

MCL1608V1

Multilayer chip inductor



Product features

- 0603 (1608 metric) package
- Low DC resistance, high current
- Multilayer monolithic construction yields high reliability
- Suitable for wave and reflow soldering
- Inductance range from 0.047 μ H to 12 μ H
- Moisture sensitivity level (MSL): 1

Applications

- Industrial connectivity (IoT)
- Wireless communications
 - Bluetooth
 - WiFi
 - Antenna
- Machine-to-machine (M2M)
- Mobile phones
- Wearable devices
- Wireless LAN
- Computing/gaming consoles
- Broadband components
- RF transceiver modules

Environmental data

- Operating temperature range: -40 °C to +85 °C (ambient plus self-temperature rise)
- Solder reflow temperature: J-STD-020 (latest revision) compliant



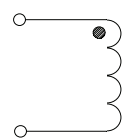
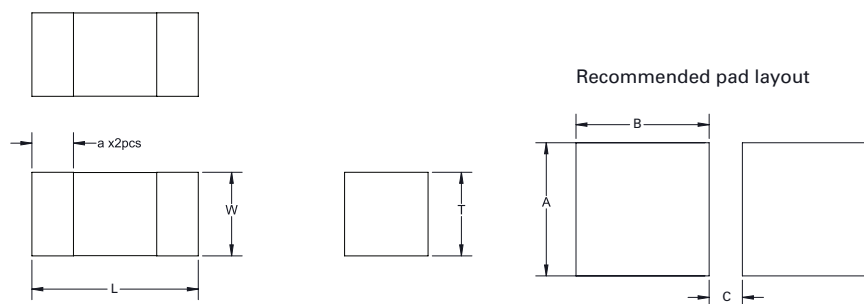
Product specifications

Part number	OCL (uH) ±20%	I Rated (mA) maximum	DCR (Ω) maximum @ +25°C	SRF (MHz) minimum	Test frequency (MHz)	Test voltage (mV)
MCL1608V1-R047-R	0.047	150	0.12	260	1.0	50
MCL1608V1-R056-R	0.056	150	0.12	260	1.0	50
MCL1608V1-R068-R	0.068	150	0.12	250	1.0	50
MCL1608V1-R082-R	0.082	150	0.12	245	1.0	50
MCL1608V1-R10-R	0.100	150	0.15	240	1.0	50
MCL1608V1-R12-R	0.120	150	0.20	205	1.0	50
MCL1608V1-R15-R	0.150	150	0.20	180	1.0	50
MCL1608V1-R18-R	0.180	150	0.20	165	1.0	50
MCL1608V1-R22-R	0.220	150	0.25	150	1.0	50
MCL1608V1-R27-R	0.270	100	0.30	136	1.0	50
MCL1608V1-R33-R	0.330	100	0.30	125	1.0	50
MCL1608V1-R39-R	0.390	100	0.35	110	1.0	50
MCL1608V1-R47-R	0.470	100	0.45	105	1.0	50
MCL1608V1-R56-R	0.560	100	0.45	95	1.0	50
MCL1608V1-R68-R	0.680	100	0.55	90	1.0	50
MCL1608V1-R82-R	0.820	100	0.60	85	1.0	50
MCL1608V1-1R0-R	1.0	150	0.30	75	1.0	50
MCL1608V1-1R2-R	1.2	150	0.30	65	1.0	50
MCL1608V1-1R5-R	1.5	120	0.35	60	1.0	50
MCL1608V1-1R8-R	1.8	120	0.40	55	1.0	50
MCL1608V1-2R2-R	2.2	120	0.50	50	1.0	50
MCL1608V1-2R7-R	2.7	100	0.60	45	1.0	50
MCL1608V1-3R3-R	3.3	100	0.65	40	1.0	50
MCL1608V1-3R9-R	3.9	80	0.70	35	1.0	50
MCL1608V1-4R7-R	4.7	80	0.75	33	1.0	50
MCL1608V1-5R6-R	5.6	60	0.90	22	1.0	50
MCL1608V1-6R8-R	6.8	60	0.90	20	1.0	50
MCL1608V1-8R2-R	8.2	60	1.05	18	1.0	50
MCL1608V1-100-R	10	60	1.15	17	1.0	50
MCL1608V1-120-R	12	60	1.25	15	1.0	50

