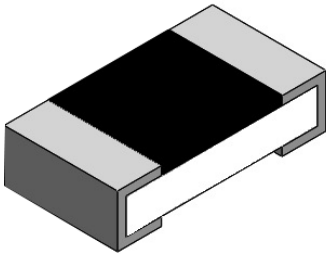


High Power Thick Film Chip Resistors 0402 (AEC-Q200)

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**RoHS
Compliant**

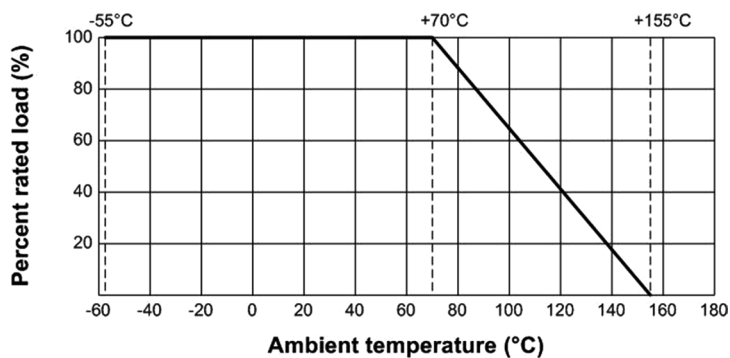


Ratings

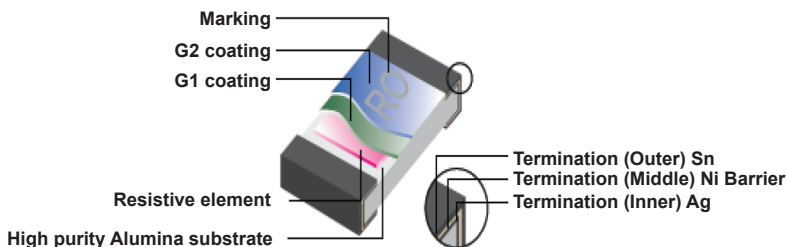
Power Rating	1/10W
Rate current (Jumper)	1A
Max. Overload Current (Jumper)	2A
Max. Working Voltage	50V
Max. Overload Voltage	100V
Dielectric Withstanding Voltage	100V
Temperature Range	-55°C to +155°C
Ambient Temperature	+70°C

Power Rating

Resistors shall have a power rating based on continuous load operation at an ambient temperature of 70°C. For temperature in excess of 70°C, the load shall be derate as shown in figure.



Construction



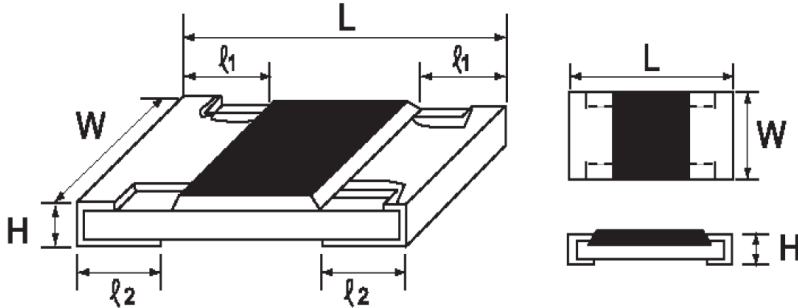
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High Power Thick Film Chip Resistors 0402 (AEC-Q200)



Dimensions



Type	L	W	H	l1	l2
0402	1 ±0.1	0.5 ±0.05	0.35 ±0.05	0.2 ±0.1	0.25 ±0.1

Dimensions : Millimetres

Power Rating

Type	Power Rating at 70°C	Tolerance %	Resistance Range	Standard Series
0402	1/10W	±1	Jumper	
			1Ω ~ 10MΩ	E-96

