



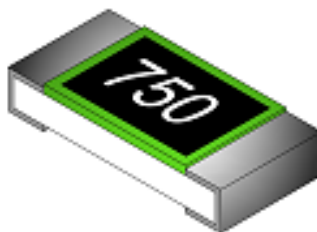
FCR-Series Fusible Chip Resistor Product Specifications

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■ Fusible Chip Resistor — FCR Series



■ Application

- The accurate fusibility is applicable to safety circuits in the wide range of electronic sets.
- Small in size, light in weight.
- Low temperature coefficient. (under ± 600 PPM/ $^{\circ}$ C)
- Treat as the general resistance use.

■ Features

- Small size and light weight
- Reliability, high quality
- RoHS compliant and Halogen free products

■ Parts Number Explanation

Example:

FCR	2512	J	100R	E	04	Z
Product Type	Size (Inch)	Resistor Tolerance	Resistor Value	Package	Quantity	Optional
FCR	0402 0603 0805 1206 1210 2010 2512	F : $\pm 1\%$ J : $\pm 5\%$	1R=1R00 10R=10R0 100R=100R 1K=1K00	P : Paper Taping (0603~1210) Q : Paper Taping (0402) E : Embossed Taping	04 : 4000PCS 05 : 5000PCS 10 : 10000PCS	Z : Default G : 2512=1W 2010=0.75W 1210=0.5W



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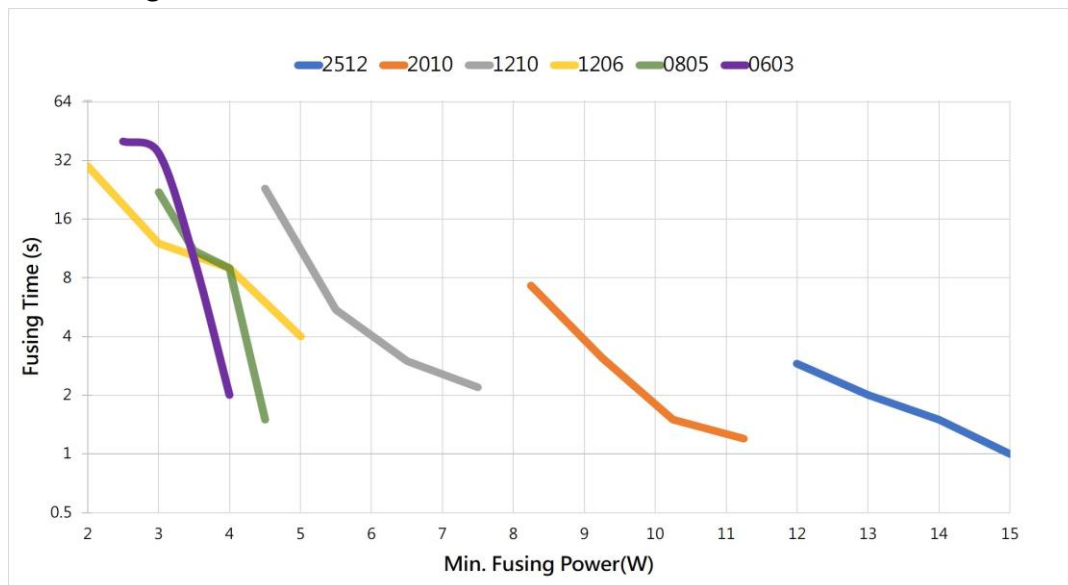
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■ Standard Electrical Specifications

