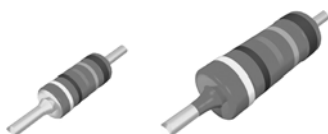


## Professional Thin Film Leaded Resistors



### DESCRIPTION

A homogeneous film of metal alloy is deposited on a high grade ceramic body. After a helical groove has been cut in the resistive layer, tinned connecting wires of electrolytic copper are welded to the end-caps. The resistors are coated with lacquer which provides electrical, mechanical, and climatic protection. Four or five color code rings designate the resistance value and tolerance according to **IEC 60062**. Suitable replacements for MRS16 and MRS25 are MBA/SMA 0204 and MBB/SMA 0207 professional.

### FEATURES

- Technology: Metal film
- Professional resistors in small outlines
- Low noise
- Lead (Pb)-free solder contacts
- Pure tin plating provides compatibility with lead (Pb)-free and lead containing soldering processes
- Compatible to RoHS Directive 2002/95/EC


**RoHS**  
COMPLIANT

### APPLICATIONS

- All general purpose applications

### TECHNICAL SPECIFICATIONS

| DESCRIPTION                                                                                            | UNIT     | MRS16                          | MRS25                          |
|--------------------------------------------------------------------------------------------------------|----------|--------------------------------|--------------------------------|
| Resistance Range                                                                                       | $\Omega$ | 4.99 to 1M                     | 1 to 10M                       |
| Resistance Tolerance                                                                                   | %        | $\pm 1$                        | $\pm 1$                        |
| Resistance Series                                                                                      |          | E24, E96                       | E24, E96                       |
| Rated Dissipation, $P_{70}$                                                                            | W        | 0.4                            | 0.6                            |
| Thermal Resistance ( $R_{th}$ )                                                                        | K/W      | 170                            | 150                            |
| Temperature Coefficient                                                                                | ppm/K    | $\pm 50$                       | $\pm 50$                       |
| Operating Voltage, $U_{max}$ , AC/DC                                                                   | V        | 200                            | 350                            |
| Basic Specifications                                                                                   |          | IEC 60 115-1                   | IEC 60 115-1                   |
| Climatic Category (IEC 60068-1)                                                                        |          | 55/155/56                      | 55/155/56                      |
| Max. Resistance Change for Resistance Range, $\Delta R$ max., after:                                   |          |                                |                                |
| Load (1000 h, $P_{70}$ )                                                                               |          | $\pm (0.5 \% R + 0.05 \Omega)$ | $\pm (0.5 \% R + 0.05 \Omega)$ |
| Long Term Damp Heat Test (56 Days):                                                                    |          |                                |                                |
| MRS16: $4.99 \Omega \leq R \leq 332 \text{ k}\Omega$ ; MRS25: $1 \Omega \leq R \leq 1 \text{ M}\Omega$ |          | $\pm (0.5 \% R + 0.05 \Omega)$ | $\pm (0.5 \% R + 0.05 \Omega)$ |
| MRS16: $R > 332 \text{ k}\Omega$ ; MRS25: $R > 1 \text{ M}\Omega$                                      |          | $\pm (2 \% R + 0.05 \Omega)$   | $\pm (2 \% R + 0.05 \Omega)$   |
| Soldering (260 °C, 10 s):                                                                              |          |                                |                                |
| MRS16: $4.99 \Omega \leq R \leq 332 \text{ k}\Omega$ ; MRS25: $1 \Omega \leq R \leq 1 \text{ M}\Omega$ |          | $\pm (0.1 \% R + 0.05 \Omega)$ | $\pm (0.1 \% R + 0.05 \Omega)$ |
| MRS16: $R > 332 \text{ k}\Omega$ ; MRS25: $R > 1 \text{ M}\Omega$                                      |          | $\pm (0.5 \% R + 0.05 \Omega)$ | $\pm (0.5 \% R + 0.05 \Omega)$ |
| Short Time Overload:                                                                                   |          |                                |                                |
| MRS16: $4.99 \Omega \leq R \leq 332 \text{ k}\Omega$ ; MRS25: $1 \Omega \leq R \leq 1 \text{ M}\Omega$ |          | $\pm (0.1 \% R + 0.01 \Omega)$ | $\pm (0.1 \% R + 0.01 \Omega)$ |
| MRS16: $R > 332 \text{ k}\Omega$ ; MRS25: $R > 1 \text{ M}\Omega$                                      |          | $\pm (0.5 \% R + 0.05 \Omega)$ | $\pm (0.5 \% R + 0.05 \Omega)$ |

