RWF series
Thick Film Automotive Chip Resistor

◆ Features

» Meet AEC-Q200 test for Automotive industry

» Suitable for lead free soldering

» Compatible with wave and reflow soldering

» RoHS compliant & Halogen Free

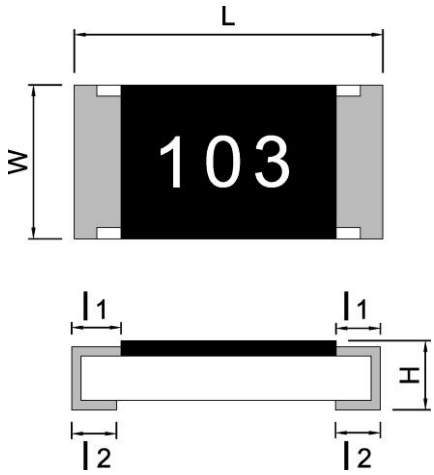
» Anti-sulfurate products

◆ Applications

» Automotive Industry

» General Electronic devices

◆ Dimensions



Size	L	W	H	I1	I2
0201	0.60±0.03	0.30±0.03	0.23±0.03	0.15±0.05	0.15±0.05
0402	1.00±0.10	0.50±0.05	0.30±0.05	0.15±0.10	0.20±0.10
0603	1.60±0.20	0.80±0.15	0.40±0.10	0.30±0.20	0.30±0.10
0805	2.00±0.20	1.25±0.15	0.50±0.15	0.30±0.15	0.40±0.15
1206	3.05±0.10	1.60±0.20	0.55±0.15	0.40±0.20	0.50±0.20
1210	3.05±0.10	2.50±0.20	0.55±0.15	0.50±0.20	0.50±0.20
1812	4.50±0.10	3.10±0.20	0.55±0.05	0.55±0.20	0.70±0.20
2010	5.00±0.20	2.50±0.20	0.55±0.10	0.60±0.20	0.60±0.20
1218	3.10±0.10	4.60±0.10	0.55±0.05	0.40±0.20	0.50±0.20
2512	6.30±0.20	3.20±0.20	0.55±0.10	0.60±0.20	0.60±0.20
0612	1.60±0.20	3.20±0.20	0.55±0.15	0.30±0.20	0.50±0.20

Unit: mm

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◆ Standard 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% ±0.5%	±1%	±5%	
0201	1/20 W	-55 ~ +125°C	25V	50V	---	1Ω - 10MΩ		±200
0402	1/16 W		50V	100V	---	1Ω – 9.9Ω		±400
					---	10Ω – 1MΩ		±100
					10Ω - 1MΩ	1M1Ω - 10MΩ		±200
0603	1/10 W		75V	150V	---	1Ω – 9.9Ω		±400
					---		10Ω - 10MΩ	±200
					10Ω - 1MΩ	10Ω - 10MΩ	---	±100
0805	1/8 W		150V	300V	---	1Ω – 9.9Ω		±400
					---		10Ω - 10MΩ	±200
					10Ω - 1MΩ	10Ω - 10MΩ	---	±100
1206	1/4 W		200V	400V	---	1Ω – 9.9Ω		±400
					---		10Ω - 10MΩ	±200
					10Ω - 1MΩ	10Ω - 10MΩ	---	±100
1210	1/2 W	-55 ~ +155°C	200V	400V	---	1Ω – 9.9Ω		±400
					---		10Ω - 10MΩ	±200
					10Ω - 1MΩ	10Ω - 10MΩ	---	±100
1812	3/4 W		200V	400V	---	1Ω – 9.9Ω		±400
					---		10Ω - 10MΩ	±200
					10Ω - 1MΩ	10Ω - 10MΩ	---	±100
2010	3/4 W		200V	400V	---	1Ω – 9.9Ω		±400
					---		10Ω - 10MΩ	±200
					10Ω - 1MΩ	10Ω - 10MΩ	---	±100
1218	1 W		200V	400V	---	1Ω – 9.9Ω		±400
					---		10Ω - 10MΩ	±200
					10Ω - 1MΩ	10Ω - 10MΩ	---	±100
2512	1 W		200V	400V	---	1Ω – 9.9Ω		±400
					---		10Ω - 10MΩ	±200
					10Ω - 1MΩ	10Ω - 10MΩ	---	±100
0612	3/4W		200V	400V		1Ω – 9.9Ω 10Ω - 10MΩ		±400 ±100

