

# APPROVAL SHEET

## **WLBD1608 Chip Bead**

\*Contents in this sheet are subject to change without prior notice.

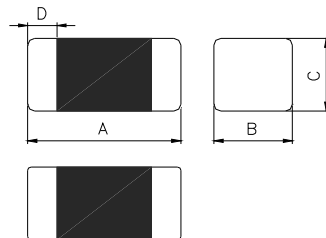
## FEATURES

1. Closed magnetic circuit.

## APPLICATIONS

1. Noise reduction for general signal and DC line for General electronic circuits. Ex:PCs 、Networking and Consumer electronics.

## SHAPE and DIMENSION



| Chip Size |           |
|-----------|-----------|
| <b>A</b>  | 1.60±0.15 |
| <b>B</b>  | 0.80±0.15 |
| <b>C</b>  | 0.80±0.15 |
| <b>D</b>  | 0.30±0.20 |

Units: mm

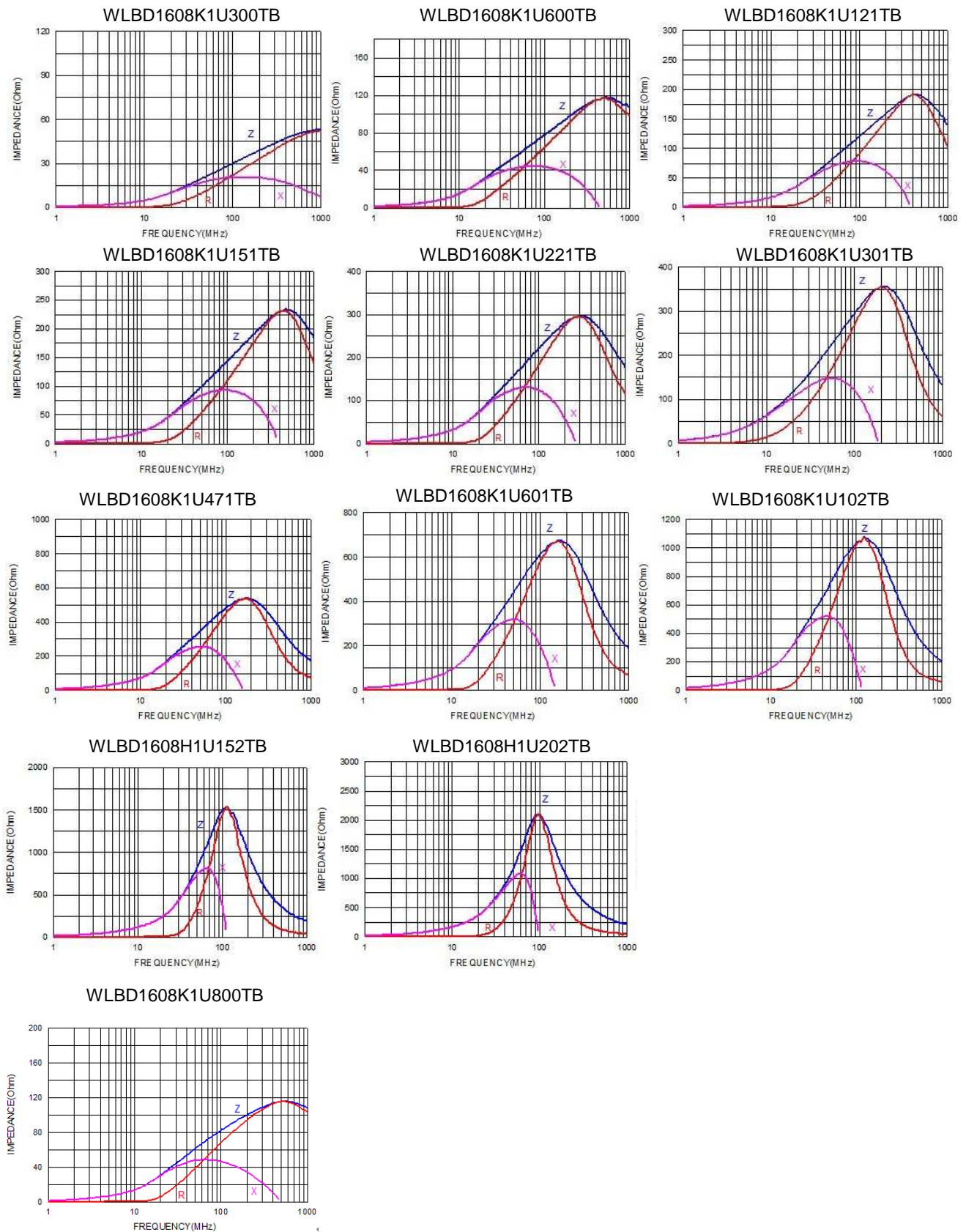
## Ordering Information

| WL                                     | BD                              | 1608  | K1   | U                           | 300  | T   | B     |
|--|---------------------------------|---|--|-----------------------------|--|---|-------|
| <b>Product Code</b><br>WL:<br>Inductor | <b>Series</b><br>BD: Chip Bead. | <b>Dimensions</b><br>1.6 * 0.8 mm<br>1608 :EIA 0603 | <b>Series extension</b><br>Refer to characteristic | <b>Tolerance</b><br>U: ±25% | <b>Value</b><br>300 =30 OHM<br>301 =300 OHM<br>152 =1500 OHM | <b>Packing Code</b><br>T = 7"<br>Paper Tape | B:STD |

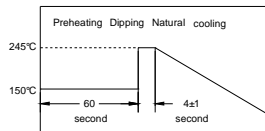
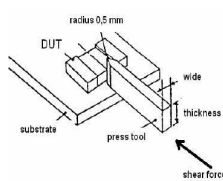
## Electrical Characteristics

### ● WLBD1608 series

| Walsin Part Number | Impedance ( $\Omega$ ) | Test Frequency (MHz) | DC Resistance ( $\Omega$ ) max. | Rated Current (mA) max. |
|--------------------|------------------------|----------------------|---------------------------------|-------------------------|
