APPROVAL SHEET

PRODUCT **High Frequency Chip Ceramic Inductor for Automotive**

SERIES MCI Automotive

PART NO.

DESCRIPTION

ISSUE DATE 2023/10/25 **REVISION DATE** 2023/10/25

REFERENCE NO. ENS000186960

AEC-Q200 Qualified

RoHS COMPLIANCE ITEM

Halogen Free

CUSTOMER APPROVAL

CUSTOMER **CUSTOMER PN**

■ **Vendor:**
Walsin Technology Corporation
566-1, Kao Shi Road, Yangmei, Taiwan
Tel. 886-3-475-3711 www.passivecomponent.com

■ **Manufacturer:**
INPAQ Technology Co., Ltd.
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High Frequency Chip Ceramic Inductor for Automotive

Engineering Specification

Qualified based on AEC-Q200

1. Features

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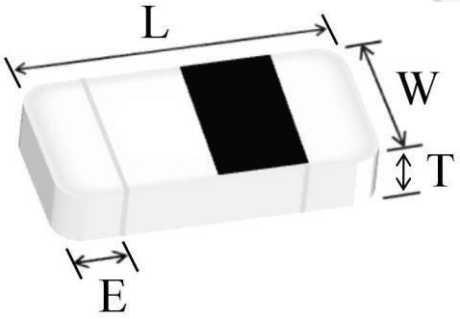
- Particular ceramic material and coil structure provide high frequency application range up to 10GHz.
- Small size and low profile.
- Available in various sizes.
- Excellent solderability and heat resistance.

2. Applications

- RF and wireless communication, information technology equipment which includes computer, telecommunications, radar detectors, automotive electronics, cellular phones, pagers, audio equipment, PDAs, keyless remote system and low-voltage power supply modules

3. Shapes and Dimensions



TYPE	060303 (EIA0201)	100505 (EIA0402)	160808 (EIA0603)
L	0.6±0.03	1.0±0.10	1.60±0.15
W	0.3±0.03	0.5±0.10	0.80±0.15
T	0.3±0.03	0.5±0.10	0.80±0.15
E	0.15±0.05	0.10~0.30	0.20~0.60
Unit	mm	mm	mm

4. Explanation of Part Number

MCI	1005	HZ	1N0	S	H	B	P
1	2	3	4	5	6	7	8

1 Series Name
2 Dimensions L*W
3 Product Type：HZ - Automotive Infotainment , HH - Automotive Powertrain / Safety
4 Inductance(nH)：N means Decimal point , ex：1.0 nH = 1N0
5 Tolerance : B = ±0.1nH，C = ±0.2nH，S = ±0.3nH，G = ±2%，H = ±3%，J = ±5%
6 Mark：H = 1/8 Mark，M = 1/4 Mark，N = No Mark
7 Internal Code
8 Packaging : P - Paper tape, 7" reel

5. General Technical Data

- Operating temperature range : - 55℃ ~ +125℃
- Storage Condition : Less than 40℃ and 70% RH
- Storage time : 6 months Max. (Size:1005)
  12 month Max. (Size:1608)
- Soldering method : Reflow

6. Test Instruments Conditions

- Agilent E4991A/B RF Impedance Material Analyzer or equivalent
  with fixture 16197A or equivalent
  Agilent 4338B Milliohm meter
  Test Level：500 mV

