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 ±5% 4K7Ω

CR0805J80472G

CR	0805	J	8	0472	G

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

备注

(1) Common code for chip resistors

(2) Normal resistance value for tolerance ±0.1% , ±0.25%, ±0.5% ±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 ±2% , ±5%, ±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, ±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 tree-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 ±1% 330ohm product.

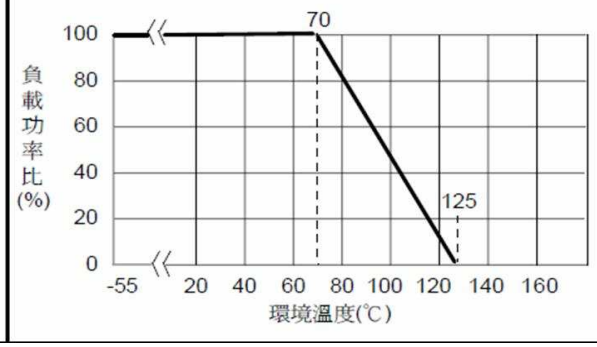
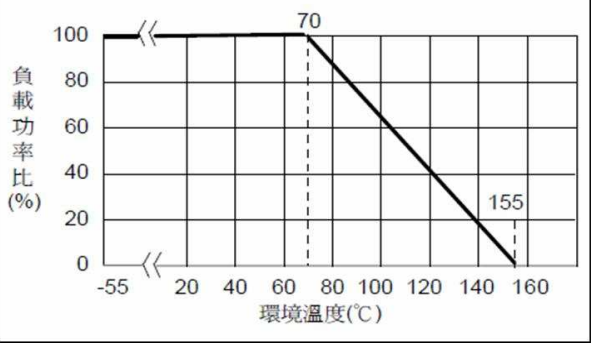
3. Rating

3.1 Rated Power (%)

Rated power shall be load power corresponding to normal wattage suitable for continuous use at 70℃ ambient temperature in case the ambient temperature exceeds 70℃ 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		

工作温度范围为-55℃?+155℃;

储存条件是5~30℃，30~75%RH。

额定电压

额定的电压，计算形式的额定功率和正常电阻由下式：E = $\sqrt{RP}$

其中：E：额定的电压（V）

P：额定功率（W）

R：普通电阻（欧姆）

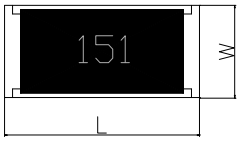
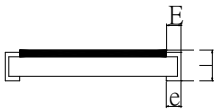
在情况下，通过下式计算出的值超过最大工作电压作为

最大工作电压应视为额定

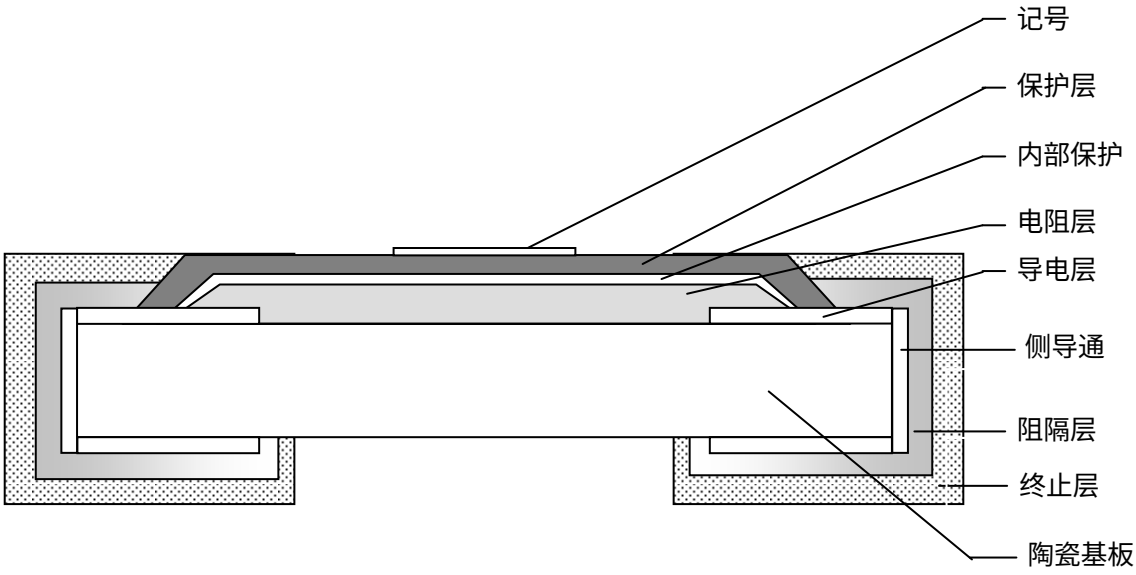
电阻范围和电阻容差

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 CR1210 CR2010 CR2512	±20%	M		

