

## Type RL73 Series

### Key Features

- Up to 2 Watts at 70°C
- Values down to R10
- 8 chip sizes
- Ideal for current detection
- Value marked on resistor
- Sizes 0201 to 2512
- 0402, 0603, 0805, 1206, 2512 stocked in distribution
- New Higher Power Version now available

### Applications

- Audio
- Communications
- Automotive
- Low voltage power supplies
- Power management applications



TE Connectivity are pleased to offer this thick film chip resistor for current sensing positions. It has a special metal glaze resistive element and a nickel barrier layer beneath the solder to prolong terminal life. Following the developments by semiconductor manufacturers in the production of a range of IC's for battery charge management and low voltage power supplies, the RL73 Series satisfies the demand for a low ohmic shunt resistor to act as a current sensor.

### Characteristics - Electrical - Standard Power

| Type    | TCR     | Power rating @ 70°C | Resistance Range | TDF  | TD   | TE   | Tape                  |
|---------|---------|---------------------|------------------|------|------|------|-----------------------|
| RL73X1H | 1000PPM | 0.05W               | R10 - R13        | 1000 | 5000 | --   | Paper tape            |
| RL73V1H | 600PPM  | 0.05W               | R15 - R47        | 1000 | 5000 | --   | Paper tape            |
| RL73N1H | 300PPM  | 0.05W               | R51 - R91        | 1000 | 5000 | --   | Paper tape            |
| RL73N1E | 300PPM  | 0.0625W             | R10 - R91        | 1000 | 5000 | --   | Paper tape            |
| RL73N1J | 300PPM  | 0.1W                | R10 - R91        | 1000 | 5000 | --   | Paper tape            |
| RL73H2A | 100PPM  | 0.125W              | R10 - R91        | 1000 | 5000 | --   | Paper tape            |
| RL73K2A | 200PPM  | 0.125W              | R10 - R91        | 1000 | 5000 | --   | Paper tape            |
| RL73H2B | 100PPM  | 0.25W               | R10 - R91        | 1000 | 5000 | --   | Paper tape            |
| RL73K2B | 200PPM  | 0.25W               | R10 - R91        | 1000 | 5000 | --   | Paper tape            |
| RL73H2E | 100PPM  | 0.5W                | R10 - R91        | 1000 | 5000 | --   | Paper tape            |
| RL73K2E | 200PPM  | 0.5W                | R10 - R91        | 1000 | 5000 | --   | Paper tape            |
| RL73H2H | 100PPM  | 0.75W               | R10 - R91        | 1000 | --   | 4000 | Embossed plastic tape |
| RL73K2H | 200PPM  | 0.75W               | R10 - R91        | 1000 | --   | 4000 | Embossed plastic tape |
| RL73H3A | 100PPM  | 1W                  | R10 - R91        | 1000 | --   | 4000 | Embossed plastic tape |
| RL73K3A | 200PPM  | 1W                  | R10 - R91        | 1000 | --   | 4000 | Embossed plastic tape |

## Type RL73 Series

### Characteristics - Electrical - High power version

| Type     | TCR    | Power rating @ 70°C | Resistance Range | TDF  | TD   | TE   | Tape    |
|----------|--------|---------------------|------------------|------|------|------|---------|
| RLP73M1E | 400PPM | 0.125W              | R051 - R10       | 1000 | 5000 | --   | Paper   |
| RLP73N1E | 300PPM | 0.125W              | R110 - R47       | 1000 | 5000 | --   | Paper   |
| RLP73K1E | 200PPM | 0.125W              | R51 - 1R0        | 1000 | 5000 | --   | Paper   |
| RLP73M1J | 400PPM | 0.125W              | R051 - R10       | 1000 | 5000 | --   | Paper   |
| RLP73N1J | 300PPM | 0.125W              | R110 - R47       | 1000 | 5000 | --   | Paper   |
| RLP73K1J | 200PPM | 0.125W              | R51 - 1R0        | 1000 | 5000 | --   | Paper   |
| RLP73M2A | 400PPM | 0.25W               | R051 - R10       | 1000 | 5000 | --   | Paper   |
| RLP73N2A | 300PPM | 0.25W               | R110 - R47       | 1000 | 5000 | --   | Paper   |
| RLP73K2A | 200PPM | 0.25W               | R51 - 1R0        | 1000 | 5000 | --   | Paper   |
| RLP73V2B | 600PPM | 0.5W                | R010 - R020      | 1000 | 5000 | --   | Paper   |
| RLP73M2B | 400PPM | 0.5W                | R022 - R047      | 1000 | 5000 | --   | Paper   |
| RLP73N2B | 300PPM | 0.5W                | R051 - R091      | 1000 | 5000 | --   | Paper   |
| RLP73K2B | 200PPM | 0.5W                | R10 - 1R0        | 1000 | 5000 | --   | Paper   |
| RLP73V3A | 600PPM | 2W                  | R010 - R020      | 1000 | --   | 4000 | Plastic |
| RLP73M3A | 400PPM | 2W                  | R022 - R047      | 1000 | --   | 4000 | Plastic |
| RLP73N3A | 300PPM | 2W                  | R051 - R091      | 1000 | --   | 4000 | Plastic |
| RLP73K3A | 200PPM | 2W                  | R10 - 1R0        | 1000 | --   | 4000 | Plastic |

