

# Power Inductor High Current Multilayer Chip Type

PIM-23T Series

**MERITEK**

## FEATURE

- Operating temperature: -40°C ~ +105°C (Including Self-temperature rise)
- Compact size 0603/0805/0806/1008
- Stable DCR resistance
- Suitable for SMT mounter and re-flow soldering



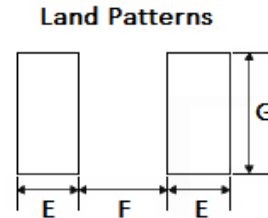
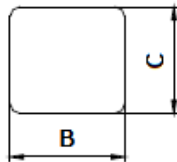
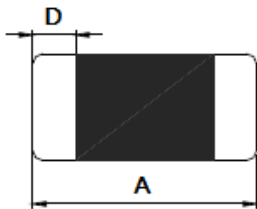
## PART NUMBERING SYSTEM

PIM   03   H33   M   23T  
(1)   (2)   (3)   (4)   (5)



| No  | item           | Code | Description           | Series Reference                      |
|-----|----------------|------|-----------------------|---------------------------------------|
| (1) | Meritek Series | PIM  | Power Inductor series | High Current Multilayer Chip Type     |
| (2) | Size Code      | 03   | EIA size: 0603        | 05: 0805, 06:0806, 08: 1008           |
| (3) | Inductance     | H33  | H33: 0.33μH           | 1H0: 1.0μH, 2H2: 2.2μH                |
| (4) | Tolerance      | M    | M: ±20%               | -20%~+20%                             |
| (5) | Internal Code  | 23T  | Internal control code | Internal control or project reference |

## DIMENSIONS



(Unit: mm)

| Item      | A         | B         | C         | D         | E    | F    | G    |
|-----------|-----------|-----------|-----------|-----------|------|------|------|
| PIM03-23T | 1.60±0.15 | 0.80±0.15 | 0.95 Max. | 0.30±0.20 | 0.80 | 0.85 | 0.95 |
| PIM05-23T | 2.00±0.20 | 1.25±0.20 | 1.00 Max. | 0.50±0.30 | 1.05 | 1.00 | 1.45 |
| PIM06-23T | 2.00±0.20 | 1.60±0.20 | 1.00 Max. | 0.50±0.30 | 1.05 | 1.00 | 1.80 |
| PIM08-23T | 2.50±0.20 | 2.00±0.20 | 1.00 Max. | 0.50±0.30 | 1.05 | 1.50 | 2.15 |

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## ELECTRICAL CHARACTERISTICS

### PIM03-23T Series

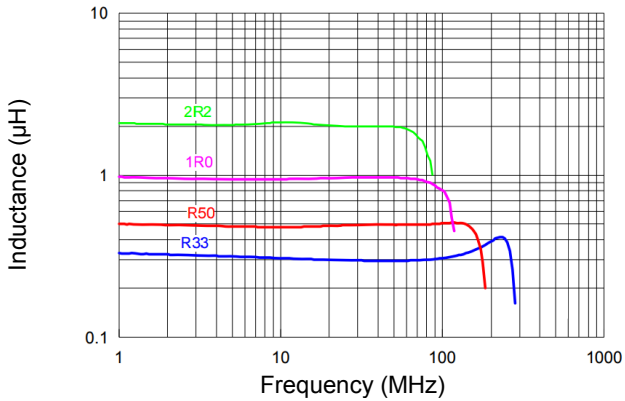
| Inch/Metric<br>0603/1608 | Inductance<br>( $\mu\text{H}$ ) | Tolerance (%) | DCR ( $\Omega$ ) Typ. | DCR ( $\Omega$ ) Max. | Rated Current<br>(mA) Max. |
|--------------------------|---------------------------------|---------------|-----------------------|-----------------------|----------------------------|
| PIM03H33M23T             | 0.33                            | $\pm 20\%$    | 0.27                  | 0.35                  | 350                        |
| PIM03H50M23T             | 0.50                            | $\pm 20\%$    | 0.12                  | 0.15                  | 900                        |
| PIM031H0M23T             | 1.0                             | $\pm 20\%$    | 0.17                  | 0.20                  | 750                        |
| PIM032H2M23T             | 2.2                             | $\pm 20\%$    | 0.27                  | 0.30                  | 650                        |

Note:

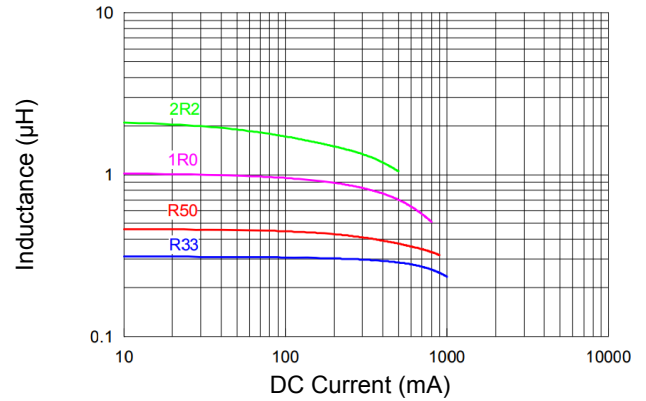
1. Inductance test under 1MHz, 60mV
2. Rated current defined based on temperature rise test.

## CHARACTERISTIC CURVES

L vs. Frequency



L vs. DC Bias



# Power Inductor High Current Multilayer Chip Type

PIM-23T Series

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## ELECTRICAL CHARACTERISTICS

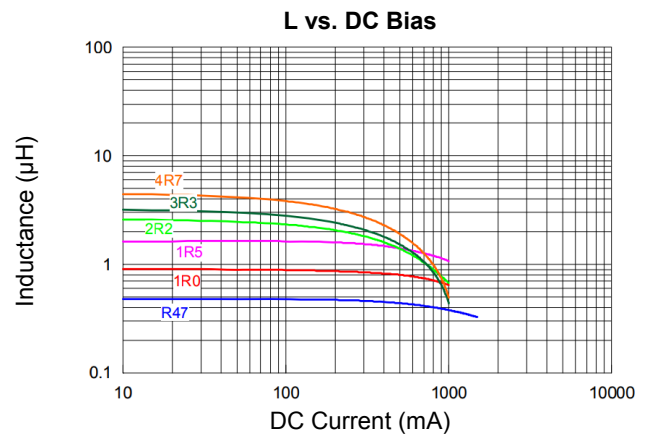
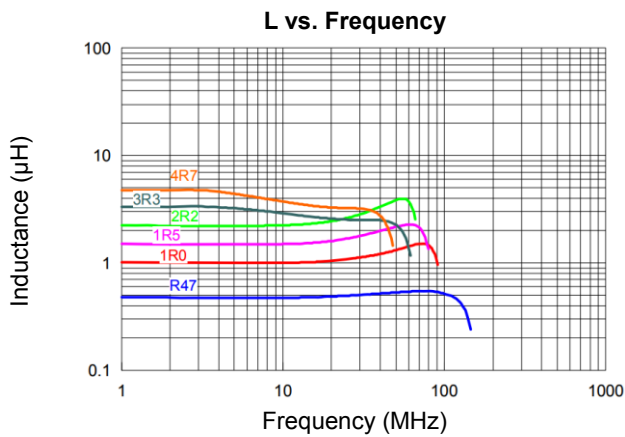
### PIM05-23T Series

| Inch/Metric<br>0805/2012 | Inductance<br>( $\mu\text{H}$ ) | Tolerance (%) | DCR ( $\Omega$ ) Typ. | DCR ( $\Omega$ ) Max. | Rated Current<br>(mA) Max. |
|--------------------------|---------------------------------|---------------|-----------------------|-----------------------|----------------------------|
| PIM05H47M23T             | 0.47                            | $\pm 20\%$    | 0.06                  | 0.08                  | 1200                       |
| PIM051H0M23T             | 1.0                             | $\pm 20\%$    | 0.11                  | 0.14                  | 1000                       |
| PIM051H5M23T             | 1.5                             | $\pm 20\%$    | 0.15                  | 0.20                  | 800                        |
| PIM052H2M23T             | 2.2                             | $\pm 20\%$    | 0.15                  | 0.20                  | 800                        |
| PIM053H3M23T             | 3.3                             | $\pm 20\%$    | 0.20                  | 0.24                  | 700                        |
| PIM054H7M23T             | 4.7                             | $\pm 20\%$    | 0.23                  | 0.28                  | 700                        |

Note:

1. Inductance test under 1MHz, 60mV
2. Rated current defined based on temperature rise test.

## CHARACTERISTIC CURVES



# Power Inductor High Current Multilayer Chip Type

PIM-23T Series

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## ELECTRICAL CHARACTERISTICS

