

# Multilayer Ceramic Chip Inductors

## MHI\_D Series, 0402 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:

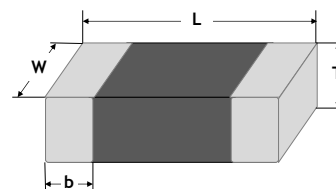
- RF resonance and impedance matching circuit
- RF and wireless communication
- Information technology equipment, computers, telecommunications, radar detectors, automotive electronics, cellular phones, pagers, PDAs, keyless remote systems
- L-C filter configuration

### Ordering Code:

MHI	0402	D	10N	J	T
<u>Series Code</u>	<u>Size Code</u> inch (mm)	<u>Characteristic Code</u>	<u>Inductance Code</u>	<u>Tolerance Code</u>	<u>Package Code</u>
MHI: Multilayer ceramic chip inductor	0402 (1005)		1N0 = 1nH 10N = 10nH R10 = 100nH	J = ±5% K = ±10% S = ±0.3nH	T = Tape & Reel

### Shape and Dimensions:

Unit (mm)	0402 (1005)
Length (L)	1.00±0.10
Width (W)	0.50±0.10
Thickness (T)	0.50±0.10
Termination bandwidth (b)	0.25±0.10



## General Electrical Characteristics:

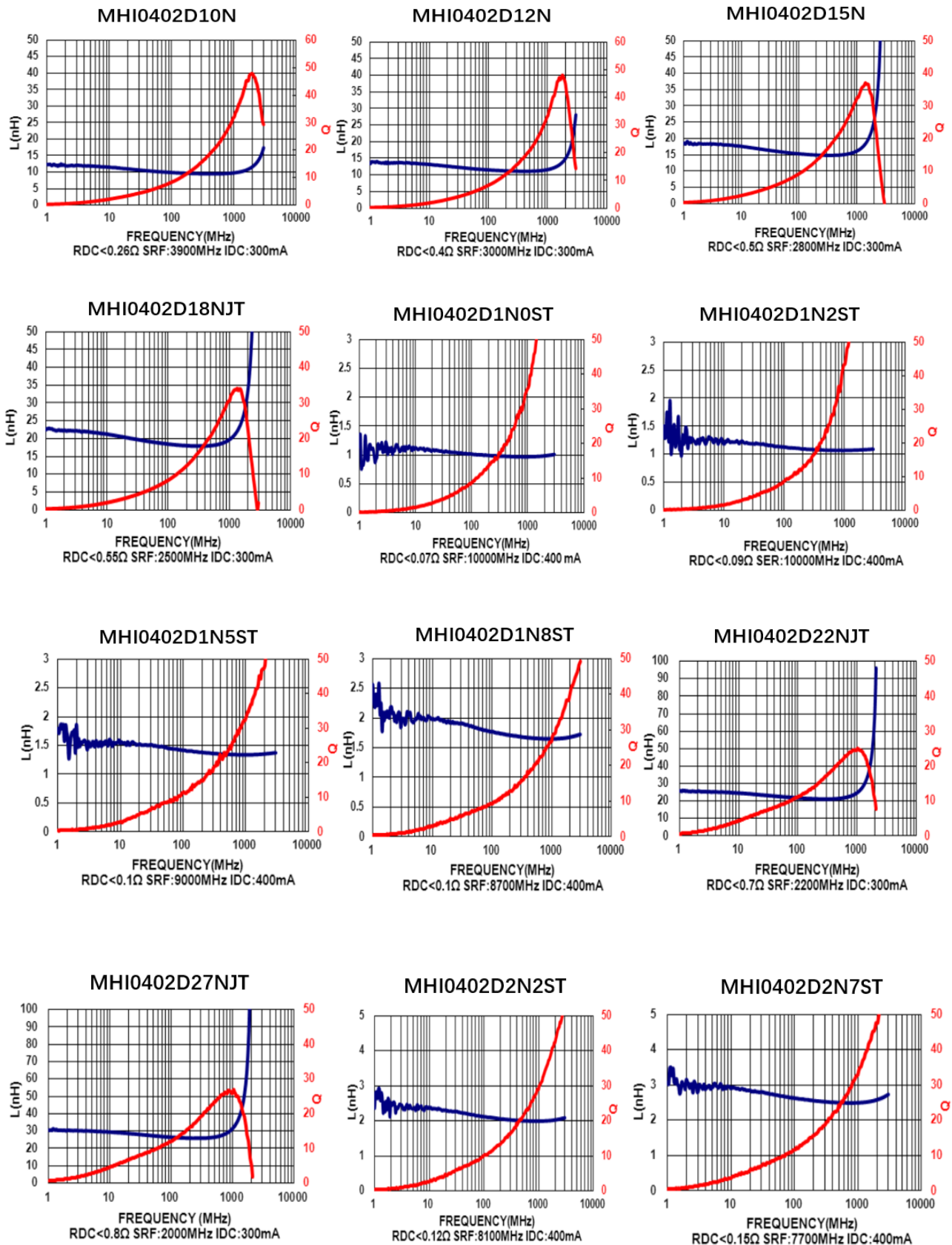
✧ Operating temperature: -55 to +125°C (including self-temperature rise)

