

MPI20-V1

High current, low profile, miniature power inductors



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 features

- High current carrying capacity in a compact 0806 (2016 metric) footprint
- Magnetically shielded, Low EMI
- Ring-core 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



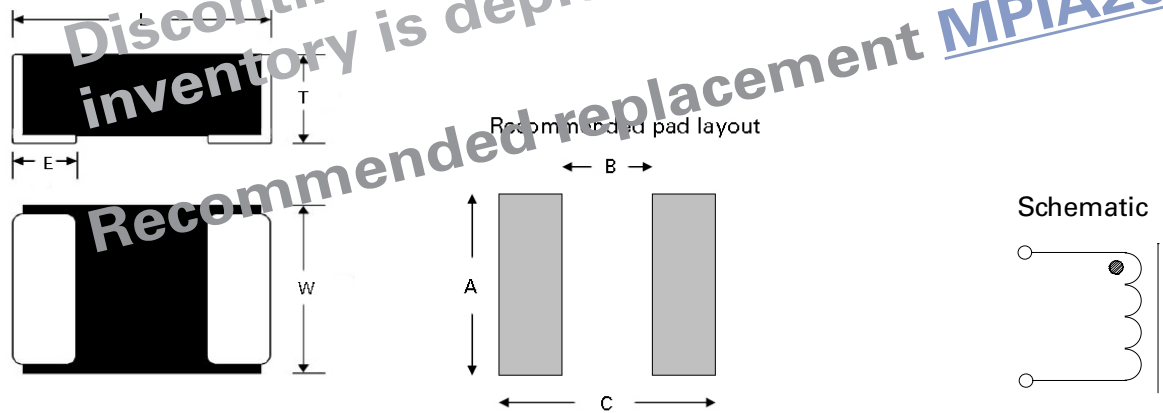
Discontinued February 1, 2022 or until inventory is depleted PCN22004 Recommended replacement MPI20-V1

Product specifications

Part Number ⁵	OCL ¹ (μH) ±20%	I _{rms} ² (A)	I _{sat} ³ (A)	DCR (mΩ) typical @ +20 °C	DCR (mΩ) 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 * ΔI. Bp-p (Gauss), K: (K-factor from table), L: (Inductance in uH), ΔI (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 μH, R= decimal point, If no R is present then last character equals number of zeros
 -R suffix = RoHS compliant

Dimensions (mm)

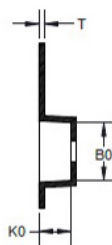
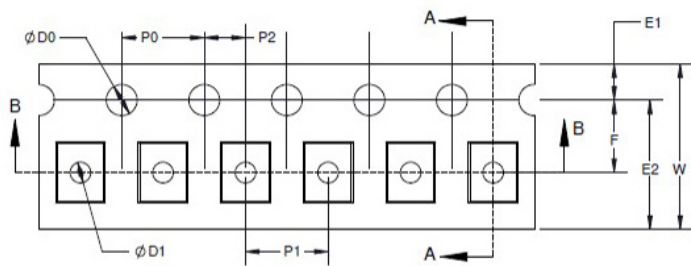


Part Number	L	W	T	E	A	B	C
MPI2010V1-xxx-R	2.0 ±0.2	1.6 ±0.2	1.0 maximum	0.5 ±0.3	1.6 ±0.10	0.9 ±0.10	2.0 ±0.10

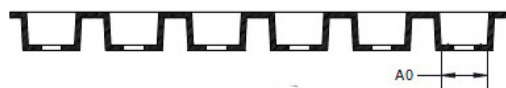
No marking
 All soldering surfaces to be coplanar within 0.10 millimeters
 Tolerances are ±0.3 millimeters unless stated otherwise
 Pad layout tolerances are ±0.1 millimeters unless stated otherwise
 Do not route traces or vias underneath the inductor

Packaging information (mm)

