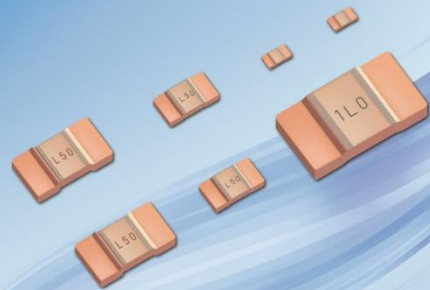


**PRODUCT
DATASHEET**



MRP3920 Series Current Sensing Resistor

MRP3920 Series Current Sensing Resistor

Description

MRP is an all-metal current sensing resistor. Welded metal strip construction carries long term stability is ideal for high current sensing. Precise resistance tolerance and wide operating temperature make this product suitable for various applications to meet the growing high-power electronics, servers, and electrical vehicles nowadays.





Features

- Chip size from 1206 to 5930
- Resistance value from 0.2mΩ to 5mΩ
- Low thermal EMF
- Low TCR
- AEC-Q200 compliant
- Superior pulse tolerance

Application

- Switching model power supply
- DC/DC & DC/AC converters
- Li-ion battery management
- Test Instrument and meters
- Motor controls

Environmental Compliance

Regulation	Standard
 RoHS	2011/65/EU
 Halogen Free	IEC 61249-2-21:2003

Electrical Characteristics

Size Type	Power Rating at 70 °C (W)	Resistance Range (mΩ)	TCR (ppm/°C)	Resistance tolerance	Operating Temp. Range
3920	12	0.2	±200	±1% (F)	-65 °C ~ +170 °C
	10	0.3	±150		
	9	0.5	±75		
	8	1	±50		
	7	1			
	7	1.5			
	6	2			
	5	3			
	4	4			
	3	5			

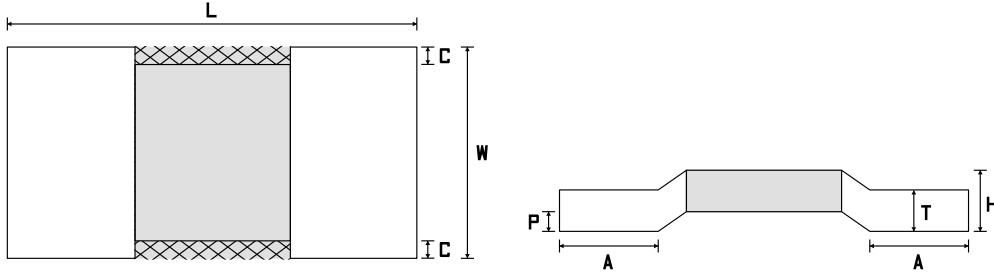
Part Number System

MRP 39 P 12 S F 0L20
[1] [2] [3] [4] [5] [6] [7]

- [1] Series name, Metal Resistor for current sensing, all-metal Power series
 [2] Chip size, 12: 1206, 25:2512, 39:3920, 59:5930
 [3] Polytronics symbol
 [4] Power code, 03: 3W, 05: 5W, 12: 12W
 [5] Material code, M:MnCu, N:NiCrAl, S: SnMnCu, F: FeCrAl
 [6] Resistance tolerance, F: ±1%
 [7] Resistance code, 0L20=0.20 mΩ, 1L50=1.50 mΩ, R002=2 mΩ

MRP3920 Series Current Sensing Resistor

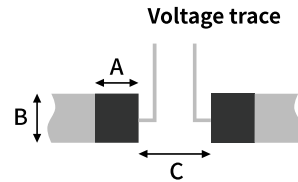
Physical Dimensions (mm)



Size Type	Resistance (mΩ)	L	W	H	T	A	C (Max.)	P
3920	0.2	10.20±0.30	5.20±0.30	1.98±0.15	1.48±0.15	1.80±0.20	0.6	0.50±0.10
	0.3			1.92±0.15	1.42±0.15			
	0.5			1.36±0.15	0.86±0.15			
	1			0.92±0.15	0.42±0.15			
	1			1.87±0.15	1.37±0.15			
	1.5			1.46±0.15	0.96±0.15			
	2			1.19±0.15	0.69±0.15			
	3			0.94±0.15	0.44±0.15			
	4			0.85±0.15	0.35±0.15			
	5			0.85±0.15	0.35±0.15			

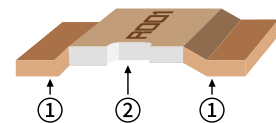
Recommended Solder Pad Layout (mm)

