

ITEM P/N	TPMC1004H-SERIES	TEST INSTRUMENT	HP4284 / CH16502 Equality
PRODUCT	SMD Inductor	TEST FREQUENCY	100 kHz / 1.0V

**CUSTOMER :**

**CUSTOMER P/N :**

**DESCRIPTION :** SMD INDUCTOR

**SINKA P/N :** TPMC1004H-SERIES

**REVISION NO. :** 01

**DATE :** 2016/6/27

**NOTES :** STANDARD

DOCUMENTED BY	
APPROVED	Y Imai
CHECKED	Cosby Liu
PREPARED	Wenny Wei

**CUSTOMER APPROVAL**

company seals

ITEM P/N	TMPC1004H-SERIES	TEST INSTRUMENT	HP4284 / CH16502 Equality
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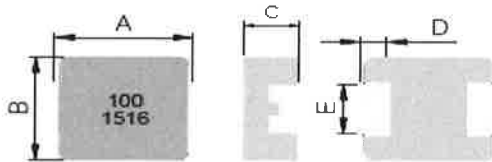
### 1. Features

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.

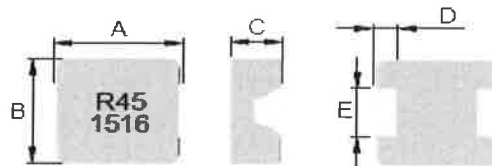
### 2. Applications

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

### 3. Dimensions

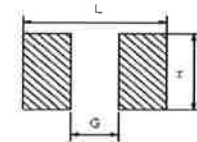


leadframe (1R8 - 470)



non-leadframe (R15 - 1R5)

#### Recommend PC Board Pattern



L(mm)	G(mm)	H(mm)
13.6	5.4	3.5

Note: 1. The above PCB layout reference only.  
2. Recommend solder paste thickness at 0.15mm and above.

Series	Type	A(mm)	B(mm)	C(mm)	D(mm)	E(mm)
TMPC1004H	leadframe non-leadframe	11.0±0.5	10.0±0.3	3.8 ± 0.2	2.3±0.3	3.0±0.3

### 4. Part Numbering



A: Series  
B: Dimension  
C: Type  
D: Inductance  
E: Inductance Tolerance  
F: 印 D/C

BxC  
Carbonyl Powder.  
100=10.0uH  
M=±20%

印字: 黑色, 100 及 D/C 1516 (15 年, 16 週期)(依實際生產日期而定)

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**5. Specification**

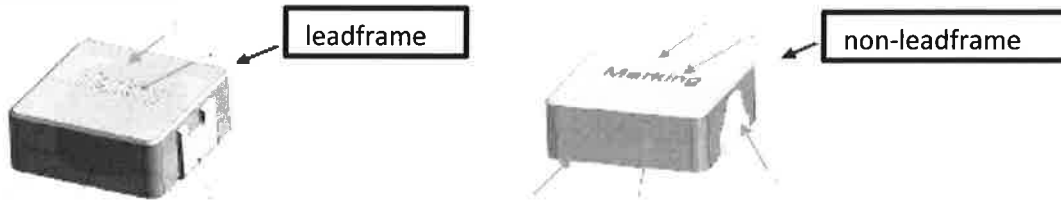
Part Number	Inductance L0 (uH)±20% @ 0 A	I rms (A) Typ.	I sat (A) Typ.	DCR (mΩ) Typ. @25°C	DCR (mΩ) Max. @25°C
TMPC1004H-R15MG-D	0.15	43	75	0.5	0.6
TMPC1004H-R22MG-D	0.22	35	60	0.8	1.0
TMPC1004H-R27MG-D	0.27	33	60	0.82	1.0
TMPC1004H-R30MG-D	0.30	32	60	0.94	1.1
TMPC1004H-R33MG-D	0.33	31	60	1.00	1.2
TMPC1004H-R36MG-D	0.36	31	60	1.05	1.2
TMPC1004H-R39MG-D	0.39	30	60	1.1	1.3
TMPC1004H-R45MG-D	0.45	29	45	1.3	1.5
TMPC1004H-R47MG-D	0.47	28	43	1.3	1.5
TMPC1004H-R56MG-D	0.56	25	40	1.6	1.8
TMPC1004H-R68MG-D	0.68	22	39	2.4	2.7
TMPC1004H-1R0MG-D	1.00	18	36	3.0	3.3
TMPC1004H-1R2MG-D	1.20	17	33	3.3	3.8
TMPC1004H-1R5MG-D	1.50	16	33	4.0	4.6
TMPC1004H-2R2MG-D	2.20	12	27	6.5	7.0
TMPC1004H-2R5MG-D	2.50	11.5	23	7.9	8.7
TMPC1004H-3R3MG-D	3.30	11	20	10.8	11.8
TMPC1004H-4R0MG-D	4.00	10.2	18	13	15
TMPC1004H-4R7MG-D	4.70	10	17	15.0	15.5
TMPC1004H-5R6MG-D	5.60	9.0	14	17	19.3
TMPC1004H-6R8MG-D	6.80	8.5	13.5	17.5	23.3
TMPC1004H-8R2MG-D	8.20	8.0	12.5	20	22.5
TMPC1004H-100MG-D	10.0	7.5	12.0	27.0	30
TMPC1004H-150MG-D	15.0	6.25	10	40	45
TMPC1004H-220MG-D	22.0	5.0	7.0	64	74
TMPC1004H-270MG-D	27.0	4.0	6.0	86	100
TMPC1004H-330MG-D	33.0	3.5	5.0	92	112
TMPC1004H-470MG-D	47.0	3.0	4.5	145	167
TMPC1004H-680MG-D	68.0	2.0	3.0	205	240

