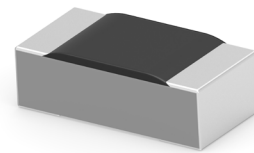


# THICK FILM PRECISION RESISTORS

## TYPE RT73 AEC-Q200 QUALIFIED SERIES

### INTRODUCTION

TE Connectivity (TE) brings you its metal-glaze high precision thick film resistor range, type RT73 series, available in four different packages with standard resistance values offered in E96 and E24 series. The resistance tolerance specifications are from 1% to 0.1% with low temperature co-efficient of resistance (T.C.R.) making the RT73 series suitable for use in automotive, measuring equipment and industrial measurement applications.



### FEATURES

- Metal glaze
- High precision
- Resistance tolerances -0.1%
- AEC-Q200 qualified
- MSL1 moisture sensitivity level

**Note:** SMD (Surface mount devices) resistors and inductors should be kept in their original packaging (in reels and paper tapes) to protect them from ESD (Electrostatic Discharge). The reels can be broken into smaller quantities, but the components should not be exposed from their original packaging or used unless in an ESD protected environment.

### APPLICATIONS

- Car electronics
- Industrial equipment
- Industrial measurement

### ELECTRICAL CHARACTERISTICS

		RT73 1E				RT73 1J				RT73 2A				RT73 2B			
Power rating		0.125 W				0.2 W				0.25 W				0.33 W			
Resistance range (Ω)	Min.	300	300	300	300	10	10	10	10	10	10	10	10	10	10	10	10
	Max.	100K	1M	1M	1M	1M	1M	1M	1M	3M	6.8M	10M	10M	1M	1M	10M	10M
Tolerance %		0.1	0.25	0.5	1.0	0.1	0.25	0.5	1.0	0.1	0.25	0.5	1.0	0.1	0.25	0.5	1.0
Code letter		B	C	D	E	B	C	D	E	B	C	D	E	B	C	D	E
TCR (PPM)		25/50															
Selection series		E96 E24															
Max. operating voltage		75 V				100 V				150 V				200 V			
Max. overload voltage		100 V				150 V				300 V				400 V			
Rated ambient temperature		85 °C															
Rated terminal part temperature		125 °C															
Operating temperature range		-55 °C ~ +150 °C															
Thermal resistance R <sub>th</sub> (K/W)		160				102				70				55			

# Thick Film Precision Resistors

Type RT73 AEC-Q200 Qualified Series

## ENVIRONMENTAL CHARACTERISTICS

Characteristics	Condition	Test Methods (JIS-C-5201-1)
Resistance	Within specified tolerance	25 °C
T.C.R	Within specified T.C.R	+25 °C/ -55 °C and +25 °C/ 125 °C
Overload (short term)	$\Delta R (\pm 0.2\% \ 0.05 \ \Omega)$	*Rated voltage X 2.5 for 5s
Resistance to soldering	$\Delta R (\pm 0.2\% \ 0.05 \ \Omega)$	260 °C $\pm 5$ °C, 10 s $\pm 1$ s
Moisture resistance	$\Delta R (\pm 0.2\% \ 0.05 \ \Omega) : 1E(300 \ \Omega \leq R \leq 20 \ k\Omega)$ 1J ( $10 \ \Omega \leq R \leq 200 \ k\Omega$ ) 2A, 2B ( $10 \ \Omega \leq R \leq 1 \ M\Omega$ )	40 °C $\pm 2$ °C, 90% ~ 95% RH, 1000 h 1.5 h ON/ 0.5 h OFF cycle
Endurance at 85°C or rated terminal part temperature	$\Delta R (\pm 0.2\% \ 0.05 \ \Omega) : 1E(300 \ \Omega \leq R \leq 20 \ k\Omega)$ 1J ( $10 \ \Omega \leq R \leq 200 \ k\Omega$ ) 2A, 2B ( $10 \ \Omega \leq R \leq 1 \ M\Omega$ )	85 °C $\pm 2$ °C or rated terminal part temperature $\pm 2$ °C 1000 h 1.5 ON/ 0.5 OFF cycle
High temperature exposure	$\Delta R (\pm 0.2\% \ 0.05 \ \Omega) : 1E(300 \ \Omega \leq R \leq 10 \ k\Omega)$ 1J ( $10 \ \Omega \leq R \leq 200 \ k\Omega$ ) 2A, 2B ( $10 \ \Omega \leq R \leq 100 \ k\Omega$ )	+155 °C, 1000 h
Withstanding voltage	$\Delta R (\pm 0.2\% \ 0.05 \ \Omega)$	60 +10/ -0 (applied voltage) RT73 1E, 1J DC100V RT73 2A, 2B DC500V

\*Overload voltage is rated X 2.5 or maximum overload voltage, whichever is lower.

