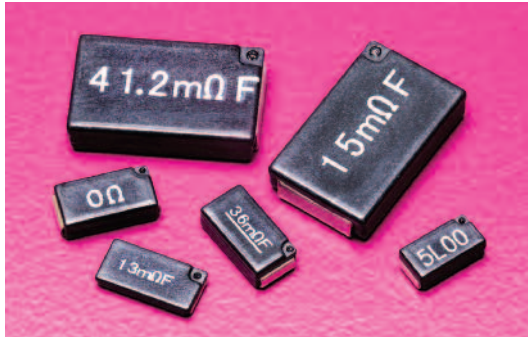
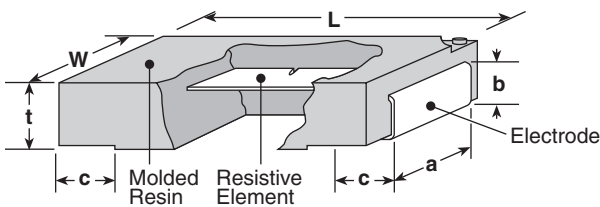




### features

- Surface mount type
- Flameproof UL94V0 molded polymer case
- Excellent dimension accuracy, mountability and shock resistance
- Low profile type available (TSL)
- Products with lead-free terminations meet EU RoHS requirements. EU RoHS regulation is not intended for Pb-glass contained in electrode, resistor element and glass.
- AEC-Q200 Qualified

### dimensions and construction



| Size Code       | Dimensions inches (mm)  |                        |                        |                        |                        |                         |
|-----------------|-------------------------|------------------------|------------------------|------------------------|------------------------|-------------------------|
|                 | L                       | W                      | t                      | a                      | b                      | c                       |
| SL07 (2010)     | .197±.012<br>(5.0±0.3)  | .098±.008<br>(2.5±0.2) | .067±.008<br>(1.7±0.2) | .079±.008<br>(2.0±0.2) | .047±.008<br>(0.9±0.2) | .035±.012<br>(1.2±0.3)  |
| TSL1 (2512)     | .248±.012<br>(6.3±0.3)  | .122±.008<br>(3.1±0.2) | .039±.008<br>(1.0±0.2) | .094±.008<br>(2.4±0.2) | .028±.008<br>(0.7±0.2) | .047±.012<br>(1.2±0.3)  |
| SL1,SLZ1 (2512) | .248±.012<br>(6.3±0.3)  | .122±.008<br>(3.1±0.2) | .075±.008<br>(1.9±0.2) | .094±.008<br>(2.4±0.2) | .047±.008<br>(1.2±0.2) | .047±.012<br>(1.2±0.3)  |
| SL2 (4527)      | .453±.012<br>(11.5±0.3) | .276±.008<br>(7.0±0.2) | .098±.008<br>(2.5±0.2) | .197±.008<br>(5.0±0.2) | .067±.008<br>(1.7±0.2) | .102±.02<br>(2.6±0.5)   |
| SLN2 (4527)     | .453±.012<br>(11.5±0.3) | .276±.008<br>(7.0±0.2) | .094±.008<br>(2.4±0.2) | .217±.008<br>(5.5±0.2) | .063±.008<br>(1.6±0.2) | .100±.016<br>(2.55±0.4) |
| SL3 (4527)      | .453±.012<br>(11.5±0.3) | .276±.008<br>(7.0±0.2) | .098±.008<br>(2.5±0.2) | .197±.008<br>(5.0±0.2) | .067±.008<br>(1.7±0.2) | .102±.02<br>(2.6±0.5)   |

### ordering information

| SL                      | 1                                    | T                    | TE                                                                                         | 10L0                                                                                                                                                             | F                                      | 75                                                                                          |
|-------------------------|--------------------------------------|----------------------|--------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------|---------------------------------------------------------------------------------------------|
| Type                    | Power Rating                         | Termination Material | Packaging                                                                                  | Nominal Resistance                                                                                                                                               | Tolerance                              | T.C.R. (x10 <sup>-6</sup> /K)                                                               |
| TSL<br>SL<br>SLN<br>SLZ | 07: 0.75W<br>1: 1W<br>2: 2W<br>3: 3W | T: Sn<br>L: Sn/Pb*   | TE: 7" embossed plastic<br>For further information on packaging please refer to Appendix A | ±0.5%, ±1%: 4 digits<br>±2%, ±5%: 3 digits<br>All values less than 0.1Ω (100m) are expressed in mΩ with "L" as decimal<br>Ex: 2mΩ = 2L00<br>0.1Ω: R100; 5mΩ: 5L0 | D: ±0.5%<br>F: ±1%<br>G: ±2%<br>J: ±5% | Nil: 0-150<br>0-200<br>±75 (SLN2)<br>±100<br>±110<br>±180<br>50: ±50 (SL1)<br>75: ±75 (SL1) |

