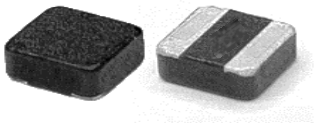
AFE2016 Series
Mini Molded Chip Power Inductors

FEATURES



- RoHS, Halogen Free and REACH Compliance
- High performance (Isat) realized by metal dust core.
- Low coil resistance with large currents.
- Operate temperature range .... －40℃～＋125℃(Including self temp. rise)

APPLICATIONS

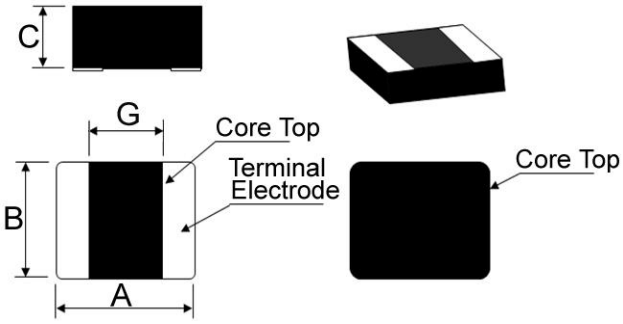
- Smart phone， pad
- Notebooks, VR, AR
- Portable gaming devices, Smart wear, Wi-Fi module

PRODUCT IDENTIFICATION

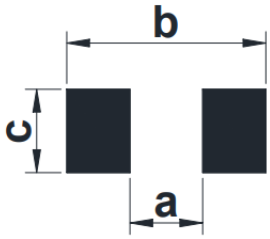
AFE 201610 S 2R2 M B T
① ② ③ ④ ⑤ ⑥ ⑦

① Series Name:Mini Molding Chip type power inductor
② Size Code: L*W*T
③ Feature Type:Standard
④ Initial inductance value: 2R2 = 2.2uH
⑤ Inductance Tolerance:M±20%
⑥ Coating color:B=Black
⑦ Packing： Tape & Reel

Dimensions: [mm]



Recommended Pattern



Series	A	G	B	C	b	a	c
AFE201655S	2.0±0.2	0.6±0.2	1.6±0.2	0.55Max.	2.10	0.50	1.70
AFE201665S	2.0±0.2	0.6±0.2	1.6±0.2	0.65Max.	2.10	0.50	1.70
AFE201607S	2.0±0.2	0.6±0.2	1.6±0.2	0.70Max.	2.10	0.50	1.70
AFE201608S	2.0±0.2	0.6±0.2	1.6±0.2	0.80Max.	2.10	0.50	1.70
AFE201610S	2.0±0.2	0.6±0.2	1.6±0.2	1.00Max.	2.10	0.50	1.70
AFE201612S	2.0±0.2	0.6±0.2	1.6±0.2	1.20Max.	2.10	0.50	1.70

Electrical Properties:

AFE201655(2.0*1.6*0.55mm)

P/N	L0(μH) @(0A) 1MHz	Rdc(mΩ)		Heat rating current Irms(A)		Saturation current Isat(A)	
		Typical	Max	Typical	Max	Typical	Max
AFE201655SR33MBT	0.33	34	41	4.0	3.5	4.0	3.5
AFE201655SR47MBT	0.47	44	53	3.5	3.0	3.5	3.0

AFE201665(2.0*1.6*0.65mm)

P/N	L0(μH) @(0A) 1MHz	Rdc(mΩ)		Heat rating current Irms(A)		Saturation current Isat(A)	
		Typical	Max	Typical	Max	Typical	Max
AFE201665S1R0MBT	1.0	58	70	3.5	3.0	3.0	2.7

AFE201607(2.0*1.6*0.70mm)

P/N	L0(μH) @(0A) 1MHz	Rdc(mΩ)		Heat rating current Irms(A)		Saturation current Isat(A)	
		Typical	Max	Typical	Max	Typical	Max
AFE201607S2R2MBT	2.2	150	175	2.1	1.8	2.3	2.0

AFE201608(2.0*1.6*0.80mm)

