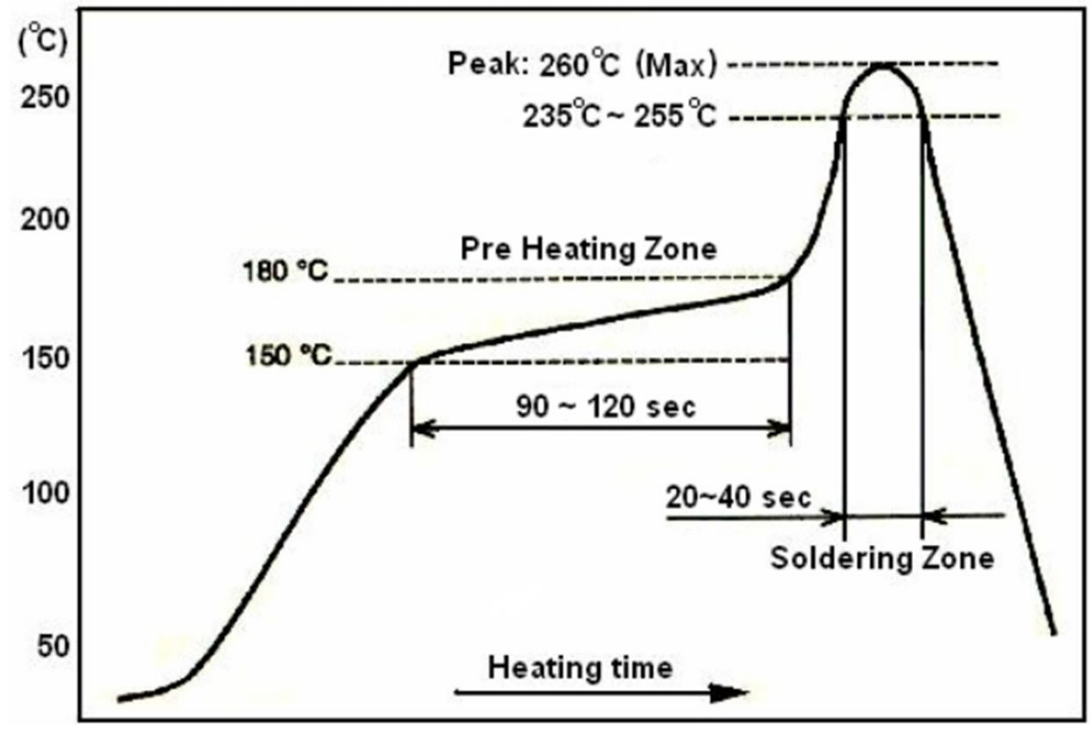
Chip resistor (SMD)		
Characteristics	**Limit**	**Soldering Condition**
Soldering Temp. reference	Electrical characteristics shall be satisfied. Without distinct deformation in appearance. (95 % coverage Min.)	**A. Wave soldering condition:** Pre-heat: 100 to 120 °C, 30 ± 5 sec. Suggestion Soldering Temp.: 235 ~ 255 °CSuggestion Soldering Time: 10 sec. (Max.) Peak Temperature: 260 °C, 10 sec. (Max.) **Reflow soldering condition:** Pre-heat: 150 to 180 °C, 90 ~ 120 sec. Suggestion Soldering Temp.: 235 ~ 255 °CSuggestion Soldering Time: 20 ~ 40 sec. Peak Temperature: 260 °C, 10 sec. (Max.) Maximum Soldering Time: 2 times **Hand soldering condition:** Hand soldering temperature: 350 +/-5 °CDwell time in solder: Less than 3 sec. Soldering Wattage: Less than 40 W. Maximum Soldering Time: 1 time
Solderability	**95 % coverage Min.**	**Test temperature of solder : 245+/-3°CDwell time in solder : 3 ~ 5 seconds**

Recommended Reflow Soldering Curve:



Max Soldering Time: 3 times

Temperature profile for evaluation

B. Recommended Wave Soldering Curve:
Pre-heat: 100 to 120 °C, 30 ± 5 sec.
Temperature: 235 - 255 °C, 10 sec. (Max)

Test Methods of GB/T 5729, JIS-C-5201, IEC 60115-1

GB/T 5729、JIS-C-5201、IEC 60115-1 检测方法

测试项目	引用标准	测试方法
Temperature coefficient **温度系数**	**GB/T 5729 4.8** **JIS-C-5201 4.8** **IEC 60115-1 4.8**	Natural resistance change per temperature degree centigrade 实际阻值随温度变化的变化率： $\frac{R_2-R_1}{R_1(t_2-t_1)}$ X 10^6 (PPM / °C) R_1: Resistance value at room temperature 室温下的阻值 (t_1); R_2: Resistance at test temperature (Upper limit temperature or Lower limit temperature) 测试温度下的阻值 (上限温度或者下限温度) t_1: +25°C or specified room temperature +25°C 或者特殊要求的室内温度 ; t_2: Upper limit temperature or Lower limit temperature test temperature 上限温度或者下限温度的测试温度
Short-time overload **短时间过负荷**	**GB/T 5729 4.13** **JIS-C-5201.4.13** **IEC 60115-1 4.13**	Permanent resistance change after the application of a potential of 2.5 times RCWV or Max.Overload Votage whichever less for 5 seconds. 加 2.5 倍额定工作电压或最大过负荷电压 (取其低者)，持续 5 秒钟，测阻值变化。
Insulation resistance **绝缘阻值**	**GB/T 5729 4.6** **JIS-C-5201 4.6** **IEC 60115-1 4.6**	1. Chip Resistor:if insulation withstanding voltage is<100V,test voltage to use equals insulation withstanding voltage; if the insulation withstanding voltage is ≥100V,test voltage will be 100±15VDC or insulation voltage,test the resistance value after 1 minute. 2. Through Hole Resistor:if insulation withstanding voltage is<500V,test voltage equals insulation withstanding voltage; if the insulation withstanding voltage is≥ 500V,test voltage will be 500±50VDC ; test the resistance value after 1 minute. 1. 贴片电阻：绝缘耐压＜ 100V，测试电压取绝缘耐压的电压；绝缘耐压 ≥100V，测试电压为 100±15VDC，或绝缘电压1分钟后量测阻值。 2. 插件电阻：绝缘耐压 ＜ 500V，测试电压取绝缘耐压的电压；绝缘耐压 ≥500V，测试电压为 500±50VDC，1分钟后量测阻值。
Dielectric Withstanding Voltage **绝缘耐压**	**GB/T 5729 4.7** **JIS-C-5201 4.7** **IEC 60115-1 4.7**	Resistor shall be clamped in the trough of 90° metallicV -block and shall be tested at AC potential respectively specified in the given list of each product type for 60-70 seconds.For Cement Fixed Resistors,the testing voltage is 1000V. 电阻固定在 90° 的 V 型槽中，根据不同产品规定交流电压，持续 60~70 秒，水泥型电阻电压设定为 1000V。
Pulse overload **脉冲过负荷**	**IEC 60115-1 4.39**	Rsistance change after 10000 cycles(1 second"ON",25 seconds"OFF") at 4 times of RCWV or Max.Overload whichever less. 10000 次循环后变化 (1 秒 " 通 "、25 秒断)4 倍工作电压或最大工作电压 (取其最低者)。 **Remark:** DIP resistor using 4 times of RCWV, Chip resistor using 2.5 times of RCWV **注：**传统电阻 :4×Ur, 晶片电阻 : 2.5×Ur
Terminal strength **端子强度**	**GB/T 5729 4.16** **JIS-C-5201 4.16** **IEC 60115-1 4.16**	Direct Load: Resistance at a 2.5kg direct load for 10 seconds in the direction of the longitudinal axis of the terminal leads. Twist Test: Terminal leads shall be bent through 90° at a point of about 6mm from the body of the resisitor and shall be rotated through 360° about the original axis of the bent terminal in alternating direction for a total of 3 rotations. 直接负荷：在电阻引线方向直接加 2.5 公斤力 10 秒。扭曲测试：两端导线折弯 90 度在熔点 6mm 处交替旋转 360 度 3 次。
Terminal strength **端子强度**	**GB/T 5729 4.16** **JIS-C-5201 4.16** **IEC 60115-1 4.16**	(Applicable for Resister Network 适用网络电阻) Tensile：1KG,30 seconds /Bending:500g ,2 times 张力：1KG，30 秒 / 弯曲：500g，2 次。
Terminal bending **端子弯曲**	**GB/T 5729 4.33** **JIS-C-5201 4.33** **IEC 60115-1 4.33**	(Applicable for CHIP Resisters 适用晶片电阻) Twist of Test Board:Y/X=3/90mm 60 seconds. 测试板弯曲：Y/X=3/90mm 60 秒。
Soldering heat **耐焊接热**	**GB/T 5729 4.18** **JIS-C-5201 4.18** **IEC 60115-1 4.18**	(Applicable for CHIP Resisters 适用晶片电阻) Dip the resistor into a temperature of 260±5°C and hold it for a 10±1 seconds. 将电阻浸入到 260±5°C 的锡炉中并保持 10 秒时间
Soldering heat **耐焊接热**	**GB/T 5729 4.18** **JIS-C-5201 4.18** **IEC 60115-1 4.18**	(Applicable forTH Resisters 适用插件电阻) Permanent resistor change when leads immersed to a point 2.0~2.5mm from the body in 260±5°C solder 10±1 seconds . 锡炉温度 260±5°C，浸入深度：离本体导线根部约 2.0~2.5mm，处浸入时间 10±1 秒。
Solderability **可焊性**	**GB/T 5729 4.17** **JIS-C-5201 4.17** **IEC 60115-1 4.17**	The area covered with a new, smooth, clean, shiny and continuous surface free from concentrated pinholes. Temperature of solder: 245±3°C; Dwell time in solder: 2~3 seconds. 表面光滑、清洁、均匀、有光泽，锡炉温度：245±3°C；浸入时间：2~3 秒。
Resistance to solvent **耐溶剂**	**GB/T 5729 4.29** **JIS-C-5201 4.29** **IEC 60115-1 4.29**	Specimens shall be immersed in a bath of IPA completely for a 5±0.5 minutes using ultrasonic test equipment. 电阻浸入异丙醇超声波清洗 5±0.5 分钟。
Rapid change of temperature **温度快速变化**	**GB/T 5729 4.19** **JIS-C-5201 4.19** **IEC 60115-1 4.19**	30 min at lower limit temperature and 30 min at upper limit temperature,100 cycles. 下限温度放置30min, 上限温度放置30min, 100个循环；
High Temperature Exposure **高温暴露**	**MIL-STD-202 108A**	Exposed to a test temperature (upper limit temperature) for 1000H. 在测试温度(上限温度)下曝露1000小时。
Low Temperature Storage **低温存放**	**IEC 60068-2-1 (Aa)**	Exposed to a test temperature (Lower limit temperature) for 2H. 在测试温度(下限温度)放置2小时。
Leaching **金属融出**	**J-STD-002 Test D**	Samples completely immersed for 30 sec in solder bath at 260°C, no visible damage. 样品浸入 260°C 的焊锡炉 30S，无明显的损伤。
Load life in humidity **湿度寿命**	**GB/T 5729 4.24** **JIS-C-5201 4.24** **IEC 60115-1 4.24**	Resistance change after 1000 hours (1.5hours"ON"，0.5hours"OFF") at RCWV or Max.Working Voltage whichever less in a humidity test chamber controlled at 40±2°C and 90~95% RH. 持续时间：1000h (1.5h "通"，0.5h "断")；试验温度：40±2°C；相对湿度：93%±3% RH；试验电压：额定工作电压或最大工作电压 (取其低者)。
Load life **负载寿命**	**GB/T 5729 4.25.1** **JIS-C-5201 4.25.1** **IEC 60115-1 4.25.1**	Permanent Resistance change after 1000 hours operating at RCWV or Max.Working Voltage whichever less with duty cycle of 1.5 hours "ON"，0.5 hour "OFF" at 70±2°C ambient. 持续时间：1000h (1.5h "通"，0.5h "断")；试验温度：70±2°C；试验电压：额定工作电压或最大工作电压 (取其低者)。
Accidental overload **意外过载**	**GB/T 5729 4.26** **JIS-C-5201 4.26** **IEC 60115-1 4.26**	Resistors shall resist flaming or arcing when overload up to 5,10,16,25,40,63,100 times power or 4times Max.Working Voltage , whichever less. 施加 5,10,16,25,40,63 和 100 倍额定功耗的过负荷，但所加的电压不超过 4 倍的最大工作电压，测试其阻燃性。