| WLBD1608K1U300TB   | 30 $\pm$ 25%           | 100                  | 0.20                            | 700                     |
| WLBD1608K1U600TB   | 60 $\pm$ 25%           | 100                  | 0.20                            | 700                     |
| WLBD1608K1U800TB   | 80 $\pm$ 25%           | 100                  | 0.20                            | 700                     |
| WLBD1608K1U121TB   | 120 $\pm$ 25%          | 100                  | 0.25                            | 600                     |
| WLBD1608K1U151TB   | 150 $\pm$ 25%          | 100                  | 0.25                            | 600                     |
| WLBD1608K1U221TB   | 220 $\pm$ 25%          | 100                  | 0.30                            | 550                     |
| WLBD1608K1U301TB   | 300 $\pm$ 25%          | 100                  | 0.35                            | 500                     |
| WLBD1608K1U471TB   | 470 $\pm$ 25%          | 100                  | 0.45                            | 350                     |
| WLBD1608K1U601TB   | 600 $\pm$ 25%          | 100                  | 0.50                            | 350                     |
| WLBD1608K1U102TB   | 1000 $\pm$ 25%         | 100                  | 0.70                            | 200                     |
| WLBD1608H1U152TB   | 1500 $\pm$ 25%         | 100                  | 1.00                            | 200                     |
| WLBD1608H1U202TB   | 2000 $\pm$ 25%         | 100                  | 1.20                            | 150                     |