Operating Voltage= $\sqrt{P \cdot R}$  ; Overload Voltage= $2.5 \cdot \sqrt{P \cdot R}$  ; Operating Current= $\sqrt{P/R}$   
 Maximum operating temperature -55°C to +155°C

### Power Derating Curve



\* Recommended Circuit Board Design

For resistors operated in ambient temperatures above 70°C, power rating must be derated in accordance with this curve.

### Characteristics - Environmental

| Item   | Requirement   | Test Method  |
|--|---|--|
| Temperature Coefficient of Resistance (TCR): | As Specification  | -55°C ~ +125°C, 25°C is the reference temperature  |
| Short Time Overload:                         | $\pm(0.5\%+0.05\Omega)$<br>for higher Power rating: $\pm(1.0\% + 0.05\Omega)$ | RCWV*2.5 or Max. overload voltage for 5 seconds  |
| Insulation Resistance:                       | $\geq 10G$  | Max. overload voltage for 1 minute   |
| Endurance:                                   | $\pm(1.0\%+0.05\Omega)$   | 70 $\pm 2^\circ C$ , Max. working voltage for 1000 hrs with 1.5 hrs "ON" and 0.5 hrs "OFF"             |
| Damp Heat with Load:                         | $\pm(0.5\%+0.05\Omega)$   | 40 $\pm 2^\circ C$ , 90-95% R.H. max. working voltage for 1000 hrs with 1.5 hrs "ON" and 0.5 hrs "OFF" |
| Dry Heat:                                    | $\pm(0.5\%+0.05\Omega)$   | at +155°C for 1000 hrs   |
| Bending Strength:                            | As Spec.  | Bending once for 5 seconds 2010, 2512 sizes: 2mm<br>Other sizes: 3mm                                   |
| Solderability:                               | 95% min. coverage   | 245 $\pm 5^\circ C$ for 3 seconds  |
| Resistance to Soldering Heat:                | $\pm(0.5\%+0.05\Omega)$   | 260 $\pm 5^\circ C$ for 10 seconds   |
| Voltage Proof:                               | No breakdown or flashover   | 1.42 times RCWV (RMS) for 1 minute   |
| Leaching:                                    | Individual leaching area $\leq 5\%$<br>Total leaching area $\leq 10\%$        | 260 $\pm 5^\circ C$ for 30 seconds   |
| Thermal Shock:                               | $\pm(0.5\%+0.05\Omega)$   | -55°C to +155°C, 5 cycles  |

Reference Standards: IEC 60115-1, 60068-2-58; JIS-C 5201-1

Storage Temperature: 25 $\pm 3^\circ C$ ; Humidity < 80%RH

### Type RL73 Series

#### Dimensions



- |                          |                            |                          |
|--------------------------|----------------------------|--------------------------|
| 1. Alumina Substrate     | 4. Edge Electrode (NiCr)   | 7. Resistor Layer (NiCr) |
| 2. Bottom Electrode (Ag) | 5. Barrier Layer (Ni)      | 8. Overcoat (Epoxy)      |
| 3. Top Electrode (Ag-Pd) | 6. External Electrode (Sn) | 9. Marking               |

