

# 900W CHASSIS MOUNTING NON-INDUCTIVE HIGH POWER RESISTORS

## TCP900



### Features and Applications

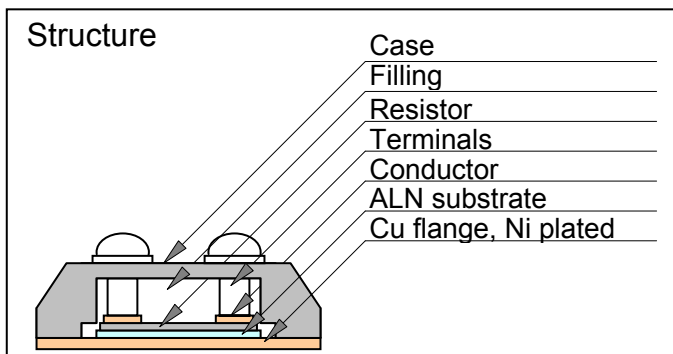
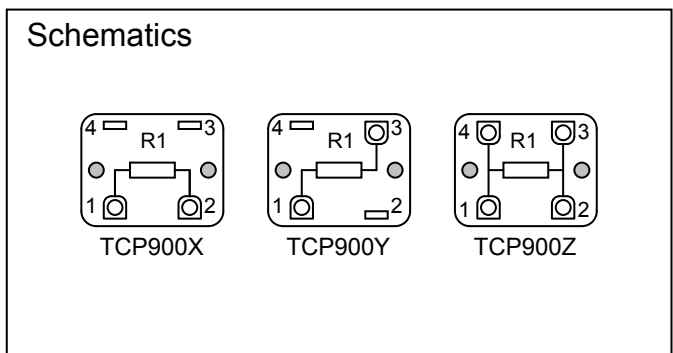
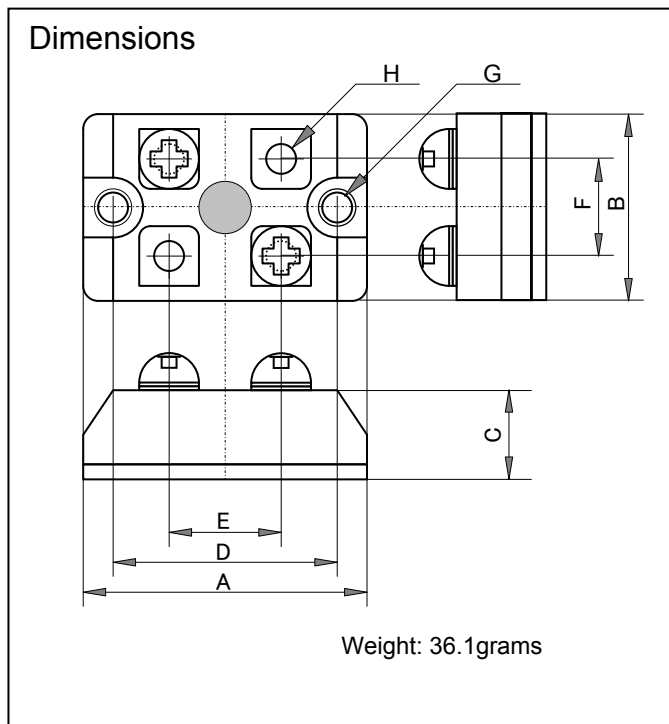
Small size SOT227, 900W high power resistor. Attaching with a large forced air-cooled heat sink or liquid-cooling would be necessary for high power operation.

Rated power is 900W (single resistor at 25 °C flange temperature), dual resistor configuration is optionally available with 600W (total of dual resistors at 25 °C flange temperature). Please see TCP600.

M4 screw terminals, very low series inductance.

Higher density packing, vibration-proof and perfect heat dissipation are available.

Applications include snubber resistors, breeder resistor, power voltage divider, dumping resistor, braking resistor for X-ray, MRI, Laser power source and etc.