7. Electrical Specification

Part No.	Inductance (nH)	Inductance Tolerance	Q (Min.)	Freq. (MHz)	DCR(Ω) Max.	S.R.F (MHz) Min.	Rated Current (mA) Max.
MCI0603MZ0N6_HBP	0.6	B=±0.1nH C=±0.2nH	14	500	0.07	20,000	850
MCI0603MZ0N7_HBP	0.7		14	500	0.08	20,000	800
MCI0603MZ0N8_HBP	0.8		14	500	0.08	18,000	800
MCI0603MZ0N9_HBP	0.9		14	500	0.10	18,000	750
MCI0603MZ1N0_HBP	1.0	B=±0.1nH C=±0.2nH S=±0.3nH	14	500	0.10	17,000	750
MCI0603MZ1N1_HBP	1.1		14	500	0.10	17,000	750
MCI0603MZ1N2_HBP	1.2		14	500	0.10	17,000	750
MCI0603MZ1N3_HBP	1.3		14	500	0.15	17,000	600
MCI0603MZ1N4_HBP	1.4		14	500	0.15	16,000	600
MCI0603MZ1N5_HBP	1.5		14	500	0.15	15,000	600
MCI0603MZ1N6_HBP	1.6		14	500	0.15	15,000	600
MCI0603MZ1N7_HBP	1.7		14	500	0.15	15,000	600
MCI0603MZ1N8_HBP	1.8		14	500	0.15	15,000	600
MCI0603MZ1N9_HBP	1.9		14	500	0.15	12,500	600
MCI0603MZ2N0_HBP	2.0		14	500	0.15	12,500	600
MCI0603MZ2N1_HBP	2.1		14	500	0.15	11,000	600
MCI0603MZ2N2_HBP	2.2		14	500	0.15	11,000	600
MCI0603MZ2N3_HBP	2.3		14	500	0.20	10,000	500
MCI0603MZ2N4_HBP	2.4		14	500	0.20	10,000	500
MCI0603MZ2N5_HBP	2.5		14	500	0.20	10,000	500
MCI0603MZ2N6_HBP	2.6		14	500	0.20	10,000	500
MCI0603MZ2N7_HBP	2.7		14	500	0.20	10,000	500
MCI0603MZ2N8_HBP	2.8		14	500	0.20	9,500	500
MCI0603MZ2N9_HBP	2.9		14	500	0.20	9,500	500
MCI0603MZ3N0_HBP	3.0		14	500	0.25	9,500	450
MCI0603MZ3N1_HBP	3.1		14	500	0.25	8,000	450
MCI0603MZ3N2_HBP	3.2		14	500	0.25	8,000	450
MCI0603MZ3N3_HBP	3.3		14	500	0.25	8,000	450
MCI0603MZ3N4_HBP	3.4		14	500	0.25	7,000	450
MCI0603MZ3N5_HBP	3.5		14	500	0.25	7,000	450

Part No.	Inductance (nH)	Inductance Tolerance	Q (Min.)	Freq. (MHz)	DCR(Ω) Max.	S.R.F (MHz) Min.	Rated Current (mA) Max.
MCI0603MZ3N6_HBP	3.6	B=±0.1nH C=±0.2nH S=±0.3nH	14	500	0.30	6,000	400
MCI0603MZ3N7_HBP	3.7		14	500	0.30	6,000	400
MCI0603MZ3N8_HBP	3.8		14	500	0.30	6,000	400
MCI0603MZ3N9_HBP	3.9		14	500	0.30	5,700	400
MCI0603MZ4N0_HBP	4.0		14	500	0.40	5,300	350
MCI0603MZ4N1_HBP	4.1		14	500	0.40	5,300	350
MCI0603MZ4N2_HBP	4.2		14	500	0.40	5,300	350
MCI0603MZ4N3_HBP	4.3	S=±0.3nH H=±3% J=±5%	14	500	0.40	5,300	350
MCI0603MZ4N7_HBP	4.7		14	500	0.40	4,400	350
MCI0603MZ5N1_HBP	5.1		14	500	0.40	4,200	350
MCI0603MZ5N6_HBP	5.6		14	500	0.40	4,000	350
MCI0603MZ6N2_HBP	6.2	H=±3% J=±5%	14	500	0.60	4,000	300
MCI0603MZ6N8_HBP	6.8		14	500	0.60	3,900	300
MCI0603MZ7N5_HBP	7.5		14	500	0.60	3,700	300
MCI0603MZ8N2_HBP	8.2		14	500	0.70	3,600	250
MCI0603MZ9N1_HBP	9.1		14	500	0.70	3,300	250
MCI0603MZ10N_HBP	10		14	500	0.70	3,200	250
MCI0603MZ11N_HBP	11		14	500	0.80	2,900	250
MCI0603MZ12N_HBP	12		12	500	0.70	2,900	250
MCI0603MZ13N_HBP	13		12	500	0.80	2,600	250
MCI0603MZ15N_HBP	15		12	500	0.70	2,600	250
MCI0603MZ16N_HBP	16		12	500	0.95	2,200	200
MCI0603MZ18N_HBP	18		12	500	0.80	2,200	200

