

Power Inductor

SMD Low Profile, High Current

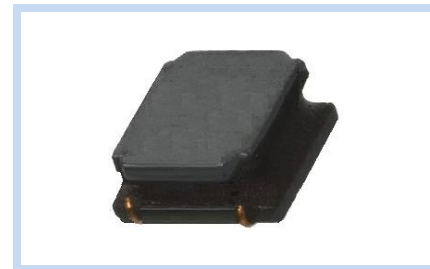
AEC-Q200

PIW-40EM63

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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



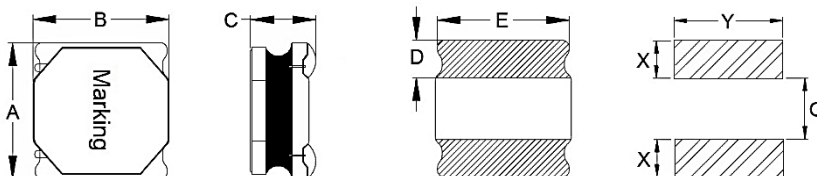
ELECTRICAL CHARACTERISTICS

Part Number	Inductance (μH)	Tolerance (%)	Test Freq. (Hz)	I _{RMS} (A)		I _{SAT} (A)		DCR (mΩ)	
				Typ.	Max.	Typ.	Max.	Typ.	Max.
PIWR22M40EM63	0.22	±20	1V/1M	9.50	8.20	23.0	19.0	9.5	10.9
PIWR47M40EM63	0.47	±20	1V/1M	8.00	7.00	16.0	14.0	14.0	16.1
PIWR60M40EM63	0.60	±20	1V/1M	7.50	6.50	13.0	10.0	17.1	19.0
PIWR68M40EM63	0.68	±20	1V/1M	7.40	6.40	12.0	9.00	18.0	20.7
PIW1R0M40EM63	1.00	±20	1V/1M	6.70	5.80	11.1	8.70	22.0	26.0
PIW1R5M40EM63	1.50	±20	1V/1M	6.00	5.20	10.0	8.00	30.0	36.0
PIW2R2M40EM63	2.20	±20	1V/1M	5.00	4.30	7.60	6.20	40.0	48.0
PIW3R3M40EM63	3.30	±20	1V/1M	4.00	3.50	5.90	4.80	60.0	72.0
PIW4R7M40EM63	4.70	±20	1V/1M	3.30	2.90	5.10	4.30	90.0	108
PIW6R8M40EM63	6.80	±20	1V/1M	2.80	2.40	4.60	3.70	128	154
PIW100M40EM63	10.0	±20	1V/1M	2.40	2.00	4.00	3.20	180	216

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_{rms}) 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
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

(Unit: mm)

PART NUMBERING SYSTEM

PIW 100M 40E M63
 (1) (2) (3) (4)

