

SMD Power Inductor

TMPC0412HP-Serise(G)-Z02

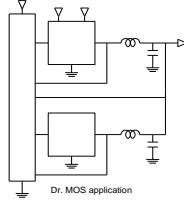
1. Features

1. Carbonyl Powder.
2. Compact design.
3. High current · low DCR · high efficiency.
4. Very low acoustic noise and very low leakage flux noise.
5. High reliability.
6. 100% Lead(Pb)-Free and RoHS compliant.

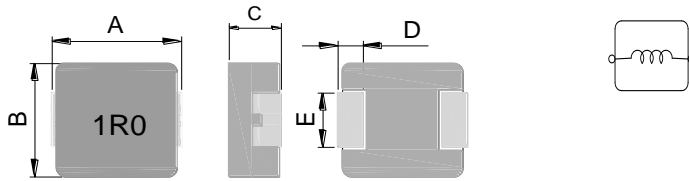


2. Applications

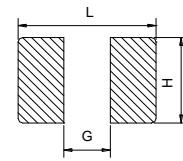
Note PC power system · incl. IMVP-6
DC/DC converter .



3. Dimensions



Recommend PC Board Pattern



Series	A(mm)	B(mm)	C(mm)	D(mm)	E(mm)
TMPC0412HP	4.45±0.25	4.06±0.25	1.0±0.2	0.76±0.30	2.0±0.20

L(mm)	G(mm)	H(mm)
5.2	2.2	2.3

4. Part Numbering



- A: Series
- B: Dimension
- C: Type
- D: Inductance
- E: Inductance Tolerance
- F: Control S/N
- BxC
- H: Carbonyl Powder, P:PAD broaden.
- 1R0=1.0uH
- M=±20%
- 印字:黑色,單向印字

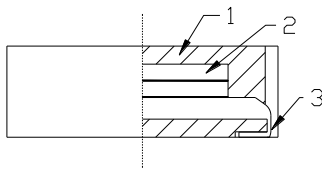
5. Specification

Part Number	Inductance L0 (uH) @ 0 A	I rms (A) Typ.	I sat (A) Typ.	DCR (mΩ) Typ. @25°C	DCR (mΩ) Max. @25°C
TMPC0412HP-R10YG-Z02	0.10±30%	11.5	25	4.3	5.5
TMPC0412HP-R15YG-Z02	0.15±30%	10	21.5	5.5	6.8
TMPC0412HP-R22MG-Z02	0.22±20%	8.5	20	6.6	8.0
TMPC0412HP-R36MG-Z02	0.36±20%	6.5	8.5	15.5	18
TMPC0412HP-R47MG-Z02	0.47±20%	6.0	6.5	18	20
TMPC0412HP-R60MG-Z02	0.60±20%	5.3	6.0	22.5	26
TMPC0412HP-R68MG-Z02	0.68±20%	5.0	6.0	32	37
TMPC0412HP-1R0MG-Z02	1.00±20%	4.0	6.0	41	47
TMPC0412HP-1R2MG-Z02	1.20±20%	3.5	5.0	48	56
TMPC0412HP-1R5MG-Z02	1.50±20%	3.0	4.0	55	63.3
TMPC0412HP-2R2MG-Z02	2.20±20%	2.8	3.5	69.2	80
TMPC0412HP-3R3MG-Z02	3.30±20%	2.3	3.0	84	97
TMPC0412HP-4R7MG-Z02	4.70±20%	2.0	2.5	128	145
TMPC0412HP-5R6MG-Z02	5.60±20%	1.7	2.3	180	208
TMPC0412HP-6R8MG-Z02	6.80±20%	1.5	1.7	300	360
TMPC0412HP-8R2MG-Z02	8.20±20%	1.4	1.6	313	376
TMPC0412HP-100MG-Z02	10.0±20%	1.3	1.4	410	463

Note:

1. Test frequency : L/Q : 100KHz /1.0V;
2. All test data referenced to 25°C ambient.
3. Testing Instrument : L/Q: HP4284A,CH11025,CH3302,CH1320 ,CH1320S LCR METER / Rdc:CH16502,Agilent33420A MICRO OHMMETER.
4. Heat Rated Current (I_{rms}) will cause the coil temperature rise approximately Δt of 40°C(keep 1min.).
5. Saturation Current (I_{sat}) will cause L0 to drop 20% typical. (keep quickly).
6. The part temperature (ambient + temp rise) should not exceed 125°C under worst case operating conditions.Circuit design,component,PCB trace size and thickness,airflow and other cooling provisions all affect the part temperature. Part temperature should be verified in the end application.
7. Special inquiries besides the above common used types can be met on your requirement.

