

73M1A, 73M2A, 73M3x & 73M5 Series Current Sensing Resistor – Up To 5 Watts

Features

- Metal Plate Construction Copper Alloy
- 1-5 Watts Power Rating @ +70°C
- Resistance Range 0.25 120 milliohms
- Operating Temperature to +155°C
- EIA Standard Package Sizes
- Terminal Finish Matte Tin [e3]
- Reflow Capable per JEDEC J-STD-020, +260°C Maximum
- Tape and Reel Packaging

Applications

- Current Detection
- Current Limiting
- Regulated Battery Circuits
- Motor Control
- Power Supply
- Hard Disk Drives
- Inverter/Converter
- Industrial Equipment

RoH

Connect

Infotainment Systems

Description

73M1A, 73M2A, 73M3x and 73M5 Series Current Sensing Resistors are metal plate packaged devices that provides excellent accuracy for current detection. Each resistor has good electrical and thermal characteristics by using a special metallic resistor material.

Ordering Information



Notes:

- 1. No dashes or spaces to appear in part number.
- 2. Resistor codes are 4, 5 or 6 characters. See Addendum for Standard EIA Values and Codes.

Not all performance combinations and resistor values may be available. Contact your local CTS Representative or CTS Customer Service for availability.

This product is specified for use only in standard commercial applications. Supplier disclaims all express and implied warranties and liability in connection with any use of this product in any non-commercial applications or in any application that may expose the product to conditions that are outside of the tolerances provided in its specification.

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Ordering Information

Part Number Examples

Tolerance/Value	Resistor Code F [±1%]
1.5 milliohms	73M2AR0015F
0.25 milliohms	73M3AR00025F
50 milliohms	73M3BR050F
120 milliohms	73M5R120F

Electrical & Environmental Specifications

Operating Conditions

1 0						
Model Type	Rated Power [Watts]	Resistance Range [mΩ]	Resistor Tolerance [%]	Temperature Coefficient	Rated Ambient Temperature	Operating Temperature Range
73M1A	1.0	1-50	±1	R≥0.010Ω: ±50ppm/°C R<0.010Ω: ±100ppm/°C	+70°C	-55°C to +155°C
73M2A	2.0	1-75	±1	R<0.010Ω: ±100ppm/°C R≥0.010Ω: ±50ppm/°C	+70°C	-55°C to +155°C
73M3A	3.0	0.25 - 3	±1	R≤0.001Ω: ±200ppm/°C R>0.001Ω: ±100ppm/°C	+70°C	-55°C to +155°C
73M3B	3.0	4 - 100	±1	±50ppm/°C	+70°C	-55°C to +155°C
73M5	5.0	1-120	±1	R<0.010Ω: ±100ppm/°C R≥0.010Ω: ±50ppm/°C	+70°C	-55°C to +155°C

Power Derating Curve 73M1A, 73M2A, 73M3A, 73M3B – Typical

With the rated ambient temperature set to $+70^{\circ}$ C, the maximum power [maximum current for 0 Ω product] at a temperature of no more than rated ambient temperature shall be equal to the rated power [rate current for 0 Ω product]. The maximum power at a temperature exceeding the rated ambient temperature shall be a value determined by reducing the rated power according to the power reduction curve in the figure below.



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73M1A, 73M2A, 73M3x & 73M5 Series

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Electrical & Environmental Specifications

Power Derating Curve 73M5 – Typical

With the rated ambient temperature set to +105°C, the maximum power [maximum current for 0Ω product] at a temperature of no more than rated ambient temperature shall be equal to the rated power [rate current for 0Ω product]. The maximum power at a temperature exceeding the rated ambient temperature shall be a value determined by reducing the rated power according to the power reduction curve in the figure below.



Rated Voltage

The rated voltage shall be the DC or AC [effective power frequency] voltage corresponding to the rated power and shall be determined with the formula shown below. If the determined rated voltage exceeds the maximum operating voltage specified in Operating Conditions table, the maximum operating voltage shall be the rated voltage.

$$E = Rated Voaltge [V]$$

$$E = \sqrt{PxR}$$

$$P = Rated Power [W]$$

Voaltge [V]