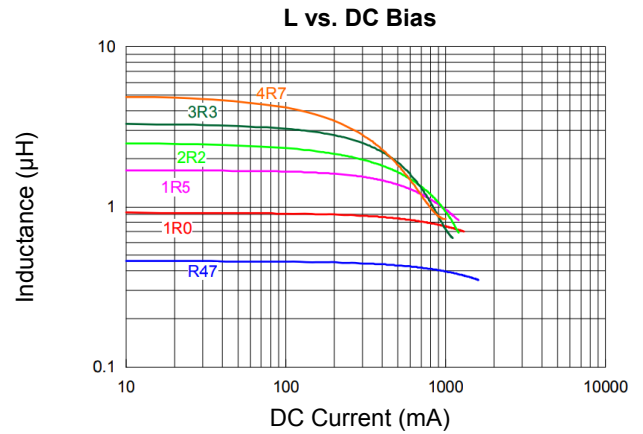
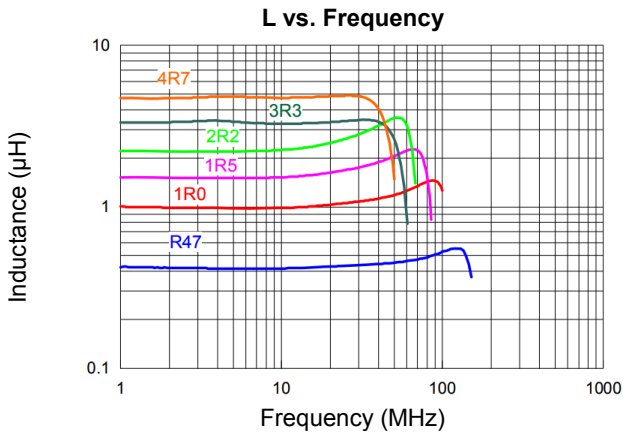
### PIM-06-23T Series

| Inch/Metric<br>0806/2016 | Inductance<br>( $\mu\text{H}$ ) | Tolerance (%) | DCR ( $\Omega$ ) Typ. | DCR ( $\Omega$ ) Max. | Rated Current<br>(mA) Max. |
|--------------------------|---------------------------------|---------------|-----------------------|-----------------------|----------------------------|
| PIM06H47M23T             | 0.47                            | $\pm 20\%$    | 0.06                  | 0.075                 | 1600                       |
| PIM061H0M23T             | 1.0                             | $\pm 20\%$    | 0.09                  | 0.12                  | 1300                       |
| PIM061H5M23T             | 1.5                             | $\pm 20\%$    | 0.10                  | 0.13                  | 1200                       |
| PIM062H2M23T             | 2.2                             | $\pm 20\%$    | 0.11                  | 0.14                  | 1200                       |
| PIM063H3M23T             | 3.3                             | $\pm 20\%$    | 0.13                  | 0.16                  | 1100                       |
| PIM064H7M23T             | 4.7                             | $\pm 20\%$    | 0.16                  | 0.20                  | 900                        |

Note:

1. Inductance test under 1MHz, 60mV
2. Rated current defined based on temperature rise test.

## CHARACTERISTIC CURVES



# Power Inductor High Current Multilayer Chip Type

PIM-23T Series

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## ELECTRICAL CHARACTERISTICS

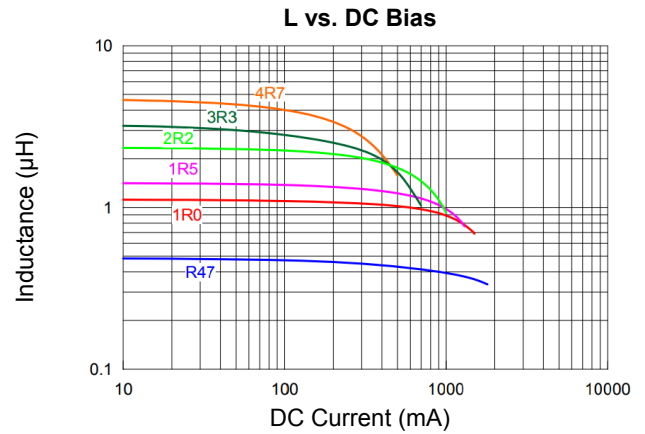
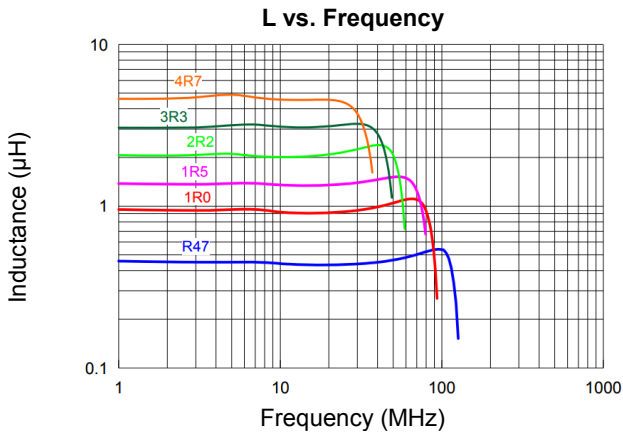
### PIM08-23T Series