Part No.	Inductance (nH)	Inductance Tolerance	Q (Min.)	Freq. (MHz)	DCR(Ω) Max.	S.R.F (MHz) Min.	Rated Current (mA) Max.
MCI1005HZ Series							
MCI1005HZ0N3_HBP	0.3	B	8	100	0.08	10,000	1000
MCI1005HZ0N4_HBP	0.4		8	100	0.08	10,000	1000
MCI1005HZ0N5_HBP	0.5		8	100	0.08	10,000	1000
MCI1005HZ0N6_HBP	0.6		8	100	0.08	10,000	1000
MCI1005HZ0N7_HBP	0.7		8	100	0.08	10,000	1000
MCI1005HZ0N8_HBP	0.8		8	100	0.08	10,000	1000
MCI1005HZ1N0_HBP	1.0	B , C, S	8	100	0.08	10,000	1000
MCI1005HZ1N1_HBP	1.1		8	100	0.08	10,000	1000
MCI1005HZ1N2_HBP	1.2		8	100	0.09	10,000	1000
MCI1005HZ1N3_HBP	1.3		8	100	0.09	10,000	1000
MCI1005HZ1N5_HBP	1.5		8	100	0.10	10,000	1000
MCI1005HZ1N6_HBP	1.6		8	100	0.10	10,000	1000
MCI1005HZ1N8_HBP	1.8		8	100	0.12	10,000	900
MCI1005HZ2N0_HBP	2.0		8	100	0.12	10,000	900
MCI1005HZ2N2_HBP	2.2		8	100	0.13	10,000	900
MCI1005HZ2N4_HBP	2.4		8	100	0.13	10,000	800
MCI1005HZ2N7_HBP	2.7		8	100	0.16	6,000	800
MCI1005HZ3N0_HBP	3.0		8	100	0.16	6,000	800
MCI1005HZ3N3_HBP	3.3		8	100	0.16	6,000	800
MCI1005HZ3N6_HBP	3.6		8	100	0.20	6,000	700
MCI1005HZ3N9_HBP	3.9		8	100	0.20	6,000	700
MCI1005HZ4N3_HBP	4.3		8	100	0.20	6,000	700
MCI1005HZ4N7_HBP	4.7		8	100	0.20	6,000	700
MCI1005HZ5N1_HBP	5.1		8	100	0.23	5,300	600
MCI1005HZ5N6_HBP	5.6		8	100	0.23	4,500	600
MCI1005HZ6N2_HBP	6.2		8	100	0.25	4,500	600
MCI1005HZ6N8_HBP	6.8	G , H , J	8	100	0.25	4,500	600
MCI1005HZ7N5_HBP	7.5		8	100	0.28	4,200	500
MCI1005HZ8N2_HBP	8.2		8	100	0.28	3,700	500
MCI1005HZ9N1_HBP	9.1		8	100	0.30	3,400	500
MCI1005HZ10N_HBP	10		8	100	0.30	3,400	500
MCI1005HZ12N_HBP	12		8	100	0.45	3,000	400

Part No.	Inductance (nH)	Inductance Tolerance	Q (Min.)	Freq. (MHz)	DCR(Ω) Max.	S.R.F (MHz) Min.	Rated Current (mA) Max.
MCI1005HZ Series							
MCI1005HZ15N_HBP	15	G , H , J	8	100	0.55	2,500	400
MCI1005HZ18N_HBP	18		8	100	0.65	2,200	300
MCI1005HZ22N_HBP	22		8	100	0.70	1,900	300
MCI1005HZ27N_HBP	27		8	100	0.80	1,700	300
MCI1005HZ33N_HBP	33		8	100	0.90	1,600	200
MCI1005HZ39N_HBP	39		8	100	1.00	1,200	200
MCI1005HZ47N_HBP	47		8	100	1.10	1,100	200
MCI1005HZ56N_HBP	56		8	100	1.10	1,000	200
MCI1005HZ68N_HBP	68		8	100	1.20	800	200
MCI1005HZ82N_HBP	82	J	8	100	1.30	600	200
MCI1005HZR10_HBP	100		8	100	1.60	600	200

