Power Inductor
SMD Low Profile, High Current
AEC-Q200

PIW-4010M65

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

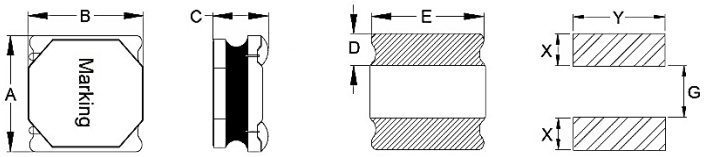
RoHS

ELECTRICAL CHARACTERISTICS

Part Number	Inductance (µH)	Tolerance (%)	Test Frequency (Hz)	DCR (mΩ)		I_{SAT} (A)		I_{RMS} (A)	
				Typ.	Max.	Typ.	Max.	Typ.	Max.
PIW1R0M4010M65	1.0	±20%	1V/100K	60	72	2.80	2.60	3.5	3.0
PIW2R2M4010M65	2.2	±20%	1V/100K	93	112	1.80	1.60	2.8	2.5
PIW3R3M4010M65	3.3	±20%	1V/100K	110	132	1.40	1.30	2.5	2.3
PIW4R7M4010M65	4.7	±20%	1V/100K	150	180	1.30	1.20	2.3	2.1
PIW6R8M4010M65	6.8	±20%	1V/100K	200	240	1.00	0.90	1.8	1.6
PIW100M4010M65	10	±20%	1V/100K	300	360	0.88	0.80	1.4	1.2
PIW150M4010M65	15	±20%	1V/100K	430	516	0.65	0.60	1.2	1.0
PIW220M4010M65	22	±20%	1V/100K	600	720	0.53	0.46	0.8	0.7

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
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

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

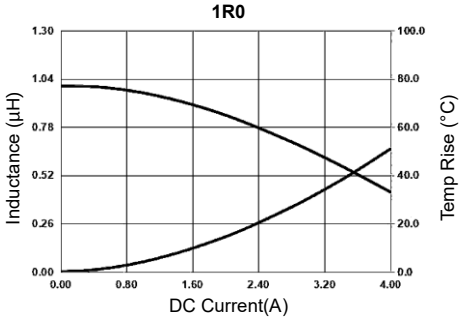
PART NUMBERING SYSTEM

PIW	220M	4010	M65
(1)	(2)	(3)	(4)

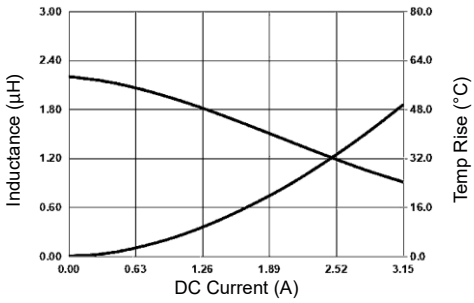
No	Item	Code	Description	
(1)	**Product Code**	PIW	Power Inductor series, Wire Wound type	
(2)	**Inductance**	220M	22µH ±20%(M)	First two digits: significant, Third: multiplier
(3)	**Size Code**	4010	4.0x4.0x0.9 mm	Length x Width x Thickness (mm)
(4)	**Series Code**	M65	Surface Mount Shielded, Low Profile, High Current series, AEC-Q200 Compliant	

CHARACTERISTIC CURVES- PIW-4010M65 series

1R0



2R2



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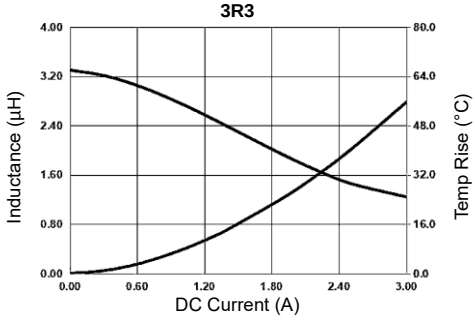
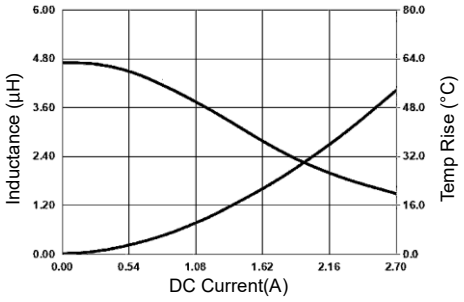
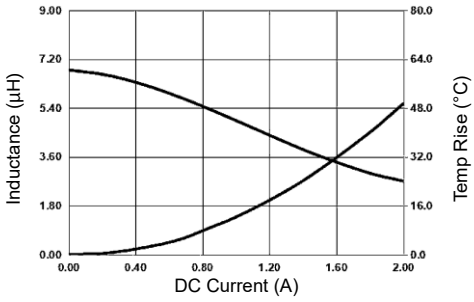


