



高功率厚膜贴片电阻规格书-RH 系列

Approval Specification for High Power Thick Film Chip Resistors - Type RH

规格书

SPECIFICATION

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1. 范围 (scope) :

1.1 适用于本公司所生产的无铅、无卤之高功率厚膜贴片电阻 RH 系列

This specification applies to high power thick film chip resistors which meet requirements of Pb free and halogen free

1.2 本公司的无铅产品指的贴片电阻端电极无铅，而存在于电阻层的玻璃中的符合 RoHS 豁免条款。

There no lead exists in terminal of resistor, and lead which exist in glass of resistor layer meets RoHS exemption.

2. 产品料号 (part number) :

2512 2W 5% 100Ω

RH2512JB0101G

RH	2512	J	B	0101	G	—
↓	↓	↓	↓	↓	↓	↓
类型(Type) RH: 高功率厚 膜贴片电阻 (High Power thick film chip resistors)	尺寸(Size) 2512	公差 Tolerance B=±0.1% D=±0.5% F=±1% G=±2% J=±5%	额定功率 Rated Power B=2W	阻值 Resistance value ≤ ±1% 49R9=49.9Ω 1002=10KΩ ≥ ±2% 06R8=6.8Ω 0564=560KΩ < 1R: R010=10mΩ R470=470mΩ	包装代码 Packing Code G=成品, 7inch reel 常规包装量 V=bulk (散料)	区别码 Distinction Code 空码 = 无指定 - "X" = 特别指 定, 不同字母代表不 同指定

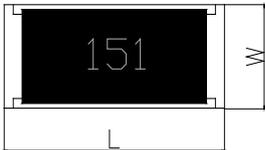
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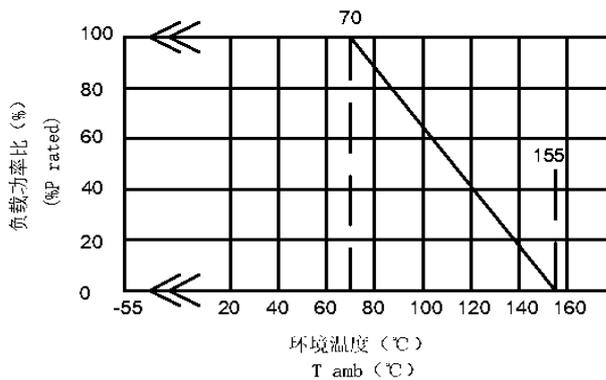
3. 电阻本体字码标示 (Marking on the Resistor's Body):

※ 公差 $\geq\pm 2\%$ 的产品，以三字码标示，前两位表示阻值的有效数字，最后一位表示 10 的乘幂 $\geq\pm 2\%$ Tolerance product: the marking is 3 digits, the first 2 digits are significant figures of resistance value and the 3rd one denotes the power number of 10, (10X). ※ 公差 $\leq\pm 1\%$ 的产品，以四字码标示，前三位表示阻值的有效数字，最后一位表示 10 的乘幂 $\leq\pm 1\%$ tolerance product: the marking is 4 digits, the first 3 digits are significant figures of resistance value and the 4th one denotes the power number of 10, (10X).		$472=47\times 10^2=4.7\text{K}\Omega$
		10 Ω 以下标示: 5R6=5.6 Ω Below 10 Ω : 5R6=5.6 Ω
		$4992=499\times 10^2=49.9\text{K}\Omega$
		100 Ω 以下标示: 6R81=6.81 Ω Below 100 Ω : 6R81=6.81 Ω

4. 尺寸 (dimension):

尺寸 dimension						单位 (unit) : mm
	型别 (Type)	L	W	T	E	
RH2512	6.30 ± 0.20	3.20 ± 0.15	0.65 ± 0.10	0.60 ± 0.30	0.60 ± 0.30	

5. 功率衰减曲线 (Derating Curve) :