 $R = Nomimal Resistance [\Omega]$

Environmental Parameters

Test	Maximun	n Delta R [%]	Tesh Deseriation			
Test	73M1A, 73M2A, 7	3M3A, 73M3B, 73M5				
Resistance	±1.0		Measurement current; 1A measured at +25°C [73M3A - 1A above 1mohm; 3A 1mohm or less]			
Temperature Coefficient	±50ppm/°C,≥10mΩ ±100ppm/°C,≥1mΩ ±50ppm/°C	[73M1A, 73M2A, 73M5] [73M3A] [73M3B]	Standard temperature at +25°C			
	±100ppm/°C, < 10mΩ ±200ppm/°C, <1mΩ ±50ppm/°C	[73M1A, 73M2A, 73M5] [73M3A] [73M3B]	Measured temperature at +150°C			
Short-Time Overload ±0.5 [73M1A, 73M2A, 73M3x] Applied electric power equal to 3 times rated power in 5s [JIS C 5201-1 4.13] ±2.0 [73M5]			Applied electric power equal to 3 times rated power in 5s [JIS C 5201-1 4.13]			
Insulation Resistance Over 10 ⁹ ohm			Measured at terminals and center of resistor by D.C. 100V $\pm 15V$ in 1 minute [JIS C 5201-1 4.6]			
Dielectric Withstanding Voltage	No Breakdown		Applied at terminals and center of resistor on A.C. 500V, 1 minute [JIS C 5201-1 4.7]			
Resistance to Solder Heat	±0.5 No Damage		Place on copper sheet [t = 0.2mm] heated by solder, +260 $^{\circ}C$ ±5 $^{\circ}C$, 5 ±0.5 seconds			
Solderability	Over 95% Coverage		Immerse terminal in solder [Sn3Ag0.5Cu], +245°C ±0.5°C, 3 ±0.5 seconds [JIS C 5201-14.17]			
Vibratian	±0.5		Frequency 10Hz to 55Hz, Pk-Pk amplitude 15mm, sweeping rate 1 minute,			
	No Damage		3 directions each 2 hours [JIS C 5201-1 4.22]			
Resistance to Solvent	No Damage		Immerse in Isopropyl alcohol, +20°C to +25°C, 60 ±5 seconds			
High Temperature Exposure	±2.0		1,000 hours @ +155°C ±2°C, bias load 0% power [JIS C 5201-1 4.23.2]			
Change of Temperature	±0.5 No Damage		30 minutes @ -55°C, 3 minutes @ +25°C, 30 minutes @ +155°C, 3 minutes @ +25°C; 5 cycles			
Moisture Resistance	±1.0		MIL-STD-202, Method 106, 0% power 7a and 7b not required, 1 cycle = 24 hours, 10 cycles			
Bias Humidity	±1.0		1,000 hours @ +85°C ±2°C, 85% relative humidity, bias load 10%, on time 90 minutes/off time 30 minutes			
Endurance [Rated Load]	±2.0		1,000 hours @ +70°C ±3°C, bias load, on time 90 minutes/off time 30 minutes			

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Mechanical Specifications

Package Drawing/Dimensions

		Desistantes							
Model		[mm]							
туре	L	W	t	с	[mΩ]				
73M1A	3.2 ±0.3	1.6 ±0.3	0.6 ±0.3	0.5 ±0.3	-				
73M2A	6 3 40 3	2 7 10 2	0.8 ±0.3	1.9 ±0.3	1.0 - 4.0				
	0.5 ±0.5	5.2 ±0.5	0.6 ±0.3	1.1 ±0.3	4.1-75				
			1.3 Max.		0.25,0.50				
			1.4 Max.	2.2 ±0.3	1.0				
721424	6 9 10 2		1.3 Max.		1.5				
7 5 IVI 5 A	0.8 ±0.5	0.5 ±0.5		1.8 ±0.3	2.0				
			1.2 Max.	1.6 ±0.3	2.5				
				1.3 ±0.3	3.0				
73 M3 B	6.7 ±0.3	7.2 ±0.3	1.3 Max.	1.1 ±0.3	-				
73M5	11 4 10 2	60103	1.9 Мах	3.2 ±0.3	1.0-5.0				
	11.4 ±0.3	0.9 ±0.3	T'O INIGX'	1.8 ±0.3	5.1-120				



Notes

1. Terminal Details Base Metal – Copper [Cu]

Barrier Plating – Nickel [Ni] Finish Plating – Matte Tin [Sn]

Recommended Pad Layout

Model Type	A	Dimensions [mm] B	С	Resistance [mΩ]
73M1A	2.1	1.4	1.6	-
721424	2 7	2.8	1.9	1.0-4.0
73IVIZA	5.7	2.0	3.5	4.1-75
		3.8	1.4	0.25 - 1.5
721424	71	3.4	2.2	2.0
7 3 IVI 3 A	7.1	3.2	2.6	2.5
		2.9	3.2	3.0
73 M3 B	7.8	2.7	3.5	-
72 ME	7 5	4.8	4.0	1.0 - 5.0
/ 3 MI5	7.5	3.4	6.8	5.1-120



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Mechanical Specifications

Marking Information

Model Type	Part Marking
73M1A	Rxxx = "R" is the decimal point and 3 digits [E24] are significant values. See resistor tables for codes.
	Rxxx = "R" is the decimal point and 3 digits [E24] are significant values. See resistor tables for codes.
73M2A	Nominal resistances that includes a decimal point; marking is denoted by "m" expressing a decimal point in milliohms and three digits. Ex. 1m50 [1.5 milliohms]
721424	Rxxx = "R" is the decimal point and 3 digits [E24] are significant values. See resistor tables for codes.
73M3A 73M3B	Nominal resistances that includes a decimal point; marking is denoted by "m" expressing a decimal point in milliohms and three digits. Ex. 0m25 [0.25 milliohms]
73M5	Rxxx = "R" is the decimal point and 3 digits [E24] are significant values. See resistor tables for codes.