** *RCWV* = Rated Continuous Working Voltage 额定持续工作电压 = $\sqrt{\text{Rated Power} \times \text{Resistance Value}}$ 额定功率 × 阻值 the calculated value or the Max. Working Voltage whichever less. 计算值或该产品最大工作电压取其低者

Standard Nominal Resistance Values
标准阻值

The below chart shows the nominal resistance value for each series. The values in the chart have been in this order using the approximate values that are based on the common ratios given in the following table:

下表列出每种系列的标准阻值，表中的阻值是按照通用倍率得出的接近阻值。

Series 系 列	Common Ratio 通用倍率	Remarks 备注
E-6	$\sqrt[6]{10}$ (1.46)	Rounded off to a 2-digit figure (2 位有效数字)
E-12	$\sqrt[12]{10}$ (1.21)	Rounded off to a 2-digit figure (2 位有效数字)
E-24	$\sqrt[24]{10}$ (1.10)	Rounded off to a 2-digit figure (2 位有效数字)
E-96	$\sqrt[96]{10}$ (1.02)	Rounded off to a 3-digit figure (3 位有效数字)

E-6	E-12	E-24	E-96
1.0	1.0	1.0	1.00
			1.02
			1.05
			1.07
		1.1	1.10
			1.13
			1.15
			1.18
	1.2	1.2	1.21
			1.24
			1.27
			1.30
		1.3	1.33
			1.37
			1.40
			1.43
1.5	1.5	1.5	1.47
			1.50
			1.54
			1.58
		1.6	1.62
			1.65
			1.69
			1.74
	1.8	1.8	1.78
			1.82
			1.87
			1.91
		2.0	1.96
			2.00
			2.05
			2.10

E-6	E-12	E-24	E-96
2.2	2.2	2.2	2.15
			2.21
			2.26
			2.32
		2.4	2.37
			2.43
			2.49
			2.55
	2.7	2.7	2.61
			2.67
			2.74
			2.80
		3.0	2.87
			2.94
			3.01
			3.09
3.3	3.3	3.3	3.16
			3.24
			3.32
			3.40
		3.6	3.48
			3.57
			3.65
			3.74
	3.9	3.9	3.83
			3.92
			4.02
			4.12
		4.3	4.22
			4.32
			4.42
			4.53

E-6	E-12	E-24	E-96
4.7	4.7	4.7	4.64
			4.75
			4.87
			4.99
		5.1	5.11
			5.23
			5.36
			5.49
	5.6	5.6	5.62
			5.76
			5.90
			6.04
		6.2	6.19
			6.34
			6.49
			6.65
6.8	6.8	6.8	6.81
			6.98
			7.15
			7.32
		7.5	7.50
			7.68
			7.87
			8.06
	8.2	8.2	8.25
			8.45
			8.66
			8.87
		9.1	9.09
			9.31
			9.53
			9.76

Standard Nominal Resistance Values

标准阻值

E-24 series standard resistance value & the codes to be used in the part No. system 2%, 5% & 10% tolerance (4 digits, start with "0"):

E-24 系列标准阻值和料号系统使用代码 (4 位 , 以 0 为首位 , 2%、5%、10% 公差):

Value 阻值	Code 代码	Value 阻值	Code 代码	Value 阻值	Code 代码	Value 阻值	Code 代码	Value 阻值	Code 代码	Value 阻值	Code 代码	Value 阻值	Code 代码
1.0Ω	**010J**	10Ω	**0100**	100Ω	**0101**	1.0KΩ	**0102**	10KΩ	**0103**	100KΩ	**0104**	1.0MΩ	**0105**
1.1Ω	**011J**	11Ω	**0110**	110Ω	**0111**	1.1KΩ	**0112**	11KΩ	**0113**	110KΩ	**0114**	1.1MΩ	**0115**
1.2Ω	**012J**	12Ω	**0120**	120Ω	**0121**	1.2KΩ	**0122**	12KΩ	**0123**	120KΩ	**0124**	1.2MΩ	**0125**
1.3Ω	**013J**	13Ω	**0130**	130Ω	**0131**	1.3KΩ	**0132**	13KΩ	**0133**	130KΩ	**0134**	1.3MΩ	**0135**
1.5Ω	**015J**	15Ω	**0150**	150Ω	**0151**	1.5KΩ	**0152**	15KΩ	**0153**	150KΩ	**0154**	1.5MΩ	**0155**
1.6Ω	**016J**	16Ω	**0160**	160Ω	**0161**	1.6KΩ	**0162**	16KΩ	**0163**	160KΩ	**0164**	1.6MΩ	**0165**
1.8Ω	**018J**	18Ω	**0180**	180Ω	**0181**	1.8KΩ	**0182**	18KΩ	**0183**	180KΩ	**0184**	1.8MΩ	**0185**
2.0Ω	**020J**	20Ω	**0200**	200Ω	**0201**	2.0KΩ	**0202**	20KΩ	**0203**	200KΩ	**0204**	2.0MΩ	**0205**
2.2Ω	**022J**	22Ω	**0220**	220Ω	**0221**	2.2KΩ	**0222**	22KΩ	**0223**	220KΩ	**0224**	2.2MΩ	**0225**
2.4Ω	**024J**	24Ω	**0240**	240Ω	**0241**	2.4KΩ	**0242**	24KΩ	**0243**	240KΩ	**0244**	2.4MΩ	**0245**
2.7Ω	**027J**	27Ω	**0270**	270Ω	**0271**	2.7KΩ	**0272**	27KΩ	**0273**	270KΩ	**0274**	2.7MΩ	**0275**
3.0Ω	**030J**	30Ω	**0300**	300Ω	**0301**	3.0KΩ	**0302**	30KΩ	**0303**	300KΩ	**0304**	3.0MΩ	**0305**
3.3Ω	**033J**	33Ω	**0330**	330Ω	**0331**	3.3KΩ	**0332**	33KΩ	**0333**	330KΩ	**0334**	3.3MΩ	**0335**
3.6Ω	**036J**	36Ω	**0360**	360Ω	**0361**	3.6KΩ	**0362**	36KΩ	**0363**	360KΩ	**0364**	3.6MΩ	**0365**
3.9Ω	**039J**	39Ω	**0390**	390Ω	**0391**	3.9KΩ	**0392**	39KΩ	**0393**	390KΩ	**0394**	3.9MΩ	**0395**
4.3Ω	**043J**	43Ω	**0430**	430Ω	**0431**	4.3KΩ	**0432**	43KΩ	**0433**	430KΩ	**0434**	4.3MΩ	**0435**
4.7Ω	**047J**	47Ω	**0470**	470Ω	**0471**	4.7KΩ	**0472**	47KΩ	**0473**	470KΩ	**0474**	4.7MΩ	**0475**
5.1Ω	**051J**	51Ω	**0510**	510Ω	**0511**	5.1KΩ	**0512**	51KΩ	**0513**	510KΩ	**0514**	5.1MΩ	**0515**
5.6Ω	**056J**	56Ω	**0560**	560Ω	**0561**	5.6KΩ	**0562**	56KΩ	**0563**	560KΩ	**0564**	5.6MΩ	**0565**
6.2Ω	**062J**	62Ω	**0620**	620Ω	**0621**	6.2KΩ	**0622**	62KΩ	**0623**	620KΩ	**0624**	6.2MΩ	**0625**
6.8Ω	**068J**	68Ω	**0680**	680Ω	**0681**	6.8KΩ	**0682**	68KΩ	**0683**	680KΩ	**0684**	6.8MΩ	**0685**
7.5Ω	**075J**	75Ω	**0750**	750Ω	**0751**	7.5KΩ	**0752**	75KΩ	**0753**	750KΩ	**0754**	7.5MΩ	**0755**
8.2Ω	**082J**	82Ω	**0820**	820Ω	**0821**	8.2KΩ	**0822**	82KΩ	**0823**	820KΩ	**0824**	8.2MΩ	**0825**
9.1Ω	**091J**	91Ω	**0910**	910Ω	**0911**	9.1KΩ	**0912**	91KΩ	**0913**	910KΩ	**0914**	9.1MΩ	**0915**
												10MΩ	**0106**