Performance Specification

Characteristics	Limits	Test Methods
Operational Life	±(1% +0.1Ω)max	125°C, at 35% of operating power, 1000H (1.5 hours "ON", 0.5 hour "OFF"). (MIL-STD-202)
	<100mΩ	Apply to rate current for 0Ω
Electrical Characterization	1Ω≤R ≤ 10Ω: ±400 ppm/°C 10Ω<R ≤100Ω: ±200 ppm/°C 100Ω<R ≤10M : ±100 ppm/°C	Parametrically test per lot and sample size requirements, summary to show Min, Max, Mean and Standard deviation at room as well as Min and Max operating temperatures. (User Spec.)
External Visual	No Mechanical Damage	Electrical test not required. Inspect device construction, marking and workmanship (MIL-STD-883 Method 2009)
Physical Dimension	Reference 2.0 Dimension Standards	Verify physical dimensions to the applicable device detail specification. Note: User(s) and Suppliers spec. Electrical test not required. (JESD22 MH Method JB-100)
Resistance to Solvent	Marking Unsmearred	Note: Add Aqueous wash chemical – OKEM Clean or equivalent. Do not use banned solvents. (MIL-STD-202 Method 215)
High Temperature Exposure (Storage)	±(1%+0.1W)max	1000hrs. @T=155°C.Unpowered. Measurement at 24 ±2 hours after test conclusion. (MIL-STD-202 Method 108)
	<50mΩ	Apply to rate current for 0 Ω
Temperature Cycling	Resistance change rate is ±(0.5%+0.1Ω) Max.	1000 Cycles (-55°C to +155°C). Measurement at 24±2 hours after test conclusion. JESD22 Method JA-104)
	<50mΩ	Apply to rate current for 0 Ω

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High Power Thick Film Chip Resistors 0402 (AEC-Q200)



Characteristics	Limits	Test Methods
Moisture Resistance	Resistance change rate is $\pm(0.5\% + 0.1\Omega)$ Max.	<p>T=24 hours /cycle. Unpowered. Measurement at 24±2 hours after test conclusion. (MIL-STD-202 Method 106)</p>
	<50mΩ	Apply to rate current for 0Ω
Biased Humidity	Resistance change rate is $\pm(1\% + 0.1\Omega)$ Max.	10% rated power, 85°C/85%RH, 1000H, Measurement at 24 hours after test conclusion. MIL-STD-202 Method 103)
	<100mΩ	Apply to rate current for 0 Ω
Mechanical Shock	$\pm(1\% + 0.1W)$ max.	Wave Form: Tolerance for half sine shock pulse. Peak value is 100g's. Normal duration (D) is 6. (MIL-STD-202 Method 213)
Vibration	$\pm(1\% + 0.1W)$ max.	5g's for 20 min., 12cycle each of 3 orientations. Note: Use 8"×5"PCB. 0.31" thick 7 secure points (one) long side and 2 secure points at corners of opposite sides. Parts mounted within 2' from any secure point. Test from 10-2000Hz. (MIL-STD-202 Method 204)
Thermal Shock	$\pm(1\% + 0.1W)$ max.	-55°C/+155°C, Note: Number of cycles required -300, Maximum transfer time -20 seconds, Dwell time -15 minutes. Air-Air. (MIL-STD-202 Method 107)
	<50mW	Apply to rate current for 0 W
ESD	$\pm(10\% + 0.1W)$ max.	With the electrometer in direct contact with the discharge tip, verify the voltage setting at levels of ±500V, ±1KV, ±2KV, ±4KV, ±8KV. The electrometer reading shall be within ±10% for voltages from 500V to ≤800V. (AEC-Q200-002)
Solderability	95% coverage Min.	For both leaded & SMD. Electrical test not required. Magnification 50X. Conditions: a) Method B 4hrs at 155°C dry heat, the dip in bath with 245°C, 5s. b) Method B: at 215°C, 5s. c) Method D: at 260°C, 60s. (J-STD-002)
Flammability	No ignition of the tissue paper or scorching or the pinewood board	V-0 or V-1 are acceptable. Electrical test not required. (UL-94)
Board Flex	$\pm(1\% + 0.05W)$ max.	2mm (Min) (JIS-C-6429)
	<50mW	Apply to rate current for 0 W



High Power Thick Film Chip Resistors 0402 (AEC-Q200)