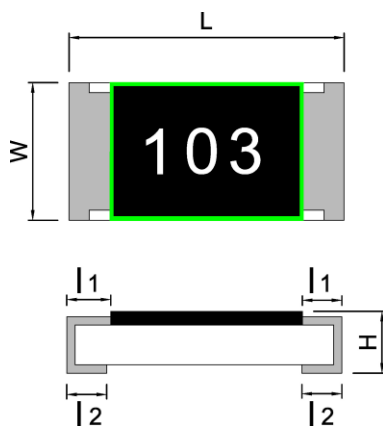
Item Type	Rated Power at 70℃	Max Hold-Off Voltage	Fusing Time & Min. Fusing Power	Resistance Range	T.C.R. (PPM/℃)	Standard Tolerance (%)
FCR0402	0.063W	50V	< 30 sec at 2.5W	$1\Omega \leq R < 48\Omega$	±600PPM	±1% , ±5%
				$48\Omega \leq R < 471\Omega$	±400PPM	
				$471\Omega \leq R \leq 1K\Omega$	±200PPM	
FCR0603	0.1W	100V	< 30 sec at 3W	$1\Omega \leq R < 48\Omega$	±600PPM	
				$48\Omega \leq R < 471\Omega$	±400PPM	
				$471\Omega \leq R \leq 1.8K\Omega$	±200PPM	
FCR0805	0.125W	150V	< 30 sec at 3.25W	$1\Omega \leq R < 48\Omega$	±600PPM	
				$48\Omega \leq R < 471\Omega$	±400PPM	
				$471\Omega \leq R \leq 1.8K\Omega$	±200PPM	
FCR1206	0.25W	200V	< 30 sec at 5W	$0R47\Omega \leq R < 1\Omega$	±800PPM	
				$1\Omega \leq R < 48\Omega$	±600PPM	
				$48\Omega \leq R < 471\Omega$	±400PPM	
				$471\Omega \leq R \leq 1.8K\Omega$	±200PPM	
FCR1210	0.33W	250V	< 30 sec at 7.5W	$0R47\Omega \leq R < 1\Omega$	±800PPM	
				$1\Omega \leq R < 48\Omega$	±600PPM	
	0.5W			$48\Omega \leq R < 471\Omega$	±400PPM	
				$471\Omega \leq R \leq 1.8K\Omega$	±200PPM	
FCR2010	0.5W	300V	< 30 sec at 11.25W	$1\Omega \leq R < 48\Omega$	±600PPM	
	0.75W			$48\Omega \leq R < 471\Omega$	±400PPM	
				$471\Omega \leq R \leq 1.8K\Omega$	±200PPM	
FCR2512	0.75W	400V	< 30 sec at 15W	$0R47\Omega \leq R < 1\Omega$	±800PPM	
				$1\Omega \leq R < 48\Omega$	±600PPM	
	1W			$48\Omega \leq R < 471\Omega$	±400PPM	
				$471\Omega \leq R \leq 1.8K\Omega$	±200PPM	

- For non-standard parts, please contact our sales dept.
- Operating Temperature Range : $-55^{\circ}\text{C} \sim +155^{\circ}\text{C}$.

■ Example of Fusing Characteristics



■ Type Dimension



■ Dimension

Unit: mm

Type	L	W	H	l ₁	l ₂
FCR0402	1.00 ± 0.05	0.50 ± 0.05	0.30 ± 0.05	0.15 ± 0.10	0.20 ± 0.10
FCR0603	1.60 ± 0.10	0.80 ± 0.10	0.40 ± 0.10	0.30 ± 0.20	0.30 ± 0.10
FCR0805	2.00 ± 0.10	1.25 ± 0.10	0.50 ± 0.15	0.30 ± 0.15	0.40 ± 0.15
FCR1206	3.05 ± 0.10	1.60 ± 0.10	0.55 ± 0.15	0.40 ± 0.20	0.50 ± 0.20
FCR1210	3.05 ± 0.10	2.50 ± 0.15	0.55 ± 0.15	0.50 ± 0.20	0.50 ± 0.20
FCR2010	5.00 ± 0.20	2.50 ± 0.15	0.55 ± 0.10	0.60 ± 0.20	0.60 ± 0.20
FCR2512	6.30 ± 0.20	3.20 ± 0.15	0.55 ± 0.10	0.60 ± 0.20	0.60 ± 0.20



