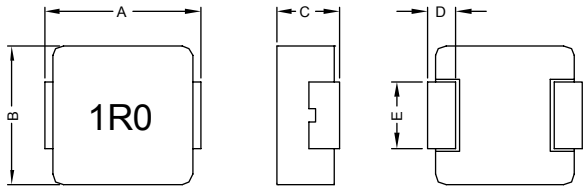
LM0412HP Series
SMD Power Choke Coil

1. PART NO. EXPRESSION :

LM 0412 HP 1R0 M F - □□
(a) (b) (c) (d) (e)(f) (g)

(a) Series code
(b) Dimension code
(c) Type code
(d) Inductance code : 1R0 = 1.0uH
(e) Tolerance code : M = ±20%,Y = ±30%
(f) F : RoHS Compliant
(g) 11~99 : Internal controlled number

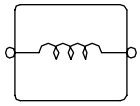
2. CONFIGURATION & DIMENSIONS :



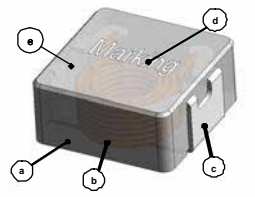
Unit:m/m

A	B	C	D	E
4.45± 0.25	4.06± 0.25	1.0± 0.2	0.76± 0.30	2.0± 0.20

3. SCHEMATIC :



4. MATERIALS :



(a) Core : Carbonyl Powder.
(b) Wire : Polyester Wire or equivalent
(c) Solder Plating : 100% Pb free solder
(d) Ink : Halogen-free ketone
(e) Paint : Epoxy resin

5. GENERAL SPECIFICATION :

a) Test Freq. : L : 100KHz/1.0V
b) Ambient Temp. : 25° C
c) Operating Temp. : -40° C to +125° C
d) Storage Temp. : -10° C to + 40° C
e) Humidity Range : 50 ~ 60% RH (Product without taping)
f) Heat Rated Current (Irms) will cause the coil temperature rise approximately Δt of 40°C (keep 1min.)
g) Saturation Current (Isat) will cause L0 to drop 20% typical. (keep quickly).
h) Part Temperature (Ambient+Temp. Rise) : Should not exceed 125° C under worst case operating conditions.

NOTE : Specifications subject to change without notice. Please check our website for latest information.

6. ELECTRICAL CHARACTERISTICS :

Part No.	Inductance L_0 (µH) @ 0 A	Irms (A) Typ.	Isat (A) Typ.	DCR (mΩ) Typ. @ 25° C	DCR (mΩ) Max. @ 25° C
LM0412HPR10YF	0.10	11.5	25	4.3	5.5
LM0412HPR22MF	0.22	8.5	20	6.6	8.0
LM0412HPR47MF	0.47	6.0	6.5	18	20
LM0412HP1R0MF	1.00	4.0	6.0	41	47
LM0412HP1R5MF	1.50	3.0	4.0	55	63.3
LM0412HP2R2MF	2.20	2.8	3.5	69.2	80
LM0412HP3R3MF	3.30	2.3	3.0	84	97
LM0412HP4R7MF	4.70	2.0	2.5	128	145
LM0412HP5R6MF	5.60	1.7	2.3	180	208
LM0412HP6R8MF	6.80	1.5	1.7	300	360
LM0412HP8R2MF	8.20	1.4	1.6	313	376
LM0412HP100MF	10.0	1.3	1.4	410	463