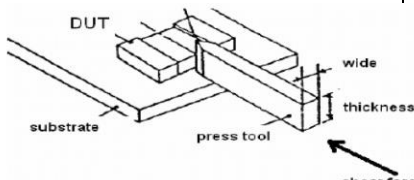
6. Material List



NO	Items	Materials
1	Core	Carbonyl powder or equ.
2	Wire	Polyester Wire or equivalent.
3	Solder Plating	100% Pb free solder

7. Reliability and Test Condition

Item	Performance	Test Condition															
Operating temperature	-40~+125°C (Including self - temperature rise)																
Storage temperature	-40~+125°C (on board)																
Electrical Performance Test																	
Inductance	Refer to standard electrical characteristics list.	HP4284A, CH11025, CH3302, CH1320, CH1320S LCR Meter.															
DCR		CH16502, Agilent33420A Micro-Ohm Meter.															
Saturation Current (Isat)	$\Delta L \leq 20\%$ typical.	Saturation DC Current (Isat) will cause L0 to drop $\Delta L(\%)$ (keep quickly).															
Heat Rated Current (Irms)	Approximately $\Delta T \leq 40^\circ C$	Heat Rated Current (Irms) will cause the coil temperature rise $\Delta T(^\circ C)$ without core loss. 1. Applied the allowed DC current(keep 1 min.). 2. Temperature measured by digital surface thermometer															
Reliability Test																	
Life Test	Appearance : No damage. Inductance : within $\pm 10\%$ of initial value Q : Shall not exceed the specification value.	Preconditioning: Run through IR reflow for 2 times.(IPC/JEDEC J-STD-020D Classification Reflow Profiles) Temperature : 125 $\pm 2^\circ C$ (Bead) Temperature : 85 $\pm 2^\circ C$ (Inductor) Applied current : rated current Duration : 1000 ± 12 hrs Measured at room temperature after placing for 24 ± 2 hrs															
Load Humidity	RDC : within $\pm 15\%$ of initial value and shall not exceed the specification value	Preconditioning: Run through IR reflow for 2 times.(IPC/JEDEC J-STD-020D Classification Reflow Profiles) Humidity : 85 $\pm 2\%$ R.H, Temperature : 85 $\pm 2^\circ C$ Duration : 1000hrs Min. with 100% rated current Measured at room temperature after placing for 24 ± 2 hrs															
Thermal shock		Preconditioning: Run through IR reflow for 2 times.(IPC/JEDEC J-STD-020D Classification Reflow Profiles) Condition for 1 cycle Step1 : -40 $\pm 2^\circ C$ 30 ± 5 min Step2 : 25 $\pm 2^\circ C$ ≤ 0.5 min Step3 : 105 $\pm 2^\circ C$ 30 ± 5 min Number of cycles : 500 Measured at room temperature after placing for 24 ± 2 hrs															
Vibration		Oscillation Frequency: 10 ~ 2K ~ 10Hz for 20 minutes Equipment : Vibration checker Total Amplitude: 1.52mm $\pm 10\%$ Testing Time : 12 hours(20 minutes, 12 cycles each of 3 orientations) *															
Shock		<table border="1"> <thead> <tr> <th>Type</th> <th>Peak value (g's)</th> <th>Normal duration (D) (ms)</th> <th>Wave form</th> <th>Velocity change (V)/ft/sec</th> </tr> </thead> <tbody> <tr> <td>SMD</td> <td>1500</td> <td>0.5</td> <td>Half-sine</td> <td>15.4</td> </tr> <tr> <td>Lead</td> <td>100</td> <td>6</td> <td>Half-sine</td> <td>12.3</td> </tr> </tbody> </table>	Type	Peak value (g's)	Normal duration (D) (ms)	Wave form	Velocity change (V)/ft/sec	SMD	1500	0.5	Half-sine	15.4	Lead	100	6	Half-sine	12.3
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SMD	1500	0.5	Half-sine	15.4													
Lead	100	6	Half-sine	12.3													
Bending		Shall be mounted on a FR4 substrate of the following dimensions: $\geq 0805: 40 \times 100 \times 1.2$ mm $< 0805: 40 \times 100 \times 0.8$ mm Bending depth: $\geq 0805: 1.2$ mm $< 0805: 0.8$ mm duration of 10 sec.															