**Characteristic Curve**

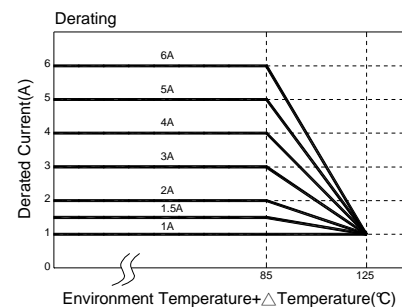
## Test condition &amp; Requirements

| Item                                    | Performance  | Test Condition   |                  |  |  |                            |                            |                |    |    |           |      |      |    |    |           |      |
|---|--|--|------------------|--|--|----------------------------|----------------------------|----------------|----|----|-----------|------|------|----|----|-----------|------|
| Operating Temperature                   | -40~+125℃<br>(Including self-temperature rise)   | --   |                  |  |  |                            |                            |                |    |    |           |      |      |    |    |           |      |
| Transportation<br>Storage Temperature   | -40~+125℃<br>(on board)  | For long storage conditions, please see the Application Notice   |                  |  |  |                            |                            |                |    |    |           |      |      |    |    |           |      |
| Impedance (Z)                           | Refer to standard electrical characteristics list  | Agilent4291  |                  |  |  |                            |                            |                |    |    |           |      |      |    |    |           |      |
| Inductance (Ls)                         |  | Agilent E4991  |                  |  |  |                            |                            |                |    |    |           |      |      |    |    |           |      |
| Q Factor                                |  | Agilent4287  |                  |  |  |                            |                            |                |    |    |           |      |      |    |    |           |      |
| DC Resistance                           |  | Agilent16192   |                  |  |  |                            |                            |                |    |    |           |      |      |    |    |           |      |
| Rated Current                           |  | Agilent 4338   |                  |  |  |                            |                            |                |    |    |           |      |      |    |    |           |      |
|   |  | DC Power Supply<br>Over Rated Current requirements, there will be some risk  |                  |  |  |                            |                            |                |    |    |           |      |      |    |    |           |      |
| Temperature Rise Test                   | Rated Current < 1A ΔT 20℃ Max<br>Rated Current ≥ 1A ΔT 40℃ Max   | 1. Applied the allowed DC current.<br>2. Temperature measured by digital surface thermometer.  |                  |  |  |                            |                            |                |    |    |           |      |      |    |    |           |      |
| Resistance to Soldering<br>Heat         | 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   | Number of heat cycles: 1   |                  |  |  |                            |                            |                |    |    |           |      |      |    |    |           |      |
|   |  | <table><tr><th>Temperature (℃)</th><th>Time (s)</th><th>Temperature ramp/immersion and emersion rate</th></tr><tr><td>260 ±5 (solder temp)</td><td>10 ±1</td><td>25mm/s ±6 mm/s</td></tr></table>  | Temperature (℃)  | Time (s)                                     | Temperature ramp/immersion and emersion rate | 260 ±5 (solder temp)       | 10 ±1                      | 25mm/s ±6 mm/s |    |    |           |      |      |    |    |           |      |
|   |  | Temperature (℃)  | Time (s)         | Temperature ramp/immersion and emersion rate |  |                            |                            |                |    |    |           |      |      |    |    |           |      |
| 260 ±5 (solder temp)                    | 10 ±1  | 25mm/s ±6 mm/s   |                  |  |  |                            |                            |                |    |    |           |      |      |    |    |           |      |
| Depth: completely cover the termination |  |  |                  |  |  |                            |                            |                |    |    |           |      |      |    |    |           |      |
| Solderability                           | More than 95% of the terminal electrode should be covered with solder.<br>  | Preheat: 150℃,60sec.<br>Solder: Sn96.5%-Ag3%-Cu0.5%<br>Solder temperature: 245±5℃<br>Flux for lead free: Rosin. 9.5%<br>Depth: completely cover the termination.<br>Dip time: 4±1sec.  |                  |  |  |                            |                            |                |    |    |           |      |      |    |    |           |      |
| Terminal strength                       | 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<br> | Preconditioning: Run through IR reflow for 2 times.( IPC/JEDEC J-STD-020D Classification Reflow Profiles)<br>Component mounted on a PCB apply a force (>0805:1kg <=0805:0.5kg)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. |                  |  |  |                            |                            |                |    |    |           |      |      |    |    |           |      |
| Bending                                 | 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   | Shall be mounted on a FR4 substrate of the following dimensions:>=0805:40x100x1.2mm<br><0805:40x100x0.8mm<br>Bending depth:>=0805:1.2mm<br><0805:0.8mm<br>Duration of 10 sec for a min.  |                  |  |  |                            |                            |                |    |    |           |      |      |    |    |           |      |
| Vibration Test                          | 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   | Preconditioning: Run through IR reflow for 2 times.( IPC/JEDEC J-STD-020D Classification Reflow Profiles)<br>Oscillation Frequency: 10~2K~10Hz 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) °  |                  |  |  |                            |                            |                |    |    |           |      |      |    |    |           |      |
| Shock                                   | 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   | Test condition:  |                  |  |  |                            |                            |                |    |    |           |      |      |    |    |           |      |
|   |  | <table><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><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></table>  | 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 |
|   |  | 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   |  |                            |                            |                |    |    |           |      |      |    |    |           |      |

