# Multilayer Ceramic Chip Inductors
# MHI_D Series, 0603 Size

## *Features:*

- RoHS compliant
- Excellent Q factor and SRF characteristics
- Small size of 1005/1608 is suitable for small portable devices
- Supports operating frequency up to 6GHz with nominal inductance values from 1.0nH to 470nH.

## *Applications:*

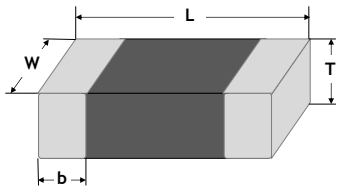
- RF resonance and impedance matching circuit
- RF and wireless communication
- Information technology equipment, computers, telecommunications, radar detectors, automotive electronics, cellular phones, pagers, PDAs, keyless remote systems
- L-C filter configurations

## *Ordering Code:*

| MHI | 0603 | D | 10N | J | T |
|---|---|---|---|---|---|
| **Series Code** | **Size Code** inch (mm) | **Characteristic Code** | **Inductance Code** | **Tolerance Code** | **Package Code** |
| **MHI**: Multilayer ceramic chip inductor | **0603** (1608) | | **1N0** = 1nH<br>**10N** = 10nH<br>**R10** = 100nH | **J** = ±5%<br>**K** = ±10%<br>**S** = ±0.3nH | **T** = Tape & Reel |

## *Shape and Dimensions:*

| Unit (mm) | 0603 (1608) |
|---|---|
| Length (L) | 1.6±0.15 |
| Width (W) | 0.8±0.15 |
| Thickness (T) | 0.8±0.15 |
| Termination bandwidth (b) | 0.3±0.20 |



## *General Electrical Characteristics:*

✧ Operating temperature: -55 to +125°C (including self-temperature rise)

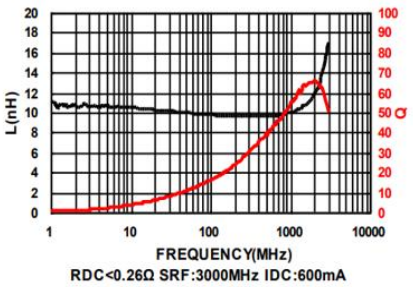
| Part Number | Inductance (nH) | L Test Frequency | Q Min. @ 100MHz | SRF typ. (MHz) | RDC Max. (Ω) | IDC [1] Max. (mA) | Tolerance |
|---|---|---|---|---|---|---|---|
| **MHI0603D10NJT** | 10 | 100 MHz, 200 mV | 12 | 3,000 | 0.26 | 600 | 5/10 |
| **MHI0603D12NJT** | 12 | 100 MHz, 200 mV | 12 | 2,600 | 0.28 | 600 | 5/10 |
| **MHI0603D15NJT** | 15 | 100 MHz, 200 mV | 12 | 2,500 | 0.32 | 600 | 5/10 |
| **MHI0603D18NJT** | 18 | 100 MHz, 200 mV | 12 | 2,400 | 0.35 | 600 | 5/10 |
| **MHI0603D1N0ST** | 1.0 | 100 MHz, 200 mV | 8 | 10,000 | 0.10 | 600 | ±0.3nH |
| **MHI0603D1N5ST** | 1.5 | 100 MHz, 200 mV | 8 | 8,000 | 0.10 | 600 | ±0.3nH |
| **MHI0603D1N8ST** | 1.8 | 100 MHz, 200 mV | 8 | 8,000 | 0.10 | 600 | ±0.3nH |
| **MHI0603D22NJT** | 22 | 100 MHz, 200 mV | 12 | 2,000 | 0.40 | 500 | 5/10 |
| **MHI0603D27NJT** | 27 | 100 MHz, 200 mV | 12 | 1,900 | 0.45 | 500 | 5/10 |
| **MHI0603D2N2ST** | 2.2 | 100 MHz, 200 mV | 8 | 7,200 | 0.10 | 600 | ±0.3nH |
| **MHI0603D2N7ST** | 2.7 | 100 MHz, 200 mV | 10 | 6,200 | 0.10 | 600 | ±0.3nH |
| **MHI0603D33NJT** | 33 | 100 MHz, 200 mV | 12 | 1,600 | 0.55 | 400 | 5/10 |
| **MHI0603D39NJT** | 39 | 100 MHz, 200 mV | 12 | 1,400 | 0.60 | 400 | 5/10 |
| **MHI0603D3N3ST** | 3.3 | 100 MHz, 200 mV | 10 | 5,200 | 0.12 | 600 | ±0.3nH/10 |
| **MHI0603D3N9ST** | 3.9 | 100 MHz, 200 mV | 10 | 5,000 | 0.14 | 600 | ±0.3nH/10 |
| **MHI0603D47NJT** | 47 | 100 MHz, 200 mV | 12 | 1,300 | 0.70 | 400 | 5/10 |
| **MHI0603D4N7ST** | 4.7 | 100 MHz, 200 mV | 10 | 4,750 | 0.16 | 600 | ±0.3nH/10 |
| **MHI0603D56NJT** | 56 | 100 MHz, 200 mV | 12 | 1,100 | 0.75 | 400 | 5/10 |
| **MHI0603D5N6ST** | 5.6 | 100 MHz, 200 mV | 10 | 4,100 | 0.18 | 600 | ±0.3nH/10 |
| **MHI0603D68NJT** | 68 | 100 MHz, 200 mV | 12 | 1,050 | 0.85 | 400 | 5/10 |
| **MHI0603D6N8ST** | 6.8 | 100 MHz, 200 mV | 10 | 3,750 | 0.22 | 600 | 5/10 |
| **MHI0603D82NJT** | 82 | 100 MHz, 200 mV | 12 | 900 | 1.00 | 300 | 5/10 |
| **MHI0603D8N2ST** | 8.2 | 100 MHz, 200 mV | 10 | 3,300 | 0.24 | 600 | 5/10 |
| **MHI0603DR10JT** | 100 | 100 MHz, 200 mV | 12 | 770 | 1.20 | 300 | 5/10 |
| **MHI0603DR12JT** | 120 | 100 MHz, 200 mV | 8 | 650 | 1.30 | 300 | 5/10 |
| **MHI0603DR15JT** | 150 | 100 MHz, 200 mV | 8 | 2,400 | 1.70 | 250 | 5/10 |
| **MHI0603DR18JT** | 180 | 100 MHz, 200 mV | 8 | 2,400 | 1.90 | 250 | 5/10 |
| **MHI0603DR22JT** | 220 | 100 MHz, 200 mV | 8 | 2,000 | 2.00 | 250 | 5/10 |

