MCL2012V1

Multilayer chip inductor



Product features

- 0805 (2012 metric) package
- Low DC resistance, high current
- Multilayer monolithic construction yields high reliability
- Suitable for wave and reflow soldering
- Inductance range from 0.047 uH to 22 uH
- Mositure 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

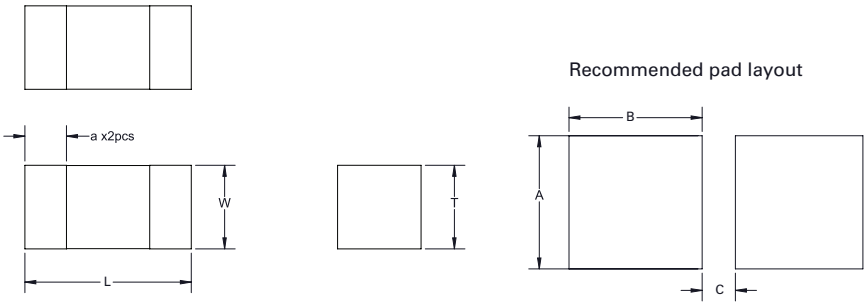
Powering Business Worldwide

Product specifications

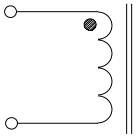
Part number	OCL (uH) ±20%	I Rated (mA) maximum	DCR (Ω) maximum @ +25°C	SRF (MHz) minimum	Test frequency (MHz)	Test voltage (mV)
MCL2012V1-R047-R	0.047	350	0.15	320	1.0	50
MCL2012V1-R056-R	0.056	350	0.15	320	1.0	50
MCL2012V1-R068-R	0.068	350	0.20	280	1.0	50
MCL2012V1-R082-R	0.082	350	0.20	280	1.0	50
MCL2012V1-R100-R	0.10	350	0.20	235	1.0	50
MCL2012V1-R120-R	0.120	350	0.20	220	1.0	50
MCL2012V1-R150-R	0.150	350	0.20	200	1.0	50
MCL2012V1-R180-R	0.180	300	0.25	185	1.0	50
MCL2012V1-R220-R	0.220	300	0.25	170	1.0	50
MCL2012V1-R270-R	0.270	300	0.25	150	1.0	50
MCL2012V1-R330-R	0.330	300	0.25	145	1.0	50
MCL2012V1-R390-R	0.390	250	0.30	135	1.0	50
MCL2012V1-R470-R	0.470	250	0.30	125	1.0	50
MCL2012V1-R560-R	0.560	200	0.36	115	1.0	50
MCL2012V1-R680-R	0.680	200	0.36	105	1.0	50
MCL2012V1-R820-R	0.820	200	0.36	100	1.0	50
MCL2012V1-1R0-R	1.0	220	0.26	75	1.0	50
MCL2012V1-1R2-R	1.2	220	0.26	65	1.0	50
MCL2012V1-1R5-R	1.5	180	0.30	60	1.0	50
MCL2012V1-1R8-R	1.8	180	0.30	55	1.0	50
MCL2012V1-2R2-R	2.2	150	0.36	50	1.0	50
MCL2012V1-2R7-R	2.7	150	0.36	45	1.0	50
MCL2012V1-3R3-R	3.3	120	0.40	41	1.0	50
MCL2012V1-3R9-R	3.9	120	0.40	38	1.0	50
MCL2012V1-4R7-R	4.7	120	0.40	35	1.0	50
MCL2012V1-5R6-R	5.6	100	0.60	32	1.0	50
MCL2012V1-6R8-R	6.8	100	0.60	29	1.0	50
MCL2012V1-8R2-R	8.2	100	0.65	26	1.0	50
MCL2012V1-100-R	10	100	0.65	24	1.0	50
MCL2012V1-120-R	12	100	0.65	22	1.0	50
MCL2012V1-150-R	15	50	0.75	19	1.0	50
MCL2012V1-180-R	18	50	0.75	18	1.0	50
MCL2012V1-220-R	22	50	0.75	16	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: MCL2012V1-xxx-R
   MCL2012 = 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

Dimensions (mm)



