



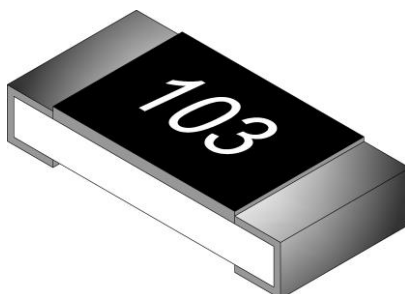
AS Series Thick Film Anti-Surge Chip Resistor Product Specifications

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Released Date 2024/12/19

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■ Thick Film Anti-Surge Chip Resistor — AS Series



■ Application

- Metering(Testing/Measurement)
- Medical Devices
- Automotive
- Power supply
- Charger
- Inverter
- LCD Video Monitors

■ Features

- High power rating
- Improved working voltage ratings
- Standard package sizes of 0402~2512
- excellent Anti-Pulse ability (Tolerance 1%&2%)
- excellent Anti-Surge ability (Tolerance 5%&10%&20%&30%)
- AEC-Q200 Compliant

■ Parts Number Explanation

Example

AS	0603	J	10R0	P	05	Z
Product Type	Size (Inch)	Resistor Tolerance	Resistor Value	Package	Quantity	Optional
AS	0402 0603 0805 1206 1210 2010 2512	F : $\pm 1\%$ G : $\pm 2\%$ J : $\pm 5\%$ K : $\pm 10\%$ M : $\pm 20\%$ N : $\pm 30\%$	1R=1R00 10R=10R0 100R=100R 1K=1K00 1M=1M00	P : Paper Taping (0603~1210) Q : Paper Taping (0402) E : Embossed Taping	04 : 4000PCS 05 : 5000PCS 10 : 10000PCS 40 : 40000PCS 50 : 50000PCS	Z : Type-1 Normal Type H : Type-2 High Power



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■ Standard Electrical Specifications Type-1

Item Type-1	Rated Power at 70°C	Max Working Voltage	Max Overload Voltage	T.C.R. (PPM/°C)	Resistance Range		
					F(±1%) G(±2%)	J(±5%) K(±10%)	M(±20%) N(±30%)
AS0402	0.1 W	50V	100V	±400	$1\Omega \leq R < 10\Omega$	$1\Omega \leq R < 10\Omega$	
				±300		$10\Omega \leq R < 1K\Omega$	
				±200	$10\Omega \leq R \leq 1M\Omega$	$1K\Omega \leq R \leq 10M\Omega$	
AS0603	0.125 W	150V	200V	±400	$1\Omega \leq R < 10\Omega$	$1\Omega \leq R < 10\Omega$	
				±200	-	-	$10\Omega \leq R \leq 10M\Omega$
				±100	$10\Omega \leq R \leq 1M\Omega$	$10\Omega \leq R \leq 10M\Omega$	-
AS0805	0.25 W	150V	300V	±400	$1\Omega \leq R < 10\Omega$	$1\Omega \leq R < 10\Omega$	
				±200	-	-	$10\Omega \leq R \leq 10M\Omega$
				±100	$10\Omega \leq R \leq 1M\Omega$	$10\Omega \leq R \leq 10M\Omega$	-
AS1206	0.33 W	200V	400V	±400	$1\Omega \leq R < 10\Omega$	$1\Omega \leq R < 10\Omega$	
				±200	-	-	$10\Omega \leq R \leq 10M\Omega$
				±100	$10\Omega \leq R \leq 1M\Omega$	$10\Omega \leq R \leq 10M\Omega$	-
AS1210	0.5 W	200V	400V	±400	$1\Omega \leq R < 10\Omega$	$1\Omega \leq R < 10\Omega$	
				±200	-	-	$10\Omega \leq R \leq 10M\Omega$
				±100	$10\Omega \leq R \leq 1M\Omega$	$10\Omega \leq R \leq 10M\Omega$	-
AS2010	0.75 W	400V	800V	±400	$1\Omega \leq R < 10\Omega$	$1\Omega \leq R < 10\Omega$	
				±200	-	-	$10\Omega \leq R \leq 10M\Omega$
				±150	$10\Omega \leq R \leq 1M\Omega$	$10\Omega \leq R \leq 10M\Omega$	-
AS2512	1.5 W	500V	1000V	±400	$1\Omega \leq R < 10\Omega$	$1\Omega \leq R < 10\Omega$	
				±200	-	-	$10\Omega \leq R \leq 10M\Omega$
				±150	$10\Omega \leq R \leq 1M\Omega$	$10\Omega \leq R \leq 10M\Omega$	-

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



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■ High Power Rating Electrical Specifications Type-2

