

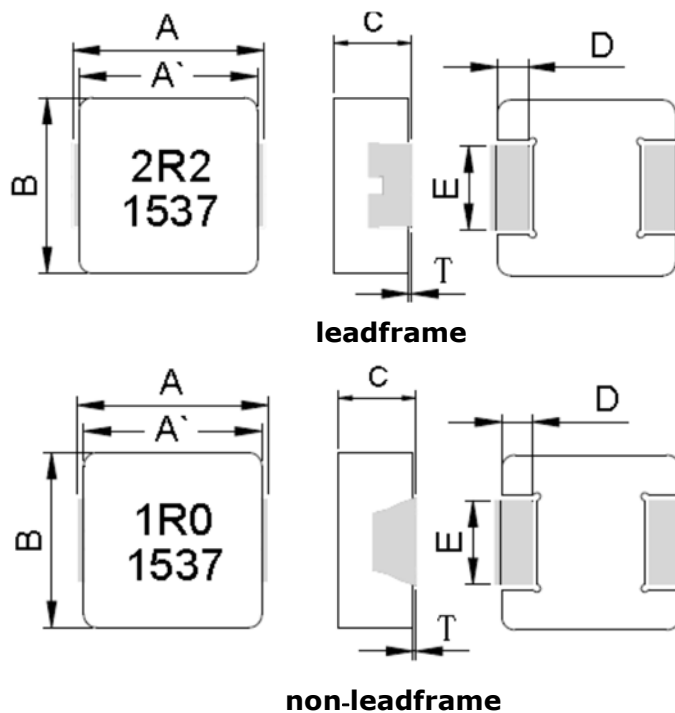
FEATRLRES

- Shielded construction.
- Capable of corresponding high frequency (5MHz).
- Low loss realized with low DCR.
- High performance (Isat) realized by metal dust core.
- Ultra low buzz noise, due to composite construction.
- 100% Lead(Pb)-Free and RoHS compliant.

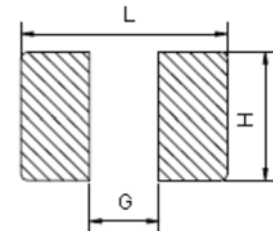
APPLICATIONS

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

CONFIGLRATIONS & DIMENSIONS (unit in mm)



Recommended Land pattern



L	G	H
12.5	5.4	3.5

Note:

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

Type	A	A'	B	C	D	T	E	Inductance
HMPL1004S	11.0±0.3	10.0±0.3	10.0±0.3	3.8±0.2	2.0±0.3	0~0.2	2.5±0.3	0.56~1.50uH among
							3.0±0.3	0.47uH and below
								2.00uH and above