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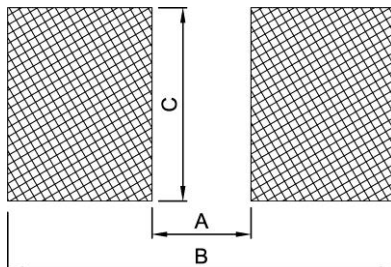
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● General Information

■ Recommend Land Pattern Design



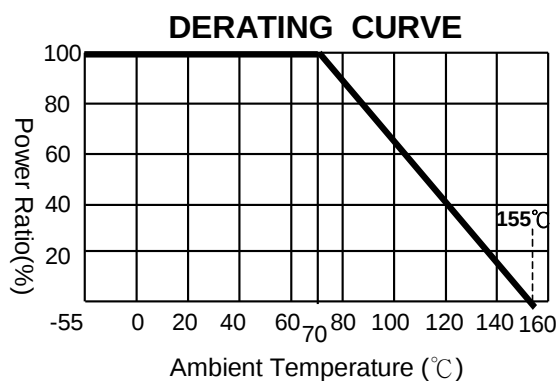
■ Dimension

Unit: mm

Item \ Type	0402	0603	0805	1206	1210	2010	2512
A	0.60	0.80	1.30	2.20	2.00	3.80	4.90
B	1.60	2.40	2.90	4.20	4.40	6.60	8.10
C	0.70	1.00	1.45	1.80	2.70	2.70	3.40

■ Performance Characteristics

■ Power Derating Curve



Power rating or current rating is in the case based on continuous full-load at ambient temperature of 70°C.

For operation at ambient temperature in excess of 70°C, the load should be derated in accordance with figure of derating Curve.

■ Voltage Rating or Current Rating

Resistance Range: $\geq 1\Omega$

Rated Voltage: The resistor shall have a DC continuous working voltage or a RMS AC continuous working voltage at commercial-line frequency and wave form corresponding to the power rating, as determined formula as following:

$$E(RCWV) = \sqrt{P \times R}$$

E=Rated voltage(V)

P=Power rating(W)

R=Nominal resistance(Ω)



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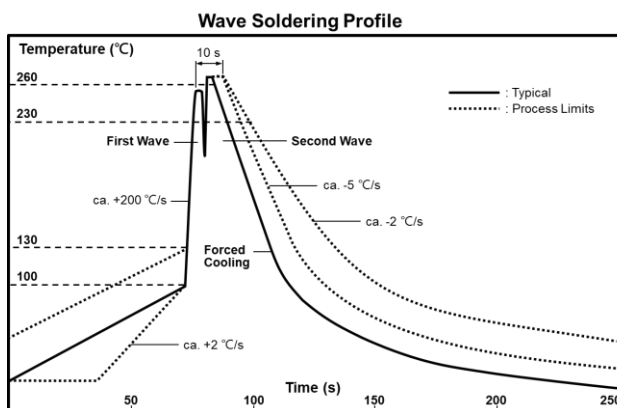
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● Reliability Test and Requirement