E-96 series standard resistance value & the codes to be used in the part No. system not over 1% tolerance (4 digits):

E-96 系列标准阻值和料号系统使用代码 (4 位 , 0.1%、0.25%、0.5%、1% 公差):

Value 阻值	Code 代码	Value 阻值	Code 代码	Value 阻值	Code 代码	Value 阻值	Code 代码	Value 阻值	Code 代码	Value 阻值	Code 代码	Value 阻值	Code 代码	Value 阻值	Code 代码
10.0Ω	**l00J**	17.8Ω	**178J**	31.6Ω	**316J**	56.2Ω	**562J**	100Ω	**1000**	178Ω	**1780**	316Ω	**3160**	562Ω	**5620**
10.2Ω	**102J**	18.2Ω	**182J**	32.4Ω	**324J**	57.6Ω	**576J**	102Ω	**1020**	182Ω	**1820**	324Ω	**3240**	576Ω	**5760**
10.5Ω	**105J**	18.7Ω	**187J**	33.2Ω	**332J**	59.0Ω	**590J**	105Ω	**1050**	187Ω	**1870**	332Ω	**3320**	590Ω	**5900**
10.7Ω	**107J**	19.1Ω	**191J**	34.0Ω	**340J**	60.4Ω	**604J**	107Ω	**1070**	191Ω	**1910**	340Ω	**3400**	604Ω	**6040**
11.0Ω	**110J**	19.6Ω	**196J**	34.8Ω	**348J**	61.9Ω	**619J**	110Ω	**1100**	196Ω	**1960**	348Ω	**3480**	619Ω	**6190**
11.3Ω	**113J**	20.0Ω	**200J**	35.7Ω	**357J**	63.4Ω	**634J**	113Ω	**1130**	200Ω	**2000**	357Ω	**3570**	634Ω	**6340**
11.5Ω	**115J**	20.5Ω	**205J**	36.5Ω	**365J**	64.9Ω	**649J**	115Ω	**1150**	205Ω	**2050**	365Ω	**3650**	649Ω	**6490**
11.8Ω	**118J**	21.0Ω	**210J**	37.4Ω	**374J**	66.5Ω	**665J**	118Ω	**1180**	210Ω	**2100**	374Ω	**3740**	665Ω	**6650**
12.1Ω	**121J**	21.5Ω	**215J**	38.3Ω	**383J**	68.1Ω	**681J**	121Ω	**1210**	215Ω	**2150**	383Ω	**3830**	681Ω	**6810**
12.4Ω	**124J**	22.1Ω	**221J**	39.2Ω	**392J**	69.8Ω	**698J**	124Ω	**1240**	221Ω	**2210**	392Ω	**3920**	698Ω	**6980**
12.7Ω	**127J**	22.6Ω	**226J**	40.2Ω	**402J**	71.5Ω	**715J**	127Ω	**1270**	226Ω	**2260**	402Ω	**4020**	715Ω	**7150**
13.0Ω	**130J**	23.2Ω	**232J**	41.2Ω	**412J**	73.2Ω	**732J**	130Ω	**1300**	232Ω	**2320**	412Ω	**4120**	732Ω	**7320**
13.3Ω	**133J**	23.7Ω	**237J**	42.2Ω	**422J**	75.0Ω	**750J**	133Ω	**1330**	237Ω	**2370**	422Ω	**4220**	750Ω	**7500**
13.7Ω	**137J**	24.3Ω	**243J**	43.2Ω	**432J**	76.8Ω	**768J**	137Ω	**1370**	243Ω	**2430**	432Ω	**4320**	768Ω	**7680**
14.0Ω	**140J**	24.9Ω	**249J**	44.2Ω	**442J**	78.7Ω	**787J**	140Ω	**1400**	249Ω	**2490**	442Ω	**4420**	787Ω	**7870**
14.3Ω	**143J**	25.5Ω	**255J**	45.3Ω	**453J**	80.6Ω	**806J**	143Ω	**1430**	255Ω	**2550**	453Ω	**4530**	806Ω	**8060**
14.7Ω	**147J**	26.1Ω	**261J**	46.4Ω	**464J**	82.5Ω	**825J**	147Ω	**1470**	261Ω	**2610**	464Ω	**4640**	825Ω	**8250**
15.0Ω	**150J**	26.7Ω	**267J**	47.5Ω	**475J**	84.5Ω	**845J**	150Ω	**1500**	267Ω	**2670**	475Ω	**4750**	845Ω	**8450**
15.4Ω	**154J**	27.4Ω	**274J**	48.7Ω	**487J**	86.6Ω	**866J**	154Ω	**1540**	274Ω	**2740**	487Ω	**4870**	866Ω	**8660**
15.8Ω	**158J**	28.0Ω	**280J**	49.9Ω	**499J**	88.7Ω	**887J**	158Ω	**1580**	280Ω	**2800**	499Ω	**4990**	887Ω	**8870**
16.2Ω	**162J**	28.7Ω	**287J**	51.1Ω	**511J**	90.9Ω	**909J**	162Ω	**1620**	287Ω	**2870**	511Ω	**5110**	909Ω	**9090**
16.5Ω	**165J**	29.4Ω	**294J**	52.3Ω	**523J**	93.1Ω	**931J**	165Ω	**1650**	294Ω	**2940**	523Ω	**5230**	931Ω	**9310**
16.9Ω	**169J**	30.1Ω	**301J**	53.6Ω	**536J**	95.3Ω	**953J**	169Ω	**1690**	301Ω	**3010**	536Ω	**5360**	953Ω	**9530**
17.4Ω	**174J**	30.9Ω	**309J**	54.9Ω	**549J**	97.6Ω	**976J**	174Ω	**1740**	309Ω	**3090**	549Ω	**5490**	976Ω	**9760**

