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CMCL Series

Multilayer Chip Ferrite Inductor

◆ Features

1、Monolithic structure for high reliability
2、Compact size inductor possible
3、No cross coupling due to magnetic shield
4、Perfect shape for mounting with no directionality
5、Excellent solderability and high heat resistance for reflow soldering or wave soldering
6、RoHS Compliant.

◆ Application

Widely use in Communications, Video and audio equipment, Computer, Remote control, etc.

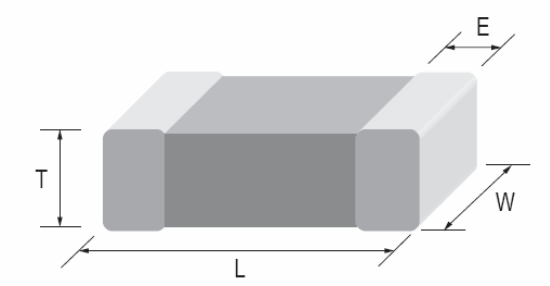
◆ PRODUCT IDENTIFICATION

CMCL	1608	S	1R0	M	S	P
(1)	(2)	(3)	(4)	(5)	(6)	(7)

(1) Series Type
(2) Chip Size（mm）:Length X Width
(3) Material Code
(4) Inductance：47N=0.047μH；R10=0.10μH
1R0=1.0μH；100=10μH
(5) Inductance Tolerance：K=±10%, M=±20%
(6) Company Code
(7) Packaging:P–Embossed paper tape, 7" reel
E- Embossed plastic tape, 7" reel

◆ Dimensions Unit: mm

Size(EIA)	1005 (0402)	1608 (0603)	2012 (0805)	3216 (1206)
L	1.00±0.10	1.60±0.150	2.00±0.20	3.20±0.20
W	0.50±0.10	0.80±0.150	1.25±0.20	1.60±0.20
T	0.50±0.10	0.80±0.150	0.90±0.20	1.10±0.20
E	0.25±0.10	0.30±0.20	0.50±0.30	0.50±0.30



◆Specifications

Part Number	Inductance (μH)	Min. Quality Factor (Q)	L, Q Test Freq.L/Q Freq. (MHz)	Min.Self-resonant Frequency S.R.F(MHz)	Max. DC Resistance DCR(Ω)	Max. Rated Current Ir(mA)
CMCL1005 Series						
CMCL1005L47NKSP	0.047	10	50	220	0.45	25
CMCL1005L68NKSP	0.068	10	50	210	0.45	25
CMCL1005L82NKSP	0.082	10	50	200	0.45	25
CMCL1005LR10KSP	0.10	10	25	200	0.8	25
CMCL1005LR12KSP	0.12	10	25	165	0.8	25
CMCL1005LR15KSP	0.15	10	25	140	0.9	25
CMCL1005LR18KSP	0.18	10	25	120	0.9	25
CMCL1005LR22KSP	0.22	10	25	110	1.2	25
CMCL1005LR27KSP	0.27	15	25	95	1.2	25
CMCL1005LR33KSP	0.33	15	25	85	1.25	18
CMCL1005QR39KSP	0.39	20	10	85	0.6	15
CMCL1005QR47KSP	0.47	20	10	80	0.7	15
CMCL1005QR56KSP	0.56	20	10	75	0.8	15
CMCL1005QR68KSP	0.68	20	10	70	0.9	15
CMCL1005QR82KSP	0.82	20	10	65	0.9	15
CMCL1005Q1R0KSP	1.0	20	10	40	0.9	15
CMCL1005Q1R2KSP	1.2	20	10	35	1.2	15
CMCL1005Q1R5KSP	1.5	20	10	30	1.2	15
CMCL1005Q1R8KSP	1.8	20	10	30	1.45	15
CMCL1005Q2R2KSP	2.2	20	10	28	1.7	10
CMCL1005Q2R7KSP	2.7	20	10	28	2.4	10
CMCL1005Q3R3KSP	3.3	20	10	28	2.7	10
CMCL1608 Series						
CMCL1608L47NKSP	0.047	10	50	260	0.3	50
CMCL1608L68NKSP	0.068	10	50	250	0.3	50
CMCL1608L82NKSP	0.082	10	50	245	0.3	50
CMCL1608LR10KSP	0.10	15	25	240	0.5	50
CMCL1608LR12KSP	0.12	15	25	205	0.5	50
CMCL1608LR15KSP	0.15	15	25	180	0.6	50
CMCL1608LR18KSP	0.18	15	25	165	0.6	50
CMCL1608LR22KSP	0.22	15	25	150	0.8	50
CMCL1608LR27KSP	0.27	15	25	136	0.8	50
CMCL1608LR33KSP	0.33	15	25	125	0.85	35
CMCL1608LR39KSP	0.39	15	25	110	1	35

