

Specification for Approval

Date: 2019/11/01

Customer : 深圳臺慶

TAI-TECH P/N: **TMPC0503HP-220MG-D02**

CUSTOMER P/N:

DESCRIPTION:

QUANTITY: pcs

REMARK:

Customer Approval Feedback

☐ 西北臺慶科技股份有限公司
 TAI-TECH Advanced Electronics Co., Ltd
 Headquarter:
 NO.1 YOU 4TH ROAD, YOUTH INDUSTRIAL DISTRICT, YANG-MEI,
 TAO-YUAN HSIEN, TAIWAN, R.O.C.
 TEL: +886-3-4641148 FAX: +886-3-4643565
 http://www.tai-tech.com.tw
 E-mail: sales@tai-tech.com.tw

☐ Office:
 深圳辦公室
 11BC,Building B Fortune Plaza,NO.7002, Shennan Avenue, Futian
 District Shenzhen
 TEL: +86-755-23972371 FAX: +86-755-23972340

☐ 臺慶精密電子(昆山)有限公司
 TAI-TECH ADVANCED ELECTRONICS(KUNSHAN) CO., LTD
 SHINWHA ROAD, KUNJIA HI-TECH INDUSTRIAL PARK, KUN-SHAN,
 JIANG-SU, CHINA
 TEL: +86-512-57619396 FAX: +86-512-57619688
 E-mail: sales@tai-tech.cn

☒ 慶邦電子元件(泗洪)有限公司
 TAIPAQ ELECTRONICS(SIHONG) CO., LTD
 JIN SHA JIANG ROAD , CONOMIC DEVELOPMENT ZONE SIHONG ,
 JIANGSU , CHINA.
 TEL: +86-527-88601191 FAX: +86-527-88601190
 E-mail: sales@taipaq.cn

Sales Dep.

APPROVED	CHECKED
管哲頌 Eric Kuan	曾詩涵 Angela Tseng

R&D Center

APPROVED	CHECKED	DRAWN
羅宜春	梁周虎	許靜

SMD Power Inductor

TMPC0503HP-220MG-D02

ECN HISTORY LIST					
REV	DATE	DESCRIPTION	APPROVED	CHECKED	DRAWN
1.0	19/11/01	新發行	羅宜春	梁周虎	許靜
備 注					

SMD Power Inductor

TMPC0503HP-220MG-D02

1. Features

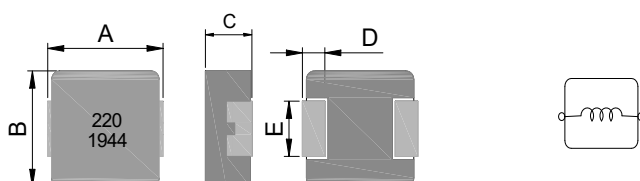
1. Carbonyl Powder.
2. Compact design.
3. High current , low DCR , high efficiency.
4. Very low acoustic noise and very low leakage flux noise.
5. High reliability.
6. 100% Lead(Pb)-Free and RoHS compliant.
7. Operating temperature -40~+125℃(Including self - temperature rise)



2. Applications

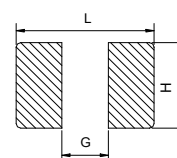
Note PC power system , incl. IMVP-6
DC/DC converter .

3. Dimensions



Series	A(mm)	B(mm)	C(mm)	D(mm)	E(mm)
TMPC0503HP	5.7±0.3	5.2±0.2	2.8±0.2	1.1±0.3	2.5±0.3

Recommend PC Board Pattern



L(mm)	G(mm)	H(mm)
6.5	2.5	2.8

Note: 1. The above PCB layout reference only.
2. Recommend solder paste thickness at 0.12mm and above.

4. Part Numbering

TMPC	0503	HP	-	220	MG	-	D02
A	B	C		D	E		F

A: Series
B: Dimension
C: Type
D: Inductance
E: Inductance Tolerance
F: Control S/N

BxC
HP:H:Carbonyl Powder,P:PAD broaden.
220=22.0uH
M=±20%.
Marking: Black.220 and 1944(19 YY, 44WW, follow production date).