1. Test frequency and voltage at +25 °C
2. Resistance to soldering heat: +260 ±5 °C for 10 ± 1 second
3. At low temperature (-40 ±2°C) the inductance change is within ±10%
4. At high temperature (+85 ±2°C) the inductance change is within ±10%

5. Rated I: When rated I is applied to the product, self-temperature rise will be 40 °C or less.
6. Part Number Definition: MCL1608V1-xxx-R
MCL1608 = Product code and size
V1= Version indicator
xxx= inductance value in uH, R= decimal point,
If no R is present then last character equals number of zeros
-R suffix = RoHS compliant

Schematic

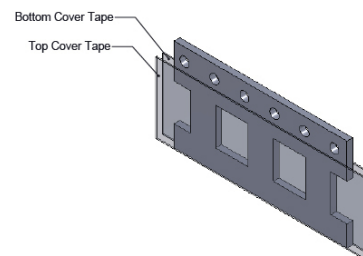
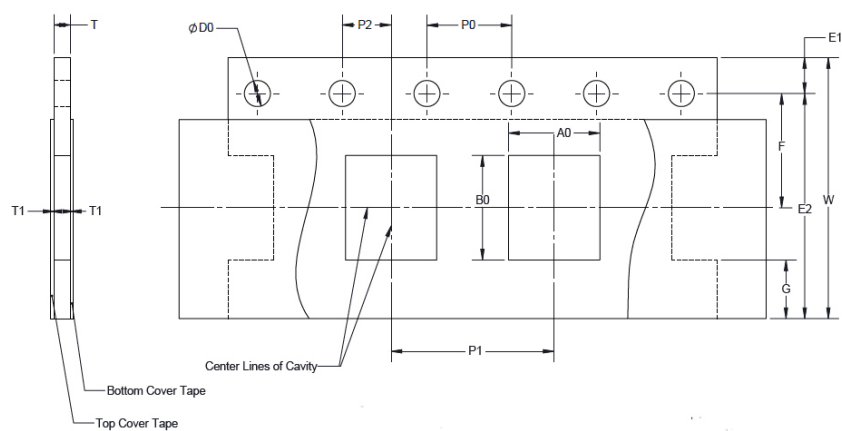


Part Number	L	W	T	a	A	B	C
MCL1608V1-xxx-R	1.6 ±0.20	0.80 ±0.20	0.80 ±0.20	0.30 ±0.20	1.2 ±0.10	0.9 ±0.10	040 ±0.10

No part marking
All soldering surfaces to be coplanar within 0.1 millimeters
Tolerances are ± 0.2 millimeters unless stated otherwise
Pad layout tolerances are ± 0.1 millimeters unless stated otherwise
Do not route traces or vias underneath the inductor

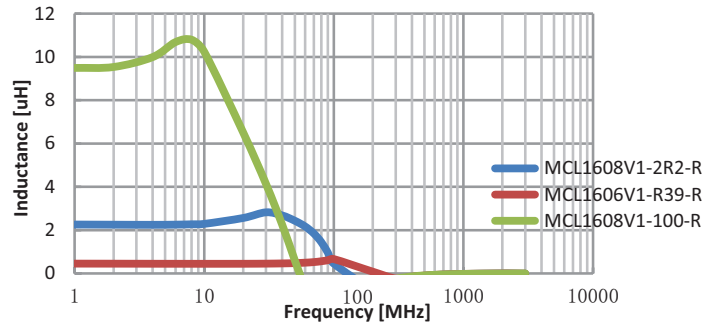
Drawing not to scale

Supplied in tape and reel packaging, 4000 parts per 7" diameter reel

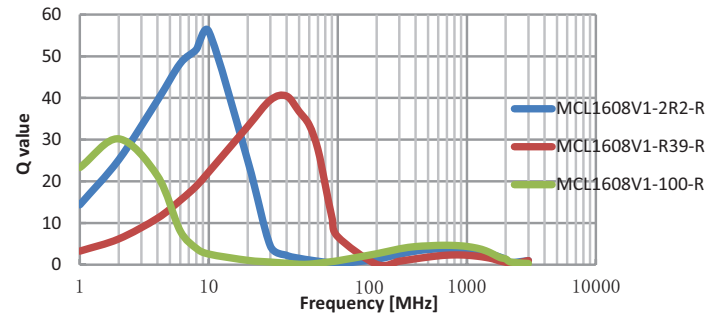


W ± 0.3	8.00
F ± 0.05	3.50
E1 ± 0.10	1.75
E2 Min	6.25
P0 ± 0.10	4.00
P1 ± 0.20	4.00
P2 ± 0.1	2.00
D0 $\pm 0.10/-0$	1.50
A0	1.1 ± 0.20
B0	1.9 ± 0.20
T Max	1.10
T1 Max	na

