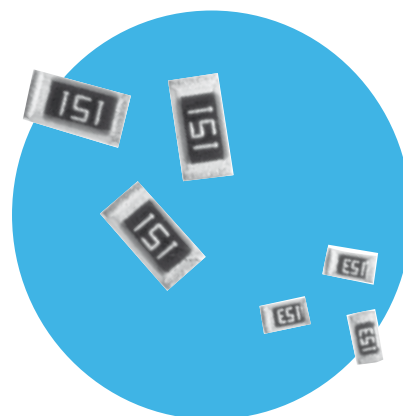


## General Purpose Surface Mounted Resistors

### WCR Series

- Excellent reliability
- Wide range of sizes and ohmic values
- Wrap around terminations
- Inner electrode protection
- AEC-Q200 grade available



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

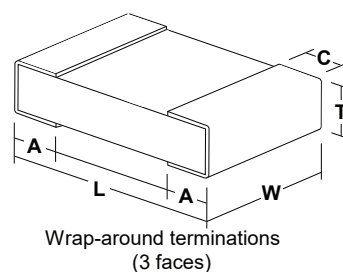
### Electrical Data

|                                 |           | 0201       | 0402       | 0603       | 0805  | 1206 | 1210 | 2010 | 2512 |
|---------------------------------|-----------|------------|------------|------------|-------|------|------|------|------|
| Power rating @ 70°C             | watts     | 0.05       | 0.063      | 0.1        | 0.125 | 0.25 | 0.25 | 0.5  | 1.0  |
| Resistance range                | ohms      | 10R to 1M0 | 1R0 to 1M0 | 1R0 to 10M |       |      |      |      |      |
| Limiting element votage         | volts     | 25         | 50         | 75         | 150   | 200  |      |      |      |
| TCR*                            | ppm/°C    | 250        | 100        |            |       |      | 200  |      |      |
| Resistance Tolerance            | %         | 1          |            |            |       |      |      |      |      |
| Standard values                 |           | E24 or E96 |            |            |       |      |      |      |      |
| Ambient temperature range       | °C        | -55 to 155 |            |            |       |      |      |      |      |
| Zero-ohm Jumper Chip Rating     | amps      | 0.5        | 1          |            | 1.5   | 2    |      |      |      |
| Zero-ohm Jumper Chip Resistance | milliohms | <50        |            |            |       |      |      |      |      |

\* Notes – TCR for low values 1R to 10R: -400 to +600ppm/°C, 11R to 100R: ±200ppm/°C  
TCR for high values 3M3 to 10M: ±300ppm/°C

### Physical Data

| Dimensions (mm) |                  |                  |                   |                  |                  |
|-----------------|------------------|------------------|-------------------|------------------|------------------|
| Style           | L                | W                | T                 | C                | A                |
| 0201            | 0.6 ± 0.03       | 0.3 ± 0.03       | 0.23 ± 0.03       | 0.12 ± 0.05      | 0.15 ± 0.05      |
| 0402            | 1.0 ± 0.1        | 0.5 ± 0.05       | 0.35 ± 0.05       | 0.2 ± 0.1        | 0.25 ± 0.1       |
| 0603            | 1.6 ± 0.15       | 0.8 ± 0.15       | 0.5 ± 0.15        | 0.25 ± 0.2       | 0.25 ± 0.2       |
| 0805            | 2.0 ± 0.2        | 1.25 ± 0.2 - 0.1 | 0.5 ± 0.15 - 0.10 | 0.4 ± 0.2        | 0.4 ± 0.2        |
| 1206            | 3.2 ± 0.1 - 0.25 | 1.6 ± 0.1 - 0.15 | 0.55 ± 0.15 - 0.1 | 0.5 ± 0.2 - 0.25 | 0.5 ± 0.2 - 0.25 |
| 1210            | 3.2 ± 0.1 - 0.2  | 2.6 ± 0.15       | 0.55 ± 0.15 - 0.1 | 0.5 ± 0.25       | 0.5 ± 0.2        |
| 2010            | 5.0 ± 0.15       | 2.5 ± 0.15       | 0.56 ± 0.15       | 0.60 ± 0.25      | 0.60 ± 0.25      |
| 2512            | 6.3 ± 0.15       | 3.2 ± 0.15       | 0.56 ± 0.15       | 0.60 ± 0.25      | 1.2 ± 0.85       |



