



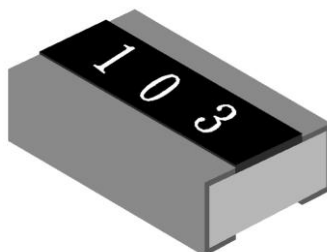
QRW Series Automotive Wide Terminal Chip Resistor Product Specifications

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■ Automotive Wide Terminal Chip Resistor— QRW Series



■ Application

- Automotive electronics
- Navigation equipment, TPMS
- Heating, Ventilating and Air conditioning
- Indoor lighting, Central door locking, Wiper module

■ Features

- Small size and light weight
- Reliability, high quality
- CCD visual quality inspection
- AEC-Q200 Compliant
- Excellent Resistance to Vulcanization
(ASTM-B-809-95 & EIA-977 Specification)

■ Parts Number Explanation

Example:

QRW	0612	J	10R0	P	05	Z
Product Type	Size (Inch)	Resistor Tolerance	Resistor Value	Package	Quantity	Optional
QRW	0508 0612 1020 1218 1225	F : $\pm 1\%$ J : $\pm 5\%$	10mR=R010 100mR=R100 1R=1R00 10R=10R0 100R=100R 1K=1K00 1M=1M00	P : Paper Taping (0508、0612) E : Embossed Taping (1020~1225)	04 : 4000PCS 05 : 5000PCS	Z : Default H: High Power



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■ Standard Electrical Specifications

Item Type	Rated Power at 70℃	Max Working Voltage	Max Overload Voltage	T.C.R. (PPM/℃)	Resistance Range	
					F(±1%)	J(±5%)
QRW0508	0.75W	200V	400V	±200	1Ω≤R<10Ω	
				±100	10Ω≤R≤1MΩ	
QRW0612	0.75 W			±200	1Ω≤R<10Ω	
				±100	10Ω≤R≤10MΩ	
QRW1020	1 W			±200	1Ω≤R<10Ω	
				±100	10Ω≤R≤10MΩ	
QRW1218	1 W			±200	1Ω≤R<10Ω	
				±100	10Ω≤R≤10MΩ	
QRW1225	2W			±200	1Ω≤R<10Ω	
				±100	10Ω≤R≤10MΩ	

- For non-standard parts, please contact our sales dept.
- Operating Temperature Range : -55℃ ~ +155℃

■ High Power Electrical Specifications

Item Type	Rated Power at 70℃	Max Working Voltage	Max Overload Voltage	T.C.R. (PPM/℃)	Resistance Range	
					F(±1%)	J(±5%)
QRW0508	1W	200V	400V	±150	1Ω≤R<10Ω	
				±100	10Ω≤R≤1MΩ	
QRW0612	1.5 W			±100	1Ω≤R<10Ω	
				±100	10Ω≤R≤10MΩ	
QRW1020	2 W			±100	1Ω≤R<10Ω	
				±100	10Ω≤R≤10MΩ	
QRW1218	2 W			±100	1Ω≤R<10Ω	
				±100	10Ω≤R≤10MΩ	
QRW1225	3W			±100	1Ω≤R<10Ω	
				±100	10Ω≤R≤10MΩ	

- For non-standard parts, please contact our sales dept.
- Operating Temperature Range : -55℃ ~ +155℃

■ Low Ohm Chip Resistor Electrical Specifications

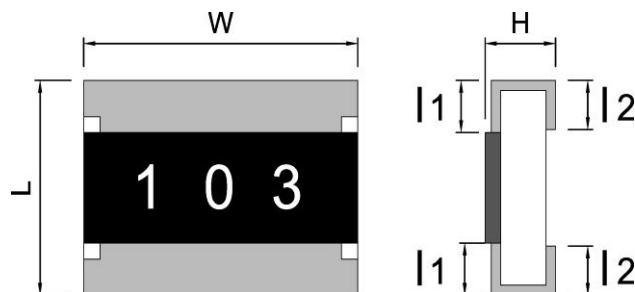
Type \ Item	Rated Power at 70℃	Rated Voltage Range	Max Overload Voltage	T.C.R. (PPM/℃)	Resistance Range (mΩ)
					F(±1%)、J±(5%)
QRW0612	0.75W	0.087~0.86V	2.154V	±1800	10 ≤ R < 50
				±800	50 ≤ R < 100
				±600	100 ≤ R < 1000
QRW1020	1W	0.10~0.99V	2.475V	±1800	10 ≤ R < 50
				±800	50 ≤ R < 100
				±600	100 ≤ R < 1000
QRW1218	1W	0.10~0.99V	2.475V	±1800	10 ≤ R < 50
				±800	50 ≤ R < 100
				±600	100 ≤ R < 1000
QRW1225	2W	0.14~1.41V	3.518 V	±1800	10 ≤ R < 50
				±800	50 ≤ R < 100
				±600	100 ≤ R < 1000

