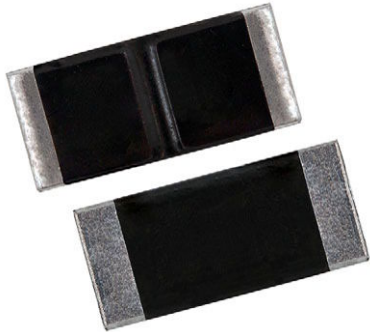


Power Metal Plate™ Current Sense Resistors, Low Value (5 mΩ to 500 mΩ), Surface-Mount, High Power


 AUTOMOTIVE
GRADE

RoHS
COMPLIANT

 HALOGEN
FREE
GREEN
(5-2008)

FEATURES

- 2010 and 2512 size package
- Ideal for all types of current sensing and pulse applications including switching and linear power supplies, instruments, power amplifiers, shunts, power inverters, and battery management
- Proprietary processing technique produces low resistance values (5 mΩ to 500 mΩ)
- Solid metal manganese-copper and nickel-chromium-aluminum alloy resistive element with low TCR (< 20 ppm/°C)
- Very low inductance 0.5 nH to 5 nH
- Low thermal EMF (< 3 μV/°C)
- AEC-Q200 qualified ⁽¹⁾
- PATENT(S): www.vishay.com/patents
- Material categorization: for definitions of compliance please see www.vishay.com/doc?99912

Note

- ⁽¹⁾ Flame retardance test may not be applicable to some resistor technologies

ADDITIONAL RESOURCES



| STANDARD ELECTRICAL SPECIFICATIONS | | | | | |
|------------------------------------|------|----------------------------------|----------------|--------------------------------|--------------------------------------|
| GLOBAL MODEL | SIZE | POWER RATING ⁽¹⁾ W | TOLERANCE % | RESISTANCE VALUE RANGE Ω | WEIGHT (typical) g/1000 pieces |
| WFMA2010 | 2010 | 2.0 at 110 °C | ± 1.0 | 0.005 to 0.0329 | 32 |
| WFMB2010 | 2010 | 2.0 at 110 °C | ± 1.0 | 0.033 to 0.500 | 32 |
| WFMA2512 | 2512 | 3.0 at 95 °C | ± 1.0 | 0.010 to 0.0329 | 41 |
| WFMB2512 | 2512 | 3.0 at 95 °C | ± 1.0 | 0.033 to 0.500 | 41 |

Note

- ⁽¹⁾ Terminal temperature

| GLOBAL PART NUMBER INFORMATION | | | | | | | | | | | | | | | | | |
|-------------------------------------------------|--------------------------------------|---|---|----------------------------|---|---|---|-----------------------------------------------------------------------------------------------------------------------------------------|---|---|------------------------------------------|---|-----------------------------------------------------------------------------|---|----------------------------------------------------------|--|--|
| Global Part Numbering example: WFMB2512R5000FEA | | | | | | | | | | | | | | | | | |
| W | F | M | B | 2 | 5 | 1 | 2 | R | 5 | 0 | 0 | 0 | F | E | A | | |
| GLOBAL MODEL (3 digits) | ELEMENT MATERIAL (1 digit) | | | CASE SIZE (4 digits) | | | | RESISTANCE VALUE ⁽¹⁾ (5 digits) | | | TOLERANCE CODE (1 digit) | | PACKAGING CODE ⁽²⁾ (2 digits) | | SPECIAL (2 digits) | | |
| WFM | A = CuMn B = NiCrAl | | | 2010 2512 | | | | L = mΩ* R = decimal 5L000 = 0.005 Ω R0100 = 0.01 Ω * Use "L" for resistance values < 0.01 Ω | | | F = ± 1.0 % J = ± 5.0 % | | EA = lead (Pb)-free, tape / reel EK = lead (Pb)-free, bulk | | Dash numbers 1 thru 99 as applicable | | |

Notes

- ⁽¹⁾ Resistance values available according to WSL decade values (www.vishay.com/doc?30117)
- ⁽²⁾ Packaging code: EB (lead (Pb)-free) is a non-standard packaging code designating 1000 piece reels. This non-standard packaging code is identical to our standard EA (lead (Pb)-free), except that it has a package quantity of 1000 pieces