◆Specifications

Part Number	Inductance (μH)	Min. Quality Factor (Q)	L, Q Test Freq.L/Q Freq. (MHz)	Min.Self-resonant Frequency S.R.F(MHz)	Max. DC Resistance DCR(Ω)	Max. Rated Current Ir(mA)
CMCL1608 Series						
CMCL1608LR47KSP	0.47	15	25	105	1.35	35
CMCL1608LR56KSP	0.56	15	25	95	1.55	35
CMCL1608LR68KSP	0.68	15	25	90	1.7	35
CMCL1608LR82KSP	0.82	15	25	85	2.1	35
CMCL1608Q1R0KSP	1.0	35	10	75	0.6	25
CMCL1608Q1R1KSP	1.1	35	10	75	0.6	25
CMCL1608Q1R2KSP	1.2	35	10	65	0.8	25
CMCL1608Q1R5KSP	1.5	35	10	60	0.8	25
CMCL1608Q1R8KSP	1.8	35	10	55	0.95	25
CMCL1608Q2R2KSP	2.2	35	10	50	1.15	15
CMCL1608Q2R7KSP	2.7	35	10	45	1.35	15
CMCL1608Q3R3KSP	3.3	35	10	40	1.55	15
CMCL1608Q3R9KSP	3.9	35	10	35	1.7	15
CMCL1608Q4R7KSP	4.7	35	10	33	2.1	15
CMCL1608S5R6KSP	5.6	35	4	22	1.55	5
CMCL1608S6R8KSP	6.8	35	4	20	1.7	5
CMCL1608S8R2KSP	8.2	35	4	18	2.1	5
CMCL1608S100KSP	10	30	2	17	1.85	3
CMCL1608S120KSP	12	30	2	15	2.1	3
CMCL1608T150KSP	15	20	1	14	1.7	1
CMCL1608T180KSP	18	20	1	13	1.85	1
CMCL1608T220KSP	22	20	1	11	2.1	1
CMCL1608T270KSP	27	20	1	10	2.75	1
CMCL1608T330KSP	33	20	1	9	2.95	1
CMCL2012 Series						
CMCL2012L47NKSP	0.047	15	50	320	0.2	300
CMCL2012L68NKSP	0.068	15	50	280	0.2	300
CMCL2012L82NKSP	0.082	15	50	255	0.2	300
CMCL2012LR10KSP	0.10	20	25	235	0.3	250
CMCL2012LR12KSP	0.12	20	25	220	0.3	250
CMCL2012LR15KSP	0.15	20	25	200	0.4	250
CMCL2012LR18KSP	0.18	20	25	185	0.4	250
CMCL2012LR22KSP	0.22	20	25	170	0.5	250
CMCL2012LR27KSP	0.27	20	25	150	0.5	250
CMCL2012LR33KSP	0.33	20	25	145	0.55	250

