Form No: T00752-7-0000-PBM02-200700068

Specification for Approval

Date: 2020/07/02

Customer : 天河星

TAI-TECH P/N: **TMPA0603S-Series(N)-DTH**

CUSTOMER P/N:

DESCRIPTION:

QUANTITY: pcs

REMARK:		
Customer Approval Feedback		

□西北臺慶科技股份有限公司
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APPROVED	CHECKED
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R&D Center

APPROVED	CHECKED	DRAWN
羅宜春	梁周虎	許靜

SMD Power Inductor

TMPA0603S-Series(N)-DTH

ECN HISTORY LIST

REV	DATE	DESCRIPTION	APPROVED	CHECKED	DRAWN
1.0	20/07/02	新發行	羅宜春	梁周虎	許靜
備注					

SMD Power Inductor

TMPA0603S-Series(N)-DTH

1. Features

1. Shielded construction.
2. Capable of corresponding high frequency .
3. Low loss realized with low DCR.
4. High performance (Isat) realized by metal dust core.
5. Ultra low buzz noise, due to composite construction.
6. 100% Lead(Pb)-Free and RoHS compliant.
7. Operating temperature -40~+125℃(Including self - temperature rise)

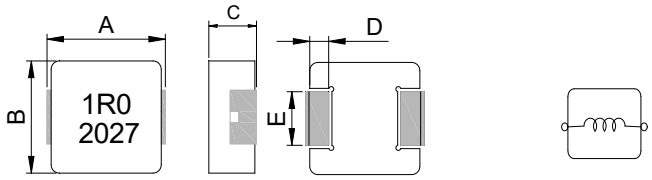
Halogen-free

RoHS

2. Applications

1. DC/DC converters in distributed power systems.
2. DC/DC converter for Field Programmable Gate Array(FPGA).
3. Battery powered devices.
4. Thin type on-board power supply module for exchanger.
5. VRM for server.
6. High current, low profile POL converters.
7. PDA/notebook/desktop/server and battery powered devices.

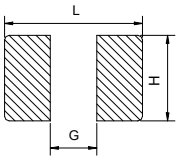
3. Dimensions



Series	A	B	C	D	E
TMPA0603	7.1±0.3	6.6±0.2	2.8±0.2	1.6±0.3	3.0±0.2

Unit:mm

Recommend PC Board Pattern



L(mm)	G(mm)	H(mm)
8.0	3.7	3.4

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

4. Part Numbering

TMPA	0603	S	-	1R0	MN	-	DTH
A	B	C		D	E		F

A: Series	
B: Dimension	BxC
C: Type	Standard.
D: Inductance	R10=0.1uH，1R0=1.0uH，100=10uH，101=100uH，102=1000uH.
E: Inductance Tolerance	K=±10%，L=±15%，M=±20%，N=±25%，Y=±30%
F: Code	Marking: Black.1R0 and 2027(20 YY, 27WW,follow production date).

