MPI40-V2

High current, low profile, miniature power inductors

Product features

- High current carrying capacity
- Magnetically shielded, Low EMI
- Rugged flexible construction
- Self resonant frequency (SRF) greater than 9.5 MHz
- Inductance range from 0.1 µH to 22 µH
- Current range from 1.2 A to 22 A
- 4.75 mm x 4.45 mm footprint surface mount package in 1.2 mm, 1.5 mm, and 2.0 mm heights
- Moisture Sensitivity Level (MSL): 1

Applications

- Handheld/mobile devices
- Portable media players
- Notebook/netbook/laptop regulators
- Tablets/smartbooks
- Battery operated devices
- LED drivers
- LCD displays
- Point-of-load (POL) converters

Environmental data

- Storage temperature range (Component): -55 °C to +125 °C
- Operating temperature range: -55 °C to +125 °C (ambient plus self-temperature rise)
- Solder reflow temperature: J-STD-020 (latest revision) compliant
- Halogen free, lead free, RoHS compliant

Pb HALOGEN HF FREE RoHS

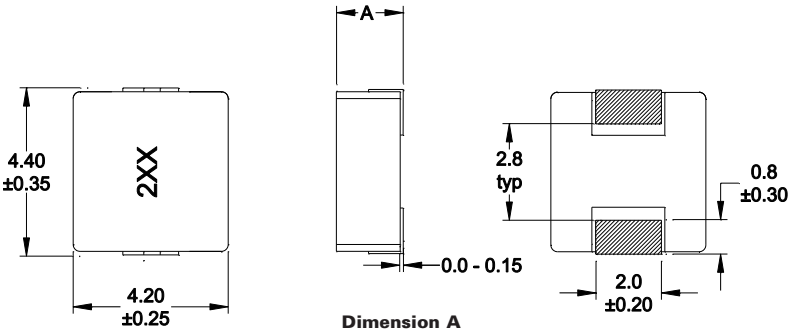
Powering Business Worldwide

Product specifications

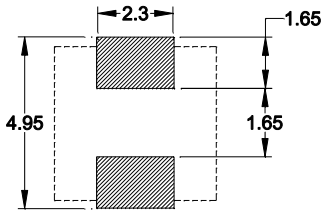
Part Number[5]	OCL[1] (µH) ±20%	Part marking designator	I_{rms}[2] (A)	I_{sat}[3] (A)	DCR (mΩ) typical @ +20 °C	DCR (mΩ) maximum @ +20 °C	SRF (MHz) typical	K-factor[4]
1.2 mm height								
MPI4012V2-R33-R	0.33	A	7.5	11	11	13.5	128	2480
MPI4012V2-R47-R	0.47	B	5.6	6.8	19	23	106	2470
MPI4012V2-R68-R	0.68	C	4.5	6.7	28	33.5	98	2223
MPI4012V2-1R0-R	1.0	D	4.3	6.5	38.5	46.5	64	1477
MPI4012V2-1R5-R	1.5	E	3.3	4.3	55	66	63	1264
MPI4012V2-2R2-R	2.2	F	2.9	4.2	75	90	35	1143
MPI4012V2-4R7-R	4.7	G	1.8	2.8	175	210	29	890
1.5 mm height								
MPI4015V2-R22-R	0.22	A	10.5	14	6.0	7.5	153	2649
MPI4015V2-R33-R	0.33	B	9.5	11	7.0	8.5	120	2158
MPI4015V2-R47-R	0.47	C	7.8	9.0	11	14	98	1991
MPI4015V2-R56-R	0.56	D	7.5	8.3	12	14	84	1942
MPI4015V2-R68-R	0.68	E	6.8	8.0	16	19	81	1437
MPI4015V2-1R0-R	1.0	F	5.5	6.0	23	27	56	1382
MPI4015V2-1R5-R	1.5	G	4.2	4.6	48	58	48	1468
MPI4015V2-2R2-R	2.2	H	2.9	4.5	65	78	42	920
MPI4015V2-3R3-R	3.3	I	3.0	3.2	77	92	31	854
MPI4015V2-4R7-R	4.7	J	2.2	3.0	108	130	22	791
MPI4015V2-6R8-R	6.8	K	2.0	2.3	172	207	21	609
MPI4015V2-100-R	10	L	1.8	2.1	245	294	14	766
2.0 mm height								
MPI4020V2-R10-R	0.10	A	16	22	3.5	4.5	343	2692
MPI4020V2-R22-R	0.22	B	13	17	5.5	6.6	165	2036
MPI4020V2-R33-R	0.33	C	9.5	12	7.5	9.0	113	1268
MPI4020V2-R47-R	0.47	D	8.5	11	10.5	13	95	1219
MPI4020V2-R56-R	0.56	E	8.0	10	12	15	87	1205
MPI4020V2-R68-R	0.68	F	7.5	9.0	12.5	16	80	1201
MPI4020V2-1R0-R	1.0	G	6.5	7.0	20	24	65	1168
MPI4020V2-1R2-R	1.2	H	6.5	6.8	23	28	52	1110
MPI4020V2-1R5-R	1.5	I	5.0	6.0	25	30	45	1038
MPI4020V2-2R2-R	2.2	J	3.8	5.5	40	48	33	711
MPI4020V2-3R3-R	3.3	K	3.3	4.0	71	85	25	643
MPI4020V2-4R7-R	4.7	L	2.7	3.2	98	118	24	453
MPI4020V2-6R8-R	6.8	M	2.0	2.6	167	192	23	482
MPI4020V2-100-R	10	N	1.7	2.2	245	281	17	307
MPI4020V2-150-R	15	O	1.5	1.8	320	384	13	257
MPI4020V2-220-R	22	P	1.2	1.65	350	402	9.5	215

