

Metal Strip Current Sense Resistors Surface Mount

PROVISIONAL

ULR Series

- ULR1, ULR2, ULR3 all 2512 sizes
- ULR1S 1206 size, ULR15S 2010 size
- Resistance R0005 (0.5mΩ) to R01 (10mΩ)
- Low TCR, Low inductance
- Designed for current sensing in power electronic systems
- RoHS compliant



Electrical Data

| | | ULR1S | ULR1 | ULR15S | ULR2 | ULR25 | ULR3 |
|---------------------------------|------------|--------------------------------------|--|-------------|--------------|---------------|--------------------------------|
| Power rating at 80°C | watts | 1.0 | 1.0 | 1.5 | 2.0 | 2.5 | 3.0 |
| Resistance range ¹ | ohms | R001 to R01 | R0005 to R01 | R001 to R01 | R0005 to R01 | R0035 to R006 | R0005 to R003 |
| Isolation voltage | volts | 200V | 200V | 200V | 200V | 200V | 200V |
| TCR | ppm/ °C | 50 | 50, 75, 100, 150 See table below | 50 | 50 | 50 | 50, 75, 100 See table below |
| Resistance Tolerance | % | 1(F), 5(J) | | | | | |
| Protective coating ² | | Green | Black | Green | Black/Green | Green | Green |
| Standard Values | | See table below for available values | | | | | |
| Ambient temperature range | °C | -55 to +170 | | | | | |

Note 1: For values above 0R01 refer to our LR / LRF Series

Note 2: Colour of coating relates to solder process suitability, see Construction

Standard values available (non-standard values may be available to order - consult factory)

| Value | ULR1S | | ULR1 | | ULR15S | | ULR2 | | ULR25 | | ULR3 | |
|--------|--------|-----|--------|-----|--------|-----|--------|-----|--------|-----|--------|-----|
| | Colour | TCR | Colour | TCR | Colour | TCR | Colour | TCR | Colour | TCR | Colour | TCR |
| R0005 | | | Black | 50 | | | Black | 50 | | | Green | 100 |
| R00075 | | | Black | 50 | | | Black | 50 | | | Green | 100 |
| R001 | Green | 50 | Black | 50 | Green | 50 | Black | 50 | | | Green | 50 |
| R0015 | Green | 50 | Black | 50 | Green | 50 | Black | 50 | | | Green | 50 |
| R002 | Green | 50 | Black | 50 | Green | 50 | Black | 50 | | | Green | 50 |
| R0025 | Green | 50 | Black | 150 | Green | 50 | | | | | Green | 75 |
| R003 | Green | 50 | Black | 150 | Green | 50 | | | | | Green | 75 |
| R0035 | Green | 50 | Black | 150 | Green | 50 | | | Green | 50 | | |
| R004 | Green | 50 | Black | 100 | Green | 50 | | | Green | 50 | | |
| R0045 | Green | 50 | Black | 100 | Green | 50 | | | Green | 50 | | |
| R005 | Green | 50 | Black | 100 | Green | 50 | | | Green | 50 | | |
| R0055 | Green | 50 | Black | 100 | Green | 50 | | | Green | 50 | | |
| R006 | Green | 50 | Black | 75 | Green | 50 | | | Green | 50 | | |
| R007 | Green | 50 | Black | 75 | Green | 50 | Green | 50 | | | | |
| R008 | Green | 50 | | | Green | 50 | Green | 50 | | | | |
| R009 | Green | 50 | | | Green | 50 | Green | 50 | | | | |
| R01 | Green | 50 | | | Green | 50 | Green | 50 | | | | |

General Note

Welwyn Components reserves the right to make changes in product specification without notice or liability. All information is subject to Welwyn's own test data and is considered accurate at time of print.

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Construction

Black type

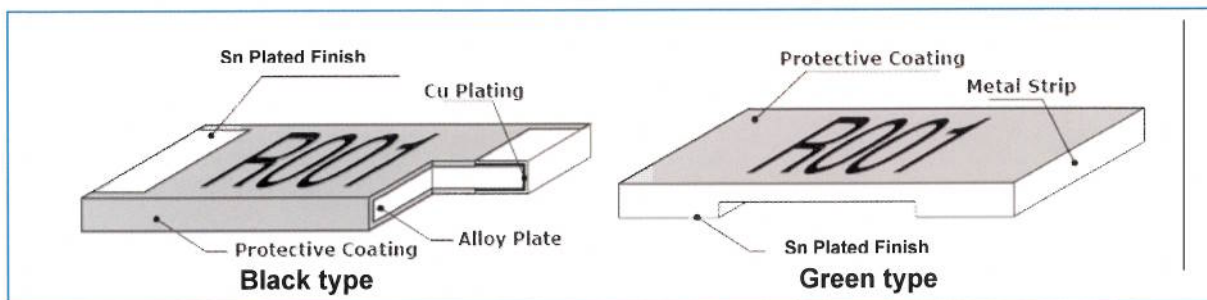
A low TCR resistance alloy plate, with plated connection bands is protectively coated and numerically marked with the resistance value. This part has standard plated end connections and is suitable for wave or IR reflow soldering.