P/N	L0(μH) @(0A) 1MHz	Rdc(mΩ)		Heat rating current Irms(A)		Saturation current Isat(A)	
		Typical	Max	Typical	Max	Typical	Max
AFE201608SR22MBT	0.22	14	19	6.6	5.9	6.1	5.6
AFE201608SR24MBT	0.24	14	20	6.5	5.8	6.0	5.5
AFE201608SR33MBT	0.33	18	24	5.5	4.8	5.8	5.3
AFE201608SR47MBT	0.47	24	27	4.6	4.4	5.5	5.0
AFE201608SR68MBT	0.68	39	44	3.8	3.5	4.6	4.2
AFE201608S1R0MBT	1.0	53	60	3.6	3.3	3.3	3.1
AFE201608S1R5MBT	1.5	73	85	3.1	2.8	3.0	2.8
AFE201608S2R2MBT	2.2	123	140	2.2	2.0	2.5	2.3
AFE201608S3R3MBT	3.3	200	220	1.8	1.5	2.1	1.8
AFE201608S4R7MBT	4.7	260	290	1.6	1.4	1.7	1.5
AFE201608S100MBT	10.0	690	800	1.0	0.9	1.0	0.9

AFE201610(2.0*1.6*1.0mm)

P/N	L0(μH) @(0A) 1MHz	Rdc(mΩ)		Heat rating current Irms(A)		Saturation current Isat(A)	
		Typical	Max	Typical	Max	Typical	Max
AFE201610SR10MBT	0.10	7.0	12	8.5	8.0	9.0	8.4
AFE201610SR11MBT	0.11	7.5	13	8.0	7.5	8.9	8.2
AFE201610SR15MBT	0.15	8.0	14	7.6	7.0	8.7	8.0
AFE201610SR22MBT	0.22	11	18	6.9	6.3	8.2	7.5
AFE01610SR24MBT	0.24	12	19	6.8	6.2	8.0	7.4
AFE201610SR24MBT	0.24	11	14	6.8	6.2	8.0	7.4
AFE201610SR33MBT	0.33	17	22	5.7	5.3	7.0	6.5
AFE201610SR47MBT	0.47	22	25	5.5	5.0	6.3	5.5
AFE201610SR68MBT	0.68	25	32	4.6	4.3	5.2	4.7
AFE201610S1R0MBT	1.0	35	43	4.5	4.1	4.6	4.2
AFE201610S1R5MBT	1.5	80	100	2.6	2.3	3.2	2.9
AFE201610S2R2MBT	2.2	120	130	2.5	2.1	3.0	2.8
AFE201610S3R3MBT	3.3	140	170	1.7	1.5	2.3	2.0
AFE201610S4R7MBT	4.7	190	220	1.6	1.4	2.0	1.8
AFE201610S100MBT	10.0	483	580	1.0	0.7	1.4	1.1

AFE201612(2.0*1.6*1.2mm)

P/N	L0(μH) @(0A) 1MHz	Rdc(mΩ)		Heat rating current Irms(A)		Saturation current Isat(A)	
		Typical	Max	Typical	Max	Typical	Max
AFE201612SR10MBT	0.10	4.0	6.0	12	10	13	11.5
AFE201612SR11MBT	0.11	4.8	5.6	15.5	14.5	12.5	11.0
AFE201612SR15MBT	0.15	7.5	10	10	9.0	12	10.5
AFE201612SR24MBT	0.24	9.0	11	9.1	8.6	9.2	8.7
AFE201612SR33MBT	0.33	10	15	7.7	7.2	7.8	7.3
AFE201612SR47MBT	0.47	13	17	6.7	6.0	6.7	6.0
AFE201612SR68MBT	0.68	19	23	6.0	5.3	6.0	5.3
AFE201612S1R0MBT	1.0	30	36	5.0	4.5	5.0	4.5
AFE201612S1R5MBT	1.5	40	50	4.0	3.5	4.0	3.5
AFE201612S2R2MBT	2.2	77	90	3.3	2.9	3.1	2.7
AFE201612S3R3MBT	3.3	135	165	2.4	2.0	2.7	2.3

Test remarks

Note 1.: All test data is referenced to 25 ℃ ambient.

