

MPI20-V1

High current, low profile, miniature power inductors



Product features

- High current carrying capacity in a compact 0806 (2016 metric) footprint
- Magnetically shielded, Low EMI
- Rugged construction
- DC-DC converter applications up to 3 MHz
- Filtering applications up to Self Resonant Frequency (SRF). [See product specification table]
- Inductance range from 0.47 μ H to 2.2 μ H
- Current range from 2.2 A to 5.5 A
- 2.2 mm x 1.8 mm footprint surface mount package in 1.0 mm height maximum
- Moisture Sensitivity Level (MSL): 1

Applications

- Mobile/smart phones
- Handheld/mobile equipment
- Tablets/e-readers
- Digital cameras
- Wearable devices
- Notebook/netbook/laptop regulators
- Portable media players

Environmental data

- Storage temperature range (Component): -40 °C to +125 °C
- Operating temperature range: -40 °C to +125 °C (ambient plus self-temperature rise)
- Solder reflow temperature: J-STD-020 (latest revision) compliant

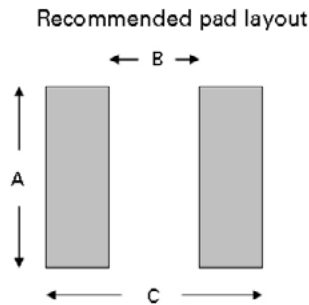
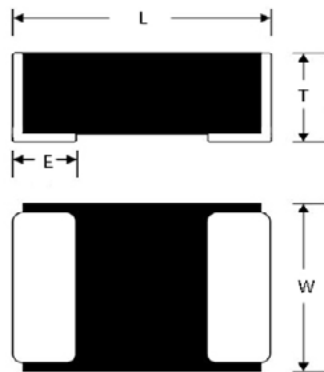


Product specifications

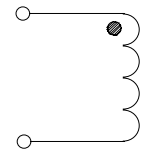
Part Number ⁵	OCL ¹ (μ H) \pm 20%	I _{rms} ² (A)	I _{sat} ³ (A)	DCR (m Ω) typical @ +20 °C	DCR (m Ω) maximum @ +20 °C	SRF (MHz) typical	K-factor ⁴
1.0 mm height							
MPI2010V1-R47-R	0.47	4.5	5.5	26	31	160	3822
MPI2010V1-1R0-R	1.0	3.3	3.6	54	62	100	2990
MPI2010V1-1R5-R	1.5	2.4	3.2	87	99	85	2083
MPI2010V1-2R2-R	2.2	2.2	2.6	117	135	65	1729

- Open Circuit Inductance (OCL) Test parameters: 1.0 MHz, 1.0 Vrms, 0.0 Adc, +25 °C.
- I_{rms}: DC current for an approximate temperature rise of 40 °C without core loss. Derating is necessary for AC currents. PCB layout, trace thickness and width, air-flow, and proximity of other heat generating components will affect the temperature rise. It is recommended that the temperature of the part not exceed +125 °C under worst case operating conditions verified in the end application.
- I_{sat}: Peak current for approximately 30% rolloff @ +25 °C.
- K-factor: Used to determine Bp-p for core loss (see graph). Bp-p = K * L * Δ I. Bp-p (Gauss), K: (K-factor from table), L: (Inductance in μ H), Δ I (Peak to peak ripple current in Amps).
- Part Number Definition: MPI20xxV1-xxx-R
 MPI20 = Product code
 xx= Height indicator
 V1=Version indicator
 xxx= inductance value in μ H, R= decimal point, If no R is present then last character equals number of zeros
 -R suffix = RoHS compliant

Dimensions (mm)



Schematic

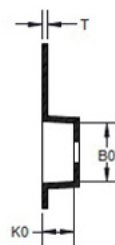
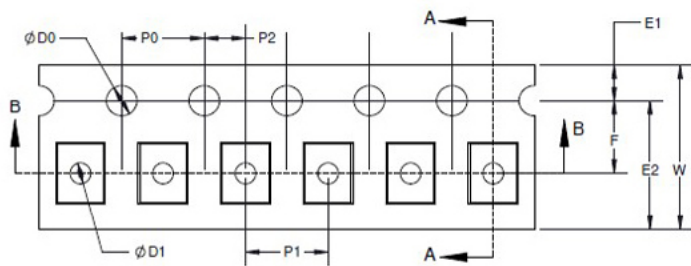


