

SINLOON®

保險絲晶圓電阻
Power: 1/8W - 3WS

MELF FRM - Type
MELF Fusible Resistor

□ FEATURE

- ◆ Advanced Metal film technology.
- ◆ Power 1/8W~ 3WS
- ◆ Force fitted steel caps, tin plated on nickel barrier.
- ◆ Pure Sn termination on Ni barrier layer.
- ◆ Compatible with lead (Pb)-free and lead containing soldering processes.
- ◆ Lead (Pb)-free and **RoHS** compliant .

FIGURE

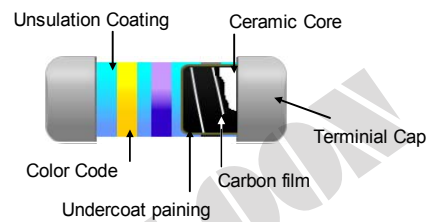


□ APPLICATION

MELF Fusible Resistor - FRM

There are some similarities between Resistor and Fuses in material and structure. Fusible Resistor contain both functions, as being Resistor in normal condition and changed into fuse while abnormal Current comes in to protect machine and equipment. Since two functions performed by one resistor, the cost therefore saved. FRM Fusible Resistor series are produced with precision technique, Enabling precise fusing time and stabilized, aiming to reach best Quality Resistor.(FRM 保險絲晶圓電阻系列生產採用了精密技術，精確的熔斷時間和穩定的質量，旨在生產出色的熔斷保險絲晶圓電阻。)

□ CONSTRUCTION DIAGRAM



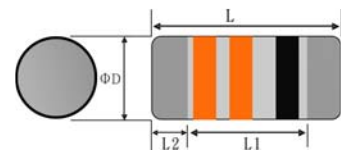
□ ORDERING INFORMATION

Example: V-FRM07J102x16 (1/4W 0207 1K Ω ±5% x16)

| Power 功率 | Size 尺寸 | Type 型號 | Tolerance 誤差 | E24 (±5%) | | Multiple | Package | |
|-------------|------------|------------|-------------------|---------------------|-----------|----------|-----------|----------|
| | | | | Resistance (Ω) Code | | | Reel Size | Quantity |
| 1/8W | 0204 | W-FRM04 | G= ±2% J = ±5% | m5=R0005Ω | 1K=102 | x16 | 178mm | 3000 pcs |
| 1/4S | 0204 | V-FRM04 | | 5m=R005Ω | 10K = 103 | x25 | 178mm | 3000 pcs |
| 1/4W | 0207 | V-FRM07 | | 50m=R05Ω | 100K=104 | x30 | 178mm | 2000 pcs |
| 1/2WS | 0207 | U-FRM07 | | 100m=R1Ω | 1M=105 | x40 | 178mm | 2000 pcs |
| 1/2W | 0309 | U-FRM09 | | 1000m=1Ω | 10M=106 | | 178mm | 2000 pcs |
| 1WS | 0309 | S-FRM09 | | 1R = 1R0 | 100M=107 | | 178mm | 2000 pcs |
| 1W | 0411 | S-FRM11 | | 10R=100 | 1G=108 | | 330mm | 2500 pcs |
| 2WS | 0411 | Q-FRM11 | | 100R=101 | 10G=109 | | 330mm | 2500 pcs |
| 2W | 0515 | Q-FRM15 | | | | | 330mm | 1500 pcs |
| 3WS | 0515 | N-FRM15 | | | | | 330mm | 1500 pcs |

□ DIMENSION

| Power | Size | Type | L | Φ D | L1 | L2 |
|-------|------|---------|------------|-----------|----------|------------|
| 1/8W | 0204 | W-FRM04 | 3.5 ±0.20 | 1.6 ±0.2 | 2.1 ±0.1 | 0.70 ±0.1 |
| 1/4S | 0204 | V-FRM04 | 3.5 ±0.20 | 1.6 ±0.2 | 2.1 ±0.1 | 0.70 ±0.1 |
| 1/4W | 0207 | V-FRM07 | 5.7 ±0.20 | 2.4 ±0.15 | 4.1 ±0.1 | 0.80 ±0.20 |
| 1/2WS | 0207 | U-FRM07 | 5.7 ±0.20 | 2.4 ±0.15 | 4.1 ±0.1 | 1.70 ±0.20 |
| 1/2W | 0309 | U-FRM09 | 8.5 ±0.20 | 3.3 ±0.15 | 6.1±0.2 | 1.70 ±0.20 |
| 1WS | 0309 | S-FRM09 | 8.5 ±0.20 | 3.3 ±0.15 | 6.1±0.2 | 1.70 ±0.20 |
| 1W | 0411 | S-FRM11 | 10.5 ±0.30 | 4.3 ±0.2 | 6.2±0.3 | 2.30 ±0.20 |
| 2WS | 0411 | Q-FRM11 | 10.5 ±0.30 | 4.3 ±0.2 | 6.2±0.3 | 2.30 ±0.20 |
| 2W | 0515 | Q-FRM15 | 14.5 ±0.30 | 2.6 ±0.3 | 9.9±0.4 | 2.30 ±0.20 |
| 3WS | 0515 | N-FRM15 | 14.5 ±0.30 | 2.6 ±0.3 | 9.9±0.4 | 2.30 ±0.20 |