Note 2.: Test Condition:1MHz, 1.0Vrms.

Note 3.: Irms:DC current (A) that will cause an approximate △T of 40 ℃.

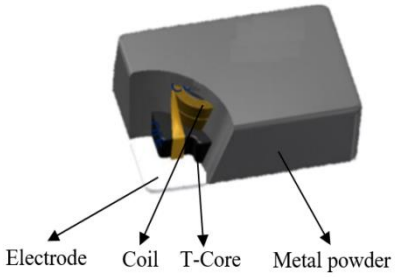
Note 4.: Isat:DC current (A) that will cause L0 to drop approximately 30%.

Note 5.: Operating Temperature Range -40℃ to + 125℃.

Note 6.: The part temperature (ambient + temp rise) should not exceed 125 under ℃ the worst case operating conditions. Circuit design, component placement, PCB trace size and thickness, airflow and other cooling provision all affect the part temperature. Part temperature should be verified in the end application.

Note 7.: The rated current as listed is either the saturation current or the heating current depending on which value is lower.

Structure



Current Characteristic

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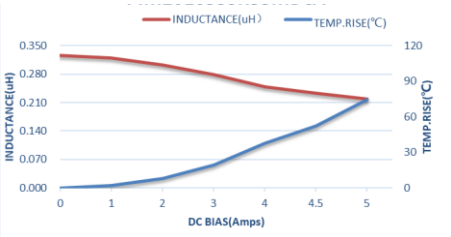

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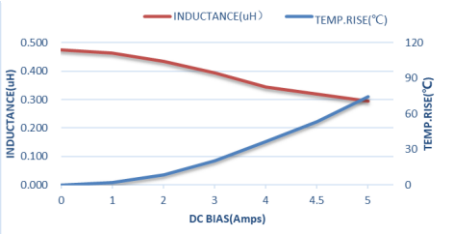

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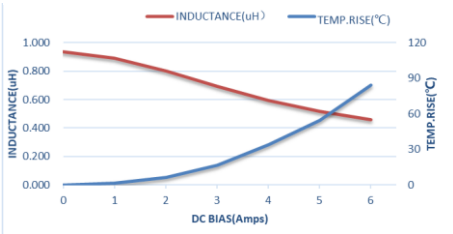

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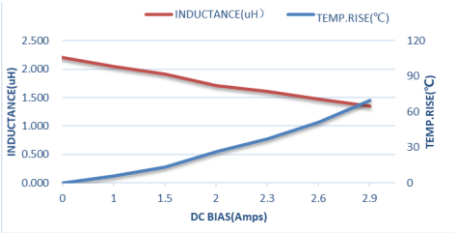

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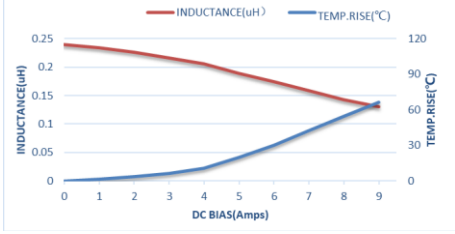

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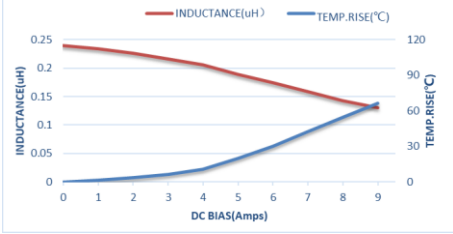

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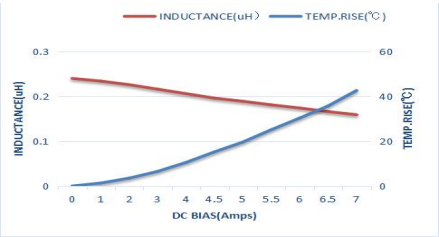

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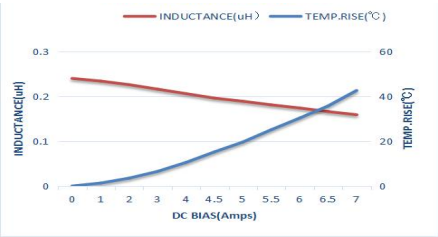

