

AI-TECH Advanced Electronics Co., Ltd	Ē	Date: 2023	/05/19	
CUSTOMER P/N:         DESCRIPTION:         QUANTITY:       pcs         REMARK:         Customer Approval Feedback         Lundown         Customer Approval Feedback         Lundown         Hträge Atktorna Kanada         Al-TECH Advanced Electronics Co., Ltd	Custome	e <b>r</b> :		_
QUANTITY:       pcs         REMARK:	TAI-TECH P/N:	FMPA1205S	PV-Series(N)-H	D
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i 北臺慶科技股份有限公司 AI-TECH Advanced Electronics Co., Ltd	Custo	mer Approval	Feedback	
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APPROVED	CHECKED	DRAWN
Sky Luo	Mr.Liang	Cui lingling

# **SMD** Power Inductor

TMPA1205SPV-Series(N)-HD

	ECN HISTORY LIST						
REV	DATE	DESCRIPTION	APPROVED	CHECKED	DRAWN		
1.0	23/05/19	New Issue	Sky Luo	Mr.Liang	Cui lingling		
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# **SMD** Power Inductor

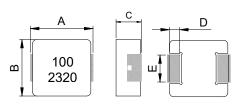
### 1. Features

- 1. Low loss realized with low DCR.
- 2. High performance realized by metal dust core.
- 3. Ultra low buzz noise, due to composite construction.
- 4. 100% Lead(Pb)-Free and RoHS compliant.
- 5. High reliability -Reliability test complied to AEC-Q200.

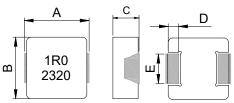
# 2. Applications

Automotive applications.

### 3. Dimensions







non-leadframe

Series	Α	В	С	D	E
TMPA1205	13.5±0.5	12.6±0.2	4.7±0.3	2.3±0.3	See Spec table
Unit·mm					

# 4. Part Numbering



A: Series

- **B:** Dimension
- C: Type
- D: Inductance

E: Inductance Tolerance

F: Code

BxC.

Standard. P:PAD broaden. V=Vehicle. R10=0.1uh, 1R0=1.0uh, 100=10uh, 101=100uh, 102=1000uh. K=±10%, L=±15%, M=±20%, N=±25%, Y=±30% Marking: Black.100 and 2320 (23 YY, 20 WW,follow production date).





### **Recommend PC Board Pattern**



L(mm)	G(mm)	H(mm)
14.5	8.0	5.0

Note: 1.PCB layout is referred to standard IPC-7351B The above PCB layout reference only.
 Recommend solder paste thickness at

0.15mm and above.



# 5. Specification

Part Number	Inductance L0 A(uH) ±20%	Irms ( A )		Irms(A)		Irms (A)		L0 A(uH)		l sa	I sat ( A )		(mΩ)	E(mm) ±0.3	Туре
	±20%	Тур	Max	Тур	Max	Тур	Max								
TMPA1205SPV-R10YN-HD	0.10±30%	57.0	52.0	95.0	85.0	0.28	0.32	4.0	non-leadframe						
TMPA1205SPV-R22MN-HD	0.22	55	50	65	60	0.50	0.61	4.0	non-leadframe						
TMPA1205SPV-R33MN-HD	0.33	42	37	65	59	0.65	0.80	4.0	non-leadframe						
TMPA1205SPV-R47MN-HD	0.47	38	34	65	58	0.77	0.90	4.0	non-leadframe						
TMPA1205SPV-R56MN-HD	0.56	36	32.5	57	50	1.10	1.30	4.0	non-leadframe						
TMPA1205SPV-R68MN-HD	0.68	34	31	50	42	1.30	1.55	4.0	non-leadframe						
TMPA1205SPV-R82MN-HD	0.82	32	29	44	38	1.40	1.70	4.0	non-leadframe						
TMPA1205SPV-1R0MN-HD	1.00	30	27	40	34	1.60	1.90	4.0	non-leadframe						
TMPA1205SPV-1R5MN-HD	1.50	25	22	31	28	3.20	3.80	4.7	leadframe						
TMPA1205SPV-2R2MN-HD	2.20	17	15.5	26	23	4.10	4.80	4.7	leadframe						
TMPA1205SPV-3R3MN-HD	3.30	15.5	14	23	20.5	6.00	7.00	4.7	leadframe						
TMPA1205SPV-4R7MN-HD	4.70	14	12.5	18.5	16	8.80	10.2	4.7	leadframe						
TMPA1205SPV-5R6MN-HD	5.60	13	12	17.5	15.5	10.0	12.0	4.7	leadframe						
TMPA1205SPV-6R8MN-HD	6.80	12	11	16.5	15	13.0	16.0	4.7	leadframe						
TMPA1205SPV-8R2MN-HD	8.20	11	10	13.5	12	15	18	4.7	leadframe						
TMPA1205SPV-100MN-HD	10.0	10	9.0	13	10.5	19.2	22.0	4.7	leadframe						
TMPA1205SPV-150MN-HD	15.0	9.4	8.2	11	9.2	30.0	36.0	4.7	leadframe						
TMPA1205SPV-220MN-HD	22.0	8.0	7.0	8.5	7.5	42.0	52.0	4.7	leadframe						
TMPA1205SPV-330MN-HD	33.0	6.0	5.2	7.3	6.5	66.0	80.0	4.7	leadframe						
TMPA1205SPV-470MN-HD	47.0	5.2	4.3	6.0	5.2	78	94	4.7	leadframe						
TMPA1205SPV-680MN-HD	68.0	4.3	3.6	5.0	4.4	110	132	4.7	leadframe						
TMPA1205SPV-101MN-HD	100	3.5	3.0	4.0	3.7	175	210	4.7	leadframe						
TMPA1205SPV-151MN-HD	150	2.7	2.3	3.2	2.8	280	336	4.7	leadframe						