Green type

A low TCR resistance alloy plate is grooved to set the final resistance, the lower faces are solder plated for connections, and it is protectively coated and numerically marked with the resistance value. This part is ONLY suitable for IR reflow soldering.

Marking

For values which are integer numbers of milliohms, the marking is 4-character IEC62 code; e.g. "R002" for 2mΩ, "R010" for 10mΩ. For values including fractions of a milliohm the marking is 3 or 4-character code using "M" to indicate the decimal point, e.g. "M75" for 0.75mΩ, "1M50" for 1.5mΩ.



Termination Details:

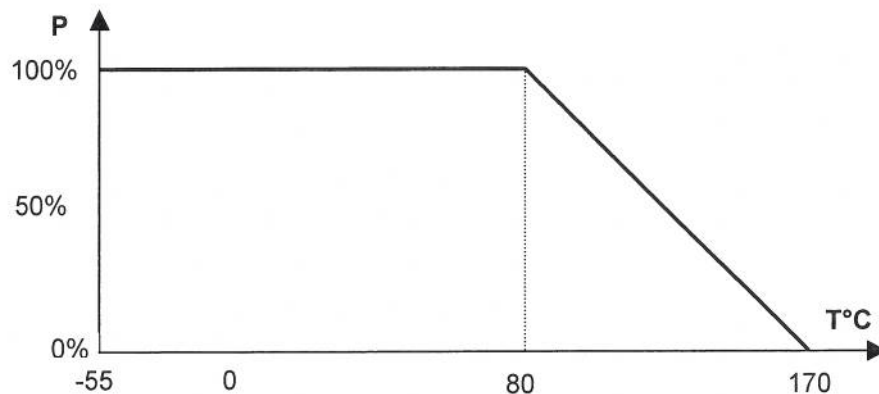
Material Matt tin plated finish over a barrier layer

Solderability 95% min coverage (MIL-STD 202F / 208H, 235°C 2 secs)

Performance Data

| | | Maximum |
|---|--------------|---|
| Load at rated power (1000hrs cyclic load at 70°C) | $\Delta R\%$ | $\pm 1\% + 0.5m\Omega$ (Black): $\pm 1\%$ (Green) |
| De-rating from rated power at 80°C | | See Graph |
| Short term overload (5 x rated power for 5s) | $\Delta R\%$ | $\pm 0.5\% + 0.5m\Omega$ (Black): $\pm 1\%$ (Green) |
| Dry heat (96Hrs, no load, +155°C) | $\Delta R\%$ | $\pm 1\% + 0.5m\Omega$ (Black): $\pm 1\%$ (Green) |
| Temperature rapid change (-55 / +150°C, 100 cycles) | $\Delta R\%$ | $\pm 0.5\% + 0.5m\Omega$ (Black): $\pm 1\%$ (Green) |
| Resistance to solder heat (260°C for 10s) | $\Delta R\%$ | $\pm 0.5\% + 0.5m\Omega$ (Black): $\pm 1\%$ (Green) |

Power de-rating graph



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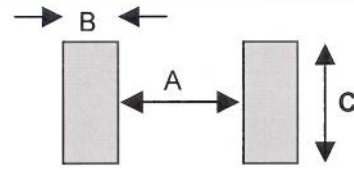
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Recommended Solder Pad Layout for precision current sensing.

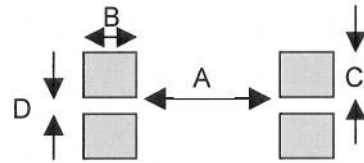
2-wire pad layout.

| Mounting Type | A | B | C |
|---------------|-------|------|------|
| 2512 | 4.75 | 1.8 | 3.6 |
| 2010 | 3.8 | 1.44 | 3.12 |
| 1206 | 2.375 | 0.9 | 1.95 |



