

合金电阻器 Alloy Resistor

- 焊接电阻系列 Welding Resistance Series.
- 符合 ROHS 要求 Complies With ROHS Requirements.
- 符合车规 AEC-Q200 测试 Conforms To Vehicle-specific AEC-200 Tests.

■ 产品图示(product illustration)



■ 产品特点(Features)	■ 应用领域(Applications)
■ 高功率, 功率可达 15W High power rating up to 15watts	■ 汽车电子 Automotive electronics
■ 超低感值: $\leq 3\text{nH}(1\text{MHz})$ Low inductance: $\leq 3\text{nH}(1\text{MHz})$	■ 空调/变频器 Air conditioner/Variable frequency drive
■ 耐冲击 ideal for pulse application	■ 工业/轻工业 industry/lite industry
■ 印字方式: 激光打标 Printing method:laser marking	■ 手机、电脑、消费性电子 Mobile phones、Computers 、Consumer

■ 料号标识:示例 RL2512F4R003= RL 系列 2512 尺寸 4W 1% 3mΩ

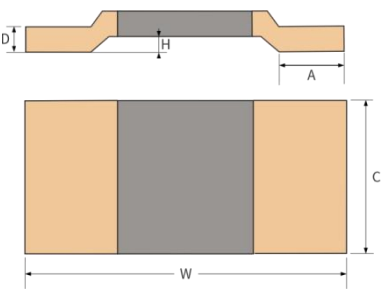
RL	2512	F	4	R003
产品系列 Type	尺寸 Size 2512 3920 5930	公差 Tolerance F:1% G:2% J:5%	额定功率 Rated Power A=1/2W B= 3/4W 1=1W 2=2W 3=3W	阻值 Resistance Value R50m=0.5mΩ R002=2mΩ R010=10mΩ 1R5m=1.5mΩ

■ 电阻值范围及电气特性(Resistance Range and Electrical Characteristics)

类别 Type	材料 Material	阻值 Resistance	Rthi(°C/W)	温度系数 TCR (ppm/°C)	D±0.1 (mm)	最高额定功率@70°C(W) Rated Power@70°C(W)
2512	S	0.2mΩ	3	±175	1.4	6
		0.3mΩ	5	±175	1.5	6
	M	0.5mΩ	6	±115	0.93	6
		1mΩ	10	±100	0.45	5
		1.2mΩ	-	±70	1.08	6
	K/F	1.5mΩ	-	±70	0.86	5
		2mΩ	15	±70	0.65	5
		2.5mΩ	-	±70	0.5	4
		3mΩ	24	±70	0.43	4
		4mΩ	27	±70	0.31	3
		5mΩ	40	±70	0.28	3
3920	M	0.2mΩ	3	±200	1.64	12
		0.3mΩ	3.5	±150	1.37	10
		0.4mΩ	-	±100	0.97	9
		0.5mΩ	7	±70	0.83	9
		0.7mΩ	9	±70	0.55	8
		1mΩ	10	±50	0.4	7
	K/F	1mΩ	7	±50	1.16	8
		1.5mΩ	-	±50	0.75	6
		2mΩ	14.5	±50	0.56	6
		2.5mΩ	-	±50	0.47	5
		3mΩ	22	±50	0.37	5
		4mΩ	24	±50	0.28	5
		5mΩ	-	±50	0.28	4
5930	S	0.1mΩ	2	±200	2.0	15
	M	0.2mΩ	3	±100	1.5	15
		0.3mΩ	-	±100	0.98	10
		0.35mΩ	-	±100	0.83	10
		0.4mΩ	-	±100	0.75	10
		0.5mΩ	3.5	±75	0.6	10
		0.6mΩ	-	±75	0.5	10
		0.75mΩ	6	±75	0.41	10
	K/F	1mΩ	7	±50	0.86	9
		1.5mΩ	10	±50	0.61	8
		2mΩ	13	±50	0.4	7
		2.5mΩ	-	±50	0.34	7
		3mΩ	17.5	±50	0.29	7

TCR (ppm/°C) : Test was conducted with the temperature from 20°C to 120°C , while 20°C worked as reference.

