



抗硫车用宽电极厚膜贴片电阻规格书-AW 系列

Approval Specification for Anti-Sulfuration Wide Terminal Thick Film Chip Resistors-Type AW

规格书

SPECIFICATION

丽智电子（南通）有限公司

地址：江苏省南通市通州区康富路 789 号

Address: No. 789, Kang Fu Road Tongzhou District Nantong city Jiangsu province

Tel: 0086-0513-68856666

Fax: 0086-0513-68383688

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1. 范围 (scope) :

1.1 适用于本公司所生产的无铅、抗硫车用宽电极厚膜贴片电阻 AW 系列

This specification applies to Anti-Sulfuration wide Terminal thick film chip resistors which Meet requirements of Pb 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.

1.3 符合 AEC-Q200 标准。

Comply with AEC-Q200 standard.

1.4 车用

Automotive



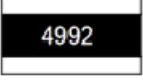

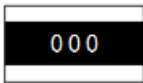
2. 产品料号 (part number) :

0612 0.75W 1% 10Ω

AW0612F210R0G

AW	0612	F	2	10R0	G	
类型(Type)	尺寸(Size)	公差	额定功率	阻值	包装代码	区别码
AW: 抗硫车用宽电极厚膜贴片电阻 (Anti-Sulfuration wide Terminal thick film)	0612 1020 1225	Tolerance F=±1% J=±5%	Rated Power 1= 1W 2= 0.75W D= 1.5W B= 2W C= 3W	Resistance value ±1% : 10R0=10Ω 49R9=49.9Ω 1002=10KΩ ±5% : 6R8=6.8Ω 200=20Ω 564=560KΩ	Packing Code G=成品, 7 inch reel 常规包装量 H=成品, 10 inch reel 两倍包装量 S=成品, 20K包装量 V=bulk (散料)	Distinction Code 空码 = 无指定 - "X" = 特别指定, 不同字母代表不同指定

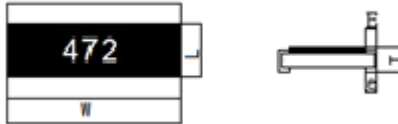
3. 电阻本体字码标示 (Marking on the Resistor's Body):

※ 公差±5%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 ±5% 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, (10 ^x)		472=47×10 ² =4.7K Ω
		10Ω 以下标示：5R6=5.6Ω Below 10Ω: 5R6=5.6Ω
※ ±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 ±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, (10 ^x)		4992=499×10 ² =49.9K Ω
		100Ω 以下标示：20R0=20Ω Below 100Ω: 20R0=20Ω
※ 0 欧姆产品，采用 000 三位代码标示。 0Ω Products, use 000 3digits code to indicate the resistance value.		000=0Ω

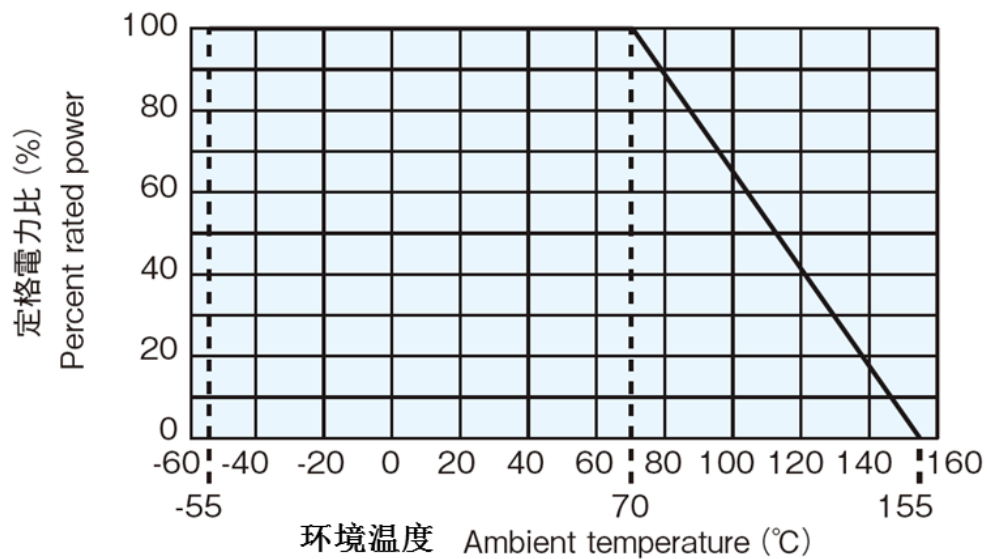
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4. 尺寸 (dimension) :

