

SM60 SERIES

5.3~6W DC/DC CONVERTERS Single Output & Dual Outputs



H6.2×W19.6×L30(mm)

Features

- Possible to Reflow Solder (250°C~260°C)
- Transfer Molding Package, and Washable after Soldering
- Remote ON/OFF Control
- Input-Output Isolated AC3000V
- High Efficiency 80%~85% typ.
- Low Output Ripple and Noise 30mVp-p (0~100MHz)
- Conformity to RoHS Directive
- Please add external Fuse connected to input for protection
- リフロー炉によるハンダ付け可能 (250°C~260°C)
- トランスファモールドにより基板洗浄可能
- リモートON/OFFコントロール
- 入出力間絶縁 AC3000V
- 高効率 80%~85% typ.
- 低出力リップル、ノイズ 30mVp-p (0~100MHz)
- RoHS指令対応
- 保護のため入力にヒューズを 外付けして下さい

General Characteristics

- (at Ta : 25°C, Full Load, Nominal Vin)
- Input Voltage, Range DC5, 12, 24, 48, 100, 140V (See Table 1)
 - Output Voltage, Current DC3.3, 5, 6, 12, 15, 24V ±5, ±12, ±15V (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 (2% Vin)Vp-p max.
 - Reflected Input Noise (2% Vin)Vp-p max.
 - Output Ripple 20mVp-p max. (0~100MHz)
 - Output Noise 30mVp-p max. (0~100MHz)
 - Short Circuit Protection Built-in, Auto-restart
 - Remote ON/OFF Control ON : Short or 0~0.8V
OFF : Open or 2~10V
 - 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 AC3000V or DC6000V one minute (Input-Output)
 - Isolation Impedance 100MΩ min. (at DC1000V) (Input-Output)
 - Isolation Capacitance 10pF max.
 - Switching Frequency 400kHz typ.
 - Weight 6.7g max.
 - Humidity 20~95% RH
 - Shock 490m/s² (11msec 3directions)
 - Vibration 10~55Hz 98m/s²
(30minutes 3directions)
 - MTBF Single : 1,200,000H
Dual : 1,000,000H
(Ta : 25°C, 80% Load, Nominal Vin)
 - Warranty 5 years

Selection Guide

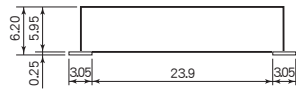
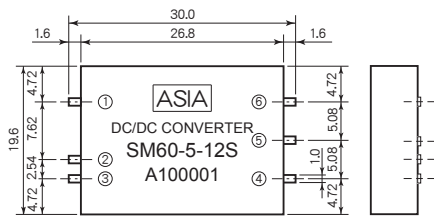
Table 1