Part No.	Inductance (nH)	Inductance Tolerance	Q (Min.)	Freq. (MHz)	DCR(Ω) Max.	S.R.F (MHz) Min.	Rated Current (mA) Max.
MCI1005HH Series							
MCI1005HH0N3_HBP	0.3	B	8	100	0.08	10,000	1000
MCI1005HH0N4_HBP	0.4		8	100	0.08	10,000	1000
MCI1005HH0N5_HBP	0.5		8	100	0.08	10,000	1000
MCI1005HH0N6_HBP	0.6		8	100	0.08	10,000	1000
MCI1005HH0N7_HBP	0.7		8	100	0.08	10,000	1000
MCI1005HH0N8_HBP	0.8		8	100	0.08	10,000	1000
MCI1005HH1N0_HBP	1.0	B , C, S	8	100	0.08	10,000	1000
MCI1005HH1N1_HBP	1.1		8	100	0.08	10,000	1000
MCI1005HH1N2_HBP	1.2		8	100	0.09	10,000	1000
MCI1005HH1N3_HBP	1.3		8	100	0.09	10,000	1000
MCI1005HH1N5_HBP	1.5		8	100	0.10	10,000	1000
MCI1005HH1N6_HBP	1.6		8	100	0.10	10,000	1000
MCI1005HH1N8_HBP	1.8		8	100	0.12	10,000	900
MCI1005HH2N0_HBP	2.0		8	100	0.12	10,000	900
MCI1005HH2N2_HBP	2.2		8	100	0.13	10,000	900
MCI1005HH2N4_HBP	2.4		8	100	0.13	10,000	800
MCI1005HH2N7_HBP	2.7		8	100	0.16	6,000	800
MCI1005HH3N0_HBP	3.0		8	100	0.16	6,000	800
MCI1005HH3N3_HBP	3.3		8	100	0.16	6,000	800
MCI1005HH3N6_HBP	3.6		8	100	0.20	6,000	700
MCI1005HH3N9_HBP	3.9		8	100	0.20	6,000	700
MCI1005HH4N3_HBP	4.3		8	100	0.20	6,000	700
MCI1005HH4N7_HBP	4.7		8	100	0.20	6,000	700
MCI1005HH5N1_HBP	5.1		8	100	0.23	5,300	600
MCI1005HH5N6_HBP	5.6		8	100	0.23	4,500	600
MCI1005HH6N2_HBP	6.2		8	100	0.25	4,500	600
MCI1005HH6N8_HBP	6.8	G , H , J	8	100	0.25	4,500	600
MCI1005HH7N5_HBP	7.5		8	100	0.28	4,200	500
MCI1005HH8N2_HBP	8.2		8	100	0.28	3,700	500
MCI1005HH9N1_HBP	9.1		8	100	0.30	3,400	500
MCI1005HH10N_HBP	10		8	100	0.30	3,400	500
MCI1005HH12N_HBP	12		8	100	0.45	3,000	400

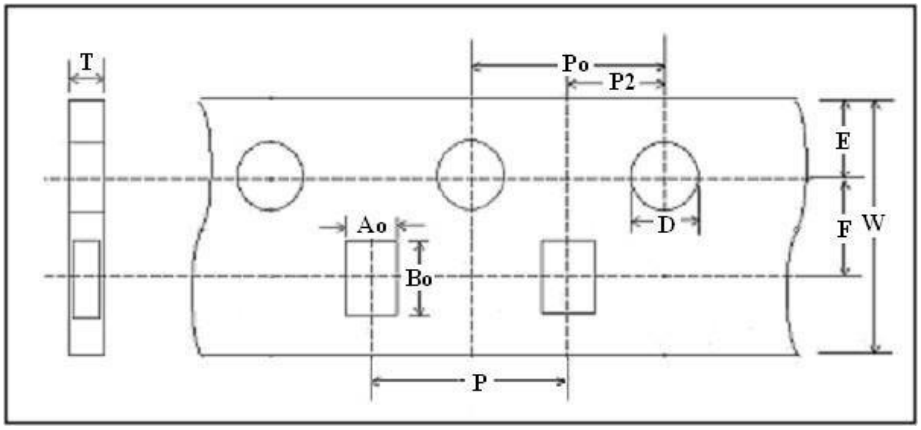
Part No.	Inductance (nH)	Inductance Tolerance	Q (Min.)	Freq. (MHz)	DCR(Ω) Max.	S.R.F (MHz) Min.	Rated Current (mA) Max.
MCI1005HH Series							
MCI1005HH15N_HBP	15	G , H , J	8	100	0.55	2,500	400
MCI1005HH18N_HBP	18		8	100	0.65	2,200	300
MCI1005HH22N_HBP	22		8	100	0.70	1,900	300
MCI1005HH27N_HBP	27		8	100	0.80	1,700	300
MCI1005HH33N_HBP	33		8	100	0.90	1,600	200
MCI1005HH39N_HBP	39		8	100	1.00	1,200	200
MCI1005HH47N_HBP	47		8	100	1.10	1,100	200
MCI1005HH56N_HBP	56		8	100	1.10	1,000	200
MCI1005HH68N_HBP	68		8	100	1.20	800	200
MCI1005HH82N_HBP	82	J	8	100	1.30	600	200
MCI1005HHR10_HBP	100		8	100	1.60	600	200

