

MCL1608V2

Multilayer chip inductor



Product features

- 0603 (1608 metric) package
- High self resonant frequency (SRF)
- Multilayer monolithic construction yields high reliability
- Suitable for wave and reflow soldering
- Inductance range from 1.0 nH to 470 nH
- 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



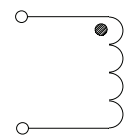
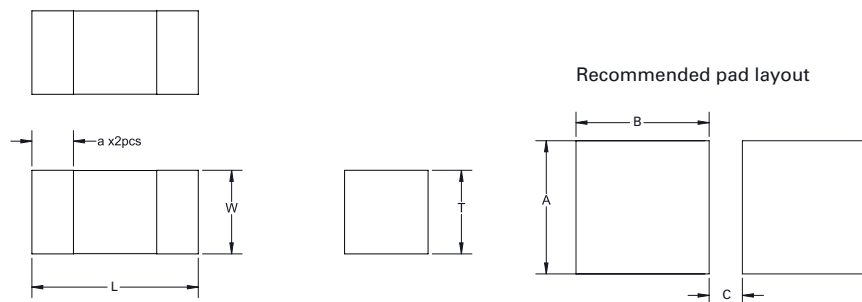
Product specifications

Part number	OCL (nH) $\pm 5\%$	I Rated (mA) maximum	DCR (Ω) maximum @ +25°C	SRF (MHz) minimum	Q minimum	Test frequency (MHz)	Test voltage (mV)
MCL1608V2-1R0-R	1.0 ± 0.3 nH	500	0.05	10000	8	100	50
MCL1608V2-1R2-R	1.2 ± 0.3 nH	500	0.05	10000	8	100	50
MCL1608V2-1R5-R	1.5 ± 0.3 nH	500	0.10	6000	8	100	50
MCL1608V2-1R8-R	1.8 ± 0.3 nH	500	0.10	6000	8	100	50
MCL1608V2-2R2-R	2.2 ± 0.3 nH	500	0.10	6000	8	100	50
MCL1608V2-2R7-R	2.7 ± 0.3 nH	500	0.12	6000	10	100	50
MCL1608V2-3R3-R	3.3 ± 0.3 nH	500	0.15	6000	10	100	50
MCL1608V2-3R9-R	3.9 ± 0.3 nH	500	0.16	6000	10	100	50
MCL1608V2-4R7-R	4.7 ± 0.3 nH	500	0.20	6000	10	100	50
MCL1608V2-5R6-R	5.6 ± 0.3 nH	500	0.25	5000	10	100	50
MCL1608V2-6R8-R	6.8	500	0.30	5000	10	100	50
MCL1608V2-8R2-R	8.2	500	0.35	4500	10	100	50
MCL1608V2-100-R	10.0	300	0.40	3500	12	100	50
MCL1608V2-120-R	12.0	300	0.45	3000	12	100	50
MCL1608V2-150-R	15.0	300	0.50	2300	12	100	50
MCL1608V2-180-R	18.0	300	0.55	2200	12	100	50
MCL1608V2-220-R	22.0	300	0.60	2000	12	100	50
MCL1608V2-270-R	27.0	300	0.65	1700	12	100	50
MCL1608V2-330-R	33.0	300	0.70	1500	12	100	50
MCL1608V2-390-R	39.0	300	0.70	1400	12	100	50
MCL1608V2-470-R	47.0	300	0.70	1200	12	100	50
MCL1608V2-560-R	56.0	300	0.75	1100	12	100	50
MCL1608V2-680-R	68.0	300	0.85	900	12	100	50
MCL1608V2-820-R	82.0	300	1.00	800	8	100	50
MCL1608V2-101-R	100	300	1.20	700	8	100	50
MCL1608V2-121-R	120	200	1.40	600	8	100	50
MCL1608V2-151-R	150	200	1.60	500	8	100	50
MCL1608V2-181-R	180	200	1.90	400	8	100	50
MCL1608V2-221-R	220	200	2.40	350	8	100	50
MCL1608V2-271-R	270	150	2.60	350	8	100	50
MCL1608V2-331-R	330	150	2.80	350	8	100	50
MCL1608V2-391-R	390	150	3.20	300	8	100	50
MCL1608V2-431-R	430	150	3.40	280	8	50	50
MCL1608V2-471-R	470	150	3.60	250	8	50	50

1. Test frequency and voltage are for OCL and Q at +25 °C
2. Resistance to soldering heat: +260 ± 5 °C for 10 ± 1 second
3. At low temperature resistance (-40 ± 2 °C) the inductance change is within $\pm 10\%$ and the Q within $\pm 20\%$
4. At high temperature resistance (+85 ± 2 °C) the inductance change is within $\pm 10\%$ and the Q within $\pm 20\%$