ELECTRICAL CHARACTERISTICS

Part Number	Inductance L0 A(μH)±20%	Heat Rating Current		Saturation Current		DCR		Type
		DC I rms.(A)		DC I sat. (A)		(mΩ)		
		Typ	Max	Typ	Max	Typ	Max	
HMPL1004S-R15YN-D	0.15±30%	44.0	38.0	82.0	75.0	0.5	0.6	non-leadframe
HMPL1004S-R22MN-D	0.22	36.0	33.0	70.0	60.0	0.72	0.83	non-leadframe
HMPL1004S-R36MN-D	0.36	33.0	29.0	51.0	45.0	1.05	1.18	non-leadframe
HMPL1004S-R42MN-D	0.42	32.5	28.5	50.0	42.0	1.15	1.3	non-leadframe
HMPL1004S-R45MN-D	0.45	32.5	28.5	48.0	42.0	1.2	1.4	non-leadframe
HMPL1004S-R47MN-D	0.47	32.0	28.0	46.0	40.0	1.3	1.5	non-leadframe
HMPL1004S-R56MN-D	0.56	25.0	23.0	34.0	29.0	1.6	1.8	non-leadframe
HMPL1004S-R68MN-D	0.68	23.0	20.0	31.0	28.0	1.9	2.2	non-leadframe
HMPL1004S-R82MN-D	0.82	22.0	19.0	30.0	27.0	2.1	2.5	non-leadframe
HMPL1004S-R90MN-D	0.90	21.0	19.0	29.5	27.0	2.2	2.6	non-leadframe
HMPL1004S-1R0MN-D	1.00	20.0	18.0	29.0	26.0	2.9	3.25	non-leadframe
HMPL1004S-1R5MN-D	1.50	17.5	16.0	26.0	22.0	3.7	4.2	non-leadframe
HMPL1004S-1R8MN-D	1.80	16.5	15.0	23.0	20.5	5.1	5.7	leadframe
HMPL1004S-2R0MN-D	2.00	16.0	14.5	21.0	18.0	5.3	6.1	leadframe
HMPL1004S-2R2MN-D	2.20	15.0	13.0	20.0	16.0	5.8	6.7	leadframe
HMPL1004S-3R3MN-D	3.30	11.0	10.0	17.5	14.0	10.5	11.8	leadframe
HMPL1004S-4R7MN-D	4.70	8.8	8.0	15.2	13.0	15.8	19	leadframe
HMPL1004S-5R6MN-D	5.60	8.0	7.2	14.1	11.5	19	22.8	leadframe
HMPL1004S-6R8MN-D	6.80	7.8	6.8	12.2	11.0	22	24.5	leadframe
HMPL1004S-8R2MN-D	8.20	7.6	6.5	9.5	8.5	25	28	leadframe
HMPL1004S-100MN-D	10.0	7.5	6.1	8.6	7.5	27	30	leadframe
HMPL1004S-150MN-D	15.0	6.25	5.0	7.0	6.0	41	45	leadframe
HMPL1004S-220MN-D	22.0	5.0	4.1	6.2	5.5	58	66	leadframe
HMPL1004S-330MN-D	33.0	4.4	3.5	5.5	5.0	84	91	leadframe
HMPL1004S-470MN-D	47.0	3.5	3.0	4.0	3.7	125	143	leadframe
HMPL1004S-680MN-D	68.0	2.6	2.4	3.2	3.0	184	210	leadframe
HMPL1004S-820MN-D	82.0	2.3	2.1	3.0	2.8	240	270	leadframe
HMPL1004S-101MN-D	100	2.0	1.8	2.7	2.4	270	310	leadframe

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 LO to drop approximately 20%.

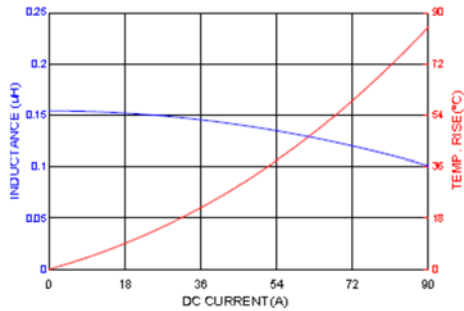
6.The part temperature (ambient + temp rise) should not exceed 125℃under worst case operating conditions.Circuit design,component,PCB trace size and thickness,airflow and other cooling provisions all affect the part temperature. Part

temperature should be verified in the end application.

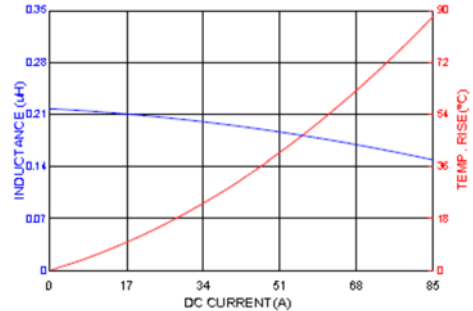
7.Special inquiries besides the above common used types can be met on your requirement.

TYPICALELECTRICALCHARACTERISTICS:

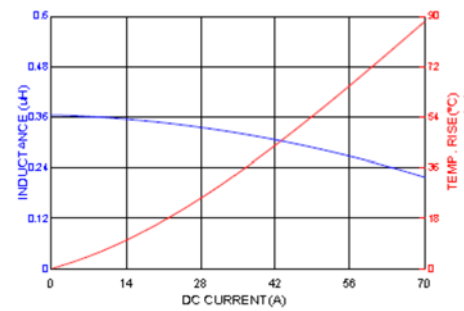
HMPL1004S-R15



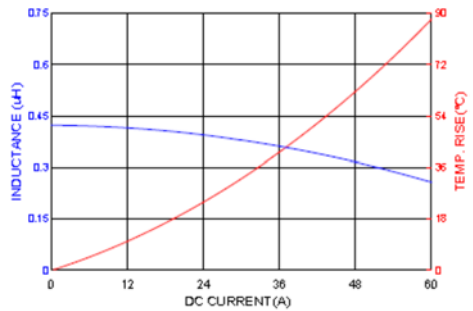
HMPL1004S-R22



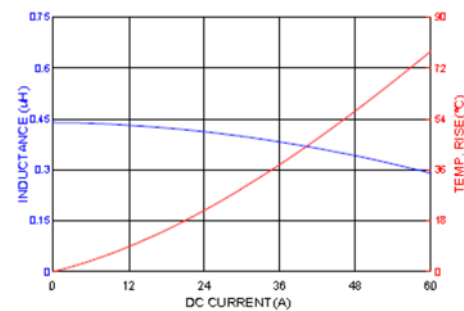
HMPL1004S-R36



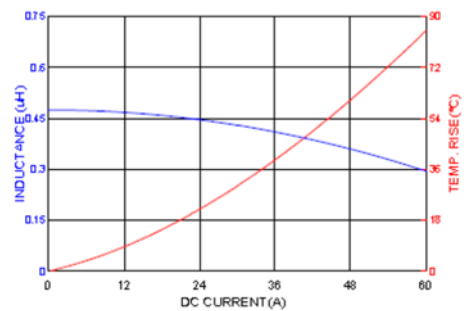
HMPL1004S-R42



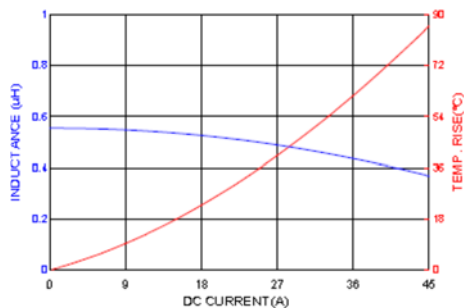
HMPL1004S-R45



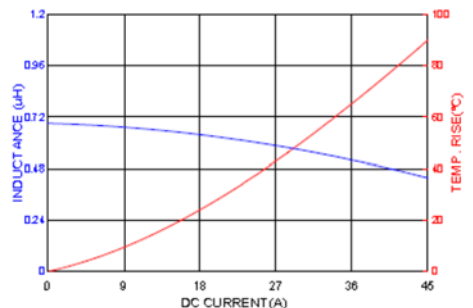
HMPL1004S-R47

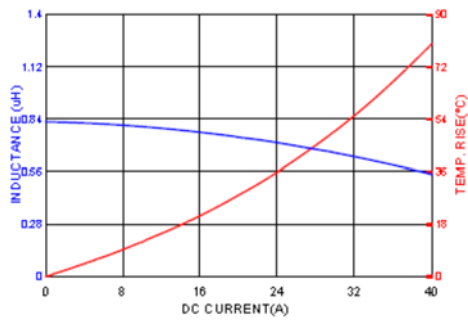
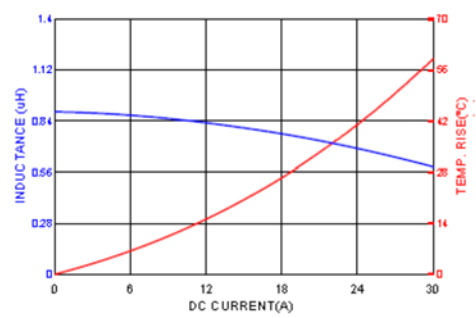
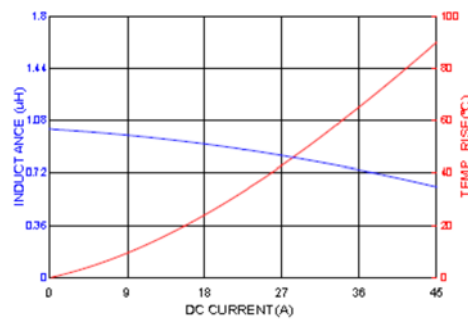
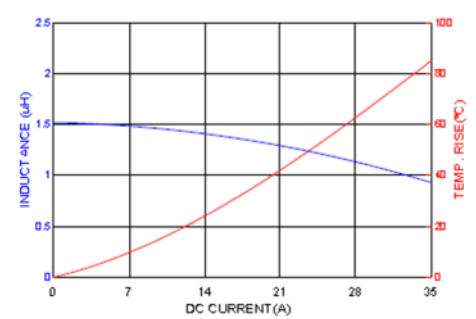
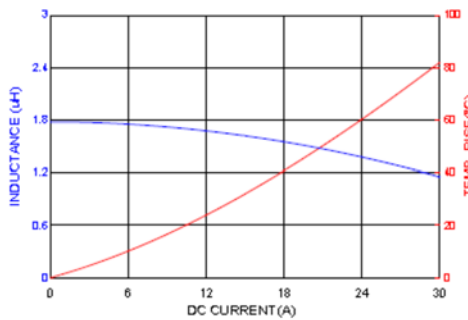
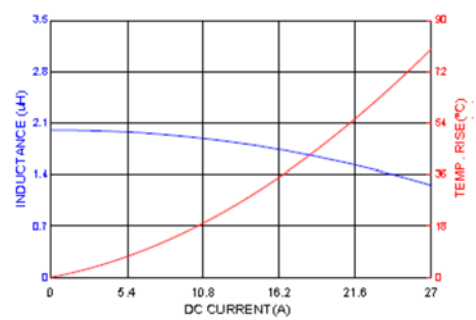
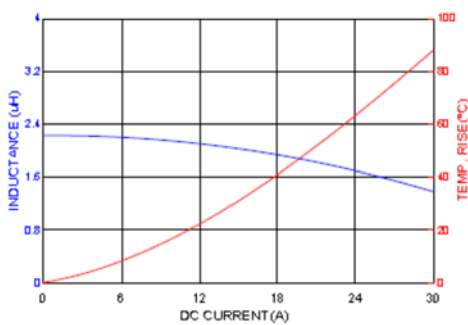
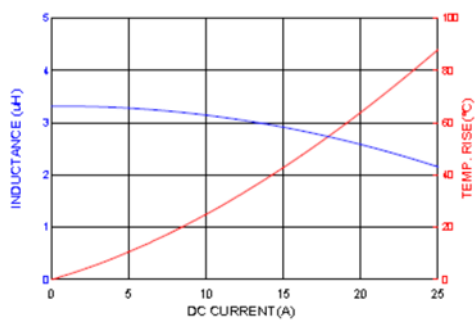