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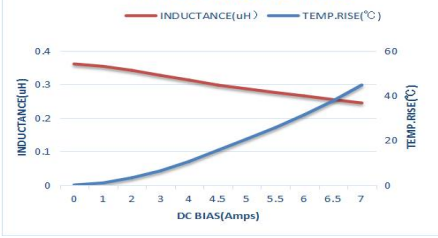

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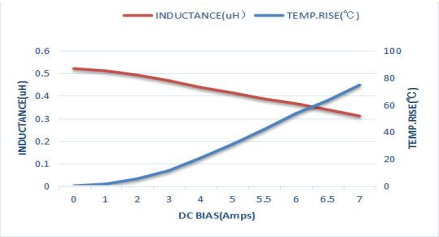

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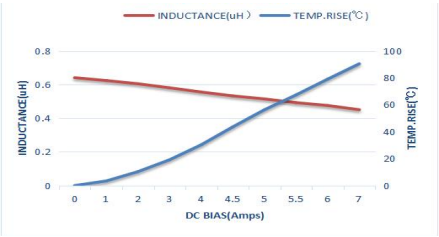

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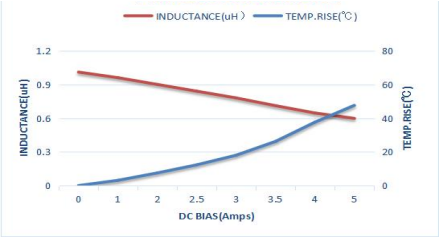

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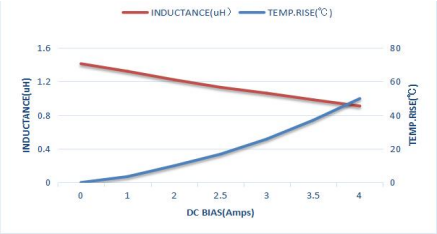

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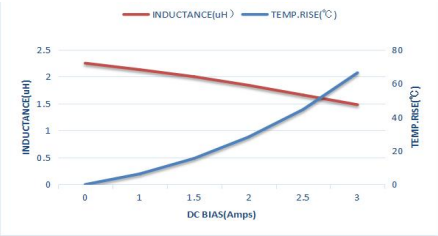

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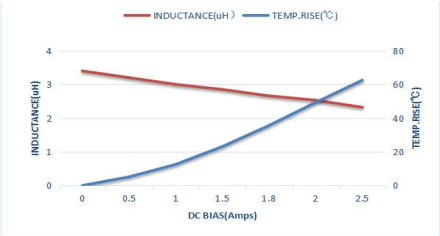

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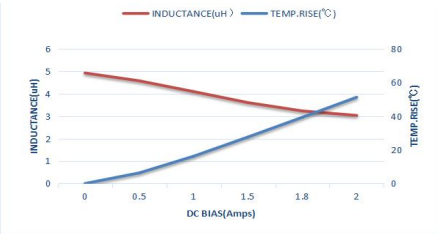

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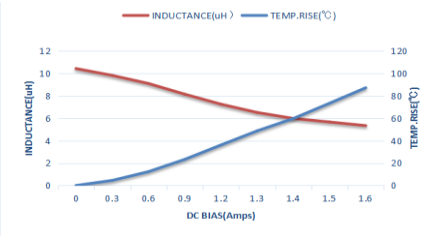

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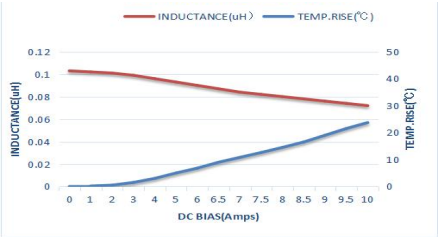