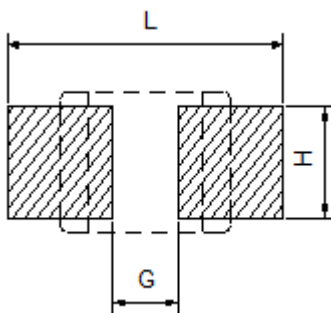
| Item                  | Performance   | Test Condition   |
|-----------------------|---|--|
| Life test             | Appearance: no damage.  | Preconditioning: Run through IR reflow for 2 times.( IPC/JEDEC J-STD-020D Classification Reflow Profiles)<br>Temperature: 125±2℃ (bead), 105±2℃ (Inductor)<br>Applied current: rated current.<br>Duration: 1000±12hrs.<br>Measured at room temperature after placing for 24±2 hrs.   |
| Load Humidity         | 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                           | Preconditioning: Run through IR reflow for 2 times.( IPC/JEDEC J-STD-020D Classification Reflow Profiles)<br>Humidity: 85±2%R.H.<br>Temperature: 85±2℃.<br>Duration: 1000hrs Min. with 100% rated current.<br>Measured at room temperature after placing for 24±2 hrs.   |
| Thermal shock         | 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 | Preconditioning: Run through IR reflow for 2 times.( IPC/JEDEC J-STD-020D Classification Reflow Profiles)<br>Condition for 1 cycle<br>Step1: -40±2℃ 30±5 min.<br>Step2: 25±2℃ ≤0.5min<br>Step3: +125±2℃ 30±5min. (Bead)<br>Step3: +105±2℃ 30±5min. (Inductor)<br>Number of cycles: 500<br>Measured at room temperature after placing for 24±2 hrs. |
| Insulation Resistance | IR>1GΩ  | Chip Inductor Only<br>Test Voltage:100±10%V for 30Sec.   |

### \*\*Derating Curve

For the ferrite chip bead which withstanding current over 1.5A, as the operating temperature over 85℃, the derating current information is necessary to consider with. For the detail derating of current, please refer to the Derated Current vs. Operating Temperature curve.



### Soldering and Mounting



|          | L (mm) | G (mm) | H (mm) |
|----------|--------|--------|--------|
| WLBD1608 | 2.6    | 0.6    | 0.8    |

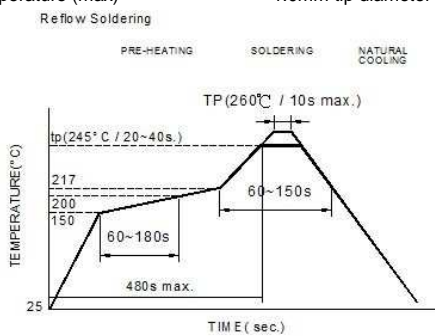
Mildly activated rosin fluxes are preferred. The terminations are suitable for re-flow soldering systems. If hand soldering cannot be avoided, the preferred technique is the utilization of hot air soldering tools.