[1] IDC: Applied the current to coils, the inductance shall be less than 10% initial value.

## *High Frequency Characteristics:*

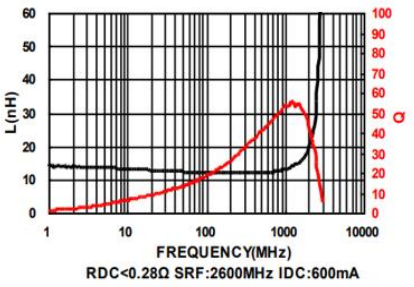
Test Instruments：Agilent E4991A Material/Impedance Analyzer

MHI0603D10NJT



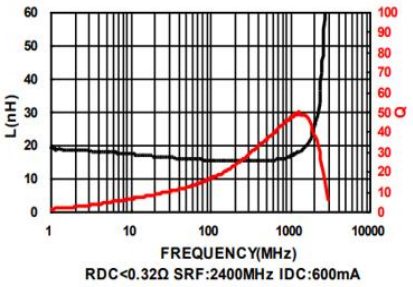

RDC<0.26Ω SRF:3000MHz IDC:600mA

MHI0603D12NJT



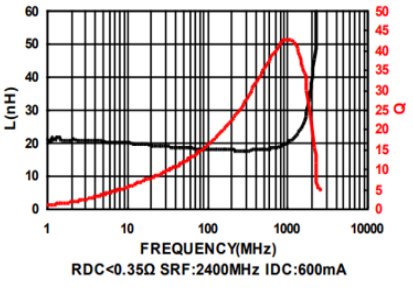

RDC<0.28Ω SRF:2600MHz IDC:600mA

MHI0603D15NJT



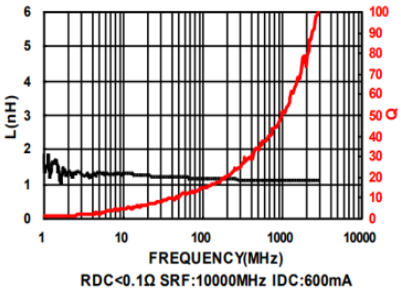

RDC<0.32Ω SRF:2400MHz IDC:600mA

MHI0603D18NJT



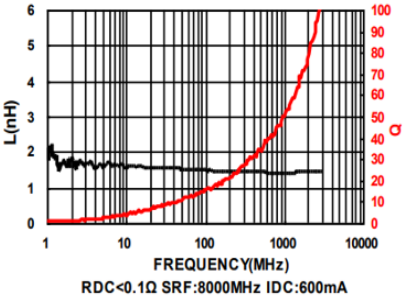

RDC<0.35Ω SRF:2400MHz IDC:600mA

MHI0603D1N0ST



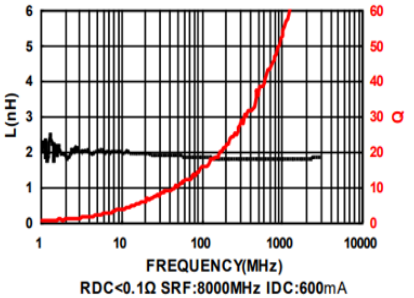

RDC<0.1Ω SRF:10000MHz IDC:600mA

MHI0603D1N5ST



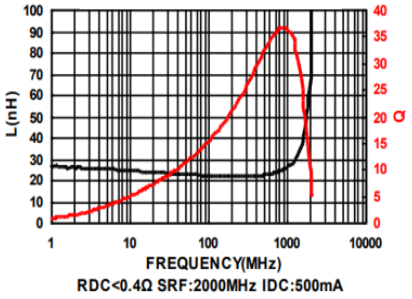

