

PIO 系列功率电感器

PIO Series SMD Power Inductor


◆工作温度

Operation Temperature

-40°C ~ 85°C

◆特征

Feature

* 超薄

Ultra-thin design

* 适合表面贴装

Suitable for surface mounting

◆应用

Application

* 便携式通信设备, 笔记本电脑

Portable communication equipment, Notebook

* DC/DC 转换

DC/DC conversion

* 直流电源开关电源电路

DC switching power supply circuit

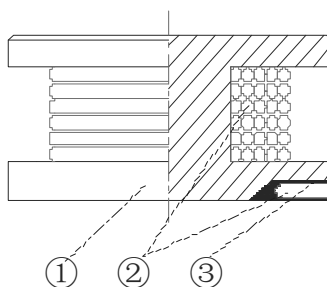
◆规格型号表示方法

Part Number

PIO	43	-	1R0	M	T
产品代号 Product Code	尺寸(长×高) Dimension (Length × Thickness)		电感量 Inductance	公差 Tolerance	包装代号 Packaging code
PIO	43→4.5×3.2mm 54→5.8×4.5mm 75→7.8×5.0mm		R10→0.1 uH 1R0→1.0 uH 100→10 uH 101→100 uH 102→1000 uH	K→±10% M→±20% N→±30%	T→ 卷带盘装 Tape & Reel

◆产品结构

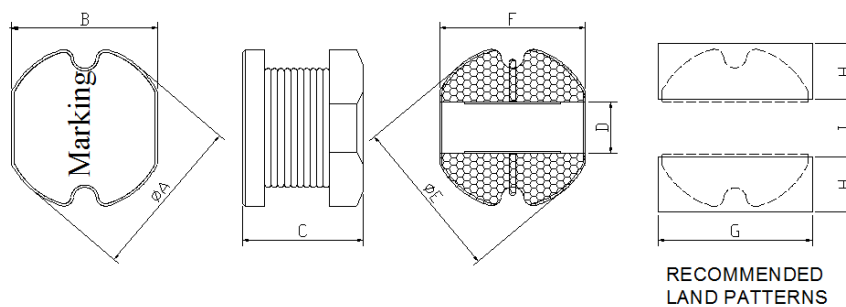
Product Structure



No.	部位 Component	材料 Material
①	磁芯 Core	镍锌铁氧体 Ni-Zn Ferrite
②	线圈 Winding	漆包线 Enamelled Wire
③	电极 Electrodes	底层—银 Bottom Layer—Ag 镀层—镍层 Electroplated Coating—Ni 镀层—锡层 Electroplated Coating—Sn 表层—锡/铜 Surface Layer—Sn/Cu

◆规格尺寸

Dimension



单位(Unit): mm

型号 Part	A	B	C	D (Typ.)	E (Typ.)	F (Typ.)	G (Typ.)	H (Typ.)	I (Typ.)
PIO43	4.5±0.3	4.0±0.3	3.2±0.3	1.6	4.5	4.0	4.5	1.75	1.5
PIO54	5.8±0.3	5.2±0.3	4.5±0.3	2.0	5.8	5.2	5.5	2.15	1.7
PIO75	7.8±0.3	7.0±0.3	5.0±0.3	2.5	7.8	7.0	7.5	3.0	2.0

