

## Metal Film Fixed Resistors

### Type LR Series

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The resistive element comprises a thin film of nickel-chrome alloy evaporated onto a high thermal conductivity ceramic element. Metal end caps are force fitted to the element prior to spiralling to value. Tinned copper lead wires are welded to the end caps and the components are then coated. One coat of phenolic resin is followed by three coats of epoxy resin. All resistors are tested for value and tolerance.

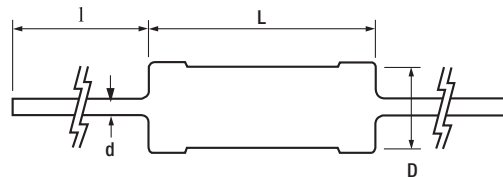
#### Key Features

- Superior quality metal film resistors with 1% tolerance and temperature coefficients down to 50 ppm. 3 case sizes are available in 0.25, 0.6, 0.75W. The LR1L series is a low ohmic value range from 0.1 to 0.82 ohm. Ideally suited where low resistance and small size are required.
- Metal film resistors have excellent stability under load and severe environmental conditions. They exhibit very low noise current and voltage coefficients. They are available in a wide range of resistance values and are suitable for general purpose and precision applications.

#### Characteristics - Electrical

|                                       | LR0204      | LR1L  | LR1   |       |     | LR2 | LR100 | LR200 |      |     |       |           |           |
|---------------------------------------|-------------|-------|-------|-------|-----|-----|-------|-------|------|-----|-------|-----------|-----------|
| Rated Power @ 70°C (W)                | 0.25        |       | 0.5   |       |     | 0.6 | 0.75  | 1     | 2    |     |       |           |           |
| Resistance Range (Ohms)               | Min         | 1R0   | 10R   | R10   | 1R0 | 10R | 1M1   | 1R0   | 10R  | 10R |       |           |           |
|                                       | Max         | 9R1   | 1M0   | R82   | 9R1 | 1M0 | 10M   | 1M0   | 1M0  | 1M0 |       |           |           |
| Tolerance (%)                         | 1           | 1     | 5     | 0.5   | 1   | 2   | 0.5   | 1     | 5    | 1   | 5     |           |           |
| Code Letter                           | F           | F     | J     | D     | F   | G   | D     | F     | G    | F   | J     | F         | J         |
| Temperature Coefficient (ppm/°C)      | ± 100       | ± 100 | ± 200 | ± 100 |     |     | ± 50  | ± 100 |      |     | ± 100 | 25/50/100 | 25/50/100 |
| Selection Series                      | E24         | E24   | E12   | E24   |     |     | E24   | E24   | E24  | E24 | E24   | E24       |           |
| On Request                            |             | E96   |       | E96   |     |     | E96   | E96   | E96  | E96 | E96   | E96       |           |
| Limiting Element Voltage              | 200         |       | 350   |       |     | 350 | 350   | 500   | 500  |     |       |           |           |
| Max Permitted Element Voltage         | 200         |       | 350   |       |     | 350 | 350   | 500   | 500  |     |       |           |           |
| Max Overload Voltage                  | 400         |       | 500   |       |     | 700 | 700   | 1000  | 1000 |     |       |           |           |
| Max Intermittent Overload Voltage     | 500         |       | 750   |       |     | 750 | 750   | 1000  | 1000 |     |       |           |           |
| Operating Temperature Range (°C)      | -55 to +155 |       |       |       |     |     |       |       |      |     |       |           |           |
| Climatic Category                     | 55/155/56   |       |       |       |     |     |       |       |      |     |       |           |           |
| Dielectric Strength (V)               | 500         |       | 700   |       |     | 700 |       |       | 700  | 700 | 700   |           |           |
| Insulation Resistance Min Dry (Mohms) | 1000        |       |       |       |     |     |       |       |      |     |       |           |           |

