

Metal Film Precision MELF Resistor

Automotive Grade

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**RoHS
Compliant**



Features

- Thin film technology
- AEC-Q200 Qualified
- Excellent overall stability
- Sn termination on Ni barrier layer
- Tight tolerance down to $\pm 0.1\%$
- Extremely low TCR down to $\pm 5 \text{ ppm}/^\circ\text{C}$
- High power rating up to 1 Watts
- SMD enabled structure

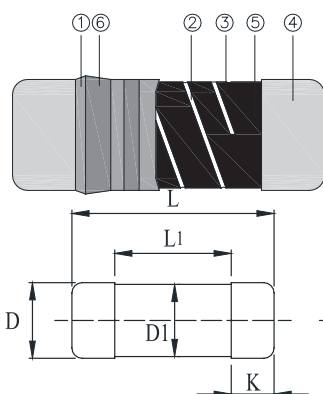
Applications

- Automotive
- Industrial
- Telecommunication
- Medical Equipment
- Measurement/Testing Equipment

Technical Specifications

Description	MCCSRA0102		MCCSRA0204		MCCSRA0207	
Resistance range	1Ω-1MΩ; 0Ω		0.1Ω-10MΩ; 0Ω		0.1Ω-10MΩ; 0Ω	
Resistance tolerance	±5%;±1%;±0.5%;±0.25%;±0.1%					
Temperature coefficient	±100ppm/°C; ±50ppm/°C; ±25ppm/°C; ±15ppm/°C		±100ppm/°C; ±50ppm/°C; ±25ppm/°C; ±15ppm/°C; ±10ppm/°C; ±5ppm/°C			
Operation mode	Standard	High power	Standard	High power	Standard	High power
Power rating P ₇₀	1/5W	0.3W	1/4W	2/5W	1/2W	1W
Operating voltage U _{max.}	200V	200V	200V	200V	300V	350V
Operating temperature range	-55°C to 155°C					
Max. resistance change at P70 for resistance range, ΔR/R max., after 1000 h	≤0.5%					

Construction & Dimension



1	Insulation Coating	4	Electrode Cap
2	Trimming Line	5	Resistor Layer
3	Ceramic Rod	6	Marking

Dimensions

Type	L (mm)	L1 min. (mm)	ΦD (mm)	$\Phi D1$ (mm)	K (mm)	Weight (g) (1000pcs)
MCCSRA0102	2.2 $\pm$ 0.1	1.1	1.1 $\pm$ 0.1	D +0/-0.15	0.45 $\pm$ 0.05	7.7
MCCSRA0204	3.5 $\pm$ 0.2	1.7	1.4 $\pm$ 0.15	D +0/-0.2	0.8 $\pm$ 0.1	18.7
MCCSRA0207	5.9 $\pm$ 0.2	2.9	2.2 $\pm$ 0.2	D +0/-0.2	1.3 $\pm$ 0.1	80.9

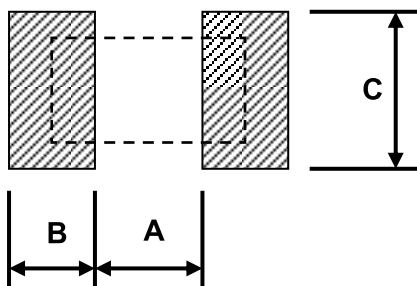
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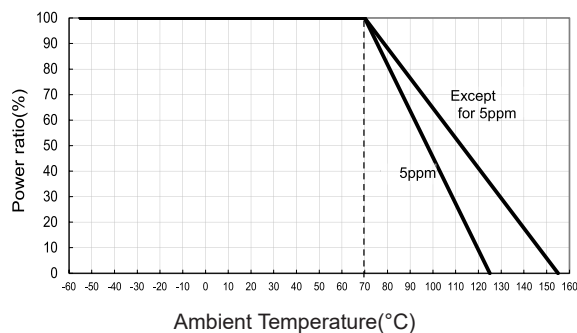
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Recommend Land Pattern

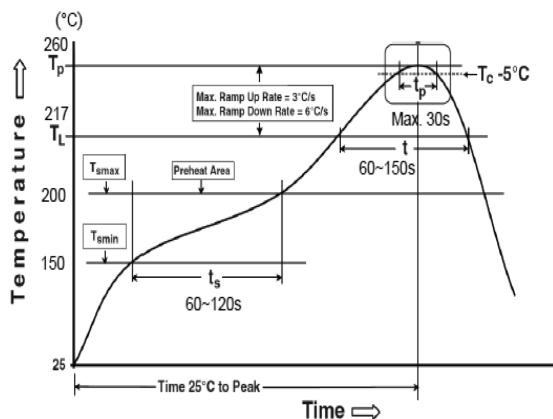


Type	A (mm)	B (mm)	C (mm)
MCCSRA0102	1	0.8	1.5
MCCSRA0204	1.6	1.2	1.6
MCCSRA0207	3	1.7	2.4

Derating Curve



Soldering Condition Ref. IPC/JEDEC J-STD-020 & J-STD-002



Reflow Profiles	
Profile Feature	Pb-Free Assembly
Preheat	
Min. Temperature (T _{min})	150°C
Max Temperature (T _{max})	200°C
Preheating time (t _s) from (T _{min} to T _{max})	60-120 seconds
Ramp-up rate (T _L to T _p)	3°C/second max.
Liquidous temperature (T _L)	217°C
Time (t _L) maintained above T _L	60-150 seconds
Min. Peak temperature (T _p min)	235°C
Max. Peak temperature (T _p max)	260°C
Time (t _p) within 5°C of the specified classification temperature (T _c)	30 seconds max.
Ramp-down rate (T _p to T _L)	6°C/second max.
Time 25°C to peak temperature	8 minutes max.