Part Number	Inductance (nH)	L Test Frequency	Q Min. @ 100MHz	SRF typ. (MHz)	RDC Max. (Ω)	IDC <sup>1</sup> Max. (mA)	Tolerance (±%)
MHI0402D10NJT	10	100MHz, 200mV	8	3,900	0.26	300	5/10
MHI0402D12NJT	12	100MHz, 200mV	8	3,000	0.40	300	5/10
MHI0402D15NJT	15	100MHz, 200mV	8	2,800	0.50	300	5/10
MHI0402D18NJT	18	100MHz, 200mV	8	2,500	0.55	300	5/10
MHI0402D1N0ST	1.0	100MHz, 200mV	8	10,000	0.07	400	±0.3nH
MHI0402D1N2ST	1.2	100MHz, 200mV	8	10,000	0.09	400	±0.3nH
MHI0402D1N5ST	1.5	100MHz, 200mV	8	9,000	0.10	400	±0.3nH
MHI0402D1N8ST	1.8	100MHz, 200mV	8	8,700	0.10	400	±0.3nH
MHI0402D22NJT	22	100MHz, 200mV	8	2,200	0.70	300	5/10
MHI0402D27NJT	27	100MHz, 200mV	8	2,000	0.80	300	5/10
MHI0402D2N2ST	2.2	100MHz, 200mV	8	8,100	0.12	400	±0.3nH
MHI0402D2N7ST	2.7	100MHz, 200mV	8	7,700	0.15	400	±0.3nH
MHI0402D33NJT	33	100MHz, 200mV	8	1,800	0.90	200	5/10
MHI0402D39NJT	39	100MHz, 200mV	8	1,600	1.00	150	5/10
MHI0402D3N3ST	3.3	100MHz, 200mV	8	6,300	0.15	400	±0.3nH/10
MHI0402D3N9ST	3.9	100MHz, 200mV	8	6,100	0.18	400	±0.3nH/10
MHI0402D47NJT	47	100MHz, 200mV	8	1,400	1.20	150	5/10
MHI0402D4N7ST	4.7	100MHz, 200mV	8	6,000	0.18	400	±0.3nH/10
MHI0402D56NJT	56	100MHz, 200mV	8	1,300	1.30	150	5/10
MHI0402D5N6ST	5.6	100MHz, 200mV	8	5,100	0.20	400	±0.3nH/10
MHI0402D68NJT	68	100MHz, 200mV	8	1,100	1.50	100	5/10
MHI0402D6N8JT	6.8	100MHz, 200mV	8	4,550	0.24	400	5/10
MHI0402D82NJT	82	100MHz, 200mV	8	1,000	1.60	100	5/10
MHI0402D8N2JT	8.2	100MHz, 200mV	8	4,100	0.24	300	5/10
MHI0402DR10JT	100	100MHz, 200mV	8	900	2.00	100	5/10
MHI0402DR12JT	120	100MHz, 200mV	8	800	2.20	100	5/10

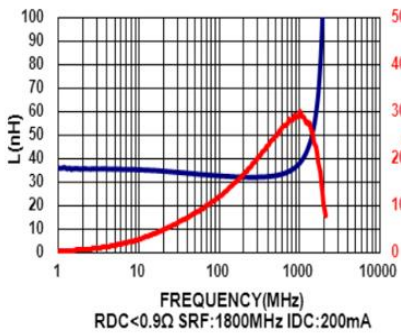
<sup>1</sup> IDC: Applied the current to coils, the inductance shall be less than 10% initial value.

