














DC-DCコンバータ 縦型オンボードタイプ

アルミ電解コンデンサレス、タンタルコンデンサレスにより高信頼性、長寿命化を実現。
立型実装(SIP)により、省実装面積が可能な、絶縁型DC-DCコンバータです。

| シリーズ名 Series Name | 出力容量 Output Power (W) | 形状(H×W×L) Dimension (mm) | 入力電圧 Input Voltage (V.DC) | 出力電圧 Output Voltage (V.DC) | 効率 Efficiency (%) | 特長 Feature | ページ Page |
|----------------------|--|--------------------------------|--|--|-------------------------|---|-------------|
| LP |  1W | 13.5×10×22 | 5V (4.5~9) 12V (9~18) 24V (18~36) 48V (36~72) | 5, 12, 15, 24, 5・5, 12・12, 15・15, 5・12, 5・15 | 65~75% | 縦型実装タイプ 低価格 SIP package Low cost | |
| TS |  2~3W | 24.5×8.5×35 | 5V (4.5~9) 12V (8~18) 24V (16~36) 48V (32~72) | 5, 6, 12, 15, 24, ±12, ±15 | 70~80% | 縦型実装タイプ 低価格 SIP package Low cost | |














DC-DCコンバータ オンボードタイプ

アルミ電解コンデンサレス、タンタルコンデンサレスにより高信頼性、長寿命化を実現。
入力フィルタを内蔵したオンボード絶縁型DC-DCコンバータです。

| シリーズ名 Series Name | 出力容量 Output Power (W) | 形状(H×W×L) Dimension (mm) | 入力電圧 Input Voltage (V.DC) | 出力電圧 Output Voltage (V.DC) | 効率 Efficiency (%) | 特長 Feature | ページ Page | |
|----------------------|--|--------------------------------|--|---|--|--|--|--|
| SS |  2~3W | 10×21×33 | 5V (4.5~9) 12V (8~18) 24V (16~36) 48V (32~72) | 5, 6, 12, 15, 24, ±5, ±12, ±15 | 75~82% | 広範囲な入力電圧 高信頼性 Wide input voltage range High reliability | | |
| SSK |  2~3W | 8.5×21×33 | | | 70~81% | 高さ 8.5mm 高信頼性 8.5mm in height High reliability | | |
| SSV |  5~6W | 8.5×21×33 | 5V (4.5~9) 12V (8~18) 24V (16~36) 48V (32~72) 100V (64~120) | 3.3, 5, 6, 12, 15, 24 | 81~88% | 高さ 8.5mm 高信頼性 8.5mm in height High reliability | | |
| SQ |  5~6W | 10×30×47 | 5V (4.5~9) 12V (8~18) 24V (16~36) 48V (32~72) | 5, 6, 12, 15, 24, ±5, ±12, ±15 | 79~87% | 広範囲な入力電圧 高信頼性 Wide input voltage range High reliability | | |
| SQK |  5~6W | 8.5×30×47 | | | 80~85% | 高さ 8.5mm 高信頼性 8.5mm in height High reliability | | |
| SQV |  10~12W | 8.5×30×47 | | | 3.3, 5, 6, 12, 15, 24, 28 | 81~87% | 高さ 8.5mm 高信頼性 8.5mm in height High reliability | |
| SQT |  10~15W | 7×31×47 | | | 3.3, 5, 5.2, 6, 12, 15, 24, ±12, ±15 | 85~88% | 高さ 7mm ON/OFFコントロール内蔵 7mm in height ON/OFF control function | |
| BHU |  7~15W | 8.5×50×55 | 5V (4.5~9) 12V (8~18) 24V (16~36) 48V (32~76) | 3.3, 5, 6, 12, 15, 24, 28, 48, ±5, ±12, ±15 | 77~88% | 高さ 8.5mm ON/OFFコントロール内蔵 8.5mm in height ON/OFF control function | | |
| BRU |  23~30W | 8.5×50×55 | 12V (8~18) 24V (16~36) 48V (32~76) 100V (64~144) | 3.3, 5, 6, 12, 15, 24, 28, 48 | 87~90% | 高さ 8.5mm ON/OFFコントロール内蔵 8.5mm in height ON/OFF control function | | |
| BPU |  20~50W | 8.5×50×75 | 12V (8~18) 24V (16~36) 48V (32~72) 100V (64~144) | 3.3, 5, 6, 12, 15, 24, ±3.3, ±5, ±12, ±15 | 81~90% | 高さ 8.5mm ON/OFFコントロール内蔵 8.5mm in height ON/OFF control function | | |
| BTU |  80~100W | 12.8×50×98 | | 3.3, 5, 6, 12, 15, 24 | 88~91% | 高効率 ON/OFFコントロール内蔵 High efficiency ON/OFF control function | | |
| KMP |  105~200W | 20×60×105 | 12V (8~18) 24V (16~36) 48V (36~76) 100V (64~144) 140V (90~200) | 3.3, 5, 6, 12, 13.8, 15, 24, 28, 48 | 87~91% | 高効率 ON/OFFコントロール内蔵 High efficiency ON/OFF control function | | |

DC-DCコンバータ ユニットタイプ

アルミ電解コンデンサレス (PD、RDPシリーズを除く)、タンタルコンデンサレスにより高信頼性、長寿命化を実現。
入力フィルタを内蔵した、ユニットタイプ絶縁型DC-DCコンバータです。

| シリーズ名 Series Name | 出力容量 Output Power (W) | 形状(H×W×L) Dimension (mm) | 入力電圧 Input Voltage (V.DC) | 出力電圧 Output Voltage (V.DC) | 効率 Efficiency (%) | 特長 Feature | ページ Page |
|----------------------|--|--------------------------------|--|---|-------------------------|--|-------------|
| BHM |  7~15W | 12.8×50×75 | 5V (4.5~9) 12V (8~18) 24V (16~36) 48V (32~76) | 3.3, 5, 6, 12, 15, 24, 28, 48, ±5, ±12, ±15 | 77~88% | 高さ 12.8mm ON/OFFコントロール内蔵 12.8mm in height ON/OFF control function | |
| BRM |  23~30W | 12.8×50×75 | 12V (8~18) 24V (16~36) 48V (32~76) 100V (64~144) | 3.3, 5, 6, 12, 15, 24, 28, 48 | 87~90% | 高さ 12.8mm ON/OFFコントロール内蔵 12.8mm in height ON/OFF control function | |
| BPM |  20~50W | 12.8×50×95 | 12V (8~18) 24V (16~36) 48V (32~72) 100V (64~144) | 3.3, 5, 6, 12, 15, 24, ±3.3, ±5, ±12, ±15 | 81~90% | 高さ 12.8mm ON/OFFコントロール内蔵 12.8mm in height ON/OFF control function | |
| QD |  40~50W | 16×50×82 | 12V (8~18) 24V (16~36) 48V (32~72) 100V (64~144) | 3.3, 5, 6, 12, 15, 24 | 86~90% | 高さ 16mm 高効率 16mm in height High efficiency | |
| BTS |  80~100W | 12.8×50×118 | 12V (8~18) 24V (16~36) 48V (32~72) 100V (64~144) | 3.3, 5, 6, 12, 15, 24 | 88~91% | 高効率 ON/OFFコントロール内蔵 High efficiency ON/OFF control function | |
| BTM |  80~100W | 12.8×50×118 | | | | 高効率 ON/OFFコントロール内蔵 High efficiency ON/OFF control function | |
| FD |  80~100W | 20×60×120 | 12V (8~18) 24V (16~36) 48V (32~72) 100V (64~144) 140V (90~200) | 3.3, 5, 6, 12, 13.8, 15, 24 | 85~92% | 高さ 20mm 高効率 20mm in height High efficiency | |
| PD |  85~110W | 35×70×158 | 12V (6~18) 24V (14~40) 48V (28~80) 96V (56~160) | 3.3, 5, 12, 13.8, 15, 24, 48, 100, 140, 200, 300 | 83~90% | 高効率 広範囲な入力電圧 High efficiency Wide input voltage range | |
| FM |  105~200W | 20×60×120 | 12V (8~18) 24V (16~36) 48V (36~76) 100V (64~144) 140V (90~200) | 3.3, 5, 6, 12, 13.8, 15, 24, 28, 48 | 87~91% | 並列運転可能 高さ 20mm Parallel operation 20mm in height | |
| KM |  105~200W | 20×60×135 | | | | 並列運転可能 ON/OFFコントロール内蔵 Parallel operation ON/OFF control function | |
| PM |  240~300W | 20×60×120 | | 12, 13.8, 15, 24, 28, 48 | 89~93% | 並列運転可能 高効率 Parallel operation High efficiency | |
| RDP |  130~250W | 36×100×220 | 12V (9~18) 24V (18~36) 48V (36~72) 96V (70~144) | 3.3, 5, 12, 13.8, 15, 24, 48, 100, 140, 200, 300 | 85~92% | 並列運転可能 高効率 Parallel operation High efficiency | |
| VD |  500W | 40×100×220 | 12V (9~18) 24V (18~36) 48V (36~75) 96V (70~144) 200V (150~300) 300V (225~450) 400V (300~600) 400V (300~600) | 12, 13.8, 15, 24, 28, 48, 100, 140, 200, 300, 400 | 89~93% | 並列運転可能 高効率 Parallel operation High efficiency | |
| XD |  1000W | 55×120×280 | 100V (70~144) 200V (150~300) 300V (225~450) 400V (300~600) 600V (420~730) | 24 | 89~93% | 並列運転可能 高効率 Parallel operation High efficiency | |

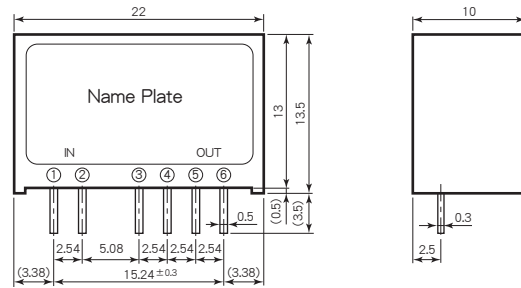
LP SERIES

1W DC/DC CONVERTERS Single Output & Dual Outputs



H13.5×W10×L22 (mm)

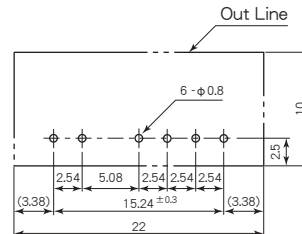
Pin Outs & Dimensions (±0.5mm)



Pin Outs

| Single Output | | Dual Outputs | |
|---------------|---------------|--------------|-------------|
| ① | +Vdc in | ① | +Vdc in |
| ② | 0 Vdc in | ② | 0 Vdc in |
| ③ | No Connection | ③ | +Vdc out 1 |
| ④ | No Connection | ④ | 0 Vdc out 1 |
| ⑤ | +Vdc out | ⑤ | +Vdc out 2 |
| ⑥ | 0 Vdc out | ⑥ | 0 Vdc out 2 |

Hole Configurations on PCB (Top View)



Features

- SIP Package
- Input-Output Isolation
- Each Output Isolation
- Wide Input Voltage Range
- High Reliability
- Low Cost
- Operating Ambient Temp. -30°C~+71°C
- Max. Case Temperature +90°C
- Conformity to RoHS2 Directive
- Not built-in aluminum and tantalum electrolytic capacitor
- SIP パッケージ
- 入出力間絶縁
- 各出力間絶縁
- 広範囲な入力電圧
- 高信頼性
- 低価格
- 動作周囲温度 -30°C~+71°C
- 最大ケース温度 +90°C
- RoHS2指令対応
- アルミ電解コンデンサ及びタンタルコンデンサ不使用

General Characteristics

- Input Voltage, Range DC5, 12, 24, 48V (See Table 1)
- Output Voltage, Current See Table 1
- Output Voltage Accuracy ±3%
- Efficiency See Table 1
- Line Regulation ±1.5% max. (at Vin Range)
- Load Regulation ±5% max. (min. Load~max. Load)
- Reflected Input Ripple and Noise (3% Vin)Vp-p max.
- Output Ripple 100mVp-p max.
- Output Noise 300mVp-p max.
- Short Circuit Protection Built-in, Auto-restart (See Fig. 2)
- Temperature Coefficient 0.06%/°C max.
- Operating Ambient Temp. -30°C~+71°C (See Fig. 1)
- Max. Case Temperature +90°C
- Storage Temperature -40°C~+100°C
- Isolation Voltage AC500V one minute (Input-Output-Case)
- Isolation Impedance 100MΩ min. (at DC1000V) (Input-Output-Case)
- Switching Frequency 360kHz typ.
- Weight 8g max.
- Humidity 20~95% RH
- Shock 490m/s² (11msec 3directions)
- Vibration 10~55Hz 98m/s² (30minutes 3directions)
- Surface Structure Plastic Case
- Soldering Conditions Soldering iron 360°C, for 5 seconds max.
- MTBF 1,500,000H (Ta : 25°C, 80% Load, Nominal Vin)
- Warranty 5 years

Selection Guide

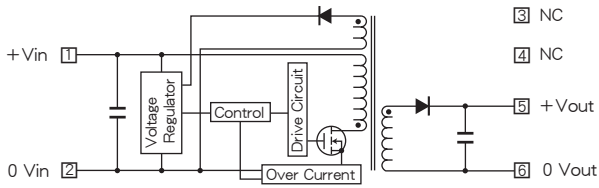
Table 1

| Model Number | Input Volt. (Range) (V. DC) | Output Volt. (V. DC) | | Output Current (mA) | | Efficiency (Typical) (%) |
|----------------|-----------------------------|----------------------|-------|---------------------|--------|--------------------------|
| | | out 1 | out 2 | out 1 | out 2 | |
| LP 5 - 5S200 | 5 (4.5~9) | 5 | - | 20~200 | - | 65 |
| LP 5 - 12S 85 | | 12 | - | 8~85 | - | 70 |
| LP 5 - 15S 70 | | 15 | - | 7~70 | - | 70 |
| LP 5 - 24S 45 | | 24 | - | 4~45 | - | 70 |
| LP 5 - 5D100 | | 5 | 5 | 10~100 | 10~100 | 65 |
| LP 5 - 12D 45 | | 12 | 12 | 5~45 | 5~45 | 70 |
| LP 5 - 15D 35 | | 15 | 15 | 4~35 | 4~35 | 70 |
| LP 5 - 5S12S | | 5 | 12 | 10~100 | 5~50 | 68 |
| LP 5 - 5S15S | | 5 | 15 | 10~100 | 4~40 | 68 |
| LP 12 - 5S200 | | 12 (9~18) | 5 | - | 20~200 | - |
| LP 12 - 12S 85 | 12 | | - | 8~85 | - | 75 |
| LP 12 - 15S 70 | 15 | | - | 7~70 | - | 75 |
| LP 12 - 24S 45 | 24 | | - | 4~45 | - | 75 |
| LP 12 - 5D100 | 5 | | 5 | 10~100 | 10~100 | 70 |
| LP 12 - 12D 45 | 12 | | 12 | 5~45 | 5~45 | 75 |
| LP 12 - 15D 35 | 15 | | 15 | 4~35 | 4~35 | 75 |
| LP 12 - 5S12S | 5 | | 12 | 10~100 | 5~50 | 72 |
| LP 12 - 5S15S | 5 | | 15 | 10~100 | 4~40 | 72 |
| LP 24 - 5S200 | 24 (18~36) | | 5 | - | 20~200 | - |
| LP 24 - 12S 85 | | 12 | - | 8~85 | - | 75 |
| LP 24 - 15S 70 | | 15 | - | 7~70 | - | 75 |
| LP 24 - 24S 45 | | 24 | - | 4~45 | - | 75 |
| LP 24 - 5D100 | | 5 | 5 | 10~100 | 10~100 | 70 |
| LP 24 - 12D 45 | | 12 | 12 | 5~45 | 5~45 | 75 |
| LP 24 - 15D 35 | | 15 | 15 | 4~35 | 4~35 | 75 |
| LP 24 - 5S12S | | 5 | 12 | 10~100 | 5~50 | 72 |
| LP 24 - 5S15S | | 5 | 15 | 10~100 | 4~40 | 72 |
| LP 48 - 5S200 | | 48 (36~72) | 5 | - | 20~200 | - |
| LP 48 - 12S 85 | 12 | | - | 8~85 | - | 75 |
| LP 48 - 15S 70 | 15 | | - | 7~70 | - | 75 |
| LP 48 - 24S 45 | 24 | | - | 4~45 | - | 75 |
| LP 48 - 5D100 | 5 | | 5 | 10~100 | 10~100 | 70 |
| LP 48 - 12D 45 | 12 | | 12 | 5~45 | 5~45 | 75 |
| LP 48 - 15D 35 | 15 | | 15 | 4~35 | 4~35 | 75 |
| LP 48 - 5S12S | 5 | | 12 | 10~100 | 5~50 | 72 |
| LP 48 - 5S15S | 5 | | 15 | 10~100 | 4~40 | 72 |

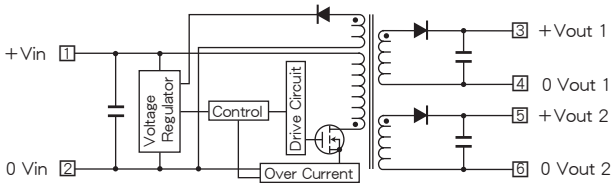
LP SERIES DATA SHEET

Block Diagram

Single Output



Dual Outputs



Characteristic Curves

Fig. 1 Derating Curve

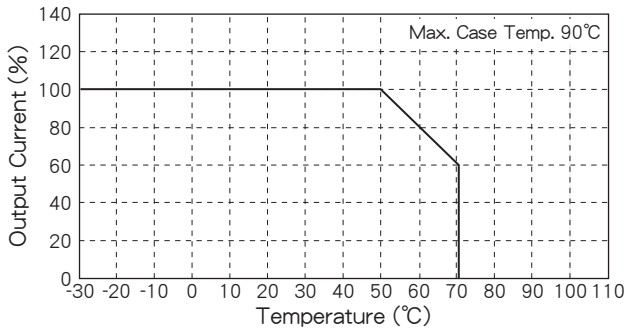


Fig. 2 Short Circuit Operating Area

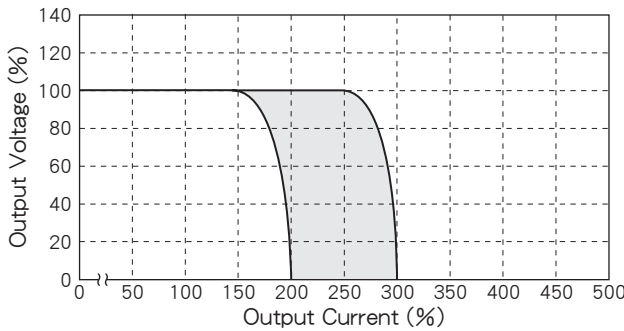


Fig. 3 Temperature Characteristic on Case Surface

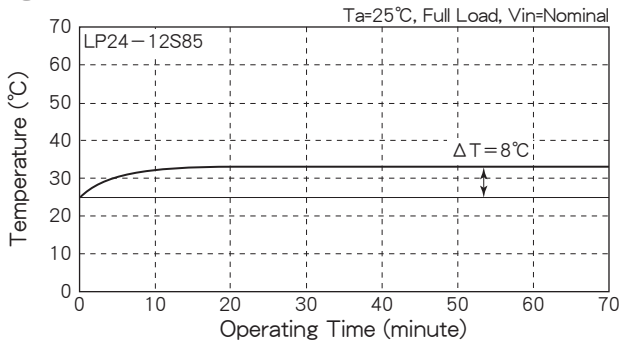


Fig. 4 Output Voltage vs. Output Current

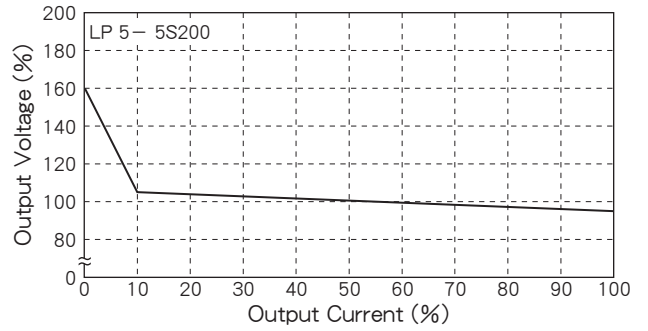


Fig. 5 Efficiency vs. Output Current (Single Output)

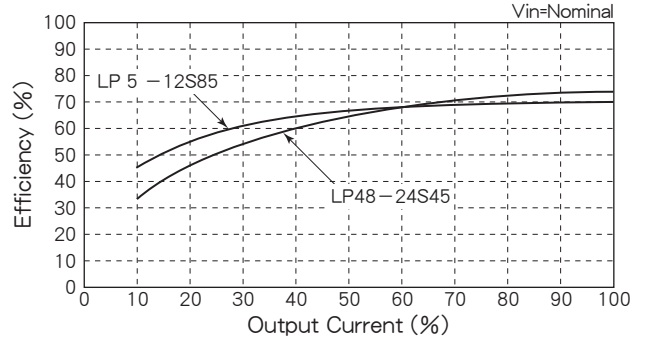
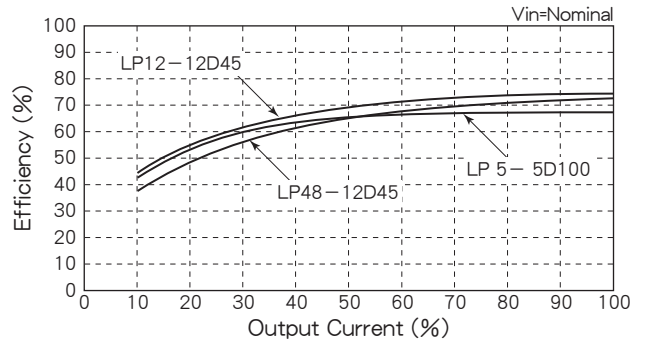
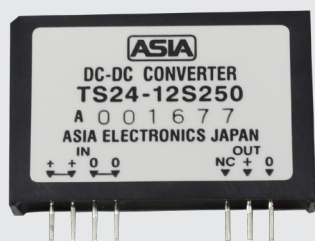


Fig. 6 Efficiency vs. Output Current (Dual Outputs)



TS SERIES

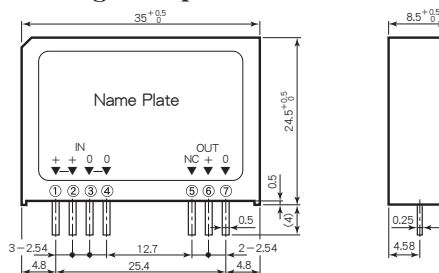
2~3W DC/DC CONVERTERS Single Output & Dual Outputs



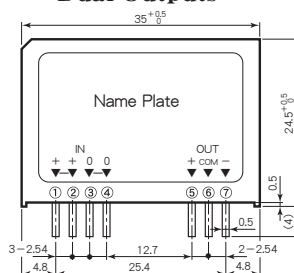
H24.5×W8.5×L35 (mm)

Pin Outs & Dimensions (±0.2mm)

Single Output



Dual Outputs



Pin Outs

| Single Output | | Dual Outputs | |
|---------------|---------------|--------------|----------|
| ① | +Vdc in | ① | +Vdc in |
| ② | +Vdc in | ② | +Vdc in |
| ③ | 0 Vdc in | ③ | 0 Vdc in |
| ④ | 0 Vdc in | ④ | 0 Vdc in |
| ⑤ | No Connection | ⑤ | +Vdc out |
| ⑥ | +Vdc out | ⑥ | Common |
| ⑦ | 0 Vdc out | ⑦ | -Vdc out |

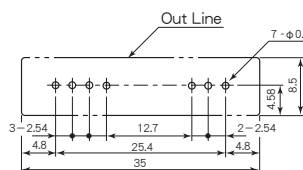
Features

- SIP Package
- Internal Input Filtering
- Input-Output Isolation
- High Efficiency 70~80%
- Wide Input Voltage Range
- High Reliability
- Low No Load Current
- Operating Ambient Temp. -30°C~+71°C
- Max. Case Temperature +90°C
- Conformity to RoHS2 Directive
- Not built-in aluminum and tantalum electrolytic capacitor
- SIP パッケージ
- 入力フィルタ内蔵
- 入出力間絶縁
- 高効率 70~80%
- 広範囲な入力電圧
- 高信頼性
- 無負荷電流が少ない
- 動作周囲温度 -30°C~+71°C
- 最大ケース温度 +90°C
- RoHS2指令対応
- アルミ電解コンデンサ及びタンタルコンデンサ不使用

General Characteristics

- Input Voltage, Range (at Ta : 25°C, Full Load, Nominal Vin) DC5, 12, 24, 48V (See Table 1)
- Output Voltage, Current See Table 1
- Output Voltage Accuracy ±3%
- Efficiency See Table 1
- Line Regulation 0.3% max. (at Vin Range)
- Load Regulation Single : ±0.5% max. (0~100% Load)
Dual : ±3% max. (0~100% Load)
(3% Vin)Vp-p max.
- Reflected Input Ripple and Noise
- Output Ripple 20mVp-p max.
- Output Noise 100mVp-p max.
- Short Circuit Protection Built-in, Auto-restart (See Fig. 2)
- Temperature Coefficient 0.02%/°C max.
- Operating Ambient Temp. -30°C~+71°C (See Fig. 1)
- Max. Case Temperature +90°C
- Storage Temperature -40°C~+100°C
- Isolation Voltage AC500V one minute (Input-Output-Case)
- Isolation Impedance 100MΩ min. (at DC1000V) (Input-Output-Case)
- Weight 15g max.
- Humidity 20~95% RH
- Shock 490m/s² (11msec 3directions)
- Vibration 10~55Hz 98m/s² (30minutes 3directions)
- Surface Structure Plastic Case
- Soldering Conditions Soldering iron 360°C, for 5 seconds max.
- MTBF Single : 720,000H
Dual : 600,000H (Ta : 25°C, 80% Load, Nominal Vin)
- Warranty 5 years

Hole Configurations on PCB (Top View)



Selection Guide

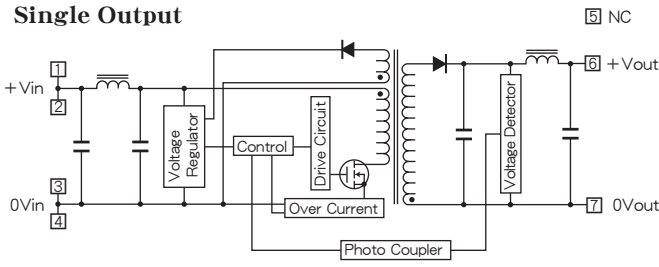
Table 1

| Model Number | Input Volt. (Range) (V. DC) | Output Voltage (V. DC) | Output Current (mA) | Efficiency (Typical) (%) |
|----------------|-----------------------------|------------------------|---------------------|--------------------------|
| TS 5 - 5S400 | 5 (4.5~9) | 5 | 400 | 70 |
| TS 5 - 6S350 | | 6 | 350 | 70 |
| TS 5 - 12S200 | | 12 | 200 | 72 |
| TS 5 - 15S160 | | 15 | 160 | 72 |
| TS 5 - 24S100 | | 24 | 100 | 72 |
| TS 5 - 12D100 | | ±12 | ±100 | 72 |
| TS 5 - 15D 80 | | ±15 | ± 80 | 72 |
| TS 12 - 5S500 | 12 (8~18) | 5 | 500 | 75 |
| TS 12 - 6S450 | | 6 | 450 | 75 |
| TS 12 - 12S250 | | 12 | 250 | 78 |
| TS 12 - 15S200 | | 15 | 200 | 78 |
| TS 12 - 24S125 | | 24 | 125 | 78 |
| TS 12 - 12D125 | | ±12 | ±125 | 78 |
| TS 12 - 15D100 | | ±15 | ±100 | 78 |
| TS 24 - 5S500 | 24 (16~36) | 5 | 500 | 75 |
| TS 24 - 6S450 | | 6 | 450 | 75 |
| TS 24 - 12S250 | | 12 | 250 | 80 |
| TS 24 - 15S200 | | 15 | 200 | 80 |
| TS 24 - 24S125 | | 24 | 125 | 80 |
| TS 24 - 12D125 | | ±12 | ±125 | 80 |
| TS 24 - 15D100 | | ±15 | ±100 | 80 |
| TS 48 - 5S500 | 48 (32~72) | 5 | 500 | 75 |
| TS 48 - 6S450 | | 6 | 450 | 75 |
| TS 48 - 12S250 | | 12 | 250 | 80 |
| TS 48 - 15S200 | | 15 | 200 | 80 |
| TS 48 - 24S125 | | 24 | 125 | 80 |
| TS 48 - 12D125 | | ±12 | ±125 | 80 |
| TS 48 - 15D100 | | ±15 | ±100 | 80 |

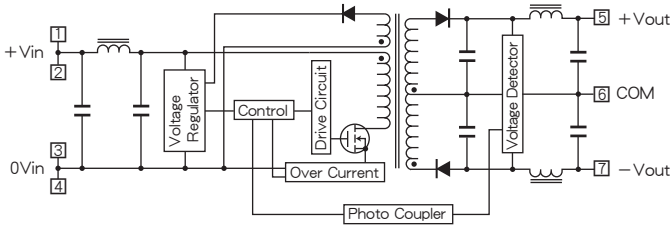
TS SERIES DATA SHEET

Block Diagram

Single Output



Dual Outputs



Characteristic Curves

Fig. 1 Derating Curve

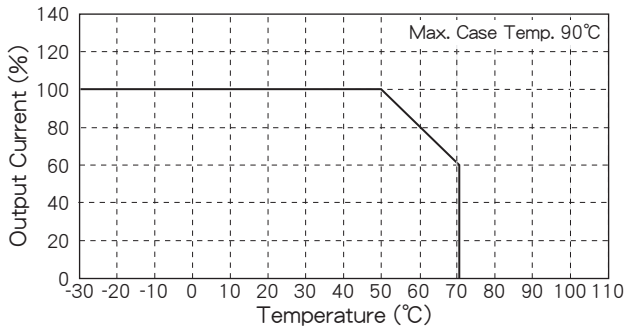


Fig. 2 Short Circuit Operating Area

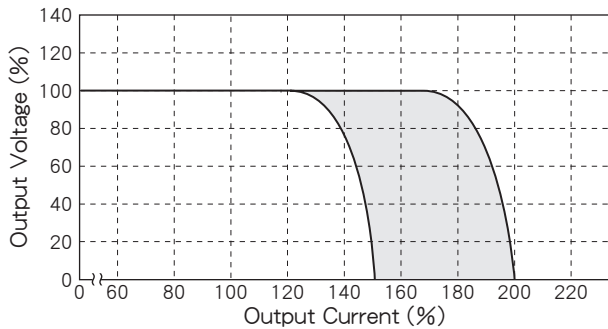


Fig. 3 Temperature Characteristic on Case Surface

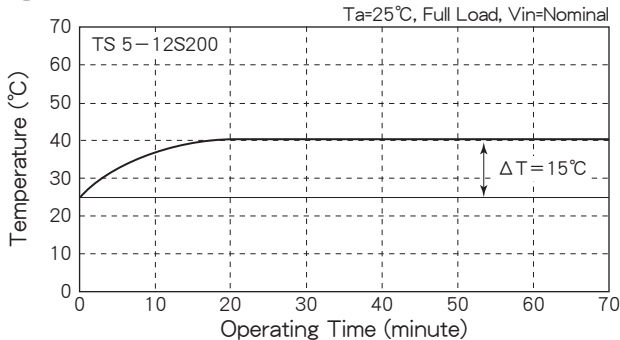


Fig. 4 No Load Current vs. Input Voltage

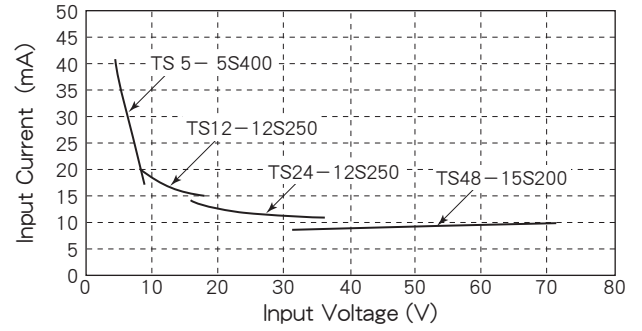


Fig. 5 Efficiency vs. Output Current

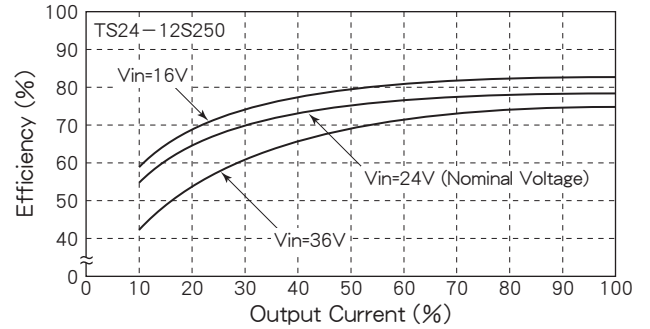
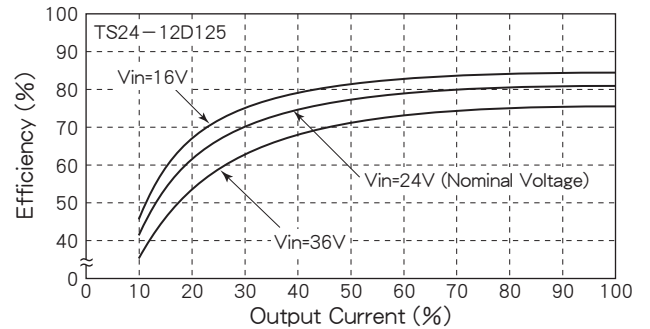


Fig. 6 Efficiency vs. Output Current



SS SERIES

2~3W DC/DC CONVERTERS Single Output & Dual Outputs



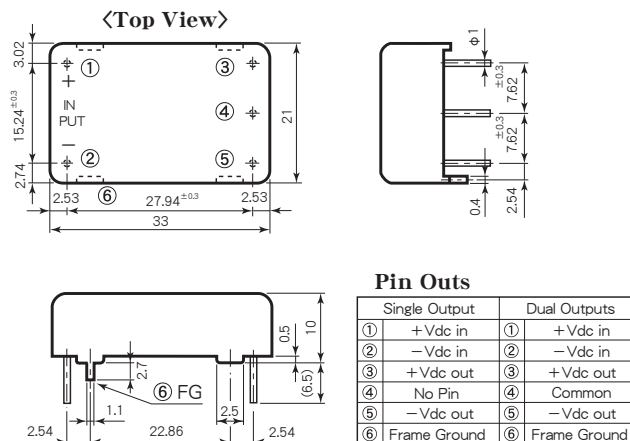
Features

- 10mm in Height
 - Built-in Input Filter
 - Input-Output Isolation
 - High Efficiency 75~82%
 - Wide Input Voltage Range
 - High Reliability
 - Low No Load Current
 - 5 Sided Metal Shielding
 - Operating Ambient Temp. -40°C~+85°C
 - Max. Case Temperature +100°C
 - Conformity to RoHS2 Directive
 - Not built-in aluminum and tantalum electrolytic capacitor
- 高さ10mm
 - 入力フィルタ内蔵
 - 入出力間絶縁
 - 高効率 75~82%
 - 広範囲な入力電圧
 - 高信頼性
 - 無負荷電流が少ない
 - 5面メタルシールド
 - 動作周囲温度 -40°C~+85°C
 - 最大ケース温度 +100°C
 - RoHS2指令対応
 - アルミ電解コンデンサ及びタンタルコンデンサ不使用

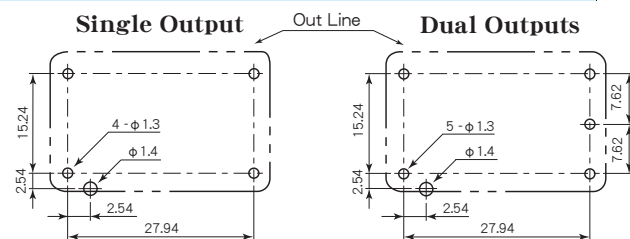
General Characteristics

- Input Voltage, Range DC5, 12, 24, 48V (See Table 1)
- Output Voltage, Current See Table 1
- Output Voltage Accuracy ±2%
- Efficiency ±3%(5, 6V Vout only)
- Line Regulation See Table 1
- Load Regulation 0.3% max. (at Vin Range)
- Reflected Input Ripple and Noise Single : ±0.5% max. (0~100% Load)
- Output Ripple 20mVp-p max.
- Output Noise 100mVp-p max.
- Short Circuit Protection Built-in, Auto-restart (See Fig. 2)
- Temperature Coefficient 0.02%/°C max.
- Operating Ambient Temp. -40°C~+85°C (See Fig. 1)
- Storage Temperature -30°C~+85°C (5V Vin only)
- Isolation Voltage -40°C~+100°C
- Isolation Impedance AC500V one minute (Input-Output-Case)
- Weight 100MΩ min. (at DC1000V) (Input-Output-Case)
- Humidity 18g max.
- Shock 20~95% RH
- Vibration 490m/s² (11msec 3directions)
- Surface Structure 10~55Hz 98m/s² (30minutes 3directions)
- Soldering Conditions 5 Sided Steel Case
- MTBF Soldering DIP 260°C, for 15 seconds max.
- Warranty Soldering iron 360°C, for 5 seconds max.
- Single : 1,200,000H
- Dual : 1,000,000H
- (Ta : 25°C, 80% Load, Nominal Vin)
- 5 years

Pin Outs & Dimensions (±0.5mm)



Hole Configurations on PCB (Top View)



Selection Guide

Table 1

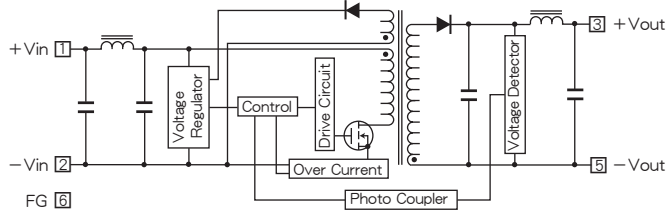
| Model Number | Input Volt. (Range) (V. DC) | Output Voltage (V. DC) | Output Current (mA) | Efficiency (Typical) (%) |
|---------------|-----------------------------|------------------------|---------------------|--------------------------|
| SS 5 - 5S400 | 5 (4.5~9) | 5 | 400 | 76 |
| SS 5 - 6S350 | | 6 | 350 | 76 |
| SS 5 - 12S200 | | 12 | 200 | 78 |
| SS 5 - 15S160 | | 15 | 160 | 79 |
| SS 5 - 24S100 | | 24 | 100 | 75 |
| SS 5 - 5D200 | | ±5 | ±200 | 75 |
| SS 5 - 12D100 | | ±12 | ±100 | 76 |
| SS 5 - 15D80 | | ±15 | ±80 | 78 |
| SS12 - 5S500 | | 12 (8~18) | 5 | 500 |
| SS12 - 6S450 | 6 | | 450 | 79 |
| SS12 - 12S250 | 12 | | 250 | 80 |
| SS12 - 15S200 | 15 | | 200 | 80 |
| SS12 - 24S125 | 24 | | 125 | 80 |
| SS12 - 5D250 | ±5 | | ±250 | 75 |
| SS12 - 12D125 | ±12 | | ±125 | 82 |
| SS12 - 15D100 | ±15 | | ±100 | 80 |
| SS24 - 5S500 | 24 (16~36) | | 5 | 500 |
| SS24 - 6S450 | | 6 | 450 | 79 |
| SS24 - 12S250 | | 12 | 250 | 81 |
| SS24 - 15S200 | | 15 | 200 | 80 |
| SS24 - 24S125 | | 24 | 125 | 80 |
| SS24 - 5D250 | | ±5 | ±250 | 75 |
| SS24 - 12D125 | | ±12 | ±125 | 82 |
| SS24 - 15D100 | | ±15 | ±100 | 82 |
| SS48 - 5S500 | | 48 (32~72) | 5 | 500 |
| SS48 - 6S450 | 6 | | 450 | 78 |
| SS48 - 12S250 | 12 | | 250 | 80 |
| SS48 - 15S200 | 15 | | 200 | 80 |
| SS48 - 24S125 | 24 | | 125 | 80 |
| SS48 - 5D250 | ±5 | | ±250 | 75 |
| SS48 - 12D125 | ±12 | | ±125 | 80 |
| SS48 - 15D100 | ±15 | | ±100 | 80 |

* 上記仕様以外にも対応可能ですので お問い合わせ下さい。
Please consult with us about other specification.

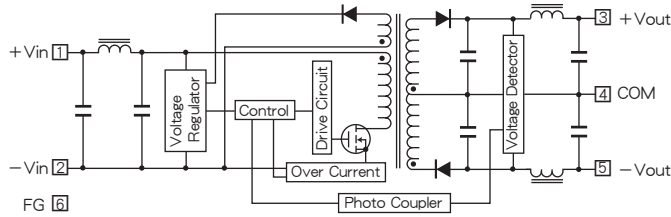
SS SERIES DATA SHEET

Block Diagram

Single Output



Dual Outputs



Characteristic Curves

Fig. 1 Derating Curve

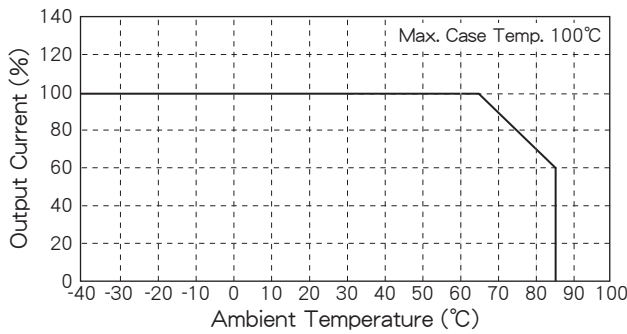


Fig. 2 Short Circuit Operating Area

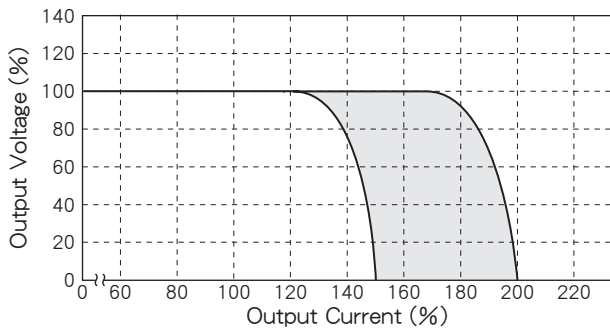


Fig. 3 Temperature Characteristic on Case Surface

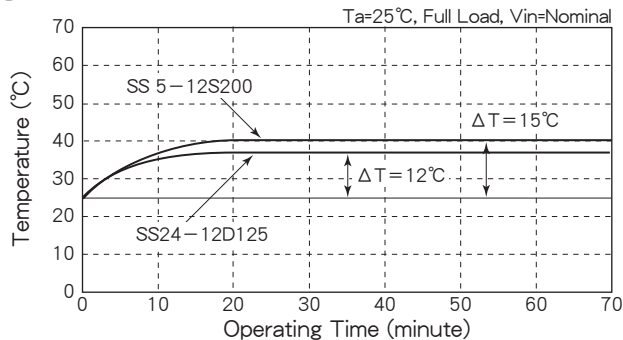


Fig. 4 No Load Current vs. Input Voltage

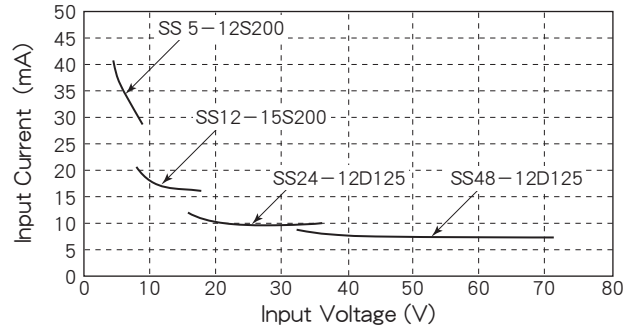


Fig. 5 Efficiency vs. Output Current (Single Output)

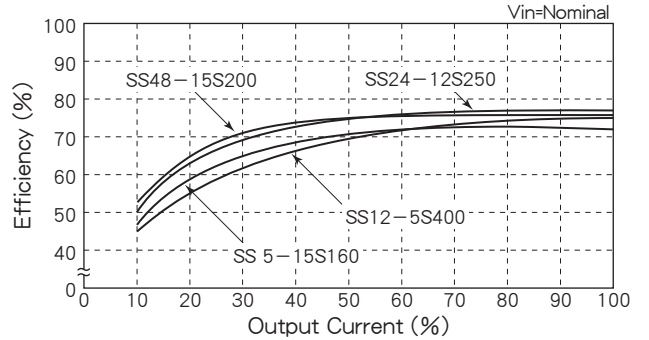
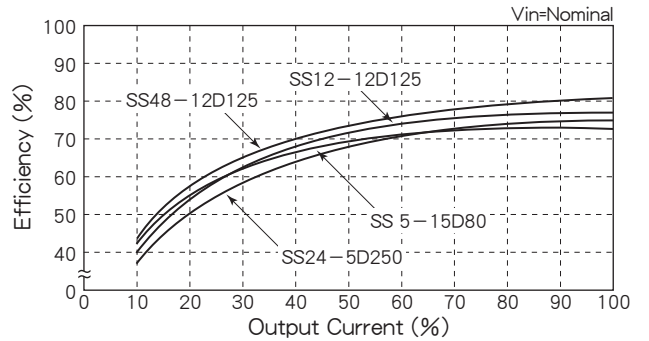


Fig. 6 Efficiency vs. Output Current (Dual Outputs)



SSK SERIES

2~3W DC/DC CONVERTERS Single Output & Dual Outputs



H8.5×W21×L33 (mm)

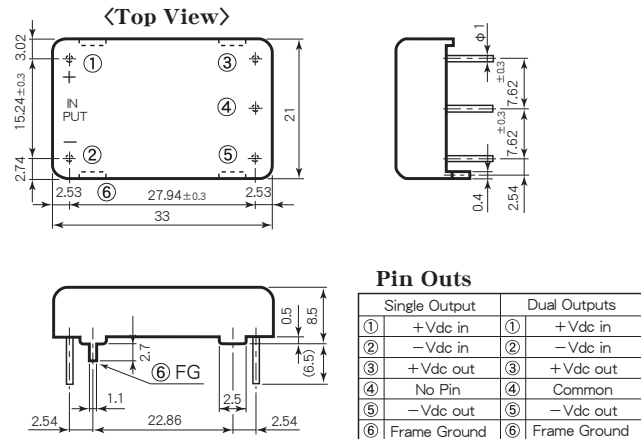
Features

- Low Profile 8.5mm
- Built-in Input Filter
- Input-Output Isolation
- High Efficiency 70~81%
- Wide Input Voltage Range
- High Reliability
- Low No Load Current
- 5 Sided Metal Shielding
- Operating Ambient Temp. -40°C~+85°C
- Max. Case Temperature +100°C
- Conformity to RoHS2 Directive
- Not built-in aluminum and tantalum electrolytic capacitor
- 薄型 8.5mm
- 入力フィルタ内蔵
- 入出力間絶縁
- 高効率 70~81%
- 広範囲な入力電圧
- 高信頼性
- 無負荷電流が少ない
- 5面メタルシールド
- 動作周囲温度 -40°C~+85°C
- 最大ケース温度 +100°C
- RoHS2指令対応
- アルミ電解コンデンサ及びタンタルコンデンサ不使用

General Characteristics

- Input Voltage, Range (at Ta : 25°C, Full Load, Nominal Vin) DC5, 12, 24, 48V (See Table 1)
- Output Voltage, Current See Table 1
- Output Voltage Accuracy ±3%
- Efficiency See Table 1
- Line Regulation 0.3% max. (at Vin Range)
- Load Regulation Single : ±0.5% max. (0~100% Load) Dual : ±3% max. (10~100% Load) (3% Vin)Vp-p max.
- Reflected Input Ripple and Noise
- Output Ripple 20mVp-p max.
- Output Noise 100mVp-p max.
- Short Circuit Protection Built-in, Auto-restart (See Fig. 2)
- Temperature Coefficient 0.02%/°C max.
- Operating Ambient Temp. -40°C~+85°C (See Fig. 1) -30°C~+85°C (5V Vin only) -40°C~+100°C
- Storage Temperature
- Isolation Voltage AC500V one minute (Input-Output-Case)
- Isolation Impedance 100MΩ min. (at DC1000V) (Input-Output-Case)
- Weight 15g max.
- Humidity 20~95% RH
- Shock 490m/s² (11msec 3directions)
- Vibration 10~55Hz 98m/s² (30minutes 3directions)
- Surface Structure 5 Sided Steel Case
- Soldering Conditions Soldering DIP 260°C, for 15 seconds max. Soldering iron 360°C, for 5 seconds max.
- MTBF Single : 720,000H Dual : 600,000H (Ta : 25°C, 80% Load, Nominal Vin)
- Warranty 5 years

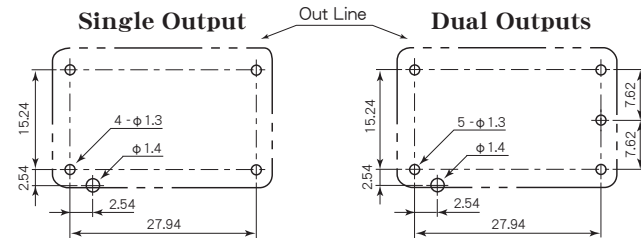
Pin Outs & Dimensions (±0.5mm)



Pin Outs

| Single Output | | Dual Outputs | |
|---------------|--------------|--------------|--------------|
| ① | +Vdc in | ① | +Vdc in |
| ② | -Vdc in | ② | -Vdc in |
| ③ | +Vdc out | ③ | +Vdc out |
| ④ | No Pin | ④ | Common |
| ⑤ | -Vdc out | ⑤ | -Vdc out |
| ⑥ | Frame Ground | ⑥ | Frame Ground |

Hole Configurations on PCB (Top View)



Selection Guide

Table 1

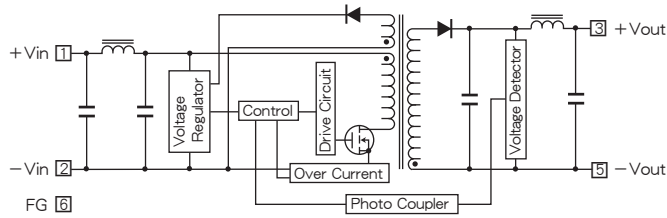
| Model Number | Input Volt. (Range) (V. DC) | Output Voltage (V. DC) | Output Current (mA) | Efficiency (Typical) (%) |
|-----------------|-----------------------------|------------------------|---------------------|--------------------------|
| SSK 5 - 5S400 | 5 (4.5~9) | 5 | 400 | 70 |
| SSK 5 - 6S350 | | 6 | 350 | 70 |
| SSK 5 - 12S200 | | 12 | 200 | 74 |
| SSK 5 - 15S160 | | 15 | 160 | 72 |
| SSK 5 - 24S100 | | 24 | 100 | 72 |
| SSK 5 - 5D200 | | ±5 | ±200 | 74 |
| SSK 5 - 12D100 | | ±12 | ±100 | 74 |
| SSK 5 - 15D80 | | ±15 | ±80 | 74 |
| SSK 12 - 5S500 | 12 (8~18) | 5 | 500 | 78 |
| SSK 12 - 6S450 | | 6 | 450 | 77 |
| SSK 12 - 12S250 | | 12 | 250 | 80 |
| SSK 12 - 15S200 | | 15 | 200 | 78 |
| SSK 12 - 24S125 | | 24 | 125 | 78 |
| SSK 12 - 5D250 | | ±5 | ±250 | 81 |
| SSK 12 - 12D125 | | ±12 | ±125 | 81 |
| SSK 12 - 15D100 | | ±15 | ±100 | 78 |
| SSK 24 - 5S500 | 24 (16~36) | 5 | 500 | 76 |
| SSK 24 - 6S450 | | 6 | 450 | 76 |
| SSK 24 - 12S250 | | 12 | 250 | 80 |
| SSK 24 - 15S200 | | 15 | 200 | 81 |
| SSK 24 - 24S125 | | 24 | 125 | 80 |
| SSK 24 - 5D250 | | ±5 | ±250 | 80 |
| SSK 24 - 12D125 | | ±12 | ±125 | 80 |
| SSK 24 - 15D100 | | ±15 | ±100 | 80 |
| SSK 48 - 5S500 | 48 (32~72) | 5 | 500 | 75 |
| SSK 48 - 6S450 | | 6 | 450 | 75 |
| SSK 48 - 12S250 | | 12 | 250 | 80 |
| SSK 48 - 15S200 | | 15 | 200 | 80 |
| SSK 48 - 24S125 | | 24 | 125 | 80 |
| SSK 48 - 5D250 | | ±5 | ±250 | 75 |
| SSK 48 - 12D125 | | ±12 | ±125 | 80 |
| SSK 48 - 15D100 | | ±15 | ±100 | 81 |

※ 上記仕様以外にも対応可能ですのでお問い合わせ下さい。
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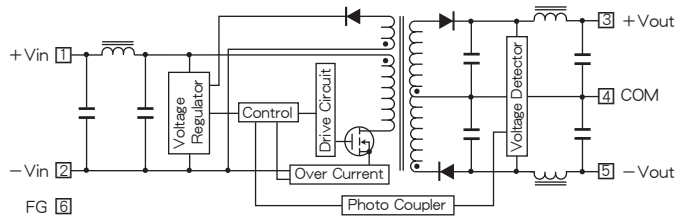
SSK SERIES DATA SHEET

Block Diagram

Single Output



Dual Outputs



Characteristic Curves

Fig. 1 Derating Curve

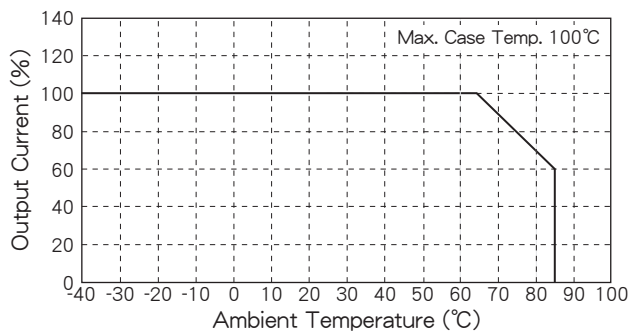


Fig. 2 Short Circuit Operating Area

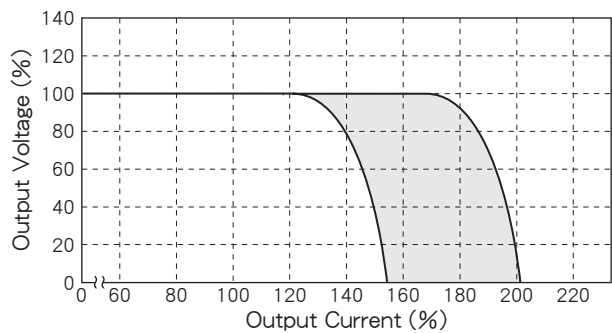


Fig. 3 Temperature Characteristic on Case Surface

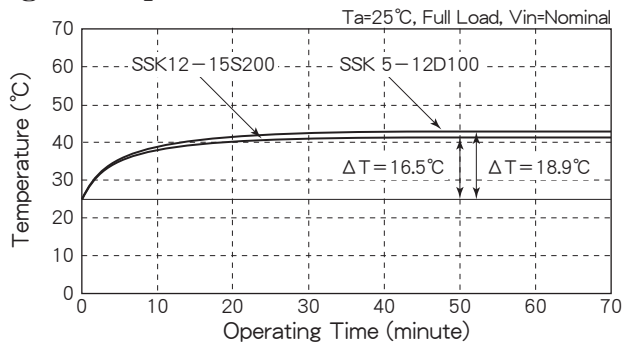


Fig. 4 No Load Current vs. Input Voltage

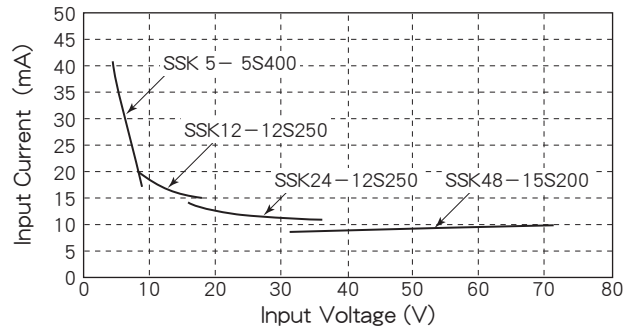


Fig. 5 Efficiency vs. Output Current (Single Output)