### PACKAGING

| MODEL | REEL        |      | BOX        |      |
|-------|-------------|------|------------|------|
|       | PIECES/REEL | CODE | PIECES/BOX | CODE |
| MRS16 | 5000        | RP   | 1000       | C1   |
|       |             |      | 5000       | CT   |
| MRS25 | 5000        | RP   | 1000       | C1   |
|       |             |      | 5000       | CT   |

## DIMENSIONS



### DIMENSIONS (Leaded Resistor Types, Mass and Relevant Physical Dimensions)

| TYPE  | D <sub>max.</sub><br>(mm) | L <sub>max.</sub><br>(mm) | d <sub>nom.</sub><br>(mm) | M <sub>min.</sub><br>(mm) | MASS<br>(mg) |
|-------|---------------------------|---------------------------|---------------------------|---------------------------|--------------|
| MRS16 | 1.6                       | 3.6                       | 0.5                       | 5.0                       | 125          |
| MRS25 | 2.5                       | 6.5                       | 0.6                       | 10.0                      | 220          |

### PART NUMBER AND PRODUCT DESCRIPTION

PART NUMBER: MRS16000C5119FCT00

| MODEL/SIZE         | VARIANT     | TCR            | VALUE                                                                                                                                                                                                                                                                                     | TOLERANCE | PACKAGING <sup>(1)</sup> | SPECIAL                         |
|--------------------|-------------|----------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|--------------------------|---------------------------------|
| MRS1600<br>MRS2500 | 0 = Neutral | C = ± 50 ppm/K | 3 digit value<br>1 digit multiplier<br>MULTIPLIER<br><br>7 = *10 <sup>-3</sup> 2 = *10 <sup>2</sup><br>8 = *10 <sup>-2</sup> 3 = *10 <sup>3</sup><br>9 = *10 <sup>-1</sup> 4 = *10 <sup>4</sup><br>0 = *10 <sup>0</sup> 5 = *10 <sup>5</sup><br>1 = *10 <sup>1</sup> 6 = *10 <sup>6</sup> | F = ± 1 % | RP<br>CT<br>C1           | Up to 2 digits<br>00 = Standard |

PRODUCT DESCRIPTION: MRS16 50 1 % CT 51R1

| MODEL/SIZE     | TCR        | TOLERANCE | PACKAGING <sup>(1)</sup> | RESISTANCE VALUE           |
|----------------|------------|-----------|--------------------------|----------------------------|
| MRS16<br>MRS25 | ± 50 ppm/K | ± 1 %     | RP<br>CT<br>C1           | 51R1 = 51.1 Ω<br>1K = 1 kΩ |

#### Notes

- The PART NUMBER is shown to facilitate the introduction of a unified part numbering system for ordering products

<sup>(1)</sup> Please refer packaging table

### 12NC INFORMATION FOR HISTORICAL CODING REFERENCE

- The resistors have a 12 digit numeric code starting with 2322 15.
- The subsequent 2 digits indicate the resistor type and packaging; see the 12NC Ordering Code table.
- The remaining 4 digits indicate the resistance value:
  - The first 3 digits indicate the resistance value.
  - The last digit indicates the resistance decade in accordance with the 12NC Indicating Resistance Decade table.

#### Last Digit of 12NC Indicating Resistance Decade

| RESISTANCE DECADE | LAST DIGIT |
|-------------------|------------|
| 1 Ω to 9.76 Ω     | 8          |
| 10 Ω to 97.6 Ω    | 9          |
| 100 Ω to 976 Ω    | 1          |
| 1 kΩ to 9.76 kΩ   | 2          |
| 10 kΩ to 97.6 kΩ  | 3          |
| 100 kΩ to 976 kΩ  | 4          |
| 1 MΩ to 9.76 MΩ   | 5          |
| 10 MΩ             | 6          |

#### 12NC Example

The 12NC of a MRS16 resistor with value 750 Ω, supplied on a bandolier of 1000 units in ammpack is: 2322 157 17501.

### 12NC (Resistors Type and Packaging)

| TYPE  | 2322 15. ....         |            |                   |
|-------|-----------------------|------------|-------------------|
|       | BANDOLIER IN AMMOPACK |            | BANDOLIER ON REEL |
|       | 1000 UNITS            | 5000 UNITS | 5000 UNITS        |
| MRS16 | 7 1....               | 7 2....    | 7 3....           |
| MRS25 | 6 1....               | 6 2....    | 6 3....           |



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