

# SMD Power Inductor

## Low Profile, High Current Type

PIW-30B63

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

| Part Number   | Inductance (μH) | Tolerance (%) | Test Freq. (Hz) | DCR Typ. (Ω) | DCR Max. (Ω) | I <sub>SAT</sub> (A) | I <sub>RMS</sub> (A) |
|---------------|-----------------|---------------|-----------------|--------------|--------------|----------------------|----------------------|
| PIWR47MH30B63 | 0.47            | ±20%          | 1V/1M           | 0.033        | 0.039        | 5.8                  | 3.5                  |
| PIWR68MH30B63 | 0.68            | ±20%          | 1V/1M           | 0.048        | 0.058        | 5.0                  | 3.0                  |
| PIW1R0MH30B63 | 1.00            | ±20%          | 1V/1M           | 0.068        | 0.080        | 4.6                  | 2.5                  |
| PIW1R5MH30B63 | 1.50            | ±20%          | 1V/1M           | 0.087        | 0.100        | 3.5                  | 2.3                  |
| PIW2R2MH30B63 | 2.20            | ±20%          | 1V/1M           | 0.115        | 0.135        | 2.7                  | 2.0                  |
| PIW3R3MH30B63 | 3.30            | ±20%          | 1V/1M           | 0.210        | 0.238        | 2.2                  | 1.5                  |
| PIW4R7MH30B63 | 4.70            | ±20%          | 1V/1M           | 0.265        | 0.315        | 1.9                  | 1.3                  |
| PIW6R8MH30B63 | 6.80            | ±20%          | 1V/1M           | 0.300        | 0.360        | 1.4                  | 1.1                  |
| PIW100MH30B63 | 10.0            | ±20%          | 1V/1M           | 0.360        | 0.420        | 1.1                  | 1.0                  |

Notes:

1. All test data referenced to 25°C ambient.
2. Saturation Current (Isat) based on inductance drop ( $\Delta L/L_0 \leq 30\%$ ) approximately
3. Heat Rated Current (I<sub>rms</sub>) based on temperature rise ( $\Delta T: 40^\circ\text{C}$ ) approximately
4. Operating Temperature: -40°C ~ +125°C (Including Self-temperature rise)

### DIMENSIONS

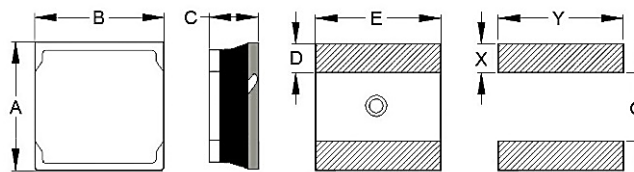


Fig.3

(Unit: mm)

| Series     | A        | B        | C Max | D ref. | E   | X    | Y   | G   | Fig |
|------------|----------|----------|-------|--------|-----|------|-----|-----|-----|
| PIW-H30B63 | 3.0 ±0.2 | 3.0 ±0.2 | 1.0   | 1.0    | 3.0 | 1.25 | 3.5 | 0.9 | 3   |