尺寸 dimension					
	单位 (unit) : mm				
型别 (Type)	L	W	T	E	e
AW0612	1.60±0.20	3.20±0.20	0.55±0.10	0.30±0.20	0.50±0.20
AW1020	2.50±0.15	5.00±0.20	0.55±0.10	0.40±0.20	0.75±0.20
AW1225	3.20±0.20	6.50±0.20	0.55±0.20	0.40±0.20	0.75±0.20

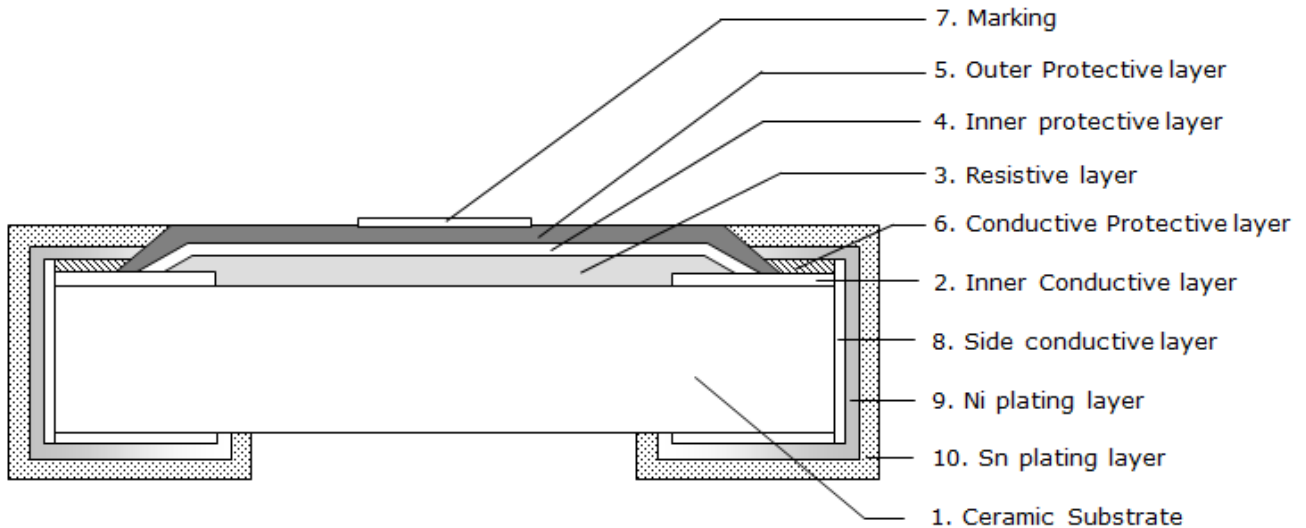
5. 功率衰减曲线 (Derating Curve) :



工作温度范围 (Operating Temperature Range) : -55°C~+155°C;

储存条件 (storage condition) : 5~30°C, 30~75%RH.

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	银钯 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	电极保护层 Conductive Protective layer	银 Ag
7	文字 Marking	环氧树脂 Epoxy
8	侧电极 Side conductive layer	镍铬合金 Ni-Cr
9	镍电极 Ni plating layer	镍 Ni
10	锡电极 Sn plating layer	雾锡 Matte Tin

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7. 阻值范围 (resistance range) :

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	
					F: ±1.0%	J: ±5.0%
0612	0.75W	200V	400V	±200	1Ω ≤ R < 10Ω	
				±100	10Ω ≤ R ≤ 10MΩ	
1020	1W			±200	1Ω ≤ R < 10Ω	
				±100	10Ω ≤ R ≤ 10MΩ	
1225	2W			±200	1Ω ≤ R < 10Ω	
				±100	10Ω ≤ R ≤ 10MΩ	

8. 电气特性 (electrical characteristics) :

型别 Type	AW0612	AW1020	AW1225
额定功率 Rated power	0.75W	1W	2W
零欧姆阻值 Resistance Value of Jumper	20mΩ Max		
零欧姆额定电流 Rated Current of Jumper	4.0A	6.0A	8.0A
最大过载电流 < 1 秒且 1 次 Max Over Load Current < 1 Second and 1 times	15.0A	22.0A	30.0A

备注 (remark) :

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

$$E = \sqrt{RP}$$

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 9, the maximum working voltage shall be regarded as rated voltage.