◆电性能参数

Electrical Characteristics

* PIO43 Type

规格型号 Part No.	电感量 Inductance (μH)	公差 Tolerance	测试频率 Test Freq.	直流电阻 Direct Current Resistance DCR(Ω)Max	额定电流 Rated DC Current IDC (A)
PIO43-1R0MT	1.0	±20%	100KHz	0.045	3.50
PIO43-1R5MT	1.5	±20%	100KHz	0.055	2.85
PIO43-2R2MT	2.2	±20%	100KHz	0.070	2.40
PIO43-2R7MT	2.7	±20%	100KHz	0.075	2.30
PIO43-3R3MT	3.3	±20%	100KHz	0.085	2.25
PIO43-3R9MT	3.9	±20%	100KHz	0.090	1.70
PIO43-4R7MT	4.7	±20%	100KHz	0.105	1.65
PIO43-5R6MT	5.6	±20%	100KHz	0.120	1.60
PIO43-6R8MT	6.8	±20%	100KHz	0.130	1.40
PIO43-8R2MT	8.2	±20%	100KHz	0.145	1.30
PIO43-100MT	10	±20%	100KHz	0.180	1.10
PIO43-120MT	12	±20%	100KHz	0.210	1.00
PIO43-150MT	15	±20%	100KHz	0.235	0.85
PIO43-180MT	18	±20%	100KHz	0.330	0.80
PIO43-220MT	22	±20%	100KHz	0.360	0.70
PIO43-270MT	27	±20%	100KHz	0.520	0.65
PIO43-330MT	33	±20%	100KHz	0.540	0.60
PIO43-390MT	39	±20%	100KHz	0.580	0.55
PIO43-470MT	47	±20%	100KHz	0.840	0.48
PIO43-560MT	56	±20%	100KHz	0.930	0.46
PIO43-680MT	68	±20%	100KHz	1.110	0.44
PIO43-820MT	82	±20%	100KHz	1.250	0.42

PIO43-101KT	100	±10%	1KHz	1.400	0.40
PIO43-121KT	120	±10%	1KHz	1.500	0.38
PIO43-151KT	150	±10%	1KHz	2.000	0.35
PIO43-181KT	180	±10%	1KHz	2.120	0.30
PIO43-221KT	220	±10%	1KHz	2.460	0.27

* PIO54 Type

规格型号 Part No.	电感量 Inductance (μH)	公差 Tolerance	测试频率 Test Freq.	直流电阻 Direct Current Resistance DCR(Ω)Max	额定电流 Rated DC Current IDC (A)
PIO54-R47NT	0.47	±30%	100KHz	0.012	4.80
PIO54-1R0MT	1.00	±20%	100KHz	0.025	3.50
PIO54-1R5MT	1.50	±20%	100KHz	0.025	3.30
PIO54-2R2MT	2.20	±20%	100KHz	0.028	3.20
PIO54-2R7MT	2.70	±20%	100KHz	0.030	3.00
PIO54-3R3MT	3.30	±20%	100KHz	0.035	2.50
PIO54-3R9MT	3.90	±20%	100KHz	0.038	2.40
PIO54-4R7MT	4.70	±20%	100KHz	0.040	2.30
PIO54-5R6MT	5.60	±20%	100KHz	0.050	2.10
PIO54-6R8MT	6.80	±20%	100KHz	0.055	2.00
PIO54-7R2MT	7.20	±20%	100KHz	0.070	1.80
PIO54-8R2MT	8.20	±20%	100KHz	0.090	1.70
PIO54-100MT	10	±20%	100KHz	0.100	1.65
PIO54-120MT	12	±20%	100KHz	0.120	1.55
PIO54-150MT	15	±20%	100KHz	0.140	1.40
PIO54-180MT	18	±20%	100KHz	0.150	1.25
PIO54-220MT	22	±20%	100KHz	0.180	1.10
PIO54-270MT	27	±20%	100KHz	0.200	0.95
PIO54-330MT	33	±20%	100KHz	0.220	0.90
PIO54-390MT	39	±20%	100KHz	0.300	0.80
PIO54-470MT	47	±20%	100KHz	0.350	0.75
PIO54-560MT	56	±20%	100KHz	0.400	0.70
PIO54-680MT	68	±20%	100KHz	0.450	0.65
PIO54-820MT	82	±20%	100KHz	0.600	0.60
PIO54-101KT	100	±10%	1KHz	0.700	0.55
PIO54-121KT	120	±10%	1KHz	0.850	0.45
PIO54-151KT	150	±10%	1KHz	1.100	0.43
PIO54-181KT	180	±10%	1KHz	1.350	0.40
PIO54-221KT	220	±10%	1KHz	1.550	0.35
PIO54-331KT	330	±10%	1KHz	1.760	0.30
PIO54-391KT	390	±10%	1KHz	2.500	0.27
PIO54-471KT	470	±10%	1KHz	2.500	0.25
PIO54-561KT	560	±10%	1KHz	2.870	0.20
PIO54-681KT	680	±10%	1KHz	3.500	0.18