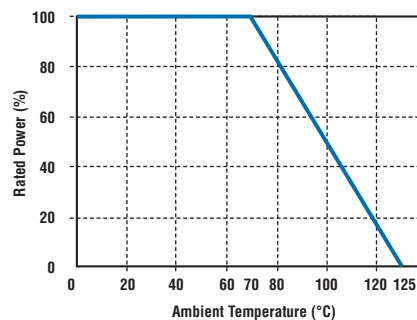
#### Dimensions



| Style  | L*         | D         | d Nom | I  |
|--------|------------|-----------|-------|----|
| LR0204 | 3.2 ± 0.2  | 1.7 ± 0.2 | 0.45  | 25 |
| LR1L   | 6.2 ± 0.5  | 2.3 ± 0.2 | 0.55  | 25 |
| LR1    | 6.2 ± 0.5  | 2.3 ± 0.2 | 0.55  | 25 |
| LR2    | 9.7 ± 0.3  | 3.5 ± 0.2 | 0.7   | 25 |
| LR100  | 12.0 ± 1.0 | 5.5 ± 0.5 | 0.8   | 25 |
| LR200  | 16.0 ± 1.0 | 6.5 ± 0.5 | 0.8   | 29 |

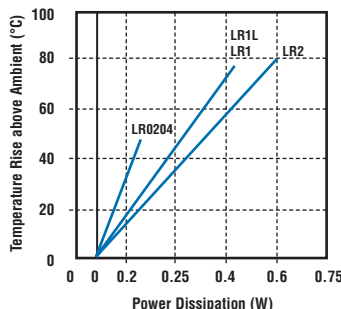
\* Length is measured in accordance with IEC 294.

#### Power Derating Curve



**Type LR Series**

**Surface Temperature Rise Vs Load**



**Mounting**

The resistors are suitable for processing on automatic insertion equipment and cutting and bending machines.

**Marking**

The resistors are marked with a colour band code in accordance with JIS C 0802.

**Packaging**

LR0204, LR1L and LR1 resistors are normally supplied taped in 'ammo' boxes of 4000 pieces. LR2 resistors are normally supplied taped in 'ammo' boxes of 1000 pieces.

Other package styles on request.

All tape specifications are in accordance with IEC 286-1.

**Performance Characteristics**

The evaluation of the performance characteristics is carried out with reference to IEC Specifications QC 400 000 and QC 400 100.

| TEST REF | Long Term Tests $\pm(1\% + 0.05 \text{ ohm})$     |
|----------|---|
| 4.23     | Climatic sequence                                 |
| 4.24     | Damp heat, steady state                           |
| 4.25.1   | Endurance at 70°C                                 |
| 4.25.3   | Endurance at 125°C                                |
| TEST REF | Short Term Tests $\pm(0.25\% + 0.05 \text{ ohm})$ |
| 4.13     | Overload  |
| 4.16     | Robustness of terminations                        |
| 4.18     | Resistance to soldering heat                      |
| 4.19     | Rapid change of temperature                       |
| 4.22     | Vibration   |

\* For LR1L the limits are  $\pm(5\% + 0.1 \text{ ohm})$  and  $\pm(1\% + 0.05 \text{ ohm})$  respectively. All resistance values are measured at a distance of 12mm from the end cap.

**How to Order**

| LR                             | 1  | F                                      | 100R   |
|--------------------------------|--|--|--|
| <b>Common Part</b>             | <b>Style</b>   | <b>Tolerance</b>                       | <b>Value</b>   |
| LR - Metal Film Fixed Resistor | 0204 - 0.25W<br>1L - 0.5W<br>1 - 0.6W<br>2 - 0.75W<br>100 - 1W<br>200 - 2W | J - 5%<br>G - 2%<br>F - 1%<br>D - 0.5% | 100 ohm<br>(100 ohms) 100R<br>1K0<br>(1000 ohms) 1K0<br>100 K ohm<br>(100,000 ohms) 100K |