

Type 3521 Series

Key Features

2 Watts at 70°C

Small size to power ratio

Supplied on tape

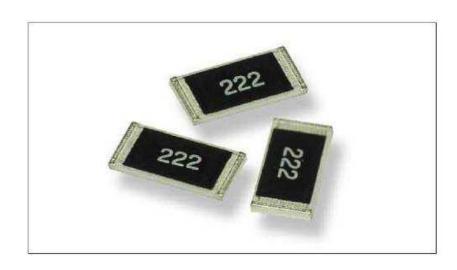
Value marked on resistor

500 volt maximum overload

250 volt maximum working voltage

Terminal finish matte Sn over Ni

AEC-Q200 Qualified

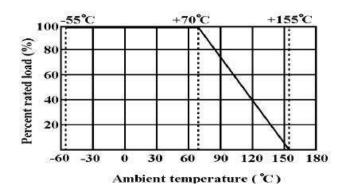


TE Connectivity is pleased to announce that our 3521 series high power Thick Film Chip Resistor is now AEC-Q200 Qualified. This low cost device, suitable for auto placement in volume, and for most applications, including high frequency operations, owing to the short lead structure, is attractively priced and available on 7" reels of 4000 pieces.

Characteristics – Electrical

Power Rating	2W
Resistance Range	0.1Ω ~ 10ΜΩ
Tolerance	±1% ±5%
Max. Working Voltage	250V
Max. Overload Voltage	500V
Dielectric Withstanding Voltage	500V
Temperature Range	-55°C ~ +155°C
Ambient Temperature	70°C

Resistors shall have a power rating based on continuous load operation at an ambient temperature of 70 $^{\circ}\text{C}$. For temperature in excess of 70 $^{\circ}\text{C}$, The load shall be derated as shown below:





Voltage Rating:

Resistors shall have a rated direct-current (DC) continuous working voltage or an approximate sine-wave root-mean-square (RMS) alternating-current (AC) continuous working voltage at commercial line frequency and waveform corresponding to the power rating , as determined from the following formula:

$$RCWV = VP \times R$$

Where:

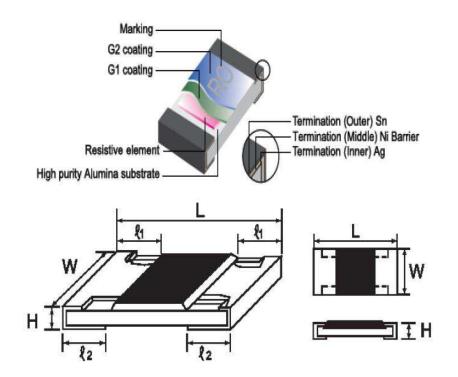
RCWV = Rated DC or RMS AC continuous working voltage at commercial-line frequency and waveform (volt)

P = Power Rating (watt)

R = Nominal Resistance (ohm)

In no case shall the rated DC or RMS AC continuous working voltage be greater than the applicable maximum value.

Construction & Dimensions:

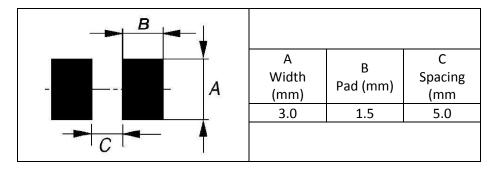


Dimensions: (mm)

L W		Н	£1	€2	
6.35±0.10	3.20±0.20	0.55±0.10	0.60±0.25	0.50±0.20	



Recommended solder pad



- 4 layers PCB specification:
- 1) Outside 2 layers (Top and Bottom) with copper foil thickness at 2oz.
- 2) Inside 2 layers (Middle layers) with copper foil thickness at 4 oz.

Marking:

For E24 series Values three digit marking, the first two digits are significant figures and the third denoting number of zeros.

E.G. 333

For Ohmic Values below 10Ω

E.G. 3.3Ω

For E96 Values four digit marking, the first three showing significant figures and the fourth showing number of zeros. As previously letter R is for decimal point.