Part Number	L	W	T	E	A	B	C
MPI2010V1-xxx-R	2.0 \pm 0.2	1.6 \pm 0.2	1.0 maximum	0.5 \pm 0.3	1.6 \pm 0.10	0.9 \pm 0.10	2.0 \pm 0.10

No marking
 All soldering surfaces to be coplanar within 0.10 millimeters
 Tolerances are \pm 0.3 millimeters unless stated otherwise
 Pad layout tolerances are \pm 0.1 millimeters unless stated otherwise
 Do not route traces or vias underneath the inductor

Packaging information (mm)

Supplied in tape and reel packaging, 3000 parts per 7" diameter reel



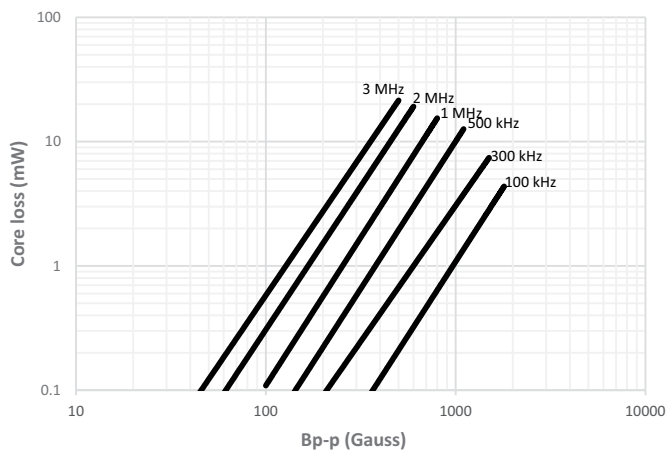
W ±0.1	8.00
F ±0.05	3.50
E1 ±0.10	1.75
E2 Min	6.25
P0 ±0.10	4.00
P1 ±0.1	4.00
P2 ±0.05	2.00
D0 +0.10/-0	1.50
D1 +0.10/-0	1.00
A0	1.9 ±0.10
B0	2.25 ±0.10
K0	1.1 ±0.10
T ±0.05	0.22



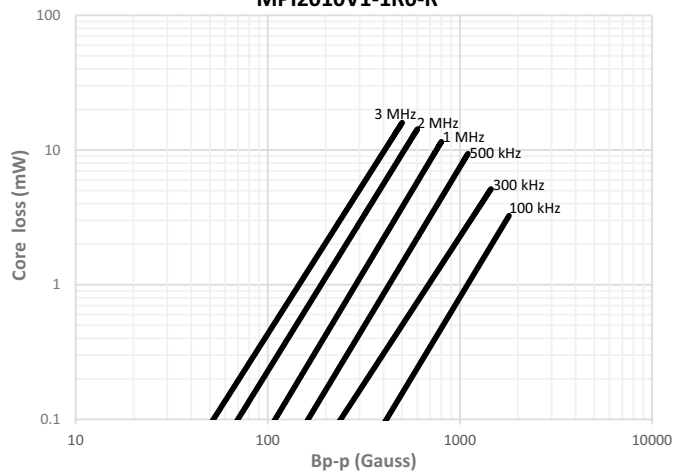
User direction of unreeling →

Core loss vs. Bp-p (+25 °C)