## AEC-Q200 TEST DATA

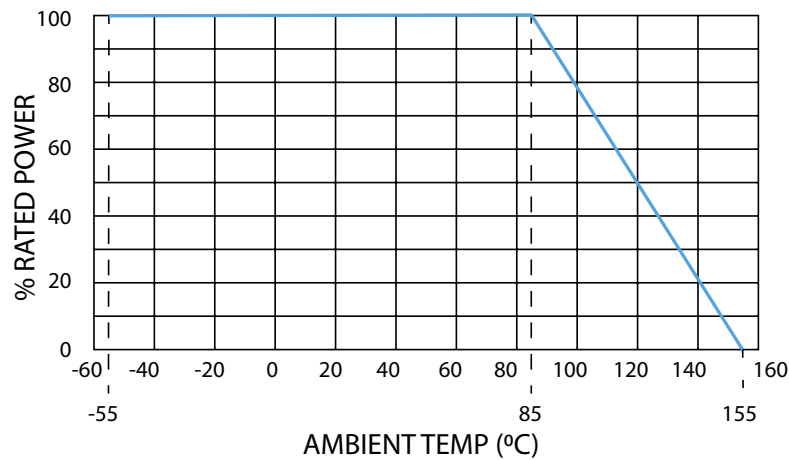
Characteristics	Condition	Test Methods (JIS-C-5201-1)
High temperature exposure	$\Delta R \pm 0.5\%$	<b>MIL-STD-202 Method</b> 108 $\pm 155$ °C, 1000 h
Temperature cycling	$\Delta R \pm 0.2\%$	<b>JESD22 Method JA-104</b> -55 °C/ 125 °C each 30 min. 1000 cycles
Biased humidity	$\Delta R \pm 0.2\%$	<b>MIL-STD-202 method 103</b> 85 °C RH rated wattage/ 10 1.5 hr-ON/ 0.5 hr- OFF 1000 hrs
Operational life	$\Delta R \pm 0.5\%$	<b>MIL-STD-202 method 108</b> 125 °C derating wattage 1.5 hr-ON/ 0.5 hr-OFF 2000 hrs
External visual	-	<b>MIL-STD-883 method 2009</b> Visual check
Physical dimension	-	<b>JESD22 method JB-100</b> Delivery specification
Resistance to solvents	$\Delta R \pm 1.0\%$	<b>MIL-STD-202 method 215</b> Solvent a/c: 25 °C 3min. solvent d: 63 °C~ 70 °C 3min.
Mechanical shock	$\Delta R \pm 1.0\%$	<b>MIL-STD-202 method 213 Test Condition C</b> 100G 6 ms.(half sine wave) X, Y, Z each direction $\pm 3$ shocks total 18 shocks
Vibration	$\Delta R \pm 1.0\%$	<b>MIL-STD-202 method 204</b> 10 Hz-2000 Hz-10 Hz/ 20 min. 1.5 mm double amplitude (5G max.) X, Y, Z each direction 4 hrs. total 12 hrs.
Resistance to soldering heat	$\Delta R \pm 0.2\%$	<b>MIL-STD-202 method 210 Test Condition B</b> 260 °C 10 sec. dipping
ESD (HBM)	$\Delta R \pm 1.0\%$ RT73 1E, 1J Class 1B RT73 2A, 2B Class 2	<b>AEC-Q200-002</b> 150 pF 2k $\Omega$ $\pm 1$ discharge
Solderability	95% min. coverage	<b>J-STD-002</b> a) Method B 4 hrs. @ 155 °C, dry heat @ 235 °C b) Method B @ 215 °C, category 3 c) Method D @ 260 °C, category 3