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9. 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	$TCR = (R - R_0) / (t - t_0) R_0 \times 10^6$ (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)	参考第 7 项
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 5 秒后测量试验前后的阻值变化率。 Applied 2.5 times of rated voltage for 5 second. Measure the variation of resistance.	$\pm 1\%$: $\pm(1.0\%+0.05\Omega)$ $\pm 5\%$: $\pm(2.0\%+0.1\Omega)$
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	$\geq 10G\Omega$
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 $\leq 5\%$ Individual leaching area $\leq 5\%$ 总未吃锡面积 $\leq 10\%$ Total leaching area $\leq 10\%$
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.	$< 5\%$: $\pm(0.50\%+0.05\Omega)$ $\geq 5\%$: $\pm(1.00\%+0.05\Omega)$

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内容 Item	测试方法 Test Methods	测试条件 Test Conditions	规格 Specification
焊锡性 Solderability	J-STD-002	干热 155 度 4 小时后浸入 245±5°C 锡炉 3 秒 4 hrs 155°C dry heat, 245±5°C 3 sec.	±1%: ±(0.50%+0.05Ω) ±5%: ±(1.00%+0.05Ω)
耐溶剂 Resistance to Solvent	MIL-STD-202 Method 215	浸于洁净的 OKEM 化学水溶液中或同等水溶液中。 Add Aqueous wash chemical-OKEM clean or equivalent	±(0.50%+0.05Ω)
负荷寿命 Operational Life	MIL-STD-202 Method 108	恒定温度 125°C 加载额定电压, 通电 1.5H, 断电 0.5H, 共持续 1000+24/-0 小时。静置 24±4 后量测阻值。 Put the specimen in a chamber at 125°C temperature, ON TIME:1.5H, OFF TIME:0.5H, rated voltage 1000 +24/-0 hours. Measurement at 24±4 hours after test conclusion.	±1%: ±(1.00%+0.05Ω) ±5%: ±(3.00%+0.10Ω)
耐湿特性 Biased Humidity	MIL-STD-202 Method 103	电阻放入恒温恒湿箱, 温度 85±2°C, 湿度 85±2%RH; 通 10% 的电额定电压 1000 ⁺⁴⁸ / ₋₀ 小时。静置 24±4 后量测阻值。 Put the specimen in a chamber at 85±2°C temperature and 85±2% relative humidity, 10% of operating power is 1000 ⁺⁴⁸ / ₋₀ hours. Measurement at 24±4 hours after test conclusion.	±1%: ±(1.00%+0.05Ω) ±5%: ±(3.00%+0.05Ω)
高温储存 High Temperature Exposure(Storage)	MIL-STD-202 Method 108	155°C 下放置 1000h, 不加载功率, 试验结束 24±4 小时后进行测试。 1000 hrs. @ T=155°C. Unpowered. Measurement at 24±4 hours after test conclusion.	±1%: ±(0.50%+0.05Ω) ±5%: ±(2.00%+0.05Ω)

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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	JESD22 Method JA-104	电阻放入温度循环机中, 温度 125°C至-55°C, 每个温度停滞不超过 30 分钟, 共 1000 个循环。 静置 24±4 后量测阻值。 Put the resistor into the temperature cycling machine. Temperature of 125°C to -55°C. Each temperature remains stagnant for no more than 30 minutes. Repeated 1000 cycles. Measurement at 24±4 hours after test conclusion.	±1%: ±(0.50%+0.05Ω) ±5%: ±(1.00%+0.10Ω)
机械冲击 Mechanical Shock	MIL-STD-202 Method 213	波形: 半正弦冲击脉冲波, 峰值 100 克, 持续时间为 6ms Wave Form : Tolerance for half sine shock pulse. Peak value is 100g' s. Normal duration(D) is 6(ms)	±1%: ±(1.00%+0.05Ω) ±5%: ±(2.00%+0.10Ω)
振动 Vibration	MIL-STD-202 Method 204	5 克 20 分钟, 12 个循环, 每个循环 3 个方向。 测试频率为 10-2000 H 5 g's for 20 min., 12 cycles each of 3 orientations. Note: Test from 10-2000 Hz	±1%: ±(1.00%+0.05Ω) ±5%: ±(2.00%+0.10Ω)
外观检 External Visual	MIL-STD-883 Method 2009	无需焊锡, 检查本体外观字码和电极尺寸。 Electrical test not required. Inspect device construction, marking and workmanship.	/
静电 ESD	AEC-Q200- 002 or ISO/DIS 10605	加载规定静电电压2次, 间隔1秒, 0612: 1KV; 1020(含)以上: 2KV Human body model 0612: 1KV; 1020 and above: 2KV	±(3.0%+0.05Ω)

