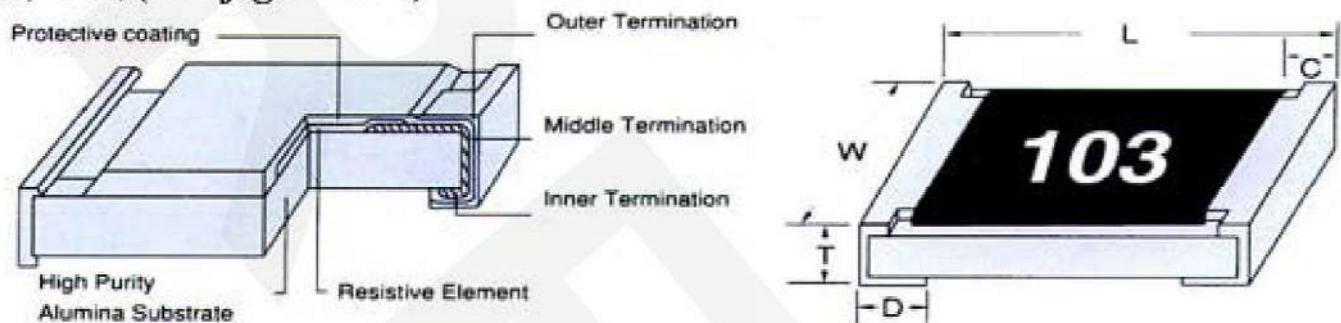


■ 特性 (Features)

- 輕薄短小：小型輕量,大幅縮小 PC 板面積及重量。
Small size and lightweight with size range per international standard
- 裝配性佳：外觀尺寸均勻精確,易於裝配。
Highly stable in auto-placement surface mounting application
- 可使用於波峰焊及迴流焊。
Compatible with both wave soldering and reflow soldering

■ 構造圖 (Configuration)

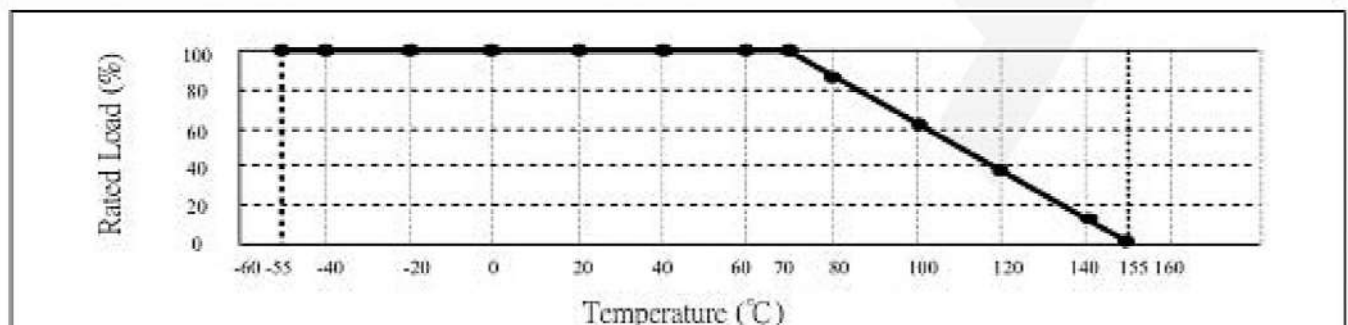


■ 尺寸 (Dimensions)

(unit: mm)

Size	L	W	T	C	D
0201	0.60 ±0.03	0.30 ±0.03	0.23 ±0.03	0.15 ±0.05	0.15 ±0.05
0402	1.00 ±0.10	0.50 ±0.05	0.35 ±0.05	0.20 ±0.10	0.25 ±0.10
0603	1.60 ±0.10	0.80 ±0.10	0.45 ±0.10	0.25 ±0.15	0.30 ±0.15
0805	2.00 ±0.10	1.25 ±0.10	0.50 ±0.10	0.35 ±0.20	0.30 ±0.20
1206	3.10 ±0.10	1.60 ±0.10	0.55 ±0.10	0.45 ±0.20	0.40 ±0.20
1210	3.10 ±0.10	2.50 ±0.10	0.55 ±0.10	0.45 ±0.25	0.45 ±0.25
1218	3.10 ±0.10	4.60 ±0.10	0.55 ±0.10	0.45 ±0.25	0.45 ±0.25
1812	4.50 ±0.10	3.10 ±0.20	0.55 ±0.05	0.55 ±0.20	0.70 ±0.20
2010	5.00 ±0.20	2.50 ±0.15	0.55 ±0.10	0.60 ±0.25	0.50 ±0.25
1225	3.10 ±0.15	6.30 ±0.15	0.90 ±0.15	0.60 ±0.30	0.80 ±0.25
2512	6.35 ±0.20	3.10 ±0.15	0.55 ±0.10	0.60 ±0.25	0.60 ±0.25