使用温度范围	-55°C~+155°C
说明 Directions	<p>电阻的额定功率基于-55°C至 70°C的环境温度下运行。当温度超过 70°C时，负载功率比例依照下图予以修订。</p> <p>Resistors shall have a power rating based on continuous load operation at an ambient temperature from -55°C to 70°C. For temperature in excess of 70°C, the load shall be derated as shown in figure.</p>
功率衰减曲线 Derating Curve	 <p style="text-align: center;">环境温度 (°C) T_{amb} (°C)</p>

备注 (remark) :

※ 额定电压计算公式 (The rated voltage is calculated by the following formula) :

R ≥ 1Ω :

$$E = \sqrt{RP}$$

E : 额定电压 (Rated Voltage) (V)

P : 额定功率 (Rated Power) (W)

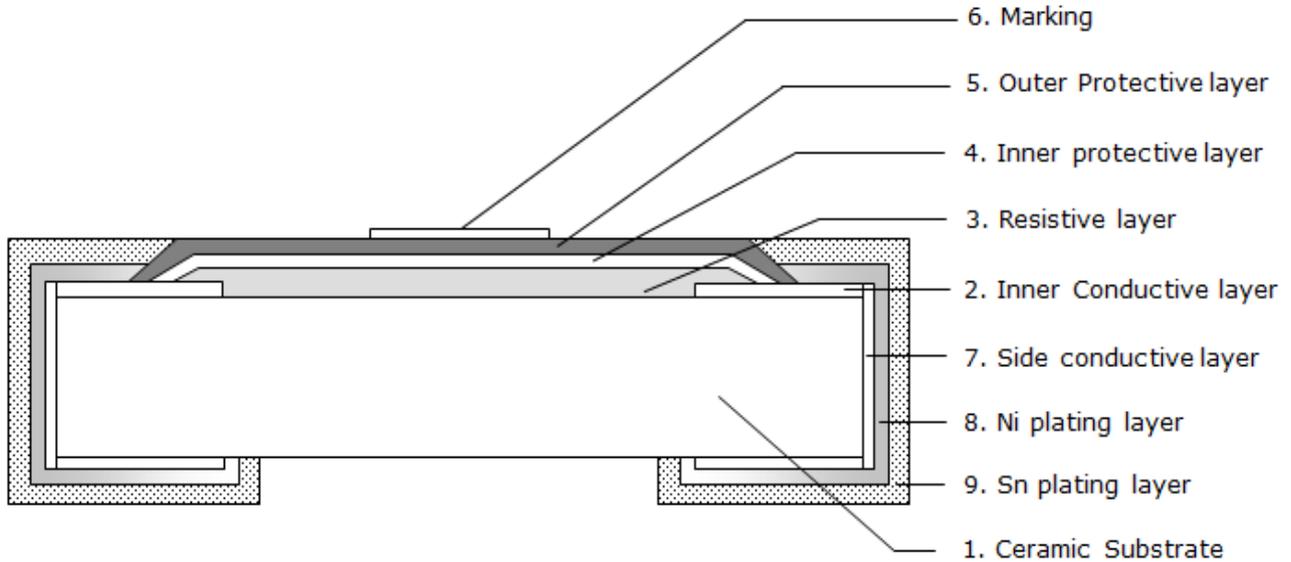
R : 电阻阻值 (Resistance) (ohm)

※ 如果计算出的电压超过此型别的最大工作电压，则此型别的最大工作电压为此电阻的额定电压。
 In case the value calculated by the formula exceed the maximum working voltage as above table, the maximum working voltage shall be regarded as rated voltage.

