



富捷科技

Product Datasheet

产品规格说明书

FMK Series

4-Pin Plug-In Alloy Resistors

FMK 系列四引脚插件合金电阻

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FMK 系列四引脚插件合金电阻

4-Pin Plug-In Alloy Resistors

FMK Series



■ 特点 (Features)

- 电子束焊接工艺
- 耐冲击
- 用于电流检测的低电流，高精度电阻
- 低电感
- 四引脚开尔文结构
- 无铅，符合 RoHS、Reach 要求
- 符合 AEC-Q200 可靠性测试
- 特殊规格可定制
- Electron beam welding process
- Ideal for pulse application
- Low Resistance and High Accuracy Resistor for Current Detection
- Low inductance
- Four-pin Kelvin structure
- Pb-free to Meet RoHS、Reach Requirements
- Complies with AEC-Q200 reliability test
- Special specifications can be customized

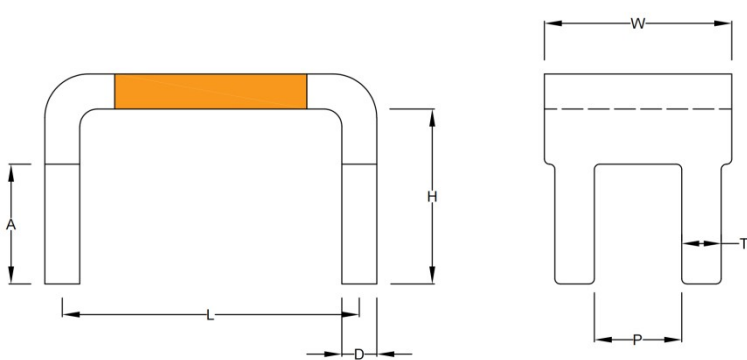
■ 应用 (Application)

- DC-DC 转换器，电池组，充电，适配器
- 工业仪器设备
- 自动化控制电源
- 变频驱动与伺服驱动系统
- 电流检测
- 电源管理系统
- 汽车电子控制系统
- DC-DC Converter, Battery Pack, Charge, Adaptor
- Industrial instruments and equipment
- Automation Control Power Supply
- Variable frequency drives and servo drive systems
- Current sensing
- power management system
- Automotive electronic control system

■ 产品料号 (Parts Number Explanation) 示例：FMK38205WFR005BK

FMK 系列	3820 型别	5w 功率	F 公差	R005 字码	B 包装别	K 材质	特殊型
FOSAN Type	3820	3W:3W 5W:5W	D:±0.5% F:±1% G:±2% J:±5%	R005=5mΩ 0M50=0.5mΩ	T: 7 inch reel R:13 inch reel B:Bulk	K: Karma M:CuMn	Blank: none
Type code	Size	Power	Tolerance	Resistance	Packaging	Termination	Special Case

■ 尺寸 (Dimension)

产品尺寸 Product Dimension								单位 (unit) : mm
	阻值 Resistance (mΩ)	产品尺寸 Product Dimension						
型别 Type		L	W	A	T	H	P	
3820	0.25~3	8.3±0.3	5.3±0.3	3.8±0.5	1.3±0.2	5.1±0.4	1.8±0.2	

■ 电气特性 (Electrical characteristics)

型别 Type	阻值 Resistance (mΩ)	材质 Element Material	厚度 D±0.15 (mm)	T.C.R. (PPM/°C)	额定功率 Power Rating at P70 (W)	精度 Tolerance (%)	使用温度范围 Operating Temperature (°C)
3820	0.25	CuMn	1.5	±100	5	±0.5%、±1% ±2%、±5%	-55~170
	0.3		1.34	±100	3		
	0.4		1.04	±100	3		
	0.5		0.83	±100	3		
	0.7		0.59	±100	3		
	1		0.45	±100	3		
	1	Karma	1.16	±50	5		
	2		0.63	±50	4		
	3		0.43	±50	3		

如有非标准品的需求,请联系我们的业务部门 For non-standard parts, please contact our sales dept.

