

## ◆ General

### ● Scope

This specification is available for metal alloy Low-Resistance Resistor manufactured by ELLON Electro-Mechanics co., Ltd.

### ● Quality

The resistor is manufactured by highly quality-controlled process and guaranteed high reliability. It meets RoHS & Halogen-Free requirement.

### ● Standard measuring conditions

Temperature  $20\pm 2^{\circ}\text{C}$ , Humidity  $65\pm 5\%$ . Being no doubt about the judgment, measurements can be made Within the following temperature  $5\sim 35^{\circ}\text{C}$ , Humidity  $45\sim 85\%$ .

## ◆ Application

- Inverter/Converter
- Power supply
- Consumer electronics
- Notebook
- Battery management system

## ◆ Specification

- Surface mount 0603/0805/1206 case sizes
- Resistance values up to  $20\text{m}\Omega$
- High precision current sensing and voltage division
- Resistance tolerance  $0.5\%(D)$ ,  $\pm 1\%(F)$ ,
- Low resistance / Low TCR

## ◆ Part number system

| EMC          | 06                                                  | F                                | 0W5                                         | R002                                                             | M        | D              | s                                             |
|--------------|-----------------------------------------------------|----------------------------------|---------------------------------------------|------------------------------------------------------------------|----------|----------------|-----------------------------------------------|
| Product Type | Size (Inch)                                         | Resistor Tolerance               | Rated Power                                 | Resistor Value                                                   | Material | Quantity (Pcs) | Remarks                                       |
| EMC          | 06=0603<br>08=0805<br>16=1206<br>58=0508<br>62=0612 | D = $\pm 0.5\%$<br>F = $\pm 1\%$ | 0W5=0.5Watt<br>W75=0.75 Watt<br>1W0=1.0Watt | R001=1m $\Omega$<br>---<br>R005=5m $\Omega$<br>R020=20m $\Omega$ | M:MnCu   | E=5000         | S=Standard<br>G=High power<br>W=Wide terminal |

(1) EMC Series

(2): Size Code: 06=0603, 08=0805, 16=1206, 58=0508, 62=0612

(3): Tolerance Code: D =  $\pm 0.5\%$ , F =  $\pm 1\%$

(4): Power Rating: Ex. 0W5=0.5Watt ; W75=0.75Watt; 1W0=1.0Watt

(5): Resistance Code: 1M50=1.5m $\Omega$  R005=5m $\Omega$  R010=10m $\Omega$ .

(6): Materials: M=MnCu; A=Alloy

(7): Optional piece reel quantity:

(8): Remarks: interior code

## ◆ SPECIFICATIONS

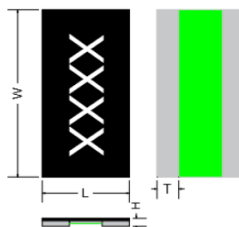
| Type  | EIA SIZE | Rating<br>Power at<br>70℃ | Material | Resistance Range (mΩ) |           | T.C.R.<br>(ppm/℃) | Operating<br>Temperature<br>Range (℃) |
|-------|----------|---------------------------|----------|-----------------------|-----------|-------------------|---------------------------------------|
|       |          |                           |          | 0.5%(D)               | 1.0%(F)   |                   |                                       |
| EMC06 | 0603     | 0.5W                      | MnCu     | --                    | R002-R003 | ≒ ±150            | -55 ~ + 155                           |
|       |          |                           |          | --                    | R004-R005 | ≒ ±100            |                                       |
|       |          |                           |          | R005-R020             | R006-R020 | ≒ ±75             |                                       |
| EMC08 | 0805     | 0.5W                      |          | --                    | R001      | ≒ ±200            |                                       |
|       |          |                           |          | --                    | 1M50-R002 | ≒ ±100            |                                       |
|       |          |                           |          | --                    | R003-R005 | ≒ ±75             |                                       |
|       |          |                           |          | R005-R020             | R006-R020 | ≒ ±50             |                                       |
|       |          | 0.75W                     |          | --                    | R001      | ≒ ±200            |                                       |
|       |          |                           |          | --                    | 1M50-R002 | ≒ ±100            |                                       |
|       |          |                           |          | --                    | R003-R005 | ≒ ±75             |                                       |
|       |          |                           |          | R005-R020             | R006-R020 | ≒ ±50             |                                       |
| EMC16 | 1206     | 1W                        |          | --                    | R001      | ≒ ±100            |                                       |
|       |          |                           |          | --                    | 1M50-R004 | ≒ ±75             |                                       |
|       |          |                           |          | R005-R020             | R005-R020 | ≒ ±50             |                                       |
| EMC58 | 0508     | 1W                        |          | --                    | R001-R002 | ≒ ±100            |                                       |
|       |          |                           |          | --                    | R003-R010 | ≒ ±75             |                                       |
| EMC62 | 0612     | 1W                        |          | --                    | R001-R002 | ≒ ±75             |                                       |
|       |          |                           |          | --                    | R003-R010 | ≒ ±50             |                                       |

