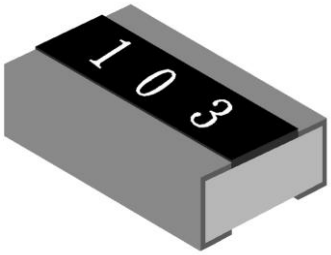
■ Automotive Wide Terminal Chip Resistor— QRW Series



■ 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：±1% J：±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

■ 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

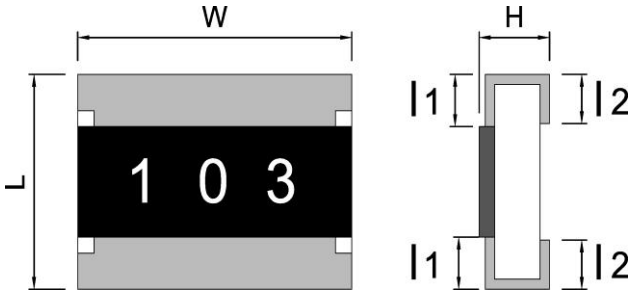
Item / Type	Rated Power at 70℃	Rated Voltage Range	Max Overload Voltage	T.C.R. (PPM/℃)	Resistance Range (mΩ) F(±1%)、J±(5%)
QRW0612	0.75W	0.087~0.86V	2.154V	±1800	10≦R<50
				±800	50≦ R<100
				±600	100≦R<1000
QRW1020	1W	0.10~0.99V	2.475V	±1800	10≦R<50
				±800	50≦ R<100
				±600	100≦R<1000
QRW1218	1W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

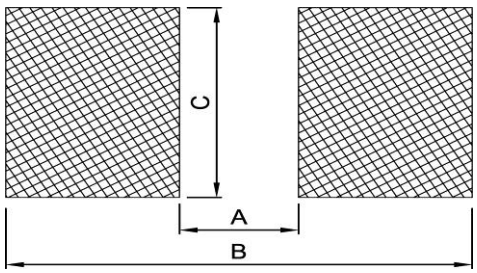
■ Dimension

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

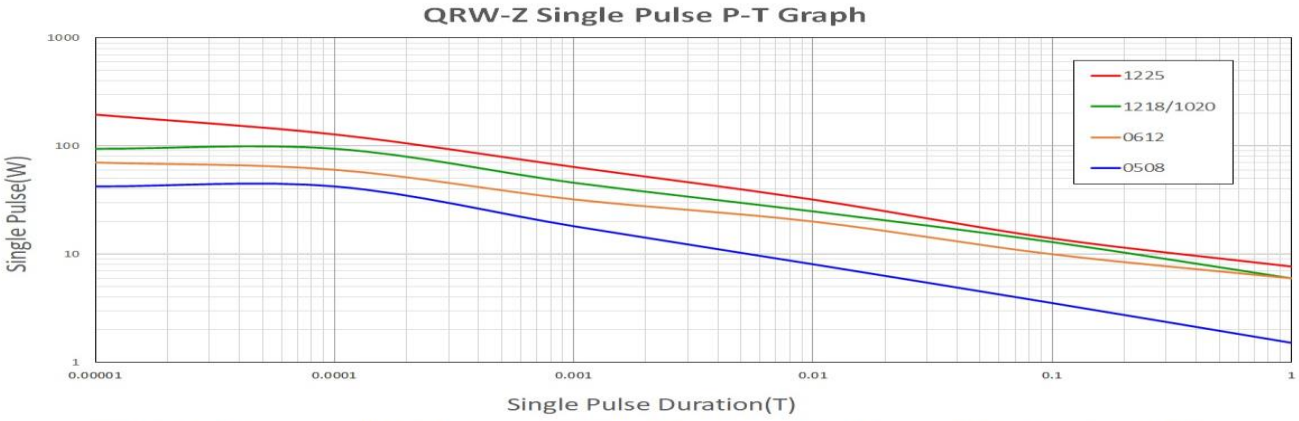
Item \ Type	0508	0612	1020	1218	1225
A	0.4	0.60	0.75	2.04	0.85
B	1.8	2.90	3.40	4.24	3.70
C	2.00	3.20	5.00	4.80	6.40

