

范围

本规范规定了无铅厚膜片式电阻器用于电子系统

称号

Chip Resistor 0805 1/8W $\pm 5\%$ 4K7 Ω

CR0805J80472G

CR	0805	J	8	0472	G
Series	Size	Tolerance	Power Rating	Value	SPECIAL VALUE
Name	Code	B $\pm$ 0.1%	1= 1W	4digitals	G= reel
Product..	0201	C $\pm$	2= 1/2W	49R9=49.9	V= bulk
CR=Chip	0402	0.25%	2= 3/4W (for 2010)	0472=4K7	D= special
Resistor	0603	D $\pm$ 0.5%	3= 1/3W	0103=10K	requirement
	0805	F $\pm$ 1%	3= 1/2W (for 1210)	0564=560K	
	1206	G $\pm$ 2%	4= 1/4W		
	1210	J $\pm$ 5%	8= 1/8W		
	2010	K $\pm$ 10%	A= 1/10W		
	2512		F= 1/16W		

备注

- (1) Common code for chip resistors
- (2) Normal resistance value for tolerance $\pm 0.1\%$, $\pm 0.25\%$, $\pm 0.5\%$ $\pm 1\%$:
the first three digits are significant figures of resistance value and the fourth one denotes the power number of 10, (10^x)
Example: 330 ohm: 3300, 4.7K ohm: 4701
22K ohm: 2202, 100K ohm: 1003
- (3) Normal resistance value for tolerance $\pm 2\%$, $\pm 5\%$, $\pm 10\%$:
the first digit is zero, the second and third digit are significant figures of resistance value and the fourth one denotes the power number of 10, (10^x)
Example: 330 ohm: 0331, 4.7K ohm: 0472
22K ohm: 0223, 100K ohm: 0104

(3) EXPLANATION OF PART NUMBER FOR 0603, $\pm 1\%$
EIA-96 Marking

code R Value	code R Value	code R Value	code R Value	code R Value	code R Value	code R Value	code R Value
01 100	13 133	25 178	37 237	49 316	61 422	73 562	85 750
02 102	14 137	26 182	38 243	50 324	62 432	74 576	86 768
03 105	15 140	27 187	39 249	51 332	63 442	75 590	87 787
04 107	16 143	28 191	40 255	52 340	64 453	76 604	88 806
05 110	17 147	29 196	41 261	53 348	65 464	77 619	89 825
06 113	18 150	30 200	42 267	54 357	66 475	78 634	90 845
07 115	19 154	31 205	43 274	55 365	67 487	79 649	91 866
08 118	20 158	32 210	44 280	56 374	68 499	80 665	92 887
09 121	21 162	33 215	45 287	57 383	69 511	81 681	93 909
10 124	22 165	34 221	46 294	58 392	70 523	82 698	94 931
11 127	23 169	35 226	47 301	59 402	71 536	83 715	95 953
12 130	24 174	36 223	48 309	60 412	72 549	84 732	96 976

This table shows the first two digits for the three-digit EIA-96 part marking scheme the third character is a letter multiplier:

$Y=10^{-2}$, $X=10^{-1}$, $A=10^0$, $B=10^1$, $C=10^2$, $D=10^3$, $E=10^4$, $F=10^5$

- (4) If the resistance value is not found in the table for 0603 product, will use normal three digits to show the value, but will add a special mark “-” under the three digits. Example as following:

“ 331 ” indicates that it is 0603 $\pm 1\%$ 330ohm product.