# Thick Film Precision Resistors

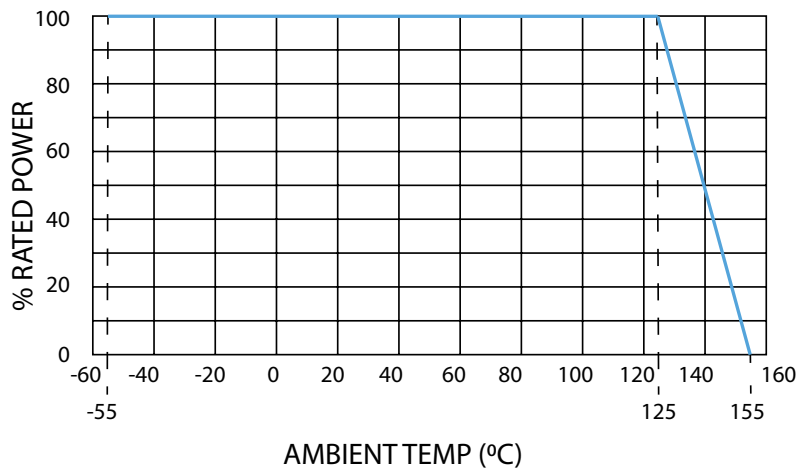
Type RT73 AEC-Q200 Qualified Series

Characteristics	Condition	Test Methods (JIS-C-5201-1)
Electrical characterisation	-	Delivery Specification Temperature coefficient of resistance -55 °C/ 125 °C (25 °C basis)
Board flex	$\Delta R \pm 0.2\%$	<b>AEC-Q200-005</b> Bend 2 mm 60 sec.
Terminal strength	$\Delta R \pm 1.0\%$	<b>AEC-Q200-006</b> Shear stress 17.7 N 60 sec.
Flame retardance	-	<b>AEC-Q200-001</b> 9.0 VDC ~ 32.0 VDC each 1 hr.
Tin whisker	<45 $\mu\text{m}$ (temperature cycling) <40 $\mu\text{m}$ (ambient temperature/ humidity storage)	<b>AEC-Q005</b> <ul style="list-style-type: none"> <li>Condition 1: Temperature cycling -55 °C/ 85°C 3 cys/hr</li> <li>Condition 2: Ambient temperature/ humidity storage (30°C 60%RH)</li> <li>Condition 3: Ambient temperature/ humidity storage (60°C 87%RH)</li> </ul>

## DERATING CURVE

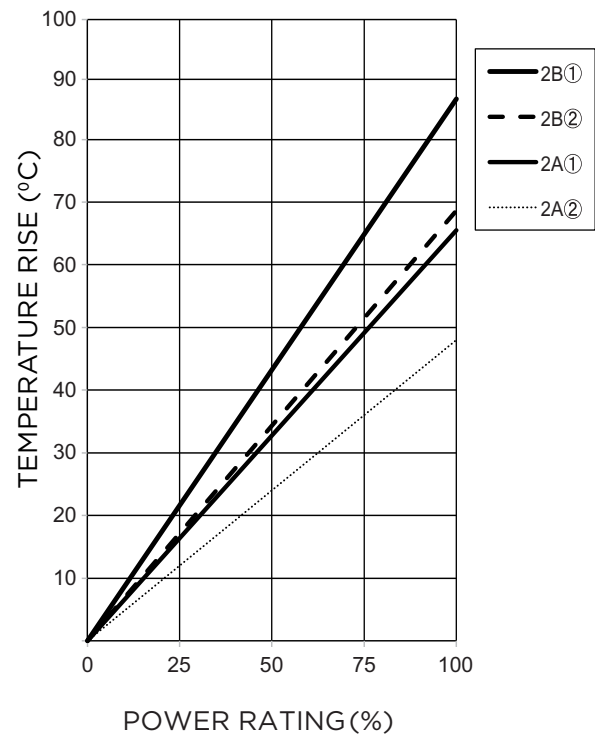
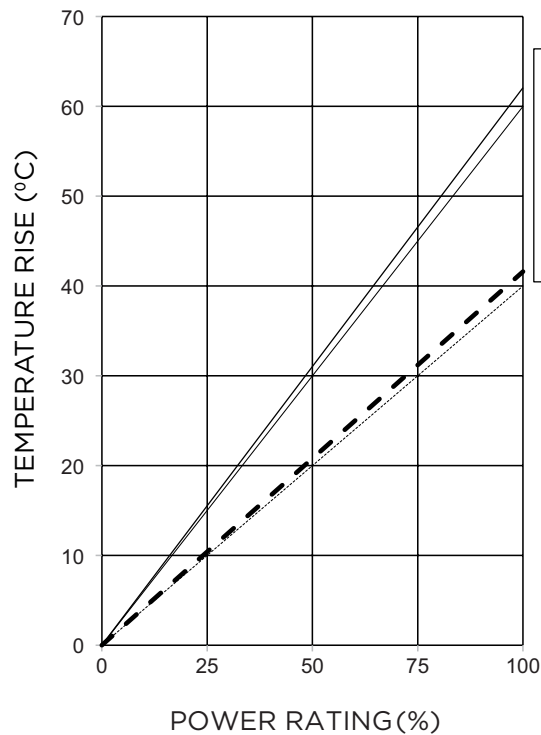


