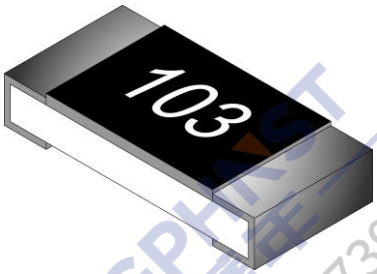
■ High Voltage Chip Resistor — HR Series



■ Application

- — Power supply, Industrial control system
- — Measurement instrument
- — Back light inverter
- — Medical, Precision equipment's

■ Features

- — Special material and design for high working voltage require
- — Meet IEC 62368 standard (1206 75K~27M , 2512 75K~27M).
- — Anti Sulfur at 60℃ (ASTM-B-809-95)
- — AEC-Q200 Compliant

■ Parts Number Explanation

Example:

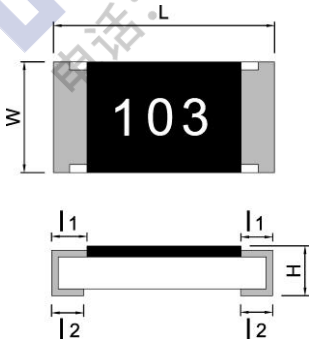
HR	2010	F	1M00	E	04	U
Product Type	Size (Inch)	Resistor Tolerance	Resistor Value	Package	Quantity	Optional
HR	1206 1210 2010 2512	D：±0.5% F：±1% J：±5%	1K=1K00 1M=1M00	P：Paper Taping (1206~1210) E：Embossed Taping (2010~2512)	04：4000PCS 05：5000PCS	U：SUPER TYPE

■ Standard Electrical Specifications

TYPE	Rated Power At 70℃	Max. Working Voltage (DC)	Max. Over Load Voltage (DC)	T.C.R (ppm/℃)	Resistance Range			V.C.R (ppm/V)
					D: ±0.5%	J : ±5%	F : ±1%	
HR1206	0.25 W	800 V	1000 V	±100	1KΩ≦R≦2MΩ	1KΩ≦R≦30MΩ		1KΩ~3MΩ:±25 >3MΩ~30MΩ:±50
HR1210	0.33 W	800 V	1000 V	±100	1KΩ≦R≦2MΩ			
HR2010	0.5 W	2000 V	3000 V	±100	1KΩ≦R≦1MΩ			
HR2512	1.0 W	3000 V	4000 V	±100	1KΩ≦R≦1MΩ			

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

■ Type Dimension

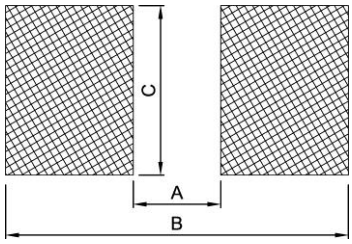


HR1206 / HR1210 / HR2010 / HR2512

TYPE	L	W	H	I_1	I_2
HR1206	3.05 ± 0.10	1.60 ± 0.10	0.55 ± 0.10	0.30 ± 0.20	0.50 ± 0.20
HR1210	3.05 ± 0.10	2.50 ± 0.15	0.55 ± 0.10	0.30 ± 0.20	0.50 ± 0.20
HR2010	5.00 ± 0.10	2.50 ± 0.15	0.55 ± 0.10	0.40 ± 0.15	0.60 ± 0.20
HR2512	6.30 ± 0.10	3.20 ± 0.15	0.55 ± 0.10	0.40 ± 0.20	0.60 ± 0.20

● General Information

■ Recommend Land Pattern Design

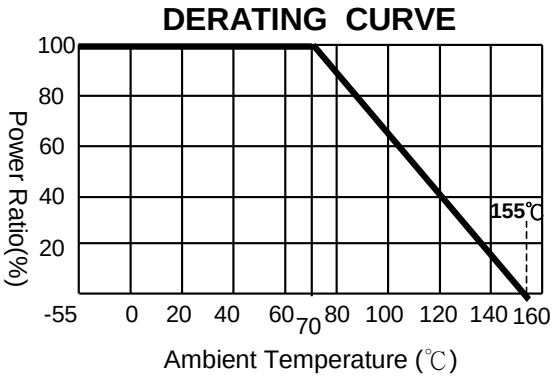


■ Dimension Unit:mm

Item \ Type	1206	1210	2010	2512
A	2.20	2.20	3.80	4.80
B	5.10	5.10	6.90	8.20
C	2.00	2.90	2.90	3.65

■Performance Characteristics

■ 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:

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

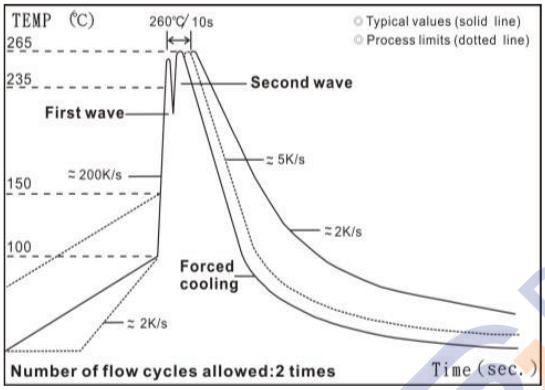
E=Rated voltage(V)
P=Power rating(W)
R=Nominal resistance(Ω)