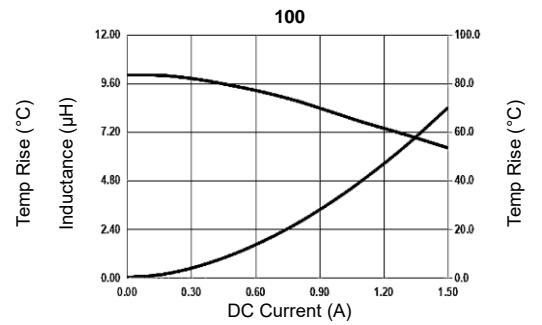
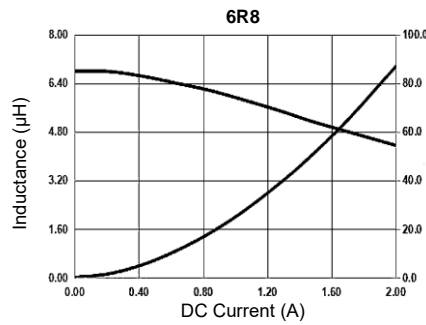
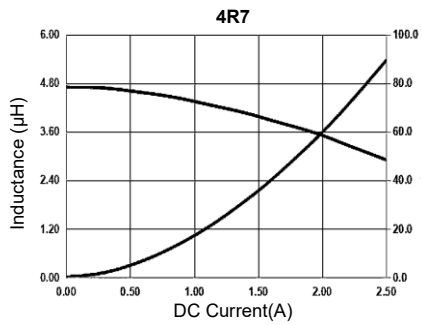
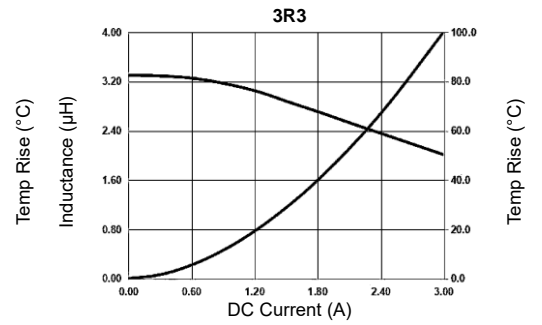
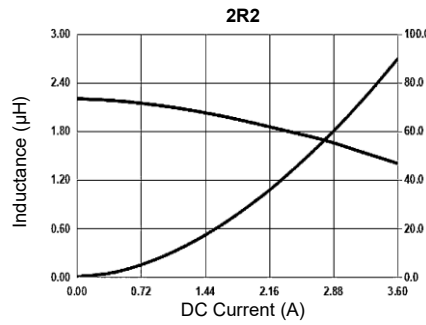
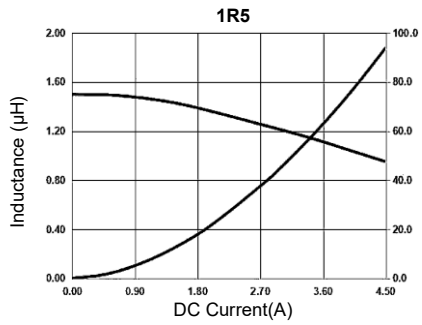
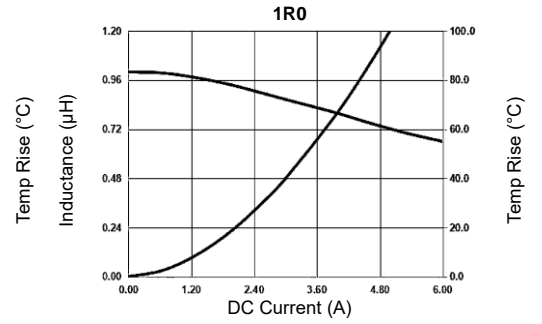
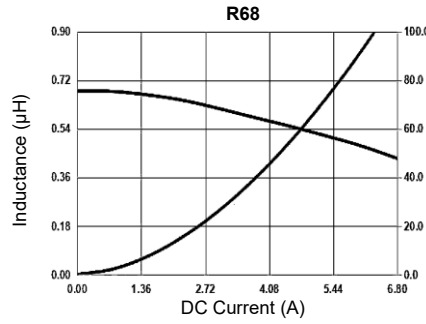
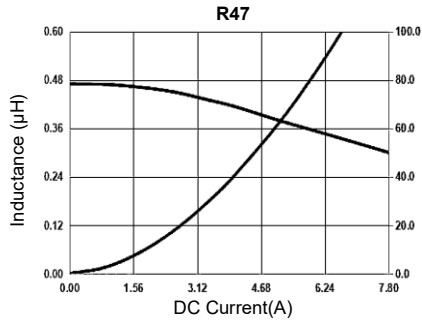
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### CHARACTERISTIC CURVES- PIW-H30B63 series