**Note:** For resistors operated at an ambient temperature of 85°C or higher, the power shall be derated in accordance with the above derating curve.



**Note:** When the terminal part temperature of the resistor exceeds the rated terminal part temperature shown above, the power shall be derated according to the derating curve.

## TEMPERATURE RISE

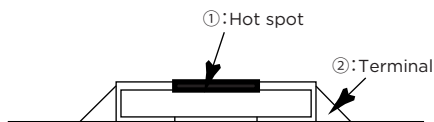


### Measurement condition:

Room temperature: 25 °C

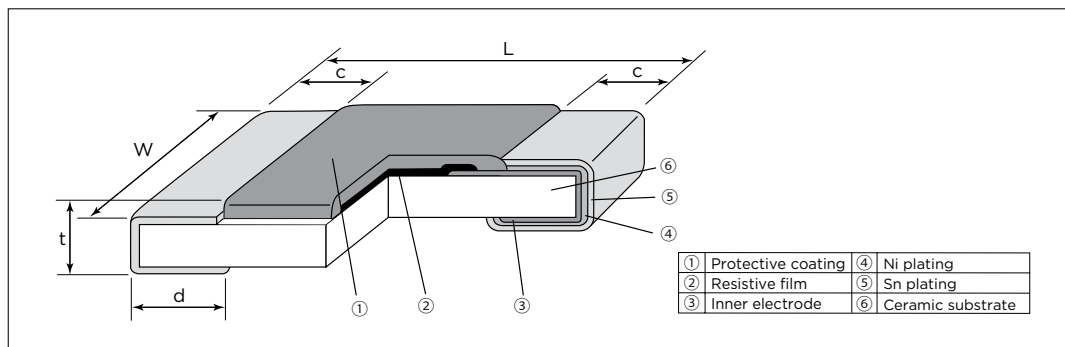
PCB: FR-4t = 1.6mm

Cu foil thickness: 35μm



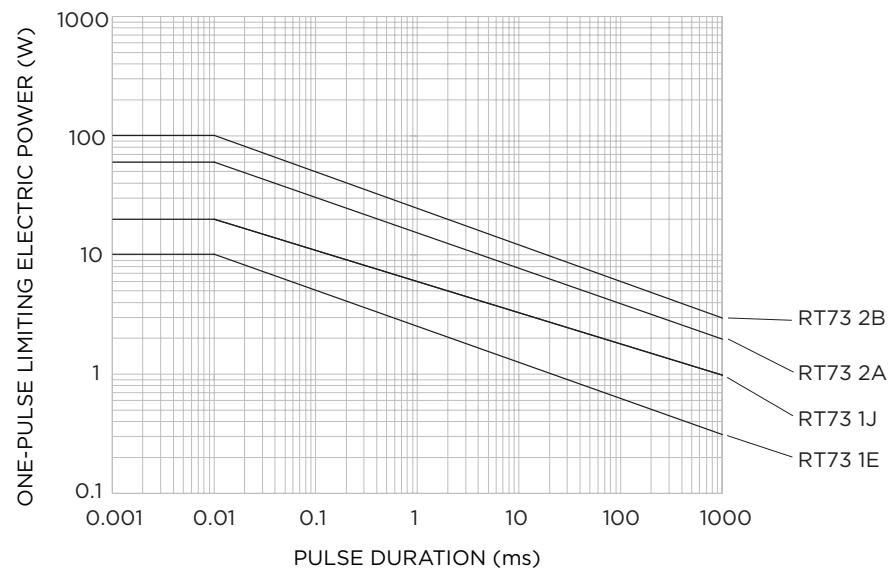
**Note:** For guidance only. Testing was carried out in controlled laboratory conditions. We recommend testing in the intended application.

