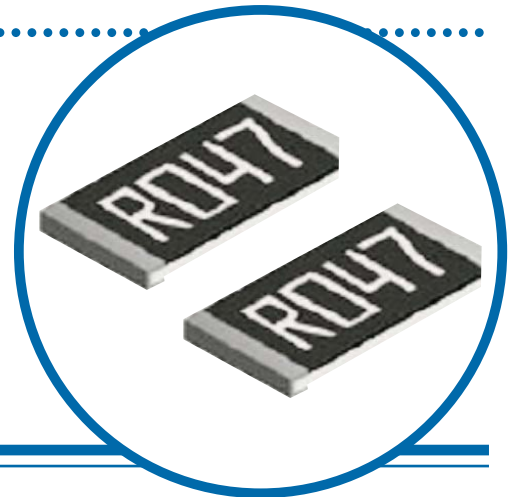


Small Size Low Value Current Sense Surface Mount Chip Resistors

L RCS Series

- 0402, 0603 and 0805 sizes (larger sizes refer to our LRF Series)
- Resistance R020 (20mΩ) to 1R0 (1000mΩ)
- Designed for current sensing in power electronic systems
- RoHS compliant



Electrical Data

		L RCS0402	L RCS0603	L RCS0805
Power rating @70°C	watts	0.063	0.1	0.125: R02 to <R10 0.25: R10 to 1R0
Resistance range	ohms	R05 to 1R0	R02 to 1R0	R02 to 1R0
Isolation voltage	volts	50V	100V	200V
TCR	ppm/°C	±400: R05 – R10 ±300: R101 – R50 ±200: R501 – 1R0	±600: R02 – R05 ±400: R051 – R10 ±300: R101 – R50 ±200: R501 – 1R0	±600: R02 – R05 ±400: R051 – R10 ±300: R101 – R50 ±200: R501 – 1R0
Resistance tolerance	%	1(F), 5(J)		
Standard values		E24 preferred		
Ambient temperature range	°C	-55 to +155		

Physical Data

	L	W	T	D1	D2	Nom wt. (g)
L RCS0402	1.00 ±0.05	0.50 ±0.10	0.32 ±0.10	0.25 ±0.10	0.20 ±0.10	0.0007
L RCS0603	1.60 ±0.10	0.80 ±0.10	0.45 ±0.10	0.30 ±0.20	0.30 ±0.20	0.002
L RCS0805	2.00 ±0.15	1.25 ±0.15	0.55 ±0.10	0.30 ±0.20	0.40 ±0.25	0.005

All dimensions in mm unless stated.

Construction

A resistor element is applied to an alumina substrate. The product is adjusted to value and protected. Marking is applied to 0603 and 0805 sizes. A wraparound conductor is applied to join the top and bottom sides. The terminations are electroplated with a Ni barrier layer prior to plating with a Sn finish.

Solvent Resistance

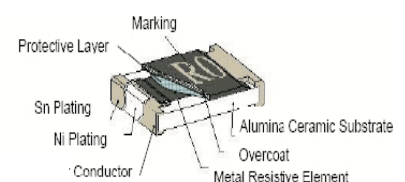
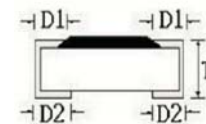
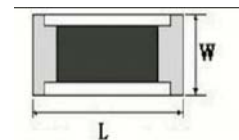
The body protection and marking are resistant to all normal industrial solvents suitable for printed circuits.

Flammability

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

Solderability

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



General Note

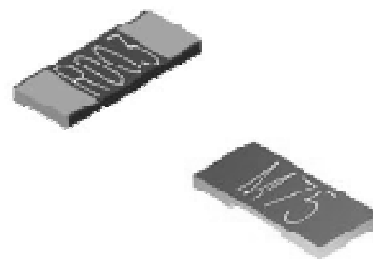
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Metal Strip Current Sense Resistors Surface Mount



ULR Series

- 1 watt to 3 watts, all 2512 size
- Resistance R0005 (0.5mΩ) to R01 (10mΩ)
- Low TCR, Low inductance
- Designed for current sensing in power electronic systems
- RoHS compliant



Electrical Data

		ULR1	ULR2	ULR25	ULR3
Power rating at 80°C	watts	1.0	2.0	2.5	3.0
Resistance range ¹	ohms	R0005 to R007	R0005 to R01	R0035 to R006	R0005 to R003
Isolation voltage	volts	200V	200V	200V	200V
TCR	ppm/°C	50, 75, 100, 150 See table below	50	50	50, 75, 100 See table below
Resistance Tolerance	%	1(F), 5(J)			
Protective coating ²		Black	Green/ Black	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	ULR1		ULR2		ULR25		ULR3	
	Colour	TCR	Colour	TCR	Colour	TCR	Colour	TCR
R0005	Black	50	Black	50			Green	100
R00075	Black	50	Black	50			Green	100
R001	Black	50	Black	50			Green	50
R0015	Black	50	Black	50			Green	50
R002	Black	50	Black	50			Green	50
R0025	Black	150					Green	75
R003	Black	150					Green	75
R0035	Black	150			Green	50		
R004	Black	100			Green	50		
R0045	Black	100			Green	50		
R005	Black	100			Green	50		
R0055	Black	100			Green	50		
R006	Black	75			Green	50		
R007	Black	75	Green	50				
R008			Green	50				
R009			Green	50				
R01			Green	50				