### High Frequency Characteristics:

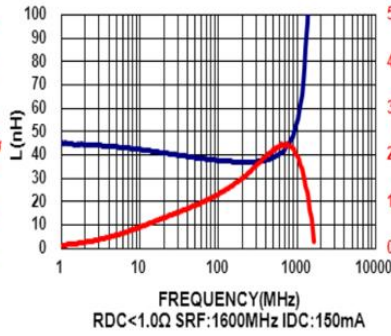
Test Instruments : Agilent E4991A Material/Impedance Analyzer



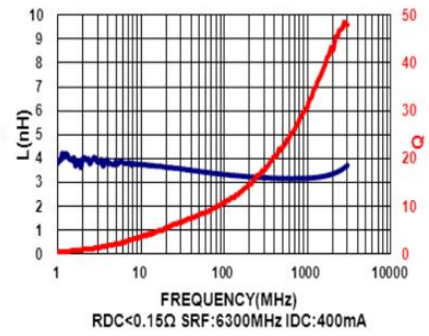
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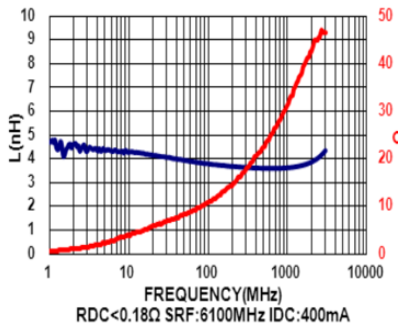
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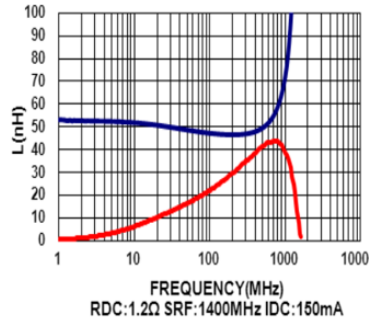
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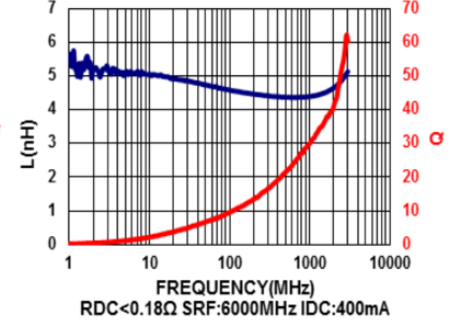
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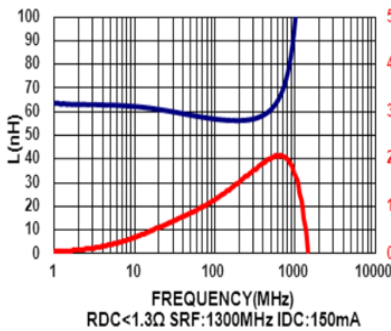
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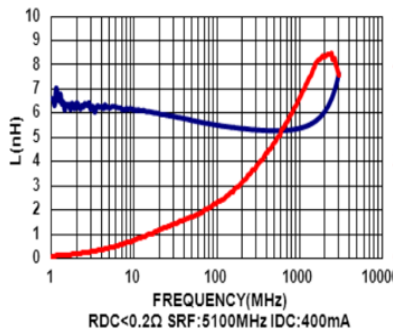
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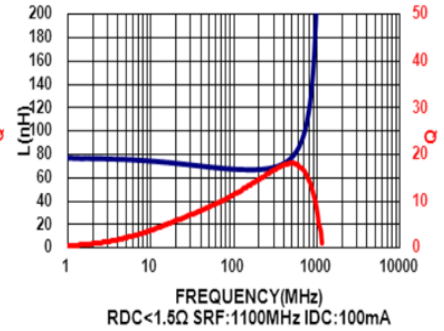
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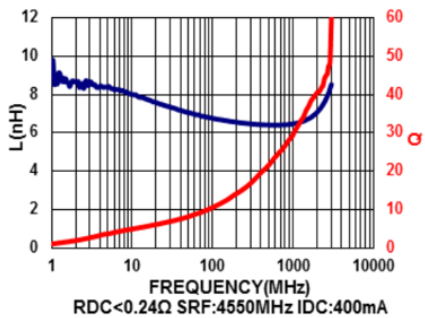
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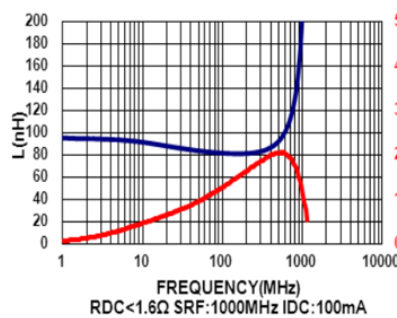
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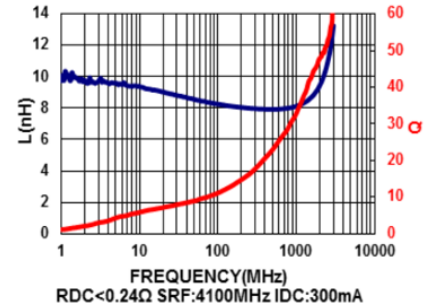
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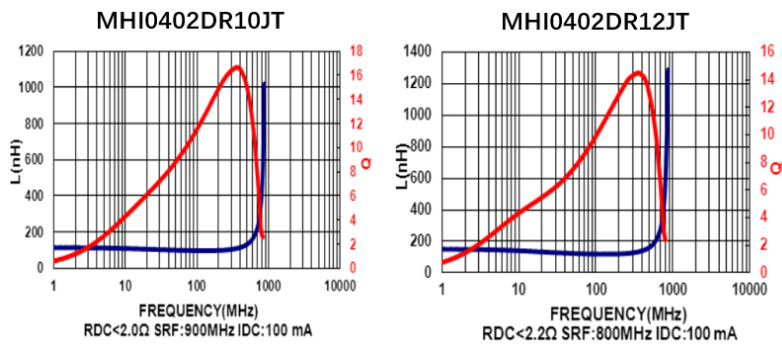