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内容 Item	测试方法 Test Methods	测试条件 Test Conditions	规格 Specification
端子强度 Terminal Strength (SMD)	AEC Q200-006	施加压力保持 60 秒。 压力 0612: 8N; 1020 含)以上: 17.7N Pressurizing force for 60 seconds 0612: 8N; 0805 and above: 17.7N	无破损 No broken
弯折 Board Flex	AEC Q200-005	弯曲一次保持 60 秒 弯曲度 0612/1020/1225: 3mm Bending once for 60 seconds 0612/1020/1225: 3mm	±(1.00%+0.05Ω)
硫化试验 Sulfur test	ASTM-B-809-95 EIA-977	在玻璃容器底部的培养皿上铺满10mm厚的硫粉, 放置在105±3°C的恒温箱中1000H, cover the tray or base of the chamber with a bed of sulfur to 10mm depth minimum, temperature 105±3°C;1000H	±(2.00%+0.05Ω)

备注 (remark) :

$$\Delta R\% = \frac{R2-R1}{R1} * 100 \text{-----} (\%)$$

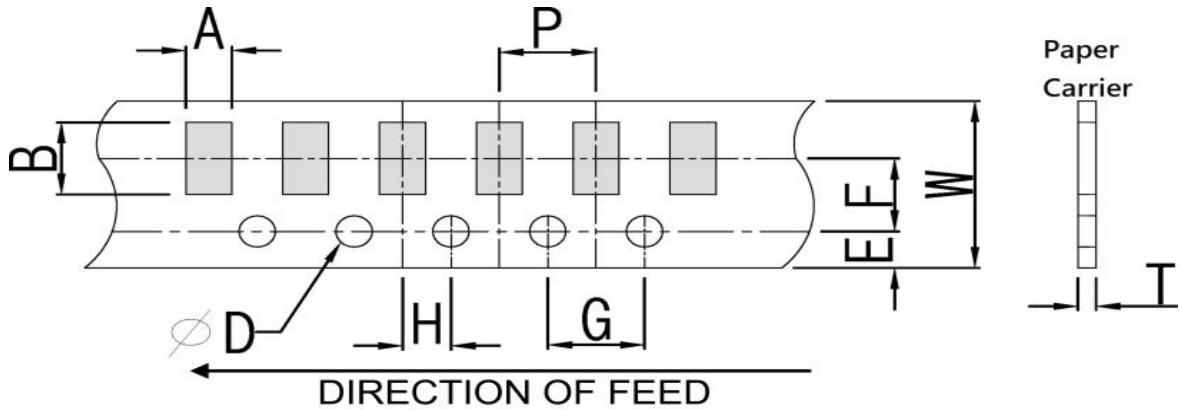
R1 = 试验前阻值(resistance before test)

R2 = 试验后阻值(resistance after test)

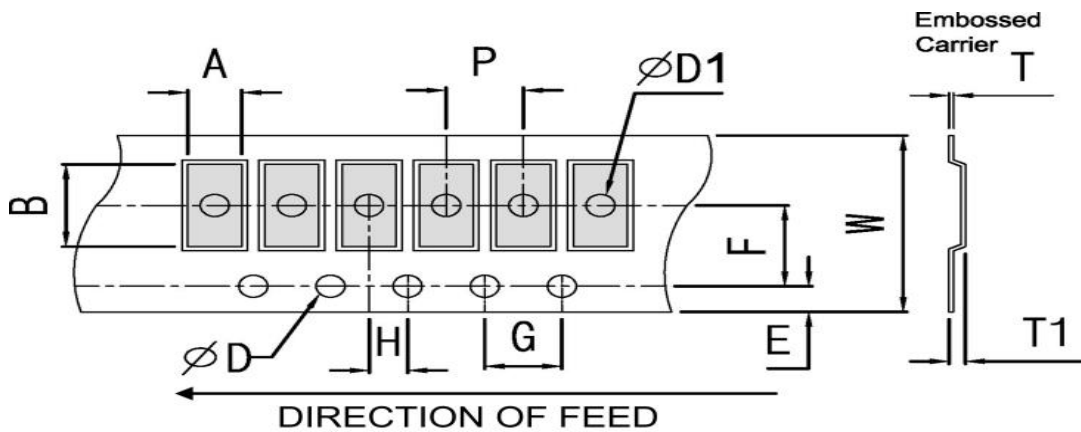
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10.2 包装尺寸 (packing dimension)