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	Al203
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℃	Max. Working Voltage	Max. Overload Voltage	T.C.R (ppm/℃)	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<0.05OHM										

环保性能

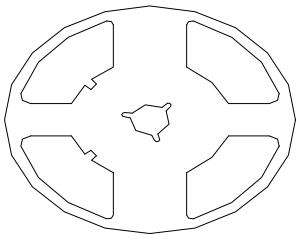
Description	Specification Limits	Test Methods
Temperature Coefficient	(over 10ohm) ±200 ppm/℃ Max. (lower 10ohm) +500～-250 ppm/℃	JIS C5202 5.2
Short Time Overload	±(1.00%+0.05ohm) Max.	JIS C5202 5.5
Resistance to Soldering Heat	±(1.00%+0.05ohm)Max.	JIS C5202 6.4
Solderability	95% Coverage Min.	JIS C5202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

攻规范

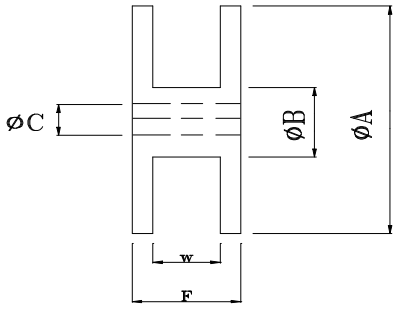
Dimensions		A	B	C	F	W
CR0201 CR0402 CR0603 CR0805 CR1206 CR1210	mm	178±2.0	60.0±1.0	13.5±0.5	11.4±0.1	9.00±0.3
	Inch	7.008±0.079	2.362±0.039	0.531±0.020	0.449±0.039	0.354±0.012
CR2010 CR2512	mm	178±2.0	60.0±1.0	13.5±0.5	15.4±1.0	13.0±0.3
	Inch	7.008±0.079	2.362±0.039	0.531±0.020	0.606±0.039	0.512±0.012

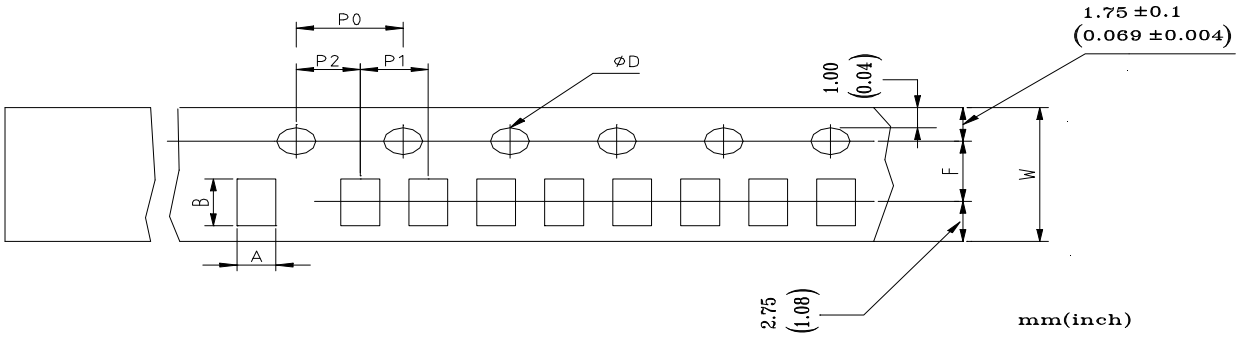
Remark: (1)CR0201/CR0402 Quantity per Reel 10,000 pcs/Reel
(2)CR2010/CR2512 Quantity per Reel 4,000 pcs/Reel

