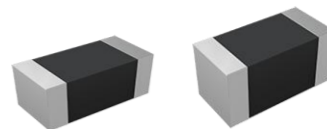


FEATURES 特征

- Monolithic structure for high reliability.
迭层独石结构、高度可靠性
- No cross coupling due to magnetic shield.
良好的磁屏蔽, 无交叉耦合
- Excellent solderability and high heat resistance.
良好的可焊性和耐焊性
- High DC bias current due to developed material.
通过磁体材料的改进, 偏置电流大幅度提高
- Low DC resistance.
直流电阻大幅度降低
- Operating Temp : -40°C~+125°C(Including self heating)
工作温度范围:-40°C~+125°C(包括自身温度上升)



APPLICATIONS 用途

- Choke circuits in DC power line of consumer electronics such as Personal computers, mobile phones, tablets and smart home appliances
用于个人电脑、移动电话、平板电脑、智能家电等 各种消费类电子设备直流电源线的扼流线路

PART NUMBERING 产品型号

APQM	18	FN	100	M	00	D
①	②	③	④	⑤	⑥	⑦

① Series Name	
APQM	Chip Inductor for Choke

② External Dimensions [inch]	
18	1608 [0603]
21	2012[0805]

③ Product identification code	
	FN

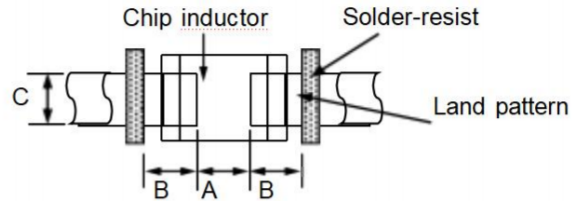
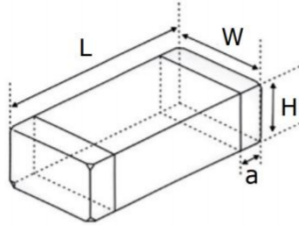
⑤ Inductance Tolerance	
M	20%
N	30%

④ Inductance	
Code (example)	Nominal inductance [μH]
1R0	1.0uH
2R2	2.2uH

⑥ Internal code	
	00,70,80

⑦ Packaging	
D	Tape & Reel

DIMENSIONS & RECOMMENDED LAND PATTERN 尺寸及推荐焊盘



Unit: mm

Dimensions					Recommended Land Pattern		
Series	L	W	H	a	A	B	C
APQM18FN	1.60±0.15	0.8±0.15	0.8±0.15	0.3±0.2	0.6~0.8	0.6~0.8	0.6~0.8
APQM21FN	2.0(+0.3,-0.1)	1.25±0.2	0.85±0.2	0.5±0.3	0.8~1.2	0.8~1.2	0.9~1.6
			1.25±0.2				

ELECTRICAL CHARACTERISTICS 特性规格表

● APQM18FN Series

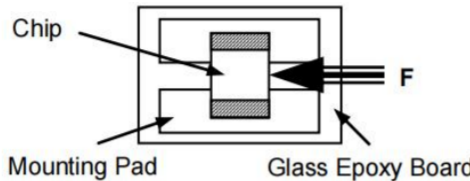
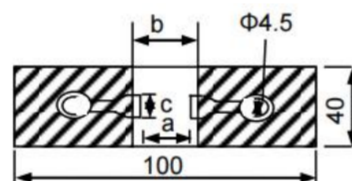
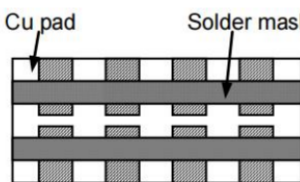
Part Number	Inductance (μH)	L,Q Test Freq. L/Q (MHz)	DC resistance (Ω)		Rated Current (mA)	S.R.F (MHz)		Thickness (mm)
			Max.	Typ.		Max.	Min.	
APQM18FN1R0M00D	1.0±20%	1	0.26	0.2	190	75		0.8±0.15
APQM18FN2R2M00D	2.2±20%	1	0.52	0.4	140	50		0.8±0.15
APQM18FN4R7M00D	4.7±20%	1	0.78	0.6	100	35		0.8±0.15
APQM18FN100M00D	10±20%	1	1.2	0.9	50	20		0.8±0.15

