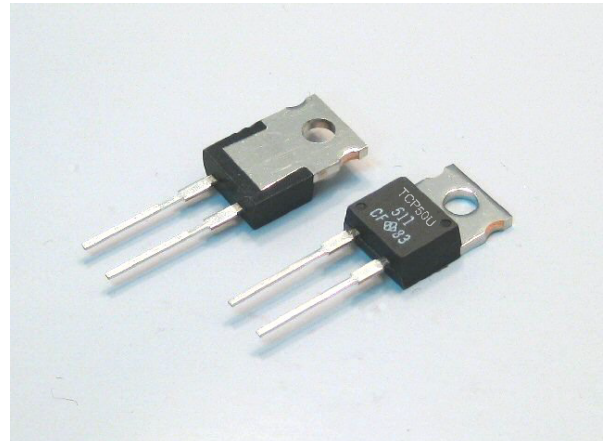


## TO220 50W HIGH POWER RESISTORS

### TCP50U



#### Features and Applications

50W high power resistors in TO220 style mold package for through-hole and screw mounting. AEC-Q200 test certified.

Non-inductive design suits high frequency applications and high-speed pulse circuits.

Low, 2.3 °C/W heat resistance from resistor hot spot to flange and long life performance are presented with thin film metallization technology and rejection of plastic adhesive joint.

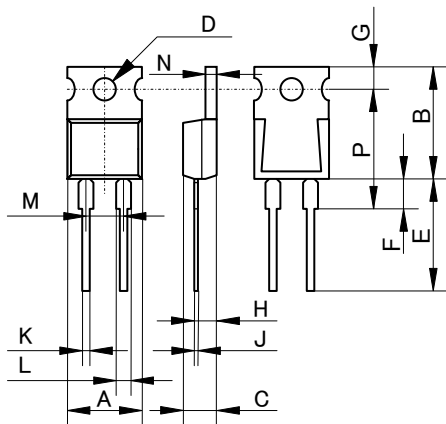
Wide 20 milliohm to 510kohm wide resistance range, non-inductive impedance characteristic and heat conduction through the insulated metal flange aids circuit designers.

Small size and thin profile suit high-density compact installations.

Complete thermal conduction, heat dissipation design and vibration durable design also available.

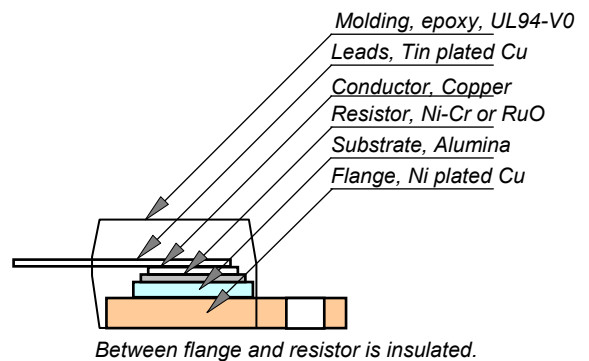
Applications include snubber, gate control, bleeder, filter, rush current protection, braking resistors of automotive, rail traction, wind turbine, PV, UPS and motor control inverters.

#### Dimensional Specifications (mm)



| TCP50U |      |         |
|--------|------|---------|
|        | mm   | +/-mm   |
| A      | 10.1 | +/-0.2  |
| B      | 15.0 | +/-0.2  |
| C      | 4.5  | +/-0.2  |
| D      | 3.6  | +/-0.1  |
| E      | 15.5 | +/-1.0  |
| F      | 4.0  | +/-0.5  |
| G      | 3.0  | +/-0.2  |
| H      | 2.75 | +/-0.2  |
| J      | 0.5  | +/-0.05 |
| K      | 0.75 | +/-0.05 |
| L      | 1.5  | +/-0.05 |
| M      | 5.08 | +/-0.10 |
| N      | 1.5  | +/-0.05 |
| P      | 16.0 | +/-0.50 |

#### Structure and Material



#### Ordering Information

|          |             |                |              |    |              |
|----------|-------------|----------------|--------------|----|--------------|
| TCP50U - | C           | 10R0 (*)       | F            | TB | Note         |
| TCP50U - | H (>250ppm) | R02-R09 (+E6)  | J(5%)        | TB | Tube         |
|          | A (100ppm)  | R10-510K(+E24) | F(1%), J(5%) |    | 50pcs / tube |
|          | C (50ppm)   | 10R-51K (+E24) | F(1%)        |    |              |

Resistance value (\*) is available following modified E24, +E24.

|     |     |     |     |     |     |     |     |     |     |     |     |     |     |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| 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 |

Note\*: When ordering, additional ohm resistance notation recommends for keeping out of misunderstanding.