SINLOON®

保險絲晶圓電阻
Power: 1/8W - 3WS

MELF FRM - Type
MELF Fusible Resistor

Power Rated

| Power 功率 | Size 尺寸 | Type 型號 | Tolerance 誤差 | *Resistance (Ω) / Multiple | | | | | Fusing Time |
|-------------|------------|------------|--------------------|----------------------------|-----------|-------------|-----------|-----------|----------------|
| | | | | x16 | x20 | x25 | x30 | x40 | |
| 1/8W | 0204 | W-FRM04 | G = ±2% J = ±5% | 5.1R~2.2K | 1R ~ 4.7R | 0.47R~0.91R | --- | --- | Within 60 sec. |
| 1/4S | 0204 | V-FRM04 | | 5.1R~2.2K | 2.4K~10K | | 100m~200m | 100m~180m | |
| 1/4W | 0207 | V-FRM07 | | 5.1R~2.2K | 1R ~ 4.7R | | | | |
| 1/2WS | 0207 | U-FRM07 | | 5.1R~2.2K | 2.4K~10K | 0.47R~2R | 100m~430m | --- | |
| 1/2W | 0309 | U-FRM09 | | 2.2R~5K | 0.47R~2R0 | | | | |
| 1WS | 0309 | S-FRM09 | | 2.2R~5K | | | | | |
| 1W | 0411 | S-FRM11 | | 2.2R~2K | | | | | |
| 2WS | 0411 | Q-FRM11 | | 2.2R~2K | | | | | |
| 2W | 0515 | Q-FRM15 | | 2.2R~1K | | | | | |
| 3WS | 0515 | N-FRM15 | | 2.2R~1K | | | | | |

* The above power rating and fusing time for standard fusible resistors, other spec. on request

* Working voltage = $\sqrt{\text{Power Rating} \times \text{Resistance}}$ °

* Fusing voltage = $\sqrt{\text{Power Rating} \times \text{Resistance} \times \text{Fusing Multiplier}}$ °

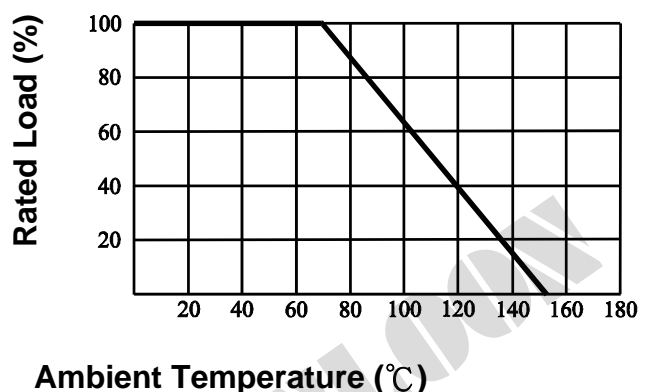
Characteristics

| Item | Characteristics | Test Method |
|--|--|---|
| 1. Operating Temp. Range 使用溫度範圍 | -55°C ~ 155°C | As Spec. |
| 2. Temperature Coefficient 溫度係數 | ±200 ppm/°C | JIS-C-5202; 5.2 |
| 3. Short time overload 短時間過負載 | ±2% | Rating voltage×2.5 or Max. overload voltage For 5 sec. Whichever less |
| 4. Resistance to soldering heat 焊接耐熱性 | ±2% | 260°C±5°C, 5 sec ± 1 sec |
| 5. Insulation Resistance 絕緣電阻 | Over 10 ³ MΩ | JIS-C-5202 ; 5.6-條件A |
| 6. Load Life in Humidity 耐濕負載 | ±5% | 40°C±2°C, 90%~95%RH, 1000h, 1.5h "on"/ 0.5h "off" cycle |
| 7. Load Life 壽命負載 | ±5% | 70°C±2°C, 1000h, 1.5h "on"/ 0.5h "off" cycle |
| 8. Solderability 焊接性 | 90% Coverage/Min | 235°C±5°C, 2 sec ± 0.5 sec |
| 9. Bending test 端子強度 | ±1% | Holding point width 90mm, Bending 5mm, 1 time |
| 10. Non-Combustibility 不燃性 | The resistors shall withstand Overload test in accordance With Article UL-94, V-0 without producing a fire hazard. | |