● Reliability Test and Requirement

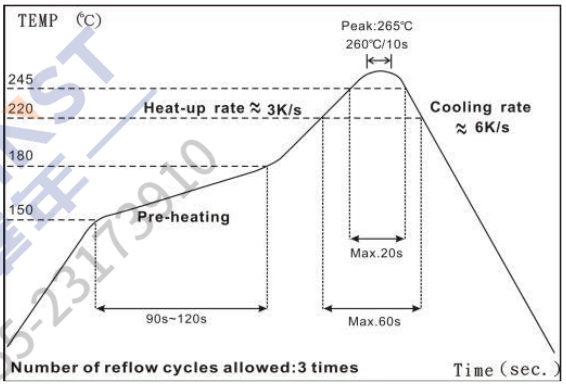
Test Item	Test Method	Procedure	Requirements
			△R(%)
Temperature Coefficient of Resistance (T.C.R)	JIS-C-5201-1 4.8 IEC-60115-1 4.8	At 25 / -55℃ and 25℃ /+155℃, 25℃ is the reference temperature	As Spec
Short Time Overload	JIS-C-5201-1 4.13 IEC-60115-1 4.13	2.5 times RCWV or Max. Overload voltage whichever is less for 5 seconds.	±2.0%
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%
Insulation Resistance	JJIS-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.	±2.0%
Resistance to Solvent	MIL-STD-202 Method 215	Add Aqueous wash chemical - OKEM Clean or equivalent.	±1.0%
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.	±3.0%
High Temperature Exposure (Storage)	MIL-STD-202 Method 108	1000 hrs. @ T=155°C. Unpowered. Measurement at 24±4 hours after test conclusion.	±2.0%
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.	±3.0%
External Visual	MIL-STD-883 Method 2009	Electrical test not required. Inspect device construction, marking and workmanship.	-
Vibration	MIL-STD-202 Method 204	5 g's for 20 min., 12 cycles each of 3 Orientations. Note: Test from 10-2000 Hz	±2.0%
ESD	AEC-Q200- 002 or ISO/DIS 10605	Human body model：2KV	±3.0%
Solder ability	J-STD-002	(1) 4 hrs 155 dry heat (2) 245±5 3 sec.	±1.0%
Damp Heat with Load	JIS-C-5201-1 4.24 IEC-60115-1 4.24	40±2℃, 90~95% R.H. RCWV or Max. working voltage whichever is less for 1000 hrs with 1.5 hrs〝ON〞and0.5 hrs〝OFF〞.	±3.0%
Load Life (Endurance)	JIS-C-5201-1 4.25 IEC-60115-1 4.25.1	70±2℃, RCWV or Max. working voltage whichever is less for 1000 hrs with 1.5 hrs〝ON〞and 0.5 hr〝OFF〞.	±3.0%
Terminal Strength (SMD)	AEC Q200-006	Pressurizing force for 60 seconds：17.7N	No broken
Bending Strength	JIS-C-5201-1 4.33 IEC-60115-1 4.33	Bending once for 5 seconds D：1206、1210 = 3mm 2010、2512 = 2mm	±1.0%
Sulfur Test	ASTM-B-809-95	60±2℃, no rating power for 1000 hrs	±1.0%
VCR (Voltage Coefficient of Resistance)	IEC 60115-1, 4.11	Measure at 10% Rated Voltage and 100% Rated Voltage or Max Working Voltage ,whichever is less.	As spec.

■Recommended Customer Soldering Parameters

■ Wave solder Temperature condition



■ Solder reflow Temperature condition



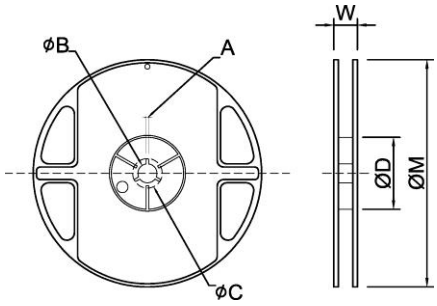
■ Rework temperature（hot air equipment）: 350℃, 3~5seconds

■ 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

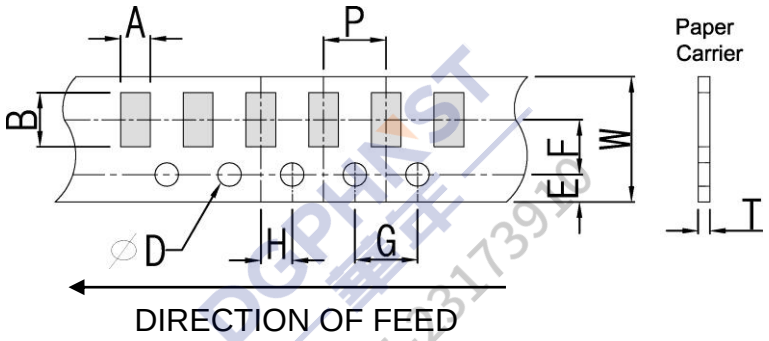


■ Dimension

Unit: mm

Type	Size		A	ΦB	ΦC	ΦD	W	ΦM
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
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