- 5 At high temperature load (+85 ± 2 °C) the inductance change is within $\pm 10\%$ and the Q within $\pm 20\%$
6. Rated I: When rated I is applied to the product, self-temperature rise will be 40 °C or less.
7. Part Number Definition: MCL1608V2-xxx-R
MCL1608 = Product code and size
V2= Version indicator
xxx= inductance value in nH, R= decimal point,
If no R is present then last character equals number of zeros
-R suffix = RoHS compliant

Schematic

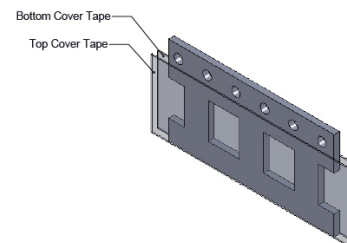
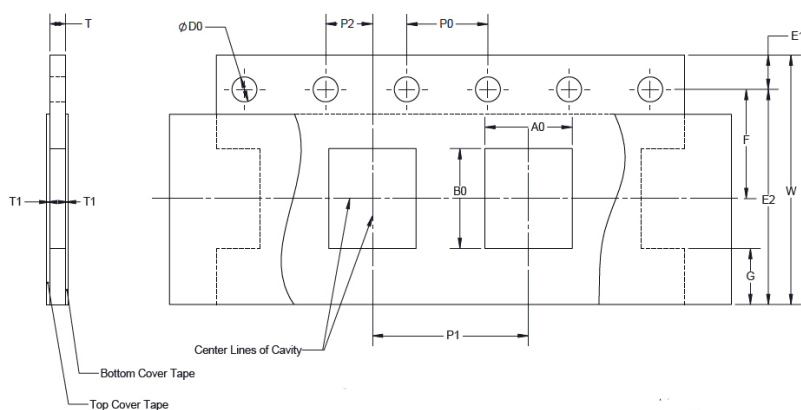


Part Number	L	W	T	a	A	B	C
MCL1608V2-xxx-R	1.6 ±0.20	0.80 ±0.20	0.80 ±0.20	0.30 ±0.20	1.2 ±0.10	0.9 ±0.10	04 ±0.10