Note:

1. Test frequency : Ls : 100 KHz / 1.0 V.

2. All test data referenced to  $25^\circ\!\mathrm{C}\,$  ambient.

3. Testing Instrument(or equ) :Agilent 4284A,E4991A,4339B,KEYSIGHT E4980A/AL,chroma3302,3250,16502.

4. Heat Rated Current (Irms) will cause the coil temperature rise approximately  $~{}^{\vartriangle}$  T of 40  $^{\circ}\!\!\mathbb{C}$ 

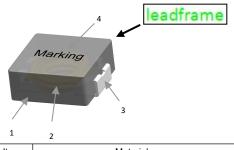
5. Saturation Current (Isat) will cause L0 to drop approximately 30%.

6. The part temperature (ambient + temp rise) should not exceed 155 °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.

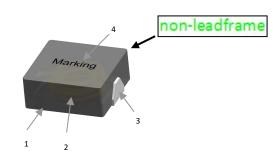
7. Irms Testing : Temperature rise is highly dependent on many factors including pcb land pattern, trace size, and proximity to other components. Therefore temperature rise should be verified in application conditions.

8. Rated DC current: The lower value of Irms and Isat

### 6. Material List



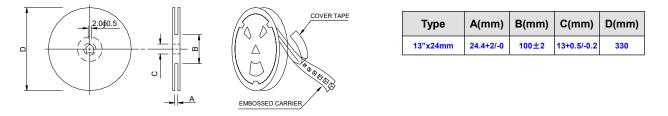
NO	Items	Materials		
1	Core	Alloy Powder .		
2	Wire	Polyester Wire or equivalent.		
3	Clip	100% Pb free solder(Ni+SnPlating)		
4	Ink	Halogen-free ketone		



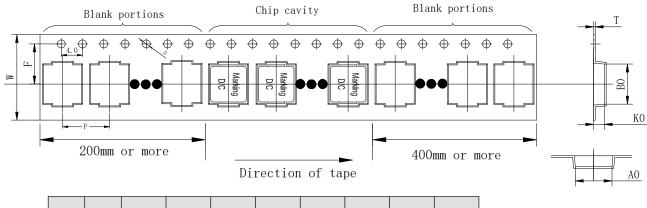
NO	Items	Materials		
1	Core	Alloy Powder .		
2	Wire	Polyester Wire or equivalent.		
3	Solder	100% Pb free solder		
4	Ink	Halogen-free ketone		

## 7. Packaging Information

(1) Reel Dimension



#### (2) Tape Dimension

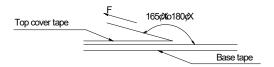


Series	Size	Bo(mm)	Ao(mm)	Ko(mm)	P(mm)	W(mm)	F(mm)	t(mm)	D(mm)
ТМРА	1205	14.1±0.1	12.9±0.1	5.5±0.1	16.0±0.1	24±0.3	11.5±0.1	0.35±0.05	1.5±0.1

#### (3) Packaging Quantity

TMPA	1205		
Chip / Reel	500		

#### (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 stadnard).

Tearing Speed	Room Temp.	Room Humidity	Room atm
mm	(℃)	(%)	(hPa)
300±10%	5~35	45~85	

