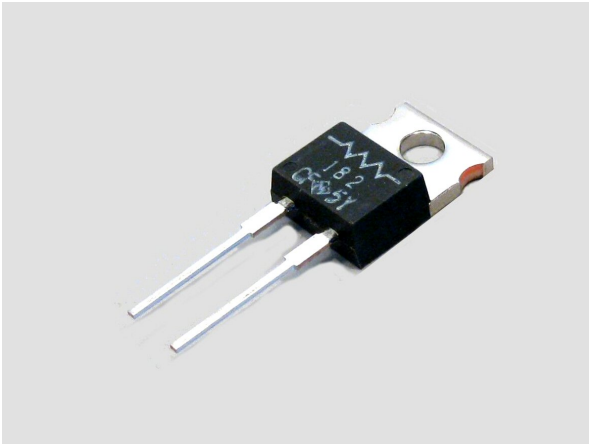


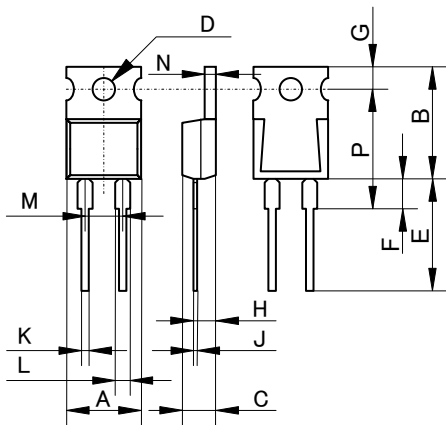
TO220 20W HIGH POWER RESISTORS  
RNP-10



Features and Applications

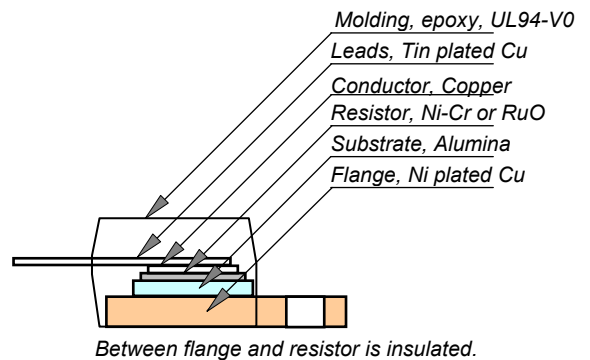
20W high power resistors in TO220 style molded package for through-hole.  
 Non-inductive design suits high frequency applications and high-speed pulse circuits.  
 Low, 5.9 °C/W heat resistance from resistor hot spot to flange and long life performance are presented with thin film metallization technology and rejection of plastic adhesive joint.  
 Wide 100 milliohm to 51kOhm resistance range, non-inductive impedance characteristic and heat conduction through the insulated metal flange aid 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 for UPS, power unit of machines, motor control, drive circuits, automotive, measurements, industrial computers and high frequency electronics.

Dimensions (mm)



| RNP-10 |      |         |
|--------|------|---------|
|        | 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

|        |                                    |   |                                |            |                           |
|--------|------------------------------------|---|--------------------------------|------------|---------------------------|
| RNP-10 | C                                  | 10R0 (*)  | F                              | Z00        | Note                      |
| RNP-10 | H(250ppm)<br>A(100ppm)<br>C(50ppm) | R02-R09 (+E6)<br>R10-9R1 (+E24)<br>10R-51K (+E24) | J(5%)<br>F(1%), J(5%)<br>F(1%) | Z03<br>Z05 | Tube/50pcs<br>Tray/100pcs |

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 is recommended for keeping out of misunderstanding.

