

FEATURES 特征

- Metal material for large current and low loss.
大电流、低损耗用金属材料
- Low loss realized with low Rdc.
通过低Rdc实现低损耗
- Closed magnetic circuit design reduces leakage flux.
闭合磁路设计可减少漏磁通
- Operating Temp : -40℃~+85℃(Including self heating)
工作温度范围:-40℃~+85℃(包括自身温度上升)



APPLICATIONS 用途

- DC/DC converters, Pad, Smart phone, Notebooks, VR, AR.
DC/DC转换器, 平板电脑, 智能手机, 笔记本电脑、VR、AR
- Portable gaming devices, Smart wear, Wi-Fi module, LCD displays, SSDs, HDDs, DVCs, DSCs, etc
便携式游戏设备, 智能穿戴, Wi-Fi模块, LCD显示器、SSD、HDD、DVC、DSC等
- Baseband power supply, Amplifier, Power management, Module power supply, Camera power Management.
基带电源、放大器、电源管理、模块电源、摄像机电源管理

PART NUMBERING 产品型号

APH	252012	T	2R2	M
①	②	③	④	⑤

① Series Name	
APH	Mini Molded SMD Power Inductors

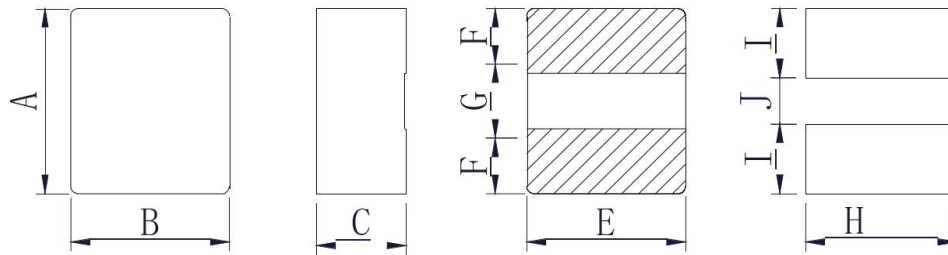
② External Dimensions [LxWxT mm]	
201208	2.0x1.2x0.8
201610	2.0x1.6x1.0
252010	2.5x2.0x1.0
252012	2.5x2.0x1.2

③ Feature Type	
	T Type

④ Inductance	
Code (example)	Nominal inductance [μH]
R47	0.47
1R0	1.0
100	10

⑤ Inductance Tolerance	
M	±20%

DIMENSIONS & RECOMMENDED LAND PATTERN 尺寸及推荐焊盘



Recommended Land Pattern
Unit: mm

Dimensions							Recommended Land Pattern		
Series	A	B	C	E	F	G	H	I	J
	±0.2	±0.2	Max.	Typ.					
APH201208	2.0	1.2	0.8	1.2	0.8	0.5	1.4	0.9	0.5
APH201610	2.0	1.6	1.0	1.6	0.7	0.6	1.8	0.9	0.5
APH252010	2.5	2.0	1.0	2.0	0.9	0.7	2.1	1.0	0.6
APH252012	2.5	2.0	1.2	2.0	0.9	0.7	2.1	1.0	0.6

ELECTRICAL CHARACTERISTICS 特性规格表

● APH201208 Series

Part Number	Inductance	Inductance Tolerance	DC Resistance		Saturation Current	Heat Rating Current
	@1MHz,1V		Max.	Typ.	Max.	Max.
Unit	μH	-	mΩ		A	A
Symbol	L	-	DCR		Isat	Irms
APH201208TR47M	0.47	±20%	50	34	4.60	2.70
APH201208T1R0M	1.0	±20%	70	55	3.50	2.40
APH201208T2R2M	2.2	±20%	185	160	2.30	1.50

● APH201610 Series

Part Number	Inductance	Inductance Tolerance	DC Resistance		Saturation Current	Heat Rating Current
	@1MHz,1V		Max.	Typ.	Max.	Max.
Unit	μH	-	mΩ		A	A
Symbol	L	-	DCR		Isat	Irms
APH201610TR22M	0.22	±20%	22	16	6.30	5.80
APH201610TR24M	0.24	±20%	22	16	6.30	5.80
APH201610TR33M	0.33	±20%	24	19	6.20	5.30
APH201610TR47M	0.47	±20%	28	22	6.00	5.60
APH201610TR68M	0.68	±20%	34	24	5.50	5.00
APH201610T1R0M	1.0	±20%	43	38	4.20	4.10
APH201610T1R5M	1.5	±20%	100	90	2.90	2.30
APH201610T2R2M	2.2	±20%	150	135	2.80	2.10
APH201610T3R3M	3.3	±20%	180	162	2.00	1.50
APH201610T4R7M	4.7	±20%	250	229	1.50	1.15