■ 功率衰減曲線 (Power Derating Curve)



當使用於環境溫度 70°C 以上時,額定功率將如上圖之曲線衰減。

For resistors operated in ambient temperatures above 70°C, power rating must be derated in accordance with the curve as above.

額定(Rating)

尺寸 Size	0201	0402	0603	0805	1206	1210	1812	1218	2010	2512	1225	
額定功率 Power Rating at 70°C	1/20W	1/16W	1/10W	1/8W	1/4W	1/3W	1/2W	1W	1/2W	1W	2W	
最高使用電壓 Max RCWV	15V	50V	50V	150V	200V	200V	200V	200V	200V	200V	200V	
最高過負荷電壓 Max Overload Voltage	30V	100V	100V	300V	400V	400V	400V	400V	400V	400V	400V	
最高使用電流 Jumper<50mΩ	0.5A	1A	1A	2A	2A	2A	2A	2A	2A	2A	10A	
使用溫度範圍 Operating Temperature Range	-55~+155°C											
標準阻值範圍 Standard Resistance Range	0Ω	0~50mΩ										
	±1% (E-96)	1Ω~10MΩ			1Ω~10MΩ						10Ω~20KΩ	
	±5% (E-24)	1Ω~10MΩ			1Ω~22MΩ							

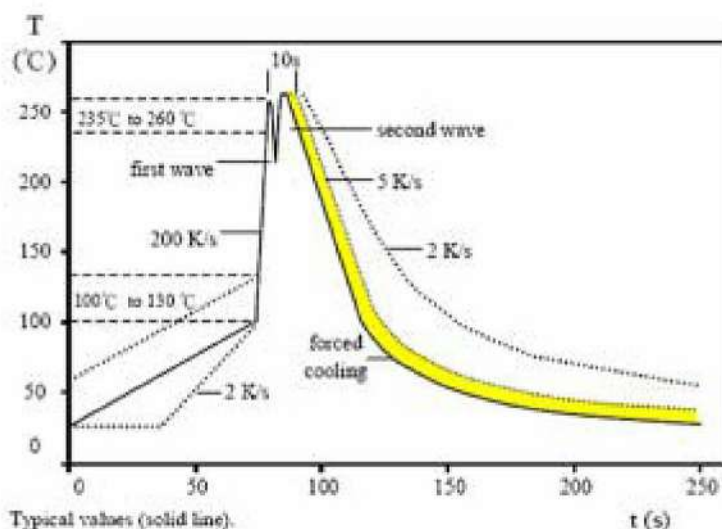
* 工作電壓根據阻值按公式 $V=\sqrt{(P*R)}$ 計算，或者採用上面提供的最高使用電壓。

The working voltage is calculated based on the resistance value following the formula of $V=\sqrt{(P*R)}$ or to its maximum extent as indicated above.

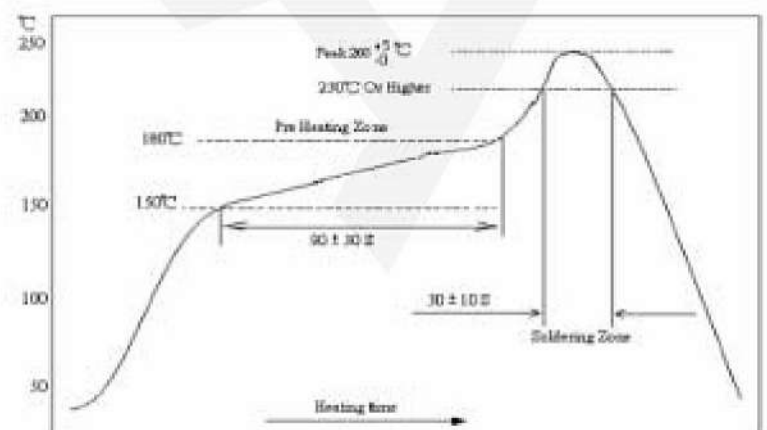
* 過負荷電壓根據阻值按公式 $V=2.5\sqrt{(P*R)}$ 計算，或者採用上面提供的最高過負荷電壓。

The overload voltage is calculated based on the resistance value following the formula of $V=2.5\sqrt{(P*R)}$ or to its maximum extent as indicated above.