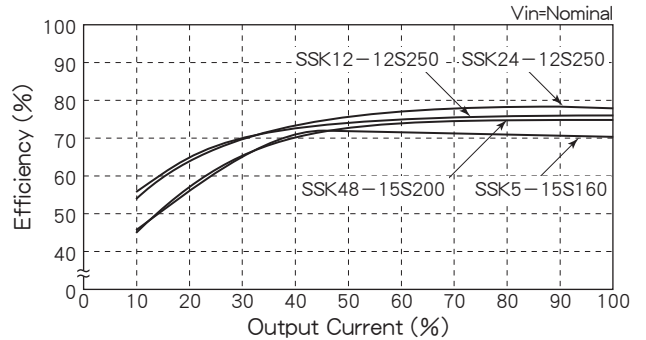
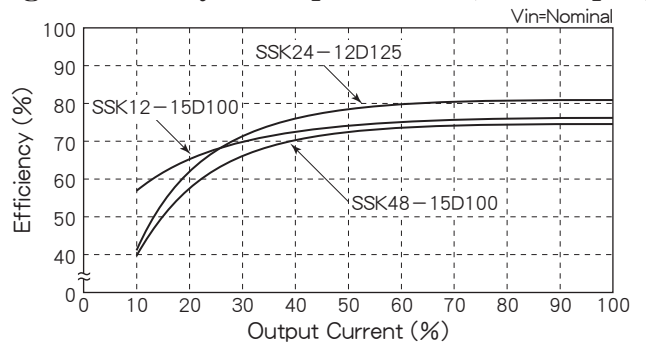


Fig. 6 Efficiency vs. Output Current (Dual Outputs)



SSV SERIES

5~6W DC/DC CONVERTERS Single Output



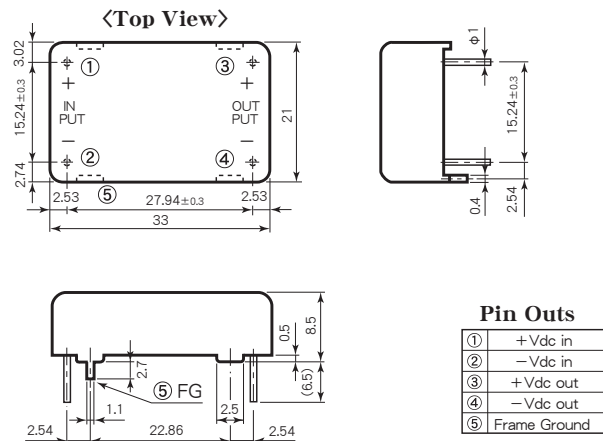
Features

- | | |
|--|--------------------------------|
| ● High Efficiency 81~88% | ● 高効率 81~88% |
| ● 8.5mm in Height | ● 高さ8.5mm |
| ● Compact, Light Weight | ● 小形、軽量 |
| ● Built-in Input Filter | ● 入力フィルタ内蔵 |
| ● Wide Input Voltage Range | ● 広範囲な入力電圧 |
| ● Input-Output Isolation | ● 入出力間絶縁 |
| ● Low No Load Current | ● 無負荷電流が少ない |
| ● 5 Sided Metal Shielding | ● 5面メタルシールド |
| ● High Reliability | ● 高信頼性 |
| ● Operating Ambient Temperature -40°C~+85°C | ● 動作周囲温度 -40°C~+85°C |
| ● Max. Case Temperature +100°C | ● 最大ケース温度 +100°C |
| ● Conformity to RoHS2 Directive | ● RoHS2指令対応 |
| ● Not built-in aluminum and tantalum electrolytic capacitor | ● アルミ電解コンデンサ及び タンタルコンデンサ不使用 |

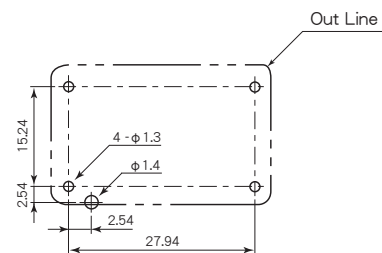
General Characteristics

- | | |
|---------------------------------|---|
| ● Input Voltage, Range | (at Ta : 25°C, Full Load, Nominal Vin) DC5, 12, 24, 48, 100V (See Table 1) |
| ● Output Voltage, Current | See Table 1 |
| ● Output Voltage Accuracy | ±2% (12, 15, 24V Vout) ±3% (3.3, 5, 6V Vout) |
| ● Efficiency | See Table 1 |
| ● Line Regulation | 0.3% max. (at Vin Range) |
| ● Load Regulation | ±0.5% max. (0~100% Load) |
| ● Reflected Input Ripple, Noise | (3% Vin)Vp-p max. |
| ● Output Ripple | 20mVp-p max. |
| ● Output Noise | 80mVp-p max. (0~20MHz) 150mVp-p max. (0~100MHz) |
| ● Short Circuit Protection | Built-in, Auto-restart (See Fig. 2) |
| ● Temperature Coefficient | 0.02%/°C max. |
| ● Operating Ambient Temp. | -40°C~+85°C (See Fig. 1) -30°C~+85°C (5V Vin only) |
| ● Max. Case Temperature | +100°C |
| ● Storage Temperature | -40°C~+100°C |
| ● Isolation Voltage | AC500V one minute (Input-Output-Case) |
| ● Isolation Impedance | 100MΩ min. (at DC1000V) (Input-Output-Case) |
| ● Weight | 15g max. |
| ● Humidity | 20~95% RH |
| ● Shock | 490m/s ² (11msec 3directions) |
| ● Vibration | 10~55Hz 98m/s ² (30minutes 3directions) |
| ● Surface Structure | 5 Sided Steel Case |
| ● Soldering Conditions | |
| Soldering DIP | 260°C, for 15 seconds max. |
| Soldering iron | 360°C, for 5 seconds max. |
| ● MTBF | 1,000,000H (Ta : 25°C, 80% Load, Nominal Vin) |
| ● Warranty | 5 years |

Pin Outs & Dimensions (±0.5mm)



Hole Configurations on PCB (Top View)



Selection Guide

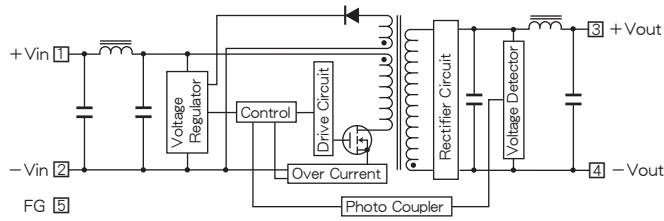
Table 1

| Model Number | Input Volt. (Range) (V. DC) | Output Voltage (V. DC) | Output Current (mA) | Efficiency (Typical) (%) |
|---------------------|-----------------------------|------------------------|---------------------|--------------------------|
| SSV 5 - 3.3 S 1500 | 5 (4.5~9) | 3.3 | 1500 | 81 |
| SSV 5 - 5 S 1000 | | 5 | 1000 | 83 |
| SSV 5 - 6 S 800 | | 6 | 800 | 83 |
| SSV 5 - 12 S 400 | | 12 | 400 | 83 |
| SSV 5 - 15 S 320 | | 15 | 320 | 83 |
| SSV 5 - 24 S 200 | 24 | 200 | 83 | |
| SSV 12 - 3.3 S 1500 | 12 (8~18) | 3.3 | 1500 | 83 |
| SSV 12 - 5 S 1000 | | 5 | 1000 | 85 |
| SSV 12 - 6 S 900 | | 6 | 900 | 85 |
| SSV 12 - 12 S 500 | | 12 | 500 | 87 |
| SSV 12 - 15 S 400 | | 15 | 400 | 87 |
| SSV 12 - 24 S 250 | 24 | 250 | 87 | |
| SSV 24 - 3.3 S 1500 | 24 (16~36) | 3.3 | 1500 | 83 |
| SSV 24 - 5 S 1000 | | 5 | 1000 | 85 |
| SSV 24 - 6 S 900 | | 6 | 900 | 85 |
| SSV 24 - 12 S 500 | | 12 | 500 | 87 |
| SSV 24 - 15 S 400 | | 15 | 400 | 87 |
| SSV 24 - 24 S 250 | 24 | 250 | 87 | |
| SSV 48 - 3.3 S 1500 | 48 (32~72) | 3.3 | 1500 | 84 |
| SSV 48 - 5 S 1000 | | 5 | 1000 | 86 |
| SSV 48 - 6 S 900 | | 6 | 900 | 86 |
| SSV 48 - 12 S 500 | | 12 | 500 | 88 |
| SSV 48 - 15 S 400 | | 15 | 400 | 88 |
| SSV 48 - 24 S 250 | 24 | 250 | 88 | |
| SSV 100 - 12 S 500 | 100 (64~120) | 12 | 500 | 88 |
| SSV 100 - 15 S 400 | | 15 | 400 | 88 |
| SSV 100 - 24 S 250 | | 24 | 250 | 88 |

※ 上記仕様以外にも対応可能ですので お問い合わせ下さい。
Please consult with us about other specification.

SSV SERIES DATA SHEET

Block Diagram



Characteristic Curves

Fig. 1 Derating Curve

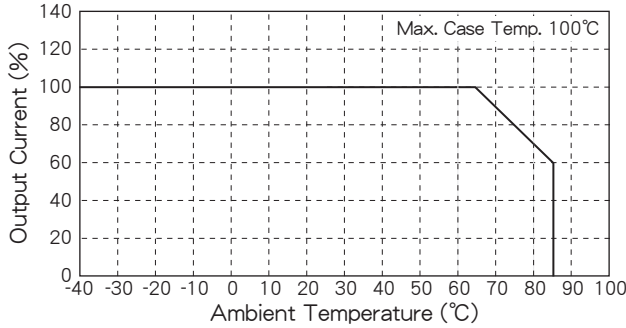


Fig. 2 Short Circuit Operating Area

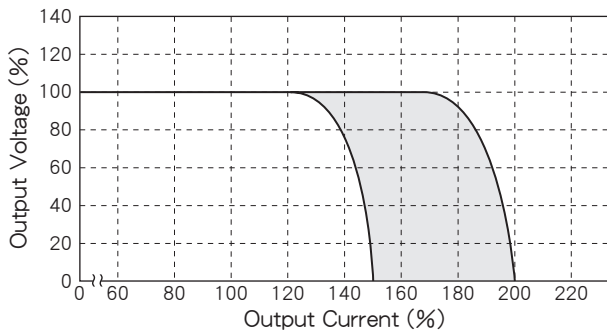


Fig. 3 Temperature Characteristic on Case Surface

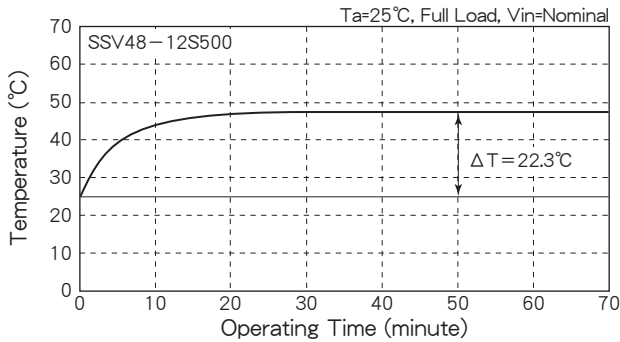


Fig. 4 Efficiency vs. Output Current

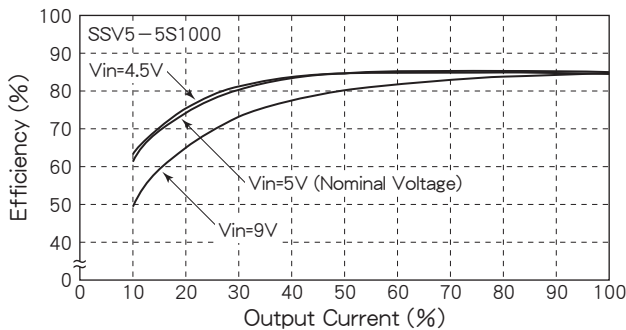


Fig. 5 Efficiency vs. Output Current

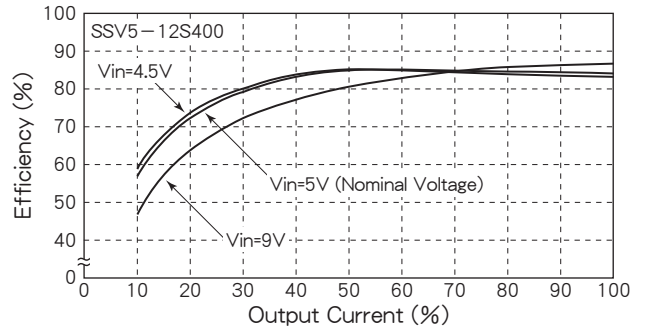


Fig. 6 Efficiency vs. Output Current

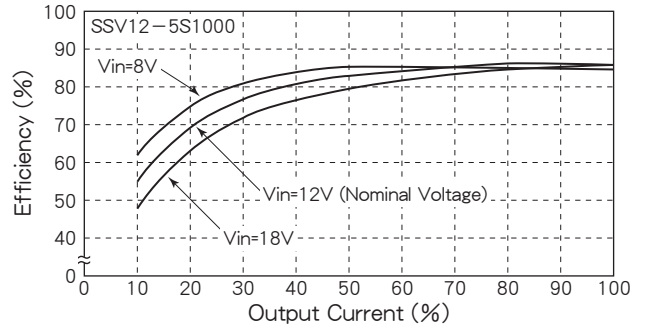


Fig. 7 Efficiency vs. Output Current

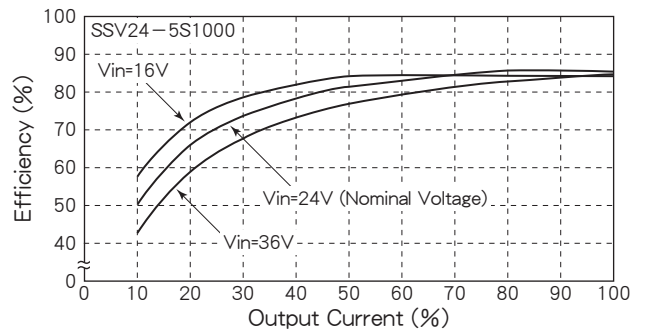


Fig. 8 Efficiency vs. Output Current

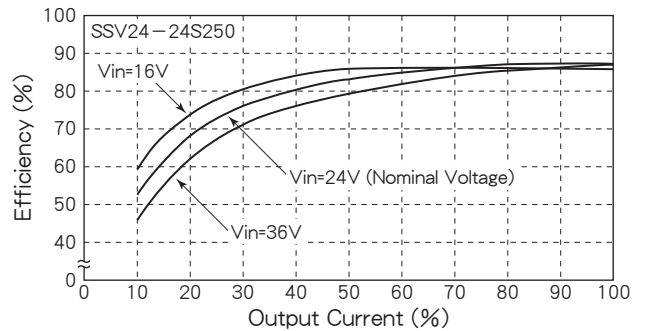
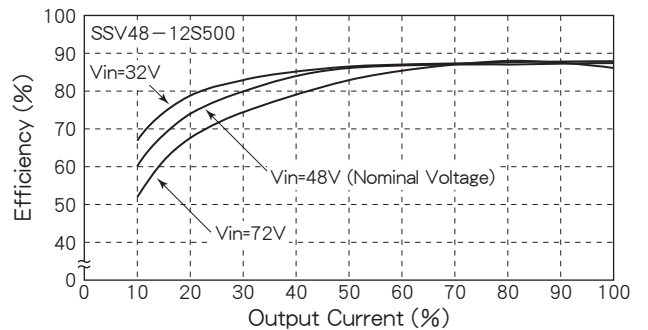


Fig. 9 Efficiency vs. Output Current



SQ SERIES

5~6W DC/DC CONVERTERS Single Output & Dual Outputs



H10×W30×L47 (mm)

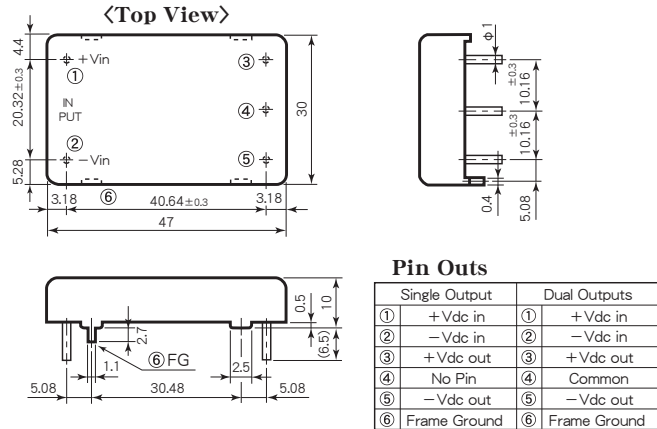
Features

- 10mm in Height
- 高さ10mm
- Built-in Input Filter
- 入力フィルタ内蔵
- Input-Output Isolation
- 入出力間絶縁
- High Efficiency 79~87%
- 高効率 79~87%
- Wide Input Voltage Range
- 広範囲な入力電圧
- High Reliability
- 高信頼性
- Low No Load Current
- 無負荷電流が少ない
- 5 Sided Metal Shielding
- 5面メタルシールド
- Operating Ambient Temp. -40°C~+85°C
- 動作周囲温度 -40°C~+85°C
- Max. Case Temperature +100°C
- 最大ケース温度 +100°C
- Conformity to RoHS2 Directive
- RoHS2指令対応
- Not built-in aluminum and tantalum electrolytic capacitor
- アルミ電解コンデンサ及びタンタルコンデンサ不使用

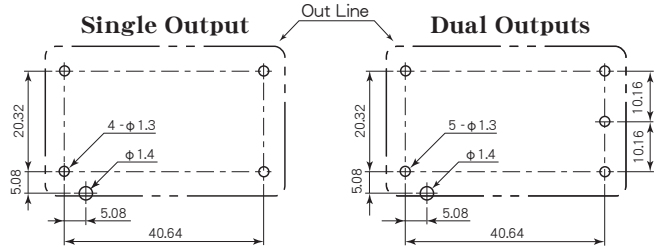
General Characteristics

- Input Voltage, Range (at Ta : 25°C, Full Load, Nominal Vin) DC5, 12, 24, 48V (See Table 1)
- Output Voltage, Current See Table 1
- Output Voltage Accuracy ±2%
- ±3%(5, 6V Vout only)
- Efficiency See Table 1
- Line Regulation 0.3% max. (at Vin Range)
- Load Regulation Single : ±0.5% max. (0~100% Load)
- Dual : ±3% max. (0~100% Load)
- (2% Vin)Vp-p max.
- Reflected Input Ripple and Noise
- Output Ripple 20mVp-p max.
- Output Noise 100mVp-p max.
- Short Circuit Protection Built-in, Auto-restart (See Fig. 2)
- Temperature Coefficient 0.02%/°C max.
- Operating Ambient Temp. -40°C~+85°C (See Fig. 1)
- 30°C~+85°C (5V Vin only)
- Storage Temperature -40°C~+100°C
- Isolation Voltage AC500V one minute
- (Input-Output-Case)
- Isolation Impedance 100MΩ min. (at DC1000V)
- (Input-Output-Case)
- Switching Frequency 230kHz typ.
- Weight 35g max.
- Humidity 20~95% RH
- Shock 490m/s² (11msec 3directions)
- Vibration 10~55Hz 98m/s² (30minutes 3directions)
- Surface Structure 5 Sided Steel Case
- Soldering Conditions Soldering DIP 260°C, for 15 seconds max.
- Soldering iron 360°C, for 5 seconds max.
- MTBF Single : 1,200,000H
- Dual : 1,000,000H
- (Ta : 25°C, 80% Load, Nominal Vin)
- Warranty 5 years

Pin Outs & Dimensions (±0.5mm)



Hole Configurations on PCB (Top View)



Selection Guide

Table 1

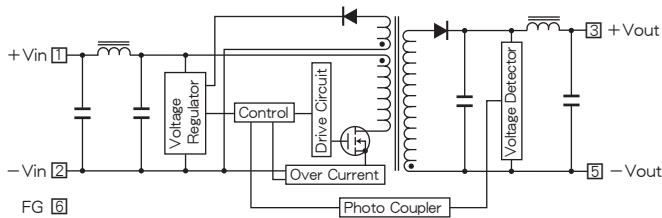
| Model Number | Input Volt. (Range) (V. DC) | Output Voltage (V. DC) | Output Current (mA) | Efficiency (Typical) (%) |
|-----------------|-----------------------------|------------------------|---------------------|--------------------------|
| SQ 5 - 5S 1000 | 5 (4.5~9) | 5 | 1000 | 79 |
| SQ 5 - 6S 900 | | 6 | 900 | 79 |
| SQ 5 - 12S 500 | | 12 | 500 | 83 |
| SQ 5 - 15S 400 | | 15 | 400 | 83 |
| SQ 5 - 24S 250 | | 24 | 250 | 83 |
| SQ 5 - 5D 500 | | ±5 | ±500 | 79 |
| SQ 5 - 12D 250 | | ±12 | ±250 | 83 |
| SQ 5 - 15D 200 | | ±15 | ±200 | 83 |
| SQ 12 - 5S 1000 | | 12 (8~18) | 5 | 1000 |
| SQ 12 - 6S 900 | 6 | | 900 | 83 |
| SQ 12 - 12S 500 | 12 | | 500 | 85 |
| SQ 12 - 15S 400 | 15 | | 400 | 87 |
| SQ 12 - 24S 250 | 24 | | 250 | 85 |
| SQ 12 - 5D 500 | ±5 | | ±500 | 82 |
| SQ 12 - 12D 250 | ±12 | | ±250 | 86 |
| SQ 12 - 15D 200 | ±15 | | ±200 | 86 |
| SQ 24 - 5S 1000 | 24 (16~36) | | 5 | 1000 |
| SQ 24 - 6S 900 | | 6 | 900 | 82 |
| SQ 24 - 12S 500 | | 12 | 500 | 85 |
| SQ 24 - 15S 400 | | 15 | 400 | 85 |
| SQ 24 - 24S 250 | | 24 | 250 | 85 |
| SQ 24 - 5D 500 | | ±5 | ±500 | 81 |
| SQ 24 - 12D 250 | | ±12 | ±250 | 85 |
| SQ 24 - 15D 200 | | ±15 | ±200 | 85 |
| SQ 48 - 5S 1000 | | 48 (32~72) | 5 | 1000 |
| SQ 48 - 6S 900 | 6 | | 900 | 81 |
| SQ 48 - 12S 500 | 12 | | 500 | 85 |
| SQ 48 - 15S 400 | 15 | | 400 | 85 |
| SQ 48 - 24S 250 | 24 | | 250 | 85 |
| SQ 48 - 5D 500 | ±5 | | ±500 | 81 |
| SQ 48 - 12D 250 | ±12 | | ±250 | 85 |
| SQ 48 - 15D 200 | ±15 | | ±200 | 85 |

※ 上記仕様以外にも対応可能ですので お問い合わせ下さい。
Please consult with us about other specification.

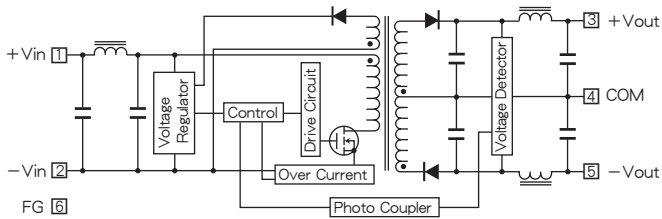
SQ SERIES DATA SHEET

Block Diagram

Single Output



Dual Outputs



Characteristic Curves

Fig. 1 Derating Curve

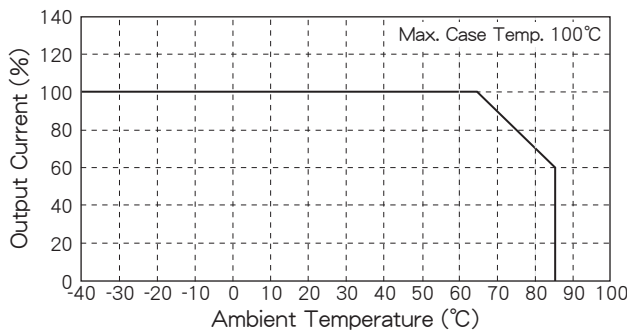


Fig. 2 Short Circuit Operating Area

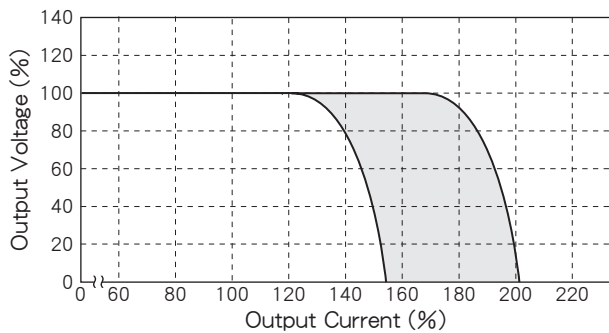


Fig. 3 Temperature Characteristic on Case Surface

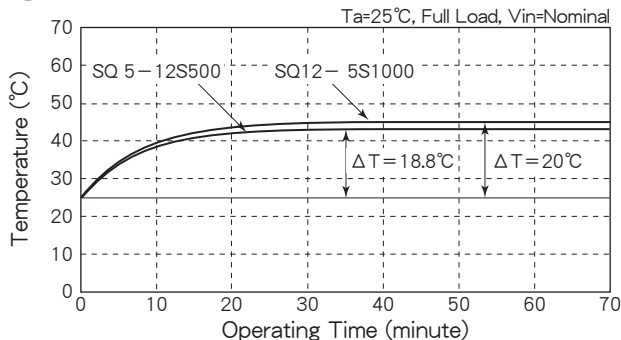


Fig. 4 No Load Current vs. Input Voltage

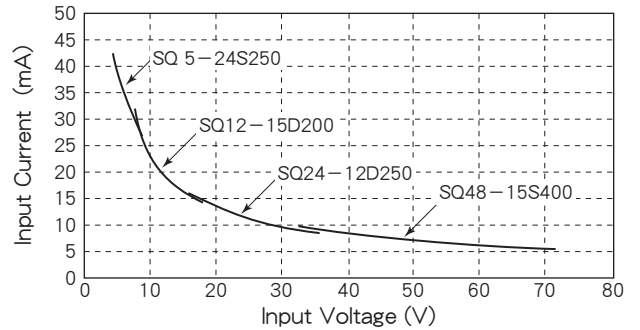


Fig. 5 Efficiency vs. Output Current

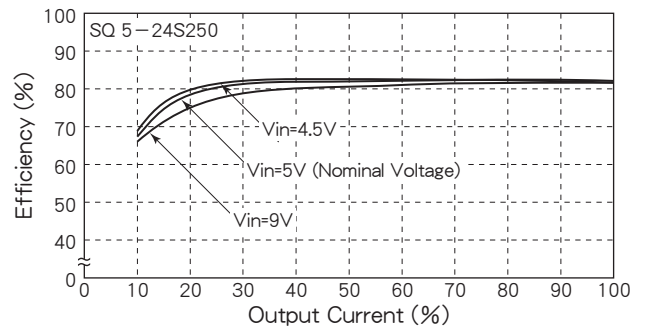


Fig. 6 Efficiency vs. Output Current

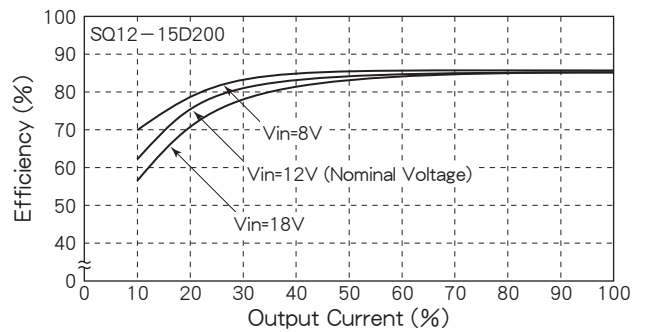


Fig. 7 Efficiency vs. Output Current

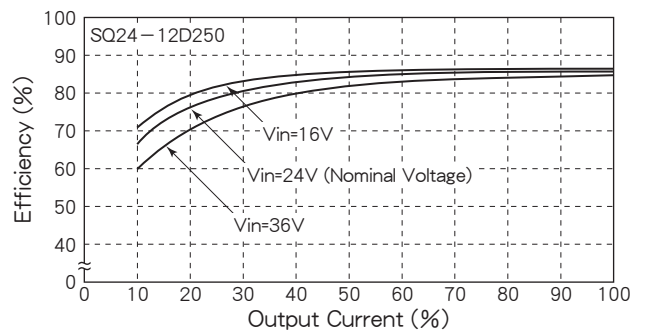
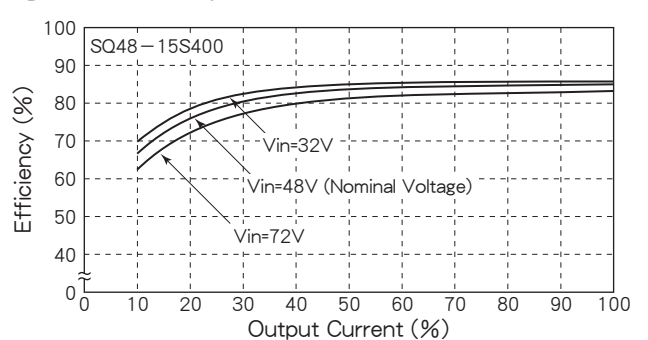


Fig. 8 Efficiency vs. Output Current



SQK SERIES

5~6W DC/DC CONVERTERS Single Output & Dual Outputs



H8.5×W30×L47 (mm)

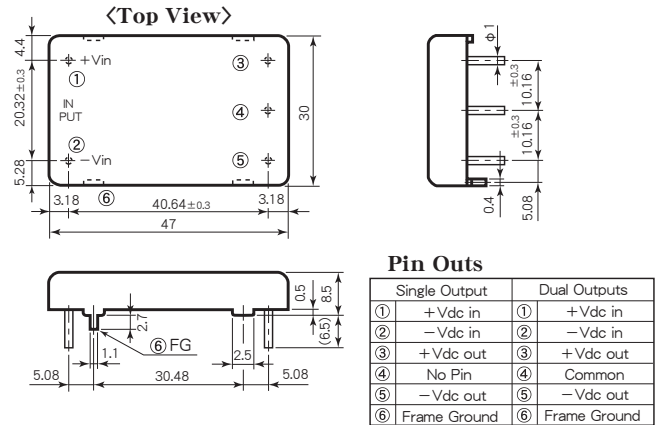
Features

- | | |
|---|----------------------------|
| ● Low Profile 8.5mm | ● 薄型 8.5mm |
| ● Built-in Input Filter | ● 入力フィルタ内蔵 |
| ● Input-Output Isolation | ● 入出力間絶縁 |
| ● High Efficiency 80~85% | ● 高効率 80~85% |
| ● Wide Input Voltage Range | ● 広範囲な入力電圧 |
| ● High Reliability | ● 高信頼性 |
| ● Low No Load Current | ● 無負荷電流が少ない |
| ● 5 Sided Metal Shielding | ● 5面メタルシールド |
| ● Operating Ambient Temp. -40°C~+85°C | ● 動作周囲温度 -40°C~+85°C |
| ● Max. Case Temperature +100°C | ● 最大ケース温度 +100°C |
| ● Conformity to RoHS2 Directive | ● RoHS2指令対応 |
| ● Not built-in aluminum and tantalum electrolytic capacitor | ● アルミ電解コンデンサ及びタンタルコンデンサ不使用 |

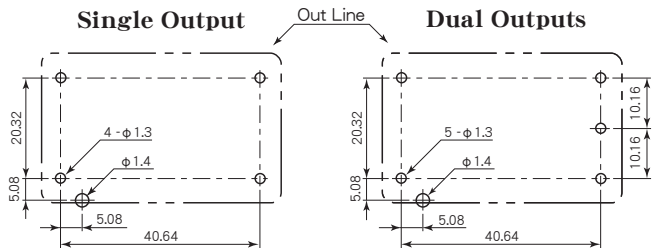
General Characteristics

- | | |
|------------------------------------|---|
| ● Input Voltage, Range | (at Ta : 25°C, Full Load, Nominal Vin) DC5, 12, 24, 48V (See Table 1) |
| ● Output Voltage, Current | See Table 1 |
| ● Output Voltage Accuracy | ±3% |
| ● Efficiency | See Table 1 |
| ● Line Regulation | 0.3% max. (at Vin Range) |
| ● Load Regulation | Single : ±0.5% max. (0~100% Load) Dual : ±3% max. ±5% max. (±5V Vout only) (10~100% Load) |
| ● Reflected Input Ripple and Noise | (2% Vin)Vp-p max. |
| ● Output Ripple | 20mVp-p max. |
| ● Output Noise | 100mVp-p max. |
| ● Short Circuit Protection | Built-in, Auto-restart (See Fig. 2) |
| ● Temperature Coefficient | 0.02%/°C max. |
| ● Operating Ambient Temp. | -40°C~+85°C (See Fig. 1) -30°C~+85°C (5V Vin only) |
| ● Storage Temperature | -40°C~+100°C |
| ● Isolation Voltage | AC500V one minute (Input-Output-Case) |
| ● Isolation Impedance | 100MΩ min. (at DC1000V) (Input-Output-Case) |
| ● Weight | 30g max. |
| ● Humidity | 20~95% RH |
| ● Shock | 490m/s ² (11msec 3directions) |
| ● Vibration | 10~55Hz 98m/s ² (30minutes 3directions) |
| ● Surface Structure | 5 Sided Steel Case |
| ● Soldering Conditions | Soldering DIP: 260°C, for 15 seconds max. Soldering iron: 360°C, for 5 seconds max. |
| ● MTBF | Single : 720,000H Dual : 600,000H (Ta : 25°C, 80% Load, Nominal Vin) |
| ● Warranty | 5 years |

Pin Outs & Dimensions (±0.5mm)



Hole Configurations on PCB (Top View)



Selection Guide

Table 1

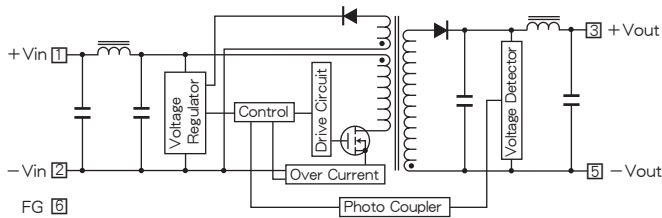
| Model Number | Input Volt. (Range) (V. DC) | Output Voltage (V. DC) | Output Current (mA) | Efficiency (Typical) (%) | |
|------------------|-----------------------------|------------------------|---------------------|--------------------------|----|
| SQK 5 - 5S1000 | 5 (4.5~9) | 5 | 1000 | 84 | |
| SQK 5 - 6S 900 | | 6 | 900 | 84 | |
| SQK 5 - 12S 500 | | 12 | 500 | 84 | |
| SQK 5 - 15S 400 | | 15 | 400 | 85 | |
| SQK 5 - 24S 250 | | 24 | 250 | 85 | |
| SQK 5 - 5D 500 | | ±5 | ±500 | 81 | |
| SQK 5 - 12D 250 | | ±12 | ±250 | 85 | |
| SQK 5 - 15D 200 | | ±15 | ±200 | 85 | |
| SQK 12 - 5S1000 | | 12 (8~18) | 5 | 1000 | 80 |
| SQK 12 - 6S 900 | | | 6 | 900 | 80 |
| SQK 12 - 12S 500 | 12 | | 500 | 83 | |
| SQK 12 - 15S 400 | 15 | | 400 | 83 | |
| SQK 12 - 24S 250 | 24 | | 250 | 83 | |
| SQK 12 - 5D 500 | ±5 | | ±500 | 81 | |
| SQK 12 - 12D 250 | ±12 | ±250 | 83 | | |
| SQK 12 - 15D 200 | ±15 | ±200 | 83 | | |
| SQK 24 - 5S1000 | 24 (16~36) | 5 | 1000 | 80 | |
| SQK 24 - 6S 900 | | 6 | 900 | 80 | |
| SQK 24 - 12S 500 | | 12 | 500 | 84 | |
| SQK 24 - 15S 400 | | 15 | 400 | 84 | |
| SQK 24 - 24S 250 | | 24 | 250 | 83 | |
| SQK 24 - 5D 500 | | ±5 | ±500 | 80 | |
| SQK 24 - 12D 250 | | ±12 | ±250 | 83 | |
| SQK 24 - 15D 200 | | ±15 | ±200 | 83 | |
| SQK 48 - 5S1000 | 48 (32~72) | 5 | 1000 | 80 | |
| SQK 48 - 6S 900 | | 6 | 900 | 80 | |
| SQK 48 - 12S 500 | | 12 | 500 | 84 | |
| SQK 48 - 15S 400 | | 15 | 400 | 84 | |
| SQK 48 - 24S 250 | | 24 | 250 | 84 | |
| SQK 48 - 5D 500 | | ±5 | ±500 | 81 | |
| SQK 48 - 12D 250 | | ±12 | ±250 | 83 | |
| SQK 48 - 15D 200 | | ±15 | ±200 | 83 | |

※ 上記仕様以外にも対応可能ですので お問い合わせ下さい。
Please consult with us about other specification.

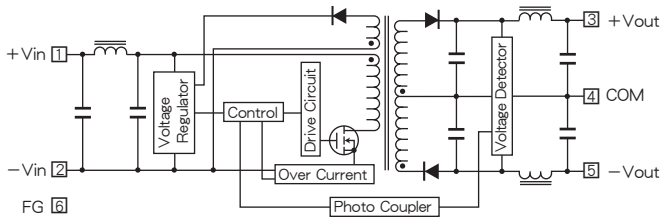
SQK SERIES DATA SHEET

Block Diagram

Single Output



Dual Outputs



Characteristic Curves

Fig. 1 Derating Curve

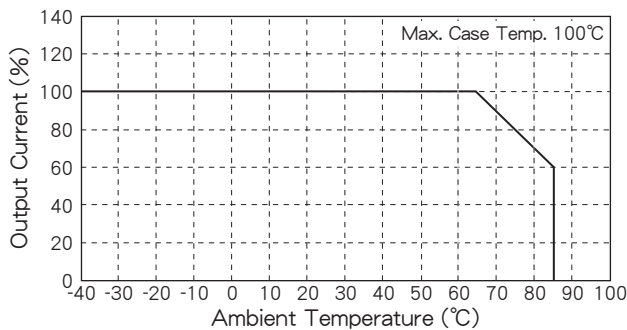


Fig. 2 Short Circuit Operating Area

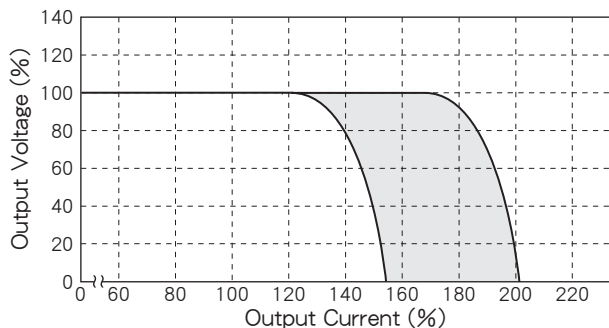


Fig. 3 Temperature Characteristic on Case Surface

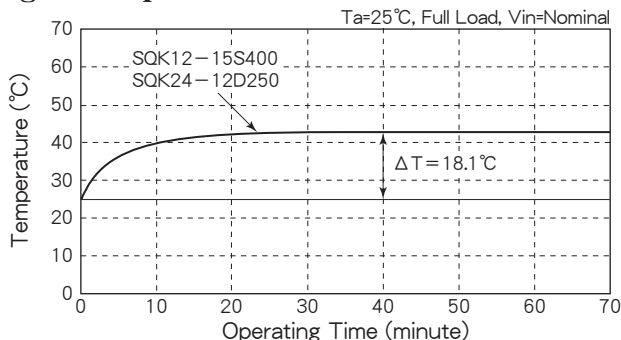


Fig. 4 No Load Current vs. Input Voltage

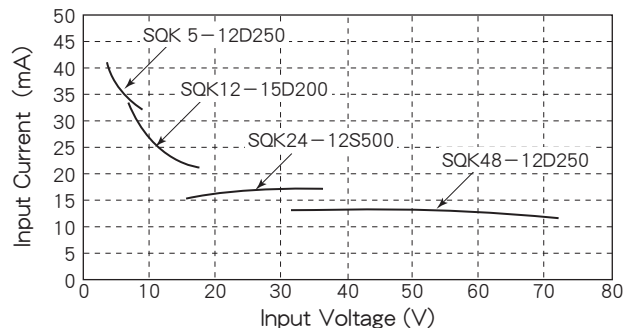


Fig. 5 Efficiency vs. Output Current (Single Output)

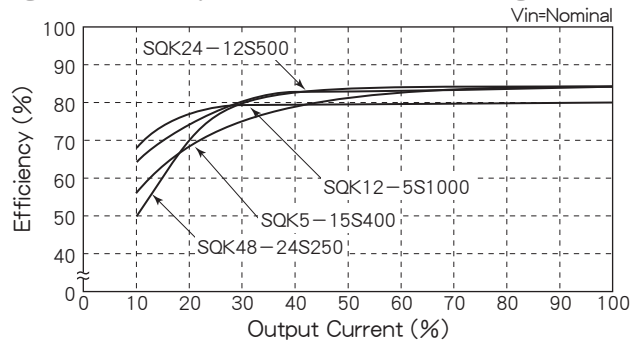
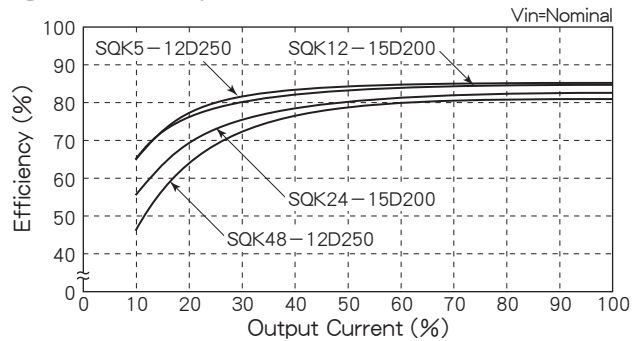


Fig. 6 Efficiency vs. Output Current (Dual Outputs)



SQV SERIES

10~12W DC/DC CONVERTERS Single Output



H8.5×W30×L47 (mm)

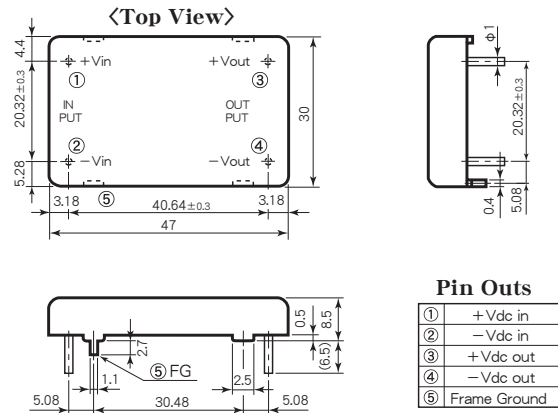
Features

- High Efficiency 81~87%
- 8.5mm in Height
- Compact, Light Weight
- Built-in Input Filter
- Wide Input Voltage Range
- Input-Output Isolation
- Low No Load Current
- 5 Sided Metal Shielding
- High Reliability
- Operating Ambient Temperature -40°C~+85°C
- Max. Case Temperature +100°C
- Conformity to RoHS2 Directive
- Not built-in aluminum and tantalum electrolytic capacitor
- 高効率 81~87%
- 高さ8.5mm
- 小形、軽量
- 入力フィルタ内蔵
- 広範囲な入力電圧
- 入出力間絶縁
- 無負荷電流が少ない
- 5面メタルシールド
- 高信頼性
- 動作周囲温度 -40°C~+85°C
- 最大ケース温度 +100°C
- RoHS2指令対応
- アルミ電解コンデンサ及びタンタルコンデンサ不使用

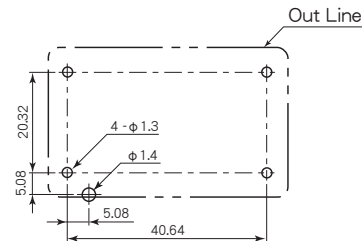
General Characteristics

- Input Voltage, Range (at Ta : 25°C, Full Load, Nominal Vin) DC5, 12, 24, 48V (See Table 1)
- Output Voltage, Current See Table 1
- Output Voltage Accuracy ±2% (12, 15, 24, 28V Vout)
±3% (3.3, 5, 6V Vout)
- Efficiency See Table 1
- Line Regulation 0.3% max. (at Vin Range)
- Load Regulation ±0.5% max. (0~100% Load)
- Reflected Input Ripple, Noise (2% Vin)Vp-p max.
- Output Ripple 20mVp-p max.
- Output Noise 80mVp-p max. (0~20MHz)
150mVp-p max. (0~100MHz)
- Short Circuit Protection Built-in, Auto-restart (See Fig. 2)
- Temperature Coefficient 0.02%/°C max.
- Operating Ambient Temp. -40°C~+85°C (See Fig. 1)
-30°C~+85°C (5V Vin only)
- Max. Case Temperature +100°C
- Storage Temperature -40°C~+100°C
- Isolation Voltage AC500V one minute
(Input-Output-Case)
- Isolation Impedance 100MΩ min. (at DC1000V)
(Input-Output-Case)
- Weight 30g max.
- Humidity 20~95% RH
- Shock 490m/s² (11msec 3directions)
- Vibration 10~55Hz 98m/s²
(30minutes 3directions)
- Surface Structure 5 Sided Steel Case
- Soldering Conditions Soldering DIP 260°C, for 15 seconds max.
Soldering iron 360°C, for 5 seconds max.
- MTBF 1,000,000H
(Ta : 25°C, 80% Load, Nominal Vin)
- Warranty 5 years

Pin Outs & Dimensions (±0.5mm)



Hole Configurations on PCB (Top View)



Selection Guide

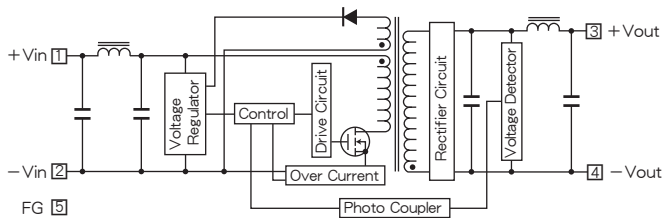
Table 1

| Model Number | Input Volt. (Range) (V. DC) | Output Voltage (V. DC) | Output Current (mA) | Efficiency (Typical) (%) |
|---------------------|-----------------------------|------------------------|---------------------|--------------------------|
| SQV 5 - 3.3 S 3000 | 5 (4.5~9) | 3.3 | 3000 | 81 |
| SQV 5 - 5 S 2000 | | 5 | 2000 | 82 |
| SQV 5 - 6 S 1600 | | 6 | 1600 | 82 |
| SQV 5 - 12 S 800 | | 12 | 800 | 85 |
| SQV 5 - 15 S 640 | | 15 | 640 | 83 |
| SQV 5 - 24 S 400 | | 24 | 400 | 83 |
| SQV 5 - 28 S 350 | | 28 | 350 | 83 |
| SQV 12 - 3.3 S 3000 | 12 (8~18) | 3.3 | 3000 | 83 |
| SQV 12 - 5 S 2200 | | 5 | 2200 | 85 |
| SQV 12 - 6 S 2000 | | 6 | 2000 | 85 |
| SQV 12 - 12 S 1000 | | 12 | 1000 | 87 |
| SQV 12 - 15 S 800 | | 15 | 800 | 87 |
| SQV 12 - 24 S 500 | | 24 | 500 | 87 |
| SQV 12 - 28 S 400 | | 28 | 400 | 87 |
| SQV 24 - 3.3 S 3000 | 24 (16~36) | 3.3 | 3000 | 83 |
| SQV 24 - 5 S 2200 | | 5 | 2200 | 85 |
| SQV 24 - 6 S 2000 | | 6 | 2000 | 85 |
| SQV 24 - 12 S 1000 | | 12 | 1000 | 87 |
| SQV 24 - 15 S 800 | | 15 | 800 | 87 |
| SQV 24 - 24 S 500 | | 24 | 500 | 87 |
| SQV 24 - 28 S 400 | | 28 | 400 | 87 |
| SQV 48 - 3.3 S 3000 | 48 (32~72) | 3.3 | 3000 | 83 |
| SQV 48 - 5 S 2200 | | 5 | 2200 | 85 |
| SQV 48 - 6 S 2000 | | 6 | 2000 | 85 |
| SQV 48 - 12 S 1000 | | 12 | 1000 | 87 |
| SQV 48 - 15 S 800 | | 15 | 800 | 87 |
| SQV 48 - 24 S 500 | | 24 | 500 | 87 |
| SQV 48 - 28 S 400 | | 28 | 400 | 87 |

※ 上記仕様以外にも対応可能ですので お問い合わせ下さい。
Please consult with us about other specification.