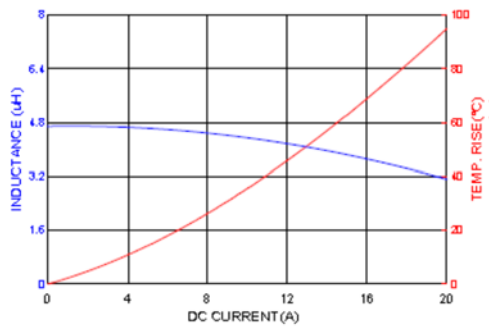
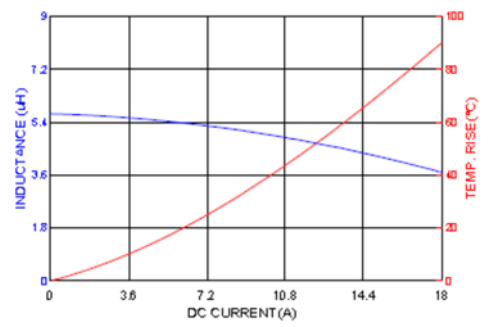
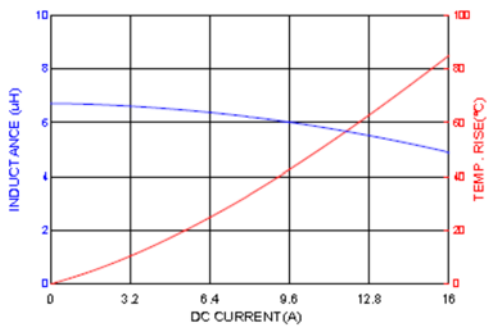
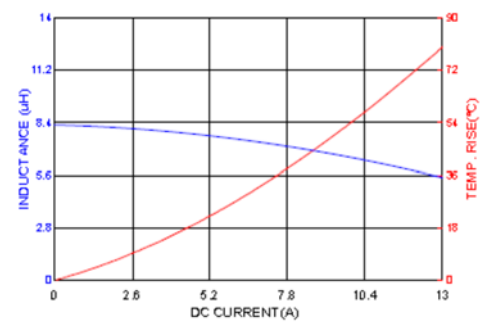
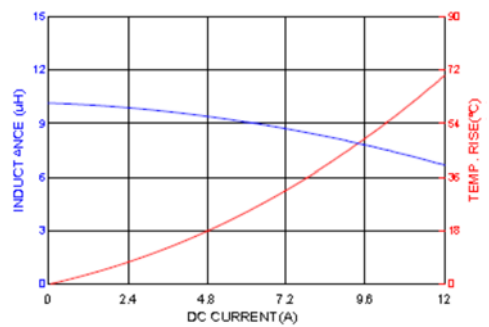
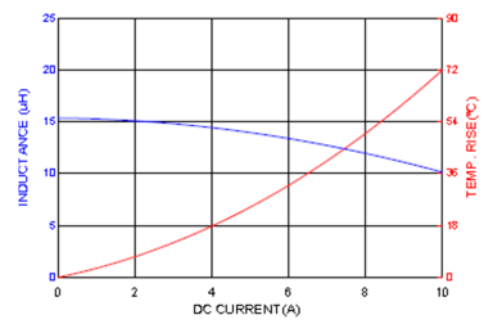
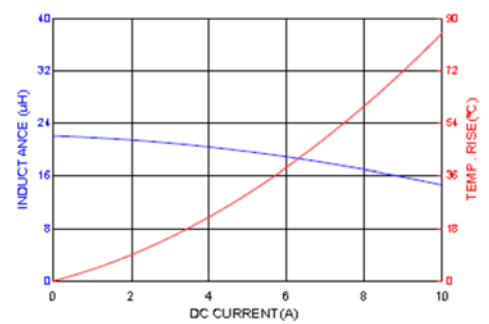
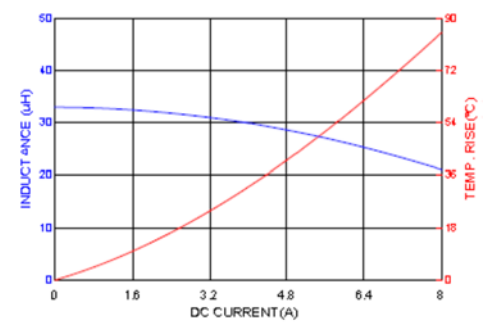
HMPL1004S-R56

