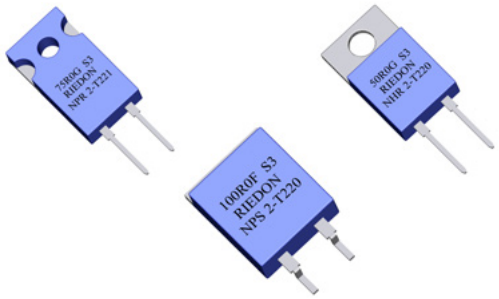
# NPR NPS 2-T220
# NHR NHS 2-T220 T221

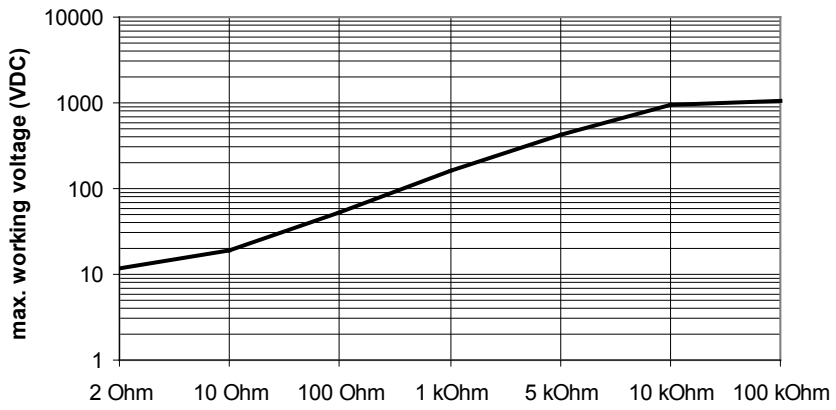
Power Resistors




- **Resistances from 0.02Ohm to 100kOhms**
- **Power Rating to 50Watt**
- **Resistance Tolerances to ±1%**
- **TCR to ±50ppm/°C**
- **Load Stability to 0.5%**
- **TO-220 Housing**
- **Convenient SMD D2Pak Available**

RoHS compliant

## SPECIFICATIONS

| Type | NPR / NPS | NHR / NHS |
|---|---|---|
| Resistance Range | 0.02 Ohms to 100kOhms | 0.02 Ohms to 15kOhms |
| Power rating<br>free air 70°C<br>with heatsink | <br>1.5 W<br>30 W | <br>1.5 W<br>50 W |
| Thermal Resistance Rthj-c | 3.5 K/W | 2.1 K/W |
| Tolerances<br>from 0.02 Ohms<br>from 1.0 Ohms | 2% / 5%<br>1% / 2% / 5% | |
| Stability | 0.5% | |
| Temperature Coefficient<br>0.02 to 0.049 Ohms<br>0.05 to 0.099 Ohms<br>0.1 Ohms to 100 kOhms | ±600 ppm/°C<br>±300 ppm/°C<br>±100 ppm/°C<br>upon request ±50 ppm/°C | |
| Voltage Proof | 2.0 kVDC | 1.5 kVDC |
| Max. Voltage<br>depending on resistance value |  | |
| Operating Temperature Range | -40 to 155°C | |
| Resistor Material | Thick Film | |
| Substrate | $Al_2O_3$ | |
| Housing | Epoxy or PPS | |
| Connector Material | Cu tinned | |
| Terminals | 2 | |
| Max. Torque | T220: 1 Nm<br>T221: 0.8 Nm | |

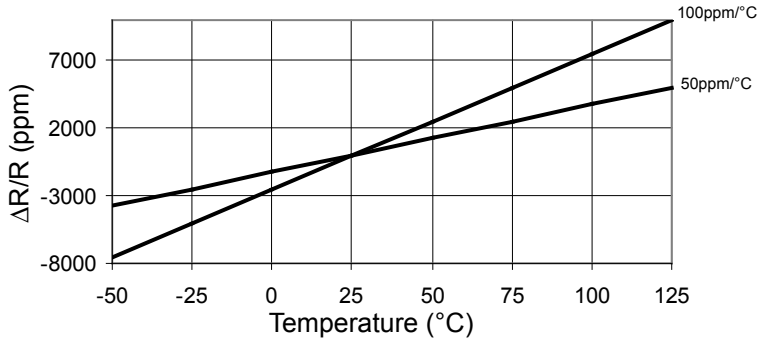


## Ordering Information

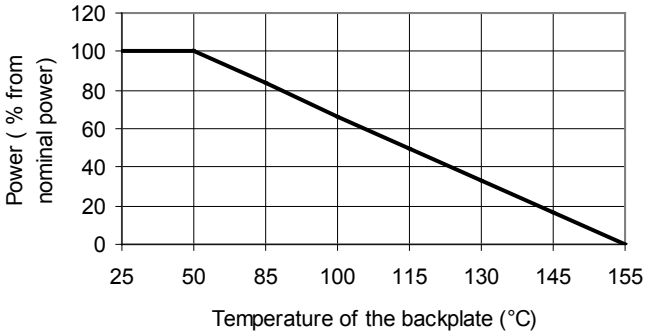
Part Description: Part Type - Resistance - Contact - Tolerance
NHR 2-T221 C 1.1 kOhms 1%