SQV SERIES DATA SHEET

Block Diagram



Characteristic Curves

Fig. 1 Derating Curve

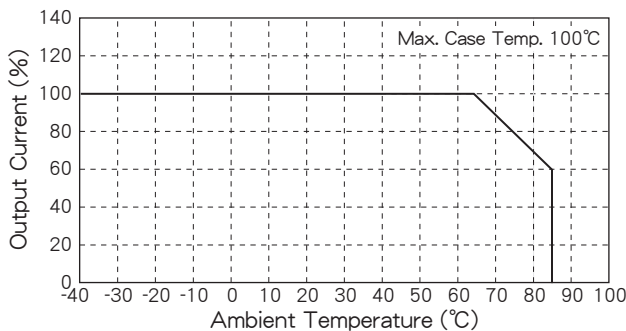


Fig. 2 Short Circuit Operating Area

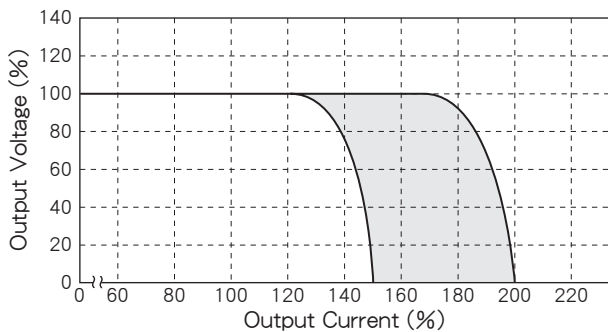


Fig. 3 Temperature Characteristic on Case Surface

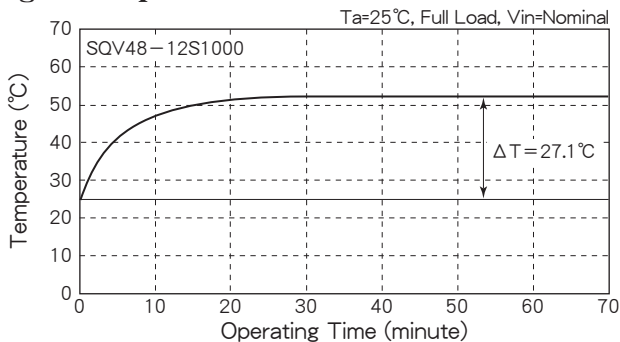


Fig. 4 Efficiency vs. Output Current

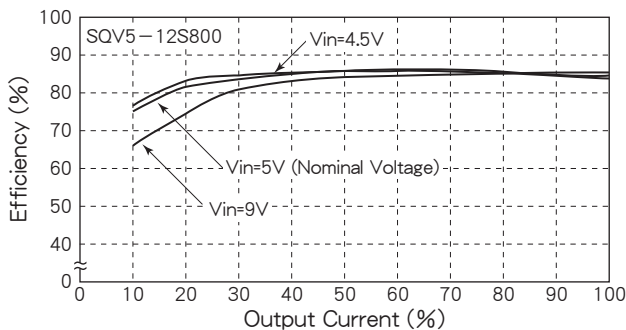


Fig. 5 Efficiency vs. Output Current

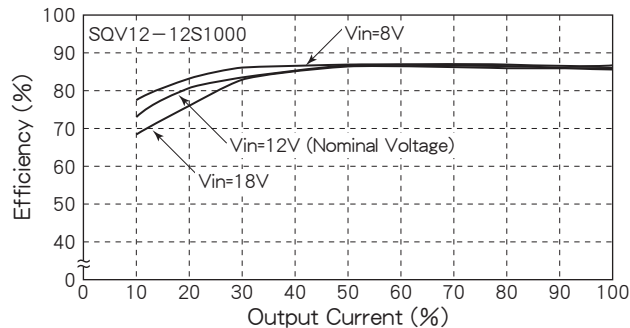


Fig. 6 Efficiency vs. Output Current

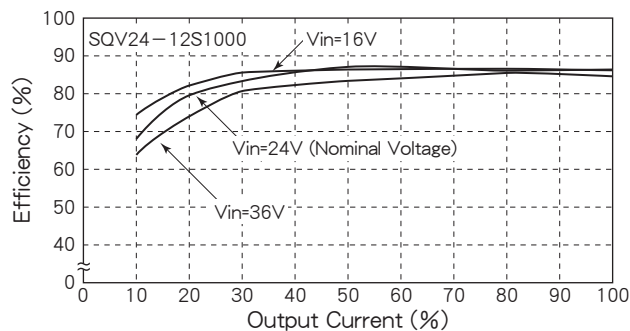


Fig. 7 Efficiency vs. Output Current

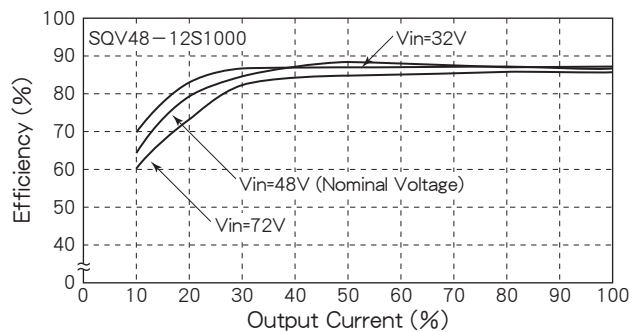
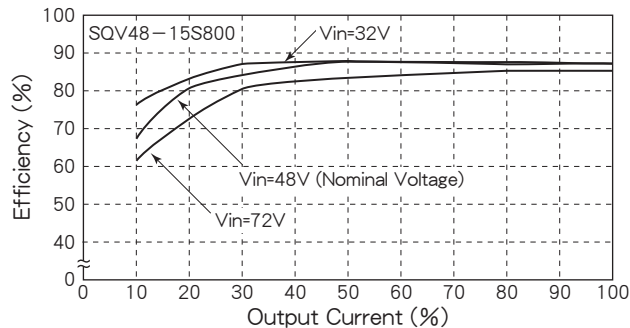


Fig. 8 Efficiency vs. Output Current



SQT SERIES

10~15W DC/DC CONVERTERS Single Output & Dual Outputs



H7×W31×L47 (mm)

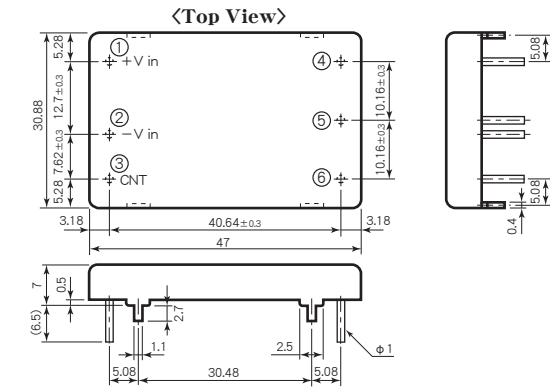
Features

- 7mm in Height
- High Efficiency 85~88%
- Built-in Input Filter
- Wide Input Voltage Range
- Input-Output Isolation AC1500V
- Low No Load Current
- 5 Sided Metal Shielding
- Remote ON/OFF Control
- Operating Ambient Temperature -40°C~+85°C
- Adjustable Output Voltage ±5% (Single Output Only)
- Max. Case Temperature +100°C
- Conformity to RoHS2 Directive
- Not built-in aluminum and tantalum electrolytic capacitor
- 高さ7mm
- 高効率 85~88%
- 入力フィルタ内蔵
- 広範囲な入力電圧
- 入出力間絶縁 AC1500V
- 無負荷電流が少ない
- 5面メタルシールド
- リモートON/OFFコントロール
- 動作周囲温度 -40°C~+85°C
- 出力電圧調整可能 ±5% (単出力のみ)
- 最大ケース温度 +100°C
- RoHS2指令対応
- アルミ電解コンデンサ及びタンタルコンデンサ不使用

Specifications

- Input (at Ta : 25°C, Full Load, Nominal Vin)
 - Input Voltage, Range DC5, 12, 24, 48V (See Table 1)
 - Input Current (No Load) 5V : 30mA typ.
12V : 18mA typ.
24V : 10mA typ.
48V : 7mA typ.
 - Reflected Input Ripple, Noise (3% Vin)Vp-p max.
- Output
 - Output Voltage, Current See Table 1
 - Output Voltage Accuracy Single : ±2%
Dual : ±3%
 - Output Voltage Range ±5% Adjustable (Used trimmer) (Single Output only)
ON : Short or 0~0.8V
OFF : Open or 2~10V (Between pin ②~③)
 - Remote ON/OFF Control See Table 1
 - Efficiency 0.3% max. (at Vin Range)
 - Line Regulation Single : ±0.5% max. (0~100% Load)
 - Load Regulation Dual : ±3% max. (10~100% Load)
 - Output Ripple 20mVp-p max.
 - Output Noise 80mVp-p max. (0~20MHz)
150mVp-p max. (0~100MHz)
 - Short Circuit Protection Built-in, Auto-restart (See Fig. 2)
 - Temperature Coefficient 0.02%/°C max.
- General
 - Operating Ambient Temp. -40°C~+85°C (See Fig. 1)
 - Max. Case Temperature +100°C
 - Storage Temperature -55°C~+100°C
 - Isolation Voltage AC1500V one minute (Input-Output-Case)
 - Isolation Impedance 100MΩ min. (at DC1000V) (Input-Output-Case)
 - Humidity 20~95% RH
 - MTBF 1,000,000H (Ta : 25°C, 80% Load, Nominal Vin)
 - Switching Frequency 210kHz (±10%)
- Physical
 - Weight 30g max.
 - Shock 490m/s² (11msec 3directions)
 - Vibration 10~55Hz 98m/s² (30minutes 3directions)
 - Surface Structure 5 Sided Steel Case
 - Soldering Conditions Soldering DIP 260°C, for 15 seconds max.
Soldering iron 360°C, for 5 seconds max.
 - Warranty 5 years

Pin Outs & Dimensions (±0.5mm)

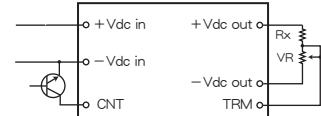


Pin Outs

| Single Output | Dual Outputs |
|---------------|--------------|
| ① +Vdc in | ① +Vdc in |
| ② -Vdc in | ② -Vdc in |
| ③ CNT | ③ CNT |
| ④ +Vdc out | ④ +Vdc out |
| ⑤ -Vdc out | ⑤ COM |
| ⑥ TRM | ⑥ -Vdc out |

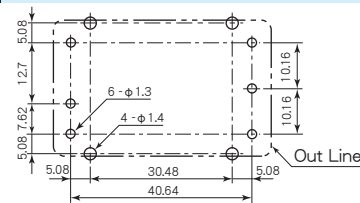
Application

ON/OFF Control and Vout Adjustment (Single Output)



| Vout (V) | VR (Ω) | Rx (Ω) |
|----------|--------|--------|
| 3.3V | 50k | 13k |
| 5V | 50k | 3k |
| 5.2V | 50k | 3k |
| 6V | 50k | 6.8k |
| 12V | 50k | 43k |
| 15V | 50k | 62k |
| 24V | 50k | 150k |

Holes on PCB (Top View)



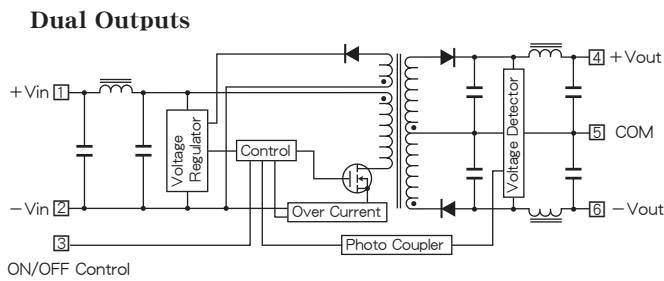
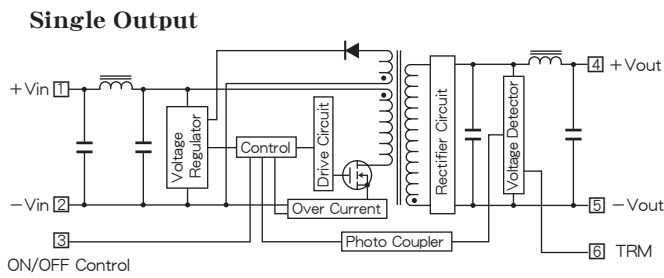
Selection Guide

| Model Number | Input Volt. (Range) (V. DC) | Output Voltage (V. DC) | Output Current (A) | Efficiency (%) | | |
|-----------------|-----------------------------|------------------------|--------------------|-----------------|-----------------|----|
| | | | | 20% Load (typ.) | 80% Load (typ.) | |
| SQT 5-3.3S 3A | 5 (4.5~9) | 3.3 | 3 | 81 | 85 | |
| SQT 5-5S 2.2A | | 5 | 2.2 | 81 | 85 | |
| SQT 5-5.2S 2.1A | | 5.2 | 2.1 | 81 | 85 | |
| SQT 5-6S 1.9A | | 6 | 1.9 | 83 | 85 | |
| SQT 5-12S 1A | | 12 | 1 | 84 | 85 | |
| SQT 5-15S 0.8A | | 15 | 0.8 | 84 | 85 | |
| SQT 5-24S 0.5A | | 24 | 0.5 | 84 | 85 | |
| SQT 5-12D 0.5A | | ±12 | ±0.5 | 86 | 86 | |
| SQT 5-15D 0.4A | | ±15 | ±0.4 | 86 | 85 | |
| SQT12-3.3S 3.6A | | 12 (8~18) | 3.3 | 3.6 | 80 | 85 |
| SQT12-5S 2.6A | | | 5 | 2.6 | 82 | 86 |
| SQT12-5.2S 2.5A | | | 5.2 | 2.5 | 82 | 85 |
| SQT12-6S 2.3A | 6 | | 2.3 | 85 | 86 | |
| SQT12-12S 1.3A | 12 | | 1.3 | 85 | 87 | |
| SQT12-15S 1A | 15 | | 1 | 85 | 88 | |
| SQT12-24S 0.6A | 24 | | 0.6 | 84 | 87 | |
| SQT12-12D 0.6A | ±12 | | ±0.6 | 85 | 87 | |
| SQT12-15D 0.5A | ±15 | | ±0.5 | 84 | 87 | |
| SQT24-3.3S 3.6A | 24 (16~36) | | 3.3 | 3.6 | 82 | 85 |
| SQT24-5S 2.6A | | | 5 | 2.6 | 82 | 87 |
| SQT24-5.2S 2.5A | | | 5.2 | 2.5 | 83 | 87 |
| SQT24-6S 2.3A | | 6 | 2.3 | 83 | 87 | |
| SQT24-12S 1.3A | | 12 | 1.3 | 86 | 88 | |
| SQT24-15S 1A | | 15 | 1 | 84 | 87 | |
| SQT24-24S 0.6A | | 24 | 0.6 | 84 | 87 | |
| SQT24-12D 0.6A | | ±12 | ±0.6 | 85 | 87 | |
| SQT24-15D 0.5A | | ±15 | ±0.5 | 86 | 87 | |
| SQT48-3.3S 3.6A | | 48 (32~72) | 3.3 | 3.6 | 80 | 85 |
| SQT48-5S 2.6A | | | 5 | 2.6 | 82 | 87 |
| SQT48-5.2S 2.5A | | | 5.2 | 2.5 | 82 | 87 |
| SQT48-6S 2.3A | 6 | | 2.3 | 82 | 87 | |
| SQT48-12S 1.3A | 12 | | 1.3 | 84 | 87 | |
| SQT48-15S 1A | 15 | | 1 | 84 | 87 | |
| SQT48-24S 0.6A | 24 | | 0.6 | 84 | 87 | |
| SQT48-12D 0.6A | ±12 | | ±0.6 | 84 | 87 | |
| SQT48-15D 0.5A | ±15 | | ±0.5 | 84 | 87 | |

※ 上記仕様以外にも対応可能ですので お問い合わせ下さい。
Please consult with us about other specification.

SQT SERIES DATA SHEET

Block Diagram



Characteristic Curves

Fig. 1 Derating Curve

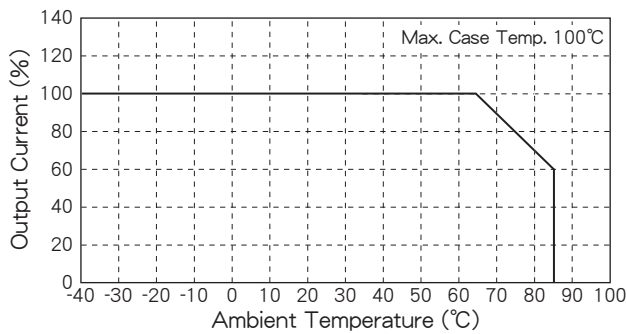


Fig. 2 Short Circuit Operating Area

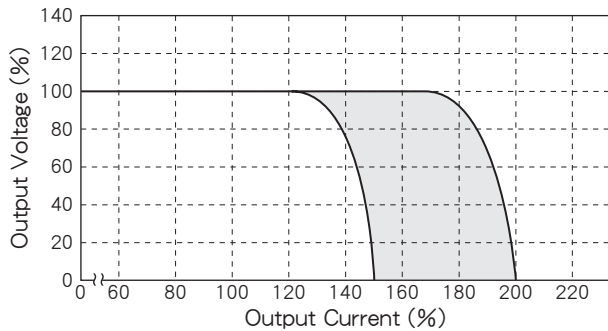


Fig. 3 Temperature Characteristic on Case Surface

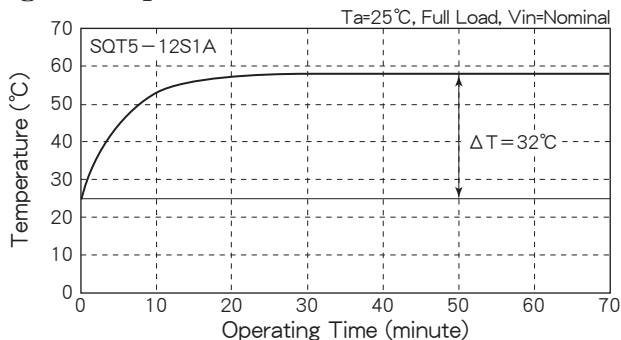


Fig. 4 Efficiency vs. Output Current

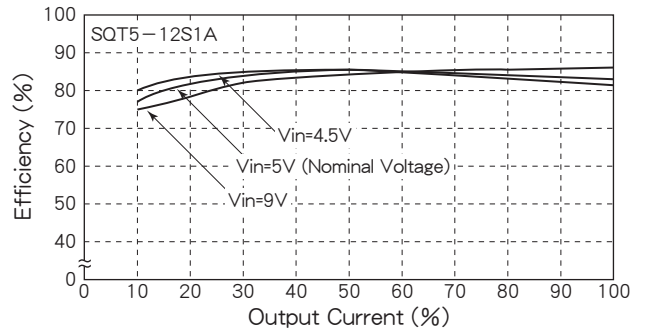


Fig. 5 Efficiency vs. Output Current

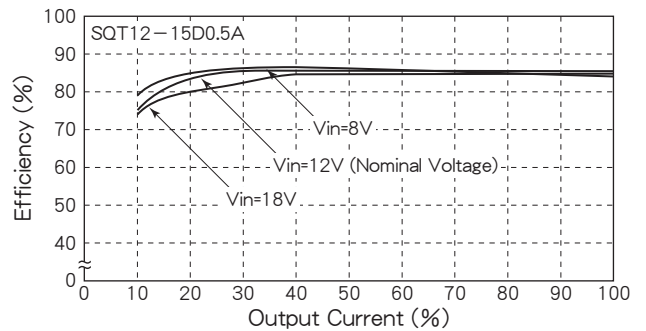
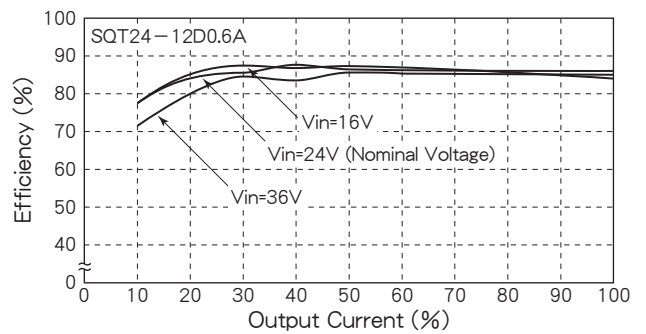
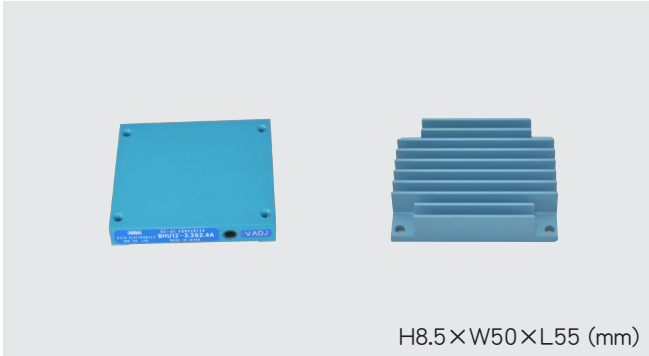


Fig. 6 Efficiency vs. Output Current



BHU SERIES

7~15W DC/DC CONVERTERS Single Output & Dual Outputs



Features

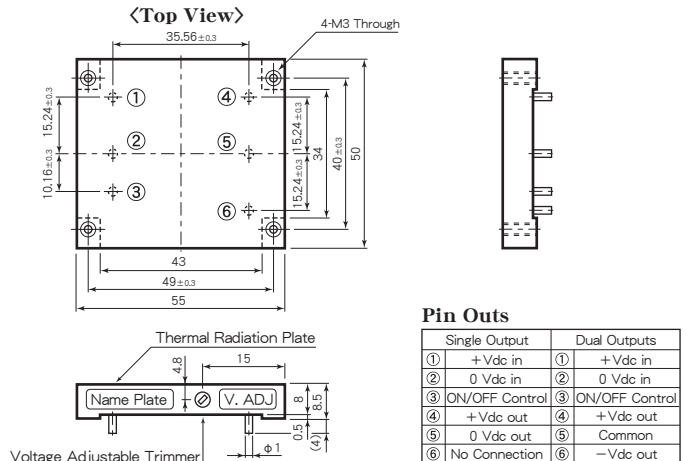
- Low Profile 8.5mm
 - Built-in Input Filter
 - Input-Output Isolation
 - High Efficiency 77~88%
 - Wide Input Voltage Range
 - High Reliability
 - 6 Sided Metal Shielding
 - Remote ON/OFF Control
 - Adjustable Output Volt. $\pm 5\%$
 - Output Over Voltage Protection 115~140% Operation
 - Operating Ambient Temperature $-40^{\circ}\text{C} \sim +85^{\circ}\text{C}$
 - Max. Case Temperature $+105^{\circ}\text{C}$
 - Conformity to RoHS2 Directive
 - Not built-in aluminum and tantalum electrolytic capacitor
- 薄型 8.5mm
 - 入力フィルタ内蔵
 - 入出力間絶縁
 - 高効率 77~88%
 - 広範囲な入力電圧
 - 高信頼性
 - 6面メタルシールド
 - リモートON/OFFコントロール
 - 可変出力電圧 $\pm 5\%$
 - 出力過電圧保護回路内蔵 115~140% 動作
 - 動作周囲温度 $-40^{\circ}\text{C} \sim +85^{\circ}\text{C}$
 - 最大ケース温度 $+105^{\circ}\text{C}$
 - RoHS2指令対応
 - アルミ電解コンデンサ及びタンタルコンデンサ不使用

General Characteristics

(at $T_a : 25^{\circ}\text{C}$, Full Load, Nominal V_{in})

- Input Voltage, Range DC5, 12, 24, 48V (See Table 1)
- Output Voltage, Current See Table 1
- Output Voltage Range $\pm 5\%$ Adjustable
- Efficiency See Table 1
- Line Regulation $\pm 0.3\%$ max. (at V_{in} Range)
- Load Regulation Single : $\pm 0.5\%$ max. (0~100% Load)
Dual : $\pm 3\%$ max. (10~100% Load)
(3% V_{in})Vp-p max.
40mVp-p max.
100mVp-p max. (48V V_{out} only)
100mVp-p max.
200mVp-p max. (48V V_{out} only)
- Output Noise Built-in, Auto-restart (See Fig. 2)
115~140% Output Voltage
ON : Short or 0~0.8V
OFF : Open or 2~10V
(Between pin ② ~ ③)
0.02%/°C max.
 $-40^{\circ}\text{C} \sim +85^{\circ}\text{C}$ (See Fig. 1)
 $-30^{\circ}\text{C} \sim +85^{\circ}\text{C}$ (5V V_{in} only)
 $+105^{\circ}\text{C}$
- Max. Case Temperature $-40^{\circ}\text{C} \sim +115^{\circ}\text{C}$
- Storage Temperature AC1500V one minute
(Input-Output-Case)
100M Ω min. (at DC1000V)
(Input-Output-Case)
- Isolation Impedance Main Body : 60g max.
Heat Sink : 40g max.
- Weight 20~95% RH
490m/s² (11msec 3directions)
10~55Hz 98m/s²
(30minutes 3directions)
6 Sided Aluminum Case
- Surface Structure 260°C, for 15 seconds max.
360°C, for 5 seconds max.
- Soldering Conditions Single : 1,000,000H
Dual : 700,000H
($T_a : 25^{\circ}\text{C}$, 80% Load, Nominal V_{in})
- MTBF 5 years
- Warranty

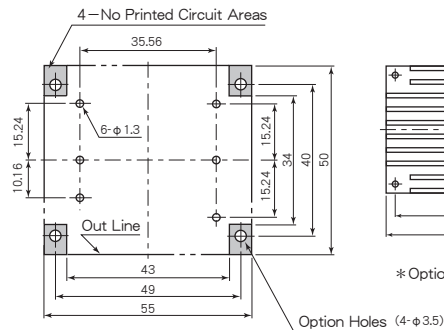
Pin Outs & Dimensions ($\pm 0.5\text{mm}$)



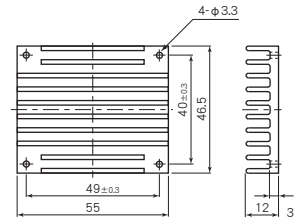
Pin Outs

| Single Output | | Dual Outputs | |
|------------------|------------------|------------------|------------------|
| ① +Vdc in | ① +Vdc in | ① +Vdc in | ① +Vdc in |
| ② 0 Vdc in | ② 0 Vdc in | ② 0 Vdc in | ② 0 Vdc in |
| ③ ON/OFF Control | ③ ON/OFF Control | ③ ON/OFF Control | ③ ON/OFF Control |
| ④ +Vdc out | ④ +Vdc out | ④ +Vdc out | ④ +Vdc out |
| ⑤ 0 Vdc out | ⑤ Common | ⑤ Common | ⑤ Common |
| ⑥ No Connection | ⑥ -Vdc out | ⑥ -Vdc out | ⑥ -Vdc out |

Holes on PCB (Top View)



Option Heat Sink



* Option Heat Sink Model : A4-3080

Selection Guide

Table 1

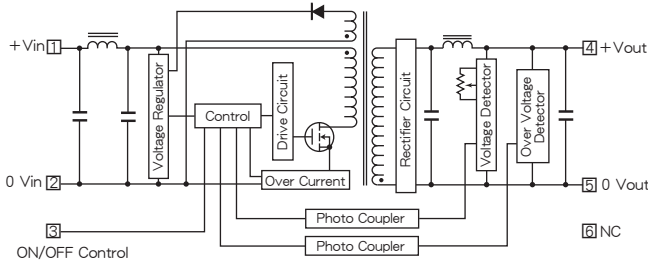
| Model Number | Input Volt. (Range) (V. DC) | Output Voltage (V. DC) | Output Current (A) | Efficiency (Typical) (%) |
|-------------------|-----------------------------|------------------------|--------------------|--------------------------|
| BHU 5-3.3 S 2A | 5 (4.5~9) | 3.3 | 2 | 83 |
| BHU 5-5 S 2A | | 5 | 2 | 82 |
| BHU 5-6 S 1.8A | | 6 | 1.8 | 82 |
| BHU 5-12 S 1A | | 12 | 1 | 84 |
| BHU 5-15 S 0.8A | | 15 | 0.8 | 83 |
| BHU 5-24 S 0.5A | | 24 | 0.5 | 83 |
| BHU 5-28 S 0.4A | | 28 | 0.4 | 83 |
| BHU 5-5 D 1A | | ± 5 | ± 1 | 77 |
| BHU 5-12 D 0.5A | | ± 12 | ± 0.5 | 81 |
| BHU 5-15 D 0.4A | | ± 15 | ± 0.4 | 81 |
| BHU 12-3.3 S 2.4A | 12 (8~18) | 3.3 | 2.4 | 83 |
| BHU 12-5 S 2.4A | | 5 | 2.4 | 85 |
| BHU 12-6 S 2.2A | | 6 | 2.2 | 85 |
| BHU 12-12 S 1.3A | | 12 | 1.3 | 85 |
| BHU 12-15 S 1A | | 15 | 1 | 85 |
| BHU 12-24 S 0.65A | | 24 | 0.65 | 85 |
| BHU 12-28 S 0.5A | | 28 | 0.5 | 85 |
| BHU 12-48 S 0.3A | | 48 | 0.3 | 85 |
| BHU 12-5 D 1.2A | | ± 5 | ± 1.2 | 78 |
| BHU 12-12 D 0.65A | | ± 12 | ± 0.65 | 83 |
| BHU 12-15 D 0.5A | ± 15 | ± 0.5 | 83 | |
| BHU 24-3.3 S 2.4A | 24 (16~36) | 3.3 | 2.4 | 84 |
| BHU 24-5 S 2.4A | | 5 | 2.4 | 86 |
| BHU 24-6 S 2.2A | | 6 | 2.2 | 86 |
| BHU 24-12 S 1.3A | | 12 | 1.3 | 86 |
| BHU 24-15 S 1A | | 15 | 1 | 86 |
| BHU 24-24 S 0.65A | | 24 | 0.65 | 86 |
| BHU 24-28 S 0.5A | | 28 | 0.5 | 86 |
| BHU 24-48 S 0.3A | | 48 | 0.3 | 85 |
| BHU 24-5 D 1.2A | | ± 5 | ± 1.2 | 78 |
| BHU 24-12 D 0.65A | | ± 12 | ± 0.65 | 83 |
| BHU 24-15 D 0.5A | ± 15 | ± 0.5 | 83 | |
| BHU 48-3.3 S 2.4A | 48 (32~76) | 3.3 | 2.4 | 83 |
| BHU 48-5 S 2.4A | | 5 | 2.4 | 86 |
| BHU 48-6 S 2.2A | | 6 | 2.2 | 86 |
| BHU 48-12 S 1.3A | | 12 | 1.3 | 88 |
| BHU 48-15 S 1A | | 15 | 1 | 88 |
| BHU 48-24 S 0.65A | | 24 | 0.65 | 86 |
| BHU 48-28 S 0.5A | | 28 | 0.5 | 86 |
| BHU 48-5 D 1.2A | | ± 5 | ± 1.2 | 80 |
| BHU 48-12 D 0.65A | | ± 12 | ± 0.65 | 85 |
| BHU 48-15 D 0.5A | | ± 15 | ± 0.5 | 85 |

* 上記仕様以外にも対応可能ですのでお問い合わせ下さい。
Please consult with us about other specification.

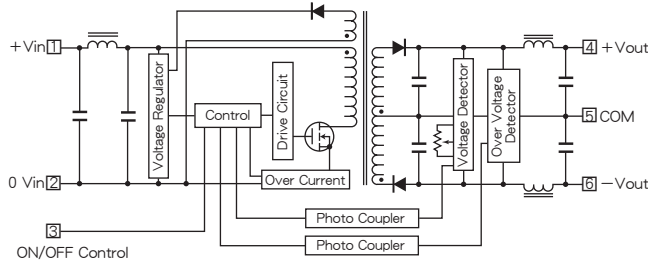
BHU SERIES DATA SHEET

Block Diagram

Single Output



Dual Outputs



Characteristic Curves

Fig. 1 Derating Curve

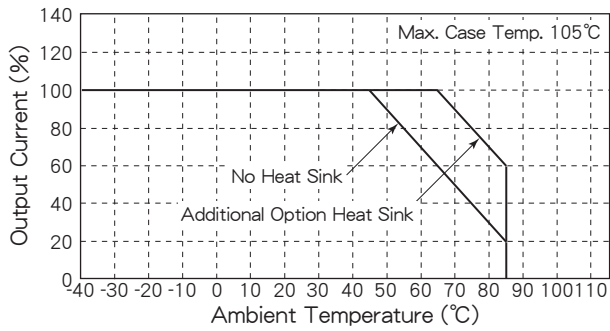


Fig. 2 Short Circuit Operating Area

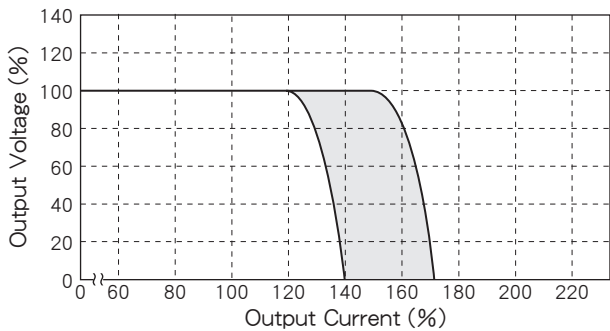


Fig. 3 Temperature Characteristic on Case Surface

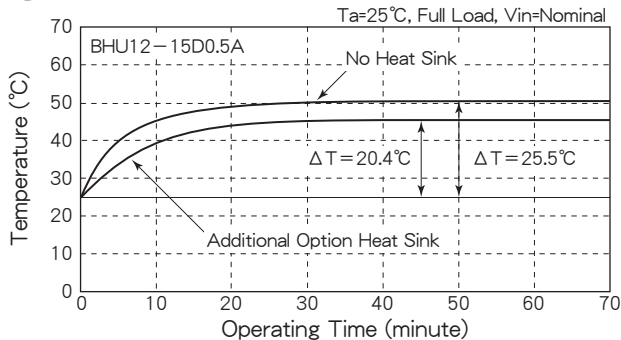


Fig. 4 Efficiency vs. Output Current

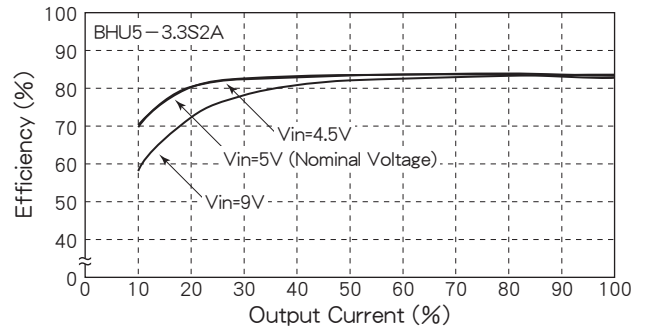


Fig. 5 Efficiency vs. Output Current

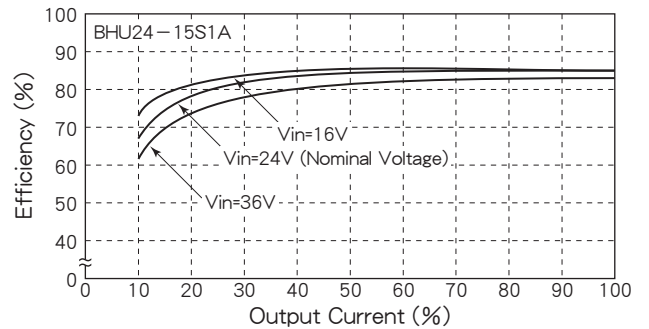


Fig. 6 Efficiency vs. Output Current

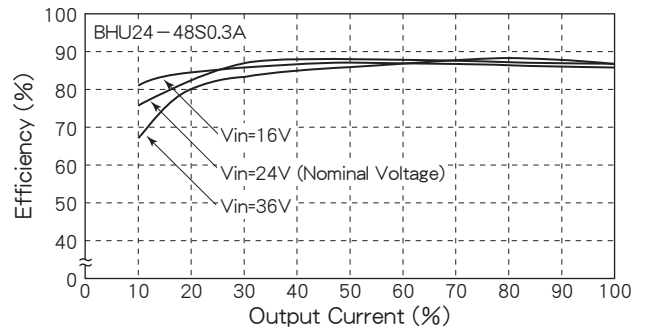


Fig. 7 Efficiency vs. Output Current

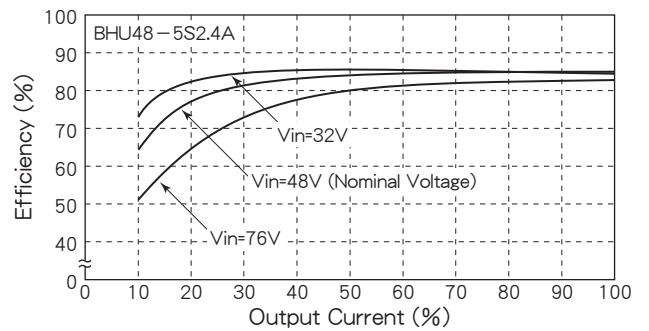
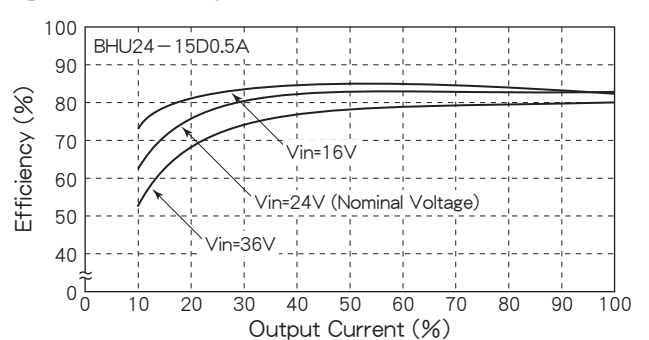


Fig. 8 Efficiency vs. Output Current



BRU SERIES

23~30W DC/DC CONVERTERS Single Output



H8.5×W50×L55 (mm)

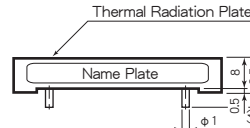
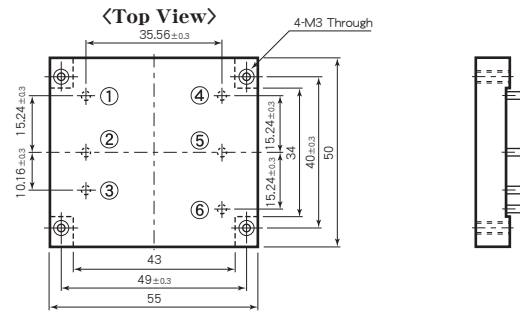
Features

- Low Profile 8.5mm
 - Built-in Input Filter
 - Input-Output Isolation (AC2000V)
 - High Efficiency 87~90%
 - Wide Input Voltage Range
 - High Reliability
 - 6 Sided Metal Shielding
 - Remote ON/OFF Control
 - Adjustable Output Volt. $\pm 5\%$
 - Input Low Voltage Protection
 - Input Over Voltage Protection
 - Output Over Voltage Protection
115~140% Operation
 - Thermal Protection
+110°C~+120°C
 - Operating Ambient Temperature
-40°C~+85°C
 - Max. Case Temperature
+105°C
 - Conformity to RoHS2 Directive
 - Not built-in aluminum and tantalum electrolytic capacitor
- 薄型 8.5mm
 - 入力フィルタ内蔵
 - 入出力間絶縁 (AC2000V)
 - 高効率 87~90%
 - 広範囲な入力電圧
 - 高信頼性
 - 6面メタルシールド
 - リモートON/OFFコントロール
 - 可変出力電圧 $\pm 5\%$
 - 入力低電圧保護回路内蔵
 - 入力過電圧保護回路内蔵
 - 出力過電圧保護回路内蔵
115~140% 動作
 - 過熱保護回路内蔵
+110°C~+120°C
 - 動作周囲温度
-40°C~+85°C
 - 最大ケース温度
+105°C
 - RoHS2指令対応
 - アルミ電解コンデンサ及びタンタルコンデンサ不使用

General Characteristics

- Input Voltage, Range
DC12, 24, 48, 100V (See Table 1)
- Output Voltage, Current
See Table 1
- Output Voltage Accuracy
 $\pm 2\%$
 $\pm 3\%$ (3.3, 5, 6V Vout only)
 $\pm 5\%$ Adjustable (Used trimmer)
- Output Voltage Range
See Table 1
- Efficiency
 $\pm 0.3\%$ max. (at Vin Range)
 $\pm 0.5\%$ max. (0~100% Load)
- Line Regulation
3% Vin)Vp-p max.
- Load Regulation
40mVp-p max.
- Reflected Input Ripple, Noise
100mVp-p max. (48V Vout only)
- Output Ripple
200mVp-p max. (48V Vout only)
- Output Noise
Built-in, Auto-restart (See Fig. 2)
- Short Circuit Protection
115~140% Output Voltage
- Over Voltage Protection
ON : Short or 0~0.8V
OFF : Open or 2~10V
(Between pin ② ~ ③)
- Remote ON/OFF Control
0.02%/°C max.
- Temperature Coefficient
-40°C~+85°C (See Fig. 1)
- Operating Ambient Temp.
+105°C
- Max. Case Temperature
-50°C~+115°C
- Storage Temperature
AC2000V one minute
(Input-Output-Case)
- Isolation Voltage
100M Ω min. (at DC1000V)
(Input-Output-Case)
- Isolation Impedance
Main Body : 60g max.
Heat Sink : 40g max.
- Weight
20~95% RH
- Humidity
490m/s² (11msec 3directions)
- Shock
10~55Hz 98m/s²
(30minutes 3directions)
- Vibration
6 Sided Aluminum Case
- Surface Structure
260°C, for 15 seconds max.
- Soldering Conditions
360°C, for 5 seconds max.
- Soldering iron
500,000H
- MTBF
(Ta : 25°C, 80% Load, Nominal Vin)
- Warranty
5 years

Pin Outs & Dimensions (± 0.5 mm)

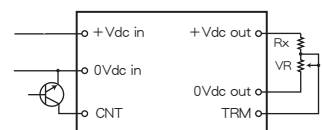


Pin Outs

| | |
|---|----------------|
| ① | +Vdc in |
| ② | 0 Vdc in |
| ③ | ON/OFF Control |
| ④ | +Vdc out |
| ⑤ | 0 Vdc out |
| ⑥ | TRM |

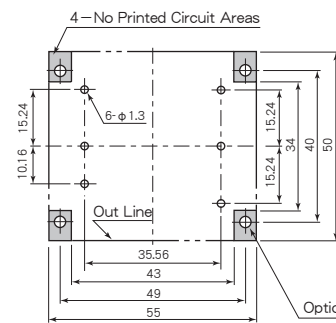
Application

ON/OFF Control and Vout Adjustment

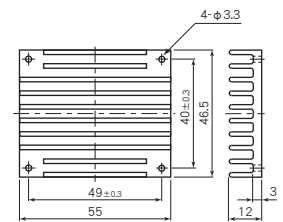


| | | | | | | | | |
|-----------------|------|-----|-----|-----|-----|------|------|------|
| Vout (V) | 3.3V | 5V | 6V | 12V | 15V | 24V | 28V | 48V |
| VR (Ω) | 50k | 50k | 50k | 50k | 50k | 50k | 50k | 50k |
| Rx (Ω) | 10k | 33k | 47k | 47k | 62k | 110k | 130k | 220k |

Holes on PCB (Top View)



Option Heat Sink



* Option Heat Sink Model : A4-3080

Selection Guide

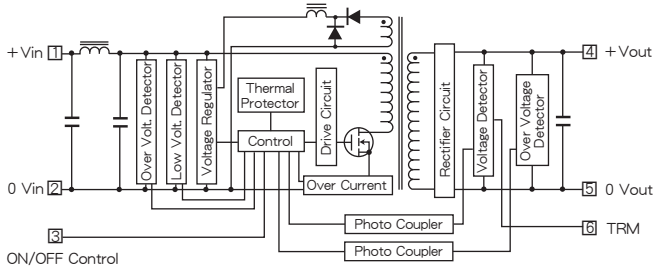
Table 1

| Model Number | Input Volt. (Range) (V. DC) | Output Voltage (V. DC) | Output Current (A) | Efficiency (Typical)(%) | | |
|------------------|-----------------------------|------------------------|--------------------|-------------------------|----------|----|
| | | | | 20% Load | 80% Load | |
| BRU12-3.3S 7A | 12 (8~18) | 3.3 | 7 | 84 | 87 | |
| BRU12-5S 6A | | 5 | 6 | 84 | 90 | |
| BRU12-6S 5A | | 6 | 5 | 84 | 90 | |
| BRU12-12S 2.5A | | 12 | 2.5 | 84 | 90 | |
| BRU12-15S 2A | | 15 | 2 | 84 | 90 | |
| BRU12-24S 1.25A | | 24 | 1.25 | 84 | 90 | |
| BRU12-28S 1.07A | | 28 | 1.07 | 84 | 90 | |
| BRU12-48S 0.6A | | 48 | 0.6 | 84 | 90 | |
| BRU24-3.3S 7A | | 24 (16~36) | 3.3 | 7 | 84 | 87 |
| BRU24-5S 6A | | | 5 | 6 | 84 | 90 |
| BRU24-6S 5A | 6 | | 5 | 84 | 90 | |
| BRU24-12S 2.5A | 12 | | 2.5 | 84 | 90 | |
| BRU24-15S 2A | 15 | | 2 | 84 | 90 | |
| BRU24-24S 1.25A | 24 | | 1.25 | 84 | 90 | |
| BRU24-28S 1.07A | 28 | 1.07 | 84 | 90 | | |
| BRU24-48S 0.6A | 48 | 0.6 | 84 | 90 | | |
| BRU48-3.3S 7A | 48 (32~76) | 3.3 | 7 | 84 | 87 | |
| BRU48-5S 6A | | 5 | 6 | 84 | 90 | |
| BRU48-6S 5A | | 6 | 5 | 84 | 90 | |
| BRU48-12S 2.5A | | 12 | 2.5 | 84 | 90 | |
| BRU48-15S 2A | | 15 | 2 | 84 | 90 | |
| BRU48-24S 1.25A | | 24 | 1.25 | 84 | 90 | |
| BRU48-28S 1.07A | | 28 | 1.07 | 84 | 90 | |
| BRU48-28S 1.07A | | 28 | 1.07 | 84 | 90 | |
| BRU100-3.3S 7A | 100 (64~144) | 3.3 | 7 | 84 | 87 | |
| BRU100-5S 6A | | 5 | 6 | 84 | 90 | |
| BRU100-6S 5A | | 6 | 5 | 84 | 90 | |
| BRU100-12S 2.5A | | 12 | 2.5 | 84 | 90 | |
| BRU100-15S 2A | | 15 | 2 | 84 | 90 | |
| BRU100-24S 1.25A | | 24 | 1.25 | 84 | 90 | |
| BRU100-28S 1.07A | | 28 | 1.07 | 84 | 90 | |
| BRU100-28S 1.07A | | 28 | 1.07 | 84 | 90 | |

* 上記仕様以外にも対応可能ですのでお問い合わせ下さい。
Please consult with us about other specification.

BRU SERIES DATA SHEET

Block Diagram



Characteristic Curves

Fig. 1 Derating Curve

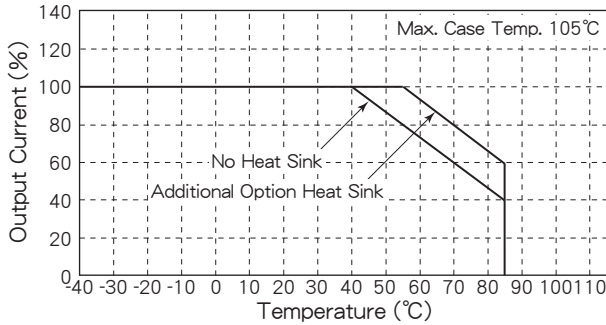


Fig. 2 Short Circuit Operating Area

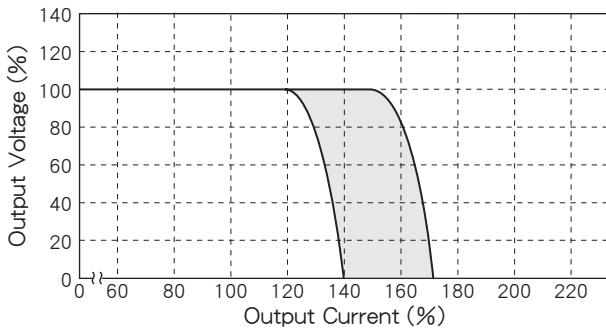


Fig. 3 Temperature Characteristic on Case Surface

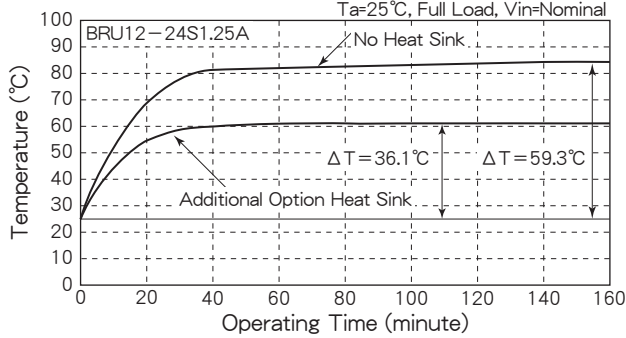


Fig. 4 Efficiency vs. Output Current

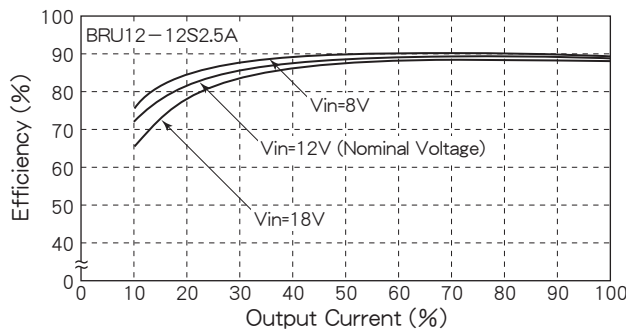


Fig. 5 Efficiency vs. Output Current

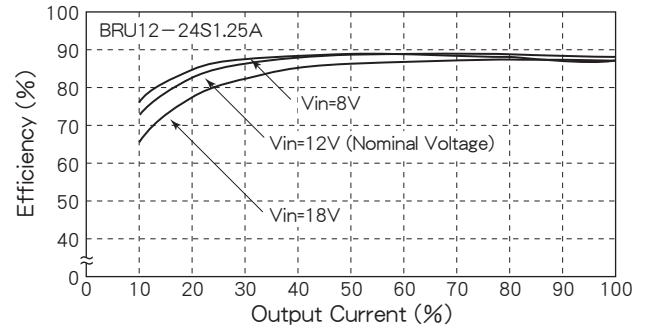


Fig. 6 Efficiency vs. Output Current

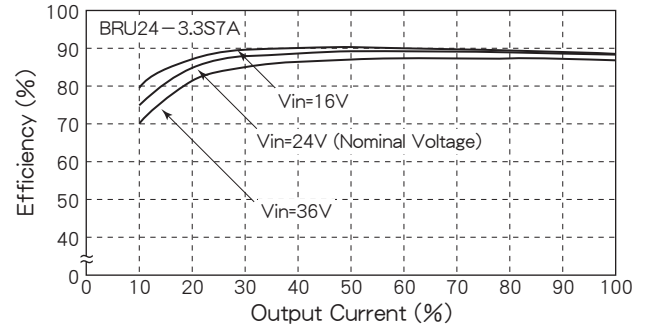


Fig. 7 Efficiency vs. Output Current

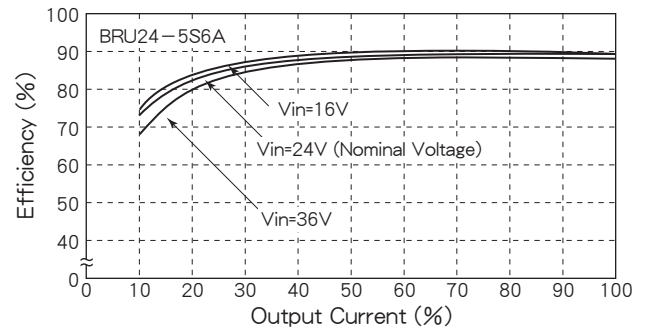


Fig. 8 Efficiency vs. Output Current

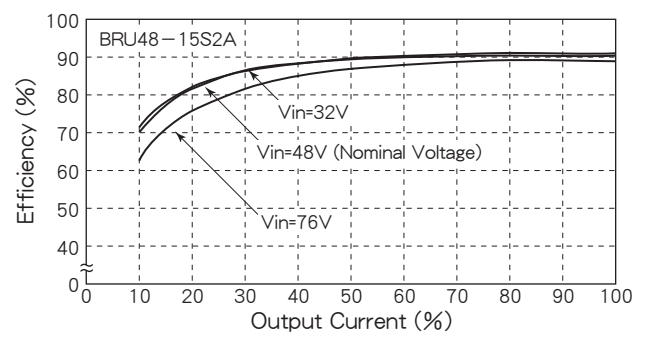
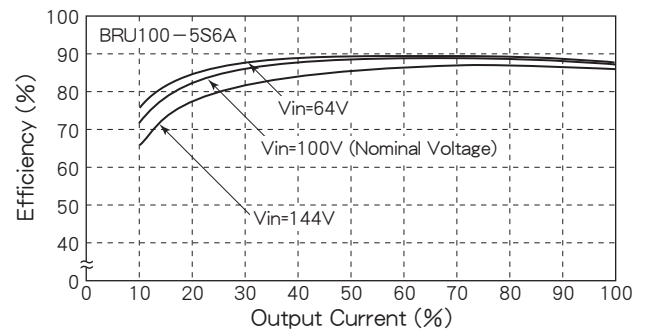
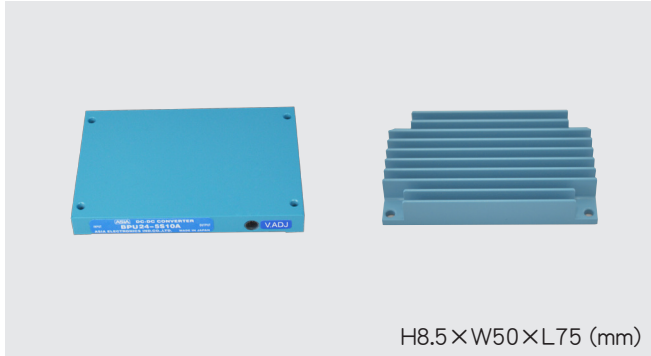


Fig. 9 Efficiency vs. Output Current



BPU SERIES

20~50W DC/DC CONVERTERS Single Output & Dual Outputs



H8.5×W50×L75 (mm)

Features

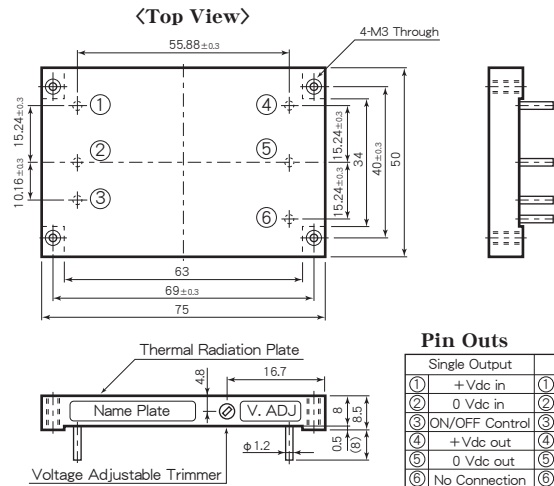
- Low Profile 8.5mm
 - 6 Sided Metal Shielding
 - Built-in Input Filter
 - Wide Input Voltage Range
 - Input-Output Isolation
 - Adjustable Output Volt. $\pm 5\%$
 - High Efficiency 81~90%
 - Remote ON/OFF Control
 - Input Low Voltage Protection
 - Input Over Voltage Protection
 - Output Over Voltage Protection 115~140% Operation
 - Thermal Protection +110°C~+120°C
 - Operating Ambient Temperature -40°C~+85°C
 - Max. Case Temperature +105°C
 - High Reliability
 - Conformity to RoHS2 Directive
 - Not built-in aluminum and tantalum electrolytic capacitor
- 薄型 8.5mm
 - 6面メタルシールド
 - 入力フィルタ内蔵
 - 広範囲な入力電圧
 - 入出力間絶縁
 - 可変出力電圧 $\pm 5\%$
 - 高効率 81~90%
 - リモートON/OFFコントロール
 - 入力低電圧保護回路内蔵
 - 入力過電圧保護回路内蔵
 - 出力過電圧保護回路内蔵 115~140% 動作
 - 過熱保護回路内蔵 +110°C~+120°C
 - 動作周囲温度 -40°C~+85°C
 - 最大ケース温度 +105°C
 - 高信頼性
 - RoHS2指令対応
 - アルミ電解コンデンサ及びタンタルコンデンサ不使用

General Characteristics

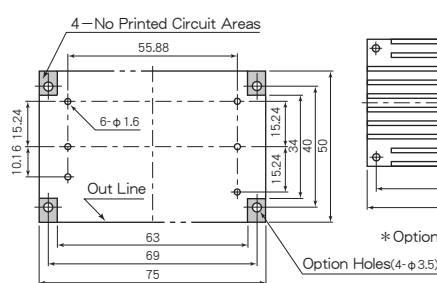
(at Ta : 25°C, Full Load, Nominal Vin)

- Input Voltage, Range DC12, 24, 48, 100V (See Table 1)
- Output Voltage, Current See Table 1
- Output Voltage Range $\pm 5\%$ Adjustable
- Efficiency See Table 1
- Line Regulation $\pm 0.3\%$ max. (at Vin Range)
- Load Regulation Single : $\pm 0.5\%$ max. (0~100% Load)
Dual : $\pm 3\%$ max. (10~100% Load)
(3% Vin)/Vp-p max.
40mVp-p max.
100mVp-p max.
- Reflected Input Ripple, Noise
- Output Ripple Built-in, Auto-restart (See Fig. 2)
- Output Noise 115~140% Output Voltage
- Short Circuit Protection ON : Short or 0~0.8V
OFF : Open or 2~10V
(Between pin ② ~ ③)
- Over Voltage Protection 0.02%/°C max.
- Remote ON/OFF Control -40°C~+85°C (See Fig. 1)
- Temperature Coefficient +105°C
- Operating Ambient Temp. -40°C~+115°C
- Max. Case Temperature AC1500V 1 min.
AC2000V 1 min. (100V Vin only)
(Input-Output-Case)
- Storage Temperature 100MΩ min. (at DC1000V)
(Input-Output-Case)
- Isolation Voltage
- Isolation Impedance
- Weight Main Body : 100g max.
Heat Sink : 55g max.
- Humidity 20~95% RH
- Shock 490m/s² (11msec 3directions)
- Vibration 10~55Hz 98m/s²
(30minutes 3directions)
- Surface Structure 6 Sided Aluminum Case
- Soldering Conditions 260°C, for 15 seconds max.
Soldering DIP 360°C, for 5 seconds max.
Soldering iron
- MTBF Single : 500,000H
Dual : 600,000H
(Ta : 25°C, 80% Load, Nominal Vin)
- Warranty 5 years

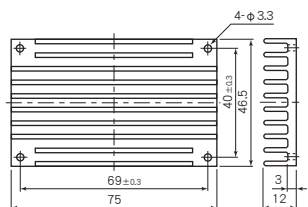
Pin Outs & Dimensions (±0.5mm)



Holes on PCB (Top View)



Option Heat Sink



* Option Heat Sink Model : A4-3079

Selection Guide

Table 1

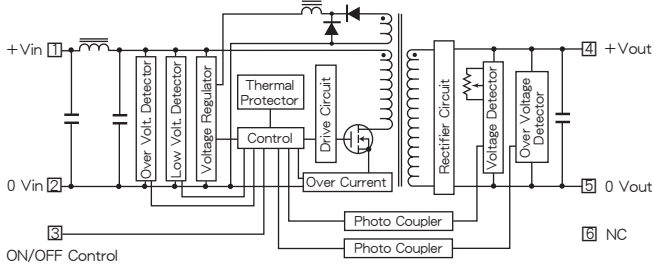
| Model Number | Input Voltage (Range) (V. DC) | Output Voltage (V. DC) | Output Current (A) | Efficiency (typ.) (%) | | |
|----------------|-------------------------------|------------------------|--------------------|-----------------------|----------|----|
| | | | | 30% Load | 80% Load | |
| BPU12-33S12A | 12 (8~18) | 3.3 | 12 | 87 | 85 | |
| BPU12-5S10A | | 5 | 10 | 86 | 87 | |
| BPU12-6S8.4A | | 6 | 8.4 | 87 | 87 | |
| BPU12-12S4.2A | | 12 | 4.2 | 84 | 88 | |
| BPU12-15S3.3A | | 15 | 3.3 | 83 | 88 | |
| BPU12-24S2.1A | | 24 | 2.1 | 83 | 88 | |
| BPU12-33S1A | | ±3.3 | ±3 | 80 | 81 | |
| BPU12-5D3A | | ±5 | ±3 | 80 | 82 | |
| BPU12-12D1.5A | | ±12 | ±1.5 | 81 | 83 | |
| BPU12-15D1.2A | | ±15 | ±1.2 | 81 | 84 | |
| BPU24-33S12A | | 24 (16~36) | 3.3 | 12 | 84 | 85 |
| BPU24-5S10A | | | 5 | 10 | 85 | 88 |
| BPU24-6S8.4A | | | 6 | 8.4 | 87 | 89 |
| BPU24-12S4.2A | | | 12 | 4.2 | 84 | 89 |
| BPU24-15S3.3A | | | 15 | 3.3 | 85 | 89 |
| BPU24-24S2.1A | | | 24 | 2.1 | 84 | 89 |
| BPU24-33S1A | | | ±3.3 | ±3 | 80 | 81 |
| BPU24-5D3A | | | ±5 | ±3 | 80 | 82 |
| BPU24-12D1.5A | ±12 | | ±1.5 | 81 | 84 | |
| BPU24-15D1.2A | ±15 | | ±1.2 | 82 | 85 | |
| BPU48-33S12A | 48 (32~72) | | 3.3 | 12 | 85 | 86 |
| BPU48-5S10A | | | 5 | 10 | 85 | 88 |
| BPU48-6S8.4A | | | 6 | 8.4 | 85 | 88 |
| BPU48-12S4.2A | | | 12 | 4.2 | 85 | 90 |
| BPU48-15S3.3A | | | 15 | 3.3 | 85 | 90 |
| BPU48-24S2.1A | | | 24 | 2.1 | 85 | 90 |
| BPU48-33S1A | | | ±3.3 | ±3 | 80 | 81 |
| BPU48-5D3A | | | ±5 | ±3 | 80 | 82 |
| BPU48-12D1.5A | | ±12 | ±1.5 | 81 | 84 | |
| BPU48-15D1.2A | | ±15 | ±1.2 | 82 | 85 | |
| BPU100-33S12A | | 100 (64~144) | 3.3 | 12 | 84 | 87 |
| BPU100-5S10A | | | 5 | 10 | 86 | 89 |
| BPU100-6S8.4A | | | 6 | 8.4 | 84 | 89 |
| BPU100-12S4.2A | | | 12 | 4.2 | 85 | 90 |
| BPU100-15S3.3A | | | 15 | 3.3 | 85 | 90 |
| BPU100-24S2.1A | | | 24 | 2.1 | 85 | 90 |
| BPU100-33S1A | | | ±3.3 | ±3 | 80 | 81 |
| BPU100-5D3A | | | ±5 | ±3 | 80 | 82 |
| BPU100-12D1.5A | ±12 | | ±1.5 | 81 | 84 | |
| BPU100-15D1.2A | ±15 | | ±1.2 | 82 | 85 | |

* 上記仕様以外にも対応可能ですので お問い合わせ下さい。
Please consult with us about other specification.

