

SMD Power Inductor

Low Profile, High Current Type

PIW-604565

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



ELECTRICAL CHARACTERISTICS- 6045

Part Number	Inductance (μH)	Tolerance Code	Test Frequency (Hz)	DCR ±20% (mΩ)	I _{SAT} (A)	I _{RMS} (A)
PIWR36M604565	0.36	±20%	1V/1M	4.80	16.50	8.50
PIWR47M604565	0.47	±20%	1V/1M	6.80	16.00	8.00
PIWR82M604565	0.82	±20%	1V/1M	8.50	13.50	7.50
PIW1R0M604565	1.00	±20%	1V/1M	10.0	12.50	7.30
PIW1R2M604565	1.20	±20%	1V/1M	10.5	11.50	7.00
PIW1R3M604565	1.30	±20%	1V/1M	10.5	11.50	7.00
PIW1R5M604565	1.50	±20%	1V/1M	11.7	11.00	6.60
PIW1R8M604565	1.80	±20%	1V/1M	12.0	10.00	6.20
PIW2R0M604565	2.00	±20%	1V/1M	13.5	9.50	5.80
PIW2R2M604565	2.20	±20%	1V/1M	15.0	8.55	5.30
PIW2R3M604565	2.30	±20%	1V/1M	16.0	8.20	5.00
PIW3R0M604565	3.00	±20%	1V/1M	20.0	7.50	4.60
PIW3R3M604565	3.30	±20%	1V/1M	21.0	7.30	4.50
PIW3R6M604565	3.60	±20%	1V/1M	22.5	6.90	4.30
PIW4R7M604565	4.70	±20%	1V/1M	26.0	6.20	4.00
PIW5R6M604565	5.60	±20%	1V/1M	31.0	5.70	3.70
PIW6R3M604565	6.30	±20%	1V/1M	33.0	5.30	3.50
PIW6R8M604565	6.80	±20%	1V/1M	34.0	5.15	3.30
PIW8R2M604565	8.20	±20%	1V/1M	46.0	4.50	2.90
PIW100M604565	10.0	±20%	1V/1M	52.0	4.20	2.60
PIW120M604565	12.0	±20%	1V/1M	65.0	3.70	2.40
PIW150M604565	15.0	±20%	1V/1M	71.0	3.30	2.20
PIW180M604565	18.0	±20%	1V/1M	80.0	2.90	2.10
PIW220M604565	22.0	±20%	1V/1M	96.0	2.70	1.90
PIW330M604565	33.0	±20%	1V/1M	145	2.10	1.50
PIW470M604565	47.0	±20%	1V/1M	200	1.75	1.20
PIW560M604565	56.0	±20%	1V/1M	230	1.65	1.00
PIW680M604565	68.0	±20%	1V/1M	305	1.52	0.92
PIW820M604565	82.0	±20%	1V/1M	365	1.40	0.88
PIW101M604565	100	±20%	1V/1M	456	1.25	0.82
PIW121M604565	120	±20%	1V/1M	500	1.10	0.79
PIW151M604565	150	±20%	1V/1M	626	1.00	0.70
PIW181M604565	180	±20%	1V/1M	745	0.90	0.60
PIW221M604565	220	±20%	1V/1M	900	0.77	0.50
PIW331M604565	330	±20%	1V/1M	1400	0.55	0.45
PIW471M604565	470	±20%	1V/1M	2050	0.45	0.35
PIW681M604565	680	±20%	1V/1M	2900	0.40	0.30

Notes:

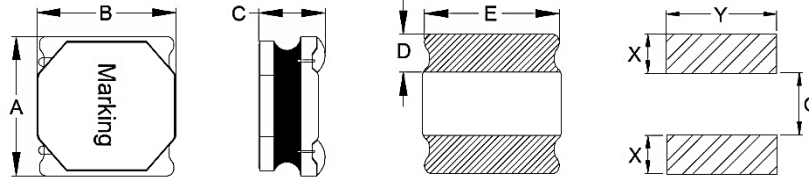
1. All test data referenced to 25°C ambient.
2. Saturation Current (Isat) based on inductance drop ($\Delta L/L0$: $\leq 30\%$) approximately
3. Heat Rated Current (Irms) based on temperature rise (ΔT : 40 °C) approximately
4. Operating Temperature: -40°C ~ +125°C (Including Self-temperature rise)

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DIMENSIONS



(Unit: mm)

Size Code	A	B	C	D	E	X	Y	G
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

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

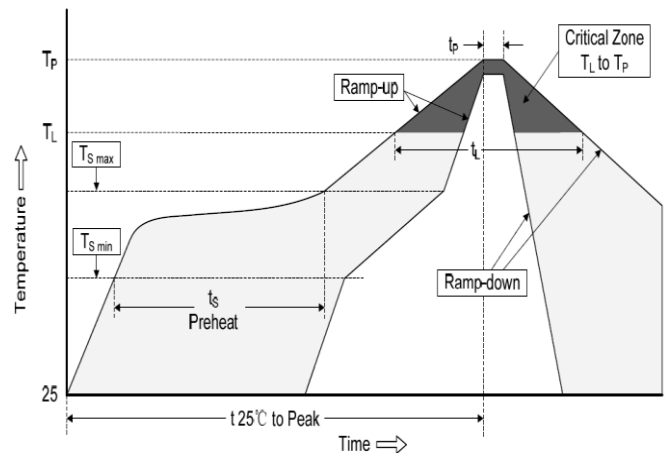
PART NUMBERING SYSTEM

PIW 471M 6045 65
(1) (2) (3) (4)

