Power Inductor
SMD Low Profile, High Current
AEC-Q200

PIW-5012M65

MERITEK

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**

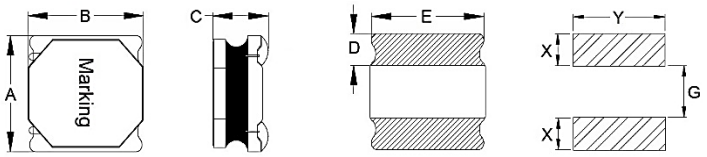
RoHS

ELECTRICAL CHARACTERISTICS

Part Number	Inductance (µH)	Tolerance (%)	Test Frequency (Hz)	DCR (mΩ)		I_{SAT} (A)		I_{RMS} (A)	
				Typ.	Max.	Typ.	Max.	Typ.	Max.
PIW1R0M5012M65	1.00	±20%	1V100K	57	68.4	4.50	4.00	4.00	3.50
PIW1R5M5012M65	1.50	±20%	1V100K	73	87.6	4.00	3.70	3.60	3.30
PIW2R2M5012M65	2.20	±20%	1V100K	88	105.6	3.40	3.20	3.30	3.00
PIW3R3M5012M65	3.30	±20%	1V100K	145	174	2.90	2.60	2.70	2.40
PIW4R7M5012M65	4.70	±20%	1V100K	180	216	2.40	2.20	2.30	2.10
PIW5R6M5012M65	5.60	±20%	1V100K	215	258	2.10	1.90	2.00	1.80
PIW6R8M5012M65	6.80	±20%	1V100K	255	306	1.85	1.73	1.80	1.70
PIW8R2M5012M65	8.20	±20%	1V100K	278	334	1.65	1.55	1.70	1.60
PIW100M5012M65	10.0	±20%	1V100K	400	480	1.45	1.37	1.50	1.40
PIW150M5012M65	15.0	±20%	1V100K	600	720	1.30	1.22	1.35	1.27

Notes:
1. All test data referenced to 25ºC ambient.
2. Saturation Current (Isat) based on inductance drop (ΔL/L0: ≦30%) approximately
3. Heat Rated Current (Irms) based on temperature rise (ΔT: 40 ºC) approximately
4. Operating Temperature: -55ºC ~ +125ºC (Including Self-temperature rise)

DIMENSIONS



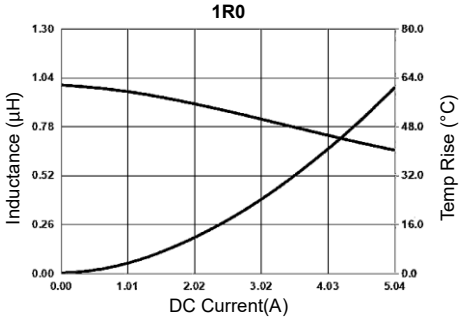
Unit: mm

Size Code	A	B	C	D	E	X	Y	G
5012	5.0 ±0.2	5.0 ±0.2	1.0 ±0.2	1.5 ±0.3	4.0 ±0.3	1.85	5.5	1.8

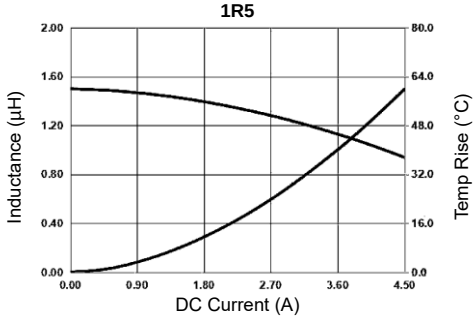
Notes: 1. The above PCB layout reference only. 2. Recommend solder paste thickness at 0.15mm and above.