- ◎ All test Data is referenced to 25°C ambient
- ◎ Typical Heat Rating DC Current would cause an approximately  $\Delta T$  of 40°C
- ◎ Typical Saturation DC Current would cause L<sub>0</sub> to drop approximately 20%
- ◎ The Part temperature (ambient +  $\Delta T$ ) should not exceed 125°C under worst case operating conditions.
- ◎ all effect the part temperature. Part temperature should be verified in the end application.

**Storage Condition**

Temperature : 0 ~ 40°C  
Humidity : 20~65%RH

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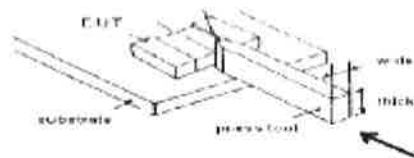
**6. Material List**

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

**7. Reliability and Test Condition**

Item	Performance	Test Condition
Operating temperature	-40~+125°C (Including self-temperature rise)	
Storage temperature	1: -13~+40°C, 50~60%RH (Product without tape) 2: -40~+125°C (on board)	
<b>Electrical Performance Test</b>		
Inductance	Refer to standard electrical characteristics list	HP4284A, CH11025, CH3302, CH1300, CH1309 (LCR Meter)
DCR		CH16502, Agilent334-20A Micro-Ohm Meter
Saturation Current (Isat)	Approximately $\pm$ 130%	Saturation DC Current (Isat) will cause LO to drop $\pm$ 1.5% (keep quickly)
Heat Rated Current (Irms)	Approximately $\pm$ 140°C	Heat Rated Current (Irms) will cause the coil temperature rise $\Delta$ T(°C) without core loss. 1. Applied the allowed DC current(keep 1 min.). 2. Temperature measured by digital surface thermometer
<b>Reliability Test</b>		
Life Test		Preconditioning: Run through IR reflow for 2 times (IPC/JEDEC J-STD-020D Classification Reflow Profiles) Temperature: $\pm$ 125 $\pm$ 2°C (inductor) Applied current: Rated current Duration: 1000 $\pm$ 12hrs Measured at room temperature after plating for 24 $\pm$ 2 hrs
Load Humidity		Preconditioning: Run through IR reflow for 2 times (IPC/JEDEC J-STD-020D Classification Reflow Profiles) Humidity: 95 $\pm$ 3% RH, Temperature: 85 $\pm$ 2°C Duration: 1000hrs Min. with 100% rated current Measured at room temperature after plating for 24 $\pm$ 2 hrs
Moldure Resistance	Appearance: No damage Inductance: within $\pm$ 13% 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/JEDEC J-STD-020D Classification Reflow Profiles) 1. Soaked at 50°C for 25hrs, measured at room temperature after plating for 4 hrs. 2. Raise temperature to 55 $\pm$ 2°C, 90-100%RH in 2.5hrs, and keep 3 hours, cool down to 25°C in 2.5hrs. 3. Raise temperature to 55 $\pm$ 2°C, 90-100%RH in 2.5hrs, and keep 3 hours, cool down to 25°C in 2.5hrs keep at 25°C for 2 hrs then keep at -10°C for 3 hrs. 4. Keep at 25°C, 80-100%RH for 15min and vibrate at the frequency of 10 to 55 Hz to 10 Hz, measure at room temperature after plating for 1~2 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°C, 30 $\pm$ 5min Step2: 25 $\pm$ 2°C, 20 $\pm$ 5min Step3: 125 $\pm$ 2°C, 30 $\pm$ 5min Number of cycles: 500 Measured at room temperature after plating for 24 $\pm$ 2 hrs
Vibration		Oscillation Frequency: 10~2K~10Hz for 20 minutes Equipment: Vibration checker Total Amplitude: 1.52mm/10% Testing Time: 12 hours/30 minutes (12 cycles each of 3 orientations)