RDC<0.1Ω SRF:8000MHz IDC:600mA

MHI0603D1N8ST



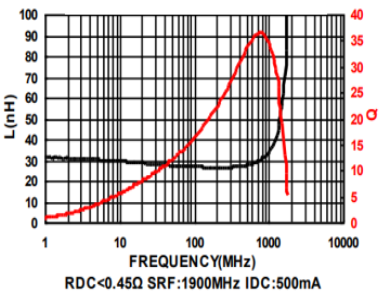

RDC<0.1Ω SRF:8000MHz IDC:600mA

MHI0603D22NJT



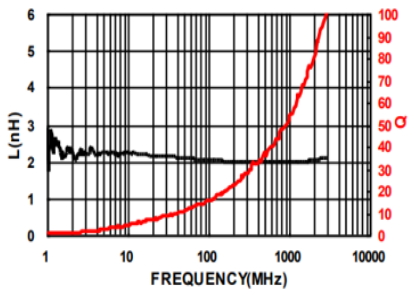

RDC<0.4Ω SRF:2000MHz IDC:500mA

MHI0603D27NJT



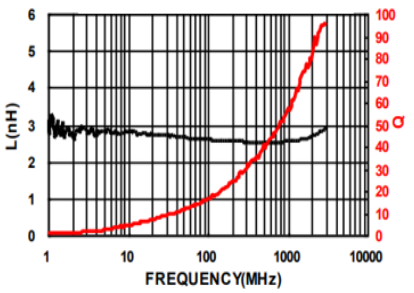

RDC<0.45Ω SRF:1900MHz IDC:500mA

MHI0603D2N2ST



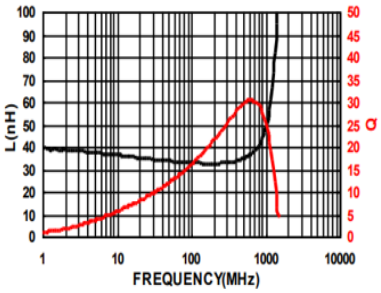

RDC<0.1Ω SRF:7200MHz IDC:600mA

MHI0603D2N7ST



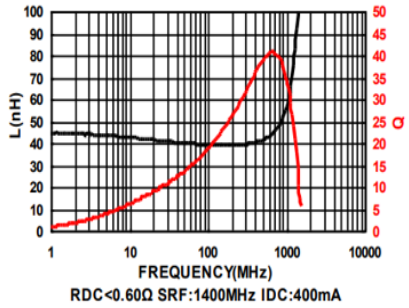

RDC<0.10Ω SRF:6200MHz IDC:600mA

MHI0603D33NJT



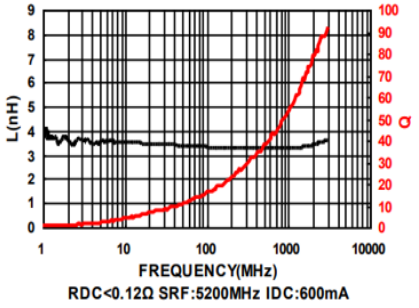

RDC<0.55Ω SRF:1600MHz IDC:400mA

MHI0603D39NJT



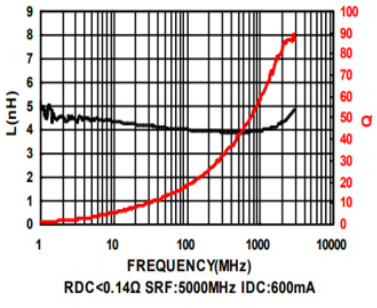

RDC<0.60Ω SRF:1400MHz IDC:400mA

MHI0603D3N3ST



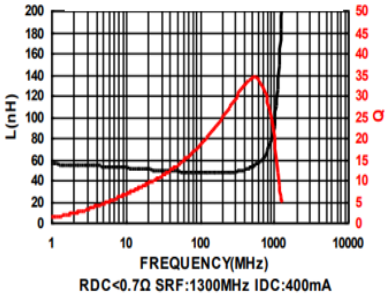

RDC<0.12Ω SRF:5200MHz IDC:600mA