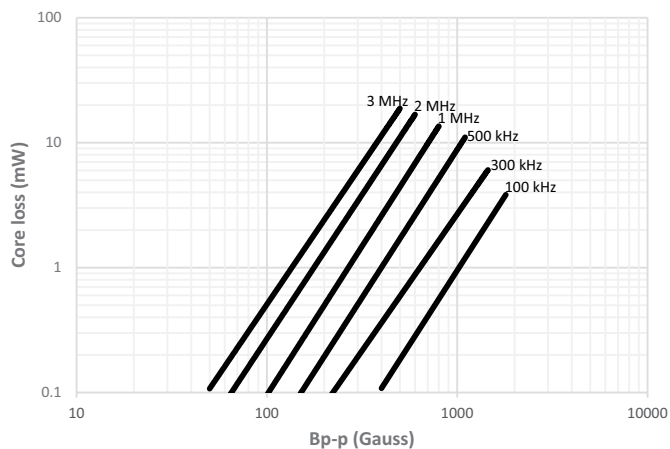
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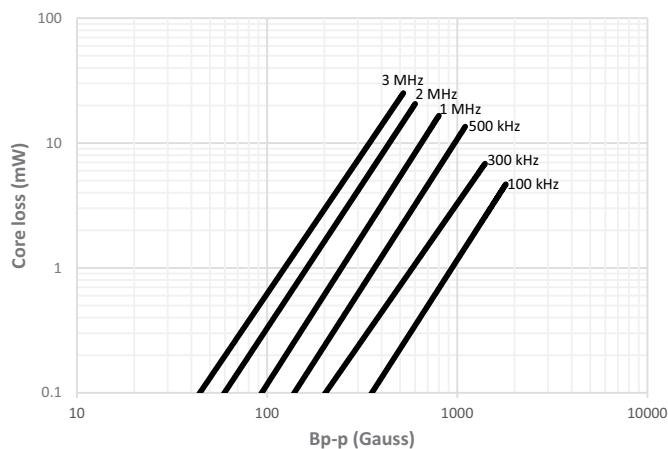
MPI2010V1-1R0-R



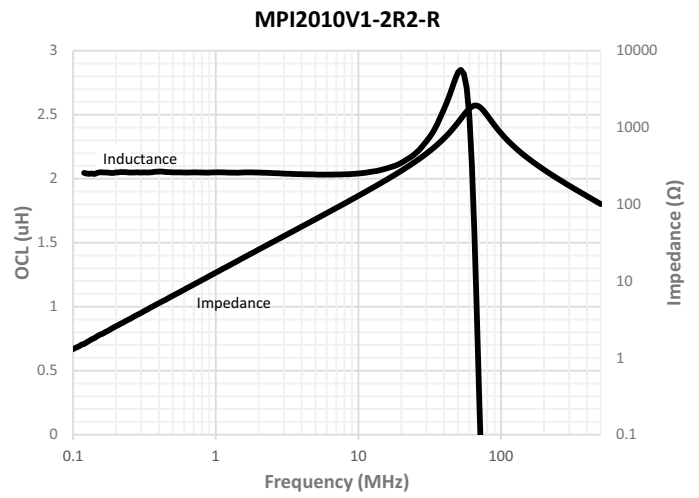
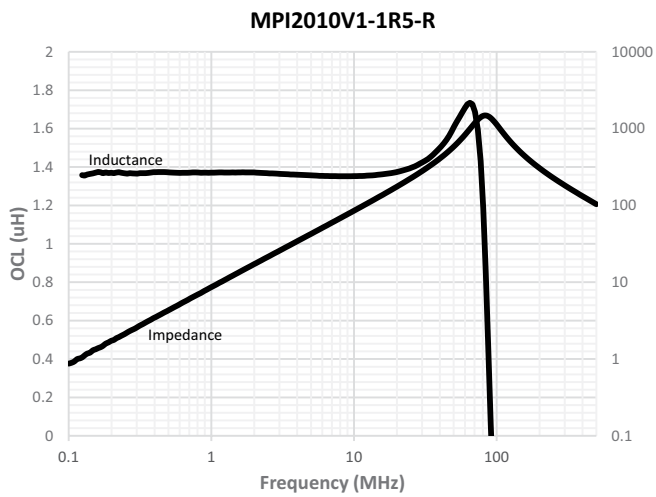
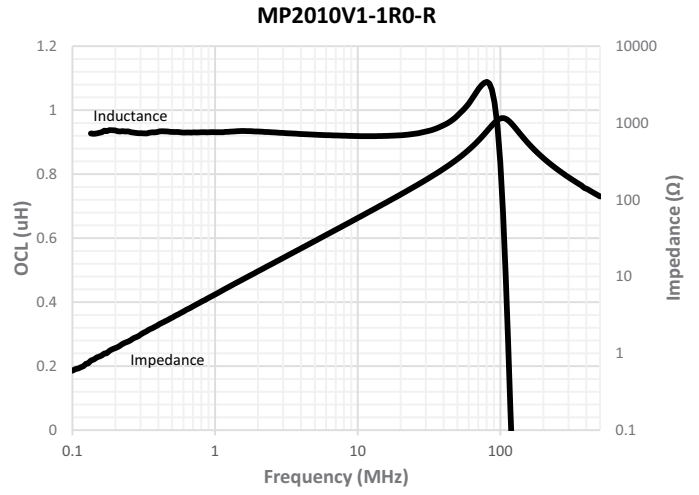
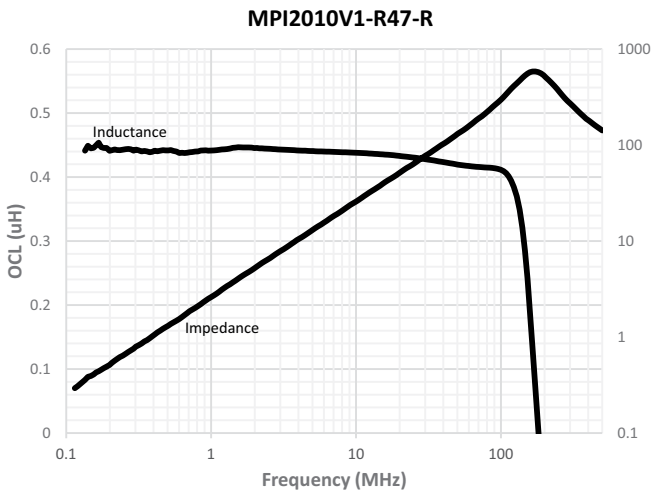
MPI2010V1-1R5-R