CHARACTERISTIC CURVES- PIW-5012M65 series

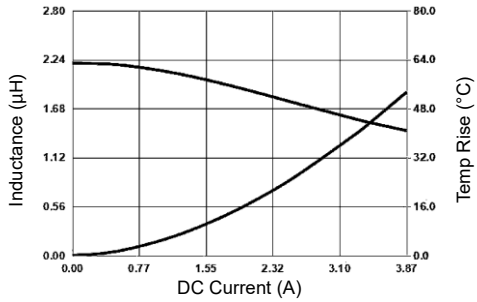
1R0



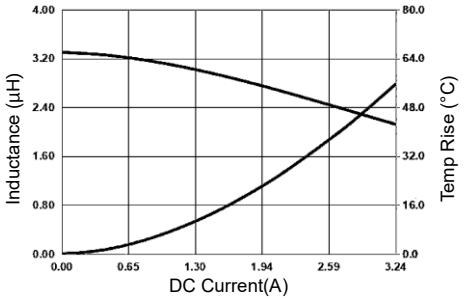
1R5



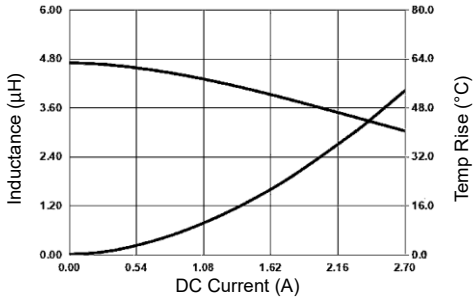
2R2



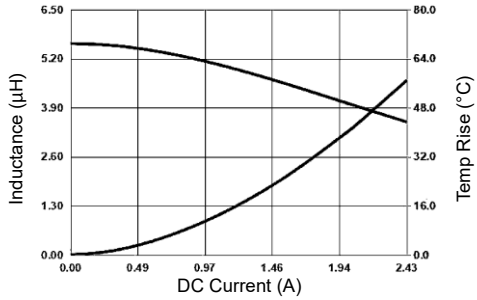
3R3



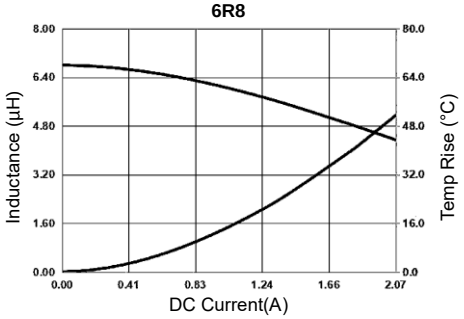
4R7



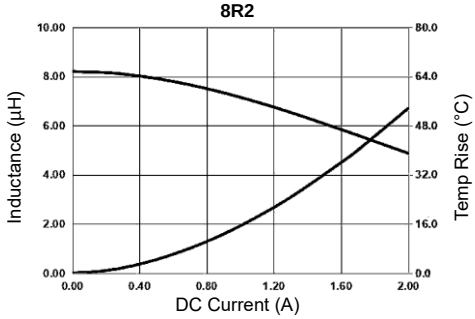
5R6



6R8



8R2



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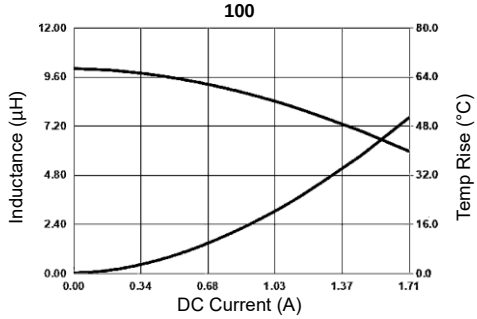

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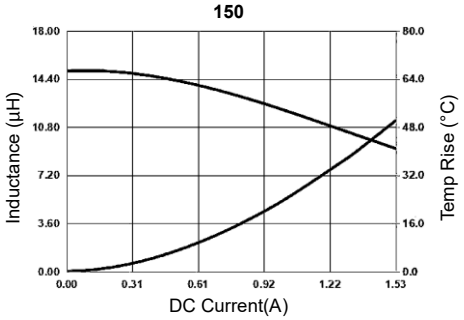
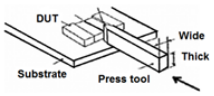
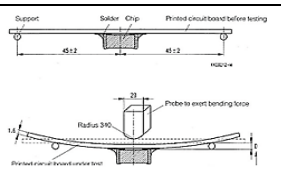