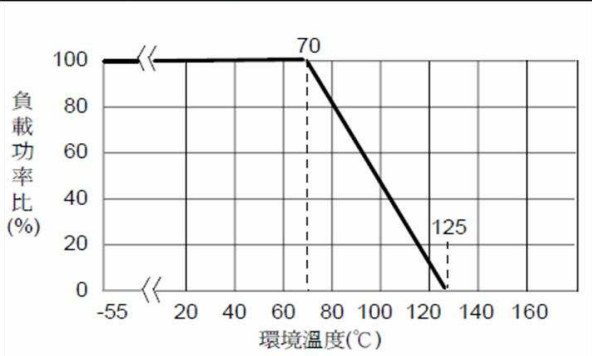
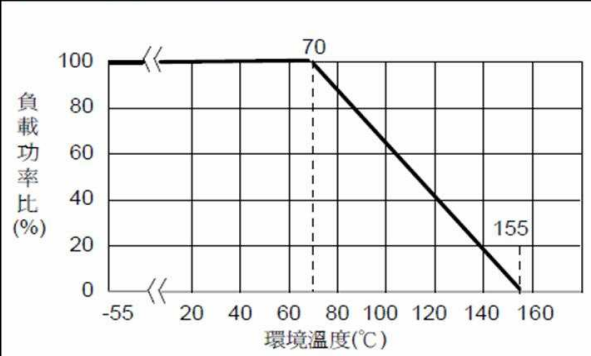
3. Rating

3.1 Rated Power (%)

Rated power shall be load power corresponding to normal wattage suitable for continuous use at 70°C ambient temperature in case the ambient temperature exceeds 70°C reduce the load power in accordance with derating curve shown as

TYPE	Rated Power	Max. Working Voltage	Max. Overload Voltage
CR0201	1/20W	25V	50V
CR0402	1/16W	50V	100V
CR0603	1/10W	50V	100V
CR0805	1/8W	150V	300V
CR1206	1/4W	200V	400V
CR1210	1/2W	200V	400V
CR2010	3/4W	200V	400V
CR2512	1W	200V	400V

降额曲线

使用 溫度範圍	-55℃ ~ +125℃ (0201)	-55℃ ~ +155℃ (其他)
說明	周圍溫度若超過70℃至125℃之間，功率可照下圖曲線予以修定之。	周圍溫度若超過70℃至155℃之間，功率可照下圖曲線予以修定之。
功率衰減曲線圖	 負載功率比 (%) 環境溫度(℃)	 負載功率比 (%) 環境溫度(℃)