Model Number	Input Volt. (Range) (V. DC)	Output Voltage (V. DC)	Output Current (A)	Efficiency (Typical) (%)
SM60-5-3.3 S	5 (4.5~9)	3.3	1.6	80
SM60-5-5 S		5	1.2	81
SM60-5-6 S		6	1.0	81
SM60-5-12 S		12	0.5	83
SM60-5-15 S		15	0.4	83
SM60-5-24 S		24	0.25	83
SM60-5-5 D		±5	±0.6	81
SM60-5-12 D		±12	±0.25	83
SM60-5-15 D		±15	±0.2	83
SM60-12-3.3 S	12 (8~18)	3.3	1.6	80
SM60-12-5 S		5	1.2	82
SM60-12-6 S		6	1.0	82
SM60-12-12 S		12	0.5	85
SM60-12-15 S		15	0.4	85
SM60-12-24 S		24	0.25	85
SM60-12-5 D		±5	±0.6	82
SM60-12-12 D		±12	±0.25	85
SM60-12-15 D		±15	±0.2	85
SM60-24-3.3 S	24 (16~36)	3.3	1.6	80
SM60-24-5 S		5	1.2	82
SM60-24-6 S		6	1.0	82
SM60-24-12 S		12	0.5	85
SM60-24-15 S		15	0.4	85
SM60-24-24 S		24	0.25	85
SM60-24-5 D		±5	±0.6	82
SM60-24-12 D		±12	±0.25	85
SM60-24-15 D		±15	±0.2	85
SM60-48-3.3 S	48 (32~72)	3.3	1.6	80
SM60-48-5 S		5	1.2	82
SM60-48-6 S		6	1.0	82
SM60-48-12 S		12	0.5	85
SM60-48-15 S		15	0.4	85
SM60-48-24 S		24	0.25	85
SM60-48-5 D		±5	±0.6	82
SM60-48-12 D		±12	±0.25	85
SM60-48-15 D		±15	±0.2	85
SM60-100-3.3 S	100 (64~144)	3.3	1.6	80
SM60-100-5 S		5	1.2	82
SM60-100-6 S		6	1.0	82
SM60-100-12 S		12	0.5	85
SM60-100-15 S		15	0.4	85
SM60-100-24 S		24	0.25	85
SM60-100-5 D		±5	±0.6	82
SM60-100-12 D		±12	±0.25	85
SM60-100-15 D		±15	±0.2	85
SM60-140-3.3 S	140 (90~200)	3.3	1.6	80
SM60-140-5 S		5	1.2	82
SM60-140-6 S		6	1.0	82
SM60-140-12 S		12	0.5	85
SM60-140-15 S		15	0.4	85
SM60-140-24 S		24	0.25	85
SM60-140-5 D		±5	±0.6	82
SM60-140-12 D		±12	±0.25	85
SM60-140-15 D		±15	±0.2	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.

SM60 SERIES DATA SHEET

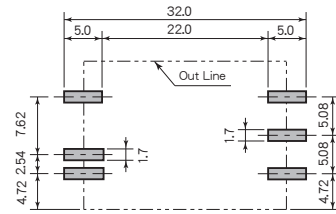
Pin Outs & Dimensions ($\pm 0.3\text{mm}$)



Pin 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	No Connection	④	-Vdc out
⑤	0 Vdc out	⑤	Common
⑥	+Vdc out	⑥	+Vdc out

Pad Configurations on PCB (Top View)