RELIABILITY TEST CONDITON AND REQUIREMENT

<table>
<tr><th>Item</th><th>Test Standards / Conditions / Equipment</th><th>Requirement</th></tr>
<tr><td>Inductance</td><td>HP4284A, CH11025, CH3302, CH1320, CH1320S, LCR Meter</td><td>Refer to specification</td></tr>
<tr><td>DC Resistance</td><td>CH16502, Agilent33420A Micro-Ohm Meter</td><td>Refer to specification</td></tr>
<tr><td>Mechanical Shock</td><td><table><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><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></table></td><td>Appearance: No damage
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</td></tr>
<tr><td>Solderability</td><td>Method B1, 4 Hrs at 155°C dry heat at 255°C±5°C
Test Time: 5 +0/-0.5 seconds.
Method D category 3. (steam aging 8 hours±15min) at 260°C±5°C
Test Time: 30+0/-0.5 seconds.</td><td>More than 95% of the terminal electrode should be covered with solder.</td></tr>
<tr><td>Resistance to Soldering Heat</td><td>Solder temperature: 260±5°C for 10 seconds
Temperature ramp/immersion and emersion rate 25mm/s ±6 mm/s.
Completely cover the termination.</td><td rowspan="2">Appearance: No damage
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</td></tr>
<tr><td>Vibration</td><td>Oscillation Frequency: 10～2K～10 Hz for 20 minutes
Equipment：Vibration checker
Total Amplitude:1.52mm ± 10%
Testing Time: 12 hours (20 minutes, 12 cycles each of 3 orientations)</td></tr>
<tr><td>High Temperature Exposure</td><td>Temperature: 125±2°C
Duration 1000Hrs Min
Measured at room temperature after placing for 24±2hrs</td><td rowspan="3">Appearance: No damage
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</td></tr>
<tr><td>Biased Humidity</td><td>Humidity: 85±3% R.H. Temperature: 85°C±2°C
Duration: 1000Hrs Min
Measured at Room Temperature after placing for 24±2hrs</td></tr>
<tr><td>High Temperature Operational Life</td><td>Temperature: 125±2°C
Duration: 1000Hrs Min. with 100% rated current
Measured at Room Temperature after placing for 24±2Hrs</td></tr>
<tr><td>Temperature Cycling</td><td>Condition for 1 cycle<table><tr><td>Step</td><td>1</td><td>2</td><td>3</td><td>4</td></tr><tr><td>Temperature</td><td>-55 ±2˚C</td><td>125 ±2˚C</td><td>125 ±2˚C</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></table>Number of Cycle: 1000
Measured at room temperature after placing for 24±2hrs</td><td>Appearance: No damage
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</td></tr>
<tr><td>Thermal Shock</td><td>Condition for 1 cycle<table><tr><td>Step</td><td>1</td><td>2</td><td>3</td></tr><tr><td>Temperature</td><td>-55 ±2˚C</td><td>125 ±2˚C</td><td>125 ±2˚C</td></tr><tr><td>Duration</td><td>15±1min</td><td>20sec</td><td>15±1min</td></tr></table>Number of cycles：300
Measured at room temperature after placing for 24±2 hrs.</td><td>Appearance: No damage
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</td></tr>
<tr><td>ESD</td><td>AEC-Q200-002 HBM ESD, Contact Discharge Level: 4KV (Level 2)</td><td>Appearance: No damage</td></tr>
<tr><td>Resistance to Solvents</td><td>Add aqueous wash chemical - OKEM clean or equivalent.</td><td>Appearance：No damage</td></tr>
<tr><td>Terminal Strength</td><td>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.
  </td><td>Appearance：No damage</td></tr>
<tr><td>Board Flex</td><td>Place the 100x40mm 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
  </td><td>Appearance：No damage</td></tr>
<tr><td>Flammability</td><td>Electrical Test not Required</td><td>V-0 or V-1 are acceptable.</td></tr>
</table>