工作溫度範圍為-55 ~ +155 ；

儲存條件是5~30 ，30~75%RH。

額定電壓

額定的電壓，計算形式的額定功率和正常電阻由下式： $E = \sqrt{RP}$

其中：E：額定的電壓（V）

P：額定功率（W）

R：普通電阻（歐姆）

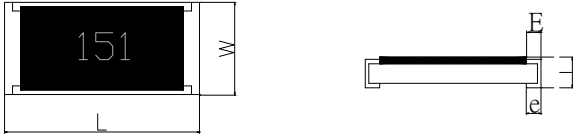
在情況下，通過下式計算出的值超過最大工作電壓作為

最大工作電壓應視為額定

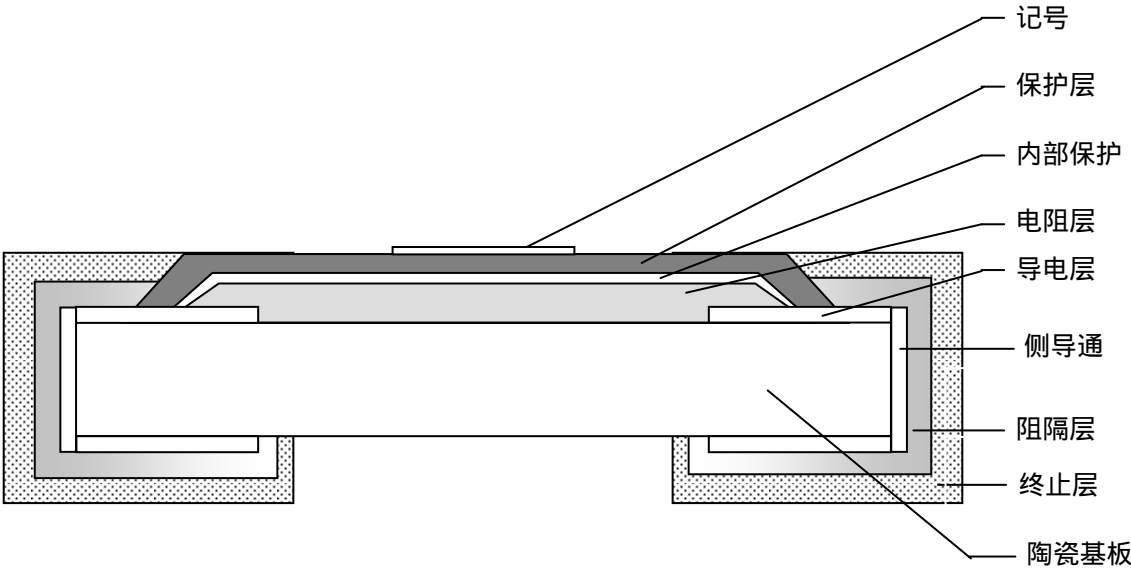
電阻範圍和電阻容差

TYPE NO.	Tolerance (%)	Symbol	Resistance Range(ohm)	Standard Resistance Values
CR0402 CR0603 CR0805 CR1206	±0.5%	D	10~1M	E96
CR0201	±1%	F	1R0-10M 0R (jumper)	E96
CR0402	±2%	G		
CR0603	±5%	J	1R0~22M 0R (jumper) (0201:1R0-10M)	E24
CR0805	±10%	K		
CR1206	±20%	M		
CR1210				
CR2010				
CR2512				

尺寸

DIMENSIONS					
Type	L	W	T	E	e
CR0201	0.60±0.03	0.30±0.03	0.23±0.03	0.15±0.05	0.15±0.05
CR0402	1.00±0.05	0.50±0.05	0.35±0.05	0.15±0.10	0.20±0.10
CR0603	1.60±0.15	0.80±0.10	0.45±0.10	0.25±0.20	0.30±0.20
CR0805	2.00±0.15	1.25±0.15	0.50±0.10	0.35±0.20	0.40±0.20
CR1206	3.10±0.15	1.60±0.15	0.55±0.10	0.45±0.25	0.40±0.25
CR1210	3.10±0.15	2.50±0.15	0.55±0.15	0.35±0.25	0.60±0.35
CR2010	5.00±0.20	2.50±0.20	0.55±0.15	0.65±0.25	0.50±0.25
CR2512	6.25±0.20	3.10±0.20	0.55±0.15	0.85±0.25	0.95±0.25

结构及材料



No.	construction	Major material
1	Ceramic substrate	Al2O3
2	Conductive layer	Ag
3	Side conductive layer	NiCr
4	Resistive layer	RuO2 + glass
5	Inner protective layer	Glass
6	Protective layer	Epoxy
7	Marking	Epoxy
8	Termination barrier layer	Ni
9	Termination layer	Matte Tin