■ Performance Characteristics

■ Functional performance

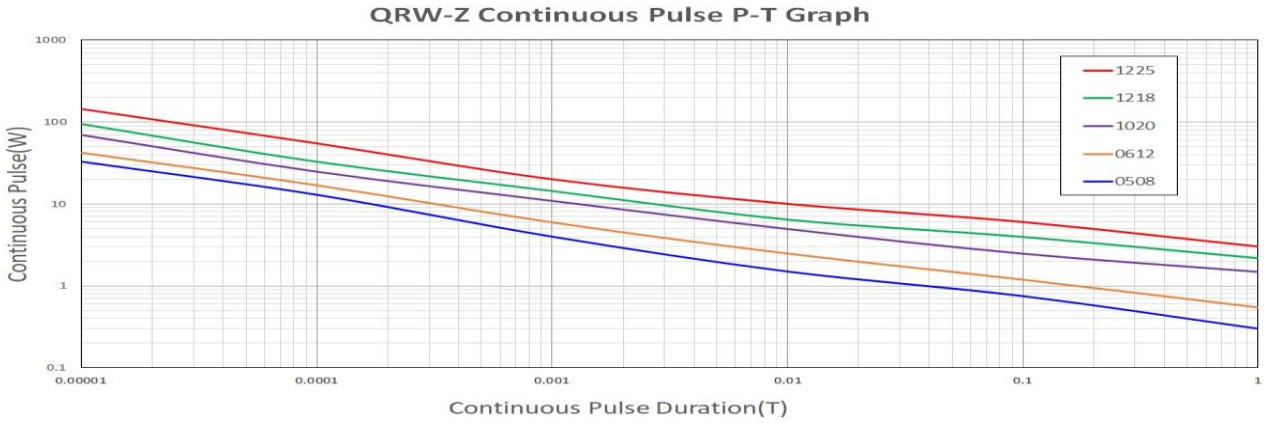
QRW-Z：

Single Pulse



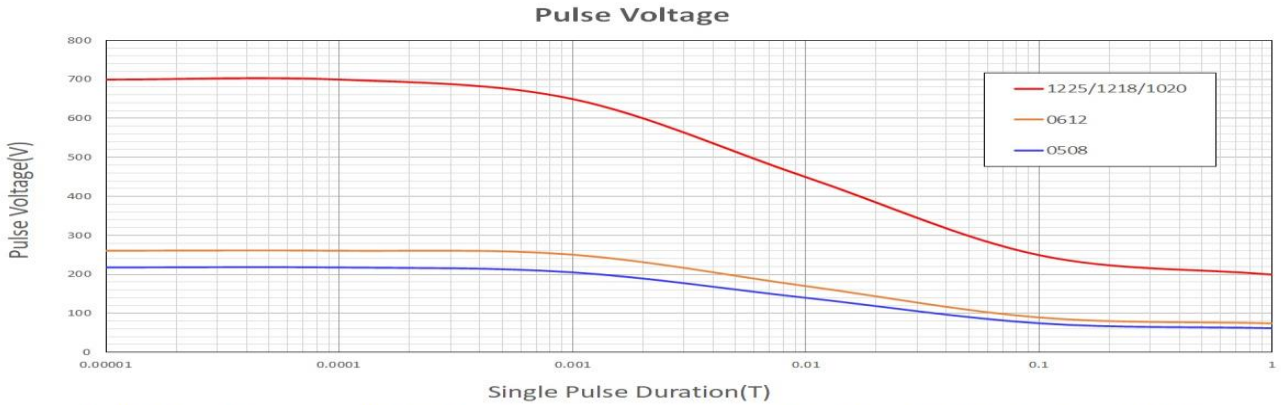
Single pulse; applicable rate power at 70℃ and Max working voltage and Max overload voltage.

