

**FEATURES**

- Resistances from 0.5Ohm to 150kOhms
- Power Rating to 10Watt
- Resistance Tolerances to  $\pm 0.01\%$
- TCR to  $\pm 3\text{ppm/K}$
- Load Stability to 0.01%
- TO-220 Housing



TABLE 1 – SPECIFICATIONS			
TYPE		USR 2-T220 USR 2-T221	UNR 2-T220 UNR 2-T221
Resistance Range		0.5 Ohms to 150 kOhms	0.5 Ohms to 5 kOhms
Power Rating	Free air 70°C R < 50R0 R > 50R0	1.5W 1.0W	1.5W 1.0W
	With heatsink R < 50R0 R > 50R0	10W 6W	15W 10W
Tolerances from 0.5 Ohms from 10.0 Ohms from 25.0 Ohms from 50.0 Ohms		0.1% / 0.25% / 0.5% / 1% 0.05% / 0.1% / 0.25% / 0.5% / 1% 0.02% / 0.05% / 0.1% / 0.25% / 0.5% / 1% 0.01% / 0.02% / 0.05% / 0.1% / 0.25% / 0.5% / 1%	
Thermal Resistance Rthj-c R < 50R0 R > 50R0		10.8 K/W 18.8 K/W	6.8 K/W 10.8 K/W
Stability (1000h)		0.01%	
Shelf Lifw Stability		25ppm / $\Delta R$ after 1 year 50ppm / $\Delta R$ after 3 year	
Temperature Coefficient		max. $\pm 5\text{ppm/K}$ (-55 to 155°C) typ. $\pm 3\text{ppm/K}$ (-55 to 125°C)	
Voltage Proof		1 kVDC	
Thermal EMF		< 0.1 $\mu\text{V/K}$	
Operating Temperature Range		-55 to 155°C	
Resistor Material		NiCr-Foil	
Substrate		Al <sub>2</sub> O <sub>3</sub>	AlN
Housing		Epoxy + Cu heatsink nickel plated	
Connector Material		Cu / tinned	
Terminals		2	
Max. Torque		1.0 Nm	
Notes		Specially designed for applications with fast changing electrical load	

**ORDERING INFORMATION**

Part Number - Resistance - Contact - Tolerance - TCR (if not standard)

UNR 2-T220B 4K700 C 0.5%

FIGURE 1 – TEMPERATURE COEFFICIENT

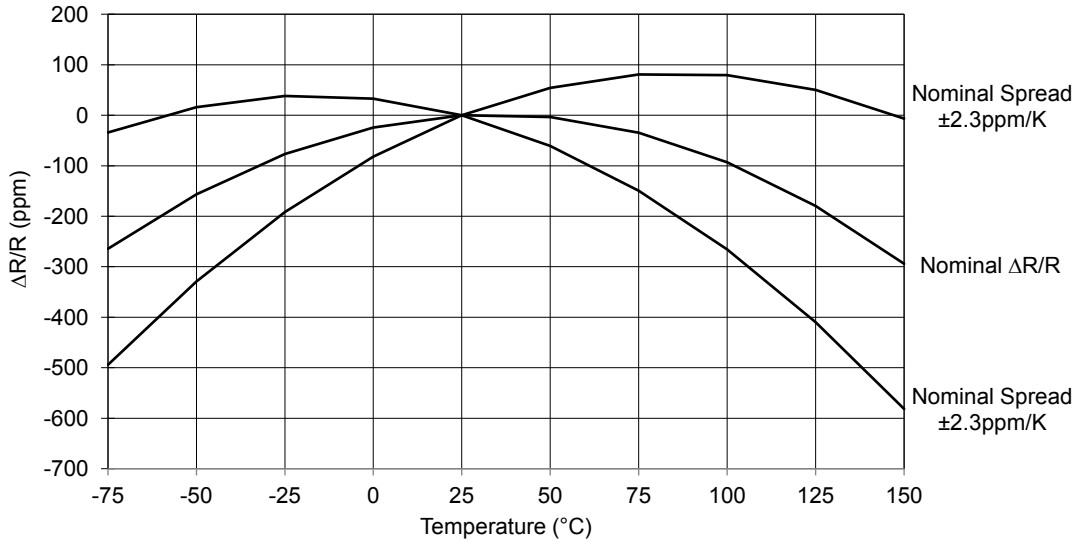
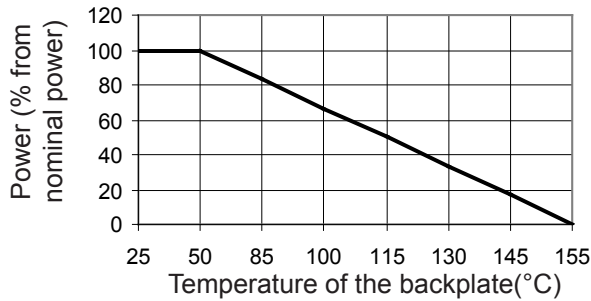