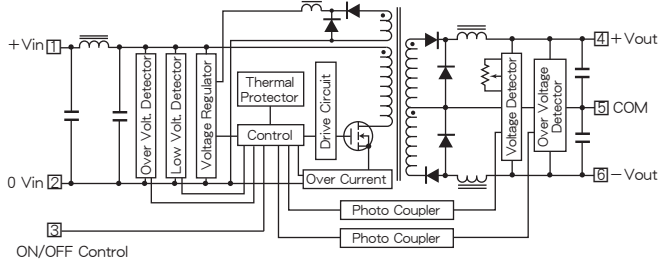
BPU SERIES DATA SHEET

Block Diagram

Single Output



Dual Outputs



Characteristic Curves

Fig. 1 Derating Curve

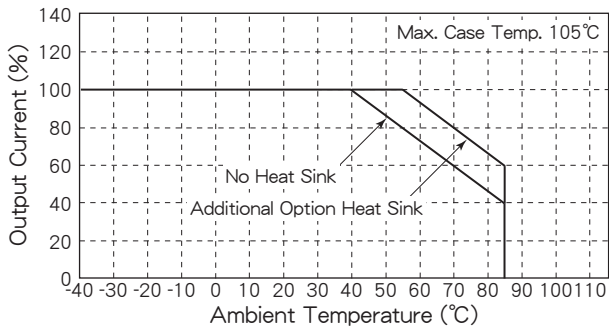


Fig. 2 Short Circuit Operating Area

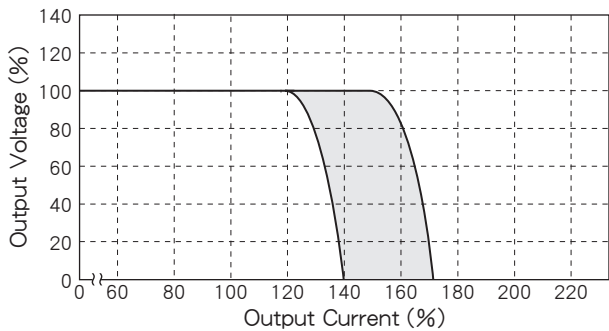


Fig. 3 Temperature Characteristic on Case Surface

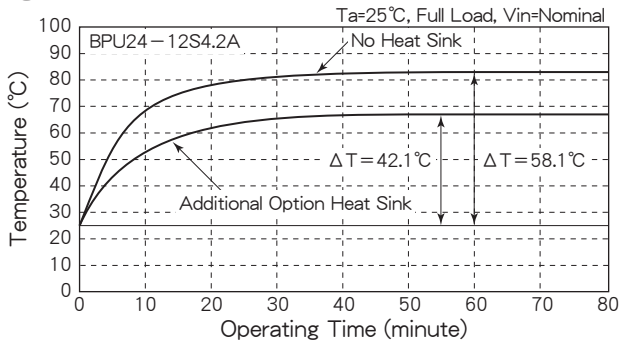


Fig. 4 Efficiency vs. Output Current

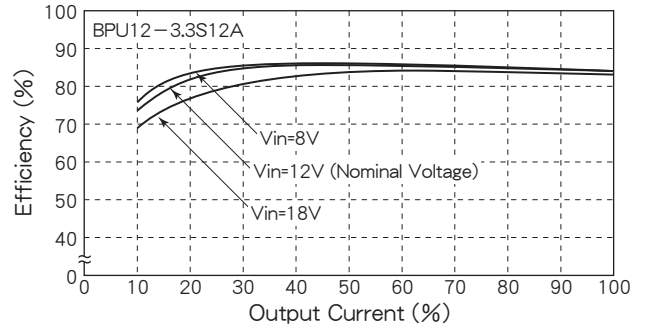


Fig. 5 Efficiency vs. Output Current

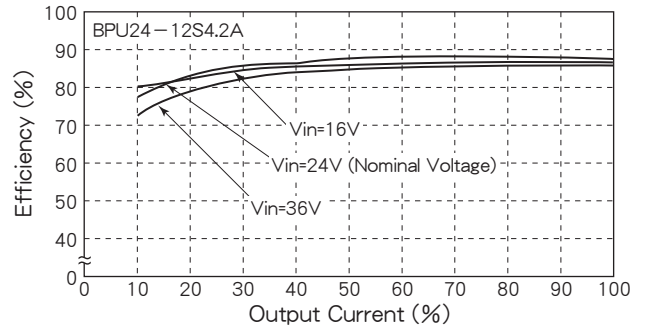


Fig. 6 Efficiency vs. Output Current

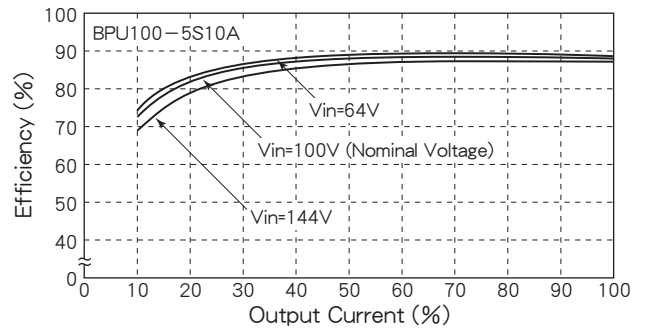


Fig. 7 Efficiency vs. Output Current

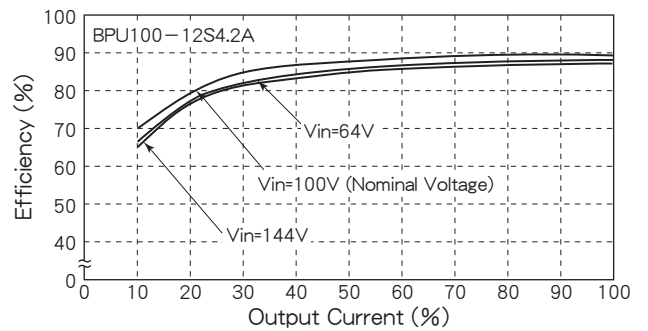
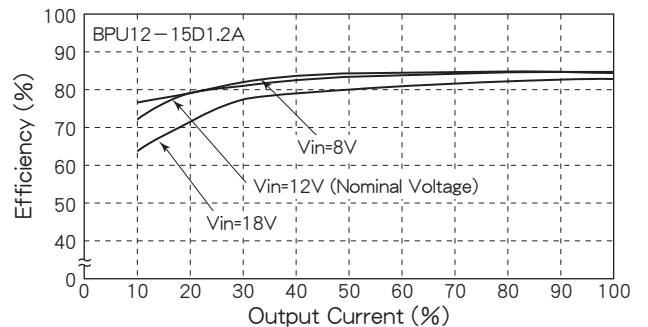


Fig. 8 Efficiency vs. Output Current



BTU SERIES

80~100W DC/DC CONVERTERS Single Output



H12.8 x W50 x L98 (mm)

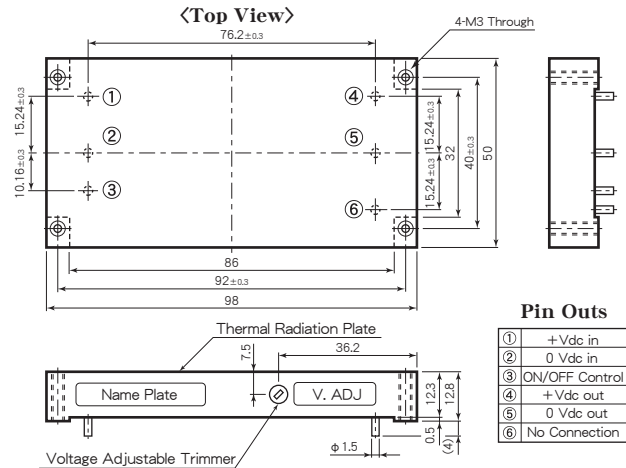
Features

- Low Profile 12.8mm
 - Built-in Input Filter
 - Input-Output Isolation
 - High Efficiency 88~91%
 - Wide Input Voltage Range
 - High Reliability
 - 6 Sided Metal Shielding
 - Remote ON/OFF Control
 - Adjustable Output Voltage $\pm 5\%$
 - Input Low Voltage Protection
 - Input Over Voltage Protection
 - Output Over Voltage Protection 115~140% Operation
 - Thermal Protection +110°C ~ +120°C
 - Operating Ambient Temperature -40°C ~ +85°C
 - Max. Case Temperature +105°C
 - Conformity to RoHS2 Directive
 - Not built-in aluminum and tantalum electrolytic capacitor
- 薄型 12.8mm
 - 入力フィルタ内蔵
 - 入出力間絶縁
 - 高効率 88~91%
 - 広範囲な入力電圧
 - 高信頼性
 - 6面メタルシールド
 - リモートON/OFFコントロール
 - 可変出力電圧 $\pm 5\%$
 - 入力低電圧保護回路内蔵
 - 入力過電圧保護回路内蔵
 - 出力過電圧保護回路内蔵 115~140% 動作
 - 過熱保護回路内蔵 +110°C ~ +120°C
 - 動作周囲温度 -40°C ~ +85°C
 - 最大ケース温度 105°C
 - RoHS2指令対応
 - アルミ電解コンデンサ及びタンタルコンデンサ不使用

General Characteristics

- (at T_a : 25°C, Full Load, Nominal V_{in})
- Input Voltage, Range DC12, 24, 48, 100V (See Table 1)
 - Output Voltage, Current See Table 1
 - Output Voltage Range $\pm 5\%$ Adjustable
 - Efficiency See Table 1
 - Line Regulation $\pm 0.3\%$ max. (at V_{in} Range)
 - Load Regulation $\pm 0.5\%$ max. (0~100% Load)
 - Reflected Input Ripple, Noise (3% V_{in}) V_p -p max.
 - Output Ripple 40mVp-p max.
 - Output Noise 100mVp-p max.
 - Short Circuit Protection Built-in, Auto-restart (See Fig. 2)
 - Over Voltage Protection 115~140% Output Voltage
 - Remote ON/OFF Control ON : Short or 0~0.8V
OFF : Open or 2~10V
(Between pin ② ~ ③)
 - Temperature Coefficient 0.02%/°C max.
 - Operating Ambient Temp. -40°C ~ +85°C (See Fig. 1)
 - Max. Case Temperature +105°C
 - Storage Temperature -55°C ~ +125°C
 - Isolation Voltage AC1500V 1 min.
AC2000V 1 min. (100V V_{in} only)
(Input-Output-Case)
 - Isolation Impedance 100M Ω min. (at DC1000V)
(Input-Output-Case)
 - Weight Main Body : 170g max.
Heat Sink : 73g max.
 - Humidity 20~95% RH
 - Shock 490m/s² (11msec 3directions)
 - Vibration 10~55Hz 98m/s²
(30minutes 3directions)
 - Surface Structure 6 Sided Aluminum Case
 - Soldering Conditions Soldering DIP 260°C, for 15 seconds max.
Soldering iron 360°C, for 5 seconds max.
 - MTBF 400,000H
(T_a : 25°C, 80% Load, Nominal V_{in})
 - Warranty 5 years

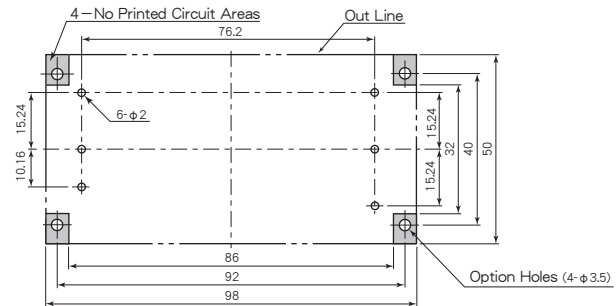
Pin Outs & Dimensions (± 0.5 mm)



Pin Outs

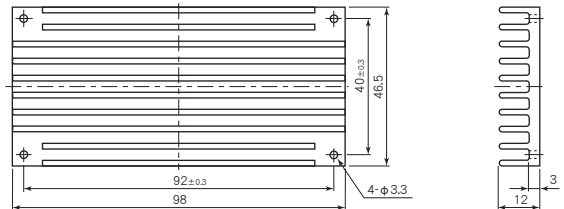
| | |
|---|----------------|
| ① | +Vdc in |
| ② | 0 Vdc in |
| ③ | ON/OFF Control |
| ④ | +Vdc out |
| ⑤ | 0 Vdc out |
| ⑥ | No Connection |

Holes on PCB (Top View)



Option Heat Sink

* Option Heat Sink Model : A3-7292



Selection Guide

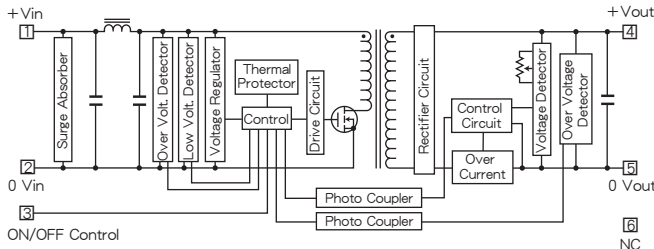
Table 1

| Model Number | Input Volt. (Range) (V. DC) | Output Voltage (V. DC) | Output Current (A) | Efficiency (Typical)(%) | |
|-----------------|-----------------------------|------------------------|--------------------|-------------------------|----------|
| | | | | 20% Load | 80% Load |
| BTU 12-3.3S 24A | 12 (8~18) | 3.3 | 24 | 88 | 88 |
| BTU 12-5S 20A | | 5 | 20 | 87 | 89 |
| BTU 12-6S16.7A | | 6 | 16.7 | 87 | 89 |
| BTU 12-12S 8.4A | | 12 | 8.4 | 87 | 89 |
| BTU 12-15S 6.7A | | 15 | 6.7 | 86 | 89 |
| BTU 12-24S 4.2A | | 24 | 4.2 | 85 | 89 |
| BTU 24-3.3S 24A | 24 (16~36) | 3.3 | 24 | 88 | 88 |
| BTU 24-5S 20A | | 5 | 20 | 88 | 90 |
| BTU 24-6S16.7A | | 6 | 16.7 | 88 | 90 |
| BTU 24-12S 8.4A | | 12 | 8.4 | 86 | 90 |
| BTU 24-15S 6.7A | | 15 | 6.7 | 86 | 90 |
| BTU 24-24S 4.2A | | 24 | 4.2 | 86 | 90 |
| BTU 48-3.3S 24A | 48 (32~72) | 3.3 | 24 | 87 | 88 |
| BTU 48-5S 20A | | 5 | 20 | 87 | 90 |
| BTU 48-6S16.7A | | 6 | 16.7 | 87 | 90 |
| BTU 48-12S 8.4A | | 12 | 8.4 | 87 | 91 |
| BTU 48-15S 6.7A | | 15 | 6.7 | 86 | 91 |
| BTU 48-24S 4.2A | | 24 | 4.2 | 86 | 91 |
| BTU100-3.3S 24A | 100 (64~144) | 3.3 | 24 | 85 | 88 |
| BTU100-5S 20A | | 5 | 20 | 86 | 90 |
| BTU100-6S16.7A | | 6 | 16.7 | 86 | 90 |
| BTU100-12S 8.4A | | 12 | 8.4 | 86 | 91 |
| BTU100-15S 6.7A | | 15 | 6.7 | 86 | 91 |
| BTU100-24S 4.2A | | 24 | 4.2 | 86 | 89 |

※ 上記仕様以外にも対応可能ですのでお問い合わせ下さい。
Please consult with us about other specification.

BTU SERIES DATA SHEET

Block Diagram



Characteristic Curves

Fig. 1 Derating Curve

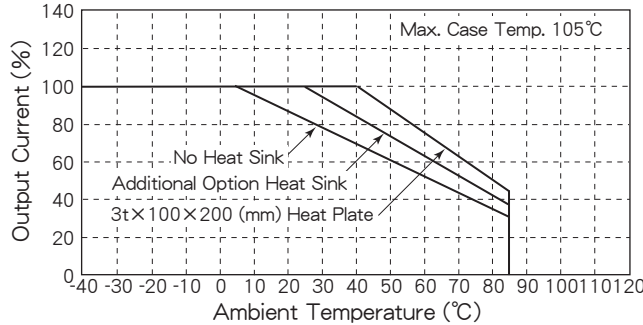


Fig. 2 Short Circuit Operating Area

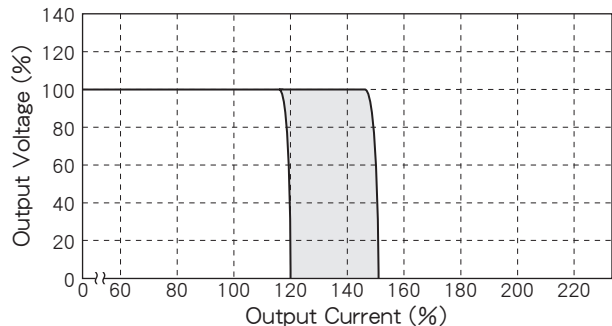


Fig. 3 Temperature Characteristic on Case Surface

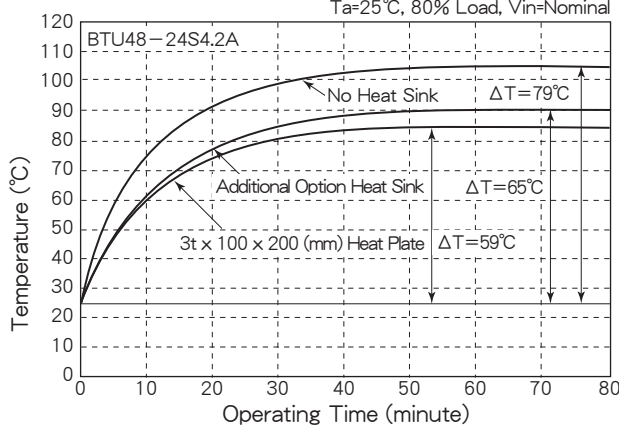


Fig. 4 Efficiency vs. Output Current

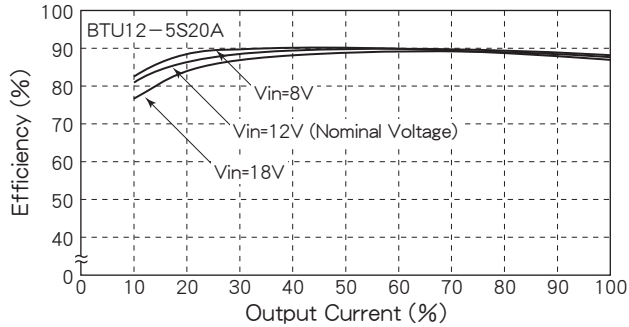


Fig. 5 Efficiency vs. Output Current

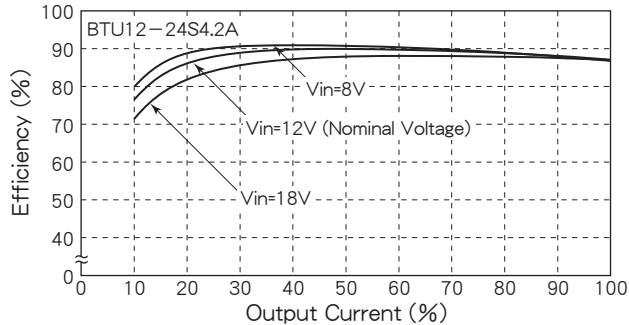


Fig. 6 Efficiency vs. Output Current

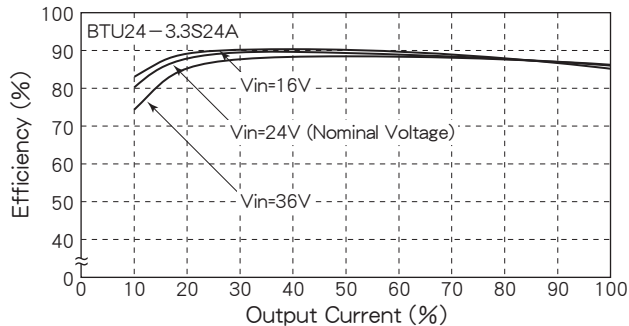


Fig. 7 Efficiency vs. Output Current

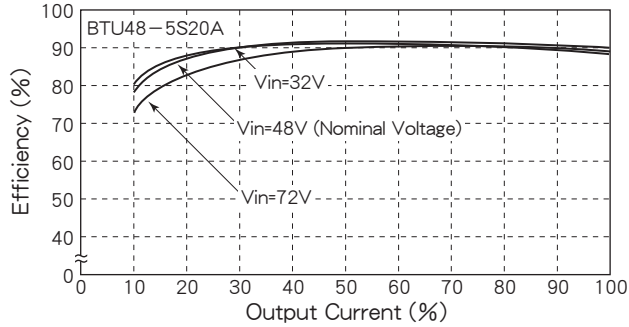
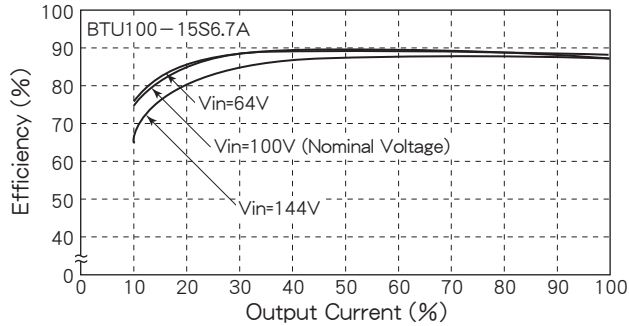


Fig. 8 Efficiency vs. Output Current



KMP SERIES

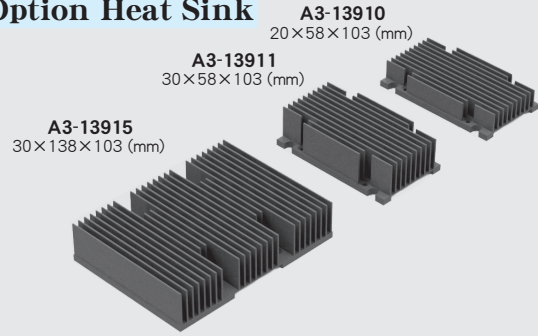
105~200W DC/DC CONVERTERS

Single Output



H20×W60×L105 (mm)

Option Heat Sink



Features

- Built-in Input Filter
 - Input-Output Isolation
 - High Efficiency 87~91%
 - Wide Input Voltage Range
 - High Reliability
 - 6 Sided Metal Shielding
 - Adjustable Output Volt. ±8%
 - Input Low Voltage Protection
 - Input Over Voltage Protection
 - Output Over Voltage Protection
 - Thermal Protection
+110°C~+120°C
 - Remote ON/OFF Control
 - Operating Ambient Temperature
-40°C~+85°C
 - Conformity to RoHS2 Directive
 - Not built-in aluminum and tantalum electrolytic capacitor
- 入力フィルタ内蔵
 - 入出力間絶縁
 - 高効率 87~91%
 - 広範囲な入力電圧
 - 高信頼性
 - 6面メタルシールド
 - 可変出力電圧 ±8%
 - 入力低電圧保護回路内蔵
 - 入力過電圧保護回路内蔵
 - 出力過電圧保護回路内蔵
 - 過熱保護回路内蔵
+110°C~+120°C
 - リモートON/OFFコントロール
 - 動作周囲温度
-40°C~+85°C
 - RoHS2指令対応
 - アルミ電解コンデンサ及びタンタルコンデンサ不使用

General Characteristics

- Input Voltage, Range (at Ta : 25°C, Full Load, Nominal Vin)
DC12, 24, 48, 100, 140V (See Table 1)
- Output Voltage, Current See Table 1
- Output Voltage Accuracy ±2%
- Output Voltage Range ±3% (3.3, 5, 6V Vout only)
- Efficiency ±8% Adjustable (Used trimmer)
- Line Regulation See Table 1
- Load Regulation ±0.3% max. (at Vin Range)
- Load Regulation ±1% max.
- Reflected Input Ripple, Noise ±1.5% max. (3.3, 5, 6V Vout only) (0~100% Load)
- Output Ripple (5% Vin)Vp-p max. 80mVp-p max.
- Output Noise (0.5% Vout+100mV)p-p max.
- Short Circuit Protection Built-in, Auto-restart (See Fig. 5)
- Over Voltage Protection 115~140% Output Voltage
- Remote ON/OFF Control ON : Short or 0~0.8V
OFF : Open or 2~10V (Between pin ② ~ ③)
- Temperature Coefficient 0.02%/°C max.
- Operating Ambient Temp. -40°C~+85°C (See Fig. 1)
- Max. Case Temperature +105°C
- Storage Temperature -55°C~+125°C
- Isolation Voltage AC2000V one minute (Input-Output-Case)
- Isolation Impedance 100MΩ min. (at DC1000V) (Input-Output-Case)
- Weight Main Body : 300g max.
Heat Sink
A3-13910 : 135g max.
A3-13911 : 175g max.
A3-13915 : 425g max.
- Humidity 20~95% RH
- Shock 490m/s² (11msec 3directions)
- Vibration 10~55Hz 98m/s² (30minutes 3directions)
- Surface Structure Aluminum Case
- Soldering Conditions 260°C, for 15 seconds max.
Soldering DIP 360°C, for 5 seconds max.
- Soldering iron
- MTBF 400,000H (Ta : 25°C, 80% Load, Nominal Vin)
- Warranty 5 years

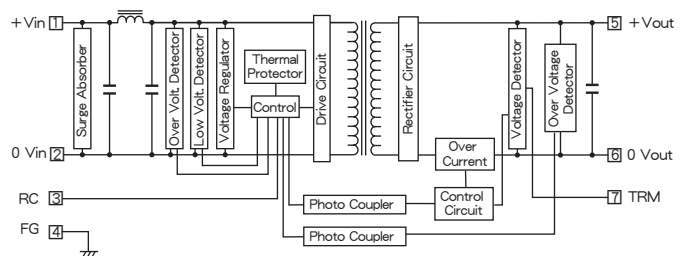
Selection Guide

Table 1

| Model Number | Input Volt. (Range) (V. DC) | Output Voltage (V. DC) | Output Current (A) | Efficiency (Typical)(%) | | |
|---------------------|---|------------------------|--------------------|-------------------------|----------|----------|
| | | | | 20% Load | 50% Load | 80% Load |
| KMP12 - 3.3S 32A | 12 (8~18) at 50% Load (9~18) at 100% Load | 3.3 | 32 | 85 | 88 | 87 |
| KMP12 - 5S 28A | | 5 | 28 | 86 | 90 | 88 |
| KMP12 - 6S23.3A | | 6 | 23.3 | 86 | 90 | 88 |
| KMP12 - 12S13.4A | | 12 | 13.4 | 87 | 90 | 89 |
| KMP12 - 13.8S11.6A | | 13.8 | 11.6 | 87 | 90 | 89 |
| KMP12 - 15S10.7A | | 15 | 10.7 | 87 | 90 | 89 |
| KMP12 - 24S 6.7A | | 24 | 6.7 | 87 | 90 | 89 |
| KMP12 - 28S 5.8A | | 28 | 5.8 | 87 | 90 | 89 |
| KMP12 - 48S 3.4A | | 48 | 3.4 | 87 | 90 | 89 |
| KMP24 - 3.3S 40A | | 24 (16~36) | 3.3 | 40 | 88 | 91 |
| KMP24 - 5S 32A | 5 | | 32 | 90 | 92 | 91 |
| KMP24 - 6S26.6A | 6 | | 26.6 | 90 | 92 | 91 |
| KMP24 - 12S16.7A | 12 | | 16.7 | 90 | 92 | 91 |
| KMP24 - 13.8S14.5A | 13.8 | | 14.5 | 90 | 92 | 91 |
| KMP24 - 15S13.4A | 15 | | 13.4 | 90 | 92 | 91 |
| KMP24 - 24S 8.4A | 24 | | 8.4 | 90 | 92 | 91 |
| KMP24 - 28S 7.2A | 28 | | 7.2 | 90 | 92 | 91 |
| KMP24 - 48S 4.2A | 48 | | 4.2 | 90 | 92 | 91 |
| KMP48 - 3.3S 40A | 48 (36~76) | | 3.3 | 40 | 88 | 91 |
| KMP48 - 5S 32A | | 5 | 32 | 91 | 92 | 91 |
| KMP48 - 6S26.6A | | 6 | 26.6 | 91 | 92 | 91 |
| KMP48 - 12S16.7A | | 12 | 16.7 | 91 | 92 | 91 |
| KMP48 - 13.8S14.5A | | 13.8 | 14.5 | 91 | 92 | 91 |
| KMP48 - 15S13.4A | | 15 | 13.4 | 91 | 92 | 91 |
| KMP48 - 24S 8.4A | | 24 | 8.4 | 91 | 92 | 91 |
| KMP48 - 28S 7.2A | | 28 | 7.2 | 91 | 92 | 91 |
| KMP48 - 48S 4.2A | | 48 | 4.2 | 91 | 92 | 91 |
| KMP100 - 3.3S 40A | | 100 (64~144) | 3.3 | 40 | 85 | 91 |
| KMP100 - 5S 32A | 5 | | 32 | 87 | 92 | 91 |
| KMP100 - 6S26.6A | 6 | | 26.6 | 87 | 92 | 91 |
| KMP100 - 12S16.7A | 12 | | 16.7 | 87 | 92 | 91 |
| KMP100 - 13.8S14.5A | 13.8 | | 14.5 | 87 | 92 | 91 |
| KMP100 - 15S13.4A | 15 | | 13.4 | 87 | 92 | 91 |
| KMP100 - 24S 8.4A | 24 | | 8.4 | 87 | 92 | 91 |
| KMP100 - 28S 7.2A | 28 | | 7.2 | 87 | 92 | 91 |
| KMP100 - 48S 4.2A | 48 | | 4.2 | 87 | 92 | 91 |
| KMP140 - 3.3S 40A | 140 (90~200) | | 3.3 | 40 | 85 | 91 |
| KMP140 - 5S 32A | | 5 | 32 | 87 | 92 | 91 |
| KMP140 - 6S26.6A | | 6 | 26.6 | 87 | 92 | 91 |
| KMP140 - 12S16.7A | | 12 | 16.7 | 87 | 92 | 91 |
| KMP140 - 13.8S14.5A | | 13.8 | 14.5 | 87 | 92 | 91 |
| KMP140 - 15S13.4A | | 15 | 13.4 | 87 | 92 | 91 |
| KMP140 - 24S 8.4A | | 24 | 8.4 | 87 | 92 | 91 |
| KMP140 - 28S 7.2A | | 28 | 7.2 | 87 | 92 | 91 |
| KMP140 - 48S 4.2A | | 48 | 4.2 | 87 | 92 | 91 |

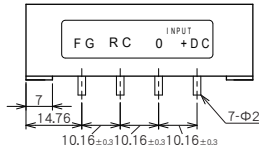
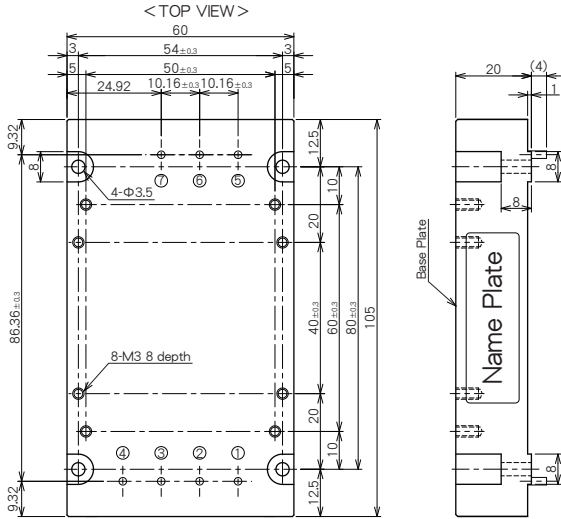
*上記仕様以外にも対応可能ですのでお問い合わせください。
Please consult with us about other specification.

Block Diagram



KMP SERIES DATA SHEET

Pin Outs & Dimensions ($\pm 0.5\text{mm}$)

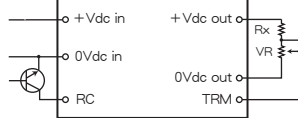


Pin Outs

| | |
|---|-----------|
| ① | +Vdc in |
| ② | 0 Vdc in |
| ③ | RC |
| ④ | FG |
| ⑤ | +Vdc out |
| ⑥ | 0 Vdc out |
| ⑦ | TRM |

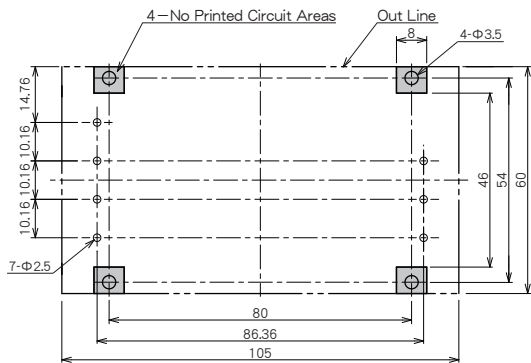
Application

ON/OFF Control and Vout Adjustment



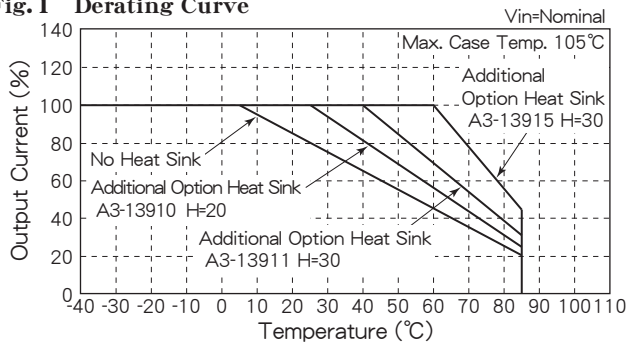
| | | | | | | | | | |
|-----------------|------|-----|------|-----|-------|-----|-----|-----|-----|
| Vout (V) | 3.3V | 5V | 6V | 12V | 13.8V | 15V | 24V | 28V | 48V |
| VR (Ω) | 50k | 50k | 50k | 50k | 50k | 50k | 50k | 50k | 50k |
| Rx (Ω) | 6.2k | 3k | 6.8k | 13k | 16k | 20k | 39k | 51k | 50k |

Holes on PCB (Top View)



Characteristic Curves

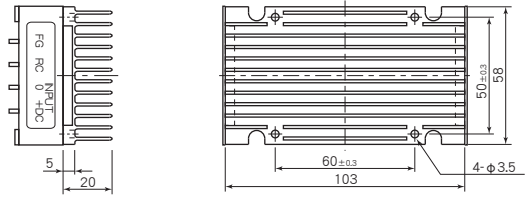
Fig. 1 Derating Curve



Option Heat Sink

Fig. 2 Temperature Characteristic on Case Surface

* Option Heat Sink Model : A3-13910



KMP24-12S16.7A Additional Heat Sink A3-13910
Ta=25°C, 100% Load, Vin=Nominal

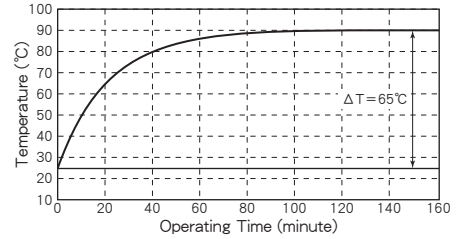
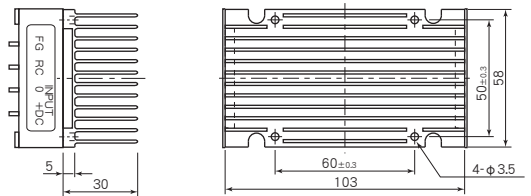


Fig. 3 Temperature Characteristic on Case Surface

* Option Heat Sink Model : A3-13911



KMP24-12S16.7A Additional Heat Sink A3-13911
Ta=25°C, 100% Load, Vin=Nominal

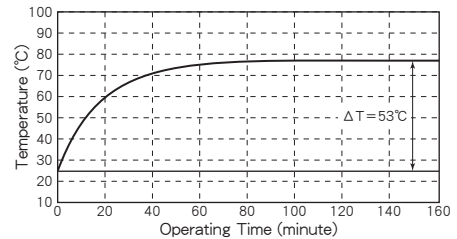
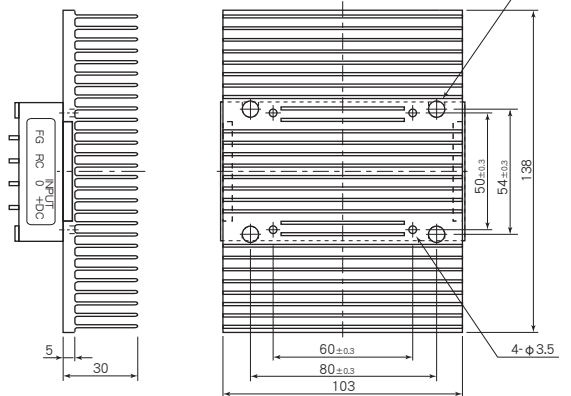
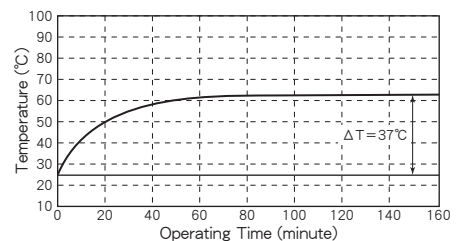


Fig. 4 Temperature Characteristic on Case Surface

* Option Heat Sink Model : A3-13915



KMP24-12S16.7A Additional Heat Sink A3-13915
Ta=25°C, 100% Load, Vin=Nominal



KMP SERIES DATA SHEET

Fig. 5 Short Circuit Operating Area

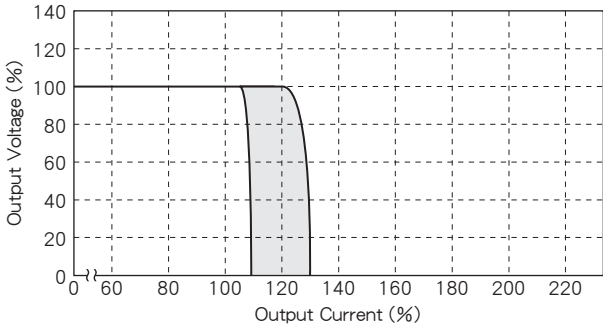


Fig. 6 Efficiency vs. Output Current

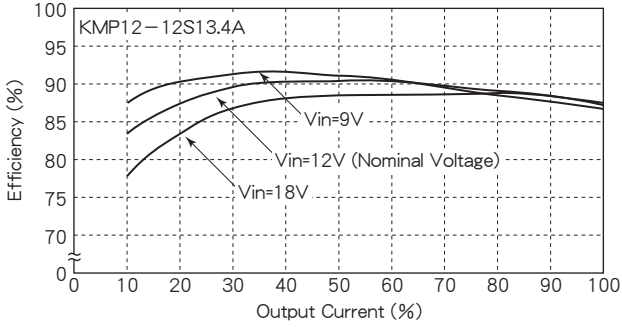


Fig. 7 Efficiency vs. Output Current

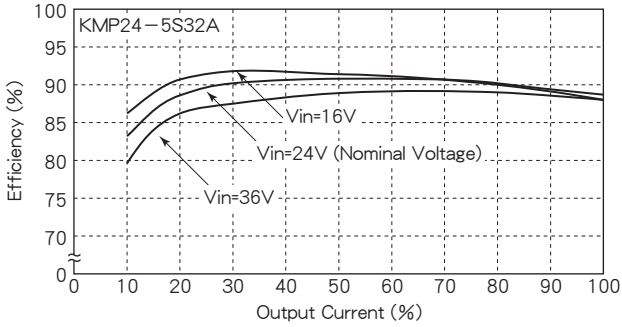


Fig. 8 Efficiency vs. Output Current

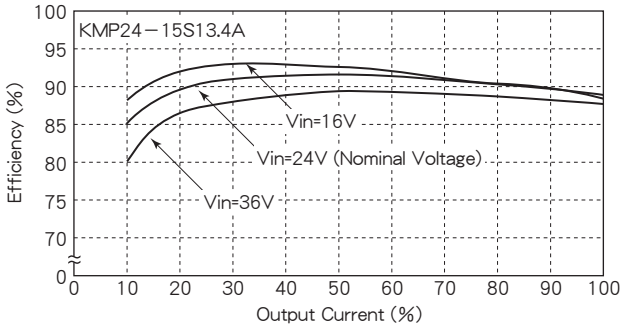


Fig. 9 Efficiency vs. Output Current

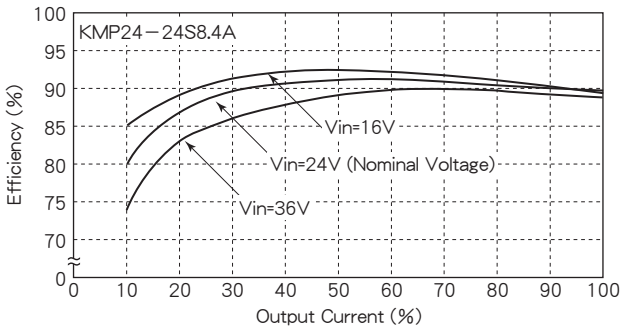


Fig. 10 Efficiency vs. Output Current

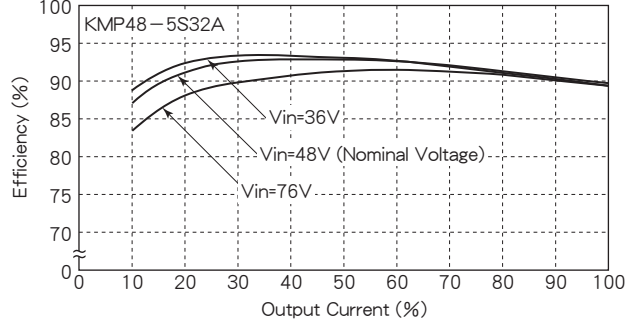


Fig. 11 Efficiency vs. Output Current

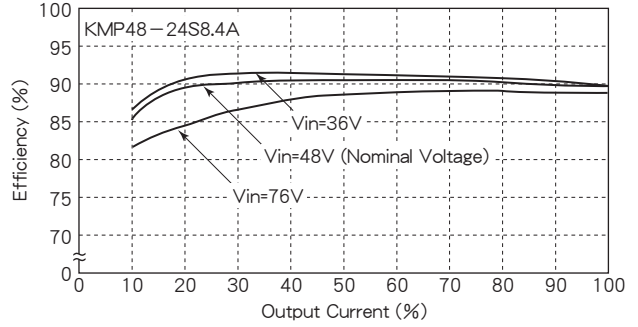
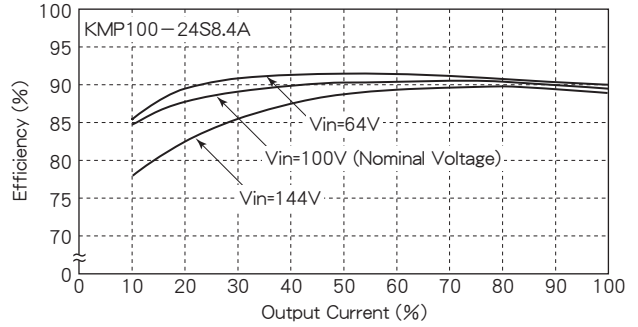


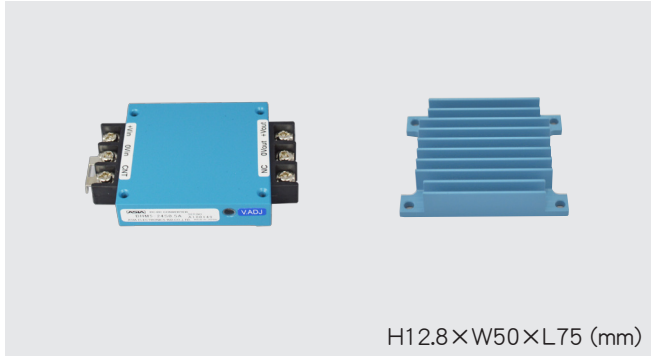
Fig. 12 Efficiency vs. Output Current



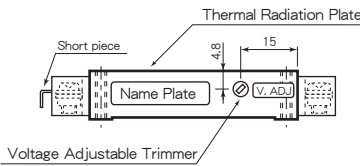
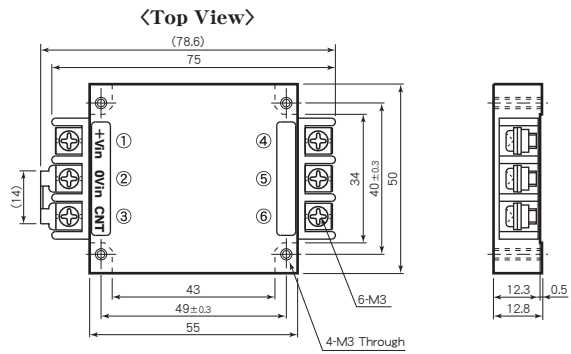
KMP SERIES DATA SHEET

BHM SERIES

7~15W DC/DC CONVERTERS Single Output & Dual Outputs



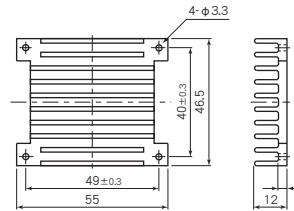
Terminal Outs & Dimensions (±0.5mm)



Terminal Outs

| Single Output | | Dual Outputs | |
|------------------|------------------|--------------|------------|
| ① +Vdc in | ① +Vdc in | ② 0 Vdc in | ② 0 Vdc in |
| ③ ON/OFF Control | ③ ON/OFF Control | ④ +Vdc out | ④ +Vdc out |
| ⑤ 0 Vdc out | ⑤ Common | ⑥ -Vdc out | ⑥ -Vdc out |
| ⑥ No Connection | ⑥ No Connection | | |

Option Heat Sink



* Option Heat Sink Model : A3-13988

Selection Guide

Table 1

| Model Number | Input Volt. (Range) (V. DC) | Output Voltage (V. DC) | Output Current (A) | Efficiency (Typical) (%) | |
|----------------------|-----------------------------|------------------------|--------------------|--------------------------|----|
| BHM 5 - 3.3 S 2 A | 5 (4.5~9) | 3.3 | 2 | 83 | |
| BHM 5 - 5 S 2 A | | 5 | 2 | 82 | |
| BHM 5 - 6 S 1.8 A | | 6 | 1.8 | 82 | |
| BHM 5 - 12 S 1 A | | 12 | 1 | 84 | |
| BHM 5 - 15 S 0.8 A | | 15 | 0.8 | 83 | |
| BHM 5 - 24 S 0.5 A | | 24 | 0.5 | 83 | |
| BHM 5 - 28 S 0.4 A | | 28 | 0.4 | 83 | |
| BHM 5 - 5 D 1 A | | ±5 | ±1 | 77 | |
| BHM 5 - 12 D 0.5 A | | ±12 | ±0.5 | 81 | |
| BHM 5 - 15 D 0.4 A | | ±15 | ±0.4 | 81 | |
| BHM 12 - 3.3 S 2.4 A | | 12 (8~18) | 3.3 | 2.4 | 83 |
| BHM 12 - 5 S 2.4 A | | | 5 | 2.4 | 85 |
| BHM 12 - 6 S 2.2 A | 6 | | 2.2 | 85 | |
| BHM 12 - 12 S 1.3 A | 12 | | 1.3 | 85 | |
| BHM 12 - 15 S 1 A | 15 | | 1 | 85 | |
| BHM 12 - 24 S 0.65 A | 24 | | 0.65 | 85 | |
| BHM 12 - 28 S 0.5 A | 28 | | 0.5 | 85 | |
| BHM 12 - 48 S 0.3 A | 48 | | 0.3 | 85 | |
| BHM 12 - 5 D 1.2 A | ±5 | | ±1.2 | 78 | |
| BHM 12 - 12 D 0.65 A | ±12 | | ±0.65 | 83 | |
| BHM 12 - 15 D 0.5 A | ±15 | | ±0.5 | 83 | |
| BHM 24 - 3.3 S 2.4 A | 24 (16~36) | | 3.3 | 2.4 | 84 |
| BHM 24 - 5 S 2.4 A | | 5 | 2.4 | 86 | |
| BHM 24 - 6 S 2.2 A | | 6 | 2.2 | 86 | |
| BHM 24 - 12 S 1.3 A | | 12 | 1.3 | 86 | |
| BHM 24 - 15 S 1 A | | 15 | 1 | 86 | |
| BHM 24 - 24 S 0.65 A | | 24 | 0.65 | 86 | |
| BHM 24 - 28 S 0.5 A | | 28 | 0.5 | 86 | |
| BHM 24 - 48 S 0.3 A | | 48 | 0.3 | 85 | |
| BHM 24 - 5 D 1.2 A | | ±5 | ±1.2 | 78 | |
| BHM 24 - 12 D 0.65 A | | ±12 | ±0.65 | 83 | |
| BHM 24 - 15 D 0.5 A | | ±15 | ±0.5 | 83 | |
| BHM 48 - 3.3 S 2.4 A | | 48 (32~76) | 3.3 | 2.4 | 83 |
| BHM 48 - 5 S 2.4 A | 5 | | 2.4 | 86 | |
| BHM 48 - 6 S 2.2 A | 6 | | 2.2 | 86 | |
| BHM 48 - 12 S 1.3 A | 12 | | 1.3 | 88 | |
| BHM 48 - 15 S 1 A | 15 | | 1 | 88 | |
| BHM 48 - 24 S 0.65 A | 24 | | 0.65 | 86 | |
| BHM 48 - 28 S 0.5 A | 28 | | 0.5 | 86 | |
| BHM 48 - 5 D 1.2 A | ±5 | | ±1.2 | 80 | |
| BHM 48 - 12 D 0.65 A | ±12 | | ±0.65 | 85 | |
| BHM 48 - 15 D 0.5 A | ±15 | | ±0.5 | 85 | |

* 上記仕様以外にも対応可能ですのでお問い合わせ下さい。
Please consult with us about other specification.

