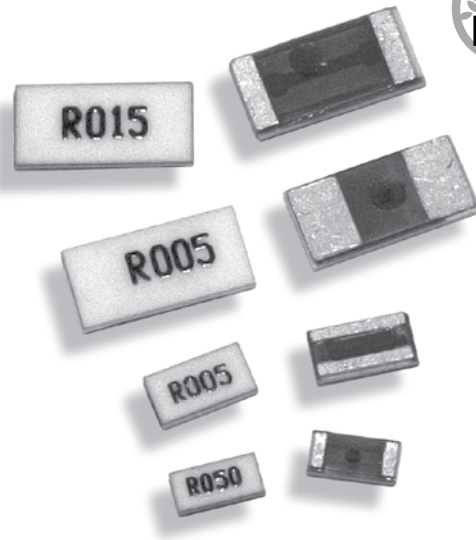


MCS Series

Metal Element Current Sense Resistive Metal Alloy mOhm Technology, SMD



FEATURES

- NiCu or MnCu resistive alloy; material TCR $\pm 10\text{ppm}/^\circ\text{K}$
- Marking epoxy UL-94-V0 conformal
- 96% alumina substrate thermo dissipation protective layer
- Cu Terminal Electrode with Pb Free termination (60% Sn, 40% Ni)
- Flame-retardant epoxy protective coat (UL-94-V0)
- Ultra low resistance value ($0.005\Omega \sim 0.050\Omega$)
- Precision resistance alloy (NiCr20AlSi, or CuMnNi); material selected for low TCR ($<50\text{ppm}/^\circ\text{C}$)
- Superior temperature coefficient characteristics; resistance vs. temp. change from 25°C to 125°C within $10\text{ppm}/^\circ\text{C} \sim 50\text{ppm}/^\circ\text{C}$
- Low inductance, low thermo EMF ($<50\mu\text{V}/^\circ\text{C}$)

APPLICATIONS

- Industrial electronics, power electronics: power supply, DC/DC converter, AC/DC converter, motor controller, automotive electronics
- Battery charger, PC, PDA, 3C products, Telecommunications, instruments, white goods

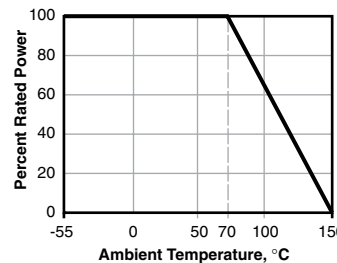
SERIES SPECIFICATIONS

| Series | Power Rating (@70°C) | Resistance TCR (ppm/°C) | | | | | | | |
|---------|----------------------|-------------------------|------|------|------|------|------|------|------|
| | | 5mΩ | 10mΩ | 15mΩ | 20mΩ | 25mΩ | 30mΩ | 40mΩ | 50mΩ |
| MCS1632 | 1W | <200 | <70 | <40 | <40 | <40 | <40 | <40 | <40 |
| MCS3264 | 2W | <200 | <70 | <40 | <40 | <40 | <40 | <40 | <40 |

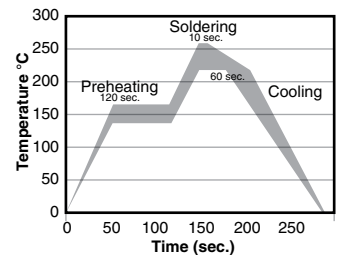
CHARACTERISTICS

| | |
|--|--|
| Resistance Range | 0.005Ω - 0.05Ω |
| Color | white (top) / green (bottom) |
| Power | 1 and 2 watts at 70°C |
| Standard resistance values (mΩ) | 5, 10, 15, 20, 25, 30, 35, 50 |
| TCR | $\pm 50\text{ppm}/^\circ\text{C}$ (two standard series of temperatures: 25°C , 0°C , -15°C , -55°C and 25°C , 50°C , 75°C , 125°C , 150°C ; temp. tolerance $\pm 3^\circ\text{C}$; $\text{TCR} = (R2-R1)/R1(T2-T1) \times 10^6$) |
| Tolerance | 1%, 3%, 5% |
| Rated voltage | $(P \times R)^{1/2}$ |

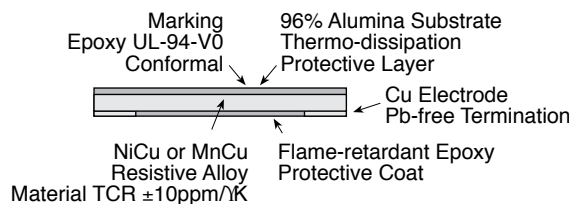
Derating



Recommended Solder Profile



Preheating: $145^\circ\text{C} \pm 15^\circ$, max. 120 sec.
Soldering: min. 220°C , max. 60 sec.
Max. Temp.: $260^\circ\text{C} \pm 5^\circ$, 10 sec.