◆Specifications

Part Number	Inductance (μH)	Min. Quality Factor (Q)	L, Q Test Freq.L/Q Freq. (MHz)	Min.Self-resonant Frequency S.R.F(MHz)	Max. DC Resistance DCR(Ω)	Max. Rated Current Ir(mA)
CMCL2012 Series						
CMCL2012LR39KSP	0.39	25	25	135	0.65	200
CMCL2012LR47KSP	0.47	25	25	125	0.65	200
CMCL2012LR56KSP	0.56	25	25	115	0.75	150
CMCL2012LR68KSP	0.68	25	25	105	0.8	150
CMCL2012LR82KSP	0.82	25	25	100	1	150
CMCL2012P1R0KSP	1.0	45	10	75	0.4	50
CMCL2012P1R1KSP	1.1	45	10	65	0.5	50
CMCL2012P1R2KSP	1.2	45	10	65	0.5	50
CMCL2012P1R5KSP	1.5	45	10	60	0.5	50
CMCL2012P1R8KSP	1.8	45	10	55	0.6	50
CMCL2012P2R2KSP	2.2	45	10	50	0.65	30
CMCL2012P2R4KSP	2.4	45	10	47	0.7	30
CMCL2012P2R7KSP	2.7	45	10	45	0.75	30
CMCL2012P3R3KSP	3.3	45	10	41	0.8	30
CMCL2012P3R9KSP	3.9	45	10	38	0.9	30
CMCL2012P4R7KSP	4.7	45	10	35	1	30
CMCL2012S5R6KSP	5.6	50	4	32	0.9	15
CMCL2012S6R8KSP	6.8	50	4	29	1	15
CMCL2012S8R2KSP	8.2	50	4	26	1.1	15
CMCL2012S100KSP	10	50	2	24	1.15	15
CMCL2012S120KSP	12	50	2	22	1.25	15
CMCL2012T150KSP	15	30	1	19	0.8	5
CMCL2012T180KSP	18	30	1	18	0.9	5
CMCL2012T220KSP	22	30	1	16	1.1	5
CMCL2012T270KSP	27	30	1	14	1.15	5
CMCL2012T330KSP	33	30	0.4	13	1.25	5
CMCL2012T390KSP	39	35	2	8	2.9	4
CMCL2012T470KSP	47	35	2	7.5	3.0	4
CMCL2012T560KSP	56	35	2	7.0	3.1	4
CMCL2012T680KSP	68	25	1	6.5	2.9	2
CMCL2012T820KSP	82	25	1	6.0	3.0	2
CMCL2012T101KSP	100	25	1	5.5	3.1	2