Schematic



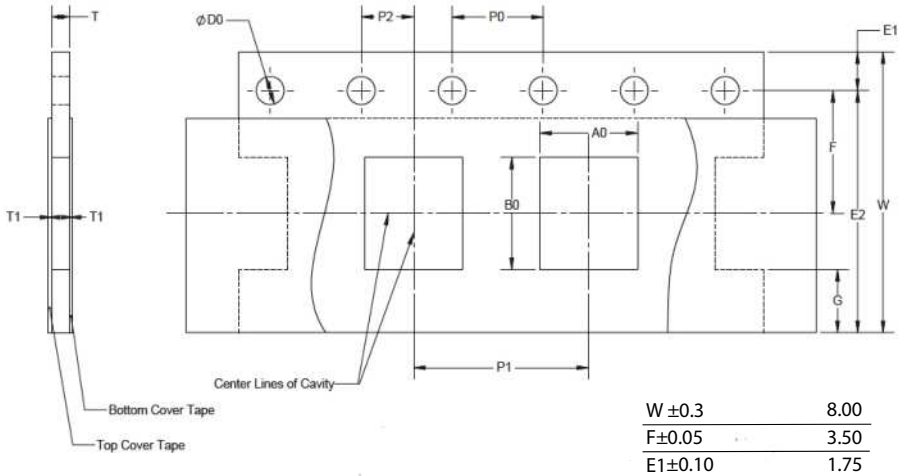
Part Number	L	W	T	a	A	B	C
MCL2012V1-xxx-R	2.0 ±0.20	1.2 ±0.20	0.90 ±0.20	0.50 ±0.30	1.6 ±0.10	1.2 ±0.10	04 ±0.10

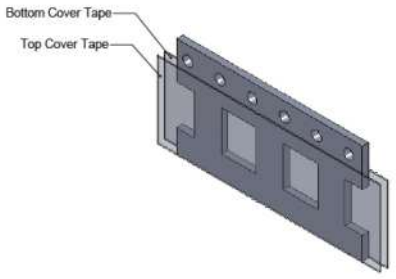
No part marking
All soldering surfaces to be coplanar within 0.1 millimeters
Tolerances are ±0.2 millimeters unless stated otherwise
Pad layout tolerances are ±0.1 millimeters unless stated otherwise
Do not route traces or vias underneath the inductor

Packaging information (mm)

Drawing not to scale

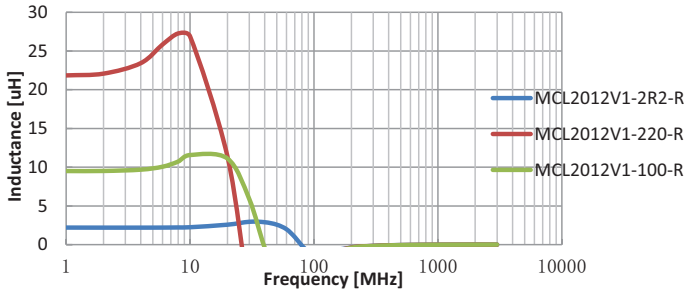
Supplied in tape and reel packaging, 4000 parts per 7" diameter reel



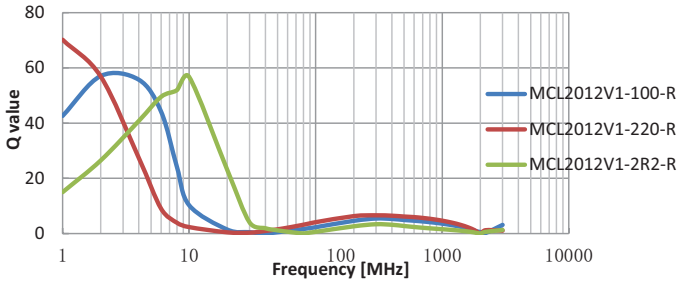


W ±0.3	8.00
F±0.05	3.50
E1±0.10	1.75
E2 Min	6.25
P0±0.10	4.00
P1±0.2	4.00
P2±0.1	2.00
D0+0.10/-0	1.50
A0	1.5±0.20
B0	2.3±0.20
T Max	1.10
T1 Max	na