Features

- Low Profile 12.8mm
- Built-in Input Filter
- Input-Output Isolation
- High Efficiency 77~88%
- Wide Input Voltage Range
- High Reliability
- 6 Sided Metal Shielding
- Remote ON/OFF Control
- Adjustable Output Volt. ±5%
- Output Over Voltage Protection 115~140% Operation
- Operating Ambient Temperature -40°C~+85°C
- Max. Case Temperature +105°C
- Conformity to RoHS2 Directive
- Not built-in aluminum and tantalum electrolytic capacitor
- 薄型 12.8mm
- 入力フィルタ内蔵
- 入出力間絶縁
- 高効率 77~88%
- 広範囲な入力電圧
- 高信頼性
- 6面メタルシールド
- リモートON/OFFコントロール
- 可変出力電圧 ±5%
- 出力過電圧保護回路内蔵 115~140% 動作
- 動作周囲温度 -40°C~+85°C
- 最大ケース温度 +105°C
- RoHS2指令対応
- アルミ電解コンデンサ及びタンタルコンデンサ不使用

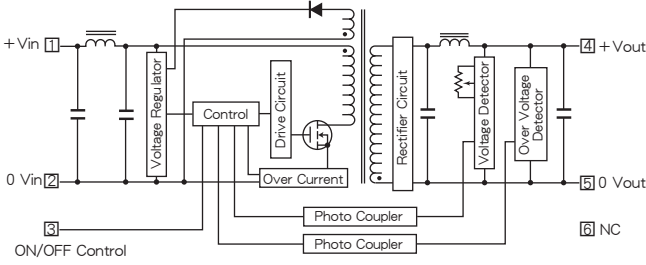
General Characteristics

- Input Voltage, Range
 - Output Voltage, Current
 - Output Voltage Range
 - Efficiency
 - Line Regulation
 - Load Regulation
 - Reflected Input Ripple, Noise
 - Output Ripple
 - Output Noise
 - Short Circuit Protection
 - Over Voltage Protection
 - Remote ON/OFF Control
 - Temperature Coefficient
 - Operating Ambient Temp.
 - Max. Case Temperature
 - Storage Temperature
 - Isolation Voltage
 - Isolation Impedance
 - Weight
 - Humidity
 - Shock
 - Vibration
 - Surface Structure
 - MTBF
 - Warranty
- (at Ta : 25°C, Full Load, Nominal Vin)
DC5, 12, 24, 48V (See Table 1)
See Table 1
±5% Adjustable
See Table 1
±0.3% max. (at Vin Range)
Single : ±0.5% max. (0~100% Load)
Dual : ±3% max. (10~100% Load)
(3% Vin) Vp-p max.
40mVp-p max.
100mVp-p max. (48V Vout only)
100mVp-p max.
200mVp-p max. (48V Vout only)
Built-in, Auto-restart (See Fig. 2)
115~140% Output Voltage
ON : Short or 0~0.8V
OFF : Open or 2~10V
(Between terminal ② ~ ③)
0.02%/°C max.
-40°C~+85°C (See Fig. 1)
-30°C~+85°C (5V Vin only)
+105°C
-40°C~+115°C
AC1500V one minute
(Input-Output-Case)
100MΩ min. (at DC1000V)
(Input-Output-Case)
Main Body : 100g max.
Heat Sink : 40g max.
20~95% RH
490m/s² (11msec 3directions)
10~55Hz 98m/s²
(30minutes 3directions)
6 Sided Aluminum Case
Single : 1,000,000H
Dual : 700,000H
(Ta : 25°C, 80% Load, Nominal Vin)
5 years

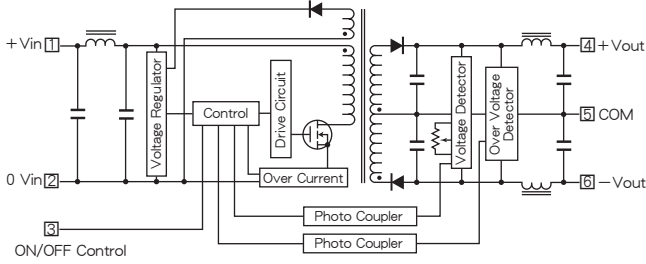
BHM SERIES DATA SHEET

Block Diagram

Single Output



Dual Outputs



Characteristic Curves

Fig. 1 Derating Curve

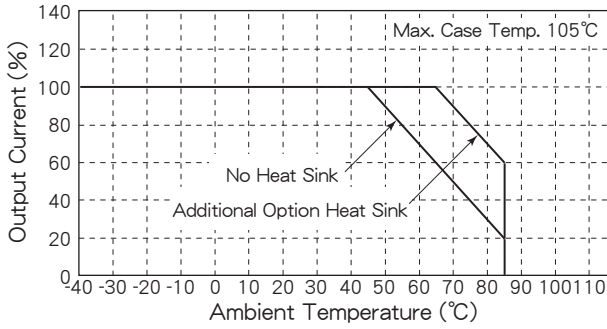


Fig. 2 Short Circuit Operating Area

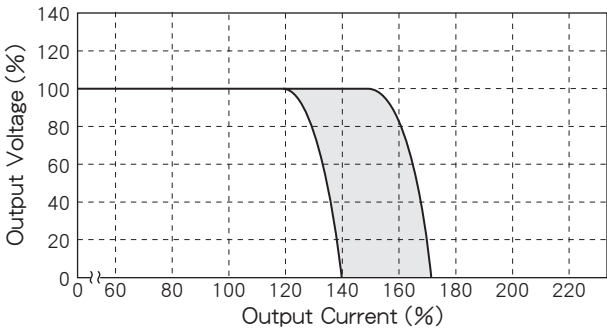


Fig. 3 Temperature Characteristic on Case Surface

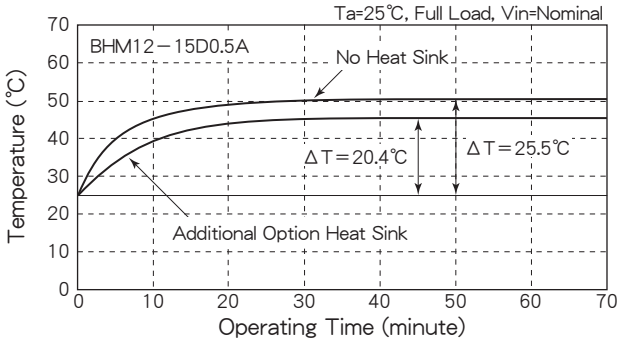


Fig. 4 Efficiency vs. Output Current

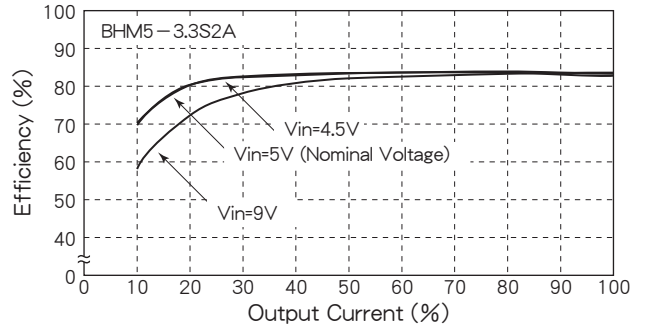


Fig. 5 Efficiency vs. Output Current

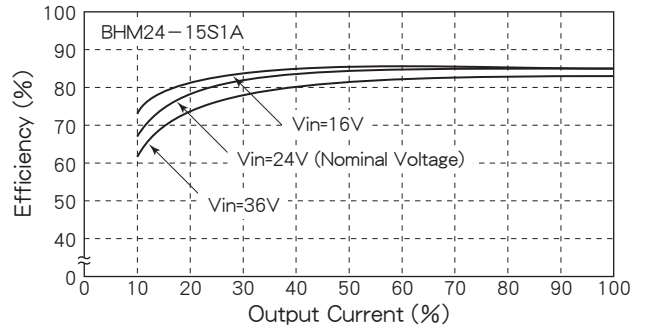


Fig. 6 Efficiency vs. Output Current

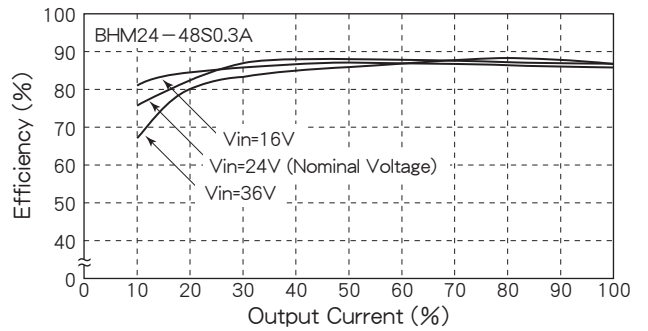


Fig. 7 Efficiency vs. Output Current

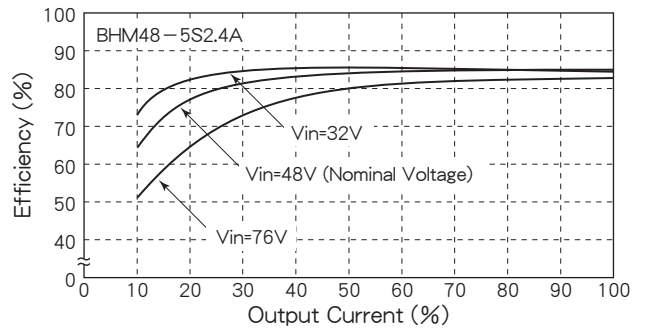
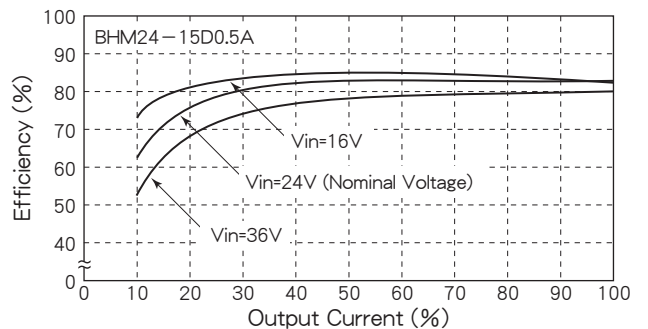
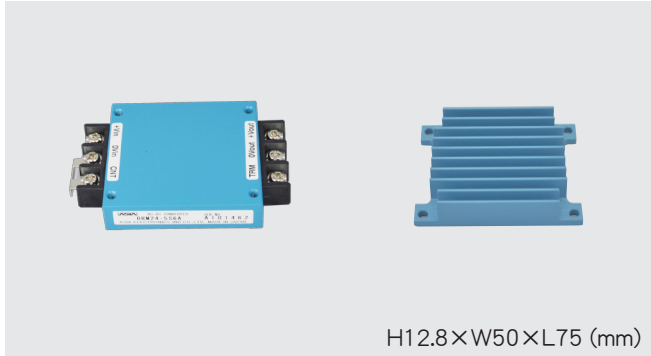


Fig. 8 Efficiency vs. Output Current



BRM SERIES

23~30W DC/DC CONVERTERS Single Output



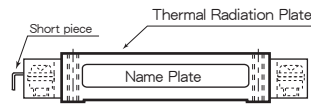
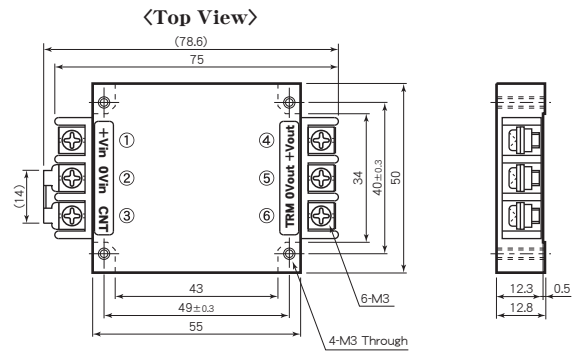
Features

- Low Profile 12.8mm
 - Built-in Input Filter
 - Input-Output Isolation (AC2000V)
 - High Efficiency 87~90%
 - Wide Input Voltage Range
 - High Reliability
 - 6 Sided Metal Shielding
 - Remote ON/OFF Control
 - Adjustable Output Volt. ±5%
 - Input Low Voltage Protection
 - Input Over Voltage Protection
 - Output Over Voltage Protection 115~140% Operation
 - Thermal Protection +110°C~+120°C
 - Operating Ambient Temperature -40°C~+85°C
 - Max. Case Temperature +105°C
 - Conformity to RoHS2 Directive
 - Not built-in aluminum and tantalum electrolytic capacitor
- 薄型 12.8mm
 - 入力フィルタ内蔵
 - 入出力間絶縁 (AC2000V)
 - 高効率 87~90%
 - 広範囲な入力電圧
 - 高信頼性
 - 6面メタルシールド
 - リモートON/OFFコントロール
 - 可変出力電圧 ±5%
 - 入力低電圧保護回路内蔵
 - 入力過電圧保護回路内蔵
 - 出力過電圧保護回路内蔵 115~140% 動作
 - 過熱保護回路内蔵 +110°C~+120°C
 - 動作周囲温度 -40°C~+85°C
 - 最大ケース温度 +105°C
 - RoHS2指令対応
 - アルミ電解コンデンサ及びタンタルコンデンサ不使用

General Characteristics

- Input Voltage, Range DC12, 24, 48, 100V (See Table 1)
- Output Voltage, Current See Table 1
- Output Voltage Accuracy ±2%
±3% (3.3, 5, 6V Vout only)
±5% Adjustable (Used trimmer)
- Output Voltage Range See Table 1
- Efficiency ±0.3% max. (at Vin Range)
- Line Regulation ±0.5% max. (0~100% Load)
- Load Regulation (3% Vin) Vp-p max.
- Reflected Input Ripple, Noise 40mVp-p max.
100mVp-p max. (48V Vout only)
- Output Ripple 100mVp-p max.
200mVp-p max. (48V Vout only)
- Short Circuit Protection Built-in, Auto-restart (See Fig. 2)
- Over Voltage Protection 115~140% Output Voltage
- Remote ON/OFF Control ON : Short or 0~0.8V
OFF : Open or 2~10V (Between terminal ② ~ ③)
- Temperature Coefficient 0.02%/°C max.
- Operating Ambient Temp. -40°C~+85°C (See Fig. 1)
- Max. Case Temperature +105°C
- Storage Temperature -50°C~+115°C
- Isolation Voltage AC2000V one minute (Input-Output-Case)
- Isolation Impedance 100MΩ min. (at DC1000V) (Input-Output-Case)
- Weight Main Body : 100g max.
Heat Sink : 40g max.
- Humidity 20~95% RH
- Shock 490m/s² (11msec 3directions)
- Vibration 10~55Hz 98m/s² (30minutes 3directions)
- Surface Structure 6 Sided Aluminum Case
- MTBF 500,000H (Ta : 25°C, 80% Load, Nominal Vin)
- Warranty 5 years

Terminal Outs & Dimensions (±0.5mm)



Terminal Outs

| | |
|---|----------------|
| ① | +Vdc in |
| ② | 0 Vdc in |
| ③ | ON/OFF Control |
| ④ | +Vdc out |
| ⑤ | 0 Vdc out |
| ⑥ | TRM |

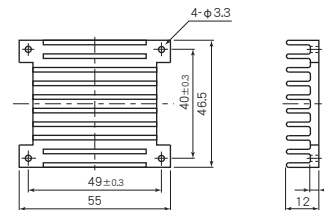
Application

ON/OFF Control and Vout Adjustment



| | | | | | | | | |
|----------|------|-----|-----|-----|-----|------|------|------|
| Vout (V) | 3.3V | 5V | 6V | 12V | 15V | 24V | 28V | 48V |
| VR (Ω) | 50k | 50k | 50k | 50k | 50k | 50k | 50k | 50k |
| Rx (Ω) | 10k | 33k | 47k | 47k | 62k | 110k | 130k | 220k |

Option Heat Sink



* Option Heat Sink Model : A3-13988

Selection Guide

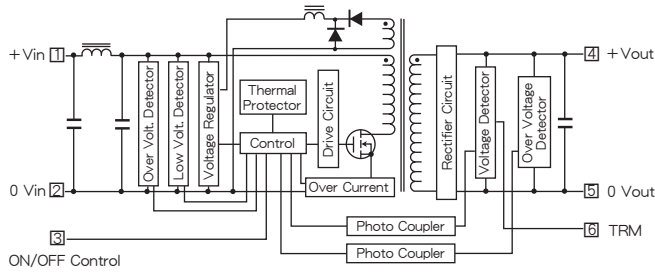
Table 1

| Model Number | Input Volt. (Range) (V. DC) | Output Voltage (V. DC) | Output Current (A) | Efficiency (Typical)(%) | | |
|-------------------|-----------------------------|------------------------|--------------------|-------------------------|----------|----|
| | | | | 20% Load | 80% Load | |
| BRM12-3.3S 7A | 12 (8~18) | 3.3 | 7 | 84 | 87 | |
| BRM12-5S 6A | | 5 | 6 | 84 | 90 | |
| BRM12-6S 5A | | 6 | 5 | 84 | 90 | |
| BRM12-1.2S 2.5A | | 12 | 2.5 | 84 | 90 | |
| BRM12-1.5S 2A | | 15 | 2 | 84 | 90 | |
| BRM12-2.4S 1.25A | | 24 | 1.25 | 84 | 90 | |
| BRM12-2.8S 1.07A | | 28 | 1.07 | 84 | 90 | |
| BRM12-4.8S 0.6A | | 48 | 0.6 | 84 | 90 | |
| BRM24-3.3S 7A | | 24 (16~36) | 3.3 | 7 | 84 | 87 |
| BRM24-5S 6A | | | 5 | 6 | 84 | 90 |
| BRM24-6S 5A | 6 | | 5 | 84 | 90 | |
| BRM24-1.2S 2.5A | 12 | | 2.5 | 84 | 90 | |
| BRM24-1.5S 2A | 15 | | 2 | 84 | 90 | |
| BRM24-2.4S 1.25A | 24 | | 1.25 | 84 | 90 | |
| BRM24-2.8S 1.07A | 28 | | 1.07 | 84 | 90 | |
| BRM24-4.8S 0.6A | 48 | | 0.6 | 84 | 90 | |
| BRM48-3.3S 7A | 48 (32~76) | | 3.3 | 7 | 84 | 87 |
| BRM48-5S 6A | | | 5 | 6 | 84 | 90 |
| BRM48-6S 5A | | 6 | 5 | 84 | 90 | |
| BRM48-1.2S 2.5A | | 12 | 2.5 | 84 | 90 | |
| BRM48-1.5S 2A | | 15 | 2 | 84 | 90 | |
| BRM48-2.4S 1.25A | | 24 | 1.25 | 84 | 90 | |
| BRM48-2.8S 1.07A | | 28 | 1.07 | 84 | 90 | |
| BRM100-3.3S 7A | | 100 (64~144) | 3.3 | 7 | 84 | 87 |
| BRM100-5S 6A | | | 5 | 6 | 84 | 90 |
| BRM100-6S 5A | | | 6 | 5 | 84 | 90 |
| BRM100-1.2S 2.5A | 12 | | 2.5 | 84 | 90 | |
| BRM100-1.5S 2A | 15 | | 2 | 84 | 90 | |
| BRM100-2.4S 1.25A | 24 | | 1.25 | 84 | 90 | |
| BRM100-2.8S 1.07A | 28 | | 1.07 | 84 | 90 | |

* 上記仕様以外にも対応可能ですので お問い合わせ下さい。
Please consult with us about other specification.

BRM SERIES DATA SHEET

Block Diagram



Characteristic Curves

Fig. 1 Derating Curve

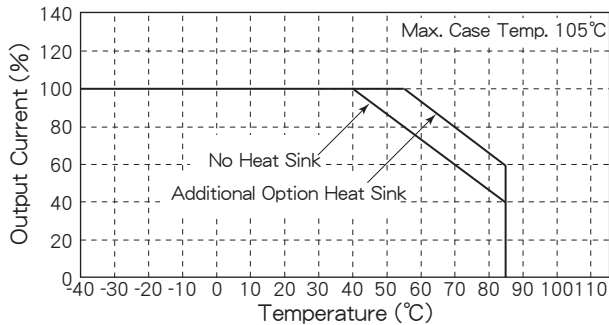


Fig. 2 Short Circuit Operating Area

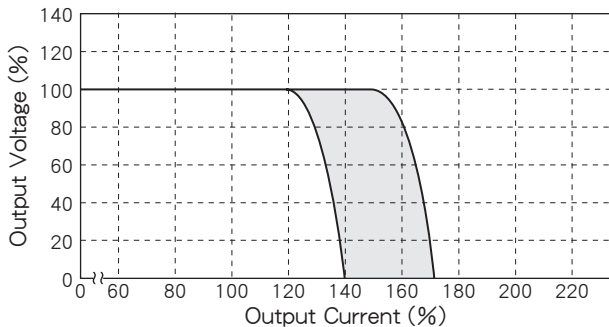


Fig. 3 Temperature Characteristic on Case Surface

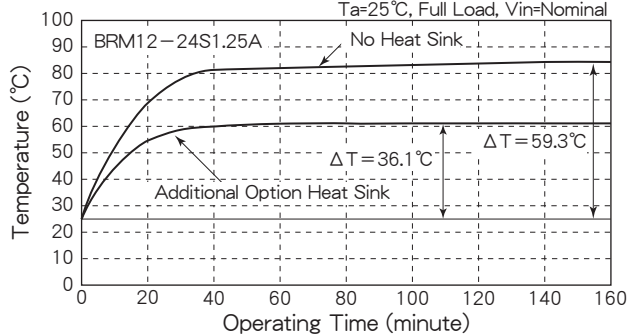


Fig. 4 Efficiency vs. Output Current

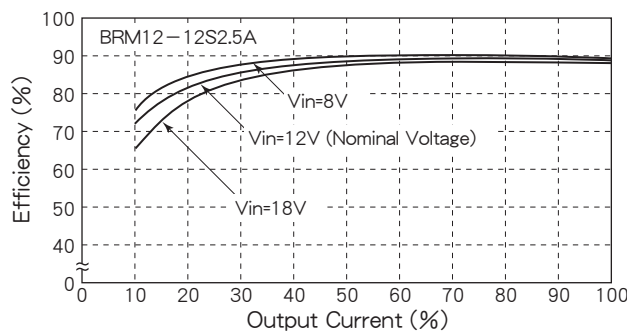


Fig. 5 Efficiency vs. Output Current

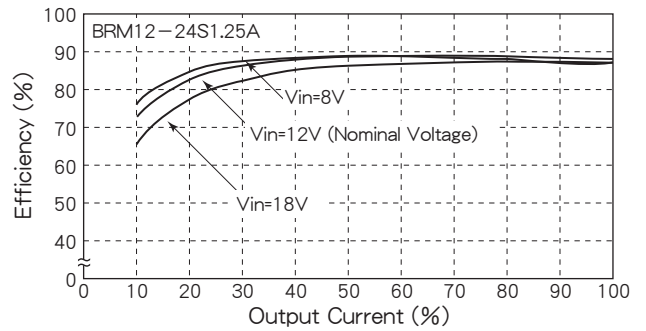


Fig. 6 Efficiency vs. Output Current

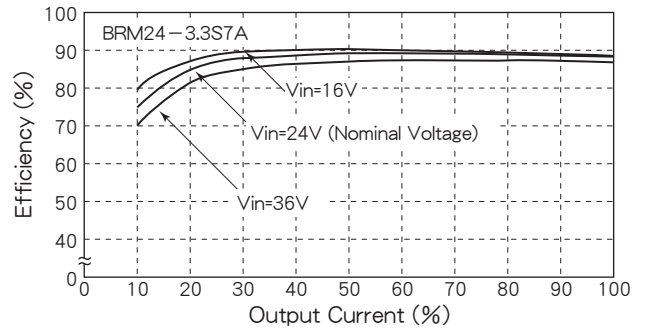


Fig. 7 Efficiency vs. Output Current

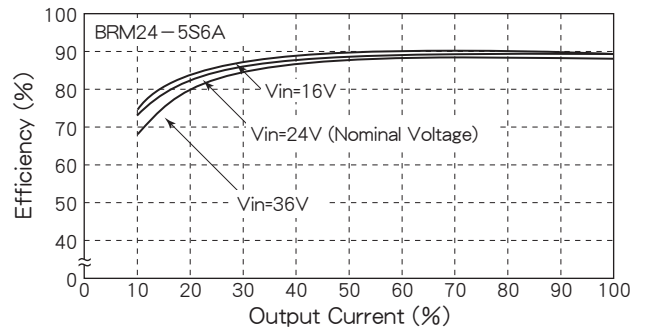


Fig. 8 Efficiency vs. Output Current

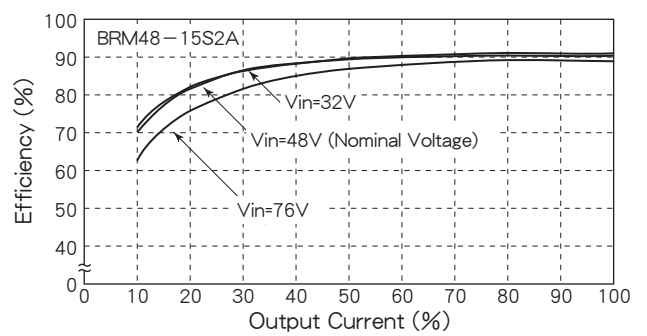
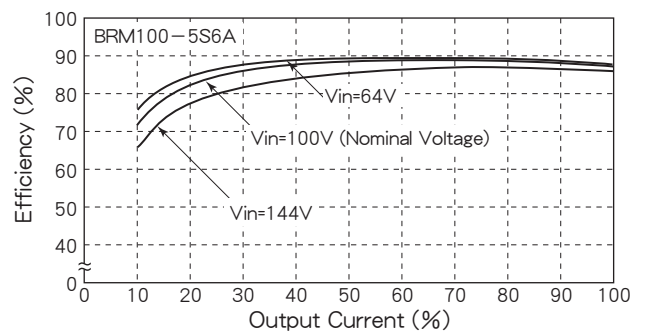
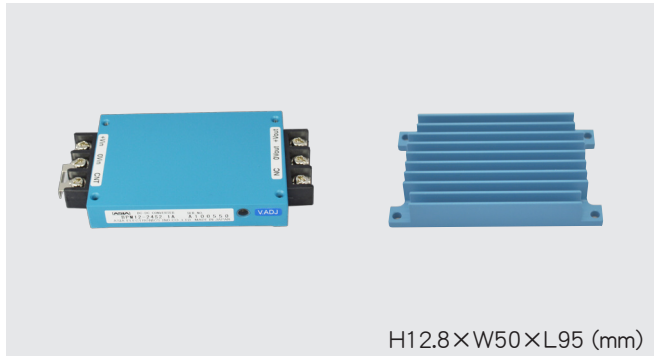


Fig. 9 Efficiency vs. Output Current



BPM SERIES

20~50W DC/DC CONVERTERS Single Output & Dual Outputs



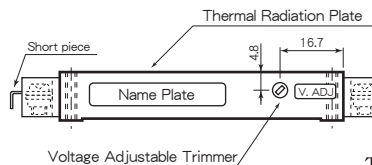
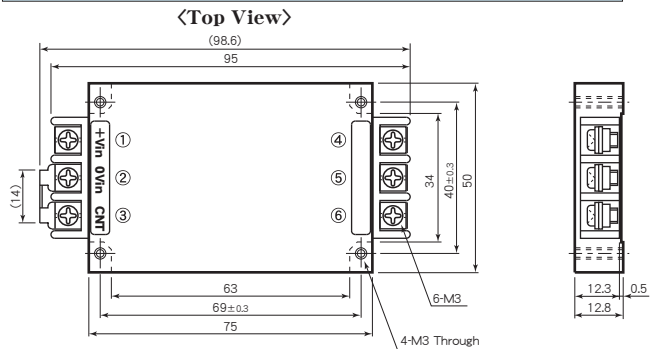
Features

- Low Profile 12.8mm
 - 6 Sided Metal Shielding
 - Built-in Input Filter
 - Wide Input Voltage Range
 - Input-Output Isolation
 - Adjustable Output Volt. ±5%
 - High Efficiency 81~90%
 - Remote ON/OFF Control
 - Input Low Voltage Protection
 - Input Over Voltage Protection
 - Output Over Voltage Protection
115~140% Operation
 - Thermal Protection
+110°C~+120°C
 - Operating Ambient Temperature
-40°C~+85°C
 - Max. Case Temperature +105°C
 - High Reliability
 - Conformity to RoHS2 Directive
 - Not built-in aluminum and tantalum electrolytic capacitor
- 薄型 12.8mm
 - 6面メタルシールド
 - 入力フィルタ内蔵
 - 広範囲な入力電圧
 - 入出力間絶縁
 - 可変出力電圧 ±5%
 - 高効率 81~90%
 - リモートON/OFF制御
 - 入力低電圧保護回路内蔵
 - 入力過電圧保護回路内蔵
 - 出力過電圧保護回路内蔵
115~140% 動作
 - 過熱保護回路内蔵
+110°C~+120°C
 - 動作周囲温度
-40°C~+85°C
 - 最大ケース温度 +105°C
 - 高信頼性
 - RoHS2指令対応
 - アルミ電解コンデンサ及びタンタルコンデンサ不使用

General Characteristics

- Input Voltage, Range
 - Output Voltage, Current
 - Output Voltage Range
 - Efficiency
 - Line Regulation
 - Load Regulation
- (at Ta : 25°C, Full Load, Nominal Vin)
DC12, 24, 48, 100V (See Table 1)
See Table 1
±5% Adjustable
See Table 1
±0.3% max. (at Vin Range)
Single : ±0.5% max. (0~100% Load)
Dual : ±3% max. (10~100% Load)
(3% Vin) Vp-p max.
40mVp-p max.
100mVp-p max.
Built-in, Auto-restart (See Fig. 2)
115~140% Output Voltage
ON : Short or 0~0.8V
OFF : Open or 2~10V
(Between terminal ② ~ ③)
0.02%/°C max.
-40°C~+85°C (See Fig. 1)
+105°C
-40°C~+115°C
AC1500V 1 min.
AC2000V 1 min. (100V Vin only)
(Input-Output-Case)
100MΩ min. (at DC1000V)
(Input-Output-Case)
Main Body : 150g max.
Heat Sink : 55g max.
20~95% RH
490m/s² (11msec 3directions)
10~55Hz 98m/s²
(30minutes 3directions)
6 Sided Aluminum Case
Single : 500,000H
Dual : 600,000H
(Ta : 25°C, 80% Load, Nominal Vin)
5 years
- Reflected Input Ripple, Noise
 - Output Ripple
 - Output Noise
 - Short Circuit Protection
 - Over Voltage Protection
 - Remote ON/OFF Control
 - Temperature Coefficient
 - Operating Ambient Temp.
 - Max. Case Temperature
 - Storage Temperature
 - Isolation Voltage
 - Isolation Impedance
 - Weight
 - Humidity
 - Shock
 - Vibration
 - Surface Structure
 - MTBF
 - Warranty

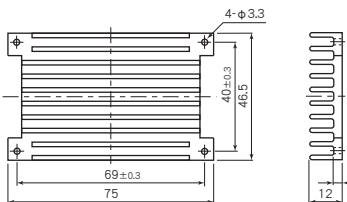
Terminal Outs & Dimensions (±0.5mm)



Terminal Outs

| Single Output | | Dual Outputs | |
|---------------|----------------|--------------|----------------|
| ① | +Vdc in | ① | +Vdc in |
| ② | 0 Vdc in | ② | 0 Vdc in |
| ③ | ON/OFF Control | ③ | ON/OFF Control |
| ④ | +Vdc out | ④ | +Vdc out |
| ⑤ | 0 Vdc out | ⑤ | Common |
| ⑥ | No Connection | ⑥ | -Vdc out |

Option Heat Sink



* Option Heat Sink Model : A3-13987

Selection Guide

Table 1

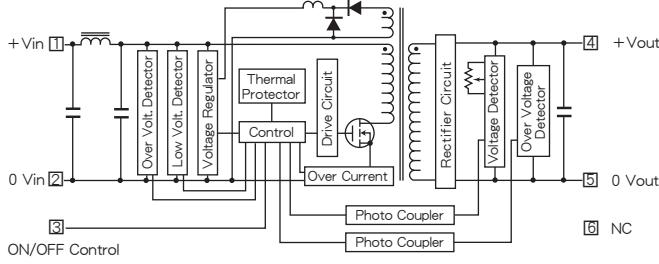
| Model Number | Input Voltage (Range) (V. DC) | Output Voltage (V. DC) | Output Current (A) | Efficiency (typ.) (%) | | |
|--------------------|-------------------------------|------------------------|--------------------|-----------------------|----------|----|
| | | | | 30% Load | 80% Load | |
| BPM 12 - 3.3S 12A | 12 (8~18) | 3.3 | 12 | 87 | 85 | |
| BPM 12 - 5S 10A | | 5 | 10 | 86 | 89 | |
| BPM 12 - 6S 8.4A | | 6 | 8.4 | 87 | 87 | |
| BPM 12 - 12S 4.2A | | 12 | 4.2 | 84 | 88 | |
| BPM 12 - 15S 3.3A | | 15 | 3.3 | 83 | 88 | |
| BPM 12 - 24S 2.1A | | 24 | 2.1 | 83 | 88 | |
| BPM 12 - 3.3D 3A | | ±3.3 | ±3 | 80 | 81 | |
| BPM 12 - 5D 3A | | ±5 | ±3 | 80 | 82 | |
| BPM 12 - 12D 1.5A | | ±12 | ±1.5 | 81 | 83 | |
| BPM 12 - 15D 1.2A | | ±15 | ±1.2 | 81 | 84 | |
| BPM 24 - 3.3S 12A | | 24 (16~36) | 3.3 | 12 | 84 | 85 |
| BPM 24 - 5S 10A | | | 5 | 10 | 85 | 88 |
| BPM 24 - 6S 8.4A | 6 | | 8.4 | 87 | 89 | |
| BPM 24 - 12S 4.2A | 12 | | 4.2 | 84 | 89 | |
| BPM 24 - 15S 3.3A | 15 | | 3.3 | 85 | 89 | |
| BPM 24 - 24S 2.1A | 24 | | 2.1 | 84 | 89 | |
| BPM 24 - 3.3D 3A | ±3.3 | | ±3 | 80 | 81 | |
| BPM 24 - 5D 3A | ±5 | | ±3 | 80 | 82 | |
| BPM 24 - 12D 1.5A | ±12 | | ±1.5 | 81 | 84 | |
| BPM 24 - 15D 1.2A | ±15 | | ±1.2 | 82 | 85 | |
| BPM 48 - 3.3S 12A | 48 (32~72) | | 3.3 | 12 | 85 | 86 |
| BPM 48 - 5S 10A | | | 5 | 10 | 85 | 88 |
| BPM 48 - 6S 8.4A | | 6 | 8.4 | 85 | 88 | |
| BPM 48 - 12S 4.2A | | 12 | 4.2 | 85 | 88 | |
| BPM 48 - 15S 3.3A | | 15 | 3.3 | 85 | 90 | |
| BPM 48 - 24S 2.1A | | 24 | 2.1 | 85 | 90 | |
| BPM 48 - 3.3D 3A | | ±3.3 | ±3 | 80 | 81 | |
| BPM 48 - 5D 3A | | ±5 | ±3 | 80 | 82 | |
| BPM 48 - 12D 1.5A | | ±12 | ±1.5 | 81 | 84 | |
| BPM 48 - 15D 1.2A | | ±15 | ±1.2 | 82 | 85 | |
| BPM 100 - 3.3S 12A | | 100 (64~144) | 3.3 | 12 | 84 | 87 |
| BPM 100 - 5S 10A | | | 5 | 10 | 86 | 89 |
| BPM 100 - 6S 8.4A | 6 | | 8.4 | 84 | 89 | |
| BPM 100 - 12S 4.2A | 12 | | 4.2 | 85 | 90 | |
| BPM 100 - 15S 3.3A | 15 | | 3.3 | 85 | 90 | |
| BPM 100 - 24S 2.1A | 24 | | 2.1 | 85 | 90 | |
| BPM 100 - 3.3D 3A | ±3.3 | | ±3 | 80 | 81 | |
| BPM 100 - 5D 3A | ±5 | | ±3 | 80 | 82 | |
| BPM 100 - 12D 1.5A | ±12 | | ±1.5 | 81 | 84 | |
| BPM 100 - 15D 1.2A | ±15 | | ±1.2 | 82 | 85 | |

※ 上記仕様以外にも対応可能ですので お問い合わせ下さい。
Please consult with us about other specification.

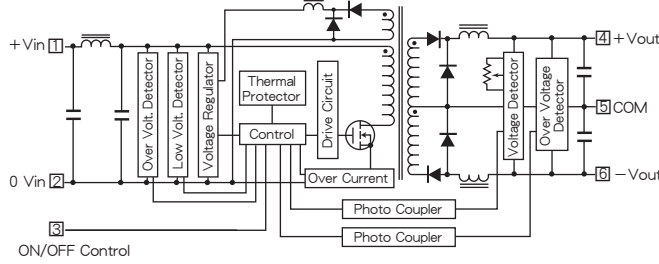
BPM SERIES DATA SHEET

Block Diagram

Single Output



Dual Outputs



Characteristic Curves

Fig. 1 Derating Curve

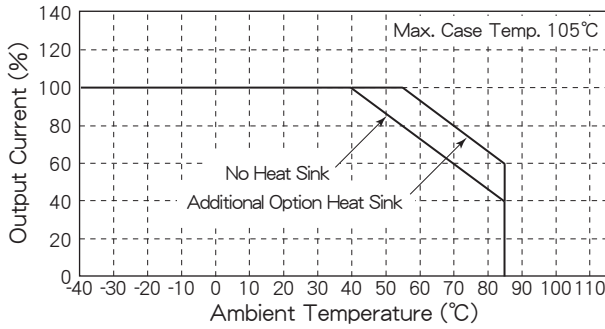


Fig. 2 Short Circuit Operating Area

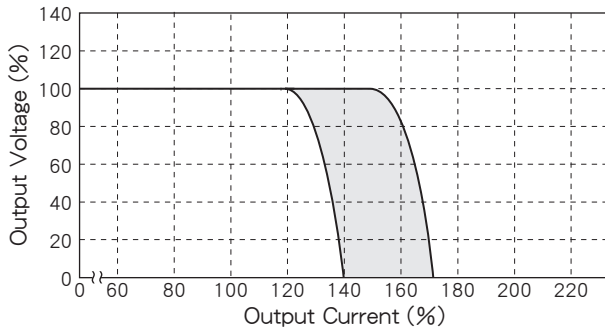


Fig. 3 Temperature Characteristic on Case Surface

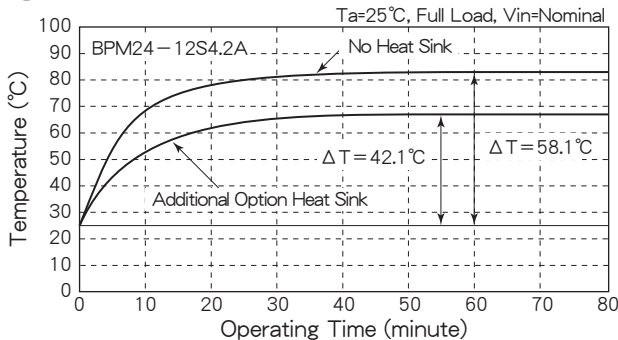


Fig. 4 Efficiency vs. Output Current

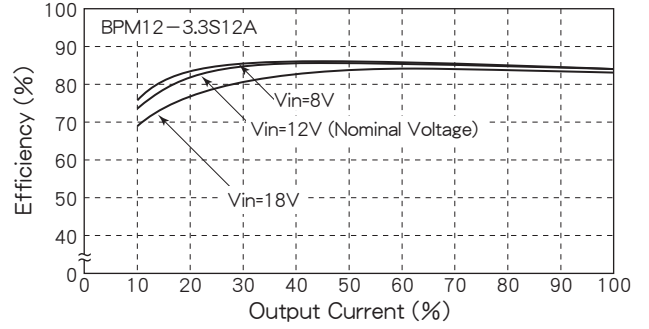


Fig. 5 Efficiency vs. Output Current

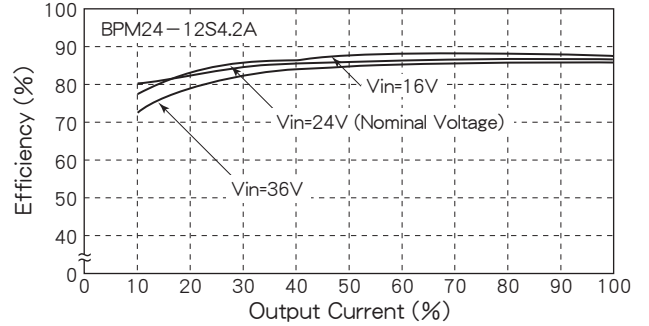


Fig. 6 Efficiency vs. Output Current

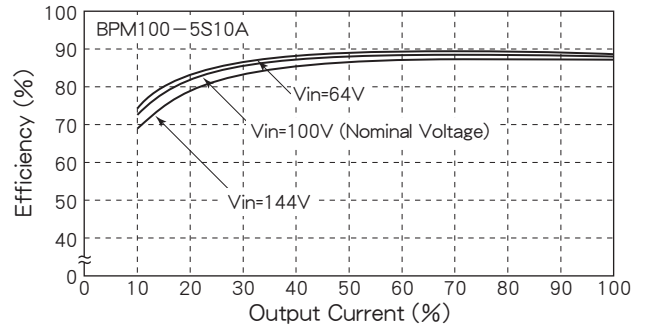


Fig. 7 Efficiency vs. Output Current

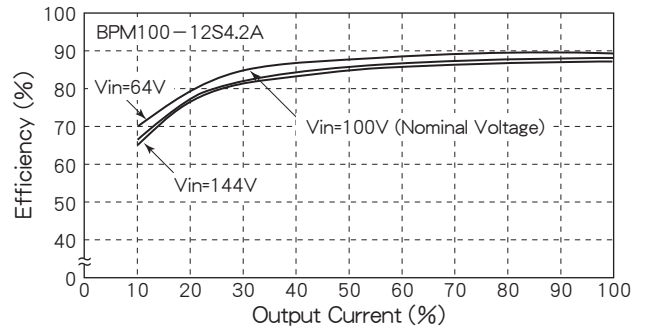
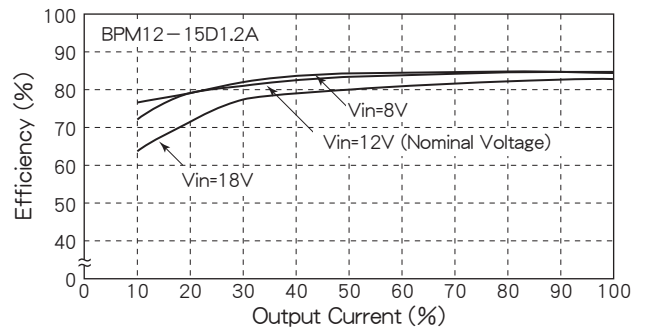


Fig. 8 Efficiency vs. Output Current



QD SERIES

40~50W DC/DC CONVERTERS Single Output

QDU type



H16×W50×L82 (mm)

QDS type



H16×W50×L82 (mm)

Features

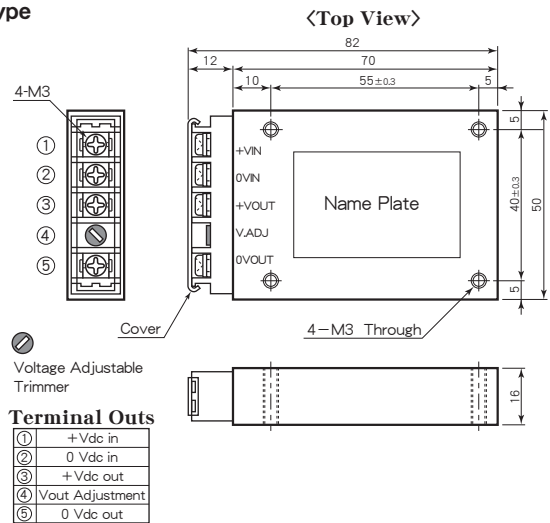
- Low Profile 16mm
- 薄型 16mm
- Built-in Input Filter
- 入力フィルタ内蔵
- Wide Input Voltage Range
- 広範囲な入力電圧
- Input-Output Isolation
- 入出力間絶縁
- Adjustable Output Volt. ±5%
- 可変出力電圧 ±5%
- Input Low Voltage Protection
- 入力低電圧保護回路内蔵
- Input Over Voltage Protection
- 入力過電圧保護回路内蔵
- Output Over Voltage Protection
- 出力過電圧保護回路内蔵
- 115~140% Operation
- 115~140%にて動作
- High Efficiency 86~90%
- 高効率 86~90%
- Thermal Protection
- 過熱保護回路内蔵
- +110°C~+120°C
- +110°C~+120°C
- Operating Ambient Temperature
- 動作周囲温度
- 40°C~+85°C
- 40°C~+85°C
- Conformity to RoHS2 Directive
- RoHS2指令対応
- Not built-in aluminum and tantalum electrolytic capacitor
- アルミ電解コンデンサ及びタンタルコンデンサ不使用

General Characteristics

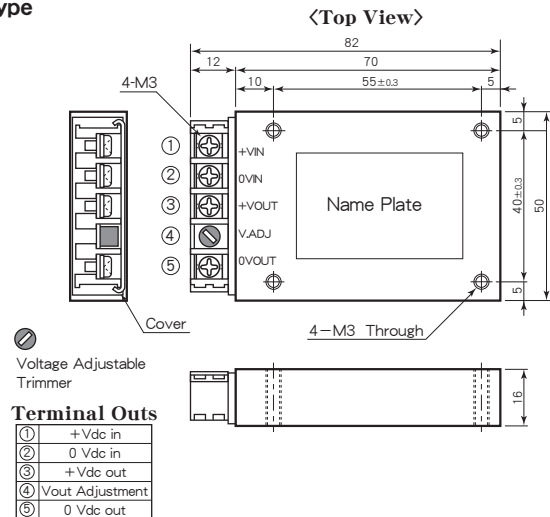
- Input Voltage, Range (at Ta : 25°C, Full Load, Nominal Vin) DC12, 24, 48, 100V (See Table 1)
- Output Voltage, Current See Table 1
- Output Voltage Range ±5% Adjustable
- Efficiency See Table 1
- Line Regulation ±0.3% max. (at Vin Range)
- Load Regulation ±0.5% max. (0~100% Load)
- Reflected Input Ripple, Noise (3% Vin)Vp-p max.
- Output Ripple 40mVp-p max.
- Output Noise 100mVp-p max.
- Short Circuit Protection Built-in, Auto-restart (See Fig. 2)
- Over Voltage Protection 115~140% Output Voltage
- Temperature Coefficient 0.02%/°C max.
- Operating Ambient Temp. -40°C~+85°C (See Fig. 1)
- Storage Temperature -40°C~+115°C
- Isolation Voltage AC1500V one minute (Input-Output-Case)
- Isolation Impedance 100MΩ min. (at DC1000V) (Input-Output-Case)
- Weight 150g max.
- Humidity 20~95% RH
- Shock 490m/s² (11msec 3directions)
- Vibration 10~55Hz 98m/s² (30minutes 3directions)
- Surface Structure 6 Sided Aluminum Case
- MTBF 500,000H (Ta : 25°C, 80% Load, Nominal Vin)
- Warranty 5 years

Terminal Outs & Dimensions (±0.5mm)

QDU type



QDS type



Selection Guide

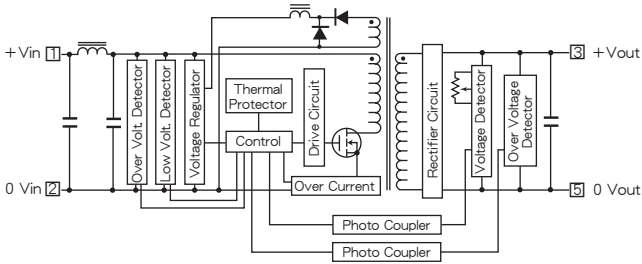
Table 1

| Model Number | Input Volt. (Range) (V. DC) | Output Voltage (V. DC) | Output Current (A) | Efficiency (Typical)(%) | |
|----------------------|-----------------------------|------------------------|--------------------|-------------------------|----------|
| | | | | 20% Load | 80% Load |
| QDU(QDS) 12-3.3S 12A | 12 (8~18) | 3.3 | 12 | 81 | 86 |
| QDU(QDS) 12-5S 10A | | 5 | 10 | 82 | 88 |
| QDU(QDS) 12-6S 8.4A | | 6 | 8.4 | 82 | 88 |
| QDU(QDS) 12-12S 4.2A | | 12 | 4.2 | 83 | 88 |
| QDU(QDS) 12-15S 3.3A | | 15 | 3.3 | 83 | 88 |
| QDU(QDS) 12-24S 2.1A | | 24 | 2.1 | 83 | 88 |
| QDU(QDS) 24-3.3S 12A | 24 (16~36) | 3.3 | 12 | 81 | 86 |
| QDU(QDS) 24-5S 10A | | 5 | 10 | 85 | 88 |
| QDU(QDS) 24-6S 8.4A | | 6 | 8.4 | 85 | 88 |
| QDU(QDS) 24-12S 4.2A | | 12 | 4.2 | 84 | 89 |
| QDU(QDS) 24-15S 3.3A | 15 | 3.3 | 84 | 89 | |
| QDU(QDS) 24-24S 2.1A | 24 | 2.1 | 84 | 89 | |
| QDU(QDS) 48-3.3S 12A | 48 (32~72) | 3.3 | 12 | 81 | 86 |
| QDU(QDS) 48-5S 10A | | 5 | 10 | 83 | 88 |
| QDU(QDS) 48-6S 8.4A | | 6 | 8.4 | 83 | 88 |
| QDU(QDS) 48-12S 4.2A | | 12 | 4.2 | 85 | 90 |
| QDU(QDS) 48-15S 3.3A | | 15 | 3.3 | 85 | 90 |
| QDU(QDS) 48-24S 2.1A | | 24 | 2.1 | 79 | 89 |
| QDU(QDS)100-3.3S 12A | 100 (64~144) | 3.3 | 12 | 82 | 87 |
| QDU(QDS)100-5S 10A | | 5 | 10 | 84 | 89 |
| QDU(QDS)100-6S 8.4A | | 6 | 8.4 | 84 | 89 |
| QDU(QDS)100-12S 4.2A | | 12 | 4.2 | 85 | 90 |
| QDU(QDS)100-15S 3.3A | | 15 | 3.3 | 85 | 90 |
| QDU(QDS)100-24S 2.1A | | 24 | 2.1 | 79 | 89 |

* 上記仕様以外にも対応可能ですのでお問い合わせ下さい。
Please consult with us about other specification.

QD SERIES DATA SHEET

■ Block Diagram



■ Characteristic Curves

Fig. 1 Derating Curve

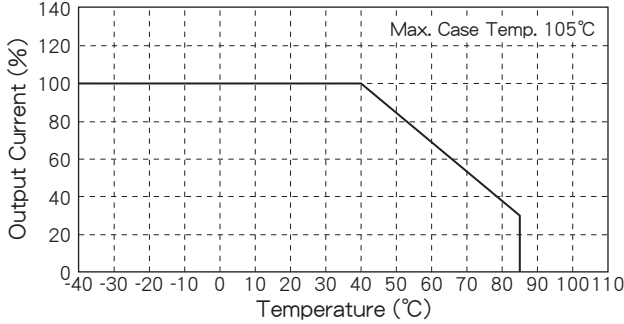


Fig. 2 Short Circuit Operating Area

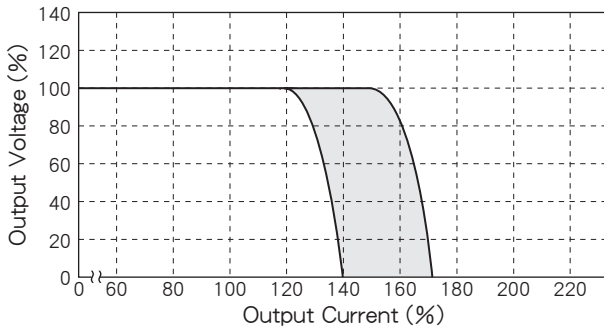


Fig. 3 Temperature Characteristic on Case Surface

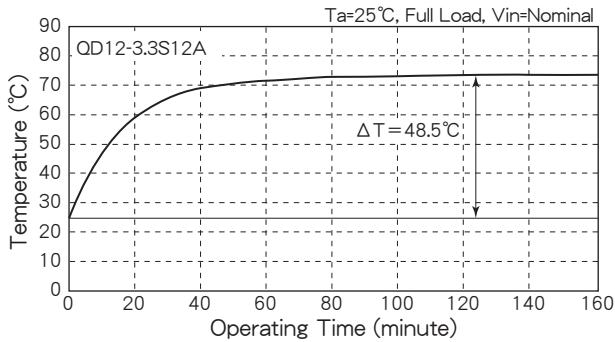


Fig. 4 Efficiency vs. Output Current

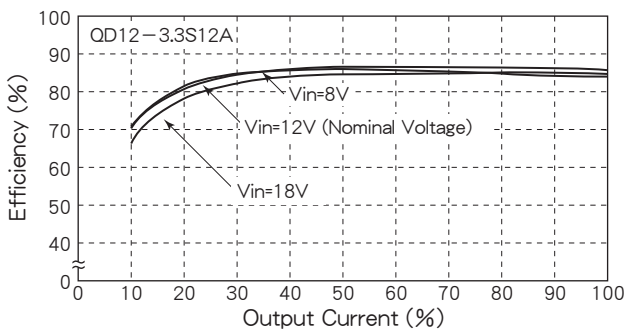


Fig. 5 Efficiency vs. Output Current

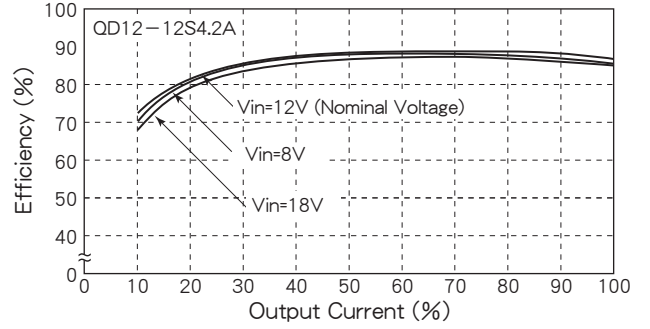


Fig. 6 Efficiency vs. Output Current

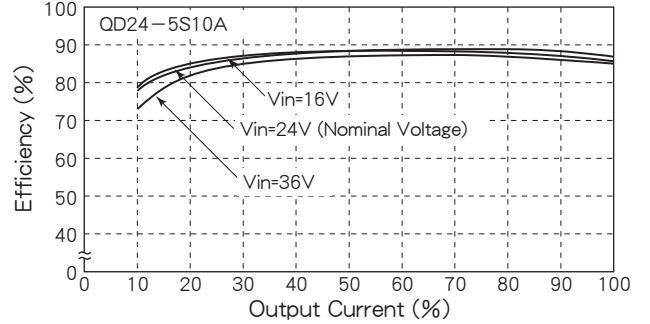


Fig. 7 Efficiency vs. Output Current

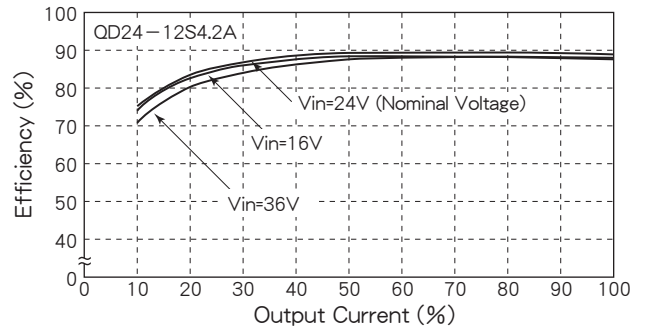


Fig. 8 Efficiency vs. Output Current

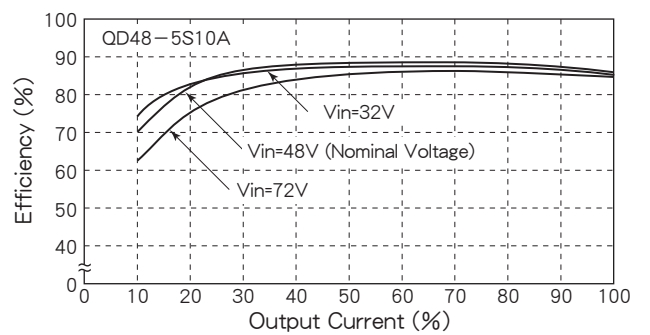
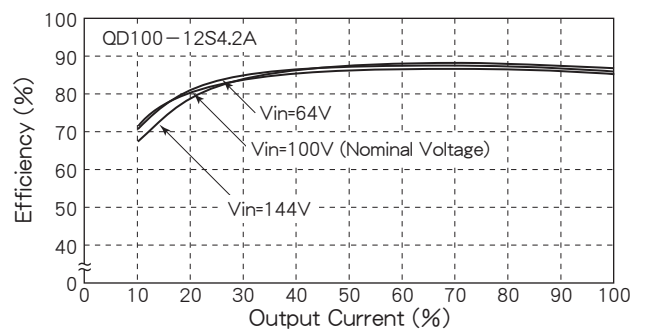


Fig. 9 Efficiency vs. Output Current



BTS SERIES

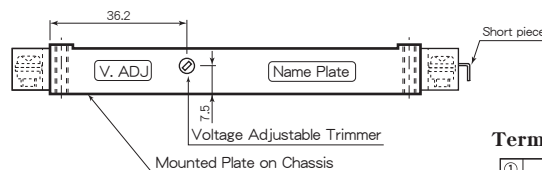
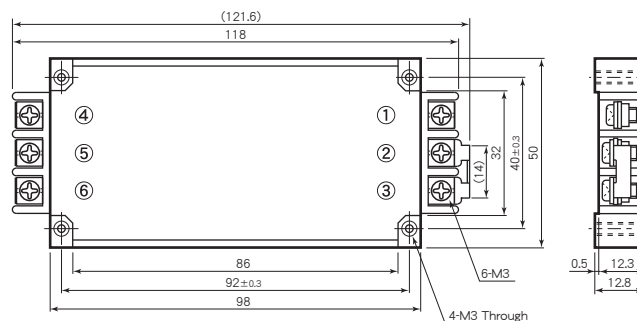
80~100W DC/DC CONVERTERS Single Output



H12.8×W50×L118 (mm)

■ Terminal Outs & Dimensions (±0.5mm)

<Top View>



Terminal Outs

| | |
|---|----------------|
| ① | +Vdc in |
| ② | 0 Vdc in |
| ③ | ON/OFF Control |
| ④ | +Vdc out |
| ⑤ | 0 Vdc out |
| ⑥ | No Connection |

■ Selection Guide

Table 1

| Model Number | Input Volt. (Range) (V. DC) | Output Voltage (V. DC) | Output Current (A) | Efficiency (Typical)(%) | |
|-------------------|-----------------------------|------------------------|--------------------|-------------------------|----------|
| | | | | 20% Load | 80% Load |
| BTS 12- 3.3S 24 A | 12 (8~18) | 3.3 | 24 | 88 | 88 |
| BTS 12- 5S 20 A | | 5 | 20 | 87 | 89 |
| BTS 12- 6S 16.7A | | 6 | 16.7 | 87 | 89 |
| BTS 12- 12S 8.4 A | | 12 | 8.4 | 87 | 89 |
| BTS 12- 15S 6.7 A | | 15 | 6.7 | 86 | 89 |
| BTS 12- 24S 4.2 A | | 24 | 4.2 | 85 | 89 |
| BTS 24- 3.3S 24 A | 24 (16~36) | 3.3 | 24 | 88 | 88 |
| BTS 24- 5S 20 A | | 5 | 20 | 88 | 90 |
| BTS 24- 6S 16.7A | | 6 | 16.7 | 88 | 90 |
| BTS 24- 12S 8.4 A | | 12 | 8.4 | 86 | 90 |
| BTS 24- 15S 6.7 A | | 15 | 6.7 | 86 | 90 |
| BTS 24- 24S 4.2 A | | 24 | 4.2 | 86 | 90 |
| BTS 48- 3.3S 24 A | 48 (32~72) | 3.3 | 24 | 87 | 88 |
| BTS 48- 5S 20 A | | 5 | 20 | 87 | 90 |
| BTS 48- 6S 16.7A | | 6 | 16.7 | 87 | 90 |
| BTS 48- 12S 8.4 A | | 12 | 8.4 | 87 | 91 |
| BTS 48- 15S 6.7 A | | 15 | 6.7 | 86 | 91 |
| BTS 48- 24S 4.2 A | | 24 | 4.2 | 86 | 91 |
| BTS100- 3.3S 24 A | 100 (64~144) | 3.3 | 24 | 85 | 88 |
| BTS100- 5S 20 A | | 5 | 20 | 86 | 90 |
| BTS100- 6S 16.7A | | 6 | 16.7 | 86 | 90 |
| BTS100- 12S 8.4 A | | 12 | 8.4 | 86 | 91 |
| BTS100- 15S 6.7 A | | 15 | 6.7 | 86 | 91 |
| BTS100- 24S 4.2 A | | 24 | 4.2 | 86 | 89 |

※ 上記仕様以外にも対応可能ですので お問い合わせ下さい。
Please consult with us about other specification.

