# Power Inductor
# SMD Low Profile, High Current
# AEC-Q200

PIW-6028M65

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

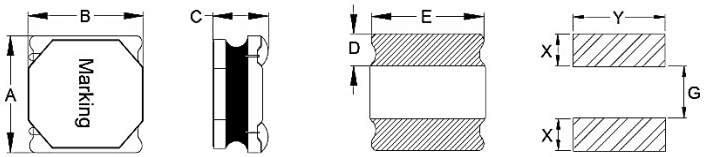
RoHS

## ELECTRICAL CHARACTERISTICS

| Part Number | Inductance (µH) | Tolerance (%) | Test Frequency (Hz) | DCR ±20% (mΩ) | $I_{SAT}$ (A) | $I_{RMS}$ (A) |
|---|---|---|---|---|---|---|
| **PIW1R0Y6028M65** | 1.00 | ±30% | 100KHz/1V | 10 | 5.75 | 5.20 |
| **PIW1R5Y6028M65** | 1.50 | ±30% | 100KHz/1V | 14 | 5.30 | 4.95 |
| **PIW2R2M6028M65** | 2.20 | ±20% | 100KHz/1V | 18 | 5.00 | 4.50 |
| **PIW3R3M6028M65** | 3.30 | ±20% | 100KHz/1V | 24 | 4.30 | 3.60 |
| **PIW4R7M6028M65** | 4.70 | ±20% | 100KHz/1V | 30 | 3.20 | 3.10 |
| **PIW6R8M6028M65** | 6.80 | ±20% | 100KHz/1V | 47 | 2.85 | 2.50 |
| **PIW100M6028M65** | 10.0 | ±20% | 100KHz/1V | 65 | 2.10 | 2.00 |
| **PIW150M6028M65** | 15.0 | ±20% | 100KHz/1V | 98 | 2.00 | 1.80 |
| **PIW220M6028M65** | 22.0 | ±20% | 100KHz/1V | 138 | 1.60 | 1.50 |
| **PIW330M6028M65** | 33.0 | ±20% | 100KHz/1V | 200 | 1.40 | 1.30 |
| **PIW470M6028M65** | 47.0 | ±20% | 100KHz/1V | 280 | 1.15 | 1.06 |
| **PIW680M6028M65** | 68.0 | ±20% | 100KHz/1V | 420 | 1.00 | 0.81 |
| **PIW101M6028M65** | 100 | ±20% | 100KHz/1V | 605 | 0.80 | 0.72 |
| **PIW471M6028M65** | 470 | ±20% | 100KHz/1V | 2250 | 0.32 | 0.32 |

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

## DIMENSIONS



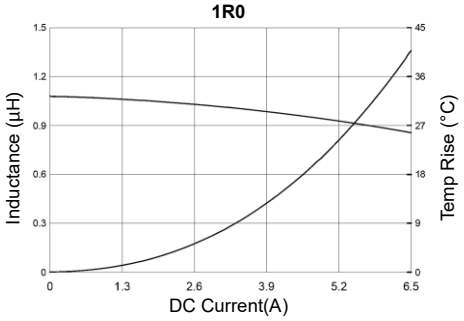

Unit: mm

| Size Code | A | B | C | D | E | X | Y | G |
|---|---|---|---|---|---|---|---|---|
| **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 |

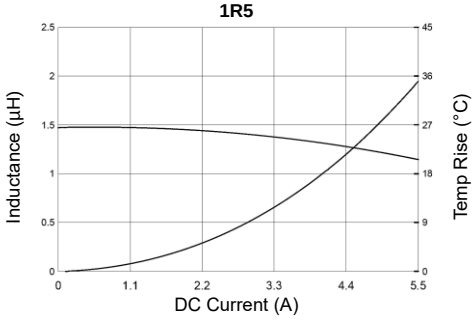
Notes: 1. The above PCB layout reference only. 2. Recommend solder paste thickness at 0.15mm and above.

