

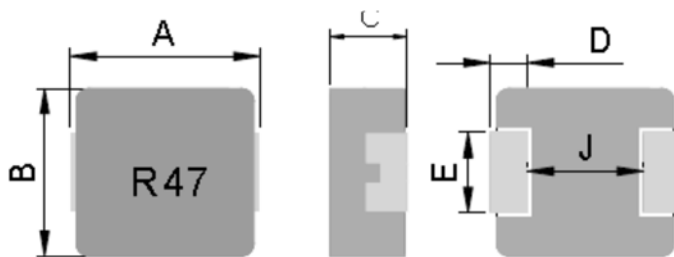
## FEATRLRES

- Carbonyl Powder.
- Compact design.
- High current · low DCR · high efficiency.
- Very low acoustic noise and very low leakage flux noise.
- High reliability.
- 100% Lead(Pb)-Free and RoHS compliant.

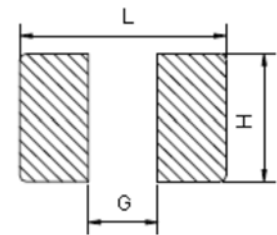
## APPLICATIONS

- Note PC power system , incl. IMVP-6
- DC/DC converter .

## CONFIGLRATIONS & DIMENSIONS ( unit in mm )



### Recommended Land pattern



Type	A	B	C	D	E	J	L	G	H
HMPL415HP	4.45±0.25	4.06±0.25	1.3±0.2	0.76±0.3	2.0±0.2	2.8±0.3	5.2	2.2	2.3

Note:

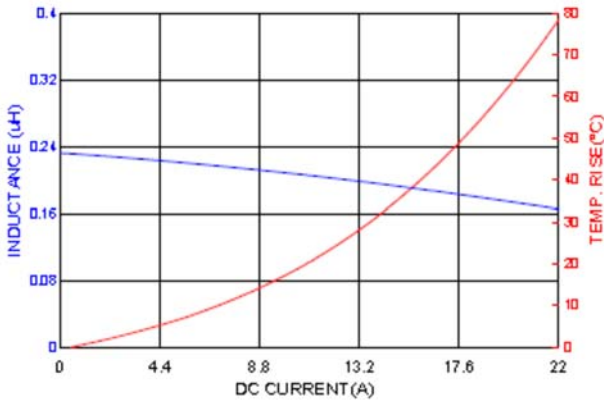
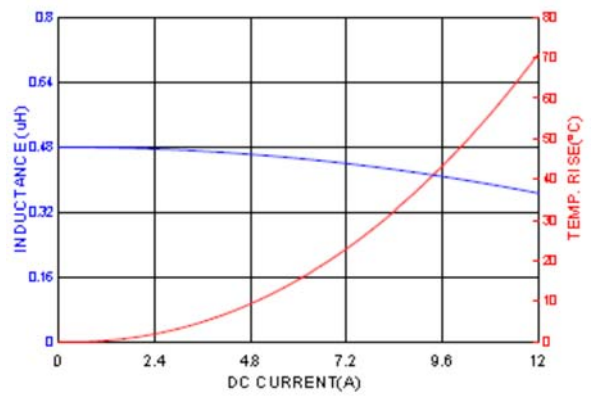
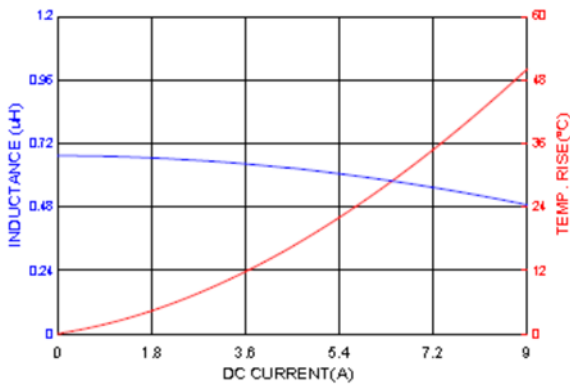
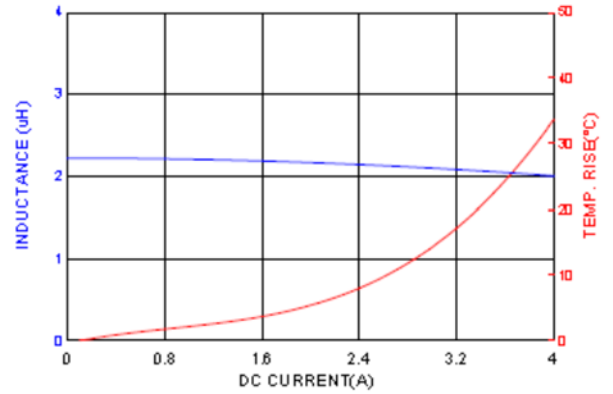
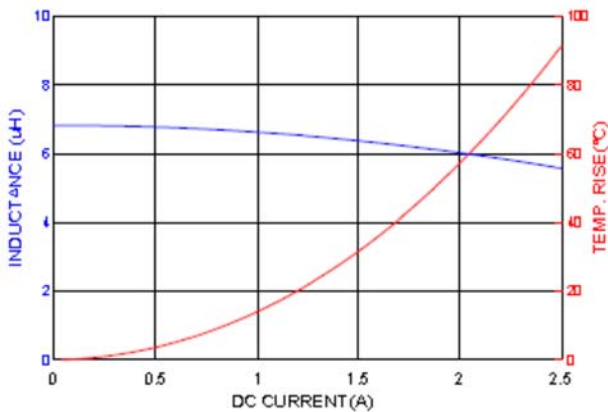
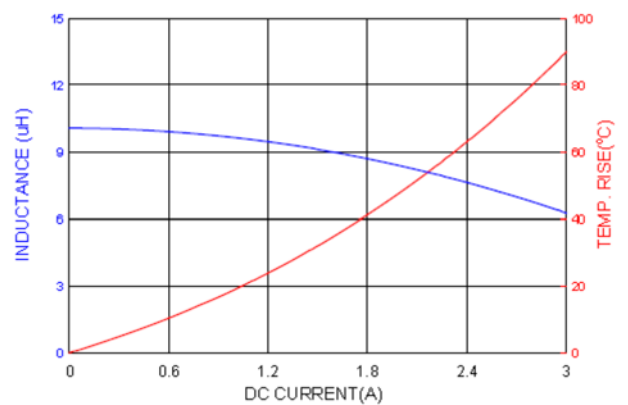
1. The above PCB layout reference only.
2. Recommend solder paste thickness at 0.12mm and above.