■ Features

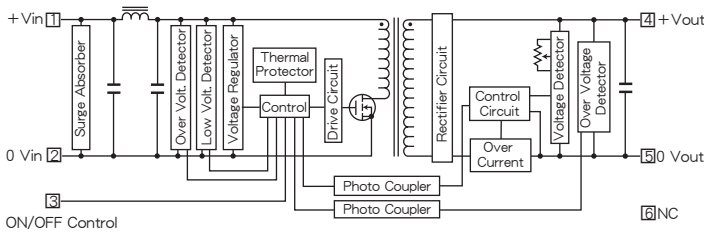
- Low Profile 12.8mm
 - Built-in Input Filter
 - Input-Output Isolation
 - High Efficiency 88~91%
 - Wide Input Voltage Range
 - High Reliability
 - 6 Sided Metal Shielding
 - Remote ON/OFF Control
 - Adjustable Output Voltage ±5%
 - Input Low Voltage Protection
 - Input Over Voltage Protection
 - Output Over Voltage Protection 115~140% Operation
 - Thermal Protection +110°C~+120°C
 - Operating Ambient Temperature -40°C~+85°C
 - Max. Case Temperature +105°C
 - Conformity to RoHS2 Directive
 - Not built-in aluminum and tantalum electrolytic capacitor
- 薄型 12.8mm
 - 入力フィルタ内蔵
 - 入出力間絶縁
 - 高効率 88~91%
 - 広範囲な入力電圧
 - 高信頼性
 - 6面メタルシールド
 - リモートON/OFFコントロール
 - 可変出力電圧 ±5%
 - 入力低電圧保護回路内蔵
 - 入力過電圧保護回路内蔵
 - 出力過電圧保護回路内蔵 115~140% 動作
 - 過熱保護回路内蔵 +110°C~+120°C
 - 動作周囲温度 -40°C~+85°C
 - 最大ケース温度 +105°C
 - RoHS2指令対応
 - アルミ電解コンデンサ及びタンタルコンデンサ不使用

■ General Characteristics

- Input Voltage, Range DC12, 24, 48, 100V (See Table 1)
- Output Voltage, Current See Table 1
- Output Voltage Range ±5% Adjustable
- Efficiency See Table 1
- Line Regulation ±0.3% max. (at Vin Range)
- Load Regulation ±0.5% max. (0~100% Load)
- Reflected Input Ripple, Noise (3% Vin) Vp-p max.
- Output Ripple 40mVp-p max.
- Output Noise 100mVp-p max.
- Short Circuit Protection Built-in, Auto-restart (See Fig. 2)
- Over Voltage Protection 115~140% Output Voltage
- Remote ON/OFF Control ON : Short or 0~0.8V
OFF : Open or 2~10V (Between terminal ② ~ ③)
- Temperature Coefficient 0.02%/°C max.
- Operating Ambient Temp. -40°C~+85°C (See Fig. 1)
- Max. Case Temperature +105°C
- Storage Temperature -55°C~+125°C
- Isolation Voltage AC1500V 1 min.
AC2000V 1 min. (100V Vin only) (Input-Output-Case)
- Isolation Impedance 100MΩ min. (at DC1000V) (Input-Output-Case)
- Weight Main Body : 170g max.
- Humidity 20~95% RH
- Shock 490m/s² (11msec 3directions)
- Vibration 10~55Hz 98m/s² (30minutes 3directions)
- Surface Structure 6 Sided Aluminum Case
- MTBF 400,000H (Ta : 25°C, 80% Load, Nominal Vin)
- Warranty 5 years

BTS SERIES DATA SHEET

Block Diagram



Characteristic Curves

Fig. 1 Derating Curve

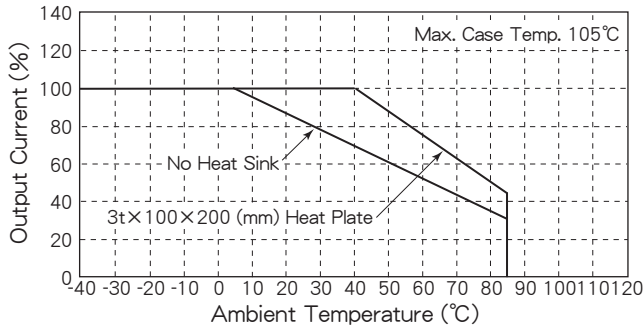


Fig. 2 Short Circuit Operating Area

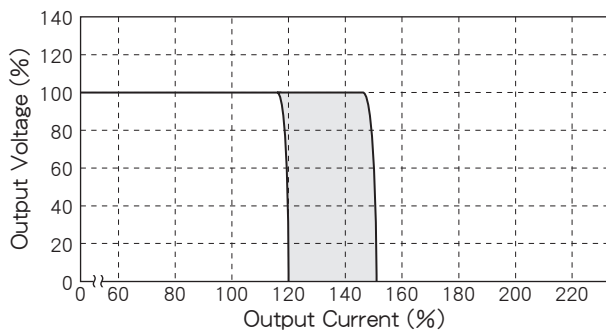


Fig. 3 Temperature Characteristic on Case Surface

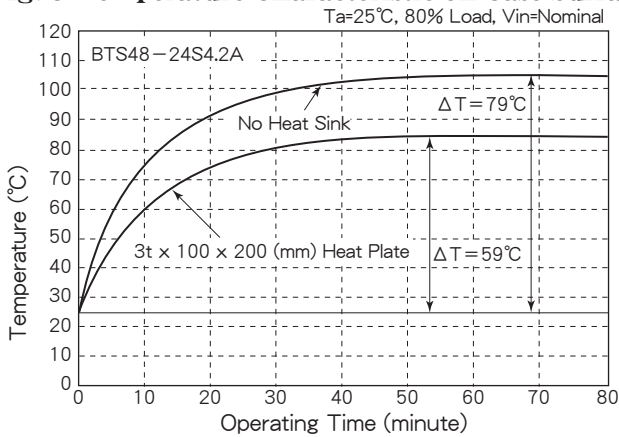


Fig. 4 Efficiency vs. Output Current

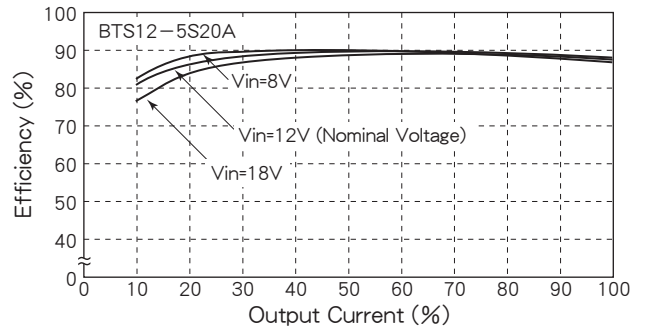


Fig. 5 Efficiency vs. Output Current

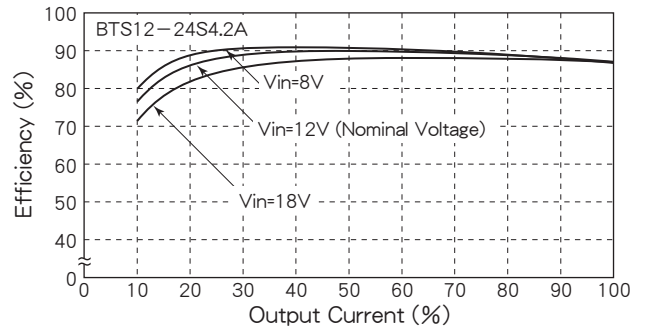


Fig. 6 Efficiency vs. Output Current

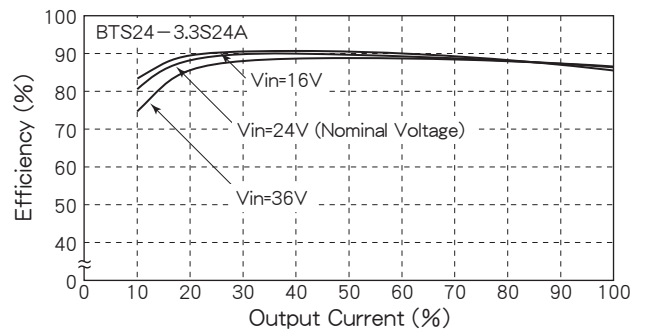


Fig. 7 Efficiency vs. Output Current

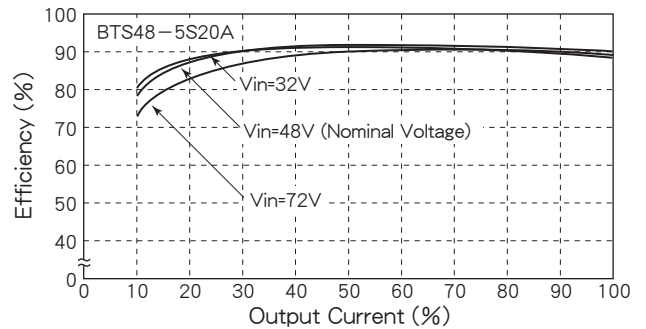
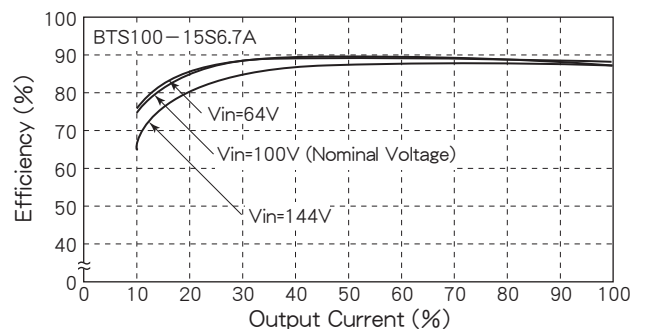


Fig. 8 Efficiency vs. Output Current

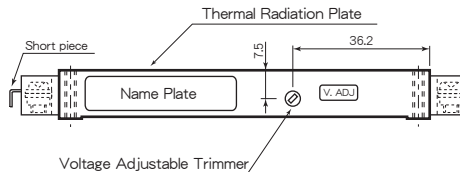
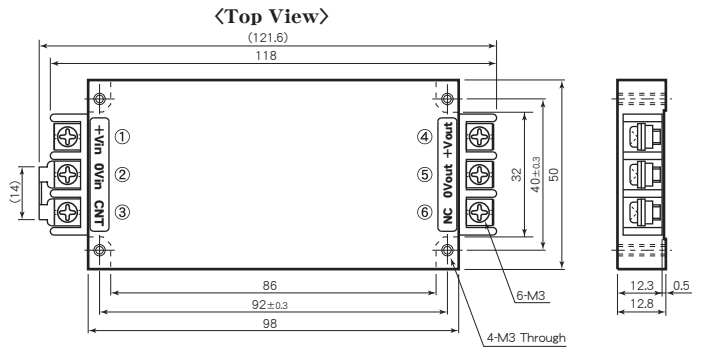


BTM SERIES

80~100W DC/DC CONVERTERS Single Output



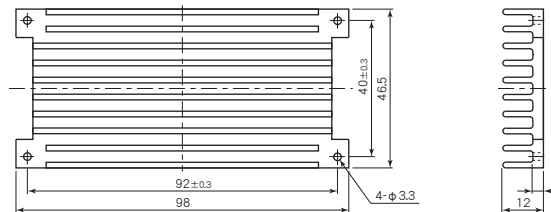
Terminal Outs & Dimensions (±0.5mm)



Terminal Outs

| | |
|---|----------------|
| ① | +Vdc in |
| ② | 0 Vdc in |
| ③ | ON/OFF Control |
| ④ | +Vdc out |
| ⑤ | 0 Vdc out |
| ⑥ | No Connection |

Option Heat Sink



* Option Heat Sink Model : A3-13986

Selection Guide

Table 1

| Model Number | Input Volt. (Range) (V. DC) | Output Voltage (V. DC) | Output Current (A) | Efficiency (Typical)(%) | |
|------------------|-----------------------------|------------------------|--------------------|-------------------------|----------|
| | | | | 20% Load | 80% Load |
| BTM 12-3.3S 24 A | 12 (8~18) | 3.3 | 24 | 88 | 88 |
| BTM 12-5S 20 A | | 5 | 20 | 87 | 89 |
| BTM 12-6S 16.7A | | 6 | 16.7 | 87 | 89 |
| BTM 12-12S 8.4 A | | 12 | 8.4 | 87 | 89 |
| BTM 12-15S 6.7 A | | 15 | 6.7 | 86 | 89 |
| BTM 12-24S 4.2 A | | 24 | 4.2 | 85 | 89 |
| BTM 24-3.3S 24 A | 24 (16~36) | 3.3 | 24 | 88 | 88 |
| BTM 24-5S 20 A | | 5 | 20 | 88 | 90 |
| BTM 24-6S 16.7A | | 6 | 16.7 | 88 | 90 |
| BTM 24-12S 8.4 A | | 12 | 8.4 | 86 | 90 |
| BTM 24-15S 6.7 A | | 15 | 6.7 | 86 | 90 |
| BTM 24-24S 4.2 A | | 24 | 4.2 | 86 | 90 |
| BTM 48-3.3S 24 A | 48 (32~72) | 3.3 | 24 | 87 | 88 |
| BTM 48-5S 20 A | | 5 | 20 | 87 | 90 |
| BTM 48-6S 16.7A | | 6 | 16.7 | 87 | 90 |
| BTM 48-12S 8.4 A | | 12 | 8.4 | 87 | 91 |
| BTM 48-15S 6.7 A | | 15 | 6.7 | 86 | 91 |
| BTM 48-24S 4.2 A | | 24 | 4.2 | 86 | 91 |
| BTM100-3.3S 24 A | 100 (64~144) | 3.3 | 24 | 85 | 88 |
| BTM100-5S 20 A | | 5 | 20 | 86 | 90 |
| BTM100-6S 16.7A | | 6 | 16.7 | 86 | 90 |
| BTM100-12S 8.4 A | | 12 | 8.4 | 86 | 91 |
| BTM100-15S 6.7 A | | 15 | 6.7 | 86 | 91 |
| BTM100-24S 4.2 A | | 24 | 4.2 | 86 | 89 |

※ 上記仕様以外にも対応可能ですので お問い合わせ下さい。
Please consult with us about other specification.

Features

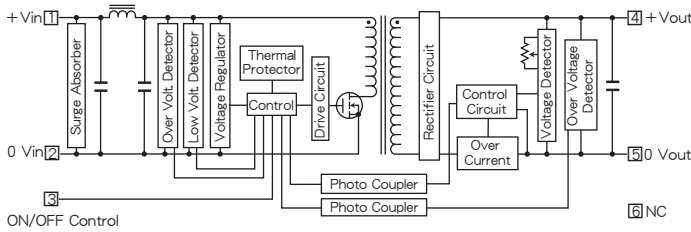
- Low Profile 12.8mm
 - Built-in Input Filter
 - Input-Output Isolation
 - High Efficiency 88~91%
 - Wide Input Voltage Range
 - High Reliability
 - 6 Sided Metal Shielding
 - Remote ON/OFF Control
 - Adjustable Output Voltage ±5%
 - Input Low Voltage Protection
 - Input Over Voltage Protection
 - Output Over Voltage Protection 115~140% Operation
 - Thermal Protection +110°C~+120°C
 - Operating Ambient Temperature -40°C~+85°C
 - Max. Case Temperature +105°C
 - Conformity to RoHS2 Directive
 - Not built-in aluminum and tantalum electrolytic capacitor
- 薄型 12.8mm
 - 入力フィルタ内蔵
 - 入出力間絶縁
 - 高効率 88~91%
 - 広範囲な入力電圧
 - 高信頼性
 - 6面メタルシールド
 - リモートON/OFFコントロール
 - 可変出力電圧 ±5%
 - 入力低電圧保護回路内蔵
 - 入力過電圧保護回路内蔵
 - 出力過電圧保護回路内蔵 115~140% 動作
 - 過熱保護回路内蔵 +110°C~+120°C
 - 動作周囲温度 -40°C~+85°C
 - 最大ケース温度 +105°C
 - RoHS2指令対応
 - アルミ電解コンデンサ及びタンタルコンデンサ不使用

General Characteristics

- Input Voltage, Range (at Ta : 25°C, Full Load, Nominal Vin) DC12, 24, 48, 100V (See Table 1)
- Output Voltage, Current See Table 1
- Output Voltage Range ±5% Adjustable
- Efficiency See Table 1
- Line Regulation ±0.3% max. (at Vin Range)
- Load Regulation ±0.5% max. (0~100% Load)
- Reflected Input Ripple, Noise (3% Vin) Vp-p max.
- Output Ripple 40mVp-p max.
- Output Noise 100mVp-p max.
- Short Circuit Protection Built-in, Auto-restart (See Fig. 2)
- Over Voltage Protection 115~140% Output Voltage
- Remote ON/OFF Control ON : Short or 0~0.8V
OFF : Open or 2~10V (Between terminal ② ~ ③)
- Temperature Coefficient 0.02%/°C max.
- Operating Ambient Temp. -40°C~+85°C (See Fig. 1)
- Max. Case Temperature +105°C
- Storage Temperature -55°C~+125°C
- Isolation Voltage AC1500V 1 min.
AC2000V 1 min. (100V Vin only) (Input-Output-Case)
- Isolation Impedance 100MΩ min. (at DC1000V) (Input-Output-Case)
- Weight Main Body : 170g max.
Heat Sink : 73g max.
- Humidity 20~95% RH
- Shock 490m/s² (11msec 3directions)
- Vibration 10~55Hz 98m/s² (30minutes 3directions)
- Surface Structure 6 Sided Aluminum Case
- MTBF 400,000H (Ta : 25°C, 80% Load, Nominal Vin)
- Warranty 5 years

BTM SERIES DATA SHEET

Block Diagram



Characteristic Curves

Fig. 1 Derating Curve

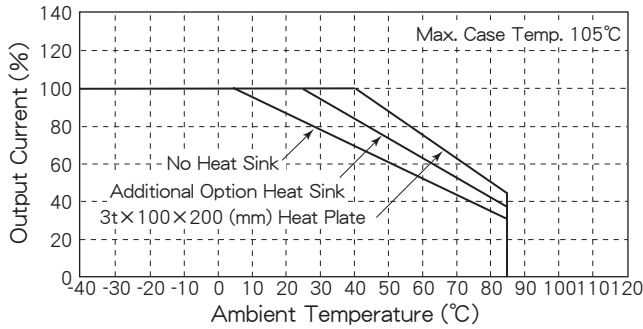


Fig. 2 Short Circuit Operating Area

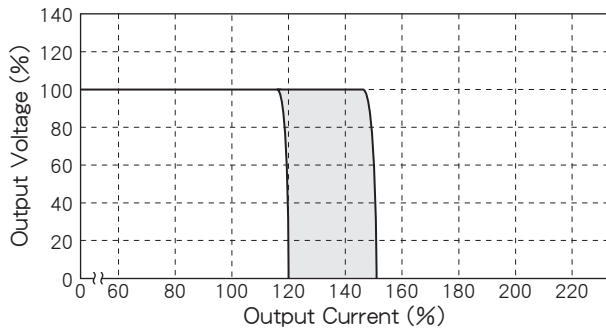


Fig. 3 Temperature Characteristic on Case Surface

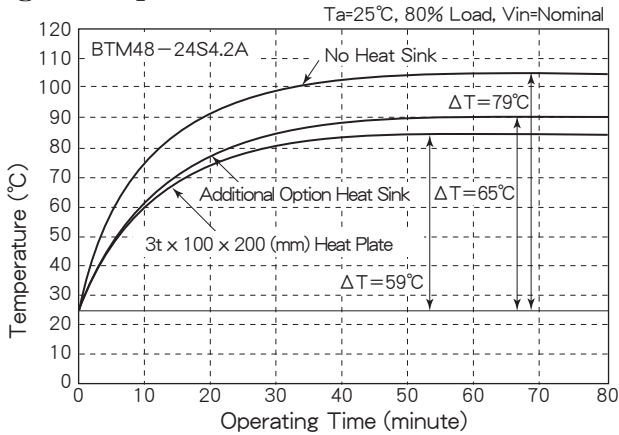


Fig. 4 Efficiency vs. Output Current

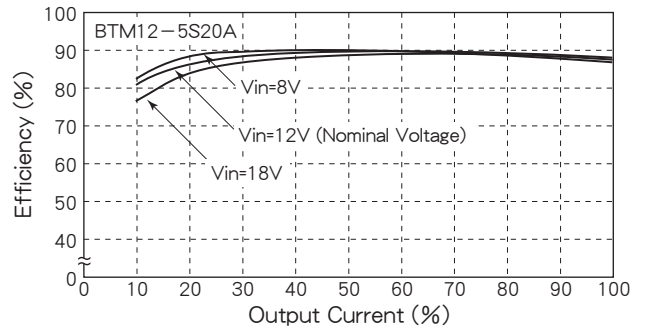


Fig. 5 Efficiency vs. Output Current

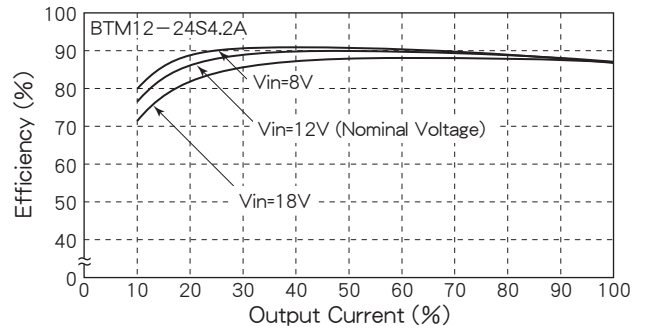


Fig. 6 Efficiency vs. Output Current

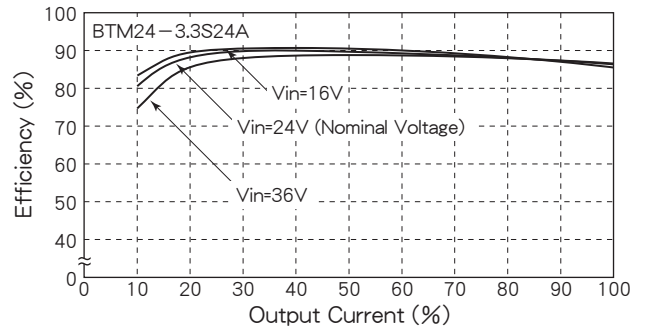


Fig. 7 Efficiency vs. Output Current

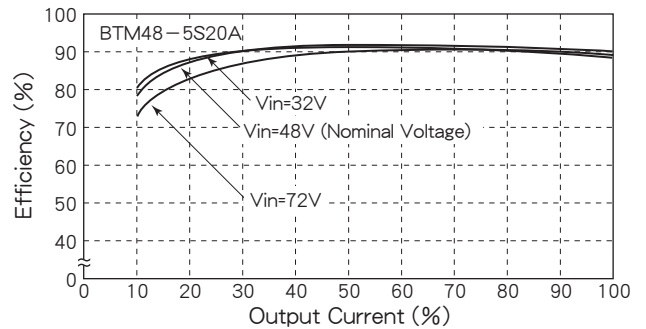
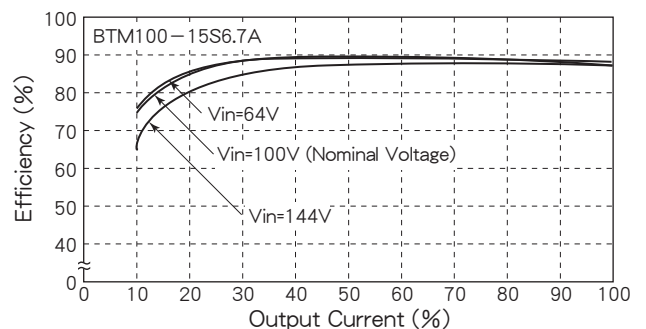


Fig. 8 Efficiency vs. Output Current



FD SERIES

80~100W DC/DC CONVERTERS Single Output

FDU type



H20×W60×L120 (mm)

FDS type



H20×W60×L120 (mm)

Features

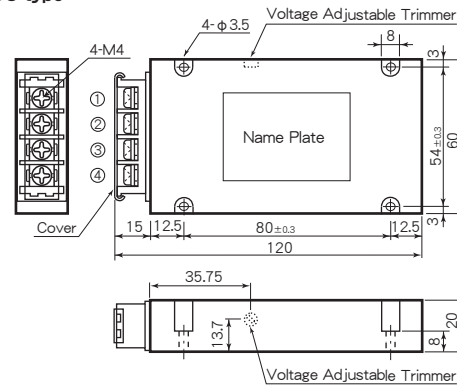
- Built-in Input Filter
- 入力フィルタ内蔵
- Input-Output Isolation
- 入出力間絶縁
- High Efficiency 85~92%
- 高効率 85~92%
- Wide Input Voltage Range
- 広範囲な入力電圧
- High Reliability
- 高信頼性
- Long Life by Mounting on Chassis or Using Heat Sink
- シャーシや放熱板への取り付けにより長寿命化
- Adjustable Output Voltage ±5%
- 可変出力電圧 ±5%
- Input Low Voltage Protection
- 入力低電圧保護回路内蔵
- Input Over Voltage Protection
- 入力過電圧保護回路内蔵
- Output Over Voltage Protection
- 出力過電圧保護回路内蔵
- Thermal Protection +110°C~+120°C
- 過熱保護回路内蔵 +110°C~+120°C
- Operating Ambient Temperature -40°C~+85°C
- 動作周囲温度 -40°C~+85°C
- Conformity to RoHS2 Directive
- RoHS2指令対応
- Not built-in aluminum and tantalum electrolytic capacitor
- アルミ電解コンデンサ及びタンタルコンデンサ不使用

General Characteristics

- Input Voltage, Range (at Ta : 25°C, Full Load, Nominal Vin) DC12, 24, 48, 100, 140V (See Table 1)
- Output Voltage, Current See Table 1
- Output Voltage Range ±5% Adjustable
- Efficiency See Table 1
- Line Regulation ±0.3% max. (at Vin Range)
- Load Regulation ±0.5% max. ±1% max. (3.3, 5V Vout only) (0~100% Load)
- Reflected Input Ripple, Noise (5% Vin) Vp-p max.
- Output Ripple 40mVp-p max.
- Output Noise (0.5% Vout+100mV) p-p max.
- Short Circuit Protection Built-in, Auto-restart (See Fig. 2)
- Over Voltage Protection 115~140% Output Voltage
- Temperature Coefficient 0.02%/°C max.
- Operating Ambient Temp. -40°C~+85°C (See Fig. 1)
- Max. Case Temperature +105°C
- Storage Temperature -55°C~+125°C
- Isolation Voltage AC2000V one minute (Input-Output-Case)
- Isolation Impedance 100MΩ min. (at DC1000V) (Input-Output-Case)
- Weight 350g max.
- Humidity 20~95% RH
- Shock 490m/s² (11msec 3directions)
- Vibration 10~55Hz 98m/s² (30minutes 3directions)
- Surface Structure Aluminum Case
- MTBF 400,000H (Ta : 25°C, 80% Load, Nominal Vin)
- Warranty 5 years

Terminal Outs & Dimensions (±0.5mm)

FDU type

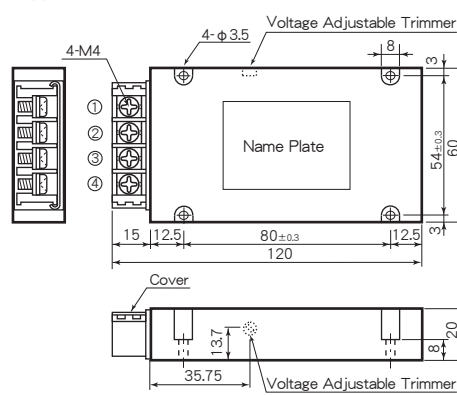


Terminal Outs

- ① +Vdc in
- ② 0 Vdc in
- ③ +Vdc out
- ④ 0 Vdc out

Ⓢ Voltage Adjustable Trimmer

FDS type



Terminal Outs

- ① +Vdc in
- ② 0 Vdc in
- ③ +Vdc out
- ④ 0 Vdc out

Ⓢ Voltage Adjustable Trimmer

Selection Guide

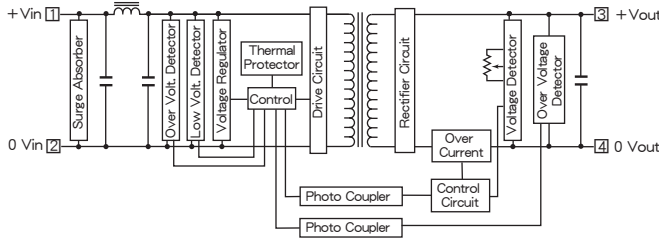
Table 1

| Model Number | Input Volt. (Range) (V. DC) | Output Voltage (V. DC) | Output Current (A) | Efficiency (Typical)(%) | | |
|-------------------------|-----------------------------|------------------------|--------------------|-------------------------|----------|----|
| | | | | 20% Load | 80% Load | |
| FDU(FDS) 12- 3.3S 24A | 12 (8~18) | 3.3 | 24 | 85 | 85 | |
| FDU(FDS) 12- 5S 20A | | 5 | 20 | 87 | 89 | |
| FDU(FDS) 12- 6S 16.7A | | 6 | 16.7 | 87 | 89 | |
| FDU(FDS) 12- 12S 8.4A | | 12 | 8.4 | 88 | 90 | |
| FDU(FDS) 12- 13.8S 7.2A | | 13.8 | 7.2 | 88 | 89 | |
| FDU(FDS) 12- 15S 6.7A | | 15 | 6.7 | 88 | 89 | |
| FDU(FDS) 12- 24S 4.2A | | 24 | 4.2 | 88 | 89 | |
| FDU(FDS) 24- 3.3S 24A | | 24 (16~36) | 3.3 | 24 | 88 | 90 |
| FDU(FDS) 24- 5S 20A | | | 5 | 20 | 88 | 91 |
| FDU(FDS) 24- 6S 16.7A | | | 6 | 16.7 | 88 | 91 |
| FDU(FDS) 24- 12S 8.4A | 12 | | 8.4 | 88 | 91 | |
| FDU(FDS) 24- 13.8S 7.2A | 13.8 | | 7.2 | 88 | 91 | |
| FDU(FDS) 24- 15S 6.7A | 15 | | 6.7 | 88 | 91 | |
| FDU(FDS) 24- 24S 4.2A | 24 | | 4.2 | 88 | 91 | |
| FDU(FDS) 48- 3.3S 24A | 48 (32~72) | | 3.3 | 24 | 87 | 88 |
| FDU(FDS) 48- 5S 20A | | | 5 | 20 | 89 | 92 |
| FDU(FDS) 48- 6S 16.7A | | | 6 | 16.7 | 88 | 92 |
| FDU(FDS) 48- 12S 8.4A | | 12 | 8.4 | 88 | 91 | |
| FDU(FDS) 48- 13.8S 7.2A | | 13.8 | 7.2 | 88 | 91 | |
| FDU(FDS) 48- 15S 6.7A | | 15 | 6.7 | 88 | 91 | |
| FDU(FDS) 48- 24S 4.2A | | 24 | 4.2 | 88 | 91 | |
| FDU(FDS)100- 3.3S 24A | | 100 (64~144) | 3.3 | 24 | 87 | 88 |
| FDU(FDS)100- 5S 20A | | | 5 | 20 | 88 | 90 |
| FDU(FDS)100- 6S 16.7A | | | 6 | 16.7 | 88 | 90 |
| FDU(FDS)100- 12S 8.4A | 12 | | 8.4 | 88 | 91 | |
| FDU(FDS)100- 13.8S 7.2A | 13.8 | | 7.2 | 88 | 91 | |
| FDU(FDS)100- 15S 6.7A | 15 | | 6.7 | 88 | 91 | |
| FDU(FDS)100- 24S 4.2A | 24 | | 4.2 | 88 | 91 | |
| FDU(FDS)140- 3.3S 24A | 140 (90~200) | | 3.3 | 24 | 87 | 88 |
| FDU(FDS)140- 5S 20A | | | 5 | 20 | 88 | 90 |
| FDU(FDS)140- 6S 16.7A | | | 6 | 16.7 | 88 | 90 |
| FDU(FDS)140- 12S 8.4A | | 12 | 8.4 | 88 | 91 | |
| FDU(FDS)140- 13.8S 7.2A | | 13.8 | 7.2 | 88 | 91 | |
| FDU(FDS)140- 15S 6.7A | | 15 | 6.7 | 88 | 91 | |
| FDU(FDS)140- 24S 4.2A | | 24 | 4.2 | 88 | 91 | |

* 上記仕様以外にも対応可能ですのでお問い合わせください。
Please consult with us about other specification.

FD SERIES DATA SHEET

Block Diagram



Characteristic Curves

Fig. 1 Derating Curve

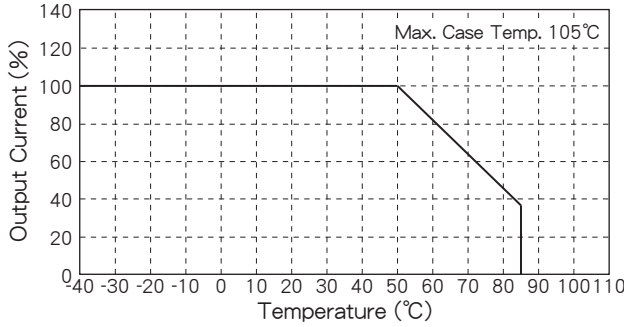


Fig. 2 Short Circuit Operating Area

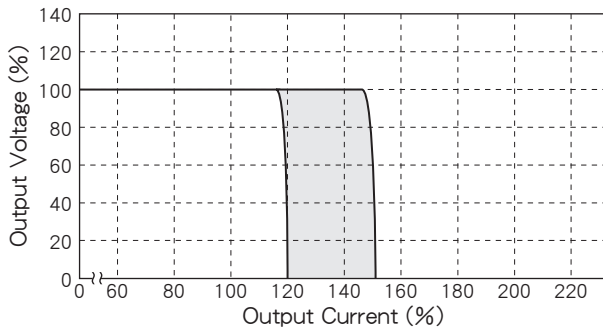


Fig. 3 Efficiency vs. Output Current

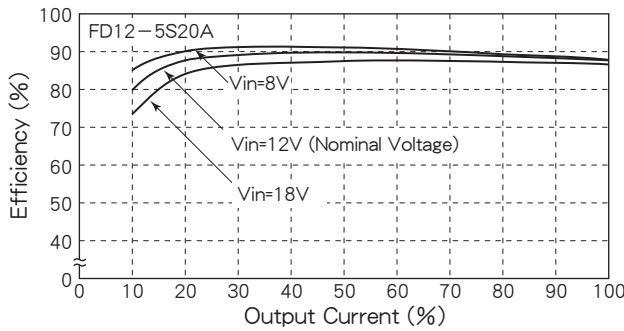


Fig. 4 Efficiency vs. Output Current

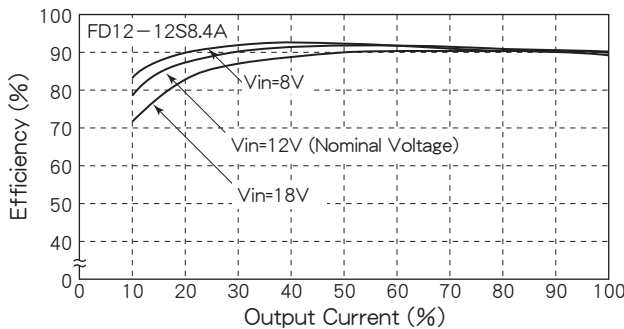


Fig. 5 Efficiency vs. Output Current

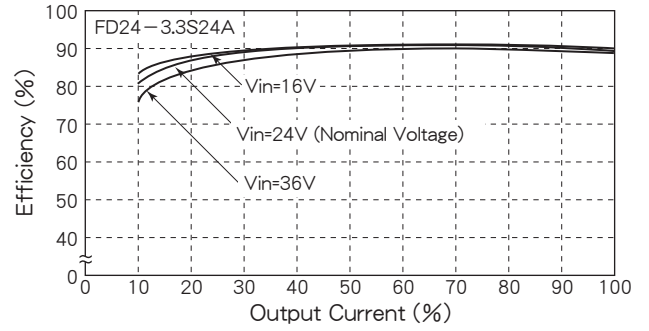


Fig. 6 Efficiency vs. Output Current

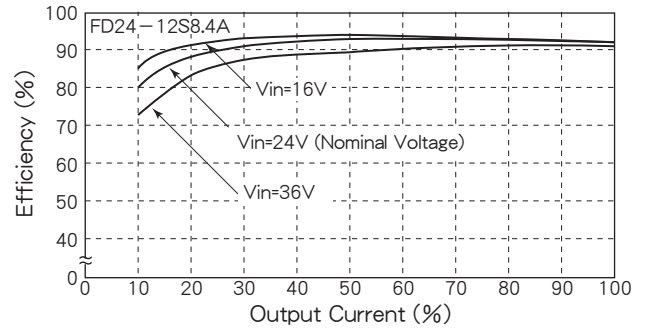


Fig. 7 Efficiency vs. Output Current

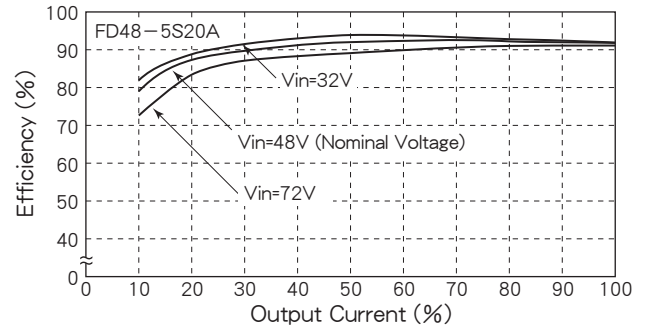


Fig. 8 Efficiency vs. Output Current

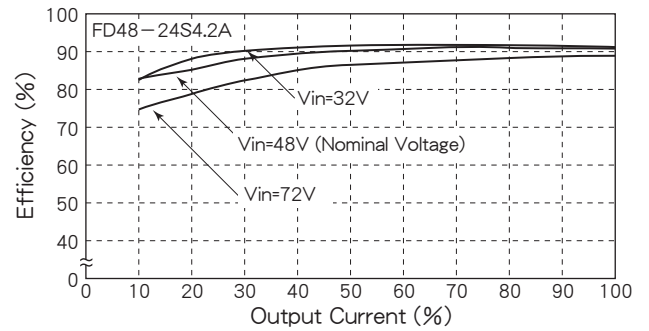
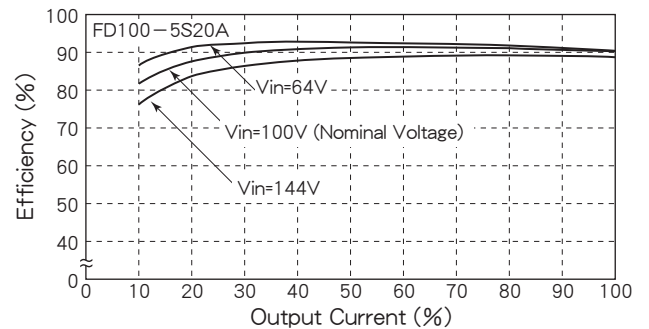


Fig. 9 Efficiency vs. Output Current



PD SERIES

85~110W DC/DC CONVERTERS Single Output



H35×W70×L158 (mm)

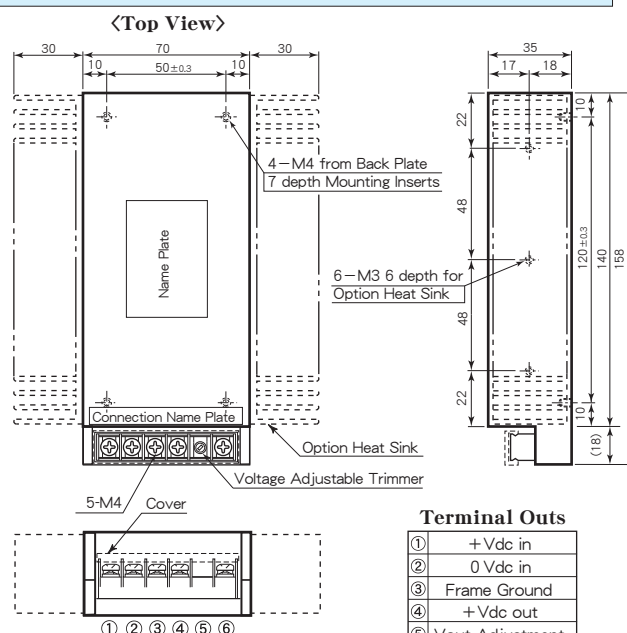
Features

- Wide Input Voltage Range
- 広範囲な入力電圧範囲
- High Efficiency 83%~90%
- 高効率 83%~90%
- Input-Output Isolation (AC2000V)
- 入出力間絶縁 (AC2000V)
- Low Output Ripple and Noise
- 出力リップルノイズが小さい
- Long Life by mounting on Chassis or Using Heat Sink
- シャーシや放熱板への取付により長寿命化
- Input Low Voltage Protection
- 入力低電圧保護回路内蔵
- Input Over Voltage Protection
- 入力過電圧保護回路内蔵
- Output Over Voltage Protection 120%~140% Operation
- 出力過電圧保護回路内蔵 120%~140%動作
- Operating Ambient Temp. -25°C~+71°C
- 動作周囲温度 -25°C~+71°C
- Max. Case Temperature +85°C
- 最大ケース温度 +85°C
- Conformity to RoHS2 Directive
- RoHS2指令対応

General Characteristics

- Input Voltage, Range (at Ta : 25°C, Full Load, Nominal Vin) DC12, 24, 48, 96V (See Table 1)
- Output Voltage, Current See Table 1
- Output Voltage Adjustment ±5%
- Efficiency See Table 1
- Line Regulation 0.1% max. (at Vin Range)
- Load Regulation 1% max. (0~100% Load)
- Output Ripple (0.1% Vout+50mV) p-p max.
- Output Noise (0.5% Vout+50mV) p-p max.
- Short Circuit Protection Built-in, Auto-restart (See Fig. 2)
- Output Over Voltage Protection Built-in, Shut-down (120%~140% Vout)
- Temperature Coefficient 0.02%/°C max.
- Operating Ambient Temp. -25°C~+71°C (See Fig. 1)
- Max. Case Temp. +85°C
- Storage Temp. -40°C~+85°C
- Isolation Voltage AC2000V one minute (Input-Output-Case)
- Isolation Impedance 100MΩ min. (at DC1000V) (Input-Output-Case)
- Weight Main Body : 800g max.
Pair Heat Sinks : 250g max.
- Humidity 20~95% RH
- Shock 490m/s² (11msec 3directions)
- Vibration 10~55Hz 98m/s² (30minutes 3directions)
- Surface Structure Aluminum Case
- MTBF 120,000H (Ta : 25°C, 80% Load, Nominal Vin)
- Warranty 5 years

Terminal Outs & Dimensions (±0.5mm)



* Option Heat Sink Model : A3-3664

Selection Guide

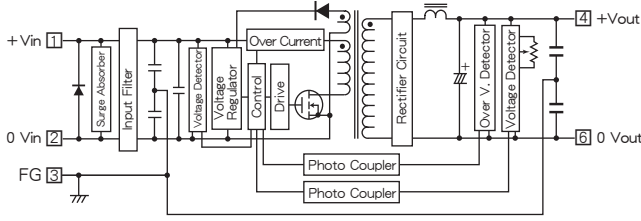
Table 1

| Model Number | Input Volt. (Range) (V. DC) | Output Voltage (V. DC) | Output Current (A) | Efficiency (typ.) (%) |
|-------------------|-----------------------------|------------------------|--------------------|-----------------------|
| PD12 - 3.3S 26A | 12 (6~18) at 50% Load | 3.3 | 26 | 83 |
| PD12 - 5S 20A | | 5 | 20 | 85 |
| PD12 - 12S 8.3A | | 12 | 8.3 | 85 |
| PD12 - 13.8S 7.3A | | 13.8 | 7.3 | 85 |
| PD12 - 15S 7A | | 15 | 7 | 85 |
| PD12 - 24S 4.5A | | 24 | 4.5 | 86 |
| PD12 - 48S 2.3A | | 48 | 2.3 | 88 |
| PD12 - 100S 1.1A | | 100 | 1.1 | 90 |
| PD12 - 140S 0.8A | | 140 | 0.8 | 90 |
| PD12 - 200S 0.55A | | 200 | 0.55 | 90 |
| PD12 - 300S 0.36A | 300 | 0.36 | 90 | |
| PD24 - 3.3S 26A | 24 (14~40) at 50% Load | 3.3 | 26 | 83 |
| PD24 - 5S 20A | | 5 | 20 | 85 |
| PD24 - 12S 8.3A | | 12 | 8.3 | 86 |
| PD24 - 13.8S 7.3A | | 13.8 | 7.3 | 86 |
| PD24 - 15S 7A | | 15 | 7 | 86 |
| PD24 - 24S 4.5A | | 24 | 4.5 | 88 |
| PD24 - 48S 2.3A | | 48 | 2.3 | 89 |
| PD24 - 100S 1.1A | | 100 | 1.1 | 90 |
| PD24 - 140S 0.8A | | 140 | 0.8 | 90 |
| PD24 - 200S 0.55A | | 200 | 0.55 | 90 |
| PD24 - 300S 0.36A | 300 | 0.36 | 90 | |
| PD48 - 3.3S 26A | 48 (28~80) at 50% Load | 3.3 | 26 | 83 |
| PD48 - 5S 20A | | 5 | 20 | 85 |
| PD48 - 12S 8.3A | | 12 | 8.3 | 85 |
| PD48 - 13.8S 7.3A | | 13.8 | 7.3 | 86 |
| PD48 - 15S 7A | | 15 | 7 | 86 |
| PD48 - 24S 4.5A | | 24 | 4.5 | 88 |
| PD48 - 48S 2.3A | | 48 | 2.3 | 89 |
| PD48 - 100S 1.1A | | 100 | 1.1 | 90 |
| PD48 - 140S 0.8A | | 140 | 0.8 | 90 |
| PD48 - 200S 0.55A | | 200 | 0.55 | 90 |
| PD48 - 300S 0.36A | 300 | 0.36 | 90 | |
| PD96 - 3.3S 26A | 96 (56~160) at 50% Load | 3.3 | 26 | 83 |
| PD96 - 5S 20A | | 5 | 20 | 87 |
| PD96 - 12S 8.3A | | 12 | 8.3 | 85 |
| PD96 - 13.8S 7.3A | | 13.8 | 7.3 | 86 |
| PD96 - 15S 7A | | 15 | 7 | 86 |
| PD96 - 24S 4.5A | | 24 | 4.5 | 88 |
| PD96 - 48S 2.3A | | 48 | 2.3 | 89 |
| PD96 - 100S 1.1A | | 100 | 1.1 | 90 |
| PD96 - 140S 0.8A | | 140 | 0.8 | 90 |
| PD96 - 200S 0.55A | | 200 | 0.55 | 90 |
| PD96 - 300S 0.36A | 300 | 0.36 | 90 | |

* 上記仕様以外にも対応可能ですので お問い合わせ下さい。
Please consult with us about other specification.