## SPECIFICATIONS (continued)

### Temperature Coefficient




### Derating



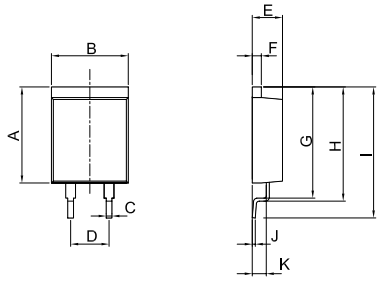

Power Rating Notes -
The NPR / NHR Series Resistors must be attached to a suitable heatsink. The maximum internal resistor temperature is 155°C. To specify an appropriate heatsink use the following formula :

$$R_{\theta H} = \frac{T_{MAX} - ( P \times R_{\theta R} ) - T_A}{P}$$

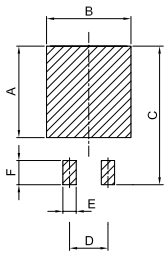
Where: $R_{\theta H}$ = Thermal Resistance of Heatsink ( K/W )
$R_{\theta R}$ = Thermal Resistance of Resistor ( K/W )
$T_{MAX}$ = Maximum Temperature of Resistor
$T_A$ = Ambient Temperature of Heatsink ( °C )
P = Power Through Resistor ( W )

### Dimensions

#### NPS / NHS 2-T220



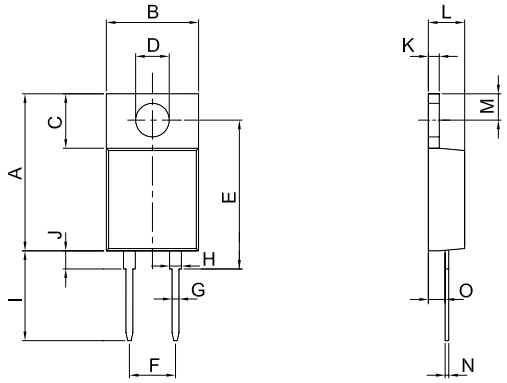

| Dimension | mm | tol. (±mm) | inches | tol. (±inches) |
|---|---|---|---|---|
| A | 12.70 | 0.2 | 0.50 | 0.008 |
| B | 10.16 | 0.2 | 0.40 | 0.008 |
| C | 0.76 | 0.1 | 0.03 | 0.004 |
| D | 5.08 | 0.1 | 0.20 | 0.004 |
| E | 4.00 | 0.1 | 0.16 | 0.004 |
| F | 1.20 | 0.1 | 0.05 | 0.004 |
| G | 14.60 | 0.2 | 0.57 | 0.008 |
| H | 15.00 | 0.2 | 0.59 | 0.008 |
| I | 17.33 | 0.2 | 0.68 | 0.008 |
| J | 0.40 | 0.1 | 0.02 | 0.004 |
| K | 1.85 | 0.1 | 0.07 | 0.004 |




| Dimension | mm | inches |
|---|---|---|
| A | 12.10 | 0.476 |
| B | 11.16 | 0.439 |
| C | 18.33 | 0.722 |
| D | 5.08 | 0.200 |
| E | 1.76 | 0.069 |
| F | 3.20 | 0.126 |

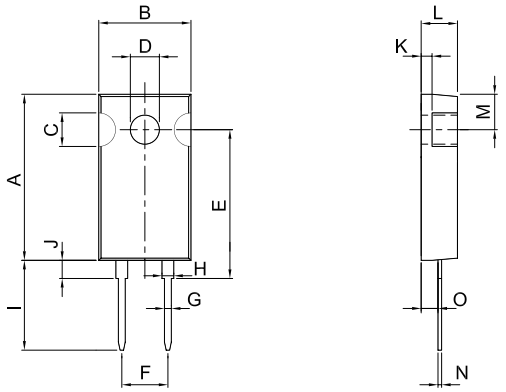
## SPECIFICATIONS (continued)

### NPR / NHR 2-T220




| Dimension | mm | tol. (±mm) | inches | tol. (±inches) |
|---|---|---|---|---|
| A | 17.30 | 0.2 | 0.68 | 0.008 |
| B | 10.16 | 0.2 | 0.40 | 0.008 |
| C | 6.00 | 0.1 | 0.24 | 0.004 |
| D | Ø3.7 | 0.1 | Ø0.146 | 0.004 |
| E | 16.40 | 0.2 | 0.65 | 0.008 |
| F | 5.08 | 0.1 | 0.20 | 0.004 |
| G | 0.76 | 0.1 | 0.03 | 0.004 |
| H | 1.30 | 0.1 | 0.05 | 0.004 |
| I | 13.80 | 0.2 | 0.54 | 0.008 |
| J | 2.00 | 0.1 | 0.08 | 0.004 |
| K | 1.20 | 0.1 | 0.05 | 0.004 |
| L | 4.00 | 0.1 | 0.16 | 0.004 |
| M | 2.90 | 0.1 | 0.11 | 0.004 |
| N | 0.40 | 0.1 | 0.02 | 0.004 |
| O | 1.85 | 0.1 | 0.07 | 0.004 |

### NPR / NHR 2-T221




| Dimension | mm | tol. (±mm) | inches | tol. (±inches) |
|---|---|---|---|---|
| A | 18.30 | 0.2 | 0.72 | 0.008 |
| B | 10.16 | 0.2 | 0.40 | 0.008 |
| C | 3.70 | 0.1 | 0.15 | 0.004 |
| D | Ø3.2 | 0.1 | Ø0.126 | 0.004 |
| E | 16.40 | 0.2 | 0.65 | 0.008 |
| F | 5.08 | 0.1 | 0.20 | 0.004 |
| G | 0.76 | 0.1 | 0.03 | 0.004 |
| H | 1.30 | 0.1 | 0.05 | 0.004 |
| I | 13.80 | 0.2 | 0.54 | 0.008 |
| J | 2.00 | 0.1 | 0.08 | 0.004 |
| K | 1.20 | 0.1 | 0.05 | 0.004 |
| L | 4.00 | 0.1 | 0.16 | 0.004 |
| M | 3.90 | 0.1 | 0.15 | 0.004 |
| N | 0.40 | 0.1 | 0.02 | 0.004 |
| O | 1.85 | 0.1 | 0.07 | 0.004 |