## CONSTRUCTION AND DIMENSIONS



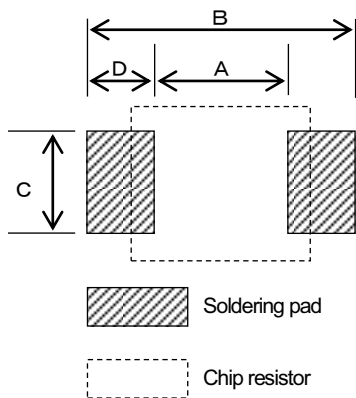
Type	L (mm)	W (mm)	c (mm)	d (mm)	t (mm)	Weight (mg)
RT73 1E	1.0 +0.1/ -0.05	0.5 ±0.05	0.2 ±0.1	0.25 +0.05/ -0.1	0.35 ±0.05	0.68
RT73 1J	1.6 ±0.2	0.8 ±0.1	0.2 ±0.1	0.3 ±0.1	0.45 ±0.1	2.14
RT73 2A	2.0 ±0.2	1.25 ±0.1	0.25 ±0.15	0.3 +0.2/ -0.1	0.5 ±0.1	4.54
RT73 2B	3.2 ±0.2	1.6 ±0.2	0.35 ±0.15	0.4 +0.2/ -0.1	0.6 ±0.1	9.14

SINGLE PULSE



**Note:** For guidance only. The maximum applicable voltage is equal to the max. overload voltage. The pulse endurance values are not assured values, and it is recommended testing in the intended application.

RECOMMENDED LAND PATTERN



Type	A (mm)	B (mm)	C (mm)	D (mm)
RT73 1E	0.5	1.3	0.3	0.4
RT73 1J	1.0	2.0	0.6	0.5
RT73 2A	1.3	2.5	1.05	0.6
RT73 2B	2.2	4.0	1.4	0.9