PIO54-821KT	820	±10%	1KHz	5.200	0.17
PIO54-102KT	1000	±10%	1KHz	5.500	0.15
PIO54-122KT	1200	±10%	1KHz	6.400	0.13

* PIO75 Type

规格型号 Part No.	电感量 Inductance (μH)	公差 Tolerance	测试频率 Test Freq.	直流电阻 Direct Current Resistance DCR(Ω)Max	额定电流 Rated DC Current IDC (A)
PIO75-1R0MT	1.0	±20%	100KHz	0.015	5.80
PIO75-1R5MT	1.5	±20%	100KHz	0.017	5.50
PIO75-2R2MT	2.2	±20%	100KHz	0.018	5.20
PIO75-2R7MT	2.7	±20%	100KHz	0.023	5.00
PIO75-3R3MT	3.3	±20%	100KHz	0.025	4.80
PIO75-3R9MT	3.9	±20%	100KHz	0.027	4.20
PIO75-4R7MT	4.7	±20%	100KHz	0.028	4.00
PIO75-5R6MT	5.6	±20%	100KHz	0.030	3.80
PIO75-6R8MT	6.8	±20%	100KHz	0.040	3.00
PIO75-8R2MT	8.2	±20%	100KHz	0.042	2.70
PIO75-100MT	10	±20%	100KHz	0.070	2.55
PIO75-120MT	12	±20%	100KHz	0.080	2.40
PIO75-150MT	15	±20%	100KHz	0.090	2.00
PIO75-180MT	18	±20%	100KHz	0.100	1.95
PIO75-220MT	22	±20%	100KHz	0.110	1.70
PIO75-270MT	27	±20%	100KHz	0.120	1.55
PIO75-330MT	33	±20%	100KHz	0.130	1.40
PIO75-390MT	39	±20%	100KHz	0.150	1.35
PIO75-470MT	47	±20%	100KHz	0.190	1.25
PIO75-560MT	56	±20%	100KHz	0.230	1.10
PIO75-680MT	68	±20%	100KHz	0.250	1.00
PIO75-820MT	82	±20%	100KHz	0.350	0.95
PIO75-101KT	100	±10%	1KHz	0.400	0.78
PIO75-121KT	120	±10%	1KHz	0.450	0.73
PIO75-151KT	150	±10%	1KHz	0.600	0.70
PIO75-181KT	180	±10%	1KHz	0.700	0.60
PIO75-221KT	220	±10%	1KHz	0.950	0.55
PIO75-271KT	270	±10%	1KHz	1.100	0.50
PIO75-331KT	330	±10%	1KHz	1.250	0.45
PIO75-391KT	390	±10%	1KHz	1.750	0.40
PIO75-471KT	470	±10%	1KHz	1.950	0.35
PIO75-561KT	560	±10%	1KHz	1.980	0.32
PIO75-681KT	680	±10%	1KHz	2.180	0.31
PIO75-821KT	820	±10%	1KHz	2.880	0.30
PIO75-102KT	1000	±10%	1KHz	3.850	0.20
PIO75-152KT	1500	±10%	1KHz	5.200	0.18

PIO75-182KT	1800	±10%	1KHz	7.000	0.16
PIO75-202KT	2000	±10%	1KHz	7.000	0.16
PIO75-222KT	2200	±10%	1KHz	8.300	0.15

备注：测试电压为 0.5V。

Remarks: The test voltage is 0.5V.

IDC：指使电感量比初始值下降 10%或电感器表面温度上升 40℃的电流值（参考周围环境温度 20℃）。

IDC: The DC current at which cause a 10% inductance reduction from the initial value or inductor surface temperature to rise by 40℃, whichever is smaller. (Reference ambient temperature 20℃).