PD SERIES DATA SHEET

Block Diagram



Characteristic Curves

Fig. 1 Derating Curve

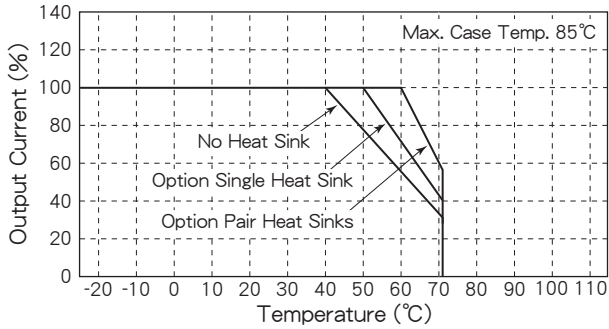


Fig. 2 Short Circuit Operating Area

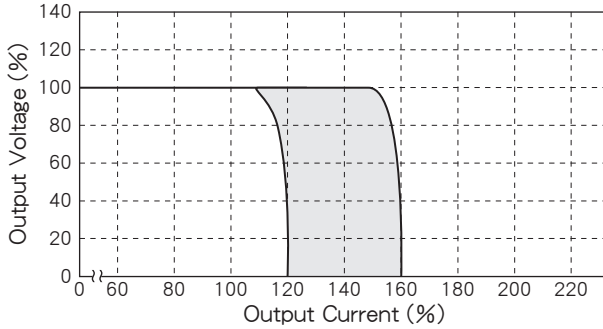


Fig. 3 Temperature Characteristic on Case Surface

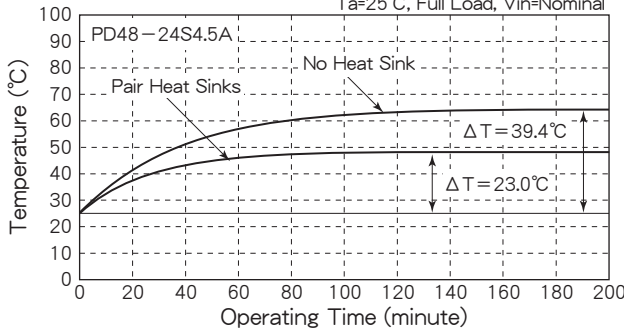


Fig. 4 Efficiency vs. Output Current

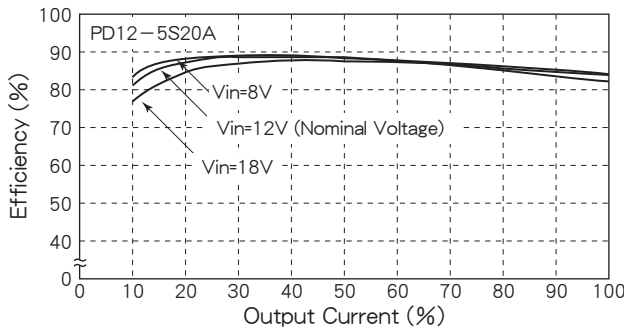


Fig. 5 Efficiency vs. Output Current

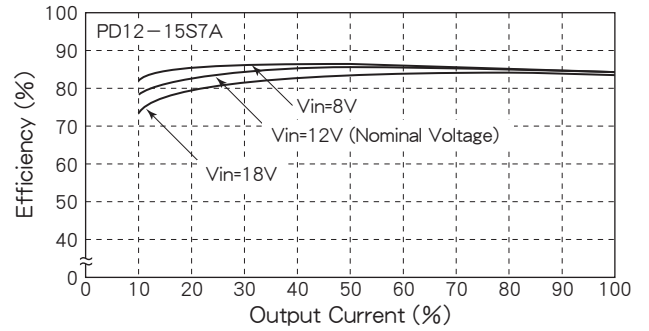


Fig. 6 Efficiency vs. Output Current

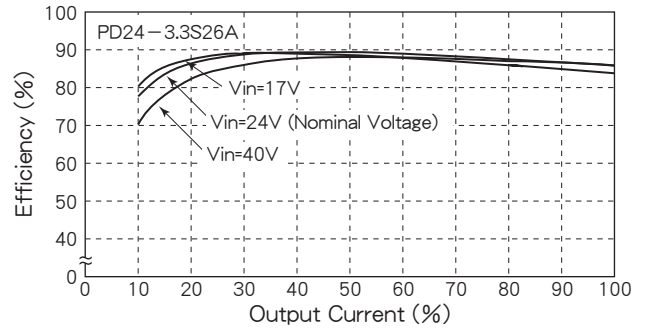


Fig. 7 Efficiency vs. Output Current

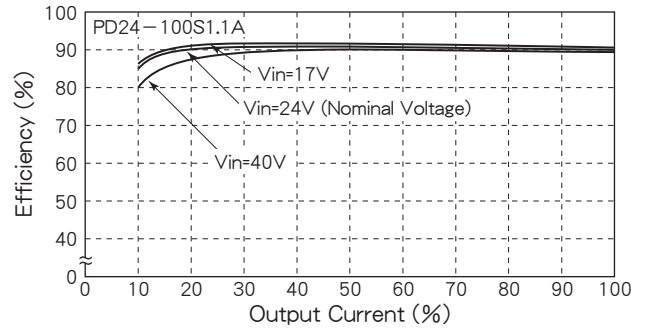


Fig. 8 Efficiency vs. Output Current

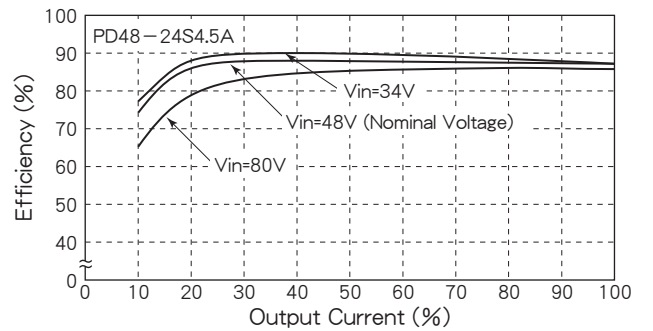
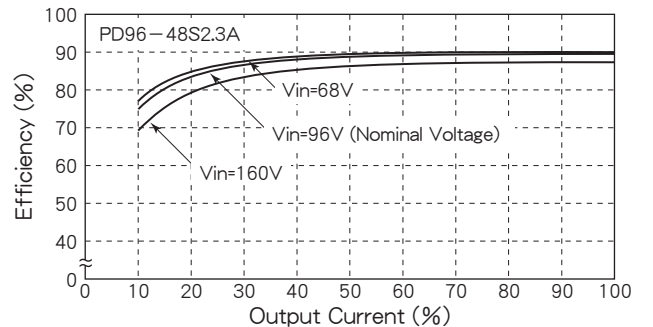


Fig. 9 Efficiency vs. Output Current



FM SERIES

105~200W DC/DC CONVERTERS 並列運転可能 Parallel Operation

FMU type



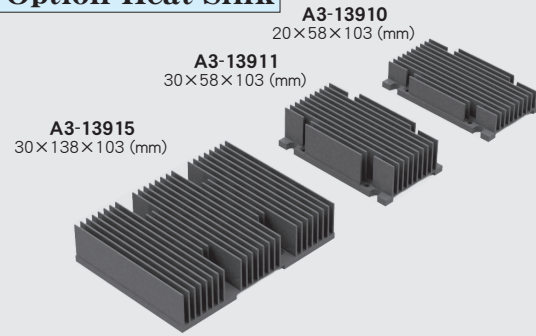
H20×W60×L120 (mm)

FMS type



H20×W60×L120 (mm)

Option Heat Sink



Features

- Built-in Input Filter
- Input-Output Isolation
- High Efficiency 87~91%
- Wide Input Voltage Range
- High Reliability
- Adjustable Output Volt. ±10%
- Input Low Voltage Protection
- Input Over Voltage Protection
- Output Over Voltage Protection
- Thermal Protection
+110°C~+120°C
- Possible Parallel Operation
up to 3 converters
- Operating Ambient Temperature
-40°C~+85°C
- Conformity to RoHS2 Directive
- Not built-in aluminum and tantalum electrolytic capacitor
- 入力フィルタ内蔵
- 入出力間絶縁
- 高効率 87~91%
- 広範囲な入力電圧
- 高信頼性
- 可変出力電圧 ±10%
- 入力低電圧保護回路内蔵
- 入力過電圧保護回路内蔵
- 出力過電圧保護回路内蔵
- 過熱保護回路内蔵
+110°C~+120°C
- 3台まで並列運転可能
- 動作周囲温度
-40°C~+85°C
- RoHS2指令対応
- アルミ電解コンデンサ及びタンタルコンデンサ不使用

Selection Guide

Table 1

| Model Number | Input Volt. (Range) (V. DC) | Output Voltage (V. DC) | Output Current (A) | Efficiency (Typical)(%) | | | | | |
|------------------------|-----------------------------|------------------------|--------------------|-------------------------|----------|----------|----|----|----|
| | | | | 20% Load | 50% Load | 80% Load | | | |
| FMU(FMS) 12- 3.3S 32A | 12 (8~18) | 3.3 | 32 | 85 | 88 | 87 | | | |
| | | | 5 | 28 | 86 | 90 | 88 | | |
| | | | 6 | 23.3 | 86 | 90 | 88 | | |
| | | at 50% Load | 12 | 13.8 | 13.4 | 87 | 90 | 89 | |
| | | | | | 11.6 | 87 | 90 | 89 | |
| | | | | | 10.7 | 87 | 90 | 89 | |
| | | at 100% Load | 12 | 15S 10.7A | 6.7 | 87 | 90 | 89 | |
| | | | | | 5.8 | 87 | 90 | 89 | |
| | | | | | 3.4 | 87 | 90 | 89 | |
| | | FMU(FMS) 24- 3.3S 40A | 24 (16~36) | 3.3 | 40 | 88 | 91 | 90 | |
| | | | | | 5 | 32 | 90 | 92 | 91 |
| | | | | | 6 | 26.6 | 90 | 92 | 91 |
| at 50% Load | 24 | | | 13.8 | 16.7 | 90 | 92 | 91 | |
| | | | | | 14.5 | 90 | 92 | 91 | |
| | | | | | 8.4 | 90 | 92 | 91 | |
| at 100% Load | 24 | | | 28S 7.2A | 7.2 | 90 | 92 | 91 | |
| | | | | | 4.2 | 90 | 92 | 91 | |
| | | | | | 4.2 | 90 | 92 | 91 | |
| FMU(FMS) 48- 3.3S 40A | 48 (36~76) | | | 3.3 | 40 | 88 | 91 | 90 | |
| | | | | | 5 | 32 | 91 | 92 | 91 |
| | | | | | 6 | 26.6 | 91 | 92 | 91 |
| | | at 50% Load | 48 | 13.8 | 16.7 | 91 | 92 | 91 | |
| | | | | | 14.5 | 91 | 92 | 91 | |
| | | | | | 8.4 | 91 | 92 | 91 | |
| | | at 100% Load | 48 | 28S 7.2A | 7.2 | 91 | 92 | 91 | |
| | | | | | 4.2 | 91 | 92 | 91 | |
| | | | | | 4.2 | 91 | 92 | 91 | |
| | | FMU(FMS) 100- 3.3S 40A | 100 (64~144) | 3.3 | 40 | 85 | 91 | 90 | |
| | | | | | 5 | 32 | 87 | 92 | 91 |
| | | | | | 6 | 26.6 | 87 | 92 | 91 |
| at 50% Load | 100 | | | 13.8 | 16.7 | 87 | 92 | 91 | |
| | | | | | 14.5 | 87 | 92 | 91 | |
| | | | | | 8.4 | 87 | 92 | 91 | |
| at 100% Load | 100 | | | 28S 7.2A | 7.2 | 87 | 92 | 91 | |
| | | | | | 4.2 | 87 | 92 | 91 | |
| | | | | | 4.2 | 87 | 92 | 91 | |
| FMU(FMS) 140- 3.3S 40A | 140 (90~200) | | | 3.3 | 40 | 85 | 91 | 90 | |
| | | | | | 5 | 32 | 87 | 92 | 91 |
| | | | | | 6 | 26.6 | 87 | 92 | 91 |
| | | at 50% Load | 140 | 13.8 | 16.7 | 87 | 92 | 91 | |
| | | | | | 14.5 | 87 | 92 | 91 | |
| | | | | | 8.4 | 87 | 92 | 91 | |
| | | at 100% Load | 140 | 28S 7.2A | 7.2 | 87 | 92 | 91 | |
| | | | | | 4.2 | 87 | 92 | 91 | |
| | | | | | 4.2 | 87 | 92 | 91 | |

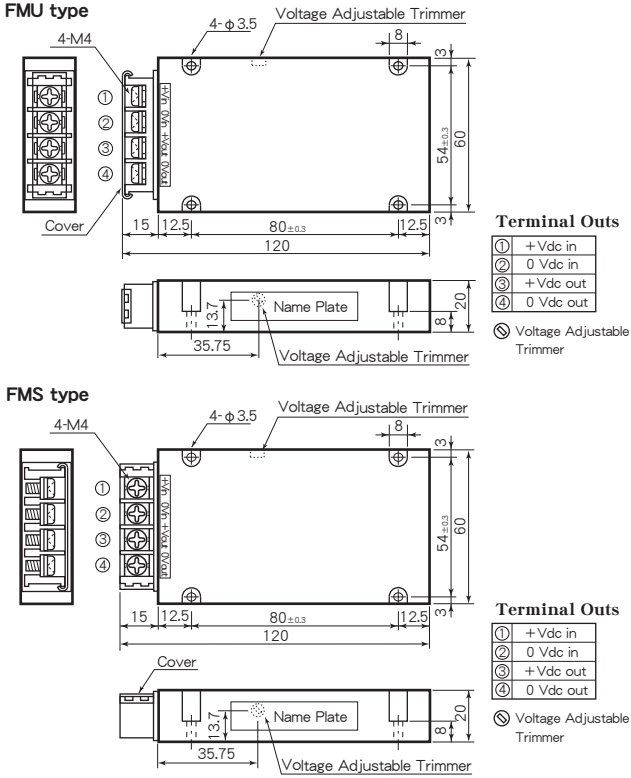
General Characteristics

- Input Voltage, Range (at Ta : 25°C, Full Load, Nominal Vin) DC12, 24, 48, 100, 140V (See Table 1)
- Output Voltage, Current See Table 1
- Output Voltage Range ±10% Adjustable
- Efficiency See Table 1
- Line Regulation ±0.3% max. (at Vin Range)
- Load Regulation 3% max. (0~100% Load) (See Fig. 6)
- Reflected Input Ripple, Noise (5% Vin)/Vp-p max.
- Output Ripple 80mVp-p max.
- Output Noise (0.5% Vout+100mV) p-p max.
- Short Circuit Protection Built-in, Auto-restart (See Fig. 5)
- Over Voltage Protection 115~140% Output Voltage
- Temperature Coefficient 0.02%/°C max.
- Operating Ambient Temp. -40°C~+85°C (See Fig. 1)
- Max. Case Temperature +105°C
- Storage Temperature -55°C~+125°C
- Isolation Voltage AC2000V one minute (Input-Output-Case)
- Isolation Impedance 100MΩ min. (at DC1000V) (Input-Output-Case)
- Weight Main Body : 350g max.
Heat Sink
A3-13910 : 135g max.
A3-13911 : 175g max.
A3-13915 : 425g max.
- Humidity 20~95% RH
- Shock 490m/s² (11msec 3directions)
- Vibration 10~55Hz 98m/s² (30minutes 3directions)
- Surface Structure Aluminum Case
- MTBF 400,000H (Ta : 25°C, 80% Load, Nominal Vin)
- Warranty 5 years

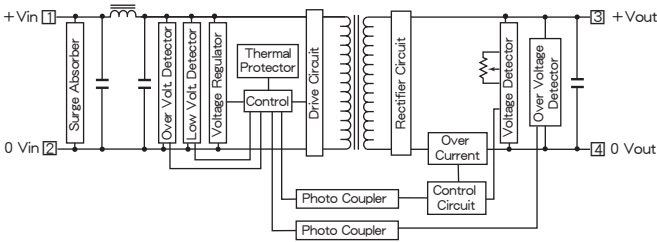
* 上記仕様以外にも対応可能ですのでお問い合わせください。
Please consult with us about other specification.

FM SERIES DATA SHEET

Terminal Outs & Dimensions (±0.5mm)

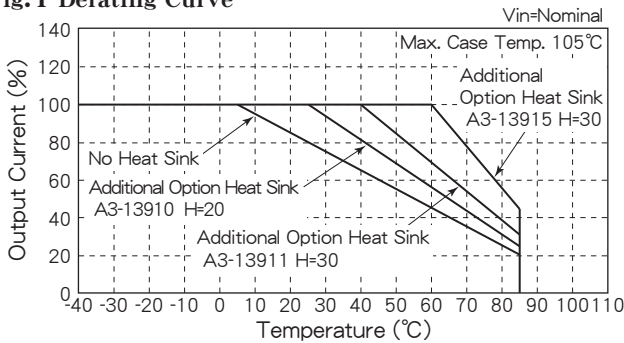


Block Diagram



Characteristic Curves

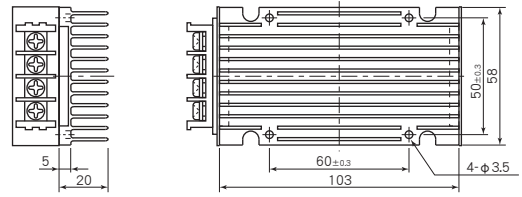
Fig. 1 Derating Curve



Option Heat Sink

Fig. 2 Temperature Characteristic on Case Surface

* Option Heat Sink Model : A3-13910



FMU24-12S16.7A Additional Heat Sink A3-13910
Ta=25°C, 100% Load, Vin=Nominal

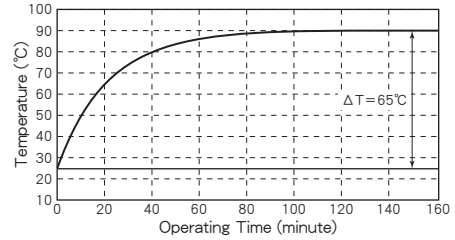
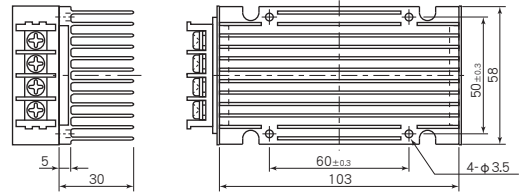


Fig. 3 Temperature Characteristic on Case Surface

* Option Heat Sink Model : A3-13911



FMU24-12S16.7A Additional Heat Sink A3-13911
Ta=25°C, 100% Load, Vin=Nominal

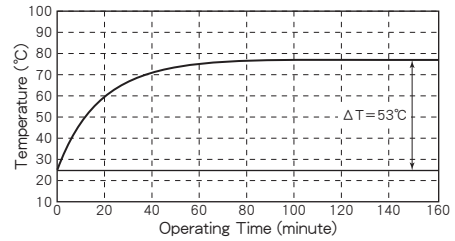
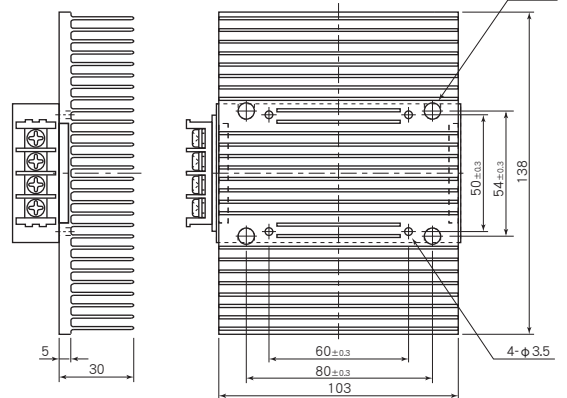
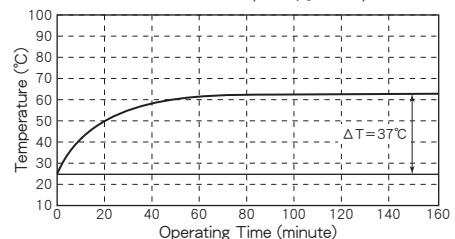


Fig. 4 Temperature Characteristic on Case Surface

* Option Heat Sink Model : A3-13915



FMU24-12S16.7A Additional Heat Sink A3-13915
Ta=25°C, 100% Load, Vin=Nominal



FM SERIES DATA SHEET

Characteristic Curves

Fig. 5 Short Circuit Operating Area

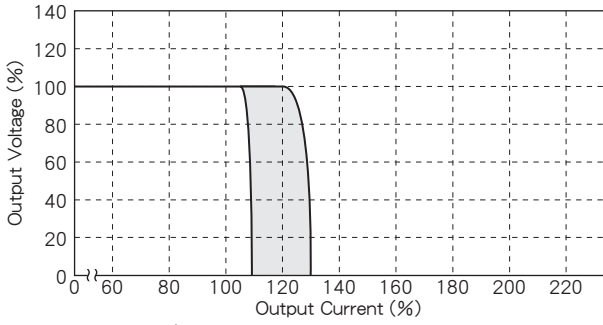
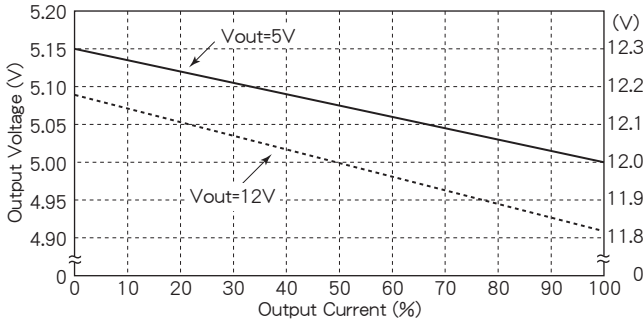


Fig. 6 Output Voltage vs. Output Current



* 並列運転時に各モジュールの電流を平均化するため
負荷変動を大きくしてあります。
Load Regulation is regulated large on purpose to equate
the each unit's output current at parallel operation.

Fig. 7 Efficiency vs. Output Current

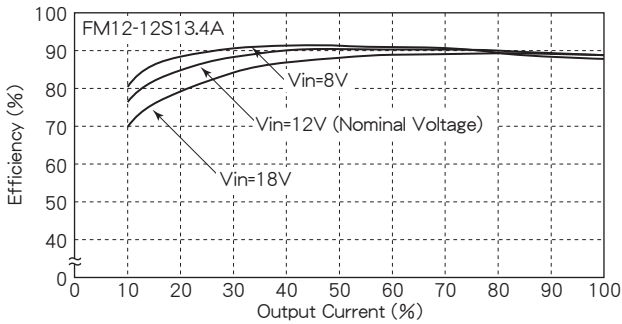


Fig. 8 Efficiency vs. Output Current

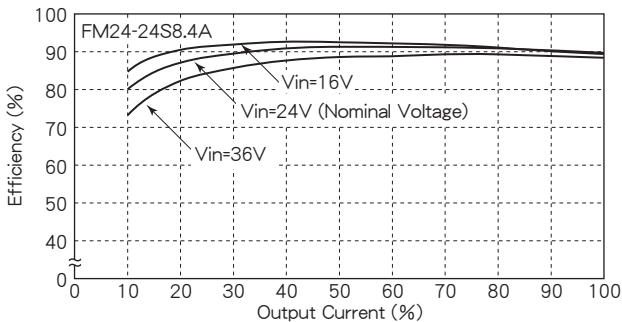


Fig. 9 Efficiency vs. Output Current

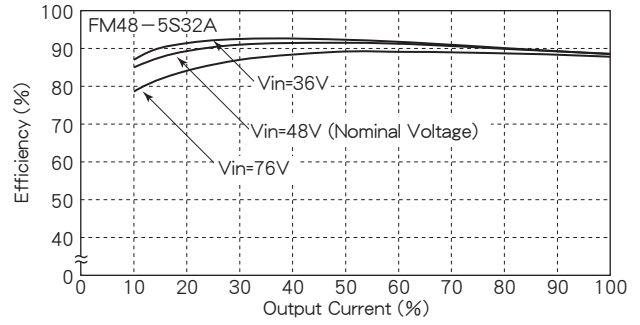


Fig. 10 Efficiency vs. Output Current

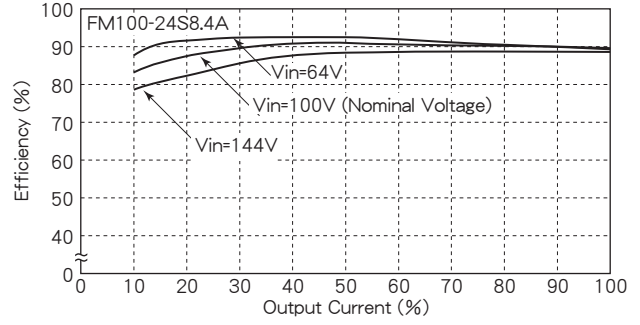
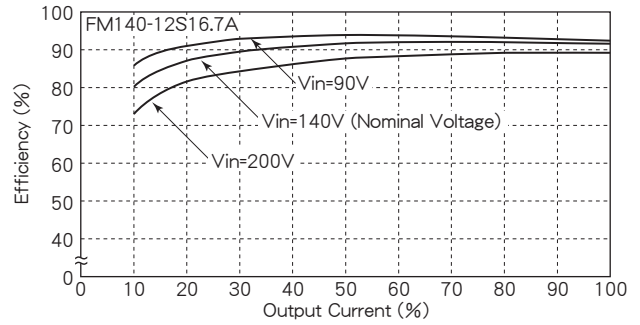


Fig. 11 Efficiency vs. Output Current



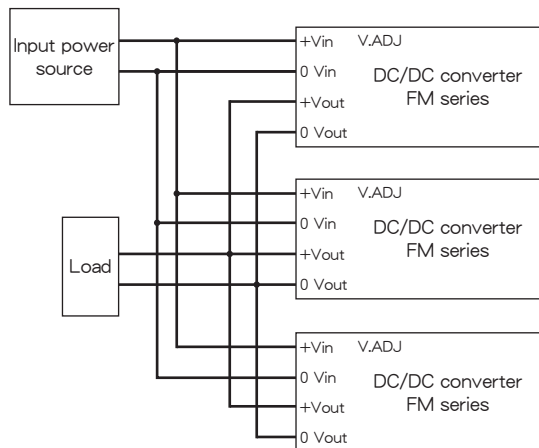
FM SERIES DATA SHEET

■ Parallel Operation

同機種を並列に動作させることにより、出力電流容量を増やすことができます。下図のように結線し、各コンバータ間の出力電圧を同じ電圧に調整することで、並列運転ができます。(Fig. 12を御参照ください)

It is possible to increase output current capacity by parallel operation of the same model. Please see the below figure for wiring instruction. Parallel operation is possible by each outputs to be same voltage.

Fig. 12 Parallel Operation Connection



KM SERIES

105~200W DC/DC CONVERTERS 並列運転可能 Parallel Operation

KMU type



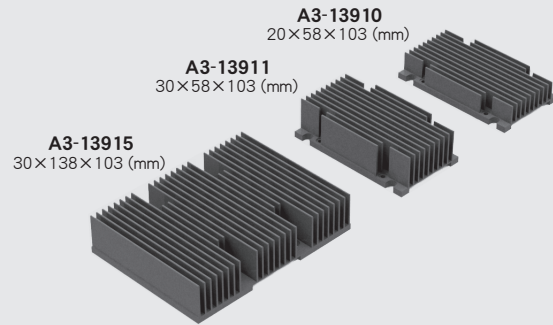
H20×W60×L135 (mm)

KMS type



H20×W60×L135 (mm)

Option Heat Sink



Features

- Built-in Input Filter
- Input-Output Isolation
- High Efficiency 87~91%
- Wide Input Voltage Range
- High Reliability
- Adjustable Output Volt. ±10%
- Input Low Voltage Protection
- Input Over Voltage Protection
- Output Over Voltage Protection
- Thermal Protection
+110°C~+120°C
- Remote ON/OFF Control
- Possible Parallel Operation
up to 3 converters
- Operating Ambient Temperature
-40°C~+85°C
- Conformity to RoHS2 Directive
- Not built-in aluminum and
tantalum electrolytic capacitor
- 入力フィルタ内蔵
- 入出力間絶縁
- 高効率 87~91%
- 広範囲な入力電圧
- 高信頼性
- 可変出力電圧 ±10%
- 入力低電圧保護回路内蔵
- 入力過電圧保護回路内蔵
- 出力過電圧保護回路内蔵
- 過熱保護回路内蔵
+110°C~+120°C
- リモートON/OFFコントロール
- 3台まで並列運転可能
- 動作周囲温度
-40°C~+85°C
- RoHS2指令対応
- アルミ電解コンデンサ及び
タンタルコンデンサ不使用

Selection Guide

Table 1

| Model Number | Input Volt. (Range) (V. DC) | Output Voltage (V. DC) | Output Current (A) | Efficiency (Typical)(%) | | |
|-----------------------|---|------------------------------|--------------------------|----------------------------|----------|----------|
| | | | | 20% Load | 50% Load | 80% Load |
| KMU(KMS) 12- 3.3S 32A | 12 (8~18) at 50% Load (9~18) at 100% Load | 3.3 | 32 | 85 | 88 | 87 |
| | | 5 | 28 | 86 | 90 | 88 |
| | | 6 | 23.3 | 86 | 90 | 88 |
| | | 12 | 13.4 | 87 | 90 | 89 |
| | | 13.8 | 11.6 | 87 | 90 | 89 |
| | | 15 | 10.7 | 87 | 90 | 89 |
| | | 24 | 6.7 | 87 | 90 | 89 |
| | | 28 | 5.8 | 87 | 90 | 89 |
| | | 48 | 3.4 | 87 | 90 | 89 |
| | | 3.3 | 40 | 88 | 91 | 90 |
| | | 5 | 32 | 90 | 92 | 91 |
| | | 6 | 26.6 | 90 | 92 | 91 |
| KMU(KMS) 24- 5S 32A | 24 (16~36) | 5 | 28 | 86 | 90 | 88 |
| | | 6 | 23.3 | 86 | 90 | 88 |
| | | 12 | 13.4 | 87 | 90 | 89 |
| | | 13.8 | 11.6 | 87 | 90 | 89 |
| | | 15 | 10.7 | 87 | 90 | 89 |
| | | 24 | 6.7 | 87 | 90 | 89 |
| | | 28 | 5.8 | 87 | 90 | 89 |
| | | 48 | 3.4 | 87 | 90 | 89 |
| | | 3.3 | 40 | 88 | 91 | 90 |
| | | 5 | 32 | 90 | 92 | 91 |
| | | 6 | 26.6 | 90 | 92 | 91 |
| | | KMU(KMS) 48- 5S 32A | 48 (36~76) | 5 | 28 | 86 |
| 6 | 23.3 | | | 86 | 90 | 88 |
| 12 | 13.4 | | | 87 | 90 | 89 |
| 13.8 | 11.6 | | | 87 | 90 | 89 |
| 15 | 10.7 | | | 87 | 90 | 89 |
| 24 | 6.7 | | | 87 | 90 | 89 |
| 28 | 5.8 | | | 87 | 90 | 89 |
| 48 | 3.4 | | | 87 | 90 | 89 |
| 3.3 | 40 | | | 88 | 91 | 90 |
| 5 | 32 | | | 90 | 92 | 91 |
| 6 | 26.6 | | | 90 | 92 | 91 |
| KMU(KMS)100- 3.3S 40A | 100 (64~144) | | | 3.3 | 40 | 85 |
| | | 5 | 32 | 87 | 92 | 91 |
| | | 6 | 26.6 | 87 | 92 | 91 |
| | | 12 | 16.7 | 87 | 92 | 91 |
| | | 13.8 | 14.5 | 87 | 92 | 91 |
| | | 15 | 13.4 | 87 | 92 | 91 |
| | | 24 | 8.4 | 87 | 92 | 91 |
| | | 28 | 7.2 | 87 | 92 | 91 |
| | | 48 | 4.2 | 87 | 92 | 91 |
| | | 3.3 | 40 | 85 | 91 | 90 |
| | | 5 | 32 | 87 | 92 | 91 |
| | | 6 | 26.6 | 87 | 92 | 91 |
| KMU(KMS)140- 5S 32A | 140 (90~200) | 5 | 32 | 87 | 92 | 91 |
| | | 6 | 26.6 | 87 | 92 | 91 |
| | | 12 | 16.7 | 87 | 92 | 91 |
| | | 13.8 | 14.5 | 87 | 92 | 91 |
| | | 15 | 13.4 | 87 | 92 | 91 |
| | | 24 | 8.4 | 87 | 92 | 91 |
| | | 28 | 7.2 | 87 | 92 | 91 |
| | | 48 | 4.2 | 87 | 92 | 91 |
| | | 3.3 | 40 | 85 | 91 | 90 |
| | | 5 | 32 | 87 | 92 | 91 |
| | | 6 | 26.6 | 87 | 92 | 91 |
| | | 12 | 16.7 | 87 | 92 | 91 |

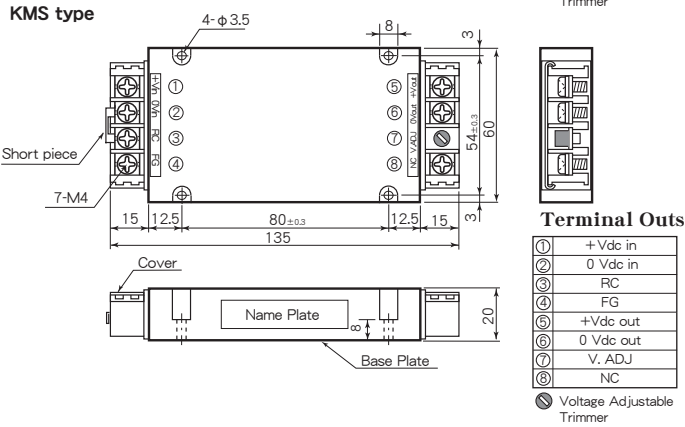
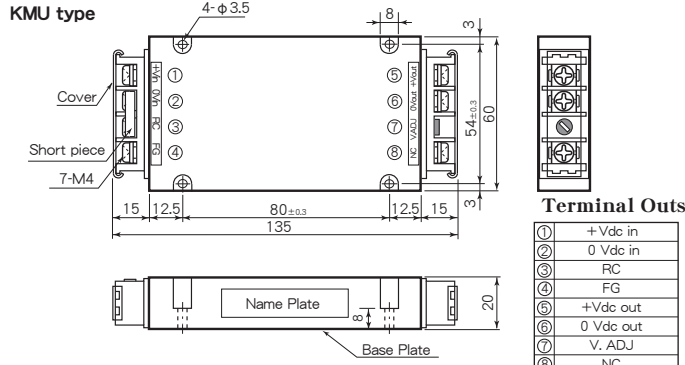
* 上記仕様以外にも対応可能ですのでお問い合わせください。
Please consult with us about other specification.

General Characteristics

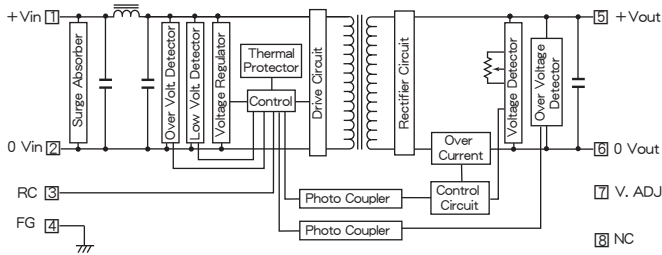
- Input Voltage, Range DC12, 24, 48, 100, 140V (See Table 1)
- Output Voltage, Current See Table 1
- Output Voltage Range ±10% Adjustable
- Efficiency See Table 1
- Line Regulation ±0.3% max. (at Vin Range)
- Load Regulation 3% max. (0~100% Load) (See Fig. 6)
- Reflected Input Ripple, Noise (5% Vin) Vp-p max.
- Output Ripple 80mVp-p max.
- Output Noise (0.5% Vout+100mV) p-p max.
- Short Circuit Protection Built-in, Auto-restart (See Fig. 5)
- Over Voltage Protection 115~140% Output Voltage
- Remote ON/OFF Control ON : Short or 0~0.8V
OFF : Open or 2~10V
(Between terminal ② ~ ③)
- Temperature Coefficient 0.02%/°C max.
- Operating Ambient Temp. -40°C~+85°C (See Fig. 1)
- Max. Case Temperature +105°C
- Storage Temperature -55°C~+125°C
- Isolation Voltage AC2000V one minute
(Input-Output-Case)
- Isolation Impedance 100MΩ min. (at DC1000V)
(Input-Output-Case)
- Weight Main Body : 350g max.
Heat Sink
A3-13910 : 135g max.
A3-13911 : 175g max.
A3-13915 : 425g max.
- Humidity 20~95% RH
- Shock 490m/s² (11msec 3directions)
- Vibration 10~55Hz 98m/s²
(30minutes 3directions)
- Surface Structure Aluminum Case
- MTBF 400,000H
(Ta : 25°C, 80% Load, Nominal Vin)
- Warranty 5 years

KM SERIES DATA SHEET

Terminal Outs & Dimensions (±0.5mm)

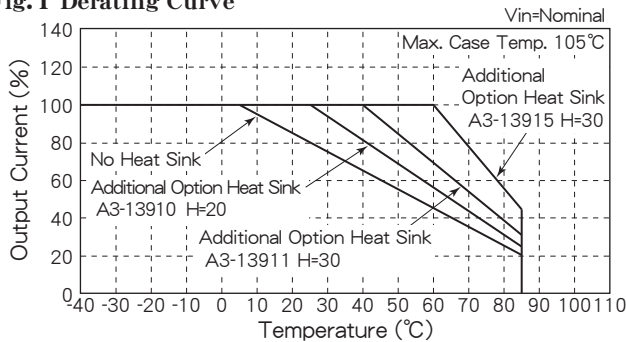


Block Diagram



Characteristic Curves

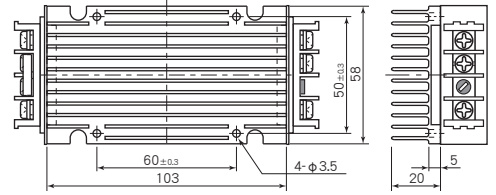
Fig. 1 Derating Curve



Option Heat Sink

Fig. 2 Temperature Characteristic on Case Surface

* Option Heat Sink Model : A3-13910



KMU24-12S16.7A Additional Heat Sink A3-13910
Ta=25°C, 100% Load, Vin=Nominal

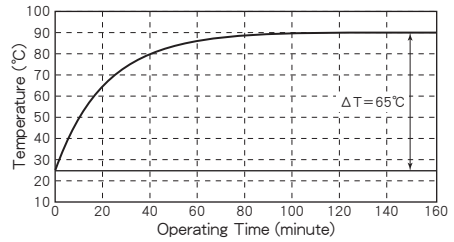
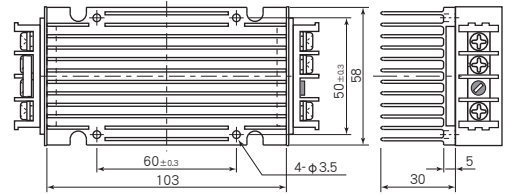


Fig. 3 Temperature Characteristic on Case Surface

* Option Heat Sink Model : A3-13911



KMU24-12S16.7A Additional Heat Sink A3-13911
Ta=25°C, 100% Load, Vin=Nominal

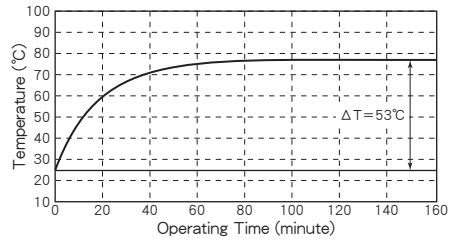
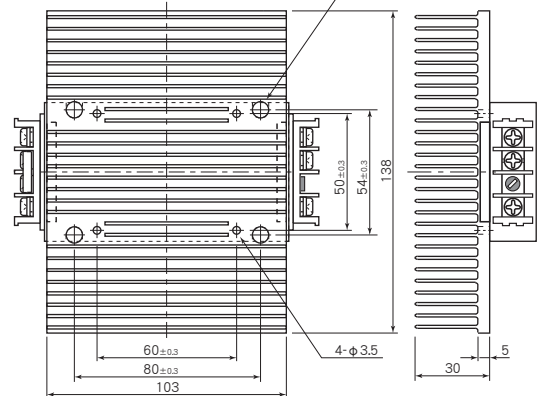
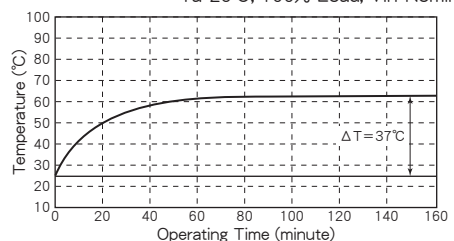


Fig. 4 Temperature Characteristic on Case Surface

* Option Heat Sink Model : A3-13915



KMU24-12S16.7A Additional Heat Sink A3-13915
Ta=25°C, 100% Load, Vin=Nominal



KM SERIES DATA SHEET

■ Characteristic Curves

Fig. 5 Short Circuit Operating Area

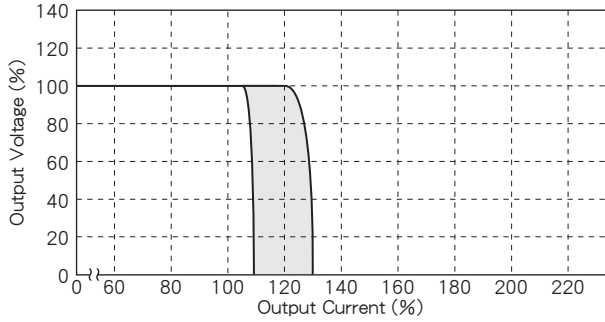
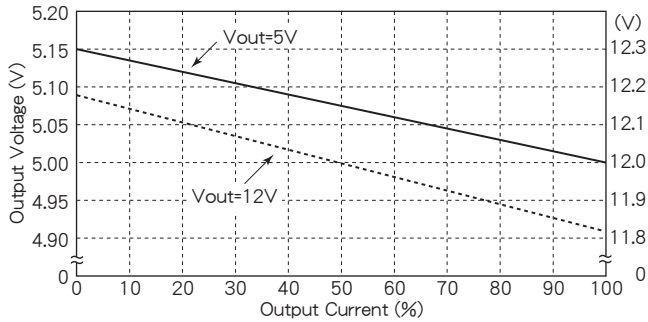


Fig. 6 Output Voltage vs. Output Current



* 並列運転時に各モジュールの電流を平均化するため
負荷変動を大きくしてあります。
Load Regulation is regulated large on purpose to equate
the each unit's output current at parallel operation.

Fig. 7 Efficiency vs. Output Current

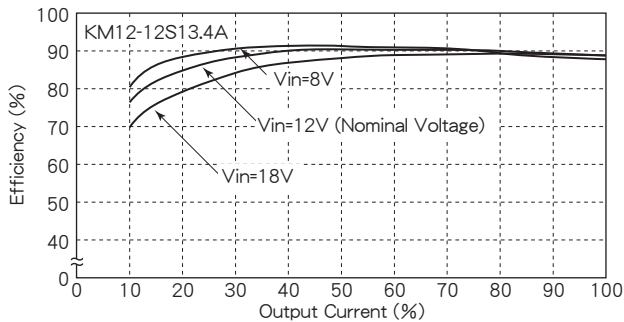


Fig. 8 Efficiency vs. Output Current

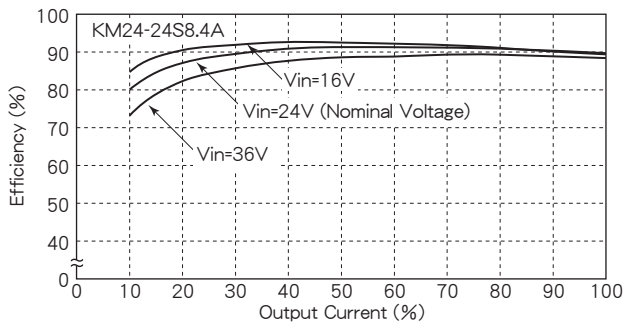


Fig. 9 Efficiency vs. Output Current

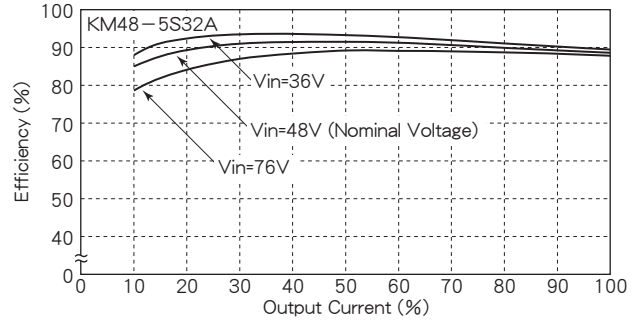


Fig. 10 Efficiency vs. Output Current

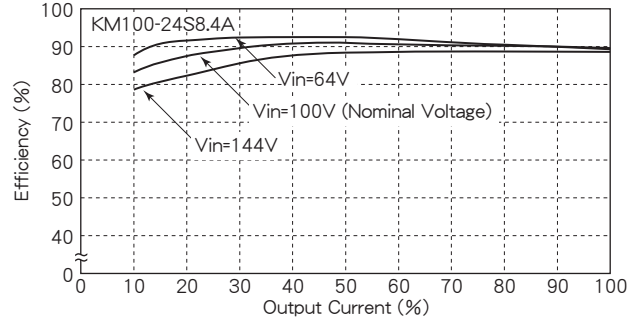
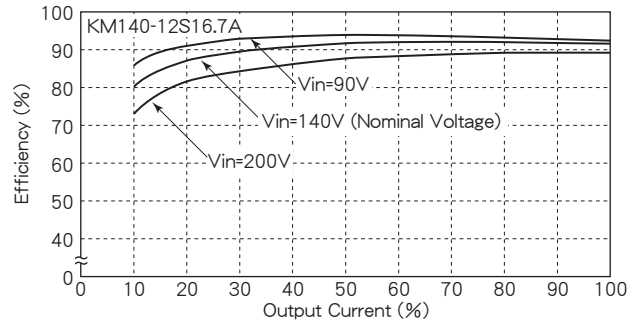


Fig. 11 Efficiency vs. Output Current

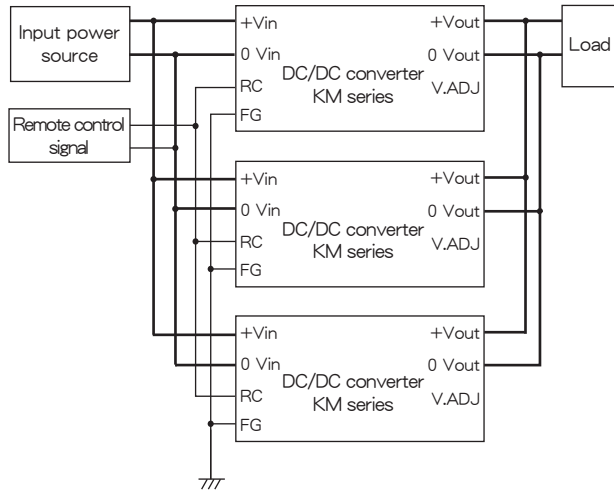


Parallel Operation

同機種を並列に動作させることにより、出力電流容量を増やすことができます。下図のように結線し、各コンバータ間の出力電圧を同じ電圧に調整することで、並列運転ができます。(Fig. 12を御参照ください)

It is possible to increase output current capacity by parallel operation of the same model. Please see the below figure for wiring instruction. Parallel operation is possible by each outputs to be same voltage.

Fig. 12 Parallel Operation Connection



PM シリーズ

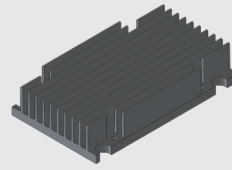
240~300W DC/DCコンバータ
並列運転可能

PMS(端子横向きタイプ)



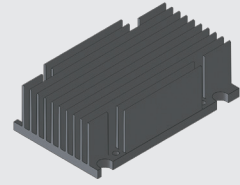
H20×W60×L120 (mm)

オプションヒートシンクA
A3-14777



H20×W58×L98(mm)

オプションヒートシンクB
A3-14778



H30×W58×L98(mm)

■特長

- 入力フィルタ内蔵
- 入出力間絶縁(AC2000V)
- 高効率 91~93%
- 広範囲な入力電圧
- 高信頼性
- 可変出力電圧 ±10%
- 入力低電圧保護回路内蔵
- 入力過電圧保護回路内蔵
- 出力過電圧保護回路内蔵
- 過熱保護回路内蔵
+110℃~+120℃
- 3台まで並列運転可能
- 動作周囲温度
-40℃~+85℃
- RoHS2指令対応
- アルミ電解コンデンサ及び
タンタルコンデンサ不使用

■仕様

- 入力電圧(範囲) (周囲温度: 25℃, 入力電圧: 定格, 負荷: 100%)
DC12, 24, 48, 100, 140V (表1参照)
- 出力電圧, 電流 表1参照
- 出力電圧調整範囲 ±10%
- 効率 表1参照
- 対入力変動率 ±0.3% max. (入力電圧範囲において)
- 対負荷変動率 3% max. (0~100%負荷において)
(表4参照)
- 入力リップル・ノイズ 表2参照
- 出力リップル・ノイズ 表3参照
- 出力過電流保護 有り(図3参照), 自動復帰
- 出力過電圧保護 出力電圧115~140%時, 手動復帰
- 出力電圧温度係数 0.02%/℃ max.
- 動作周囲温度範囲 -40℃~+85℃ (図1参照)
- 最大ケース温度 +105℃
- 保存周囲温度範囲 -55℃~+125℃
- 絶縁耐圧 AC2000V 1分間
(入カ-出カ-ケース)
100MΩ min. (DC1000Vにて)
(入カ-出カ-ケース)
- 質量 本体: 400g max.
オプションヒートシンク
A3-14777: 135g max.
A3-14778: 175g max.
- 湿度 20~95% RH
- 衝撃 490m/s² (11ms X, Y, Z方向)
- 振動 10~55Hz 98m/s²
(30分間 X, Y, Z方向)
- 構造 アルミケース
- MTBF 220,000H
(周囲温度: 25℃, 入力電圧: 定格, 負荷: 80%)
- 無償保証期間 5年間

■型式

表1

| 型式 | 入力電圧 (電圧範囲) (V.DC) | 出力電圧 (V.DC) | 出力電流 (A) | 効率 (typ.)(%) | | |
|---------------------|---|----------------|-------------|-----------------|-------|-------|
| | | | | 20%負荷 | 50%負荷 | 80%負荷 |
| PMS 12- 12S 20A | 12 (8~18) 50%負荷時 (9~18) 100%負荷時 | 12 | 20 | 87 | 91 | 91 |
| PMS 12-13.8S 17.4A | | 13.8 | 17.4 | 88 | 91 | 91 |
| PMS 12- 15S 16A | | 15 | 16 | 88 | 91 | 91 |
| PMS 12- 24S 10A | | 24 | 10 | 88 | 91 | 91 |
| PMS 12- 28S 8.6A | | 28 | 8.6 | 88 | 91 | 91 |
| PMS 12- 48S 5A | | 48 | 5 | 88 | 91 | 91 |
| PMS 24- 12S 25A | 24 (16~36) | 12 | 25 | 89 | 93 | 93 |
| PMS 24-13.8S 21.7A | | 13.8 | 21.7 | 89 | 93 | 93 |
| PMS 24- 15S 20A | | 15 | 20 | 89 | 93 | 93 |
| PMS 24- 24S 12.5A | | 24 | 12.5 | 89 | 93 | 93 |
| PMS 24- 28S 10.7A | | 28 | 10.7 | 89 | 93 | 93 |
| PMS 24- 48S 6.25A | | 48 | 6.25 | 89 | 93 | 93 |
| PMS 48- 12S 25A | 48 (36~76) | 12 | 25 | 89 | 93 | 93 |
| PMS 48-13.8S 21.7A | | 13.8 | 21.7 | 89 | 93 | 93 |
| PMS 48- 15S 20A | | 15 | 20 | 89 | 93 | 93 |
| PMS 48- 24S 12.5A | | 24 | 12.5 | 89 | 93 | 93 |
| PMS 48- 28S 10.7A | | 28 | 10.7 | 89 | 93 | 93 |
| PMS 48- 48S 6.25A | | 48 | 6.25 | 89 | 93 | 93 |
| PMS 100- 12S 25A | 100 (64~144) | 12 | 25 | 89 | 93 | 93 |
| PMS 100-13.8S 21.7A | | 13.8 | 21.7 | 89 | 93 | 93 |
| PMS 100- 15S 20A | | 15 | 20 | 89 | 93 | 93 |
| PMS 100- 24S 12.5A | | 24 | 12.5 | 89 | 93 | 93 |
| PMS 100- 28S 10.7A | | 28 | 10.7 | 89 | 93 | 93 |
| PMS 100- 48S 6.25A | | 48 | 6.25 | 89 | 93 | 93 |
| PMS 140- 12S 25A | 140 (90~200) | 12 | 25 | 89 | 93 | 93 |
| PMS 140-13.8S 21.7A | | 13.8 | 21.7 | 89 | 93 | 93 |
| PMS 140- 15S 20A | | 15 | 20 | 89 | 93 | 93 |
| PMS 140- 24S 12.5A | | 24 | 12.5 | 89 | 93 | 93 |
| PMS 140- 28S 10.7A | | 28 | 10.7 | 89 | 93 | 93 |
| PMS 140- 48S 6.25A | | 48 | 6.25 | 89 | 93 | 93 |

*上記仕様以外にも対応可能ですのでお問い合わせください。

表2 入力電圧リップル・ノイズ

| 入力電圧 (電圧範囲) (V.DC) | リップル (mVp-p max.) | ノイズ (mVp-p max.) |
|--------------------------|-------------------------|------------------------|
| 12 (9~18) | 300 | 250 |
| 24 (16~36) | 400 | 350 |
| 48 (36~76) | 500 | 400 |
| 100 (64~144) | 600 | 500 |
| 140 (90~200) | 800 | 550 |

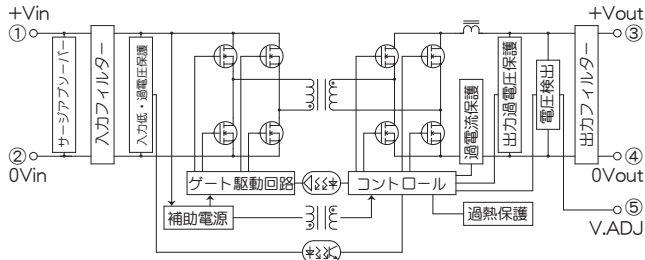
*入力ラインは各1.5mツイスト線にて測定
*使用環境によって異なります

表3 出力電圧リップル・ノイズ

| 出力電圧 (V.DC) | リップル (mVp-p max.) | ノイズ (mVp-p max.) |
|----------------|-------------------------|------------------------|
| 12 | 40 | 160 |
| 13.8 | 40 | 170 |
| 15 | 40 | 175 |
| 24 | 60 | 220 |
| 28 | 60 | 240 |
| 48 | 80 | 340 |

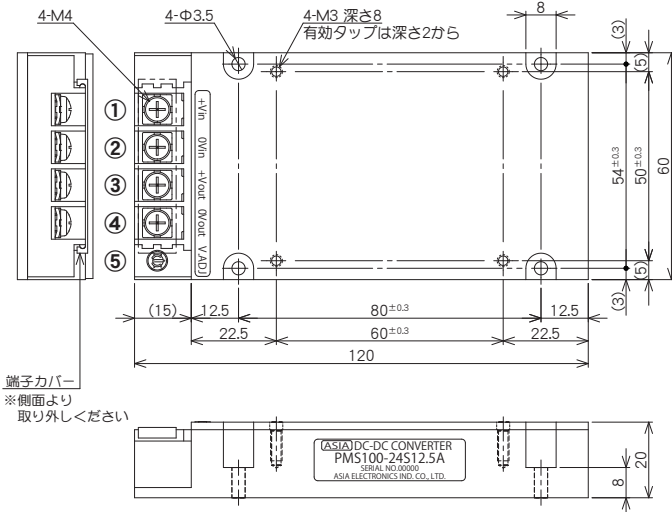
PM シリーズ データシート

■ブロック図



■端子配列及び外形寸法 (±0.5mm)

PMS(端子横向きタイプ)



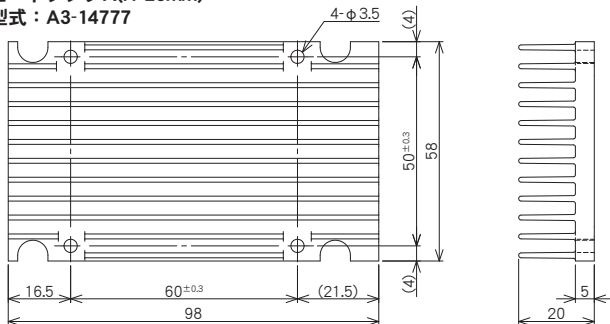
端子カバー
※側面より
取り外しください

端子配列

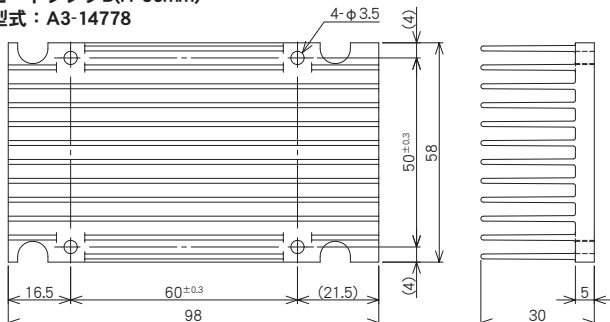
| | |
|---|-------------------|
| ① | 直流入力端子 +Vin |
| ② | 直流入力端子 0 Vin |
| ③ | 直流出力端子 +Vout |
| ④ | 直流出力端子 0 Vout |
| ⑤ | 出力電圧調整ボリューム V.ADJ |

■オプションヒートシンク (±0.5mm)

ヒートシンクA(H=20mm)
型式: A3-14777



ヒートシンクB(H=30mm)
型式: A3-14778



■特性データ

図1 ディレーティングカーブ

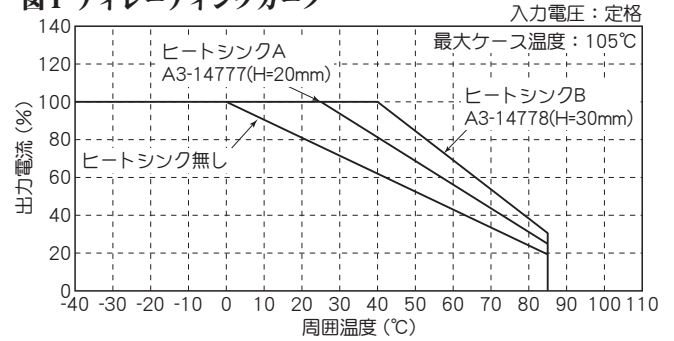


図2 温度上昇特性(ケース表面温度)【PMS100-24SI 2.5A】

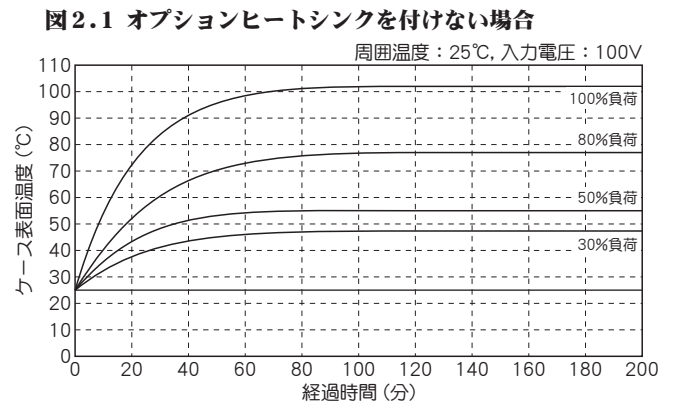


図2.2 オプションヒートシンクA(H=20mm) A3-14777 を付けた場合

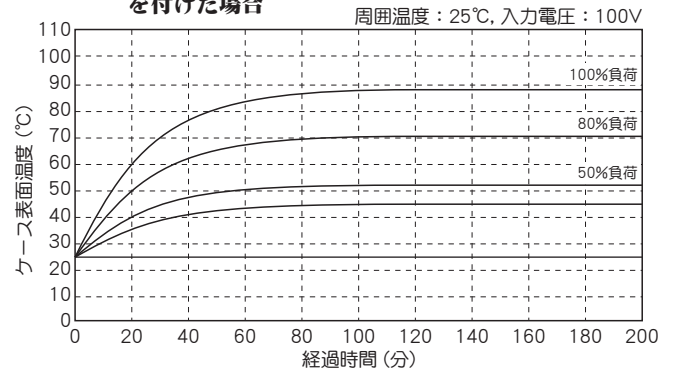
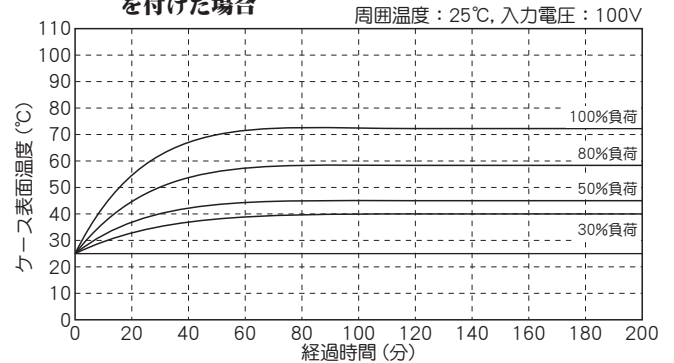