Fusing Characteristics



Power Daring Curve




SINLOON®

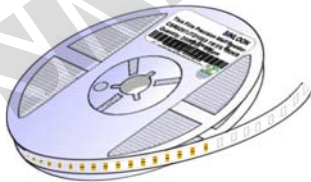
保險絲晶圓電阻
Power: 1/8W - 3WS

MELF FRM - Type
MELF Fusible Resistor

PACKAGE SPECIFICATION

| Rated Power | Size | Type Number | Quantity (ea) | | | SINLOON® |
|-------------|------|-------------|---------------|----------|---------|---|
| | | | Tape Reel | | Carton | |
| 1/8W | 0204 | W-FRM04 | 178mm | 3000 pcs | 30K Pcs |  <p>品質承諾標誌 QUALITY COMMITMENT</p> |
| 1/4S | 0204 | V-FRM04 | 178mm | 3000 pcs | 30K Pcs | |
| 1/4W | 0207 | V-FRM07 | 178mm | 2000 pcs | 20K Pcs | |
| 1/2WS | 0207 | U-FRM07 | 178mm | 2000 pcs | 20K Pcs | |
| 1/2W | 0309 | U-FRM09 | 178mm | 2000 pcs | 20K Pcs | |
| 1WS | 0309 | S-FRM09 | 330mm | 2500 pcs | 5K Pcs | |
| 1W | 0411 | S-FRM11 | 330mm | 2000 pcs | 4K Pcs | |
| 2WS | 0411 | Q-FRM11 | 330mm | 2000 pcs | 4K Pcs | |
| 2W | 0515 | Q-FRM15 | 330mm | 1500 pcs | 3K Pcs | |
| 3WS | 0515 | N-FRM15 | 330mm | 1500 pcs | 3K Pcs | |

Reel Tape

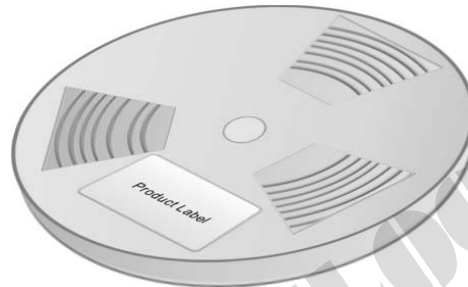


Inner Box

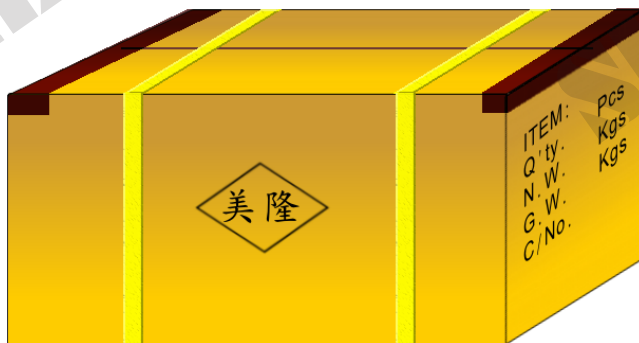


Φ330mm Tape Reel

Figure



Carton Package



※美隆公司產品規格及其特性參數的改變或更新恕不另行通知。

※Mayloon characteristic parameters of electronic product specification changes or updates without notice to improve。

SINLOON®

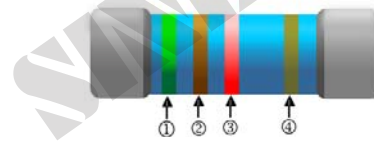
保險絲晶圓電阻
Power: 1/8W - 3WS

MELF FRM - Type
MELF Fusible Resistor

Standard Resistor Color Code E24 Series (4 band code)

| Color | 1st digit | 2nd digit | 3rd Multiplier | 4 Tolerance |
|--------|-----------|-----------|----------------|------------------|
| Black | 0 | 0 | $\times 10^0$ | |
| Brown | 1 | 1 | $\times 10^1$ | $\pm 1\%$ (F) |
| Red | 2 | 2 | $\times 10^2$ | $\pm 2\%$ (G) |
| Orange | 3 | 3 | $\times 10^3$ | |
| Yellow | 4 | 4 | $\times 10^4$ | |
| Green | 5 | 5 | $\times 10^5$ | $\pm 0.5\%$ (D) |
| Blue | 6 | 6 | $\times 10^6$ | $\pm 0.25\%$ (C) |
| Violet | 7 | 7 | $\times 10^7$ | $\pm 0.1\%$ (B) |
| Gray | 8 | 8 | $\times 10^8$ | $\pm 0.05\%$ (A) |
| White | 9 | 9 | $\times 10^9$ | |
| Gold | | | $\times 0.1$ | $\pm 5\%$ (J) |
| Silver | | | $\times 0.01$ | $\pm 10\%$ (K) |
| None | | | | $\pm 20\%$ (M) |

