

# Power Inductor SMD Low Profile, High Current AEC-Q200

PIW08-BM63

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## FEATURE

- Magnetic Shield Construction for Power Circuit.
- Large Current and Low DC Resistance
- Low profile power inductors
- Application: DC/DC Converter, Battery Powered Devices, Low Profile High Current Power Supply, Notebook/Server
- AEC-Q200 Compliant



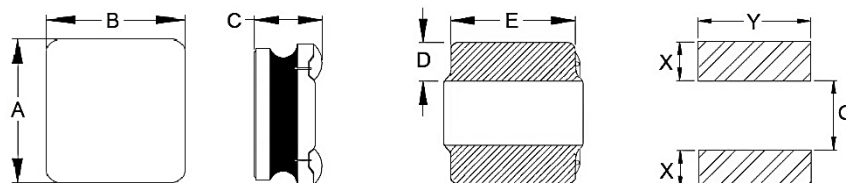
## ELECTRICAL CHARACTERISTICS

Part Number	Inductance (μH)	Tolerance (%)	Test Freq. (Hz)	I <sub>RMS</sub> (A)		I <sub>SAT</sub> (A)		DCR (mΩ)	
				Typ.	Max.	Typ.	Max.	Typ.	Max.
PIW08R24MBM63	0.24	±20	1V/1M	5.60	5.10	9.50	8.50	23	27.6
PIW08R33MBM63	0.33	±20	1V/1M	5.30	4.80	8.40	7.60	29	34.8
PIW08R47MBM63	0.47	±20	1V/1M	4.60	4.20	7.00	6.30	32	38.4
PIW08R68MBM63	0.68	±20	1V/1M	4.00	3.60	6.00	5.40	46	55.2
PIW081R0MBM63	1.00	±20	1V/1M	3.40	3.10	5.00	4.50	66	79.2
PIW081R5MBM63	1.50	±20	1V/1M	2.90	2.50	3.80	3.50	85	102
PIW082R2MBM63	2.20	±20	1V/1M	2.50	2.20	3.00	2.50	125	150
PIW083R3MBM63	3.30	±20	1V/1M	2.00	1.80	2.50	2.10	195	234
PIW084R7MBM63	4.70	±20	1V/1M	1.70	1.50	2.20	1.90	260	312

Notes:

1. All test data referenced to 25°C ambient.
2. Saturation Current (Isat) based on inductance drop ( $\Delta L/L_0 \leq 30\%$ ) approximately
3. Heat Rated Current (I<sub>rms</sub>) based on temperature rise ( $\Delta T: 40^\circ\text{C}$ ) approximately
4. Operating Temperature: -55°C ~ +125°C (Including Self-temperature rise)

## DIMENSIONS



Part Number	A	B	C Max	D	E	X	Y	G
PIW08-BM63	2.5 ±0.2	2.0 ±0.2	1.0	0.9 ±0.3	2.0 ±0.2	1.15	2.5	0.7

(Unit: mm)