Type	A	B	W	E	F	G	H	T	ΦD	P
0612	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± ^{0.1} / _{0.0}	4.0±0.1



Unit: mm

Embossed Type

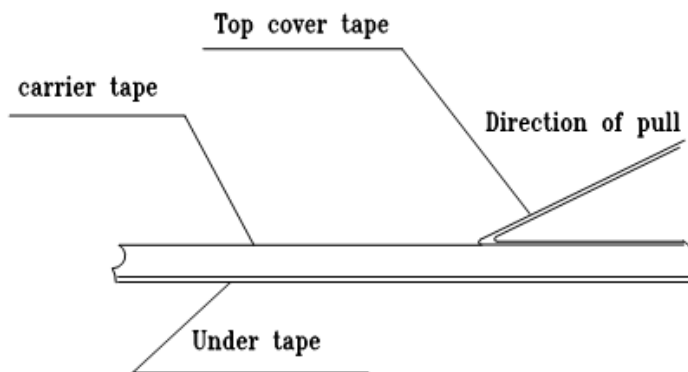
Type	A	B	W	E	F	G	H	T	ΦD	ΦD1	T1	P
1020	2.80±0.2	5.60±0.2	12±0.1	1.75±0.1	5.5±0.05	4.0±0.1	2.0±0.05	0.23±0.1	1.50± ^{0.1} / _{0.0}	1.5±0.1	0.85±0.15	4.0±0.1
1225	3.40±0.2	6.70±0.2	12±0.1	1.75±0.1	5.5±0.05	4.0±0.1	2.0±0.05	0.23±0.1		1.5±0.1	0.85±0.15	4.0±0.1

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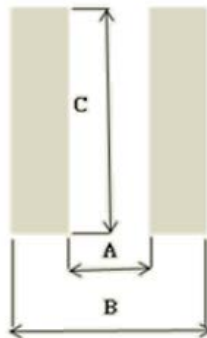
11. 上胶带剥离力测试 (Peel force of top cover tape)

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 0.10N to 0.70N (10g to 70 g), the peel force of plastic carrier tape shall be 0.15N to 0.80 (15g to 80 g)



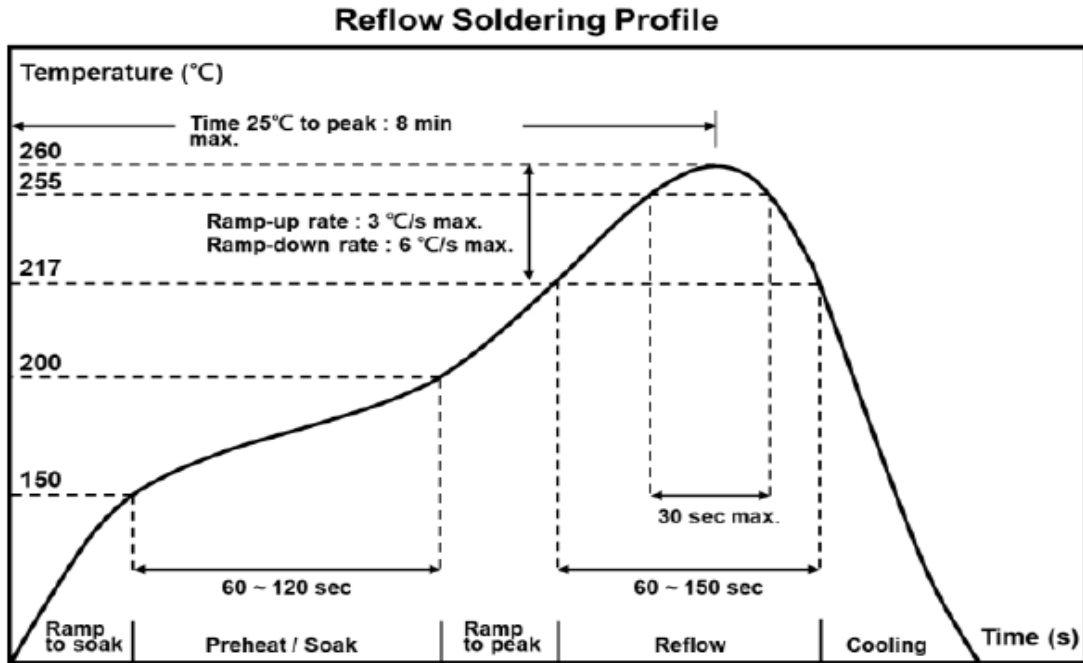
12. 焊盘尺寸 (Recommended land patterns):



