

New Product Notification

16th Mar 09

| Release | |
|-------------------------------|---|
| Welwyn Sales Force | * |
| TT electronics Sales Channels | * |
| Distributors & Agents | * |



| Datasheet Status | | |
|------------------|---|---|
| Preliminary | Target for development. Not supported by test data. Not for customer use. | |
| Provisional | Ongoing development. Incomplete test data. Limited customer use. | |
| Publication | Approved for website / catalogue. Full customer use. | * |

Product Description

ULR is an ultra-low value current sense chip resistor produced using metal strip technology. The construction is low-profile non-moulded in two variants distinguished by protection colour. The black type is a simple flat chip shape suitable for wave as well as IR reflow. The green type has a small clearance between the underside and the PCB, so is not suitable for wave soldering. The two new sizes are like the green type, but without the upper face coating and marking.

Key Features (new sizes only)

- Ohmic values down to 1m Ω
- Compact: 1W in 1206, 1.5W in 2010
- Good pulse withstand performance
- Precision to 1% and 50ppm/ $^{\circ}$ C

Target Markets / Applications

Similar to LRF – current sense function in:
Industrial (e.g. battery monitor, process control)
Automotive (e.g. motor control, lamp monitor)
Power Supply (e.g. output protection, DC-DC convertor)
Consumer (e.g. battery protection)

Competitors' Equivalents

The following products are the same technology and size as ULR:
Vishay WSL1206, WSL2010
Isabellenhutte LMK (1206), LMP (2010)
Koa TLR2B (1206), SL07 & TLR2H (2010)

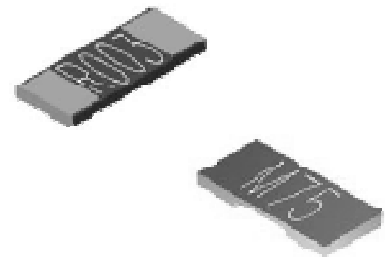
Target Launch Date

Available now.

Metal Strip Current Sense Resistors Surface Mount

ULR Series

- Resistance R0005 (0.5mΩ) to R01 (10mΩ)
- Low TCR, Low inductance
- Designed for current sensing in power electronic systems
- Solid metal element withstands high current surges
- RoHS compliant



Electrical Data

| | | ULR1S | ULR1 | ULR15S | ULR2 | ULR25 | ULR3 |
|---------------------------------|--------|--------------------------------------|-------------------------------------|-------------|--------------|---------------|--------------------------------|
| Footprint size | | 1206 | 2512 | 2010 | 2512 | 2512 | 2512 |
| 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 | | None | Black | None | 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 | |
|--------|-------|-----|-------|-----|--------|-----|-------|-----|-------|-----|-------|-----|
| | Coat | TCR | Coat | TCR | Coat | TCR | Coat | TCR | Coat | TCR | Coat | TCR |
| R0005 | | | Black | 50 | | | Black | 50 | | | Green | 100 |
| R00075 | | | Black | 50 | | | Black | 50 | | | Green | 100 |
| R001 | None | 50 | Black | 50 | None | 50 | Black | 50 | | | Green | 50 |
| R0015 | None | 50 | Black | 50 | None | 50 | Black | 50 | | | Green | 50 |
| R002 | None | 50 | Black | 50 | None | 50 | Black | 50 | | | Green | 50 |
| R0025 | None | 50 | Black | 150 | None | 50 | | | | | Green | 75 |
| R003 | None | 50 | Black | 150 | None | 50 | | | | | Green | 75 |
| R0035 | None | 50 | Black | 150 | None | 50 | | | Green | 50 | | |
| R004 | None | 50 | Black | 100 | None | 50 | | | Green | 50 | | |
| R0045 | None | 50 | Black | 100 | None | 50 | | | Green | 50 | | |
| R005 | None | 50 | Black | 100 | None | 50 | | | Green | 50 | | |
| R0055 | None | 50 | Black | 100 | None | 50 | | | Green | 50 | | |
| R006 | None | 50 | Black | 75 | None | 50 | | | Green | 50 | | |
| R007 | None | 50 | Black | 75 | None | 50 | Green | 50 | | | | |
| R008 | None | 50 | | | None | 50 | Green | 50 | | | | |
| R009 | None | 50 | | | None | 50 | Green | 50 | | | | |
| R01 | None | 50 | | | None | 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 coat