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

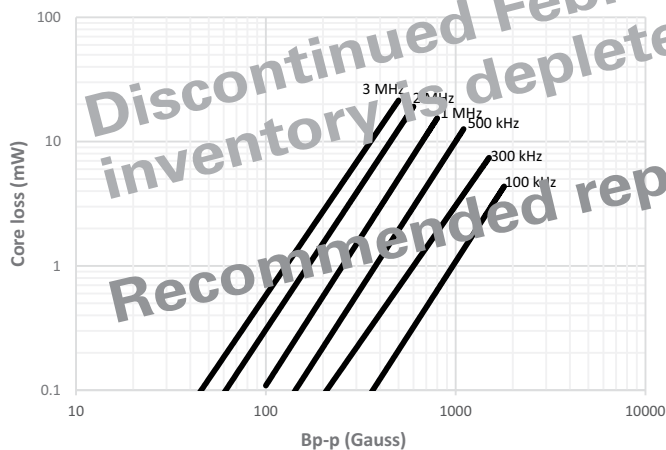


User direction of unreeling →

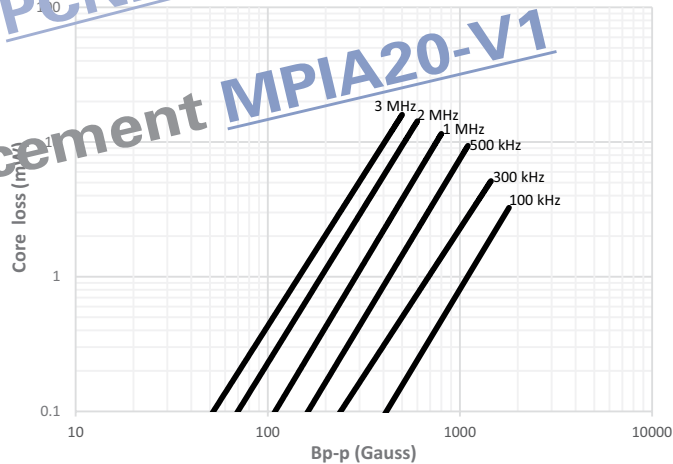
Core loss vs. Bp-p (+25 °C)

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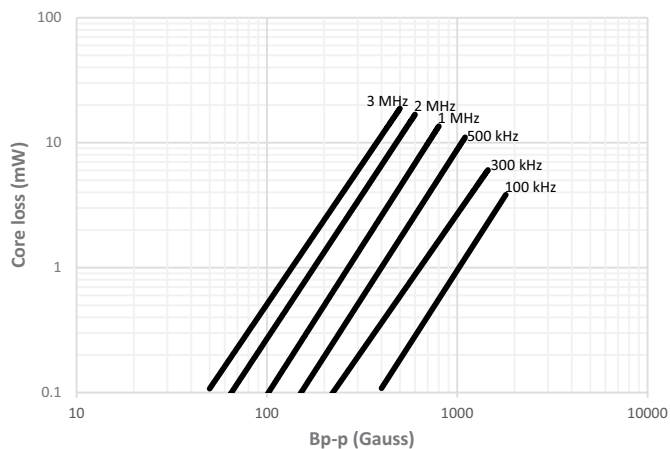
MPI2010V1-R47-R