4.3 Electrical Characteristics:

Type	Rated Power at 70°C	Max. Working Voltage	Max. Overload Voltage	T.C.R (ppm/°C)	Resistance Range				Jumper Resistance Value	Jumper Rated Current
					D(±0.5%) E96	F(±1%) E96	G(±2%) E24	J(±5%) E24		
0201	1/20W	25V	50V	±600	-----	1Ω~25Ω	1Ω~25Ω	1Ω~25Ω	50mΩ MAX	0.5A
				±250	-----	25Ω~10MΩ	25Ω~10MΩ	25Ω~10MΩ		
0402	1/16W	50 V	100V	+500~-250	-----	1Ω~10Ω	1Ω~10Ω	1Ω~10Ω	50mΩ MAX	1A
				±200	10Ω~1MΩ	10Ω~10MΩ	10Ω~10MΩ	10Ω~22MΩ		
				±100	-----	-----	-----	-----		
0603	1/10W	50V	100V	+500~-250	-----	1Ω~10Ω	1Ω~10Ω	1Ω~10Ω	50mΩ MAX	1A
				±200	-----	-----	10Ω~10MΩ	10Ω~22MΩ		
				±100	10Ω~1MΩ	10Ω~10MΩ	-----	-----		
0805	1/8W	150V	300V	+500~-250	-----	1Ω~10Ω	1Ω~10Ω	1Ω~10Ω	50mΩ MAX	1.5A
				±200	-----	-----	10Ω~10MΩ	10Ω~22MΩ		
				±100	10Ω~1MΩ	10Ω~10MΩ	-----	-----		
1206	1/4W	200V	400V	+500~-250	-----	1Ω~10Ω	1Ω~10Ω	1Ω~10Ω	50mΩ MAX	1.9A
				±200	-----	-----	10Ω~10MΩ	10Ω~22MΩ		
				±100	10Ω~1MΩ	10Ω~10MΩ	-----	-----		
1210	1/2W	200V	400V	+500~-250	-----	1Ω~10Ω	1Ω~10Ω	1Ω~10Ω	50mΩ MAX	2.2A
				±200	-----	-----	10Ω~10MΩ	10Ω~22MΩ		
				±100	-----	10Ω~10MΩ	-----	-----		
2010	3/4W	200V	400V	+500~-250	-----	1Ω~10Ω	1Ω~10Ω	1Ω~10Ω	50mΩ MAX	3A
				±200	-----	-----	10Ω~10MΩ	10Ω~22MΩ		
				±100	-----	10Ω~10MΩ	-----	-----		
2512	1W	200V	400V	+500~-250	-----	1Ω~10Ω	1Ω~10Ω	1Ω~10Ω	50mΩ MAX	3A
				±200	-----	-----	10Ω~10MΩ	10Ω~22MΩ		
				±100	-----	10Ω~10MΩ	-----	-----		

*ZERO OHM JUMPER<0.050HM

环保性能

Description	Specification Limits	Test Methods
Temperature Coefficient	(over 10ohm) ± 200 ppm/°C Max. (lower 10ohm) +500~-250 ppm/°C	JIS C5202 5.2
Short Time Overload	$\pm(1.00\%+0.05\text{ohm})$ Max.	JIS C5202 5.5
Resistance to Soldering Heat	$\pm(1.00\%+0.05\text{ohm})$ Max.	JIS C5202 6.4
Solderability	95% Coverage Min.	JIS C5202 6.4
Load Life	$\pm(3.00\%+0.05\text{ohm})$ Max.	JIS C5202 7.10
Load Life Humidity	$\pm(2.00\%+0.05\text{ohm})$ Max.	JIS C5202 7.5
Temperature Cycle	$\pm(2.00\%+0.05\text{ohm})$ Max.	JIS C5202 7.6
Component high temperature resistance	$\pm(1.00\%+0.05\text{ohm})$ Max.	<260°C 10second 3times
Component rework/hand soldering temperature resistance	Avoid solder iron tip direct touch the components body	Approx. 350°C for 3seconds
MSL (moisture sensitive level)	Level 1	J-STD-020C

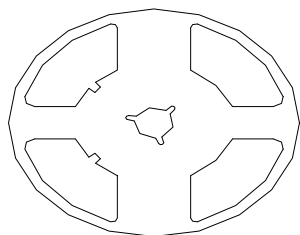
规格规范

Dimensions		A	B	C	F	W
CR0201 CR0402 CR0603 CR0805 CR1206 CR1210	mm	178 $\pm$ 2.0	60.0 $\pm$ 1.0	13.5 $\pm$ 0.5	11.4 $\pm$ 0.1	9.00 $\pm$ 0.3
	Inch	7.008 $\pm$ 0.079	2.362 $\pm$ 0.039	0.531 $\pm$ 0.020	0.449 $\pm$ 0.039	0.354 $\pm$ 0.012
	mm	178 $\pm$ 2.0	60.0 $\pm$ 1.0	13.5 $\pm$ 0.5	15.4 $\pm$ 1.0	13.0 $\pm$ 0.3
	Inch	7.008 $\pm$ 0.079	2.362 $\pm$ 0.039	0.531 $\pm$ 0.020	0.606 $\pm$ 0.039	0.512 $\pm$ 0.012