| Inch/Metric<br>1008/2520 | Inductance<br>( $\mu\text{H}$ ) | Tolerance (%) | DCR ( $\Omega$ ) Typ. | DCR ( $\Omega$ ) Max. | Rated Current<br>(mA) Max. |
|--------------------------|---------------------------------|---------------|-----------------------|-----------------------|----------------------------|
| PIM08H47M23T             | 0.47                            | $\pm 20\%$    | 0.04                  | 0.05                  | 1800                       |
| PIM081H0M23T             | 1.0                             | $\pm 20\%$    | 0.065                 | 0.08                  | 1400                       |
| PIM081H5M23T             | 1.5                             | $\pm 20\%$    | 0.075                 | 0.09                  | 1300                       |
| PIM082H2M23T             | 2.2                             | $\pm 20\%$    | 0.075                 | 0.09                  | 1300                       |
| PIM083H3M23T             | 3.3                             | $\pm 20\%$    | 0.09                  | 0.12                  | 1200                       |
| PIM084H7M23T             | 4.7                             | $\pm 20\%$    | 0.12                  | 0.15                  | 1100                       |

Note:

1. Inductance test under 1MHz, 60mV
2. Rated current defined based on temperature rise test.

## CHARACTERISTIC CURVES



# Power Inductor High Current Multilayer Chip Type

PIM-23T Series

**MERITEK**

## RELIABILITY TEST CONDITON AND REQUIREMENT

| Item                                | Test Standards / Conditions / Equipment   | Requirement  |                  |                                 |           |                                |       |  |        |             |      |          |      |  |           |      |  |
|-------------------------------------|---|--|------------------|---------------------------------|-----------|--------------------------------|-------|--|--------|-------------|------|----------|------|--|-----------|------|--|
| <b>Rated Current</b>                | DC power supply.<br>Over rated current requirements, there will be some risk.   | Refer to standard electrical characteristic spec.  |                  |                                 |           |                                |       |  |        |             |      |          |      |  |           |      |  |
| <b>Temperature Rise Test</b>        | <ul style="list-style-type: none"> <li>Applied the allowed DC current.</li> <li>Temperature measured by digital surface thermometer.</li> </ul>   | Rated Current < 1A $\Delta T$ 20°C Max.<br>Rated Current $\geq$ 1A $\Delta T$ 40°C Max.  |                  |                                 |           |                                |       |  |        |             |      |          |      |  |           |      |  |
| <b>Solderability</b>                | Preheat: 150°C for 60sec.<br>Solder: Sn:96.5% - Ag:3% - Cu:0.5%<br>Solder temperature: 245±5°C<br>Flux for lead free: Rosin. 9.5%<br>Depth: completely cover the termination.<br>Dip time: 4±1sec.  | More than 95% of the terminal electrode should be covered with solder.   |                  |                                 |           |                                |       |  |        |             |      |          |      |  |           |      |  |
| <b>Resistance to Soldering Heat</b> | Solder temperature: 260±5°C for 10 seconds.<br>Temperature ramp/immersion and emersion rate 25±6 mm/s.<br>Completely cover the termination.   | Appearance: no damage.<br>Impedance: within±15%of initial value.<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. |                  |                                 |           |                                |       |  |        |             |      |          |      |  |           |      |  |
| <b>Vibration</b>                    | Preconditioning: Run through IR reflow for 2 times.<br>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)  | Appearance: no damage.<br>Impedance: within±15%of initial value.<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. |                  |                                 |           |                                |       |  |        |             |      |          |      |  |           |      |  |
| <b>Shock</b>                        | Test condition:<br><table border="1"> <thead> <tr> <th>Type</th> <th>Peak Value (g's)</th> <th>Normal duration (ms)</th> <th>Wave Form</th> <th>Velocity change (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 (ms)            | Wave Form | Velocity change (ft/sec)       | SMD   | 50   | 11     | Half-sine   | 11.3 | Lead     | 50   | 11   | Half-sine | 11.3 | Appearance: no damage.<br>Impedance: within±10%of initial value.<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. |