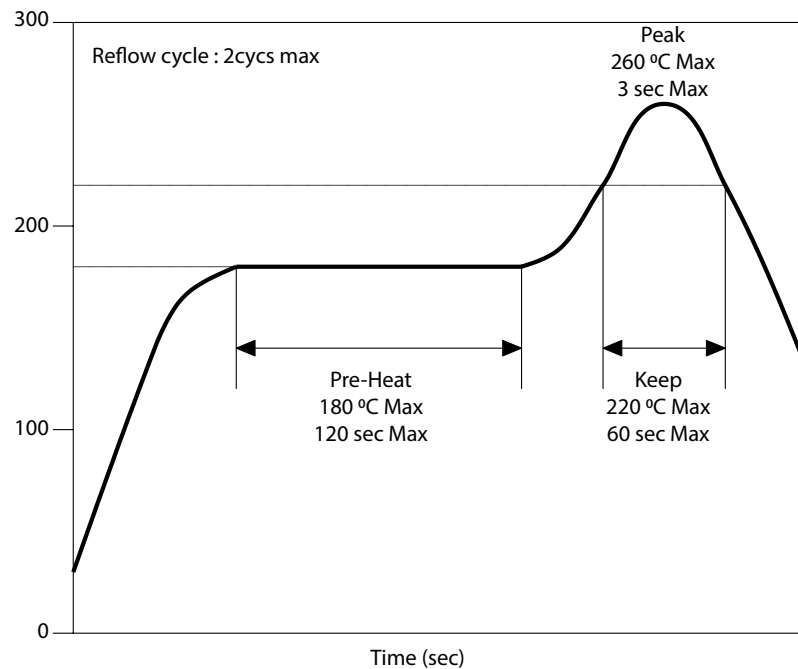
COATING COLOUR AND MARKING

Type	Coating Colour	Marking
RT73 1E	Black	No Marking
RT73 1J		
RT73 2A		
RT73 2B		

# Thick Film Precision Resistors

Type RT73 AEC-Q200 Qualified Series

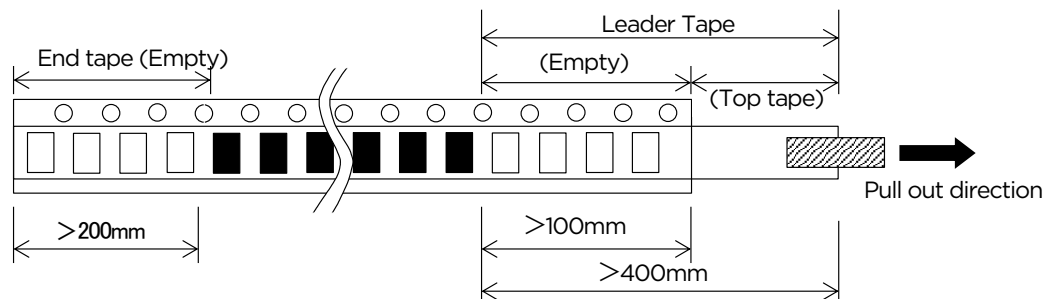
## SOLDERING REFLOW PROFILE



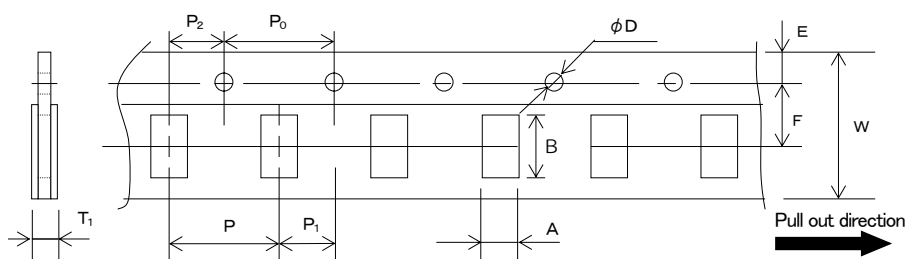
## PACKAGING

### Paper Tape

Leader and end tape

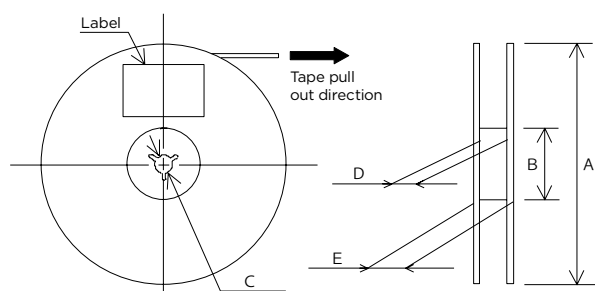


### Paper Tape Dimensions (mm)



Type	A (mm)	B (mm)	D (mm)	E (mm)	F (mm)	P (mm)	P <sub>0</sub> (mm)	P <sub>1</sub> (mm)	P <sub>2</sub> (mm)	T <sub>1</sub> (mm)	W (mm)
RT73 1E	0.65 ±0.10	1.15 ±0.10	1.5 +0.1/- 0	1.75 ±0.1	3.5 ±0.05	-	4.0 ±0.1	2.0 ±0.05	2.0 ±0.05	0.42 +0.2/- 0	8.0 ±0.2
RT73 1J	1.10 ±0.10	1.90 ±0.10				4.0 ±0.1	4.0 ±0.1	-		0.6 +0.2/- 0	
RT73 2A	1.65 ±0.20	2.40 ±0.20				4.0 ±0.1	4.0 ±0.1	-		0.75 +0.2/- 0	
RT73 2B	2.00 ±0.20	3.50 ±0.20				4.0 ±0.1	4.0 ±0.1	-			

## REEL DIMENSIONS



Type	A (mm)	B (mm)	C (mm)	D (mm)	E (mm)	Qty
RT73 1E	180 +0/ -3	60 +1/ -0	13 ±0.2	8.4 +1.5/ -0	12.4 ±0.2	10,000
RT73 1J						5,000
RT73 2A						5,000
RT73 2B						5,000

## ORDERING INFORMATION

Part Number		RT73 F 1E 10R B TH	
Common Part		Packaging	
RT73	Standard	TH	10,000 pcs
		TD	5,000 pcs
TCR		Tolerance	
F	*25 PPM	B	*0.1%
G	50 PPM	C	0.25%
		D	0.5%
		F	1%
Package Size		Resistance Value	
1E	0402	10R	10 ohm (10Ω)
1J	0603	100R	100 ohm (100Ω)
2A	0805	1K0	1K ohm (1000Ω)
2B	1206	10K	10K ohm (10000Ω)
		100K	100K ohm (100000Ω)
		1M	1M ohm (1000000Ω)

\*Preferred TCR and tolerance, other options offered on demand

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