■ 印字标识 (Marking)

The resistance value of the product is expressed in two ways:

- The decimal point of Ω is indicated by the character "R".
- Using "m" to indicate the decimal point of mΩ.

E.g.,

R001 1%=1mΩ 1%;

0m50 1%=0.5mΩ 1%; 2m50 1%=2.5mΩ 1%

产品阻值使用两种方式表示:

- 以 "R" 字指示 Ω 的小数点的位置
- 以 "m" 字指示 mΩ 的小数点的位置

例:

R001 1%=1mΩ 1%;

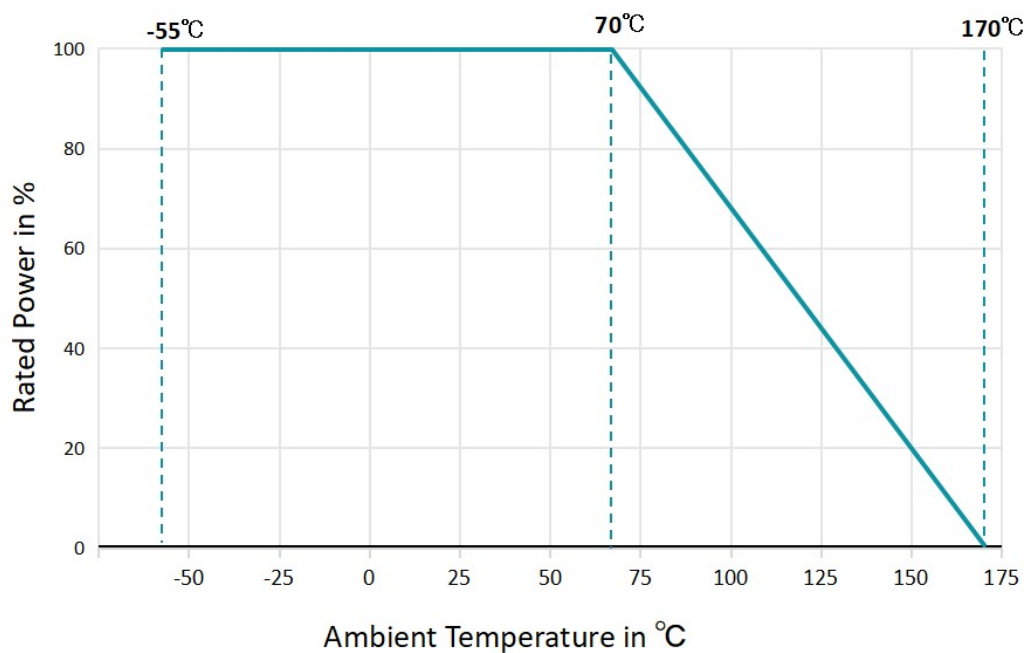
0m50 1%=0.5mΩ 1%; 2m50 1%=2.5mΩ 1%

■ 性能 (Performance)