储存条件及期限 (storage condition or Data) : 25±5°C , 60±20%RH ; 有效期 2 年。

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6.电阻结构 (Construction) :



No.	结构 construction	主要材料 Major material
1	陶瓷基板 Ceramic substrate	三氧化二铝 Al ₂ O ₃
2	内电极 Inner Conductive layer	银 Ag-Pd
3	阻体层 Resistive layer	氧化钌+玻璃 RuO ₂ + glass
4	内保护层 Inner protective layer	玻璃 Glass
5	外保护层 Outer Protective layer	环氧树脂 Epoxy
6	文字 Marking	环氧树脂 Epoxy
7	侧电极 Side conductive layer	镍铬合金 Ni-Cr
8	镍电极 Ni plating layer	镍 Ni
9	锡电极 Sn plating layer	雾锡 Matte Tin

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7. 电气特性标准 (Standard Electrical Specifications) :

7.1. 规格-1 (Type-1) : $R \geq 1\Omega$

型别 Type	额定功率 Rated power	最大工作电压 Max Working Voltage	最大过载电压 Max Overload Voltage	T.C.R. (PPM/°C)	阻值范围		
					B: $\pm 0.1\%$ D: $\pm 0.5\%$	F: $\pm 1.0\%$ G: $\pm 2.0\%$	J: $\pm 5.0\%$
RH2512	2W	200V	400V	± 400	-	$1\Omega \leq R < 10\Omega$	
				± 100	$10\Omega \leq R \leq 1M\Omega$	$10\Omega \leq R \leq 10M\Omega$	
				± 200	-	$10M\Omega < R \leq 30M\Omega$	

7.2. 规格-2 (Type-2) : $0\Omega < R < 1\Omega$

型别 Type	额定功率 Rated power	额定电压范围 Rated Voltage Range	最大过载电压 Max Overload Voltage	T.C.R. (PPM/°C)	阻值范围	
					F: $\pm 1.0\%$ J: $\pm 5.0\%$	
RH2512	2W	0.14~1.41V	3.54V	± 1800	$10m\Omega \leq R < 50m\Omega$	
				± 800	$50m\Omega \leq R < 100m\Omega$	
				± 600	$100m\Omega \leq R < 1000m\Omega$	

7.3. 规格-3 (Type-3) : $R=0\Omega$

Type	RH2512
Jumper Resistance Value	20mΩ Max
Jumper Rated Current	10A
Max Over Load Current < 1 Second and 1 times	30A

8.性能信赖性测试 (Performance Reliability Test Methods)

内容 Item	测试方法 Test Methods	测试条件 Test Conditions	规格 Specification
温度系数 Temperature Coefficient of Resistance (T.C.R.)□	JIS C 5201 4.8 IEC-60115-1 4.8	TCR= (R-R ₀) / (t-t ₀) R ₀ ×10 ⁶ (ppm) R ₀ 电阻在室温下的阻值(resistance at room temperature) R 电阻在 155°C或-55°C下的阻值(resistance at 155°C or -55°C) t ₀ 室温(room temperature) t 测试温度 (test temperature 155°C or -55°C)	参照 7 项
绝缘电阻 Insulation resistance	JIS C 5201 4.6 IEC-60115-1 4.6	电阻本体上加载 100V (DC) 绝缘耐压 60±5 秒后, 测量绝缘阻抗 Applying 100V (DC) to the resistor body and withstanding 60±5 seconds of insulation voltage. Measure the insulation resistance	≥ 10GΩ
短时间过负荷 Short-time overload	JIS C 5201 4.13 IEC-60115-1 4.13	加载 2.5 倍的额定电压, 时间 2 秒后测量试验前后的阻值变化率; 0R 加过载电流 5 秒。 Applied 2.5 times of rated voltage for 2 seconds. Measure the variation of resistance; Jumper Over Load Current for 5 seconds. 0402=4.5A; 0603=6.3A; 0805=8.8A; 1206=11A; 1210=13A; 1812=15A; 2010=15A; 2512=20A。 $\Delta R\% = \frac{R_2 - R_1}{R_1} * 100 \text{-----} (\%)$ R1 = 试验前阻值(resistance before test) R2 = 试验后阻值(resistance after test)	≤ ±1%: ±(1.00%+0.05Ω) ≥ ±2%: ±(2.00%+0.1Ω) 0R: < 20mΩ
溶蚀 Leaching	JIS C 5201 4.18 IEC-60068-2-58 8.2.1	锡炉温度 260±5°C, 时间 30+1/-0 秒, 取出置于显微镜下观察焊锡面积。 Dip the resistance in a tin furnace at 260±5°C for 30+1/-0seconds, then take it out and observe the solder area under a microscope;	单边未吃锡面积 ≤ 5% Individual leaching area ≤ 5% 总未吃锡面积 ≤ 10% Total leaching area ≤ 10%

