MCL2012V2

Multilayer chip inductor



Product features

- 0805 (2012 metric) package
- High self resonant frequency (SRF)
- Multilayer monolithic construction yields high reliability
- Suitable for wave and reflow soldering
- Inductance range from 1.5 nH to 470 nH
- Moisture sensitivity level (MSL): 1

Applications

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

Pb HALOGEN HF FREE RoHS

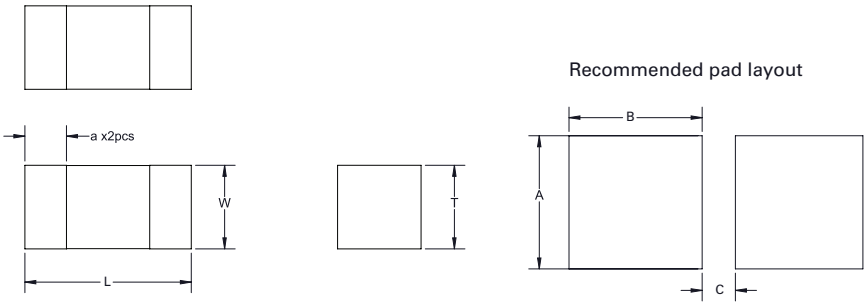
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Product specifications

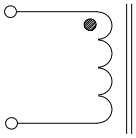
Part number	OCL (nH) ±5%	I Rated (mA) maximum	DCR (Ω) maximum @ +25°C	SRF (MHz) minimum	Q minimimum	Test frequency (MHz)	Test voltage (mV)
MCL2012V2-1R5-R	1.5 ± 0.3nH	500	0.10	6000	10	100	50
MCL2012V2-1R8-R	1.8 ± 0.3nH	500	0.10	6000	10	100	50
MCL2012V2-2R2-R	2.2 ±0.3nH	500	0.10	6000	10	100	50
MCL2012V2-2R7-R	2.7 ±0.3nH	500	0.10	5500	12	100	50
MCL2012V2-3R0-R	3.0 ±0.3nH	500	0.13	5000	12	100	50
MCL2012V2-3R3-R	3.3± 0.3nH	500	0.13	5000	12	100	50
MCL2012V2-3R9-R	3.9 ±0.3nH	500	0.15	4500	12	100	50
MCL2012V2-4R7-R	4.7 ± 0.3nH	500	0.20	4000	12	100	50
MCL2012V2-5R6-R	5.6 ± 0.3nH	500	0.23	3500	15	100	50
MCL2012V2-6R8-R	6.8	500	0.25	3000	15	100	50
MCL2012V2-8R2-R	8.2	500	0.28	2500	15	100	50
MCL2012V2-100-R	10	500	0.30	2200	15	100	50
MCL2012V2-120-R	12	500	0.35	2000	15	100	50
MCL2012V2-150-R	15	500	0.40	1800	15	100	50
MCL2012V2-180-R	18	300	0.45	1600	15	100	50
MCL2012V2-220-R	22	300	0.50	1500	15	100	50
MCL2012V2-270-R	27	300	0.55	1400	15	100	50
MCL2012V2-330-R	33	300	0.60	1300	15	100	50
MCL2012V2-390-R	39	300	0.65	1100	15	100	50
MCL2012V2-470-R	47	300	0.70	1000	18	100	50
MCL2012V2-560-R	56	300	0.75	900	18	100	50
MCL2012V2-680-R	68	300	0.80	850	18	100	50
MCL2012V2-820-R	82	300	0.90	800	18	100	50
MCL2012V2-101-R	100	300	0.90	700	18	100	50
MCL2012V2-121-R	120	300	0.95	600	13	100	50
MCL2012V2-151-R	150	300	1.20	550	13	100	50
MCL2012V2-181-R	180	300	1.30	500	13	100	50
MCL2012V2-221-R	220	300	1.50	400	12	100	50
MCL2012V2-271-R	270	300	1.80	350	12	100	50
MCL2012V2-331-R	330	300	2.00	300	12	50	50
MCL2012V2-391-R	390	300	2.00	250	10	50	50
MCL2012V2-471-R	470	300	2.00	200	10	50	50

1. Test frequency and voltage is 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 ±10% and the Q within ±20%
4. At high temperature rsistance (+85 ±2°C) the inductance change is within ±10% and the Q within ±20%
5. At high temperature load (+85 ±2°C) the inductance change is within ±10% and the Q within ±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: MCL2012V2-xxx-R
   MCL2012 = Product code and size
   V2= Version indictaor
   xxx= inductance value in nH, R= decimal point,
   If no R is present then last character equals number of zeros
   -R suffix = RoHS compliant

Dimensions (mm)