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

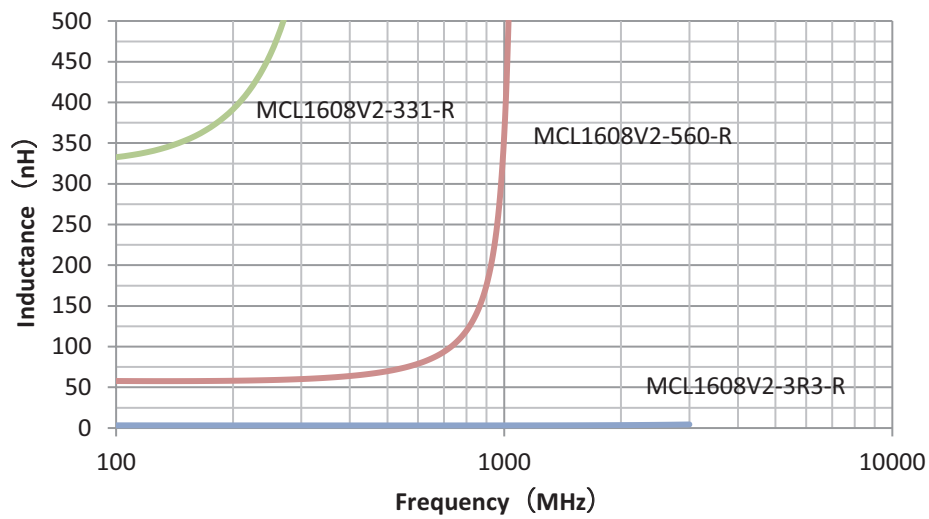
Drawing not to scale

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

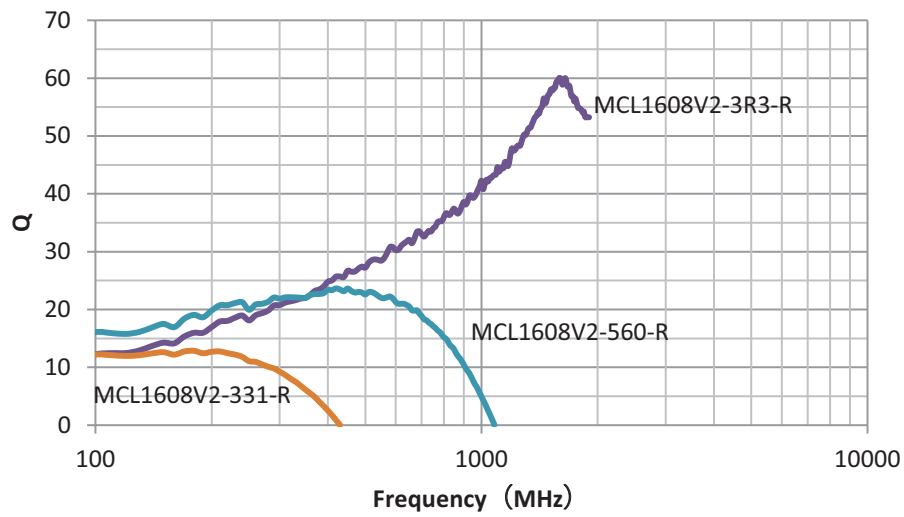


W ± 0.3	8.00
F ± 0.05	3.50
E1 ± 0.10	1.75
E2 Min	6.25
P0 ± 0.10	4.00
P1 ± 0.2	4.00
P2 ± 0.1	2.00
D0 $\pm 0.10/-0$	1.50
A0	1.1 ± 0.20
B0	1.9 ± 0.20
T Max	1.10
T1 Max	na

Inductance vs frequency



Q vs frequency



Solder reflow profile

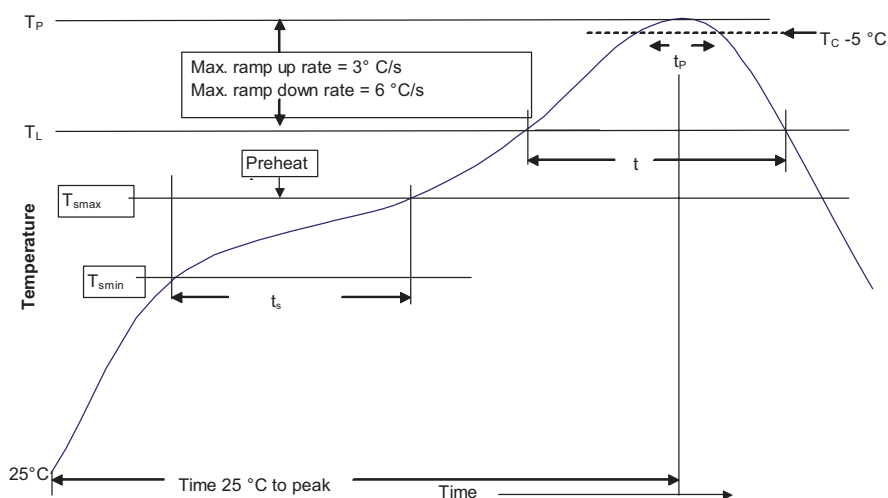


Table 1 - Standard SnPb solder (T_C)

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

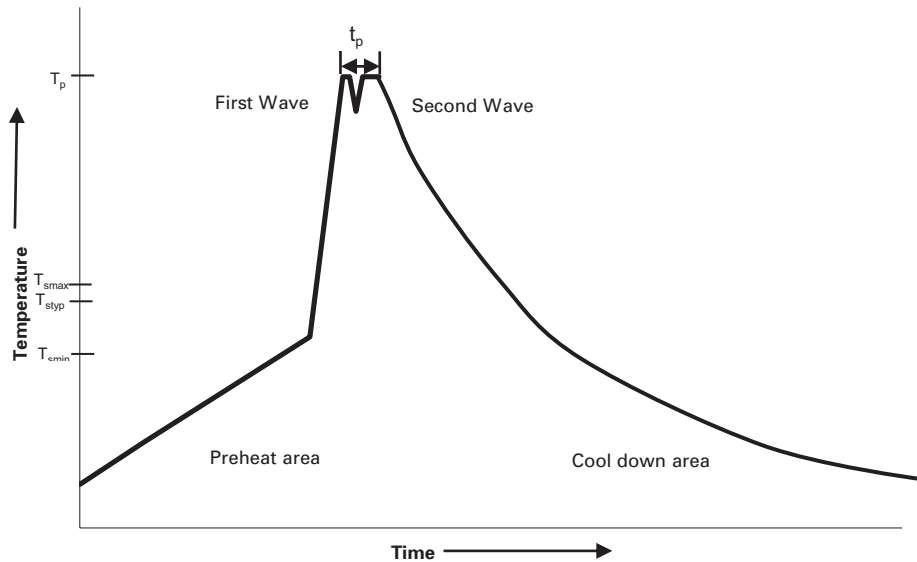
Reference J-STD-020

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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Printed in USA
Publication No. 10927 BU-MC19059
June 2019

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