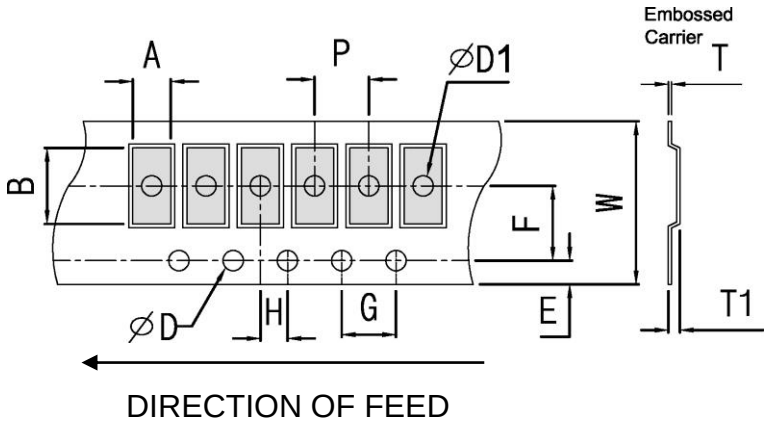
■ Tapping Specification



■ Dimension

Unit: mm

Packaging	Type	A	B	W	E	F	G	H	T	ΦD	P
Paper Type	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	$1.50^{+0.10}_{-0}$	4.0±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		



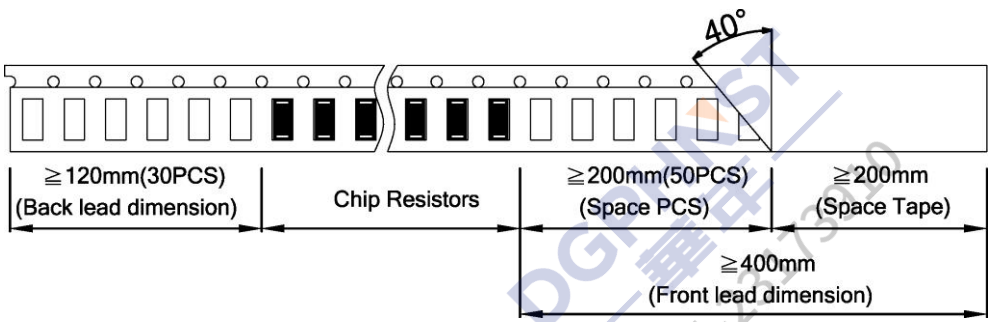
■ Dimension

Unit: mm

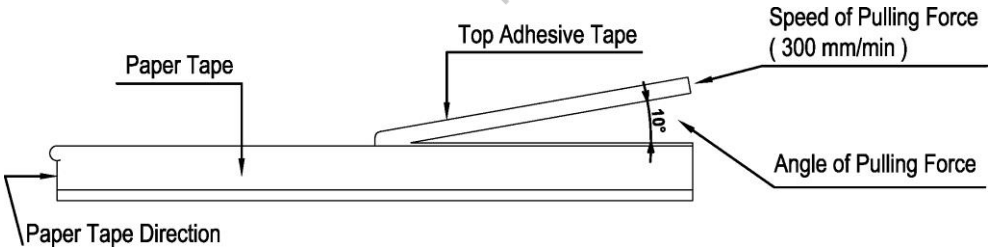
Packaging	Type	A	B	W	E	F	G	H	T	ΦD	ΦD1	T1	P
Embossed Type	2010	2.80±0.20	5.60±0.20	12±0.10	1.75±0.10	5.5±0.05	4.0±0.10	2.0±0.05	0.23±0.10	$1.50^{+0.10}_{-0}$	1.50±0.10	0.85±0.15	4.0±0.1
	2512	3.40±0.20	6.70±0.20	12±0.10	1.75±0.10	5.5±0.05	4.0±0.10	2.0±0.05	0.23±0.10		1.50±0.10	0.85±0.15	

■ Packing Material Data/Storage Data

■ Front & Back Lead Dimension

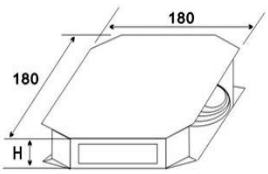


■ Top Adhesive Peel Off Strength：10~70g

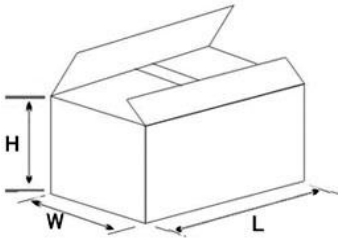


■ Package

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 one year from the date of delivery.

■ 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.

■ Standard Resistance Values in a Decade

Marking code:

- 1%: marking code, please refer to E96 and E24 data form as below
  Ex: 120K, The marking code is 1203 in E24
  121K, The marking code is 1213 in E96
  5%: marking code, please refer to E24 data form as below
  Ex: 120K, The marking code is 124 in E24