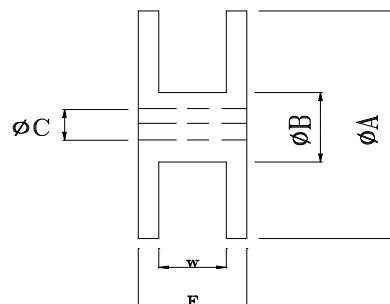
Remark: (1)CR0201/CR0402 Quantity per Reel 10,000 pcs/Reel

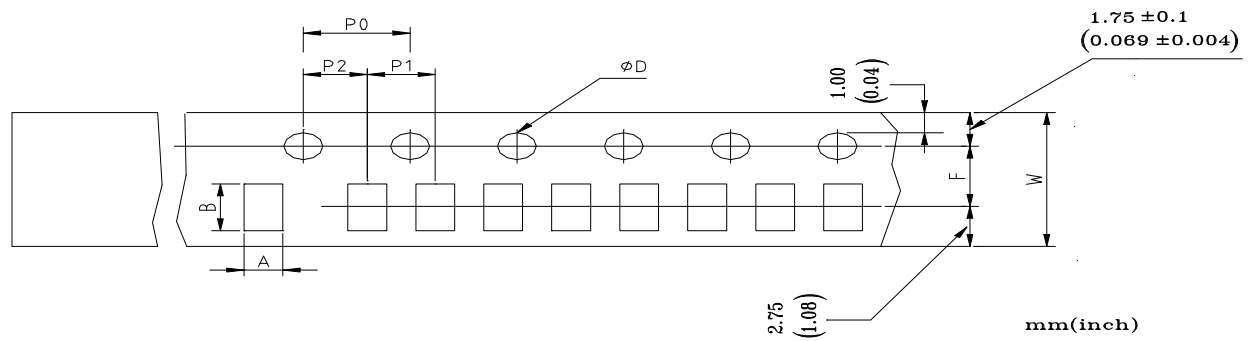
(2)CR2010/CR2512 Quantity per Reel 4,000 pcs/Reel