### Construction

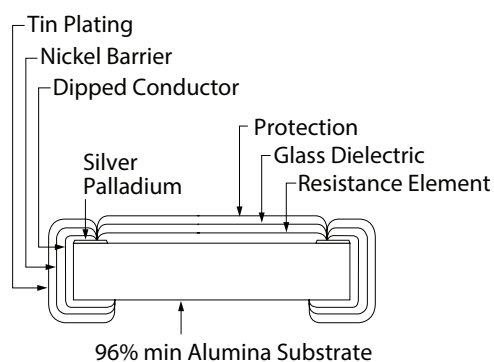
The chips have a high alumina substrate (96% minimum) with a ruthenium oxide resistance element and silver palladium, nickel and tin plated terminations. A glazed protection coat is applied to the resistive element (See Fig.1)

### Terminations

**Solderability** The terminations meet the requirements of IEC 115-1, Clause 4.17.3.2.

**Strength** The terminations meet requirements of IEC 68.2.21.

Figure 1



### General Note

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## WCR Series

### Marking

All resistors are individually marked with 3 digits. The first two digits are the significant figures and the third defines the number of added zeros. Jumpers are marked 000. Types 0201 and 0402 have no marking.

E96 1% components that can not be marked with 4 digits will be marked with a standard 3 digit code. Details can be supplied upon request.

### Solvent Resistance

The protective epoxy lacquer and marking are resistant to all normal industrial cleaning fluids suitable for printed circuits.

Table 1

| Resistance value ohms | Noise dB |
|-----------------------|----------|
| ≤100R                 | -10      |
| >100R, ≤10K           | 0        |
| >10K, ≤100K           | +15      |
| >100K, ≤1M0           | +20      |
| >1M0                  | +30      |

### Performance Data

|                                          |       | Maximum Change            |                           |                          |                          |                          |                          |                          |
|------------------------------------------|-------|---------------------------|---------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|
|                                          |       | 0201                      | 0402                      | 0603                     | 0805                     | 1206                     | 1210                     | 2010                     |
|                                          |       | 2512                      |                           |                          |                          |                          |                          |                          |
| Load: 1000 hrs at 70°C                   | Δ R%  | 10R-100K : 1<br>>100K : 2 | 4R7-100K : 1<br>>100K : 2 | 1R-100K : 1<br>>100K : 2 | 1R-100K : 1<br>>100K : 2 | 1R-100K : 1<br>>100K : 2 | 1R-100K : 1<br>>100K : 2 | 1R-100K : 1<br>>100K : 2 |
| Shelf life: 12 months at room temp.      | Δ R%  | 0.2                       | 0.2                       | 0.2                      | 0.2                      | 0.2                      | 0.2                      | 0.2                      |
| Derate linearly to zero from 70°C        |       | zero @ 155 °C             |                           |                          |                          |                          |                          |                          |
| Short term overload (6.25 x rated power) | Δ R%  | 2                         | 2                         | 2.5                      | 2.5                      | 2.5                      | 2.5                      | 2.5                      |
| Max voltage                              | volts | 50                        | 100                       | 100                      | 200                      | 400                      | 400                      | 400                      |
| Climatic                                 | Δ R%  | 3                         | 3                         | 3                        | 3                        | 3                        | 3                        | 3                        |
| Climatic Catagory                        |       | 55/125/56                 |                           |                          |                          |                          |                          |                          |
| Long term damp heat                      | Δ R%  | 1                         |                           |                          |                          |                          |                          |                          |
| Temperature rapid change                 | Δ R%  | 1                         | 1                         | 1                        | 1                        | 1                        | 1                        | 1                        |
| Resistance to solder heat                | Δ R%  | 2.5                       | 2.5                       | 2.5                      | 2.5                      | 2.5                      | 2.5                      | 2.5                      |
| Vibration and bump                       | Δ R%  | 1                         | 1                         | 1                        | 1                        | 1                        | 1                        | 1                        |
| Noise                                    |       | see table 1               |                           |                          |                          |                          |                          |                          |
| Insulation resistance                    | ohms  | > 1G                      |                           |                          |                          |                          |                          |                          |
| Voltage proof                            | volts |                           | 100                       | 300                      | 500                      | 500                      | 500                      | 500                      |