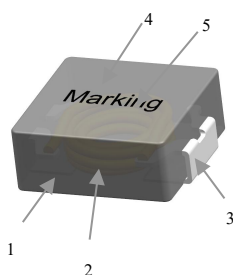
5. Specification

Part Number	Inductance L0 (uH)±20%	I rms (A) Typ	I sat (A) Typ	DCR (mΩ) Typ. @25℃	DCR (mΩ) Max. @25℃
TMPC0503HP-220MG-D02	22.0	2.2	2.7	217.0	250.0

Note:

1. Test frequency : Ls : 100KHz /1.0V.
2. All test data referenced to 25℃ ambient.
3. Testing Instrument(or equ) : L: HP4284A,CH11025,CH3302,CH1320,CH1320S LCR METER / Rdc:CH16502,Agilent33420A MICRO OHMMETER.
4. Heat Rated Current (Irms) will cause the coil temperature rise approximately ΔT of 40℃
5. Saturation Current (Isat) will cause L0 to drop approximately 30%.
6. The part temperature (ambient + temp rise) should not exceed 125℃ 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.

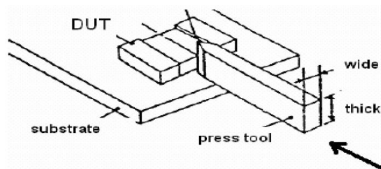
6. Material List



NO	Items	Materials
1	Core	Carbonyl Powder.
2	Wire	Polyester Wire or equivalent.
3	Clip	100% Pb free solder(Ni+Sn---Plating)
4	paint	Epoxy resin
5	Ink	Halogen-free ketone

7. Reliability and Test Condition

Item	Performance	Test Condition
Operating temperature	-40~+125℃ (Including self - temperature rise)	
Storage temperature	1. -10~+40℃, 50~60%RH (Product with taping) 2. -40~+125℃ (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)	Approximately ΔL 30%.	Saturation DC Current (Isat) will cause L0 to drop ΔL (%)
Heat Rated Current (Irms)	Approximately ΔT 40℃	Heat Rated Current (Irms) will cause the coil temperature rise ΔT (℃). 1. Applied the allowed DC current 2. Temperature measured by digital surface thermometer
Reliability Test		
Life Test	Appearance : No damage. Impedance : within $\pm 15\%$ of initial value Inductance : within $\pm 10\%$ of initial value Q : Shall not exceed the specification value. RDC : within $\pm 15\%$ of initial value and shall not exceed the specification value	Preconditioning: Run through IR reflow for 2 times.(IPC/JEDECJ-STD-020DClassification Reflow Profiles) Temperature : 125 $\pm$ 2℃ (Inductor) Applied current : rated current Duration : 1000 $\pm$ 12hrs Measured at room temperature after placing for 24 $\pm$ 2 hrs.
Load Humidity		Preconditioning: Run through IR reflow for 2 times.(IPC/JEDECJ-STD-020DClassification Reflow Profiles) Humidity : 85 $\pm$ 2% R.H. Temperature : 85 $\pm$ 2℃ Duration : 1000hrs Min. with 100% rated current Measured at room temperature after placing for 24 $\pm$ 2 hrs.
Moisture Resistance		Preconditioning: Run through IR reflow for 2 times.(IPC/JEDECJ-STD-020DClassification Reflow Profiles) 1. Baked at 50℃ for 25hrs, measured at room temperature after placing for 4 hrs. 2. Raise temperature to 65 $\pm$ 2℃ 90-100%RH in 2.5hrs, and keep 3 hours, cool down to 25℃ in 2.5hrs. 3. Raise temperature to 65 $\pm$ 2℃ 90-100%RH in 2.5hrs, and keep 3 hours, cool down to 25℃ in 2.5hrs, keep at 25℃ for 2 hrs then keep at -10℃ for 3 hrs 4. Keep at 25℃ 80-100%RH for 15min and vibrate at the frequency of 10 to 55 Hz to 10 Hz, measure at room temperature after placing for 1~2 hrs.
Thermal shock		Preconditioning: Run through IR reflow for 2 times.(IPC/JEDECJ-STD-020DClassification Reflow Profiles) Condition for 1 cycle Step1 : -40 $\pm$ 2℃ 30 $\pm$ 5min Step2 : 25 $\pm$ 2℃ $\leq$ 0.5min Step3 : 125 $\pm$ 2℃ 30 $\pm$ 5min Number of cycles : 500 Measured at room temperature after placing for 24 $\pm$ 2 hrs.
Vibration		Preconditioning: Run through IR reflow for 2 times.(IPC/JEDECJ-STD-020DClassification Reflow Profiles) Oscillation Frequency: 10Hz~2KHz~10Hz for 20 minutes Equipment: Vibration checker Total Amplitude: 10g Testing Time : 12 hours(20 minutes, 12 cycles each of 3 orientations).