Dimensions : Millimetres

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Standard Electrical Specifications

	Power Rating at 70°C	Operating Temp. Range	Max. Operating Voltage	Max. Overload Voltage	Resistance Range					TCR (PPM/°C)
					±0.1%	±0.25%	±0.5%	±1%	±5%	
0102	1/5W	-55 to +155°C	200V	400V	100Ω - 56K Ω				-	±15
					100Ω - 82KΩ		49.9Ω - 200KΩ	49.9Ω - 390KΩ	-	±25
					-		1Ω - 1MΩ			±50
					-		1Ω - 1MΩ		±100	
0204	1/4W	-55 to +125°C	200V	400V	10Ω-332KΩ		-			±5
		-55 to +155°C			10Ω-332 KΩ				-	±10
					10Ω-332 KΩ				-	±15
					10Ω - 1MΩ		10Ω-3.4 MΩ	1Ω - 3.4 MΩ		±25
					10Ω - 1MΩ		1Ω-3.4MΩ	0.2Ω - 10MΩ		±50
					-		0.1Ω - 10MΩ		±100	
0207	1/2W	-55 to +125°C	300V	600V	10Ω - 332KΩ		-			±5
		-55 to +155°C			10Ω - 332KΩ				-	±10
					10Ω - 332KΩ				-	±15
					10Ω - 1MΩ		10Ω-3.4MΩ	1Ω - 3.4 MΩ		±25
					10Ω - 1MΩ		1Ω-3.4MΩ	0.2Ω - 10MΩ		±50
					-		0.1Ω - 10MΩ		±100	

High Power Rating Electrical Specifications

Item Type	Power Rating at 70°C	Operating Temp. Range	Max. Operating Voltage	Max. Overload Voltage	Resistance Range					TCR (PPM/°C)
					±0.1%	±0.25%	±0.5%	±1%	±5%	
0102	1/5W	-55 to +155°C	200V	400V	100Ω - 56KΩ				-	±15
					100Ω - 82KΩ		49.9Ω - 200KΩ	49.9Ω - 390KΩ	-	±25
					-		1Ω - 1MΩ			±50
					-		1Ω - 1MΩ		±100	
0204	1/4W	-55 to +125°C	200V	400V	10Ω-332KΩ		-			±5
		10Ω-332 KΩ				-	±10			
		10Ω-332 KΩ				-	±15			
		10Ω - 1MΩ			10Ω-3.4 MΩ	1Ω - 3.4 MΩ		±25		
		10Ω - 1MΩ			1Ω-3.4MΩ	0.2Ω - 10MΩ		±50		
		-			0.1Ω - 10MΩ		±100			
0207	1/2W	-55 to +125°C	350V	700V	10Ω - 332KΩ		-			±5
		10Ω - 332KΩ				-	±10			
		10Ω - 332KΩ				-	±15			
		10Ω - 1MΩ			10Ω-3.4MΩ	1Ω - 3.4 MΩ		±25		
		10Ω - 1MΩ			1Ω-3.4MΩ	0.2Ω - 10MΩ		±50		
		-			0.1Ω - 10MΩ		±100			

Operating Voltage= $\sqrt{P \cdot R}$) or Max. Operating Voltage listed above, whichever is lower.

Overload Voltage= $2.5 \cdot \sqrt{P \cdot R}$) or Max. Overload Voltage listed above, whichever is lower.

RCWV(Rated Continuous Working Voltage)= $\sqrt{P \cdot R}$) or Max. Operating Voltage whichever is lower.

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Jumper Specifications

	Power Rating	Operating Temp.Range	Resistance	Rated Current
MCCSRA 0102	1/5W - 0.3W	-55°C to +155°C	0Ω(<15mΩ)	2A
MCCSRA 0204	1/4W - 2/5W			3A
MCCSR A 0207	1/2W - 1W			5A

Environmental Characteristics

Item	Requirement		Test Method
	5% and Below	Jumper	
Temperature Coefficient of Resistance (T.C.R.)	As Spec.		JIS-C-5201-1 4.8 IEC-60115-1 4.8 At 25°C/ -55°C and 25°C/+125°C, 25°C is the reference temperature 5ppm: At 25°C/ 10 °C and 25°C/+ 8 5°C, 2 5°C is the reference temperature
Short Time Overload	10Ω-332KΩ: ± (0.1%+0.01Ω) <10Ω & 332KΩ : ± (0.15 %+0.01Ω) 0102:± (0.15 %+0.01Ω) 5ppm:± (0.05 %+0.01Ω)	<15mΩ	JIS-C-5201-1 4.13 IEC-60115-1 4.13 RCWV*2.5 or Max. Overload Voltage whichever is lower for 5 seconds
Insulation Resistance	≥10G		JIS-C-5201-1 4.6 IEC-60115-1 4.6 Max. Overload Voltage for 1 minute
Operational Life (Endurance)	10Ω-332KΩ: ± (0.25%+0.01Ω) <10Ω & 332KΩ : ± (0.5 %+0.01Ω) 0102:± (0.5 %+0.01Ω)	<15mΩ	MIL-STD-202 Method 108 Condition D Steady State TA=125°C at derated power. Measurement at 24±4 hours after test conclusion. 5ppm: 70±2°C, RCWV for 1000 hrs with 1.5 hrs "ON" and 0.5 hr "OFF"
Biased Humidity	10Ω: ± (0.5%+0.01Ω) <10Ω - 332KΩ : ± (0.25 %+0.01Ω) >332KΩ-3.4MΩ: ±(1%+0.01Ω >3.4MΩ: ±(2%+0.01Ω 0102:± (1%+0.01Ω)	<15mΩ	MIL-STD-202 Method 103 1344 hrs 85°C/85%RH 10% of operating power (≤100V)
High Temperature Exposure	10Ω-332KΩ: ± (0.25%+0.01Ω) <10Ω & 332KΩ : ± (0.5 %+0.01Ω) 0102:± (1%+0.01Ω)	<15mΩ	MIL-STD-202 Method 108 at +155°C for 1000 hrs
Board Flex	10Ω-332KΩ: ± (0.1%+0.01Ω) <10Ω & 332KΩ : ± (0.2 %+0.01Ω) 0102:± (5%+0.01Ω)	<15mΩ	AEC-Q200-005 Bending once for 60 seconds with 2mm
Solderability	95% min. Coverage		JIS-C-5201-1 4.17 IEC-60115-1 4.17 245±5°C for 3 seconds
Resistance to Soldering Heat	10Ω-332KΩ: ± (0.1%+0.01Ω) <10Ω & 332KΩ : ± (0.25 %+0.01Ω) 0102:± (0.25 %+0.01Ω) 5ppm:± (0.05 %+0.01Ω)	<15mΩ	MIL-STD-202 Method 210 260±5°C for 10 seconds
Voltage Proof	No breakdown or flashover		JIS-C-5201-1 4.7 IEC-60115-1 4.7 1.42 times Max. Operating Voltage for 1 minute