### Packaging

All chips are tape mounted and supplied on standard 8mm tape reel, as IEC publication 286-3.

180mm (7 inch) reel is standard

250mm (10 inch) reel carrying double the standard quantity can be supplied by agreement.

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## Ordering Procedure

This product has two valid part numbers:

**European (Welwyn) Part Number: WCR1206-10KFI** (1206, 10 kilohms  $\pm 1\%$ , Pb-free)

|   |   |   |   |   |   |   |   |   |   |   |   |   |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| W | C | R | 1 | 2 | 0 | 6 | - | 1 | 0 | K | F | I |
| 1 | 2 | 3 | 4 | 5 |   |   |   |   |   |   |   |   |

| 1<br>Type | 2<br>Size | 3<br>Value <sup>1</sup> | 4<br>Tolerance <sup>1</sup> | 5<br>Grade / Packing                         |
|-----------|-----------|-------------------------|-----------------------------|----------------------------------------------|
| WCR       | 0201      | E24 = 3 characters      | F = $\pm 1\%$               | I = Standard                                 |
|           | 0402      | E96 = 4 characters      |                             | A = AEC-Q200 grade <sup>2</sup>              |
|           | 0603      | R = ohms                |                             | Both grades use standard packing as follows: |
|           | 0805      | K = kilohms             |                             |                                              |
|           | 1206      | M = megohms             |                             |                                              |
|           | 1210      |                         |                             |                                              |
|           | 2010      |                         |                             |                                              |
|           | 2512      |                         |                             |                                              |
|           |           |                         |                             | 0201 20000/reel                              |
|           |           |                         |                             | 0402 10000/reel                              |
|           |           |                         |                             | 0603, 0805, 1206, 1210 5000/reel             |
|           |           |                         |                             | 2010, 2512 4000/reel                         |

Note 1: For zero ohm jumper chips use the dummy value & tolerance code **R005J**

Note 2: AEC-Q200 grade on resistor chips is not available in 0201 size.

**USA (IRC) Part Number: WCR-WCR1206LF-1002FPLT** (1206, 10 kilohms  $\pm 1\%$ , Pb-free)

|   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| W | C | R | - | W | C | R | 1 | 2 | 0 | 6 | L | F | 1 | 0 | 0 | 2 | F | P | L | T |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 |   |   |   |   |   |   |   |   |   |   |   |   |   |   |

| 1<br>Family | 2<br>Model | 3<br>Size | 4<br>Termination | 5<br>Value                    | 6<br>Tolerance | 7<br>Packing                     |
|-------------|------------|-----------|------------------|-------------------------------|----------------|----------------------------------|
| WCR         | WCR        | 0201      | LF = Pb-free     | 3 digits + multiplier         | F = $\pm 1\%$  | PLT = Paper Tape                 |
|             |            | 0402      |                  | R = ohms for values <100 ohms |                | 0201 20000/reel                  |
|             |            | 0603      |                  |                               |                | 0402 10000/reel                  |
|             |            | 0805      |                  |                               |                | 0603, 0805, 1206, 1210 5000/reel |
|             |            | 1206      |                  |                               |                | 2010 4000/reel                   |
|             |            | 1210      |                  |                               |                |                                  |
|             |            | 2010      |                  |                               |                | ELT = Plastic Tape               |
|             |            | 2512      |                  |                               |                | 2512 4000/reel                   |

Note: For zero ohm jumper chips use value & tolerance code **R000J**

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