FIGURE 2 – DERATING



Power Rating Notes -

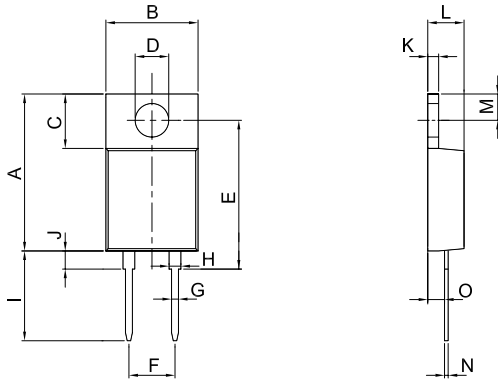
The U-Series Resistors must be attached to a suitable heat-sink. The maximum internal resistor temperature is 155°C. To specify an appropriate heatsink use the following formula :

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

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 )

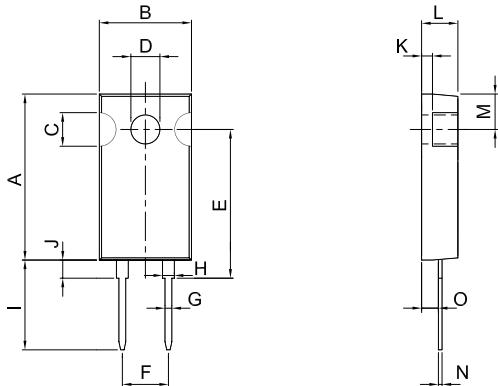
FIGURE 3—DIMENSIONS in mm (inches)

USR 2-T220 / UNR 2-T220



Dimension	Standard contact	C-contact
A ±0.2 (±0.008)	17.30 (0.68)	
B ±0.2 (±0.008)	10.16 (0.40)	
C ±0.1 (±0.004)	6.00 (0.24)	
D ±0.1 (±0.004)	Ø3.7 (Ø0.146)	
E ±0.2 (±0.008)	16.40 (0.65)	
F ±0.1 (±0.004)	5.08 (0.20)	
G ±0.1 (±0.004)	0.76 (0.03)	
H ±0.1 (±0.004)	1.30 (0.05)	
I ±0.2 (±0.008)	10.00 (0.39)	13.80 (0.54)
J ±0.1 (±0.004)	2.00 (0.08)	
K ±0.1 (±0.004)	1.20 (0.05)	
L ±0.1 (±0.004)	4.00 (0.16)	
M ±0.1 (±0.004)	2.90 (0.11)	
N ±0.1 (±0.004)	0.40 (0.02)	
O ±0.1 (±0.004)	1.85 (0.07)	

USR 2-T221 / UNR 2-T221



Dimension	Standard contact S	C-contact
A ±0.2 (±0.008)	18.30 (0.72)	
B ±0.2 (±0.008)	10.16 (0.40)	
C ±0.1 (±0.004)	3.70 (0.15)	
D ±0.1 (±0.004)	Ø3.2 (Ø0.126)	
E ±0.2 (±0.008)	16.40 (0.65)	
F ±0.1 (±0.004)	5.08 (0.20)	
G ±0.1 (±0.004)	0.76 (0.03)	
H ±0.1 (±0.004)	1.30 (0.05)	
I ±0.2 (±0.008)	10.00 (0.39)	13.80 (0.54)
J ±0.1 (±0.004)	2.00 (0.08)	
K ±0.1 (±0.004)	1.20 (0.05)	
L ±0.1 (±0.004)	4.00 (0.16)	
M ±0.1 (±0.004)	3.90 (0.15)	
N ±0.1 (±0.004)	0.40 (0.02)	
O ±0.1 (±0.004)	1.85 (0.07)	

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