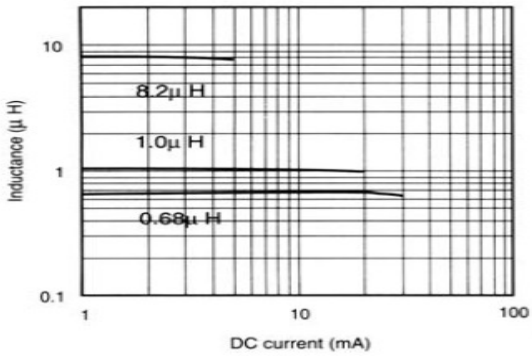
◆Specifications

Part Number	Inductance (μH)	Min. Quality Factor (Q)	L, Q Test Freq.L/Q Freq. (MHz)	Min.Self-resonant Frequency S.R.F(MHz)	Max. DC Resistance DCR(Ω)	Max. Rated Current Ir(mA)
CMCL3216 Series						
CMCL3216L47NKSP	0.047	20	50	320	0.15	300
CMCL3216L68NKSP	0.068	20	50	280	0.25	300
CMCL3216LR10KSP	0.10	20	25	235	0.25	250
CMCL3216LR12KSP	0.12	20	25	220	0.3	250
CMCL3216LR15KSP	0.15	20	25	200	0.3	250
CMCL3216LR18KSP	0.18	20	25	185	0.4	250
CMCL3216LR22KSP	0.22	20	25	170	0.4	250
CMCL3216LR27KSP	0.27	20	25	150	0.5	250
CMCL3216LR33KSP	0.33	20	25	145	0.5	250
CMCL3216LR39KSP	0.39	25	25	135	0.5	200
CMCL3216LR47KSP	0.47	25	25	125	0.6	200
CMCL3216LR56KSP	0.56	25	25	115	0.7	150
CMCL3216LR68KSP	0.68	25	25	105	0.8	150
CMCL3216LR82KSP	0.82	25	25	100	0.9	150
CMCL3216Q1R0KSP	1.0	45	10	75	0.4	100
CMCL3216Q1R2KSP	1.2	45	10	65	0.5	100
CMCL3216Q1R5KSP	1.5	45	10	60	0.5	50
CMCL3216Q1R8KSP	1.8	45	10	55	0.5	50
CMCL3216Q2R2KSP	2.2	45	10	50	0.6	50
CMCL3216Q2R7KSP	2.7	45	10	45	0.6	50
CMCL3216Q3R3KSP	3.3	45	10	41	0.7	50
CMCL3216Q3R9KSP	3.9	45	10	38	0.8	50
CMCL3216Q4R7KSP	4.7	45	10	35	0.9	50
CMCL3216S5R6KSP	5.6	50	4	32	0.7	25
CMCL3216S6R8KSP	6.8	50	4	29	0.8	25
CMCL3216S8R2KSP	8.2	50	4	26	0.9	25
CMCL3216S100KSP	10	50	2	24	1	25
CMCL3216S120KSP	12	50	2	22	1.05	15
CMCL3216T150KSP	15	35	1	19	0.7	5
CMCL3216T180KSP	18	35	1	18	0.7	5
CMCL3216T220KSP	22	35	1	16	0.9	5
CMCL3216T270KSP	27	35	1	14	0.9	5
CMCL3216T330KSP	33	35	0.4	13	1.05	5
CMCL3216T390KSP	39	40	2	11	3	5
CMCL3216T470KSP	47	40	2	10	3.4	5

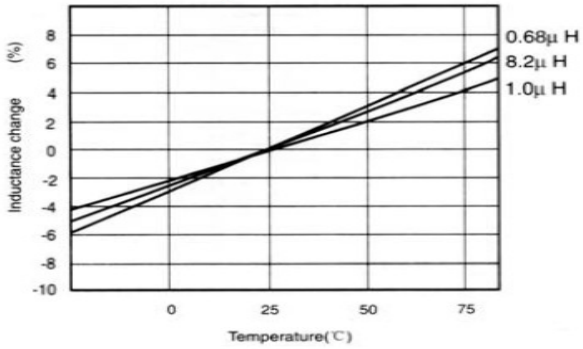
◆TYPICAL ELECTRICAL CHARACTERISTICS

CMCL1005 Series

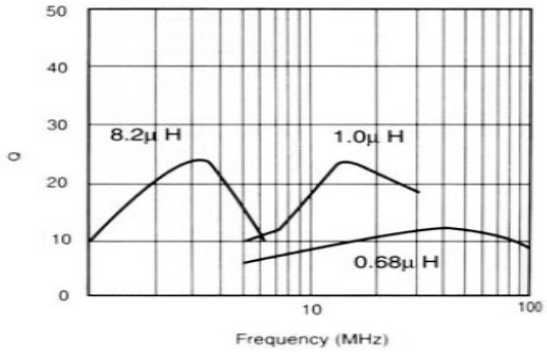
Inductance vs. DC Current Characteristics