ELECTRICAL CHARACTERISTICS 特性规格表

● APH252010 Series

Part Number	Inductance	Inductance Tolerance	DC Resistance		Saturation Current	Heat Rating Current
	@1MHz,1V		Max.	Typ.	Max.	Max.
Unit	μH	-	mΩ		A	A
Symbol	L	-	DCR		Isat	Irms
APH252010TR24M	0.24	±20%	21	15.5	7.80	6.40
APH252010TR33M	0.33	±20%	22	16	7.20	6.20
APH252010TR47M	0.47	±20%	23	17	6.50	5.60
APH252010TR68M	0.68	±20%	29	22	5.50	5.00
APH252010T1R0M	1.0	±20%	33	25	4.80	4.10
APH252010T1R5M	1.5	±20%	55	42	3.90	3.00
APH252010T2R2M	2.2	±20%	70	62	3.00	2.10
APH252010T3R3M	3.3	±20%	100	86	2.50	2.00
APH252010T4R7M	4.7	±20%	160	145	2.00	1.60

● APH252012 Series

Part Number	Inductance	Inductance Tolerance	DC Resistance		Saturation Current	Heat Rating Current
	@1MHz,1V		Max.	Typ.	Max.	Max.
Unit	μH	-	mΩ		A	A
Symbol	L	-	DCR		Isat	Irms
APH252012T1R0M	1	±20%	42	38	4.30	3.30
APH252012T2R2M	2.2	±20%	75	64	3.30	2.20

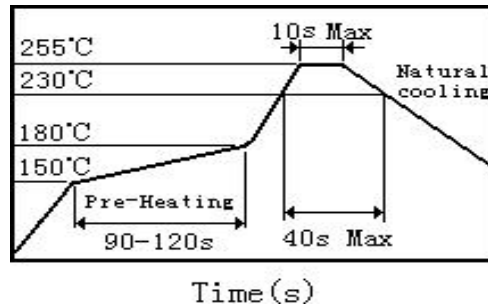
- All test data is referenced to 25 °C ambient.
- Irms:DC current (A) that will cause an approximate ΔT of 40 °C.
- Isat:DC current (A) that will cause L0 to drop approximately 30%.

RELIABILITY TEST 可靠性测试

Items	Requirements	Test Methods and Remarks
Insulation Resistance	$\geq 100M\Omega$	100 V DC between inductor coil and The middle of the top surface of the body for 60 seconds.
Solderability	90% or more of electrode area shall be coated by new solder.	Dip pads in flux and dip in solder pot (96.5Sn/3.0Ag/0.5Cu) at $(245\pm 5)^{\circ}C$ for (5 ± 1) seconds.
Resistance to Soldering Heat	No visible mechanical damage. Inductance change: Within $\pm 10\%$	Dip pads in flux and dip in solder pot (96.5Sn/3.0Ag/0.5Cu) at $(260\pm 5)^{\circ}C$ for (10 ± 1) seconds.
Adhesion of terminal electrode	Strong bond between the pad and the core, without come off PC board.	Inductors shall be subjected to $(260\pm 5)^{\circ}C$ for (20 ± 5) s Soldering in the base whit 0.3mm solder. And then aplomb electrode way plus tax 10 N for (10 ± 1) seconds.
High temperature	No visible mechanical damage. Inductance change: Within $\pm 10\%$	Temperature is $(+85\pm 2)^{\circ}C$ and keep (96 ± 2) hours.
Low temperature	No visible mechanical damage. Inductance change: Within $\pm 10\%$	Temperature is $(-40\pm 2)^{\circ}C$ and keep (96 ± 2) hours.
Thermal shock	No visible mechanical damage. Inductance change: Within $\pm 10\%$	The test sample shall be placed at $(-40\pm 3)^{\circ}C$ and $(125\pm 2)^{\circ}C$ for (30 ± 3) min, different temperature conversion time is 2~3 minutes. The temperature cycle shall be repeated 32 cycles. Placed at room temperature for 2 hours, within 48 hours of testing.
Temperature characteristic	Inductance change P_{c-b}, P_{c-d} : Within $\pm 20\%$	a: $+20^{\circ}C$ (30~45) min $\rightarrow$ b: $-40^{\circ}C$ (30~45) min $\rightarrow$ c: $+20^{\circ}C$ (30~45) min $\rightarrow$ d: $+125^{\circ}C$ (30~45) min $\rightarrow$ e: $+20^{\circ}C$ (30~45) min $P_{c-b} = L_b - L_c \div 100\%$; $P_{c-d} = L_d - L_c \div 100\%$
Static Humidity	No visible mechanical damage. Inductance change: Within $\pm 10\%$	Inductors shall be subjected to $(93\pm 3)\%RH$. at $(60\pm 2)^{\circ}C$ for (96 ± 2) h . Placed at room temperature for 2 hours, within 48 hours of testing.
Life	No visible mechanical damage. Inductance change: Within $\pm 10\%$	Inductors shall be store at $(85\pm 2)^{\circ}C$ for (1000 ± 24) hours with Irms applied. Placed at room temperature for 2 hours, within 48 hours of testing.