\* SL07 and SLN2, only the symbol T is available as the terminal surface material

### applications and ratings

| Part Designation       | Power Rating | Rated Ambient Temp. | Rated Terminal Part Temperature                                                       | Resistance Range ( $\Omega$ )* |                             |                    |                             | T.C.R. (ppm/ $^{\circ}$ C) Max.                           | Operating Temp. Range                 |
|------------------------|--------------|---------------------|---------------------------------------------------------------------------------------|--------------------------------|-----------------------------|--------------------|-----------------------------|-----------------------------------------------------------|---------------------------------------|
|                        |              |                     |                                                                                       | D: $\pm 0.5\%$ E24, E96***     | F: $\pm 1\%$ E24, E96***    | G: $\pm 2\%$ E24   | J: $\pm 5\%$ E24            |                                                           |                                       |
| SL07                   | 0.75W        | 70 $^{\circ}$ C     | 125 $^{\circ}$ C                                                                      | —                              | 5m - 100m                   | —                  | 5m - 100m                   | 0~200: R<11m $\Omega$<br>0~150: R>=11m $\Omega$           | -55 $^{\circ}$ C to +180 $^{\circ}$ C |
| TSL1                   | 1W           |                     | 125 $^{\circ}$ C                                                                      | 10m - 100m                     | 5m - 100m                   | —                  | 5m - 100m                   | $\pm 180$ : R<15m $\Omega$<br>$\pm 100$ : R>=15m $\Omega$ |                                       |
| SL1                    | 1W           |                     | 125 $^{\circ}$ C                                                                      | 10m - 102m                     | 5m - 102m                   | 3m, 4m             | 5m - 100m                   | $\pm 180$ : R<15m $\Omega$<br>$\pm 100$ : R>=15m $\Omega$ |                                       |
| SL1 (TCR $\pm 50$ ppm) | 1W           |                     | 125 $^{\circ}$ C                                                                      | 34.8m - 200m                   | 34.8m - 200m                | —                  | 36m - 200m                  | $\pm 50$ ppm                                              |                                       |
| SL1 (TCR $\pm 75$ ppm) | 1W           |                     | 125 $^{\circ}$ C                                                                      | 20m - 200m                     | 20m - 200m                  | —                  | 20m - 200m                  | $\pm 75$ ppm                                              |                                       |
| SL2                    | 2W           |                     | 125 $^{\circ}$ C                                                                      | 10m ~ 360m                     | 5m ~ 360m                   | 3m, 4m             | 3m ~ 360m                   | $\pm 180$ : R<11m $\Omega$<br>$\pm 100$ : R>=11m $\Omega$ |                                       |
| SLN2                   | 2W           |                     | 105 $^{\circ}$ C                                                                      | 5m - 200m                      | 5m - 200m                   | —                  | 5m - 200m                   | $\pm 110$ : R<10m $\Omega$<br>$\pm 75$ : R>=10m $\Omega$  |                                       |
| SL3                    | 3W           |                     | 125 $^{\circ}$ C: R $\leq 100$ m $\Omega$<br>90 $^{\circ}$ C: R $\geq 110$ m $\Omega$ | 10m $\Omega$ - 100m $\Omega$   | 5m $\Omega$ - 100m $\Omega$ | —                  | 5m $\Omega$ - 100m $\Omega$ | $\pm 180$ : R<10m $\Omega$<br>$\pm 100$ : R>=11m $\Omega$ |                                       |
| SLZ1**                 | —            |                     | —                                                                                     | 0.5m $\Omega$ Max.             | 0.5m $\Omega$ Max.          | 0.5m $\Omega$ Max. | 0.5m $\Omega$ Max.          | 4000 Max.                                                 |                                       |