No	Item	Code	Description
(1)	Product Code	PIW	Power Inductor series, Wire wound type
(2)	Inductance	471M	470 μH ±20%(M) First two digits: significant, Third: multiplier
(3)	Size Code	6045	6.0x6.0x4.2mm Length x Width x Thickness (mm)
(4)	Series Code	65	Surface Mount Shielded, Low Profile, High Current series

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

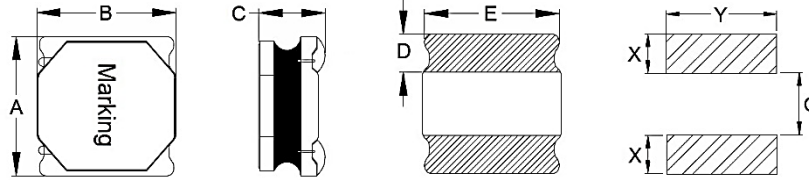
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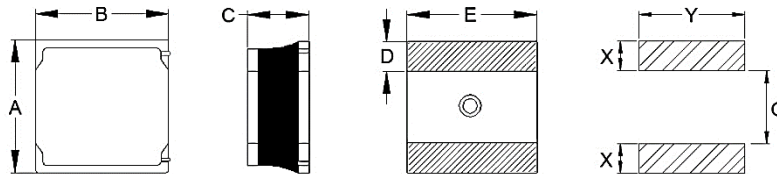
DIMENSIONS- PIW-65 SERIES



(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

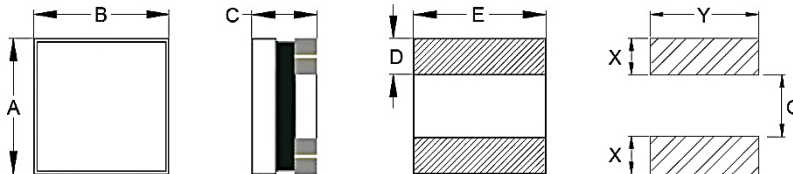
Notes: 1. The above PCB layout reference only. 2. Recommend solder paste thickness at 0.15mm and above.



(Unit: mm)

Size Code	A	B	C	D	E	X	Y	G
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
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.

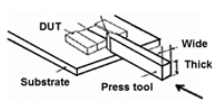
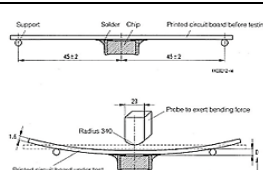
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RELIABILITY TEST CONDITON AND REQUIREMENT

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>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> </tbody> </table>	Type	Peak value (g's)	Normal duration (D) (ms)	Wave form	Velocity change (Vi) ft/sec	SMD	50	11	Half-sine	11.3	Lead	50	11	Half-sine	11.3	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	50	11	Half-sine	11.3												
Lead	50	11	Half-sine	11.3													
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 ± 6 mm/s. Completely cover the termination.																
Vibration	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)	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															
Load Humidity	Humidity: 85 $\pm 3\%$ R.H. Temperature: 85°C $\pm 2^\circ\text{C}$ Duration: 1000Hrs Min at 100% rated current Measured at Room Temperature after placing for 24 ± 2 hrs																
Life Test	Temperature: 125 $\pm 2^\circ\text{C}$ Duration: 1000Hrs Min. with 100% rated current Measured at Room Temperature after placing for 24 ± 2 Hrs																
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>-40 $\pm 2^\circ\text{C}$</td> <td>125 $\pm 2^\circ\text{C}$</td> <td>125 $\pm 2^\circ\text{C}$</td> </tr> <tr> <td>Duration</td> <td>30± 5min</td> <td>≤ 0.5min</td> <td>30± 5min</td> </tr> </tbody> </table>	Step	1	2	3	Temperature	-40 $\pm 2^\circ\text{C}$	125 $\pm 2^\circ\text{C}$	125 $\pm 2^\circ\text{C}$	Duration	30 ± 5 min	≤ 0.5 min	30 ± 5 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	-40 $\pm 2^\circ\text{C}$	125 $\pm 2^\circ\text{C}$	125 $\pm 2^\circ\text{C}$														
Duration	30 ± 5 min	≤ 0.5 min	30 ± 5 min														
	Number of cycles : 300 Measured at room temperature after placing for 24 ± 2 hrs.																
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 board into a fixture with the component facing down. Apply a force which will bend the board: $\geq 0.805\text{in}(20.12\text{mm})$:1.2mm $< 0.805\text{in}(20.12\text{mm})$:0.8mm. Duration: 10 seconds. The Force is to be applied only once to the board 	Appearance : No damage															
Moisture Resistance	<ol style="list-style-type: none"> Baked at 50°C for 25hrs, measured at room temperature after placing for 4hrs. Raise temperature to 65$\pm 2^\circ\text{C}$ 90-100%RH in 2.5hrs, and keep 3 hours, cool down to 25°C in 2.5hrs. Raise temperature to 65$\pm 2^\circ\text{C}$ 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 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. 	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															