SMD Power Inductor
Low Profile, High Current Type

PIW-401565

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**

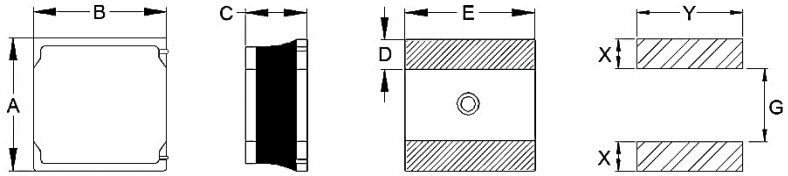
RoHS

ELECTRICAL CHARACTERISTICS

Part Number	Inductance (µH)	Tolerance (%)	Test Frequency (Hz)	DCR ±20% (mΩ)	I_{SAT} (A)	I_{RMS} (A)
PIW1R0M401565	1.00	±20%	1V/100K	0.033	4.00	3.70
PIW1R5M401565	1.50	±20%	1V/100K	0.041	3.30	3.30
PIW2R2M401565	2.20	±20%	1V/100K	0.055	2.90	2.90
PIW3R3M401565	3.30	±20%	1V/100K	0.065	2.30	2.30
PIW4R7M401565	4.70	±20%	1V/100K	0.085	1.90	1.90
PIW5R6M401565	5.60	±20%	1V/100K	0.103	1.70	1.70
PIW6R8M401565	6.80	±20%	1V/100K	0.110	1.60	1.60
PIW100M401565	10.0	±20%	1V/100K	0.160	1.40	1.40
PIW150M401565	15.0	±20%	1V/100K	0.230	1.10	1.10

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: 40ºC) approximately
4. Operating Temperature: -40ºC ~ +125ºC (Including Self-temperature rise)