| Type                                | Peak Value (g's)  | Normal duration (ms)   | Wave Form        | Velocity change (ft/sec)        |           |                                |       |  |        |             |      |          |      |  |           |      |  |
| SMD                                 | 50  | 11   | Half-sine        | 11.3                            |           |                                |       |  |        |             |      |          |      |  |           |      |  |
| Lead                                | 50  | 11   | Half-sine        | 11.3                            |           |                                |       |  |        |             |      |          |      |  |           |      |  |
| <b>Terminal strength</b>            | Preconditioning: Run through IR reflow for 2 times.<br>With component mounted on a PCB apply a force <ul style="list-style-type: none"> <li>&gt;0805inch(2012mm):1kg</li> <li>&lt;=0805inch(2012mm):0.5kg</li> </ul> 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.<br>Impedance: within±15%of initial value.<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. |                  |                                 |           |                                |       |  |        |             |      |          |      |  |           |      |  |
| <b>Thermal Shock</b>                | Preconditioning: Run through IR reflow for 2 times.<br>Number of cycles: 500. Condition for 1 cycle:<br><table border="1"> <thead> <tr> <th>No.</th> <th>Temp. (°C)</th> <th>Time (min.)</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>-40±2°C</td> <td>30±5</td> </tr> <tr> <td>2</td> <td>25±2°C</td> <td>≤30 seconds</td> </tr> <tr> <td>3</td> <td>+105±2°C</td> <td>30±5</td> </tr> </tbody> </table> Measured at room temperature after placing for 24±2 hrs. | No.  | Temp. (°C)       | Time (min.)                     | 1         | -40±2°C                        | 30±5  | 2  | 25±2°C | ≤30 seconds | 3    | +105±2°C | 30±5 | Appearance: no damage.<br>Impedance: within±15%of initial value.<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. |           |      |  |
| No.                                 | Temp. (°C)  | Time (min.)  |                  |                                 |           |                                |       |  |        |             |      |          |      |  |           |      |  |
| 1                                   | -40±2°C   | 30±5   |                  |                                 |           |                                |       |  |        |             |      |          |      |  |           |      |  |
| 2                                   | 25±2°C  | ≤30 seconds  |                  |                                 |           |                                |       |  |        |             |      |          |      |  |           |      |  |
| 3                                   | +105±2°C  | 30±5   |                  |                                 |           |                                |       |  |        |             |      |          |      |  |           |      |  |
| <b>Bending</b>                      | Shall be mounted on a FR4 substrate of the following dimensions:<br><table border="1"> <thead> <tr> <th>Dimensions</th> <th>Bending depth</th> </tr> </thead> <tbody> <tr> <td>&gt;=0805inch(2012mm):40x100x1.2mm</td> <td>1.2mm</td> </tr> <tr> <td>&lt;0805inch(2012mm):40x100x0.8mm</td> <td>0.8mm</td> </tr> </tbody> </table> Duration of 10 sec for a min.  | Dimensions   | Bending depth    | >=0805inch(2012mm):40x100x1.2mm | 1.2mm     | <0805inch(2012mm):40x100x0.8mm | 0.8mm | Appearance: no damage.<br>Impedance: within±10%of initial value.<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. |        |             |      |          |      |  |           |      |  |
| Dimensions                          | Bending depth   |  |                  |                                 |           |                                |       |  |        |             |      |          |      |  |           |      |  |
| >=0805inch(2012mm):40x100x1.2mm     | 1.2mm   |  |                  |                                 |           |                                |       |  |        |             |      |          |      |  |           |      |  |
| <0805inch(2012mm):40x100x0.8mm      | 0.8mm   |  |                  |                                 |           |                                |       |  |        |             |      |          |      |  |           |      |  |