\* 3m, 4m, 5m, 6m, 7m, 8m, 9m also available inside each resistance range

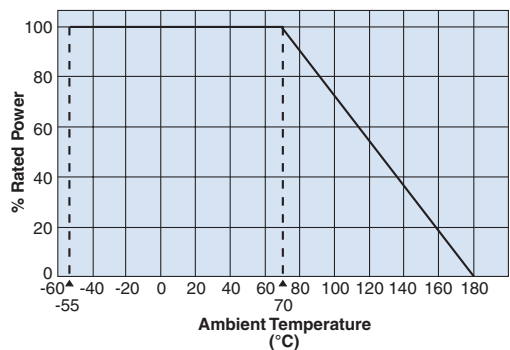
\*\* SLZ1: Current rating: 44A

\*\*\* SL07 and SL1 (T.C.R.:  $\pm 50/\pm 75$  ppm, 102m $\Omega$ =<R<200m $\Omega$ ) offer only E24 series

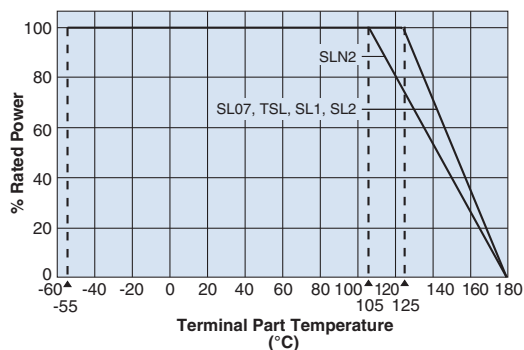
If any questions should arise whether to use the "Rated Ambient Temperature" or the "Rated Terminal Part Temperature," please give priority to the "Rated Terminal Part Temperature." Prior to use and for more details refer to "Introduction of the derating curves on the terminal part temperature" in the beginning of the catalog.

### environmental applications

#### Derating Curve



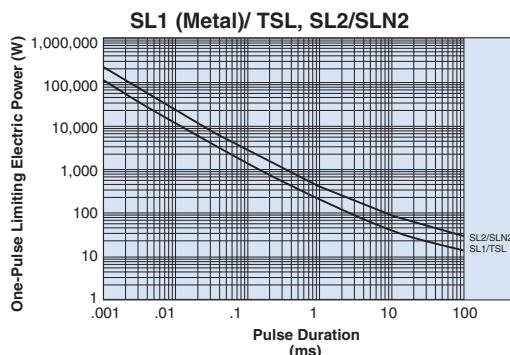
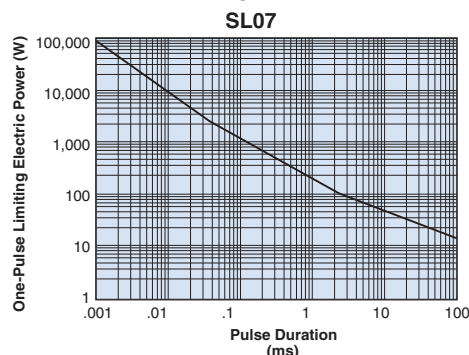
For resistors operated at an ambient temperature of 70 $^{\circ}$ C or above, a power rating shall be derated in accordance with the above derating curve.



For resistors operated at a terminal part temperature of described for each size or above, a power rating shall be derated in accordance with the derating curve.

Please refer to "Introduction of the derating curve based on the terminal part temperature" in the beginning of our catalog before use.

### One-Pulse Limiting Electric Power



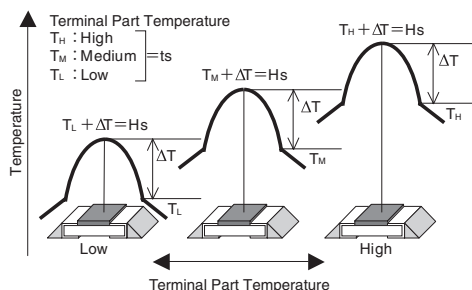
The maximum applicable voltage is equal to the max. overload voltage.

Please ask us about the resistance characteristic of continuous applied pulse.

The pulse endurance values are not assured values, so be sure to check the products on actual equipment when you use them.