# 8. Reliability and Test Condition

Item	Performance	Test Condition
Operating temperature	-55~+155℃(Including self - temperature rise)	
Storage temperature and Humidity range	110~+40℃,50~60%RH (Product with taping) 255~+155℃(on board)	
Electrical Performance Test	2. 05 9.05 5(0.1504.4)	1
Inductance		HP4284A,CH11025,CH3302,CH1320,CH1320S
DCR	Refer to standard electrical characteristics list.	LCR Meter. CH16502,Agilent33420A Micro-Ohm Meter.
Saturation Current (Isat)		Saturation DC Current (Isat) will cause L0
	Approximately △L30%	to drop $\triangle L(\%)$ Heat Rated Current (Irms) will cause the coil temperature rise $\angle$
Heat Rated Current (Irms)	Approximately △T40℃	T(°C). 1.Applied the allowed DC current 2.Temperature measured by digital surface thermometer
Reliability Test		
High Temperature Exposure(Storage) AEC-Q200 Temperature Cycling AEC-Q200		Preconditioning: Run through IR reflow for 3 times.( IPC/JEDEC J-STD-020DClassification Reflow Profiles Temperature : 155±2°C (Inductor, ambient + temp rise) Duration : 1000hrs Min. Measured at room temperature after placing for 24±2 hrs Preconditioning: Run through IR reflow for 3 times.( IPC/JEDEC J-STD-020E Classification Reflow Profiles Condition for 1 cycle Step1 : -55±2°C 30min Min.(Inductor) Step2 : 155±2°C transition time 1min MAX. Step3 : 155±2°C 30min Min. Step4 : Low temp. transition time 1min MAX. Number of cycles : 1000 Measured at room temperature after placing for 24±2 hrs
Moisture Resistance (AEC-Q200)	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	t=24 hours/cycle. Note: Steps 7a & 7b Unpowered.
Biased Humidity (AEC-Q200)		Preconditioning: Run through IR reflow for 3 times. (IPC/JEDEC J-STD-020E Classification Reflow Profiles) Humidity : 85±3% R.H. Temperature : 85°C±2°C Duration : 1000hrs Min Measured at room temperature after placing for24±2hrs
High Temperature Operational Life (AEC-Q200)		Preconditioning: Run through IR reflow for 3 times. (IPC/JEDECJ-STD-020E Classification Reflow Profiles Temperature : 155±2℃(Inductor) Duration : 1000hrs Min. With 100% rated current. Measured at room temperature after placing for24±2hrs
External Visual	Appearance: No damage.	Inspect device construction, marking and workmanship. Electrical Test not required.
Physical Dimension	According to the product specification size measurement	According to the product specification size measurement
Resistance to Solvents	Appearance: No damage.	Add aqueous wash chemical - OKEM clean or equivalent.
Mechanical Shock	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 3 times.( IPC/JEDEC J-STD-020E Classification Reflow Profiles) Test condition Type Peak value Normal duration (D) (ms) form change (Vi)ft/sec SMD 100 6 Half-sine 12.3 Lead 100 6 Half-sine 12.3 3 shocks in each direction along 3 perpendicular axes(18 shocks).

Item	Performance	Test Condition			
Vibration		Preconditioning: Run through IR reflow for 3 times.( IPC/JEDEC J-STD-020E Classification Reflow Profiles) Oscillation Frequency: 10H2~2KH2~10Hz for 20 minute Equipment: Vibration checker Total Amplitude: 5g Testing Time : 12 hours(20 minutes, 12 cycles each of 3 crientations)			
Resistance to Soldering Heat	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	orientations).       Test condition:       Temperature Temp/immersion and emersion rate cycles       260 ±5     10 ±1     25mm/s ±6 mm/s     1       Depth: completely cover the termination       Continental       Temperature Temperatem Temperature Temperature Temperature Temperatem Temperature Tem			
Thermal shock (AEC-Q200)		Preconditioning: Run through IR reflow for 3 times.( IPC/JEDEC J-STD-020E Classification Reflow Profiles Condition for 1 cycle Step1 : -55±2°C 15±1min(Inductor) Step2 : 155±2°C within 20Sec. Step3 : 155±2°C 15±1min Number of cycles: 300 Measured at room fempraturc after placing fo24±2hrs			
ESD	Appearance: No damage.	Direct Contact and Air Discharge PASSIVE COMPONENT HBM ESD Discharge Waveform to a Coaxial Target Test mothe: AEC-Q200-002 Test mothe: Contact Discharge Discharge level: 4 KV (Level: 2)			
Solderability	More than 95% of the terminal electrode should be covered with solder.	a. Method B1, 4 hrs @155°C dry heat @255°C±5°C Test time:5 +0/-0.5 seconds. b. Method D category 3. (steam aging 8hours ± 15 min)@ 260°C±5°C Test time: 30 +0/-0.5 seconds.			
Electrical Characterization	Refer Specification for Approval	Summary to show Min, Max, Mean and Standard deviation .			
Flammability	Electrical Test not required.	V-0 or V-1 are acceptable.			