- For non-standard parts, please contact our sales dept.
- Operating Temperature Range : -55℃ ~ +155℃

■ Jumper Electrical Specifications

Type	0612	1020	1218	1225
Jumper Resistance Value	20mΩMax			
Jumper Rated Current	4A	6A	6A	8A
Max. Over Load Current <1 second and 1 times	15A	22A	22A	30A

■ Type Dimension



QRW0508/QRW0612/ QRW1020/
QRW1218/ QRW1225

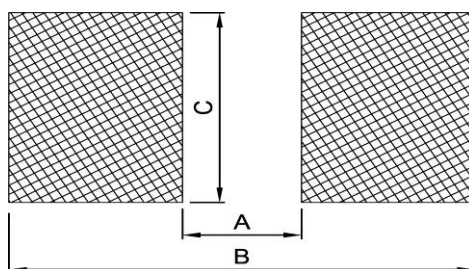
■ Dimension

Unit: mm

Type	L	W	H	l ₁	l ₂
QRW0508	1.25 ± 0.10	2.00 ± 0.10	0.55 ± 0.10	0.25 ± 0.20	0.50 ± 0.20
QRW0612	1.60 ± 0.20	3.20 ± 0.20	0.55 ± 0.10	0.30 ± 0.20	0.50 ± 0.20
QRW1020	2.50 ± 0.20	5.00 ± 0.20	0.55 ± 0.10	0.40 ± 0.20	0.75 ± 0.20
QRW1218	3.10 ± 0.10	4.60 ± 0.10	0.55 ± 0.05	0.40 ± 0.20	0.50 ± 0.20
QRW1225*Z	3.20 ± 0.20	6.50 ± 0.20	0.55 ± 0.20	0.40 ± 0.20	0.75 ± 0.20
QRW1225*H	3.20 ± 0.20	6.50 ± 0.20	0.65 ± 0.20	0.40 ± 0.20	0.75 ± 0.20

● General Information

■ Recommend Land Pattern Design



■ Dimension

Unit: mm

Type	0508	0612	1020	1218	1225
Item					
A	0.4	0.60	0.75	2.04	0.85
B	1.8	2.90	3.40	4.24	3.70
C	2.00	3.20	5.00	4.80	6.40



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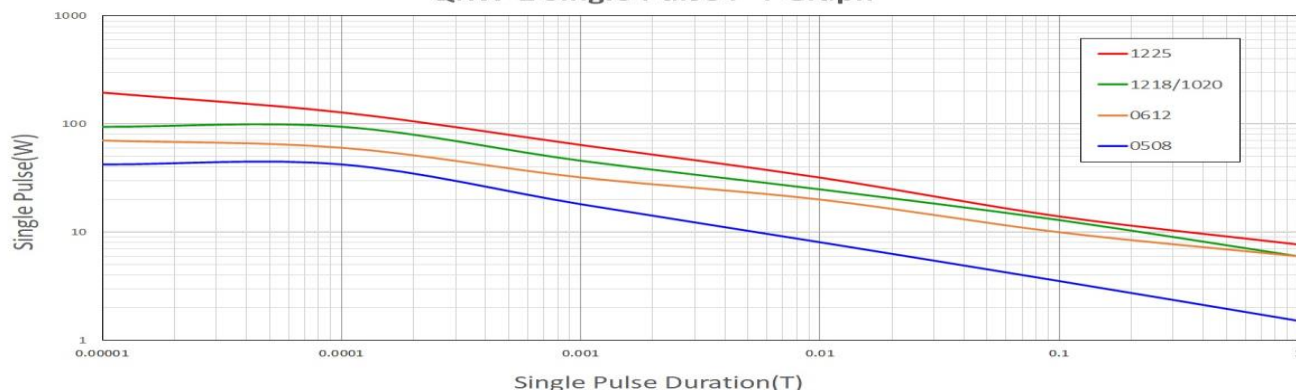
■ Performance Characteristics

■ Functional performance

QRW-Z :

Single Pulse

QRW-Z Single Pulse P-T Graph



Single pulse; applicable rate power at 70°C and Max working voltage and Max overload voltage.