Item Type-2	Rated Power at 70°C	Max Working Voltage	Max Overload Voltage	T.C.R. (PPM/°C)	Resistance Range		
					F(±1%) G(±2%)	J(±5%) K(±10%)	M(±20%) N(±30%)
AS0402	0.125W	50V	100V	±400	$1\Omega \leq R < 10\Omega$	$1\Omega \leq R < 10\Omega$	
				±300	-	$10\Omega \leq R < 1K\Omega$	
				±200	$10\Omega \leq R \leq 1M\Omega$	$1K\Omega \leq R \leq 10M\Omega$	
AS0603	0.25 W	150V	200V	±400	$1\Omega \leq R < 10\Omega$	$1\Omega \leq R < 10\Omega$	
				±200	-	-	$10\Omega \leq R \leq 10M\Omega$
				±100	$10\Omega \leq R \leq 1M\Omega$	$10\Omega \leq R \leq 10M\Omega$	-
AS0805	0.4 W	150V	300V	±400	$1\Omega \leq R < 10\Omega$	$1\Omega \leq R < 10\Omega$	
				±200	-	-	$10\Omega \leq R \leq 10M\Omega$
				±100	$10\Omega \leq R \leq 1M\Omega$	$10\Omega \leq R \leq 10M\Omega$	-
AS1206	0.5 W	200V	400V	±400	$1\Omega \leq R < 10\Omega$	$1\Omega \leq R < 10\Omega$	
				±200	-	-	$10\Omega \leq R \leq 10M\Omega$
				±100	$10\Omega \leq R \leq 1M\Omega$	$10\Omega \leq R \leq 10M\Omega$	-
AS1210	0.75 W	200V	400V	±400	$1\Omega \leq R < 10\Omega$	$1\Omega \leq R < 10\Omega$	
				±200	-	-	$10\Omega \leq R \leq 10M\Omega$
				±100	$10\Omega \leq R \leq 1M\Omega$	$10\Omega \leq R \leq 10M\Omega$	-
AS2010	1 W	400V	800V	±400	$1\Omega \leq R < 10\Omega$	$1\Omega \leq R < 10\Omega$	
				±200	-	-	$10\Omega \leq R \leq 10M\Omega$
				±150	$10\Omega \leq R \leq 1M\Omega$	$10\Omega \leq R \leq 10M\Omega$	-
AS2512	2 W	500V	1000V	±400	$1\Omega \leq R < 10\Omega$	$1\Omega \leq R < 10\Omega$	
				±200	-	-	$10\Omega \leq R \leq 10M\Omega$
				±150	$10\Omega \leq R \leq 1M\Omega$	$10\Omega \leq R \leq 10M\Omega$	-

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



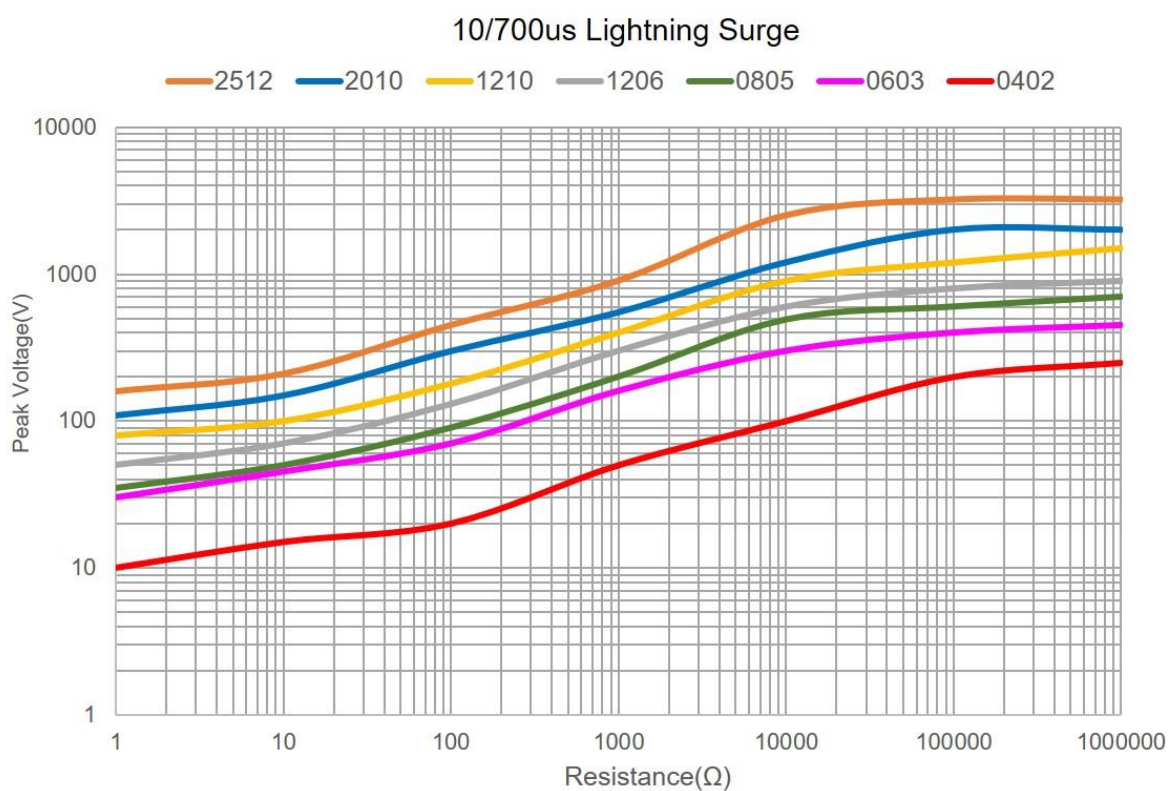
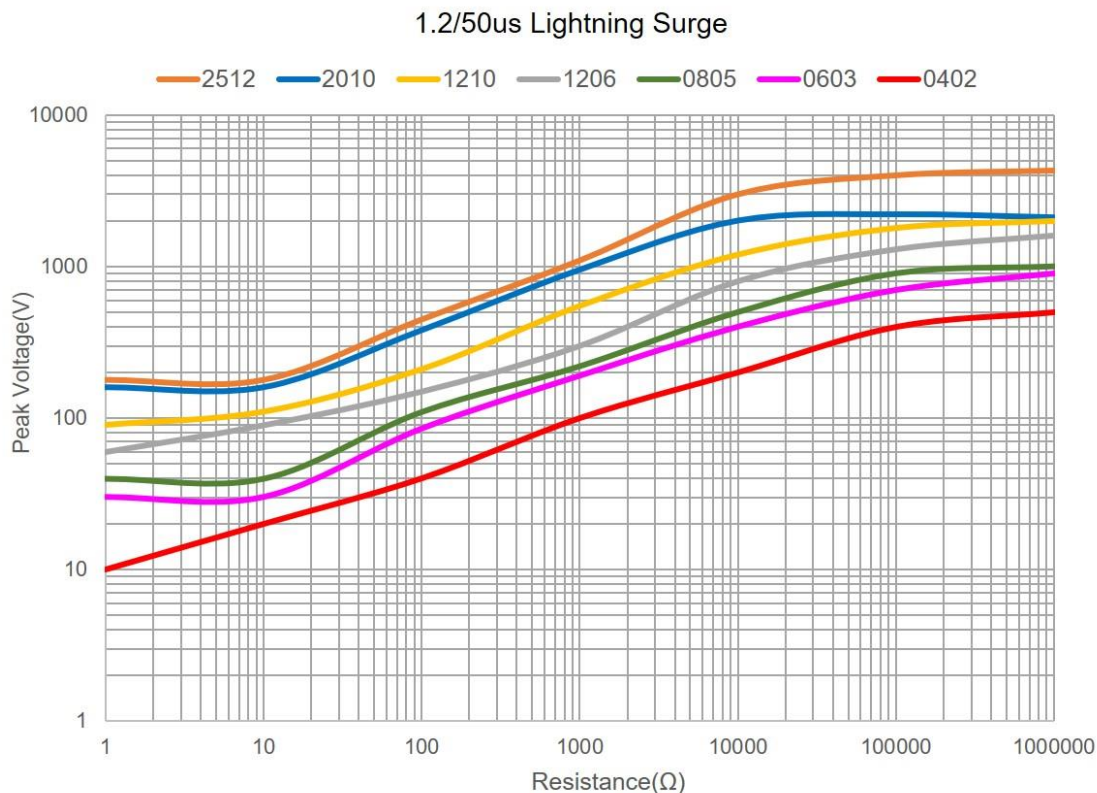
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■ Lightning Surge:





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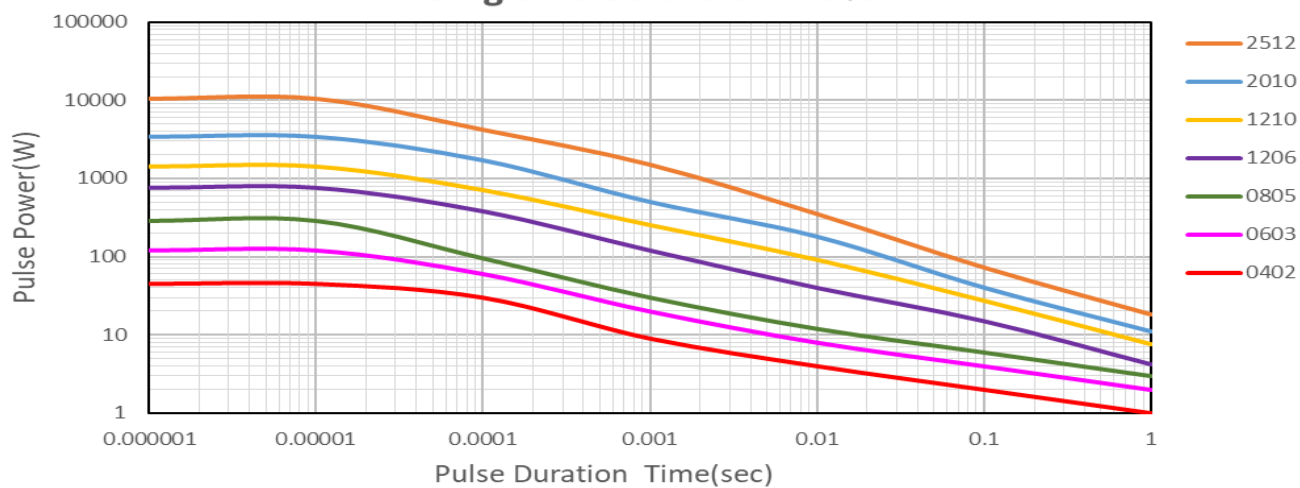
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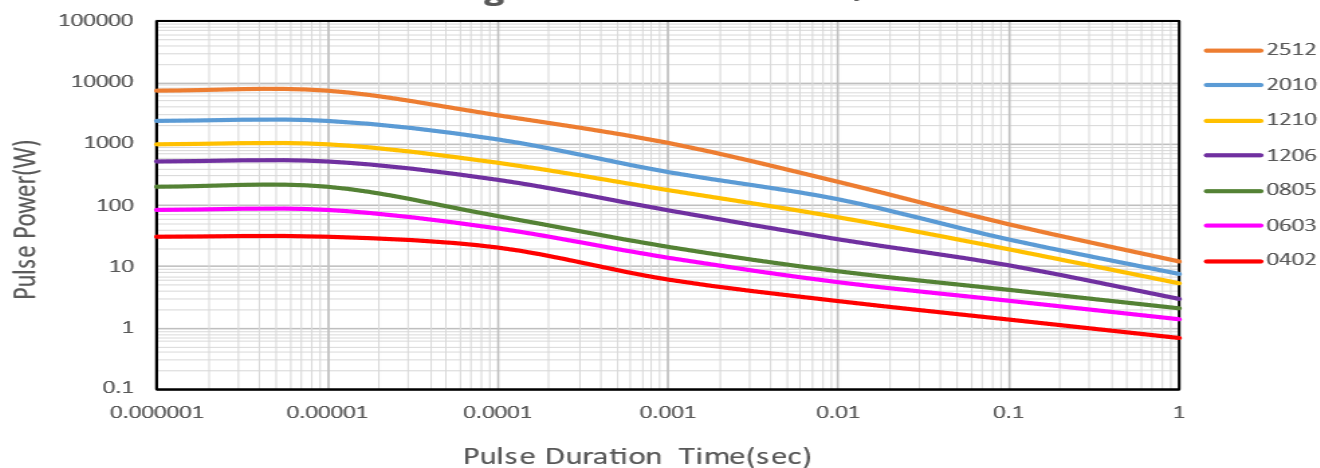
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■ Single Pulse Power:

Single Pulse 100 ohm 5%



Single Pulse 100 ohm 1%





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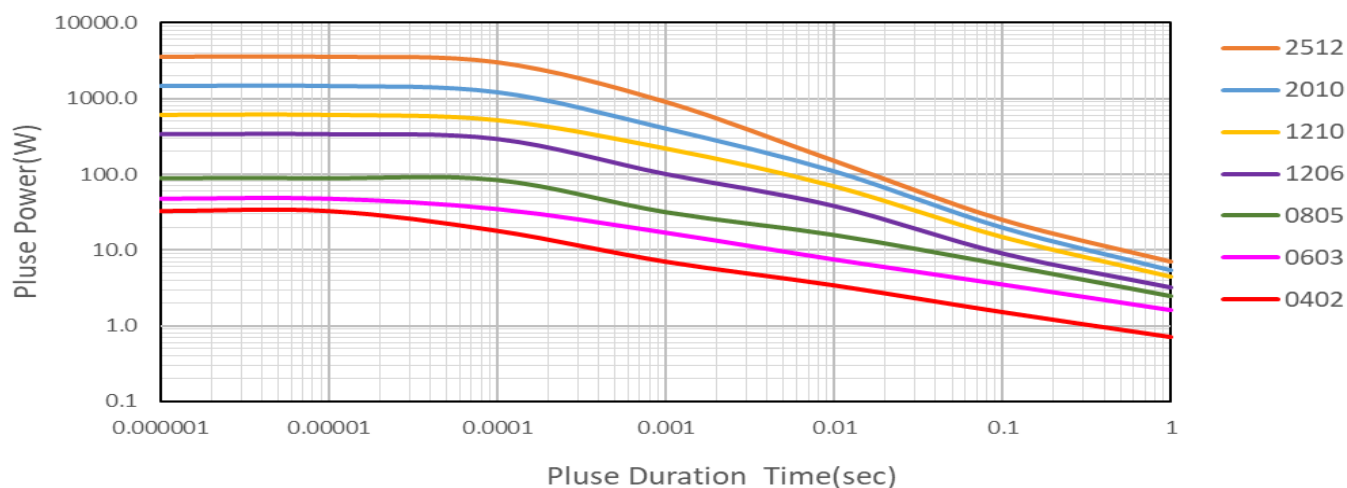
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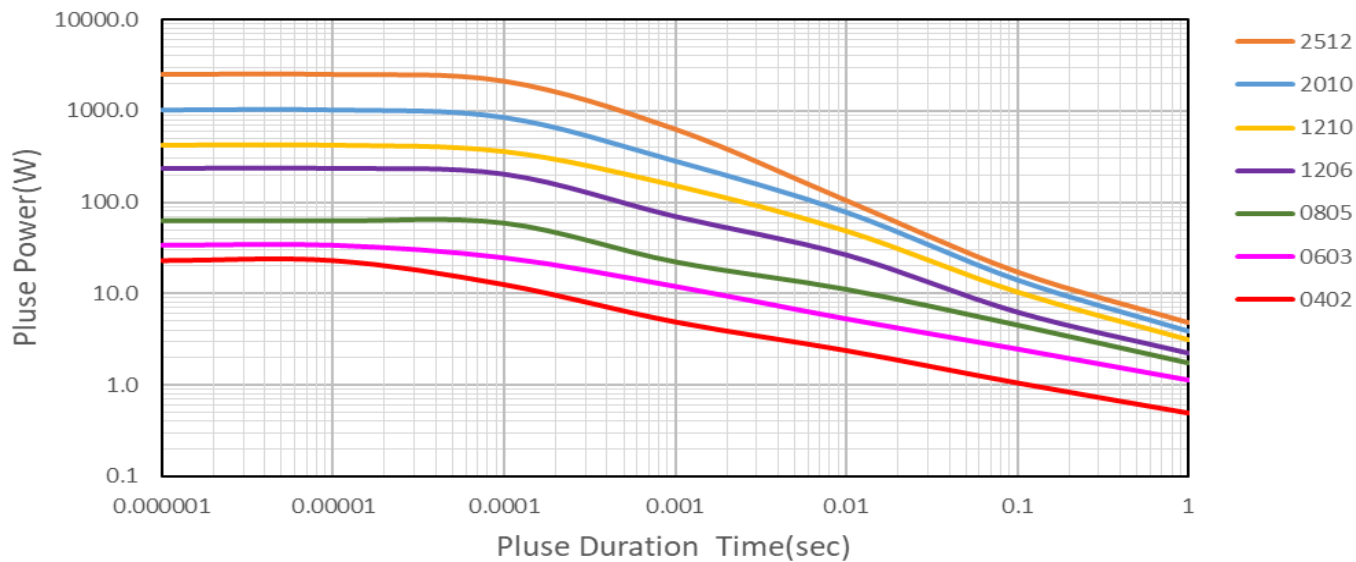
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■ Continuous Pulse Power:

Continuous Pulse 100 ohm 5%



Continuous Pulse 100 ohm 1%





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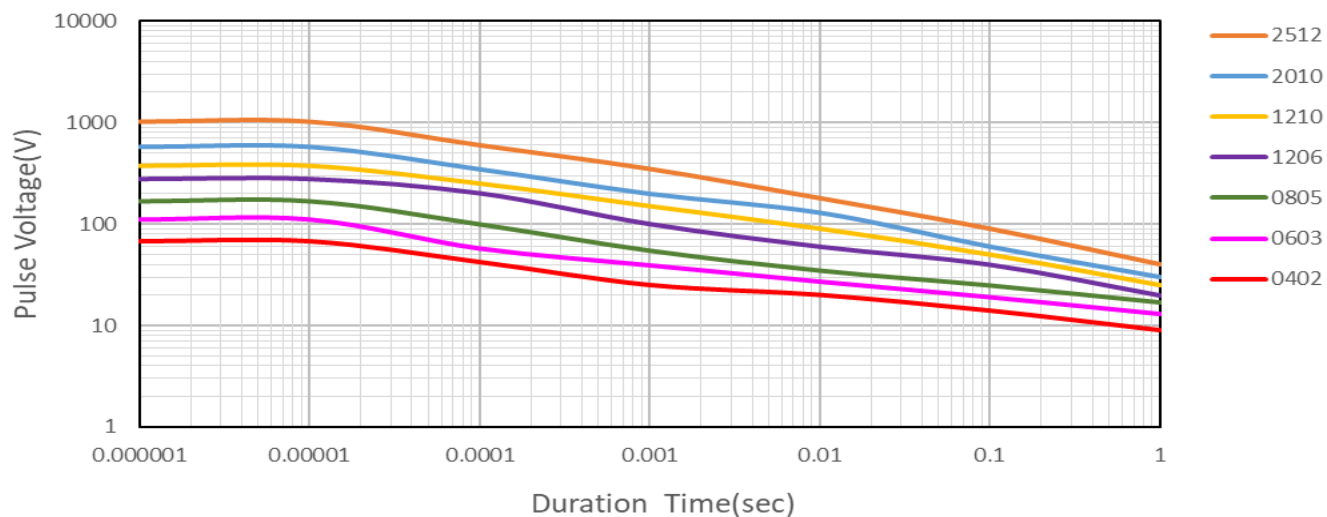
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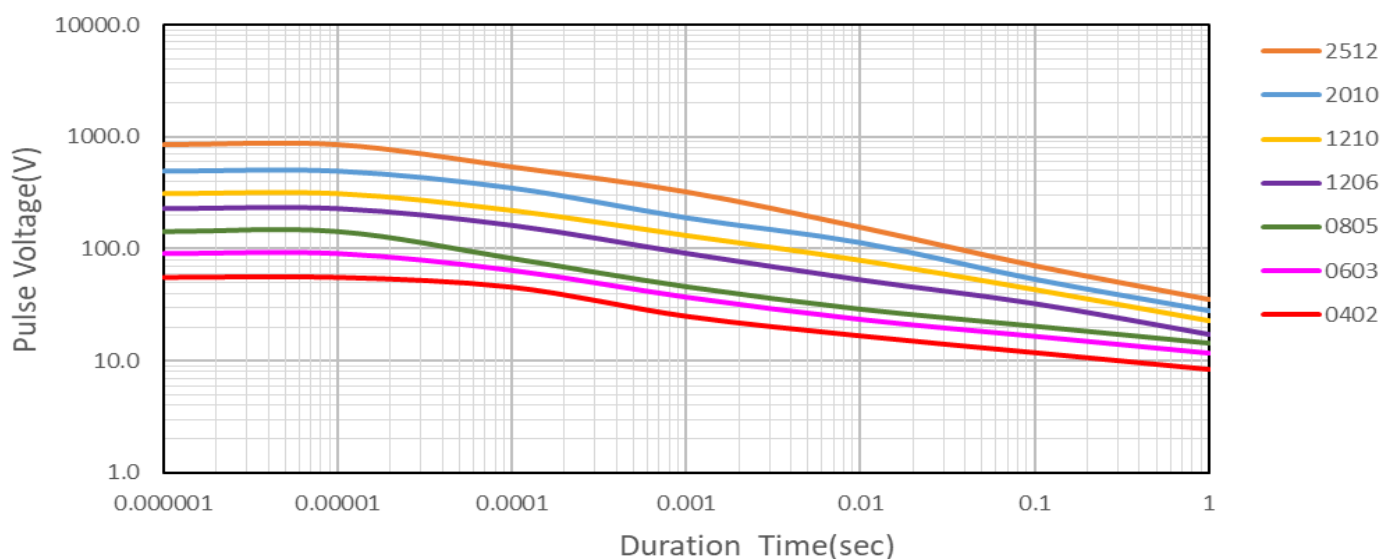
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■ Pulse Voltage:

