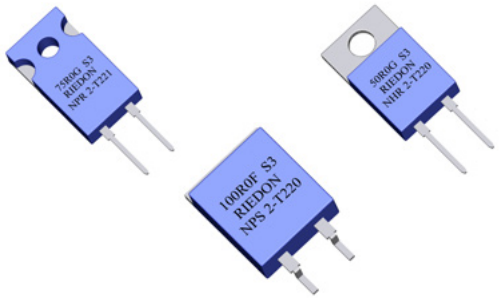
NPR NPS 2-T220
NHR NHS 2-T220 T221

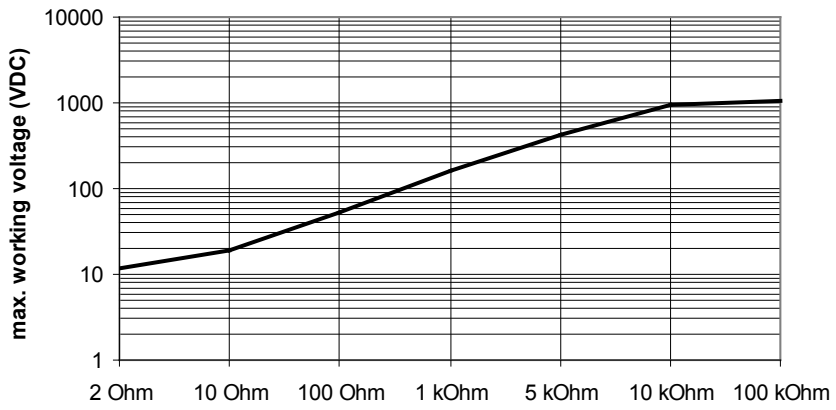
Power Resistors



- **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

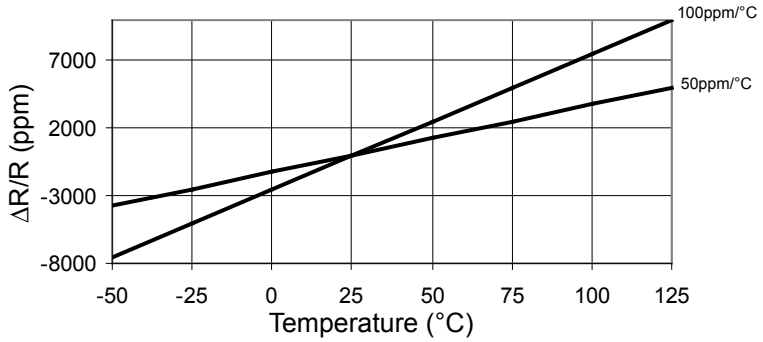
Type	NPR / NPS	NHR / NHS
Resistance Range	0.02 Ohms to 100kOhms	0.02 Ohms to 15kOhms
Power rating free air 70°C with heatsink	 1.5 W 30 W	 1.5 W 50 W
Thermal Resistance Rthj-c	3.5 K/W	2.1 K/W
Tolerances from 0.02 Ohms from 1.0 Ohms	2% / 5% 1% / 2% / 5%	
Stability	0.5%	
Temperature Coefficient 0.02 to 0.049 Ohms 0.05 to 0.099 Ohms 0.1 Ohms to 100 kOhms	±600 ppm/°C ±300 ppm/°C ±100 ppm/°C upon request ±50 ppm/°C	
Voltage Proof	2.0 kVDC	1.5 kVDC
Max. Voltage 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 T221: 0.8 Nm	

Ordering Information

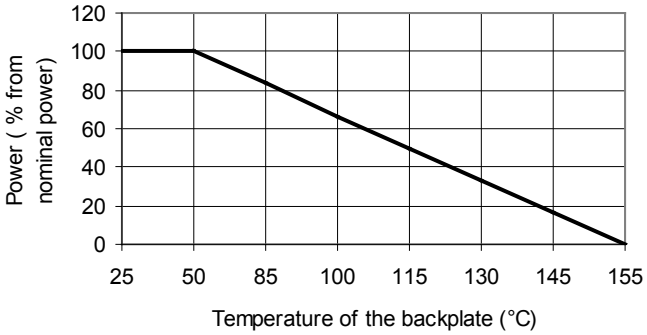
Part Description: Part Type - Resistance - Contact - Tolerance
NHR 2-T221 C 1.1 kOhms 1%

SPECIFICATIONS (continued)

Temperature Coefficient



Derating



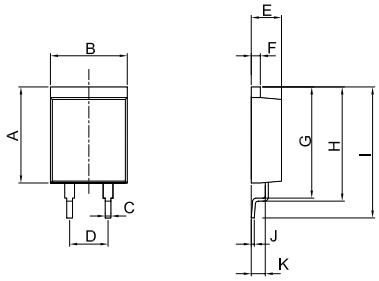
Power Rating Notes -
The NPR / NHR Series Resistors must be attached to a suitable heatsink. The maximum internal resistor temperature is 155°C. To specify an appropriate heatsink use the following formula :

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

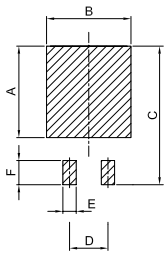
Where: $R_{\theta H}$ = Thermal Resistance of Heatsink (K/W)
$R_{\theta R}$ = Thermal Resistance of Resistor (K/W)
T_{MAX} = Maximum Temperature of Resistor
T_A = Ambient Temperature of Heatsink (°C)
P = Power Through Resistor (W)

Dimensions

NPS / NHS 2-T220



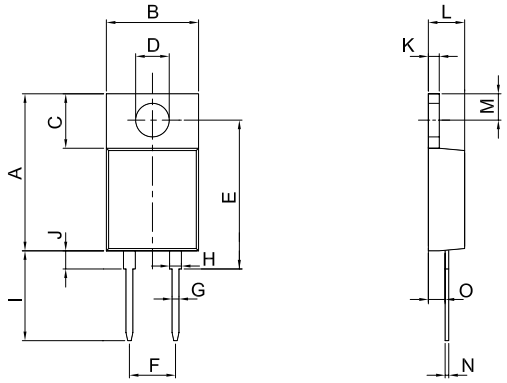
Dimension	mm	tol. (±mm)	inches	tol. (±inches)
A	12.70	0.2	0.50	0.008
B	10.16	0.2	0.40	0.008
C	0.76	0.1	0.03	0.004
D	5.08	0.1	0.20	0.004
E	4.00	0.1	0.16	0.004
F	1.20	0.1	0.05	0.004
G	14.60	0.2	0.57	0.008
H	15.00	0.2	0.59	0.008
I	17.33	0.2	0.68	0.008
J	0.40	0.1	0.02	0.004
K	1.85	0.1	0.07	0.004



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

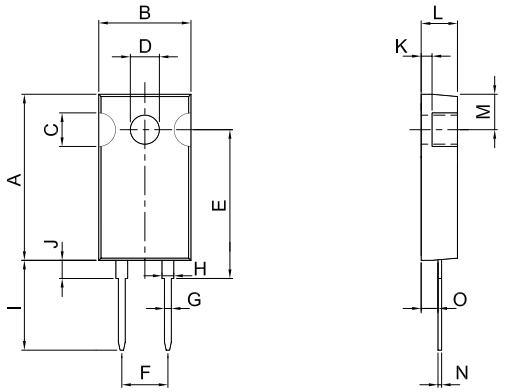
SPECIFICATIONS (continued)

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