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内容 Item	测试方法 Test Methods	测试条件 Test Conditions	规格 Specification
抗焊锡热 Resistance to soldering heat	JIS C 5201 4.18 IEC-60115-1 4.18	锡炉温度 260±5°C, 时间 10±0.5 秒, 测量试验前后的阻值变化率。 Dip the resistance in a tin furnace at 260±5°C for 10±0.5sec. Measure the variation of resistance. $\Delta R\% = \frac{R_2 - R_1}{R_1} * 100 \text{-----} (\%)$ R1 = 试验前阻值(resistance before test) R2 = 试验后阻值(resistance after test)	≤ ±1%: ±(0.50%+0.05Ω) ≥ ±2%: ±(1.00%+0.05Ω)
耐溶剂 Resistance to Solvent	JIS C 5201 4.29	浸于异丙醇中, 温度 20~25°C, 时间 60 秒, 常温静止 48 小时后量测阻值变化率。 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. $\Delta R\% = \frac{R_2 - R_1}{R_1} * 100 \text{-----} (\%)$ R1 = 试验前阻值(resistance before test) R2 = 试验后阻值(resistance after test)	±(0.50%+0.05Ω) OR: < 20mΩ
端子弯曲 Bending Strength	JIS C 5201 4.33 IEC-60115-1 4.33	电阻焊接在测试板上进行弯折, 弯折保持时间 5 秒, 量测试验前后阻值变化率 Specimen shall be mounted on test board, then bend the board and maintained for 5s. Measure the variation of resistance. 弯折深度 D: 2512=2mm $\Delta R\% = \frac{R_2 - R_1}{R_1} * 100 \text{-----} (\%)$ R1 = 试验前阻值(resistance before test) R2 = 试验后阻值(resistance after test)	±(1.00%+0.05Ω)

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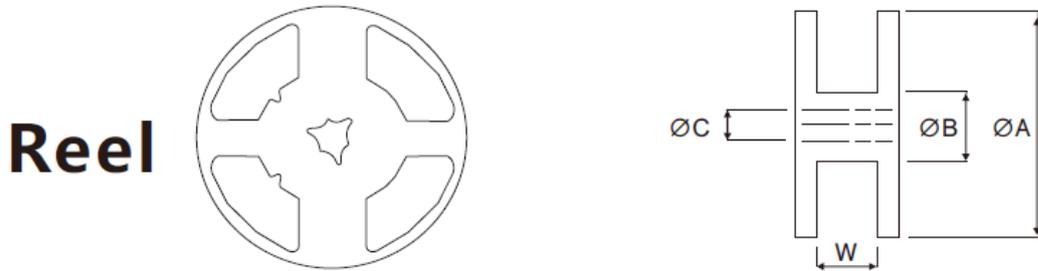
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内容 Item	测试方法 Test Methods	测试条件 Test Conditions	规格 Specification
温度循环 Temperature cycling	JIS C 5201 4.19 IEC-60115-1 4.19	电阻放入温度循环机中, 温度 155±2°C至-55±3°C, 共 5 个循环。量测试验前后阻值变化率。 Put specimen in a chamber which temperature can be changed to 155±2°C or -55±3°C, repeated 5 cycles. Measure the variation of resistance. $\Delta R\% = \frac{R2-R1}{R1} * 100 \text{-----} (\%)$ R1 = 试验前阻值(resistance before test) R2 = 试验后阻值(resistance after test)	≤ ±1%: ±(0.50%+0.05Ω) ≥ ±2%: ±(1.00%+0.10Ω)
负荷寿命 Load Life	JIS C 5201 4.25 IEC-60115-1 4.25.1	恒定温度 70°C加载额定电压, 通电 1.5H, 断电 0.5H, 共持续 1000+24/-0 小时 Put the specimen in a chamber at 70°C temperature, ON TIME:1.5H, OFF TIME:0.5H, rated voltage 1000 +24/-0 hours $\Delta R\% = \frac{R2-R1}{R1} * 100 \text{-----} (\%)$ R1 = 试验前阻值(resistance before test) R2 = 试验后阻值(resistance after test)	≤ ±1%: ±(1.00%+0.05Ω) ≥ ±2%: ±(3.00%+0.10Ω) OR: < 50mΩ
耐湿负荷 Load Life in Moisture	JIS C 5201 4.24 IEC-60115-1 4.24	电阻放入恒温恒湿箱, 温度 40±2°C, 湿度 90~95 %RH; 通额定电压 1.5 小时, 断电 0.5 小时; 共持续 1000 +48/-0 小时. 量测试验前后阻值变化率。 Put the specimen in a chamber at 40±2°C temperature and 90~95% relative humidity, then applied rated voltage for1.5H and rested for 0.5H repeatedly till total test time is 1000 +48/-0 hours. Measure the variation of resistance. $\Delta R\% = \frac{R2-R1}{R1} * 100 \text{-----} (\%)$ R1 = 试验前阻值(resistance before test) R2 = 试验后阻值(resistance after test)	≤ ±1%: ±(1.00%+0.05Ω) ≥ ±2%: ±(2.00%+0.05Ω) OR: < 50mΩ

