

IE			QA	Sales	備註	發行管制章 DATA Center.
制訂	審查	核准	會簽	會簽	<div style="border: 1px solid black; padding: 5px; text-align: center;">           非發行管制文件            自行注意版本更新         </div>	
					非經允許，禁止自行影印文件	Series No. 60

RALEC 旺詮	金屬板微電阻規格標準書	文件編號	IE-SP-060
		版本日期	2014/10/17
		頁 次	2/17

### 3 規格表：

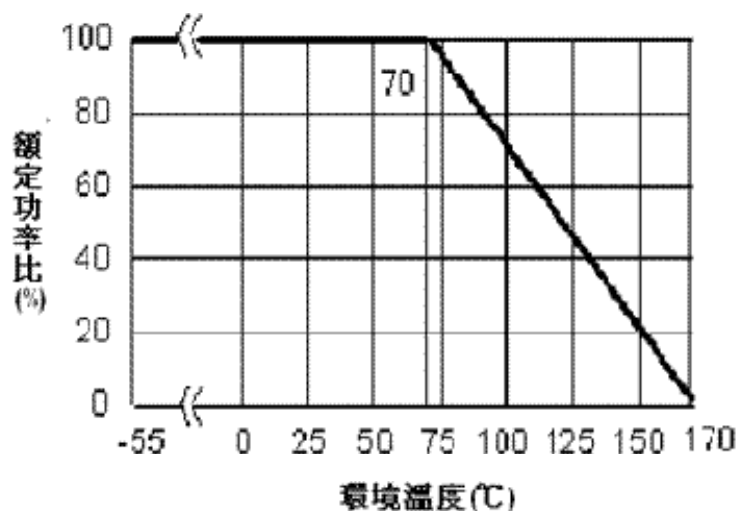
型別	端電極數	最高 額定功率	最高 額定電流	最高 過負荷電流	溫度係數 T.C.R. (ppm/°C)	阻值範圍 (mΩ)		使用溫度範圍
						D (±0.5%)	F (±1%); G (±2%); J (±5%)	
LR1206	2	0.5W	28.86	57.73A	0.6~0.9mΩ: ≤±175 1.0~1.9mΩ: ≤±75 2.0~4.0mΩ: ≤±50 4.1~15.0mΩ: ≤±25 15.1~50.0mΩ: ≤±15	7.0~50.0	0.6~50.0	-55~+170°C
		1W	40.82A	81.64A	0.6~0.9mΩ: ≤±175 1.0~1.9mΩ: ≤±75 2.0~4.0mΩ: ≤±50 4.1~15.0mΩ: ≤±25 15.1~50.0mΩ: ≤±15	7.0~50.0	0.6~50.0	
		1.5W	38.73A	77.46A	1.0mΩ: ≤±75	--	1.0	
LR2010		1W	31.62A	63.25A	1.0~1.9mΩ: ≤±75 2.0~4.0mΩ: ≤±50 3.1~6.9mΩ: ≤±25 7.0~100mΩ: ≤±15	7.0~100	1.0~100	
LR2512		1W	44.72A	100.00A	0.5~1.0mΩ: ≤±75 1.1~3.0mΩ: ≤±50	7.0~100	0.5~100	
		1.5W	54.77A	122.48A	3.1~100mΩ: ≤±25			
		2W	63.25A	141.42A	0.5~1.0mΩ: ≤±75 1.1~3.0mΩ: ≤±50 3.1~75mΩ: ≤±25	7.0~75.0	0.5~75.0	
		3W	77.46A	134.16A	0.5~1.0mΩ: ≤±75 1.1~2.5mΩ: ≤±50 2.6~10.0mΩ: ≤±25	7.0~10.0	0.5~10.0	
LR2725		4W	126.49A	252.95A	0.20 mΩ: ≤±100 0.25~3.0mΩ: ≤±50	--	0.20~3.0	
LR2728		3W	27.39A	47.43A	4.0~7.0mΩ: ≤±25 7.1~100mΩ: ≤±15	4.0~100	4.0~100	
		3.5W	29.58A	51.23A	4.0~7.0mΩ: ≤±25 7.1~100mΩ: ≤±15	4.0~100	4.0~100	
		4W	31.62A	63.25A	4.0 ~ 7.0mΩ: ≤±25 7.1 ~ 50.0mΩ: ≤±15	4.0~50.0	4.0~50.0	
LR4527S (無散熱片)		3W	77.5A	134A	≤±50	7.0 ~20	0.5 ~20	
LR4527		5W	100A	173A		7.0 ~120	0.5~120	

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### 3.1 功率衰減曲線：

使用溫度範圍： - 55 ~+170 ℃

當電阻工作在溫度超過 70℃時，額定功率必須減額,減額曲線依據下圖：



### 3.2 額定電流：

額定電流:對於額定功率之直流或交流(商用週率有效值rms)電壓。

可用下列公式求得，但求得之值若超過規格表內之最高電壓時，則以最高額定電壓為其額定電壓。

I：額定電流(A)

P：額定功率.(W)

R：Resistance.(Ω)

$$I = \sqrt{P/R}$$

## 4 尺寸及構造

1206 / 2010 / 2512 / 2725 / 2728	4527 / 4527S

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型別	最高 額定功率	阻值範圍 (mΩ)	尺寸 -英吋(mm)				
			L	W	H	T1	T2
LR1206	0.5 & 1.0	0.6	0.126±0.010 (3.200±0.254)	0.063±0.010 (1.600±0.254)	0.039±0.010 (1.000±0.254)	0.029±0.010 (0.725±0.254)	
		1.0			0.025±0.010 (0.645±0.254)	0.020±0.010 (0.508±0.254)	
		2.0 ~ 4.0			0.022±0.010 (0.545±0.254)	0.024±0.010 (0.600±0.254)	
		5.0				0.020±0.010 (0.508±0.254)	
		6.0 ~50.0				0.020±0.010 (0.508±0.254)	
	1.5	1.0	0.025±0.010 (0.645±0.254)	0.020±0.010 (0.508±0.254)			
LR2010	1.0	1.0 ~ 3.0	0.200±0.010 (5.080±0.254)	0.100±0.010 (2.540±0.254)	0.031±0.010 (0.787±0.254)	0.051±0.010 (1.295±0.254)	
		3.1 ~ 4.0			0.025±0.010 (0.645±0.254)	0.031±0.010 (0.787±0.254)	
		4.1 ~100.0					
LR2512	1.0 & 1.5	0.5 ~ 3.0	0.246±0.010 (6.248±0.254)	0.126±0.010 (3.202±0.254)	0.031±0.010 (0.787±0.254)	0.074±0.010 (1.880±0.254)	
		3.1 ~ 4.0			0.025±0.010 (0.645±0.254)	0.044±0.010 (1.118±0.254)	
		4.1 ~75.0				0.034±0.010 (0.868±0.254)	
		75.1 ~ 100.0			0.025±0.010 (0.645±0.254)	0.034±0.010 (0.868±0.254)	
	2.0	0.5 ~ 3.0			0.031±0.010 (0.787±0.254)	0.074±0.010 (1.880±0.254)	
		3.1 ~ 4.0			0.025±0.010 (0.645±0.254)	0.044±0.010 (1.118±0.254)	
		4.1 ~75.0				0.074±0.010 (1.880±0.254)	
	3.0	0.5			0.031±0.010 (0.787±0.254)	0.044±0.010 (1.118±0.254)	
		0.6 ~ 2.9				0.066±0.010 (1.676±0.254)	
		3.0 ~ 4.0				0.025±0.010 (0.645±0.254)	
		4.1 ~ 10.0			0.044±0.010 (1.118±0.254)	0.085±0.010 (2.159±0.254)	
		LR2725			4.0	0.20 ~ 0.50	0.268±0.010 (6.807±0.254)
0.60	0.043±0.010 (1.092±0.254)		0.085±0.010 (2.159±0.254)				
1.0			0.071±0.010 (1.803±0.254)				
1.5	0.039±0.010 (0.991±0.254)		0.065±0.010 (1.651±0.254)				
2.0	0.035±0.010 (0.889±0.254)		0.051±0.010 (1.295±0.254)				
2.25~2.5			0.045±0.010 (1.143±0.254)				
3.0							
LR2728	3.0, 3.5 & 4.0	4.0~100.0	0.264±0.010 (6.706±0.254)	0.283±0.010 (7.188±0.254)	0.039±0.010 (0.991±0.254)	0.045±0.010 (1.143±0.254)	