Size Type	Resistance (mΩ)	A	B	C
3920	0.2 ~ 5	2.70	6.20	5.60



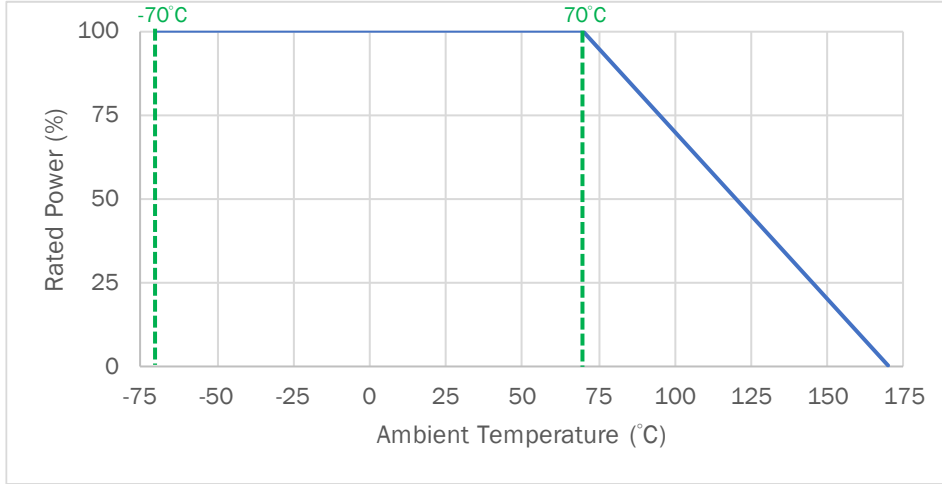
Physical Specifications

Materials	Electrode: ① Copper Element: ② MnCu / FeCrAl / NiCrAl / SnMnCu
Solderability	MIL-STD-202



MRP3920 Series Current Sensing Resistor

Thermal Derating Curve



Marking and Packaging Quantity

Size Type	Resistance (mΩ)	Part Number	Packing Quantity	Marking
3920	0.2	MRP39P12SF0L20	3000	L20
	0.3	MRP39P10MF0L30	3000	L30
	0.5	MRP39P09MF0L50	3000	L50
	1	MRP39P08FFR001	3000	1L0
	1	MRP39P07MFR001	3000	1L0
	1.5	MRP39P07FF1L50	3000	1L5
	2	MRP39P06FFR002	3000	2L0
	3	MRP39P05FFR003	3000	3L0
	4	MRP39P04FFR004	3000	4L0
	5	MRP39P03FFR005	3000	5L0

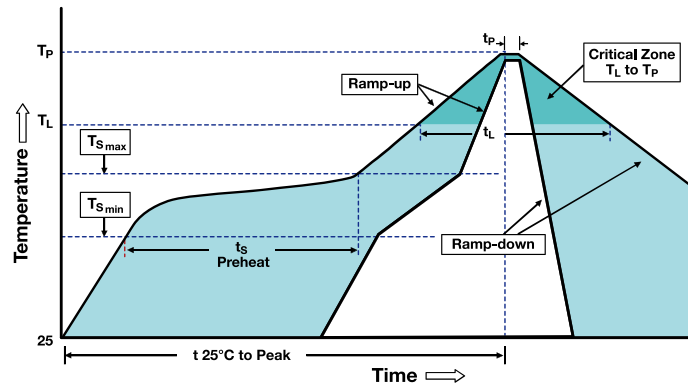
MRP3920 Series Current Sensing Resistor

Reliability Test

Test Item	Test Method	Procedure	Requirements
Temperature Coefficient of Resistance (T.C.R)	JIS-C-5201-1 4.8 IEC-60115-1 4.8	At 25°C /+150°C, 25°C is the reference temperature	As Spec
Short Time Overload	JIS-C-5201-1 4.13 IEC-60115-1 4.13	5 times of rated power	$\Delta R/R1 \leq \pm(1.0\%+0.0005\Omega)$
High Temperature Exposure (Storage)	JIS-C5201-1 4.25 IEC 60068-2-2	At 170°C for 1000 hours. Measurement at 24±4 hours after test conclusion.	$\Delta R/R1 \leq \pm(1.0\%+0.0005\Omega)$
Temperature Cycling	JESD22 Method JA-104	1000 Cycles (-55°C to +155°C) Measurement at 24±4 hours after test conclusion. 30min maximum dwell time at each temperature extreme.	$\Delta R/R1 \leq \pm(1.0\%+0.0005\Omega)$
Biased Humidity	MIL-STD-202 Method 103	1,000 hours; 85°C / 85% RH, 10% of operating power. Measurement at 24±4 hours after test conclusion.	$\Delta R/R1 \leq \pm(1.0\%+0.0005\Omega)$
Operation Life	MIL-STD-202 Method 108	Condition D Steady State TA=125 °C at derated power. Measurement at 24±4 hours after test conclusion.	$\Delta R/R1 \leq \pm(1.0\%+0.0005\Omega)$
Moisture resistance	MIL-STD 202 Method 106	T=24 hours per Cycle, 10 Cycles, unpowered. Steps 7a & 7b not required.	$\Delta R/R1 \leq \pm(1.0\%+0.0005\Omega)$
Mechanical Shock	MIL-STD-202 Method 213	Test ½ Sine Pulse, Peak value: 100g, normal duration: 6ms, Velocity change:12.3ft/sec.	$\Delta R/R1 \leq \pm(0.5\%+0.0005\Omega)$
Vibration	MIL-STD-202 Method 204	5 g's for 20 min., 12 cycles each of 3 orientations. Note: Test from 10-2000Hz	$\Delta R/R1 \leq \pm(0.5\%+0.0005\Omega)$
Board Flex	AEC Q200-005	Beading once for 60 seconds, 2mm	$\Delta R/R1 \leq \pm(1.0\%+0.0005\Omega)$
Solderability	J-STD-002	245±5°C for 3 seconds	> 95% coverage (electrode area)