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Item	Performance	Test Condition															
Shock	Appearance : No damage 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	<table border="1"> <thead> <tr> <th>Type</th> <th>Peak value (g's)</th> <th>Normal duration (0.1ms)</th> <th>Wave form</th> <th>Velocity change (m/s<sup>2</sup>/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>8</td> <td>Half-sine</td> <td>12.3</td> </tr> </tbody> </table>	Type	Peak value (g's)	Normal duration (0.1ms)	Wave form	Velocity change (m/s <sup>2</sup> /sec)	SMD	1500	0.5	Half-sine	15.4	Lead	100	8	Half-sine	12.3
Type	Peak value (g's)	Normal duration (0.1ms)	Wave form	Velocity change (m/s <sup>2</sup> /sec)													
SMD	1500	0.5	Half-sine	15.4													
Lead	100	8	Half-sine	12.3													
Bending		Shall be mounted on a FR4 substrate of the following dimensions: $\rightarrow$ 0805:40x100x1.2mm $\rightarrow$ 0805:40x100x0.8mm Bending depth: $\rightarrow$ 0805:1.2mm $\rightarrow$ 0805:0.8mm duration of 10 sec.															
Solderability	More than 95% of the terminal electrode should be covered with solder.	Preheat: 150°C / 60sec. Solder: Sn96.5% Ag3% Cu0.5% Temperature: 245 $\pm$ 5°C Flux for lead free: Rosin, 9.5% Dip time: 4 $\pm$ 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>250 <math>\pm</math>5 (solder temp)</td> <td>10 <math>\pm</math>1</td> <td>25mm/s <math>\pm</math>5 mm/s</td> </tr> </tbody> </table>	Temperature (°C)	Time(s)	Temperature ramp/immersion and emersion rate	250 $\pm$ 5 (solder temp)	10 $\pm$ 1	25mm/s $\pm$ 5 mm/s									
Temperature (°C)	Time(s)	Temperature ramp/immersion and emersion rate															
250 $\pm$ 5 (solder temp)	10 $\pm$ 1	25mm/s $\pm$ 5 mm/s															
Terminal Strength	Appearance : No damage 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/JEDEC J-S TD-0200C classification. Reflow Profiles With the component mounted on a PCB with the device to be tested apply a force ( $\rightarrow$ 0805:1kg, $\rightarrow$ 0805:0.5kg) to the side of a device being tested. This force shall be applied for 60 $\pm$ 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.

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## 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. TAIPAQ 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.

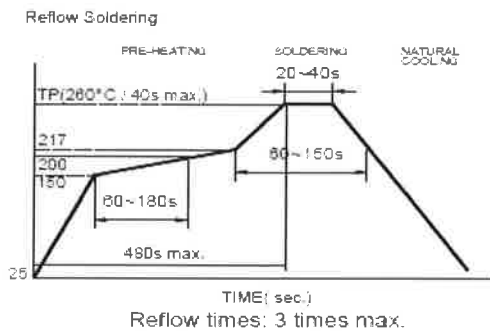


Fig.1

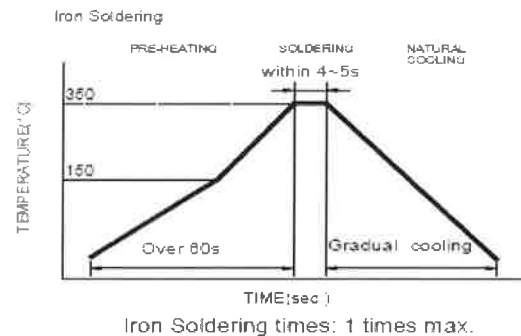
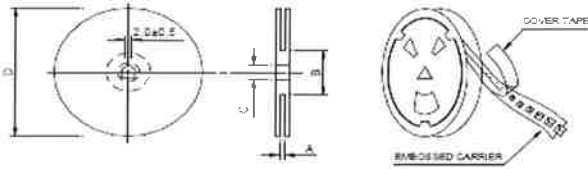
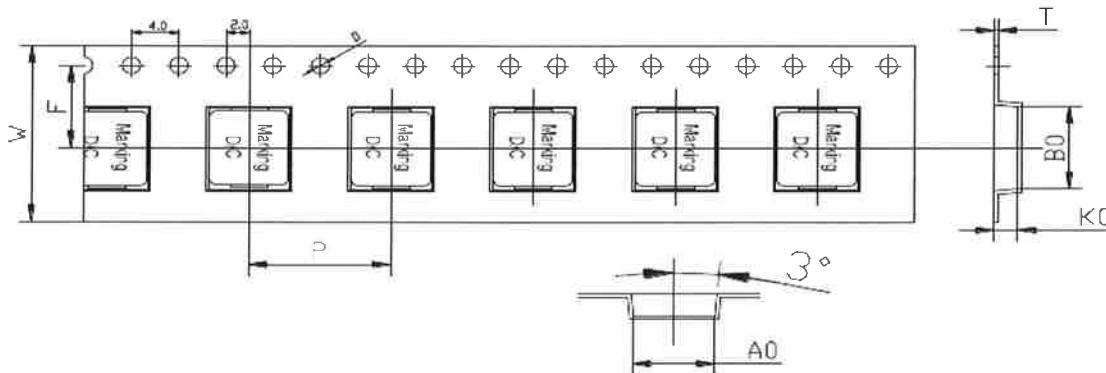