Reel



Standard Quantity per Reel
5,000 pcs/Reel





Dimensions		A	B	D	F	P0	P1	P2	W
CR0201	mm	0.38±0.05	0.68±0.05	1.50±0.10	3.50±0.05	4.00±0.10	2.00±0.10	2.00±0.05	8.00±0.20
	inch	0.015 ±0.002	0.027 ±0.002	0.059 ±0.004	0.138 ±0.002	0.157 ±0.004	0.079 ±0.004	0.079 ±0.002	0.315 ±0.008
CR0402	mm	0.65±0.10	1.15±0.10	1.50±0.10	3.50±0.05	4.00±0.10	2.00±0.10	2.00±0.05	8.00±0.20
	inch	0.026 ±0.004	0.045 ±0.004	0.059 ±0.004	0.138 ±0.002	0.157 ±0.004	0.079 ±0.004	0.079 ±0.002	0.315 ±0.008
CR0603	mm	1.10±0.10	1.90±0.10	1.50±0.10	3.50±0.05	4.00±0.10	4.00±0.10	2.00±0.05	8.00±0.20
	inch	0.043 ±0.004	0.075 ±0.004	0.059 ±0.004	0.138 ±0.002	0.157 ±0.004	0.157 ±0.004	0.079 ±0.002	0.315 ±0.008
CR0805	mm	1.65±0.20	2.40±0.20	1.50±0.10	3.50±0.05	4.00±0.10	4.00±0.10	2.00±0.05	8.00±0.20
	inch	0.065 ±0.008	0.094 ±0.008	0.059 ±0.004	0.138 ±0.002	0.157 ±0.004	0.157 ±0.004	0.079 ±0.002	0.315 ±0.008
CR1206	mm	2.00±0.20	3.60±0.20	1.50±0.10	3.50±0.05	4.00±0.10	4.00±0.10	2.00±0.05	8.00±0.20
	inch	0.079 ±0.008	0.142 ±0.002	0.059 ±0.004	0.138 ±0.002	0.157 ±0.004	0.157 ±0.004	0.079 ±0.002	0.315 ±0.008
CR1210	mm	2.80±0.10	3.50±0.10	1.50±0.10	3.50±0.05	4.00±0.10	4.00±0.10	2.00±0.05	8.00±0.20
	inch	0.110 ±0.004	0.138 ±0.004	0.059 ±0.004	0.138 ±0.002	0.157 ±0.004	0.157 ±0.004	0.079 ±0.002	0.315 ±0.008
CR2010	mm	2.90±0.10	5.30±0.10	1.50±0.10	5.50±0.05	4.00±0.10	4.00±0.10	2.00±0.05	12.0±0.10
	inch	0.114 ±0.004	0.209 ±0.004	0.059 ±0.004	0.216 ±0.002	0.157 ±0.004	0.157 ±0.004	0.079 ±0.002	0.472 ±0.004
CR2512	mm	3.40±0.10	6.60±0.10	1.50±0.10	5.50±0.05	4.00±0.10	4.00±0.10	2.00±0.05	12.0±0.10
	inch	0.134 ±0.004	0.260 ±0.004	0.059 ±0.004	0.216 ±0.002	0.157 ±0.004	0.157 ±0.004	0.079 ±0.002	0.315 ±0.004

特性和试验方法

7.1 Electrical characteristics test methods

7.1.1 Resistance Value

Measurement of resistance take place by the bridge methods or by use of a measuring instrument corresponding accuracy, its accuracy being fully reliable with respect to tolerances on resistance. The applied voltage for measurement shall be as specified in Table as following.

Resistance	Voltage applied(V)
1Ω~100Ω	0.3VΩ
100Ω~1KΩ	1VΩ
1KΩ~10KΩ	3VΩ
10KΩ~100KΩ	10VΩ
100KΩ~1MΩ	25VΩ
1MΩ~10MΩ	50VΩ
10MΩ~aboveΩ	100VΩ

7.1.2 Temperature Coefficient of Resistance

In according with 7.1.1 measure initial of resistor mounted on the test board, Then Keep the temperature at each step as following table, hold for 30 minutes after reaching a given temperature and measure resistance under the same condition as initial-value measurement. The temperature coefficient of resistance calculated from these measured values by the following formula.

$$\text{Temperature coefficient(ppm/}^{\circ}\text{C)} = \frac{R - R_0}{R} * \frac{1}{t - t_0} * 10^6$$