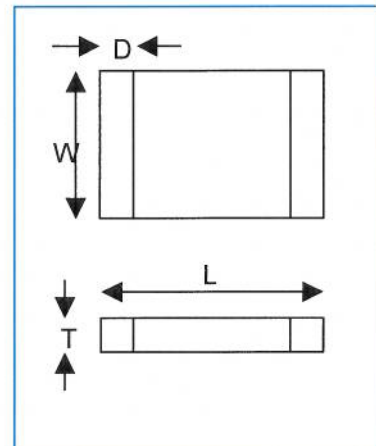
4-wire pad layout.

| Mounting Type | A | B | C | D |
|---------------|-------|------|------|-------|
| 2512 | 4.75 | 1.8 | 3.6 | 0.7 |
| 2010 | 3.8 | 1.44 | 3.12 | 1.16 |
| 1206 | 2.375 | 0.9 | 1.95 | 0.725 |



Dimensions (mm)

| Size | Type | Values (mΩ) | L | W | T | D | Nom. Wt. (g) |
|------|-------|-----------------|------|------|------|------|--------------|
| 2512 | Green | 0.5 mΩ - 0.75mΩ | 6.35 | 3.18 | 1.00 | 1.93 | 0.09 |
| 2512 | Green | 1mΩ - 22mΩ | 6.35 | 3.18 | 0.60 | 1.93 | 0.08 |
| 2512 | Black | 0.5mΩ | 6.35 | 3.18 | 1.40 | 1.30 | 0.06 |
| 2512 | Black | 0.75mΩ | 6.35 | 3.18 | 1.00 | 1.30 | 0.06 |
| 2512 | Black | 1mΩ | 6.35 | 3.18 | 0.80 | 1.30 | 0.06 |
| 2512 | Black | 1.5mΩ | 6.35 | 3.18 | 0.65 | 1.30 | 0.06 |
| 2512 | Black | 2mΩ | 6.35 | 3.18 | 0.50 | 1.30 | 0.06 |
| 2512 | Black | 2.5mΩ | 6.35 | 3.18 | 1.00 | 1.30 | 0.06 |
| 2512 | Black | 3mΩ | 6.35 | 3.18 | 0.70 | 1.30 | 0.06 |
| 2512 | Black | 3.5mΩ | 6.35 | 3.18 | 0.71 | 1.30 | 0.06 |
| 2512 | Black | 4mΩ | 6.35 | 3.18 | 0.60 | 1.30 | 0.06 |
| 2512 | Black | 4.5mΩ | 6.35 | 3.18 | 0.58 | 1.30 | 0.06 |
| 2512 | Black | 5mΩ | 6.35 | 3.18 | 0.50 | 1.30 | 0.06 |
| 2512 | Black | 5.5mΩ | 6.35 | 3.18 | 0.47 | 1.30 | 0.06 |
| 2512 | Black | 6mΩ | 6.35 | 3.18 | 0.50 | 1.30 | 0.06 |
| 2512 | Black | 7mΩ | 6.35 | 3.18 | 0.45 | 1.30 | 0.06 |
| 2010 | Green | 1mΩ - 10mΩ | 5.08 | 2.54 | 0.6 | 1.67 | TBA |
| 1206 | Green | 1mΩ - 10mΩ | 3.2 | 1.6 | 0.6 | 0.98 | TBA |



Flammability

The resistor will not burn or emit incandescent particles under any condition of applied temperature or overload.

Solvent resistance

The body protection and marking are resistant to all normal industrial solvents suitable for printed circuits.

Packaging

The standard packing for ULR parts is on a 2000 piece reel of size 12mm tape

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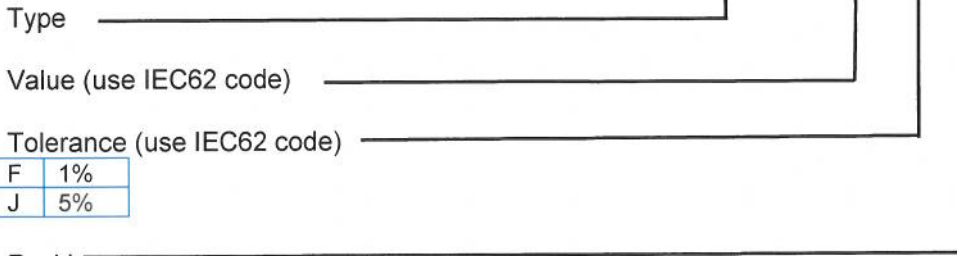
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Ordering Procedure

Example: ULR2 at 2.5 milliohms and 1% tolerance on reel of 2000 pieces:

U L R 2 - R 0 0 2 5 F T 2



| | |
|---|----|
| F | 1% |
| J | 5% |

| Packing | | | |
|---------|------|------|-------------|
| T2 | Tape | 2512 | 2000 / reel |
| | | 2010 | |
| | | 1206 | |

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