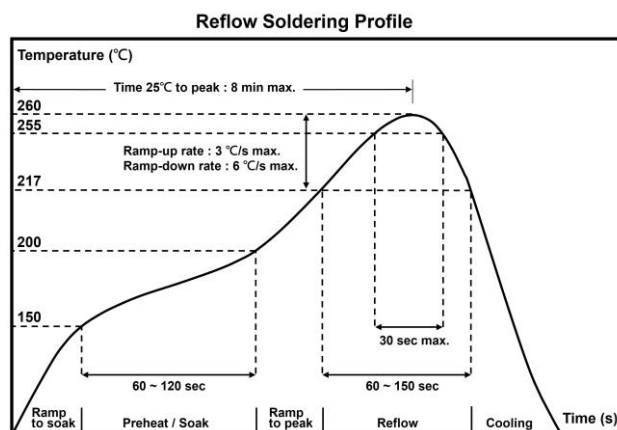
Test Item	Test Method	Procedure	Requirements
Temperature Coefficient of Resistance (T.C.R)	JIS-C-5201-1 4.8 IEC-60115-1 4.8	At 25°C / -55°C and 25°C / +155°C, 25°C is the reference temperature	As Spec
Short Time Overload	JIS-C-5201-1 4.13 IEC-60115-1 4.13	2.5 times RCWV or Max. Overload voltage whichever is less for 5 seconds.	1% and below : $\pm(1.0\%+0.05\Omega)$ 5% : $\pm(2.0\%+0.10\Omega)$
Leaching	JIS-C-5201-1 4.18 IEC-60068-2-58 8.2.1	260 $\pm$ 5°C for 30 seconds.	Individual leaching area $\leq$ 5% Total leaching area $\leq$ 10%
Resistance to Soldering Heat	JIS-C-5201-1 4.18 IEC-60115-1 4.18	260 $\pm$ 5°C for 10 seconds.	1% and below : $\pm(0.5\%+0.05\Omega)$ 5% : $\pm(1.0\%+0.05\Omega)$
Rapid Change of Temperature	JIS-C-5201-1 4.19 IEC-60115-1 4.19	-55°C to +155°C, 5 cycles	1% and below : $\pm(0.5\%+0.05\Omega)$ 5% : $\pm(1.0\%+0.10\Omega)$
Resistance to Solvent	JIS-C-5201-1 4.29	The tested resistor be immersed into isopropyl alcohol of 20~25°C for 60 secs. Then the resistor is left in the room for 48 hrs.	1% and below : $\pm(0.5\%+0.05\Omega)$ 5% : $\pm(0.5\%+0.05\Omega)$
Damp Heat with Load	JIS-C-5201-1 4.24 IEC-60115-1 4.24	40 $\pm$ 2°C, 90~95% R.H. RCWV or Max. working voltage whichever is less for 1000 hrs with 1.5 hrs "ON" and 0.5 hrs "OFF" .	1% and below : $\pm(1.0\%+0.05\Omega)$ 5% : $\pm(2.0\%+0.05\Omega)$ Value <1 Ω : $\pm(2.0\%+0.05\Omega)$
Load Life (Endurance)	JIS-C-5201-1 4.25 IEC-60115-1 4.25.1	70 $\pm$ 2°C, RCWV or Max. working voltage whichever is less for 1000 hrs with 1.5 hrs "ON" and 0.5 hr "OFF" .	1% and below : $\pm(1.0\%+0.05\Omega)$ 5% : $\pm(3.0\%+0.10\Omega)$ Value <1 Ω : $\pm(3.0\%+0.10\Omega)$
Insulation Resistance	JIS-C-5201-1 4.6 IEC-60115-1 4.6	Apply 100VDC for 1 minute.	$\geq$ 10G Ω
Bending Strength	JIS-C-5201-1 4.33 IEC-60115-1 4.33	Bending once for 5 seconds D : 0402、0603、0805=5mm 1206、1210=3mm 2010、2512=2mm	1% and below : $\pm(1.0\%+0.05\Omega)$ 5% : $\pm(1.0\%+0.05\Omega)$

■ Recommended Customer Soldering Parameters

■ Wave solder Temperature condition



■ Solder reflow Temperature condition



■ Rework temperature (hot air equipment) : 350°C, 3~5seconds

■ Recommended reflow methods

IR, vapor phase oven, hot air oven

If reflow temperatures exceed the recommended profile, devices may not meet the performance requirements.