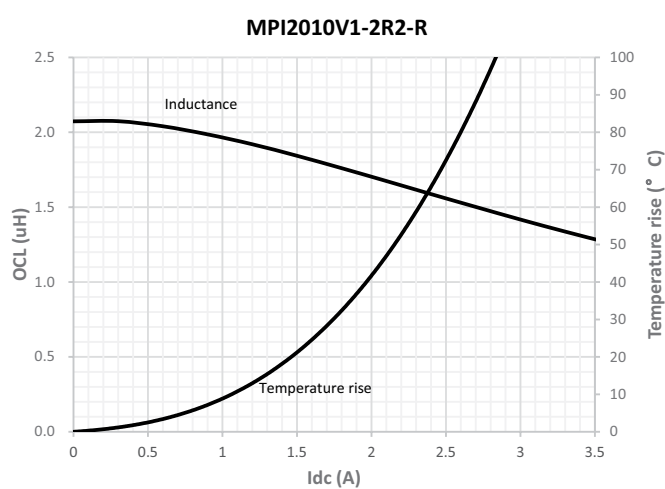
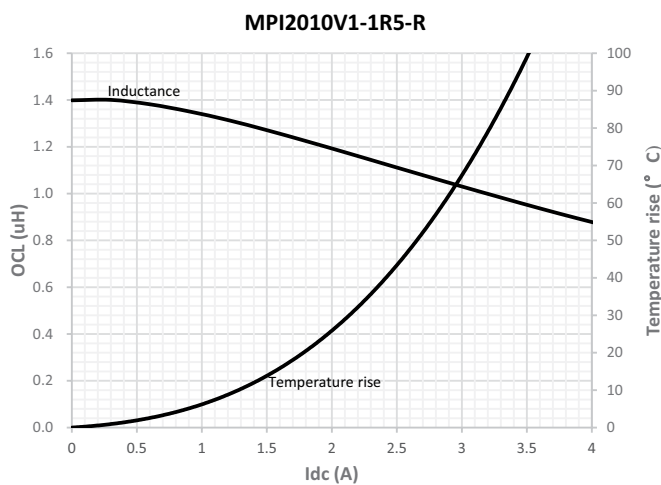
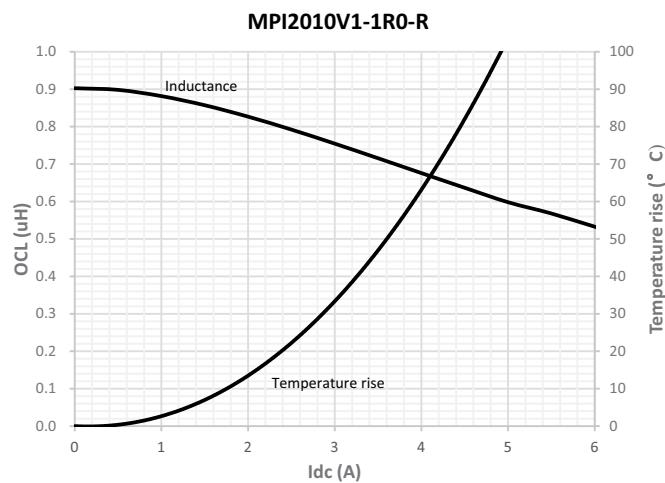
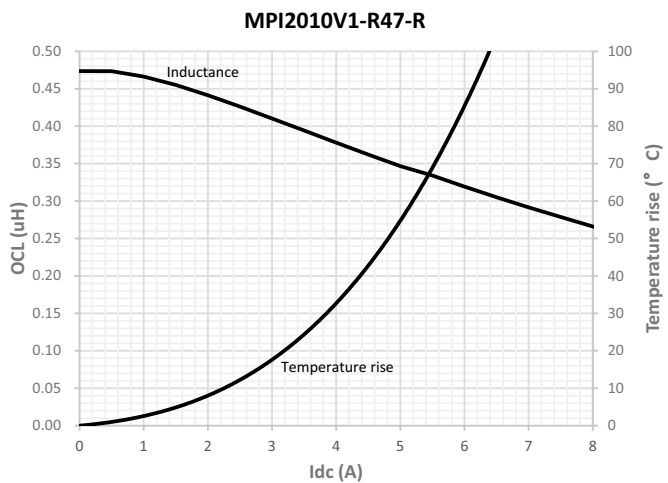
MPI2010V1-2R2-R