MHI0402D82NJT

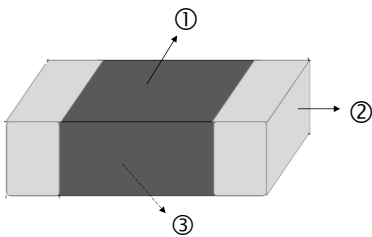


MHI0402D8N2JT



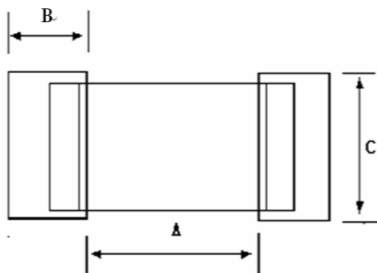


### Construction and Materials:



<b>Body ①</b>	Al <sub>2</sub> O <sub>3</sub> /SiO <sub>2</sub> base ceramic
<b>Termination ②</b>	Ag/Cu/Ni/Sn
<b>Inner electrode ③</b>	Ag

### Recommended Foot Print Dimensions:



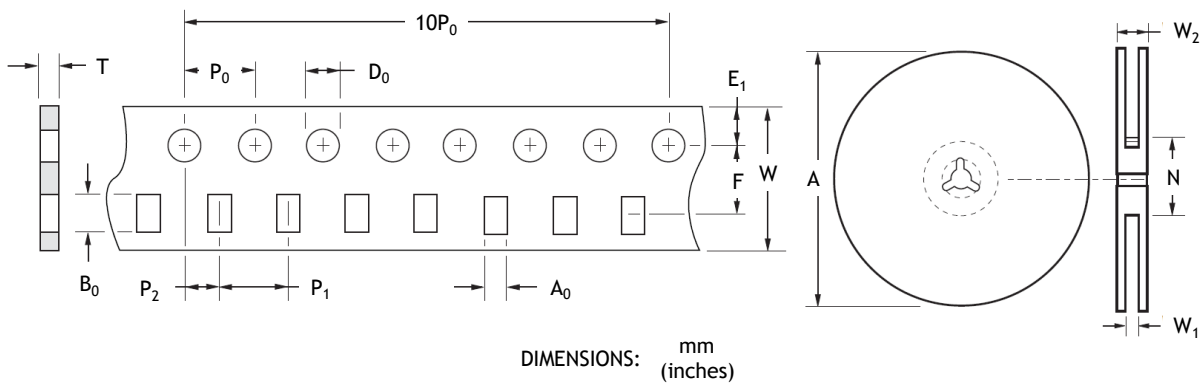
Size	A (mm)	B (mm)	C (mm)
0402	0.35~0.40	0.40~0.50	0.50~0.55