MHI0603D3N9ST



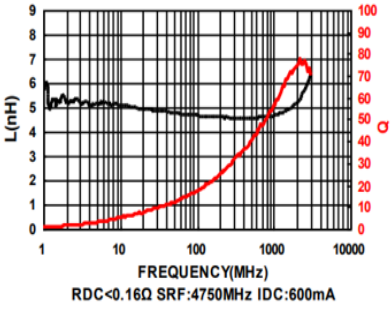

RDC<0.14Ω SRF:5000MHz IDC:600mA

MHI0603D47NJT



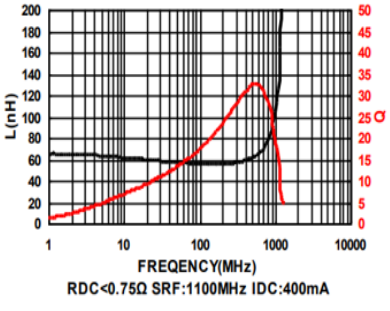

RDC<0.7Ω SRF:1300MHz IDC:400mA

MHI0603D4N7ST



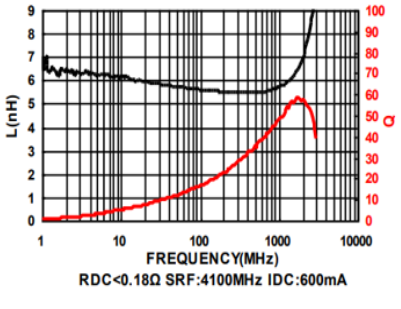

RDC<0.16Ω SRF:4750MHz IDC:600mA

MHI0603D56NJT



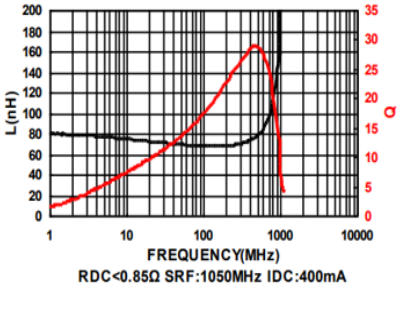

RDC<0.75Ω SRF:1100MHz IDC:400mA

MHI0603D5N6ST



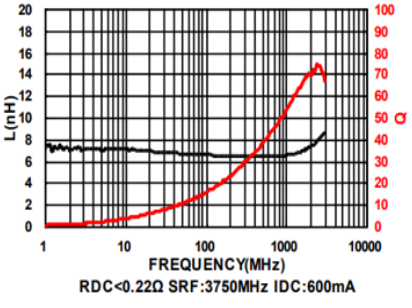

RDC<0.18Ω SRF:4100MHz IDC:600mA

MHI0603D68NJT



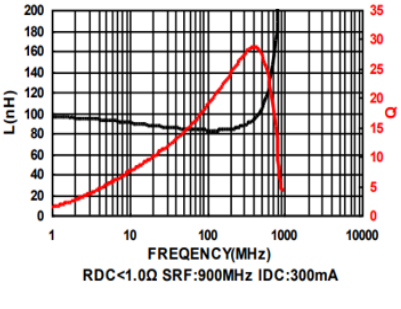

RDC<0.85Ω SRF:1050MHz IDC:400mA

MHI0603D6N8ST



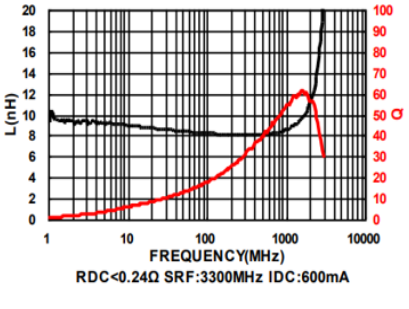

RDC<0.22Ω SRF:3750MHz IDC:600mA

MHI0603D82NJT



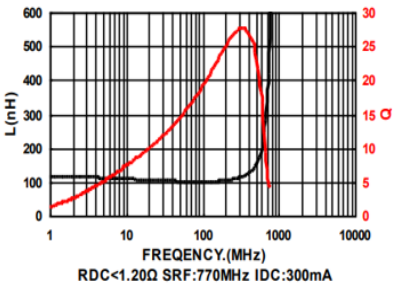

RDC<1.0Ω SRF:900MHz IDC:300mA

MHI0603D8N2ST