Part No.	Inductance (nH)	Inductance Tolerance	Q (Min.)	Freq. (MHz)	DCR(Ω) Max.	S.R.F (MHz) Min.	Rated Current (mA) Max.
MCI1608HH Series							
MCI1608HH1N0_HBP	1.0	S	8	100	0.05	10,000	1,000
MCI1608HH1N2_HBP	1.2		8	100	0.05	10,000	1,000
MCI1608HH1N5_HBP	1.5		8	100	0.10	10,000	1,000
MCI1608HH1N8_HBP	1.8		8	100	0.10	10,000	1,000
MCI1608HH2N2_HBP	2.2		8	100	0.10	8,000	1,000
MCI1608HH2N7_HBP	2.7		10	100	0.13	7,000	1,000
MCI1608HH3N3_HBP	3.3		10	100	0.13	6,000	1,000
MCI1608HH3N9_HBP	3.9		10	100	0.15	6,000	1,000
MCI1608HH4N7_HBP	4.7		10	100	0.20	5,000	1,000
MCI1608HH5N6_HBP	5.6		10	100	0.23	4,000	700
MCI1608HH6N8_HBP	6.8	J	10	100	0.25	4,000	700
MCI1608HH8N2_HBP	8.2		10	100	0.28	3,500	600
MCI1608HH10N_HBP	10		12	100	0.30	3,400	600
MCI1608HH12N_HBP	12		12	100	0.35	2,600	600
MCI1608HH15N_HBP	15		12	100	0.40	2,300	600
MCI1608HH18N_HBP	18		12	100	0.45	2,000	600
MCI1608HH22N_HBP	22		12	100	0.50	1,600	600
MCI1608HH27N_HBP	27		12	100	0.55	1,400	600
MCI1608HH33N_HBP	33		12	100	0.60	1,200	600
MCI1608HH39N_HBP	39		12	100	0.65	1,100	500
MCI1608HH47N_HBP	47		12	100	0.70	900	500
MCI1608HH56N_HBP	56		12	100	0.75	900	500
MCI1608HH68N_HBP	68		12	100	0.85	700	400
MCI1608HH82N_HBP	82		12	100	0.95	600	300
MCI1608HHR10_HBP	100		12	100	1.00	600	300
MCI1608HHR12_HBP	120		8	50	1.20	500	300