Inductance vs. Temperature Characteristics

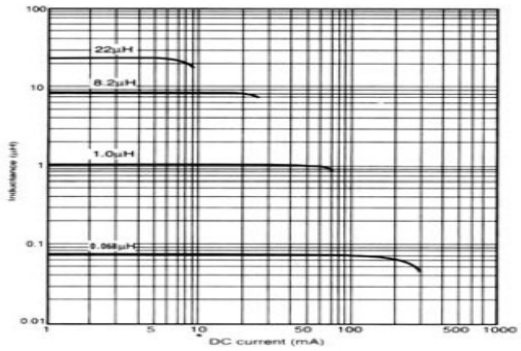


Q vs. Frequency Characteristics

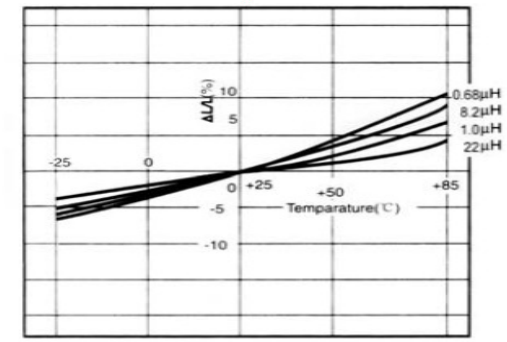


CMCL1608 Series

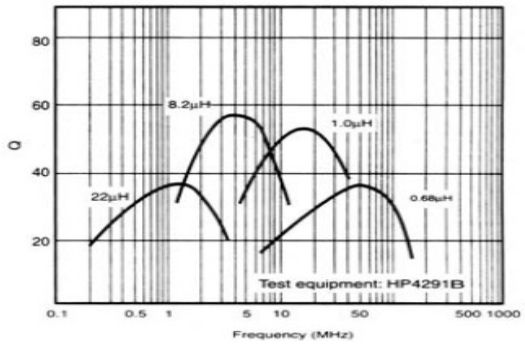
Inductance vs. DC Current Characteristics



Inductance vs. Temperature Characteristics



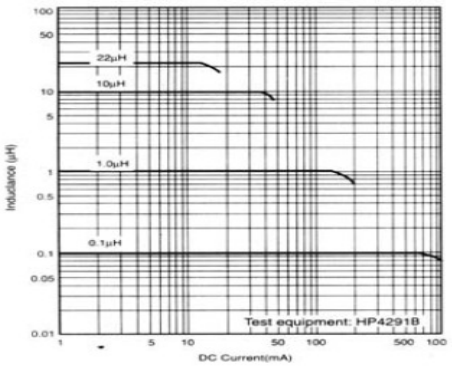
Q vs. Frequency Characteristics



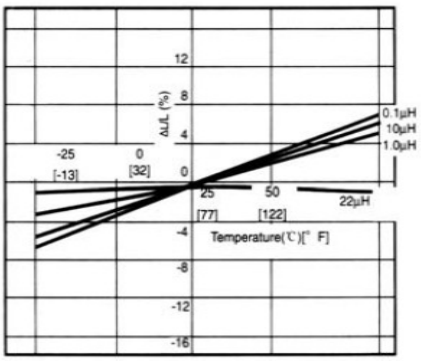
◆ TYPICAL ELECTRICAL CHARACTERISTICS

CMCL2012 Series

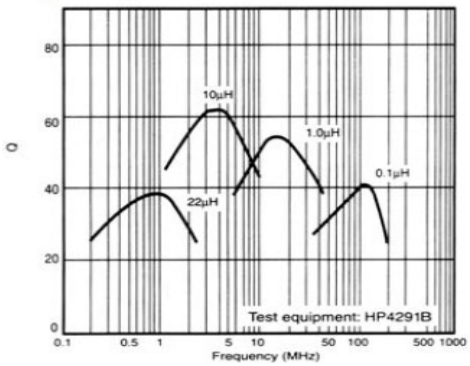
Inductance vs. DC Current Characteristics