Pulse Voltage 100 ohm 5%



Pulse Voltage 100 ohm 1%





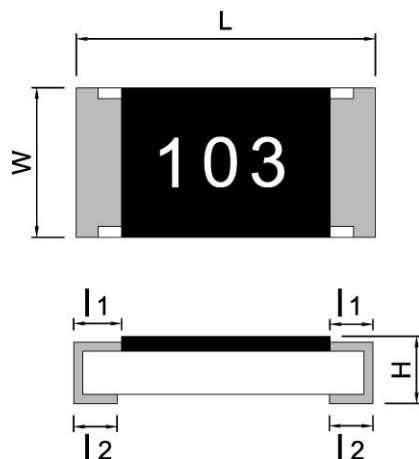
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■ Type Dimension



AS0402 / AS0603 / AS0805 / AS1206 /
AS1210 / AS2010 / AS2512

Type-1	L	W	H	l_1	l_2
AS0402	1.00 ± 0.05	0.50 ± 0.05	0.30 ± 0.05	0.15 ± 0.10	0.20 ± 0.10
AS0603	1.60 ± 0.10	0.80 ± 0.10	0.40 ± 0.10	0.30 ± 0.20	0.30 ± 0.10
AS0805	2.00 ± 0.10	1.25 ± 0.10	0.50 ± 0.15	0.30 ± 0.15	0.40 ± 0.15
AS1206	3.05 ± 0.10	1.60 ± 0.10	0.55 ± 0.15	0.40 ± 0.20	0.50 ± 0.20
AS1210	3.05 ± 0.10	2.50 ± 0.15	0.55 ± 0.15	0.50 ± 0.20	0.50 ± 0.20
AS2010	5.00 ± 0.20	2.50 ± 0.15	0.55 ± 0.10	0.60 ± 0.20	0.60 ± 0.20
AS2512	6.30 ± 0.20	3.20 ± 0.15	0.68 ± 0.10	0.60 ± 0.20	0.60 ± 0.20

Type-2	L	W	H	l_1	l_2
AS0402	1.00 ± 0.05	0.50 ± 0.05	0.30 ± 0.05	0.15 ± 0.10	0.20 ± 0.10
AS0603	1.60 ± 0.10	0.80 ± 0.10	0.40 ± 0.10	0.30 ± 0.20	0.30 ± 0.10
AS0805	2.00 ± 0.10	1.25 ± 0.10	0.50 ± 0.15	0.30 ± 0.15	0.40 ± 0.15
AS1206	3.05 ± 0.10	1.60 ± 0.10	0.55 ± 0.15	0.40 ± 0.20	0.50 ± 0.20
AS1210	3.05 ± 0.10	2.50 ± 0.15	0.55 ± 0.15	0.50 ± 0.20	0.50 ± 0.20
AS2010	5.00 ± 0.20	2.50 ± 0.15	0.55 ± 0.10	0.60 ± 0.20	0.60 ± 0.20
AS2512	6.30 ± 0.20	3.20 ± 0.15	0.68 ± 0.10	0.60 ± 0.20	0.60 ± 0.20

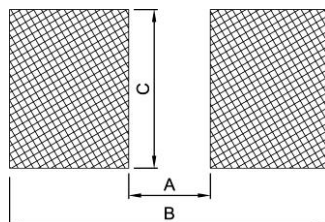


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● General Information

■ Recommend Land Pattern Design



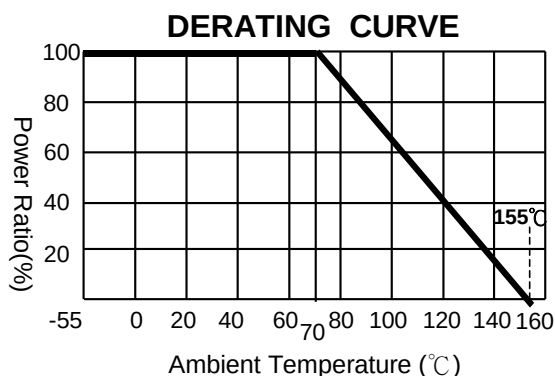
■ Dimension

Unit: mm

Type Item	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	1.40	1.70	2.70	2.70	3.40

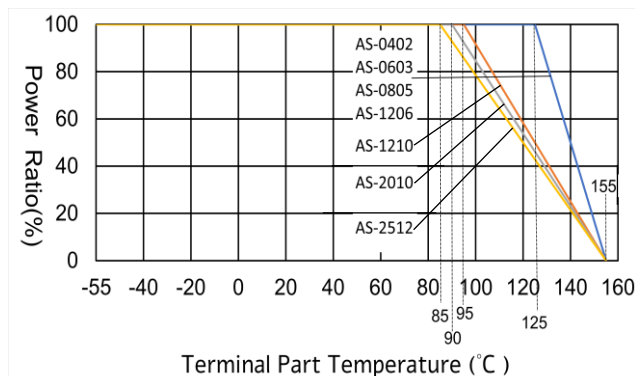
■ Performance Characteristics

■ 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.