焊接溫度曲線(Soldering Temperature Curve)



波峰焊(WAVE Soldering)



回流焊(IR Reflow Soldering)

SMD Resistor 1206 - 0805

www.refaelectronics.com

規格說明及測試方法(Specification and Test Methods)

ITEM	SPECIFICATION	TEST METHOD
焊錫性 Solderability	Over 95% of termination must be covered with solder	JIS C 5201 4.17 / MIL-STD-202G METHOD 208H / IEC 60115-1 4.17 Reflow Soldering : Bath temperature:(235±5)°C,Immersion time:(2±0.5)s WAVE Soldering : Bath temperature:(270±10)°C,Immersion time:(2±0.5)s
耐焊性 Resistance to Solder Heat	J、G: $\Delta R \leq \pm(1\% + 0.05\Omega)$ F: $\Delta R \leq \pm(0.5\% + 0.05\Omega)$ No mechanical damage	JIS C 5201 4.18 / MIL-STD-202G METHOD 210F / IEC 60115-1 4.18 The temperature of the solder bath shall be (260±5)°C,The immersion time shall be(5±0.5)s or(10±1)s as prescribed by the detail specification
溫度系數 Temperature Coefficient of Resistance (TCR)	0402以下規格(0402 & 0201) : 1Ω~10Ω;>3.3M : ±400ppm/°C 10Ω(excluding 10Ω)~3.3M: ±200ppm/°C 0603以上規格(0603 or above) : 1Ω~10Ω;>1M : ±200ppm/°C 10Ω(excluding 10Ω)~1M : ±100ppm/°C	JIS C 5201 4.8 / MIL-STD-202G METHOD 304 / IEC 60115-1 4.8 The temperature characteristic or temperature coefficient of resistance is not specified for resistance values of less than 5R owing to difficulty of accurate measurement
短時間過負荷 Short time Overload	J、G: $\Delta R \leq \pm(2\% + 0.05\Omega)$ F: $\Delta R \leq \pm(1\% + 0.05\Omega)$	JIS C 5201 4.13/IEC 60115-1 4.13 2.5×Rated voltage or Max. Overload Voltage for 5 sec. measure resistance after 30 minutes
恆溫恆濕壽命 試驗 Load Life Humidity	J、G: $\Delta R \leq \pm(3\% + 0.05\Omega)$ F: $\Delta R \leq \pm(1\% + 0.05\Omega)$	JIS C 5201 4.24/MIL-STD-202G Method 106G / IEC 60115-1 4.24 Maintain the temperature of the resistor at 40±2°C and 90~95% RH with the rated voltage applied.Cycle ON for 1.5 hours and OFF for 0.5 hour for1000+48/-0 hours. After 1~4 hour, measure the resistance value.
耐久性 Load Life	J、G: $\Delta R \leq \pm(3\% + 0.05\Omega)$ F: $\Delta R \leq \pm(1\% + 0.05\Omega)$	JIS C 5201 4.25/MIL-STD-202G Method 108A / IEC 60115-1 4.25 70±2°C · Max. working voltage for 1000 hrs with 1.5 hrs "ON" and 0.5 hrs "OFF".
高低溫試驗 Temperature Cycle	J、G: $\Delta R \leq \pm(1\% + 0.05\Omega)$ F: $\Delta R \leq \pm(0.5\% + 0.05\Omega)$ No mechanical damage	JIS C 5201 4.19/MIL-STD-202G Method 107G / IEC 60115-1 4.19 Repeat 5 cycles as follows -65°C (30 min.)+25°C (2~3 min.) +125°C (30 min.)+25°C (2~3 min.)
絕緣阻抗 Insulation Resistance	Between termination and coating must be over 1000MΩ	JIS C 5201 4.6 / MIL-STD-202G Method 302 / IEC 60115-1 4.6 Test voltage: 100±15V
彎曲強度 Bending Strength	J、G: $\Delta R \leq \pm(1\% + 0.05\Omega)$ F: $\Delta R \leq \pm(0.5\% + 0.05\Omega)$ No mechanical damage	JIS C 5201 4.33 / MIL-STD-202G Method 211A / IEC 60115-1 4.33 Resistance change after bended on the 90mm PCB. Bend: 3mm for 0201、0402、0603、0805、1206 2mm for 1210、1812、1218、1225 1mm for 2010、2512