** For special part number which is not shown in the above table, please refer to appendix.

8. Packing

- **Type：Paper Carrier**

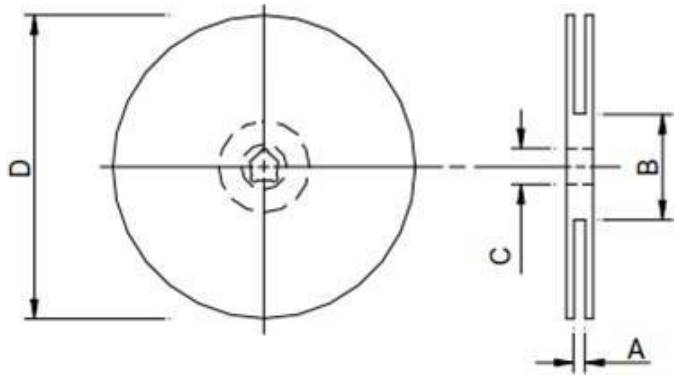


- **Taping Dimension**

Unit：mm

TYPE	**0603**	**1005**	**1608**
Symbol	PAPER	PAPER	PAPER
W	8.00 ± 0.10	8.00±0.10	8.00±0.10
P	2.00 ± 0.05	2.00±0.05	4.00±0.10
E	1.75 ± 0.05	1.75±0.05	1.75±0.05
F	3.50 ± 0.05	3.50±0.05	3.50±0.05
D	1.55 ± 0.05	1.55±0.05	1.55±0.05
Po	4.00 ± 0.10	4.00±0.10	4.00±0.10
P2	2.00 ± 0.05	2.00±0.05	2.00±0.05
Ao	0.36 ± 0.02	0.60±0.03	0.98±0.03
Bo	0.66 ± 0.02	1.12±0.03	1.80±0.05
T	0.42 ± 0.02	0.60±0.03	0.95±0.05

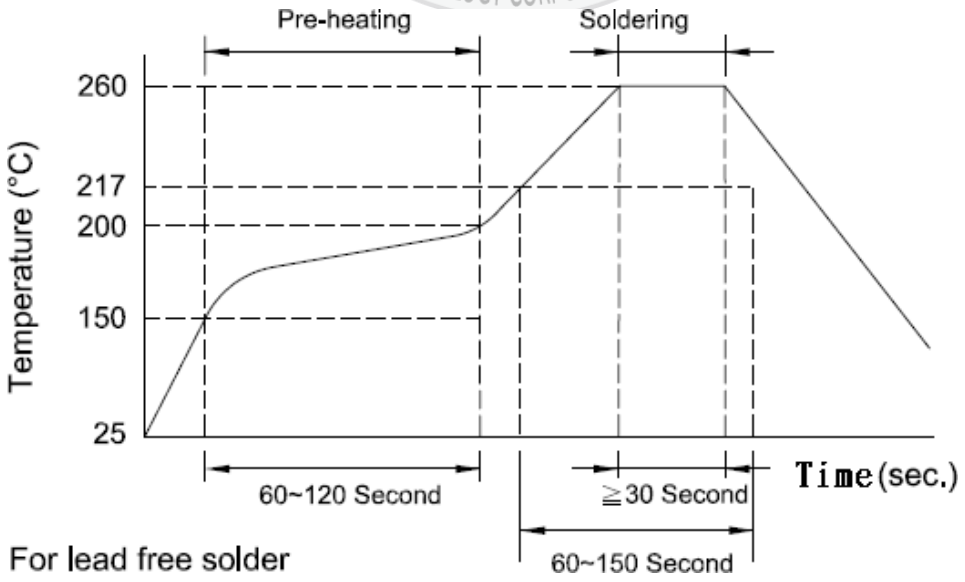
- **Reel Dimension**



Type	7"
A(mm)	10±1.5
B(mm)	50 or more
C(mm)	13.2±1.0
D(mm)	178±2.0

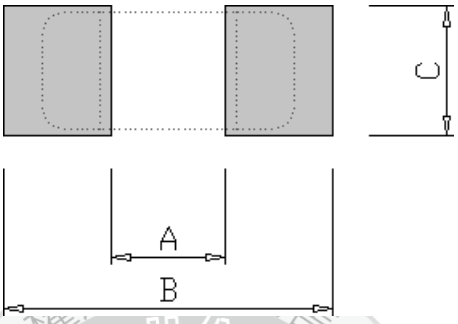
PART SIZE (EIA SIZE)	0603 (0201)	1005 (0402)	1608 (0603)
Qty.(pcs)	15,000	10,000	4,000
BOX	5 reels / inner box	5 reels / inner box	5 reels / inner box