Standard Nominal Resistance Values

标准阻值

Value 阻值	Code 代码	Value 阻值	Code 代码	Value 阻值	Code 代码	Value 阻值	Code 代码	Value 阻值	Code 代码	Value 阻值	Code 代码	Value 阻值	Code 代码	Value 阻值	Code 代码
1.00K	**1001**	2.37K	**2371**	5.62K	**5621**	13.3K	**1332**	31.6K	**3162**	75.0K	**7502**	178K	**1783**	422K	**4223**
1.02K	**1021**	2.43K	**2431**	5.76K	**5761**	13.7K	**1372**	32.4K	**3242**	76.8K	**7682**	182K	**1823**	432K	**4323**
1.05K	**1051**	2.49K	**2491**	5.90K	**5901**	14.0K	**1402**	33.2K	**3322**	78.7K	**7872**	187K	**1873**	442K	**4423**
1.07K	**1071**	2.55K	**2551**	6.04K	**6041**	14.3K	**1432**	34.0K	**3402**	80.6K	**8062**	191K	**1913**	453K	**4533**
1.10K	**1101**	2.61K	**2611**	6.19K	**6191**	14.7K	**1472**	34.8K	**3482**	82.5K	**8252**	196K	**1963**	464K	**4643**
1.13K	**1131**	2.67K	**2671**	6.34K	**6341**	15.0K	**1502**	35.7K	**3572**	84.5K	**8452**	200K	**2003**	475K	**4753**
1.15K	**1151**	2.74K	**2741**	6.49K	**6491**	15.4K	**1542**	36.5K	**3652**	86.6K	**8662**	205K	**2053**	487K	**4873**
1.18K	**1181**	2.80K	**2801**	6.65K	**6651**	15.8K	**1582**	37.4K	**3742**	88.7K	**8872**	210K	**2103**	499K	**4993**
1.21K	**1211**	2.87K	**2871**	6.81K	**6811**	16.2K	**1622**	38.3K	**3832**	90.9K	**9092**	215K	**2153**	511K	**5113**
1.24K	**1241**	2.94K	**2941**	6.98K	**6981**	16.5K	**1652**	39.2K	**3922**	93.1K	**9312**	221K	**2213**	523K	**5233**
1.27K	**1271**	3.01K	**3011**	7.15K	**7151**	16.9K	**1692**	40.2K	**4022**	95.3K	**9532**	226K	**2263**	536K	**5363**
1.30K	**1301**	3.09K	**3091**	7.32K	**7321**	17.4K	**1742**	41.2K	**4122**	97.6K	**9762**	232K	**2323**	549K	**5493**
1.33K	**1331**	3.16K	**3161**	7.50K	**7501**	17.8K	**1782**	42.2K	**4222**	l00K	**1003**	237K	**2373**	562K	**5623**
1.37K	**1371**	3.24K	**3241**	7.68K	**7681**	18.2K	**1822**	43.2K	**4322**	102K	**1023**	243K	**2433**	576K	**5763**
1.40K	**1401**	3.32K	**3321**	7.87K	**7871**	18.7K	**1872**	44.2K	**4422**	105K	**1053**	249K	**2493**	590K	**5903**
1.43K	**1431**	3.40K	**3401**	8.06K	**8061**	19.1K	**1912**	45.3K	**4532**	107K	**1073**	255K	**2553**	604K	**6043**
1.47K	**1471**	3.48K	**3481**	8.25K	**8251**	19.6K	**1962**	46.4K	**4642**	110K	**1103**	261K	**2613**	619K	**6193**
1.50K	**1501**	3.57K	**3571**	8.45K	**8451**	20.0K	**2002**	47.5K	**4752**	113K	**1133**	267K	**2673**	634K	**6343**
1.54K	**1541**	3.65K	**3651**	8.66K	**8661**	20.5K	**2052**	48.7K	**4872**	115K	**1153**	274K	**2743**	649K	**6493**
1.58K	**1581**	3.74K	**3741**	8.87K	**8871**	21.0K	**2102**	49.9K	**4992**	118K	**1183**	280K	**2803**	665K	**6653**
1.62K	**1621**	3.83K	**3831**	9.09K	**9091**	21.5K	**2152**	51.1K	**5112**	121K	**1213**	287K	**2873**	681K	**6813**
1.65K	**1651**	3.92K	**3921**	9.31K	**9311**	22.1K	**2212**	52.3K	**5232**	124K	**1243**	294K	**2943**	698K	**6983**
1.69K	**1691**	4.02K	**4021**	9.53K	**9531**	22.6K	**2262**	53.6K	**5362**	127K	**1273**	301K	**3013**	715K	**7153**
1.74K	**1741**	4.12K	**4121**	9.76K	**9761**	23.2K	**2322**	54.9K	**5492**	130K	**1303**	309K	**3093**	732K	**7323**
1.78K	**1781**	4.22K	**4221**	10.0K	**1002**	23.7K	**2372**	56.2K	**5622**	133K	**1333**	316K	**3163**	750K	**7503**
1.82K	**1821**	4.32K	**4321**	10.2K	**1022**	24.3K	**2432**	57.6K	**5762**	137K	**1373**	324K	**3243**	768K	**7683**
1.87K	**1871**	4.42K	**4421**	10.5K	**1052**	24.9K	**2492**	59.0K	**5902**	140K	**1403**	332K	**3323**	787K	**7873**
1.91K	**1911**	4.53K	**4531**	10.7K	**1072**	25.5K	**2552**	60.4K	**6042**	143K	**1433**	340K	**3403**	806K	**8063**
1.96K	**1961**	4.64K	**4641**	11.0K	**1102**	26.1K	**2612**	61.9K	**6192**	147K	**1473**	348K	**3483**	825K	**8253**
2.00K	**2001**	4.75K	**4751**	11.3K	**1132**	26.7K	**2672**	63.4K	**6342**	150K	**1503**	357K	**3573**	845K	**8453**
2.05K	**2051**	4.87K	**4871**	11.5K	**1152**	27.4K	**2742**	64.9K	**6492**	154K	**1543**	365K	**3653**	866K	**8663**
2.10K	**2101**	4.99K	**4991**	11.8K	**1182**	28.0K	**2802**	66.5K	**6652**	158K	**1583**	374K	**3743**	887K	**8873**
2.15K	**2151**	5.11K	**5111**	12.1K	**1212**	28.7K	**2872**	68.1K	**6812**	162K	**1623**	383K	**3833**	909K	**9093**
2.21K	**2211**	5.23K	**5231**	12.4K	**1242**	29.4K	**2942**	69.8K	**6982**	165K	**1653**	392K	**3923**	931K	**9313**
2.26K	**2261**	5.36K	**5361**	12.7K	**1272**	30.1K	**3012**	71.5K	**7152**	169K	**1693**	402K	**4023**	953K	**9533**
2.32K	**2321**	5.49K	**5491**	13.0K	**1302**	30.9K	**3092**	73.2K	**7322**	174K	**1743**	412K	**4123**	976K	**9763**
														1M	**1004**