図2.3 オプションヒートシンクB(H=30mm) A3-14778 を付けた場合



PM シリーズ データシート

■特性データ

図3 出力過電流保護範囲

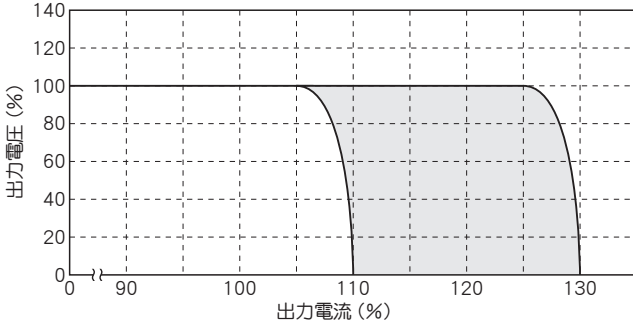
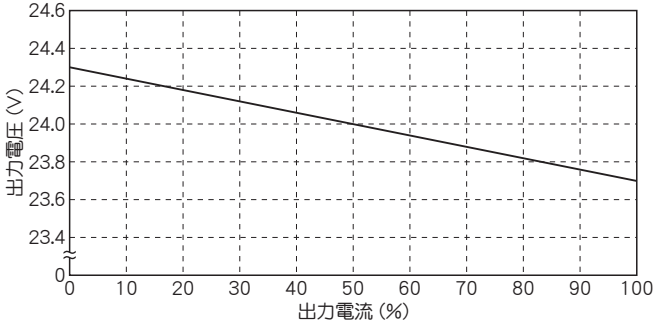


図4 出力電圧-出力電流特性【出力電圧：24V】



*並列運転時に各モジュールの電流を平均化するため
負荷変動を大きくしてあります。

図5 効率-出力電流特性【PMS100-24S12.5A】

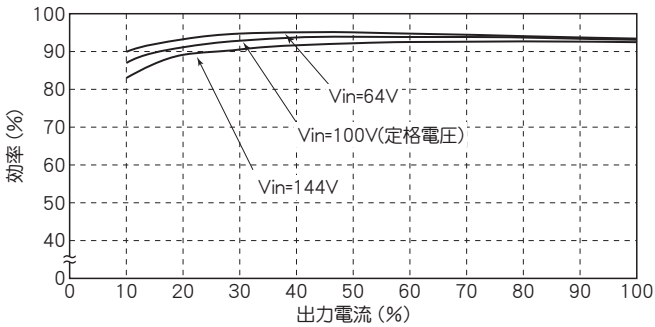


図6 入力電圧 リップル・ノイズ【PMS100-24S12.5A】

図6.1 入力電圧：64V，負荷：100%

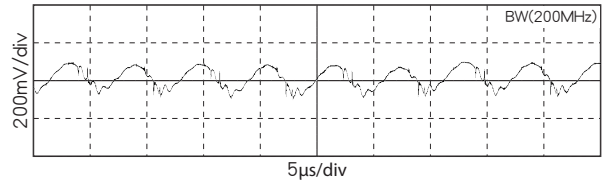


図6.2 入力電圧：100V，負荷：100%

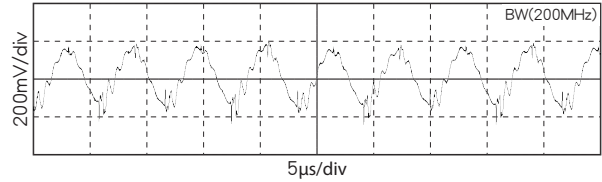


図6.3 入力電圧：144V，負荷：100%

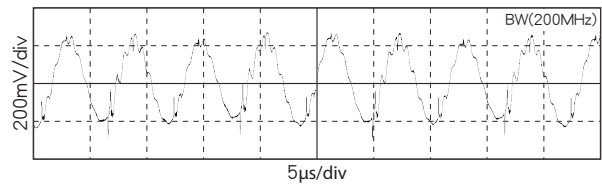


図7 出力電圧 リップル・ノイズ【PMS100-24S12.5A】

図7.1 入力電圧：64V，負荷：100%

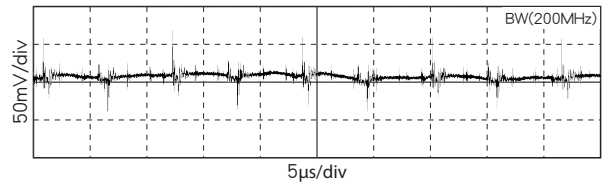


図7.2 入力電圧：100V，負荷：100%

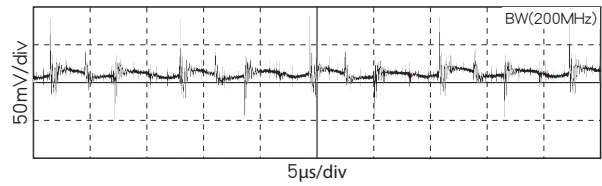
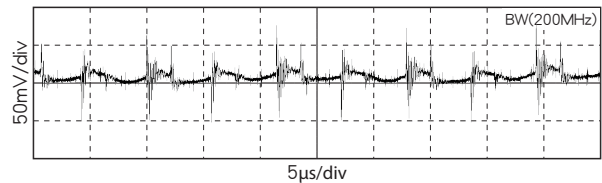


図7.3 入力電圧：144V，負荷：100%

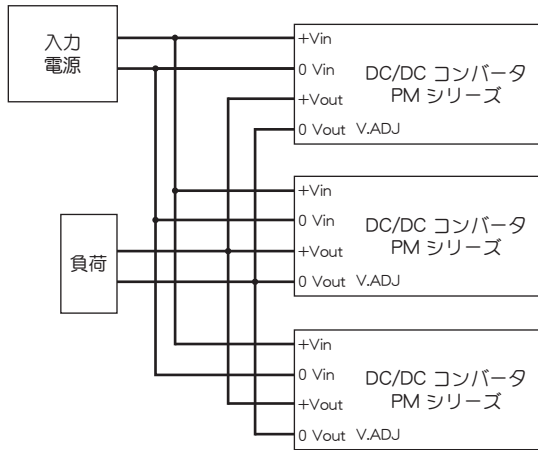


PM シリーズ データシート

■ 並列運転

同機種を並列に動作させることにより、出力電流容量を増やすことができます。下図のように結線し、各コンバータ間の出力電圧を同じ電圧に調整することで、並列運転ができます。図8を参照ください。

図8 並列運転時結線方法



RDP SERIES

130~250W DC/DC CONVERTERS Single Output

並列運転可能
Parallel Operation



H36×W100×L220 (mm)

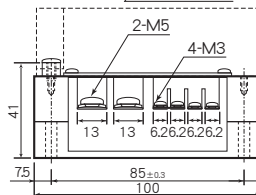
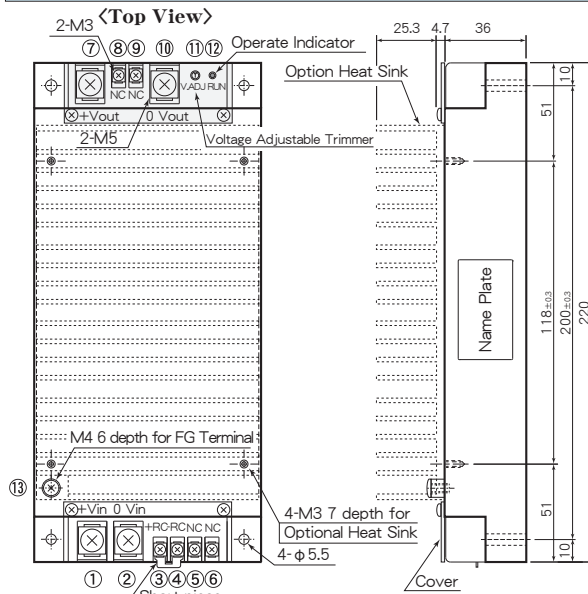
Features

- Wide Input Voltage Range
- High Efficiency 85%~92%
- Input-Output Isolation (AC2000V)
- Low Output Ripple and Noise
- Possible Parallel Operation up to 4 converters
- Remote ON/OFF Control
- Input Rush Current Protection
- Input Low Voltage Protection
- Input Over Voltage Protection
- Output Over Voltage Protection 120%~140% Operation
- Operating Ambient Temp -25°C~+71°C
- Max. Case Temperature +85°C
- Conformity to RoHS2 Directive
- 広範囲な入力電圧範囲
- 高効率 85%~92%
- 入出力間絶縁 (AC2000V)
- 出力リップルノイズが小さい
- 4台まで並列運転可能
- リモートON/OFFコントロール機能
- 入力突入電流保護回路内蔵
- 入力低電圧保護回路内蔵
- 入力過電圧保護回路内蔵
- 出力過電圧保護回路内蔵 120%~140%動作
- 動作周囲温度 -25°C~+71°C
- 最大ケース温度+85°C
- RoHS2指令対応

General Characteristics

- Input Voltage, Range (at Ta : 25°C, Full Load, Nominal Vin) DC 12, 24, 48, 96V (See Table 1)
- Output Voltage, Current See Table 1
- Output Voltage Adjustment -3~+10%
- Efficiency See Table 1
- Line Regulation 0.2% max. (at Vin Range)
- Load Regulation ±1.5% typ. (0~100% Load) (See Fig. 8)
- Output Ripple (0.1% Vout+50mV) p-p max.
- Output Noise (0.5% Vout+50mV) p-p max.
- Short Circuit Protection Built-in, Auto-restart (See Fig. 2)
- Output Over Voltage Protection Built-in, Shut-down (120%~140% Vout)
- Remote ON/OFF Control ON : Short or 0~0.8V
OFF : Open or 2~10V (Between terminal ③ ~ ④)
- Temperature Coefficient 0.02%/°C max.
- Operating Ambient Temp. -25°C~+71°C (See Fig. 1)
- Max. Case Temp. +85°C
- Storage Temp. -40°C~+85°C
- Isolation Voltage AC2000V one minute (Input-Output-Case)
- Isolation Impedance 100MΩ min. (at DC1000V) (Input-Output-Case)
- Weight Main Body : 1.8kg max.
Heat Sink : 400g max.
- Humidity 20~95% RH
- Shock 490m/s² (11msec 3directions)
- Vibration JIS E4031 Category 1 - Class B
- Surface Structure Aluminum Case
- MTBF 100,000H (Ta : 25°C, 80% Load, Nominal Vin)
- Warranty 5 years

Terminal Outs & Dimensions (±0.5mm)



* Option Heat Sink Model : A3-9023

Terminal Outs and Function

| | |
|------------|---------------------|
| ① +Vdc in | ⑦ +Vdc out |
| ② 0 Vdc in | ⑧ NC |
| ③ +RC | ⑨ NC |
| ④ -RC | ⑩ 0 Vdc out |
| ⑤ NC | ⑪ V.ADJ |
| ⑥ NC | ⑫ Operate Indicator |
| | ⑬ FG |

Selection Guide

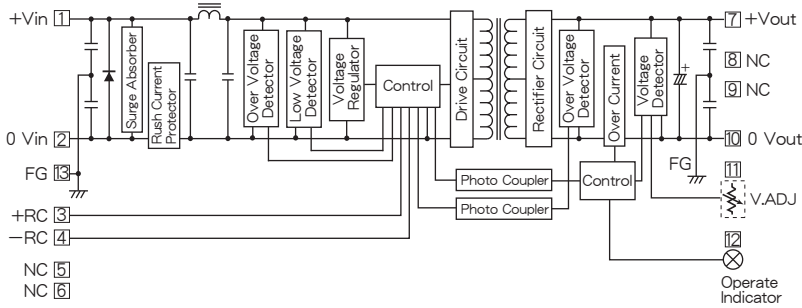
Table 1

| Model Number | Input Voltage (Range) (V. DC) | Input Rush Current (max.)(A) | Output Voltage (V. DC) | Output Current (A) | Efficiency (typ.) (%) | |
|---------------------|-------------------------------|------------------------------|------------------------|--------------------|-----------------------|----------|
| | | | | | 20% Load | 80% Load |
| RDP12 - 3.3S 40A | 12 (9~18) | 62 | 3.3 | 40 | 85 | 85 |
| RDP12 - 5S 40A | | | 5 | 40 | 86 | 87 |
| RDP12 - 12S 20.8A | | | 12 | 20.8 | 88 | 89 |
| RDP12 - 13.8S 18.1A | | | 13.8 | 18.1 | 88 | 89 |
| RDP12 - 15S 16.7A | | | 15 | 16.7 | 88 | 89 |
| RDP12 - 24S 10.5A | | | 24 | 10.5 | 89 | 89 |
| RDP12 - 48S 5.3A | | | 48 | 5.3 | 89 | 90 |
| RDP12 - 100S 2.5A | | | 100 | 2.5 | 89 | 90 |
| RDP12 - 140S 1.8A | | | 140 | 1.8 | 89 | 89 |
| RDP12 - 200S 1.3A | | | 200 | 1.3 | 89 | 90 |
| RDP12 - 300S 0.85A | | | 300 | 0.85 | 89 | 90 |
| RDP24 - 3.3S 40A | | | 24 (18~36) | 31 | 3.3 | 40 |
| RDP24 - 5S 40A | 5 | 40 | | | 87 | 88 |
| RDP24 - 12S 20.8A | 12 | 20.8 | | | 88 | 91 |
| RDP24 - 13.8S 18.1A | 13.8 | 18.1 | | | 88 | 91 |
| RDP24 - 15S 16.7A | 15 | 16.7 | | | 88 | 90 |
| RDP24 - 24S 10.5A | 24 | 10.5 | | | 88 | 91 |
| RDP24 - 48S 5.3A | 48 | 5.3 | | | 89 | 91 |
| RDP24 - 100S 2.5A | 100 | 2.5 | | | 89 | 92 |
| RDP24 - 140S 1.8A | 140 | 1.8 | | | 90 | 91 |
| RDP24 - 200S 1.3A | 200 | 1.3 | | | 90 | 91 |
| RDP24 - 300S 0.85A | 300 | 0.85 | | | 91 | 92 |
| RDP48 - 3.3S 40A | 48 (36~72) | 16 | | | 3.3 | 40 |
| RDP48 - 5S 40A | | | 5 | 40 | 88 | 90 |
| RDP48 - 12S 20.8A | | | 12 | 20.8 | 88 | 91 |
| RDP48 - 13.8S 18.1A | | | 13.8 | 18.1 | 88 | 91 |
| RDP48 - 15S 16.7A | | | 15 | 16.7 | 88 | 91 |
| RDP48 - 24S 10.5A | | | 24 | 10.5 | 88 | 91 |
| RDP48 - 48S 5.3A | | | 48 | 5.3 | 89 | 91 |
| RDP48 - 100S 2.5A | | | 100 | 2.5 | 89 | 91 |
| RDP48 - 140S 1.8A | | | 140 | 1.8 | 89 | 91 |
| RDP48 - 200S 1.3A | | | 200 | 1.3 | 89 | 91 |
| RDP48 - 300S 0.85A | | | 300 | 0.85 | 89 | 91 |
| RDP96 - 3.3S 40A | | | 96 (70~144) | 8 | 3.3 | 40 |
| RDP96 - 5S 40A | 5 | 40 | | | 88 | 90 |
| RDP96 - 12S 20.8A | 12 | 20.8 | | | 88 | 91 |
| RDP96 - 13.8S 18.1A | 13.8 | 18.1 | | | 88 | 91 |
| RDP96 - 15S 16.7A | 15 | 16.7 | | | 88 | 91 |
| RDP96 - 24S 10.5A | 24 | 10.5 | | | 88 | 92 |
| RDP96 - 48S 5.3A | 48 | 5.3 | | | 88 | 92 |
| RDP96 - 100S 2.5A | 100 | 2.5 | | | 88 | 92 |
| RDP96 - 140S 1.8A | 140 | 1.8 | | | 89 | 91 |
| RDP96 - 200S 1.3A | 200 | 1.3 | | | 89 | 91 |
| RDP96 - 300S 0.85A | 300 | 0.85 | | | 89 | 91 |

※ 上記仕様以外にも対応可能ですのでお問い合わせ下さい。
Please consult with us about other specification.

RDP SERIES DATA SHEET

Block Diagram



Characteristic Curves

Fig. 1 Derating Curve

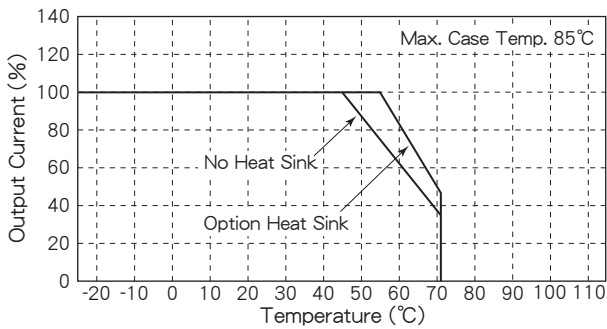


Fig. 2 Short Circuit Operating Area

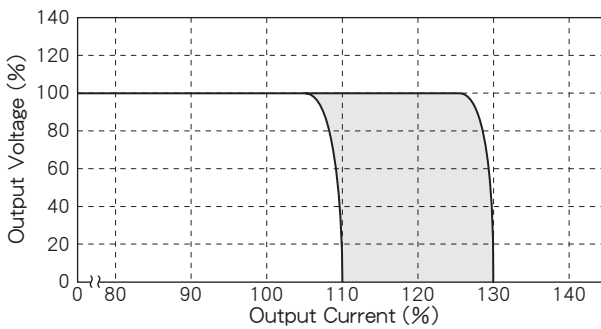


Fig. 3 Temperature Characteristic on Case Surface

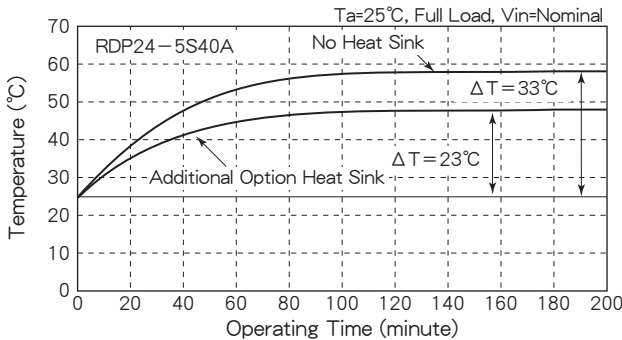


Fig. 4 Efficiency vs. Output Current

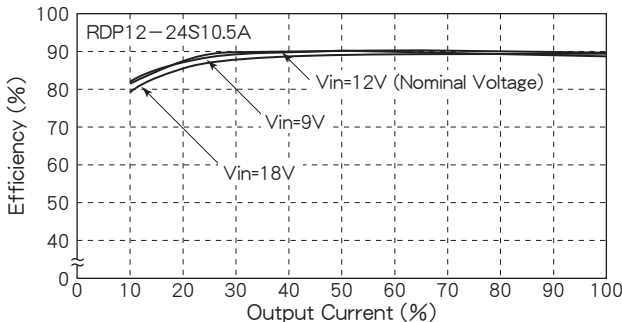


Fig. 5 Efficiency vs. Output Current

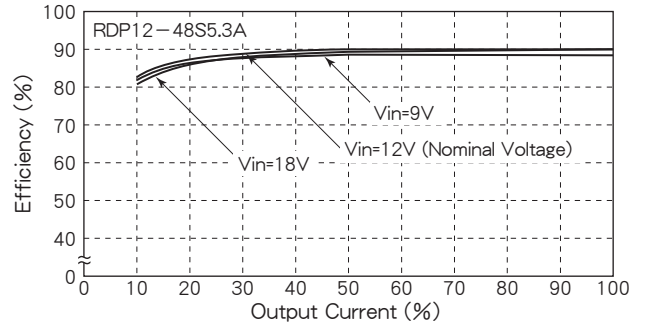


Fig. 6 Efficiency vs. Output Current

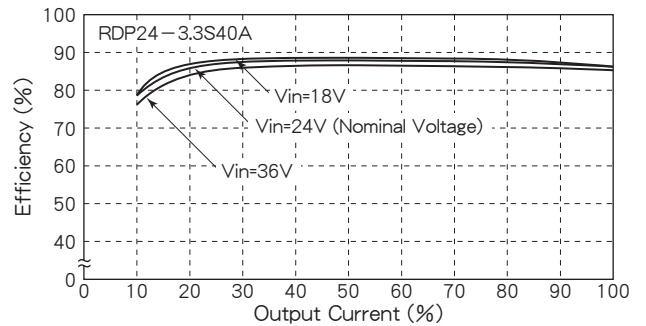


Fig. 7 Efficiency vs. Output Current

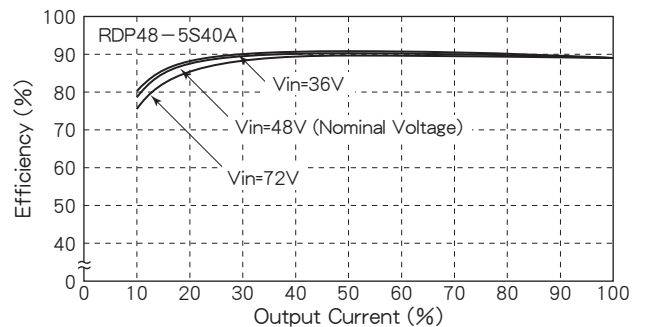
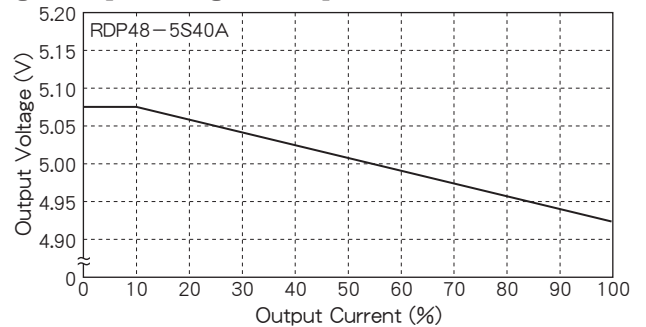


Fig. 8 Output Voltage vs. Output Current



* 並列運転時に各モジュールの電流を平均化するため
負荷変動を大きくしてあります。

Load Regulation is regulated large on purpose to equate
the each unit's output current at parallel operation.

RDP SERIES DATA SHEET

■ 主な機能及び注意事項 Function and direction in application

1. 入力低電圧保護、入力過電圧保護 Input low/over voltage protection
 下記入力電圧にて出力電圧がOFFとなります。入力電圧を規定値内に戻すと自動復帰します。
 Output will be shut down in the input voltages on the following table. Output will automatically be reset when the input voltage comes to within the specified value.

| 定格入力電圧 Rated input voltage | 低電圧保護 Low voltage protection | 過電圧保護 Over voltage protection |
|-------------------------------|---------------------------------|----------------------------------|
| 12V (9~18V) | 6~8V | 20~22V |
| 24V (18~36V) | 12~16V | 40~44V |
| 48V (36~72V) | 24~32V | 75~82V |
| 96V (70~144V) | 48~64V | 150~165V |

2. 出力電圧値 Output voltage
 出力電圧値はボリューム(V.ADJ)を回転させることにより、定格出力電圧の約-3%~+10%可変することができます。
 Output voltage will be adjusted to -3% - +10% of rated voltage by means of volume (V.ADJ).

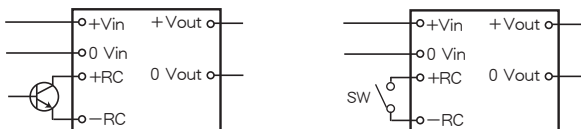
3. 出力過電流保護 Output over current protection
 負荷が短絡した場合など、過大な負荷電流が流れたときに負荷と本体を保護する機能です。定格出力電流の約105%~130%にて検出し作動します(Fig. 2 参照)。出力は定電流電圧垂下特性、入力電流はフの字特性となっています。また自動復帰特性を有しています。
 This function is to protect a power supply and a load when excessive current flows in case of short-circuited load or such possible conditions. It will operate in 105 - 130% of rated output current (see Fig. 2). Output has constant current voltage limiting characteristic and input current has combined current limiting with fold-back protection. It also has automatic reset function.

4. 出力過電圧保護 Output over voltage protection
 出力の過電圧から負荷側を保護する機能です。出力電圧値が定格値の約120~140%になると出力をOFFします。
 This function is to protect a load from output over voltage. Output will be shut down when output voltage is 120 - 140% of rated voltage.

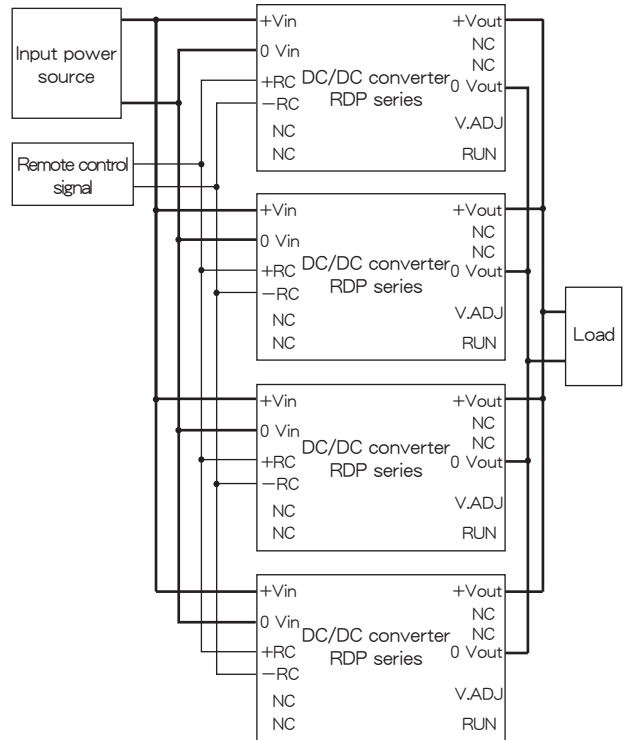
5. リモートON/OFFコントロール Remote ON/OFF control
 リモートON/OFFコントロールを使用して、電源の出力をON/OFFすることができます。RC端子間をショートする事で出力電圧がON、RC端子間をオープンにする事で出力電圧がOFFになります。RC端子間にTTLレベルの電気信号を加える事により出力をON/OFFすることができます。RC端子は入力側にあり、入力電源回路とは絶縁されていません。ON/OFFコントロールを使用しないときは、+RC端子と-RRC端子を付属のショートピンで短絡させて下さい。
 Using remote ON/OFF control, ON/OFF of the power supply output is possible. The output voltage operates by a short between RC terminals, and the output voltage stops by open between RC terminals. ON/OFF of the output voltage is possible by adding the electrical signal of the TTL level between RC terminals. RC terminals are located on the input side and the circuit is not isolated from input power source circuit. In case you don't use ON/OFF control, please short-circuit +RC and -RC terminals by means of attached short-bar.

* 回路構成例 Example of ON/OFF control circuit

- TRIによる例 Example by transistor ●SWIによる例 Example by switch



6. 並列運転 Parallel operation
 同機種を並列に動作させることにより出力電流容量を増やすことができます。並列運転は4台まで接続可能です。
 It is possible to increase output current capacity by means of parallel operation of the same model. Please see the figure below for wiring instructions. Parallel operation is possible up to 4 converters.



7. 入力側ヒューズ Input side fuse
 電源の破損に備えて、必ず入力側にヒューズ又はブレーカーを使用してください。電流容量は表1の突入電流値を参考にしてください。
 Please insert a fuse or a circuit breaker to prevent possible damage of converter. Please refer to Table 1 (rush current) to select proper current capacity of fuse or circuit breaker.

RDP SERIES DATA SHEET

並列運転可能
Parallel Operation



H40×W100×L220 (mm)

Features

- High Output 500W
- High Efficiency 89%~93%
- Input-Output Isolation (AC2000V)
- Possible Parallel Operation up to 4 converters
- Remote ON/OFF Control
- Input Low Voltage Protection
- Input Over Voltage Protection
- Thermal Protection +110°C~+120°C
- Cooling by mounting on Chassis or using Heat Sink
- Conformity to RoHS2 Directive
- No built-in aluminum and tantalum electrolytic capacitor
- 高出力 500W
- 高効率 89%~93%
- 入出力間絶縁 (AC2000V)
- 4台まで並列運転可能
- リモートON/OFFコントロール
- 入力低電圧保護回路内蔵
- 入力過電圧保護回路内蔵
- 過熱保護回路内蔵 +110°C~+120°C
- シャーシ上又はヒートシンクの取付により放熱
- RoHS2指令対応
- アルミ電解コンデンサ及びタンタルコンデンサ不使用

General Characteristics

- Input Voltage, Range (at Ta : 25°C, Full Load, Nominal Vin)
DC 12, 24, 48, 96, 200, 300, 400V (See Table 1)
- Output Voltage, Current See Table 1
- Output Voltage Adjustment ±5%
- Efficiency See Table 1
- Line Regulation 0.3% max. (at Vin Range)
- Load Regulation 3.0% typ. (0~100% Load) (See Fig. 4)
- Output Ripple (1.0% Vout) p-p max.
- Output Noise (0.5% Vout+100mV) p-p max.
- Short Circuit Protection Built-in, Auto-restart (See Fig. 2)
- Output Over Voltage Protection Built-in, Shut-down (120%~140% Vout)
- Remote ON/OFF Control ON : Short or 0~0.8V
OFF : Open or 2~10V (Between terminal ③ ~ ④)
- Temperature Coefficient 0.02%/°C max.
- Operating Ambient Temp. -40°C~+85°C (See Fig. 1)
- Max. Case Temp. +105°C
- Storage Temp. -40°C~+115°C
- Isolation Voltage AC2000V one minute (Input-Output-Case)
- Isolation Impedance 100MΩ min. (at DC1000V) (Input-Output-Case)
- Weight Main Body : 2.1kg max.
Heat Sink : 500g max.
- Humidity 20~95% RH
- Shock 490m/s² (11msec 3directions)
- Vibration JIS E4031 Category 1 - Class B
- Surface Structure Aluminum Case
- MTBF 160,000H (Ta : 25°C, 80% Load, Nominal Vin)
- Warranty 5 years

Selection Guide

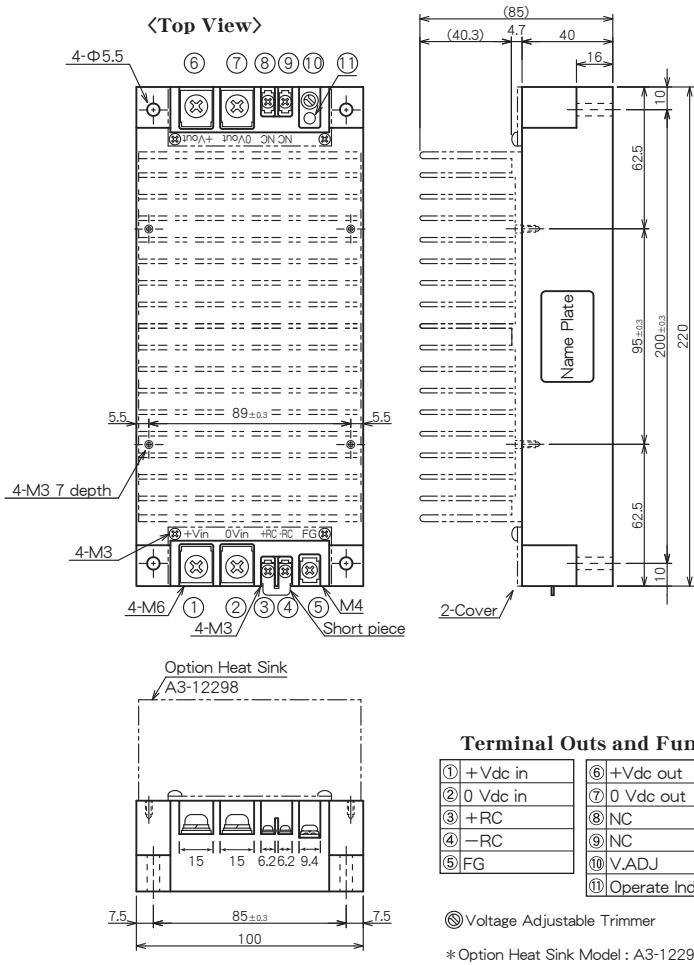
Table 1

| Model Number | Input Voltage (Range) (V. DC) | Output Voltage (V. DC) | Output Current (A) | Efficiency (typ.) (%) | |
|--------------------|-------------------------------|------------------------|--------------------|-----------------------|----------|
| | | | | 20% Load | 80% Load |
| VD12 - 12S 42A | 12 (9~18) | 12 | 42 | 91 | 90 |
| VD12 - 13.8S 36A | | 13.8 | 36 | 91 | 90 |
| VD12 - 15S 33A | | 15 | 33 | 91 | 89 |
| VD12 - 24S 21A | | 24 | 21 | 91 | 89 |
| VD12 - 28S 18A | | 28 | 18 | 91 | 89 |
| VD12 - 48S 10.5A | | 48 | 10.5 | 91 | 91 |
| VD12 - 100S 5A | | 100 | 5 | 90 | 91 |
| VD12 - 140S 3.6A | | 140 | 3.6 | 90 | 90 |
| VD12 - 200S 2.5A | | 200 | 2.5 | 90 | 90 |
| VD12 - 300S 1.7A | | 300 | 1.7 | 89 | 89 |
| VD12 - 400S 1.25A | | 400 | 1.25 | 89 | 89 |
| VD24 - 12S 42A | | 24 (18~36) | 12 | 42 | 91 |
| VD24 - 13.8S 36A | 13.8 | | 36 | 91 | 91 |
| VD24 - 15S 33A | 15 | | 33 | 91 | 90 |
| VD24 - 24S 21A | 24 | | 21 | 91 | 90 |
| VD24 - 28S 18A | 28 | | 18 | 91 | 90 |
| VD24 - 48S 10.5A | 48 | | 10.5 | 91 | 92 |
| VD24 - 100S 5A | 100 | | 5 | 91 | 92 |
| VD24 - 140S 3.6A | 140 | | 3.6 | 90 | 91 |
| VD24 - 200S 2.5A | 200 | | 2.5 | 90 | 91 |
| VD24 - 300S 1.7A | 300 | | 1.7 | 89 | 90 |
| VD24 - 400S 1.25A | 400 | | 1.25 | 89 | 90 |
| VD48 - 12S 42A | 48 (36~75) | | 12 | 42 | 89 |
| VD48 - 13.8S 36A | | 13.8 | 36 | 89 | 91 |
| VD48 - 15S 33A | | 15 | 33 | 89 | 90 |
| VD48 - 24S 21A | | 24 | 21 | 89 | 91 |
| VD48 - 28S 18A | | 28 | 18 | 89 | 91 |
| VD48 - 48S 10.5A | | 48 | 10.5 | 89 | 93 |
| VD48 - 100S 5A | | 100 | 5 | 88 | 93 |
| VD48 - 140S 3.6A | | 140 | 3.6 | 88 | 92 |
| VD48 - 200S 2.5A | | 200 | 2.5 | 88 | 92 |
| VD48 - 300S 1.7A | | 300 | 1.7 | 88 | 91 |
| VD48 - 400S 1.25A | | 400 | 1.25 | 88 | 91 |
| VD96 - 12S 42A | | 96 (70~144) | 12 | 42 | 89 |
| VD96 - 13.8S 36A | 13.8 | | 36 | 89 | 91 |
| VD96 - 15S 33A | 15 | | 33 | 89 | 90 |
| VD96 - 24S 21A | 24 | | 21 | 89 | 91 |
| VD96 - 28S 18A | 28 | | 18 | 89 | 91 |
| VD96 - 48S 10.5A | 48 | | 10.5 | 89 | 93 |
| VD96 - 100S 5A | 100 | | 5 | 88 | 93 |
| VD96 - 140S 3.6A | 140 | | 3.6 | 88 | 92 |
| VD96 - 200S 2.5A | 200 | | 2.5 | 88 | 92 |
| VD96 - 300S 1.7A | 300 | | 1.7 | 88 | 91 |
| VD96 - 400S 1.25A | 400 | | 1.25 | 88 | 91 |
| VD200 - 12S 42A | 200 (150~300) | | 12 | 42 | 89 |
| VD200 - 13.8S 36A | | 13.8 | 36 | 89 | 91 |
| VD200 - 15S 33A | | 15 | 33 | 89 | 90 |
| VD200 - 24S 21A | | 24 | 21 | 89 | 91 |
| VD200 - 28S 18A | | 28 | 18 | 89 | 91 |
| VD200 - 48S 10.5A | | 48 | 10.5 | 89 | 93 |
| VD200 - 100S 5A | | 100 | 5 | 88 | 93 |
| VD200 - 140S 3.6A | | 140 | 3.6 | 88 | 92 |
| VD200 - 200S 2.5A | | 200 | 2.5 | 88 | 92 |
| VD200 - 300S 1.7A | | 300 | 1.7 | 88 | 91 |
| VD200 - 400S 1.25A | | 400 | 1.25 | 88 | 91 |
| VD300 - 12S 42A | | 300 (225~450) | 12 | 42 | 88 |
| VD300 - 13.8S 36A | 13.8 | | 36 | 88 | 91 |
| VD300 - 15S 33A | 15 | | 33 | 88 | 90 |
| VD300 - 24S 21A | 24 | | 21 | 88 | 91 |
| VD300 - 28S 18A | 28 | | 18 | 88 | 91 |
| VD300 - 48S 10.5A | 48 | | 10.5 | 88 | 93 |
| VD300 - 100S 5A | 100 | | 5 | 87 | 93 |
| VD300 - 140S 3.6A | 140 | | 3.6 | 87 | 92 |
| VD300 - 200S 2.5A | 200 | | 2.5 | 87 | 92 |
| VD300 - 300S 1.7A | 300 | | 1.7 | 87 | 91 |
| VD300 - 400S 1.25A | 400 | | 1.25 | 87 | 91 |
| VD400 - 12S 42A | 400 (300~600) | | 12 | 42 | 87 |
| VD400 - 13.8S 36A | | 13.8 | 36 | 87 | 91 |
| VD400 - 15S 33A | | 15 | 33 | 87 | 90 |
| VD400 - 24S 21A | | 24 | 21 | 87 | 91 |
| VD400 - 28S 18A | | 28 | 18 | 87 | 91 |
| VD400 - 48S 10.5A | | 48 | 10.5 | 87 | 93 |
| VD400 - 100S 5A | | 100 | 5 | 86 | 93 |
| VD400 - 140S 3.6A | | 140 | 3.6 | 86 | 92 |
| VD400 - 200S 2.5A | | 200 | 2.5 | 86 | 92 |
| VD400 - 300S 1.7A | | 300 | 1.7 | 86 | 91 |
| VD400 - 400S 1.25A | | 400 | 1.25 | 86 | 91 |

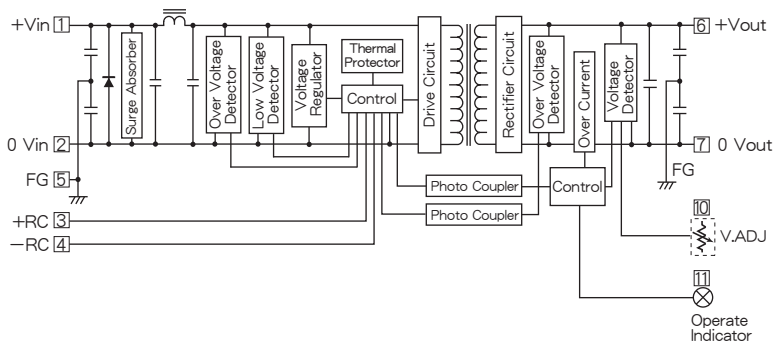
※ 上記仕様以外にも対応可能ですので お問い合わせ下さい。
Please consult with us about other specification.

VD SERIES DATA SHEET

Terminal Outs & Dimensions (±0.5mm)



Block Diagram



VD SERIES DATA SHEET

Characteristic Curves

Fig. 1 Derating Curve

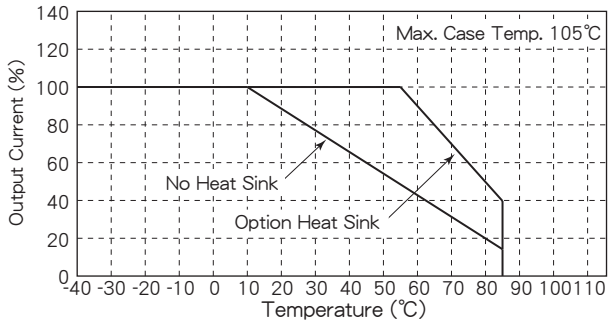


Fig. 2 Short Circuit Operating Area

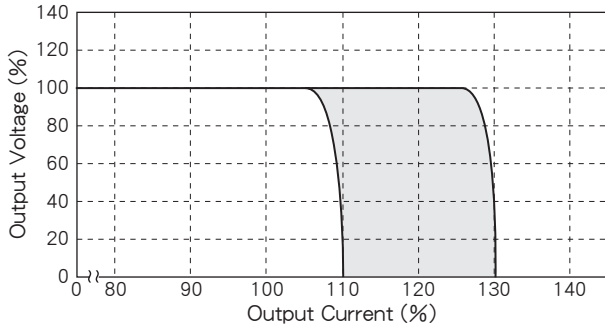


Fig. 3 Temperature Characteristic on Case Surface

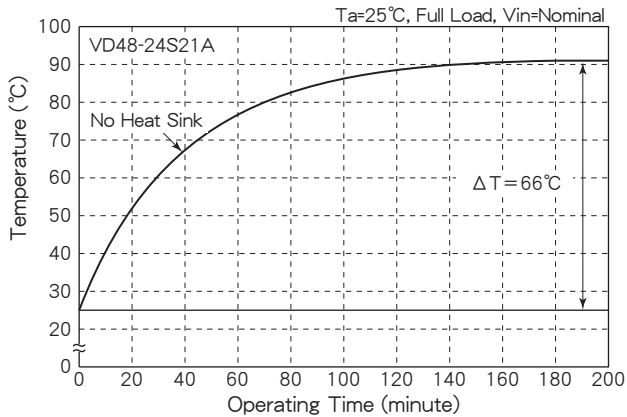
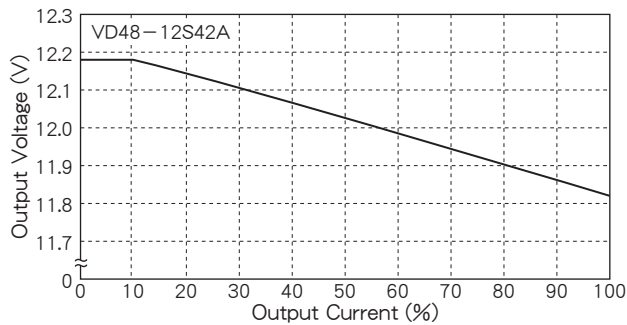


Fig. 4 Output Voltage vs. Output Current



* 並列運転時に各モジュールの電流を平均化するため
負荷変動を大きくしてあります。
Load Regulation is regulated large on purpose to equate
the each unit's output current at parallel operation.

Fig. 5 Efficiency vs. Output Current

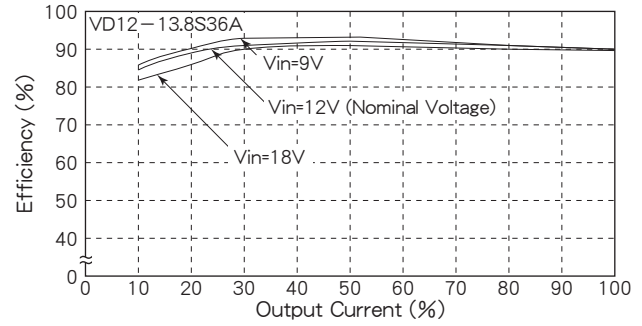


Fig. 6 Efficiency vs. Output Current

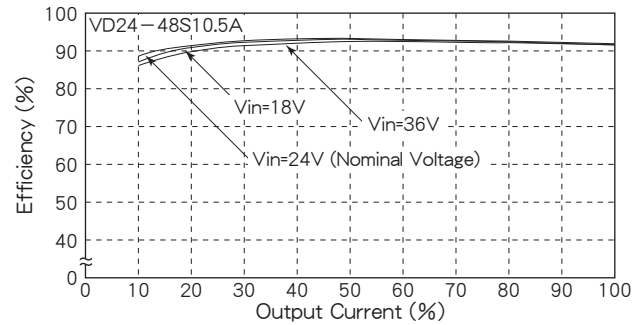


Fig. 7 Efficiency vs. Output Current

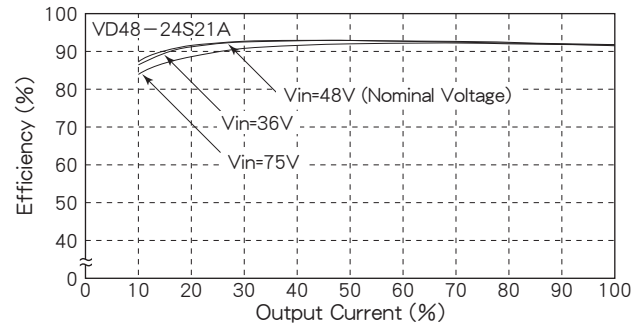
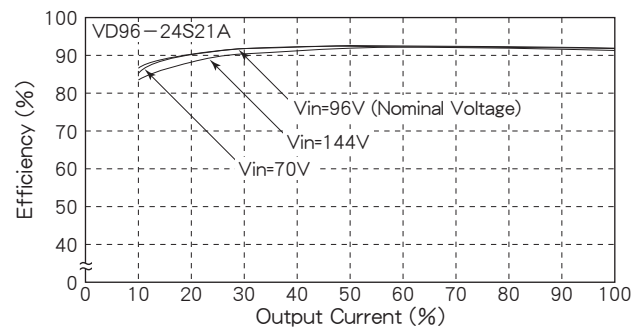


Fig. 8 Efficiency vs. Output Current

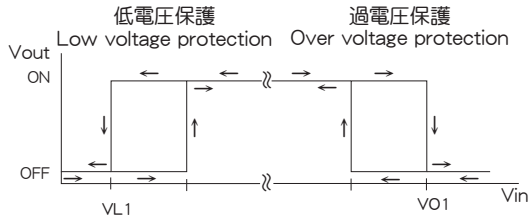


VD SERIES DATA SHEET

■ 主な機能及び注意事項 Function and direction in application

1. 入力低電圧保護、入力過電圧保護 Input low/over voltage protection
 入力が定格範囲外になると出力を停止します。範囲内に戻ると自動復帰します。またヒステリシス特性を有しています。
 This function stops output if input is out of the rated voltage range and restarts output automatically in the rating voltage range. It also has hysteresis characteristic.

ヒステリシス特性 Hysteresis Characteristic



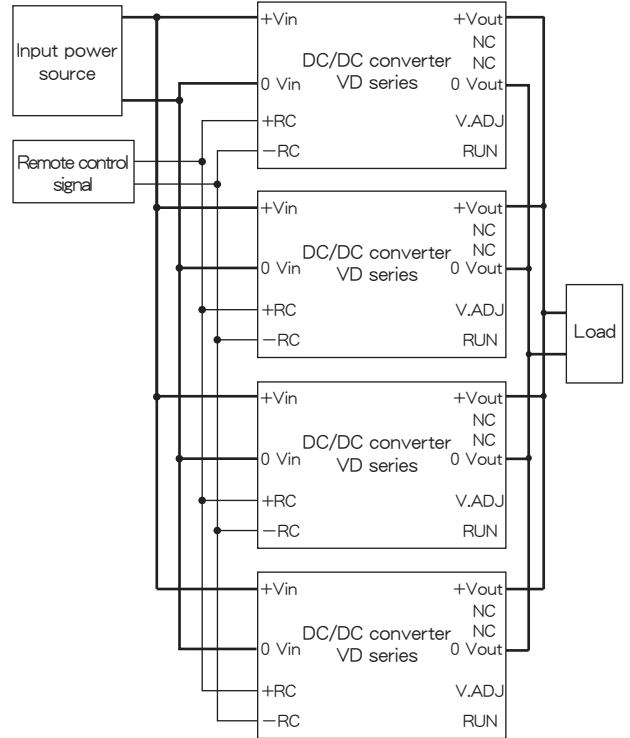
| 定格入力電圧 Rated input voltage | 低電圧保護 Low voltage protection VL1 | 過電圧保護 Over voltage protection VO1 |
|-------------------------------|--|---|
| 12V (9~18V) | 6~8V | 20~22V |
| 24V (18~36V) | 12~16V | 40~44V |
| 48V (36~75V) | 24~32V | 80~88V |
| 96V (70~144V) | 48~64V | 152~160V |
| 200V (150~300V) | 100~133V | 316~333V |
| 300V (225~450V) | 150~200V | 474~500V |
| 400V (300~600V) | 200~266V | 633~666V |

2. 出力電圧値 Output voltage
 出力電圧値はボリューム(V.ADJ)を回転させることにより、定格出力電圧の約±5%可変することができます。
 Output voltage will be adjusted to ±5% of rated voltage by means of volume (V.ADJ).

3. 出力過電流保護 Output over current protection
 負荷が短絡した場合など、過大な負荷電流が流れたときに負荷と本体を保護する機能です。定格出力電流の約105%~130%にて検出し作動します(Fig. 2 参照)。出力は定電流電圧垂下特性、入力電流はフの字特性となっています。また自動復帰特性を有しています。
 This function is to protect a power supply and a load when excessive current flows in case of short-circuited load or such possible conditions. It will operate in 105 - 130% of rated output current (see Fig. 2). Output has constant current voltage limiting characteristic and input current has combined current limiting with fold-back protection. It also has automatic reset function.

4. 出力過電圧保護 Output over voltage protection
 出力の過電圧から負荷側を保護する機能です。出力電圧値が定格値の約120~140%になると出力をOFFします。
 This function is to protect a load from output over voltage. Output will be shut down when output voltage is 120 - 140% of rated voltage.

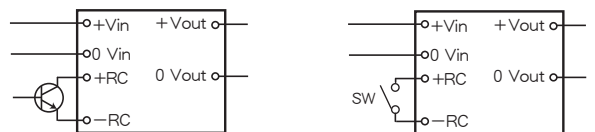
5. 並列運転 Parallel operation
 同機種を並列に動作させることにより出力電流容量を増やすことができます。
 並列運転は4台まで接続可能です。
 It is possible to increase output current capacity by means of parallel operation of the same model. Please see the figure below for wiring instructions.
 Parallel operation is possible up to 4 converters.



6. リモートON/OFFコントロール Remote ON/OFF control
 リモートON/OFFコントロールを使用して、電源の出力をON/OFFすることができます。RC端子間をショートする事で出力電圧がON、RC端子間をオープンにする事で出力電圧がOFFになります。RC端子間にTTLレベルの電気信号を加える事により出力をON/OFFすることができます。RC端子は入力側にあり、入力電源回路とは絶縁されていません。ON/OFFコントロールを使用しないときは、+RC端子と-RRC端子を付属のショートピンで短絡させて下さい。
 Using remote ON/OFF control, ON/OFF of the power supply output is possible. The output voltage operates by a short between RC terminals, and the output voltage stops by open between RC terminals. ON/OFF of the output voltage is possible by adding the electrical signal of the TTL level between RC terminals. RC terminals are located on the input side and the circuit is not isolated from input power source circuit. In case you don't use ON/OFF control, please short-circuit +RC and -RC terminals by means of attached short-bar.

* 回路構成例 Example of ON/OFF control circuit

●TRIによる例 Example by transistor ●SWによる例 Example by switch



並列運転可能
Parallel Operation



H55×W120×L280 (mm)

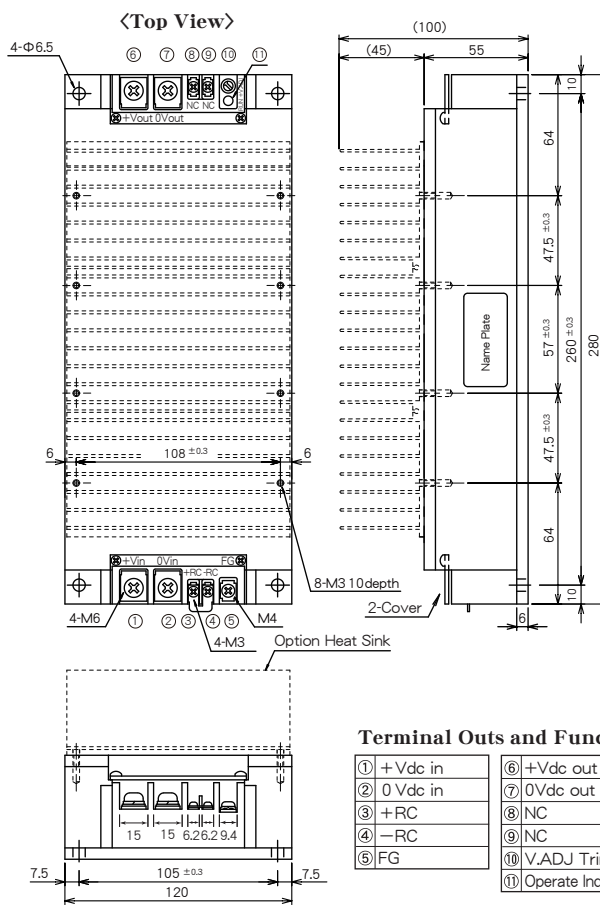
Features

- High Output 1000W
- High Efficiency 89%~93%
- Input-Output Isolation (AC2000V)
- Possible Parallel Operation up to 4 converters
- Remote ON/OFF Control
- Input Low Voltage Protection
- Input Over Voltage Protection
- Thermal Protection +110°C~+120°C
- Cooling by mounting on Chassis or using Heat Sink
- Conformity to RoHS2 Directive
- No aluminum electrolytic capacitor and no tantalum capacitor are used.
- Built-in Input Fuse
- 高出力 1000W
- 高効率 89%~93%
- 入出力間絶縁 (AC2000V)
- 4台まで並列運転可能
- リモートON/OFFコントロール
- 入力低電圧保護回路内蔵
- 入力過電圧保護回路内蔵
- 過熱保護回路内蔵 +110°C~+120°C
- シャーシ上又はヒートシンクの取付により放熱
- RoHS2指令対応
- アルミ電解コンデンサ及びタンタルコンデンサ不使用
- 入力ヒューズ内蔵

General Characteristics

- Input Voltage, Range (at Ta : 25°C, Full Load, Nominal Vin)
DC 100, 200, 300, 400, 600V (See Table 1)
- Output Voltage, Current See Table 1
- Output Voltage Adjustment ±5%
- Efficiency See Table 1
- Line Regulation 0.3% max. (at Vin Range)
- Load Regulation 3.0% typ. (0~100% Load)
- Output Ripple 200mV p-p max.
- Output Noise 500mV p-p max.
- Short Circuit Protection Built-in, Auto-restart
- Output Over Voltage Protection Built-in, Shut-down (120%~140% Vout)
- Remote ON/OFF Control ON : Short
OFF : Open
(Between pin ③ ~ ④)
- Temperature Coefficient 0.02%/°C max.
- Operating Ambient Temp. -40°C~+85°C
- Max. Case Temp. +105°C
- Storage Temp. -40°C~+115°C
- Isolation Voltage AC2000V one minute (Input-Output-Case)
- Isolation Impedance 100MΩ min. (at DC1000V) (Input-Output-Case)
- Weight Main Body : 4.2kg max.
Heat sink : 600g max.
- Humidity 20~95% RH
- Shock 490m/s² (11msec 3directions)
- Vibration JIS E4031 Category 1 - Class B
- Surface Structure Aluminium Case
- MTBF 120,000H
(Ta : 25°C, 80%Load, Nominal Vin)
- Warranty 5 years

Terminal Outs & Dimensions (±0.5mm)



Selection Guide

Table 1

| Model Number | Input Voltage (Range) (V. DC) | Output Voltage (V. DC) | Output Current (A) | Efficiency (typ.) (%) | |
|----------------|-------------------------------|------------------------|--------------------|-----------------------|----------|
| | | | | 20% Load | 80% Load |
| XD100 - 24S42A | 100(70~144) | 24 | 42 | 89 | 93 |
| XD200 - 24S42A | 200(150~300) | 24 | 42 | 89 | 93 |
| XD300 - 24S42A | 300(225~450) | 24 | 42 | 89 | 93 |
| XD400 - 24S42A | 400(300~600) | 24 | 42 | 89 | 93 |
| XD600 - 24S42A | 600(420~730) | 24 | 42 | 89 | 93 |

※ 上記仕様以外にも対応可能ですので お問い合わせ下さい。
Please consult with us about other specification.

XD SERIES DATA SHEET