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			L	W	H	T1	T2
LR4527S (無散熱片)	3.0	0.5	0.450±0.010 (11.430±0.254)	0.270±0.010 (6.850±0.254)	0.055±0.010 (1.400±0.254)	0.127±0.010 (3.215±0.254)	0.038±0.010 (0.965±0.254)
		0.6 ~ 3.0					
		4.0 ~ 5.0					
		5.1 ~ 20				0.071±0.010 (1.815±0.254)	
LR4527	5.0	0.5	0.450±0.010 (11.430±0.254)	0.270±0.010 (6.850±0.254)	0.059±0.010 (1.500±0.254)	0.127±0.010 (3.215±0.254)	0.038±0.010 (0.965±0.254)
		0.6 ~ 3.0					
		4.0 ~ 5.0					
		5.1 ~ 120				0.071±0.010 (1.815±0.254)	

#### 4.1 合金板材料：

型別	Watts	材料	阻值
1206	0.5	錳銅合金	≤ 4.0mΩ
	1.0	鐵鉻鋁合金	> 4.0mΩ
	1.5		
2010	1.0	錳銅合金	≤ 4.0mΩ
		鐵鉻鋁合金	> 4.0mΩ
2512	1.0	錳銅合金	< 3.5mΩ
	1.5	鐵鉻鋁合金	≥ 3.5mΩ
	2.0		
	3.0	錳銅合金	≤ 2.5mΩ
		鐵鉻鋁合金	≥ 3.0mΩ
2725	4.0	錳銅合金	≤ 0.5mΩ
		鐵鉻鋁合金	> 0.5mΩ
2728	3.0	鐵鉻鋁合金	All
	3.5		
	4.0		
4527	3.0	錳銅合金	≤ 3.0mΩ
	5.0	鐵鉻鋁合金	≥ 4.0mΩ

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## 5 信賴性試驗項目:

### 5.1 電氣性能試驗(Electrical Performance Test)

Test Item 項目	Conditions of Test 條件	Test Limits 規格																																	
Temperature Coefficient of Resistance 溫度係數	<ul style="list-style-type: none"> <li><math>TCR (ppm/^{\circ}C) = \frac{(R2-R1)}{R1 (T2-T1)} \times 10^6</math></li> <li>室溫下量測之阻值(<math>\Omega</math>)</li> <li>R2: 150 <math>^{\circ}C</math> 下量測之阻值(<math>\Omega</math>)</li> <li>T1: 室溫之溫度(<math>^{\circ}C</math>)</li> <li>T2: 150 <math>^{\circ}C</math></li> <li>依據 JIS C 5201-1 4.8</li> </ul>	參考 3.規格表																																	
Short Time Overload 短時間過負荷	施加過負荷5秒，靜置30分鐘以上再量測阻值變化率。 (過負荷條件下表) <table border="1"> <thead> <tr> <th>型別</th><th>額定功率</th><th>額定功率倍數</th></tr> </thead> <tbody> <tr> <td rowspan="3">LR1206</td><td>0.5</td><td rowspan="3">4 倍</td></tr> <tr> <td>1.0</td></tr> <tr> <td>1.5</td></tr> <tr> <td>LR2010</td><td>1.0</td><td></td></tr> <tr> <td rowspan="3">LR2512</td><td>1.0</td><td rowspan="3">5 倍</td></tr> <tr> <td>1.5</td></tr> <tr> <td>2.0</td></tr> <tr> <td></td><td>3.0</td><td>3 倍</td></tr> <tr> <td>LR2725</td><td>4.0</td><td>4 倍</td></tr> <tr> <td rowspan="3">LR2728</td><td>3.0</td><td rowspan="3">3 倍</td></tr> <tr> <td>3.5</td></tr> <tr> <td>4.0</td></tr> <tr> <td>LR4527S</td><td>3.0</td><td></td></tr> <tr> <td>LR4527</td><td>5.0</td><td></td></tr> </tbody> </table> Refer to JIS C 5201-1 4.13	型別	額定功率	額定功率倍數	LR1206	0.5	4 倍	1.0	1.5	LR2010	1.0		LR2512	1.0	5 倍	1.5	2.0		3.0	3 倍	LR2725	4.0	4 倍	LR2728	3.0	3 倍	3.5	4.0	LR4527S	3.0		LR4527	5.0		$\leq \pm 0.5\%$ $\leq \pm 2.0\%$ ( 4527 & 4527S series) 外觀無損傷，無短路或燒毀現象
型別	額定功率	額定功率倍數																																	
LR1206	0.5	4 倍																																	
	1.0																																		
	1.5																																		
LR2010	1.0																																		
LR2512	1.0	5 倍																																	
	1.5																																		
	2.0																																		
	3.0	3 倍																																	
LR2725	4.0	4 倍																																	
LR2728	3.0	3 倍																																	
	3.5																																		
	4.0																																		
LR4527S	3.0																																		
LR4527	5.0																																		
Insulation Resistance 絕緣電阻試驗	將金屬板微電阻置於治具上，在正負極施加 100VDC 一分鐘後，測量電極與保護層及電極與基板(底材)間之絕緣電阻值 依據 JIS-C5201-1 4.6	$\geq 10^9 \Omega$																																	
Dielectric Withstanding Voltage 絕緣耐電壓	將金屬板微電阻置於治具上，在正、負極施加 500VAC。 限制突波電流：50mA(max.) 依據 JIS-C5201-1 4.7	無短路或燒毀現象。																																	

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## 5.2 機械性能試驗(Mechanical /Constructional Performance Test)

Test Item 項目	Conditions of Test 條件	Test Limits 規格
Resistance to Solder Heat 抗焊錫熱	將金屬板微電阻浸漬於 $260\pm 5^{\circ}\text{C}$ 之錫爐中 $10\pm 1$ 秒，取出靜置60分鐘以上，再量測阻值變化率。 依據 JIS-C5201-1 4.18	$\leq \pm 0.5\%$ 外觀無損傷
Solderability 焊錫性	將金屬板微電阻浸漬於 $245\pm 5^{\circ}\text{C}$ 之爐中 $3\pm 1$ 秒後取出置於顯微鏡下觀察焊錫面積。	導體吃錫面積應大於 95%。
Vibration 耐振性試驗	震動頻率:10 Hz ~ 55 Hz ~ 10 Hz/分 振幅:1.5 mm 測試時間:12小時 (X.Y.Z 3個方向各4小時) 依據 JIS-C5201-1 4.22	$\leq \pm 0.5\%$ 外觀無損傷
Resistance to solvent 耐溶劑性試驗	將金屬板微電阻浸漬於 $20\sim 25^{\circ}\text{C}$ 異丙醇溶劑中 $60\pm 5$ 秒後，取出靜置48小時以上，再量測阻值變化率。 依據 JIS-C5201-1 4.29	$\leq \pm 0.5\%$ 外觀無損傷