Where R = Resistance value at tested temperature

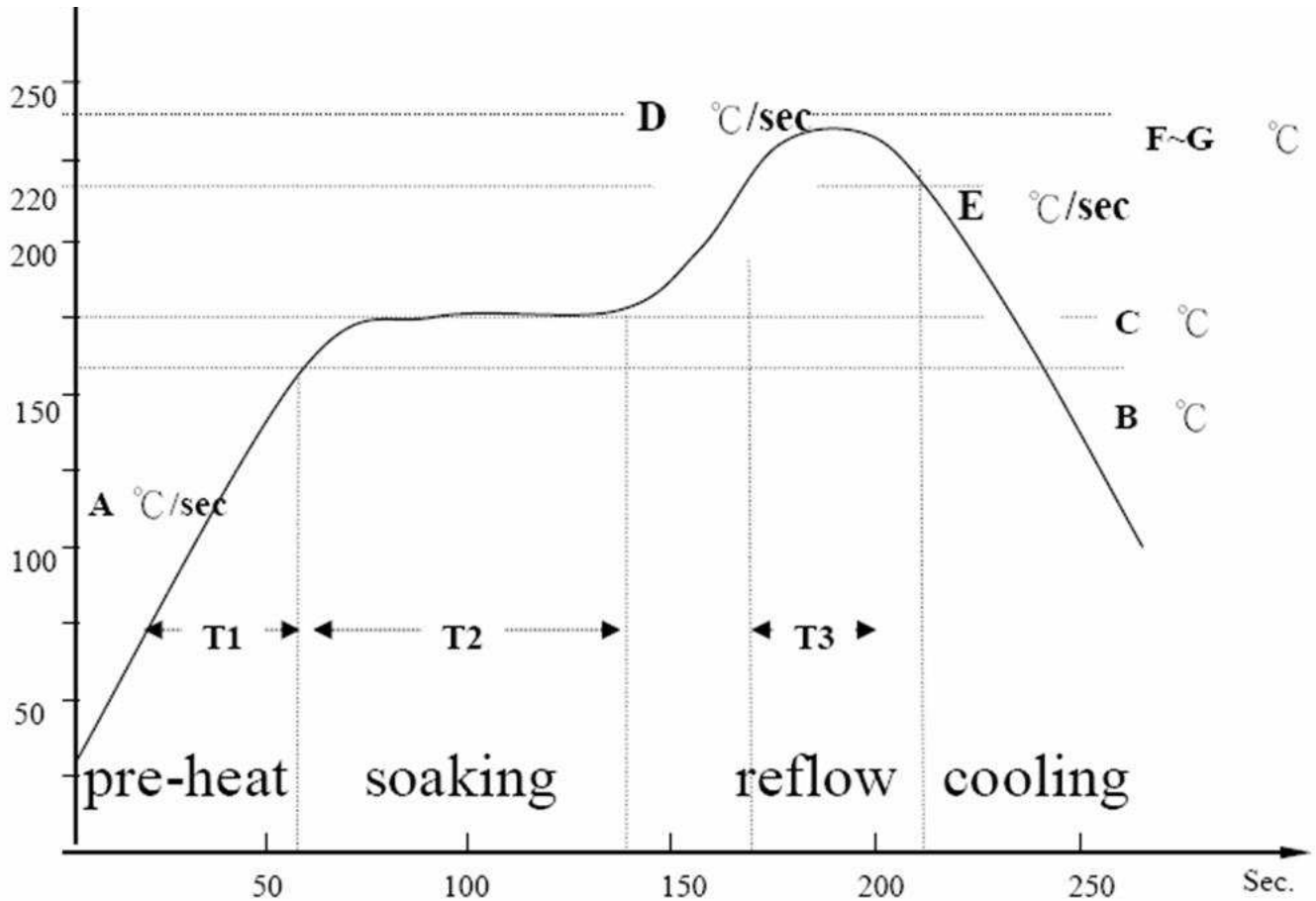
R₀ = Initial resistance value

t = Actual measurement of tested temperature

t₀ = Initial temperature

STEP	TEMPERATURE
1	25±5℃
2	125±5℃

建议参考低焊接曲线



A: ramp up rate during preheat:	1.0~3.0 °C/sec
B~ C : soaking temperature:	155~185 °C
D: ramp up rate during reflow:	1.2~2.3 °C/sec
E: ramp down rate during cooling:	1.0~6.0 °C/sec
F~G : peak temperature:	230~250 °C
T1: preheat time:	50~80 sec
T2 : dwell time during soaking:	60~120 sec
T3 : time above 220 °C :	30~100 sec

7.3.8 Recommend wave soldering profile

波峰焊曲线