General Note

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A subsidiary of TT electronics plc

Construction

Black type

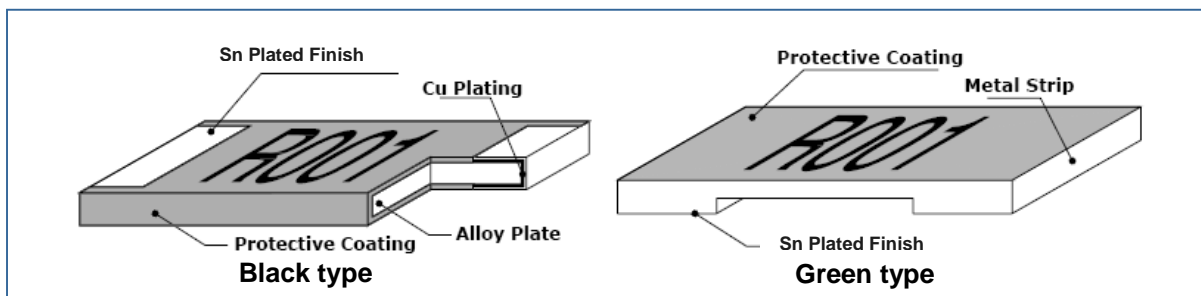
A low TCR resistance alloy plate, with plated connection bands is protectively coated and numerically marked with the resistance value. This part has standard plated end connections and is suitable for wave or IR reflow soldering.

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:

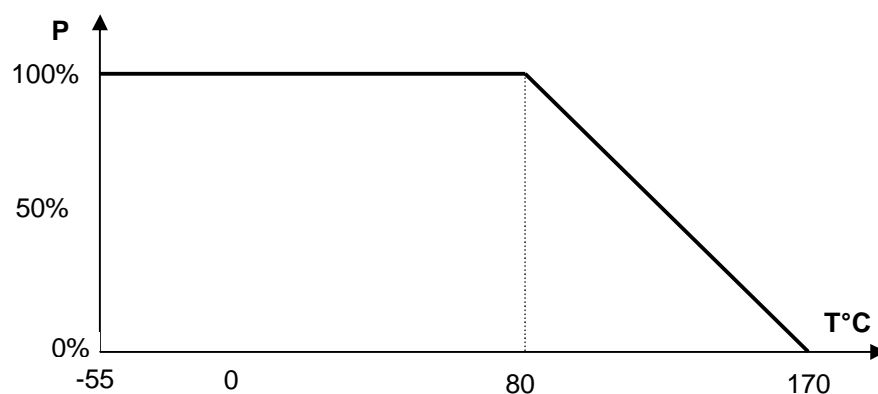
Material Matt tin plated finish over a barrier layer

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



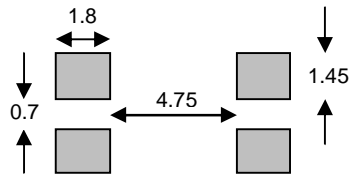
General Note

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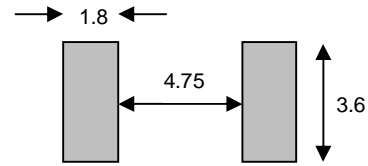
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Recommended Solder Pad Layout



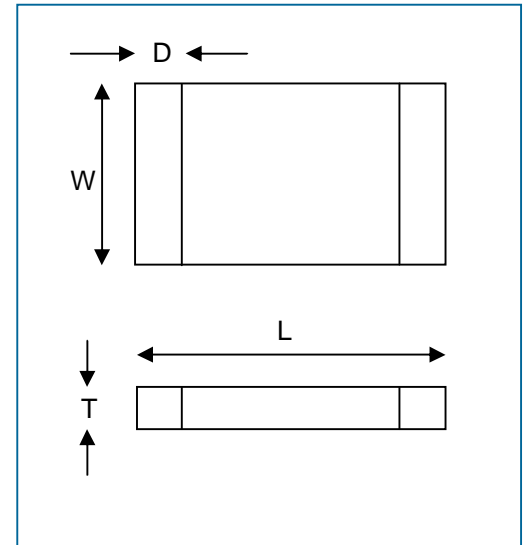
4-wire pad layout (recommended for precision current sensing)



2-wire pad layout

Dimensions (mm)