E.G. 49K9Ω



Performance Specification:

Characteristics	Limits	Test Methods			
		125°C, at 35% of operating power, 1000H			
Operational life	±(1%+0.1Ω)max	(1.5 hours "ON", 0.5 hour "OFF").			
Operational life		(MIL-STD-202)			
	<100mΩ	Apply to rate current for 0Ω			
	0.1Ω <r<0.976ω td="" ±100ppm<=""><td>Parametrically test per lot and sample size</td></r<0.976ω>	Parametrically test per lot and sample size			
Electrical	$1\Omega \le R \le 10\Omega \le \pm 400 PPM/^{\circ}C$	requirements, summary to show Min, Max,			
Characterisation	10Ω < R ≦100Ω ≤ ±200PPM/°C	Mean and Standard deviation at room as			
	100Ω <r≦10mω td="" °c<="" ±100ppm="" ≤=""><td>well as Min and Max operating</td></r≦10mω>	well as Min and Max operating			
	-	temperatures. (User Spec)			
Futamal Marral	No Manhanian Damana	Electrical test not required. Inspect device			
External Visual	No Mechanical Damage	construction, marking and workmanship (MIL-STD-883 Method 2009)			
		Verify physical dimensions to the applicable			
		device detail specification.			
Physical	Reference 2.0 Dimension	Note: User(s) and Suppliers spec. Electrical			
Dimension	Standards	test not required.			
		(JESD22 MH Method JB-100)			
		Note: Add Aqueous wash chemical – OKEM			
Resistance to	A A and it and the same and	Clean or equivalent.			
Solvent	Marking Unsmeared	Do not use banned solvents.			
		(MIL-STD-202 Method 215)			
Torminal Charact	Not broken	Force of 1.8kg for 60 seconds.			
Terminal Strength	Not broken	(JIS-C-6429)			
		1000hrs. @T=155°C.Unpowered.			
High Temperature	Resistance change rate is	Measurement at 24±2 hours after test			
Exposure	± (0.5%+0.1Ω) Max.	conclusion.			
(Storage)		(MIL-STD-202 Method 108)			
	<50mΩ	Apply to rate current for 0Ω			
	Resistance change rate is	1000 Cycles (-55°C to +155°C). Measurement			
Temperature	± (0.5%+0.1Ω) Max.	at 24±2 hours after test conclusion			
cycling	450m0	(JESD22 Method JA-104)			
	<50mΩ	Apply to rate current for 0Ω			
Moisture	Resistance change rate is	2FC 3540 300 7550 2500 500 7550 500 THE STATE ST			
Resistance	± (0.5%+0.1Ω) Max.				
		T=24 hours /cycle. Unpowered.			
		Measurement at 24±2 hours after test			
		conclusion. (MIL-STD-202 Method 106)			
	<50mΩ	Apply to rate current for $\Omega\Omega$			
		10% rated power, 85°C/85%RH, 1000H.			
	Resistance change rate is	Measurement at 24 hours after test			
Biased Humidity	± (1%+0.1Ω) Max	conclusion.			
,	, , , , , , , , , , , , , , , , , , ,	(MIL-STD-202 Method 103)			
	<100mΩ	Apply to rate current for Ω			
	±(1%+0.1Ω) max	Wave Form: Tolerance for half sine shock			
Mechanical Shock		pulse. Peak value is 100g's. Normal duration			
ivicentalited SHOCK		(D) is 6.			
		(MIL-STD-202 Method 213)			
		5g's for 20 min., 12cycle each of 3			
		orientations. Note: Use 8"*5"PCB. 031" thick 7 secure			
		points (onone) long side and 2 secure points			
Vibration	±(1%+0.1Ω) max	at corners of opposite sides. Parts mounted			
		within 2' from any secure point.			
		Test from 10-2000Hz.			
		(MIL-STD-202 Method 204)			
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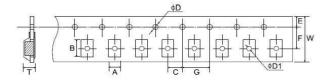


Performance Specification (continued)