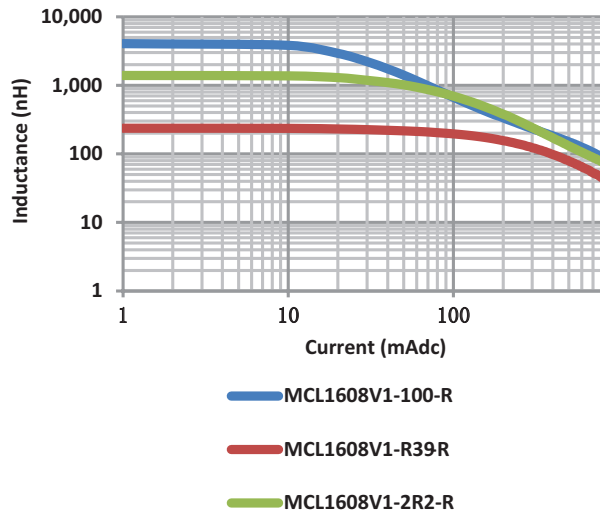
Inductance vs frequency



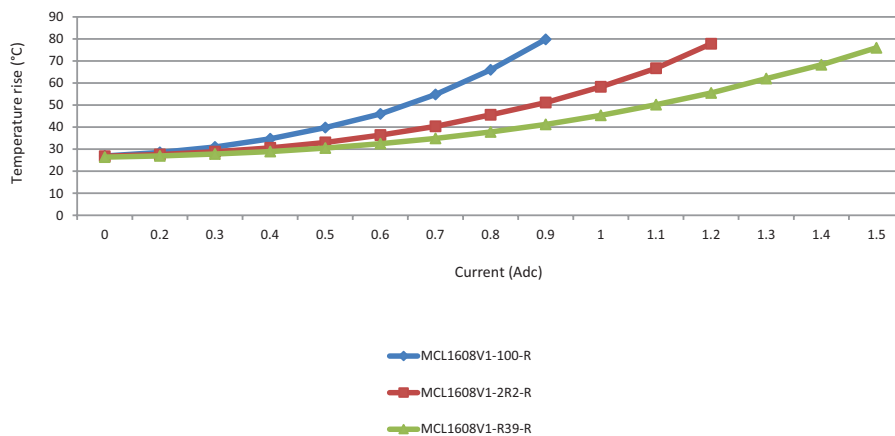
Q vs frequency



Inductance vs current



Temperature rise vs current



Solder reflow profile

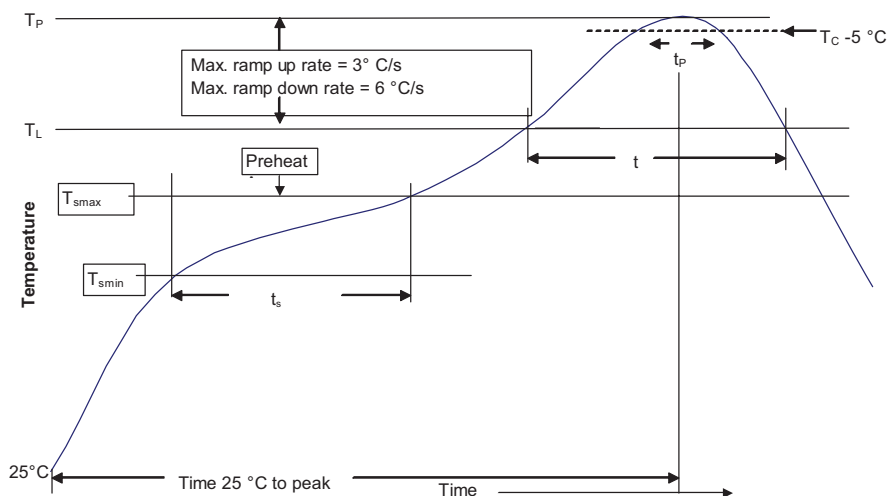


Table 1 - Standard SnPb solder (T_C)