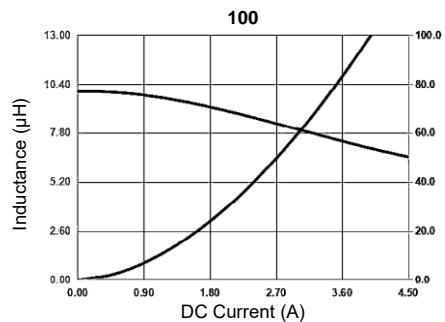
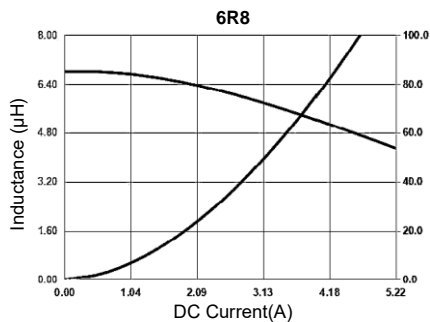
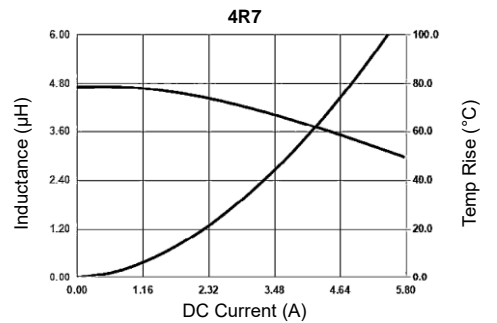
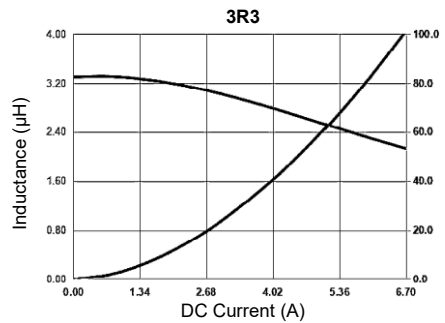
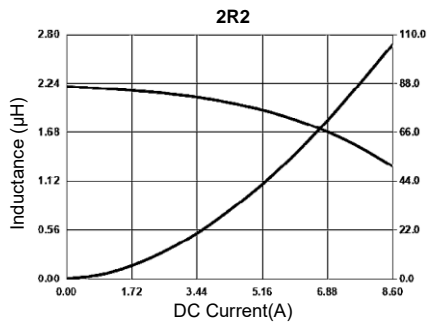
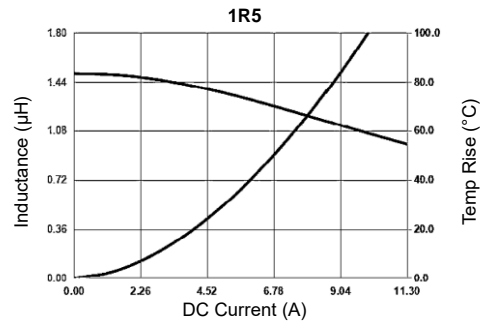
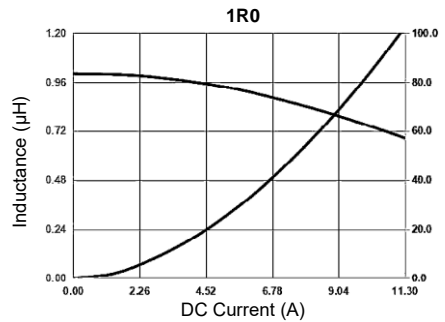
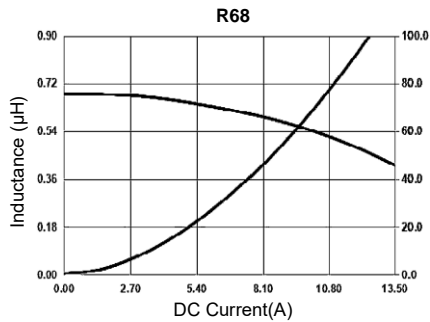
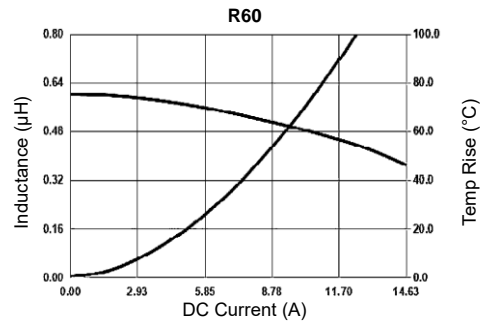
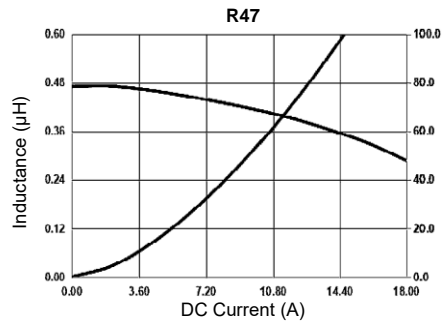
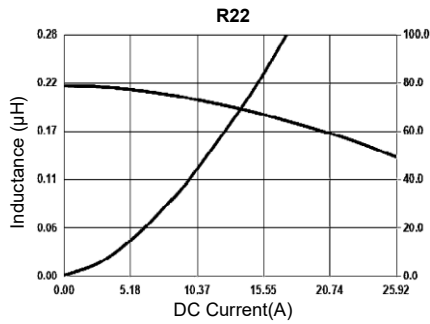
No	Item	Code	Description
(1)	Product Code	PIW	Power Inductor series, Wire Wound type
(2)	Inductance	100M	10μH ±20% (M) R47: 0.47μH, 2R2: 2.2μH
(3)	Size Code	40E	4.0x4.0x2.0mm Length x Width x Height (mm)
(4)	Series Code	R63	Surface Mount Shielded, Low Profile, High Current series, R: Internal Control Code