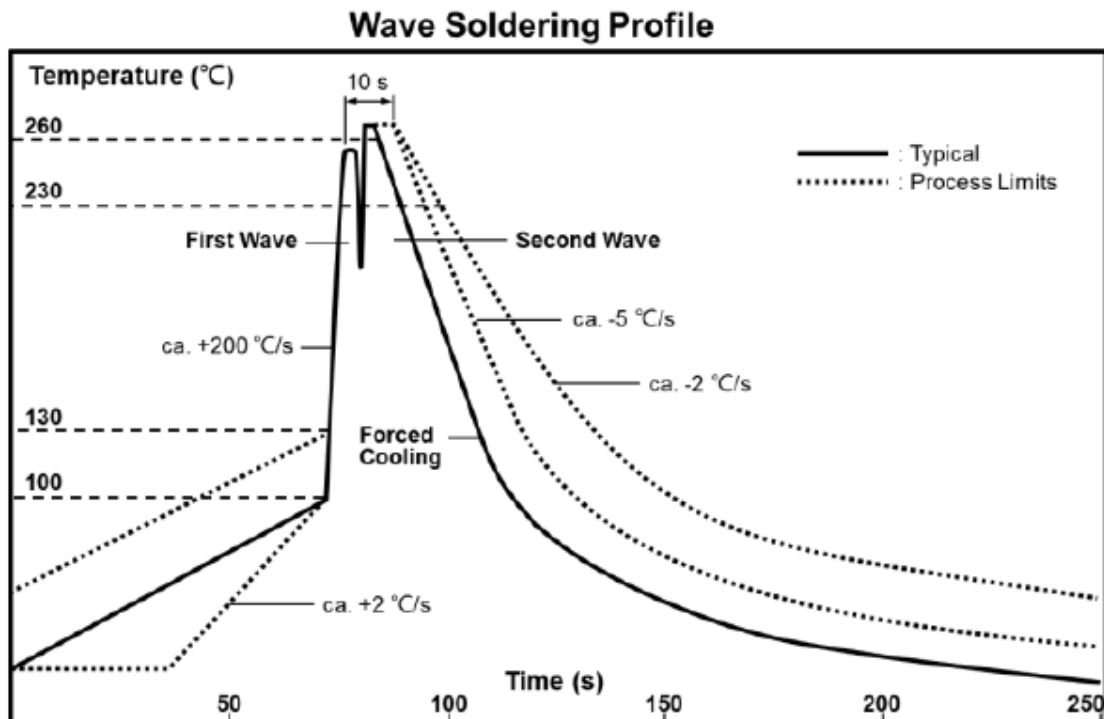
型别 Typ	焊盘式样 Land pattern	尺寸 Dimensions (mm)		
		A	B	C
	AW0612	0.60	2.90	3.20
	AW1020	0.75	3.40	5.00
	AW1225	0.85	3.70	6.40

13. 焊接 (soldering)

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



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



13.3 手工焊温度 (hand soldering temperature)

烙鐵溫度 $350\pm 10^{\circ}\text{C}$ 3 秒之內，避免烙鐵接觸電阻本體

The iron temperature is $350\pm 10^{\circ}\text{C}$, hand soldering time less than 3S. Avoid solder iron tip direct touch the components body.

產品規格及資料如有更改，恕不另行通知。

All product specification and data are subject to change without notice