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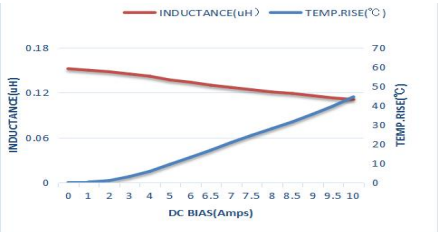

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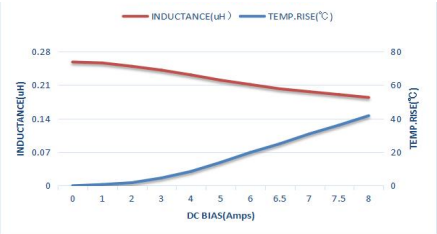

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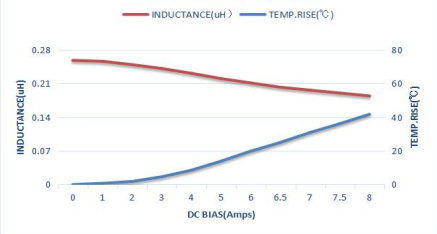

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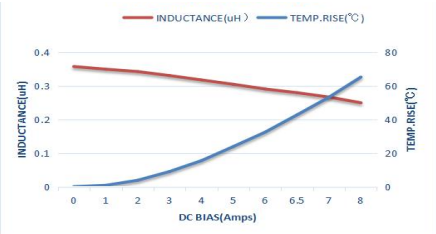

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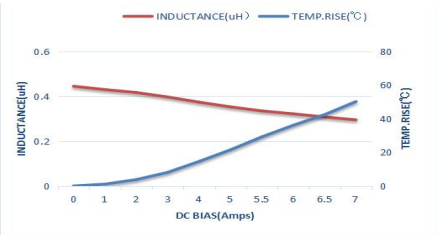

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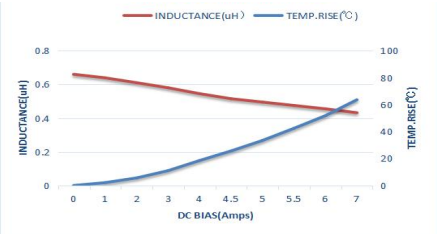

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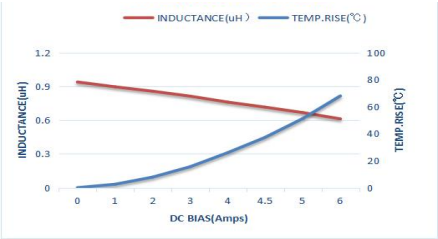

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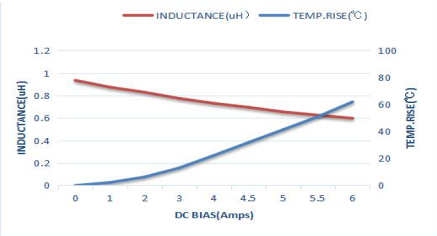

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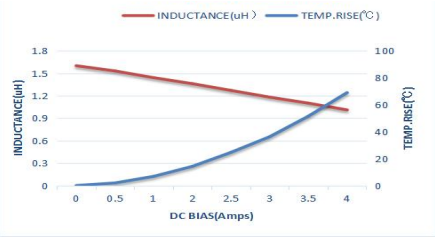

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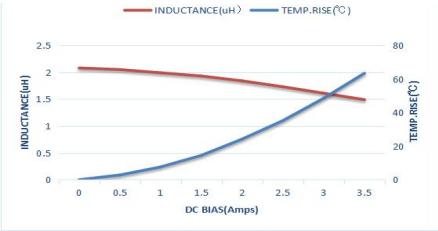

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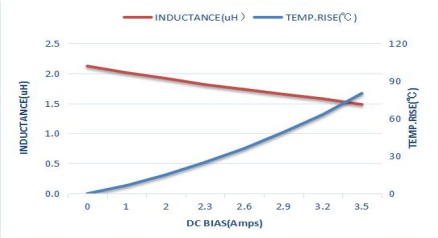