Fig.2

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**9. Packaging Information****(1) Reel Dimension**

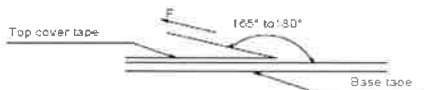
Type	A(mm)	B(mm)	C(mm)	D(mm)
13''x24mm	24.4±2/0	100±2	13.5±0.5	330

**(2) Tape Dimension**

Series	Size	Bo(mm)	Ao(mm)	Ko(mm)	P(mm)	W(mm)	F(mm)	t(mm)	D(mm)
TMPC	1004	11.6±0.1	19.4±0.1	4.5±0.1	16.0±0.1	24±0.3	11.5±0.1	0.35±0.05	1.5±0.1

**(3) Packaging Quantity**

TMPC	1004
Chip / Reel	500
In Reel box	1000
Carton	4000

**(4) Tearing Off Force**

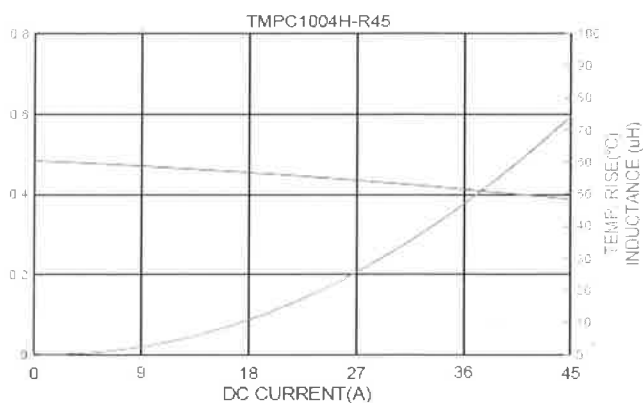