Characteristic Curves

Fig. 1 Derating Curve

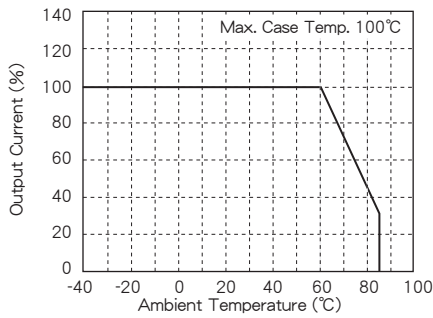


Fig. 2 Temperature Characteristic on Case Surface

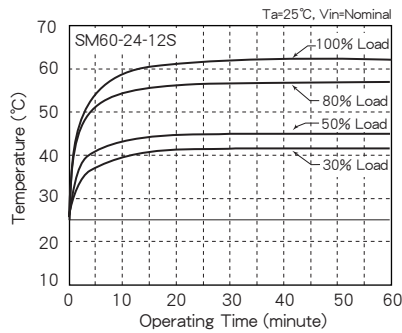


Fig. 3 Output Ripple and Noise

Fig. 3.1

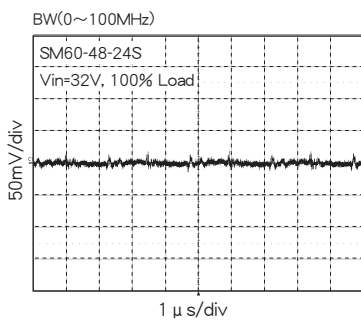


Fig. 3.2

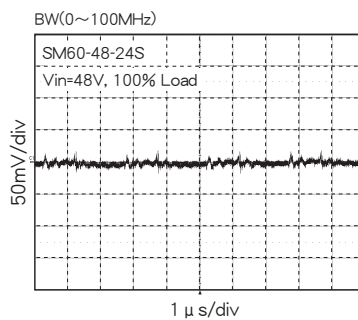


Fig. 3.3

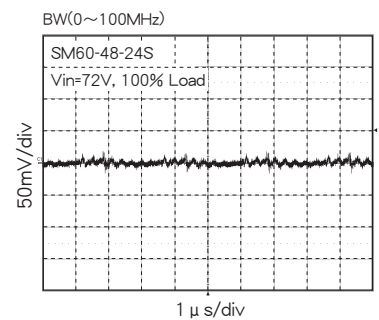


Fig. 4 Reflected Input Ripple and Noise

Fig. 4.1

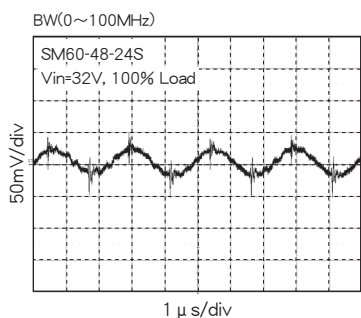


Fig. 4.2

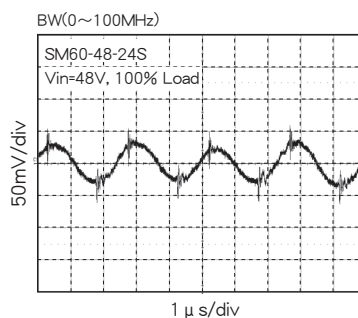
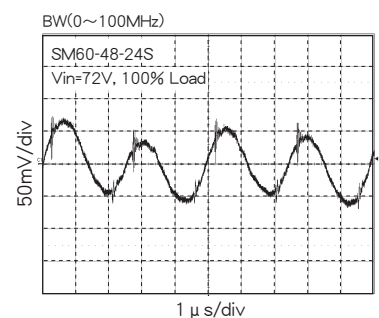


Fig. 4.3

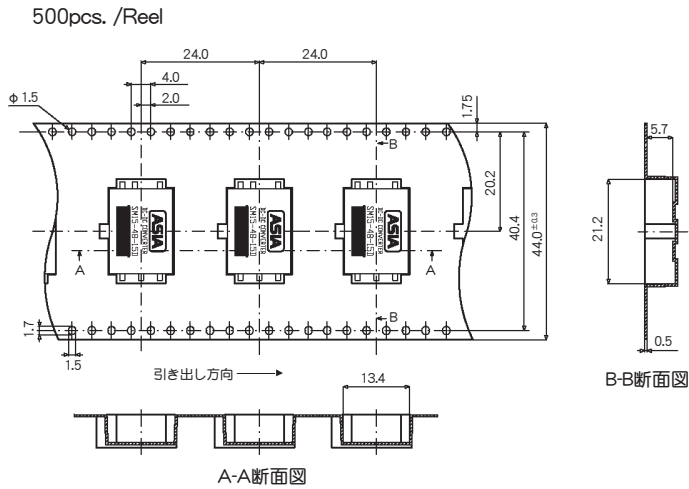


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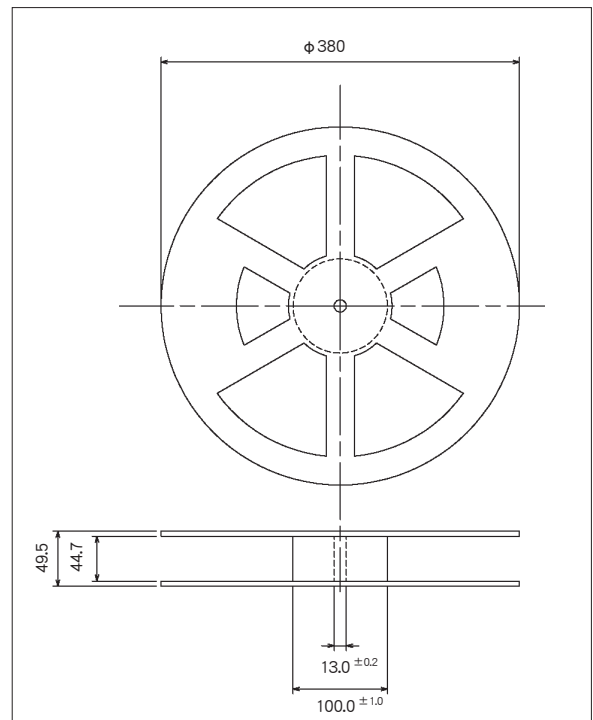
DC/DC CONVERTERS Single Output & Dual Outputs