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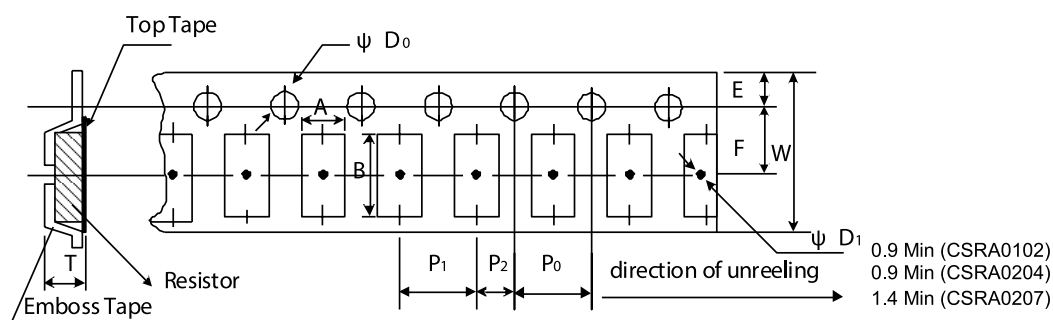
Item	Requirement		Test Method
	5% and Below	Jumper	
Leaching	Individual leaching area ≤5% Total leaching area ≤10%		JIS-C-5201-1 4.18 IEC-60068-2-58 8.2.1 260±5°C for 30 seconds
Temperature Cycling	10Ω-332KΩ: ± (0.15%+0.01Ω) <10Ω & 332KΩ : ± (0.5 %+0.01Ω) 0102:± (1 %+0.01Ω)	<15mΩ	JESD22 Method JA-104 -55°C to +125°C, 1000 cycles
Mechanical Shock	±(0.25%+0.01Ω)	<15mΩ	MIL-STD-202 Method 213 Wave Form: Tolerance for half sine shock pulse. Peak value is 100g's. Normal duration (D) is 6.
Vibration	±(0.5%+0.01Ω)	<15mΩ	MIL-STD-202 Method 204 5 g's for 20 min., 12 cycles each of 3 orientations, 10-2000 Hz
ESD	±(0.5%+0.01Ω)	<15mΩ	AEC-Q200-002 Human body/Human body, 0102/0204:2KV; 0207:4KV
Resistance to solvents	No visible damage on appearance and marking.		MIL-STD-202 Method 215 Add Aqueous wash chemical - OKEM Clean or equivalent. Do not use banned solvents.
Terminal Strength	No broken		AEC-Q200-006 Force of 1.8kg for 60 seconds.
Flammability	No ignition of the tissue paper or scorching or the pinewood board		UL-94 V-0 or V-1 are acceptable. Electrical test not required.

RCWV(Rated continuous working voltage)= $\sqrt{P \cdot R}$ or Max. Operating voltage whichever is lower

Storage Temperature: 15°C to 28°C; Humidity < 80%RH

Shelf Life: 2 years from production date.

Emboss Plastic Tape Specifications



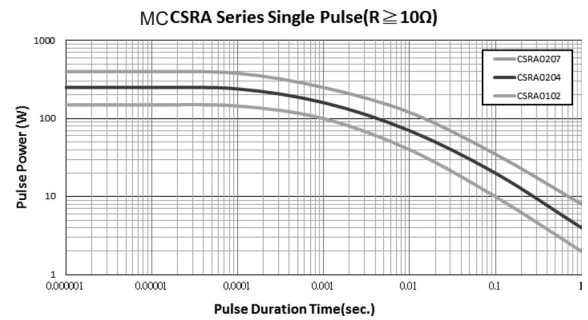
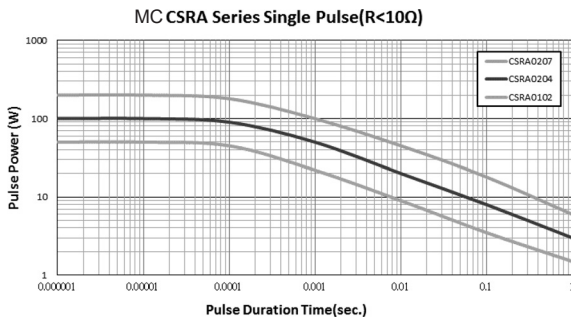
Type	A mm	B mm	W mm	E mm	F mm	P ₀ mm	P ₁ mm	P ₂ mm	Dimensions: Millimetres D ₀ mm	mm
MCCSRA0102	1.3 ±0.2	2.4 ±0.2	8 ±0.1	1.75 ±0.1	3.5 ±0.05	4 ±0.1	4 ±0.1	2 ±0.05	1.5+0.1	1.5 ±0.1
MCCSRA0204	1.55 ±0.2	3.65 ±0.2	8 ±0.1	1.75 ±0.1	3.5 ±0.05	4 ±0.1	4 ±0.1	2 ±0.05	1.5+0.1	1.8 ±0.1
MCCSRA0207	2.4 ±0.1	6.15 ±0.1	12 ±0.2	1.75 ±0.1	5.5 ±0.05	4 ±0.1	4 ±0.1	2 ±0.05	1.5+0.1	2.7 ±0.1

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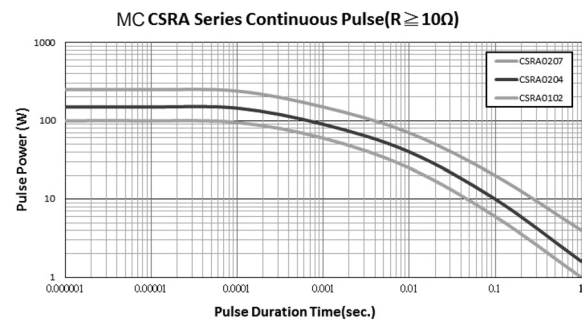
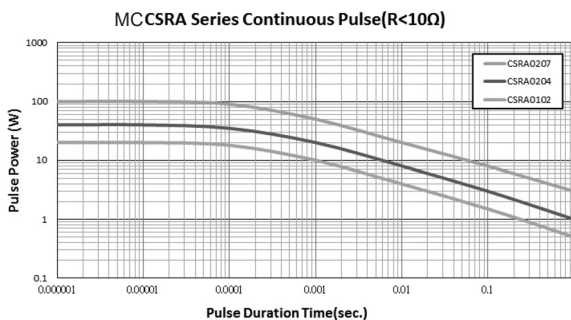
Pulse withstanding capacity

The single impulse graph is the result of the impulse of rectangular shape applied. The limit of acceptance was a shift in resistance of less than 1% from the initial value. The power applied was subject to the restrictions of the maximum permissible impulse voltage graph shown.