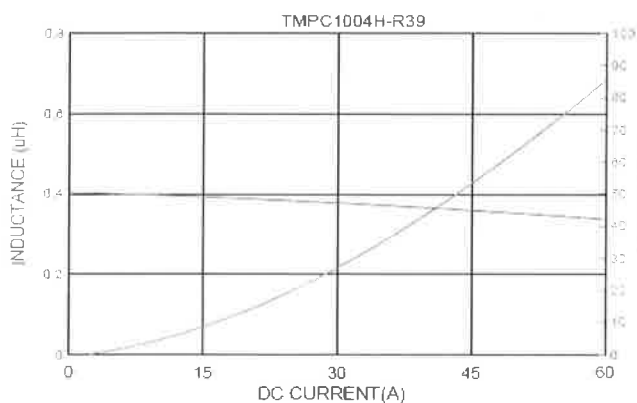
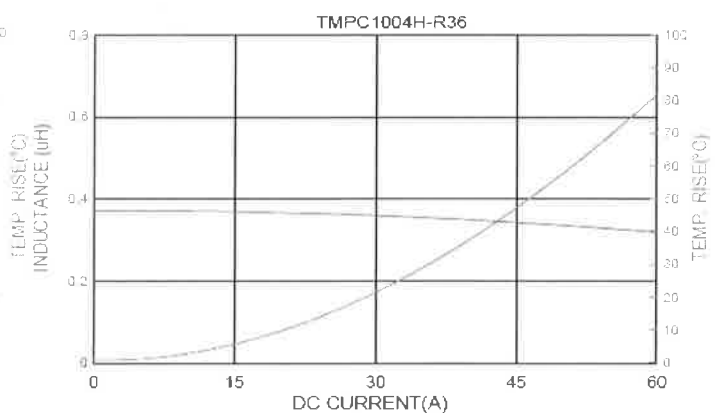
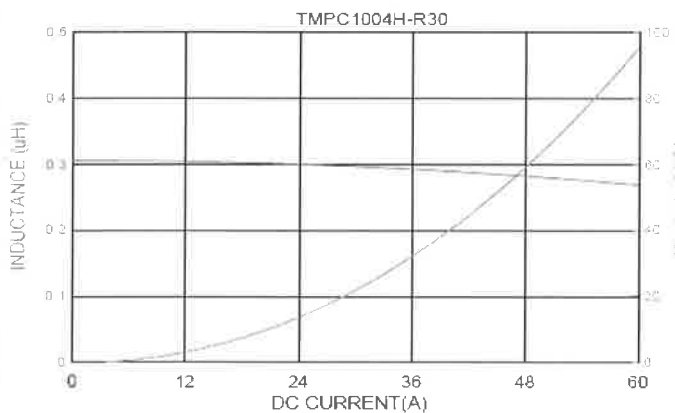
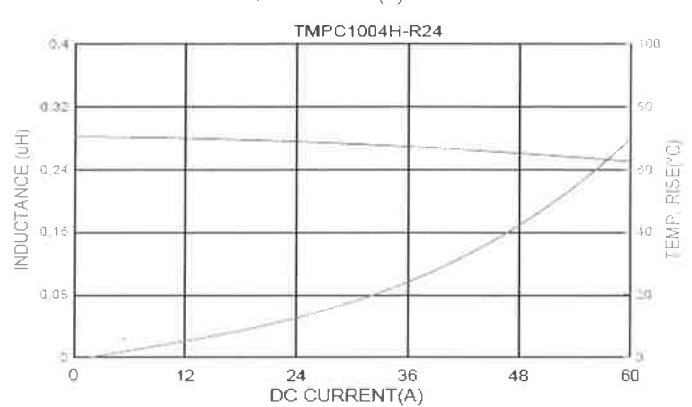
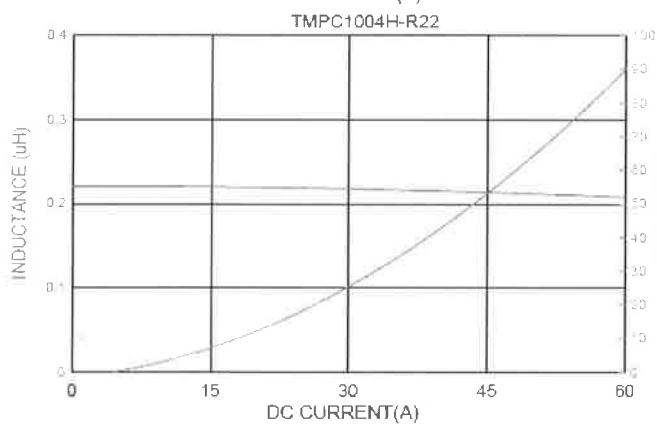
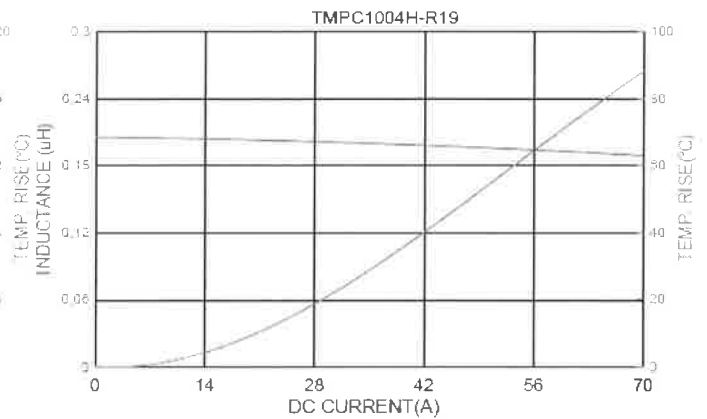
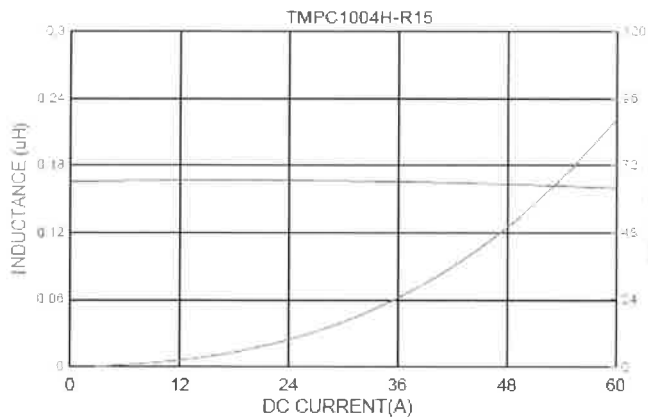
The force for tearing off cover tape is 10 to 130 grams in the arrow direction under the following conditions(referenced ANSI/EIA-481-C-2003 of 4.11 stadnard).

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. TAIPAQ 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.