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9. 包装规格 (Tapping Specification)

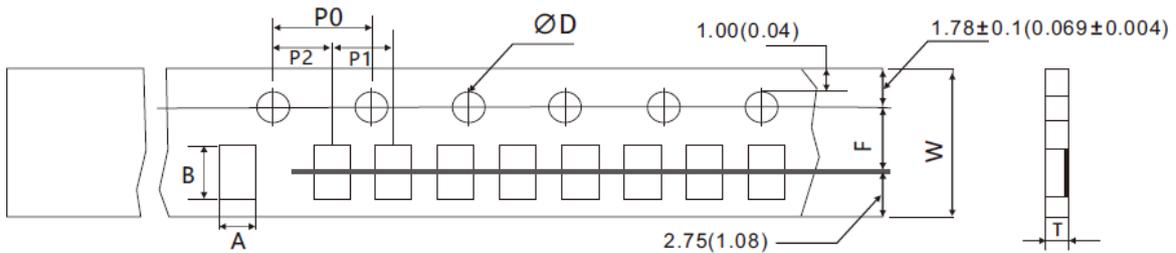
9.1 卷盘尺寸 (reel dimension)



Unit: mm

卷盘及纸带 Reel Type / Tape	ΦA	ΦB	ΦC	W
7" reel for 12 mm tape	178±2.0	60.0±1.0	13.5±0.5	13.0±0.3

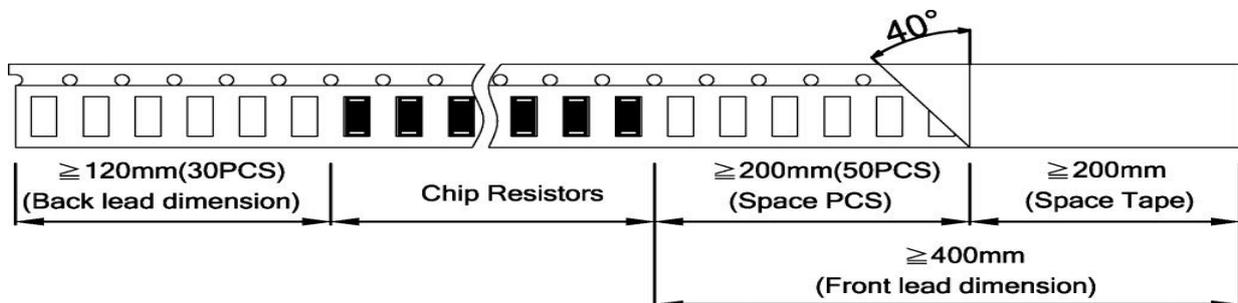
9.2 包装尺寸 (packing dimension)