■ Tape & Reel Specifications (±0.1 mm)

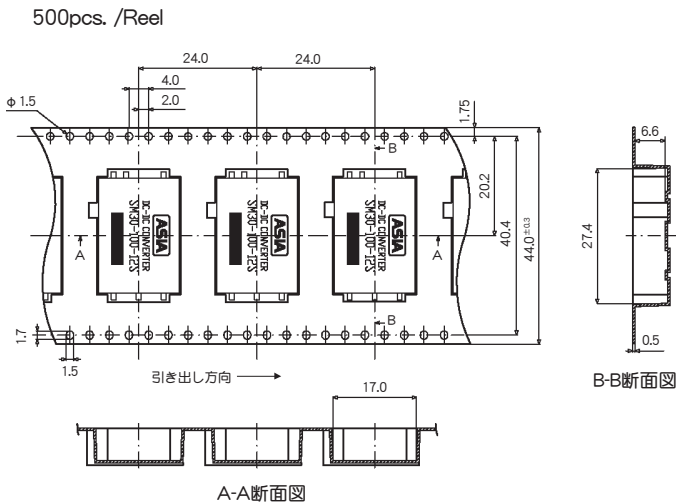
■ SM15 Series Tape Outline Dimensions



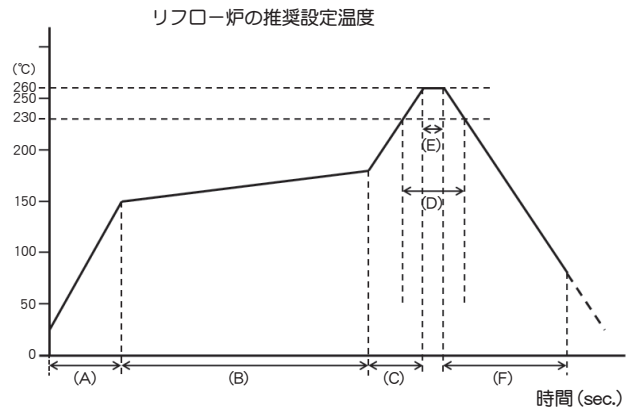
■ Reel Outline Dimensions (±2mm)



■ SM30 Series Tape Outline Dimensions



■ Recommended Solder Conditions



- (A)温度上昇勾配 : 2~4°C/sec.
- (B)予備加熱温度・時間 : 150~180°C・60~120sec.
- (C)温度上昇勾配 : 2~4°C/sec.
- (D)実装領域温度・時間 : 230°C以上・20~40sec.
- (E)ピーク温度・時間 : 260°Cmax.・10sec. min.
- (F)冷却温度勾配 : -2~-4°C/sec.

注意

1. リフローの場合
リフロー炉によるはんだ付けの場合次の点にご注意下さい。
本D/Dコンは体積容量が、SM15=1226mm³、SM30=2081mm³、SM60=3125mm³と大きい為、端子部分の温度が不足しはんだ付けが不十分な場合があります。その場合は、はんだゴテによる手はんだにて、再度はんだ付けを行なって下さい。
手はんだの際は、コテ先温度360°C以下、3秒以内として下さい。
リフロー炉の温度を上げ過ぎると、製品が故障する場合がありますので、ご注意ください。
2. 手付けはんだの場合
はんだゴテを使用し、はんだ付けを行なう場合は、コテ先温度360°C以下、3秒以内で行なって下さい。

■ SM60 Series Tape Outline Dimensions