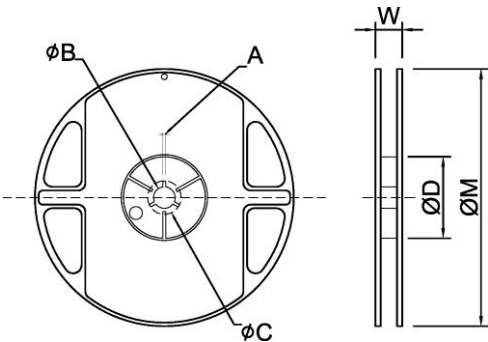


FCR-Series Fusible Chip Resistor
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■ Appendix For SMD Chip Resistor

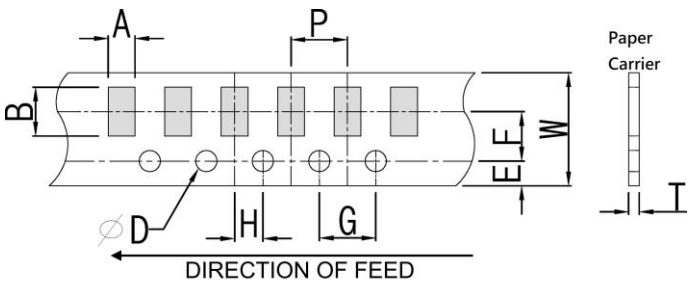
● Packaging Information



■ Dimension Unit: mm

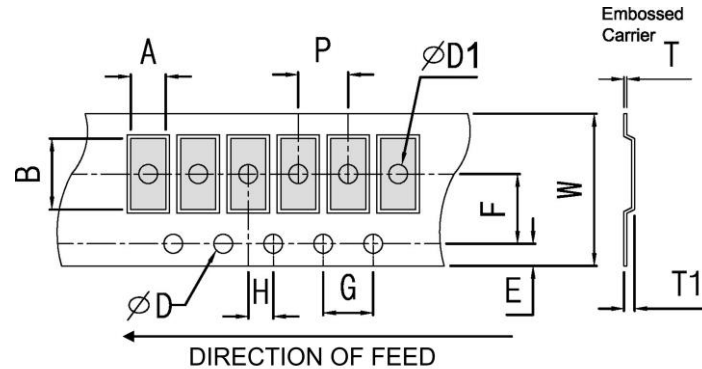
Type	Size		A	φB	φC	φD	W	φM
0402	7"	10K/Reel	2.0±0.5	13.5±1.0	21±1.0	60±1.0	11.5±2.0	178±2.0
	13"	40K/50K Reel	2.0±0.5	13.5±1.0	21±1.0	100±1.0	11.5±2.0	330±2.0
0603/0805/1206/1210	7"	5K/Reel	2.0±0.5	13.5±1.0	21±1.0	60±1.0	11.5±2.0	178±2.0
0603/0805/1206	10"	10K/Reel	2.0±0.5	13.5±1.0	21±1.0	100±1.0	11.5±2.0	254±2.0
	13"	20K/Reel	2.0±0.5	13.5±1.0	21±1.0	100±1.0	11.5±2.0	330±2.0
2010/2512	7"	4K/Reel	2.0±0.5	13.5±1.0	21±1.0	60±1.0	16.0±2.0	178±2.0

■ Tapping Specification



■ Dimension Unit: mm

Packaging	Type	A	B	W	E	F	G	H	T	φD	P
Paper Type	0402	0.70±0.1	1.20±0.1	8.0±0.2	1.75±0.1	3.5±0.05	4.0±0.1	2.0±0.05	0.45±0.1	1.50 ^{+0.10} ₋₀	2.0±0.1
	0603	1.05±0.2	1.80±0.2	8.0±0.2	1.75±0.1	3.5±0.05	4.0±0.1	2.0±0.05	0.60±0.1		4.0±0.1
	0805	1.55±0.2	2.30±0.2	8.0±0.2	1.75±0.1	3.5±0.05	4.0±0.1	2.0±0.05	0.75±0.1		
	1206	1.90±0.2	3.50±0.2	8.0±0.2	1.75±0.1	3.5±0.05	4.0±0.1	2.0±0.05	0.75±0.1		
	1210	2.85±0.2	3.50±0.2	8.0±0.2	1.75±0.1	3.5±0.05	4.0±0.1	2.0±0.05	0.75±0.1		