### Thermal Resistance

| Type       | Resistance (Ω) | Rth (°C/W) |
|------------|----------------|------------|
| SLO7       | 5m             | 26         |
|            | 22m            | 48         |
|            | 100m           | 78         |
| SL1<br>TSL | 5m             | 16         |
|            | 20m            | 39         |
|            | 100m           | 59         |
| SL2        | 5m             | 16         |
|            | 20m            | 41         |
|            | 200m           | 55         |
| SLN2       | 5m             | 19         |
|            | 11m            | 24         |
|            | 200m           | 46         |



The temperature of the resistor will increase the same  $\Delta T$  from the standard terminal part temperature regardless of the ambient temperature when the same power is applied. This is because there is hardly any heat dissipation from the resistor surface to the ambient air.

$$R_{th} = (H_s - t_s) / \text{Power}$$

Regarding the temperature rise, the value of the temperature varies per conditions and board for use since the temperature is measured under our measuring conditions. Please refer to us before use.

### Performance Characteristics

| Parameter                   | Requirement $\Delta R \pm \%$                               |                                                              | Test Method                                                                                                                                                                         |
|-----------------------------|-------------------------------------------------------------|--------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                             | Limit                                                       | Typical                                                      |                                                                                                                                                                                     |
| Resistance                  | Within specified tolerance                                  | —                                                            | 25°C                                                                                                                                                                                |
| T.C.R.                      | Within specified T.C.R.                                     | —                                                            | +25°C/+125°C                                                                                                                                                                        |
| Overload (Short time)       | $\pm 1\%$ : SLO7, TSL1, SL1, SL2, SL3<br>$\pm 0.5\%$ : SLN2 | $\pm 1\%$ : SLO7, TSL1, SL1, SL2, SL3<br>$\pm 0.25\%$ : SLN2 | SLO7: Rated power x 4 for 5 seconds, TSL1: Rated power x 2.5 for 5 seconds, SL1, SL2, SLN2, SL3: Rated power x 5 for 5 seconds, SL1 (T.C.R.: +50/+75): Rated power x4 for 5 seconds |
| Resistance to Solder Heat   | $\pm 1\%$ : SLO7, TSL1, SL1, SL2, SL3                       | $\pm 1\%$ : SLO7, TSL1, SL1, SL2, SL3                        | 260°C $\pm 5^\circ\text{C}$ , 10 $\pm 1$ second                                                                                                                                     |
|                             | $\pm 0.5\%$ : SLN2                                          | $\pm 0.5\%$ : SLN2                                           | 260°C $\pm 5^\circ\text{C}$ , 10~12 seconds                                                                                                                                         |
| Rapid Change of Temperature | $\pm 1\%$ : SLO7, TSL1, SL1, SL2, SL3                       | $\pm 0.5\%$ : SLO7, TSL1, SL1, SL2, SL3                      | -55°C (30 minutes), +150°C (30 minutes), 100 cycles                                                                                                                                 |
|                             | $\pm 0.5\%$ : SLN2                                          | $\pm 0.25\%$ : SLN2                                          | -55°C (15 minutes), +150°C (15 minutes), 1000 cycles                                                                                                                                |
| Moisture Resistance         | $\pm 2\%$ : SLO7, TSL1, SL1, SL2, SL3                       | $\pm 0.5\%$ : SLO7, TSL1, SL1, SL2, SL3                      | 40°C $\pm 2^\circ\text{C}$ , 90%~95%RH, 1000 hours, 1.5 hr ON, 0.5 hr OFF cycle                                                                                                     |
|                             | $\pm 0.5\%$ : SLN2                                          | $\pm 0.25\%$ : SLN2                                          | 85°C $\pm 2^\circ\text{C}$ , 85% $\pm 3\%$ RH, 1000 hours, Rated power x 0.1                                                                                                        |
| Endurance at 70°C           | $\pm 2\%$ : SLO7, TSL1, SL1, SL2, SL3<br>$\pm 1\%$ : SLN2   | $\pm 1\%$                                                    | 70°C $\pm 2^\circ\text{C}$ , 1000 hours, 1.5 hr ON, 0.5 hr OFF cycle                                                                                                                |
| Low Temperature Exposure    | $\pm 0.5\%$                                                 | $\pm 0.25\%$                                                 | SLO7, TSL1, SL1, SL2, SL3: -55°C, 1 hour; SLN2: -65°C, 24 hours                                                                                                                     |

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