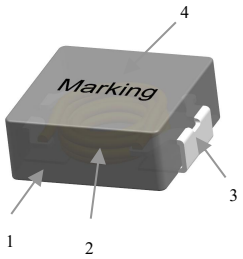
5. Specification

Part Number	Inductance L0 A(uH) ±20%	Heat Rating Current DC Irms (A)		Saturation Current DC I sat (A)		DCR (mΩ)Typ	DCR (mΩ)Max
		Typ	Max	Typ	Max		
TMPA0603S-R15YN-DTH	0.15±30%	30	25	40	36	1.7	2.1
TMPA0603S-R22MN-DTH	0.22	23	21	34	32	2.0	2.5
TMPA0603S-R33MN-DTH	0.33	21	20	25	22	2.8	3.4
TMPA0603S-R36MN-DTH	0.36	20	18	24	21	3.3	3.9
TMPA0603S-R47MN-DTH	0.47	18	16	20	18	3.4	4.0
TMPA0603S-R56MN-DTH	0.56	16.5	15	18	16	3.9	4.5
TMPA0603S-R68MN-DTH	0.68	16	14.5	17	15	4.7	5.3
TMPA0603S-R82MN-DTH	0.82	14	13	16	14	5.4	6.0
TMPA0603S-1R0MN-DTH	1.00	12	11	15	13.5	6.7	7.4
TMPA0603S-1R5MN-DTH	1.50	10	9.0	14	12	10.2	12.1
TMPA0603S-2R2MN-DTH	2.20	8.0	7.5	10	9.0	13.5	15
TMPA0603S-3R3MN-DTH	3.30	6.5	6.0	9.5	8.5	19	22
TMPA0603S-4R7MN-DTH	4.70	5.5	5.0	6.5	5.5	28	33
TMPA0603S-5R6MN-DTH	5.60	5.5	5.0	6.0	5.2	39	42
TMPA0603S-6R8MN-DTH	6.80	4.5	4.2	6.0	5.0	43	50
TMPA0603S-8R2MN-DTH	8.20	4.5	4.0	6.0	4.7	54	60
TMPA0603S-100MN-DTH	10.0	4.0	3.5	5.5	4.5	62	68
TMPA0603S-150MN-DTH	15.0	3.0	2.5	4.5	4.0	110	140
TMPA0603S-220MN-DTH	22.0	2.5	2.0	3.0	2.5	150	190
TMPA0603S-330MN-DTH	33.0	2.1	1.8	2.5	2.0	215	258

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.
8. Rated DC Current : The less value whith is Irms or Isat

6. Material List

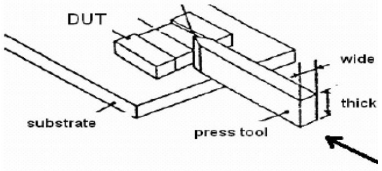


NO	Items	Materials
1	Core	Alloy Powder .
2	Wire	Polyester Wire or equivalent.
3	Clip	100% Pb free solder(Ni+Sn---Plating)
4	Ink	Halogen-free ketone

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 without 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 △L30%.	Saturation DC Current (Isat) will cause L0 to drop △L(%)
Heat Rated Current (Irms)	Approximately △T40℃	Heat Rated Current (Irms) will cause the coil temperature rise △T(℃). 1.Applied the allowed DC current 2.Temperature measured by digital surface thermometer
Reliability Test		
Life Test	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	Preconditioning: Run through IR reflow for 3times. (IPC/JEDECJ-STD-020E Classification Reflow Profiles) Temperature： 125±2℃(Inductor) Applied current：rated current Duration：1000±12hrs Measured at room temperature after placing for 24±2 hrs.
Load Humidity		Preconditioning: Run through IR reflow for 3times. (IPC/JEDECJ-STD-020E Classification Reflow Profiles) Humidity：85±2％R.H, Temperature：85℃±2℃ Duration：1000hrs Min. Bead:with 100% rated current, Inductance：with 100% rated current Measured at room temperature after placing for 24±2 hrs.
Moisture Resistance		Preconditioning: Run through IR reflow for 3 times. (IPC/JEDECJ-STD-020E Classification Reflow Profiles) 1. Baked at50℃ for 25hrs, measured at room temperature after placing for 4 hrs. 2. Raise temperature to 65±2℃ 90-100%RH in 2.5hrs, and keep 3 hours, cool down to 25℃ in 2.5hrs. 3. Raise temperature to 65±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 3 times. (IPC/JEDECJ-STD-020E Classification Reflow Profiles) Condition for 1 cycle Step1：-40±2℃ 30±5min Step2：125±2℃ ≦0.5min Step3：125±2℃ 30±5minNumber of cycles： 500 Measured at room fempraturc after placing for 24±2 hrs.
Vibration		Preconditioning: Run through IR reflow for 3 times. (IPC/JEDECJ-STD-020E Classification 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)。

<table>
<tr><th>Item</th><th>Performance</th><th>Test Condition</th></tr>
<tr><td>Bending</td><td rowspan="2">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</td><td>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.</td></tr>
<tr><td>Shock</td><td><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></td></tr>
<tr><td>Solderability</td><td>More than 95% of the terminal electrode should be covered with solder。</td><td>a. Method B, 4 hrs @155°C dry heat @235°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.</td></tr>
<tr><td>Resistance to Soldering Heat</td><td rowspan="2">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</td><td>Depth: completely cover the termination
<table>
<tr><th>Temperature(°C)</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></td></tr>
<tr><td>Terminal Strength</td><td>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,applyaforce(>0805inch(2012mm):1kg,<=0805inch(2012 mm):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.
 