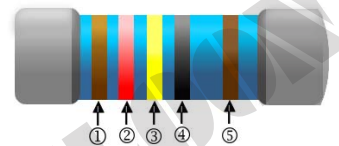
Example : Value : 5.1K Ω $\pm 5\%$



Standard Resistor Color Code E96 Series (5 band code)

| Color | 1st digit | 2nd digit | 3rd digit | 4 Multiplier | 5 Tolerance |
|--------|-----------|-----------|-----------|---------------|------------------|
| Black | 0 | 0 | 0 | $\times 10^0$ | |
| Brown | 1 | 1 | 1 | $\times 10^1$ | $\pm 1\%$ (F) |
| Red | 2 | 2 | 2 | $\times 10^2$ | $\pm 2\%$ (G) |
| Orange | 3 | 3 | 3 | $\times 10^3$ | |
| Yellow | 4 | 4 | 4 | $\times 10^4$ | |
| Green | 5 | 5 | 5 | $\times 10^5$ | $\pm 0.5\%$ (D) |
| Blue | 6 | 6 | 6 | $\times 10^6$ | $\pm 0.25\%$ (C) |
| Violet | 7 | 7 | 7 | $\times 10^7$ | $\pm 0.1\%$ (B) |
| Gray | 8 | 8 | 8 | $\times 10^8$ | $\pm 0.05\%$ (A) |
| White | 9 | 9 | 9 | $\times 10^9$ | |
| Gold | | | | $\times 0.1$ | $\pm 5\%$ (J) |
| Silver | | | | $\times 0.01$ | $\pm 10\%$ (K) |
| None | | | | | $\pm 20\%$ (M) |

Example : Value : 12.4 Ω $\pm 1\%$



STANDARD RESISTANCE VALUE IN A DECADE

For Resistance According to IEC Publication 63

| E24 | E96 | | | | Example : | E24 Series: 10 Resistance: 0.1R; 1R0; 10R; 100R; 1K; 10K; 100K; 1M; 100M. |
|-----|-----|-----|-----|-----|-----------|---|
| 10 | 100 | 178 | 316 | 562 | | |
| 11 | 102 | 182 | 324 | 576 | | |
| 12 | 105 | 187 | 332 | 590 | | |
| 13 | 107 | 191 | 340 | 604 | | |
| 15 | 110 | 196 | 348 | 619 | | |
| 16 | 113 | 200 | 357 | 634 | | |
| 18 | 115 | 205 | 365 | 649 | | |
| 20 | 118 | 210 | 374 | 665 | | |
| 22 | 121 | 215 | 383 | 681 | | |
| 24 | 124 | 221 | 392 | 698 | | |
| 27 | 127 | 226 | 402 | 715 | | |
| 30 | 130 | 232 | 412 | 732 | | |
| 33 | 133 | 237 | 422 | 750 | | |
| 36 | 137 | 243 | 432 | 768 | | |
| 39 | 140 | 249 | 442 | 787 | | |
| 43 | 143 | 255 | 453 | 806 | | |
| 47 | 147 | 261 | 464 | 825 | | |
| 51 | 150 | 267 | 475 | 845 | | |
| 56 | 154 | 274 | 487 | 866 | | |
| 62 | 158 | 280 | 499 | 887 | | |
| 68 | 162 | 287 | 511 | 909 | | |
| 75 | 165 | 294 | 523 | 931 | | |
| 82 | 169 | 301 | 536 | 953 | | |
| 91 | 174 | 309 | 549 | 976 | | |

| ORDERING RESISTANCE CODE | | | |
|------------------------------|------------|------------------------------|-----------|
| E96 ($\pm 1\%$) | | E24 ($\pm 5\%$) | |
| Resistance (Ω) Code | | Resistance (Ω) Code | |
| m5=R0005 Ω | 1K = 1001 | m5=R0005 Ω | 1K=102 |
| 5m=R005 Ω | 10K = 1002 | 5m=R005 Ω | 10K = 103 |
| 50m=R05 Ω | 100K=1003 | 50m=R05 Ω | 100K=104 |
| 100m=R1 Ω | 1M=1-004 | 100m=R1 Ω | 1M=105 |
| 1000m=1 Ω | 10M=1005 | 1000m=1 Ω | 10M=106 |
| 1R = 1R00 | 100M=1006 | 1R = 1R0 | 100M=107 |
| 10R=10R0 | 1G = 1007 | 10R=100 | 1G=108 |
| 100R=100R | 10G = 1008 | 100R=101 | 10G=109 |

※美隆公司產品規格及其特性參數的改變和更新不會另行通知。

※Mayloon characteristic parameters of electronic product specification changes or updates without notice to improve。