DIMENSIONS

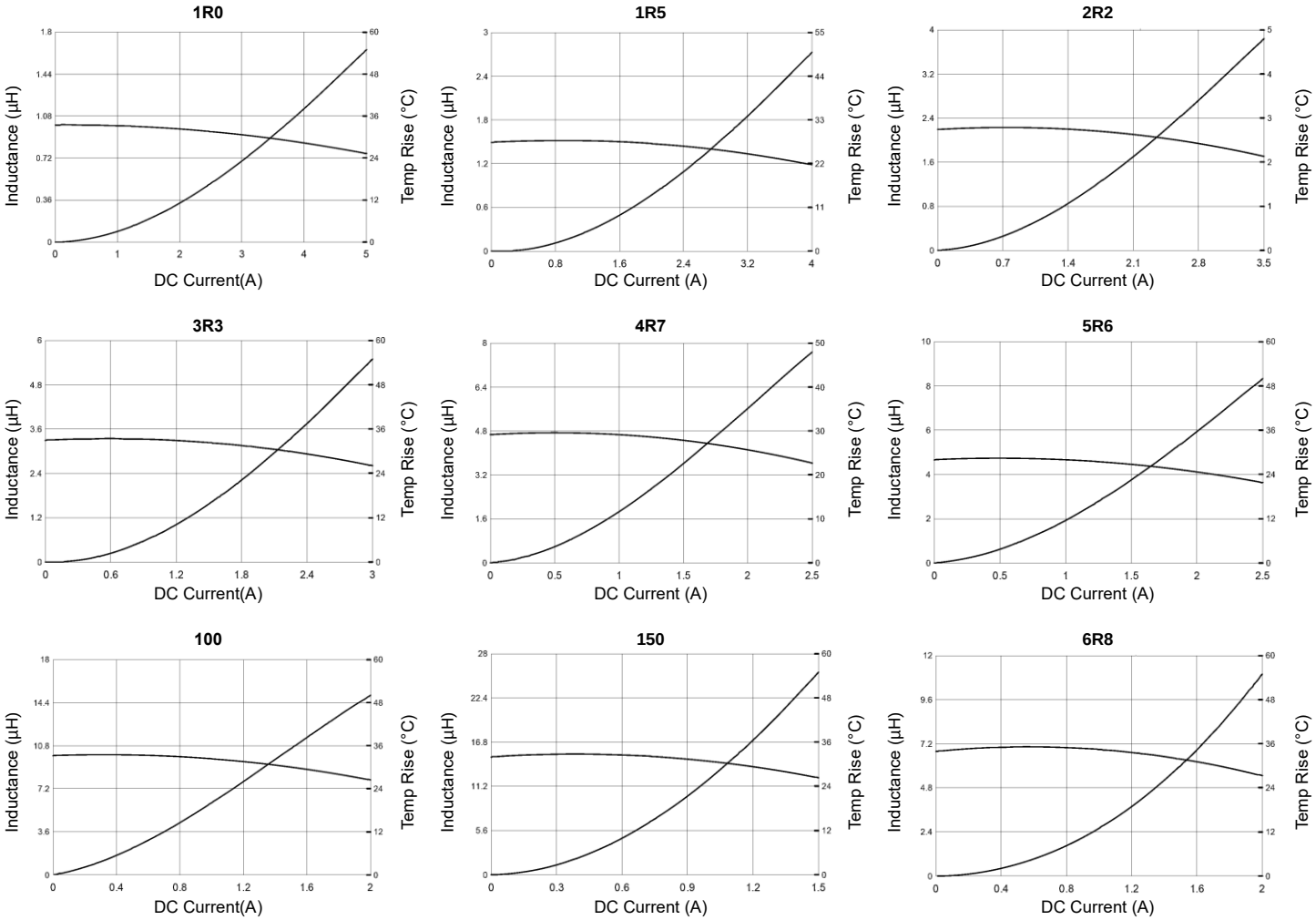


(Unit: mm)

Size Code	A	B	C	D	E	X	Y	G
4015	4.0± 0.2	4.0 ± 0.2	1.5 max	1.2 ref	4.0 ± 0.2	1.5	4.5	1.5

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

CHARACTERISTIC CURVES- PIW-401565

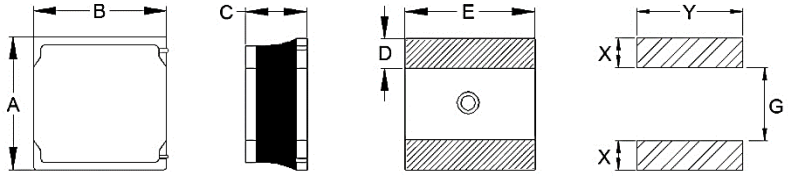


PART NUMBERING SYSTEM

PIW	150M	4015	65
(1)	(2)	(3)	(4)

No	Item	Code	Description	
(1)	**Product Code**	PIW	Power Inductor series, Wire wound type	
(2)	**Inductance**	150M	15.0 µH ±20%(M)	First two digits: significant, Third: multiplier
(3)	**Size Code**	4015	4.0x4.0x1.5 mm	Length x Width x Thickness (mm)
(4)	**Series Code**	65	Surface Mount Shielded, Low Profile, High Current series	

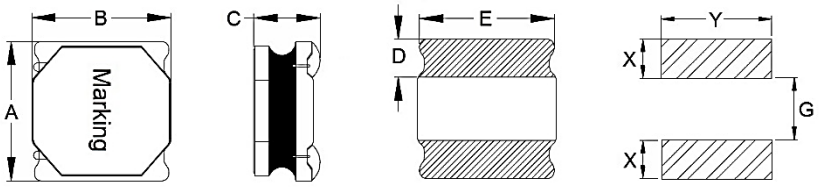
DIMENSIONS- PIW-65 SERIES



(Unit: mm)

Size Code	A	B	C	D	E	X	Y	G
3010	3.0 ± 0.2	3.0 ± 0.2	1.0 max	1.0 ref	3.0 ± 0.2	1.25	3.5	0.9
3012	3.0 ± 0.2	3.0 ± 0.2	1.2 max	1.0 ref	3.0 ± 0.2	1.25	3.5	0.9
3015	3.0 ± 0.2	3.0 ± 0.2	1.5 max	1.0 ref	3.0 ± 0.2	1.25	3.5	0.9
4010	4.0 ± 0.2	4.0 ± 0.2	1.0 max	1.2 ref	4.0 ± 0.2	1.5	4.5	1.5
4012	4.0 ± 0.2	4.0 ± 0.2	1.2 max	1.2 ref	4.0 ± 0.2	1.5	4.5	1.5
4015	4.0± 0.2	4.0 ± 0.2	1.5 max	1.2 ref	4.0 ± 0.2	1.5	4.5	1.5

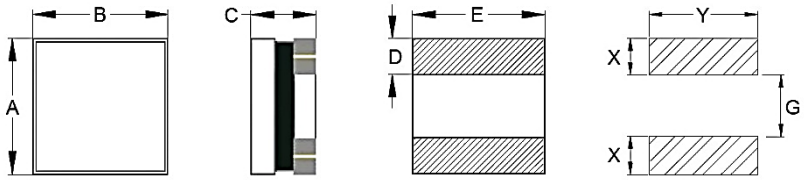
Notes: 1. The above PCB layout reference only. 2. Recommend solder paste thickness at 0.15mm and above.