| Part Number          | L          | W          | C          | D          | t          |
|----------------------|------------|------------|------------|------------|------------|
| RL73 1H (0201)       | 0.58 ±0.05 | 0.29 ±0.05 | 0.15 ±0.05 | 0.12 ±0.05 | 0.23 ±0.05 |
| RL(P)73 1E (0402)    | 1.00 ±0.05 | 0.50 ±0.05 | 0.20 ±0.10 | 0.25 ±0.10 | 0.32 ±0.10 |
| RL(P)73 1J (0603)    | 1.60 ±0.10 | 0.80 ±0.10 | 0.30 ±0.20 | 0.30 ±0.20 | 0.45 ±0.10 |
| RL(P)73 2A (0805)    | 2.00 ±0.15 | 1.25 ±0.15 | 0.40 ±0.25 | 0.30 ±0.20 | 0.55 ±0.10 |
| RL(P)73 2B (1206)    | 3.10 ±0.10 | 1.55 ±0.15 | 0.40 ±0.25 | 0.50 ±0.30 | 0.55 ±0.10 |
| RL(P)73 2E (1210)    | 3.10 ±0.10 | 2.50 ±0.15 | 0.50 ±0.25 | 0.50 ±0.30 | 0.55 ±0.10 |
| RL(P)73 2H (2010)    | 5.00 ±0.20 | 2.50 ±0.15 | 0.50 ±0.25 | 0.60 ±0.30 | 0.60 ±0.15 |
| RL73 3A (2512)       | 6.35 ±0.20 | 3.10 ±0.15 | 0.55 ±0.25 | 0.60 ±0.30 | 0.60 ±0.10 |
| RLP73 3A (2512) <R10 | 6.35 ±0.20 | 3.15 ±0.15 | 0.55 ±0.25 | 0.60 ±0.30 | 0.74 ±0.10 |
| RLP73 3A (2512) ≥R10 | 6.35 ±0.20 | 3.15 ±0.15 | 2.10 ±0.10 | 0.60 ±0.30 | 0.74 ±0.10 |

#### Recommend Land Pattern



| Type                 | A    | B    | C         |
|----------------------|------|------|-----------|
| RL73 1H (0201)       | 0.25 | 0.3  | 0.40 ±0.2 |
| RL(P)73 1E (0402)    | 0.5  | 0.5  | 0.60 ±0.2 |
| RL(P)73 1J (0603)    | 0.8  | 1.0  | 0.90 ±0.2 |
| RL(P)73 2A (0805)    | 1.0  | 1.0  | 1.35 ±0.2 |
| RL(P)73 2B (1206)    | 2.0  | 1.15 | 1.70 ±0.2 |
| RL(P)73 2E (1210)    | 2.0  | 1.15 | 2.50 ±0.2 |
| RL(P)73 2H (2010)    | 3.6  | 1.4  | 2.50 ±0.2 |
| RL73 3A (2512)       | 4.9  | 1.6  | 3.10 ±0.2 |
| RLP73 3A (2512) <R10 | 4.9  | 1.6  | 3.10 ±0.2 |
| RLP73 3A (2512) ≥R10 | 1.0  | 3.55 | 3.10 ±0.2 |

## Type RL73 Series

### Packaging Quantity & Reel Specifications



| Type              | øA         | øB        | øC        | W         | T         | Paper Tape  | Embossed Plastic Tape |
|-------------------|------------|-----------|-----------|-----------|-----------|-------------|-----------------------|
| RL73 1H (0402)    | 178.0 ±1.0 | 60.0 +1.0 | 13.5 ±0.7 | 9.5 ±0.1  | 11.5 ±1.0 | 1000 / 5000 | -                     |
| RL(P)73 1E (0402) | 178.0 ±1.0 | 60.0 +1.0 | 13.5 ±0.7 | 9.5 ±0.1  | 11.5 ±1.0 | 1000 / 5000 | -                     |
| RL(P)73 1J (0603) | 178.0 ±1.0 | 60.0 +1.0 | 13.5 ±0.7 | 9.5 ±0.1  | 11.5 ±1.0 | 1000 / 5000 | -                     |
| RL(P)73 2A (0805) | 178.0 ±1.0 | 60.0 +1.0 | 13.5 ±0.7 | 9.5 ±0.1  | 11.5 ±1.0 | 1000 / 5000 | -                     |
| RL(P)73 2B (1206) | 178.0 ±1.0 | 60.0 +1.0 | 13.5 ±0.7 | 9.5 ±0.1  | 11.5 ±1.0 | 1000 / 5000 | -                     |
| RL(P)73 2E (1210) | 178.0 ±1.0 | 60.0 +1.0 | 13.5 ±0.7 | 9.5 ±0.1  | 11.5 ±1.0 | 1000 / 5000 | -                     |
| RL(P)73 2H (2010) | 178.0 ±1.0 | 60.0 +1.0 | 13.5 ±0.7 | 13.5 ±1.0 | 15.5 ±1.0 | -           | 1000 / 4000           |
| RL(P)73 3A (2512) | 178.0 ±1.0 | 60.0 +1.0 | 13.5 ±0.7 | 13.5 ±1.0 | 15.5 ±1.0 | -           | 1000 / 4000           |

