

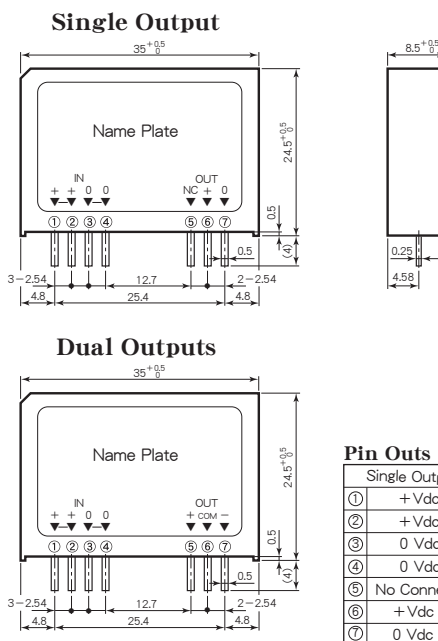
# TS SERIES

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



H24.5×W8.5×L35 (mm)

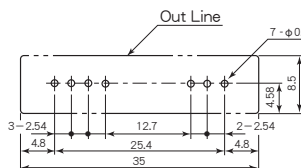
### Pin Outs & Dimensions (±0.2mm)



#### 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

### Hole Configurations on PCB (Top View)



### 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 RoHS 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
- RoHS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)
- Reflected Input Ripple (3% 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. -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/s<sup>2</sup> (11msec 3directions)
- Vibration 10~55Hz 98m/s<sup>2</sup> (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

### Selection Guide

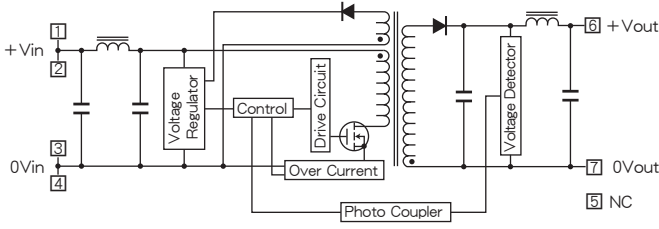
Table 1

Model Number	Input Volt. (Range) (V. DC)	Output Voltage (V. DC)	Output Current (mA)	Efficiency (Typical) (%)
TS 5 - 5 S 4 0 0	5 (4.5~9)	5	400	70
TS 5 - 6 S 3 5 0		6	350	70
TS 5 - 1 2 S 2 0 0		12	200	72
TS 5 - 1 5 S 1 6 0		15	160	72
TS 5 - 2 4 S 1 0 0		24	100	72
TS 5 - 1 2 D 1 0 0		±12	±100	72
TS 5 - 1 5 D 8 0		±15	±80	72
TS 1 2 - 5 S 5 0 0	12 (8~18)	5	500	75
TS 1 2 - 6 S 4 5 0		6	450	75
TS 1 2 - 1 2 S 2 5 0		12	250	78
TS 1 2 - 1 5 S 2 0 0		15	200	78
TS 1 2 - 2 4 S 1 2 5		24	125	78
TS 1 2 - 1 2 D 1 2 5		±12	±125	78
TS 1 2 - 1 5 D 1 0 0		±15	±100	78
TS 2 4 - 5 S 5 0 0	24 (16~36)	5	500	75
TS 2 4 - 6 S 4 5 0		6	450	75
TS 2 4 - 1 2 S 2 5 0		12	250	80
TS 2 4 - 1 5 S 2 0 0		15	200	80
TS 2 4 - 2 4 S 1 2 5		24	125	80
TS 2 4 - 1 2 D 1 2 5		±12	±125	80
TS 2 4 - 1 5 D 1 0 0		±15	±100	80
TS 4 8 - 5 S 5 0 0	48 (32~72)	5	500	75
TS 4 8 - 6 S 4 5 0		6	450	75
TS 4 8 - 1 2 S 2 5 0		12	250	80
TS 4 8 - 1 5 S 2 0 0		15	200	80
TS 4 8 - 2 4 S 1 2 5		24	125	80
TS 4 8 - 1 2 D 1 2 5		±12	±125	80
TS 4 8 - 1 5 D 1 0 0		±15	±100	80