■ 产品尺寸(Dimension)

	类型 Type	W	A	C	H
	2512	6.3 ±0.2mm	1.2 ±0.2mm	3.1 ±0.3mm	0.5 ±0.1mm
	3920	10.0 ±0.2mm	2.2 ±0.2mm	5.1 ±0.4mm	0.5 ±0.1mm
	5930	15.0 ±0.3mm	4.2 ±0.3mm	7.6 ±0.4mm	0.5 ±0.1mm

■ 字码标示(Marking on the Resistor's Body)

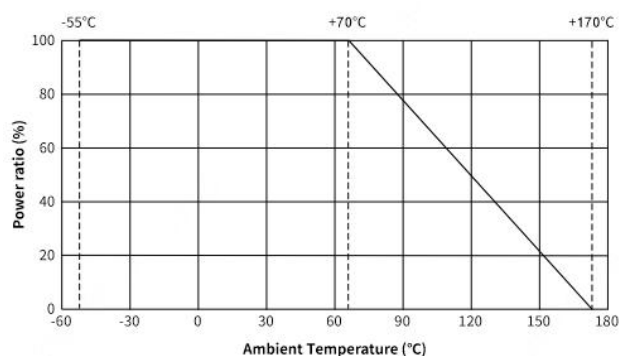
图例 legend



R001=1mΩ

阻值 resistance	代码 code	阻值 resistance	代码 code	阻值 resistance	代码 code	阻值 resistance	代码 code
0.5mΩ	R50m	25mΩ	R025	80mΩ	R080	200mΩ	R200
1mΩ	R001	30mΩ	R030	90mΩ	R090	220mΩ	R220
1.5mΩ	1R5m	35mΩ	R035	100mΩ	R100	250mΩ	R250
2mΩ	R002	40mΩ	R040	120mΩ	R120	270mΩ	R270
3mΩ	R003	50mΩ	R040	130mΩ	R130	300mΩ	R300
5mΩ	R005	57mΩ	R057	140mΩ	R140	330mΩ	R330
10mΩ	R010	60mΩ	R060	150mΩ	R150	360mΩ	R360
15mΩ	R015	68mΩ	R068	160mΩ	R160	400mΩ	R400
20mΩ	R020	75mΩ	R075	180mΩ	R180	500mΩ	R500

■ 功率衰减曲线(power attenuation curve)



工作温度范围 (Operating Temperature Range) : -55°C~+170°C。

当电阻在高于 70°C 的周围环境中工作时, 最大负载功率应该按照以上曲线减少。

When the resistor is operating in an ambient environment above 70 °C, the maximum load power should be reduced according to the above curve.

■ 额定电流(rated current)

额定电流计算方式如下

The rated current is calculated by the following formula:

rmula:

$$I = \sqrt{P/R}$$

I: 额定电流 (Rated current) (A)

P: 额定功率 (Rated Power) (W)

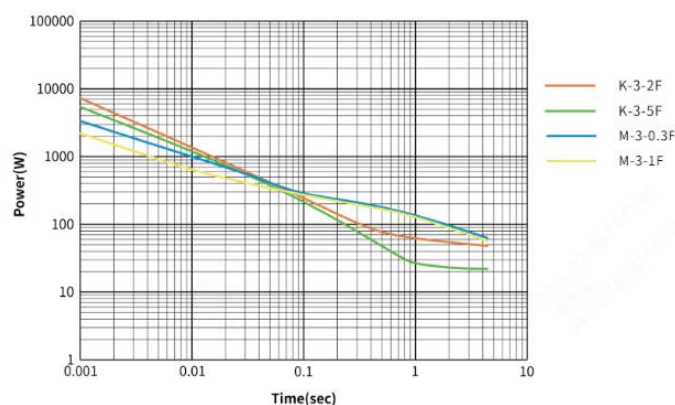
R: 额定电阻 (Resistance) (ohm)

如果计算出的电流超过此型别的最大工作电流, 则此型别的最大工作电流为此电阻的额定电流。

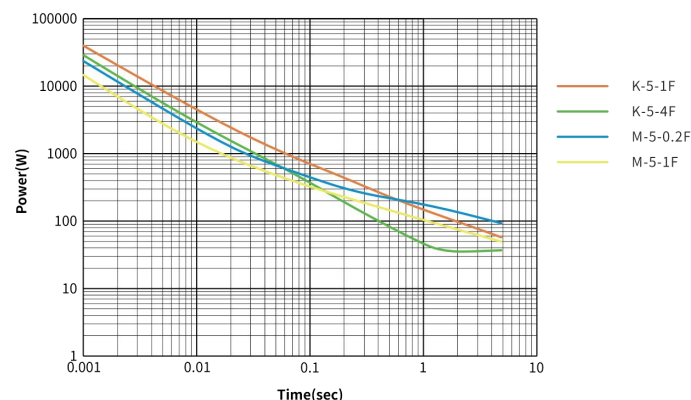
In case the value calculated by the formula exceed the maximum working current as above table, the maximum working current shall be regarded as rated current.