Package Thickness	Volume mm ³ <350	Volume mm ³ ≥350
<2.5 mm)	235 °C	220 °C
≥2.5 mm	220 °C	220 °C

Table 2 - Lead (Pb) free solder (T_C)

Package thickness	Volume mm ³ <350	Volume mm ³ 350 - 2000	Volume mm ³ >2000
<1.6 mm	260 °C	260 °C	260 °C
1.6 – 2.5 mm	260 °C	250 °C	245 °C
>2.5 mm	250 °C	245 °C	245 °C

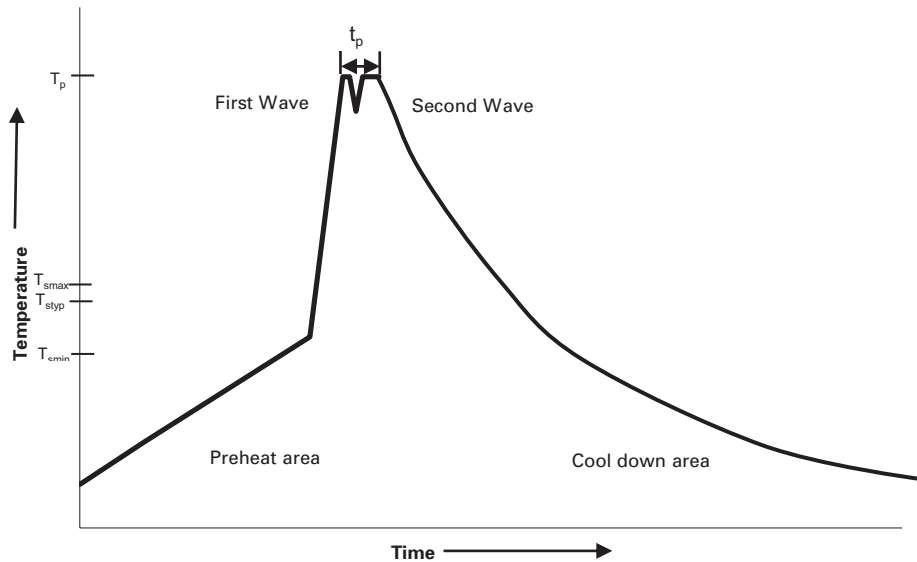
Reference J-STD-020

Profile feature	Standard SnPb solder	Lead (Pb) free solder
Preheat and soak		
• Temperature min. (T_{smin})	100 °C	150 °C
• Temperature max. (T_{smax})	150 °C	200 °C
• Time (T_{smin} to T_{smax}) (t_s)	60-120 seconds	60-120 seconds
Average ramp up rate T_{smax} to T_P	3 °C/ second max.	3 °C/ second max.
Liquidous temperature (T_L)	183 °C	217 °C
Time at liquidous (t_L)	60-150 seconds	60-150 seconds
Peak package body temperature (T_P)*	Table 1	Table 2
Time (t_p)** within 5 °C of the specified classification temperature (T_C)	10 seconds**	10 seconds**
Average ramp-down rate (T_P to T_{smax})	6 °C/ second max.	6 °C/ second max.
Time 25 °C to peak temperature	6 minutes max.	8 minutes max.

* Tolerance for peak profile temperature (T_P) is defined as a supplier minimum and a user maximum.

** Tolerance for time at peak profile temperature (t_p) is defined as a supplier minimum and a user maximum.

Wave solder profile



Reference EN 61760-1:2006

Profile feature	Standard SnPb solder	Lead (Pb) free solder
Preheat		
• Temperature min. (T _{smin})	100 °C	100 °C
• Temperature typ. (T _{styp})	120 °C	120 °C
• Temperature max. (T _{smax})	130 °C	130 °C
• Time (T _{smin} to T _{smax}) (t _s)	70 seconds	70 seconds
Δ preheat to max Temperature	150 °C max.	150 °C max.
Peak temperature (T _p)*	235 °C – 260 °C	250 °C – 260 °C
Time at peak temperature (t _p)	10 seconds max 5 seconds max each wave	10 seconds max 5 seconds max each wave
Ramp-down rate	~ 2 K/s min ~3.5 K/s typ ~5 K/s max	~ 2 K/s min ~3.5 K/s typ ~5 K/s max
Time 25 °C to 25 °C	4 minutes	4 minutes

Manual solder

+350 °C, 4-5 seconds. (by soldering iron), generally manual, hand soldering is not recommended.

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