## PART NUMBERING SYSTEM

**PIW** (1)   **08** (2)   **4R7M** (3)   **B** (4)   **M63** (5)

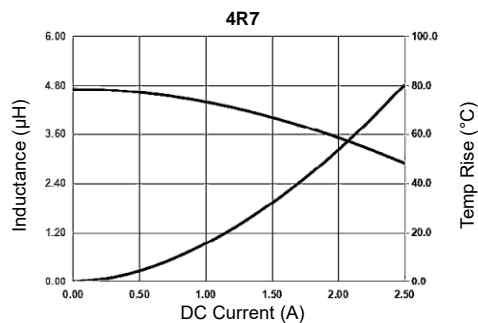
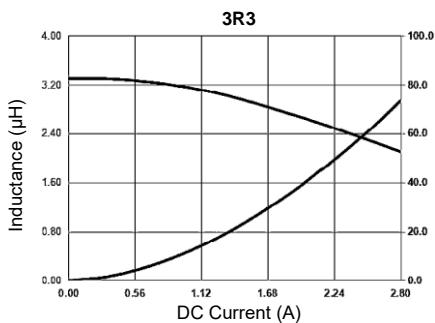
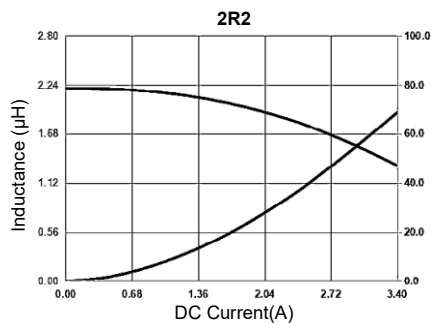
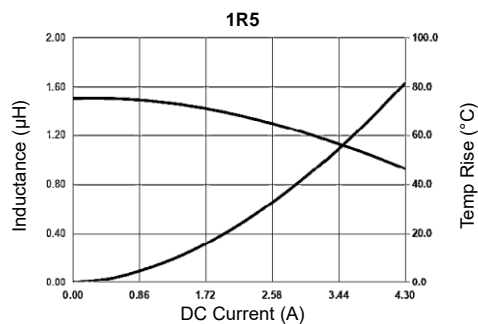
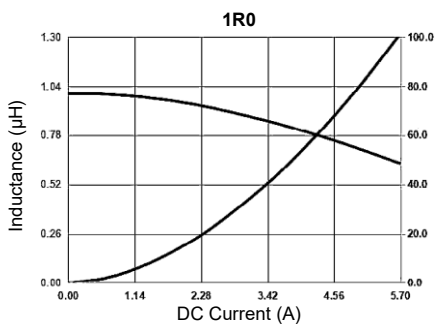
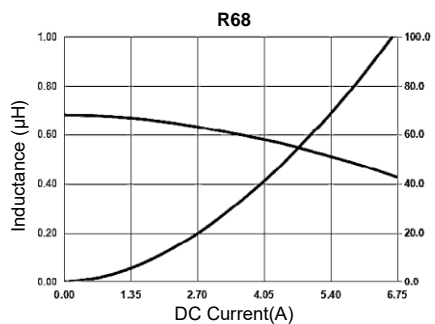
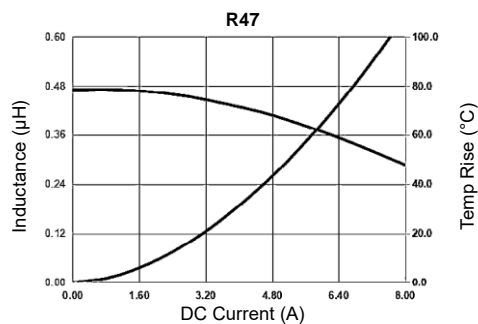
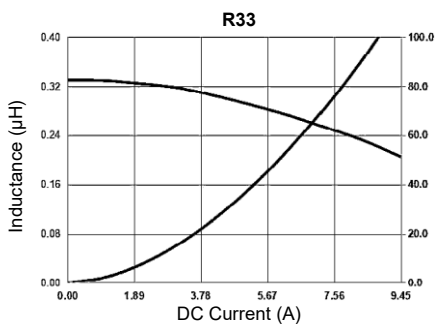
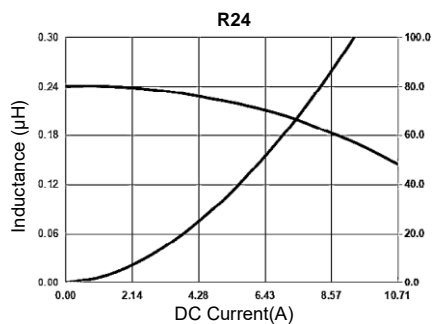
No	Item	Code	Description	
(1)	Product Code	PIW	Power Inductor Series, Wire Wound Type	
(2)	Size Code	08	1008, 2.5x2.0mm	L x W (mm)
(3)	Inductance	4R7M	4.7μH ±20% (M)	R47: 0.47μH, 2R2: 2.2μH
(4)	Internal Code	B	1.0mm Height	A: 0.8mm, C: 1.2mm, D: 1.5mm
(5)	Series Code	M63	Surface Mount Shielded, Low Profile, High Current series, AEC-Q200 Compliant	

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## CHARACTERISTIC CURVES- PIW08-BM63

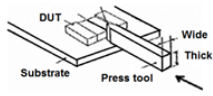
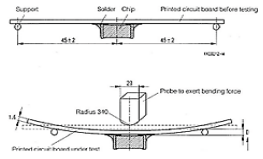


