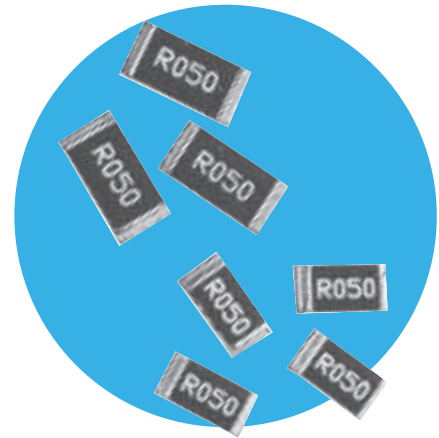


## Low Value Flat Chip Resistor

### LR Series

- Standard 2512, 2010 and 1206 sizes
- Resistance values down to 0.003 ohms
- Leach resistant solder-plated copper wrap-around termination
- AEC-Q200 Qualified
- RoHS compliant and SnPb variants



All Pb-free parts comply with EU Directive 2011/65/EU amended by (EU) 2015/863 (RoHS3)

## Electrical Data

|                                   |                 | LR(F)1206  | LR(F)2010 | LR(F)2512 |
|-----------------------------------|-----------------|--|-----------|-----------|
| Power rating @70°C                | watts           | 0.5  | 1         | 2         |
| Resistance range <sup>1</sup>     | ohms            | R003 to 1R0  |           |           |
| Resistance tolerance <sup>1</sup> | %               | <R01: 5, ≥R01: 1, 2, 5   |           |           |
| TCR                               | ppm/°C          | ≥R05: ±100, R025–R047: <+200, R015–R024: <+300, R01–R014: <+500, <R01: <+900 |           |           |
| Dielectric withstand              | volts           | 200  |           |           |
| Ambient temperature range         | °C              | -55 to +150  |           |           |
| Values                            |                 | E24 preferred <sup>2</sup>   |           |           |
| Temperature rise at rated power   | °C              | 40   | 80        | 90        |
| Pad / trace area <sup>3</sup>     | mm <sup>2</sup> | 30   | 100       | 300       |

Note 1: Contact factory for value – tolerance combinations outside this range. Note 2: Many values = N x R001 and N x R005 up to N=10 are also available. Note 3: Recommended minimum pad & adjacent trace area for each termination for rated dissipation on FR4 PCB

## Physical Data

| Dimensions (mm) |            |           |         |           |
|-----------------|------------|-----------|---------|-----------|
| Size            | L          | W         | H (max) | D         |
| LR(F)1206       | 3.20±0.305 | 1.63±0.20 | 0.8     | 0.48±0.25 |
| LR(F)2010       | 5.23±0.38  | 2.64±0.25 | 0.84    | 0.48±0.25 |
| LR(F)2512       | 6.50±0.38  | 3.25±0.25 | 0.84    | 0.48±0.25 |

**LR 1206 / 2010 / 2512**

| Recommended Solder Pad Dimensions (mm) |      |      |      |
|--|------|------|------|
|  | A    | B    | C    |
| LR(F)1206                              | 2.0  | 4.0  | 1.25 |
| LR(F)2010                              | 3.05 | 6.5  | 1.5  |
| LR(F)2512                              | 3.7  | 7.75 | 1.5  |

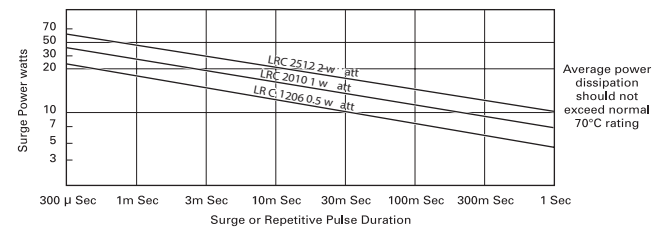
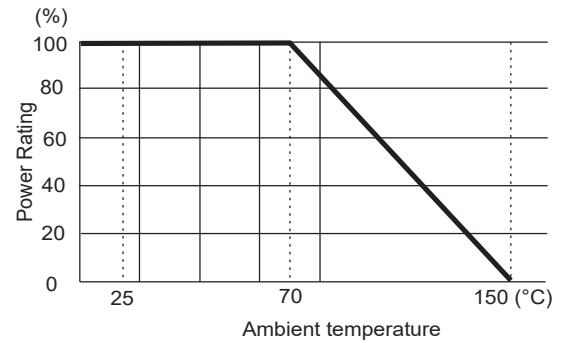
### General Note