Schematic



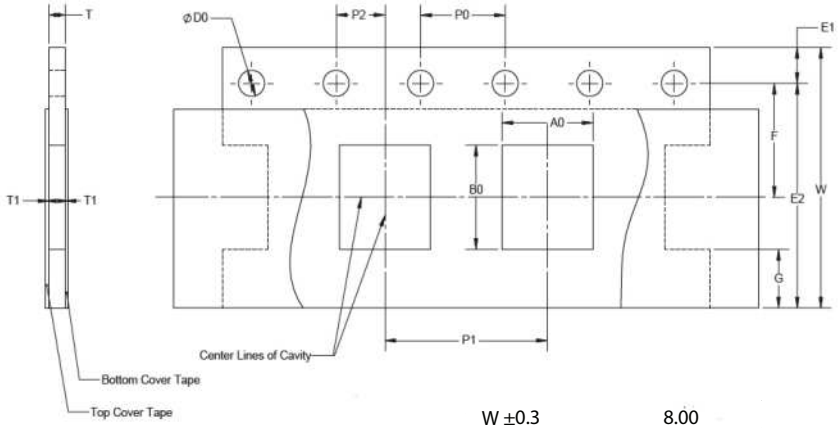
Part Number	L	W	T	a	A	B	C
MCL2012V2-xxx-R	2.0 ±0.20	1.2 ±0.20	0.90 ±0.20	0.50 ±0.30	1.6 ±0.10	1.2 ±0.10	04 ±0.10

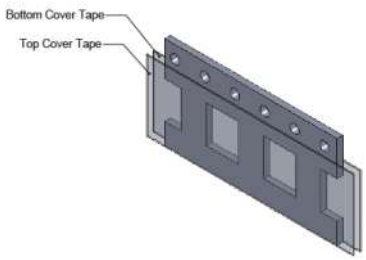
No part marking
All soldering surfaces to be coplanar within 0.1 millimeters
Tolerances are ±0.2 millimeters unless stated otherwise
Pad layout tolerances are ±0.1 millimeters unless stated otherwise
Do not route traces or vias underneath the inductor

Packaging information (mm)

Drawing not to scale

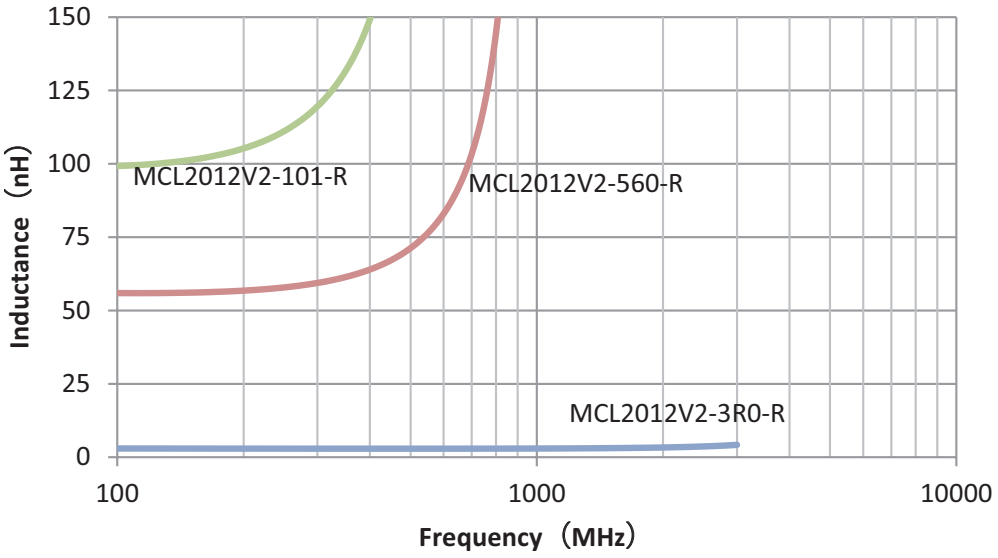
Supplied in tape and reel packaging, 4000 parts per 7" diameter reel



