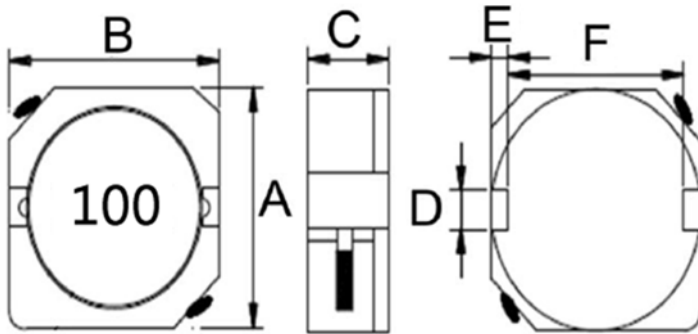


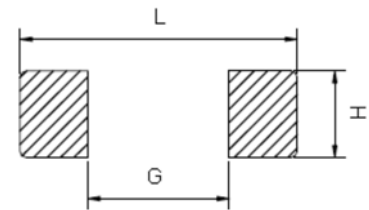
## FEATRLRES

- Low profile very effective in space-conscious applications.
- Low resistance and high energy storage.
- 100% Lead(Pb) & Halogen-Free and RoHS compliant.

## CONFIGLRATIONS & DIMENSIONS ( unit in mm )



### Recommended Land pattern



Size	A	B	C	D	E	F
HSBR104R	10.2±0.3	10.0±0.3	3.8±0.2	3.0±0.1	1.2±0.15	7.7±0.3

L	G	H
10.5	7.3	3.2

## ELECTRICAL CHARACTERISTICS

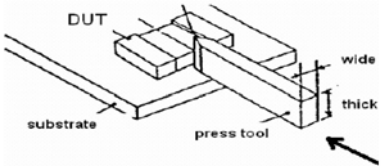
Part Number	Inductance (uH)	Test Frequency (Hz)	DCR (Ω) max.	I sat (A) max.	I rms (A) typ.
HSBR104R-1R5Y	1.5±30%	0.1V/100K	0.0081	10.0	6.50
HSBR104R-2R5Y	2.5±30%	0.1V/100K	0.0105	7.50	6.10
HSBR104R-3R8Y	3.8±30%	0.1V/100K	0.013	6.00	5.50
HSBR104R-5R2Y	5.2±30%	0.1V/100K	0.022	5.50	5.40
HSBR104R-6R8Y	6.8±30%	0.1V/100K	0.027	4.80	4.50
HSBR104R-7R0Y	7.0±30%	0.1V/100K	0.027	4.80	4.50
HSBR104R-100M	10±20%	0.1V/100K	0.035	4.40	3.80
HSBR104R-150M	15±20%	0.1V/100K	0.050	3.60	3.10
HSBR104R-220M	22±20%	0.1V/100K	0.073	2.90	2.50
HSBR104R-330M	33±20%	0.1V/100K	0.093	2.30	2.20
HSBR104R-470M	47±20%	0.1V/100K	0.155	2.10	1.90
HSBR104R-680M	68±20%	0.1V/100K	0.213	1.50	1.42
HSBR104R-101M	100±20%	0.1V/100K	0.304	1.35	1.25
HSBR104R-151M	150±20%	0.1V/100K	0.506	1.15	0.82
HSBR104R-221M	220±20%	0.1V/100K	0.756	0.92	0.70
HSBR104R-331M	330±20%	0.1V/100K	1.090	0.70	0.52

Note:

Based on inductance change ( $\Delta L/L_0 : \leq -35\%$ ) @ ambient temp. 25°C Based on temperature rise ( $\Delta T : 40^\circ\text{C}$  typ.)

## 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)	
<b>Electrical Performance Test</b>		
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
<b>Reliability Test</b>		
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-020DClassification Reflow Profiles) Temperature : 125 $\pm 2^\circ\text{C}$ (Inductor) Applied current : rated current Duration : 1000 $\pm 12$ hrs 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-020DClassification Reflow Profiles) Humidity : 85 $\pm 2 \times$ 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 $^\circ\text{C}$ for 25hrs, measured at room temperature after placing for 4 hrs. 2. Raise temperature to 65 $\pm 2^\circ\text{C}$ 90-100%RH in 2.5hrs, and keep 3 hours, cool down to 25 $^\circ\text{C}$ in 2.5hrs. 3. Raise temperature to 65 $\pm 2^\circ\text{C}$ 90-100%RH in 2.5hrs, and keep 3 hours, cool down to 25 $^\circ\text{C}$ in 2.5hrs,keep at 25 $^\circ\text{C}$ for 2 hrs then keep at -10 $^\circ\text{C}$ for 3 hrs 4. Keep at 25 $^\circ\text{C}$ 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 $\pm 2^\circ\text{C}$ 30 $\pm 5$ min Step2 : 25 $\pm 2^\circ\text{C}$ $\leq 0.5$ min Step3 : 125 $\pm 2^\circ\text{C}$ 30 $\pm 5$ min Number of cycles : 500 Measured at room temperature after placing for 24 $\pm 2$ hrs
Vibration		Oscillation Frequency: 10 ~ 2K ~ 10Hz for 20 minutes Equipment : Vibration checker Total Amplitude:1.52mm $\pm 10\%$ Testing Time : 12 hours(20 minutes, 12 cycles each of 3 orientations).
Bending		Shall be mounted on a FR4 substrate of the following dimensions: $\geq 0805$ inch(2012mm):40x100x1.2mm $< 0805$ inch(2012mm):40x100x0.8mm Bending depth: $\geq 0805$ inch(2012mm):1.2mm $< 0805$ inch(2012mm):0.8mm duration of 10 sec.
		Appearance : No damage.

Shock	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 border="1"> <thead> <tr> <th>Type</th> <th>Peak value (g's)</th> <th>Normal duration (D) (ms)</th> <th>Wave form</th> <th>Velocity change (Vi)ft/sec</th> </tr> </thead> <tbody> <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> </tbody> </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°C,60sec. Solder: Sn96.5% Ag3% Cu0.5% Temperature: 245±5°C Flux for lead free: Rosin. 9.5% Dip time: 4±1sec Depth: completely cover the termination Depth: completely cover the termination															
Resistance to Soldering Heat		<table border="1"> <thead> <tr> <th>Temperature(°C)</th> <th>Time(s)</th> <th>Temperature ramp/immersion and emersion rate</th> <th>Number of heat cycles</th> </tr> </thead> <tbody> <tr> <td>260 ±5 (solder temp)</td> <td>10 ±1</td> <td>25mm/s ±6 mm/s</td> <td>1</td> </tr> </tbody> </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-020Classification 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.