Tolerance : M = ± 20%,Y = ± 30%

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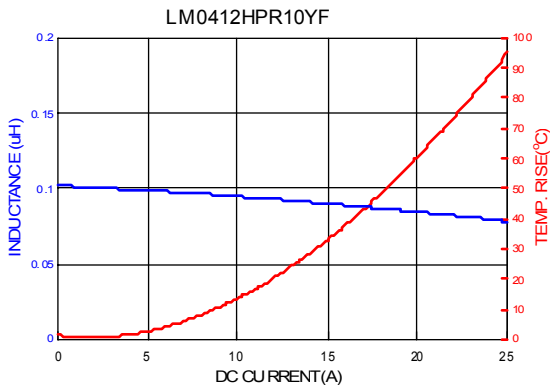
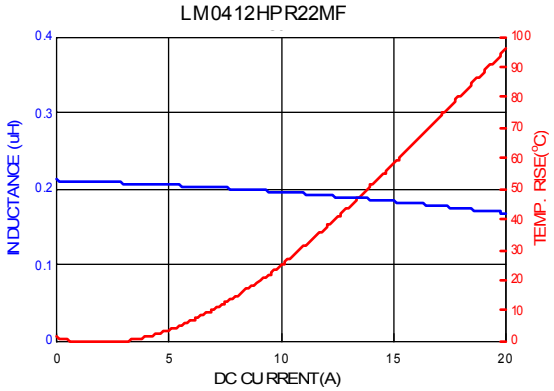
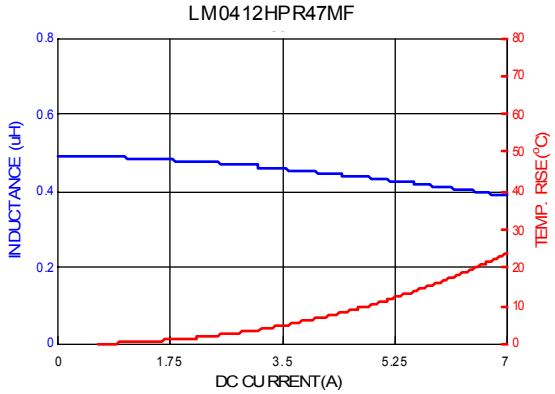
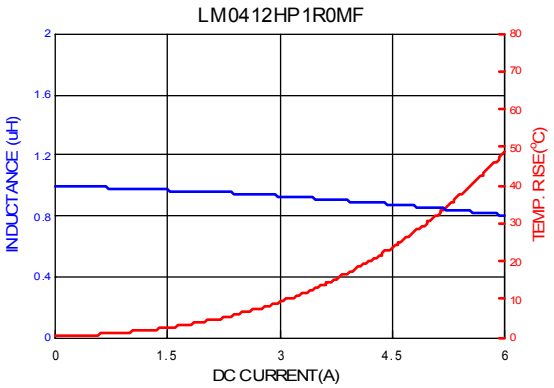
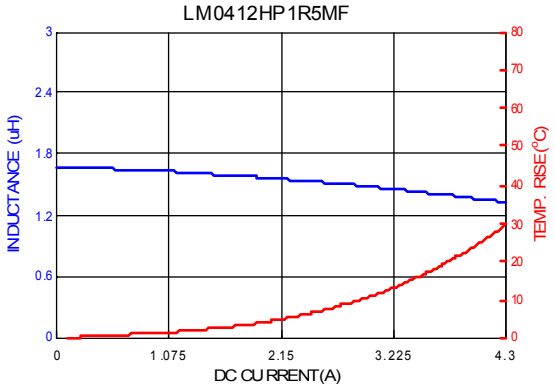
7. CHARACTERISTICS CURVES :