## CHARACTERISTIC CURVES- PIW-6028M65 series

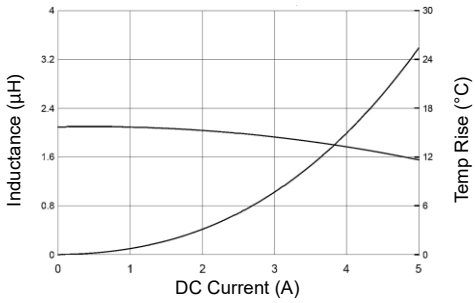
1R0



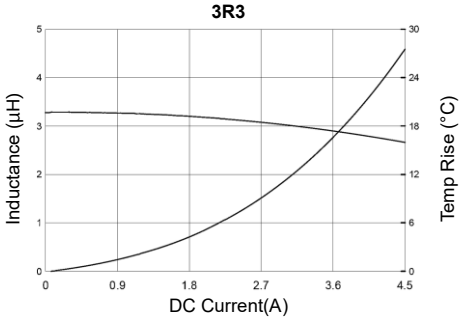

1R5



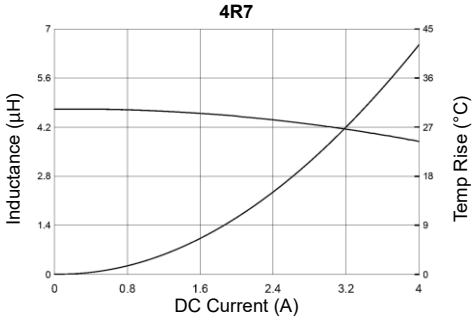

2R2



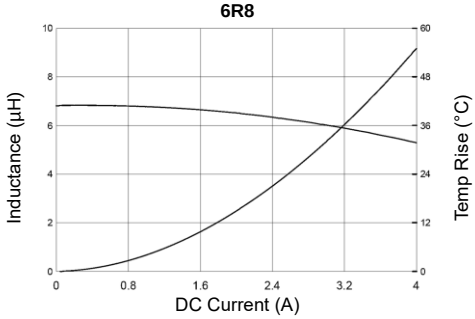

3R3




4R7




6R8

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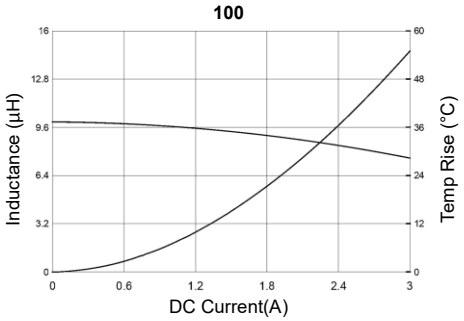


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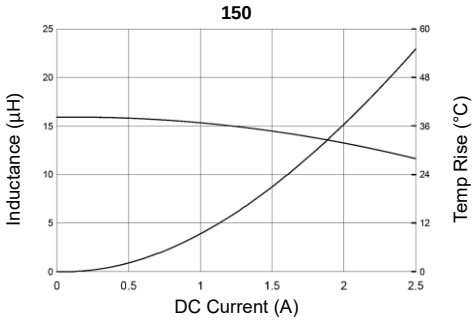


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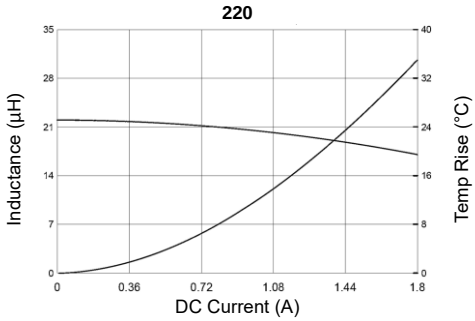


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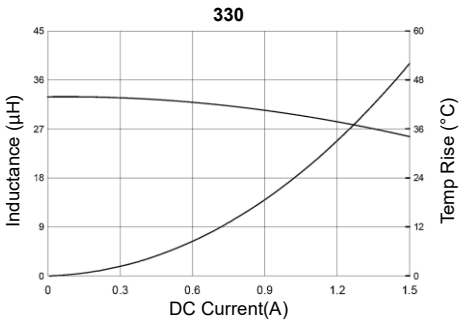
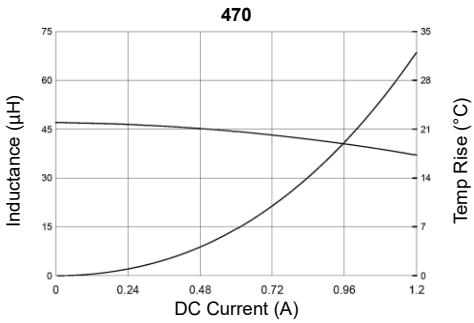
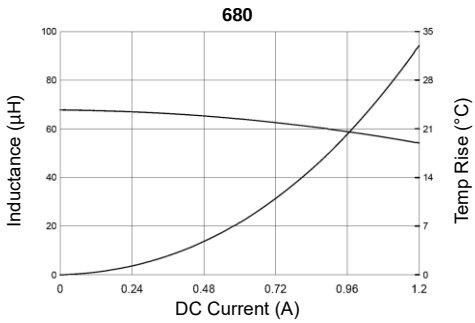


