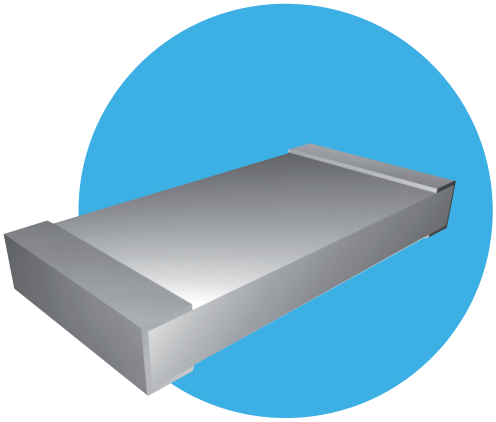
# Resistors

# High Current Jumper Chip

**LRZ Series**

- High current zero-Ohm link
- Thick film copper technology
- Current rating to 35A
- Typical resistance 1.5mΩ
- Inductance below 0.2nH
- AEC-Q200 Qualified
- RoHS compliant and SnPb variants



All Pb-free parts comply with EU Directive 2011/65/EU (RoHS2)

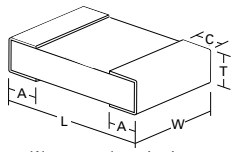
## Electrical Data

| Size | | 0805 | 1206 | 2010 | 2512 | Notes |
|---|---|---|---|---|---|---|
| Current rating @ 70 °C | amps | 15 | 20 | 30 | 35 | DC or AC rms |
| 2 second overload current @ 25°C | amps | 30 | 40 | 60 | 70 | |
| Residual resistance | ohms | 0.003 max. | | | | 0.0015 typ. |
| Ambient temperature range | °C | -55 to +150 | | | | |
| Dielectric withstand voltage | volts | 200 | | | | |
| Temperature rise at rated current | °C | 30 | 40 | 80 | 90 | |
| Pad & trace area for rated current | $mm^2$ | 40 | 50 | 100 | 300 | See Application Notes |

## Physical Data

**Dimensions (mm) & Weight (g)**

| | L | W | T | A | C | Wt |
|---|---|---|---|---|---|---|
| **0805** | 2.0 ± 0.3 | 1.25 ± 0.2 | 0.61 ± 0.1 | 0.3 ± 0.15 | 0.3 ± 0.1 | 0.009 |
| **1206** | 3.20 ± 0.31 | 1.63 ± 0.2 | 0.61 ± 0.1 | 0.48 ± 0.25 | 0.48 ± 0.25 | 0.020 |
| **2010** | 5.23 ± 0.38 | 2.64 ± 0.25 | 0.74 ± 0.1 | 0.48 ± 0.25 | 0.48 ± 0.25 | 0.036 |
| **2512** | 6.5 ± 0.38 | 3.25 ± 0.25 | 0.74 ± 0.1 | 0.48 ± 0.25 | 0.48 ± 0.25 | 0.055 |



Wrap-around terminations
(3 faces)

### Construction

A thick film copper conductive element and organic protection are screen printed on a 96% alumina substrate. Parts supplied under USA part numbering have the conductive element on the underside whilst those supplied under European numbering have it on the upper side. These two formats are functionally identical and interchangeable, and marking is always on the upper surface.

### Terminations

The wrap-around copper terminations have an electroplated nickel barrier and solderable coating, which ensures excellent 'leach' resistance properties and solderability. Chips can withstand immersion in solder at 260˚C for 30 seconds and are suitable for reflow or wave soldering processes.

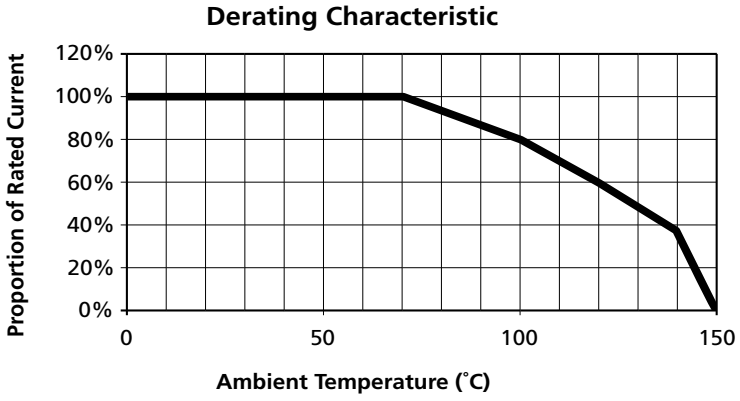
### Marking

The body protection is resistant to all normal cleaning solvents suitable for printed circuits. Chips are marked R000 except for 0805 size which are not marked.