Packaging

Tape and Reel Information

Embosse	d Tape										[mm]
Model Type	w	Ρ1	E	F	Do	Ро	Ρ2	Ao	Во	Ko	t
73M1A	8.0 ±0.15	4.0 ±0.1	1.75 ±0.10	3.5 ±0.1	1.55 ±0.05	4.0 ±0.1	2.0 ±0.1	1.83 ±0.10	3.48 ±0.10	0.9 ±0.1	0.20 ±0.05
73M2A	12.0 ±0.15	4.0 ±0.1	1.75 ±0.10	5.5 ±0.1	1.55 ±0.05	4.0 ±0.1	2.0 ±0.1	3.50 ±0.10	6.74 ±0.10	1.1 ±0.1	0.20 ±0.05
73M3A	12.0 ±0.15	8.0 ±0.1	1.75 ±0.10	5.5 ±0.1	1.50 ±0.05	4.0 ±0.1	2.0 ±0.1	6.75 ±0.10	7.15 ±0.10	1.7 ±0.1	0.25 ±0.05
73M3B	12.0 ±0.15	12.0 ±0.1	1.75 ±0.10	5.5 ±0.1	1.55 ±0.05	4.0 ±0.1	2.0 ±0.1	7.70 ±0.10	7.15 ±0.10	1.2 ±0.1	0.25 ±0.05
73M5	24.0 ±0.30	12.0 ±0.1	1.75 ±0.10	11.5 ±0.1	1.55 ±0.05	4.0 ±0.1	2.0 ±0.1	7.20 ±0.10	11.80 ±0.10	1.7 ±0.1	0.30 ±0.10



Reel							[mm]
Model Type	Quantity Per Reel	W	М	А	В	С	D
73M1A	4,000	12.0 ±0.5	178 ±0.1	2.0 ±0.5	13.2 ±0.5	21.7 ±0.5	60.0 ±0.5
73M2A	4,000	16.2 ±0.5	178 ±0.1	2.5 ±0.6	13.5 ±0.6	21.9 ±0.6	60.0 ±0.5
73M3A	1,000	16.2 ±0.5	178 ±0.1	2.5 ±0.6	13.5 ±0.6	21.9 ±0.6	60.0 ±0.5
73M3B	1,000	16.2 ±0.5	178 ±0.1	2.5 ±0.6	13.5 ±0.6	21.9 ±0.6	60.0 ±0.5
73M5	500	24.4 +2.0 -0.0	178 ±0.1	2.5 ±0.6	13.5 ±0.6	21.9 ±0.6	60.0 ±0.5

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Addendum

CODE	онмѕ	CODE	OHMS	CODE	OHMS	CODE	онмѕ
R00025	0.00025	R009	0.00900	R030	0.03000	R082	0.08200
R0005	0.00050	R010	0.01000	R033	0.03300	R091	0.09100
R001	0.00100	R011	0.01100	R036	0.03600	R100	0.10000
R0015	0.00150	R012	0.01200	R039	0.03900	R110	0.11000
R002	0.00200	R013	0.01300	R043	0.04300	R120	0.12000
R0025	0.00250	R015	0.01500	R047	0.04700		
R003	0.00300	R016	0.01600	R050	0.05000		
R004	0.00400	R018	0.01800	R051	0.05100		
R005	0.00500	R020	0.02000	R056	0.05600		
R006	0.00600	R022	0.02200	R062	0.06200		
R007	0.00700	R024	0.02400	R068	0.06800		
R008	0.00800	R027	0.02700	R075	0.07500		

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Authorized Distributor

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CTS:

 73M2AR0025F
 73M2AR002F
 73M2AR003F
 73M2AR0010F
 73M2AR050F
 73M2AR024F
 73M2AR062F

 73M2AR004F
 73M2AR013F
 73M2AR020F
 73M2AR033F
 73M2AR036F
 73M2AR016F
 73M2AR075F

 73M2AR027F
 73M2AR056F
 73M2AR011F
 73M2AR022F
 73M2AR039F
 73M2AR005F
 73M2AR006F

 73M2AR007F
 73M2AR0015F
 73M2AR008F
 73M2AR039F
 73M2AR039F
 73M2AR030F

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 73M2AR001F
 73M2AR009F
 73M2AR001F
 73M2AR043F
 73M2AR047F
 73M2AR047F
 73M1AR043F

 73M3AR0025F
 73M3BR013F
 73M3BR015F
 73M3BR033F
 73M3BR062F
 73M5R002F
 73M5R039F
 73M5R039F

 73M1AR0026F
 73M1AR022F
 73M1AR047F
 73M1AR050F
 73M5R009F
 73M5R050F
 73M1AR002F
 73M1AR002F

 73M3BR022F
 73