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SMD Low Profile, High Current
AEC-Q200

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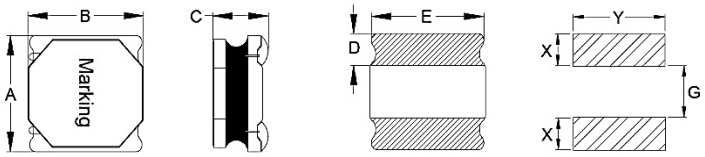
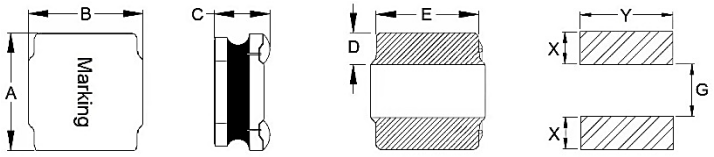
DIMENSIONS- PIW-M65 series



Unit: mm

Size Code	A	B	C	D	E	X	Y	G
3612	3.6 ±0.2	3.6 ±0.2	1.0 ±0.2	1.2 ±0.3	3.2 ±0.3	0.9	3.7	2.0
4010	4.0 ±0.2	4.0 ±0.2	0.9 ±0.1	1.2 ±0.3	3.5 ±0.3	1.5	4.5	1.5
4012	4.0 ±0.2	4.0 ±0.2	1.0 ±0.2	1.2 ±0.3	3.5 ±0.3	1.5	4.5	1.5
4018	4.0 ±0.2	4.0 ±0.2	1.6 ±0.2	1.1 ±0.2	3.5 ±0.3	1.5	4.5	1.5
4020	4.0 ±0.2	4.0 ±0.2	1.8 ±0.2	1.2 ±0.3	3.4 ±0.3	1.5	4.5	1.5
4030	4.0 ±0.2	4.0 ±0.2	3.0 Max.	1.35 ±0.3	3.4 ±0.4	1.5	3.7	1.3
5010	5.0 ±0.2	5.0 ±0.2	0.9 ±0.1	1.5 ±0.3	4.0 ±0.3	1.85	5.5	1.8
5012	5.0 ±0.2	5.0 ±0.2	1.0 ±0.2	1.5 ±0.3	4.0 ±0.3	1.85	5.5	1.8
5020	5.0 ±0.2	5.0 ±0.2	1.8 ±0.2	1.3 ±0.2	4.7 ±0.2	1.5	4.7	2.1
5030	5.0 ±0.2	5.0 ±0.2	2.8 ±0.2	1.3 ±0.2	4.7 ±0.3	1.85	5.5	1.8
5040 (≤ 10 µH)	4.95 ±0.2	4.95 ±0.2	3.9 ±0.2	1.3 ±0.2	4.2 ±0.2	1.5	4.2	2.1
5040 (> 10 µH)	4.95 ±0.2	4.95 ±0.2	3.8 ±0.2	1.3 ±0.2	4.2 ±0.2	1.5	4.2	2.1
6020	6.0 ±0.2	6.0 ±0.2	1.8 ±0.2	1.6 ±0.3	5.8 ±0.3	1.8	5.8	2.5
6028	6.0 ±0.2	6.0 ±0.2	2.6 ±0.2	1.6 ±0.3	5.8 ±0.3	1.8	5.8	2.5

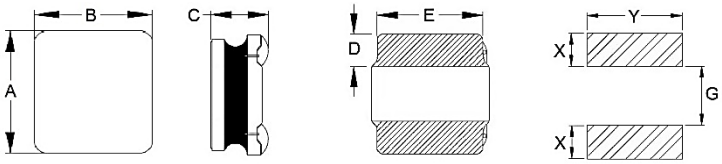
Notes: 1. The above PCB layout reference only. 2. Recommend solder paste thickness at 0.15mm and above.