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## RELIABILITY TEST CONDITON AND REQUIREMENT

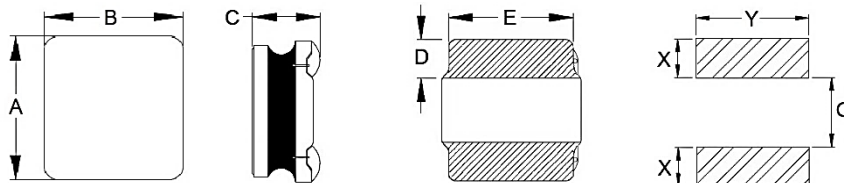
Item	Test Standards / Conditions / Equipment	Requirement															
Inductance	HP4284A, CH11025, CH3302, CH1320, CH1320S, LCR Meter	Refer to specification															
DC Resistance	CH16502, Agilent33420A Micro-Ohm Meter	Refer to specification															
Mechanical Shock	<table border="1"> <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>100</td> <td>6</td> <td>Half-sine</td> <td>12.3</td> </tr> <tr> <td>Lead</td> <td>100</td> <td>6</td> <td>Half-sine</td> <td>12.3</td> </tr> </tbody> </table> <p>3 shocks in each direction along 3 perpendicular axes (18 shocks).</p>	Type	Peak value (g's)	Normal duration (D) (ms)	Wave form	Velocity change (Vi) ft/sec	SMD	100	6	Half-sine	12.3	Lead	100	6	Half-sine	12.3	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
	Type	Peak value (g's)	Normal duration (D) (ms)	Wave form	Velocity change (Vi) ft/sec												
SMD	100	6	Half-sine	12.3													
Lead	100	6	Half-sine	12.3													
Solderability	Method B1, 4 Hrs at 155°C dry heat at 255°C $\pm 5^\circ\text{C}$ Test Time: 5 +0/-0.5 seconds. Method D category 3. (steam aging 8 hours $\pm 15\text{min}$ ) at 260°C $\pm 5^\circ\text{C}$ Test Time: 30+0/-0.5 seconds.	More than 95% of the terminal electrode should be covered with solder.															
Resistance to Soldering Heat	Solder temperature: 260 $\pm 5^\circ\text{C}$ for 10 seconds Temperature ramp/immersion and emersion rate 25mm/s $\pm 6$ mm/s. Completely cover the termination. Number of cycles: 1 heat cycle	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															
Vibration	Oscillation Frequency: 10~2K~10 Hz for 20 minutes Equipment : Vibration checker Total Amplitude: 1.52mm $\pm 10\%$ Testing Time: 12 hours (20 minutes, 12 cycles each of 3 orientations)																
High Temperature Exposure	Temperature: 125 $\pm 2^\circ\text{C}$ Duration 1000Hrs Min Measured at room temperature after placing for 24 $\pm 2$ hrs	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															
Biased Humidity	Humidity: 85 $\pm 3\%$ R.H. Temperature: 85°C $\pm 2^\circ\text{C}$ Duration: 1000Hrs Min Measured at Room Temperature after placing for 24 $\pm 2$ hrs																
High Temperature Operational Life	Temperature: 125 $\pm 2^\circ\text{C}$ Duration: 1000Hrs Min. with 100% rated current Measured at Room Temperature after placing for 24 $\pm 2$ Hrs																
Temperature Cycling	Condition for 1 cycle <table border="1"> <thead> <tr> <th>Step</th> <th>1</th> <th>2</th> <th>3</th> <th>4</th> </tr> </thead> <tbody> <tr> <td>Temperature</td> <td>-55 <math>\pm 2^\circ\text{C}</math></td> <td>125 <math>\pm 2^\circ\text{C}</math></td> <td>125 <math>\pm 2^\circ\text{C}</math></td> <td>Low Temp</td> </tr> <tr> <td>Duration</td> <td>30min Min</td> <td>1 min Max</td> <td>30 min Min</td> <td>1 min Max</td> </tr> </tbody> </table> Number of Cycle: 1000 Measured at room temperature after placing for 24 $\pm 2$ hrs	Step	1	2	3	4	Temperature	-55 $\pm 2^\circ\text{C}$	125 $\pm 2^\circ\text{C}$	125 $\pm 2^\circ\text{C}$	Low Temp	Duration	30min Min	1 min Max	30 min Min	1 min Max	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
	Step	1	2	3	4												
Temperature	-55 $\pm 2^\circ\text{C}$	125 $\pm 2^\circ\text{C}$	125 $\pm 2^\circ\text{C}$	Low Temp													
Duration	30min Min	1 min Max	30 min Min	1 min Max													
Thermal Shock	Condition for 1 cycle <table border="1"> <thead> <tr> <th>Step</th> <th>1</th> <th>2</th> <th>3</th> </tr> </thead> <tbody> <tr> <td>Temperature</td> <td>-55 <math>\pm 2^\circ\text{C}</math></td> <td>125 <math>\pm 2^\circ\text{C}</math></td> <td>125 <math>\pm 2^\circ\text{C}</math></td> </tr> <tr> <td>Duration</td> <td>15<math>\pm 1</math>min</td> <td>20sec</td> <td>15<math>\pm 1</math>min</td> </tr> </tbody> </table> Number of cycles : 300 Measured at room temperature after placing for 24 $\pm 2$ hrs.	Step	1	2	3	Temperature	-55 $\pm 2^\circ\text{C}$	125 $\pm 2^\circ\text{C}$	125 $\pm 2^\circ\text{C}$	Duration	15 $\pm 1$ min	20sec	15 $\pm 1$ min	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			
	Step	1	2	3													
Temperature	-55 $\pm 2^\circ\text{C}$	125 $\pm 2^\circ\text{C}$	125 $\pm 2^\circ\text{C}$														
Duration	15 $\pm 1$ min	20sec	15 $\pm 1$ min														
ESD	AEC-Q200-002 HBM ESD, Contact Discharge Level: 4KV (Level 2)	Appearance: No damage															
Resistance to Solvents	Add aqueous wash chemical - OKEM clean or equivalent.	Appearance : No damage															
Terminal Strength	Component mounted on a PCB apply a force 1.8kg 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 shock the component being tested. 	Appearance : No damage															
Board Flex	Place the 100x40mm FR4 board into a fixture with the component facing down. Apply a force which will bend the board (D) x = 2mm minimum. Duration: 60 (+5) seconds. The Force is to be applied only once to the board 	Appearance : No damage															
Flammability	Electrical Test not Required	V-0 or V-1 are acceptable.															