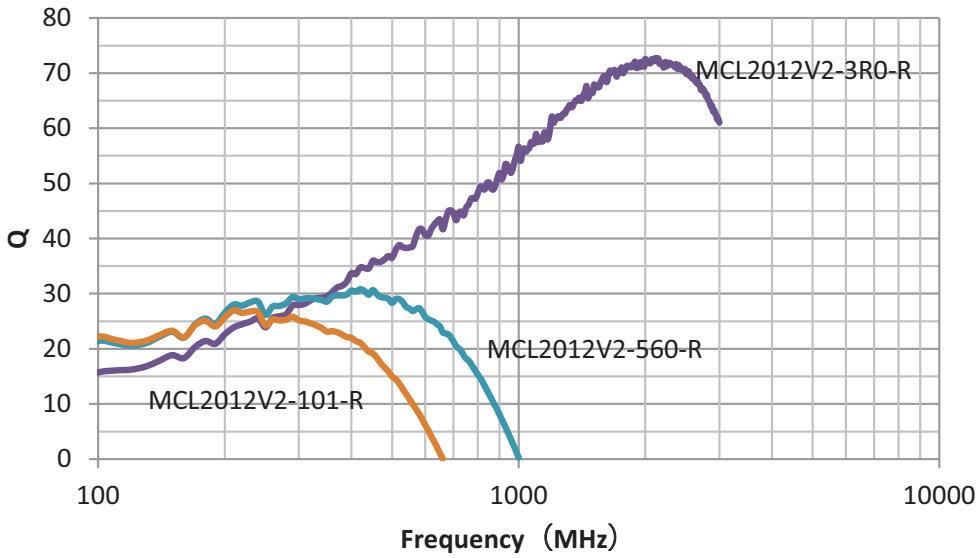


W ±0.3	8.00
F±0.05	3.50
E1±0.10	1.75
E2 Min	6.25
P0±0.10	4.00
P1±0.2	4.00
P2±0.1	2.00
D0+0.10/-0	1.50
A0	1.5±0.20
B0	2.3±0.20
T Max	1.10
T1 Max	na

Inductance vs frequency



Q vs frequency



Solder reflow profile

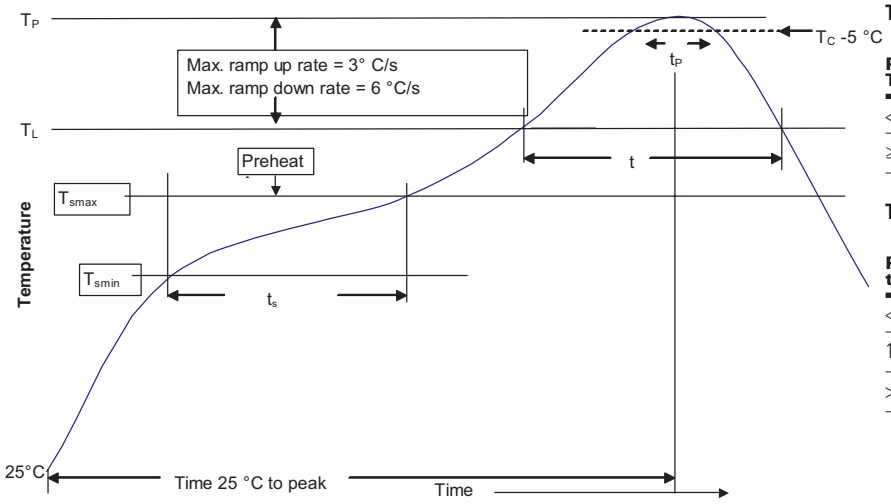


Table 1 - Standard SnPb solder (T_C)

Package Thickness	Volume mm3 <350	Volume mm3 ≥350
<2.5 mm)	235 °C	220 °C
≥2.5 mm	220 °C	220 °C

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

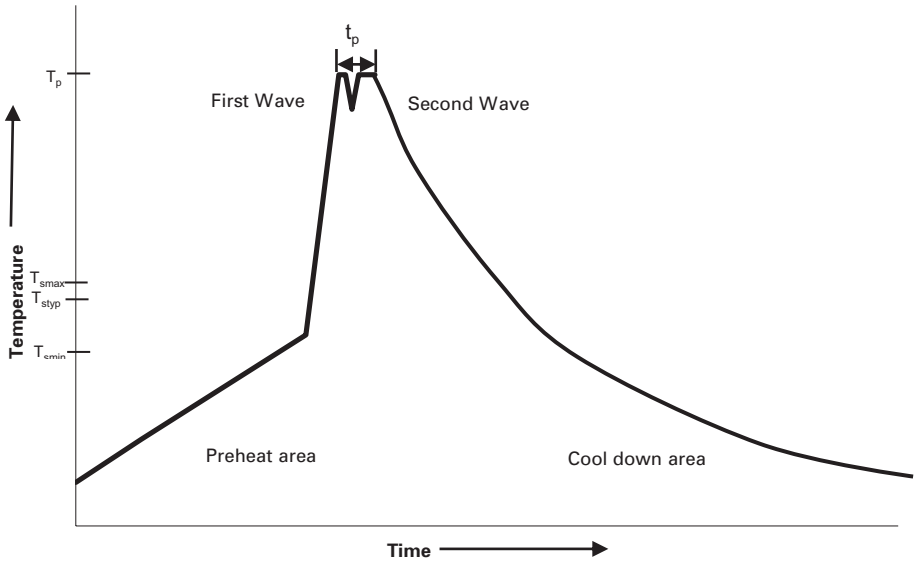
Package thickness	Volume mm³ <350	Volume mm³ 350 - 2000	Volume mm³ >2000
<1.6 mm	260 °C	260 °C	260 °C
1.6 – 2.5 mm	260 °C	250 °C	245 °C
>2.5 mm	250 °C	245 °C	245 °C

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) Time at liquidous (t_L)		183 °C 60-150 seconds	217 °C 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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