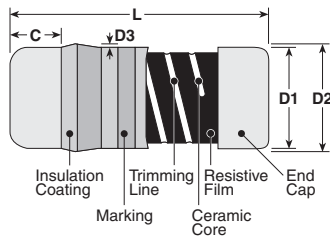


### features

- Free direction for mounting due to cylindrical design
- Superior in the linearity of resistance change to temperature
- Standard resistance sizes
- Meets or exceeds IEC 60115-1
- Marking: Gray body color
- Products with lead-free terminations meet EU RoHS and China RoHS requirements

### dimensions and construction



Type (Inch Size Code)	Dimensions inches (mm)				
	L	C	D1	D2 (max.)	D3 (max.)
<b>2ES (1406)</b>	.138±.008 (3.5±0.2)	.02 ~ .035 (0.5 ~ 0.9)	.055±.004 (1.4±0.1)	.061 (1.55)	.004 (0.1)
<b>2E (2309)</b>	.232±.008 (5.9±0.2)	.02 (0.5 min.)	.087±.004 (2.2±0.1)	.094 (2.4)	.006 (0.15)

### ordering information

New Part #	<b>MLT</b>	<b>2B</b>	<b>T</b>	<b>TE</b>	<b>101</b>	<b>J</b>	<b>3600</b>
	Type	Size	Termination Material	Packaging	Nominal Resistance	Tolerance	T.C.R.
		2ES: 1406 2E: 2309	T: Sn	TE: 7" embossed plastic (2ES - 3,000 pieces/reel) (2E - 1,500 pieces/reel)	2 significant figures + 1 multiplier	J: ±5%	

### applications and ratings

Part Designation	T.C.R. (ppm/°C) Max.	T.C.R. Tolerance	Resistance Range 2ES (0.125W)	Resistance Range 2E (0.25W)	Resistance Tolerance	Rated Ambient Temperature	Operating Temperature Range
MLT	2000	±10%	5.1kΩ - 9.1kΩ	—	J: ±5%	70°C	-40°C to +125°C
	2800		—	1kΩ - 4.7kΩ			
	3000		1kΩ - 4.7kΩ	—			
	3300		1kΩ - 4.7kΩ	1kΩ - 7.5kΩ			
	3600		1kΩ - 5.1kΩ	1kΩ - 6.8kΩ			
	3900		1kΩ - 3.3kΩ	1kΩ - 6.2kΩ			

Rated voltage =  $\sqrt{\text{Power Rating} \times \text{Resistance value}}$  or Max. working voltage, whichever is lower.

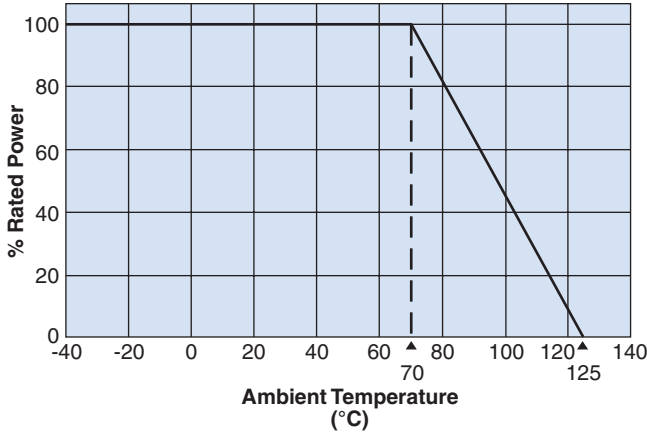
For further information on packaging, please refer to Appendix A.

Specifications given herein may be changed at any time without prior notice. Please confirm technical specifications before you order and/or use.

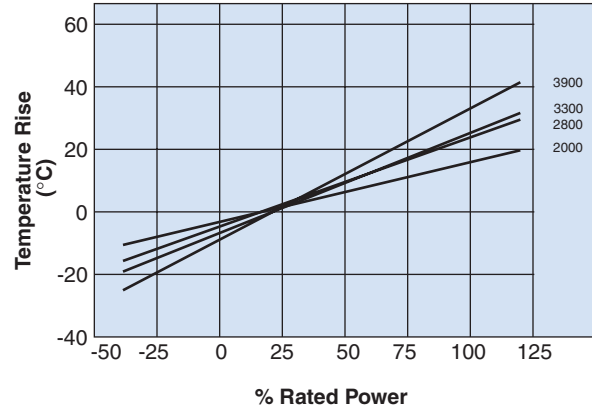
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## environmental applications

### Derating Curve



### Temperature Characteristics of Resistance



thermal protection

### Approximate Expression for Resistance-Temperature Characteristics

T.C.R. (x10 <sup>-6</sup> /K)	C <sub>0</sub>	C <sub>1</sub>	C <sub>2</sub>
3000	0.9288	0.0028	1.9983 x 10 <sup>-6</sup>
3300	0.9232	0.0030	2.9980 x 10 <sup>-6</sup>
3600	0.9175	0.0032	4.0000 x 10 <sup>-6</sup>
3900	0.9099	0.0035	4.0064 x 10 <sup>-6</sup>

(Values are not guaranteed but typical)  $R_T = R_{25} (C_0 + C_1 T + C_2 T^2)$

R<sub>T</sub>: Resistance value at T°C

R<sub>25</sub>: Resistance value at 25°C

T: Ambient temperature (°C)

C<sub>0</sub>, C<sub>1</sub>, C<sub>2</sub>: Constants

### Performance Characteristics

Parameter	Requirement $\Delta R \pm(\% + 0.05\Omega)$		Test Method
	Limit	Typical	
Resistance	Within regulated tolerance	—	25°C
T.C.R.	Within specified T.C.R.	—	Room temperature, 50°C up
Overload	±1.0%	±0.75%	Rated power x 2.5 or max. overload voltage for 5 seconds, whichever is less
Resistance to Solder Heat	±1.0%	±0.75%	260°C ± 5°C, 10 seconds ± 1 second
Rapid Change of Temperature	±1.0%	±0.75%	-55°C (30 minutes), +125°C (30 minutes), 5 cycles
Moisture Resistance	±3.0%	±2.0%	40°C ± 2°C, 90 - 95% RH, 1000 hours, 1.5 hr ON, 0.5 hr OFF cycle
Endurance at 70°C	±3.0%	±2.0%	70°C ± 2°C, 1000 hours, 1.5 hr ON, 0.5 hr OFF cycle