Test Items 测试项目	Reference 依据标准	Conditions of Test 测试条件	Test Limits 测试结果
Temperature Coefficient of Resistance 温度系数	AEC-Q200 TEST 19 IEC 60115-1 4.8	Measuring points 25°C and +125°C, reference point +25°C 测量点 25°C和+125°C, 参考点+25°C	见图表
High Temperature Exposure (Storage) 高温存储	AEC-Q200-REV D-Test 3 MIL-STD202 Method 108	T=170°C,1000hrs, Measurement at 24hrs after test conclusion. 170°C, 1000 小时, 测试结束后 24 小时测量。	$\Delta R \leq \pm 1\%$
Temperature Cycling 温度循环	AEC-Q200-REV D-Test 4 JESD22 Method JA-104	1000 Cycle (-55°C to 125°C) Measurement at 24hrs after test conclusion. 1000 次循环 (-55°C至 125°C) 测试结束后 24 小时进行测量。	$\Delta R \leq \pm 0.5\%$
Short time overload 短时过载	IEC60115-1 4.13	5 X rated power for 5s 5 倍额定功率,5 秒	$\Delta R \leq \pm 0.5\%$
Biased Humidity 高温高湿	AEC-Q200-REV D-Test 7 MIL-STD-202 Method 103	10% Rated power at 85°C, RH:85%, 1000Hrs,Measurement at 24hrs after test conclusion. 10%额定功率, 85°C, 相对湿度: 85%, 1000 小时, 测试结束后 24 小时测量。	$\Delta R \leq \pm 0.5\%$
Load Life 负载寿命	AEC-Q200-REV D-Test 8 MIL-STD-202 Method 108	1000 h at +70 °C, 1.5 h "ON", 0.5 h "OFF", Measurement at 24hrs after test conclusion. 1000 小时, +70 °C, 1.5 小时"开启", 0.5 小时"关闭", 测试结束后 24 小时测量。	$\Delta R \leq \pm 1\%$
Resistance to Soldering Heat 耐焊接热	AEC-Q200-REV D-Test 15 MIL-STD-202 Method 210	T=260±5°C solder,10±1 sec dwell 260±5°C焊接, 停留 10±1 秒。	$\Delta R \leq \pm 0.5\%$
Mechanical Shock 机械冲击	AEC-Q200-REV D-Test 13 MIL-STD-202 Method 213	100g's, Normal duration is 6ms, half sine shock pulse 正半弦波,峰值加速度 100g's,脉冲持续 6ms,三轴六向各 3 次。	$\Delta R \leq \pm 0.5\%$
Thermal Shock 冷热冲击	AEC-Q200-REV D-Test 16 MIL-STD-202 Method 107	-55°C/+155°C. Note: Number of cycles required-1000, Maximum transfer time-20 seconds, Dwell time-15 minutes. -55°C,15 分钟~常温<20 秒~+155°C,15 分钟,1000 个循环	$\Delta R \leq \pm 1\%$

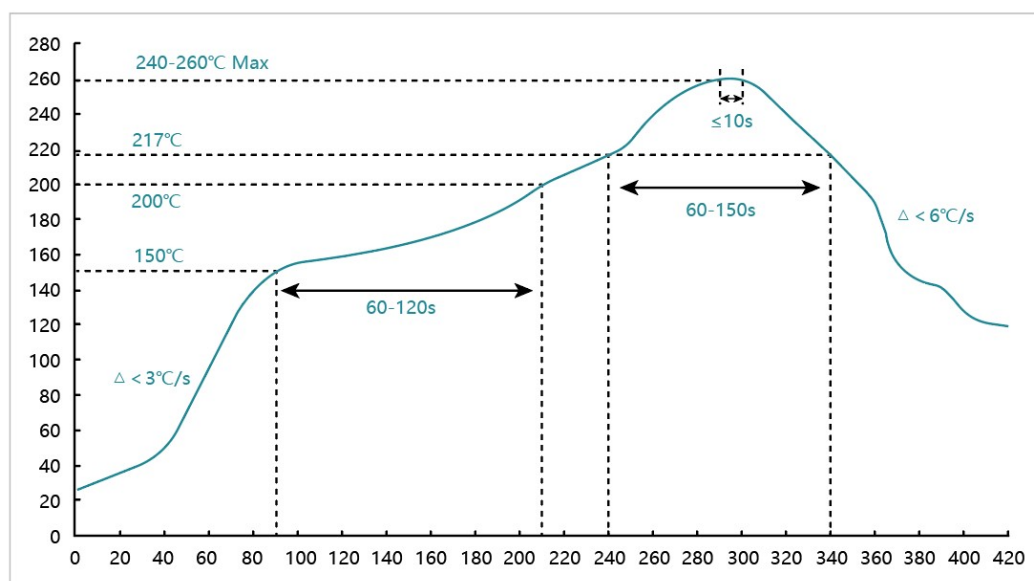
Solderability 可焊性	AEC-Q200-REV D-Test 18 J-STD-002	Dip the terminal in a flux and then dip into a soldering bath at $245\pm5^{\circ}\text{C}$ for $3\pm0.5\text{sec}$ 沾助焊剂后浸入锡炉，锡炉温度 $245\pm5^{\circ}\text{C}$ ，时间 3 ± 0.5 秒。	> 95% area covered > 95%面积上锡
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■ 功率衰减曲线 (Derating Curve)