Characteristics	Limits	Test Methods		
		-55°C/+155°C		
		Note: Number of cycles required -300,		
The average Character	±(1%+0.1Ω) max	Maximum transfer time -20 seconds, Dwell		
Thermal Shock		time -15 minutes. Air-Air.		
		(MIL-STD-202 Method 107)		
	<50mΩ	Apply to rate current for 0Ω		
		With the electrometer in direct contact with		
		the discharge tip, verify the voltage setting		
		at levels of		
ESD	±(10%+0.1W)max	±500V,±1KV, ±2KV, ±4KV, ±8KV,		
		The electrometer reading shall be within		
		±10% for voltages from 500V to ≦800V.		
		(AEC-Q200-002)		
		For both leaded & SMD. Electrical test not		
		required		
	95% coverage Min.	Magnification 50X. Conditions:		
Solderability		a) Method B 4hrs at 155°C dry heat, the dip		
Solderability		in bath with 245°C,5s.		
		b) Method B: at 215°C,5s.		
		c) Method D: at 260°C, 60s.		
		(J-STD-002)		
	No ignition of the tissue paper or scorching of the pinewood board	V-0 or V-1 are acceptable. Electrical test not		
Flammability		required.		
	scorening of the pinewood board	(UL-94)		
Board Flex	±(1%+0.05W)max	2mm (Min) (JIS-C-6429)		
board riex	<50mW	Apply to rate current for 0 W		
		Temperature sensing at 5002, Voltage		
		power subjected to 32VDC current clampe		
Flame Retardance	No flame	up to 500ADC and decreased in		
		1.0VDC/hour.		
		(AEC-Q200-001)		
	±(1%+0.05Ω)max.	Condition B No per-heat of samples. Note:		
		Single Wave Solder-Procedure 2 for SMD		
Resistance to		and Procedure 1 for Leaded with solder		
soldering Heat		within 1.5mm of device body.		
		(MIL-STD-202 Method 210)		
	<50mW Apply to rate current for 0 W			
* Culturation tast: L	2S 3~5PPM 50°C±2°C 91%~93%RH :	1000H		

Packaging specification

Embossed Taping:

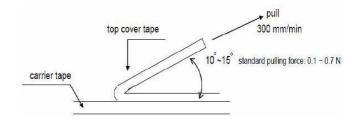


Α	В	С	ØD+0.1	ØD1+0.1	E	F	G	W	Τ±
±0.2	±0.2	±0.05	-0	-0	±0.1	±0.05	±0.1	±0.2	0.1
3.50	6.70	2.0	1.5	1.5	1.75	5.5	4.0	12.0	1.0

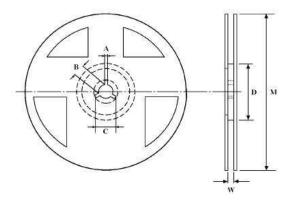


Peeling Strength of Top Cover Tape

Test Condition: 0.1 to 0.7 N at a peel-off speed of 300 mm / min.



Reel Dimensions



T	ape	Reel	A ±	В±	C ±	D ± 1	M ± 2	W ± 1
		Qty	0.5	0.5	0.5			
E	mbossed	4,000	2	13	21	60	178	13.8

Environment Related Substance

This product complies to EU RoHS directive, EU PAHs directive, EU PFOS directive and Halogen free.

Ozone layer depleting substances.

Ozone depleting substances are not used in our manufacturing process of this product.

This product is not manufactured using Chloro fluorocarbons (CFCs), Hydrochlorofluorocarbons (HCFCs), Hydrobromofluorocarbons (HBFCs) or other ozone depleting substances in any phase of the manufacturing process.



Storage Condition

The performance of these products, including the solderability, is guaranteed for a year from the date of arrival at your company, provided that they remain packed as they were when delivered and stored at a temperature of $25^{\circ}\text{C} \pm 10^{\circ}\text{C}$ and a relative humidity of $60\%\text{RH} \pm 10\%\text{RH}$, chemical and dust free atmosphere

Even within the above guarantee periods, do not store these products in the following conditions, otherwise their electrical performance and/or solderability may be deteriorated, and the packaging materials (e.g. taping materials) may be deformed or deteriorated, resulting in mounting failures.

- 1. In salty air or in air with a high concentration of corrosive gas, such as Cl2, H2S, NH3, SO2, or NO2
- 2. In direct sunlight

AEC-Q200

The 3521 series is qualified to AEC-Q200 standard at Grade"4"

How To Order

3521	10K	F	
Common Part	Resistance Value	Tolerance	Pack Style
3521 – SMD Power Resistor	1Ω - 1R0 100Ω - 100R 1,000Ω (1ΚΩ) -1Κ0 10,000Ω (10ΚΩ) - 10Κ 1,000,000Ω (1ΜΩ) - 1Μ0	F – 1%	T – 4000 Reel

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M55342K06B6E81RS3 M55342K08B100DRWB M55342M05B200DRWB M55342M06B26E7RS3 MC0603-511-JTW 742C083750JTR

MCR01MZPF1601 MCR01MZPF1800 MCR01MZPJ822 MCR03EZHJ103 MCR03EZPFX1272 MCR10EZPF2003 RC0603F1473CS

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