◆可靠性测试方法

Reliability Test Method

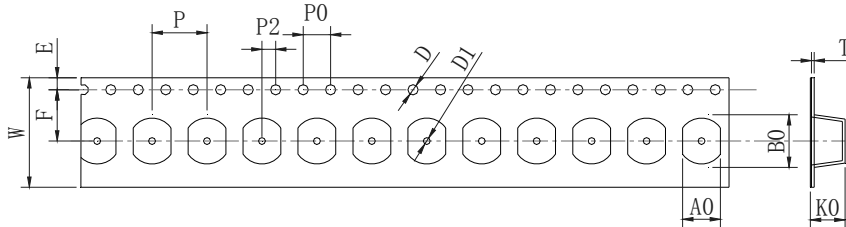
序号 No.	项目 Items	要求 Requirements	试验方法及备注 Test Methods and Remarks
1	绝缘电阻 Insulation Resistance	≥100MΩ	在电感器线圈和磁芯之间施加 100 V 直流电压保持 60s。 100 V DC between inductor coil and core for 60 seconds.
2	可焊性 Solderability	电极面 95%以上覆盖新的焊料。 95% or more of electrode area shall be coated by new solder.	在 245±5℃熔融的焊锡（96.5Sn/3.0Ag/0.5Cu）中浸 5±1s。 Dip pads in flux and dip in solder pot (96.5Sn/3.0Ag/0.5Cu) at 245±5℃ for (5±1) seconds.
3	耐焊接热 Resistance to Soldering Heat	外观无可见机械损伤； 电感量变化率：±10%以内。 No visible mechanical damage. Inductance change: Within ±10%	在 260±5℃熔融的焊锡（96.5Sn/3.0Ag/0.5Cu）中浸 10±1s。 Dip pads in flux and dip in solder pot (96.5Sn/3.0Ag/0.5Cu) at 260±5℃ for (10±1) seconds.
4	端子强度 Terminal Strength	元件端子无松动、无脱落。 No looseness of shedding of terminals.	使用焊料将电感器焊接到试验板上，然后按箭头方向分别施加 10N 的力，保持时间 10±1s。 The inductor is welded to the test plate with solder, and then applied 10 N force in the direction of arrow and kept for 10 ± 1s. 
5	耐高温 High Temperature	外观无可见机械损伤； 电感量变化率：±10%以内。 No visible mechanical damage. Inductance change: Within ±10%	温度+85±2℃，时间 1000 ^{±2} h，在室温下放置 2 小时后、48 小时内测试。 Temperature 85±2℃, time 1000 ^{±2} h, test within 48 hours after 2 hours of placement at room temperature.
6	耐低温 Low Temperature	外观无可见机械损伤； 电感量变化率：±10%以内。 No visible mechanical damage. Inductance change: Within ±10%	温度-40±2℃，时间 1000 ^{±2} h；在室温下放置 2 小时后、48 小时内测试。 Temperature -40 ± 2 °C, time 1000 ^{±2} h, test within 48 hours after 2 hours of placement at room temperature.
7	温度冲击 Thermal Shock	外观无可见机械损伤； 电感量变化率：±10%以内。 No visible mechanical damage. Inductance change: Within ±10%	(-40±3) °C,时间(30±3) min ↔ (85±2) °C/(30±3) min, 转换时间(2~3) min,循环 32 次；在室温下放置 2 小时后、48 小时内测试。 The test sample shall be placed at (-40±3)°C and (85±2)°C for (30±3) min, different temperature conversion time is 2~3 minutes. The temperature cycle shall be repeated 32 cycles. Test within 48 hours after 2 hours of placement at room temperature.
8	温度特性 Temperature Characteristic	电感量变化率 P_{c-b}, P_{c-d} 不超过 ±20%。 Inductance change P_{c-b}, P_{c-d} Within ±20%	在 -40℃~+85℃的环境下测量电感量值，分别与 20℃环境下测量的电感量进行比较。 Based on the inductance at 20℃ and Measured at the ambient of -40℃~+85℃.
9	恒定湿热 Constant Damp Heat	外观无可见机械损伤； 电感量变化率：±10%以内。 No visible mechanical damage. Inductance change: Within ±10%	将电感器放置于湿度(90~95)%RH,温度 60±2℃的环境中存放 1000 ^{±2} h，在室温下放置 2 小时后、48 小时内测试。 The inductors were stored for 1000 + 240 h at humidity (90~95)%RH, temperature 60±2℃, and tested within 48h after 2H at room temperature.