### Paper Tape Specification



| Type       | A          | B          | W         | E          | F          | P <sub>0</sub> | P <sub>1</sub> | P <sub>2</sub> | øD <sub>0</sub> | T          |
|------------|------------|------------|-----------|------------|------------|----------------|----------------|----------------|-----------------|------------|
| RL73 1H    | 0.38 ±0.05 | 0.68 ±0.05 | 8.0 ±0.20 | 1.75 ±0.10 | 3.50 ±0.05 | 4.00 ±0.10     | 2.00 ±0.05     | 2.00 ±0.05     | 1.50+0.1,-0     | 0.42 ±0.20 |
| RL(P)73 1E | 0.65 ±0.10 | 1.15 ±0.10 | 8.0 ±0.20 | 1.75 ±0.10 | 3.50 ±0.05 | 4.00 ±0.10     | 2.00 ±0.05     | 2.00 ±0.05     | 1.50+0.1,-0     | 0.45 ±0.10 |
| RL(P)73 1J | 1.10 ±0.10 | 1.90 ±0.10 | 8.0 ±0.20 | 1.75 ±0.10 | 3.50 ±0.05 | 4.00 ±0.10     | 4.00 ±0.05     | 2.00 ±0.05     | 1.50+0.1,-0     | 0.70 ±0.10 |
| RL(P)73 2A | 1.60 ±0.10 | 2.40 ±0.20 | 8.0 ±0.20 | 1.75 ±0.10 | 3.50 ±0.05 | 4.00 ±0.10     | 4.00 ±0.05     | 2.00 ±0.05     | 1.50+0.1,-0     | 0.85 ±0.10 |
| RL(P)73 2B | 1.90 ±0.10 | 3.50 ±0.20 | 8.0 ±0.20 | 1.75 ±0.10 | 3.50 ±0.05 | 4.00 ±0.10     | 4.00 ±0.05     | 2.00 ±0.05     | 1.50+0.1,-0     | 0.85 ±0.10 |
| RL(P)73 2E | 2.90 ±0.10 | 3.50 ±0.20 | 8.0 ±0.20 | 1.75 ±0.10 | 3.50 ±0.05 | 4.00 ±0.10     | 4.00 ±0.05     | 2.00 ±0.05     | 1.50+0.1,-0     | 0.85 ±0.10 |

## Type RL73 Series

### Embossed Plastic Tape Specifications



| Type       | A         | B         | W         | E         | F        | $P_0$     | $P_1$     | $P_2$     | $\phi D_0$ | T         |
|------------|-----------|-----------|-----------|-----------|----------|-----------|-----------|-----------|------------|-----------|
| RL(P)73 2H | 2.80±0.10 | 5.50±0.10 | 12.0±0.10 | 1.75±0.10 | 5.5±0.05 | 4.00±0.05 | 4.00±0.10 | 2.00±0.05 | 1.50+0.10  | 1.00±0.20 |
| RL73 3A    | 3.50±0.10 | 6.70±0.10 | 12.0±0.10 | 1.75±0.10 | 5.5±0.05 | 4.00±0.05 | 4.00±0.10 | 2.00±0.05 | 1.50+0.10  | 1.00±0.20 |
| RLP73 3A   | 3.38±0.10 | 6.68±0.10 | 12.0±0.30 | 1.75±0.10 | 5.5±0.01 | 4.00±0.10 | 4.00±0.10 | 2.00±0.05 | 1.50+0.05  | 1.45±0.20 |

### How to Order

| RL73          | H  | 2A   | R10  | F                      | TD  |
|---------------|--|--|--|------------------------|---|
| Common Part   | TCR  | Size   | Resistor Value   | Tolerance              | Packaging   |
| RL73<br>RLP73 | X - 1000PPM<br>V - 600PPM<br>N - 300PPM<br>H - 100PPM<br>K - 200PPM<br>M - 400PPM<br>See above for applicability | 1H -0201<br>1E -0402<br>1J -0603<br>2A -0805<br>2B -1206<br>2E -1210<br>2H -2010<br>3A -2512 | 0.1 Ohm<br>(100milliOhm)<br>R10<br><br>0.91 Ohm<br>(910 milliOhm)<br>R91 | F - ±1%<br><br>J - ±5% | TDF -1000 REEL<br>TD -5000 REEL<br>TE -4000 REEL<br>See above for applicability |

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Телефон: 8 (812) 309-75-97 (многоканальный)

Факс: 8 (812) 320-03-32

Электронная почта: [ocean@oceanchips.ru](mailto:ocean@oceanchips.ru)

Web: <http://oceanchips.ru/>

Адрес: 198099, г. Санкт-Петербург, ул. Калинина, д. 2, корп. 4, лит. А