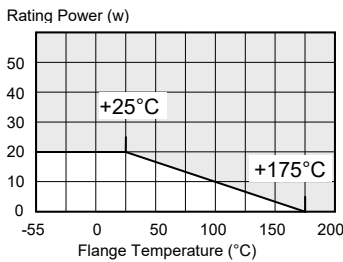
20W HIGH POWER RESISTORS

RNP-10

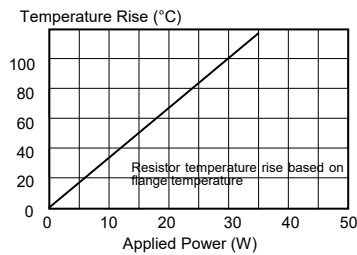
Specifications

| Items                 | RNP-10  |               |           | Test Conditions  |
|-----------------------|---|---------------|-----------|--|
| Rating Power          | 20 W  |               |           | -55°C to 25 °C flange temperature                        |
| Rating Power          | 1 W   |               |           | Free air.  |
| Heat Resistance       | 5.9 °C/W  |               |           | From resistor to flange                                  |
| Resistance Range      | 0.01-0.091ohm                                   | 0.1-9.1ohm    | 10-51kohm | Note 2   |
| Nominal Resistance    | E6  | E24           | E24       | Includes 2.5, 4.0 and 5.0                                |
| 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 are available optionally. |
| Capacitance           | 1.15pF  |               |           | Equivalent parallel capacitance.                         |
| Inductance            | 8.38nH  |               |           | Equivalent series inductance                             |
| Operation Temp. Range | -55 °C to +175 °C                               |               |           |  |
| Max. Operating Volt.  | smaller value either 500V or $\sqrt{P \cdot R}$ |               |           | P: rating power and R: resistance                        |
| Withstanding Volt.    | 2000 VAC  |               |           | 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 MΩ                                   |               |           | Between terminals and flange.                            |
| Vibration             | +/- 0.25 %                                      |               |           | IEC60068-2-6, see note 4                                 |
| Weight                | 2.1 grams                                       |               |           |  |

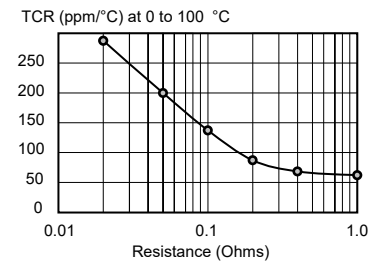
Derating



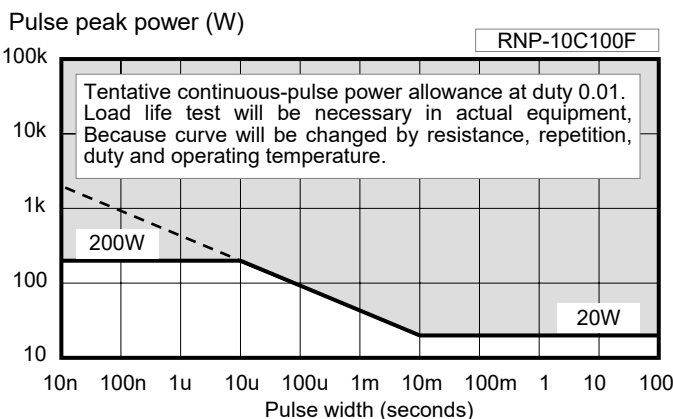
Temperature Rise



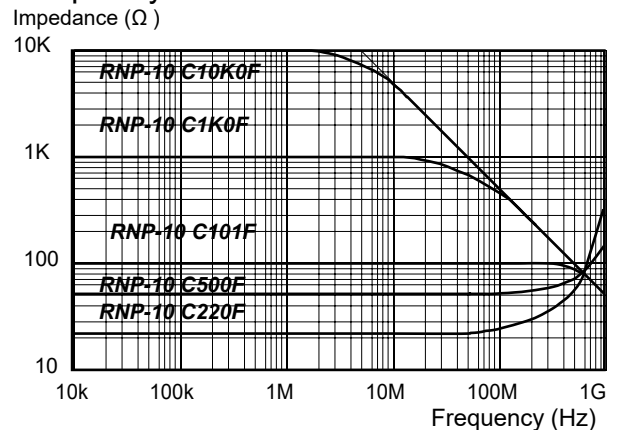
TCR



Pulse Energy Durability



Frequency Characteristics



Note:

- Insulating 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.
- 0.1% tolerance resistors is available, please see datasheet of RNP-20P.

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