(续上表 Continue the above table)

序号 No.	项目 Items	要求 Requirements	试验方法及备注 Test Methods and Remarks
10	振动 Vibration	外观无可见机械损伤; 电感量变化率: $\pm 10\%$ 以内。 No visible mechanical damage. Inductance change: Within $\pm 10\%$	使用焊料将电感器焊接到试验板上, 试验板固定于振动试验夹具使之与振动台刚性连接。试验按以下条件进行: 振动频率范围: 10Hz~55Hz 振幅: 1.5mm (加速度 $\leq 196\text{m/s}^2$) 一次循环时间: 1min (10Hz \rightarrow 55Hz \rightarrow 10Hz) 振动时间: X/Y/Z 轴各 2H (共 6H) The inductor is welded to the test plate with solder, and the test plate is fixed to the vibration test fixture so that it is rigidly connected with the vibration table. The test shall be conducted according to the following conditions: Vibration frequency range: 10Hz~55Hz Amplitude: 1.5mm (Acceleration $\leq 196\text{m/s}^2$) One cycle time: 1min (10Hz \rightarrow 55Hz \rightarrow 10Hz) Vibration time: 2 hours for X/Y/Z axis (Total of 6 hours)
11	弯曲试验 Resistance to Flexure	外观无可见机械损伤; No visible mechanical damage.	使用焊料将电感器焊接到试验板上, 然后施加一个垂直方向的力 (如图所示), 试验按以下条件进行: 弯曲度: 2mm 加压速度: 0.5mm/s 保持时间: 30 \pm 1s 测试板厚度: 1.0mm The inductor is welded to the test plate with solder, and then apply a vertical force (as shown in the figure). The test shall be conducted according to the following conditions: Curvature: 2mm Pressurization speed: 0.5mm/s Holding time: 30 \pm 1s Thickness of test plate: 1.0mm
12	高温负载 (寿命) High-temperature Load (Life-span)	外观无可见机械损伤; 电感量变化率: $\pm 10\%$ 以内。 No visible mechanical damage. Inductance change: Within $\pm 10\%$	温度 85 ± 2 $^{\circ}\text{C}$, 时间 1000 $^{\circ}$ h, 施加额定电流, 在室温下放置 2 小时后、48 小时内测试。 Temperature 85 ± 2 $^{\circ}\text{C}$, Time 1000 $^{\circ}$ h, apply a rated current, test within 48 hours after 2 hours of placement at room temperature. 注: 加载电流时零件表面温度超过 125 $^{\circ}\text{C}$ 的, 需要对电流降额到零件表面温度不超过 125 $^{\circ}\text{C}$ 。 Note: If the surface temperature of the part over 125 $^{\circ}\text{C}$ when the current is loaded, the current need to reduce until the surface temperature of the part less than 125 $^{\circ}\text{C}$.