Continuous Pulse

QRW-Z Continuous Pulse P-T Graph



Continuous pulse; applicable rate power at 70°C and Max working voltage and Max overload voltage.

Pulse Voltage

Pulse Voltage



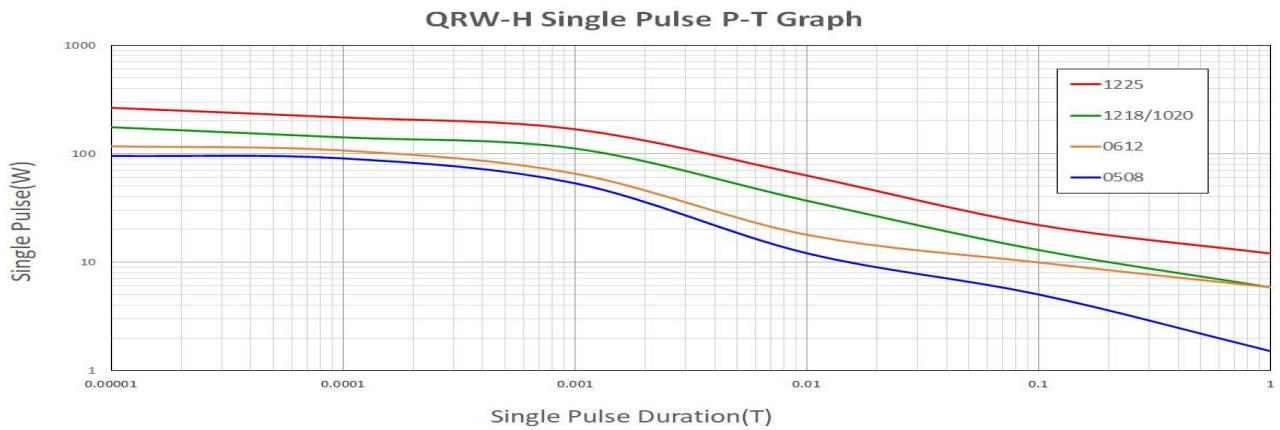
Pulse Voltage; applicable rate power at 70°C and Max working voltage and Max overload voltage.



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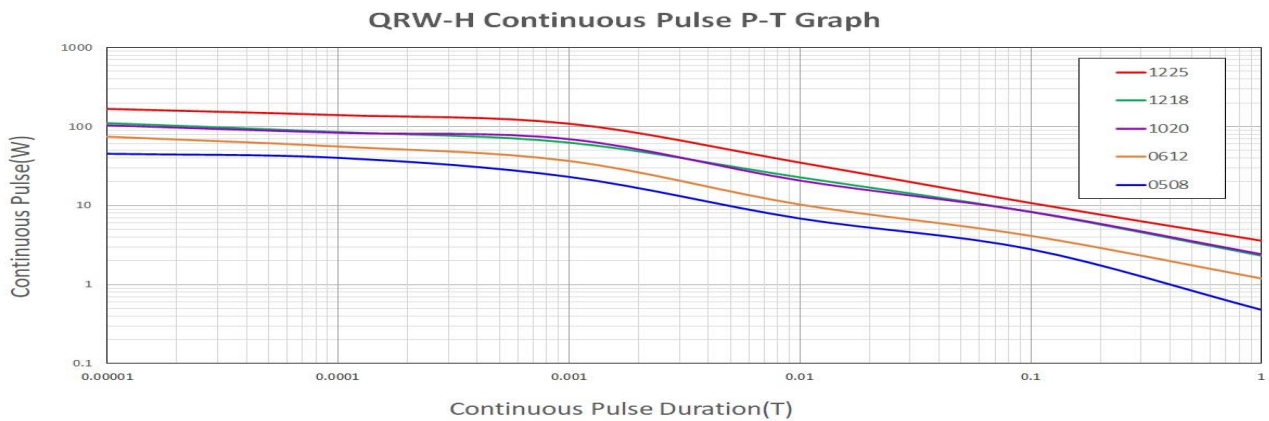
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QRW-H : Single Pulse