字碼編碼說明 (Markings)

472

2212

02D

1.1. $\pm 5\%$ (IEC E-24系列 Series)0603、0805、1206及以上規格(0201、0402無字碼)均用三字碼表示。
No markings on 0201 and 0402. Markings on the other sizes are expressed by a 3-digit code in its exact value.

E. G. : 6R8=6.8 Ω ; 100=10 $\times 10^0$ =10 Ω ; 472=47 $\times 10^2$ =4700 Ω =4.7K Ω .

1.2. $\pm 1\%$ 阻值表示規則 (+/-1% Resistance value markings)

a. 0805、1206及以上規格 $\pm 1\%$ 阻值均用四字碼表示。

Markings on sizes 0805, 1206 and above are expressed by a 4-digit code.

E. G. : 82R5=82.5 Ω ; 1000=100 $\times 10^0$ =100 Ω ; 2212=221 $\times 10^2$ =22100 Ω =22.1K Ω .

b. 0603 $\pm 1\%$ (IEC E-96系列)阻值均採用三代碼表示。前兩位為阻值的數字代碼；後一位為英文大寫字母，表示倍率(10n次幂)。

Markings on 0603 $\pm 1\%$ (IEC E-96 Series) are expressed by a 3-digit code; the first two digits represent the value code and the last capital letter represents the multiplier.

E-96系列阻值的數字代碼如下表： The coding system of the E-96 series is as follows :

阻值	代碼	阻值	代碼	阻值	代碼	阻值	代碼	阻值	代碼	阻值	代碼	阻值	代碼	阻值	代碼
100	01	133	13	178	25	237	37	316	49	422	61	562	73	750	85
102	02	137	14	182	26	243	38	324	50	432	62	576	74	768	86
105	03	140	15	187	27	249	39	332	51	442	63	590	75	787	87
107	04	143	16	191	28	255	40	340	52	453	64	604	76	806	88
110	05	147	17	196	29	261	41	348	53	464	65	619	77	825	89
113	06	150	18	200	30	267	42	357	54	475	66	634	78	845	90
115	07	154	19	205	31	274	43	365	55	487	67	649	79	866	91
118	08	158	20	210	32	280	44	374	56	499	68	665	80	887	92
121	09	162	21	215	33	287	45	383	57	511	69	681	81	909	93
124	10	165	22	221	34	294	46	392	58	523	70	698	82	931	94
127	11	169	23	226	35	301	47	402	59	536	71	715	83	953	95
130	12	174	24	232	36	309	48	412	60	549	72	732	84	976	96

倍率字母代碼如下表：(Multiplier code)

Code	A	B	C	D	E	F	G	X	Y	Z
Multiplier	10 ⁰	10 ¹	10 ²	10 ³	10 ⁴	10 ⁵	10 ⁶	10 ⁻¹	10 ⁻²	10 ⁻³

E. G. : 01Y=100 $\times 10^{-2}$ =1 Ω ; 68A=499 $\times 10^0$ =499 Ω ; 02D=102 $\times 10^3$ =102K Ω

c. 任何 1%電阻其阻值不在 E-96 範圍系列中，則其字碼表示與E-24系列 $\pm 5\%$ 字碼相同。
僅用標籤注明誤差。

Any resistance values of 1% tolerance but not included in the E-96 series, the value markings are the same as $\pm 5\%$ tolerance with labelling identification.