■ Terminal part temperature



For resistors operated terminal part temperature of described for each size or above, a power rating shall be derated in accordance with 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	Refer to Ratings
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.	±(1.0%+0.05Ω)
Single pulse high voltage overload	IEC-60115	Severity No. 4: $U = 10 \times \sqrt{P_{70} \times R}$ or $U = 2 \times U_{MAX}$; whichever is the less severe. One pulse per minute, 10 pulses 10 / 700 μs.	±(1.0%+0.05Ω)
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.	≥ 5% : ±(1.0%+0.05Ω) < 5% : ±(0.5%+0.05Ω)
Rapid Change of Temperature	JIS-C-5201-1 4.19 IEC-60115-1 4.19	-55°C to +155°C, 5 cycles	≥ 5% : ±(1.0%+0.05Ω) < 5% : ±(0.5%+0.05Ω)
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.	±(0.5%+0.05Ω)
Damp Heat with Load	JIS-C-5201-1 4.24 IEC-60115-1 4.24	40±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" .	≥ 5% : ±(2.0%+0.05Ω) < 5% : ±(0.5%+0.05Ω)
Load Life (Endurance)	JIS-C-5201-1 4.25 IEC-60115-1 4.25.1	70±2°C, RCWV or Max. working voltage whichever is less for 1000 hrs with 1.5 hrs "ON" and 0.5 hrs "OFF" .	≥ 5% : ±(3.0%+0.05Ω) < 5% : ±(0.5%+0.05Ω)
Insulation Resistance	JJIS-C-5201-1 4.6 IEC-60115-1 4.6	Apply 100VDC for 1 minute.	≥ 10GΩ
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	±(1.0%+0.05Ω)



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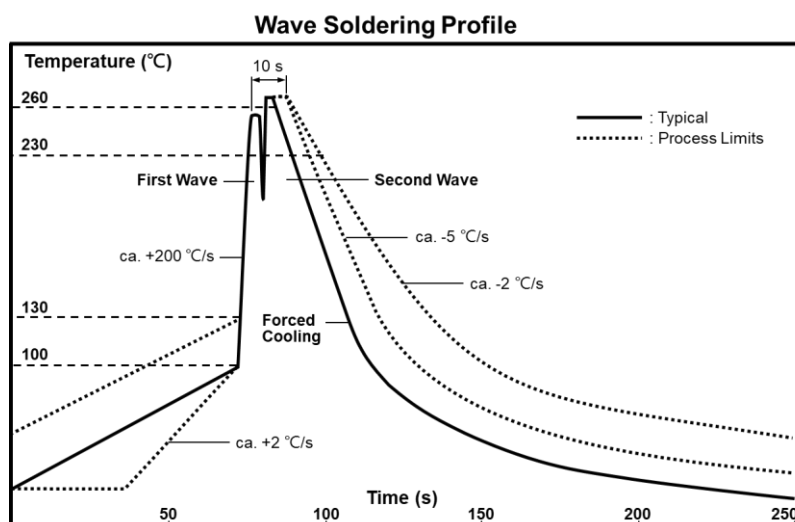
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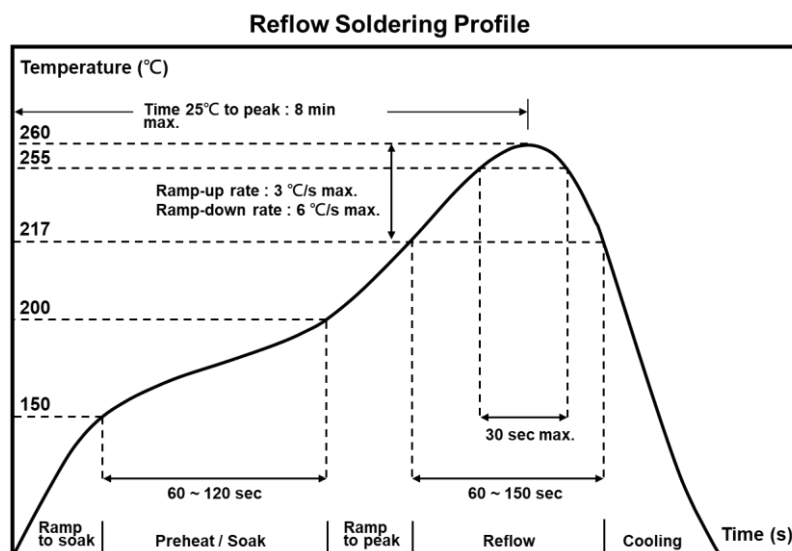
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■ Recommended Customer Soldering Parameters

■ 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.