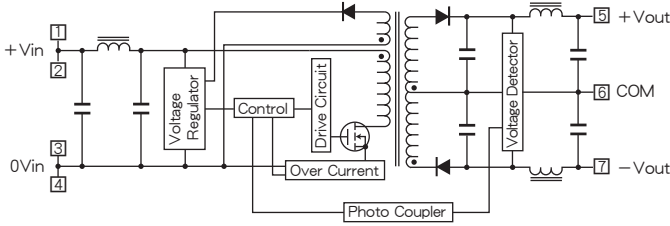
# TS SERIES DATA SHEET

## Block Diagram

### Single Output

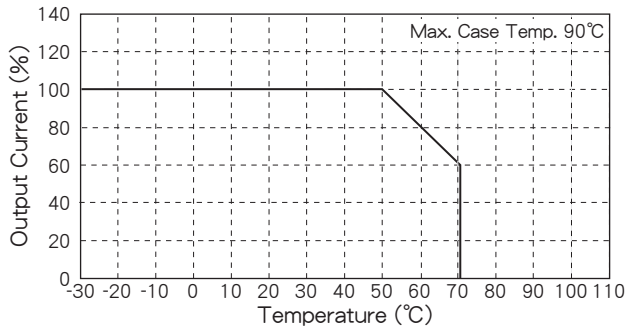


### Dual Outputs

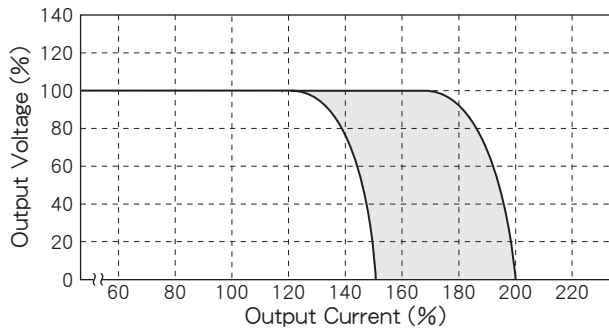


## Characteristic Curves

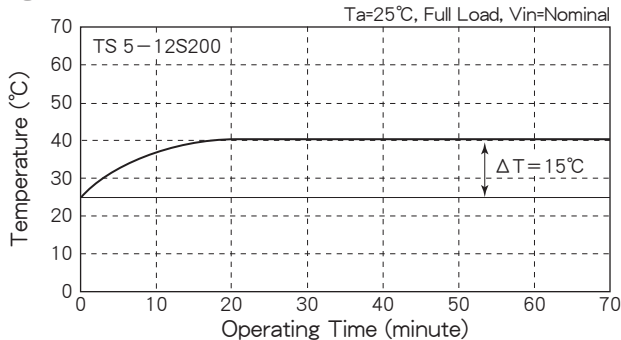
**Fig. 1 Derating Curve**



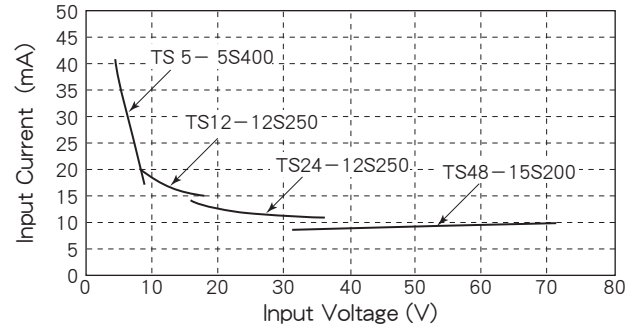
**Fig. 2 Short Circuit Operating Area**



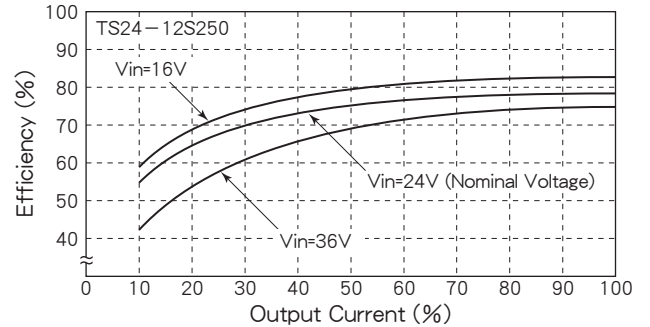
**Fig. 3 Temperature Characteristic on Case Surface**



**Fig. 4 No Load Current vs. Input Voltage**



**Fig. 5 Efficiency vs. Output Current**



**Fig. 6 Efficiency vs. Output Current**