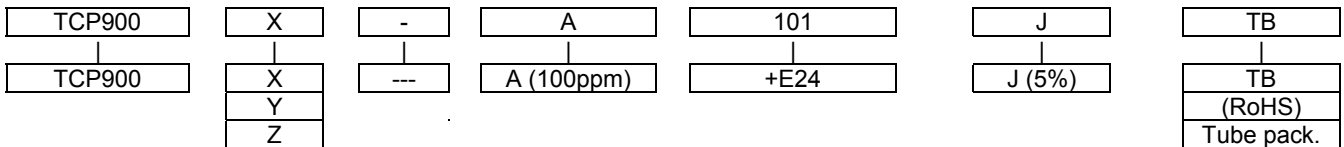
Symbols	(mm)	(inch)
A	38+/-0.5	1.50+/-0.02
B	25+/-0.5	0.98+/-0.02
C	15+/-0.5	0.59+/-0.02
D	30+/-0.2	1.18+/-0.008
E	15+/-0.5	0.59+/-0.02
F	13+/-0.5	0.51+/-0.02
G	2 – 4.20+/-0.1 dia.	2 - 0.165+/-0.004 dia.
H	4 - M4.0	4 - M4.0 (mm)

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### Ordering Information

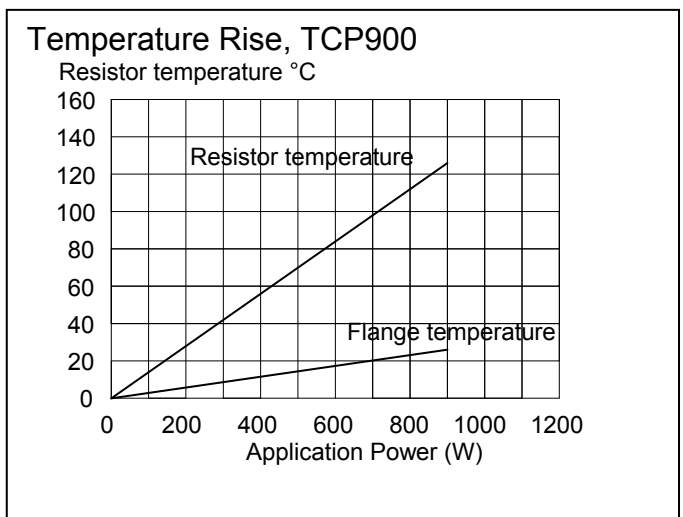
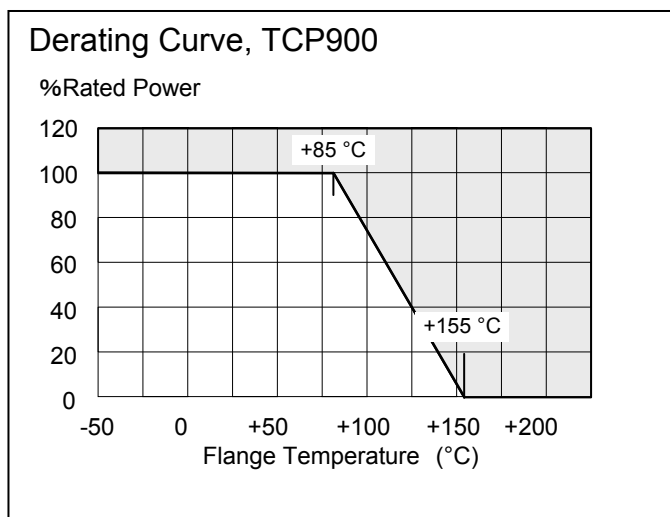


Resistance value is available following modified E24, +E24. Another is available optionally.