Note. If wave soldering is used ,there will be some risk.  
Re-flow soldering temperatures below 240 degrees, there will be non-wetting risk

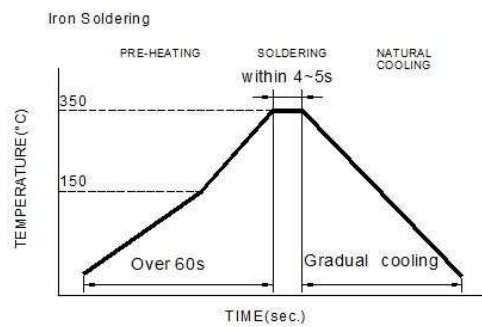
Recommended temperature profiles for lead free re-flow soldering in Figure 1. (Referred to J-STD-020C)

Products attachment with a soldering iron is discouraged due to the inherent process control limitations. If a soldering iron must be employed the following precautions are recommended, for Iron Soldering in Figure 2.

- Preheat circuit and products to 150°C
- 350°C tip temperature (max)
- Never contact the ceramic with the iron tip
- 1.0mm tip diameter (max)
- Use a 20 watt soldering iron with tip diameter of 1.0mm
- Limit soldering time to 4~5sec.

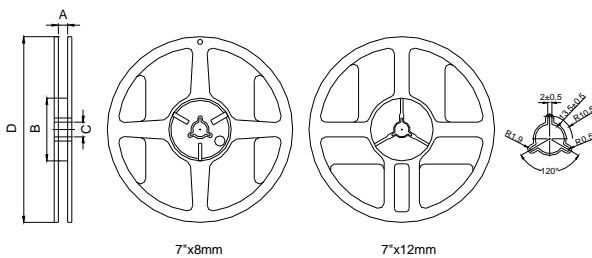


Reflow times: 3 times max.  
Fig.1



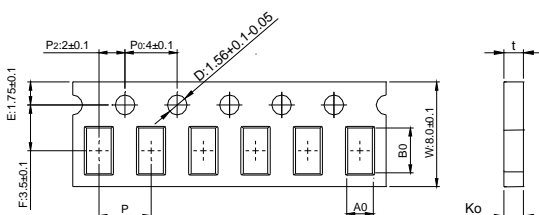
Iron Soldering times : 1 times max  
Fig.2

## Reel Dimension

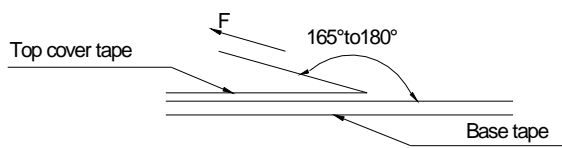


| Type    | A(mm)    | B(mm) | C(mm)    | D(mm) |
|---------|----------|-------|----------|-------|
| 7"x8mm  | 9.0±0.5  | 60±2  | 13.5±0.5 | 178±2 |
| 7"x12mm | 13.5±0.5 | 60±2  | 13.5±0.5 | 178±2 |

■Material of taping is paper



| Size    | Bo(mm)    | Ao(mm)          | Ko(mm)    | P(mm)    | t(mm)     |
|---------|-----------|-----------------|-----------|----------|-----------|
| WLB1608 | 1.80±0.05 | 0.96+0.05/-0.03 | 0.95±0.05 | 4.0±0.10 | 0.95±0.05 |



The force for tearing off cover tape is 15 to 60 grams in the arrow direction under the following conditions

| Room Temp. (°C) | Room Humidity (%) | Room atm (hPa) | Tearing Speed mm/min |
|-----------------|-------------------|----------------|----------------------|
| 5~35            | 45~85             | 860~1060       | 300                  |

Products meet IPC/JEDEC J-STD-020D standard-MSL, level 1.

Quantity per reel : 4K pcs / reel



# Mouser Electronics

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[WLBD1608K1U300TB](#)