Soldering Parameters

Reflow Soldering	Pb-free assembly
Average Ramp-Up Rate ($T_{S_{max}}$ to T_P)	3°C/second max.
Preheat	
-Temperature Min ($T_{S_{min}}$)	150°C
-Temperature Max ($T_{S_{max}}$)	200°C
-Time ($T_{S_{min}}$ to $T_{S_{max}}$)	60-180 seconds
Time maintained above:	
-Temperature (T_L)	217°C
-Time (t_L)	60-150 seconds
Peak Temperature (T_P)	260°C
Time within 5°C of actual Peak Temperature (t_P)	20 seconds max.
Ramp-Down Rate	6°C /second max.
Time 25°C to Peak Temperature	8 minutes max.



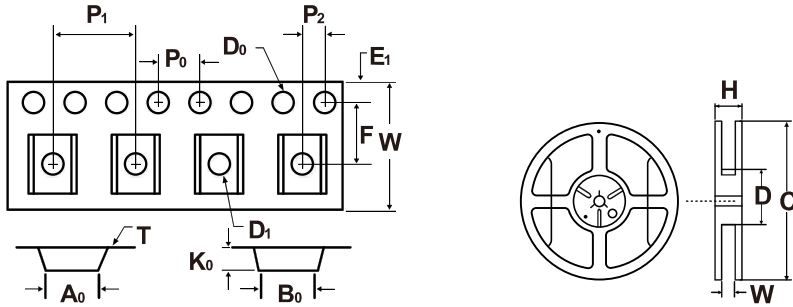
Hand Soldering 350°C peak temperature, 5 second max.

Note: If temperatures exceed the recommended profile, devices may not meet the performance requirements.

MRP3920 Series Current Sensing Resistor

Tape & Reel Specification (mm.)

Devices are packaged per EIA481 and EIA-2 standard



Tape measurements

Size Type	Resistance (mΩ)	W	F	E ₁	D ₀	D ₁	P ₀
3920	0.2, 0.3, 0.5, 1 (8W), 1.5, 2	16.00 ± 0.30	7.50 ± 0.10	1.75 ± 0.10	1.50 ± 0.10	1.50 ± 0.10	4.00 ± 0.10
3920	1 (7W), 3, 4, 5	16.00 ± 0.30	7.50 ± 0.10	1.75 ± 0.10	1.50 ± 0.10	1.50 ± 0.10	4.00 ± 0.10

Size Type	Resistance (mΩ)	P ₁	P ₂	A ₀	B ₀	T	K ₀
3920	0.2, 0.3, 0.5, 1 (8W), 1.5, 2	8.00 ± 0.10	2.00 ± 0.10	5.50 ± 0.10	10.80 ± 0.10	-	1.97 ± 0.10
3920	1 (7W), 3, 4, 5	8.00 ± 0.10	2.00 ± 0.10	5.50 ± 0.10	10.80 ± 0.10	-	1.35 ± 0.10

Reel measurements

Size Type	H	W	D	C
3920	20.7 ± 0.5	-	99.0 ± 1.0	330.0 ± 2.0

Storage

- The ambient temperature recommended for storage shall be between 5°C ~ 30°C.
- The relative humidity recommended for storage shall be between 25%RH ~ 60%RH.
- Sealed plastic bags with desiccant shall be used to reduce the oxidation of the terminals and shall only be opened prior to use.
- The products shall not be stored in areas where harmful gases containing sulfur or chlorine are present.