## ELECTRICAL CHARACTERISTICS

Part Number	Inductance L0	I rms (A) Typ.	I sat (A) Typ.	DCR(mΩ)	DCR(mΩ)
	(uH)±20% @ 0 A			Typ.@25°C	Max.@25°C
HMPL415HP-R22MG-Z02	0.22	10	20	6.5	7.8
HMPL415HP-R47MG-Z02	0.47	8	11	15	19
HMPL415HP-R68MG-Z02	0.68	6.5	8.5	19	21.5
HMPL415HP-2R2MG-Z02	2.20	3.2	4	63	72
HMPL415HP-6R8MG-Z02	6.80	1.7	2.3	230	276
HMPL415HP-100MG-Z02	10.0	1.5	1.9	345	400

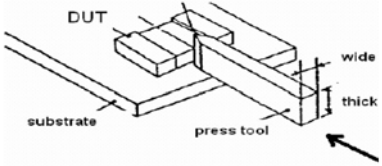
Note:

- 1.Test frequency : Ls : 100KHz /1.0V.
- 2.All test data referenced to 25°C 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  $\Delta T$  of 40°C
- 5.Saturation Current (Isat) will cause L0 to drop approximately 20%.
- 6.The part temperature (ambient + temp rise) should not exceed 125°C 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:**
**HMPL415HP-R22**

**HMPL415HP-R47**

**HMPL415HP-R68**

**HMPL415HP-2R2**

**HMPL415HP-6R8**

**HMPL415HP-100**


## 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-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 : $85 \pm 2 \times \text{R.H.}$ , 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-020D Classification Reflow Profiles) 1. Baked at $50^\circ\text{C}$ 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-020D Classification Reflow Profiles) Condition for 1 cycle Step1 : $-40 \pm 2^\circ\text{C}$ 30 $\pm$ 5min Step2 : $25 \pm 2^\circ\text{C}$ $\leq 0.5$ min Step3 : $125 \pm 2^\circ\text{C}$ 30 $\pm$ 5min 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: $1.52\text{mm} \pm 10\%$ Testing Time : 12 hours(20 minutes, 12 cycles each of 3 orientations).															
Bending		Shall be mounted on a FR4 substrate of the following dimensions: $\geq 0.805$ inch(2012mm):40x100x1.2mm $< 0.805$ inch(2012mm):40x100x0.8mm Bending depth: $\geq 0.805$ inch(2012mm):1.2mm $< 0.805$ inch(2012mm):0.8mm duration of 10 sec.															
Shock		Appearance : No damage. Impedance : within $\pm 15\%$ of initial value 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															
Solder ability	More than 95% of the terminal electrode should be covered with solder.	Preheat: $150^\circ\text{C}$ , 60sec. Solder: Sn96.5% Ag3% Cu0.5% Temperature: $245 \pm 5^\circ\text{C}$ <table border="1" data-bbox="1018 1854 1455 1989"> <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
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		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
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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(>0.805:1kg , <=0.805:0.5kg)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.