# TO220 50W HIGH POWER RESISTORS

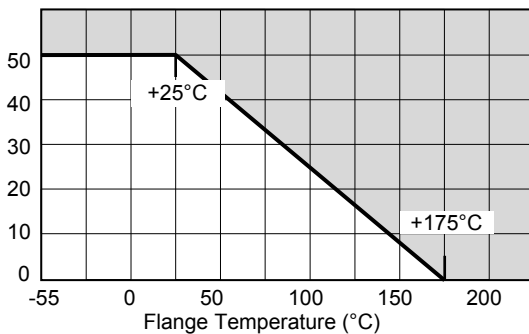
# TCP50U

## Specifications

|                       |  | TCP50U         |           | Test Conditions   |
|-----------------------|--|----------------|-----------|---|
| Rated Power           | 50 Watt                                    |                |           | -55 °C to 25 °C flange temperature                      |
| Rating Power          | 1 Watt                                     |                |           | Free air.   |
| Heat Resistance       | 2.3 °C/W                                   |                |           | Hot spot to flange                                      |
| Resistance Range      | 0.02-0.09ohm                               | 0.1-510 k ohm  | 10-51Kohm | Note 2  |
| Nominal Resistance    | E6   | E24+           | E24+      | Include 2.5, 4.0, 5.0, 8.0 and 16                       |
| TCR, ppm/°C           | >250 (H)                                   | 100 (A)        | 50 (C)    | Note 3  |
| Tolerance             | 5%(J)                                      | 1% (F), 5% (J) | +/-1% (F) | 1% tolerance at 0.01-0.091 ohm is available optionally. |
| Resistor Material     | Thick Film                                 |                | Thin Film |   |
| Capacitance           | 1.69pF                                     |                |           | Equivalent parallel capacitance.                        |
| Inductance            | 9.65nH                                     |                |           | Equivalent series inductance                            |
| Operation Temp.       | -55 °C to +175 °C                          |                |           |   |
| Max. Operating Volt.  | smaller either 700V or $\sqrt{P \times R}$ |                |           | P is rating power and R resistance                      |
| Withstanding Voltage  | 2000VAC                                    |                |           | Terminal and flange, 60 seconds, 1mA                    |
| Load Life             | +/- 1.0 %                                  |                |           | 25 °C, 90 min. ON, 30 min. OFF, 1000 hours.             |
| Humidity              | +/- 1.0 %                                  |                |           | 40 °C, 90-95%RH, DC 0.1W, 1000 hours.                   |
| Temp. Cycle           | +/- 0.25 %                                 |                |           | -55 °C,30 min.,+155 °C,30 min., 5cycles                 |
| Soldering Heat        | +/- 0.1 %                                  |                |           | 350+/-5 °C, 3seconds,                                   |
| Solder ability        | Over 95% of surface                        |                |           | 230+/-5 °C, 3seconds.                                   |
| Insulation Resistance | Over 1,000 Meg ohm                         |                |           | Between terminals and flange.                           |
| Vibration             | +/- 0.25 %                                 |                |           | IEC60068-2-6, see note 4                                |
| Weight                | 2.1 grams                                  |                |           |   |

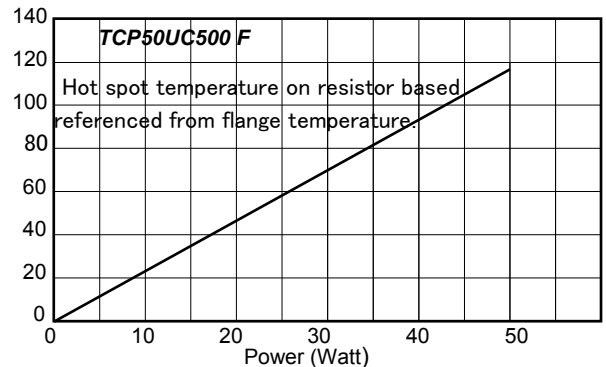
## Derating

Rating Power (W)



## Temperature Rise

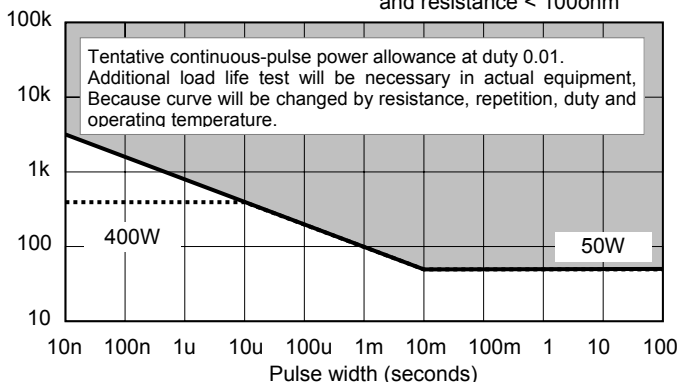
Temperature Rise (°C)



## Pulse Energy Durability

Pulse peak power (W)

Applied to TCP50UC10ohmF and resistance < 100ohm



### Note:

- Insulation material is unnecessary between flange and heat-sink, flange and resistor is separated by alumina substrate.
- Resistance measurement shall be made at a point 5.27mm +/-0.6 mm from the resistor body.
- TCR of low resistance will be increased as 300ppm/0.02ohm, 200ppm/0.05ohm, 140ppm/0.1ohm and 80ppm/0.2ohm typically. Testing point is at 5.27mm from bottom of molding of terminals.
- Test method is IEC60068-2-6, and specification is sine sweep wave form, 100Hz-2000Hz, 10 cycles, amplitude 0.75mm or 100m/s<sup>2</sup>, 90minutes. direction x-y z, Amplitude 0.75mm will be applied under break point Frequency (about 60Hz) and 100m/ s<sup>2</sup> over break point
- When mounting resistor on heat-sink by screw, clip and pressure strip with using heat conduction grease on back side of resistor are recommended. Recommended screw torque is 0.5-0.6Nm.

## Frequency Characteristics

Impedance (ohm)