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### LR Series

## Performance Data

| AEC-Q200 Table 7        |                                | Method                 | Max.          |      | Typ. |
|-------------------------|--------------------------------|------------------------|---------------|------|------|
| ref                     | Test                           |                        | (add R05)     |      |      |
| 3                       | High Temp. Exposure            | MIL-STD-202 Method 108 | ΔR%           | 0.5  | 0.2  |
| 4                       | Temperature Cycling            | JESD22 Method JA-104   | ΔR%           | 0.25 | 0.1  |
| 6                       | Moisture Resistance            | MIL-STD-202 Method 106 | ΔR%           | 0.5  | 0.2  |
| 7                       | Biased Humidity                | MIL-STD-202 Method 103 | ΔR%           | 0.5  | 0.2  |
| 8                       | Operational Life (Cyclic Load) | MIL-STD-202 Method 108 | ΔR%           | 1    | 0.5  |
| 14                      | Vibration                      | MIL-STD-202 Method 204 | ΔR%           | 0.5  | 0.05 |
| 15                      | Resistance to Soldering Heat   | MIL-STD-202 Method 210 | ΔR%           | 0.25 | 0.05 |
| 16                      | Thermal Shock                  | MIL-STD-202 Method 107 | ΔR%           | 0.25 | 0.1  |
| 18                      | Solderability                  | J-STD-002              | >95% coverage |      |      |
| 21                      | Board Flex                     | AEC-Q200-005           | ΔR%           | 0.5  | 0.2  |
| 22                      | Terminal Strength              | AEC-Q200-006           | ΔR%           | 0.25 | 0.1  |
| Short Term Overload     |                                | 6.25 x Pr for 2s       | ΔR%           | 0.5  |      |
| Low Temperature Storage |                                | -65°C for 100 hours    | ΔR%           | 0.5  |      |
| Leach Resistance        |                                | Solder dip at 250°C    | 90s minimum   |      |      |



### Note:

1. Although 2010 and 2512 sizes have passed temperature cycling and thermal shock, it is in general not recommended that ceramic chips this large be used on FR4 in a severe temperature cycle environment due to the possibility of solder joint fatigue. Full AEC-Q200 qualification applies only to ohmic values  $\geq R01$ .

## Ordering Procedure

This product has two valid part numbers:

**European (Welwyn) Part Number: LRF1206-R02FW** (1206, 20 milliohms  $\pm 1\%$ , Pb-free)

|   |   |   |   |   |   |   |   |   |   |   |   |   |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| L | R | F | 1 | 2 | 0 | 6 | - | R | 0 | 2 | F | W |
| 1 |   | 2 |   | 3 |   |   | 4 |   | 5 |   |   |   |

| 1   | 2    | 3                                | 4                               | 5                     |                                   |
|---|------|----------------------------------|---------------------------------|-----------------------|-----------------------------------|
| Type  | Size | Value                            | Tolerance                       | Termination & Packing |                                   |
| LR = Conventional orientation (values $>R025$ )   | 1206 | E24 = 3/4 characters<br>R = ohms | F = $\pm 1\%$                   | W                     | Pb-free, standard packing         |
|   | 2010 |                                  | G = $\pm 2\%$                   | T1                    | Pb-free, 1000/reel (non-standard) |
| LRF = Flip-chip orientation (values $\leq R025$ ) | 2512 |                                  | J = $\pm 5\%$                   | PB                    | SnPb finish, standard packing     |
|   |      |                                  | Standard packing is tape & reel |                       |                                   |
|   |      |                                  |                                 | 1206 & 2010           | 3000/reel                         |
|   |      |                                  |                                 | 2512                  | 1800/reel                         |

**USA (IRC) Part Number: LRC-LRF1206LF-01-R020-F** (1206, 20 milliohms  $\pm 1\%$ , Pb-free)

|   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| L | R | C | - | L | R | F | 1 | 2 | 0 | 6 | L | F | - | 0 | 1 | - | R | 0 | 2 | 0 | - | F |
| 1 |   | 2 |   | 3 |   |   | 4 |   | 5 |   | 6 |   |   | 7 |   |   |   |   |   |   |   |   |

| 1      | 2   | 3    | 4             | 5  | 6                        | 7             | Packing                         |             |           |  |
|--------|---|------|---------------|--|--------------------------|---------------|---------------------------------|-------------|-----------|--|
| Family | Model   | Size | Termination   | TCR  | Value                    | Tolerance     |                                 |             |           |  |
| LRC    | LR = Conventional orientation (values $>R025$ )   | 1206 | Omit for SnPb | 01 = standard ( $\pm 100\text{ppm}/^\circ\text{C}$ values $\geq R05$ ) | 4 characters<br>R = ohms | F = $\pm 1\%$ | Standard packing is tape & reel |             |           |  |
|        |   | 2010 | LF = Pb-free  |  |                          | G = $\pm 2\%$ | Pb-free                         | All sizes   | 1000/reel |  |
|        | LRF = Flip-chip orientation (values $\leq R025$ ) | 2512 |               |  |                          | J = $\pm 5\%$ | SnPb                            | 1206 & 2010 | 3000/reel |  |
|        |   |      |               |  |                          |               | 2512                            | 1800/reel   |           |  |

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