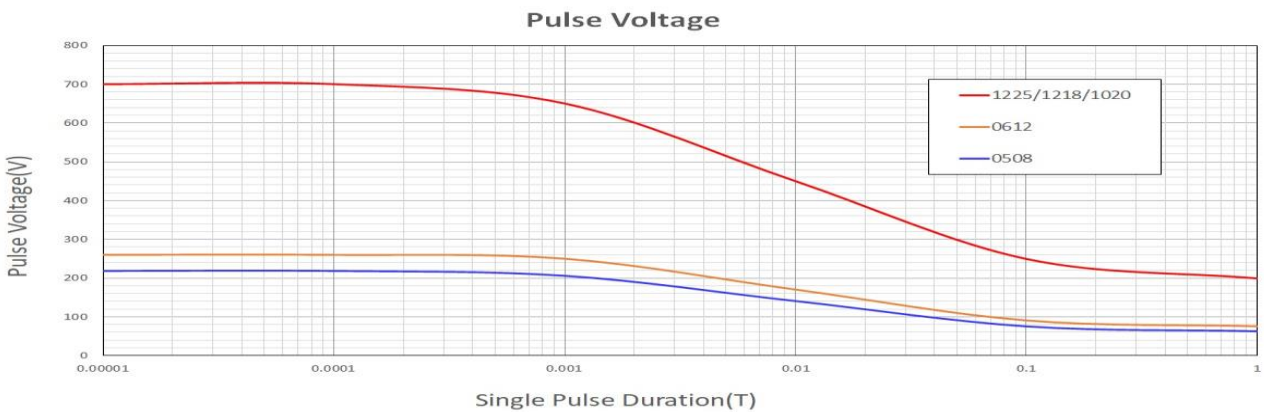
Single pulse; applicable rate power at 70°C and Max working voltage and Max overload voltage.

Continuous Pulse



Continuous pulse; applicable rate power at 70°C and Max working voltage and Max overload voltage.

Pulse Voltage



Pulse Voltage; applicable rate power at 70°C and Max working voltage and Max overload voltage.



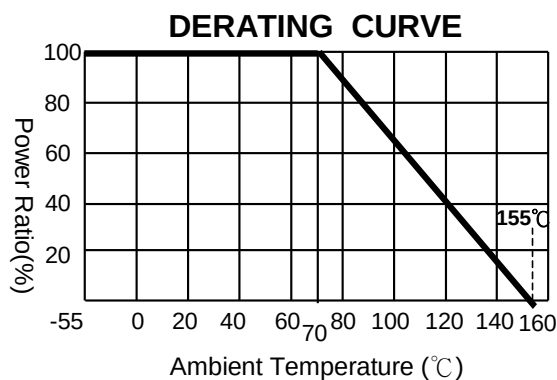
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■ Power Derating Curve