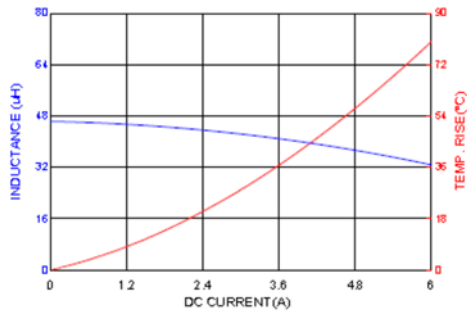
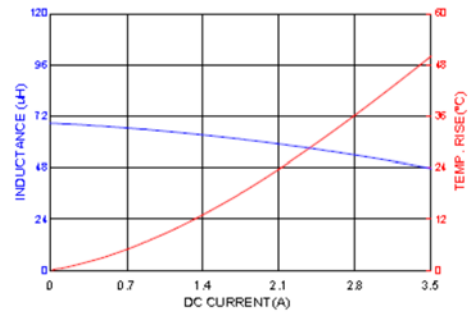
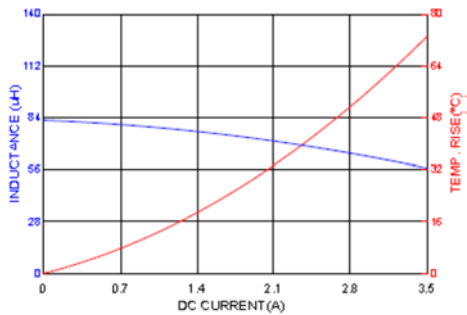
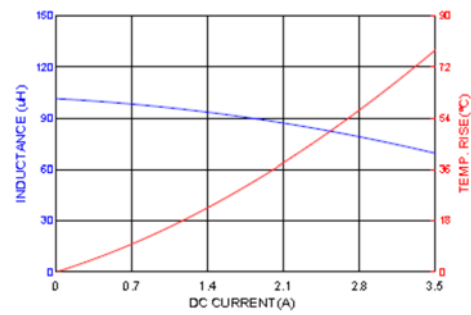