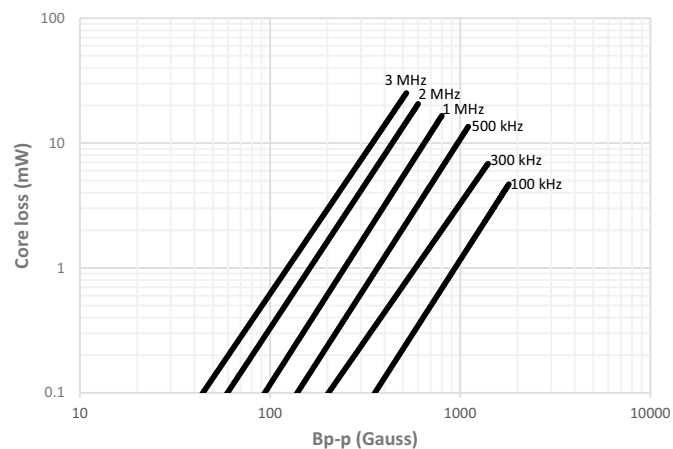
MPI2010V1-1R0-R



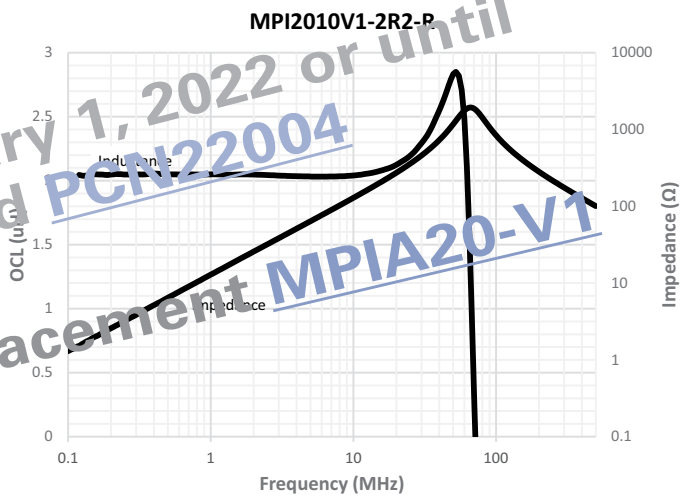
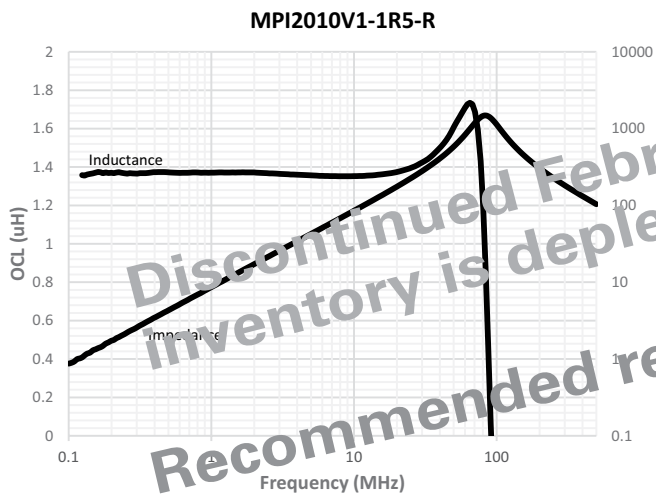
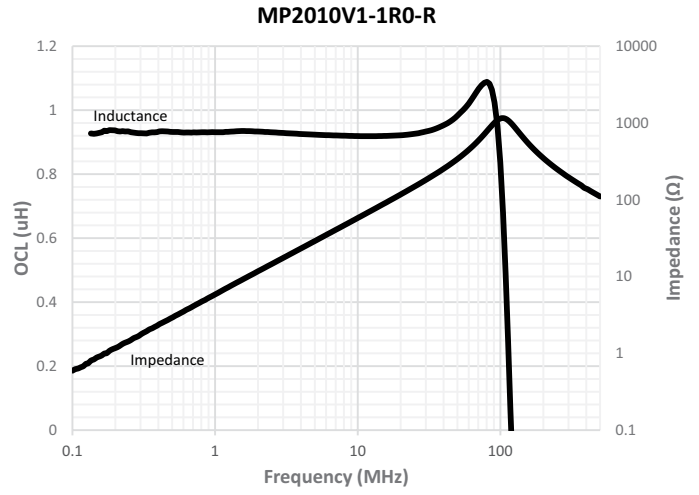
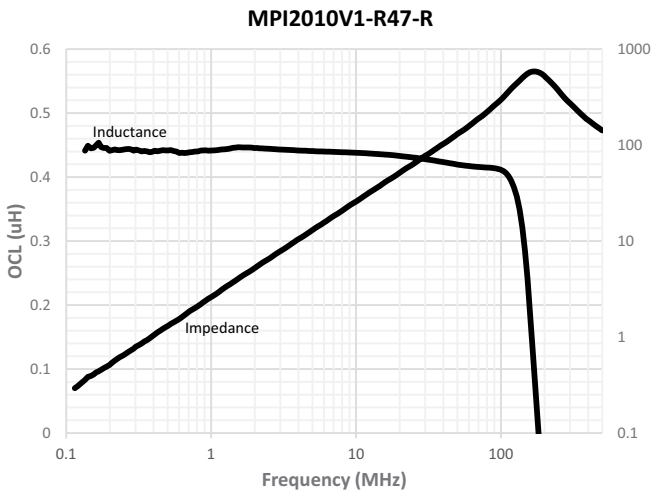
MPI2010V1-1R5-R