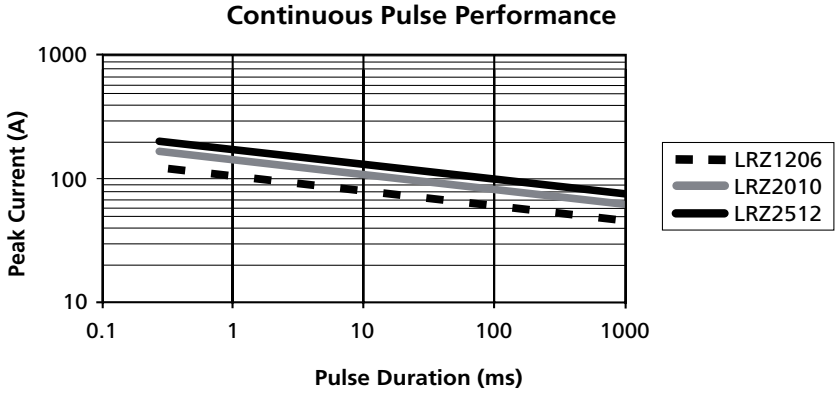
| AEC-Q200 Table 7 | | Method | Result |
|---|---|---|---|
| ref | Test | | |
| 3 | High Temp. Exposure | MIL-STD-202 Method 108 | Pass (see note 1) |
| 4 | Temperature Cycling | JESD22 Method JA-104 | Pass (see note 1) |
| 6 | Moisture Resistance | MIL-STD-202 Method 106 | Pass (see note 1) |
| 7 | Biased Humidity | MIL-STD-202 Method 103 | Pass (see note 1) |
| 8 | Operational Life (Cyclic Load) | MIL-STD-202 Method 108 | Pass (see note 1) |
| 14 | Vibration | MIL-STD-202 Method 204 | Pass (see note 1) |
| 15 | Resistance to Soldering Heat | MIL-STD-202 Method 210 | Pass (see note 1) |
| 16 | Thermal Shock | MIL-STD-202 Method 107 | Pass (see note 1) |
| 18 | Solderability | J-STD-002 | >95% coverage |
| 21 | Board Flex | AEC-Q200-005 | Pass (see note 1) |
| 22 | Terminal Strength | AEC-Q200-006 | Pass (see note 1) |
| | Leach Resistance | Solder dip at 250°C | 90s minimum |

Notes:
1. AEC qualification based on testing of structurally similar LRF Series low value chip resistors, of which LRZ is the zero-ohm version. ΔR measurements are not applicable to the zero-ohm version.
2. 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.
3. Full AEC-Q200 qualification applies to sizes 1206, 2010 and 2512 in European coding only.

## Temperature Derating




## Pulse Performance



# Application Notes

Conventional thick film "zero-Ohm" jumper chips typically have up to 50mΩ resistance values and 1 to 2A current ratings. LRZ jumper chips offer a solution for currents over an order of magnitude greater by combining lower resistance values with better thermal conductivity.

Care should be taken when designing the associated printed circuit board tracks to ensure that they can carry the required current without excessive heating, for example by using multiple layers thermally linked with many vias. Any temperature rise caused by power dissipated in the PCB tracks themselves should be allowed for when calculating the ambient temperature in order to determine whether power de-rating should be applied. The minimum recommended pad and trace areas close to the resistor stated under Electrical Data should be provided at each terminal. For multi-layer PCB's, this minimum area requirement should be met by surface layers rather than buried layers. The actual solder pad area follows the normal design rules for chip resistors.

LRZ jumper chips themselves can operate at a maximum temperature of 150˚C (see performance above). For conventionally soldered jumper chips, the joint temperature should not exceed 110˚C. This condition is met when the stated current levels at 70˚C are used.

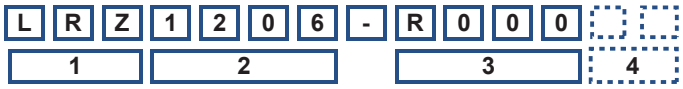
### Packaging

LRZ jumper chips are supplied taped and reeled as per IEC 286-3.

# Ordering Procedure

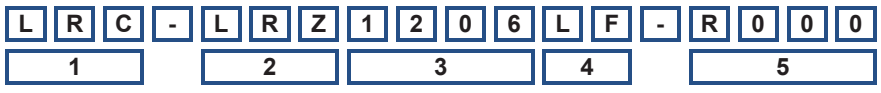
This product has two valid part numbers:

**European (Welwyn) Part Number: LRZ1206-R000** (1206, Pb-free)




| 1<br>Type | 2<br>Size | 3<br>Value | 6<br>Termination & Packing | |
|---|---|---|---|---|
| LRZ | 0805 | R000 | Omit for Pb-free, standard packing | |
| | 1206 | | PB = SnPb finish, standard packing | |
| | 2010 | | Standard packing is tape & reel | |
| | 2512 | | 0805, 1206 & 2010 | 3000/reel |
| | | | 2512 | 1800/reel |

**USA (IRC) Part Number: LRC-LRZ1206LF-R000** (1206, Pb-free)




| 1<br>Family | 2<br>Model | 3<br>Size[1] | 4<br>Termination | 5<br>Value | Packing | |
|---|---|---|---|---|---|---|
| LRC | LRZ | 1206 | Omit for SnPb | R000 | Standard packing is tape & reel | |
| | | 2010 | LF = Pb-free | | 1206 & 2010 | 3000/reel |
| | | 2512 | | | 2512 | 1800/reel |

Note 1: Size 0805 is only available under European part numbering.