Continuous Pulse



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

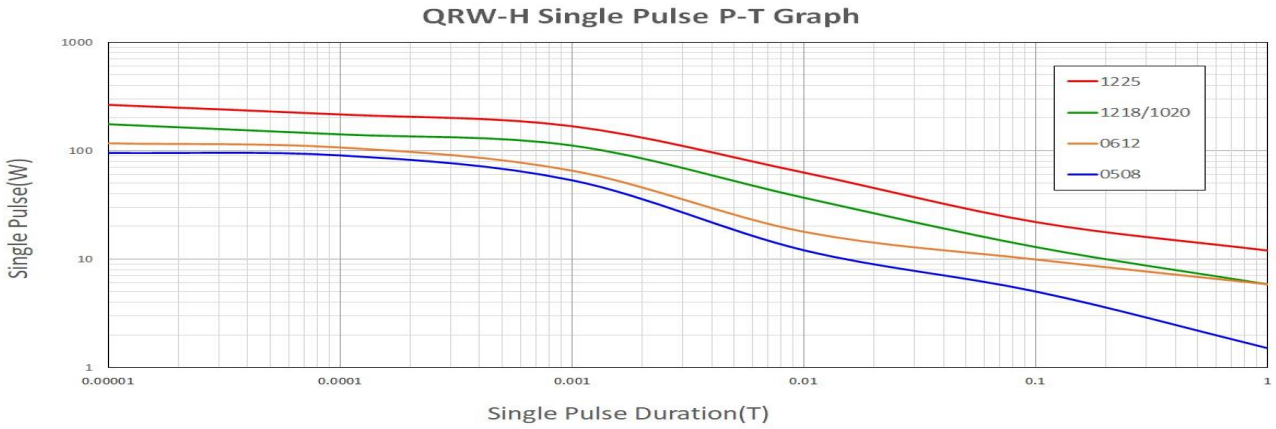
Pulse Voltage



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

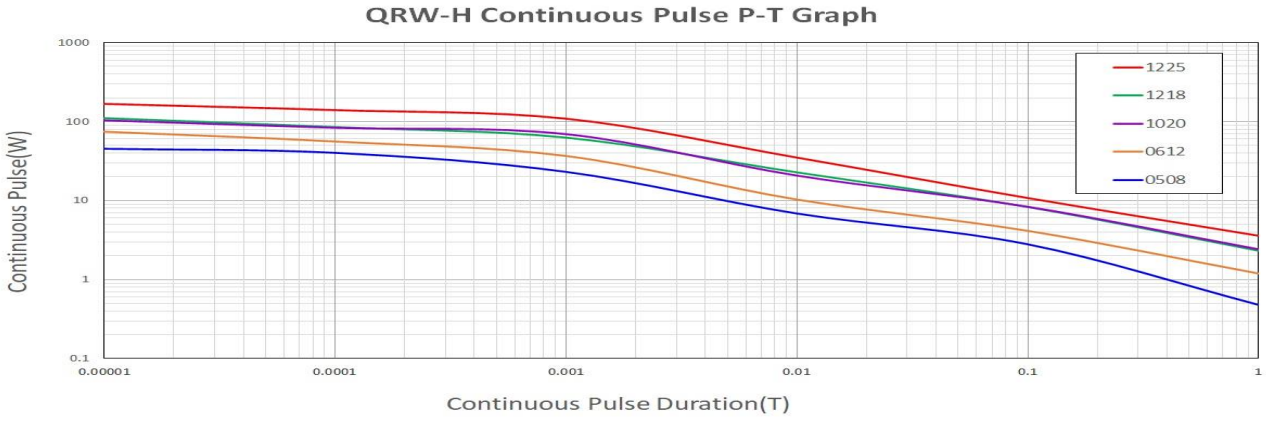
QRW-H：

Single Pulse



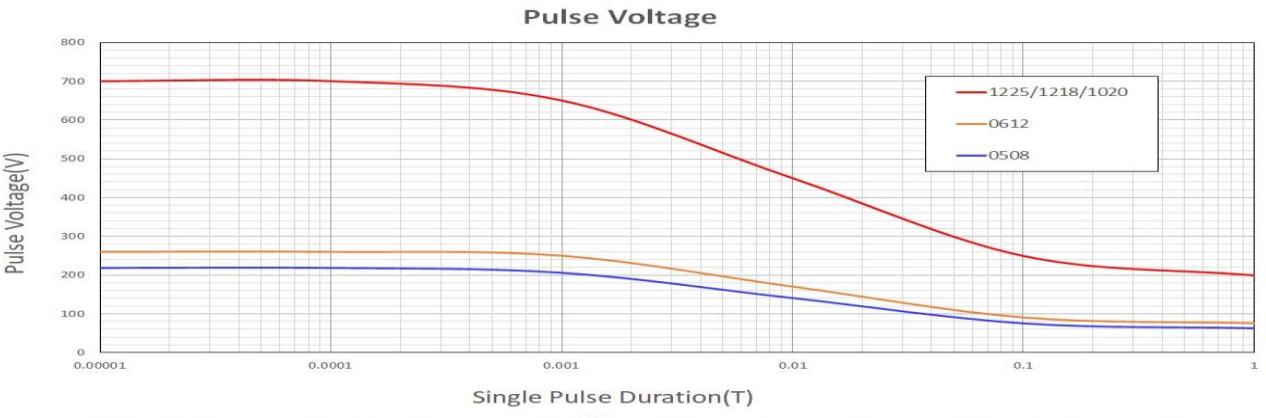
Single pulse; applicable rate power at 70°C and Max working voltage and Max overload voltage.

Continuous Pulse



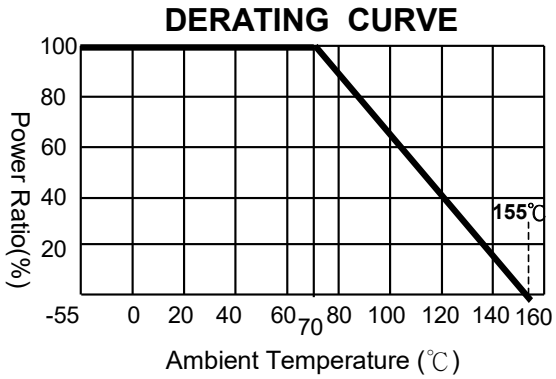
Continuous pulse; applicable rate power at 70°C and Max working voltage and Max overload voltage.

Pulse Voltage