■ 脉冲功率曲线 Pulse power curve

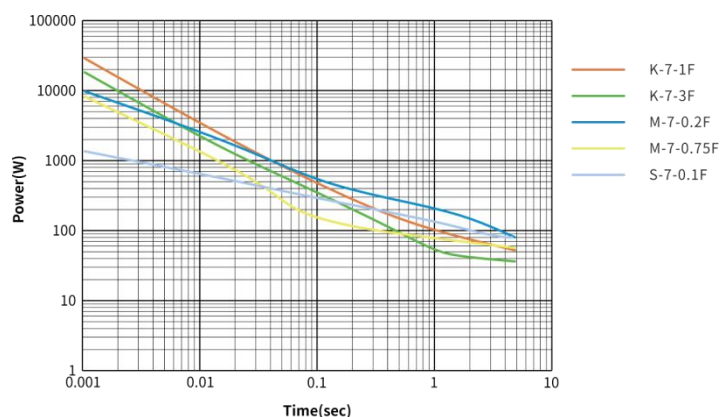
RL-2512



RL-3920



RL-5930

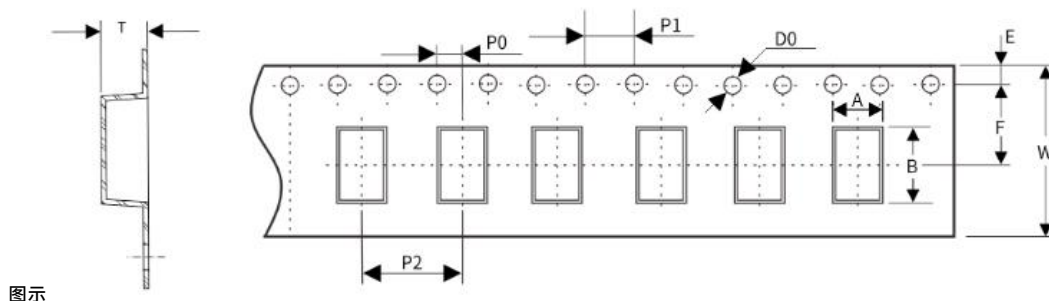


■ 信赖性试验项目(Performance Reliability Test Methods)

项目 project	测试方法 test	条件 condition	标准 norms
高温高湿 high temperature and high humidity	加载 10%额定功率, 85°C/85%RH, 持续通电 1000H, 试验结束 24±4 小时后进行测试. 1000 hours 85°C/85%RH. Note: Specified conditions: 10% of operating power. Measurement at 24±4 hours after test conclusion.	MIL-STD-202Method 103	±0.5%
高温运行寿命 High Temperature Operating Life	1000 小时 (T=125°C) , 产品间歇性地施加长期运行电流: 90 分钟开, 30 分钟关; 测试结束后 24±4 小时进行测量。 1000 hrs.(T=125°C). Long-term operating current was applied to the products intermittently: 90 minutes ON and 30 minutes OFF . Measurement at 24±4 hours after test conclusion .	MIL-STD-202Method 108	±0.5%
抗焊锡热 Resistance to Soldering Heat	250°C±5°C, 30s±5s	MIL-STD-202Method 210	±0.5%
可焊性 weldability	沾助焊剂后浸入锡炉, 锡炉温度 245±5°C, 时间 2~3 秒. Dip the terminal in a flux and then dip into a soldering bath at 245±5°C for 2~3sec.	J-STD-002	95% Coverage Minimum
振动 Vibration	5g's 的力 20 分钟, 12 个循环, 测试频率从 10-2000 赫兹, 测量试验前后阻值变化率. 5g's for 20min.12cycles, 10-2000Hz . Measure the variation of resistance.	MIL-STD-202Method 204	±0.5%

