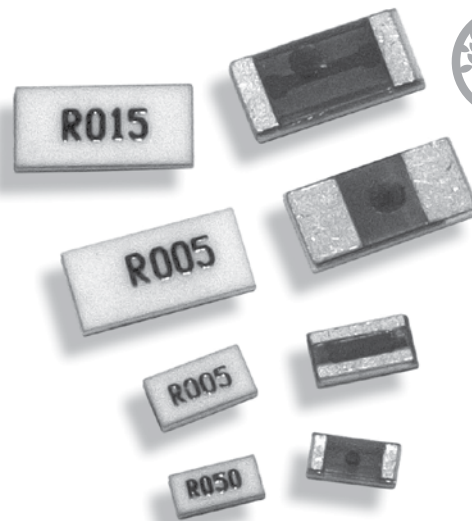


MCS Series

**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 ($<50\text{ppm}/^\circ\text{C}$)
- 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

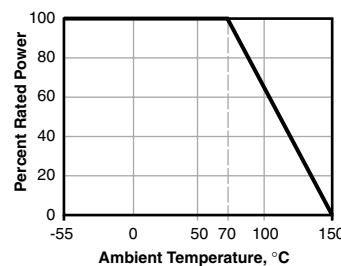
SERIES SPECIFICATIONS

Series	Power Rating (@70°C)	Resistance (mΩ)	Tolerance	TCR (ppm/°C)
MCS1320	0.75W	3-9 10-200	$\pm 1\%$ (F)	± 100 ± 50
MCS1632	1W	3-9 10-400	$\pm 0.5\%$ (D), $\pm 1\%$ (F)	± 100 ± 50
MCS3264	2W	2-9 10-400	$\pm 1\%$ (F)	± 100 ± 50

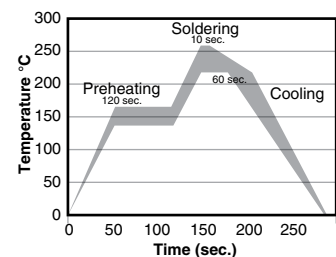
CHARACTERISTICS

Resistance Range	0.005Ω - 0.05Ω
Color	white (top) / green (bottom)
Power	0.75, 1 and 2 watts at 70°C
Standard resistance values (mΩ)	5, 10, 15, 20, 25, 30, 35, 50
TCR	$\geq 10\text{m}\Omega$: $\pm 50\text{ppm}/^\circ\text{C}$ $< 10\text{m}\Omega$: $\pm 100\text{ppm}/^\circ\text{C}$
Tolerance	0.5%, 1%, 3%, 5%
Rated voltage	$(P \times R)^{1/2}$

Derating



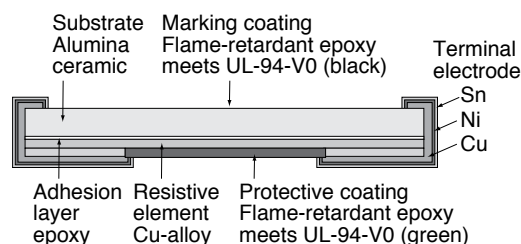
Recommended Solder Profile



Preheating: 145°C $\pm 15^\circ$, max. 120 sec.

Soldering: min. 220°C, max. 60 sec.

Max. Temp.: 260°C $\pm 5^\circ$, 10 sec.



MCS Series

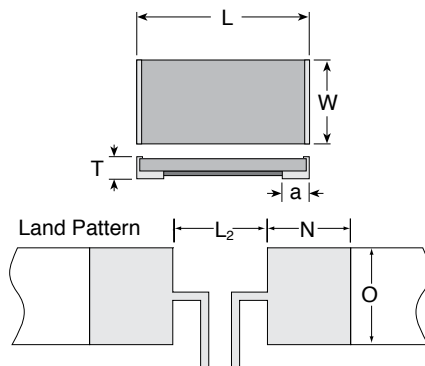
Metal Element Current Sense Resistive Metal Alloy mOhm Technology, SMD

PERFORMANCE CHARACTERISTICS

Test	Condition	Maximum ΔR
Short Time Overload	JIS C 5201 4.13; Overload voltage 2.5x rated voltage for 5 sec.	$\pm(0.5\% + 0.0005\Omega)$
High Temp. Exposure	JIS C 5202 7.11; Test chamber 155 $\pm 3^\circ\text{C}$ for 1000 +48/-0 hours	$\pm(0.5\% + 0.0005\Omega)$
Storage	Two years under airtight conditions 10 $^\circ\text{C}$ ~40 $^\circ\text{C}$ and relative humidity $\leq 75\%$; 30 days at 10 $^\circ\text{C}$ ~60 $^\circ\text{C}$ and relative humidity $\leq 95\%$.	
Low Temp. Storage	JIS C 5202 7.1; Test chamber -55 $\pm 3^\circ\text{C}$ for 96 ± 4 hours	$\pm(0.5\% + 0.0005\Omega)$
Endurance under Damp and Load	JIS C 5202 7.9; Temp. 60 $\pm 2^\circ\text{C}$, relative humidity 90-95%, rated DC voltage applied 90 min. on, 30 min. off for 1000 +48/-0 hours	$\pm(0.5\% + 0.0005\Omega)$
Thermal Shock	JIS C 5202 7.4; -55 $\pm 3^\circ\text{C}$ for 30 min. to room temp for 2-3 min. to +150 $\pm 2^\circ\text{C}$ for 30 min. to room temp for 2-3 min., 100 cycles	$\pm(0.5\% + 0.0005\Omega)$
Load Life	JIS C 5202 7.10; Temp. 70 $\pm 2^\circ\text{C}$, rated DC voltage applied 90 min. on, 30 min. off for 1000 +48/-0 hours	$\pm(1\% + 0.0005\Omega)$
Solderability	JIS C 5202 6.5; Solder temp. 235 $\pm 5^\circ\text{C}$, 2 ± 0.5 sec. immersion	New solder min. 90% of terminal
Resistance to Solder Heat	JIS C 5202 6.4; Solder temp. 260 $\pm 5^\circ\text{C}$, 10 ± 1 sec. immersion	$\pm(0.5\% + 0.0005\Omega)$
Mechanical Shock	JIS C 5202 6.2; Load 10N (1.02kgf) for 10 ± 1 sec., middle of specimen pressurized	$\pm(0.5\% + 0.0005\Omega)$
Insulation Resistance	JIS C 5202 5.6; DC 100 $\pm 15\text{V}$ for 1 min.	$>102\text{M}\Omega$