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

■ Power Derating Curve



Power rating or current rating is in the case based on continuous full-load at ambient temperature of 70℃.
For operation at ambient temperature in excess of 70℃, the load should be derated in accordance with figure of derating Curve.

■ Voltage Rating or Current Rating

Resistance Range: ≧1Ω
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)=$\sqrt{P \times R}$

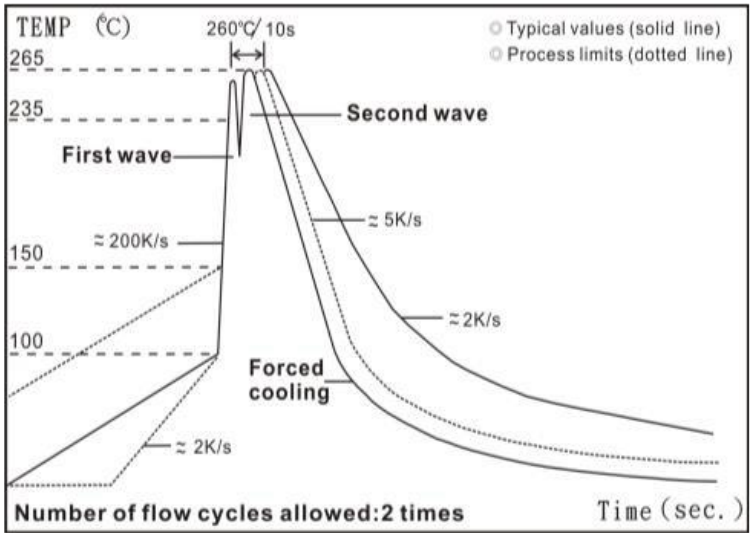
E=Rated voltage(V)
P=Power rating(W)
R=Nominal resistance(Ω)