</td></tr>
</table>

Note : When there are questions concerning measurement result : measurement shall be made after 48 ± 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.

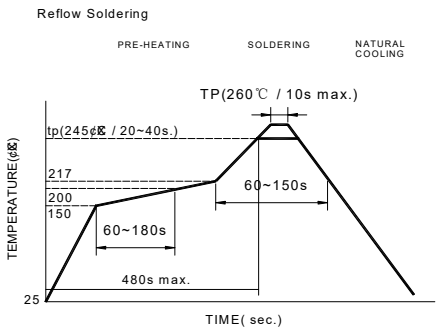
(2) Solder re-flow:

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

(3) Soldering Iron:

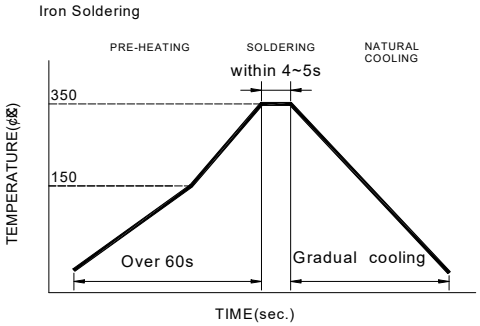
Products attachment with a soldering iron is discouraged due to the inherent process control limitations. In the event that a soldering iron must be employed the following precautions are recommended.

- Preheat circuit and products to 150℃
- Never contact the ceramic with the iron tip
- Use a 20 watt soldering iron with tip diameter of 1.0mm
- 355℃ 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. Friendly reminder

(1) When there are questions concerning measurement result : measurement shall be made after 48 ± 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.

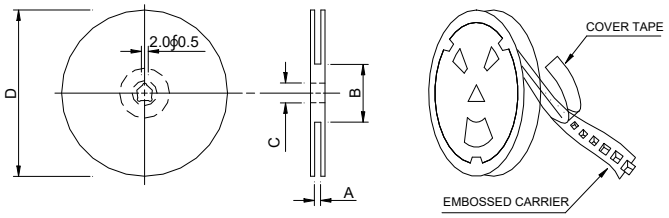
(4) Dielectric withstanding test with higher voltage than specific value will damage insulating material and shorten its life.

(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.

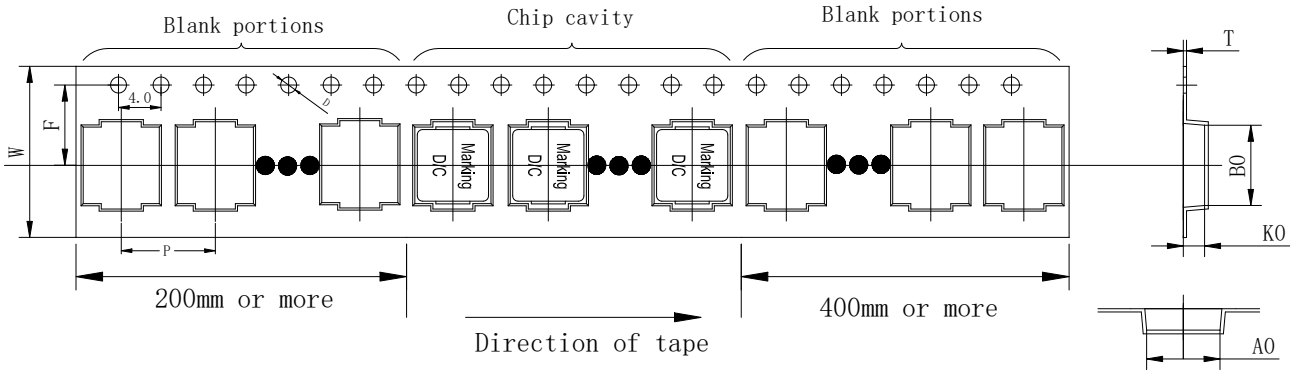
10. Packaging Information

(1) Reel Dimension



Type	A(mm)	B(mm)	C(mm)	D(mm)
13"x16mm	16.4+2/-0	100±2	13+0.5/-0.2	330

(2) Tape Dimension

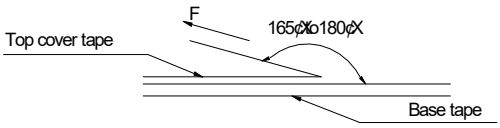


Series	Size	Bo(mm)	Ao(mm)	Ko(mm)	P(mm)	W(mm)	F(mm)	t(mm)	D(mm)
TMPA	0603	7.7±0.1	7.0±0.1	3.3±0.1	12.0±0.1	16±0.3	7.5±0.1	0.35±0.05	1.5±0.1