### TAI-TECH

Board Flex	Appearance: No damage	Preconditioning: Run through IR reflow for 3 times.( IPC/JEDEC J-STD-020E Classification Reflow Profiles Place the 100mm X 40mm board into a fixture similar to the one shown in below Figure with the component facing down. The apparatus shall consist of mechanical means to apply a force which will bend the board (D) x = 2 mm minimum. The duration of the applied forces shall be 60 (+ 5) sec. The force is to be applied only once to the board. Support Solder Chip Printed circuit board before testing 45±2 45±2 Readius 340 Probe to exert bending force 1.6 Printed circuit board under test Displacement
Terminal Strength(SMD)	Appearance: No damage	Preconditioning: Run through IR reflow for 3 times.( IPC/JEDEC J-STD-020E Classification Reflow Profiles With the component mounted on a PCB with the device to be tested, apply a 17.7 N (1.8 Kg) force 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. radius 0,5 mm DUT But thickness press tool shear force

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

### 9. Soldering Specifications

### (1) Soldering

Mildly activated rosin fluxes are preferred. 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) Soldering Reflow:

Recommended temperature profiles for lead free re-flow soldering in Figure 1. Table 1.1&1.2 (J-STD-020E)

#### (3) Iron Reflow:

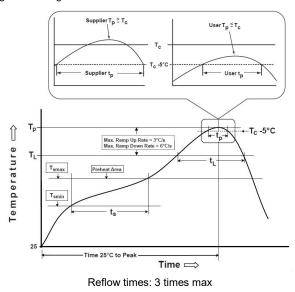
- Products attachment with a soldering iron is discouraged due to the inherent process control limitations. In the event that
- a soldering iron must be employed the following precautions are recommended.(Fig. 2)

· 1.0mm tip diameter (max)

- $\cdot\,$  Preheat circuit and products to 150  $^\circ\!\!\!\!^\circ$   $\,\cdot\,$  Never contact the ceramic with the iron tip
- Use a 20 watt soldering iron with tip diameter of 1.0mm
   Limit soldering time to 4~5sec.

Fig.1 Soldering Reflow

· 355°C tip temperature (max)



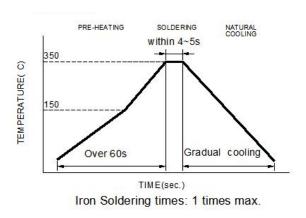


Fig.2 Iron soldering temperature profiles

Soldering iron Method :  $350\pm5^{\circ}$ C max

Table	(1.1): Reflow Profiles	

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Profile Type:	Pb-Free Assembly	
Preheat		
-Temperature Min(T <sub>smin</sub> )	150℃	
-Temperature Max(T <sub>smax</sub> )	<b>200</b> ℃	
-Time(t <sub>s</sub> )from(T <sub>smin</sub> to T <sub>smax</sub> )	60-120seconds	
Ramp-up rate(T∟to T <sub>p</sub> )	3℃/second max.	
Liquidus temperature(T <sub>L</sub> )	<b>217</b> ℃	
$Time(t_L)$ maintained above $T_L$	60-150 seconds	
Classification temperature(T <sub>c</sub> )	See Table (1.2)	
Time(t_p) at Tc- 5 $^\circ \!$	*< 30 seconds	
Ramp-down rate( $T_p$ to $T_L$ )	6℃ /second max.	
Time $25^{\circ}$ C to peak temperature	8 minutes max.	

**Tp**: maximum peak package body temperature, **Tc**: the classification temperature.

For user (customer) Tp should be equal to or less than Tc.

\* Tolerance for peak profile temperature (Tp) is defined as a supplier minimum and a user maximum.

#### Table (1.2) Package Thickness/Volume and Classification Temperature $(T_c)$

	Package Thickness	Volume mm <sup>3</sup> <350	Volume mm <sup>3</sup> 350-2000	Volume mm <sup>3</sup> >2000
PB-Free Assembly	<1.6mm	<b>260</b> ℃	<b>260</b> ℃	260°C
	1.6-2.5mm	<b>260</b> ℃	<b>250</b> ℃	245℃
	≥2.5mm	<b>250℃</b>	245℃	245℃

Reflow is referred to standard IPC/JEDEC J-STD-020E .