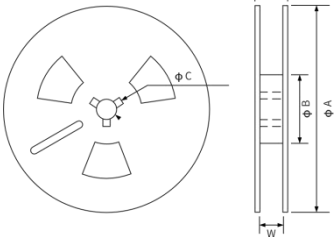
■ 信赖性试验项目(Performance Reliability Test Methods)			
项目 project	测试方法 test	条件 condition	标准 norms
电路板弯曲测试 Board Flex Test	对外电路板施加一次外力，至少弯曲 Dx=2 毫米， 持续时间 60+5 秒。 Apply an external force once to the circuit board, bend at least Dx = 2mm, duration 60+5S .	AEC-Q200-005	±0.5%
终端强度 Terminal Strength (SMD)	对测试设备的一侧施加一次外力，力为 17.7 牛顿（1.8 千克）， 持续时间 60 秒加 1 秒。 Apply an external force once to the side of the test device, the force is 17.7N(1.8kg), duration 60+1S.	AEC-Q200-006	±0.5%
机械冲击 Mechanical Shock	半正弦，100g's，震动 6ms，速度 12.3 ft/s100Hz， 测量试验前后阻值变化率。 100g's, Normal duration is 6ms , half sine shock pulse, Measure the variation of resistance.	MIL-STD-202H Method 213	±0.5%
静电放电 ESD	1)直接接触（DC）：±6 千伏； 2)空气放电（AD）：±12 千伏，±16 千伏，±25 千伏 1) Direct Contact (DC): ±6kV ; 2) Air Discharge (AD): ±12kV, ±16kV, ±25kV .	AEC-Q200-002 REV-B	±0.5%
阻燃性 Flammability	1) 测试电流：100%，115%，130%，150%（长期运行电流） 2)测试持续时间：1 小时。 1) Test current: 100%, 115%,130%, 150% (Long-term operating current) 2) Test duration: 1h .	AEC-Q200-001	温度不超过 350°C 超过 10 秒，无火焰，无爆炸。 The temperature is not higher than 350°C for more than 10 seconds, no flame, no explosion.

■ 包装尺寸(packing dimension)

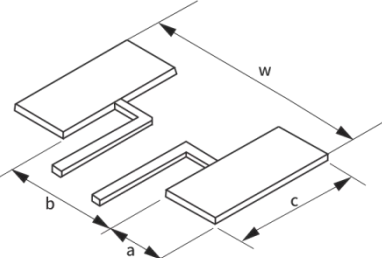


尺寸 Size	电阻合金 Resistance Alloy	阻值范围 Resistance Range (mΩ)	$A \pm 0.15$	$B \pm 0.15$	$W \pm 0.3$	$E \pm 0.15$	$F \pm 0.15$	$P_0 \pm 0.15$	$P_1 \pm 0.15$	$P_2 \pm 0.15$	$D_0 \pm 0.15$	数量 Quantity (pcs)	$T \pm 0.15$
2512	S	0.2	3.6	6.7	16	1.75	7.5	2	4	8	1.5	1000	取决于产 品的厚度 Depends on the thickness of the product
	M	0.3	3.7	6.9	16	1.75	7.5	2	4	8	1.5	1000	
		0.5	3.5	6.7	12	1.75	5.5	2	4	4	1.5	2000	
		0.6~1	3.5	6.7	12	1.75	5.5	2	4	4	1.5	3000	
	K/F	1.1~1.5	3.5	6.7	12	1.75	5.5	2	4	4	1.5	2000	
		1.5~5	3.5	6.7	12	1.75	5.5	2	4	4	1.5	3000	
3920	M	0.2	5.8	10.6	24	1.75	11.5	2	4	12	1.5	2000	
		0.3	5.6	10.65	24	1.75	11.5	2	4	12	1.5	1500	
		0.4	5.8	10.5	24	1.75	11.5	2	4	12	1.5	2500	
		0.5	5.7	10.4	16	1.75	7.5	2	4	12	1.5	2500	
		0.7~1	5.8	10.5	16	1.75	7.5	2	4	12	1.5	2500	
	K/F	1	5.8	10.5	24	1.75	11.5	2	4	12	1.5	2500	
		1.5~5	5.8	10.5	16	1.75	7.5	2	4	12	1.5	2500	
5930	S	0.1	8.5	15.7	24	1.75	11.5	2	4	12	1.5	1000	
	M	0.2	8.5	15.7	24	1.75	11.5	2	4	16	1.5	1000	
		0.3~0.35	8.5	15.7	24	1.75	11.5	2	4	16	1.5	1500	
		0.4~0.5	8.1	15.5	24	1.75	11.5	2	4	12	1.5	2000	
		0.6~0.8	8.5	15.7	24	1.75	11.5	2	4	12	1.5	2000	
	K/F	1	8.1	15.5	24	1.75	11.5	2	4	12	1.5	2000	
		2~3	8.5	15.7	24	1.75	11.5	2	4	12	1.5	2000	

■ 卷盘尺寸 reel dimension(Unit:mm)

	尺寸 Size	2512 W=12	2512 W=16	3920 W=24	3920 W=16	5930
	ΦA	178	203	330	330	330
	ΦB	60	60	100	100	100
	ΦC	13	13	13	13	13
	W	12.5	16.5	24.5	16.5	24.5
	T	21	21	29	21	29

■ 焊盘尺寸 Pad size(Unit:mm)

	Solder Pad Ty	w	c	a	b
	RL-S/M/K/F-3	7.0	3.4	1.8	3.4
	RL-S/M/K/F-5	11	6.2	2.7	5.6
	RL-S/M/K/F-7	16	8.75	5.2	5.6