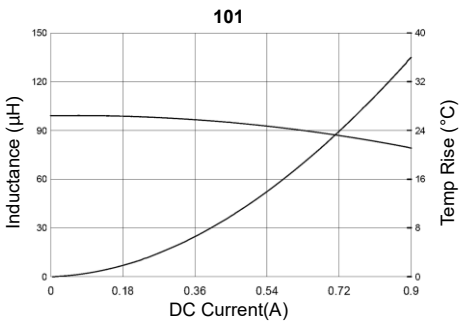

470



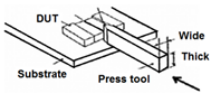
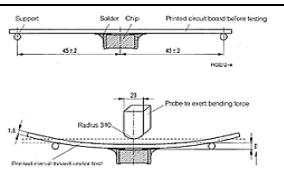

680




101



# 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<br>Inductance: within ±10% of initial value<br>Q: Shall not exceed the specification value<br>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<br>Test Time: 5 +0/-0.5 seconds.<br>Method D category 3. (steam aging 8 hours±15min) at 260°C±5°C<br>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<br>Temperature ramp/immersion and emersion rate 25mm/s ±6 mm/s.<br>Completely cover the termination.</td><td rowspan="2">Appearance: No damage<br>Inductance: within ±10% of initial value<br>Q: Shall not exceed the specification value<br>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<br>Equipment：Vibration checker<br>Total Amplitude:1.52mm ± 10%<br>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<br>Duration 1000Hrs Min<br>Measured at room temperature after placing for 24±2hrs</td><td rowspan="3">Appearance: No damage<br>Inductance: within ±10% of initial value<br>Q: Shall not exceed the specification value<br>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<br>Duration: 1000Hrs Min<br>Measured at Room Temperature after placing for 24±2hrs</td></tr>
<tr><td>High Temperature Operational Life</td><td>Temperature: 125±2°C<br>Duration: 1000Hrs Min. with 100% rated current<br>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<br>Measured at room temperature after placing for 24±2hrs</td><td>Appearance: No damage<br>Inductance: within ±10% of initial value<br>Q: Shall not exceed the specification value<br>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<br>Measured at room temperature after placing for 24±2 hrs.</td><td>Appearance: No damage<br>Inductance: within ±10% of initial value<br>Q: Shall not exceed the specification value<br>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.<br> 
</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.<br>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<br>  </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

PIW-6028M65

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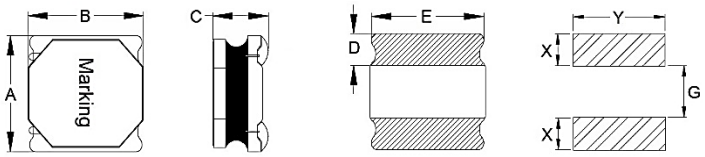
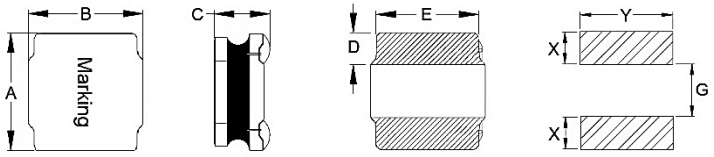
## DIMENSIONS- PIW-M65 series




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 |

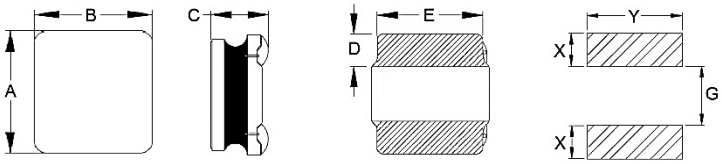
Notes: 1. The above PCB layout reference only. 2. Recommend solder paste thickness at 0.15mm and above.




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.

# Power Inductor
# SMD Low Profile, High Current
# AEC-Q200

PIW-6028M65

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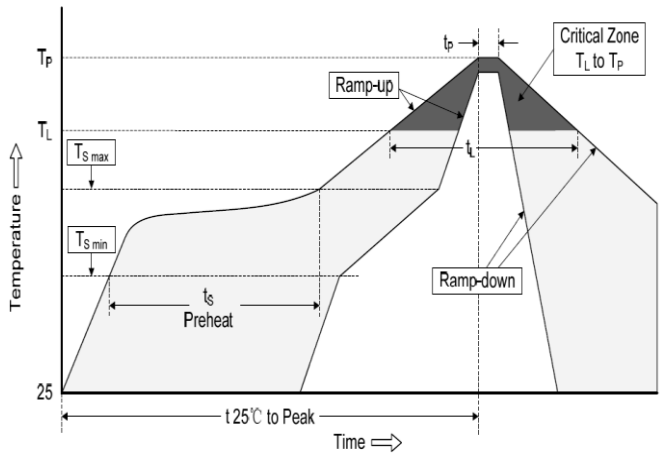
## PART NUMBERING SYSTEM

**PIW** **471M** **6028** **M65**
(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** | 6028 | 6.0x6.0x2.6mm | 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