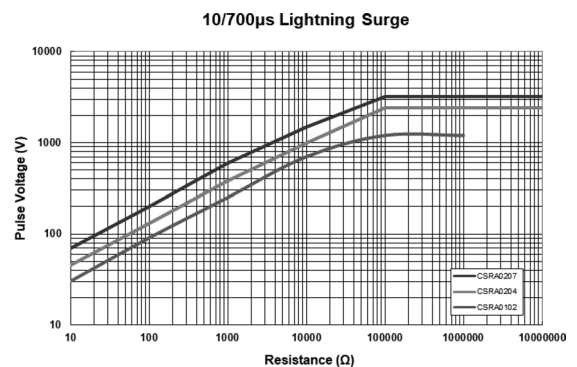
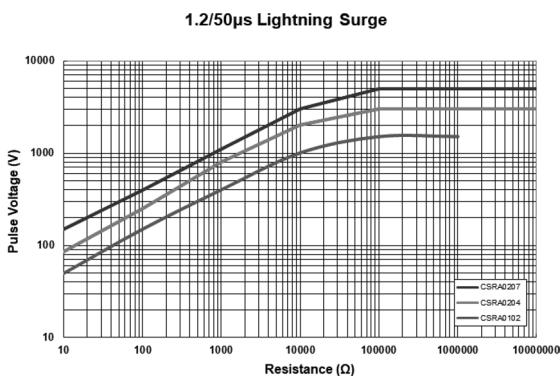
Continuous Pulse

The continuous load graph was obtained by applying repetitive rectangular pulses where the pulse period was adjusted so that the average power dissipated in the resistor was equal to its rated power at 70°C. Again the limit of acceptance was a shift in resistance of less than 1% from the initial value.



Lightning Surge

Resistors are tested in accordance with IEC 60115-1 using both 1.2/50μs and 10/700μs pulse shapes. The limit of acceptance is a shift in resistance of less than 0.5% from the initial value.

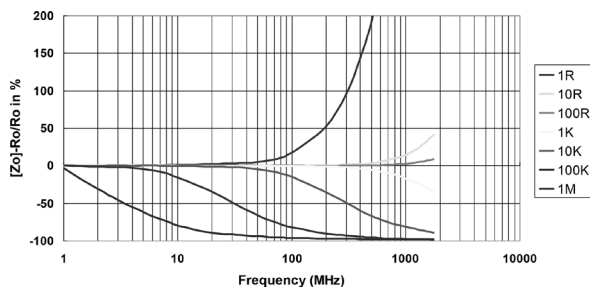


Frequency behavior

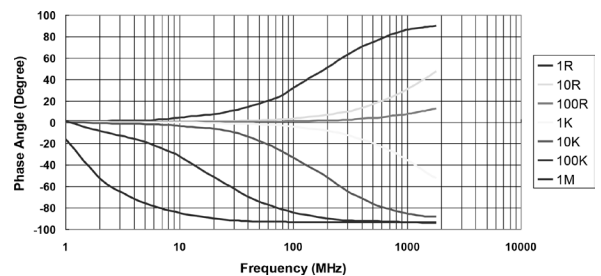
Resistors are designed to function according to ohmic laws. This is basically true of resistors for frequencies up to 100kHz. At higher frequencies, there is an additional contribution to the impedance by an ideal resistor switched in series with a coil and both switched parallel to a capacitor. The values of the capacitance and inductance are mainly determined by the dimensions of the terminations and the conductive path length.

The environment surrounding components has a large influence on the behavior of the component on the printed-circuit board.

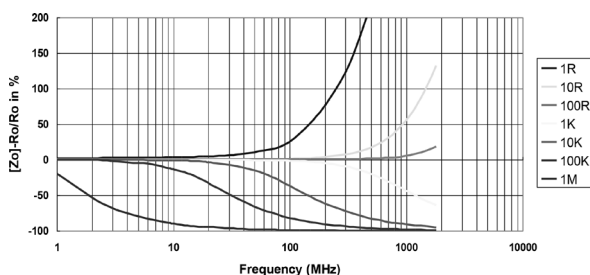
Frequency vs. Impedance
MCCSR Series(MCCSR0204)



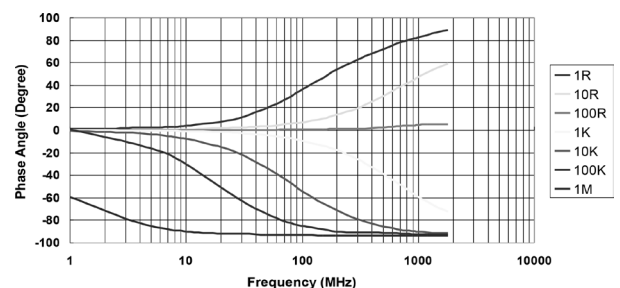
Frequency vs. Phase Angle
MCCSR Series(MCCSR0204)



Frequency vs. Impedance
MCCSR Series(MCCSR0207)



Frequency vs. Phase Angle
MCCSR Series(MCCSR0207)