Characteristics	Limits	Test Methods
Flame Retardance	No flame	Temperature sensing at 500°C, Voltage power subjected to 32V DC current clamped up to 500A DC and decreased in 1.0VDC/hour. (AEC-Q200-001)
Soldering Heat Resistance to	$\pm(1\% +0.05\Omega)$ max.	Condition B No per-heat of samples. Note: Single Wave Solder-Procedure 2 for SMD and Procedure 1 for Leaded with solder within 1.5mm of device body. (MIL-STD-202 Method 210)
	<50mW	Apply to rate current for 0 W

Part Number Table

Description	Part Number	Description	Part Number
Chip Resistor, Thick Film, Jumper, 1/10W, 0402	MP000463	Chip Resistor, Thick Film, 1%, 180R, 1/10W, 0402	MP000493
Chip Resistor, Thick Film, 1%, 10R, 1/10W, 0402	MP000464	Chip Resistor, Thick Film, 1%, 200R, 1/10W, 0402	MP000494
Chip Resistor, Thick Film, 1%, 11R, 1/10W, 0402	MP000465	Chip Resistor, Thick Film, 1%, 220R, 1/10W, 0402	MP000495
Chip Resistor, Thick Film, 1%, 12R, 1/10W, 0402	MP000466	Chip Resistor, Thick Film, 1%, 240R, 1/10W, 0402	MP000496
Chip Resistor, Thick Film, 1%, 15R, 1/10W, 0402	MP000467	Chip Resistor, Thick Film, 1%, 270R, 1/10W, 0402	MP000497
Chip Resistor, Thick Film, 1%, 16R, 1/10W, 0402	MP000468	Chip Resistor, Thick Film, 1%, 300R, 1/10W, 0402	MP000498
Chip Resistor, Thick Film, 1%, 18R, 1/10W, 0402	MP000469	Chip Resistor, Thick Film, 1%, 330R, 1/10W, 0402	MP000499
Chip Resistor, Thick Film, 1%, 20R, 1/10W, 0402	MP000470	Chip Resistor, Thick Film, 1%, 360R, 1/10W, 0402	MP000500
Chip Resistor, Thick Film, 1%, 22R, 1/10W, 0402	MP000471	Chip Resistor, Thick Film, 1%, 390R, 1/10W, 0402	MP000501
Chip Resistor, Thick Film, 1%, 24R, 1/10W, 0402	MP000472	Chip Resistor, Thick Film, 1%, 430R, 1/10W, 0402	MP000502
Chip Resistor, Thick Film, 1%, 27R, 1/10W, 0402	MP000473	Chip Resistor, Thick Film, 1%, 470R, 1/10W, 0402	MP000503
Chip Resistor, Thick Film, 1%, 30R, 1/10W, 0402	MP000474	Chip Resistor, Thick Film, 1%, 510R, 1/10W, 0402	MP000504
Chip Resistor, Thick Film, 1%, 33R, 1/10W, 0402	MP000475	Chip Resistor, Thick Film, 1%, 560R, 1/10W, 0402	MP000505