E. G. : 120=12 $\times 10^0$ =12 Ω ; 475=47 $\times 10^7$ =4.7M Ω .

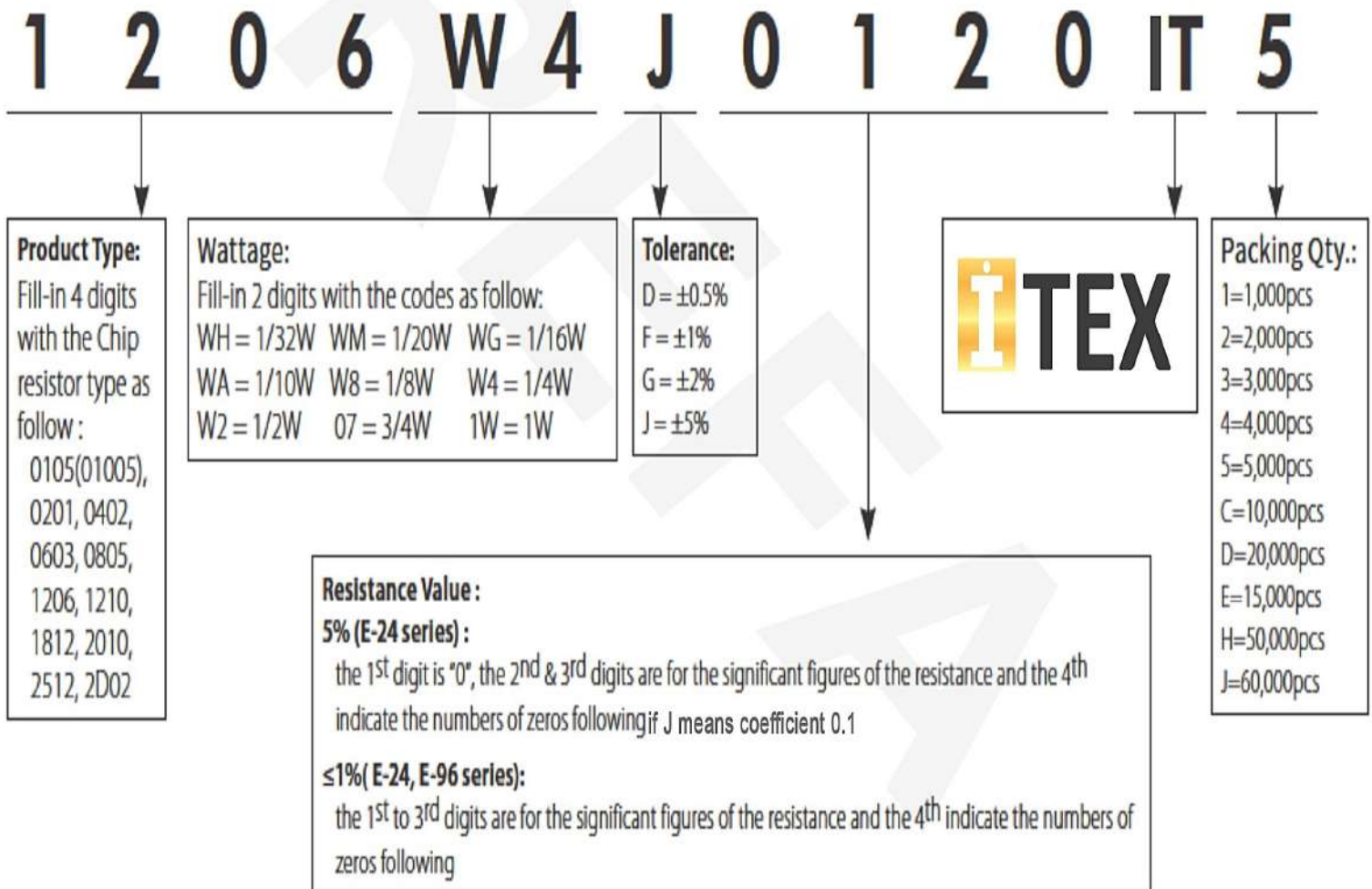
d. 零歐姆晶片電阻字碼均用一個“0”表示，其阻值在0~50m Ω 範圍內，並無誤差之分，
所以我司標籤上無註明誤差值。

Marking of the 0 Ohm resistor is a '0' with its value range from 0-50m Ω . No tolerance shown on the product label.