9. Recommended Soldering Conditions



10. Land Patterns Reflow Soldering

- **Solder Land Information**



TYPE (mm)	A	B	C
0603 (EIA 0201)	0.20 ~ 0.30 (0.008 ~ 0.012)	0.80 ~ 0.90 (0.031 ~ 0.035)	0.20 ~ 0.30 (0.008 ~ 0.012)
1005 (EIA 0402)	0.4 (0.016)	1.4 ~ 1.5 (0.055 ~ 0.059)	0.5 ~ 0.6 (0.020 ~ 0.024)
1608 (EIA 0603)	0.7 (0.028)	1.9 ~ 2.3 (0.075 ~ 0.091)	0.6 ~ 0.8 (0.024 ~ 0.031)

11. Reliability Performance

Item	Test Condition	Criteria
High Temperature Exposure	1.Temperature : 125℃ ± 5℃ 2.Test time : 1000 hrs Measurement: at ambient temperature 24 hrs after test completion	1.No mechanical damage 2.Inductance value should be within ± 10 % of the initial value 3. Q value should be within ± 20% of the initial value
Temperature Cycle	1.Temperature : -55 ~ +125℃ 2.Cycle : 1000 cycles 3.Dwell time : 30minutes Measurement : at ambient temperature 24 hrs after test completion	1.No mechanical damage 2.Inductance value should be within ± 10 % of the initial value 3. Q value should be within ± 20% of the initial value
Biased Humidity	1.Temperature : 85℃ ± 2℃ 2.Humidity : 85 % RH 3.Test time : 1000 hrs 4.Apply current : full rated current Measurement: at ambient temperature 24 hrs after test completion	1.No mechanical damage 2.Inductance value should be within ± 10 % of the initial value 3. Q value should be within ± 20% of the initial value
Operational Life	1.Temperature : 125℃ ± 5℃ 2.Test time : 1000 hrs 3.Apply current : full rated current Measurement : at ambient temperature 24 hrs after test completion	1.No mechanical damage 2.Inductance value should be within ± 10 % of the initial value 3. Q value should be within ± 20% of the initial value
Mechanical Shock	Condition F:1500g's/0.5ms/Half sine	1.No mechanical damage 2.Inductance value should be within ± 10 % of the initial value 3. Q value should be within ± 20% of the initial value

<table>
<tr><th>Item</th><th>Test Condition</th><th>Requirements</th></tr>
<tr><td>Vibration Test</td><td>5g's for 20 minutes,12cycles each of 3 orientations
Test from 10-2000Hz.,12cycles each of 3 orientations</td><td>1.No mechanical damage
2.Inductance value should be within ± 10 % of the initial value
3. Q value should be within ± 20% of the initial value</td></tr>
<tr><td>Resistance to Solder Heat</td><td>1.Solder temperature : 260 ± 5℃
2.Flux : Rosin
3.DIP time : 10 ± 1 sec</td><td>1.More than 95 % of terminal electrode should be covered with new solder
2.No mechanical damage
3.Inductance value should be within ± 10 % of the initial value
4. Q value should be within ± 20% of the initial value</td></tr>
<tr><td>ESD</td><td>Classification Levels 1C</td><td>1. No mechanical damage
2. Inductance variation within10%.
3. Q value should be within ± 20% of the initial value</td></tr>
<tr><td>Solderability Test</td><td>1.Solder temperature : 235 ± 5℃
2.Flux : Rosin
3.DIP time : 5 ± 1 sec</td><td>1.More than 95 % of terminal electrode should be covered with new solder
2.No mechanical damage</td></tr>
<tr><td>Board Flex</td><td>Epoxy-PCB(1.6mm)
Deflection 2mm(min)
60s minimum holding time</td><td>No mechanical damage.</td></tr>
<tr><td>Terminal Strength</td><td><table><tr><th>Size</th><th>Apply Force(F)</th><th>Test Time</th></tr><tr><td>0603</td><td>2 N</td><td>10 ±1 sec.</td></tr><tr><td>1005</td><td>5 N</td><td>10 ±1 sec.</td></tr><tr><td>1608</td><td>10 N</td><td>10 ±1 sec.</td></tr></table></td><td>No mechanical damage</td></tr>
</table>

- **NOTE**

  The storage atmosphere must be free of gas containing sulfur and chlorine. Also, avoid exposing the product to saline moisture. If the product is exposed to such atmospheres, the terminals will oxidize and solderability will be affected.