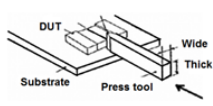
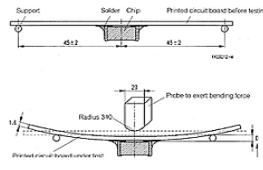
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### RELIABILITY TEST CONDITON AND REQUIREMENT

| 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 (V) 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> <p>3 shocks in each direction along 3 perpendicular axes (18 shocks).</p>   | Type  | Peak value (g's)          | Normal duration (D) (ms)   | Wave form | Velocity change (V) ft/sec | SMD                       | 50                        | 11                        | Half-sine | 11.3           | Lead           | 50             | 11  | Half-sine | 11.3 | <p>Appearance: No damage<br/>           Inductance: within <math>\pm 10\%</math> of initial value<br/>           Q: Shall not exceed the specification value<br/>           RDC: within <math>\pm 15\%</math> of initial value and shall not exceed the specification value</p> |
| Type                         | Peak value (g's)   | Normal duration (D) (ms)  | Wave form                 | Velocity change (V) ft/sec |           |                            |                           |                           |                           |           |                |                |                |   |           |      |   |
| SMD                          | 50   | 11  | Half-sine                 | 11.3                       |           |                            |                           |                           |                           |           |                |                |                |   |           |      |   |
| Lead                         | 50   | 11  | Half-sine                 | 11.3                       |           |                            |                           |                           |                           |           |                |                |                |   |           |      |   |
| Solderability                | <p>Method B1, 4 Hrs at 155°C dry heat at 255°C<math>\pm 5^\circ\text{C}</math><br/>           Test Time: 5 +0/-0.5 seconds.<br/>           Method D category 3. (steam aging 8 hours<math>\pm 15\text{min}</math>) at 260°C<math>\pm 5^\circ\text{C}</math><br/>           Test Time: 30+0/-0.5 seconds.</p>   | More than 95% of the terminal electrode should be covered with solder.  |                           |                            |           |                            |                           |                           |                           |           |                |                |                |   |           |      |   |
| Resistance to Soldering Heat | <p>Solder temperature: 260<math>\pm 5^\circ\text{C}</math> for 10 seconds<br/>           Temperature ramp/immersion and emersion rate 25mm/s <math>\pm 6</math> mm/s.<br/>           Completely cover the termination.<br/>           Number of cycles: 1 heat cycle</p>   |   |                           |                            |           |                            |                           |                           |                           |           |                |                |                |   |           |      |   |
| Vibration                    | <p>Oscillation Frequency: 10~2K~10 Hz for 20 minutes<br/>           Equipment : Vibration Checker<br/>           Total Amplitude: 10g<br/>           Testing Time: 12 hours (20 minutes, 12 cycles each of 3 orientations)</p>   | <p>Appearance: No damage<br/>           Inductance: within <math>\pm 10\%</math> of initial value<br/>           Q: Shall not exceed the specification value<br/>           RDC: within <math>\pm 15\%</math> of initial value and shall not exceed the specification value</p> |                           |                            |           |                            |                           |                           |                           |           |                |                |                |   |           |      |   |
| Load Humidity                | <p>Humidity: 85<math>\pm 3\%</math> R.H. Temperature: 85°C<math>\pm 2^\circ\text{C}</math><br/>           Duration: 1000Hrs Min at 100% rated current<br/>           Measured at Room Temperature after 24<math>\pm 2</math>hrs</p>  |   |                           |                            |           |                            |                           |                           |                           |           |                |                |                |   |           |      |   |
| Life Test                    | <p>Temperature: 125<math>\pm 2^\circ\text{C}</math><br/>           Duration: 1000Hrs Min. with 100% rated current<br/>           Measured at Room Temperature after 24<math>\pm 2</math>Hrs</p>  |   |                           |                            |           |                            |                           |                           |                           |           |                |                |                |   |           |      |   |
| Thermal Shock                | <p>Condition for 1 cycle</p> <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 <math>\pm 2^\circ\text{C}</math></td> <td>125 <math>\pm 2^\circ\text{C}</math></td> <td>125 <math>\pm 2^\circ\text{C}</math></td> </tr> <tr> <td>Duration</td> <td>30<math>\pm 5</math>min</td> <td><math>\leq 0.5</math>min</td> <td>30<math>\pm 5</math>min</td> </tr> </tbody> </table> <p>Number of cycles : 500<br/>           Measured at room temperature after 24<math>\pm 2</math> hrs.</p>  | 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 $\pm 5$ min | $\leq 0.5$ min | 30 $\pm 5$ min | <p>Appearance: No damage<br/>           Inductance: within <math>\pm 10\%</math> of initial value<br/>           Q: Shall not exceed the specification value<br/>           RDC: within <math>\pm 15\%</math> of initial value and shall not exceed the specification value</p> |           |      |   |
| 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 $\pm 5$ min   | $\leq 0.5$ min  | 30 $\pm 5$ min            |                            |           |                            |                           |                           |                           |           |                |                |                |   |           |      |   |
| Terminal Strength            | <p>Component mounted on a PCB apply a force to the side of a device being tested.<br/>           &gt;0805inch(2012mm): 1Kg,<br/>           &lt;=0805inch(2012mm): 0.5Kg<br/>           Duration 60 +1 seconds. The force shall be applied gradually as not to shock the component being tested.</p>    | Appearance : No damage  |                           |                            |           |                            |                           |                           |                           |           |                |                |                |   |           |      |   |
| Board Flex                   | <p>Place the 100x40mm FR4 board into a fixture with the component facing down.<br/>           Apply a force which will bend the board:<br/>           &gt;=0805in(2012mm): 1.2mm<br/>           &lt;0805in(2012mm): 0.8mm<br/>           Duration: 10 seconds. The Force is to be applied only once to the board</p>   | Appearance : No damage  |                           |                            |           |                            |                           |                           |                           |           |                |                |                |   |           |      |   |
| Moisture Resistance          | <ol style="list-style-type: none"> <li>Baked at 50°C for 25hrs, measure at room after 4hrs.</li> <li>Raise temperature to 65<math>\pm 2^\circ\text{C}</math> 90-100%RH in 2.5hrs,</li> <li>Keep at 65°C for 3 hours, cool down to 25°C in 2.5hrs.</li> <li>Raise temperature to 65<math>\pm 2^\circ\text{C}</math> 90-100%RH in 2.5hrs</li> <li>Keep at 65°C for 3hrs, cool down to 25°C in 2.5hrs</li> <li>Keep at 25°C for 2hrs then keep at -10°C for 3hrs</li> <li>Keep at 25°C 80-100%RH for 15min, Vibrate at the frequency of 10 to 55 Hz to 10 Hz, Measure at room temperature after 1~2 hrs.</li> </ol> | <p>Appearance: No damage<br/>           Inductance: within <math>\pm 10\%</math> of initial value<br/>           Q: Shall not exceed the specification value<br/>           RDC: within <math>\pm 15\%</math> of initial value and shall not exceed the specification value</p> |                           |                            |           |                            |                           |                           |                           |           |                |                |                |   |           |      |   |