*** All values shown above are standard resistance values, other values could also be provided on a case to case basis (MOQ requested)*

*** 以上所有阻值都是标准阻值，其他阻值可以特别提供，但有相应 MOQ 之要求。*

Part No. System

标准料号系统

1	2	3	4	5	6	7	8	9	10	11	12	13	14

The standard Part No. includes 14 digits with the following explanation (标准料号包括 14 位数字，注释如下):

1. 1st~4th digits (第 1 位 ~ 第 4 位):
   a) This is to indicate the SMD Resistor size. Example (表示晶片电阻的尺寸，例如): 1206, TC05 or HV03;
   b) For Resistor Network & Coated type, the 1st~3rd digits are to indicate the product type and the 4th digit is the special feature. Example: RNLA = Resistor Newtork Circuit A type; CFRF = Carbon Film Fixed Resistors Non-Flame type; MORI = Metal Oxide Film Fixed Resistor Non-Inductive type.
   网络电阻和涂装型电阻第 1 位到第 3 位表示产品类型，第 4 位表示特殊形态，如 : RNLA = 网络电阻 A 型 ; CFRF = 不燃性碳膜电阻器 ; MORI = 无感型金属氧化膜电阻器。
   c) For Cement Fixed Resistors, these 4 digits are to indicate the product type but if the product type has only 3 digits, the 4th digit will be "0". Example: PRW0=PRW type; PRWC=PRWC type.
   水泥型前 4 位表示产品类型，如果产品只有 3 个字母，第 4 位为 0，例：PRW0=PRW 型 ; PRWC=PRWC 型。

2. 5th~ 6th digits (第 5 位 ~ 第 6 位):
   a) This is to indicate the wattage or power rating. To distinguish the sizes and the numbers, the following codes are used, and please refer to the following chart for details: W = Normal Size; S = Small Size; U = Ultra Small Size; "1" ~ "G" to denotes "1" ~ "16" as Hexadecimal:
   表示产品标识功率，为区别不同尺寸，同时使用以下字母，如 :W = 正常尺寸 ; S = 小尺寸 ; U = 超小尺寸 ; "1" ~ "G" 代表 "1" ~ "16" 为 16 进制。

1/16W ~ 1/2W (<1W)

Wattage 功率	1/2	1/3	1/4	1/5	1/6	1/7	1/8	1/9	1/10	1/11	1/12	1/13	1/14	1/15	1/16
Normal Size 正常尺寸	W2	W3	W4	W5	W6	W7	W8	W9	WA	WB	WC	WD	WE	WF	WG
Small Size 小尺寸	S2	S3	S4	S5	S6	S7	S8	S9	SA	SB	SC	SD	SE	SF	SG
Ultra Small Size 超小尺寸	U2	U3	U4	U5	U6	U7	U8	U9	UA	UB	UC	UD	UE	UF	UG

1W ~ 16W (≥1W)

Wattage 功率	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Normal Size 正常尺寸	IW	2W	3W	4W	5W	6W	7W	8W	9W	AW	BW	CW	DW	EW	FW	GW
Small Size 小尺寸	1S	2S	3S	4S	5S	6S	7S	8S	9S	AS	BS	CS	DS	ES	FS	GS
Ultra Small Size 超小尺寸	1U	2U	3U	4U	5U	6U	7U	8U	9U	AU	BU	CU	DU	EU	FU	GU