HMPL1004S-R68



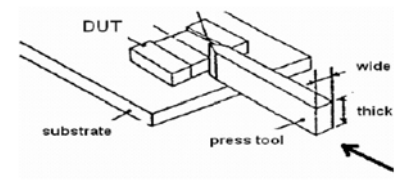
HMPL1004S-R82

HMPL1004S-R90

HMPL1004S-1R0

HMPL1004S-1R5

HMPL1004S-1R8

HMPL1004S-2R0

HMPL1004S-2R2

HMPL1004S-3R3


HMPL1004S-4R7

HMPL1004S-5R6

HMPL1004S-6R8

HMPL1004S-8R2

HMPL1004S-100

HMPL1004S-150M

HMPL1004S-220

HMPL1004S-330


HMPL1004S-470

HMPL1004S-680

HMPL1004S-820

HMPL1004S-101


Reliability and Test Condition

Item	Performance	Test Condition
Operating temperature	-40~+125°C (Including self - temperature rise)	
Storage temperature	1. -10~+40°C, 50~60%RH (Product with taping) 2. -40~+125°C (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 $\Delta L30\%$	Saturation DC Current (Isat) will cause L0 to drop $\Delta L(\%)$
Heat Rated Current (Irms)	Approximately $\Delta T40^\circ\text{C}$	Heat Rated Current (Irms) will cause the coil temperature rise $\Delta T(^\circ\text{C})$. 1. Applied the allowed DC current 2. Temperature measured by digital surface thermometer
Reliability Test		
Life Test	Appearance : No damage. Inductance : within $\pm 10\%$ of initial value Q : Shall not exceed the specification value. RDC : within $\pm 15\%$ of initial value and shall not exceed the specification value	Preconditioning: Run through IR reflow for 2 times.(IPC/JEDEC J-STD-020D Classification Reflow Profiles) Temperature : $125 \pm 2^\circ\text{C}$ (Inductor) Applied current : rated current Duration : 1000 \pm 12hrs Measured at room temperature after placing for 24 \pm 2 hrs
Load Humidity		Preconditioning: Run through IR reflow for 2 times.(IPC/JEDEC J-STD-020D Classification Reflow Profiles) Humidity : $85 \pm 2\%$ R.H. Temperature : $85^\circ\text{C} \pm 2^\circ\text{C}$ Duration : 1000hrs Min. with 100% rated current Measured at room temperature after placing for 24 \pm 2 hrs

Moisture Resistance		Preconditioning: Run through IR reflow for 2 times.(IPC/JEDEC J-STD-020DClassification 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 2 times.(IPC/JEDEC J-STD-020DClassification Reflow Profiles Condition for 1 cycle Step1 : -40±2℃ 30±5min Step2 : 25±2℃ ≤0.5min Step3 : 125±2℃ 30±5min Number of cycles : 500 Measured at room temperature after placing for 24±2 hrs															
Vibration		Oscillation Frequency: 10 ~ 2K ~ 10Hz for 20 minutes Equipment : Vibration checker Total Amplitude:1.52mm±10% Testing Time : 12 hours(20 minutes, 12 cycles each of 3 orientations).															
Bending		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.															
Shock	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	<table><tr><td>Type</td><td>Peak value (g's)</td><td>Normal duration (D) (ms)</td><td>Wave form</td><td>Velocity change (Vi)ft/sec</td></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>	Type	Peak value (g's)	Normal duration (D) (ms)	Wave form	Velocity change (Vi)ft/sec	SMD	50	11	Half-sine	11.3	Lead	50	11	Half-sine	11.3
Type	Peak value (g's)	Normal duration (D) (ms)	Wave form	Velocity change (Vi)ft/sec													
SMD	50	11	Half-sine	11.3													
Lead	50	11	Half-sine	11.3													
Solder ability	More than 95% of the terminal electrode should be covered with solder.	Preheat: 150℃,60sec.. Solder: Sn96.5% Ag3% Cu0.5% Temperature: 245±5℃ ° Flux for lead free: Rosin. 9.5% ° Dip time: 4±1sec ° Depth: completely cover the termination															
Resistance to Soldering Heat		Depth: completely cover the termination <table><tr><td>Temperature(℃C)</td><td>Time(s)</td><td>Temperature ramp/immersion and emersion rate</td><td>Number of heat cycles</td></tr><tr><td>260 ±5 (solder temp)</td><td>10 ±1</td><td>25mm/s ±6 mm/s</td><td>1</td></tr></table>	Temperature(℃C)	Time(s)	Temperature ramp/immersion and emersion rate	Number of heat cycles	260 ±5 (solder temp)	10 ±1	25mm/s ±6 mm/s	1							
Temperature(℃C)	Time(s)	Temperature ramp/immersion and emersion rate	Number of heat cycles														
260 ±5 (solder temp)	10 ±1	25mm/s ±6 mm/s	1														
Terminal Strength	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	Preconditioning: Run through IR reflow for 2 times.(IPC/JEDEC J-STD-020DClassification Reflow Profiles With the component mounted on a PCB with the device to be tested, apply a force(>0805:1kg , <=0805:0.5kg)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. 															

Note : When there are questions concerning measurement result : measurement shall be made after 48 ± 2 hours of recovery under the standard condition.