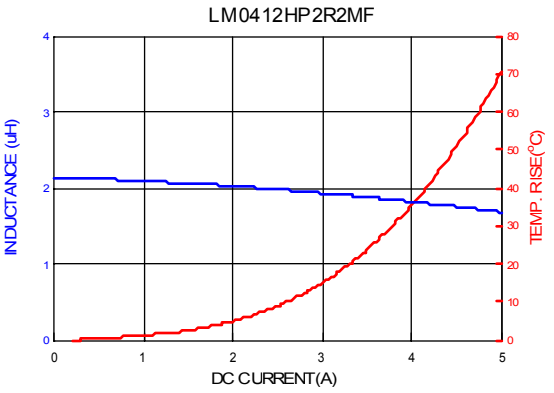












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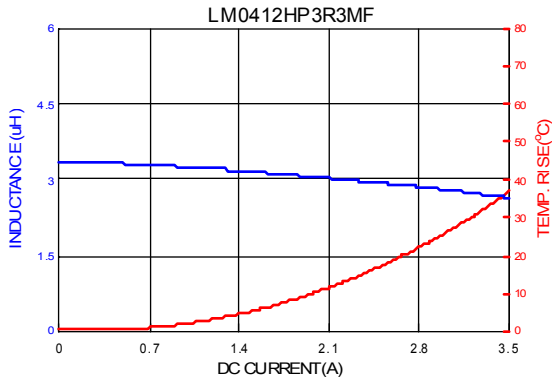
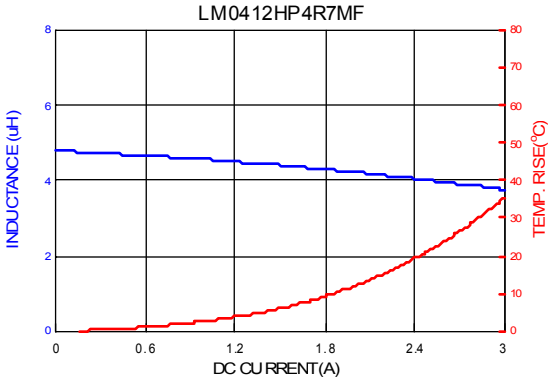
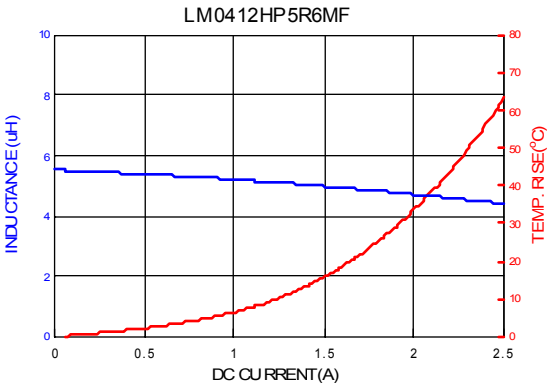
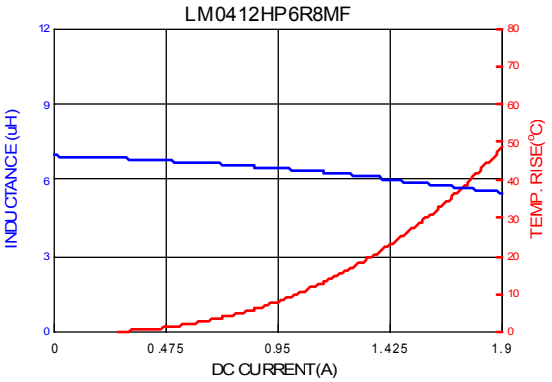
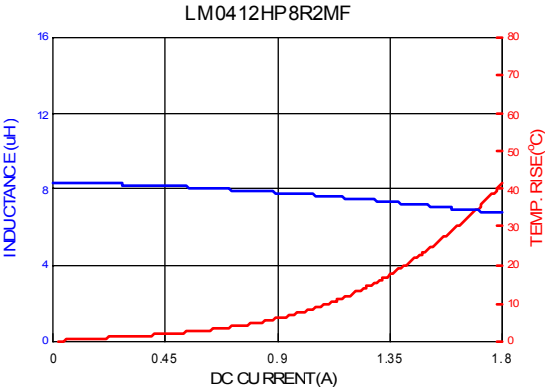
7. CHARACTERISTICS CURVES :

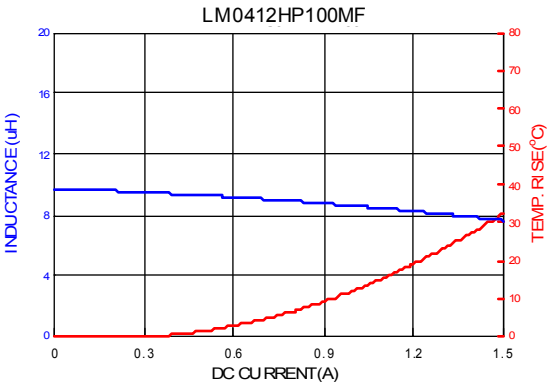












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8. RELIABILITY AND TEST CONDITION