Item	Performance	Test Method and Remarks						
Soderability	More than 95% of the terminal electrode should be covered with solder °	Preheat: 150°C, 60sec. ° Solder: Sn96.5% Ag3% Cu0.5% ° Temperature: 245±5°C ° Flux for lead free: Rosin. 9.5% ° Dip time: 4±1sec ° Depth: completely cover the termination						
Resistance to Soldering Heat		Number of heat cycles: 1 <table border="1"> <thead> <tr> <th>Temperature (°C)</th> <th>Time(s)</th> <th>Temperature ramp/immersion and emersion rate</th> </tr> </thead> <tbody> <tr> <td>260 ±5(solder temp)</td> <td>10 ±1</td> <td>25mm/s ±6 mm/s</td> </tr> </tbody> </table>	Temperature (°C)	Time(s)	Temperature ramp/immersion and emersion rate	260 ±5(solder temp)	10 ±1	25mm/s ±6 mm/s
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260 ±5(solder temp)	10 ±1	25mm/s ±6 mm/s						
Terminal Strength	Appearance : No damage. Inductance : within±10% of initial value Q : Shall not exceed the specification value. RDC : within ±15% of initial value and shall not exceed the specification value	Preconditioning: Run through IR reflow for 2 times. (IPC/JEDEC J-STD-020DClassification Reflow Profiles With the component mounted on a PCB with the device to be tested, apply a force (>0.805:1kg , <=0.805:0.5kg)to the side of a device being tested. This force shall be applied for 60 +1 seconds. Also the force shall be applied gradually as not to apply a shock to the component being tested. 						

8. Soldering and Mounting

(1) Soldering

Mildly activated rosin fluxes are preferred. The minimum amount of solder can lead to damage from the stresses caused by the difference in coefficients of expansion between solder, chip and substrate. TAI-TECH terminations are suitable for re-flow soldering systems. If hand soldering cannot be avoided, the preferred technique is the utilization of hot air soldering tools.

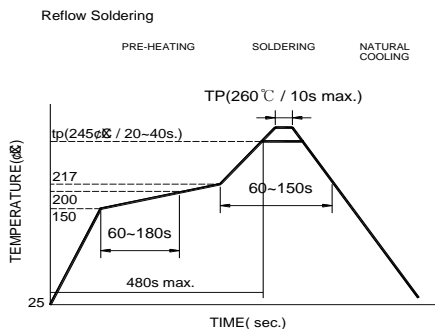
(2) Solder re-flow:

Recommended temperature profiles for re-flow soldering in Figure 1.

(3) Soldering Iron:

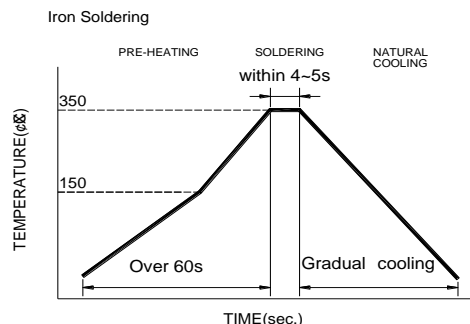
Products attachment with a soldering iron is discouraged due to the inherent process control limitations. In the event that a soldering iron must be employed the following precautions are recommended.

- Preheat circuit and products to 150°C
- Never contact the ceramic with the iron tip
- Use a 20 watt soldering iron with tip diameter of 1.0mm
- 355°C tip temperature (max)
- 1.0mm tip diameter (max)
- Limit soldering time to 4~5sec.