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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■ 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	Z:6.25*Rated power or Max Overload voltage whichever is less for 5 seconds. H:5*Rated power or Max Overload voltage whichever is less for 5 seconds. Jumper : Over Load Current for 5 seconds 0612=10A / 1020=15A / 1218=15A 1225=20A	±1% : ±(1.0%+0.05Ω) ±5% : ±(2.0%+0.1Ω) Value <1Ω : ±(2.0%+0.1Ω) Jumper : Max 0.02Ω after test.
Leaching	JIS-C-5201-1 4.18 IEC-60068-2-58 8.2.1	260±5°C for 30 seconds.	Individual leaching area ≤5% Total leaching area ≤ 10%
Resistance to Soldering Heat	JIS-C-5201-1 4.18 IEC-60115-1 4.18	260±5°C for 10 seconds.	±1% : ±(0.5%+0.05Ω) ±5% : ±(1.0%+0.05Ω) Value <1Ω : ±(1.0%+0.05Ω)
Insulation Resistance	JIS-C-5201-1 4.6 IEC-60115-1 4.6	Apply 100VDC for 1 minute.	≥ 10GΩ
Temperature Cycling	JESD22 Method JA-104	1000 Cycles (-55°C to +125°C) Measurement at 24±4 hours after test conclusion. 30min maximum dwell time at each temperature extreme.	±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) Jumper : Max 0.02Ω after test.
Biased Humidity	MIL-STD-202 Method 103	1,000 hours; 85°C / 85% RH, 10% of operating power. Measurement at 24±4 hours after test conclusion.	±1% : ±(1.0%+0.05Ω) ±5% : ±(3.0%+0.05Ω)
High Temperature Exposure (Storage)	MIL-STD-202 Method 108	1000 hrs. @ T=155°C. Unpowered. Measurement at 24±4 hours after test conclusion.	±1% : ±(0.5%+0.05Ω) ±5% : ±(2.0%+0.05Ω)
Operational Life	MIL-STD-202 Method 108	Condition D Steady State TA=125°C at derated power. Measurement at 24±4 hours after test conclusion.	±1% : ±(1.0%+0.05Ω) ±5% : ±(3.0%+0.10Ω)
External Visual	MIL-STD-883 Method 2009	Electrical test not required. Inspect device construction, marking and workmanship.	—
Mechanical Shock	MIL-STD-202 Method 213	Wave Form : Tolerance for half sine shock pulse. Peak value is 100g's. Normal duration(D) is 6(ms)	±1% : ±(1.0%+0.05Ω) ±5% : ±(2.0%+0.1Ω)
Vibration	MIL-STD-202 Method 204	5 g's for 20 min., 12 cycles each of 3 orientations. Note: Test from 10-2000 Hz	±1% : ±(1.0%+0.05Ω) ±5% : ±(2.0%+0.1Ω)
ESD	AEC-Q200- 002 or ISO/DIS 10605	Human body model 0508、0612 : 1KV, 1020 and above : 2KV	±(3%+0.05Ω)
Solderability	J-STD-002	(1) 4 hrs 155°C dry heat (2) 245±5°C 3 sec.	±1% : ±(0.5%+0.05Ω) ±5% : ±(1.0%+0.05Ω)
Terminal Strength (SMD)	AEC Q200-006	Pressurizing force for 60 seconds 0508/0612 : 8N ; 1020 and above : 17.7N	No broken
Board Flex	AEC Q200-005	Bending once for 60 seconds 0508/0612/1020/1218/1225 : 3mm	±1% : ±(1.0%+0.05Ω) ±5% : ±(1.0%+0.05Ω)
Sulfur Test	ASTM-B-809-95 EIA-977	105±2°C, no rating power for 1000 hrs (not include type 0508)	ΔR : ±(2.0%+0.05 Ω)



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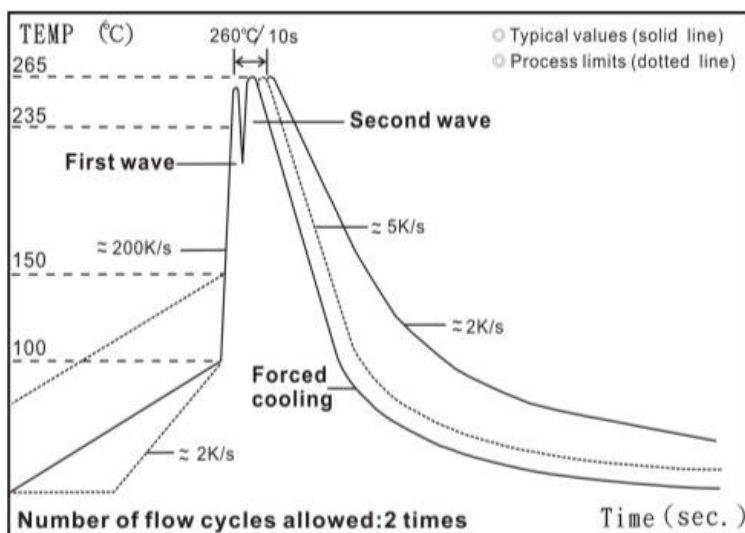
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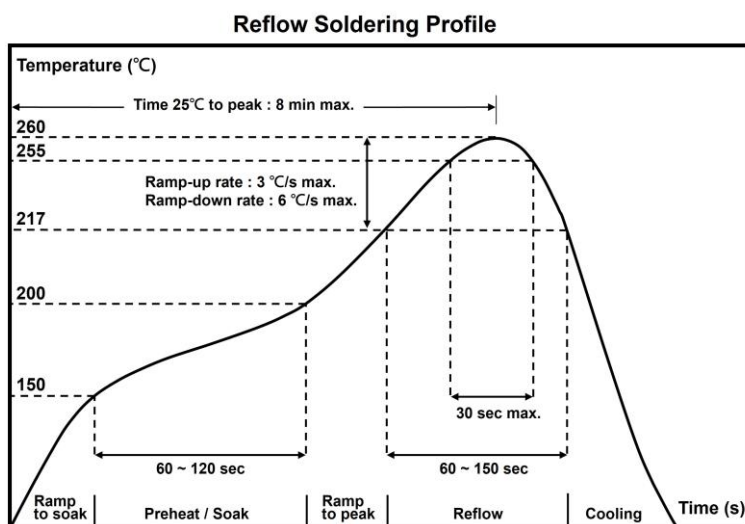
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■ Recommended Customer Soldering Parameters