Item	Performance	Test Condition															
Bending		Shall be mounted on a FR4 substrate of the following dimensions: >=0805 inch(2012mm):40x100x1.2mm <0805 inch(2012mm):40x100x0.8mm Bending depth: >=0805 inch(2012mm):1.2mm <0805 inch(2012mm):0.8mm duration of 10 sec.															
Shock	Appearance : No damage. Impedance : within±15% of initial value 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	<table><tr><th>Type</th><th>Peak value (g's)</th><th>Normal duration (D) (ms)</th><th>Wave form</th><th>Velocity change (Vi)ft/sec</th></tr><tr><td>SMD</td><td>50</td><td>11</td><td>Half-sine</td><td>11.3</td></tr><tr><td>Lead</td><td>50</td><td>11</td><td>Half-sine</td><td>11.3</td></tr></table>	Type	Peak value (g's)	Normal duration (D) (ms)	Wave form	Velocity change (Vi)ft/sec	SMD	50	11	Half-sine	11.3	Lead	50	11	Half-sine	11.3
Type	Peak value (g's)	Normal duration (D) (ms)	Wave form	Velocity change (Vi)ft/sec													
SMD	50	11	Half-sine	11.3													
Lead	50	11	Half-sine	11.3													
Solder ability	More than 95% of the terminal electrode should be covered with solder.	Preheat: 150℃,60sec.。 Solder: Sn96.5% Ag3% Cu0.5% Temperature: 245±5℃。 Flux for lead free: Rosin. 9.5%。 Dip time: 4±1sec。 Depth: completely cover the termination															
Resistance to Soldering Heat		Depth: completely cover the termination <table><tr><th>Temperature(℃)</th><th>Time(s)</th><th>Temperature ramp/immersion and emersion rate</th><th>Number of heat cycles</th></tr><tr><td>260 ±5 (solder temp)</td><td>10 ±1</td><td>25mm/s ±6 mm/s</td><td>1</td></tr></table>	Temperature(℃)	Time(s)	Temperature ramp/immersion and emersion rate	Number of heat cycles	260 ±5 (solder temp)	10 ±1	25mm/s ±6 mm/s	1							
Temperature(℃)	Time(s)	Temperature ramp/immersion and emersion rate	Number of heat cycles														
260 ±5 (solder temp)	10 ±1	25mm/s ±6 mm/s	1														
Terminal Strength	Appearance : No damage. Impedance : within±15% of initial value 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 e	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(>0805:1kg , <=0805:0.5kg)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. 															

Note : When there are questions concerning measurement result : measurement shall be made after 48 $\pm$ 2 hours of recovery under the standard condition.

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.