(Unit: mm)

Size Code	A	B	C	D	E	X	Y	G
4018	4.0 ± 0.2	4.0 ± 0.2	1.8 max	1.2 ref	--	1.2	3.7	1.6
4018B	4.0 ± 0.2	4.0 ± 0.2	1.8 max	1.1 ± 0.2	--	1.2	3.7	1.6
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
5040 (≤10μH)	4.95 ± 0.2	4.95 ± 0.2	3.9 ± 0.2	1.3 ± 0.3	4.2 ± 0.2	1.5	4.2	2.1
5040 (>10μH)	4.95 ± 0.2	4.95 ± 0.2	3.8 ± 0.2	1.3 ± 0.3	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
6045	6.0 ± 0.3	6.0 ± 0.3	4.2 ±0.3	1.9 ± 0.3	4.8 ± 0.3	2.15	6.5	2.2
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.

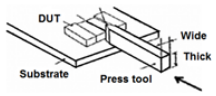
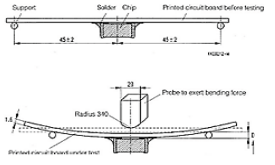


(Unit: mm)

Size Code	A	B	C	D	E	X	Y	G
1608B	1.60 ± 0.15	0.90 ± 0.15	0.95 Max.	0.50 ref.	0.90 ± 0.15	0.75	1.15	0.6
2016B	2.0 -0.1/+0.2	1.6 -0.1/+0.2	1.0 max	0.60	1.6	1.0	2.1	0.5
2520A	2.50 -0.1/+0.3	2.0 -0.05/+0.35	0.80 max.	0.85	2.0	1.15	2.5	0.7
2520C	2.5 ± 0.2	2.0 ± 0.2	1.2Max	0.85	2.0	1.15	2.5	0.7

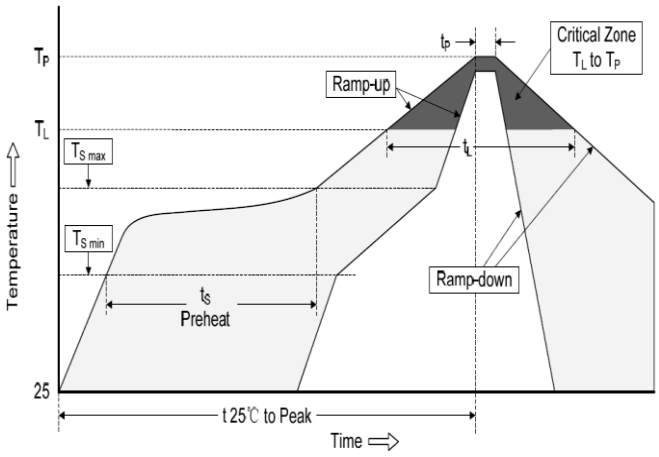
Notes: 1. The above PCB layout reference only. 2. Recommend solder paste thickness at 0.15mm and above.

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>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>
</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="4">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:10g
Testing Time: 12 hours (20 minutes, 12 cycles each of 3 orientations)</td></tr>
<tr><td>Load Humidity</td><td>Humidity: 85±3% R.H. Temperature: 85°C±2°C
Duration: 1000Hrs Min at 100% rated current
Measured at Room Temperature after placing for 24±2hrs</td></tr>
<tr><td>Life Test</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>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>-40 ±2˚C</td><td>125 ±2˚C</td><td>125 ±2˚C</td></tr>
<tr><td>Duration</td><td>30±5min</td><td>≤0.5min</td><td>30±5min</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>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:
>=0805in(2012mm):1.2mm
<0805in(2012mm):0.8mm.
Duration: 10 seconds. The Force is to be applied only once to the board
  </td><td>Appearance：No damage</td></tr>
<tr><td>Moisture Resistance</td><td>1. Baked at50°C for 25hrs, measured at room temperature after placing for 4hrs.
2. Raise temperature to 65±2°C 90-100%RH in 2.5hrs, and keep 3 hours, cool down to 25°C in 2.5hrs.
3. Raise temperature to 65±2°C 90-100%RH in 2.5hrs, and keep 3 hours, cool down to 25°C in 2.5hrs,keep at 25°C for 2hrs then keep at -10°C for 3hrs
4. Keep at 25°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.</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>
</table>

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