尺寸 Dimensions	A	B	ΦD	F	P0	P1	P2	W	T
RH2512	3.40±0.10	6.60±0.10	1.50± $\frac{0.1}{0.0}$	5.50±0.05	4.00±0.10	4.00±0.10	2.00±0.05	12.0±0.10	1.0±0.07

※ 备注 (Remark) : 2512 每卷 4,000 pcs

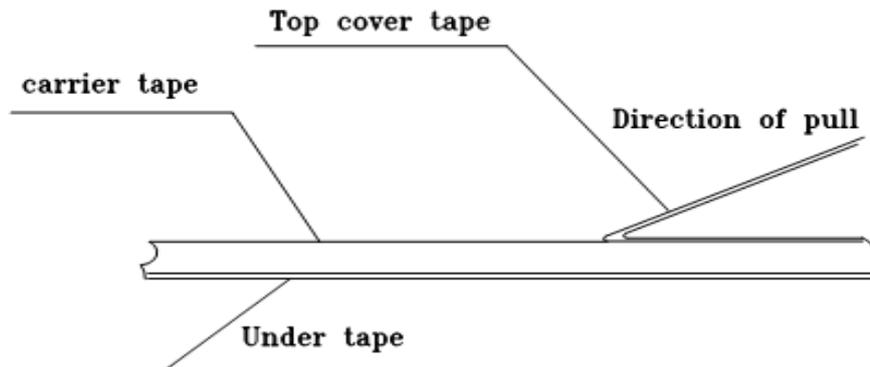
9.4 前后引线尺寸 (Front & Back Lead Dimension)



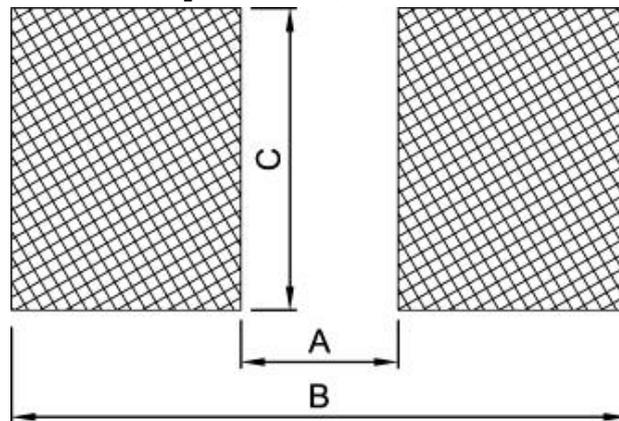
10. 上胶带剥离力测试 (Peel force of top cover tape)

上胶带以 300mm/分钟的速度，沿 165~180 度角的方向进行剥离，如下图所示。纸带的剥离力范围为 10g~70g；载带的剥离力范围为 15g~80g

The top cover tape is pulled at a speed of 300 mm/min with the angle between the tape during peel and the direction of unreeling maintained at 165 to 180 degree as following picture. The peel force of paper carrier tape shall be 10 g to 70 g, the peel force of plastic carrier tape shall be 15 g to 80 g



11. 焊盘尺寸 (Recommended land patterns):