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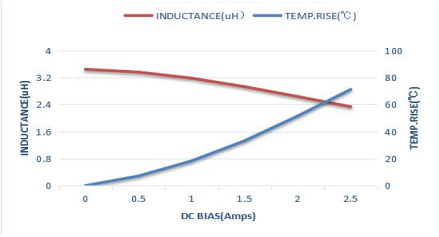

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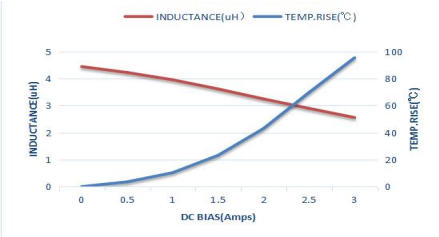

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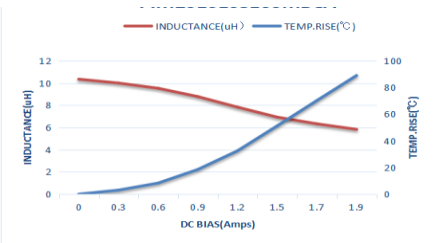

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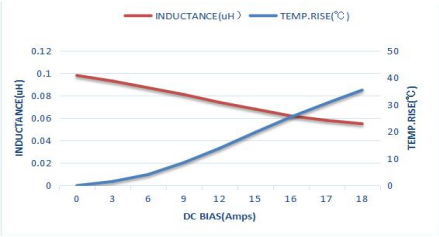

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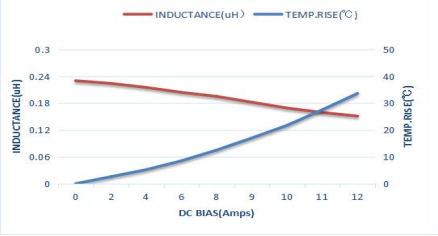

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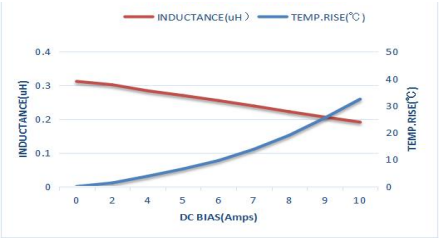

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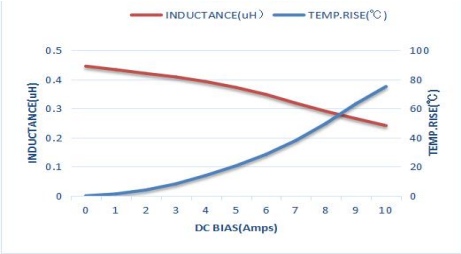

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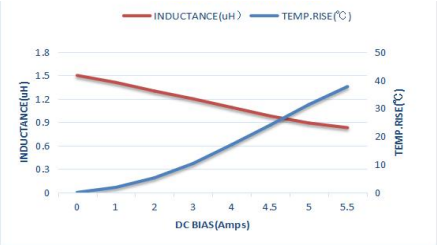

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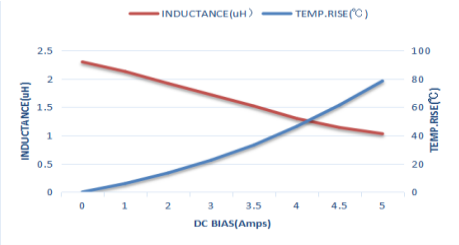

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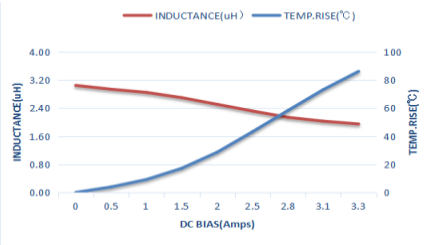