Power Inductor SMD Low Profile, High Current AEC-Q200

PIW-40EM63

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CHARACTERISTIC CURVES- PIW-40EM63

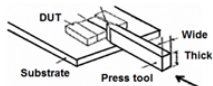
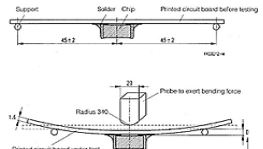


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RELIABILITY TEST CONDITON AND REQUIREMENT

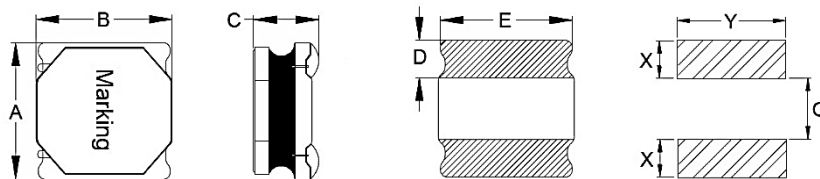
Item	Test Standards / Conditions / Equipment	Requirement															
Inductance	HP4284A, CH11025, CH3302, CH1320, CH1320S, LCR Meter	Refer to specification															
DC Resistance	CH16502, Agilent33420A Micro-Ohm Meter	Refer to specification															
Mechanical Shock	<table border="1"> <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>	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													
3 shocks in each direction along 3 perpendicular axes (18 shocks).																	
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 ± 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 ± 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 ± 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 ± 2 Hrs																
Temperature Cycling	Condition for 1 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															
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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	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															
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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 ± 1 min	20sec	15 ± 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.															

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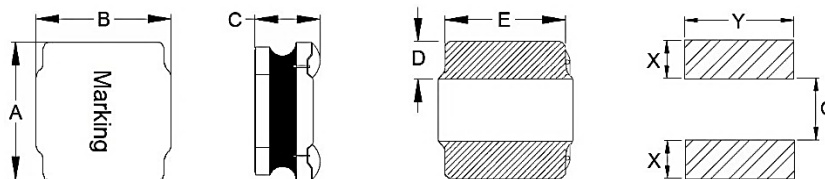
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DIMENSIONS



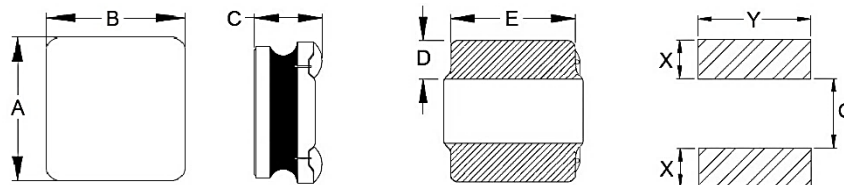
(Unit: mm)

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



(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
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

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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 ³	350-2000mm ³	> 2000mm ³
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