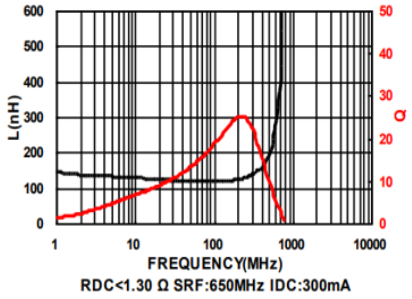

RDC<0.24Ω SRF:3300MHz IDC:600mA

MHI0603DR10JT

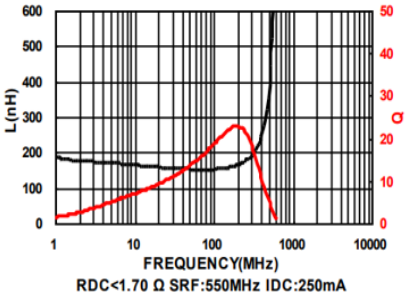



RDC<1.20Ω SRF:770MHz IDC:300mA

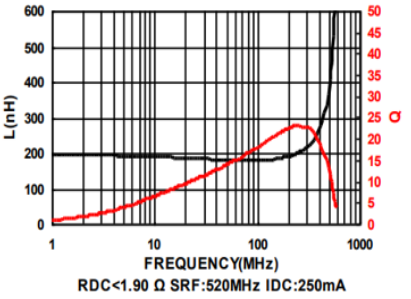
MHI0603DR12JT



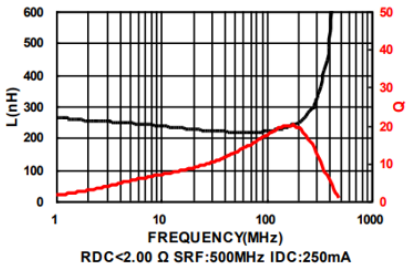

MHI0603DR15JT



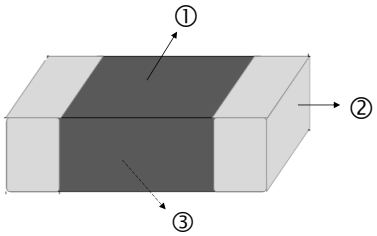

MHI0603DR18JT




MHI0603DR22JT

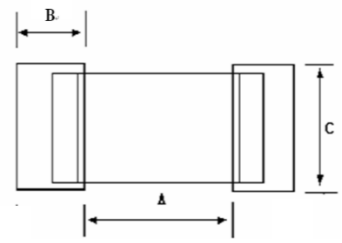



## *Construction and Materials:*




| | |
|---|---|
| **Body ①** | $Al_2O_3/SiO_2$ base ceramic |
| **Termination ②** | Ag/Cu/Ni/Sn |
| **Inner electrode ③** | Ag |

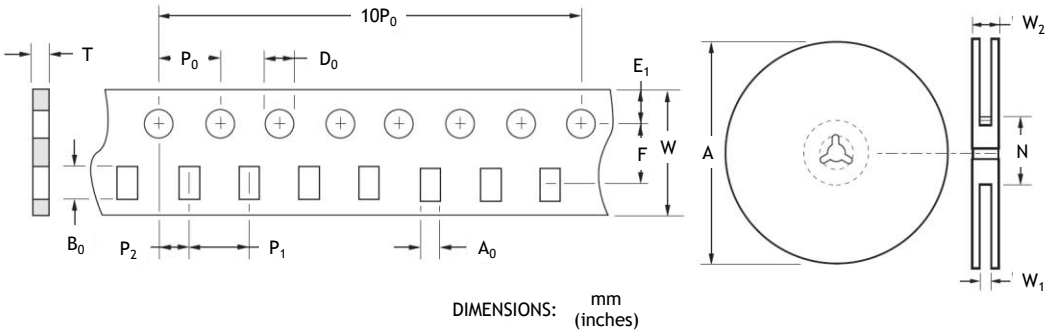
## *Recommended Foot Print Dimensions:*




| Size | A (mm) | B (mm) | C (mm) |
|---|---|---|---|
| 0603 | 0.70~0.80 | 0.55~0.60 | 0.80~0.90 |