■ Wave solder Temperature condition



■ Solder reflow Temperature condition



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

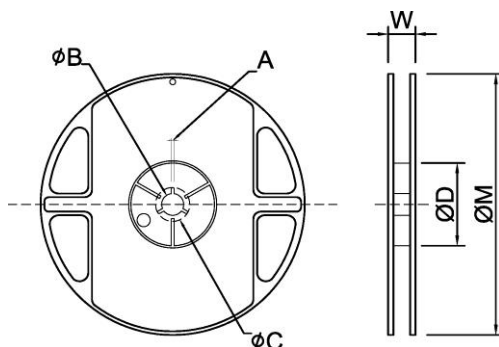
■ Recommended reflow methods

IR, vapor phase oven, hot air oven

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

Appendix For SMD Chip Resistor

Packaging Information

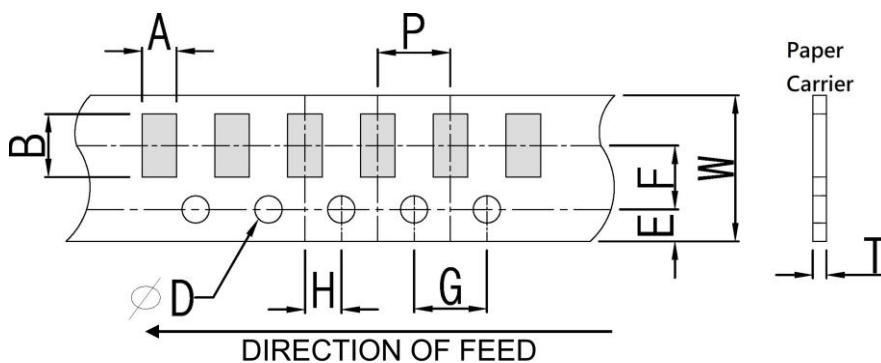


Dimension

Unit: mm

Type	Size		A	ϕB	ϕC	ϕD	W	ϕM
0508/0612	7"	5K/Reel	2.0±0.5	13.5±1.0	21±1.0	60±1.0	11.5±2.0	178±2.0
1020/1218/1225	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	0508	1.50 ± 0.15	2.25 ± 0.15	8.0 ± 0.2	1.75 ± 0.1	3.5 ± 0.05	4.0 ± 0.1	2.0 ± 0.05	0.75 ± 0.1	$1.50^{+0.10}_{-0}$	4.0 ± 0.1
	0612	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		4.0 ± 0.1