Part Number Table

Description	Part Number
MELF Resistor, 0102, 1%, TCR50, 1/5W, 10Ω	MCCSRA0102FTDP0100
MELF Resistor, 0102, 1%, TCR50, 1/5W, 22Ω	MCCSRA0102FTDP0220
MELF Resistor, 0102, 1%, TCR50, 1/5W, 47Ω	MCCSRA0102FTDP0470
MELF Resistor, 0102, 1%, TCR50, 1/5W, 56Ω	MCCSRA0102FTDP0560
MELF Resistor, 0102, 1%, TCR50, 1/5W, 100Ω	MCCSRA0102FTDP1000
MELF Resistor, 0102, 1%, TCR50, 1/5W, 1KΩ	MCCSRA0102FTDP1001
MELF Resistor, 0102, 1%, TCR50, 1/5W, 10KΩ	MCCSRA0102FTDP1002
MELF Resistor, 0102, 1%, TCR50, 1/5W, 100KΩ	MCCSRA0102FTDP1003
MELF Resistor, 0102, 1%, TCR50, 1/5W, 1MΩ	MCCSRA0102FTDP1004
MELF Resistor, 0102, 1%, TCR50, 1/5W, 120Ω	MCCSRA0102FTDP1200
MELF Resistor, 0102, 1%, TCR50, 1/5W, 1.2KΩ	MCCSRA0102FTDP1201
MELF Resistor, 0102, 1%, TCR50, 1/5W, 1.5KΩ	MCCSRA0102FTDP1501
MELF Resistor, 0102, 1%, TCR50, 1/5W, 15KΩ	MCCSRA0102FTDP1502
MELF Resistor, 0102, 1%, TCR50, 1/5W, 150KΩ	MCCSRA0102FTDP1503
MELF Resistor, 0102, 1%, TCR50, 1/5W, 1.8KΩ	MCCSRA0102FTDP1801
MELF Resistor, 0102, 1%, TCR50, 1/5W, 220Ω	MCCSRA0102FTDP2200
MELF Resistor, 0102, 1%, TCR50, 1/5W, 2.2KΩ	MCCSRA0102FTDP2201
MELF Resistor, 0102, 1%, TCR50, 1/5W, 22KΩ	MCCSRA0102FTDP2202
MELF Resistor, 0102, 1%, TCR50, 1/5W, 270Ω	MCCSRA0102FTDP2700
MELF Resistor, 0102, 1%, TCR50, 1/5W, 3.3KΩ	MCCSRA0102FTDP3301
MELF Resistor, 0102, 1%, TCR50, 1/5W, 33KΩ	MCCSRA0102FTDP3302
MELF Resistor, 0102, 1%, TCR50, 1/5W, 3.9KΩ	MCCSRA0102FTDP3901
MELF Resistor, 0102, 1%, TCR50, 1/5W, 470Ω	MCCSRA0102FTDP4700
MELF Resistor, 0102, 1%, TCR50, 1/5W, 4.7KΩ	MCCSRA0102FTDP4701
MELF Resistor, 0102, 1%, TCR50, 1/5W, 47KΩ	MCCSRA0102FTDP4702
MELF Resistor, 0102, 1%, TCR50, 1/5W, 5.6KΩ	MCCSRA0102FTDP5601
MELF Resistor, 0102, 1%, TCR50, 1/5W, 56KΩ	MCCSRA0102FTDP5602
MELF Resistor, 0102, 1%, TCR50, 1/5W, 680Ω	MCCSRA0102FTDP6800
MELF Resistor, 0102, 1%, TCR50, 1/5W, 68KΩ	MCCSRA0102FTDP6802
MELF Resistor, 0102, 5% Jumper 1/5W, 0Ω	MCCSRA0102JT-PR0R0
MELF Resistor, 0204, 1%, TCR50, 2/5W, 1MΩ	MCCSRA0204FTDG1004
MELF Resistor, 0204, 1%, TCR50, 2/5W, 120KΩ	MCCSRA0204FTDG1203
MELF Resistor, 0204, 1%, TCR50, 2/5W, 150KΩ	MCCSRA0204FTDG1503
MELF Resistor, 0204, 1%, TCR50, 2/5W, 220KΩ	MCCSRA0204FTDG2203
MELF Resistor, 0204, 1%, TCR50, 2/5W, 330KΩ	MCCSRA0204FTDG3303
MELF Resistor, 0204, 1%, TCR50, 2/5W, 390KΩ	MCCSRA0204FTDG3903
MELF Resistor, 0204, 1%, TCR50, 2/5W, 470KΩ	MCCSRA0204FTDG4703
MELF Resistor, 0204, 1%, TCR50, 2/5W, 560KΩ	MCCSRA0204FTDG5603

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Description	Part Number
MELF Resistor, 0207, 1%, TCR50, 1W 2M2Ω	MCCSRA0207FTDT2204
MELF Resistor, 0207, 1%, TCR50, 1W 4M7Ω	MCCSRA0207FTDT4704
MELF Resistor, 0204, 0.1%, TCR25 2/5W, 100KΩ	MCCSRA0204BTCG1003
MELF Resistor, 0204, 0.1%, TCR25 2/5W, 100Ω	MCCSRA0204BTCG1000
MELF Resistor, 0204, 0.1%, TCR25 2/5W, 1KΩ	MCCSRA0204BTCG1001
MELF Resistor, 0204, 0.1%, TCR25 2/5W, 2KΩ	MCCSRA0204BTCG2001
MELF Resistor, 0204, 1%, TCR50, 2/5W, 10Ω	MCCSRA0204FTDG0100
MELF Resistor, 0204, 1%, TCR50, 2/5W, 22Ω	MCCSRA0204FTDG0220
MELF Resistor, 0204, 1%, TCR50, 2/5W, 27Ω	MCCSRA0204FTDG0270
MELF Resistor, 0204, 1%, TCR50, 2/5W, 33Ω	MCCSRA0204FTDG0330
MELF Resistor, 0204, 1%, TCR50, 2/5W, 39Ω	MCCSRA0204FTDG0390
MELF Resistor, 0204, 1%, TCR50, 2/5W, 47Ω	MCCSRA0204FTDG0470
MELF Resistor, 0204, 1%, TCR50, 2/5W, 100Ω	MCCSRA0204FTDG1000
MELF Resistor, 0204, 1%, TCR50, 2/5W, 1KΩ	MCCSRA0204FTDG1001
MELF Resistor, 0204, 1%, TCR50, 2/5W, 10KΩ	MCCSRA0204FTDG1002
MELF Resistor, 0204, 1%, TCR50, 2/5W, 100KΩ	MCCSRA0204FTDG1003
MELF Resistor, 0204, 1%, TCR50, 2/5W, 12KΩ	MCCSRA0204FTDG1202
MELF Resistor, 0204, 1%, TCR50, 2/5W, 1.5KΩ	MCCSRA0204FTDG1501
MELF Resistor, 0204, 1%, TCR50, 2/5W, 15KΩ	MCCSRA0204FTDG1502
MELF Resistor, 0204, 1%, TCR50, 2/5W, 180Ω	MCCSRA0204FTDG1800
MELF Resistor, 0204, 1%, TCR50, 2/5W, 1.8KΩ	MCCSRA0204FTDG1801
MELF Resistor, 0204, 1%, TCR50, 2/5W, 18KΩ	MCCSRA0204FTDG1802
MELF Resistor, 0204, 1%, TCR50, 2/5W, 220Ω	MCCSRA0204FTDG2200
MELF Resistor, 0204, 1%, TCR50, 2/5W, 2.2KΩ	MCCSRA0204FTDG2201
MELF Resistor, 0204, 1%, TCR50, 2/5W, 22KΩ	MCCSRA0204FTDG2202
MELF Resistor, 0204, 1%, TCR50, 2/5W, 270Ω	MCCSRA0204FTDG2700
MELF Resistor, 0204, 1%, TCR50, 2/5W, 2.7KΩ	MCCSRA0204FTDG2701
MELF Resistor, 0204, 1%, TCR50, 2/5W, 27KΩ	MCCSRA0204FTDG2702
MELF Resistor, 0204, 1%, TCR50, 2/5W, 3.3KΩ	MCCSRA0204FTDG3301
MELF Resistor, 0204, 1%, TCR50, 2/5W, 33KΩ	MCCSRA0204FTDG3302
MELF Resistor, 0204, 1%, TCR50, 2/5W, 3.9KΩ	MCCSRA0204FTDG3901
MELF Resistor, 0204, 1%, TCR50, 2/5W, 39KΩ	MCCSRA0204FTDG3902
MELF Resistor, 0204, 1%, TCR50, 2/5W, 470Ω	MCCSRA0204FTDG4700
MELF Resistor, 0204, 1%, TCR50, 2/5W, 4.7KΩ	MCCSRA0204FTDG4701
MELF Resistor, 0204, 1%, TCR50, 2/5W, 47KΩ	MCCSRA0204FTDG4702
MELF Resistor, 0204, 1%, TCR50, 2/5W, 560Ω	MCCSRA0204FTDG5600
MELF Resistor, 0204, 1%, TCR50, 2/5W, 5.6KΩ	MCCSRA0204FTDG5601
MELF Resistor, 0204, 1%, TCR50, 2/5W, 68KΩ	MCCSRA0204FTDG6802
MELF Resistor, 0204, 1%, TCR50, 2/5W, 820Ω	MCCSRA0204FTDG8200