A low TCR resistance alloy plate, with tin plated connection bands is protectively coated on the upper and lower faces and numerically marked with the resistance value. This part is suitable for wave or IR reflow soldering.

Green coat

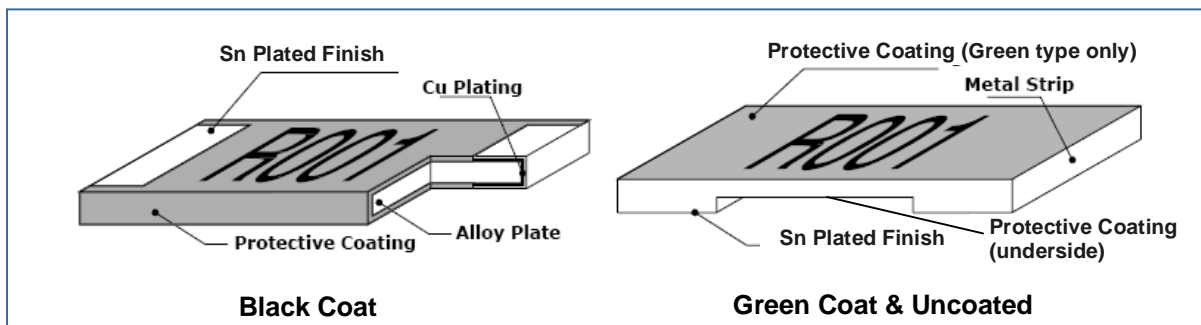
A low TCR resistance alloy plate is grooved to set the final resistance, the lower faces are tin plated for connections, and it is protectively coated on the upper and lower faces and numerically marked with the resistance value. This part is ONLY suitable for IR reflow soldering.

Uncoated

A low TCR resistance alloy plate is grooved to set the final resistance and the lower face only is protected with an epoxy coating. The lower faces are tin plated for connections. This part is ONLY suitable for IR reflow soldering.

Marking

Only 2512 size parts are marked. For values which are integer numbers of milliohms, the marking is 4-character IEC62 code; e.g. "R002" for 2m Ω , "R010" for 10m Ω . 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 0.75m Ω , "1M50" for 1.5m Ω .



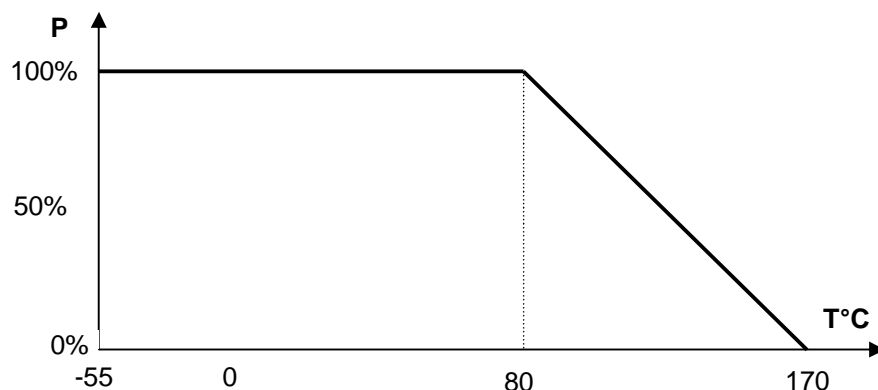
Termination Details:

Material Matt tin plated finish over a barrier layer
Solderability 95% min coverage (MIL-STD 202F / 208H, 235°C 2 secs)

Performance Data

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

Power de-rating graph



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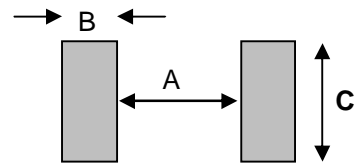
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Recommended Solder Pad Layouts

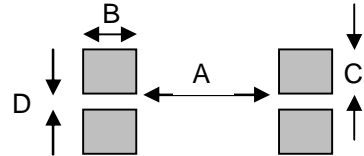
2-wire pad layout.

| 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.