Inductance and impedance vs. frequency



Inductance and temperature rise vs. current



Solder reflow profile

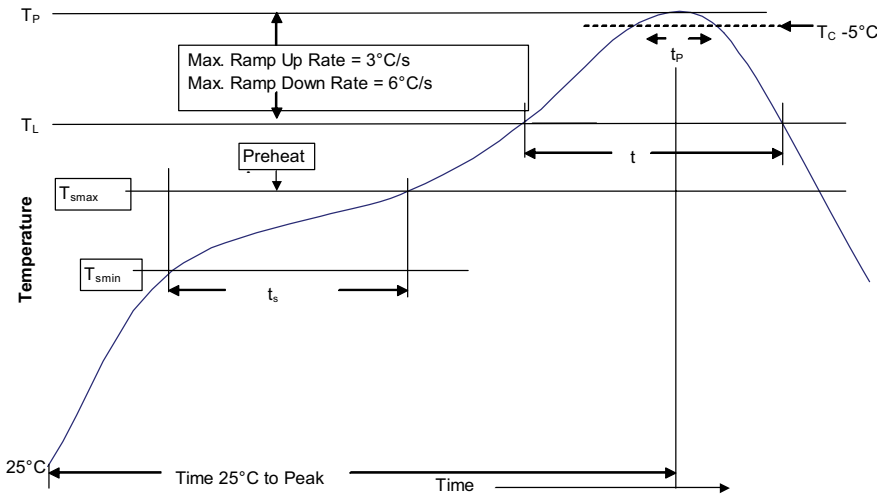


Table 1 - Standard SnPb solder (T_c)

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 _{smmin})	100 °C	150 °C
• Temperature max. (T _{smmax})	150 °C	200 °C
• Time (T _{smmin} to T _{smmax}) (t _s)	60-120 seconds	60-120 seconds
Average ramp up rate T _{smmax} 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)	20 seconds**	30 seconds**
Average ramp-down rate (T _p to T _{smmax})	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.

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