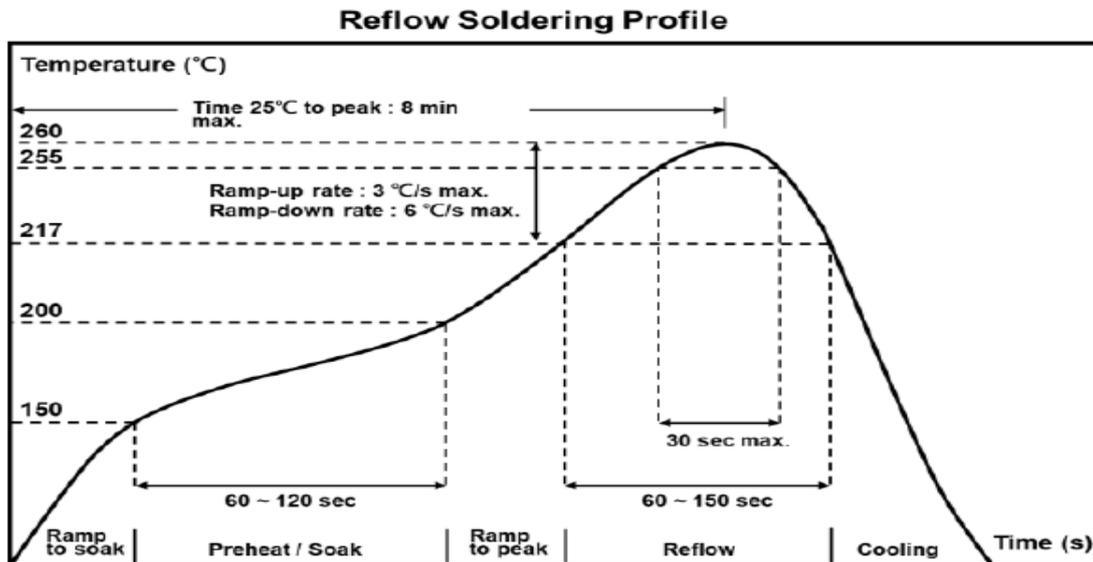


Item \ Type	Dimensions (mm)	
	RH2512	
A	4.90	
B	8.10	
C	3.40	

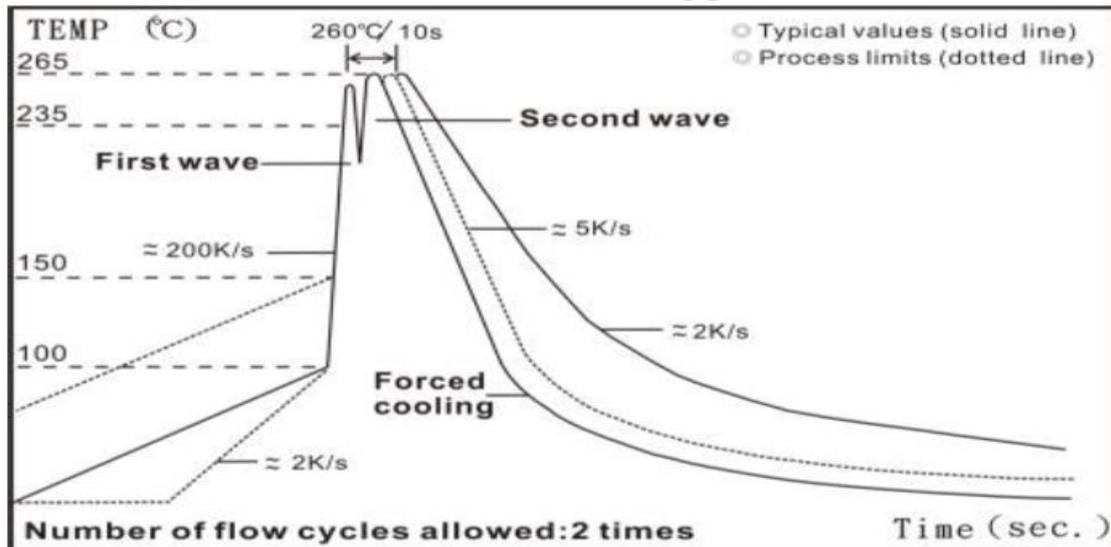
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12. 焊接 (soldering)

12.1 建议回流焊曲线 (Recommend reflow soldering profile)



12.2 建议波峰焊曲线 (Recommend wave soldering profile)



12.3 手工焊温度 (hand soldering temperature)

烙鐵溫度 350°C 3~5 秒之內，避免烙鐵接觸電阻本體

The iron temperature is 350°C, hand soldering time less than 3~5S. Avoid solder iron tip direct touch the components body.

产品规格及资料如有更改，恕不另行通知。

All product specification and data are subject to change without notice.