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

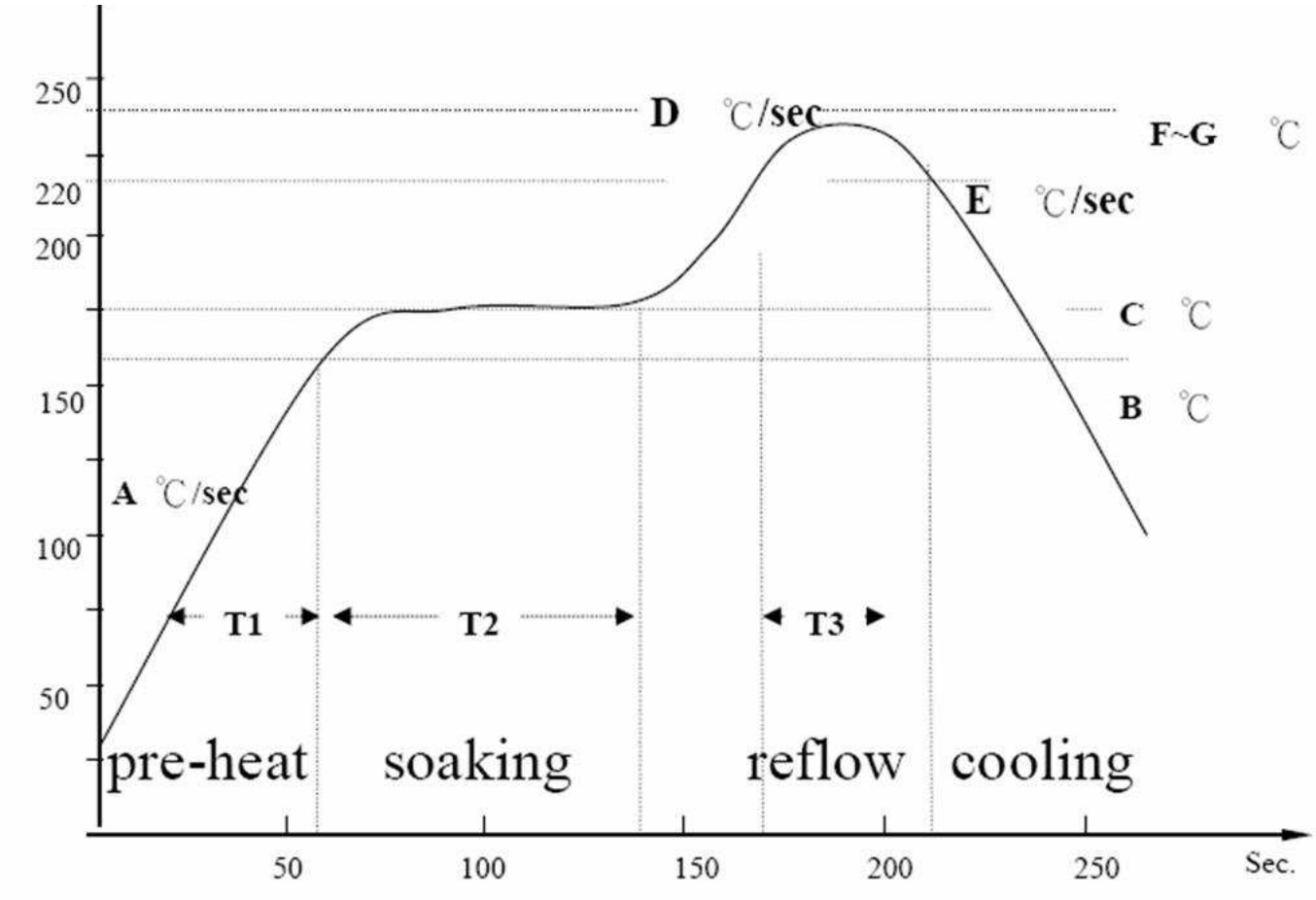
In according with 7.1.1 measure initial of resistor mounted on the test board, Then Keep the temperature at each step as following table, hold for 30 minutes after reaching a given temperature and measure resistance under the same condition as initial-value measurement. The temperature coefficient of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

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

Where R = Resistance value at tested temperature
R_0 = Initial resistance value
t = Actual measurement of tested temperature
t_0 = 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 ℃/sec
B~ C : soaking temperature:	155~185 ℃
D: ramp up rate during reflow:	1.2~2.3 ℃/sec
E: ramp down rate during cooling:	1.0~6.0 ℃/sec
F~G : peak temperature:	230~250 ℃
T1: preheat time:	50~80 sec
T2 : dwell time during soaking:	60~120 sec
T3 : time above 220 ℃ :	30~100 sec

7.3.8 Recommend wave soldering profile