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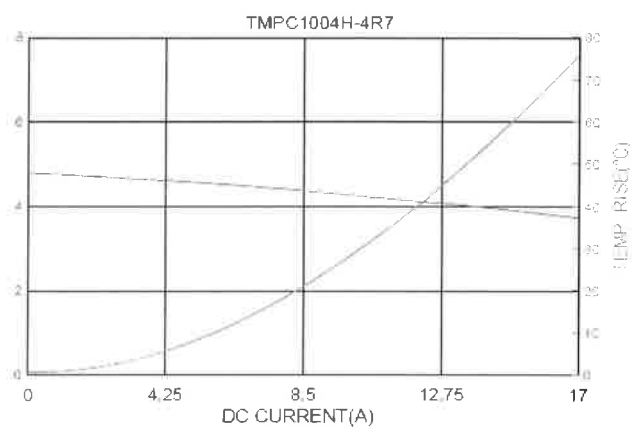
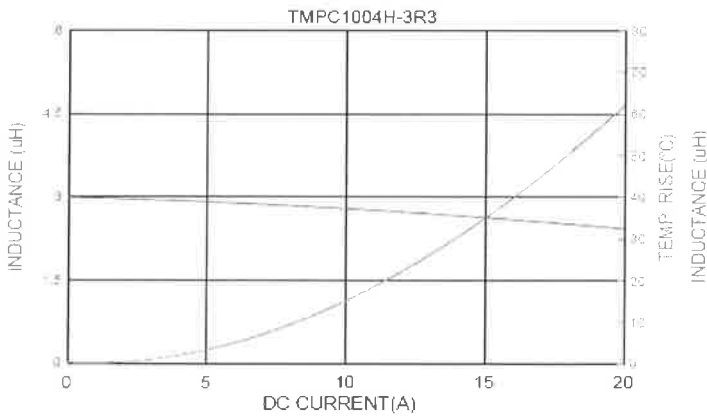
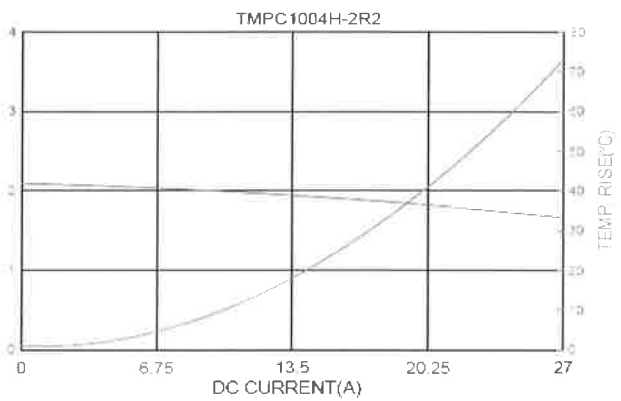
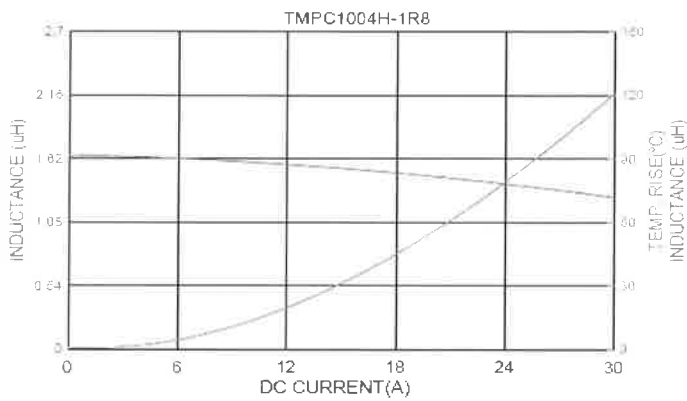