(3) Packaging Quantity

TMPA	0603
Chip / Reel	1000
Inner box	2000
Carton	8000

(4) Tearing Off Force



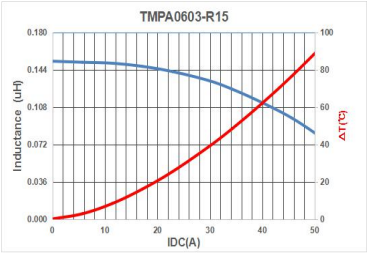
The force for tearing off cover tape is 10 to 130 grams in the arrow direction under the following conditions(referenced ANSI/EIA-481-D-2008 of 4.11 standard).

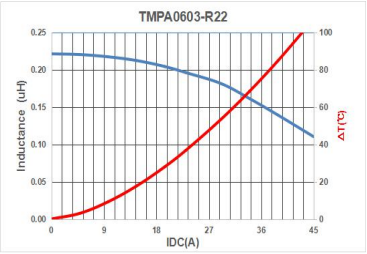
Room Temp. (℃)	Room Humidity (%)	Room atm (hPa)	Tearing Speed mm/min
5~35	45~85	860~1060	300

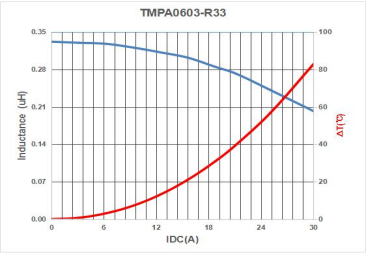
Application Notice

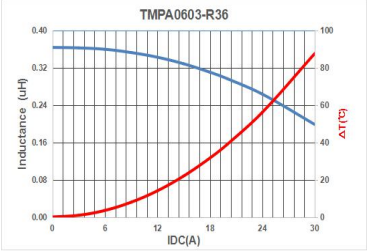
- Storage Conditions(component level)
  To maintain the solderability of terminal electrodes:
  1. TAI-TECH products meet IPC/JEDEC J-STD-020D standard-MSL, level 1.
  2. Temperature and humidity conditions: Less than 40℃ and 60% RH.
  3. Recommended products should be used within 12 months form the 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.