● APQM21FN Series

Part Number	Inductance (μH)	L,Q Test Freq. L/Q (MHz)	DC resistance (Ω)		Rated Current (mA)	S.R.F (MHz)		Thickness (mm)
			Max.	Typ.		Max.	Min.	
APQM21FN1R0N00D	1.0±30%	1	0.26	0.2	300	75		0.85±0.2
APQM21FN2R2N00D	2.2±30%	1	0.37	0.28	220	50		0.85±0.2
APQM21FN4R7N00D	4.7±30%	1	0.39	0.3	180	25		0.85±0.2
APQM21FN4R7M70D	4.7±20%	1	0.39	0.3	180	25		0.85±0.2
APQM21FN4R7M80D	4.7±20%	1	0.39	0.3	180	25		0.85±0.2
APQM21FN100N00D	10±20%	1	0.65	0.5	60	15		1.25±0.2
APQM21FN100M70D	10±20%	1	0.65	0.5	100	20		1.25±0.2
APQM21FN100M80D	10±20%	1	0.65	0.5	100	20		1.25±0.2
APQM21FN220N00D	22±30%	1	1.1	-	5	16		0.85±0.2
APQM21FN470N00D	47±30%	2	3	-	4	7.5		1.25±0.2

- The rated current is the value of DC current at which the inductance value is dropped within 50% with the application of Dc bias.

RELIABILITY TEST 可靠性测试

Items	Requirements	Test Methods and Remarks											
1. Terminal Strength	No removal or split of the termination or other defects shall occur.	<div>① Solder the inductor to the testing jig(glass epoxy board shown in Fig.1-1)using leadfree solder. Then apply a force in the direction of the arrow.</div> <div>② 5N force for APQM18FN series. 10N force for APQM21FN series.</div> <div>③ Keep time: 10+1s.</div> <div>④ Speed: 1.0mm/s.</div>											
	<div></div> <div>Fig.1-1</div>												
2. Resistance to Flexure	No visible mechanical damage.	<div>① Solder the inductor to the test jig (glass epoxy board shown in Fig.2-1) Using a leadfree solder. Then apply a force in the direction shown Fig.2-2.</div> <div>② Flexure: 2mm.</div> <div>③ Pressurizing Speed: 0.5mm/sec.</div> <div>④ Keep time: 30 sec.</div>											
	<div>Unit: mm [inch]</div> <table><tr><th>Type</th><th>a</th><th>b</th><th>c</th></tr><tr><td>1608[0603]</td><td>1.0</td><td>3.0</td><td>1.2</td></tr><tr><td>2012[0805]</td><td>1.2</td><td>4.0</td><td>1.65</td></tr></table> <div></div> <div>Fig.2-1</div>		Type	a	b	c	1608[0603]	1.0	3.0	1.2	2012[0805]	1.2	4.0
Type	a	b	c										
1608[0603]	1.0	3.0	1.2										
2012[0805]	1.2	4.0	1.65										
3. Vibration	① No visible mechanical damage.	<div>① Solder the inductor to the testing jig (glass epoxy board shown in Fig.3-1) using leadfree solder.</div> <div>② The inductor shall be subjected to a simple harmonic motion having total amplitude of 1.5mm, the frequency being varied uniformly between the approximate limits of 10 and 55 Hz.</div> <div>③ The frequency range from 10 to 55 Hz and return to 10 Hz shall be traversed in approximately 1 minute. This motion shall be applied for a period of 2 hours in each 3 mutually perpendicular directions (total of 6 hours).</div>											
	<div></div> <div>Fig. 3-1</div>												
4. Temperature	Inductance change should be within ±20% of initial value measuring at 20℃ .	Temperature range: -40℃~+85℃ Reference temperature: +20℃											
5. Solderability	<div>① No visible mechanical damage.</div> <div>② Wetting shall exceed 95% coverage.</div>	<div>① Solder temperature: 240±2℃</div> <div>② Duration: 3 sec.</div> <div>③ Solder: Sn/3.0Ag/0.5Cu.</div> <div>④ Flux: 25% Resin and 75% ethanol in weight.</div>											