Reflow times: 3 times max.

Fig.1

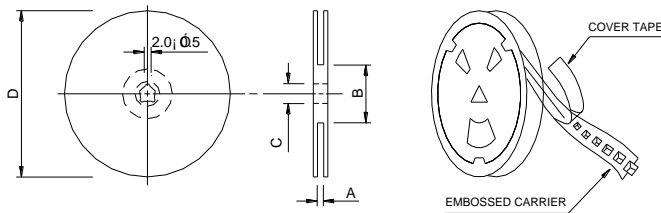


Iron Soldering times: 1 times max.

Fig.2

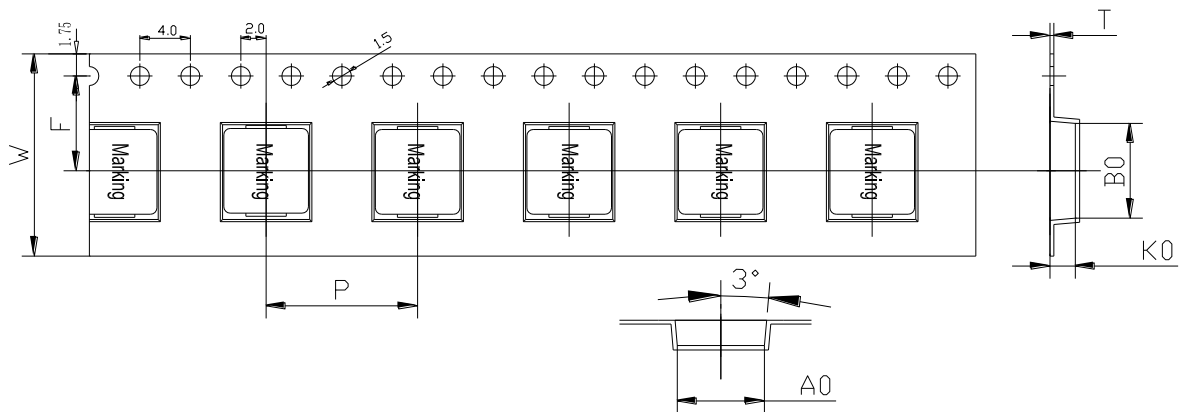
9. Packaging Information

(1) Reel Dimension



Type	A(mm)	B(mm)	C(mm)	D(mm)
13"x12mm	12.4±2/-0	100±2	13.5±0.5	330

(2) Tape Dimension

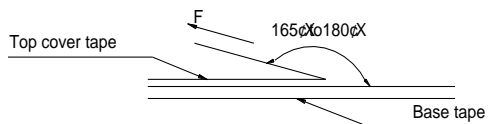


Series	Size	Bo(mm)	Ao(mm)	Ko(mm)	P(mm)	W(mm)	F(mm)	t(mm)
TMPC	0412	5.0±0.1	4.40±0.1	1.5±0.1	8.0±0.1	12±0.3	5.5±0.1	0.35±0.05

(3) Packaging Quantity

TMPC	0412
Chip / Reel	4000
Inner box	8000
Carton	32000

(4) Tearing Off Force



The force for tearing off cover tape is 10 to 130 grams in the arrow direction under the following conditions(referenced ANSI/EIA-481-C-2003 of 4.11 standard).

Room Temp. (°C)	Room Humidity (%)	Room atm (hPa)	Tearing Speed mm/min
5~35	45~85	860~1060	300

Application Notice

- Storage Conditions(component level)

To maintain the solderability of terminal electrodes:

1. TAI-TECH products meet IPC/JEDEC J-STD-020D standard-MSL, level 1.
2. Temperature and humidity conditions: Less than 40°C and 60% RH.
3. Recommended products should be used within 12 months from the time of delivery.
4. The packaging material should be kept where no chlorine or sulfur exists in the air.

- Transportation

1. Products should be handled with care to avoid damage or contamination from perspiration and skin oils.
2. The use of tweezers or vacuum pick up is strongly recommended for individual components.
3. Bulk handling should ensure that abrasion and mechanical shock are minimized.

10. Typical Performance Curves