■ Reliability Test and Requirement

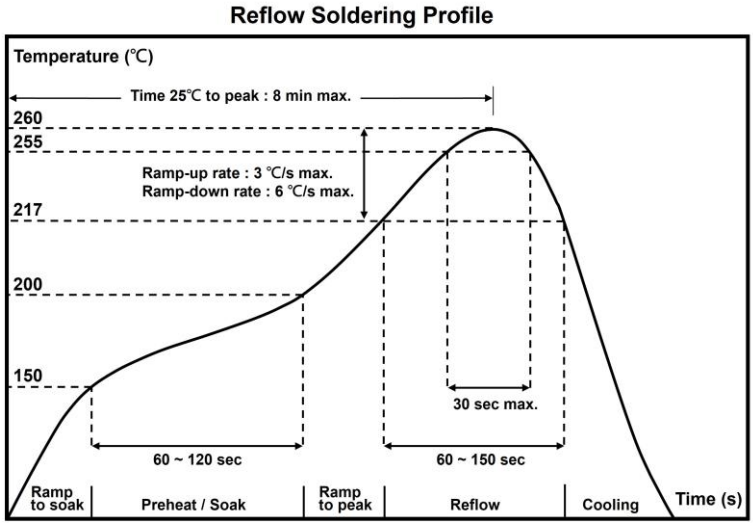
Test Item	Test Method	Procedure	Requirements
Temperature Coefficient of Resistance (T.C.R)	JIS-C-5201-1 4.8 IEC-60115-1 4.8	At 25℃ / -55℃ and 25℃ /+155℃, 25℃ is the reference temperature	As Spec
Short Time Overload	JIS-C-5201-1 4.13 IEC-60115-1 4.13	Z:6.25*Rated power or Max Overload voltage whichever 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℃ 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℃ 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℃ dry heat (2) 245±5℃ 3 sec.	>95% Coverage No Visual damage
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℃, no rating power for 1000 hrs (not include type 0508)	△R：±(2.0%+0.05 Ω)