4R7



6R8



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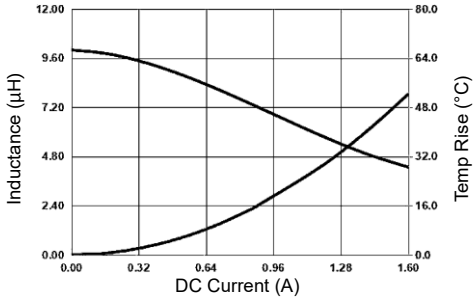

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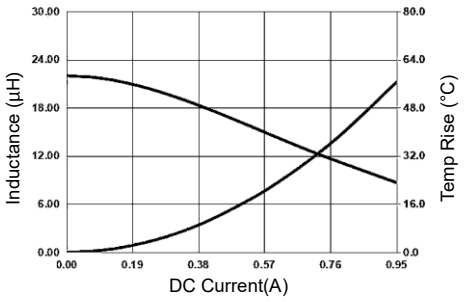
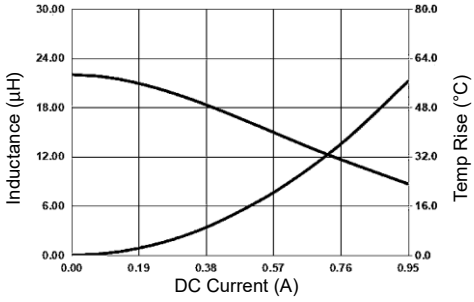
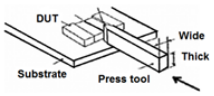
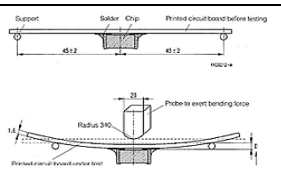


220



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
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PIW-4010M65

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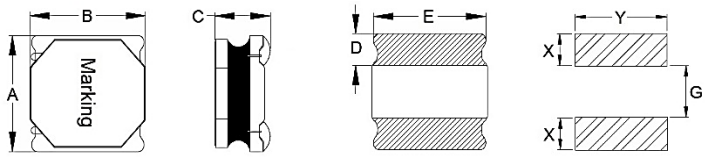
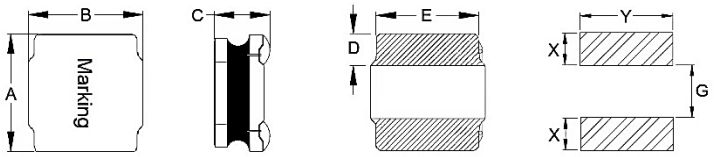
DIMENSIONS- PIW-M65 series



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

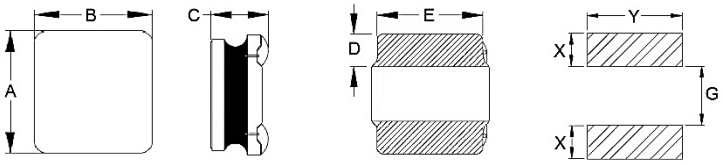
Notes: 1. The above PCB layout reference only. 2. Recommend solder paste thickness at 0.15mm and above.



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.



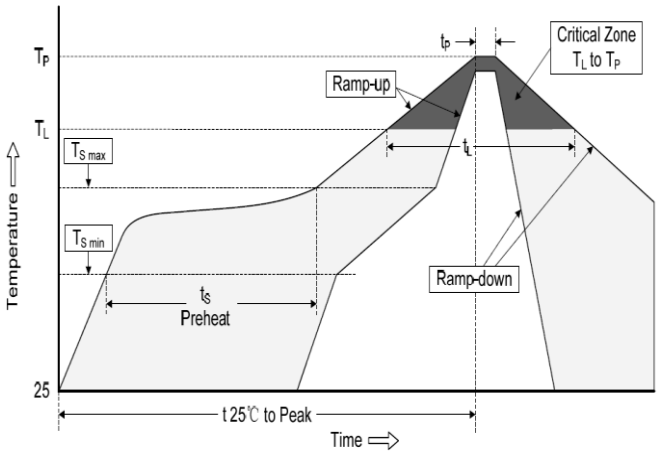
Unit: mm

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.

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