MCS Series

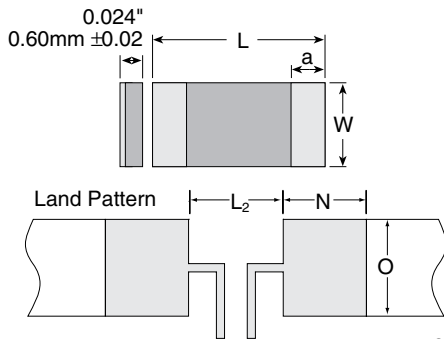
Metal Element Current Sense Resistive Metal Alloy mOhm Technology, SMD

PERFORMANCE CHARACTERISTICS

| Test Condition | Maximum ΔR |
|--|---------------------------------|
| Short Time Overload JIS C 5201 4.13; Overload voltage 2.5x rated voltage for 5 sec. | ±(0.5% +0.0005Ω) |
| High Temp. Exposure JIS C 5202 7.11; Test chamber 155 ±3°C for 1000 +48/-0 hours | ±(0.5% +0.0005Ω) |
| Low Temp. Storage JIS C 5202 7.1; Test chamber -55 ±3°C for 96 ±4 hours | ±(0.5% +0.0005Ω) |
| Endurance under Damp and Load JIS C 5202 7.9; Temp. 60 ±2°C, relative humidity 90-95%, rated DC voltage applied 90 min. on, 30 min. off for 1000 +48/-0 hours | ±(0.5% +0.0005Ω) |
| Thermal Shock JIS C 5202 7.4; -55 ±3°C for 30 min. to room temp for 2-3 min. to +150 ±2°C for 30 min. to room temp for 2-3 min., 100 cycles | ±(0.5% +0.0005Ω) |
| Load Life JIS C 5202 7.10; Temp. 70 ±2°C, rated DC voltage applied 90 min. on, 30 min. off for 1000 +48/-0 hours | ±(1% +0.0005Ω) |
| Solderability JIS C 5202 6.5; Solder temp. 235 ±5°C, 2 ±0.5 sec. immersion | New solder min. 90% of terminal |
| Resistance to Solder Heat JIS C 5202 6.4; Solder temp. 260 ±5°C, 10 ±1 sec. immersion | ±(0.5% +0.0005Ω) |
| Mechanical Shock JIS C 5202 6.2; Load 10N (1.02kgf) for 10 ±1 sec., middle of specimen pressurized | ±(0.5% +0.0005Ω) |
| Insulation Resistance JIS C 5202 5.6; DC 100 ±15V for 1 min. | >102MΩ |

DIMENSIONS

(in./mm±0.2)



| Size | L | W | a | Solder Thickness (μm) |
|----------------|------------|------------|---------------|-----------------------|
| MCS1632 | 0.126/3.20 | 0.063/1.60 | 0.020/0.50 | 105 |
| MCS3264 | 0.252/6.40 | 0.126/3.20 | 0.040/1.00 | 105 |
| MCS3264R005FER | | | 0.075/1.9 ±.2 | |

| Size | Resistance | L2 | O | N | Solder Thickness | Loading |
|---------|------------|--------|--------|--------|------------------|---------|
| MCS1632 | ≤8mΩ | 0.60mm | 1.84mm | 2.80mm | 105μm | 1.0w |
| | >8mΩ | 1.20mm | 1.84mm | 2.50mm | 105μm | 1.0w |
| MCS3264 | ≤8mΩ | 1.60mm | 3.57mm | 3.85mm | 105μm | 2.0w |
| | >8mΩ | 3.10mm | 3.57mm | 3.10mm | 105μm | 2.0w |

Packaging

(in./mm)

| Size | Tape width ±0.30mm | Reel diam. ±0.50mm | Pc/Reel | Weight (g ±10) |
|---------|--------------------|--------------------|---------|----------------|
| MCS1632 | 0.315/8.00 | 7.00/178.0 | 5000 | 131 |
| MCS3264 | 0.472/12.00 | 7.00/178.0 | 4000 | 291 |

ORDERING INFORMATION

| RoHS Compliant | | | | |
|----------------|-----------|---------------|-----------|----------------------|
| MCS1632R005FER | | | | |
| Series | Case Size | Ohms | Tolerance | Taping Code |
| Metal Alloy | 1632 = 1w | R005 = 0.005% | F = 1% | 1632 = 5,000 pc/reel |
| Current Sense | 3264 = 2w | | | 3264 = 4,000 pc/reel |

| Part Number | Power Rating | Ohm Value | Qty./Reel |
|----------------|--------------|-----------|-----------|
| MCS1632R010FER | 1W | 0.01Ω | 5000 |
| MCS1632R015FER | 1W | 0.015Ω | 5000 |
| MCS1632R020FER | 1W | 0.02Ω | 5000 |
| MCS1632R025FER | 1W | 0.025Ω | 5000 |
| MCS1632R050FER | 1W | 0.05Ω | 5000 |
| MCS3264R005FER | 2W | 0.005Ω | 4000 |
| MCS3264R010FER | 2W | 0.01Ω | 4000 |
| MCS3264R015FER | 2W | 0.015Ω | 4000 |
| MCS3264R020FER | 2W | 0.02Ω | 4000 |
| MCS3264R025FER | 2W | 0.025Ω | 4000 |
| MCS3264R050FER | 2W | 0.05Ω | 4000 |