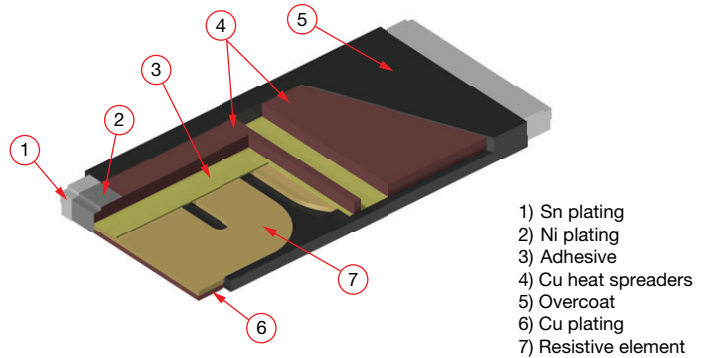
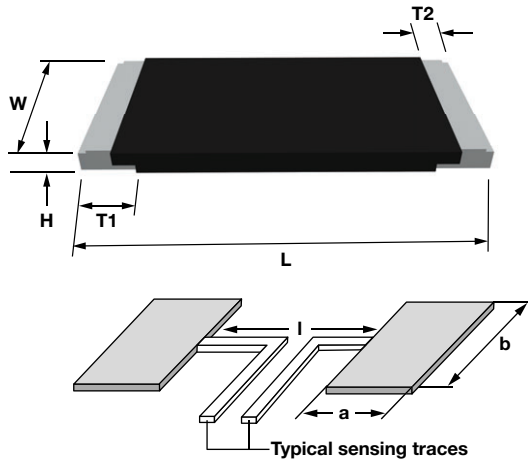
PATENT(S): www.vishay.com/patents

This Vishay product is protected by one or more United States and international patents.

| TECHNICAL SPECIFICATIONS | | | | |
|----------------------------------------------------------------------------------|--------|-------|------------------------------|-------|
| PARAMETER | UNIT | MODEL | RESISTOR CHARACTERISTICS | |
| | | | 2010 | 2512 |
| Temperature coefficient (20 °C to 60 °C) (element only) ⁽¹⁾ | ppm/°C | All | < 20 | |
| Operating temperature range | °C | All | -65 to +170 | |
| Maximum working voltage ⁽³⁾ | V | All | $(P \times R)^{1/2}$ | |
| Maximum terminal temperature | °C | All | 110 | 95 |
| Temperature coefficient (-55 °C to +150 °C) (including terminals) ⁽²⁾ | ppm/°C | WFMA | ± 110 | ± 110 |
| | | WFMB | ± 50 | ± 50 |
| Temperature coefficient (20 °C to 60 °C) (including terminals) ⁽²⁾ | ppm/°C | WFMA | ± 50 ≤ 10 mΩ ± 30 > 10 mΩ | ± 40 |
| | | WFMB | ± 20 | ± 20 |

Notes

- (1) Element TCR - only applies to the alloy used for the resistor element
- (2) Component TCR - total TCR that includes the TCR effects of the resistor element and the copper terminal
- (3) Maximum working voltage - the WFM is not voltage sensitive, but is limited by power / energy dissipation and is also not ESD sensitive

DIMENSIONS

Notes

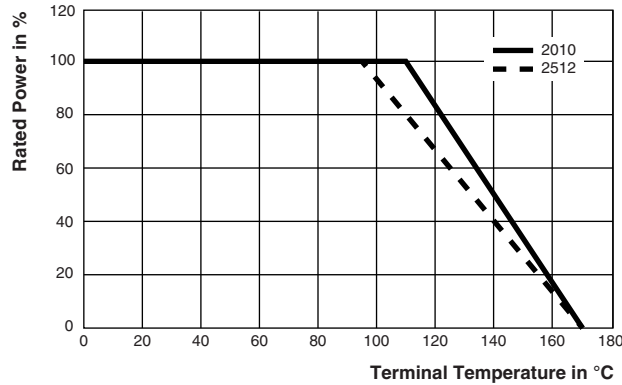
- 3D models available: www.vishay.com/doc?30401
- Surface mount solder profile recommendations: www.vishay.com/doc?31052