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Description	Part Number
MELF Resistor, 0204, 5% Jumper 1/4W 0Ω	MCCSRA0204JT-VR0R0
MELF Resistor, 0207, 1%, TCR50, 1W 10Ω	MCCSRA0207FTDT0100
MELF Resistor, 0207, 1%, TCR50, 1W 22Ω	MCCSRA0207FTDT0220
MELF Resistor, 0207, 1%, TCR50, 1W 27Ω	MCCSRA0207FTDT0270
MELF Resistor, 0207, 1%, TCR50, 1W 33Ω	MCCSRA0207FTDT0330
MELF Resistor, 0207, 1%, TCR50, 1W 39Ω	MCCSRA0207FTDT0390
MELF Resistor, 0207, 1%, TCR50, 1W 47Ω	MCCSRA0207FTDT0470
MELF Resistor, 0207, 1%, TCR50, 1W 56Ω	MCCSRA0207FTDT0560
MELF Resistor, 0207, 1%, TCR50, 1W 100Ω	MCCSRA0207FTDT1000
MELF Resistor, 0207, 1%, TCR50, 1W 1KΩ	MCCSRA0207FTDT1001
MELF Resistor, 0207, 1%, TCR50, 1W 10KΩ	MCCSRA0207FTDT1002
MELF Resistor, 0207, 1%, TCR50, 1W 100KΩ	MCCSRA0207FTDT1003
MELF Resistor, 0207, 1%, TCR50, 1W 1MΩ	MCCSRA0207FTDT1004
MELF Resistor, 0207, 1%, TCR50, 1W 120Ω	MCCSRA0207FTDT1200
MELF Resistor, 0207, 1%, TCR50, 1W 1.5KΩ	MCCSRA0207FTDT1501
MELF Resistor, 0207, 1%, TCR50, 1W 150KΩ	MCCSRA0207FTDT1503
MELF Resistor, 0207, 1%, TCR50, 1W 1.8KΩ	MCCSRA0207FTDT1801
MELF Resistor, 0207, 1%, TCR50, 1W 220Ω	MCCSRA0207FTDT2200
MELF Resistor, 0207, 1%, TCR50, 1W 2.2KΩ	MCCSRA0207FTDT2201
MELF Resistor, 0207, 1%, TCR50, 1W 22KΩ	MCCSRA0207FTDT2202
MELF Resistor, 0207, 1%, TCR50, 1W 220KΩ	MCCSRA0207FTDT2203
MELF Resistor, 0207, 1%, TCR50, 1W 2.7KΩ	MCCSRA0207FTDT2701
MELF Resistor, 0207, 1%, TCR50, 1W 3.3KΩ	MCCSRA0207FTDT3301
MELF Resistor, 0207, 1%, TCR50, 1W 33KΩ	MCCSRA0207FTDT3302
MELF Resistor, 0207, 1%, TCR50, 1W 330KΩ	MCCSRA0207FTDT3303
MELF Resistor, 0207, 1%, TCR50, 1W 470Ω	MCCSRA0207FTDT4700
MELF Resistor, 0207, 1%, TCR50, 1W 47KΩ	MCCSRA0207FTDT4702
MELF Resistor, 0207, 1%, TCR50, 1W 470KΩ	MCCSRA0207FTDT4703
MELF Resistor, 0207, 1%, TCR50, 1W 560Ω	MCCSRA0207FTDT5600
MELF Resistor, 0207, 1%, TCR50, 1W 680Ω	MCCSRA0207FTDT6800
MELF Resistor, 0207, 1%, TCR50, 1W 820Ω	MCCSRA0207FTDT8200
MELF Resistor, 0204, 0.1%, TCR15, 2/5W, 10KΩ	MCCSRA0204BTNG1002
MELF Resistor, 0204, 0.1%, TCR15, 2/5W, 100KΩ	MCCSRA0204BTNG1003
MELF Resistor, 0204, 0.1%, TCR15, 2/5W, 1KΩ	MCCSRA0204BTNG1001
MELF Resistor, 0204, 1%, TCR50, 2/5W, 1Ω	MCCSRA0204FTDG0010
MELF Resistor, 0204, 0.1%, TCR15, 2/5W, 220KΩ	MCCSRA0204BTNG2203
MELF Resistor, 0204, 0.1%, TCR15, 2/5W, 20KΩ	MCCSRA0204BTNG2002
MELF Resistor, 0204, 0.1%, TCR15, 2/5W, 750Ω	MCCSRA0204BTNG7500
MELF Resistor, 0204, 0.1%, TCR15, 2/5W, 240Ω	MCCSRA0204BTNG2400