DIMENSIONS

(in./mm)



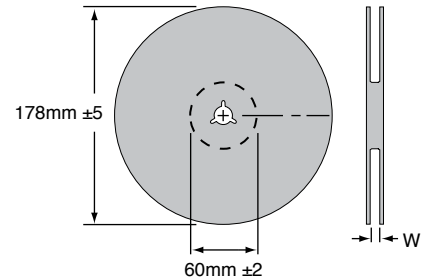
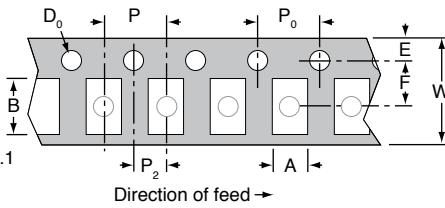
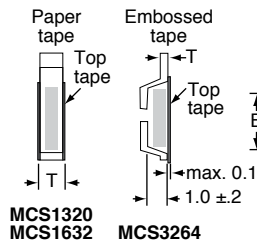
Type	L	W	a	T	L2	O	N	Solder Thickness (μm)
MCS1320	0.083/2.10 ± 2	0.053/1.35 ± 2	0.026/0.65 ± 2	0.020/0.5 ± 2	0.80mm	1.44mm	1.40mm	105
MCS1632	0.130/3.30 ± 2	0.067/1.70 ± 2	0.027/0.68 ± 3	0.026/0.65 ± 2	1.20mm	1.84mm	1.80mm	105
MCS3264	0.252/6.40 ± 3	0.126/3.20 ± 3	0.041/1.05 ± 3	0.026/0.65 ± 2	3.10mm	3.57mm	3.10mm	105

MCS Series

Metal Element Current Sense Resistive Metal Alloy mOhm Technology, SMD

PACKAGING

(mm)



Tape

Type	W	PO	P	P2	A0	B0	DO	F	E	T
MCS1320	8.00±.30	4.00±.10	4.00±.10	2.00±.10	1.68±.20	2.38±.20	1.50±.10	3.50±.10	1.75±.10	0.87±.20
MCS1632	8.00±.30	4.00±.10	4.00±.10	2.00±.10	2.05±.20	3.65±.20	1.50±.10	3.50±.10	1.75±.10	0.87±.10
MCS3264	12.00±.30	4.00±.10	4.00±.10	2.00±.10	3.40±.20	6.75±.20	1.50±.10	5.50±.10	1.75±.10	0.25±.10

Reel

Type	W ±1	Qty./reel	Weight (g)
MCS1320	9.0	5,000	150 ±30
MCS1632	9.0	5,000	160 ±40
MCS3264	13	4,000	270 ±50

ORDERING INFORMATION

RoHS Compliant

MCS 1632 R 005 FER

Series	Case Size	Ohms	Tolerance	Taping Code
Metal Alloy	1320 = 0.75w	R005 = 0.005Ω	D = 0.5%	1320 = 5,000 pc/reel
Current Sense	1632 = 1w		F = 1%	1632 = 5,000 pc/reel
	3264 = 2w			3264 = 4,000 pc/reel

Part Number	Power Rating	Ohm Value	Resistance Tolerance	Qty./Reel
MCS1320R005FER	0.75W	0.005Ω	1%	5000
MCS1320R010FER	0.75W	0.010Ω	1%	5000
MCS1320R015FER	0.75W	0.015Ω	1%	5000
MCS1320R020FER	0.75W	0.020Ω	1%	5000
MCS1320R025FER	0.75W	0.025Ω	1%	5000
MCS1320R030FER	0.75W	0.030Ω	1%	5000
MCS1320R050FER	0.75W	0.050Ω	1%	5000
MCS1632R010DER	1W	0.01Ω	0.5%	5000
MCS1632R010FER	1W	0.01Ω	1%	5000
MCS1632R015DER	1W	0.015Ω	0.5%	5000
MCS1632R015FER	1W	0.015Ω	1%	5000
MCS1632R020DER	1W	0.02Ω	0.5%	5000
MCS1632R020FER	1W	0.02Ω	1%	5000
MCS1632R025DER	1W	0.025Ω	0.5%	5000
MCS1632R025FER	1W	0.025Ω	1%	5000
MCS1632R050DER	1W	0.05Ω	0.5%	5000
MCS1632R050FER	1W	0.05Ω	1%	5000
MCS3264R005FER	2W	0.005Ω	1%	4000
MCS3264R010FER	2W	0.01Ω	1%	4000
MCS3264R015FER	2W	0.015Ω	1%	4000
MCS3264R020FER	2W	0.02Ω	1%	4000
MCS3264R025FER	2W	0.025Ω	1%	4000
MCS3264R050FER	2W	0.05Ω	1%	4000