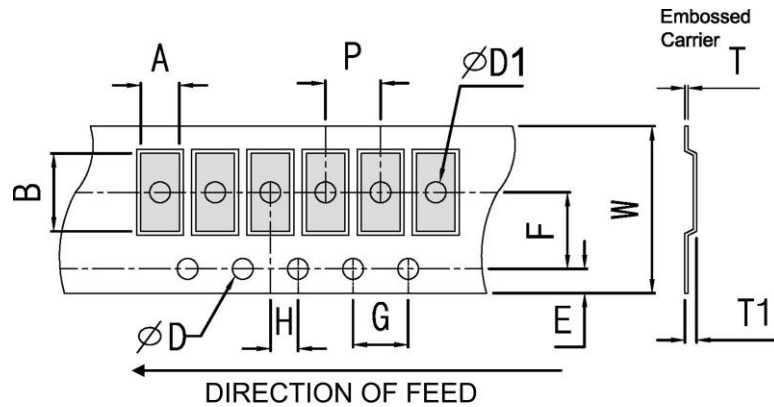


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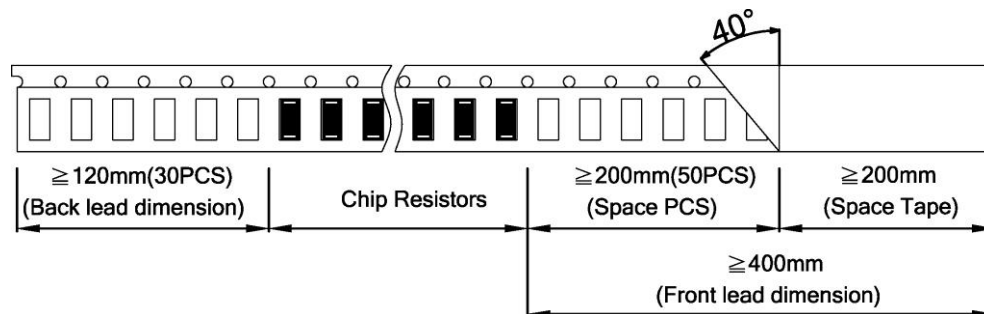
Dimension

Unit: mm

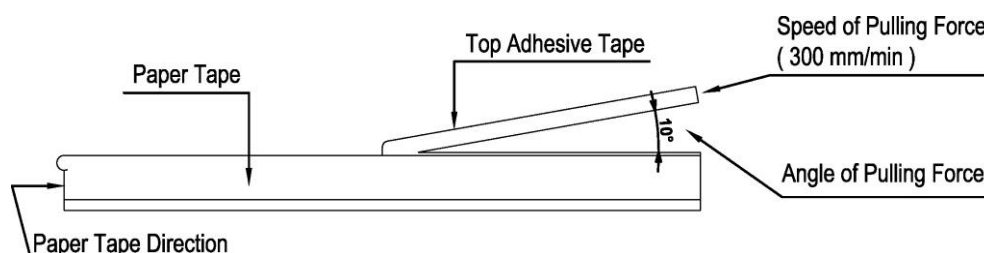
Packaging	Type	A	B	W	E	F	G	H	T	ΦD	ΦD1	T1	P
Embossed Type	1020	2.80±0.2	5.60±0.2	12±0.1	1.75±0.1	5.5±0.05	4.0±0.1	2.0±0.05	0.23±0.1	1.50 ^{+0.10} ₋₀	1.50±0.1	0.85±0.15	4.0±0.1
	1225*Z	3.40±0.2	6.70±0.2	12±0.1	1.75±0.1	5.5±0.05	4.0±0.1	2.0±0.05	0.23±0.1		1.50±0.1	0.85±0.15	
	1225*H	3.40±0.2	6.70±0.2	12±0.1	1.75±0.1	5.5±0.05	4.0±0.1	2.0±0.05	0.23±0.1		1.50±0.1	1.0±0.15	
	1218	3.30±0.2	4.60±0.2	12±0.1	1.75±0.1	5.5±0.05	4.0±0.1	2.0±0.05	0.23±0.1		1.50±0.1	0.85±0.15	

Packing Material Data/Storage Data

Front & Back Lead Dimension



Top Adhesive Peel Off Strength : 10~70g



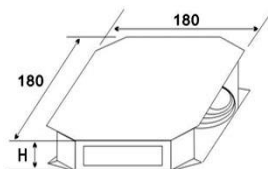


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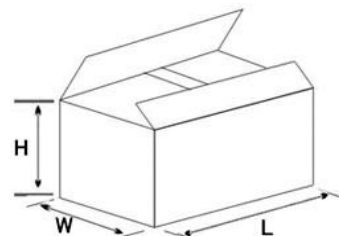
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■ Package

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.

■ 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.