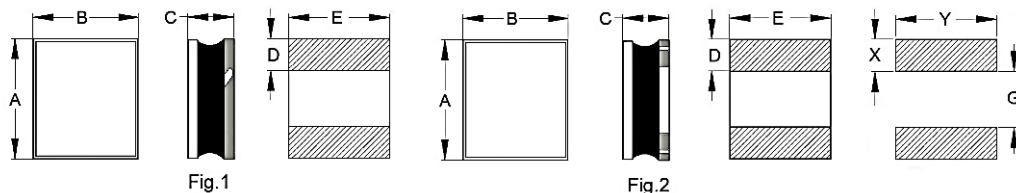
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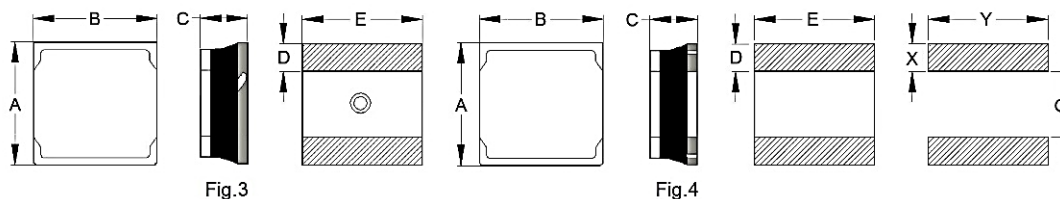
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### DIMENSIONS