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Description	Part Number
MELF Resistor, 0204, 0.1%, TCR15, 2/5W, 75KΩ	MCCSRA0204BTNG7502
MELF Resistor, 0204, 0.1%, TCR15, 2/5W, 2.2KΩ	MCCSRA0204BTNG2201
MELF Resistor, 0207, 5% Jumper 1W 0Ω	MCCSRA0207JT-TR0R0
MELF Resistor, 0204, 0.1%, TCR15, 2/5W, 51Ω	MCCSRA0204BTNG0510
MELF Resistor, 0204, 0.1%, TCR15, 2/5W, 2KΩ	MCCSRA0204BTNG2001
MELF Resistor, 0204, 0.1%, TCR15, 2/5W, 15KΩ	MCCSRA0204BTNG1502
MELF Resistor, 0204, 0.1%, TCR15, 2/5W, 3KΩ	MCCSRA0204BTNG3001
MELF Resistor, 0204, 0.1%, TCR15, 2/5W, 5.1KΩ	MCCSRA0204BTNG5101
MELF Resistor, 0204, 0.1%, TCR15, 2/5W, 22KΩ	MCCSRA0204BTNG2202
MELF Resistor, 0207, 1%, TCR50, 1W 1Ω	MCCSRA0207FTDT0010
MELF Resistor, 0204, 0.1%, TCR15, 2/5W, 510Ω	MCCSRA0204BTNG5100
MELF Resistor, 0204, 0.1%, TCR15, 2/5W, 18KΩ	MCCSRA0204BTNG1802
MELF Resistor, 0204, 0.1%, TCR15, 2/5W, 47Ω	MCCSRA0204BTNG0470
MELF Resistor, 0204, 0.1%, TCR15, 2/5W, 30KΩ	MCCSRA0204BTNG3002
MELF Resistor, 0204, 0.1%, TCR15, 2/5W, 130Ω	MCCSRA0204BTNG1300
MELF Resistor, 0204, 0.1%, TCR15, 2/5W, 470Ω	MCCSRA0204BTNG4700
MELF Resistor, 0204, 0.1%, TCR15, 2/5W, 200KΩ	MCCSRA0204BTNG2003
MELF Resistor, 0204, 0.1%, TCR15, 2/5W, 300Ω	MCCSRA0204BTNG3000
MELF Resistor, 0204, 1%, TCR50, 2/5W, 3.9Ω	MCCSRA0204FTDG3R90
MELF Resistor, 0204, 0.1%, TCR15, 2/5W, 12KΩ	MCCSRA0204BTNG1202
MELF Resistor, 0204, 0.1%, TCR15, 2/5W, 47KΩ	MCCSRA0204BTNG4702
MELF Resistor, 0204, 0.1%, TCR15, 2/5W, 6.8KΩ	MCCSRA0204BTNG6801
MELF Resistor, 0207, 1%, TCR50, 1W 4.7Ω	MCCSRA0207FTDT4R70
MELF Resistor, 0204, 0.1%, TCR15, 2/5W, 5.6KΩ	MCCSRA0204BTNG5601
MELF Resistor, 0204, 0.1%, TCR15, 2/5W, 4.7KΩ	MCCSRA0204BTNG4701
MELF Resistor, 0102, 1%, TCR50, 1/5W, 750Ω	MCCSRA0102FTDP7500
MELF Resistor, 0102, 5% Jumper 3/10W 0Ω	MCCSRA0102JT-LR0R0
MELF Resistor, 0204, 1%, TCR50, 2/5W, 2.2Ω	MCCSRA0204FTDG2R20
MELF Resistor, 0204, 0.1%, TCR15, 2/5W, 68KΩ	MCCSRA0204BTNG6802
MELF Resistor, 0207, 1%, TCR50, 1W 15Ω	MCCSRA0207FTDT0150
MELF Resistor, 0207, 1%, TCR50, 1W 2.2Ω	MCCSRA0207FTDT2R20
MELF Resistor, 0207, 1%, TCR50, 1W 330Ω	MCCSRA0207FTDT3300
MELF Resistor, 0204, 0.1%, TCR15, 2/5W, 1.2KΩ	MCCSRA0204BTNG1201
MELF Resistor, 0207, 1%, TCR50, 1W 3.3Ω	MCCSRA0207FTDT3R30
MELF Resistor, 0204, 0.1%, TCR15, 2/5W, 330Ω	MCCSRA0204BTNG3300
MELF Resistor, 0204, 1%, TCR50, 2/5W, 100Ω	MCCSRA0204FWDG1000
MELF Resistor, 0204, 0.1%, TCR15, 2/5W, 150KΩ	MCCSRA0204BTNG1503
MELF Resistor, 0207, 1%, TCR50, 1W 3.9Ω	MCCSRA0207FTDT3R90
MELF Resistor, 0204, 0.1%, TCR15, 2/5W, 1.8KΩ	MCCSRA0204BTNG1801