Chip Resistor, Thick Film, 1%, 36R, 1/10W, 0402	MP000476	Chip Resistor, Thick Film, 1%, 620R, 1/10W, 0402	MP000506
Chip Resistor, Thick Film, 1%, 39R, 1/10W, 0402	MP000477	Chip Resistor, Thick Film, 1%, 680R, 1/10W, 0402	MP000507
Chip Resistor, Thick Film, 1%, 43R, 1/10W, 0402	MP000478	Chip Resistor, Thick Film, 1%, 750R, 1/10W, 0402	MP000508
Chip Resistor, Thick Film, 1%, 47R, 1/10W, 0402	MP000479	Chip Resistor, Thick Film, 1%, 820R, 1/10W, 0402	MP000509
Chip Resistor, Thick Film, 1%, 51R, 1/10W, 0402	MP000480	Chip Resistor, Thick Film, 1%, 910R, 1/10W, 0402	MP000510
Chip Resistor, Thick Film, 1%, 56R, 1/10W, 0402	MP000481	Chip Resistor, Thick Film, 1%, 1K, 1/10W, 0402	MP000511
Chip Resistor, Thick Film, 1%, 62R, 1/10W, 0402	MP000482	Chip Resistor, Thick Film, 1%, 1K1, 1/10W, 0402	MP000512
Chip Resistor, Thick Film, 1%, 68R, 1/10W, 0402	MP000483	Chip Resistor, Thick Film, 1%, 1K2, 1/10W, 0402	MP000513
Chip Resistor, Thick Film, 1%, 75R, 1/10W, 0402	MP000484	Chip Resistor, Thick Film, 1%, 1K3, 1/10W, 0402	MP000514
Chip Resistor, Thick Film, 1%, 82R, 1/10W, 0402	MP000485	Chip Resistor, Thick Film, 1%, 1K5, 1/10W, 0402	MP000515
Chip Resistor, Thick Film, 1%, 91R, 1/10W, 0402	MP000486	Chip Resistor, Thick Film, 1%, 1K6, 1/10W, 0402	MP000516
Chip Resistor, Thick Film, 1%, 100R, 1/10W, 0402	MP000487	Chip Resistor, Thick Film, 1%, 1K8, 1/10W, 0402	MP000517
Chip Resistor, Thick Film, 1%, 110R, 1/10W, 0402	MP000488	Chip Resistor, Thick Film, 1%, 2K, 1/10W, 0402	MP000518
Chip Resistor, Thick Film, 1%, 120R, 1/10W, 0402	MP000489	Chip Resistor, Thick Film, 1%, 2K2, 1/10W, 0402	MP000519
Chip Resistor, Thick Film, 1%, 130R, 1/10W, 0402	MP000490	Chip Resistor, Thick Film, 1%, 2K4, 1/10W, 0402	MP000520
Chip Resistor, Thick Film, 1%, 150R, 1/10W, 0402	MP000491	Chip Resistor, Thick Film, 1%, 2K7, 1/10W, 0402	MP000521
Chip Resistor, Thick Film, 1%, 160R, 1/10W, 0402	MP000492	Chip Resistor, Thick Film, 1%, 3K, 1/10W, 0402	MP000522