ITEM	PERFORMANCE	TEST CONDITION
Electrical Characteristics Test		
Inductance	Refer to standard electrical characteristics list	HP4284A, CH11025, CH3302, CH1320, CH1320S LCR meter.
DCR		CH16502, Agilent33420A Micro-Ohm Meter.
Heat Rated Current (Irms)	Approximately ΔT≦40°C	Irms(A) will cause the coil temperature rise approximately ΔT(°C) without core loss 1. Applied the allowed DC current(keep 1min). 2. Temperature measured by digital surface thermometer
Saturation Current (Isat)	ΔL20% typical.	Isat(A) will cause Lo to drop ΔL(%) (keep quickly).
Reliability Test		
High Temperature Exposure Test	Electric specification should be satisfied	Temperature : 125± 2° C Time : 1000± 12 hours Measured at room temperature after placing for 2 to 3hrs (MIL-PRF-27)
Low Temperature Life Test		Temperature : -40± 2° C Time : 500± 12 hours Measured at room temperature after placing for 2 to 3hrs
Thermal Shock Test		Conditions of 1 cycle. Step / Temperature (° C) / Times (min.) 1 / -40+0/-2 / 15± 1 2 / Room Temperature / Within ≦0.2 3 / +125+2/-0 / 15± 1 Total : 300 cycles Measure at room temperature after placing for 2 to 3 hrs. (AEC-Q200-REV C)
Humidity Resistance		Temperature : 85± 2° C Humidity : 85± 3% RH Time : 1000± 12 hours Measured at room temperature after placing for 2 to 3hrs (AEC-Q200-REV C)
Vibration Test		Frequency : 10-2000-10Hz for 20min. Amplitude: Parts mounted within 2" from any secure point. Directions and times : X, Y, Z directions for 20 min. This cycle shall be performed 12 times in each of three mutually perpendicular directions. (Total 12 hours) (MIL-STD-202 Method 204 D Test condition B)
Reflow Test		Preheat : 150± 5° C Duration : 5 minutes Temperature : 260± 5° C, 20~40 seconds (IPC/JEDEC J-STD-020C)
Solder test	Terminals should be covered by over 95% solder on visual inspection.	After dip into flux， dip into solder 235± 5° C, 4± 1seconds Flux, solder for lead free (ANSI/J-STD-002C Method B)

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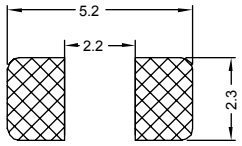
9. SOLDERING AND MOUNTING :

9-1. Recommended PC Board Pattern



9-2. 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. Our terminations are suitable for all wave and re-flow soldering systems. If hand soldering cannot be avoided, the preferred technique is the utilization of hot air soldering tools.

9-2.1 Solder Re-flow :

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

9-2.2 Soldering Iron (Figure 2) :

Products attachment with 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.
Note :

a) Preheat circuit and products to 150° C.
b) 355° C tip temperature (max)
c) Never contact the ceramic with the iron tip
d) 1.0mm tip diameter (max)
e) Use a 20 watt soldering iron with tip diameter of 1.0mm
f) Limit soldering time to 4~5 secs.

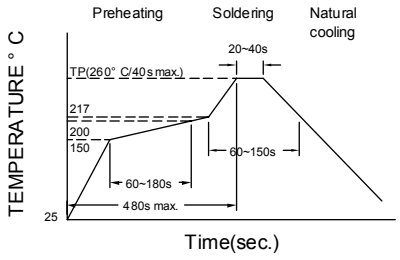


Figure 1. Re-flow Soldering: 3 times max.

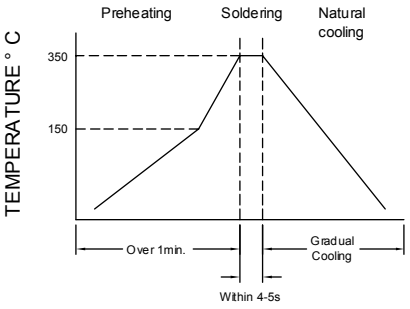


Figure 2. Hand Soldering: 1 times max.