MPI2010V1-2R2-R

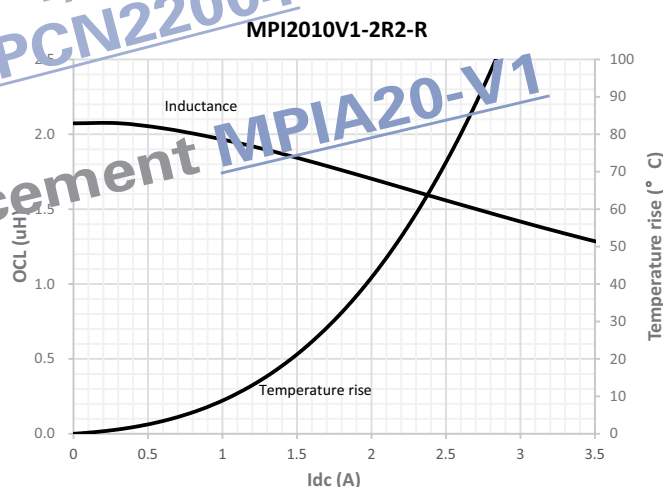
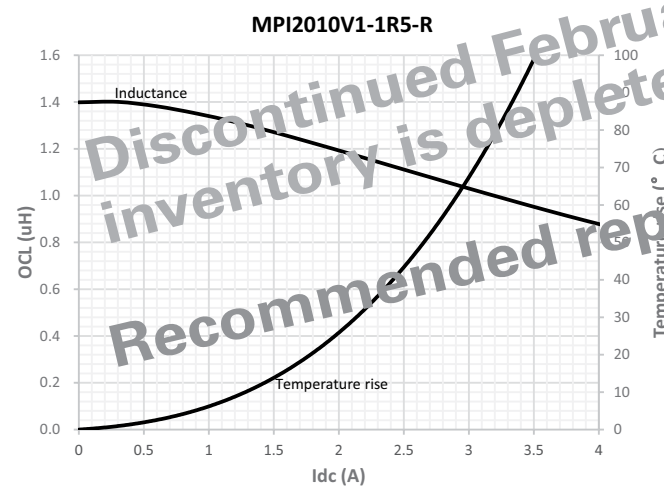
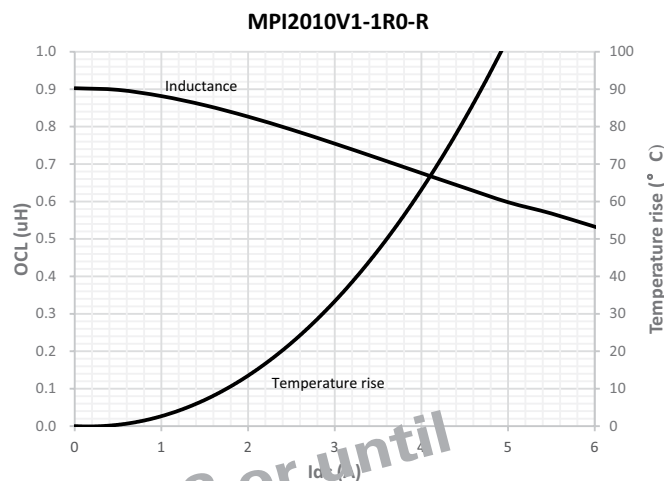
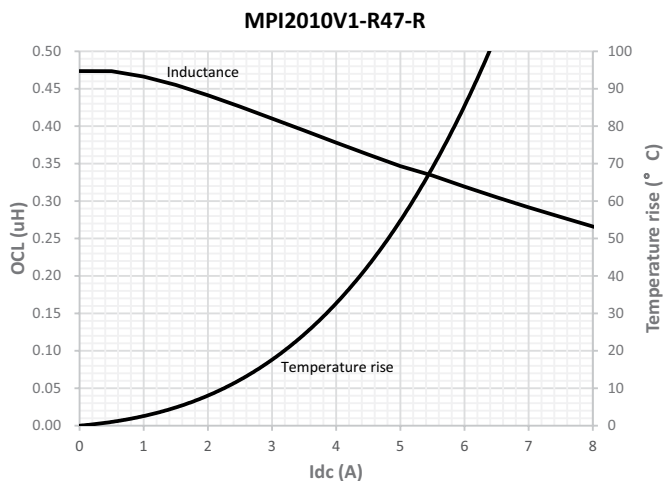


Inductance and impedance vs. frequency



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Inductance and temperature rise vs. current



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Recommended replacement **MPIA20-V1**

Solder reflow profile

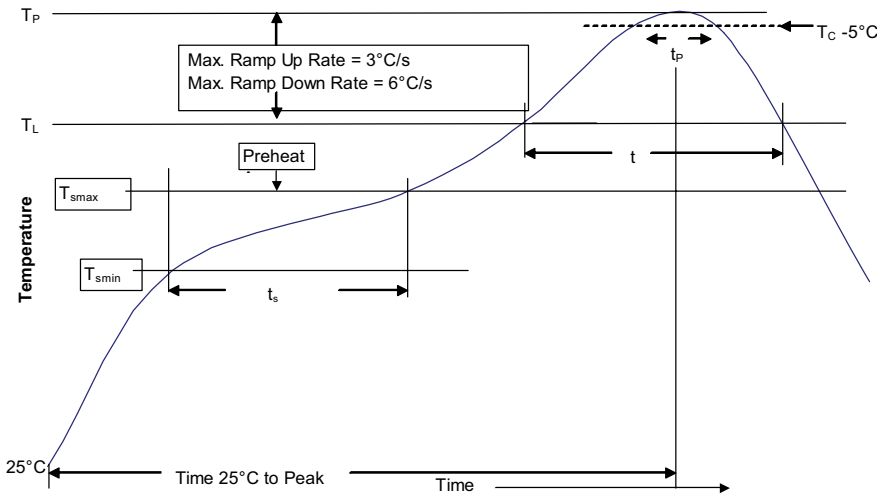


Table 1 - Standard SnPb solder (T_C)

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	<ul style="list-style-type: none"> Temperature min. (T_{smin}) Temperature max. (T_{smax}) 	<ul style="list-style-type: none"> 150 °C 200 °C
Time (T _{smin} to T _{smax}) (t _s)	60-120 seconds	60-120 seconds
Average ramp up rate (T _{smin} to T _{smax})	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 reflow temperature (T _C)	20 seconds**	30 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.

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