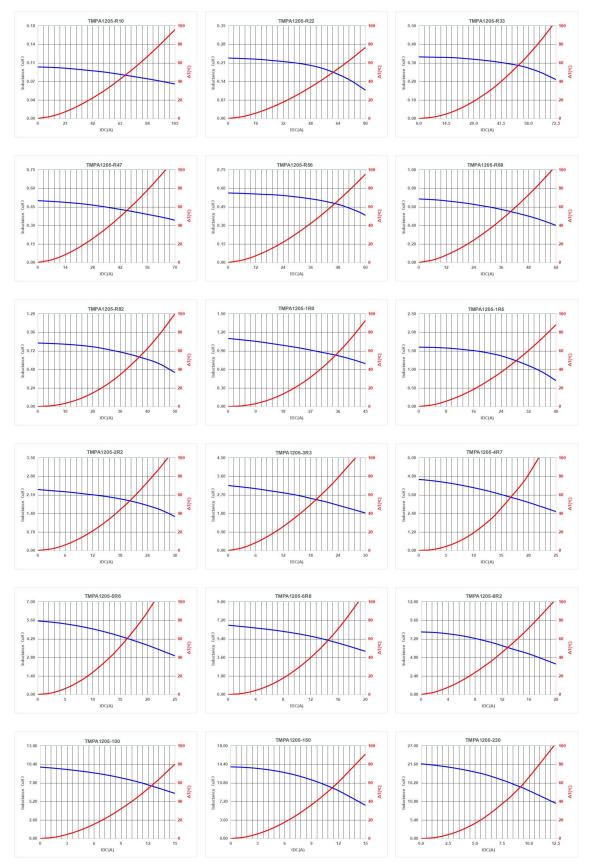
### 10. Notes

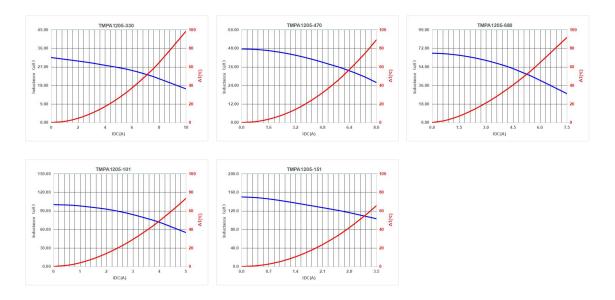
- (1) When there are questions concerning measurement result : measurement shall be made after 48  $\pm$  2 hours of recovery under the standard condition
- (2) This power choke coil itself does not have any protective function in abnormal condition such as overload, short-circuit and open-circuit conditions, etc. Therefore, it shall be confirmed as the end product that there is no risk of smoking, fire, dielectric withstand voltage, insulation resistance, etc. in abnormal conditions to provide protective devices and/or protection circuit in the end product.
- (3) When this power choke coil was used in a similar or new product to the original one, sometimes it might not be able to satisfy the specifications due to different condition of use.
- (4) Dielectric withstanding test with higher voltage than specific value will damage insulating material and shorten its life.
- (5) This power choke coil must not be used in wet condition by water, coffee or any liquid because insulation strength becomes very low in this condition.
- (6) Please consult our company to confirm the reliability of the process required to wash or use or exposure to a chemical solvent used in this product. PCB washing tested to MIL-STD-202 Method, and dry it off immediately.
- (7) The rated current as listed is either the saturation current or the heating current depending on which value is lower.
- (8) If this power choke is dipped in the cleaning agent, such as toluene, xylene, ketone, and ether system, there is a possibility that the performance decreases greatly, and marking disappearnc.
- (9) The high power ultrasonic washing may damage the choke body.
- (10) Before use, the user should determine whether this product is suitable for their own design. Our company only guarantees that the product meets the requirements of this specification.

#### Application Notice

- · Storage Conditions
- To maintain the solderability of terminal electrodes:
- 1. TAI-TECHproducts meet IPC/JEDEC J-STD-020E standard-MSL, level 1.
- 2. Temperature and humidity conditions: Less than 40  $^\circ\!\!\mathbb{C}$  and 60% RH.
- 3. Recommended products should be used within 12 months form 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.

# 11. Typical Performance Curves





单击下面可查看定价,库存,交付和生命周期等信息

>>TAI-TECH(台庆)