TYPE	0201	0402	0603	0805	1206	1210	1812	2010	1218	2512
Jumper Rated Current	1A				2A					

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◆ High Power Electrical Specifications

TYPE	Power Rating At 70°C (W)	Operating Temp. Range	Max Working Voltage	Max Overload Voltage	TCR (ppm/°C)	Resistance Range	
						1%	5%
0402	1/10W (1/5W)	-55 ~ +155°C	50V	100V	±400 ±100	1Ω – 9.76Ω 10Ω - 1MΩ	
0603	1/8W (1/3 W)		75V	150V			
0805	1/4W (1/2 W)		150V	300V			
1206	1/2 W (3/4 W)		200V	400V			
1210	2/3 W (1 W)		200V	400V			
2010	1W (1.5 W)				±400 ±150	1Ω – 9.76Ω 10Ω - 1MΩ	
2512	2W (3 W)				±400 ±150	1Ω – 9.76Ω 10Ω - 1MΩ	

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◆ Part Number

RWF	0805	F	10K	□	□□	C	V
Type	**size**	**Tolerance**	**R value**	**Reel Size**	**Package Quantity**	**TCR**	**WATT**
RWF	0201	B: ±0.1%	0Ω=0R	Blank = 7"	(Standard Size As Below)	Blank: Standard	Blank: Standard
	0402	D: ±0.5%	10K=10K	B= 13"	10= 10K per reel	C: ±25	W:1/8W
	0603	F: ±1%	2.2K=2K2	C= 10"	20= 20K per reel		V:1/4W
	0805	J: ±5%					O:1/3W
	1206						U:1/2W
	1210						T:1W
	1812						
	2010						X:1/10W
	1218						P:2/3W
	2512						S:2W
	0612						V:1.5W R:3W
							Q:3/4W B:1/5W

» Standard Package Q'ty for each size is as following.

TYPE	Standard Package Q'ty
RWF0201	10K per reel
RWF0402	10K per reel
RWF0603	5K per reel
RWF0805	5K per reel
RWF1206	5K per reel
RWF1210	5K per reel
RWF1812	4K per reel
RWF2010	4K per reel
RWF1218	4K per reel
RWF2512	4K per reel
RWF0612	5K per reel

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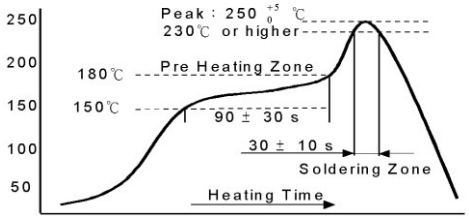
◆ Specification and Test Method