## 5.3 環境試驗Environmental Performance:

Test Item 項目	Conditions of Test 條件	Test Limits 規格						
Low Temperature Exposure (Storage) 低溫放置	將金屬板微電阻放置 -55±2℃ 恆溫箱中1000小時，取出後靜置60分鐘以上後再量測阻值變化率。 依據 JIS-C5201-1 4.23.4	≤±0.5% 外觀無損傷						
High Temperature Exposure (Storage) 高溫放置	將金屬板微電阻置於170±5℃ 之烤箱中1000小時，取出靜置1小時以上再量測阻值變化率。 依據 JIS-C5201-1 4.23.2	≤±1.0% 外觀無損傷						
Temperature Cycling (Rapid Temperature Change) 溫度循環	將金屬板微電阻置入冷熱循環機中，溫度為-55℃/15 分鐘，+150℃/15 分鐘，共計循環 1000 次後取出，靜置 60 分鐘.以上再量測阻值變化率。 <table><tr><td></td><td>測試條件</td></tr><tr><td>最低溫度</td><td>-55 +0/-10℃</td></tr><tr><td>最高溫度</td><td>150 +10/-0℃</td></tr></table> 依據 JIS-C5201-1 4.19		測試條件	最低溫度	-55 +0/-10℃	最高溫度	150 +10/-0℃	≤±0.5% 外觀無損傷
	測試條件							
最低溫度	-55 +0/-10℃							
最高溫度	150 +10/-0℃							
Moisture Resistance (Climatic Sequence) 耐濕試驗	將金屬板微電阻置於恆溫恆濕循環機中,並依步驟1至步驟7(參考圖一) 施加10個濕熱循環，取出靜置24小時以上再量測阻值變化率。 依據 MIL-STD 202 Method 106	≤±0.5% 外觀無損傷						
Bias Humidity 高溫高濕	將金屬板微電阻置於85℃±5℃/ 85 ±5%RH之恆濕恆溫循環機中施加額定電流，90分鐘ON，30分鐘OFF，共1,000小時取出靜置60分鐘以上再量測阻值變化率。 依據 JIS-C5201-1 4.24	≤±0.5% 外觀無損傷						

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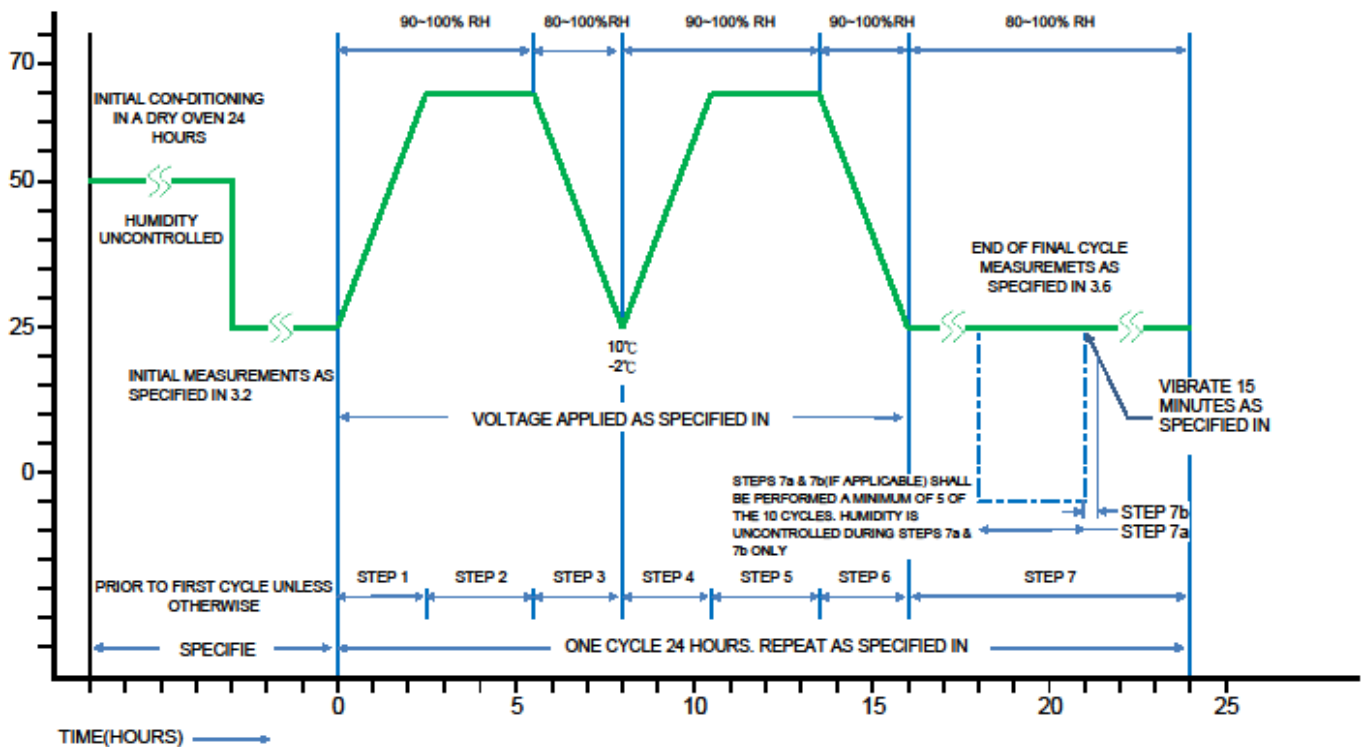
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#### 5.4 負荷壽命試驗(Operational Life Endurance:)

Test Item 項目	Conditions of Test 條件	Test Limits 規格
Load Life 負荷壽命	將金屬板微電阻置於 $70\pm 2^{\circ}\text{C}$ 之烤箱中施加額定電流，90分鐘ON，30分鐘OFF，共1,000小時取出靜置60分鐘以上再量測阻值變化率。 依據 JIS-C5201-1 4.25	$\leq \pm 1.0\%$ $\leq \pm 2.0\%$ (4527 & 4527S series) No evidence of mechanical damage



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## 6 字碼表示法: (所有產品均以4字碼表示)

6.1 產品阻值是以兩種方式表示：

a. 以“R”字指示  $\Omega$  的小數點位置

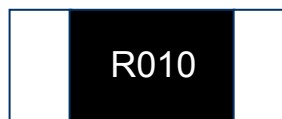
- 例如 1m $\Omega$  產品字碼是 R001
- 例如 25m $\Omega$  產品字碼是 R025
- 例如 100m $\Omega$  產品字碼是 R100

b. 以“m”字指示 m $\Omega$  的小數點位置

- 例如 0.25m $\Omega$  產品字碼是 0m25
- 例如 0.5m $\Omega$  產品字碼是 0m50
- 例如 5.5m $\Omega$  產品字碼是 5m50
- 例如 25.5m $\Omega$  產品字碼是 25m5

6.2 LR1206：

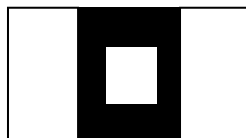
6.2.1 1.0m $\Omega$ 以上：



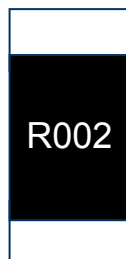
→ Ex. Resistance 10m $\Omega$  (for all LR1206 products)

6.2.2 0.6 m $\Omega$ :(方塊記號)