◆包装
Packaging
*** 载带尺寸**

Tape Dimension

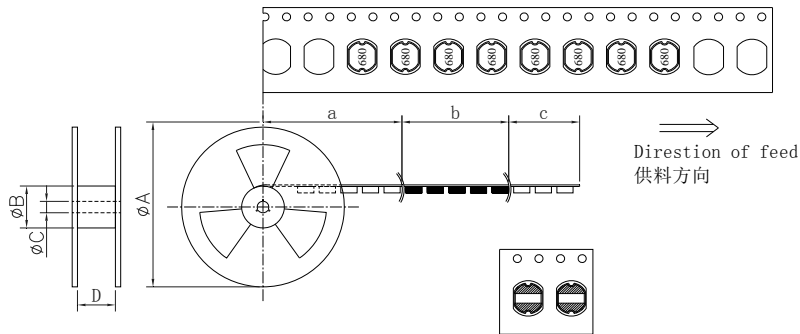


单位(Unit): mm

型号 Part	W	A0	B0	D	D1	E	F	K0	P0	P2	P	T
PIO43	12±0.5	4.3±0.3	4.8±0.3	1.5±0.3	1.5±0.3	1.75±0.3	5.5±0.3	3.6±0.3	4±0.3	2±0.3	8±0.3	0.35±0.1
PIO54	16±0.5	5.5±0.3	6.7±0.3	1.5±0.3	----	1.75±0.3	7.5±0.3	4.9±0.3	4±0.3	2±0.3	8±0.3	0.40±0.1
PIO75	16±0.5	7.3±0.3	8.1±0.3	1.5±0.3	1.5±0.3	1.75±0.3	7.5±0.3	5.6±0.3	4±0.3	2±0.3	12±0.3	0.375±0.1

*** 卷盘尺寸及供料方向**

Reel Size & Direction Of Feed



底部视图

单位(Unit): mm

型号 Part	A (Typ.)	B (Typ.)	C (Typ.)	D (Typ.)	a	b	c
PIO43	330	100	13	12.4	空带 Blank portions	装元件 Chip cavity	引带 Leader
PIO54	330	100	13	16.4			
PIO75	330	100	13	16.4			

*** 包装数量**

Packing quantity

型号 Part	卷盘 Reel(PCS)	纸盒 Box(PCS)	纸箱 Carton (PCS)
PIO43	2,000	8,000	24,000
PIO54	1,500	4,500	13,500
PIO75	1,000	3,000	9,000

◆ 推荐使用的焊接曲线
Recommended soldering profile

- * 本产品建议使用回流焊接法

Applicable soldering process to the products is reflow soldering.

- * 焊接材料

焊料: Sn-3.0Ag-0.5Cu

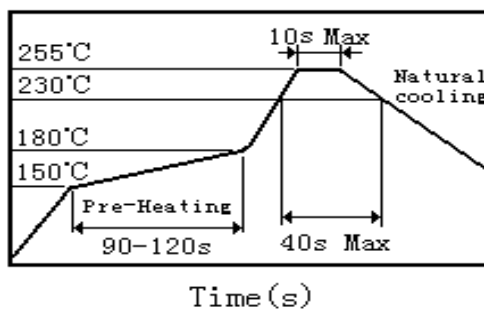
Solder: Sn-3.0Ag-0.5Cu

助焊剂: 使用松香基助焊剂, 禁止使用卤化物含量超过 0.2wt% 的强酸性助焊剂和水溶性助焊剂。

Flux: Use rosin-based flux, but not strongly acidic flux (with chlorine exceeding 0.2 wt%). Do not use water-soluble flux.

- * 焊接曲线

Soldering Profile


◆ 贮存要求
Storage Requirements

- * 存储期限: 为保证电感的焊接特性和包装材料处于良好状态, 请于本公司发货后 6 个月内使用本产品。同时, 由于电感的焊接特性会随时间发生变化, 如果贮存时间超过 6 个月, 请首先确认其焊接特性后再使用。

Storage Period: In order to ensure that the welding characteristics and packaging materials of the inductor are in good condition, please use this product within 6 months after the company ships it. At the same time, because the welding characteristics of the inductor will change with time, if the storage time exceeds 6 months, please confirm its welding characteristics before use.

- * 存储条件:

温度: -10 to +40°C (编带包装的电感器); -40 to +85°C (电感器本体)

相对湿度: 30~70%RH

Storage Conditions:

Temperature: -10 to +40°C (Inductors With Taping); -40 to +85°C (Inductors Body)

Humidity: 30~70%RH