RELIABILITY TEST 可靠性测试

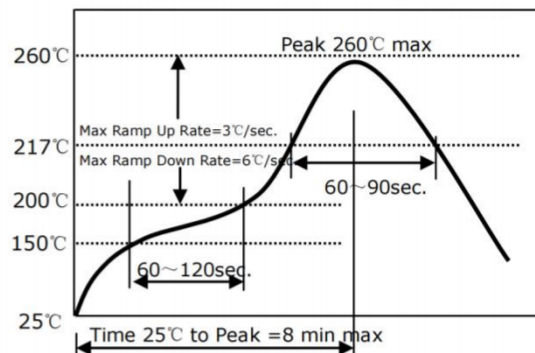
Items	Requirements	Test Methods and Remarks
6. Resistance to Soldering Heat	① No visible mechanical damage. ② Wetting shall exceed 95% coverage. ③ Inductance change: Within $\pm 20\%$.	① Solder temperature: $260 \pm 3^\circ\text{C}$. ② Duration: 5 sec. ③ Solder: Sn/3.0Ag/0.5Cu. ④ Flux: 25% Resin and 75% ethanol in weight. ⑤ The chip shall be stabilized at normal condition for 1~2 hours before measuring.
7. Thermal Shock	① No mechanical damage. ② Inductance change: Within $\pm 20\%$. Fig.7-1	① Temperature, Time: (See Fig.7-1) -40°C for 30 ± 3 min \rightarrow 85°C for 30 ± 3 min. ② Transforming interval: 20 sec.(max.). ③ Tested cycle: 100 cycles. ④ The chip shall be stabilized at normal condition for 1~2 hours before measuring.
8. Resistance to Low Temperature	① No mechanical damage. ② Inductance change: Within $\pm 20\%$.	① Temperature: $-40 \pm 2^\circ\text{C}$ ② Duration: 1000^{+24} hours. ③ The chip shall be stabilized at normal condition for 1~2 hours before measuring.
9. Loading Under Damp Heat	① No mechanical damage. ② Inductance change: Within $\pm 20\%$.	① Temperature: $60 \pm 2^\circ\text{C}$ ② Humidity: 90% to 95% RH. ③ Duration: 1000^{+24} hours. ④ Applied current: Rated current. ⑤ The chip shall be stabilized at normal condition for 1~2 hours before measuring.
10. Loading at High Temperature (Life Test)	① No mechanical damage. ② Inductance change: Within $\pm 20\%$.	① Temperature: $85 \pm 2^\circ\text{C}$ ② Duration: 1000^{+24} hours. ③ Applied current: Rated current. ④ The chip shall be stabilized at normal condition for 1~2 hours before measuring.

Recommended Soldering Technologies 回流焊建议

Reflowing Profile

- ◆ Preheat condition: 150~200℃/60~120sec.
- ◆ Allowed time above 217℃: 60~90sec.
- ◆ Max temp: 260℃
- ◆ Max time at max temp: 10sec.
- ◆ Solder paste: Sn/3.0Ag/0.5Cu
- ◆ Allowed Reflow time: 2x max

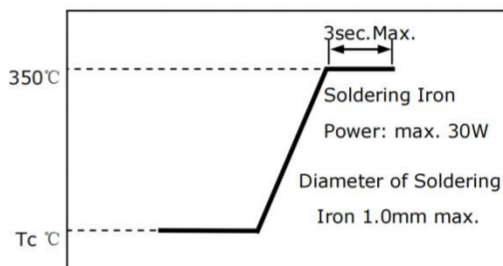
Note: The reflow profile in the above table is only for qualification and is not meant to specify board assembly profiles. Actual board assembly profiles must be based on the customer's specific board design, solder paste and process, and should not exceed the parameters as the Reflow profile shows.



Iron Soldering Profile

- ◆ Iron soldering power: Max.30W
- ◆ Pre-heating: 150 °C / 60sec.
- ◆ Soldering Tip temperature: 350°C Max.
- ◆ Soldering time: 3sec Max.
- ◆ Solder paste: Sn/3.0Ag/0.5Cu
- ◆ Max.1 times for iron soldering

Note: Take care not to apply the tip of the soldering iron to the terminal electrodes.



■ Safety Reminders 注意事项

SAFETY REMINDERS

- The storage period is within 12 months. Be sure to follow the storage conditions (temperature: 15 to 35°C, humidity: 75% RH or less). If the storage period elapses, the soldering of the terminal electrodes may deteriorate.
- Do not use or store in locations where there are conditions such as gas corrosion (salt, acid, alkali, etc.).
- Soldering corrections after mounting should be within the range of the conditions determined in the specifications. If overheated, a short circuit, performance deterioration, or lifespan shortening may occur.
- When embedding a printed circuit board where a chip is mounted to a set, be sure that residual stress is not given to the chip due to the overall distortion of the printed circuit board and partial distortion such as at screw tightening portions.
- Self heating (temperature increase) occurs when the power is turned ON, so the tolerance should be sufficient for the set thermal design.
- This product is not designed for production processes involving ultrasonic welding, as high-frequency vibration may cause application issues such as product detachment and breakage.
- Carefully layout the coil for the circuit board design of the non-magnetic shield type. A malfunction may occur due to magnetic interference.
- Use a wrist band to discharge static electricity in your body through the grounding wire.
- Do not expose the products to magnets or magnetic fields.
- Do not use for a purpose outside of the contents regulated in the delivery specifications.
- The products listed on this catalog are intended for use in general electronic equipment, under a normal operation and use condition.

The Company shall not guarantee the suitability, performance, or quality for the following applications that require a high level of safety and reliability, or where equipment failure, malfunction, or abnormal operation may cause damage to human life, physical well-being, or property, and may have significant social impacts (hereinafter referred to as "specific applications"). If you intend to use this product in the application scenarios listed below, or if you have special requirements exceeding the scope or conditions specified in each product catalog, please contact us.

- (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.