   b) For power rating less than 1W, the 5th digit will be the letters W, S or U to represent the size required & the 6th digit will be a number or a letter code. Example: WA = 1/10W; U2 = 1/2W-SS (功率小于 1 瓦 , 第 5 位用 W, S 或 U 表示尺寸要求，第 6 位将是数字或字母，例 : WA = 1/10W; U2 = 1/2W-SS.).
   c) For power rating of 1W to 16W, the 5th digit will be a number or a letter code and the 6th digit will be the letters of W, S or U. Example: AW = 10W; 3S = 3W-S.
   当功率为 1 到 16 瓦 , 第 5 位将是数字或字母，第 6 位是 W, S or U. 例 : AW = 10W; 3S = 3W-S.
   d) For power rating between 20W to 99W, the 5th & 6th digits will show the whole numbers of the power rating itself. Example: 20 = 20W; 75 = 75W.
   当功率在 20 瓦 ~99 瓦之间第 5 位至第 6 位全部表示功率。例 : 20 = 20W; 75 = 75W.
   e) For power rating of 100W & over, the 5th & 6th digits will be indicated with "00" and the actual wattage being indicated at the last 3 digits (12th~14th) of the Part No.
   当大于 100 瓦时第 5 位和第 6 位表示为 "00" 实际功率表示在料号最后 3 位 (12 位 ~ 14 位)
   f) For special power ratings, the following codes are to be used (特殊功率用下列数字表示):
      1). WH = 1/32W (10P8 Chip Network 网络电阻)
      2). 07 = 3/4W [Chip 2010 size (晶片 2010 尺寸)]
      10). 2A =2.5W
      3). 04 = 0.4W-SS (0.4 watt Ultra Small size 超小尺寸)
      4). 06 = 0.6W-S (0.6 watt Small size 小尺寸)
      11). 3A=3.5W
      5). 2A = 2.5W
      6). 6A = 6.5W
      7). WK= 2/3W
      8). 1A =1.5W
      9). 1.25W =1Q
   g) For Resistor Network, since the power rating is fixed as 1/8W for A circuit & 1/5W for B circuit, the 5th & 6th digit is to be used to denote the number of pins required. Example: 09 = 9pins; 12 = 12pins. (网络电阻功率固定为 1/8W 或 1/5W，故第 5 位和第 6 位用来表示所需要的 pins 数 . 例 : 09 = 9pins; 12 = 12pins.)
   h) For Jumper Wires the 5th & 6th digits will be indicated with "00" .(跳线电阻的第 5 位、第 6 位用 "00" 来表示)
   i) For Thin Film Chip Resistors, these 2 digits will be used to indicated the requested Temperature coefficient:
   对於薄膜晶片电阻产品 , 这两位用来表示产品的温度系数要求 :
      1). 05 = 5PPM
      2). 10 = 10PPM
      3). 15 = 15PPM
      4). 25 = 25PPM
      5). 50 = 50PPM

3. The 7th digit is to denote the Resistance Tolerance. The following letter code is to be used for indicating the standard Resisance Tolerance. As for Metal Film Fixed Resistor products, it is also to denote the standard PPM as follows (第 7 位表示阻值误差。下列数码用来表示标准误差，用于金属膜产品时，同时用来表示标准 PPM，如下):

B = ±0.1% (15PPM)	**G** = ±2% (100PPM)	**W** = ±0.05%
C = ±0.25% (25PPM)	**J** = ±5% (200PPM)	**L** = ±0.01%
D = ±0.5% (50PPM)	**K** = ±10%	
F = ±1% (50PPM)		

Remark: *if it is not one of the above standard "tolerance-TCR", the requirement should be clearly stated when placing order. Example: ±1% (25PPM), the 7th digit still shows "F" but separately note the requirement of "25PPM"*

注 : 如果一个不是上述标准 " 公差 -PPM" 的要表示清楚 例 : ±1% (25PPM), 第 7 位要标示 "F" 并另注 "25PPM"

4. The 8th to 11th digits is to denote the Resistance Value (第 8 位 ~ 第 11 位表示阻值):

a) For the standard resistance values of E-24 series in 2% & 5% & 10% tolerance, the 8th digit is "0", the 9th & 10th digits are to denote the significant figures of the resistance and the 11th digit is the number of zeros following (对于 E-24 系列的 2%、5%、10% 产品，第 8 位数是 0，第 9 位数和第 10 位数表示阻值的有效数，第 11 位表示有几个 0).

b) For the standard resistance values of E-96 series in ≤1% tolerance, the 8th digit to the 10th digits are to denote the significant figures of the resistance and the 11th digit is the number of zeros following (对于 E-96 系列 ≤1% 的产品，第 8 位数到第 10 位数表示阻值的有效数，第 11 位数表示有几个 0).

c) For the code to the significant figures to E-24 & E-96 series, please refer to page 170 & 171 of the standards Resistance Value list.(有效数 E-24 和 E-96 系列 , 请参考 170 页和 171 页标准阻值表)

d) The following numbers and the letter codes is to be used to indicate the number of zeros in the 11th digit:
以下数字及字母用来表示第 11 位数有几个 0:

$0 = 10^0$	$1 = 10^1$	$2 = 10^2$	$3 = 10^3$	$4 = 10^4$	$5 = 10^5$	$6 = 10^6$
$J = 10^{-1}$	$K = 10^{-2}$	$L = 10^{-3}$	$M = 10^{-4}$	$N = 10^{-5}$	$P = 10^{-6}$	

e) For Cement Resistors the 8th digit will be coded with "W" or "P" to denote Wire-wound type or Power Film type respectively of the Cement Fixed Resistor proudct. The 9th to 11th please refer to point 4.a (水泥电阻第 8 位数 "W" 或 "P" 用来表示绕线型或切割型，第 9 位数到第 11 位数请参考 4.a)
Example (例):

E-24 series 系列	E-96 series 系列	Cement Resistors 水泥型固定电阻值
0120 = 12 ohm	1210 = 121 ohm	W120 = 12 ohm Wire-wound type 绕线型
0123 = 12K ohm	1302 = 13K ohm	W12J = 1.2 ohm Wire-wound type 绕线型
012J = 1.2 ohm	196J = 19.6 ohm	P273 = 27 kohm Powe Film type 切割型

5. The 12th, 13th & 14th digits (第 12 位数、13 位数和 14 位数):

a) The 12th digit is to denote the Packaging type with the following codes (第 12 位数表示包装方式，采用如下代码):
A = Tape / Box (Ammo Pack) [编带 / 盒装（带装）] C = Bulk in Cassette (for Chip product)[散装盒（晶片产品）]
B = Bulk / Box (散装 / 盒装) T = Tape / Reel (编带 / 卷装) P = Tape / Box of PT-26 product [编带 / 盒装（PT-26 产品）]

b) The 13th digit is normally to indicate the Packing Quantity of Tape/Box or Tape/Reel packaging types. Except for Chip products Bulk packing, this digit should be filled "0" or other products with "Bulk/Box packaging requirement. The following letter codes is to be used for some packaging quantities (第 13 位数一般表示包装数量对于 T/B 或 T/R 型，除了晶片散装外，其他产品的散装包装用 "0" 表示数量。下列字母说明包装数量).
A = 500pcs (只) B = 2,500pcs (只) C = 10,000pcs (只) N = 12,500pcs (只) E = 15,000pcs (只)
D = 20,000pcs (只) G = 25,000pcs (只) L = 45,000pcs (只) H = 50,000pcs (只) J = 60,000pcs (只)
Example (例):