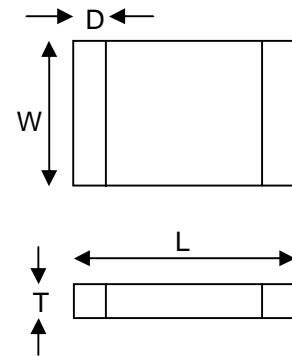
| Mounting Type | A | B | C | D |
|---------------|-------|------|-------|-----|
| 2512 | 4.75 | 1.8 | 1.45 | 1.0 |
| 2010 | 3.8 | 1.44 | 1.16 | 0.8 |
| 1206 | 2.375 | 0.9 | 0.725 | 0.5 |



Physical Data

Dimensions (mm) and weight (g)

| Size | Coat | Values (mΩ) | L ±0.25 | W | T ±0.20 | D | Wt. (nom) |
|------|-------|-------------|---------|------------|---------|------------|-----------|
| 2512 | Green | 0.5 | 6.35 | 3.18 ±0.35 | 0.60 | 2.68 ±0.25 | 0.09 |
| | | 0.75 | | | | 2.48 ±0.25 | |
| | | 1 – 1.5 | | | | 1.43 ±0.25 | 0.08 |
| | | 2 – 3 | | | | | |
| | | 4 | | | | | |
| | | 5 – 6 | | | | | |
| | | 7 | | | | | |
| | | 8 – 10 | | | | | |
| | Black | 0.5 | | 1.43 ±0.38 | 0.06 | | |
| | | 0.75 | | | | | |
| | | 1 | | | | | |
| | | 1.5 | | | | | |
| | | 2 | | | | | |
| | | 2.5 | | | | | |
| | | 3 | | | | | |
| | | 3.5 | | | | | |
| | | 4 | | | | | |
| | | 4.5 | | | | | |
| | | 5 | | | | | |
| | | 5.5 | | | | | |
| 6 | | | | | | | |
| 7 | | | | | | | |
| 2010 | None | 1 – 10 | 5.08 | 2.54 ±0.15 | 0.60 | 1.67 ±0.63 | 0.04 |
| 1206 | None | 1 - 10 | 3.20 | 1.6 ±0.10 | 0.60 | 0.98 ±0.38 | 0.02 |



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

ULR parts are packed on a 2000 piece reel. Tape width is 8mm for 1206 and 12mm for 2010 and 2512.

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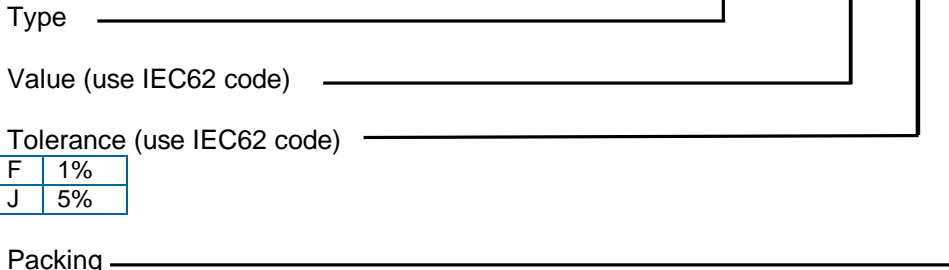
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Ordering Procedure

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

ULR2 - R0025FT2



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

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

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