Inductance vs. Temperature Characteristics

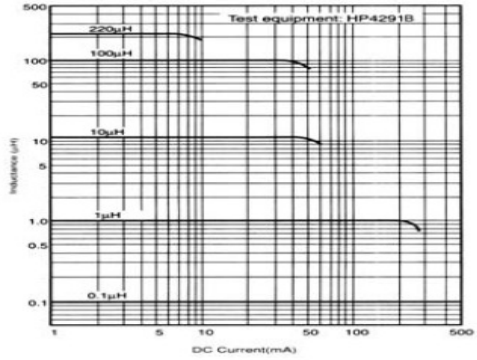


Q vs. Frequency Characteristics

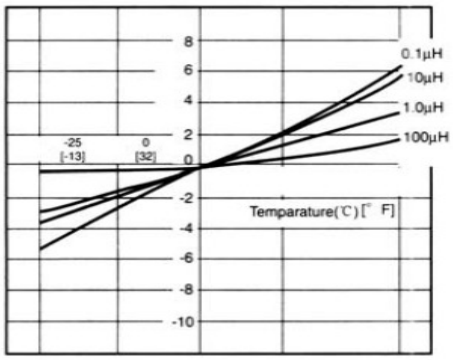


CMCL3216 Series

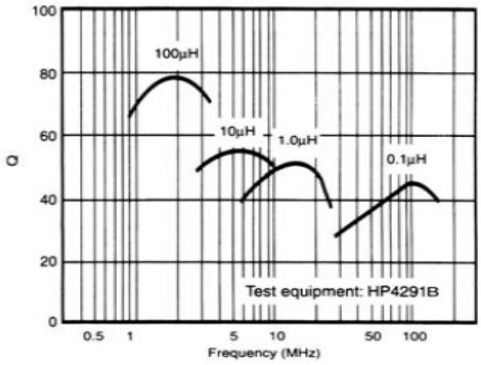
Inductance vs. DC Current Characteristics



Inductance vs. Temperature Characteristics



Q vs. Frequency Characteristics



◆ Package

Size EIA (EIA)	1005 (0402)	1608 (0603)	2012 (0805)	3216(1206)
Standard Packing Quantity (pcs / reel)	10,000	4,000	4,000	4,000

◆ Reliability testing report（1）

ITEM 项目	Requirements 要求	Test Conditions 测试条件
Operating Temp 工作温度	-25℃~125℃	/
Storage Temp 储存温度	-45~125℃	/
Temperature& Humidity Test 温湿度测试	1、无机械损伤。No mechanical damage. 2、阻抗变化在±30%内，电感量变化在±10%内，Q 值变化在±30%内。 Impedance change within±30%;Inductance change within±10%;Quality factor change within±30%;	测试温度（Test Temperature）：85℃ 测试湿度（Test Humidity）：85%RH 测试持续时间（Test Duration）：144 hours
Thermal shock 热冲击	1、无机械损伤。No mechanical damage. 2、阻抗变化在±30%内，电感量变化在±10%内，Q 值变化在±30%内。 Impedance change within±30%;Inductance change within±10%;Quality factor change within±30%;	步骤 1（Step 1）：-45±3℃ 30±3Min 步骤 2（Step 2）：125±3℃ 30±3Min 循环次数（Number of cycle）：100cycles
Low Temperature Test 低温测试	1、无机械损伤。No mechanical damage. 2、阻抗变化在±30%内，电感量变化在±10%内，Q 值变化在±30%内。 Impedance change within±30%;Inductance change within±10%;Quality factor change within±30%;	测试温度（Test Temperature）：-55±2℃ 测试持续时间（Test Duration）：24 hours
High temperature test 高温测试	1、无机械损伤。No mechanical damage. 2、阻抗变化在±30%内，电感量变化在±10%内，Q 值变化在±30%内。 Impedance change within±30%;Inductance change within±10%;Quality factor change within±30%;	测试温度（Test Temperature）：125±2℃ 测试持续时间（Test Duration）：24 hours
Humidity load resistance 耐潮湿	1、无机械损伤。No mechanical damage. 2、阻抗变化在±30%内，电感量变化在±10%内，Q 值变化在±30%内。 Impedance change within±30%;Inductance change within±10%;Quality factor change within±30%;	通过额定电流，40±2℃，90~95%RH 下放置 500 小时后，置于室温下 24 小时后测试。 At 40±2℃,90~95%RH,load rated current for 500H,Measured at room amibient after 24H.
Resistance to solder heat 耐焊性	1、焊接过程中器件无破损。 No damage such as cracks should be caused in chip element. 2、至少有 75%的端电极被焊锡覆盖。 More than 75% of terminal electrode shall be covered with mew solder. 3、阻抗变化在±30%内，电感量变化在±10%内，Q 值变化在±30%内。 Impedance change within±30%;Inductance change within±10%;Quality factor change within±30%;	预热温度（Preheat temperature）：100~150℃ 预热时间（Preheat time）：60sec 焊接温度（Solder temperature）：260±10℃ 浸焊时间（Dipping time）：10±0.5sec
Solder ability 可焊性	1、至少有 75%的端电极被焊锡覆盖。 More than 75% of terminal electrode shall be covered with mew solder. 2、阻抗变化在±30%内，电感量变化在±10%内，Q 值变化在±30%内。 Impedance change within±30%;Inductance change within±10%;Quality factor change within±30%;	预热温度（Preheat temperature）：100~150℃ 预热时间（Preheat time）：60sec 焊接温度（Solder temperature）：260±10℃ 浸焊时间（Dipping time）：10±0.5sec