(Unit: mm)

| Series     | A        | B        | C Max | D ref.     | E   | X    | Y    | G   | Fig |
|------------|----------|----------|-------|------------|-----|------|------|-----|-----|
| PIW03-FA63 | 1.6 ±0.2 | 0.8 ±0.2 | 0.8   | 0.5        | 0.8 | 0.75 | 1.15 | 0.6 | 1   |
| PIW03-RA63 | 1.6 ±0.2 | 0.8 ±0.2 | 0.8   | 0.5        | 0.8 | 0.75 | 1.15 | 0.6 | 2   |
| PIW04-FA63 | 1.2 ±0.2 | 1.0 ±0.2 | 0.8   | 0.4        | 1.0 | 0.45 | 1.2  | 0.5 | 1   |
| PIW04-RA63 | 1.2 ±0.2 | 1.0 ±0.2 | 0.8   | 0.4        | 1.0 | 0.45 | 1.2  | 0.5 | 2   |
| PIW05-FA63 | 2.0 ±0.2 | 1.2 ±0.2 | 0.8   | 0.5        | 1.2 | 0.75 | 1.4  | 0.8 | 1   |
| PIW05-RA63 | 2.0 ±0.2 | 1.2 ±0.2 | 0.8   | 0.5        | 1.2 | 0.75 | 1.4  | 0.8 | 2   |
| PIW05-FB63 | 2.0 ±0.2 | 1.2 ±0.2 | 1.0   | 0.5        | 1.2 | 0.75 | 1.4  | 0.8 | 1   |
| PIW05-RB63 | 2.0 ±0.2 | 1.2 ±0.2 | 1.0   | 0.5        | 1.2 | 0.75 | 1.4  | 0.8 | 2   |
| PIW06-FA63 | 1.9~2.2  | 1.5~1.8  | 0.8   | 0.5        | 1.6 | 0.75 | 1.9  | 0.8 | 1   |
| PIW06-RA63 | 1.9~2.2  | 1.5~1.8  | 0.8   | 0.5        | 1.6 | 0.75 | 1.9  | 0.8 | 2   |
| PIW06-FB63 | 1.9~2.2  | 1.5~1.8  | 1.0   | 0.5        | 1.6 | 0.75 | 1.9  | 0.8 | 1   |
| PIW06-HB63 | 1.9~2.2  | 1.5~1.8  | 1.0   | 0.5        | 1.6 | 0.75 | 1.9  | 0.8 | 1   |
| PIW06-RB63 | 2.0 ±0.2 | 1.6 ±0.2 | 1.0   | 0.65 ±0.20 | 1.6 | 0.75 | 1.9  | 0.8 | 2   |
| PIW08-FA63 | 2.4~2.7  | 1.9~2.2  | 0.8   | 0.75       | 2.0 | 0.95 | 2.4  | 1.0 | 1   |
| PIW08-RA63 | 2.4~2.7  | 1.9~2.2  | 0.8   | 0.75       | 2.0 | 0.95 | 2.4  | 1.0 | 2   |
| PIW08-FB63 | 2.4~2.7  | 1.9~2.2  | 1.0   | 0.75       | 2.0 | 0.95 | 2.4  | 1.0 | 1   |
| PIW08-HB63 | 2.4~2.7  | 1.9~2.2  | 1.0   | 0.75       | 2.0 | 0.95 | 2.4  | 1.0 | 1   |
| PIW08-RB63 | 2.5 ±0.2 | 2.0 ±0.2 | 1.0   | 0.80 ±0.20 | 2.0 | 0.95 | 2.4  | 1.0 | 2   |
| PIW08-FC63 | 2.4~2.7  | 1.9~2.2  | 1.2   | 0.75       | 2.0 | 0.95 | 2.4  | 1.0 | 1   |
| PIW08-HC63 | 2.4~2.7  | 1.9~2.2  | 1.2   | 0.75       | 2.0 | 0.95 | 2.4  | 1.0 | 1   |
| PIW08-RC63 | 2.5 ±0.2 | 2.0 ±0.2 | 1.2   | 0.80 ±0.20 | 2.0 | 0.95 | 2.4  | 1.0 | 2   |
| PIW10-FA63 | 3.2 ±0.2 | 2.5 ±0.2 | 0.8   | 0.95       | 2.5 | 1.20 | 2.8  | 1.2 | 1   |
| PIW10-RA63 | 3.2 ±0.2 | 2.5 ±0.2 | 0.8   | 0.95       | 2.5 | 1.20 | 2.8  | 1.2 | 2   |
| PIW10-FB63 | 3.2 ±0.2 | 2.5 ±0.2 | 1.0   | 0.95       | 2.5 | 1.20 | 2.8  | 1.2 | 1   |
| PIW10-FC63 | 3.2 ±0.2 | 2.5 ±0.2 | 1.2   | 0.95       | 2.5 | 1.20 | 2.8  | 1.2 | 1   |
| PIW10-RC63 | 3.2 ±0.2 | 2.5 ±0.2 | 1.2   | 0.95       | 2.5 | 1.20 | 2.8  | 1.2 | 2   |
| PIW-R40A63 | 4.0 ±0.2 | 4.0 ±0.2 | 0.8   | 1.4 ±0.25  | 4.0 | 1.50 | 4.5  | 1.5 | 2   |