**Power Inductor**  
**SMD Low Profile, High Current**  
**AEC-Q200**

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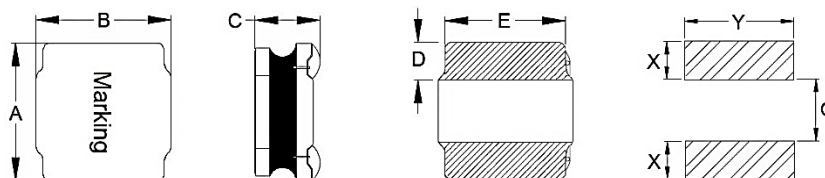
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**DIMENSIONS**



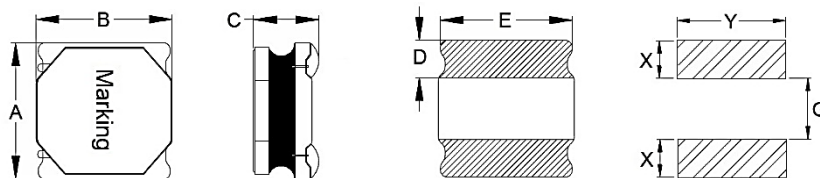
(Unit: mm)

Part Number	A	B	C Max	D	E	X	Y	G
PIW06-BM63	2.0 ±0.2	1.6 ±0.2	1.0	0.7 ±0.3	1.6 ±0.2	1.0	2.0	0.5
PIW06-CM63	2.0 ±0.2	1.6 ±0.2	1.2	0.7 ±0.3	1.6 ±0.2	1.0	2.0	0.5
PIW08-BM63	2.5 ±0.2	2.0 ±0.2	1.0	0.9 ±0.3	2.0 ±0.2	1.15	2.5	0.7
PIW08-CM63	2.5 ±0.2	2.0 ±0.2	1.2	0.9 ±0.3	2.0 ±0.2	1.15	2.5	0.7



(Unit: mm)

Part Number	A	B	C Max	D	E	X	Y	G
PIW-30CM63	3.0 ±0.2	3.0 ±0.2	1.2	0.9 ±0.3	2.7 ±0.3	1.3	3.5	0.9
PIW-30DM63	3.0 ±0.2	3.0 ±0.2	1.5	0.9 ±0.3	2.7 ±0.3	1.3	3.5	0.9



(Unit: mm)

Part Number	A	B	C Max	D	E	X	Y	G
PIW-40EM63	4.0 ±0.2	4.0 ±0.2	2.0	1.1 ±0.3	3.5 ±0.3	1.5	4.5	1.5

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## RECOMMENDED SOLDERING PROFILES

Reflow Condition		
Pre Heat	Temp. Min $T_{s(min)}$	150°C
	Temp. Max $T_{s(max)}$	200°C
	Time (min. to max.) ( $t_s$ )	60 ~ 120 seconds
Average ramp up rate (Liquidus Temperature) ( $T_L$ ) to peak		3°C/second max
$T_{s(max)}$ to $T_L$ (Ramp-up rate)		3°C/second max
Reflow	Temp. ( $T_L$ )	217°C
	Time (min. to max.) ( $t_L$ )	60 ~ 150 seconds
Peak Temperature ( $T_P$ )		See table below
Time within 5°C of actual peak Temperature ( $t_p$ )		10 seconds max
Ramp-down Rate		6°C/second max
Reflow Times		3 times max

Peak Temperature ( $T_P$ )			
Volume	< 350mm <sup>3</sup>	350-2000mm <sup>3</sup>	> 2000mm <sup>3</sup>
Thickness < 1.6mm	260°C	260°C	260°C
Thickness 1.6-2.5mm	260°C	250°C	245°C
Thickness ≥ 2.5mm	250°C	245°C	245°C

\*Specifications subject to change without notice

