

## Low Value Current Sense Thin Film Chip Resistors

### LCS Series

- Thin film technology
- Low values down to R10 (100mΩ)
- Precision to  $\pm 0.5\%$  &  $\pm 50$  ppm/ $^{\circ}\text{C}$
- Accurate current sensing in electronic systems
- Anti-sulfur construction



All Pb-free parts comply with EU Directive 2011/65/EU amended by (EU) 2015/863 (RoHS3)

### Electrical Data

|                           |                         | LCS0603                              | LCS0805 | LCS1206 | LCS2010 | LCS2512 |
|---------------------------|-------------------------|--------------------------------------|---------|---------|---------|---------|
| Power rating at 70°C      | watts                   | 0.1                                  | 0.125   | 0.25    | 0.5     | 1.0     |
| Resistance range          | ohms                    | R20-1R0                              |         | R10-1R0 |         |         |
| Limiting element voltage  | volts                   | 50                                   | 100     | 150     |         |         |
| TCR                       | ppm/ $^{\circ}\text{C}$ | <R30: $\pm 100$ $\geq$ R30: $\pm 50$ |         |         |         |         |
| Resistance tolerance      | %                       | 0.5, 1, 5                            |         |         |         |         |
| Standard values           |                         | E24 or E96 preferred                 |         |         |         |         |
| Ambient temperature range | $^{\circ}\text{C}$      | -55 to +155                          |         |         |         |         |

### Physical Data

| Dimensions in mm & weight in g |                 |                 |       |                 |                |         |
|--------------------------------|-----------------|-----------------|-------|-----------------|----------------|---------|
| Type                           | L               | W               | T max | A               | C              | Wt. nom |
| LCS0603                        | 1.60 $\pm$ 0.2  | 0.80 $\pm$ 0.2  | 0.55  | 0.30 $\pm$ 0.2  | 0.30 $\pm$ 0.2 | 0.006   |
| LCS0805                        | 2.00 $\pm$ 0.2  | 1.25 $\pm$ 0.2  | 0.65  | 0.40 $\pm$ 0.25 |                | 0.009   |
| LCS1206                        | 3.05 $\pm$ 0.15 | 1.55 $\pm$ 0.15 |       | 0.35 $\pm$ 0.25 | 0.42 $\pm$ 0.2 | 0.020   |
| LCS2010                        | 4.9 $\pm$ 0.2   | 2.4 $\pm$ 0.2   |       | 0.50 $\pm$ 0.25 | 0.60 $\pm$ 0.3 | 0.036   |
| LCS2512                        | 6.3 $\pm$ 0.2   | 3.1 $\pm$ 0.2   |       | 0.60 $\pm$ 0.3  | 0.055          |         |

### Construction

A thin-film material is selectively deposited on a 96% alumina substrate together with metallic contacts at each end of the resistor. The unadjusted resistors are heat treated to give the required TCR and stability, then a precisely controlled laser trim process adjusts the resistance value. Protection is applied and wrap-around terminations are added and plated with nickel then tin. Each resistor is measured immediately before packing into tape.

### Terminations

Standard is 100% Sn matte plated wrap-around terminations suitable for soldering. SnPb 60/40 plated terminations are also available.

### Marking

0603 & 0805 sizes are unmarked. Larger sizes are marked with up to four characters, e.g. 1Ω is marked 1R0 and 680mΩ is marked R68.

### General Note

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LCS Series

## Performance Data

|   |      | Maximum (+0.005Ω) |
|---|------|-------------------|
| Load at rated power (1000hrs cyclic load at 70°C)   | ±ΔR% | 1                 |
| De-rating from rated power at 70°C                  |      | See Graph         |
| Short term overload (6.25 x rated power for 5s)     | ±ΔR% | 1                 |
| Temperature rapid change (-55 / +150°C, 100 cycles) | ±ΔR% | 0.5               |
| Damp heat steady state                              | ±ΔR% | 0.5               |
| Resistance to solder heat (260°C for 10s)           | ±ΔR% | 0.5               |
| High temperature operation                          | ±ΔR% | 0.5               |
| Insulation resistance                               | MΩ   | >1000             |



## Packaging

The standard packing for LCS parts is on 8mm wide plastic carrier tape for 0603 to 1206 sizes and 12mm wide plastic carrier tape for 2010 and 2512 sizes. All sizes are wound on 7" (178mm) reels as per IEC 286-3.

## Ordering Procedure

**Example:** LCS0603-R20DT5 (LCS0603, 200mΩ 0.5%, Pb-free, tape packed 5000/reel)



| 1      | 2    | 3      | 4         | 5                     |  |                    |          |
|--------|------|--------|-----------|-----------------------|--|--------------------|----------|
| Series | Size | Value  | Tolerance | Termination & Packing |  |                    |          |
| LCS    | 0603 | R=ohms | D=±0.5%   | T5                    | 0603   | Pb-free, 5000/reel | Standard |
|        | 0805 |        | F=±1%     | T3                    | 0805, 1206, 2010                                       | Pb-free, 3000/reel |          |
|        | 1206 |        | J=±5%     | T18                   | 2512   | Pb-free, 1800/reel |          |
|        | 2010 |        |           | PB                    | SnPb terminations (pack quantities are as for Pb-free) |                    |          |
|        | 2512 |        |           |                       |  |                    |          |

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