1.0	1.1	1.2	1.3	1.5	1.6	1.8	2.0	2.2	2.4	2.5	2.7	3.0	3.3
3.6	3.9	4.0	4.3	4.7	5.0	5.1	5.6	6.2	6.8	7.5	8.0	8.2	9.1

### Specifications and Performances

Specification Items	TCP900X/Y/Z	Conditions
Rating Power	900 Watts	At flange temperature -55 to +85 °C
Thermal Resistance	0.10 °C/W	Between resistor to flange
Resistance Range	25 ohm to 1K ohm Single	Not available under 25 ohms.
Nominal Resistance	Modified E12	Any value, option
TCR	+/-100 ppm/K (A)	For -55 to +155 °C
Tolerance	+/-5% (J)	Not available +/- 1% (F) tolerance
Operation Temp. Range	-55 - +155 °C	
Limiting Voltage	700V	Less than $E = \sqrt{P \cdot R}$
Withstanding Voltage	2500 VAC	60 seconds. 5000VAC available
Capacitance	13.1 pF	Parallel capacitance at 10MHz
Inductance	13.7 nH	Series inductance at 10MHz
Load Life	+/- (1.0 % + 0.05 ohm)	25°C, 90min.ON, 30min.OFF, 1000hours.
Humidity	+/- (1.0 % + 0.05 ohm)	70°C, 90 to 95%RH, DC0.1W, 1000hours.
Temperature Cycle	+/- (1.0 % + 0.05 ohm)	-55°C, 30 min., +125°C 30min., 20cycles. (-55°C, 30 min., +120°C, 30min., 5 cycles.)
Short Time Overload	+/- (5.0 % + 0.05 ohm)	Rating watt×1.5, 5seconds, with heat sink.
Soldering Heat	---	
Solder ability	Soldering is not available	-
Insulation Resistance	Over 1000 meg ohm	Between terminals and flange.
Vibration	+/- (0.25 % + 0.05 ohm)	

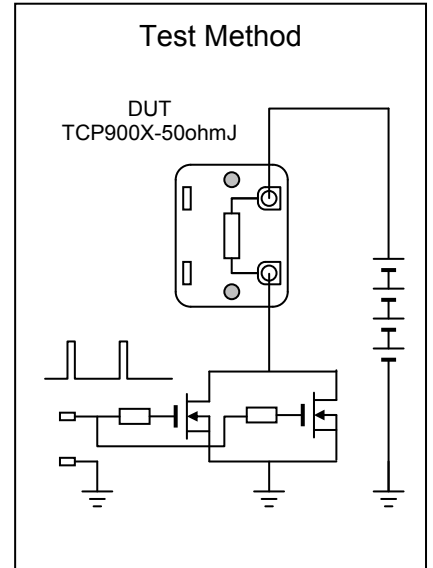
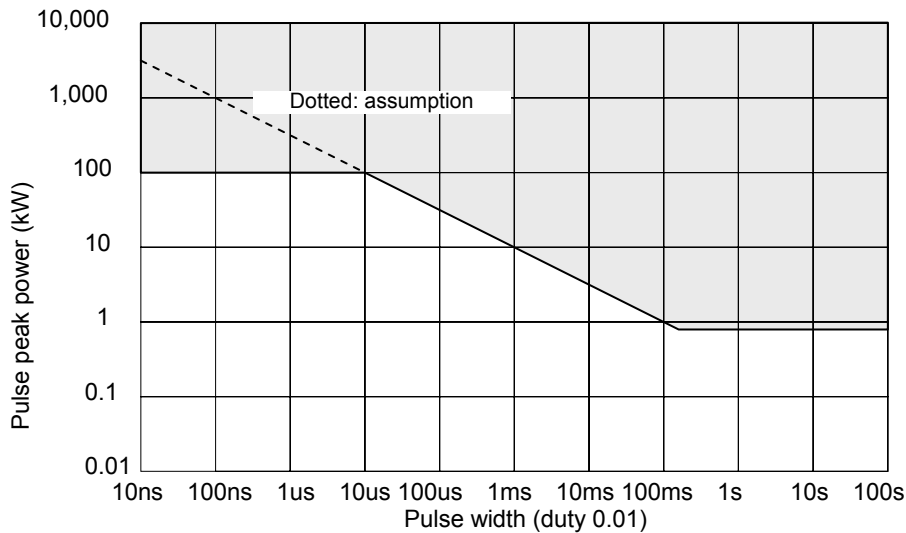