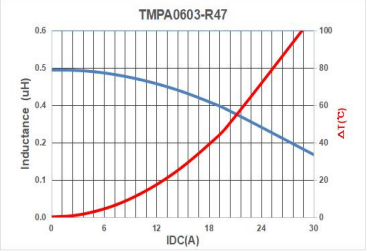
11. Typical Performance Curves

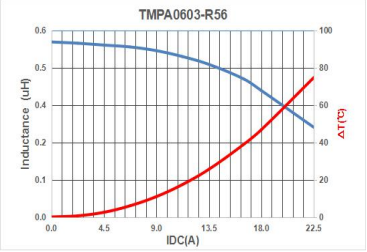


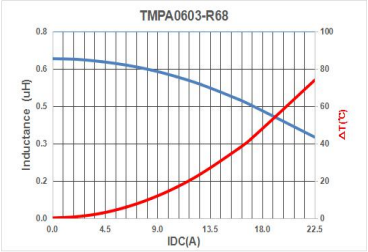


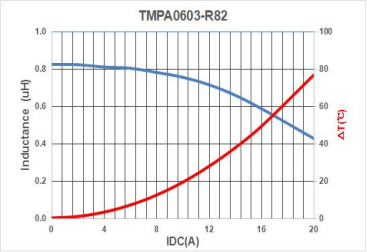


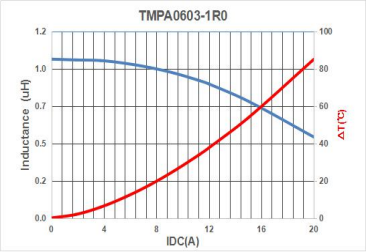


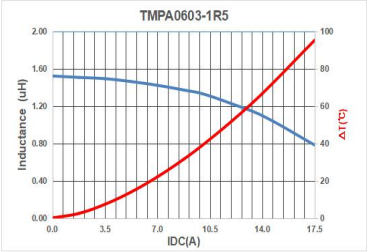


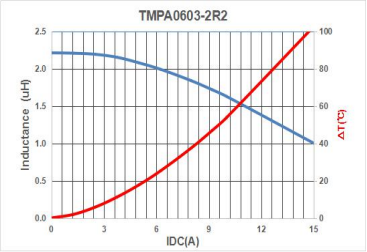


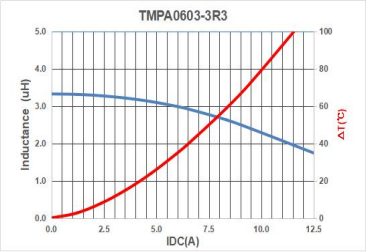


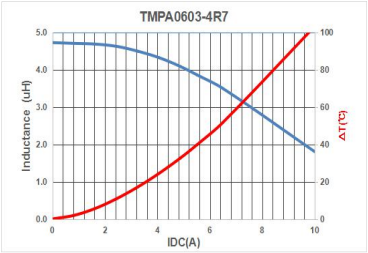


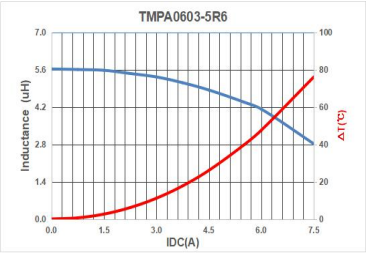


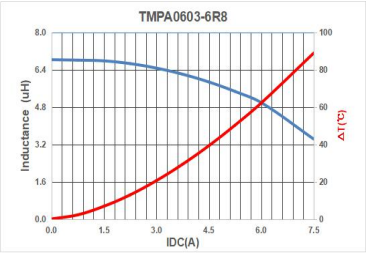


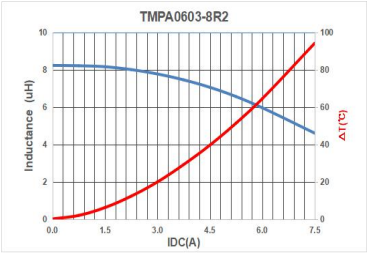


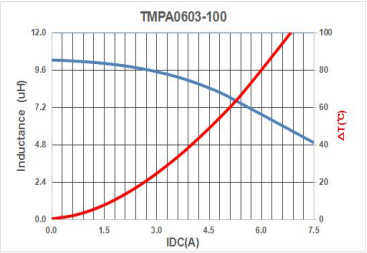


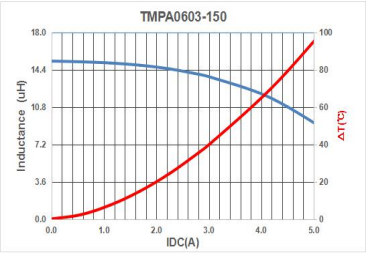


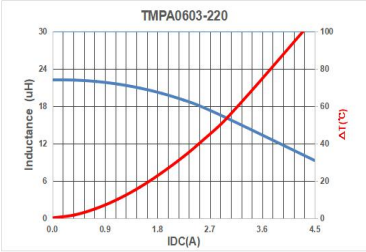








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Inductance (uH)
ΔT(℃)
IDC(A)
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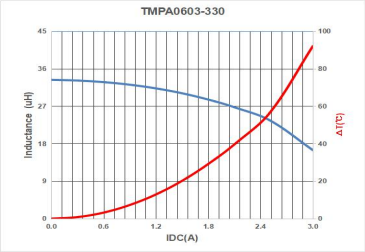
24
18
12
6
0
100
80
60
40
20
0
0.0
0.9
1.8
2.7
3.6
4.5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Inductance (uH)
ΔT(℃)
IDC(A)
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18
9
0
100
80
60
40
20
0
0.0
0.6
1.2
1.8
2.4
3.0