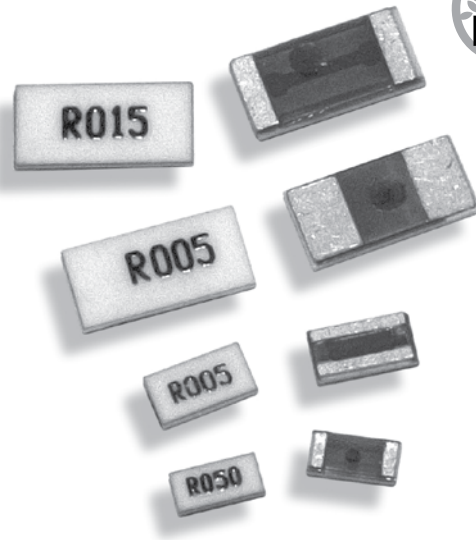


# MCS Series

## 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  $25^\circ\text{C}$  to  $125^\circ\text{C}$  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

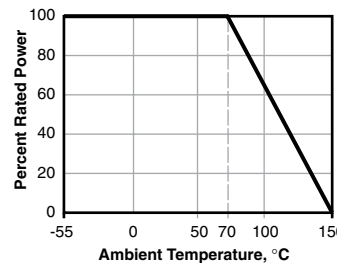
### SERIES SPECIFICATIONS

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

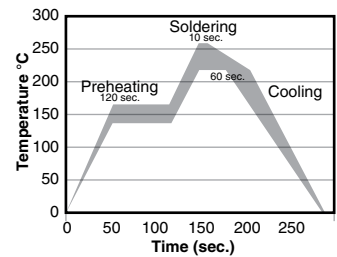
### CHARACTERISTICS

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

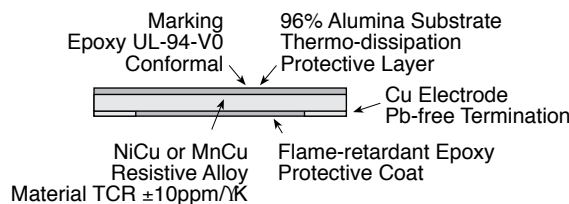
#### Derating



#### Recommended Solder Profile



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



# MCS Series

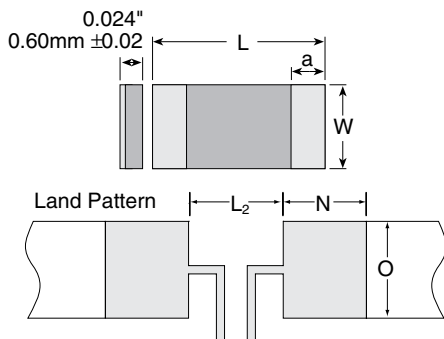
## Metal Element Current Sense Resistive Metal Alloy mOhm Technology, SMD

### PERFORMANCE CHARACTERISTICS

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

### DIMENSIONS

(in./mm±0.02)



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				
Series	Case Size	Ohms	Tolerance	Taping Code
MCS	1632 = 1w	R005 = 0.005%	F = 1%	1632 = 5,000 pc/reel
S	3264 = 2w			3264 = 4,000 pc/reel
1				
6				
3				
2				
R				
0				
0				
5				
F				
E				
R				

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