CHIP product (晶片产品)	Other products (其它产品)
TD = T/R-20,000	A5 = T/B-5,000
TE = T/R-15,000	TB = T/R-2,500
T4 = T/R-4,000	B0 = B/B (可提供标准包装)

c) For the Forming type products, the 13th & 14th digits are used to denote the forming types of the product with the following letter codes (对于成型产品第 13 位数和第 14 位数用来表示成型产品，如下字母表示):
MF = M type with Flattened lead wire (M 型打扁加工) F0 = F type 型
MK = M type with Kinked lead wire (M 型打弯加工) F1 = F1 type 型
ML = M type with normal lead wire (M 型加工) F2 = F2 type 型
MC = M type with bending lead wire (M 型打弯加工) F3 = F3 type 型

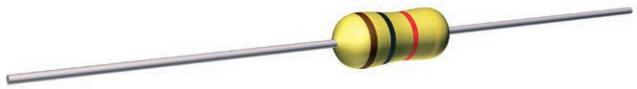
d) For power rating over 100watt, the 12th to the 14th digits are to denote the actual wattage of the products (当功率超过 100W 时，它的第 12 位数到 14 位数用来表示产品的实际功率):
Example (例): 100 = 100watt (瓦) 150 = 150watt (瓦) 225 = 225watt (瓦)

e) For some products, the 14th digit alone can use to denote special features or additional information with the following codes (对于某些产品第 14 位可以显示特性和附加信息，如下字母):
P = Panasert type (Panasert 型) 1 = Avisert 1 type (Avisert 1 型) 2 = Avisert 2 type (Avisert 2 型)
3 = Avisert 3 type (Avisert 3 型) A = CO 1/4W - A type (切割型 CO 1/4W-A 型) B = CO 1/4W - B type (切割型 CO 1/4W-B 型)
E = used to denote the "Environment Protection, lead Free type" of SMD category resistors (now, this became the Standard type of SMD)
(晶片电阻，晶片排阻及网络电阻器 " 环保无铅型 ")

f) For some products, the 14th digit alone can use to denote special features or additional information with the following codes (对于某些产品第 14 位可以显示特性和附加信息，如下字母):
B=1/32W C=1/16W F=1/10W G=1/8W H=1/6W J=1/4W K=1/3W M=1/2W
N=3/4W P=1W S=Special

4 Band Color Code (available for CFR, MOR, KNP & 2% or 5% of MF products)

4 道色码 (适用于 CFR, MOR, KNP & 2% 或 5% of MF 产品)



1 2 3 4

4th Band
第四道

Red 红	= ±2%
Gold 金	= ±5%
Silver 银	= ±10%

1st Band
第一道

Black 黑	= 0
Brown 棕	= 1
Red 红	= 2
Orange 橙	= 3
Yellow 黄	= 4
Green 绿	= 5
Blue 蓝	= 6
Violet 紫	= 7
Gray 灰	= 8
White 白	= 9

2nd Band
第二道

Black 黑	= 0
Brown 棕	= 1
Red 红	= 2
Orange 橙	= 3
Yellow 黄	= 4
Green 绿	= 5
Blue 蓝	= 6
Violet 紫	= 7
Gray 灰	= 8
White 白	= 9

3rd Band
第三道

Black 黑	= Multiply by 乘积倍数 1 (10^0)
Brown 棕	= Multiply by 乘积倍数 10 (10^1)
Red 红	= Multiply by 乘积倍数 100 (10^2)
Orange 橙	= Multiply by 乘积倍数 1,000 (10^3)
Yellow 黄	= Multiply by 乘积倍数 10,000 (10^4)
Green 绿	= Multiply by 乘积倍数 100,000 (10^5)
Blue 蓝	= Multiply by 乘积倍数 1,000,000 (10^6)
Violet 紫	= Multiply by 乘积倍数 10,000,000 (10^7)
Gold 金	= Multiply by 乘积倍数 0.1 (10^{-1})
Silver 银	= Multiply by 乘积倍数 0.01 (10^{-2})

5 Band Color Code (available for MF 1% & FRN Proudcts)

5 道色码 (适用于 MF 1% & FRN 产品)

1 2 3 4 5

5th Band
第五道

Violet	= ±0.1%
Blue	= ±0.25%
Green	= ±0.5%
Brown	= ±1%

1st Band
第一道

Black 黑	= 0
Brown 棕	= 1
Red 红	= 2
Orange 橙	= 3
Yellow 黄	= 4
Green 绿	= 5
Blue 蓝	= 6
Violet 紫	= 7
Gray 灰	= 8
White 白	= 9

2nd Band
第二道

Black 黑	= 0
Brown 棕	= 1
Red 红	= 2
Orange 橙	= 3
Yellow 黄	= 4
Green 绿	= 5
Blue 蓝	= 6
Violet 紫	= 7
Gray 灰	= 8
White 白	= 9

3rd Band
第三道

Black 黑	= 0
Brown 棕	= 1
Red 红	= 2
Orange 橙	= 3
Yellow 黄	= 4
Green 绿	= 5
Blue 蓝	= 6
Violet 紫	= 7
Gray 灰	= 8
White 白	= 9

4th Band
第四道

Black 黑	= Multiply by 乘积倍数 1 (10^0)
Brown 棕	= Multiply by 乘积倍数 10 (10^1)
Red 红	= Multiply by 乘积倍数 100 (10^2)
Orange 橙	= Multiply by 乘积倍数 1,000 (10^3)
Yellow 黄	= Multiply by 乘积倍数 10,000 (10^4)
Green 绿	= Multiply by 乘积倍数 100,000 (10^5)
Blue 蓝	= Multiply by 乘积倍数 1,000,000 (10^6)
Violet 紫	= Multiply by 乘积倍数 10,000,000 (10^7)
Gold 金	= Multiply by 乘积倍数 0.1 (10^{-1})
Silver 银	= Multiply by 乘积倍数 0.01 (10^{-2})