■ Recommended Customer Soldering Parameters

■ Wave solder Temperature condition



■ Solder reflow Temperature condition



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

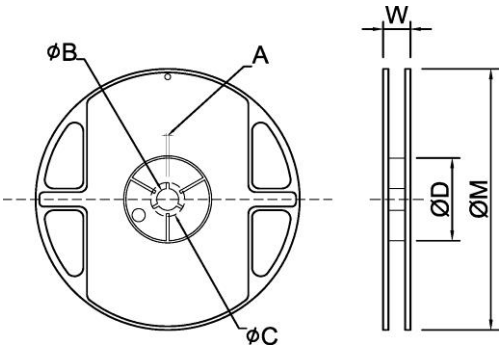
■ Recommended reflow methods

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

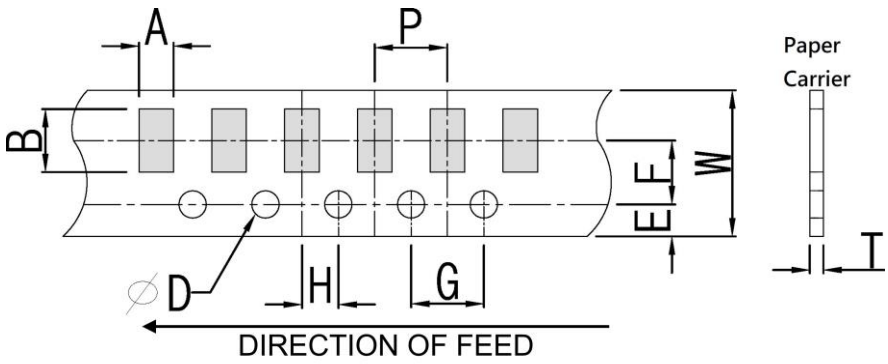
● Packaging Information



■ **Dimension** Unit: mm

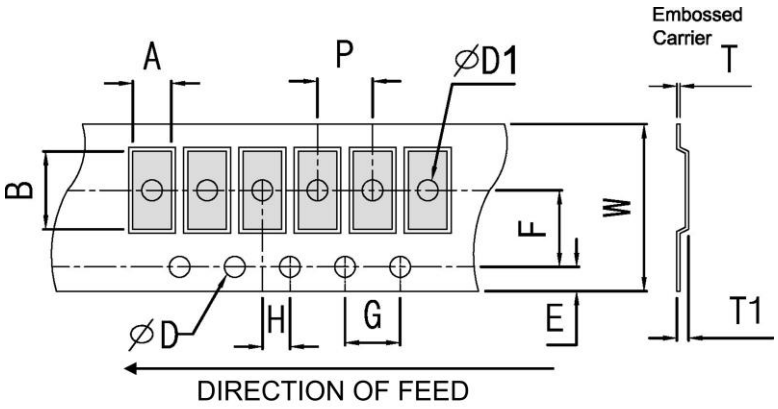
Type	Size		A	ΦB	ΦC	ΦD	W	ΦM
0508/0612	7”	5K/Reel	2.0±0.5	13.5±1.0	21±1.0	60±1.0	11.5±2.0	178±2.0
1020/1218/1225	7”	4K/Reel	2.0±0.5	13.5±1.0	21±1.0	60±1.0	16.0±2.0	178±2.0

■ 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

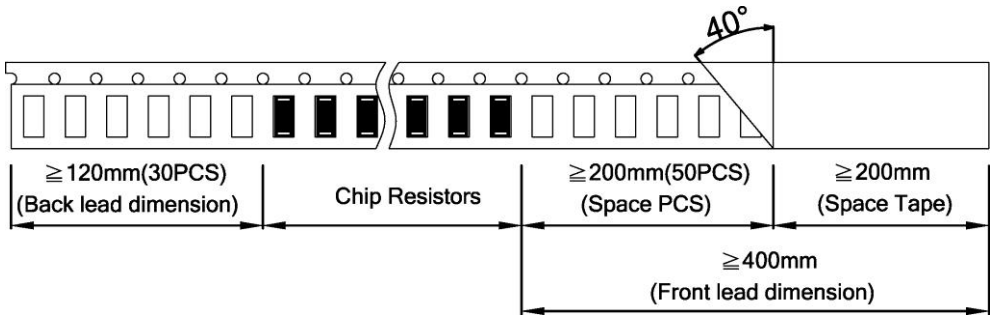


■ **Dimension** **Unit: mm**

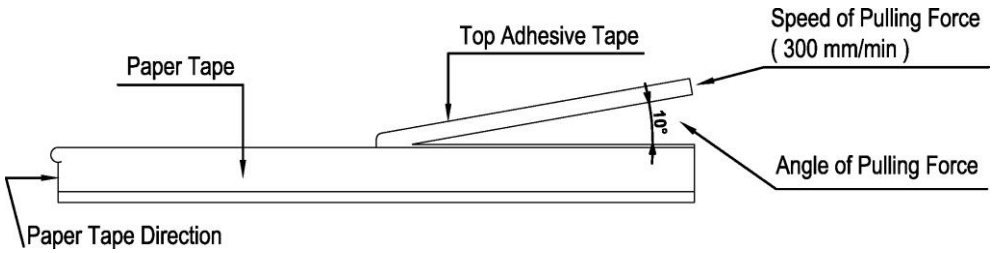
Packaging	Type	A	B	W	E	F	G	H	T	ΦD	ΦD1	T1	P
Embossed Type	1020	2.80±0.2	5.60±0.2	12±0.1	1.75±0.1	5.5±0.05	4.0±0.1	2.0±0.05	0.23±0.1	$1.50^{+0.10}_{-0}$	1.50±0.1	0.85±0.15	4.0±0.1
	1225*Z	3.40±0.2	6.70±0.2	12±0.1	1.75±0.1	5.5±0.05	4.0±0.1	2.0±0.05	0.23±0.1		1.50±0.1	0.85±0.15	
	1225*H	3.40±0.2	6.70±0.2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

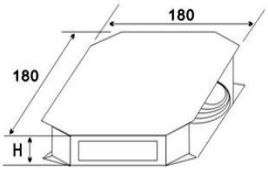


■ Top Adhesive Peel Off Strength：10~70g

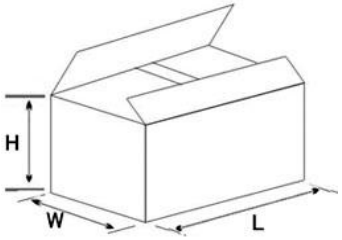


■ Package

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±5℃& humidity: 60±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.