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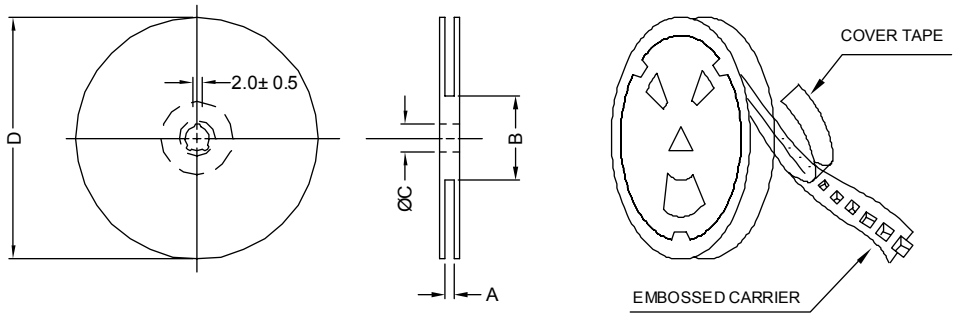
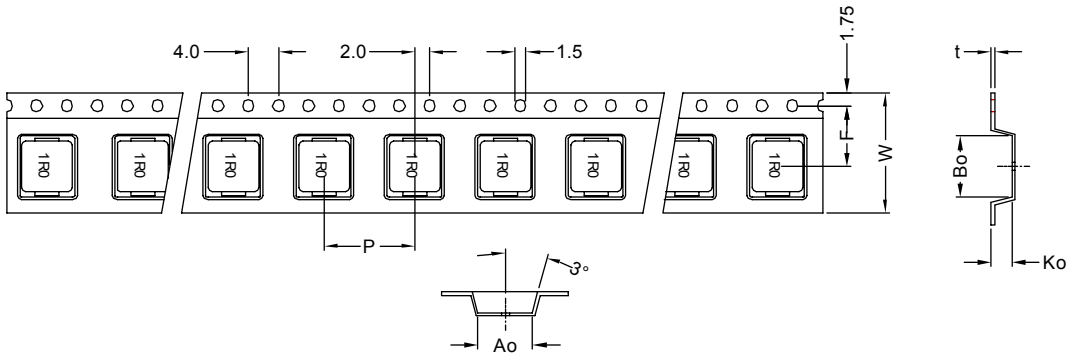
10. PACKAGING INFORMATION :

10-1. Reel Dimension



Type	A(mm)	B(mm)	C(mm)	D(mm)
13" x 12mm	12.0± 0.5	100± 2.0	13.5± 0.5	330

10-2 Tape Dimension



Series	Ao(mm)	Bo(mm)	Ko(mm)	P(mm)	W(mm)	F(mm)	t(mm)
LM0412	4.40± 0.1	5.0± 0.1	1.5± 0.1	8.0± 0.1	12.0± 0.3	5.5± 0.1	0.35± 0.05

10-3. Packaging Quantity

Size	LM0412
Chip / Reel	4000
Inner Box	8000
Carton	32000

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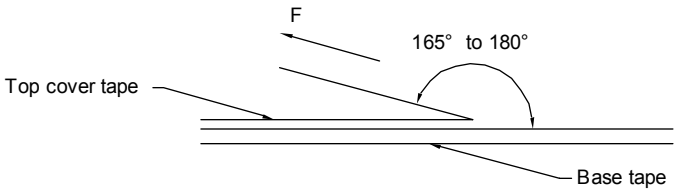
10-4. Tearing Off Force



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 standard)

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

Application Notice

1. Storage Conditions :
   To maintain the solderabililty of terminal electrodes :
   a) Temperature and humidity conditions : Less than 30° C and 70% RH.
   b) Recommended products should be used within 6 months from the time of delivery.
   c) The packaging material should be kept where no chlorine or sulfur exists in the air.

2. Transportation :
   a) Products should be handled with care to avoid damage or contamination from perspiration and skin oils.
   b) The use of tweezers or vacuum pick up is strongly recommended for individual components.
   c) Bulk handling should ensure that abrasion and mechanical shock are minimized.

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ICE Components:

LM0412HPR22MF LM0412HP100MF LM0412HP2R2MF LM0412HPR47MF LM0412HP3R3MF LM0412HP5R6MF
LM0412HP6R8MF LM0412HP1R0MF LM0412HP4R7MF LM0412HPR10YF LM0412HP1R5MF LM0412HP8R2MF