SMD Resistor 1206 - 0805

www.refaelectronics.com

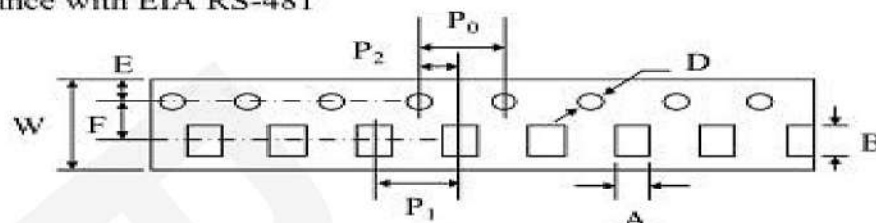
Ordering Procedure (Example: 1206 1/4W 5% 12 Ω Standard Package Quantity 5000 PCS)



SMD Resistor 1206 - 0805

■ 包裝及捲包規格(Tape and Reel Package)

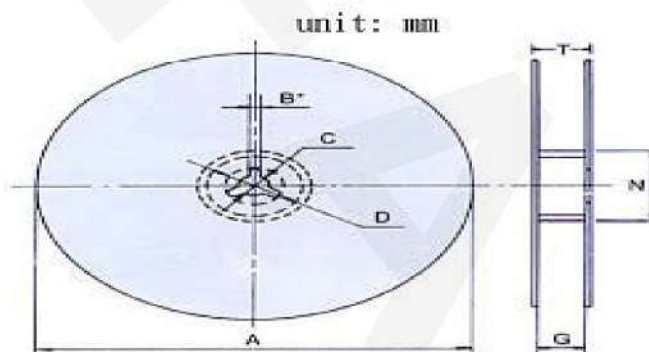
Taping is in accordance with EIA RS-481



Accumulated dimensional tolerance $40 \pm 0.2 \text{mm}$

Size	A	B	W	F	E	P ₁	P ₂	P ₀	D
0201	0.40 ±0.10	0.75 ±0.10	8.00 ±0.30	3.50 ±0.05	1.75 ±0.10	2.00 ±0.10	2.00 ±0.05	4.00 ±0.10	1.50 ±0.10
0402	0.65 ±0.10	1.15 ±0.10	8.00 ±0.30	3.50 ±0.05	1.75 ±0.10	2.00 ±0.10	2.00 ±0.05	4.00 ±0.10	1.50 ±0.10
0603	1.10 ±0.20	1.90 ±0.20	8.00 ±0.30	3.50 ±0.05	1.75 ±0.10	4.00 ±0.10	2.00 ±0.05	4.00 ±0.10	1.50 ±0.10
0805	1.65 ±0.20	2.40 ±0.20	8.00 ±0.30	3.50 ±0.05	1.75 ±0.10	4.00 ±0.10	2.00 ±0.05	4.00 ±0.10	1.50 ±0.10
1206	2.00 ±0.20	3.50 ±0.20	8.00 ±0.30	3.50 ±0.05	1.75 ±0.10	4.00 ±0.10	2.00 ±0.05	4.00 ±0.10	1.50 ±0.10
1210	2.85 ±0.20	3.50 ±0.20	12.0 ±0.30	3.50 ±0.05	1.75 ±0.10	4.00 ±0.10	2.00 ±0.05	4.00 ±0.10	1.50 ±0.10
1218	5.50 ±0.20	3.50 ±0.20	12.0 ±0.30	3.50 ±0.05	1.75 ±0.10	4.00 ±0.10	2.00 ±0.05	4.00 ±0.10	1.50 ±0.10
1812	3.50 ±0.20	5.50 ±0.20	12.0 ±0.30	3.50 ±0.05	1.75 ±0.10	4.00 ±0.10	2.00 ±0.05	4.00 ±0.10	1.50 ±0.10
2010	2.80 ±0.20	5.50 ±0.20	12.0 ±0.30	5.50 ±0.05	1.75 ±0.10	4.00 ±0.10	2.00 ±0.05	4.00 ±0.10	1.50 ±0.10
1225	3.38 ±0.20	6.68 ±0.20	12.0 ±0.30	5.50 ±0.10	1.75 ±0.10	4.00 ±0.10	2.00 ±0.05	4.00 ±0.10	1.50 ±0.10
2512	3.50 ±0.20	6.70 ±0.20	12.0 ±0.30	5.50 ±0.05	1.75 ±0.10	4.00 ±0.10	2.00 ±0.05	4.00 ±0.10	1.50 ±0.10