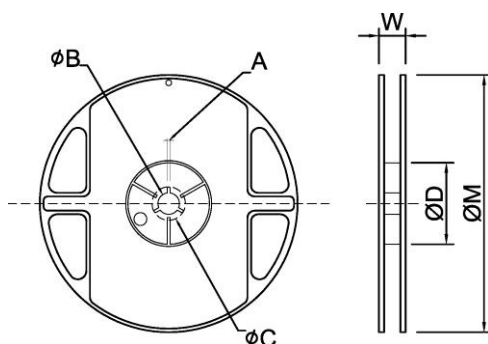


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■ Appendix For SMD Chip Resistor

● Packaging Information

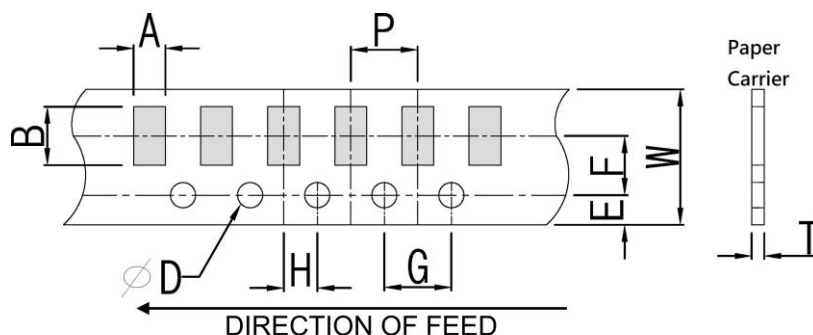


■ Dimension

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		

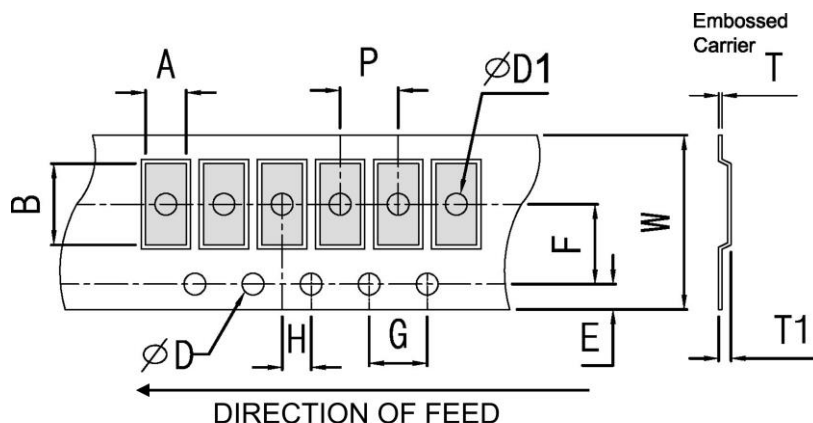


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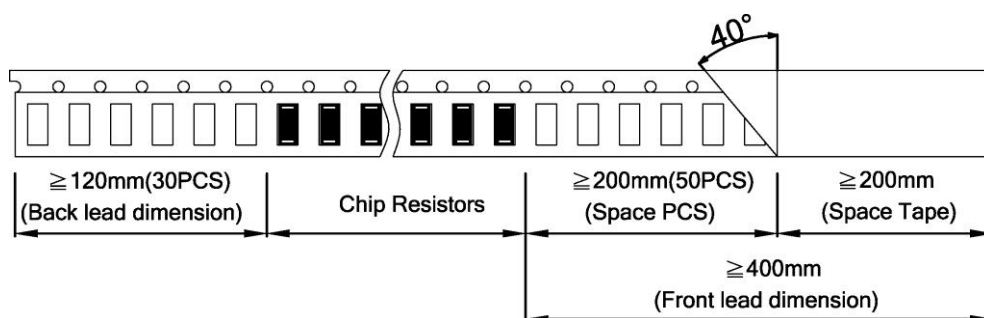
■ Dimension

Unit: mm

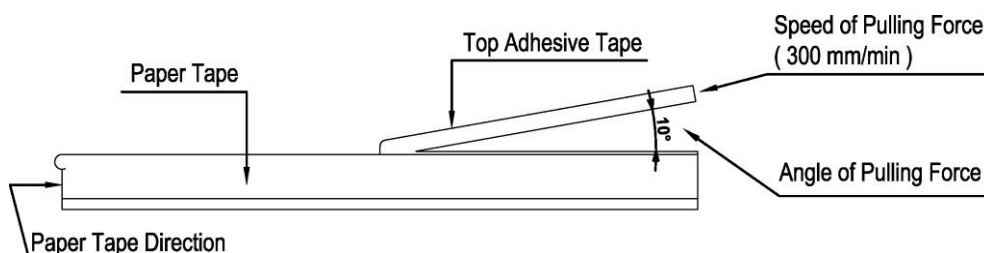
Packaging	Type	A	B	W	E	F	G	H	T	ØD	ØD1	T1	P
Embossed Type	2010	2.80±0.20	5.60±0.20	12±0.10	1.75±0.10	5.5±0.05	4.0±0.10	2.0±0.05	0.23±0.10	1.50 ^{+0.10} ₋₀	1.50±0.10	0.85±0.15	4.0±0.1
	2512	3.40±0.20	6.70±0.20	12±0.10	1.75±0.10	5.5±0.05	4.0±0.10	2.0±0.05	0.23±0.10		1.50±0.10	0.95±0.15	

■ Packing Material Data/Storage Data

■ Front & Back Lead Dimension



■ Top Adhesive Peel Off Strength : 10~70g





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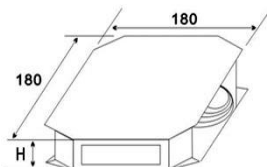
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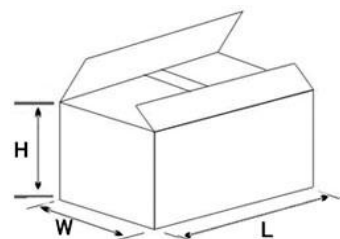
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■ Package

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.

■ 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.