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Description	Part Number
MELF Resistor, 0204, 0.1%, TCR15, 2/5W, 3.3KΩ	MCCSRA0204BTNG3301
MELF Resistor, 0204, 0.1%, TCR15, 2/5W, 2.4KΩ	MCCSRA0204BTNG2401
MELF Resistor, 0207, 5% TCR100 1W 0.1Ω	MCCSRA0207JTETR100
MELF Resistor, 0204, 0.1%, TCR15, 2/5W, 1.5KΩ	MCCSRA0204BTNG1501
MELF Resistor, 0204, 0.1%, TCR15, 2/5W, 91Ω	MCCSRA0204BTNG0910
MELF Resistor, 0102, 1%, TCR50, 1/5W, 2.4KΩ	MCCSRA0102FTDP2401
MELF Resistor, 0204, 0.1%, TCR15, 2/5W, 7.5KΩ	MCCSRA0204BTNG7501
MELF Resistor, 0204, 1%, TCR50, 2/5W, 4.7Ω	MCCSRA0204FTDG4R70
MELF Resistor, 0207, 1%, TCR50, 1W, 150Ω	MCCSRA0207FTDT1500
MELF Resistor, 0207, 1%, TCR50, 1W, 5.6Ω	MCCSRA0207FTDT5R60
MELF Resistor, 0204, 1%, TCR50, 2/5W, 10KΩ	MCCSRA0204FWDG1002
MELF Resistor, 0204, 0.1%, TCR15, 2/5W, 1.6KΩ	MCCSRA0204BTNG1601
MELF Resistor, 0204, 1%, TCR50, 2/5W, 200Ω	MCCSRA0204FTDG2001
MELF Resistor, 0204, 1%, TCR50, 2/5W, 3.3Ω	MCCSRA0204FTDG3R30
MELF Resistor, 0204, 0.1%, TCR15, 2/5W, 9.1KΩ	MCCSRA0204BTNG9101
MELF Resistor, 0102, 1%, TCR50, 1/5W, 62Ω	MCCSRA0102FTDP0620
MELF Resistor, 0102, 1%, TCR50, 1/5W, 330Ω	MCCSRA0102FTDP3300
MELF Resistor, 0102, 1%, TCR50, 1/5W, 3.6KΩ	MCCSRA0102FTDP3601
MELF Resistor, 0204, 1%, TCR50, 2/5W, 1Ω	MCCSRA0204FWDG0010
MELF Resistor, 0102, 1%, TCR50, 1/5W, 6.2KΩ	MCCSRA0102FTDP6201
MELF Resistor, 0204, 1%, TCR50, 2/5W, 330Ω	MCCSRA0204FTDG3300
MELF Resistor, 0204, 1%, TCR50, 2/5W, 5.1Ω	MCCSRA0204FTDG5R10
MELF Resistor, 0204, 1%, TCR50, 2/5W, 20KΩ	MCCSRA0204FWDG2002
MELF Resistor, 0102, 1%, TCR50, 1/5W, 5.1KΩ	MCCSRA0102FTDP5101
MELF Resistor, 0204, 0.1%, TCR15, 2/5W, 220Ω	MCCSRA0204BTNG2200
MELF Resistor, 0207, 1%, TCR50, 1W 5.1Ω	MCCSRA0207FTDT5R10
MELF Resistor, 0204, 1%, TCR50, 2/5W, 10Ω	MCCSRA0204FWDG0100
MELF Resistor, 0204, 1%, TCR50, 2/5W, 6.8Ω	MCCSRA0204FTDG6R80
MELF Resistor, 0207, 1%, TCR50, 1W 12Ω	MCCSRA0207FTDT0120
MELF Resistor, 0204, 1%, TCR50, 2/5W, 15Ω	MCCSRA0204FTDG0150
MELF Resistor, 0102, 1%, TCR50, 1/5W, 20KΩ	MCCSRA0102FTDP2002
MELF Resistor, 0102, 1%, TCR50, 1/5W, 620Ω	MCCSRA0102FTDP6200
MELF Resistor, 0207, 1%, TCR50, 1W 300Ω	MCCSRA0207FTDT3000
MELF Resistor, 0207, 1%, TCR50, 1W 1.8Ω	MCCSRA0207FTDT1R80
MELF Resistor, 0102, 1%, TCR50, 1/5W, 1.6KΩ	MCCSRA0102FTDP1601
MELF Resistor, 0207, 1%, TCR50, 1W 6.8Ω	MCCSRA0207FTDT6R80
MELF Resistor, 0102, 1%, TCR50, 1/5W, 62KΩ	MCCSRA0102FTDP6202
MELF Resistor, 0102, 1%, TCR50, 1/5W, 30KΩ	MCCSRA0102FTDP3002
MELF Resistor, 0207, 1%, TCR50, 1W 51Ω	MCCSRA0207FTDT0510

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Description	Part Number
MELF Resistor, 0102, 1%, TCR50, 1/5W, 200K Ω	MCCSRA0102FTDP2003
MELF Resistor, 0204, 0.1%, TCR15, 2/5W, 33K Ω	MCCSRA0204BTNG3302
MELF Resistor, 0204, 1%, TCR50, 2/5W, 12 Ω	MCCSRA0204FTDG0120
MELF Resistor, 0102, 1%, TCR50, 3/10W 4.7 Ω	MCCSRA0102FTDL4R70
MELF Resistor, 0102, 1%, TCR50, 1/5W, 150 Ω	MCCSRA0102FTDP1500
MELF Resistor, 0102, 1%, TCR50, 1/5W, 13K Ω	MCCSRA0102FTDP1302
MELF Resistor, 0204, 1%, TCR50, 2/5W, 1.5 Ω	MCCSRA0204FTDG1R50
MELF Resistor, 0102, 1%, TCR50, 1/5W, 16K Ω	MCCSRA0102FTDP1602
MELF Resistor, 0204, 1%, TCR50, 2/5W, 2 Ω	MCCSRA0204FTDG0020
MELF Resistor, 0102, 1%, TCR50, 1/5W, 3K Ω	MCCSRA0102FTDP3001
MELF Resistor, 0204, 1%, TCR50, 2/5W, 510 Ω	MCCSRA0204FTDG5100
MELF Resistor, 0204, 1%, TCR50, 2/5W, 18 Ω	MCCSRA0204FTDG0180
MELF Resistor, 0204, 1%, TCR50, 2/5W, 1.1K Ω	MCCSRA0204FTDG1101
MELF Resistor, 0204, 1%, TCR50, 2/5W, 75 Ω	MCCSRA0204FTDG0750
MELF Resistor, 0204, 1%, TCR50, 2/5W, 3.32K Ω	MCCSRA0204FTDG3321
MELF Resistor, 0204, 1%, TCR50, 2/5W, 6.8K Ω	MCCSRA0204FTDG6801
MELF Resistor, 0204, 1%, TCR50, 2/5W, 150 Ω	MCCSRA0204FTDG1500
MELF Resistor, 0102, 1%, TCR50, 1/5W, 1.1K Ω	MCCSRA0102FTDP1101

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