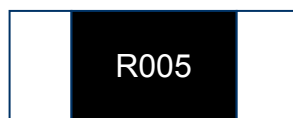
用於確定正背面。



6.3 LR2010：



→ Ex. Resistance 2m $\Omega$  (when resistance below or equal than 3m $\Omega$ )

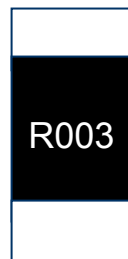


→ Ex. Resistance 5m $\Omega$  (when resistance greater than 3m $\Omega$ )

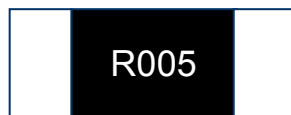
6.4 LR2512 :



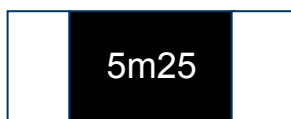
→ Ex. Resistance 0.5mΩ (when resistance below than 1mΩ)



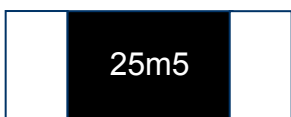
→ Ex. Resistance 3mΩ (when resistance below or equal than 4mΩ)



→ Ex. Resistance 5mΩ (when resistance greater than 4mΩ)

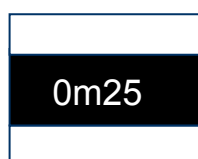


→ Ex. Resistance 5.25mΩ (when resistance greater than 4mΩ)



→ Ex. Resistance 25.5mΩ (when resistance greater than 4mΩ)

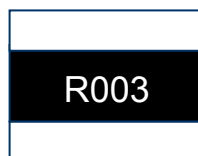
6.5 LR2725 :



→ Ex. Resistance 0.25mΩ (or 0.25mΩ only)



→ Ex. Resistance 2.5mΩ (for 1.5mΩ and 2.5mΩ only)



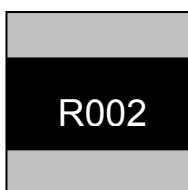
→ Ex. Resistance 3mΩ (for 1m、2m and 3mΩ only)

6.6 LR2728 :

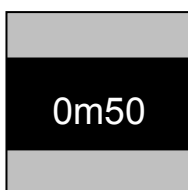


Ex. Resistance 5mΩ (for all LR2728 products)

6.7 LR4527 :

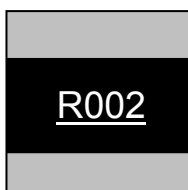


Ex: Resistance 2mΩ.

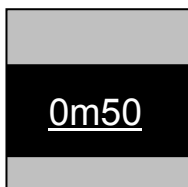


Ex: Resistance 0.5mΩ.

6.8 LR4527S :



Ex: Resistance 2mΩ.



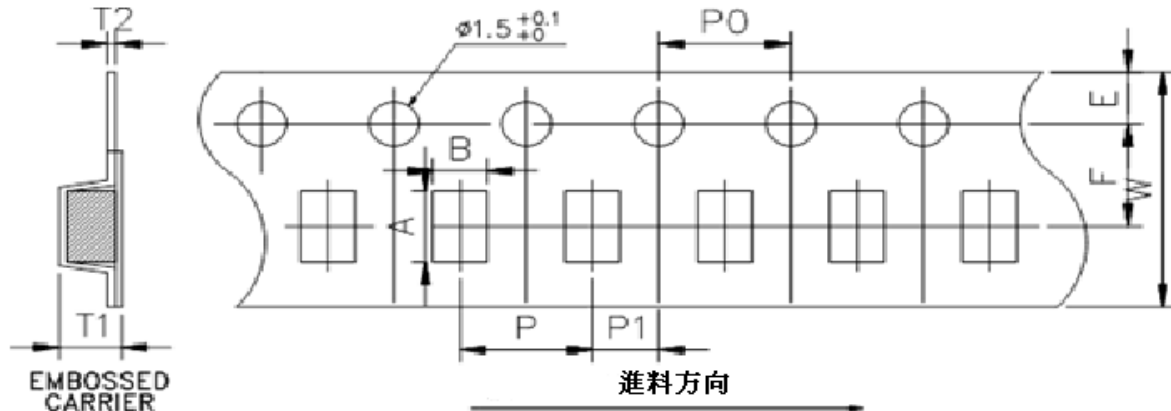
Ex: Resistance 0.5mΩ.

6.9 標準字碼外觀一覽表:

Type \ Marking	R	m	1	2	3	4	5	6	7	8	9	0
LR1206 LR2010 LR2512 LR2725 LR2728 LR4527 LR4527S	R	m	1	2	3	4	5	6	7	8	9	0

## 7 包裝規格:

### 7.1 承載帶尺寸:



單位: mm

DIM Item	A	B	W	E	F	T1	T2	P	P0	10*P0	P1
LR1206 (0.6mΩ)	3.50±0.10	1.90±0.10	8.0±0.15	1.75±0.10	3.5±0.10	1.27±0.10	0.23±0.10	4.0±0.10	4.0±0.10	40.0±0.20	2.0±0.10
LR1206 (≥1.0mΩ)	3.48±0.10	1.83±0.10	8.0±0.15	1.75±0.10	3.5±0.10	1.10±0.10	0.20±0.05	4.0±0.10	4.0±0.10	40.0±0.20	2.0±0.10
LR2010	5.45±0.10	2.90±0.10	12.0±0.15	1.75±0.10	5.5±0.10	1.33±0.10	0.23±0.05	4.0±0.10	4.0±0.10	40.0±0.20	2.0±0.10
LR2512	6.75±0.10	3.50±0.10	12.0±0.15	1.75±0.10	5.5±0.10	1.30±0.10	0.20±0.05	4.0±0.10	4.0±0.10	40.0±0.20	2.0±0.10
LR2725	7.15±0.10	6.75±0.10	12.0±0.15	1.75±0.10	5.5±0.10	1.95±0.10	0.25±0.05	8.0±0.10	4.0±0.10	40.0±0.20	2.0±0.10
LR2728	7.15±0.10	7.70±0.10	12.0±0.15	1.75±0.10	5.5±0.10	1.45±0.10	0.25±0.05	12.0±0.10	4.0±0.10	40.0±0.20	2.0±0.10
LR4527	11.80±0.10	7.20±0.10	24.0±0.15	1.75±0.10	11.5±0.10	2.00±0.10	0.30±0.10	12.0±0.10	4.0±0.10	40.0±0.20	2.0±0.10
LR4527S	11.80±0.10	7.20±0.10	24.0±0.15	1.75±0.10	11.5±0.10	2.00±0.10	0.30±0.10	12.0±0.10	4.0±0.10	40.0±0.20	2.0±0.10

### 7.2 包裝型式(Packaging Model):

Type	Tape width	Max. Packaging Quantity (pcs/reel)		
		Embossed Plastic Type		
		4mm pitch	8mm pitch	12mm pitch
LR1206(0.6mΩ)	8mm	2,000pcs	--	--
LR1206(≥1.0mΩ)		4,000pcs		
LR2010	12mm	2,000pcs	--	--
LR2512		4,000pcs	--	--
LR2725		--	1,000pcs	--
LR2728		--	--	1,000pcs
LR4527 LR4527S	24mm	--	--	500pcs