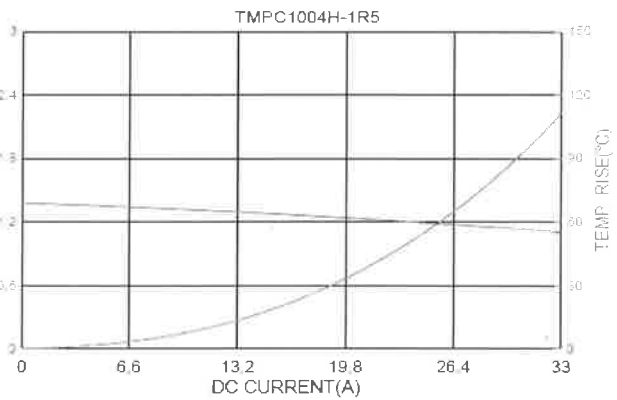
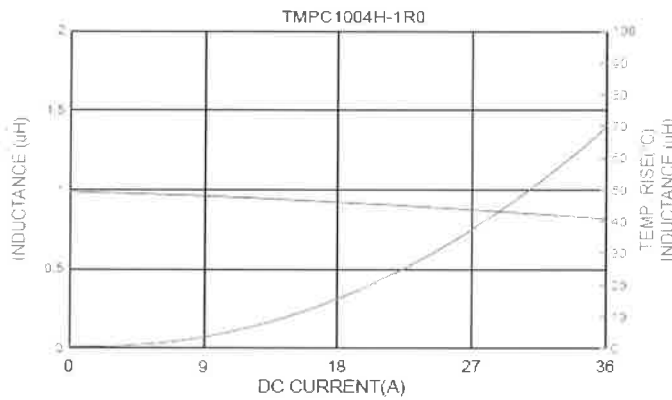
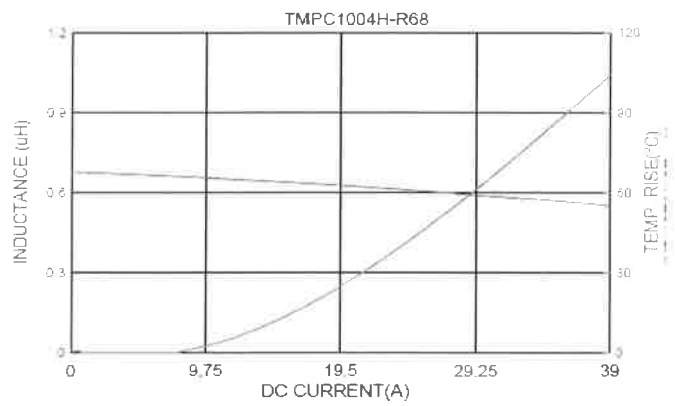
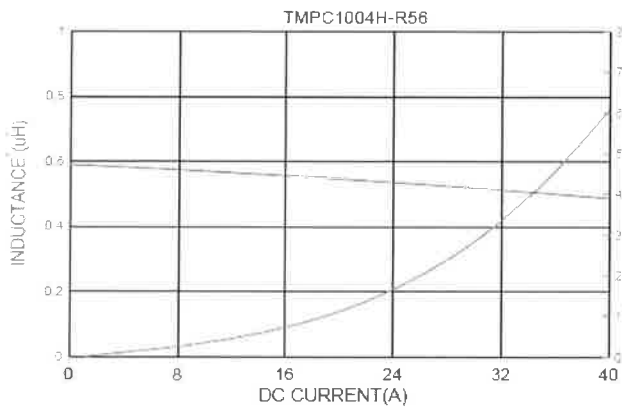
**10. DC Bias Characterization**