Type	Values (mΩ)	L	W	T	D	Nom. Wt. (g)
Green	0.5 mΩ, 0.75mΩ	6.35	3.18	1.00	1.93	0.09
Green	1mΩ to 10mΩ	6.35	3.18	0.60	1.93	0.08
Black	0.5mΩ	6.35	3.18	1.40	1.30	0.06
Black	0.75mΩ	6.35	3.18	1.00	1.30	0.06
Black	1mΩ	6.35	3.18	0.80	1.30	0.06
Black	1.5mΩ	6.35	3.18	0.65	1.30	0.06
Black	2mΩ	6.35	3.18	0.50	1.30	0.06
Black	2.5mΩ	6.35	3.18	1.00	1.30	0.06
Black	3mΩ	6.35	3.18	0.70	1.30	0.06
Black	3.5mΩ	6.35	3.18	0.71	1.30	0.06
Black	4mΩ	6.35	3.18	0.60	1.30	0.06
Black	4.5mΩ	6.35	3.18	0.58	1.30	0.06
Black	5mΩ	6.35	3.18	0.50	1.30	0.06
Black	5.5mΩ	6.35	3.18	0.47	1.30	0.06
Black	6mΩ	6.35	3.18	0.50	1.30	0.06
Black	7mΩ	6.35	3.18	0.45	1.30	0.06



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.

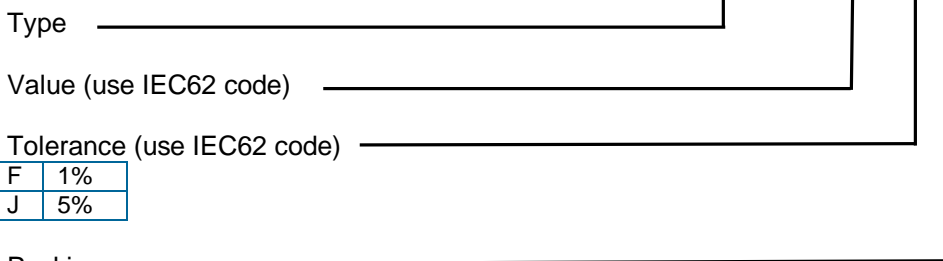
Packaging

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

Ordering Procedure

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

ULR2 - R0025 FT2



Packing

T2	Tape	2512	2000 / reel
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General Note

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Welwyn Components Limited

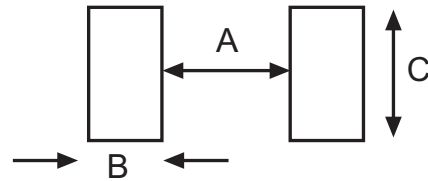
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Marking

The LRCS0402 is not marked, the LRCS0603 is marked with 3 digits and LRCS0805 with 4 digits. e.g. 100mΩ is marked as R10 (3digit) and R100 (4digit) and 35 mΩ is marked as 035 (3digit) or R035 (4digit)

Mounting

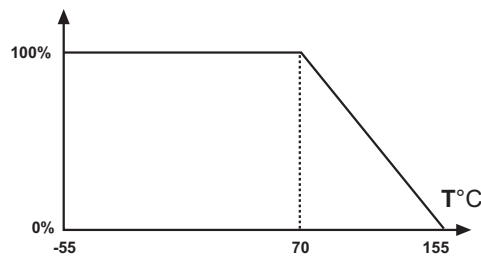
Type	A	B	C
LRCS0402	0.6	0.4	0.50±0.2
LRCS0603	1.0	0.7	1.00±0.2
LRCS0805	1.0	0.8	1.30±0.2



Performance Data

		Maximum
Load at rated power (1000hrs cyclic load at 70°C)	ΔR%	±1% + 0.05Ω
De-rating from rated power at 70°C		See Graph
Short term overload (6.25 x rated power for 5s)	ΔR%	±0.5% + 0.05Ω ±1% + 0.05Ω(0.25W LRCS0805 rating)
Dry heat (96Hrs, no load, +155°C)	ΔR%	±0.5% + 0.05Ω
Temperature rapid change (-55 / +150°C, 100 cycles)	ΔR%	±0.5% + 0.05Ω
Damp heat steady state	ΔR%	±0.5% + 0.05Ω
Resistance to solder heat (260°C for 10s)	ΔR%	±0.5% + 0.05Ω
Low Temperature Operation	ΔR%	±0.5% + 0.05Ω
Insulation Resistance		>1000MΩ

Power de-rating graph



Packaging

The standard packing for LRCS parts is on 8mm wide paper tape wound on 178mm diameter reels.

Ordering Procedure

Example: LRCS0603 at 25 milliohms and 1% tolerance on reel of 5000 pieces:

LRCS0603 - R 0 2 5 F T5

Type _____

Value (use IEC62 code) _____

Tolerance (use IEC62 code) _____

F	1%
J	5%

Packing _____

T10	Tape	0402	10,000 / reel
T5	Tape	0603	5,000 / reel
T5	Tape	0805	5,000 / reel