### Packaging:

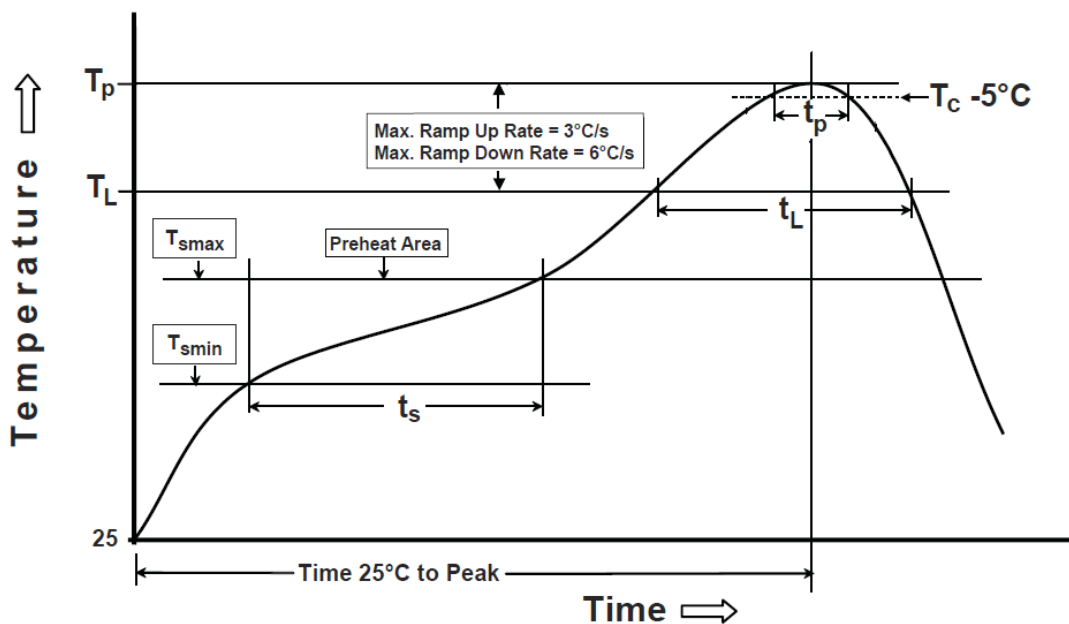
Chip Size	Parts on 7 inch (178mm) Reel
0402	10,000

**Tape and Reel Specifications:**

Dimensions (Tape)	MHI0402D Series	Dimensions (Reel)	MHI0402D Series
W	8.0±0.1 (0.315±0.004)	A max.	178 (7.01)
P <sub>0</sub>	4.0±0.1 (0.157±0.004)	N min.	60 (2.362)
P <sub>1</sub>	4.0±0.05 (0.157±0.002)	W <sub>1</sub>	9.0 (0.354)
P <sub>2</sub>	2.0±0.05 (0.079±0.002)	W <sub>2</sub>	12 (0.472)
A <sub>0</sub>	0.62±0.1 (0.024±0.004)		
B <sub>0</sub>	1.12±0.1 (0.044±0.004)		
D <sub>0</sub>	1.55±0.1 (0.061±0.004)		
F	3.5±0.05 (0.138±0.002)		
E <sub>1</sub>	1.75±0.1 (0.069±0.004)		
T	0.60±0.05 (0.024±0.002)		
10P <sub>0</sub>	40.0±0.1 (1.575±0.004)		



**Recommended Reflow Soldering Profile:**



Profile Feature	Pb-Free Assembly
<b>Preheat/Soak</b>	
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.