Unit: mm

Size Code	A	B	C	D	E	X	Y	G
3010	3.0 ±0.2	3.0 ±0.2	0.9 ±0.1	0.9 ±0.3	2.7 ±0.3	1.25	3.5	0.9
3012	3.0 ±0.2	3.0 ±0.2	1.0 ±0.2	0.9 ±0.3	2.7 ±0.3	1.25	3.5	0.9
3015	3.0 ±0.2	3.0 ±0.2	1.3 ±0.2	0.9 ±0.3	2.7 ±0.3	1.25	3.5	0.9
6045	6.0 ±0.3	6.0 ±0.3	4.2 ±0.3	1.9 ±0.3	4.8 ±0.3	3.0	6.3	5.5
8040 (< 1.0 µH)	8.0 ±0.3	8.0 ±0.3	4.2 Max	2.4 ±0.3	6.3 ±0.3	2.85	6.6	2.8
8040 (≥ 1.0 µH)	8.0 ±0.3	8.0 ±0.3	3.7 ±0.3	2.4 ±0.3	6.3 ±0.3	2.85	6.6	2.8

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



Unit: mm

Size Code	A	B	C	D	E	X	Y	G
2016A	2.0 ±0.2	1.6 ±0.2	0.7 ±0.1	0.7 ±0.3	1.8 ±0.2	1.0	2.1	0.5
2016B	2.0 ±0.2	1.6 ±0.2	0.9 ±0.1	0.7 ±0.3	1.6 ±0.2	1.0	2.1	0.5
2016C	2.0 ±0.2	1.6 ±0.2	1.0 ±0.2	0.7 ±0.3	1.6 ±0.2	1.0	2.1	0.5
2520A	2.5 ±0.2	2.0 ±0.2	0.7 ±0.1	0.9 ±0.3	2.0 ±0.2	1.15	2.5	0.7
2520B	2.5 ±0.2	2.0 ±0.2	0.9 ±0.1	0.9 ±0.3	2.0 ±0.2	1.15	2.5	0.7
2520C	2.5 ±0.2	2.0 ±0.2	1.0 ±0.2	0.9 ±0.3	2.0 ±0.2	1.15	2.5	0.7
3225C	3.2 ±0.2	2.5 ±0.2	1.0 ±0.2	1.0 ±0.3	2.5 ±0.2	1.25	3.0	1.0

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

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SMD Low Profile, High Current
AEC-Q200

PIW-5012M65

MERITEK

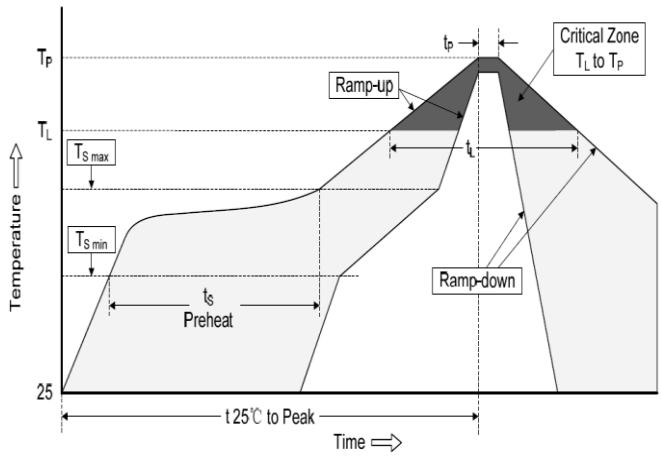
PART NUMBERING SYSTEM

PIW	4R7M	5012	M65
(1)	(2)	(3)	(4)

No	Item	Code	Description	
(1)	**Product Code**	PIW	Power Inductor series, Wire Wound type	
(2)	**Inductance**	4R7M	4.7µH ±20%(M)	First two digits: significant, Third: multiplier
(3)	**Size Code**	5012	5.0x5.0x1.0 mm	Length x Width x Thickness (mm)
(4)	**Series Code**	M65	Surface Mount Shielded, Low Profile, High Current series, AEC-Q200 Compliant	

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	**< 350mm³**	**350-2000mm³**	**> 2000mm³**
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