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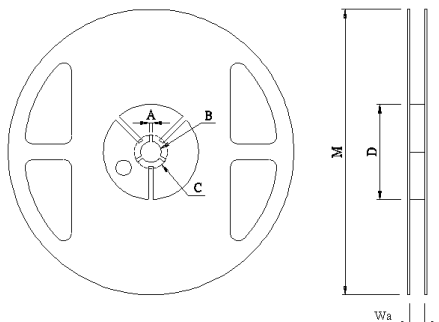
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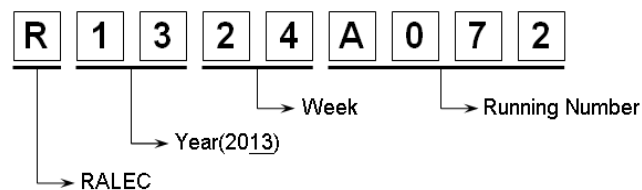
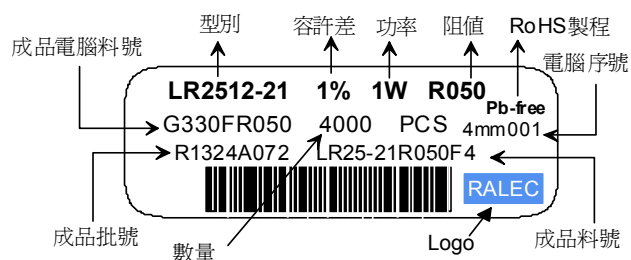
## 7.3 塑膠圓盤尺寸(Reel Dimensions):



單位: mm

Reel Type / Tape	W	M	A	B	C	D
7" reel for 8 mm tape	9.0 ± 0.5	178 ± 2.0	2.0 ± 0.5	13.5 ± 0.5	21.0 ± 0.5	60.0 ± 1.0
7" reel for 12 mm tape	13.8 ± 0.5					80.0 ± 1.0
7" reel for 24 mm tape	25.0 ± 1.0			13.2 ± 0.5	17.7 ± 0.5	60.0 ± 1.0

## 7.4 標籤表示(Label):



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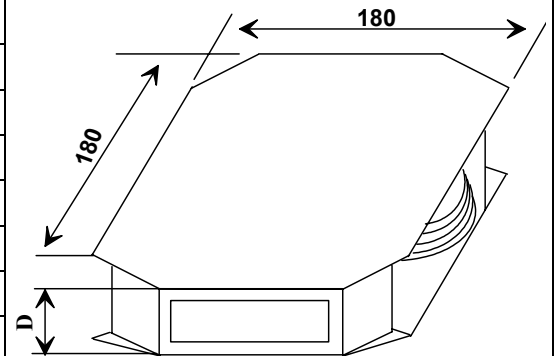
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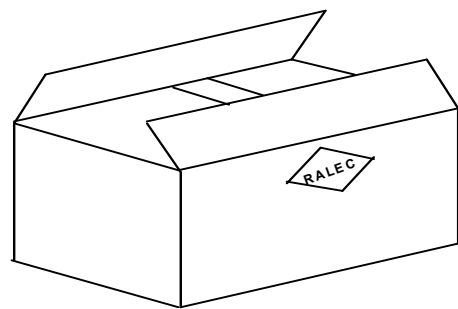
### 7.5 內盒尺寸

Reel Number (for 8 mm tape)	Reel Number ( for 12 mm tape)	Reel Number ( for 24 mm tape)	D Dimension (mm)
1	-	-	12
2	1	-	24
3	2	1	36
4	-	-	48
5	3	2	60
6	4	-	72
7	-	3	84
8	-	-	96
9	-	-	108
10	-	4	120



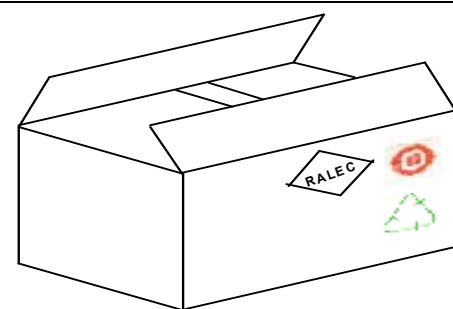
### 7.6 外箱尺寸

10R內盒個數	長(mm)	寬(mm)	厚(mm)
2	272	205	210
4	375	280	210
8	544	380	210



### 7.7 外銷中國大陸外箱尺寸:

10R內盒個數	長(mm)	寬(mm)	厚(mm)
2	272	205	210
4	375	280	210
8	544	380	210



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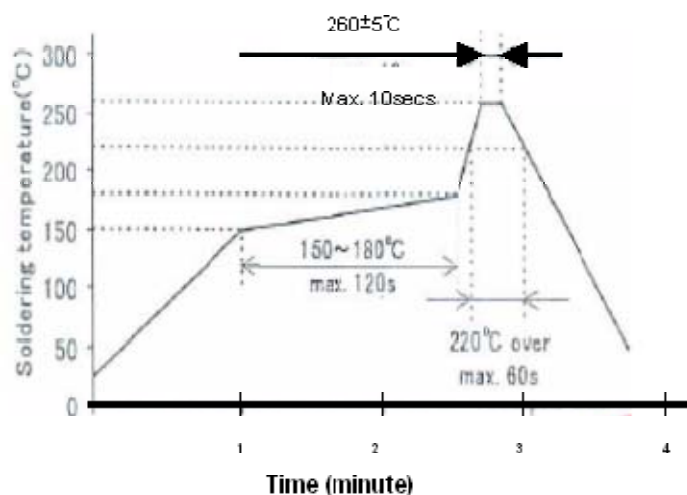
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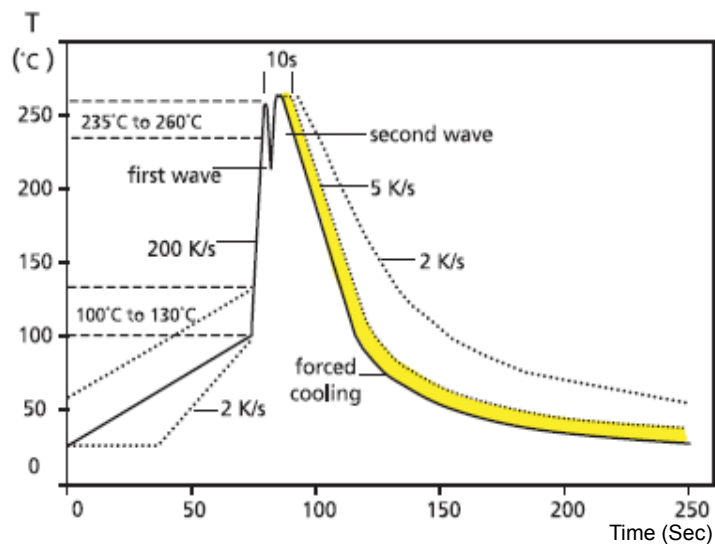
## 8 技術資料(此為建議值，請客戶使用時依實際應用作調整)

### 8.1 建議焊錫條件：

表面黏著的零組件將在溫度 $245^{\circ}\text{C}$ /3秒下測試其焊錫性。以下為典型的焊接例子可提供可靠的焊接且不會造成任何損傷。



建議 IR Reflow Soldering Profile



建議 double-wave Soldering Profile

實線：典型值

虛線：界限值

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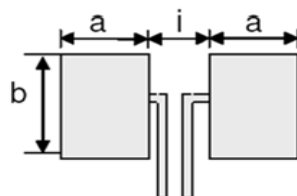
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8.2 建議 Land Pattern:



型別	最高額定功率	阻值範圍 (mΩ)	尺寸(mm)		
			a	b	i
LR1206	0.5 & 1.0 & 1.5	0.6	1.65	2.18	0.90
		1.0 ~ 50.0	1.60		1.00
LR2010	1.0	1.0 ~ 3.0	2.89	2.92	1.22
		3.1 ~ 100.0	2.29		2.41
LR2512	1.0 & 1.5	0.5 ~ 4.0	3.05	3.68	1.27
		4.1 ~ 100.0	2.11		3.18
	2.0	0.5 ~ 4.0	3.05		1.27
		4.1 ~ 75.0	2.11		3.18
	3.0	0.5	3.05		1.27
		0.6~2.9 & 4.1~10.0	2.19		3.00
		3.0~4.0	2.79		1.80
LR2725	4.0	0.20 ~ 3.0	3.18	6.86	1.32
LR2728	3.0 & 3.5 & 4.0	4.0 ~ 100.0	2.75	7.82	3.51
LR4527S	3.0	0.5 ~ 5.0	4.80	8.74	5.51
		5.1 ~ 20.0	3.40		8.31
LR4527	5.0	0.5 ~ 5.0	4.80	8.74	5.51
		5.1 ~ 120.0	3.40		8.31

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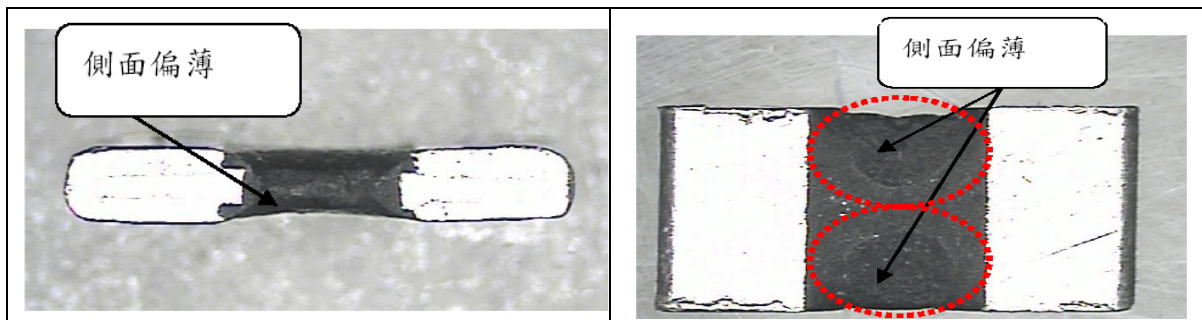
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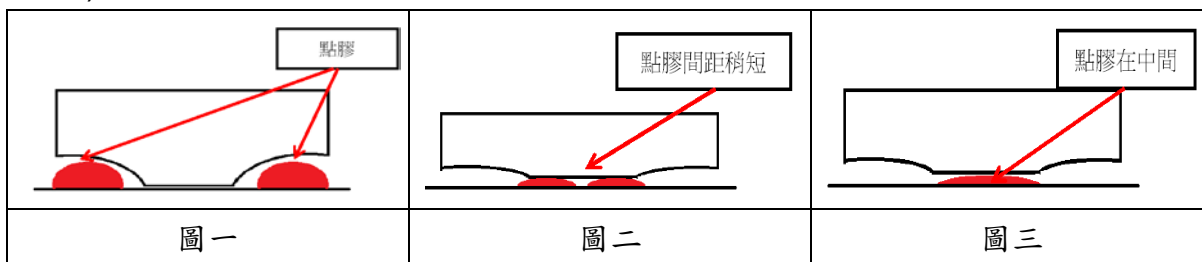


### 8.3 點膠方式建議

8.3.1 因製程關係，本公司產品結構會有兩側偏薄現象(如下圖示)



8.3.2 建議Wave Solder 製程客戶注意點膠之間距，如兩個紅膠間距過大，容易造成紅膠未黏住電阻本體，產生掉件(如圖一)問題，建議客戶點膠的間距適度縮小(如圖二)，或點於本體中央(如圖三)。



## 9 附件

9.1 文件修訂記錄表 (QA-QR-027)

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### 1. Scope:




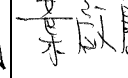

This specification is applicable to lead free and halogen free for LR0805 series metal alloy low-resistance resistor.

### 2. Explanation Of Part Numbers:

<u>LR</u>	<u>0805</u>	-	<u>2</u>	<u>C</u>	<u>R005</u>	<u>F</u>	<u>5</u>
Type	Size (inch)	Number of Terminals	Rated Power	Resistance (4 Digits)	Tolerance	Packaging	
Metal Alloy Low Resistance Resistor	● 0805	2: 2 terminals	● C=0.5W	EX: R005 = 5mΩ R010 = 10mΩ	F=± 1.0% G=± 2.0% J=± 5.0%	5=5,000pcs	

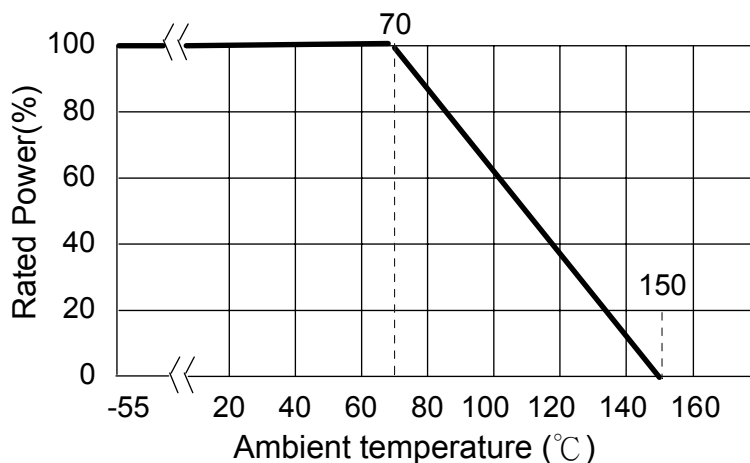
### 3. Product Specifications:

Type	# of Terminals	Max. Rating Power	Max. Rating Current	Max. Overload Current	T.C.R. (ppm/°C)	Resistance Range (mΩ)	Operating Temperature Range
						F (±1%) G (±2%) J (±5%)	
LR0805	2	0.5W	12.9A	25.8A	≤±100	3 ≤ R < 5	-55~+150°C
					≤±50	5 ≤ R ≤ 50	

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Written	Checked	Approved	Signing	Signing	IT'S NOT UNDER CONTROL FOR PDF FILE PLS NOTE THE VERSION STATED..	
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### 3.1 Power Derating Curve: Operating Temperature Range: - 55 ~+150 °C

For resistors operated in ambient temperatures 70°C, power rating shall be derated in accordance with the curve below:



### 3.2 Rating Current:

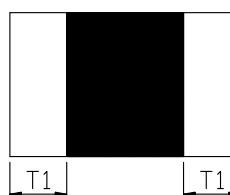
Rated Current: The resistor shall have a DC continuous working current or a RMS(Root Mean Square). AC continuous working current at commercial-line frequency and wave form corresponding to the power rating, as determined from the following:

Remark:

- a. I: Rating Current.(A)
- b. P: Rating Power.(W)
- c. R: Resistance.(Ω)

$$I = \sqrt{P/R}$$

## 4 Physical Dimensions:



Type	Maximum Power Rating (Watts)	Resistance Range (mΩ)	Dimensions - in inches (millimeters)			
			L	W	H	T1
LR0805	0.5	3 ~ 50	0.08±0.008 (2.032±0.20)	0.05±0.008 (1.270±0.20)	0.012±0.002 (0.30±0.05)	0.014±0.008 (0.35±0.20)

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## 5 Reliability Performance:

### 5.1 Electrical Performance:

Test Item	Conditions of Test	Test Limits						
Temperature Coefficient of Resistance (TCR)	<ul style="list-style-type: none"> <li>TCR (ppm/°C) = <math>\frac{(R2-R1)}{R1 (T2-T1)} \times 10^6</math></li> <li>R1: resistance of room temperature</li> <li>R2: resistance of 150 °C</li> <li>T1: Room temperature</li> <li>T2: Temperature at 150 °C</li> <li>Refer to JIS C 5201-1 4.8</li> </ul>	Refer to Paragraph 3. general specifications						
Short Time Overload	Applied Overload for 5 seconds and release the load for about 30 minutes, then measure its resistance variance rate. (Overload condition refer to below): <table border="1"> <tr> <th>Type</th><th>Power (W)</th><th># of rated power</th></tr> <tr> <td>LR0805</td><td>0.5</td><td>4 times</td></tr> </table> Refer to JIS C 5201-1 4.13	Type	Power (W)	# of rated power	LR0805	0.5	4 times	$\leq \pm 0.5\%$ No evidence of mechanical damage
Type	Power (W)	# of rated power						
LR0805	0.5	4 times						
Insulation Resistance	Put the resistor in the fixture, add 100 VDC in +, - terminal for 60secs then measured the insulation resistance between electrodes and insulating enclosure or between electrodes and base material. Refer to JIS-C5201-1 4.6	$\geq 10^9 \Omega$						
Dielectric Withstanding Voltage	Applied 500VAC for 1 minute, and Limit surge current 50 mA (max.) Refer to JIS-C5201-1 4.7	No short or burned on the appearance.						

### 5.2 Mechanical /Constructional Performance:

Test Item	Conditions of Test	Test Limits
Resistance to Solder Heat	The tested resistor be immersed 25 mm/sec into molten solder of 260±5°C for 10±1secs. Then the resistor is left in the room for 1 hour, and measured its resistance variance rate. Refer to JIS-C5201-1 4.18	$\leq \pm 0.5\%$ No evidence of mechanical damage
Solderability	Add flux into tested resistors, immersion into solder bath in temperature 245±5°C for 3±0.5secs. Refer to JIS-C5201-1 4.17	Solder coverage over 95%
Vibration	The resistor shall be mounted by its terminal leads to the supporting terminals on the solid table. The entire frequency range :from 10 Hz to 55 Hz and return to 10 Hz, shall be transferred in 1 min. Amplitude : 1.5mm This motion shall be applied for a period of 4 hours in each 3 mutually perpendicular directions (a total of 12hrs) Refer to JIS-C5201-1 4.22	$\leq \pm 0.5\%$ No evidence of mechanical damage
Resistance to solvent	The tested resistor be immersed into isopropyl alcohol of 20~25°C for 60secs, then the resistor is left in the room for 48 hrs. Refer to JIS-C5201-1 4.29	$\leq \pm 0.5\%$ No evidence of mechanical damage

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**5.3 Environmental Performance:**

Test Item	Conditions of Test	Test Limits						
Low Temperature Exposure (Storage)	Put the tested resistor in chamber under temperature $-55\pm 2^{\circ}\text{C}$ for 1,000 hours. Then leaving the tested resistor in room temperature for 60 minutes, and measure its resistance variance rate. Refer to JIS-C5201-1 4.23.4	$\leq \pm 0.5\%$ No evidence of mechanical damage						
High Temperature Exposure (Storage)	Put tested resistor in chamber under temperature $150\pm 5^{\circ}\text{C}$ for 1,000 hours. Then leaving the tested resistor in room temperature for 60 minutes , and measure its resistance variance rate. Refer to JIS-C5201-1 4.23.2	$\leq \pm 1.0\%$ No evidence of mechanical damage						
Temperature Cycling (Rapid Temperature Change)	Put the tested resistor in the chamber under the temperature cycling which shown in the following table shall be repeated 1,000 times consecutively. Then leaving the tested resistor in the room temperature for 60 minutes, and measure its resistance variance rate. <table><tr><th colspan="2">Testing Condition</th></tr><tr><td>Lowest Temperature</td><td><math>-55 +0/-10^{\circ}\text{C}</math></td></tr><tr><td>Highest Temperature</td><td><math>150 +10/-0^{\circ}\text{C}</math></td></tr></table> Refer to JIS-C5201-1 4.19	Testing Condition		Lowest Temperature	$-55 +0/-10^{\circ}\text{C}$	Highest Temperature	$150 +10/-0^{\circ}\text{C}$	$\leq \pm 0.5\%$ No evidence of mechanical damage
Testing Condition								
Lowest Temperature	$-55 +0/-10^{\circ}\text{C}$							
Highest Temperature	$150 +10/-0^{\circ}\text{C}$							
Moisture Resistance (Climatic Sequence)	Put the tested resistor in chamber and subject to 10 cycles of damp heat and without power. Each one of which consists of the steps 1 to 7 (Figure 1). Then leaving the tested resistor in room temperature for 24 hr, and measure its resistance variance rate. Refer to MIL-STD 202 Method 106	$\leq \pm 0.5\%$ No evidence of mechanical damage						
Bias Humidity	Put the tested resistor in chamber under $85\pm 5^{\circ}\text{C}$ and $85\pm 5\%\text{RH}$ with 10% bias and load the rated voltage for 90 minutes on, 30 minutes off, total 1,000 hours. Then leaving the tested resistor in room temperature for 60 minutes, and measure its resistance variance rate. Refer to JIS-C5201-1 4.24	$\leq \pm 0.5\%$ No evidence of mechanical damage						

**5.4 Operational Life Endurance:**

Test Item	Conditions of Test	Test Limits
Load Life	Put the tested resistor in chamber under temperature $70\pm 2^{\circ}\text{C}$ and load the rated voltage for 90 minutes on 30 minutes off, total 1000 hours. Then leaving the tested resistor in room temperature for 60 minutes, and measure its resistance variance rate. Refer to JIS-C5201-1 4.25	$\leq \pm 1.0\%$ No evidence of mechanical damage