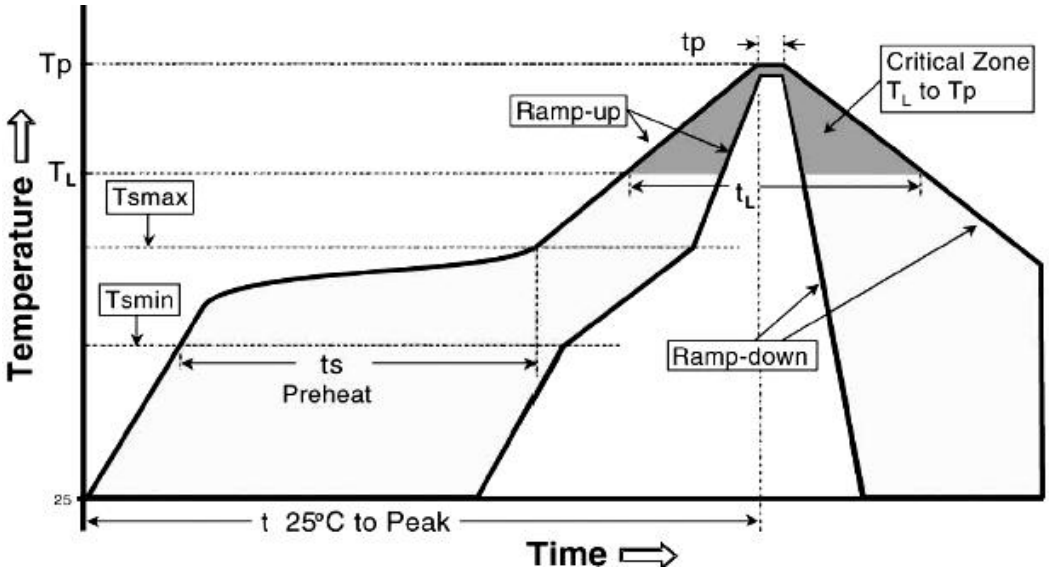
Reliability

Item	Requirements	Test Methods and Remarks
Insulation Resistance	≥100MΩ	100 VDC between inductor coil and The middle of the top surface of the body for 60 seconds.
Solderability	90% or more of electrode area shall be coated by new solde.	Dip pads in flux . Solder Composition: Sn/Ag3.0/Cu0.5(Pb-Free). Solder Temperature: 245±5℃. Immersion Time: (5±1) s.
Resistance to Soldering Heat	No visible mechanical damage. Inductance change: Within ±10.	Dip pads in flux. Solder Composition: Sn/Ag3.0/Cu0.5(Pb-Free). Solder Temperature: 260±5℃. Immersion Time: 10±1sec.
Adhesion of teral electrode	Strong bond between the pad and the core, without come off PCB.	Inductors shall be subjected to (260±5)°C for (20±5)s Soldering in the base whit 0.3mm solder. And then aplombelectrode way plus tax 10 N for (10±1) seconds.
High temperature	No case deformation or change in appearance. Inductance change: Within ±10%	Temperature: 125±2℃. Time : 1000 hours. Measurement at 24±4 hours after test conclusion.
Low temperature	No visible mechanical damage. Inductance change: Within ±10%	Temperature: -40±2℃. Time : 1000 hours. Measurement at 24±4 hours after test conclusion.
Thermal shock	No visible mechanical damage. Inductance change: Within ±10%	The test sample shall be placed at (-55±3)°C and (125±3)°C for (30±3) , different temperature conversion time is 2~3 utes. The temperature cycle shall be repeated 32 cycles. Placed at room temperature for 2 hours, within 48±4 hours of testing.
Temperature characteristic	Inductance change Pc-b,Pc-d: Within ±20%	a：+20 °C （30~45） → b: -40 °C （30~45） → c: +20 °C （30~45） → d: +125 °C （30~45） → e: +20 °C （30~45） $P_{c\text{-}b}=\frac{L_b-L_c}{L_c}\times 100\%$; $P_{c\text{-}d}=\frac{L_d-L_c}{L_c}\times 100\%$
Static Humidity	No visible mechanical damage. Inductance change: Within ±10%	Inductors shall be subjected to (95±3)%RH . at(60±2)℃ for (1000±4) h. Placed at room temperature for 2 hours, within 48 hours of testing.
	No visible mechanical damage. Inductance change: Within ±10%	Inductors shall be store at (85±2)℃ for (1000±4) hours with Irms applied. Placed at room temperature for 2 hours, within 48 hours of testing