(Unit: mm)

| Series     | A        | B        | C Max | D ref.    | E   | X    | Y   | G   | Fig |
|------------|----------|----------|-------|-----------|-----|------|-----|-----|-----|
| PIW-F30A63 | 3.0 ±0.2 | 3.0 ±0.2 | 0.8   | 1.0       | 3.0 | 1.25 | 3.5 | 0.9 | 3   |
| PIW-R30A63 | 3.0 ±0.2 | 3.0 ±0.2 | 0.8   | 1.0       | 3.0 | 1.25 | 3.5 | 0.9 | 4   |
| PIW-H30B63 | 3.0 ±0.2 | 3.0 ±0.2 | 1.0   | 1.0       | 3.0 | 1.25 | 3.5 | 0.9 | 3   |
| PIW-H30C63 | 3.0 ±0.2 | 3.0 ±0.2 | 1.2   | 1.0       | 3.0 | 1.25 | 3.5 | 0.9 | 3   |
| PIW-R30D63 | 3.0 ±0.2 | 3.0 ±0.2 | 1.5   | 1.0       | 3.0 | 1.25 | 3.5 | 0.9 | 4   |
| PIW-H40B63 | 4.0 ±0.2 | 4.0 ±0.2 | 1.0   | 1.4 ±0.25 | 4.0 | 1.5  | 4.5 | 1.5 | 3   |
| PIW-H40C63 | 4.0 ±0.2 | 4.0 ±0.2 | 1.2   | 1.4 ±0.25 | 4.0 | 1.5  | 4.5 | 1.5 | 3   |

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### PART NUMBERING SYSTEM

PIW   100M   H   30B   63  
 (1)   (2)   (3)   (4)   (5)

| No  | Item          | Code | Description  |                                     |
|-----|---------------|------|--|-------------------------------------|
| (1) | Product Code  | PIW  | Power Inductor Series, Wire Wound Type                   |                                     |
| (2) | Inductance    | 100M | 10 $\mu$ H $\pm$ 20% (M)                                 | R47: 0.47 $\mu$ H, 2R2: 2.2 $\mu$ H |
| (3) | Internal Code | H    | H Type   | F Type, R Type                      |
| (4) | Size Code     | 30B  | 3.0x3.0x1.0mm  | Length x Width x Height (mm)        |
| (5) | Series Code   | 63   | 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 ( $T_P$ ) |                         |                       |
|------------------------|----------------------------|-------------------------|-----------------------|
|                        | < 350mm <sup>3</sup>       | 350-2000mm <sup>3</sup> | > 2000mm <sup>3</sup> |
| Thickness < 1.6mm      | 260°C                      | 260°C                   | 260°C                 |
| Thickness 1.6-2.5mm    | 260°C                      | 250°C                   | 245°C                 |
| Thickness $\geq$ 2.5mm | 250°C                      | 245°C                   | 245°C                 |

\*Specifications subject to change without notice