## ◆ Component Dimensions



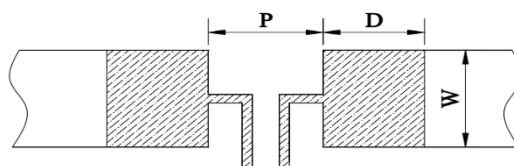
| Case Size | EIA<br>SIZE | Rating<br>Power | Resistance<br>Range (Ω) | L           | W           | A           | T          |
|-----------|-------------|-----------------|-------------------------|-------------|-------------|-------------|------------|
| EMC06     | 0603        | 0.5W            | R002                    | 1.600±0.250 | 0.800±0.200 | 0.500±0.150 | 0.350±0.15 |
|           |             |                 | R003-R004               | 1.600±0.250 | 0.800±0.200 | 0.350±0.150 | 0.350±0.15 |
|           |             |                 | R005-R020               | 1.600±0.250 | 0.800±0.200 | 0.320±0.150 | 0.300±0.15 |
| EMC08     | 0805        | 0.5W            | R001                    | 2.000±0.254 | 1.250±0.254 | 0.650±0.254 | 0.400±0.20 |
|           |             |                 | 1M50-R002               | 2.000±0.254 | 1.250±0.254 | 0.550±0.254 | 0.400±0.20 |
|           |             |                 | R003-R005               | 2.000±0.254 | 1.250±0.254 | 0.400±0.254 | 0.400±0.20 |
|           |             |                 | R006-R020               | 2.000±0.254 | 1.250±0.254 | 0.400±0.254 | 0.400±0.20 |
|           |             | 0.75W           | R001                    | 2.000±0.254 | 1.250±0.254 | 0.650±0.254 | 0.400±0.20 |
|           |             |                 | 1M50-R002               | 2.000±0.254 | 1.250±0.254 | 0.550±0.254 | 0.400±0.20 |
|           |             |                 | R003-R005               | 2.000±0.254 | 1.250±0.254 | 0.400±0.254 | 0.400±0.20 |
|           |             |                 | R006-R020               | 2.000±0.254 | 1.250±0.254 | 0.400±0.254 | 0.400±0.20 |

|       |      |    |           |             |             |            |           |
|-------|------|----|-----------|-------------|-------------|------------|-----------|
| EMC16 | 1206 | 1W | R001      | 3.200±0.254 | 1.600±0.254 | 1.20±0.254 | 0.40±0.20 |
|       |      |    | 1M50-R002 | 3.200±0.254 | 3.200±0.254 | 1.00±0.254 | 0.40±0.20 |
|       |      |    | R002-R004 | 3.200±0.254 | 3.200±0.254 | 0.85±0.254 | 0.40±0.15 |
|       |      |    | R005-R020 | 3.200±0.254 | 3.200±0.254 | 0.60±0.254 | 0.40±0.15 |



| Case Size | EIA SIZE | Rating Power | Resistance Range (Ω) | L           | W           | H           | T          |
|-----------|----------|--------------|----------------------|-------------|-------------|-------------|------------|
| EMC58     | 0508     | 1W           | R001                 | 1.200±0.250 | 2.000±0.250 | 0.500±0.100 | 0.350±0.15 |
|           |          |              | R002-R010            | 1.200±0.250 | 2.000±0.250 | 0.450±0.050 | 0.350±0.15 |
| EMC62     | 0612     | 1W           | R001                 | 1.600±0.250 | 3.200±0.250 | 0.350±0.054 | 0.40±0.20  |
|           |          |              | 1M50-R025            | 1.600±0.250 | 3.200±0.250 | 0.300±0.054 | 0.40±0.20  |