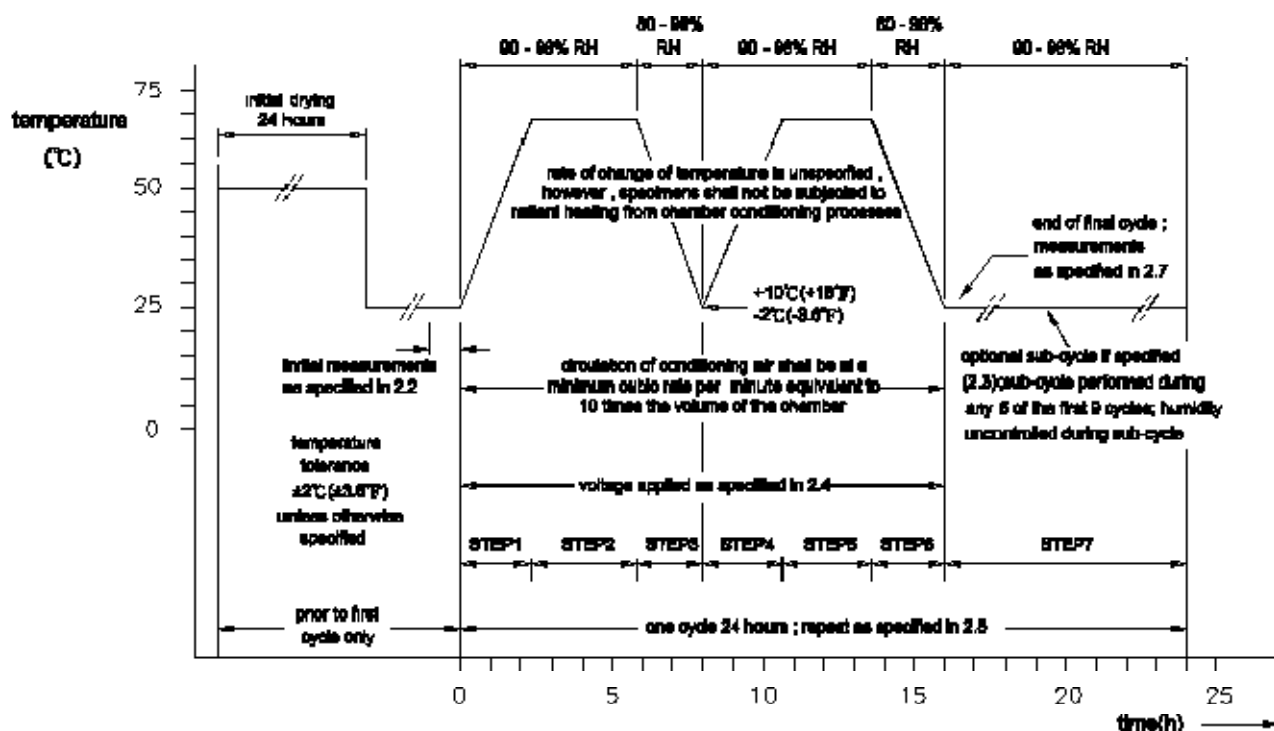
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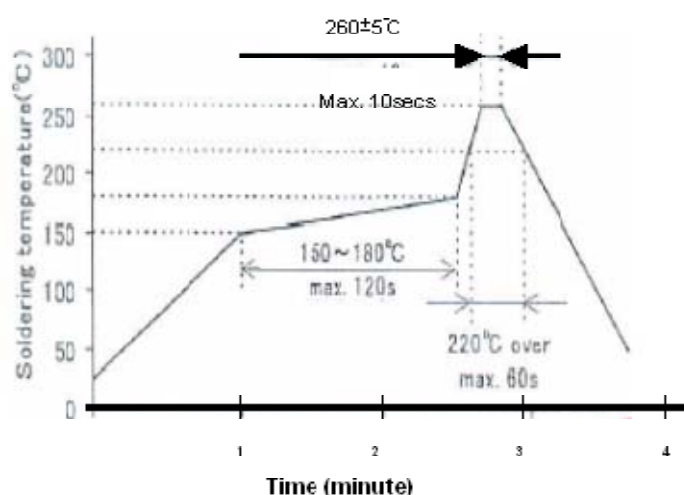
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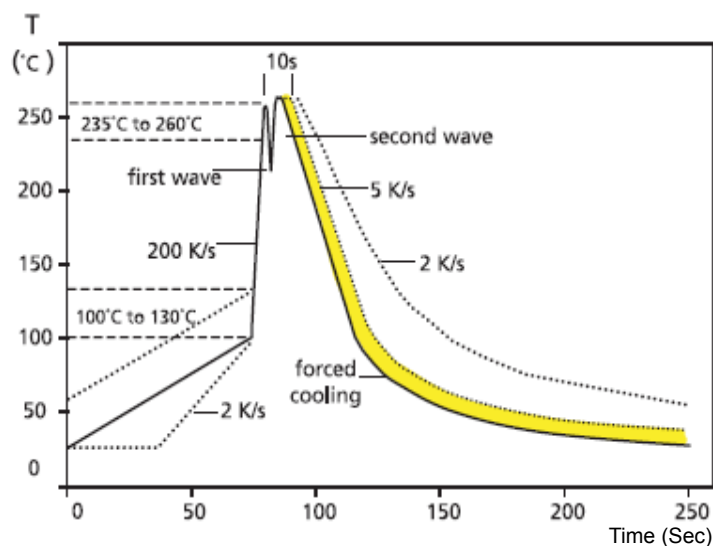
<Figure 1>

## 6. Recommend Soldering Conditions:

6.1 Surface-mount components are tested for solderability at a temperature of 245 °C for 3 seconds. Typical examples of soldering processes that provide reliable joints without any damage are given in below:



Recommended IR Reflow Soldering Profile



Recommended double-wave Soldering Profile

Typical values (solid line)

Process limits (dotted line)

Remark

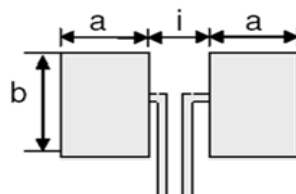
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## 7. Recommend Land Pattern:

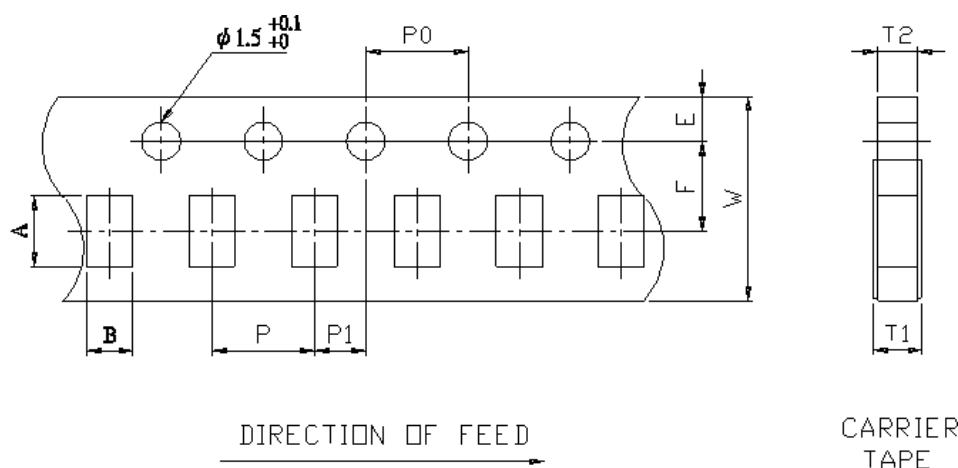


Type	Maximum Power Rating (Watts)	Resistance Range (mΩ)	Dimensions - in inches (millimeters)		
			a	b	i
LR0805	0.5	3 ~ 50	1.80	2.18	0.66

## 8. Marking Format:

LR0805 No Marking ◦

## 9. Taping specifications:



### 9.1 Tape Dimensions:

Unit: mm

DIM Item	A	B	W	E	F	T1	T2	P	P0	10*P0	P1
LR0805	2.30±0.10	1.55±0.10	8.0±0.20	1.75±0.10	3.5±0.05	0.40±0.2/-0	0.40±0.10	4.0±0.10	4.0±0.10	40.0±0.20	2.0±0.05

### 9.2 Packaging model:

Type	Tape width	Max. Packaging Quantity (pcs/reel)
		4 mm pitch
LR0805	8 mm	5,000pcs

Remark

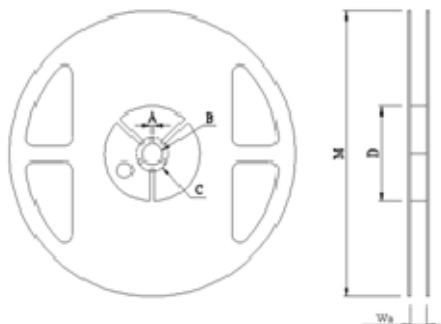
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**9.3 Reel Dimensions:**



Unit: mm

Reel Type / Tape	W	M	A	B	C	D
7" reel for 8 mm tape	12.00± 0.5	178 ± 1.0	2.0 ± 0.5	13.2 ± 0.5	17.7 ± 0.5	60.0 ± 1.0

**10. Attachments:**

10.1 Document Revise Record (QA-QR-027)

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