◆ Reliability testing report（2）

ITEM 项目	Requirements 要求	Test Conditions 测试条件
Reflow soldering 回流焊	1、至少有 50%的端电极被焊锡覆盖。 More than 50% of the terminal electrode shall be covered with solder.	预热温度（Preheat temperature）：50℃ 预热时间（Preheat time）：60sec 焊接温度（Solder temperature）：260℃ 浸焊时间（Dipping time）：10sec.MAX
Drop Test 跌落测试	1、无机械损伤。No mechanical damage. 2、阻抗变化在±30%内，电感量变化在±10%内，Q 值变化在±30%内。 Impedance change within±30%;Inductance change within±10%;Quality factor change within±30%;	跌落高度（Drop height）：1m 跌落面（Drop plane）：混泥土水平面
Vibration 抗震性	1、无机械损伤。No mechanical damage. 2、阻抗变化在±30%内，电感量变化在±10%内，Q 值变化在±30%内。 Impedance change within±30%;Inductance change within±10%;Quality factor change within±30%;	频率（Frequency）：10Hz~55Hz~10Hz 振幅（Amplitude）：1.52mm 方向和时间：X/Y/Z 各震动 2 小时，共计 6 小时 Direction&time：2H/axis,total 6 hour
Mechanical shock test 机械冲击测试	1、无机械损伤。No mechanical damage. 2、阻抗变化在±30%内，电感量变化在±10%内，Q 值变化在±30%内。 Impedance change within±30%;Inductance change within±10%;Quality factor change within±30%;	脉冲波形（Pulse shape）：半正弦波 half-sine Waveform 加速度（Acceleration）：100g 脉冲持续时间（Pulse Duration）：11ms 脉冲方向（Shock direction）：±X,±Y,±Z axis 脉冲次数（Shock times）：3 次/方向 3times/direction
Salt Spraying Test 盐雾测试	1、表面无氧化：No surface oxidation. 2、阻抗变化在±30%内，电感量变化在±10%内，Q 值变化在±30%内。 Impedance change within±30%;Inductance change within±10%;Quality factor change within±30%;	实验介质（Testing Medium）：5%氯化钠溶液 5% Sodium Chloride Solution 实验温度（Testing Temperature）：35±2℃ 实验持续时间（Testing Duration）：20hours