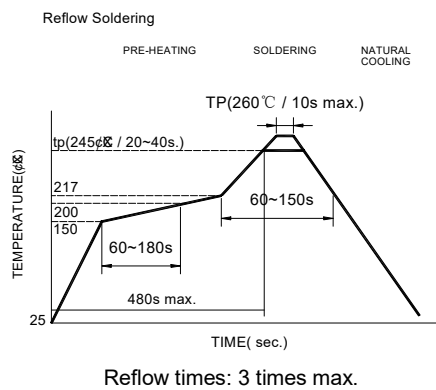


Fig.1

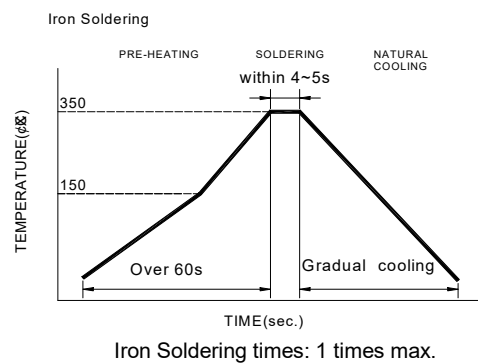
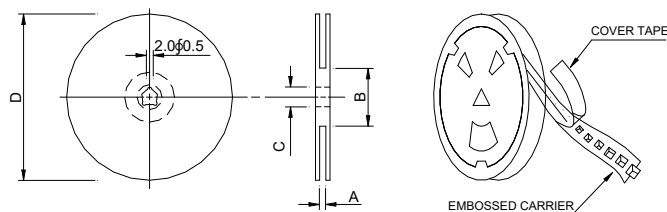


Fig.2

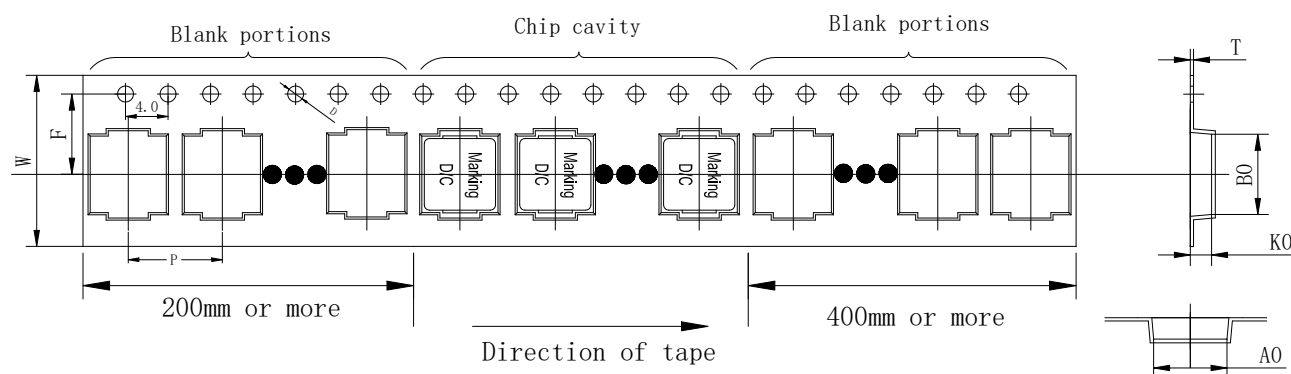
9. Packaging Information

(1) Reel Dimension



Type	A(mm)	B(mm)	C(mm)	D(mm)
13"x12mm	12.4+2/-0	100±2	13+0.5/-0.2	330

(2) Tape Dimension

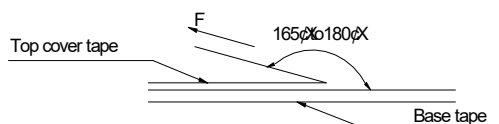


Series	Size	Bo(mm)	Ao(mm)	Ko(mm)	P(mm)	W(mm)	F(mm)	t(mm)	D(mm)
TMPC	0503	6.2±0.1	5.5±0.1	3.3±0.1	8.0±0.1	12.0±0.3	5.5±0.1	0.35±0.05	1.5±0.1

(3) Packaging Quantity

TMPC	0503
Chip / Reel	2000
Inner box	4000
Carton	16000

(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-D-2008 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

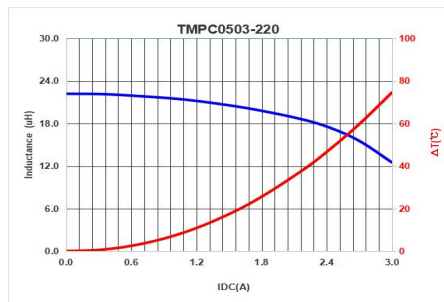
To maintain the solderability of terminal electrodes:

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



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