# COIL SPECIFICATION

**RoHS  
COMPLIANT**

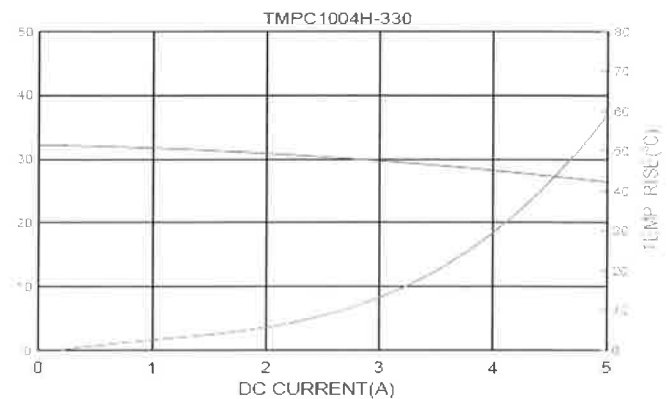
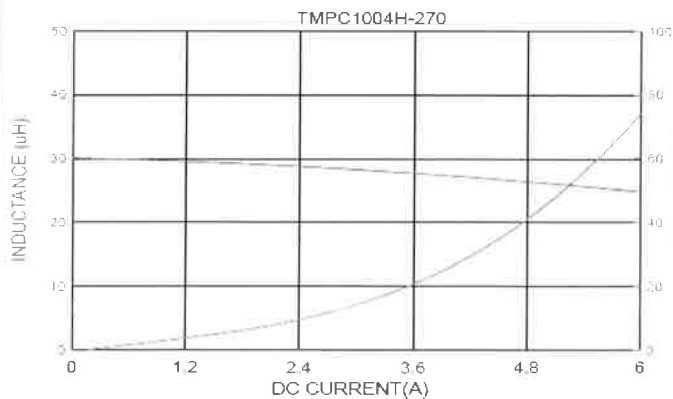
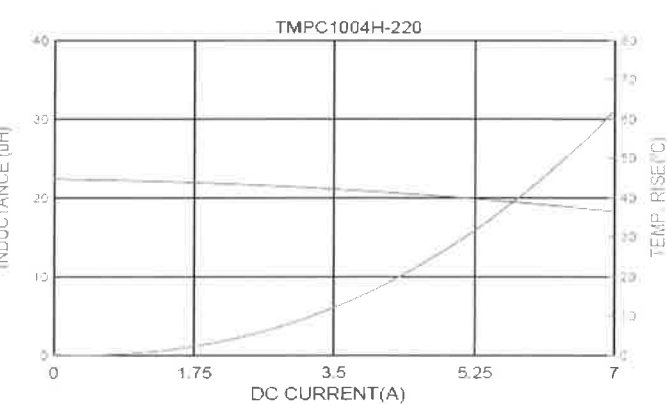
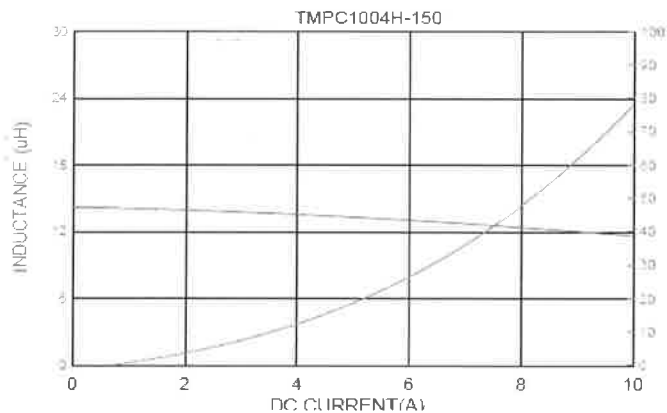
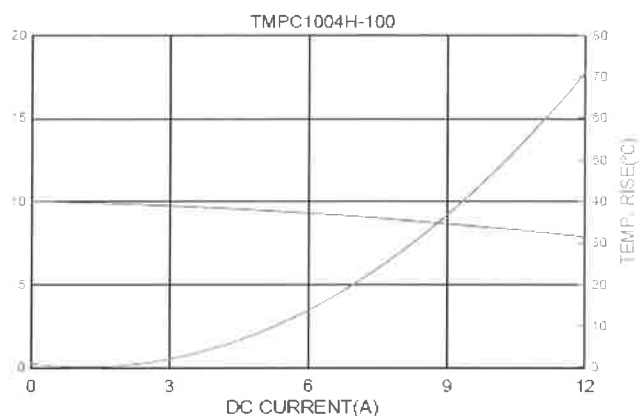
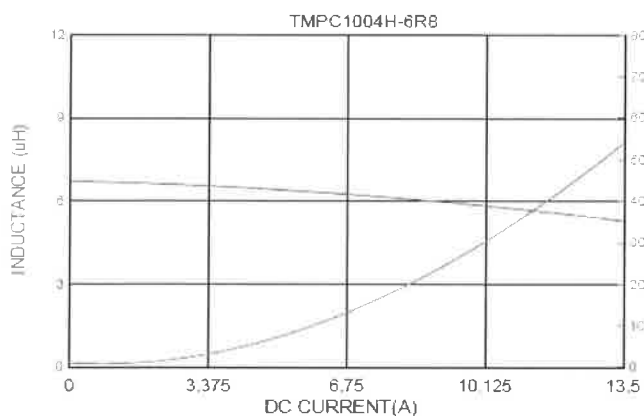
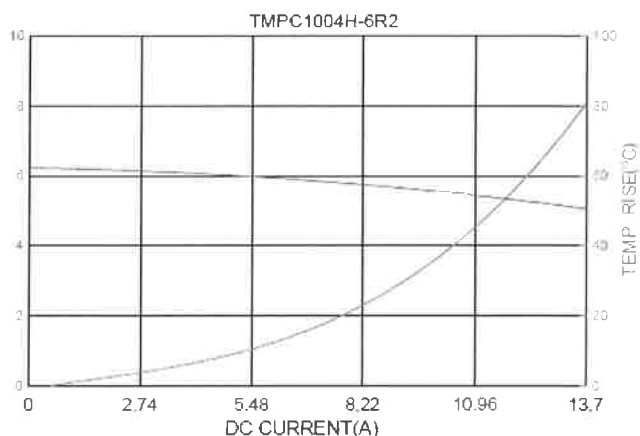
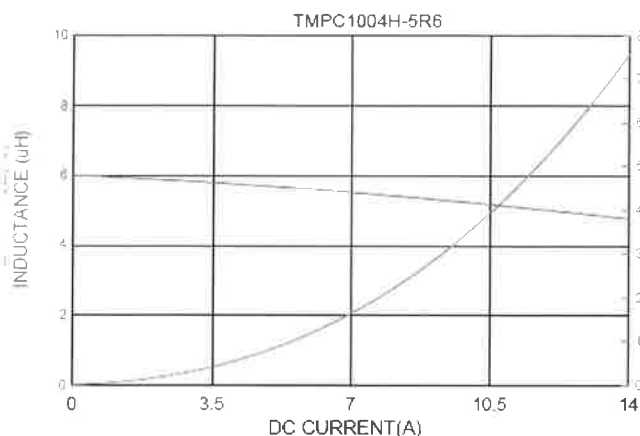
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