Soldering Condition

(This is for recommendation, please customer perform adjustment according to actual application)

Recommend Reflow Soldering Profile：(solder : Sn96.5 / Ag3 / Cu0.5)



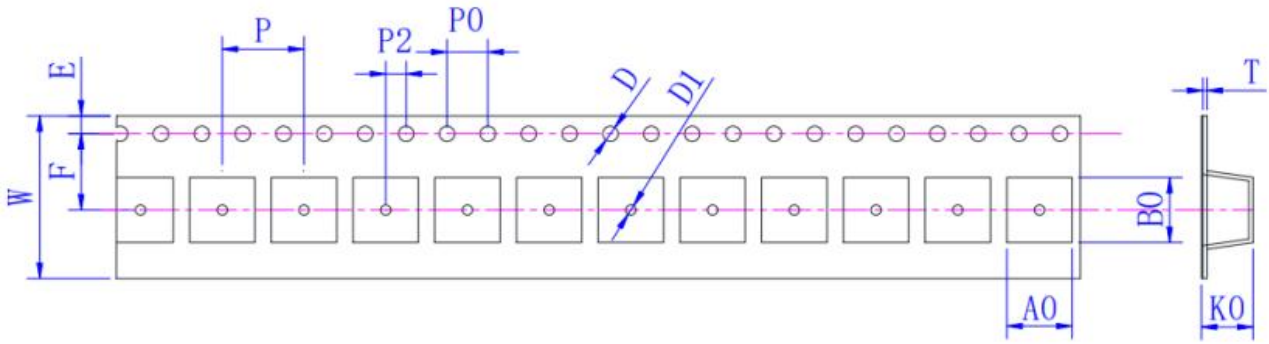
Profile Feature	Lead (Pb)-Free solder
Preheat： Temperature Min (Ts_{min}) Temperature Max (Ts_{max}) Time (Ts_{min} to Ts_{max}) (ts)	 150℃ 200℃ 60 -120 seconds
Average ramp-up rate： (Ts max to Tp)	 3℃ / second max.
Time maintained above : Temperature (T_L) Time (t_L)	 217℃ 60-150 seconds
Peak Temperature (Tp)	260℃
Time within $^{+0}_{-5}$℃ of actual peak Temperature (tp)[2]	10 seconds
Ramp-down Rate	6℃/second max.
Time 25℃ to Peak Temperature	8minutes max.

Allowed Re-flow times : 2 times

Remark : To avoid discoloration phenomena of chip on terminal electrodes, please use N_2 Re-flow furnace .

Packing

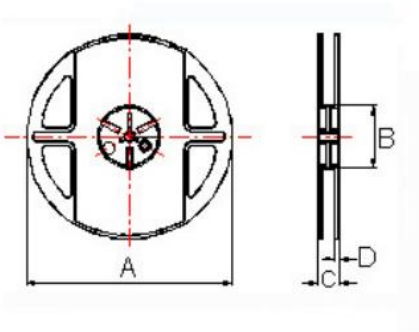
Dimension of plastic taping: (Unit: mm)



Series	W ±0.30	A0 ±0.05	B0 +0.1/-0	D +0.1/-0	D1 Min	E ±0.10	F ±0.10	K0 ±0.05	P0 ±0.10	P2 ±0.10	P ±0.10	T ±0.05
201655/65	8.00	1.90	2.30	1.50	1.0	1.75	3.50	0.8	4.00	2.00	4.00	0.23
201607/08	8.00	1.90	2.30	1.50	1.0	1.75	3.50	0.8	4.00	2.00	4.00	0.23
201610	8.00	1.90	2.30	1.50	1.0	1.75	3.50	1.20	4.00	2.00	4.00	0.23
201612	8.00	1.90	2.30	1.50	1.0	1.75	3.50	1.40	4.00	2.00	4.00	0.23

Dimension of Reel：(Unit: mm)

Type	A ±0.5	B ±0.5	C ±0.5	D ±1
All	178	60	12	1.5



Packing Quantity：3000pcs/Reel