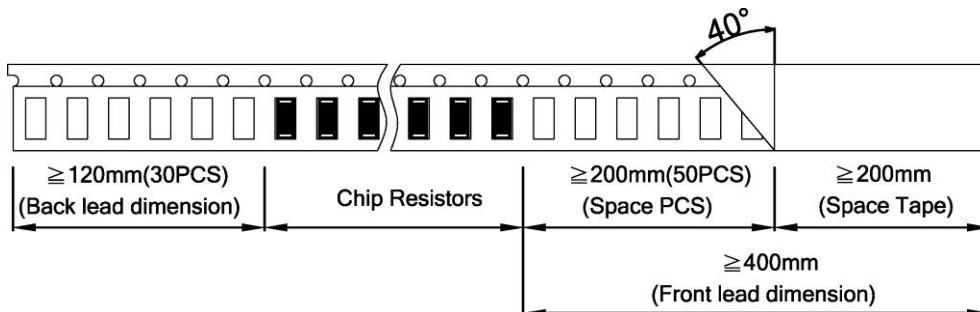
Dimension

Unit: mm

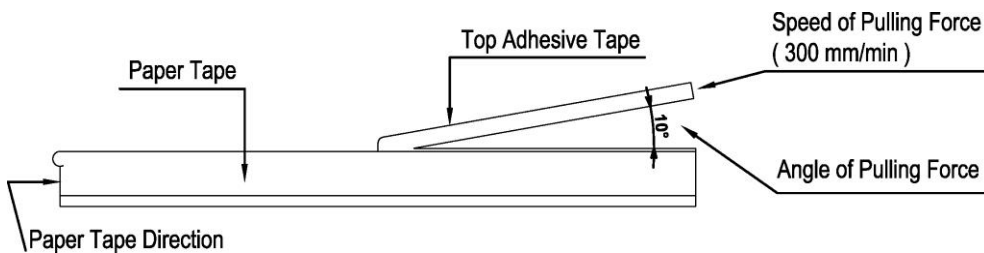
Packaging	Type	A	B	W	E	F	G	H	T	ΦD	ΦD1	T1	P
Embossed Type	2010	2.80±0.20	5.60±0.20	12±0.10	1.75±0.10	5.5±0.05	4.0±0.10	2.0±0.05	0.23±0.10	1.50 ^{+0.10} ₋₀	1.50±0.10	0.85±0.15	4.0±0.1
	2512	3.40±0.20	6.70±0.20	12±0.10	1.75±0.10	5.5±0.05	4.0±0.10	2.0±0.05	0.23±0.10		1.50±0.10	0.85±0.15	

Packing Material Data/Storage Data

Front & Back Lead Dimension



Top Adhesive Peel Off Strength : 10~70g





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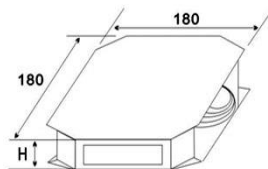
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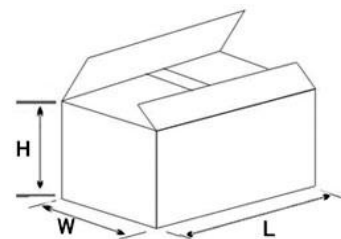
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■ Package

Inner Box Size	
Reel	Size H(mm)
1	13
2	24
3	36
5	60
10	113



External Box Size			
Contain (Kpcs)	Length (mm)	Width (mm)	Height (mm)
25K	180	180	60
50K	180	180	110
150K	430	200	200
300K	400	400	200



■ Storage Data :

Storage time at the environment temp: $25\pm 5^{\circ}\text{C}$ & humidity: $60\pm 20\%$ is valid for two years.

■ Equipments Applicable:

Our company's products are produced under low temperature processing applicable to IR reflow surface mounting devices. It is comparatively not applicable to wave soldering which will possibly cause the risk ablating the element protection layer and the front conductor and cause the drift of the resistance value and ablation of the markings.

■ Product Testing Method:

Our products are tested with our company's tapping & testing equipments by using four-feet probe to touch at the back of both electrodes. Supposed different testing points or methods are requested, please advise beforehand and customized-made production is available.