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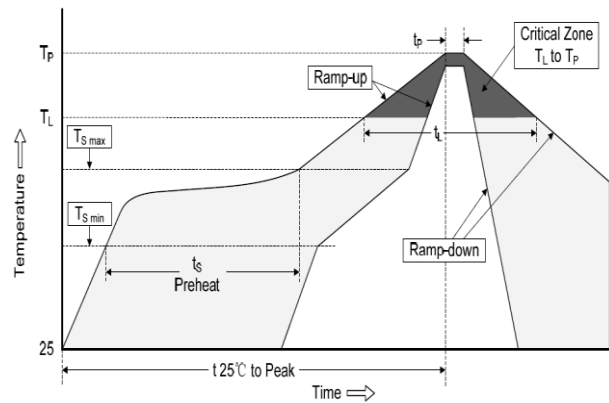
**MERITEK**

## RELIABILITY TEST CONDITON AND REQUIREMENT (CONTINUED)

| Item                  | Test Conditions / Equipment  | Requirement  |
|-----------------------|--|--|
| Load Humidity         | Preconditioning: Run through IR reflow for 2 times.<br>Humidity: 85±2%R.H. Temperature: 85±2°C.<br>Duration: 1000hrs Min. with 100% rated current.<br>Measured at room temperature after 24±2 hrs. | Appearance: no damage.<br>Impedance: within±15%of initial value.<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. |
| Life Test             | Preconditioning: Run through IR reflow for 2 times.<br>Temperature: 105±2°C<br>Applied current: rated current. Duration: 1000±12 Hrs.<br>Measured at room temperature after 24±2 Hrs.              | Appearance: no damage.<br>Impedance: within±15%of initial value.<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. |
| Insulation Resistance | Test voltage:100±10%V for 30sec.   | IR>1GΩ   |

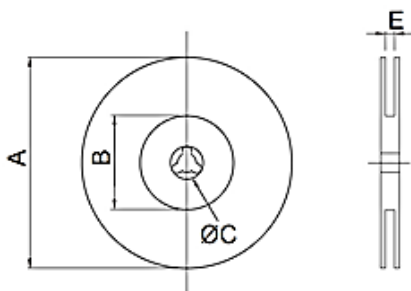
## RECOMMENDED SOLDERING PROFILES

| 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 ~180 seconds |
| Reflow   | Temp. ( $T_L$ )               | 217°C           |
|  | Time (min. to max.) ( $t_L$ ) | 60 ~150 seconds |
| Peak Temperature ( $T_P$ )                           |                               | 260°C           |
| Time within 5°C of actual peak Temperature ( $t_p$ ) |                               | 10 seconds max. |
| Reflow times:  |                               | 3 times Max.    |

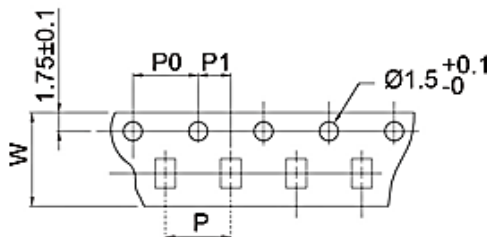


## PACKAGING

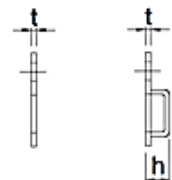
CARRIER TAPE REELS



TAPE DIMENSION (mm)



Paper Plastic



| Series    | Reel Dimension (mm) |           |           |           | Tape Dimensions (mm) |            |             |             |            |            | Parts Per Reel |
|-----------|---------------------|-----------|-----------|-----------|----------------------|------------|-------------|-------------|------------|------------|----------------|
|           | A<br>±2.0           | B<br>±2.0 | C<br>±0.5 | E<br>±0.5 | W<br>±0.20           | P<br>±0.10 | P0<br>±0.10 | P1<br>±0.10 | t<br>±0.05 | h<br>±0.10 |                |
| PIM03-23T | 178.0               | 60.0      | 13.5      | 9.0       | 8.00                 | 4.00       | 4.00        | 2.00        | -          | -          | 4,000          |
| PIM05-23T | 178.0               | 60.0      | 13.5      | 9.0       | 8.00                 | 4.00       | 4.00        | 2.00        | -          | -          | 4,000          |
| PIM06-23T | 178.0               | 60.0      | 13.5      | 9.0       | 8.00                 | 4.00       | 4.00        | 2.00        | -          | -          | 3,000          |
| PIM08-23T | 178.0               | 60.0      | 13.5      | 9.0       | 8.00                 | 4.00       | 4.00        | 2.00        | 0.30       | 1.28       | 3,000          |

\*Specifications subject to change without notice.