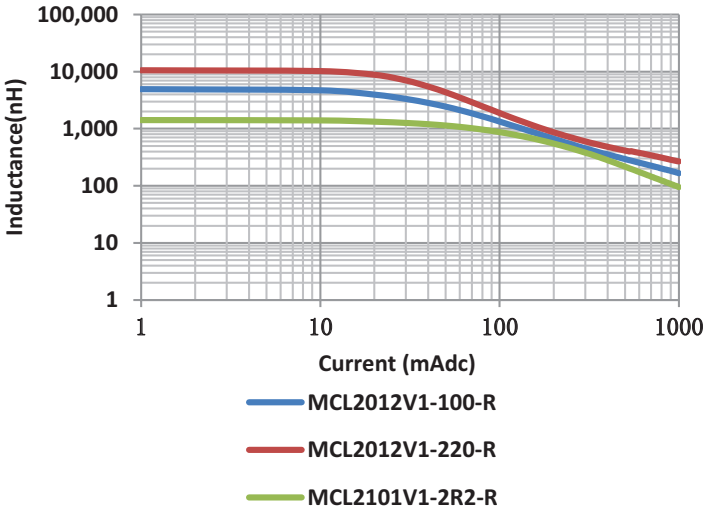
Inductance vs frequency



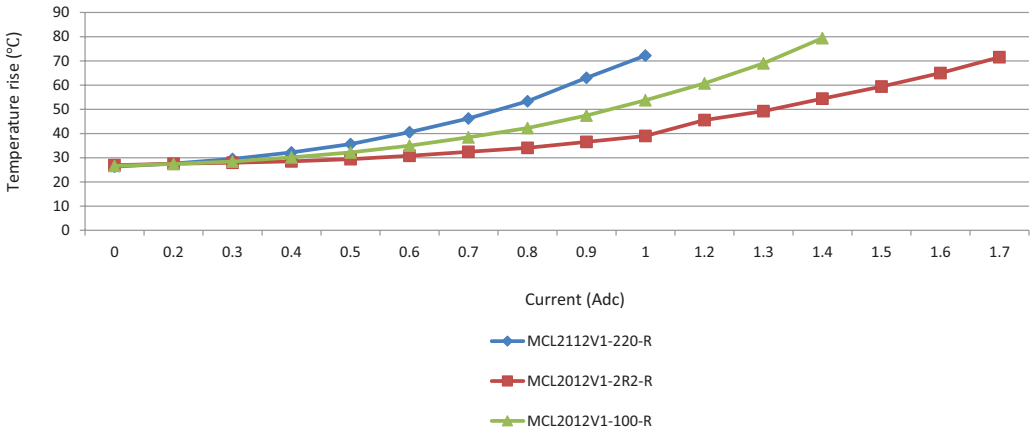
Q vs frequency



Inductance vs current



Temperature rise vs current



Solder reflow profile

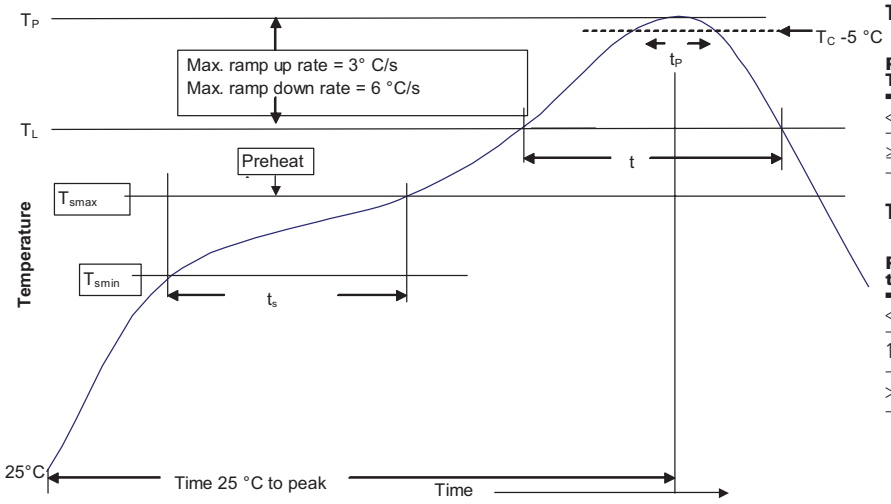


Table 1 - Standard SnPb solder (T_C)

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)

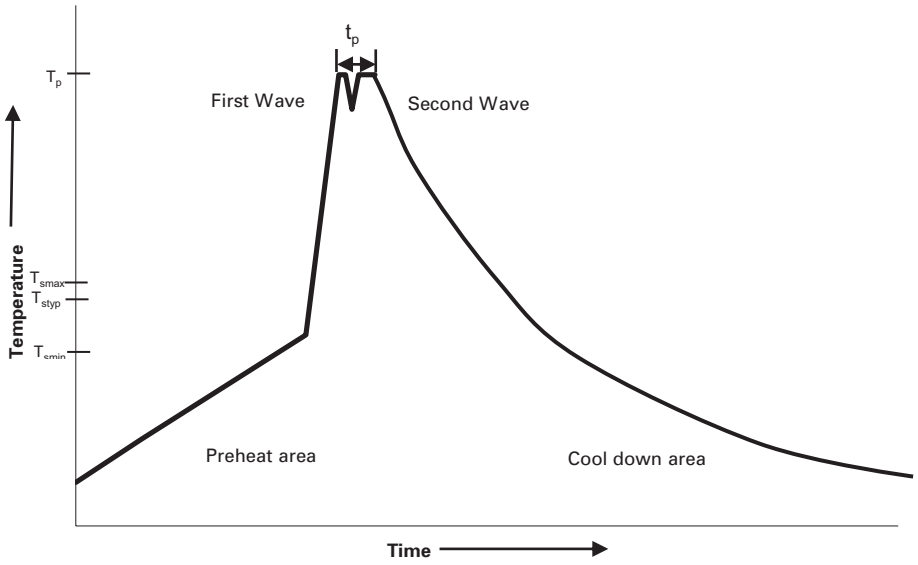
Package thickness	Volume mm³ <350	Volume mm³ 350 - 2000	Volume mm³ >2000
<1.6 mm	260 °C	260 °C	260 °C
1.6 – 2.5 mm	260 °C	250 °C	245 °C
>2.5 mm	250 °C	245 °C	245 °C

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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