## *Tape and Reel Specifications:*

| Dimensions (Tape) | MHI0603D Series | Dimensions (Reel) | MHI0603D Series |
|---|---|---|---|
| **W** | 8.0±0.1 (0.315±0.004) | **A max.** | 178 (7.01) |
| **$P_0$** | 4.0±0.1 (0.157±0.004) | **N min.** | 60 (2.362) |
| **$P_1$** | 4.0±0.05 (0.157±0.002) | **$W_1$** | 9.0 (0.354) |
| **$P_2$** | 2.0±0.05 (0.079±0.002) | **$W_2$** | 12 (0.472) |
| **$A_0$** | 1.0±0.1 (0.039±0.004) | | |
| **$B_0$** | 1.8±0.1 (0.071±0.004) | | |
| **$D_0$** | 1.55±0.1 (0.061±0.004) | | |
| **F** | 3.5±0.05 (0.138±0.002) | | |
| **$E_1$** | 1.75±0.1 (0.069±0.004) | | |
| **T** | 0.95±0.05 (0.037±0.002) | | |
| **$10P_0$** | 40.0±0.1 (1.575±0.004) | | |

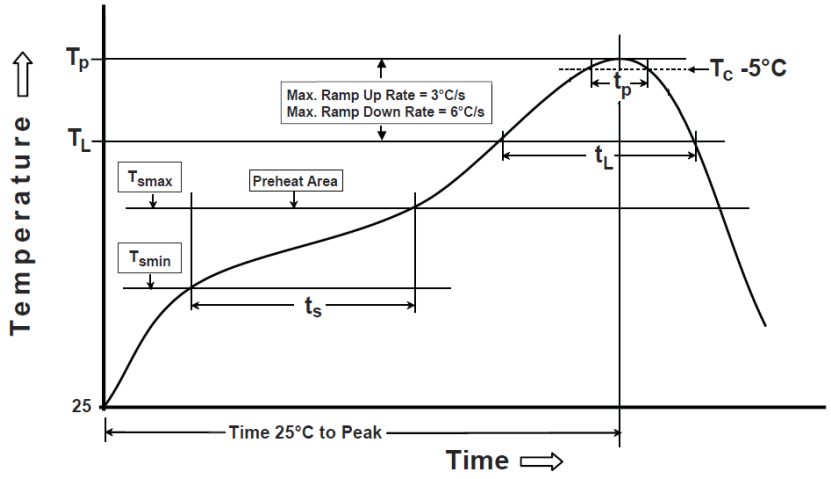



DIMENSIONS: mm (inches)

## *Packaging:*

| Chip Size | Parts on 7 inch (178mm) Reel |
|---|---|
| 0603 | 4,000 |

## *Recommended Reflow Soldering Profile:*



| Profile Feature | Pb-Free Assembly |
|---|---|
| **Preheat/Soak** | |
| Temperature Min ($T_{smin}$) | 150°C |
| Temperature Max($T_{smax}$) | 200°C |
| Time($t_s$) from ($T_{smin}$ to $T_{smax}$) | 60~120 seconds |
| Ramp-uprate ($T_L$ to $T_p$) | 3°C/second max. |
| Liquidous temperature($T_L$) | 217°C |
| Time($t_L$) maintained above $T_L$ | 60~150 seconds |
| Peak package body temperature ($T_p$) | 260°C |
| Time ($t_p$)*within 5°C of the specified classification temperature ($T_c$) | 30 seconds * |
| Ramp-down rate ($T_p$ to $T_L$) | 6°C/second max. |
| Time 25°C to peak temperature | 8 minutes max. |
| * Tolerance for peak profile temperature ($T_p$) is defined as a supplier minimum and a user maximum | |

Do not use this product in any Automotive Power train or Safety equipment such as ECU, ABS systems, or Battery Pack, Battery Management System, Battery Charger for Electric Vehicles and Plug-in Hybrid Vehicles. Only AEM products clearly described as "for Automotive Use" on its catalog can be used for automobile applications such as Power train and Safety equipment.