■ SOLDERING CONDITINO 焊接条件

- Applicable soldering process to the products is reflow soldering.
- Soldering Materials.
 - ☆ Solder: Sn-3.0Ag-0.5Cu.
 - ☆ Flux: Use rosin-based flux, but not strongly acidic flux (with chlorine exceeding 0.2 wt%). Do not use water-soluble flux.
- Soldering Profile.



- Soldering Iron.
- Reworking with electric soldering iron must preheating at 150°C for 1 minute is required, and do not directly touch the core with the tip of the soldering iron. The reworking soldering conditions are as follows:
 - ☆ Temperature of soldering iron tip: 350°C;
 - ☆ Soldering iron power output: ≤30W;
 - ☆ Diameter of soldering iron end: ≤1.0mm;
 - ☆ Soldering time: <3 s

■ PRECAUTIONS 注意事项

- 1.Storage Conditions
Store products in a warehouse in compliance with the following condition:
Temperature: Inductors (product with taping) +15 to +35℃; Humidity: 25~70%RH.
If the product is not used up 24H after opening, desiccant should be placed in the package and sealed
- 2.Do not subject products to rapid changes in temperature and humidity.
- 3.Do not store the products in chemical atmosphere such as one containing sulfurous acid gas or alkaline gas, that will causes poor solderability and corrosion of inductors.
- 4.Do not store products in bulk packaging to prevent collision among inductors which causes core chipping and wire breakage.
- 5.Store products on pallets to protect from humidity, dust, etc.
- 6.Avoid heat shock, vibration, direct sunlight, etc.
- 7.When designing the PCB, please consider the installation position of the non-magnetic shielded components to avoid failures caused by magnetic interference.
- 8.Do not place this product near magnets or objects with magnetic force.
- 9.The product will self-heat (temperature rise) due to power-on, and sufficient margin should be left in thermal design.
- 10.Mounting density
If this product is placed near heat-generating products, be sure to implement sufficient heat-dissipating measures. If this product is subjected to a significant amount of heat from other products, this could adversely affect product quality, resulting in a circuit malfunction or failure of the mounted section. Also, be sure that the product is used in a manner so that the heat that the product is subjected to from other products does not exceed the upper limit of the rated operating temperature for the product.
- 11.Since the static electricity carried by the human body will be transmitted to the ground wire, please use an anti-static wrist strap.
- 12.Grease on human hands may lead to decreased solderability. Please avoid direct contact with the terminals.
- 13.This product refers to the general standard used in audio-visual entertainment, home appliances, computers,office automation, communications, power modules, LED lighting, measuring equipment.Machine tools, industrial control panels and other general electronic equipment. And the general electronequipment should be used under the usual operation and usage methods.
- 14.Reworking with soldering iron

ITEM	Requirement
Pre-heating	150℃/approx. 1 min
Tip temperature of soldering iron	350℃ max.
Soldering time	3 s (+1 s, -0 s)
Number of reworking operations	1 times max.
It is recommended to replace the product directly, rework may cause poor appearance	
- 15.We cannot warrant against failure caused by any use of our product that deviates from the intended use as described in this product specification.
- 16.Please approve our product specifications or transact the approval sheet for product specifications before ordering.
- 17.Our specification limits the quality of the component as a single unit. Please ensure the component is thoroughly evaluated in your application circuit.

■ SAFETY REMINDERS 注意事项

SAFETY REMINDERS

● All products listed in this specification are developed, designed and intended for use in general electronics equipment. The products are not designed or Warranted to meet the requirements of the applications listed below, whose performance and/or quality require especially high reliability, or whose failure, malfunction or trouble might directly cause damage to society, person, or property. Please understand that we are not responsible for any damage or liability caused by use of the products in any of the applications below. Please contact us for more details if you intend to use our products in the following applications.

- ☆ 1.Aerospace/aviation equipment
- ☆ 2.Transportation equipment (cars, electric trains, ships, etc.)
- ☆ 3.Medical equipment
- ☆ 4.Power-generation control equipment
- ☆ 5.Atomic energy-related equipment
- ☆ 6.Seabed equipment
- ☆ 7.Transportation control equipment
- ☆ 8.Public information-processing equipment
- ☆ 9.Military equipment
- ☆ 10.Electric heating apparatus, burning equipment
- ☆ 11.Disaster prevention/crime prevention equipment
- ☆ 12.Safety equipment
- ☆ 13.Other applications that are not considered general-purpose applications

● When designing your equipment even for general-purpose applications, you are kindly requested to take into consideration securing protection circuit/device or providing backup circuits in your equipment.