900W

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TCP900

## Pulse Operation



Above drawing shows allowable pulse peak power that obtained by actual breaking test of TCP900Z-10ohm-J, and shows the result of double safety factor. The test was performed by observation of small resistance change after application of continuous pulse, that is rectangular waveform and 0.01 duty.

Since the pulse durability is moved by the resistance, the pulse waveforms and type of pulse source, constant voltage source or current source, please test carefully for long terms on actual electronics when operating the resistor by the pulse of the peak power exceeding rated power.

## DC/AC rms Operation

Resistor generates Joule heat in DC or AC rms operation at resistor material, and Joule heat shall be cooled by thermal conduction. Finally, the heat is transported to the internal air electronics or cooling liquid, makes a steady state. Then, the temperature of each portion of a resistor shows a fixed value, as shown in a right figure.

Accumulated heat resistance between resistor material and air temperature  $R_t$  is,

$$R_t = R_{rf} + R_{rfh} + R_{rha}$$

When applied power shows P

$$R_{rf} = (t_r - t_f) / P \dots \dots \dots 0.10^\circ \text{ C/W}$$

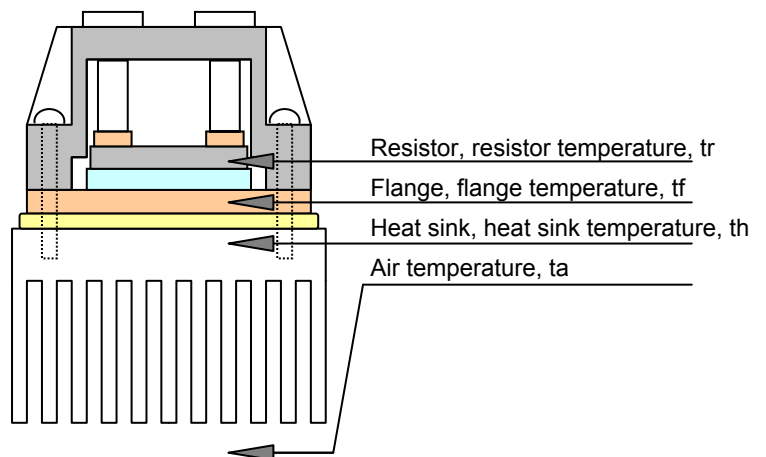
$$R_{rfh} = (t_f - t_h) / P \dots \dots \dots \text{about } 0.01^\circ \text{ C/W}$$

$$R_{rha} = (t_h - t_a) / P \dots \dots \dots \text{depends on size of heat sink.}$$

For example:

When  $R_{rha} = 6.0^\circ \text{ C/W}$ ,  $t_a = 50^\circ \text{ C}$ , max resistor temperature  $155^\circ \text{ C}$  and allowable power P1,  
 $P_1 = (t_r - t_a) / R_t = (155 - 50) / (0.1 + 0.01 + 6.0) = 17.1 \text{ W}$

When  $R_{rha} = 0.1^\circ \text{ C/W}$ ,  $t_a = 50^\circ \text{ C}$ , max resistor temperature  $155^\circ \text{ C}$  and allowable power P2,  
 $P_2 = (t_r - t_a) / R_t = (155 - 50) / (0.1 + 0.01 + 0.1) = 500 \text{ W}$



Please note, when air cool heat sink is used, actually keeping flange at less than  $25^\circ \text{ C}$  is difficult. When flange temperature is over  $25^\circ \text{ C}$ , rating will be decreased as shown above derating curve.

In DC operation, allowable power depends on a cooling performance of the heat sink.