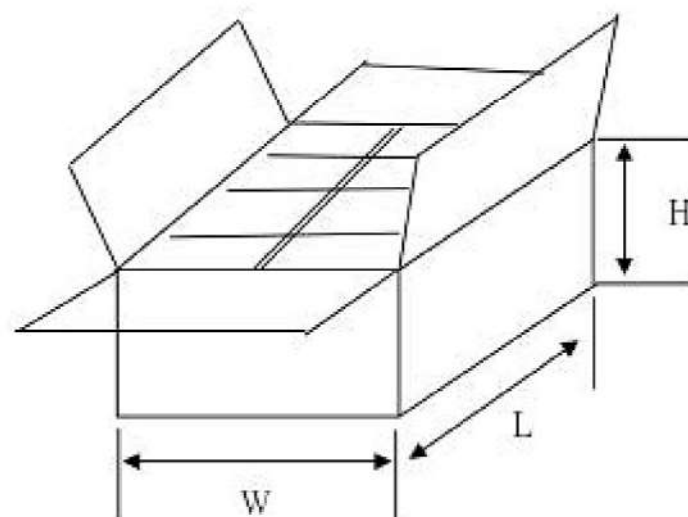
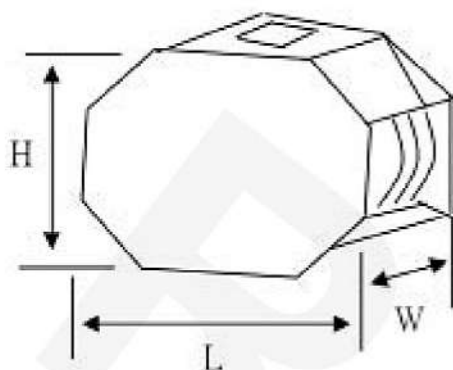
Size	Packaging Q'ty
0201	10Kpcs/Reel
0402	10Kpcs/Reel
0603	5Kpcs/Reel
0805	
1206	
1210	4Kpcs/Reel
1218	
1812	
2010	2Kpcs/Reel
2512	
1225	2Kpcs/Reel



Symbol	A	N	C	D	B	G	T
Dimension	178 ±2.0	80.0 ±0.5	13.0 ±0.5	20min	2.00 ±0.5	10.0 ±1.5	14.9 max.
	178 ±2.0	80.0 ±0.5	13.0 ±0.5	20min	2.00 ±0.5	13.8 ±1.5	16.7 max.

Storage Condition 貯存環境	Temp 溫度: 5~35°C	Humidity 濕度: 20%-70%	Storage Time 儲存期	1 year
---------------------------	--------------------	-------------------------	---------------------	--------

■ 外包装 (Outer Packaging)



第一次包装：1~10卷

First package : 1~10 reels (inner box)

第二次包装：最多66卷

Second package : 66 reels Max (export carton)

■ 当包装数量不能达到最大时，剩余空隙部位采用辅助材料填满。

When quantity shall not reach the max, the remaining empty space shall be filled up with buffer material.

■ 当包装数量为最小时，使用其它方法包装，确保运输过程中无问题是至关重要的。

When the quantity is a few, alternative packing methods may be used. It is important to ensure the safety of the products during transportation.

TYPE	PER CARTON	INNER BOX			EXPORT CARTON		
		L	W	H	L	W	H
0201	600,000PCS	180mm	118mm	180mm	350mm	348mm	237mm
0402	600,000PCS	180mm	118mm	180mm	350mm	348mm	237mm
0603	300,000PCS	180mm	118mm	180mm	350mm	348mm	237mm
0805	300,000PCS	180mm	118mm	180mm	350mm	348mm	237mm
1206	300,000PCS	180mm	118mm	180mm	350mm	348mm	237mm
1210	300,000PCS	180mm	118mm	180mm	350mm	348mm	237mm
1218	192,000PCS	180mm	118mm	180mm	350mm	348mm	237mm
1812	192,000PCS	180mm	118mm	180mm	350mm	348mm	237mm
2010	192,000PCS	180mm	118mm	180mm	350mm	348mm	237mm
1225	84,000PCS	180mm	118mm	180mm	350mm	348mm	237mm
2512	192,000PCS	180mm	118mm	180mm	350mm	348mm	237mm