| CASE SIZE | RESISTANCE RANGE (mΩ) | DIMENSIONS in inches (millimeters) | | | | | SOLDER PAD DIMENSIONS in inches (millimeters) | | |
|-----------|-----------------------|------------------------------------|--------------------------------|--------------------------------|--------------------------------|--------------------------------|-----------------------------------------------|-----------------|-----------------|
| | | L | W | H | T1 | T2 | a | b | l |
| 2010 | 5 to 500 | 0.200 ± 0.008 (5.08 ± 0.20) | 0.100 ± 0.008 (2.54 ± 0.20) | 0.020 ± 0.006 (0.50 ± 0.15) | 0.028 ± 0.008 (0.70 ± 0.20) | 0.016 ± 0.006 (0.40 ± 0.15) | 0.049 (1.25) | 0.118 (3.00) | 0.138 (3.50) |
| 2512 | 10 to 500 | 0.250 ± 0.012 (6.35 ± 0.30) | 0.125 ± 0.008 (3.18 ± 0.20) | 0.020 ± 0.006 (0.50 ± 0.15) | 0.035 ± 0.008 (0.90 ± 0.20) | 0.020 ± 0.008 (0.50 ± 0.20) | 0.061 (1.55) | 0.142 (3.60) | 0.173 (4.40) |

| PRODUCT | RESISTANCE RANGE (Ω) | THERMAL RESISTANCE (°C/W) | ALLOY |
|----------|----------------------|---------------------------|-------|
| WFMA2010 | 0.005 to 0.0329 | < 30 | Mn-Cu |
| WFMB2010 | 0.033 to 0.5 | < 55 | Ni-Cr |
| WFMA2512 | 0.01 to 0.0329 | < 25 | Mn-Cu |
| WFMB2512 | 0.033 to 0.5 | < 40 | Ni-Cr |



DERATING



| PERFORMANCE | | | | |
|---------------------------|----------------------------------------------------------------|-------------|---------------------|--------|
| TEST | CONDITIONS OF TEST | TEST LIMITS | TYPICAL PERFORMANCE | |
| | | | CuMn | NiCr |
| Thermal shock | -55 °C to +150 °C, 2000 cycles, 15 min at each extreme | ± 0.5 % | -0.26 % | 0.12 % |
| Low temperature storage | -65 °C for 24 h | ± 0.1 % | 0 % | 0.03 % |
| High temperature exposure | 2000 h at +170 °C | ± 1.0 % | -0.18 % | 0.14 % |
| Bias humidity | +85 °C, 85 % RH, 10 % power, 1000 h | ± 0.5 % | 0.09 % | 0.03 % |
| Mechanical shock | 100 g's for 6 ms, 5 pulses | ± 0.2 % | 0 % | 0 % |
| Vibration | Frequency varied 10 Hz to 2000 Hz in 1 min, 3 directions, 12 h | ± 0.2 % | 0 % | 0 % |
| Load life | 2000 h at maximum terminal temperature at rated power | ± 0.7 % | -0.09 % | 0.07 % |
| Resistance to solder heat | +260 °C solder, 10 s to 12 s dwell, 25 mm/s emergence | ± 0.3 % | 0.13 % | 0 % |
| Moisture resistance | MIL-STD-202, method 106, 0 % power, 7b not required | ± 0.3 % | 0.09 % | 0.02 % |

| PACKAGING (1) | | | | |
|----------------------|--------------------------|-------------|-------------|------|
| MODEL | REEL | | | |
| | TAPE WIDTH | DIAMETER | PIECES/REEL | CODE |
| WFMA2010 | 12 mm / embossed plastic | 178 mm / 7" | 4000 | EA |
| WFMB2010 | 12 mm / embossed plastic | 178 mm / 7" | 4000 | EA |
| WFMA2512 | 12 mm / embossed plastic | 178 mm / 7" | 2000 | EA |
| WFMB2512 | 12 mm / embossed plastic | 178 mm / 7" | 2000 | EA |

Notes

- Embossed carrier tape per EIA-481
- (1) Additional packaging details at www.vishay.com/doc?20051



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