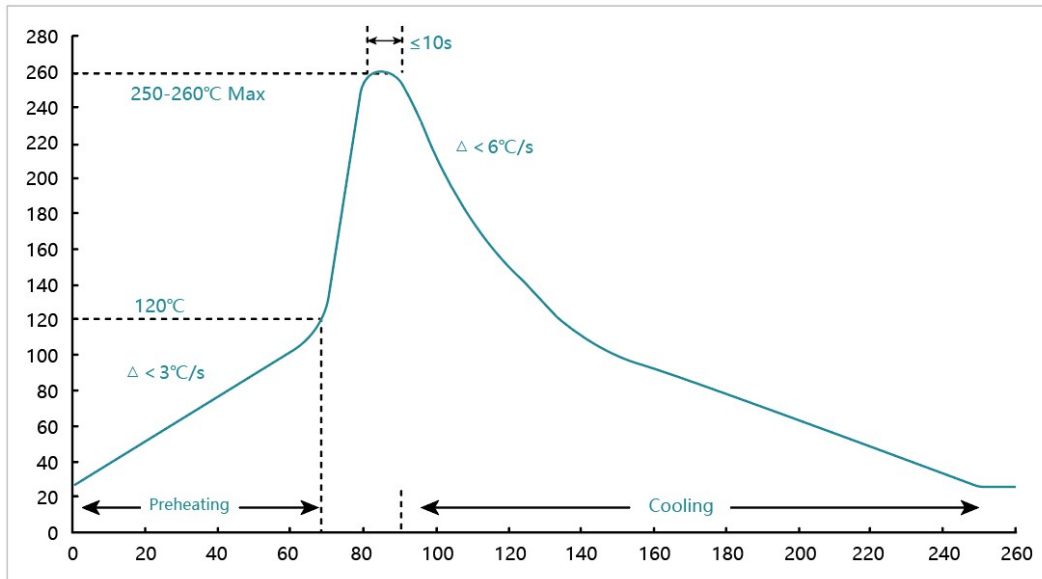


■ 焊接 (soldering)

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



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



- 手工焊温度 (hand soldering temperature)

烙铁温度 $350 \pm 10^{\circ}\text{C}$ 3 秒之内, 避免烙铁接触电阻本体

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

■ 包装规格 (Tapping Specification)

- 散装 Bulk

■ 合金电阻器使用说明 (Alloy Resistor Instructions for use)

本产品以下特殊环境下应用, 性能可能会受到影响:

(Application of the products in a special environment can deteriorate product performance) :

1. 高温;
High temperature
2. 有海风或腐蚀性气体, 包括氯气, 硫化氢, 氨气, 二氧化硫, 二氧化氮等;
Near the sea, or corrosive gas, such as $\text{Cl}_2, \text{H}_2\text{S}, \text{NH}_3, \text{SO}_2$ and NO_2 etc;
3. 各种类型的液体, 包括水, 油, 化学品, 有机溶剂的使用;
Unverified liquids, such as water, oil, chemical or organic solvent;
4. 在用树脂或其他涂层材料密封产品的情况下使用;
Unverified resin or paint to cover products;
5. 焊接后使用不洁焊剂或使用水或水溶性清洁剂清洗产品
Products should be washed with soluble cleaner even if non cleaning flux.

- 储存 / 搬运条件 (Storage / Carry conditions)

1. 储存温度 $25\pm5^{\circ}\text{C}$ Temperature: $25\pm5^{\circ}\text{C}$
2. 湿度 30~70%RH Humidity: 30~70%RH
3. 储存期限: 先进先出, 2 年 Storage life: 2years FIFO
4. 存放和搬运时, 请保持盒子的正确方向。严禁跌落在箱体上, 否则可能损坏产品电极或本体
Please hold box correct orientation when storing and carrying. It is strictly prohibited to fall on the box.
otherwise the product electrode or body may be damaged.



■ 修订履历 (Revision History)

[illegible]