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High Power Thick Film Chip Resistors 0402 (AEC-Q200)



Description	Part Number	Description	Part Number
Chip Resistor, Thick Film, 1%, 3K3, 1/10W, 0402	MP000523	Chip Resistor, Thick Film, 1%, 62K, 1/10W, 0402	MP000554
Chip Resistor, Thick Film, 1%, 3K6, 1/10W, 0402	MP000524	Chip Resistor, Thick Film, 1%, 68K, 1/10W, 0402	MP000555
Chip Resistor, Thick Film, 1%, 3K9, 1/10W, 0402	MP000525	Chip Resistor, Thick Film, 1%, 75K, 1/10W, 0402	MP000556
Chip Resistor, Thick Film, 1%, 4K3, 1/10W, 0402	MP000526	Chip Resistor, Thick Film, 1%, 82K, 1/10W, 0402	MP000557
Chip Resistor, Thick Film, 1%, 4K7, 1/10W, 0402	MP000527	Chip Resistor, Thick Film, 1%, 91K, 1/10W, 0402	MP000558
Chip Resistor, Thick Film, 1%, 5K1, 1/10W, 0402	MP000528	Chip Resistor, Thick Film, 1%, 100K, 1/10W, 0402	MP000559
Chip Resistor, Thick Film, 1%, 5K6, 1/10W, 0402	MP000529	Chip Resistor, Thick Film, 1%, 110K, 1/10W, 0402	MP000560
Chip Resistor, Thick Film, 1%, 6K2, 1/10W, 0402	MP000530	Chip Resistor, Thick Film, 1%, 120K, 1/10W, 0402	MP000561
Chip Resistor, Thick Film, 1%, 6K8, 1/10W, 0402	MP000531	Chip Resistor, Thick Film, 1%, 130K, 1/10W, 0402	MP000562
Chip Resistor, Thick Film, 1%, 7K5, 1/10W, 0402	MP000532	Chip Resistor, Thick Film, 1%, 150K, 1/10W, 0402	MP000563
Chip Resistor, Thick Film, 1%, 8K2, 1/10W, 0402	MP000533	Chip Resistor, Thick Film, 1%, 160K, 1/10W, 0402	MP000564
Chip Resistor, Thick Film, 1%, 9K1, 1/10W, 0402	MP000534	Chip Resistor, Thick Film, 1%, 180K, 1/10W, 0402	MP000565
Chip Resistor, Thick Film, 1%, 10K, 1/10W, 0402	MP000535	Chip Resistor, Thick Film, 1%, 200K, 1/10W, 0402	MP000566
Chip Resistor, Thick Film, 1%, 11K, 1/10W, 0402	MP000536	Chip Resistor, Thick Film, 1%, 220K, 1/10W, 0402	MP000567
Chip Resistor, Thick Film, 1%, 12K, 1/10W, 0402	MP000537	Chip Resistor, Thick Film, 1%, 240K, 1/10W, 0402	MP000568
Chip Resistor, Thick Film, 1%, 13K, 1/10W, 0402	MP000538	Chip Resistor, Thick Film, 1%, 270K, 1/10W, 0402	MP000569
Chip Resistor, Thick Film, 1%, 15K, 1/10W, 0402	MP000539	Chip Resistor, Thick Film, 1%, 300K, 1/10W, 0402	MP000570
Chip Resistor, Thick Film, 1%, 16K, 1/10W, 0402	MP000540	Chip Resistor, Thick Film, 1%, 330K, 1/10W, 0402	MP000571
Chip Resistor, Thick Film, 1%, 18K, 1/10W, 0402	MP000541	Chip Resistor, Thick Film, 1%, 360K, 1/10W, 0402	MP000572
Chip Resistor, Thick Film, 1%, 20K, 1/10W, 0402	MP000542	Chip Resistor, Thick Film, 1%, 390K, 1/10W, 0402	MP000573
Chip Resistor, Thick Film, 1%, 22K, 1/10W, 0402	MP000543	Chip Resistor, Thick Film, 1%, 430K, 1/10W, 0402	MP000574
Chip Resistor, Thick Film, 1%, 24K, 1/10W, 0402	MP000544	Chip Resistor, Thick Film, 1%, 470K, 1/10W, 0402	MP000575
Chip Resistor, Thick Film, 1%, 27K, 1/10W, 0402	MP000545	Chip Resistor, Thick Film, 1%, 510K, 1/10W, 0402	MP000576
Chip Resistor, Thick Film, 1%, 30K, 1/10W, 0402	MP000546	Chip Resistor, Thick Film, 1%, 560K, 1/10W, 0402	MP000577
Chip Resistor, Thick Film, 1%, 33K, 1/10W, 0402	MP000547	Chip Resistor, Thick Film, 1%, 620K, 1/10W, 0402	MP000578
Chip Resistor, Thick Film, 1%, 36K, 1/10W, 0402	MP000548	Chip Resistor, Thick Film, 1%, 680K, 1/10W, 0402	MP000579
Chip Resistor, Thick Film, 1%, 39K, 1/10W, 0402	MP000549	Chip Resistor, Thick Film, 1%, 750K, 1/10W, 0402	MP000580
Chip Resistor, Thick Film, 1%, 43K, 1/10W, 0402	MP000550	Chip Resistor, Thick Film, 1%, 820K, 1/10W, 0402	MP000581
Chip Resistor, Thick Film, 1%, 47K, 1/10W, 0402	MP000551	Chip Resistor, Thick Film, 1%, 910K, 1/10W, 0402	MP000582
Chip Resistor, Thick Film, 1%, 51K, 1/10W, 0402	MP000552	Chip Resistor, Thick Film, 1%, 1M, 1/10W, 0402	MP000583
Chip Resistor, Thick Film, 1%, 56K, 1/10W, 0402	MP000553		

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