Test Item	Test Method	Procedure	Requirements
Temperature Coefficient of Resistance (T.C.R)	JIS C 5201-1 clause 4.8	-55℃ or +155℃, 25℃ is the reference temperature	Refer to Ratings
Short Time Overload	JIS C 5201-1 clause 4.13	General：2.5 times RCWV or Max. Overload voltage whichever is less for 5 seconds.	±1：±(1.0%+0.05Ω) ±5：±(2.0%+0.1Ω) Value <1Ω： ±(2.0%+0.1Ω)
IR Reflow	Sony SS-00254		±1：±(1.0%+0.05Ω) ±5：±(1.0%+0.05Ω)
Leaching	Sony SS-00254-9	260±5℃ for 30 seconds.	>95% Coverage
Soldering Heat	JIS C 5201-1 clause 4.18	260±5℃ for 10 seconds.	±1：±(0.5%+0.05Ω) ±5：±(1.0%+0.05Ω) Value <1Ω：±(1.0%+0.05Ω)
Temperature Cycling	JIS C 5201-1 clause 4.19	-55℃ to +155℃,5 cycles	0.1%、0.5%、1%：±(0.5%+0.05Ω) 5%：±(1.0%+0.10Ω) Value <1Ω：±(1.0%+0.10Ω)
Electric Iron	Sony SS-00254-5	Preheating temperature：350±10℃ Electric iron preheating time：3+1/-0 sec	±1：±(1.0%+0.05Ω) ±5：±(1.0%+0.05Ω) Value <1Ω：±(1.0%+0. 0.05Ω)
Resistance to Solvent	JIS C 5201-1 clause 4.29	The tested resistor be immersed into isopropyl alcohol of 20~25℃ for 60 secs. Then the resistor is left in the room for 48 hrs.	±1：±(0.5%+0.05Ω) ±5：±(0.5%+0.05Ω) Value <1Ω：±(1.0%+0.05Ω)
Load Life in Humidity	JIS C 5201-1 clause 4.24	40±2℃, 90~95% R.H. RCWV or Max. working voltage whichever is less for 1000 hrs with 1.5 hrs〝ON〞and 0.5 hr〝OFF〞.	0.1%、0.5%、1%：±(1.0%+0.05Ω) 5%：±(2.0%+0.05Ω) Value <1Ω：±(2.0%+0.05Ω)
Load Life (Endurance)	JIS C 5201-1 clause 4.25	70±2℃, RCWV or Max. working voltage whichever is less for 1000 hrs with 1.5 hrs〝ON〞and 0.5 hr〝OFF〞.	0.1%、0.5%、1%：±(1.0%+0.05Ω) 5%：±(3.0%+0.10Ω) Value <1Ω：±(3.0%+0.10Ω)
Insulation Resistance	JIS C 5201-1 clause 4.6	100V for 1 minute.	≧10GΩ

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AEC-Q200 test			
Test Item	**Test Method**	**Procedure**	**Requirements**
Temperature Cycling	JESD22 Method JA-104	1000 Cycles (-55℃ to +125℃) Measurement at 24± 4 hours after test conclusion.	0.1%、0.5%、1%：±(0.5%+0.05Ω) 5%：±(1.0%+0.10Ω)
Resistance to Solvent	MIL-STD-202 Method 215	Add Aqueous wash chemical-OKEM clean or equivalent.	1%：±(0.5%+0.05Ω) 5%：±(0.5%+0.05Ω)
Biased Humidity	MIL-STD-202 Method 103	1000 hours 85℃/85%RH. 10% of operation power.	0.1%、0.5%、1%：±(1.0%+0.05Ω) 5%：±(3.0%+0.05Ω)
High Temperature Exposure (Storage)	MIL-STD-202 Method 108	1000 hrs. T=125℃.	0.1%、0.5%、1%：±(0.5%+0.05Ω) 5%：±(2.0%+0.05Ω)
Operation Life	MIL-STD-202 Method 108	125℃ RCWV or Max.working voltage whichever is less for 1000 hrs with 1.5 hrs"ON" and 0.5hr "OFF" Please refer to the Power Derating Curve .	0.1%、0.5%、1%：±(1.0%+0.05Ω) 5%：±(3.0%+0.10Ω)
External Visual	MIL-STD-883 Method 2009	Electrical test not required.	—
Mechanical Shock	MIL-STD-202 Method 213	Impact acceleration：1500g Pulse duration：0.5ms Number of shocks：30 shocks(5 shocks for each face)	±1：±(1.0%+0.05Ω) ±5：±(2.0%+0.1Ω)
Vibration	MIL-STD-202 Method 204	5 g's for 20min., 12 cycles each of 3 orientations.	±1：±(1.0%+0.05Ω) ±5：±(2.0%+0.1Ω)
ESD	AEC-Q200- 002 or ISO/DIS 10605	Human body, 2KV	For the product %
Solderability	J-STD-002	(1) 4 hrs 155℃ dry heat (2) 260±5℃ 10 sec.	±1：±(0.5%+0.05Ω) ±5：±(1.0%+0.05Ω)
Terminal Strength (SMD)	AEC Q200-006	Force of 1.8kg for 60 seconds	No broken
Board Flex	AEC Q200-005	Beading once for 60 seconds	±1：±(1.0%+0.05Ω) ±5：±(1.0%+0.05Ω)

The standard AEC-Q200 series resistors are mainly used on general automotive equipment without safety considerations. Please select SAFETY concern type or contact our company in advanced if you intend to use resistor for designing the equipment which may damage itself and the safety of third party. If necessary, please consider to add the protect circuit in devising process and obtaining fully safety evaluation.

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