## ◆ Recommended Solder Pad Layout



Unit:mm

| Case Size | EIA Size | Resistance Range (Ω) | P    | D    | W    |
|-----------|----------|----------------------|------|------|------|
| EMC06     | 0603     | R002                 | 0.90 | 1.95 | 1.74 |
|           |          | R003-R020            | 1.00 | 1.85 | 1.74 |
| EMC08     | 0805     | R001-R020            | 1.20 | 1.75 | 1.74 |
| EMC16     | 1206     | R001-R002            | 0.80 | 1.45 | 1.52 |
|           |          | R003-R005            | 0.50 | 1.35 | 0.92 |
|           |          | R006-R020            | 0.60 | 1.30 | 0.92 |
| EMC58     | 0508     | R001-R010            | 0.45 | 0.75 | 2.30 |
| EMC62     | 0612     | R001-R025            | 0.60 | 1.00 | 3.50 |

## ◆ Environmental characteristics

| Item                 | Test Conditions                 | Reference Standard                    |
|----------------------|---------------------------------|---------------------------------------|
| Short Time Over Load | P= 2.5Pr ; T=25±2°C , t = 5sec. | IEC60115-1 4.13                       |
| Low Temp. Storage    | T = -55±2°C ; t = 1000h         | IEC60115-1 4.25.1<br>JIS-C5201 4.25.1 |
| High Temp. Exposure  | T = +155±2°C ; t = 1000h        | IEC60115-1 4.13<br>JIS-C5201 4.13     |

|                                    |                                                                       |                                       |
|------------------------------------|-----------------------------------------------------------------------|---------------------------------------|
| Moisture Load Life<br>(60°C,95%RH) | Vtest = Vmax ; T=60±2°C ; RH=95% ;<br>t= 90min ON , 30min OFF , 1000h | IEC60115-1 4.25.1                     |
| Thermal Shock                      | [-55°C 30min. → R.T. 3min. → +155°C 30min.<br>→ R.T. 3min ],          | IEC60115-1 4.19                       |
| Load Life at 70°C                  | Vtest = Vmax ; T=70±2°C ;t= 90min ON ,<br>30min OFF,1000h             | IEC60115-1 4.25.1                     |
| Solderability                      | +245°C ± 5°C, 2 sec. ± 0.5sec.                                        | IEC60115-1 4.17<br>JIS-C5201 4.17     |
| Resistance to Solder Heat          | Through Reflow T= 275±5°C , t =20±1sec.                               | IEC60115-1 4.18<br>JIS-C5201 4.18     |
| Mechanical Shock                   | a =100G , t =11ms, 5 times shock                                      | IEC60115-1 4.21                       |
| Substrate Bending                  | Bending within 2mm                                                    | IEC60115-1 4.33<br>JIS-C5201 4.33     |
| Core Body Strength                 | Central part pressurizing force:5N ,10 seconds                        | JIS-C5201-1 4.15                      |
| Bending Strength                   | Bending once 2mm for 10 seconds                                       | JIS-C-5201-1 4.33<br>IEC-60115-1 4.33 |

Voltage and Current Ratings: Voltage and current ratings can be calculated for each part number by using the formulas below:

Current Rating Formula:  $I = \sqrt{P/R}$

Example: EMC16F0R006MEG

P=1W

R=0.006Ω(6milli-ohm)

$$I = \sqrt{P/R} = \sqrt{1.0/0.006} = 12.909A$$

Voltage Rating Formula:  $V = \sqrt{P * R}$

Example: EMC16F0R006MEG

P=1W

R=0.006Ω(6milli-ohm)

$$V = \sqrt{P * R} = \sqrt{1.0 * 0.006} = 0.07745V$$

Thermal EMF Characteristics:

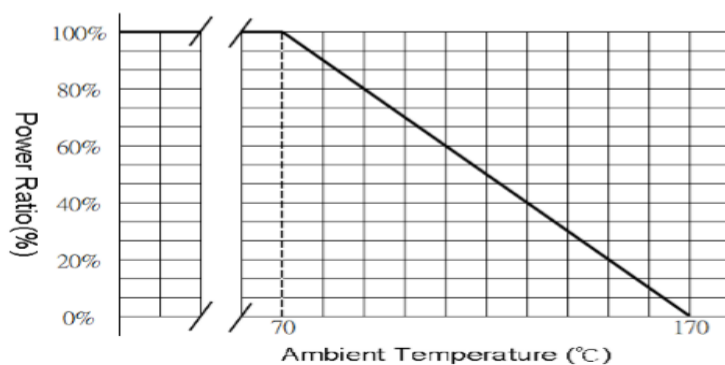
Thermal EMF=-1μV/°C

## ◆ Performance characteristics

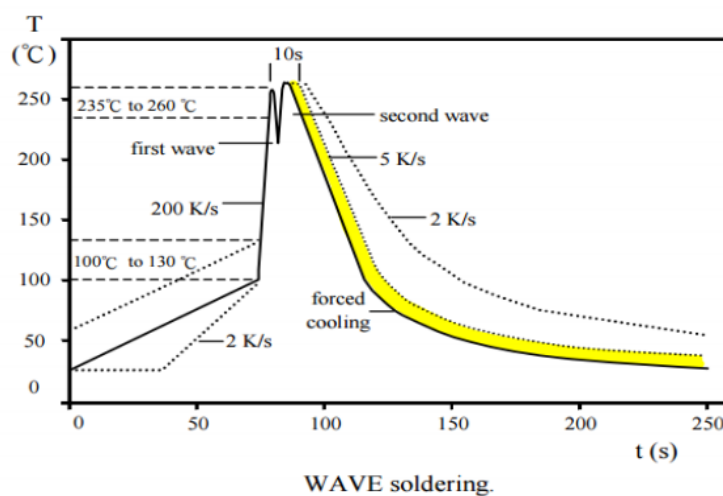
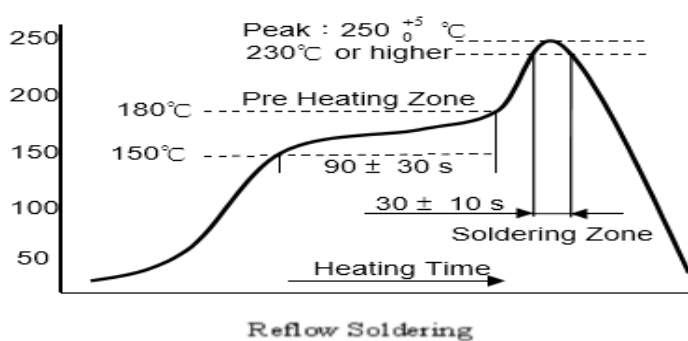
### Power Derating Curve

The Operating Temperature Range:  $-55^{\circ}\text{C} \sim +155^{\circ}\text{C}$ .

For resistors operated in ambient temperatures above  $70^{\circ}\text{C}$ , power rating must be derating in accordance with the curve below



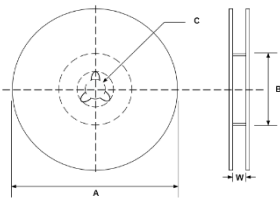
## ◆ Soldering Profile



◆ Packaging information

REEL DIMENIONS (mm) AND QUANTITY

| Type  | A        | B       | C       | W        | Quantity |
|-------|----------|---------|---------|----------|----------|
| EMC06 | 178 ±2.0 | 60 ±1.0 | 13 ±1.0 | 9.0 ±1.0 | 5000     |
| EMC08 |          |         |         |          |          |
| EMC16 |          |         |         |          |          |
| EMC58 |          |         |         |          |          |
| EMC62 |          |         |         |          |          |



◆ Storage Temperature

Temperature 20~30℃, Humidity 40~80%