1. Open Circuit Inductance (OCL) Test Parameters: 100 kHz, 1.0 Vrms, 0.0 Adc, +25 °C.
2. 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.
3. I_{sat} : Peak current for approximately 30% rolloff @ +25 °C.
4. 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).
5. Part Number Definition: MPI40xxV2-xxx-R
   MPI40 = Product code
   xx= Height indicator
   V2=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

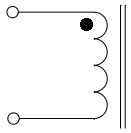
Dimensions (mm)



Recommended Pad Layout



Schematic



Dimension A	
MPI4012V2	1.00 ±0.20
MPI4015V2	1.30 ±0.20
MPI4020V2	1.80 ±0.20

Part marking: 2xx (2 = version, x = inductance value per "Part marking designator" listed in Product specification table, x = bi-weekly date code)

All soldering surfaces to be coplanar within 0.10 millimeters

Tolerances are ±0.3 millimeters unless stated otherwise

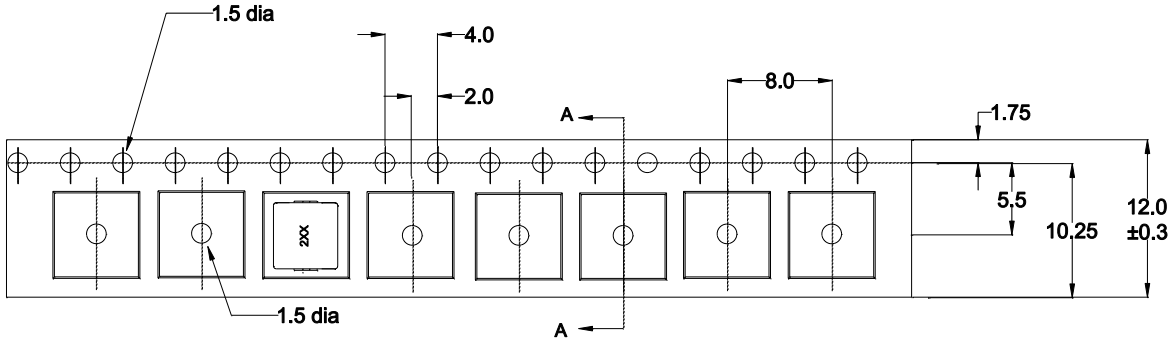
Pad layout tolerances are ±0.1 millimeters unless stated otherwise

Do not route traces or vias underneath the inductor

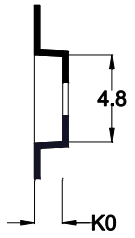
Packaging information (mm)

Drawing not to scale

Supplied in tape and reel packaging , 3000 parts per 13" diameter reel

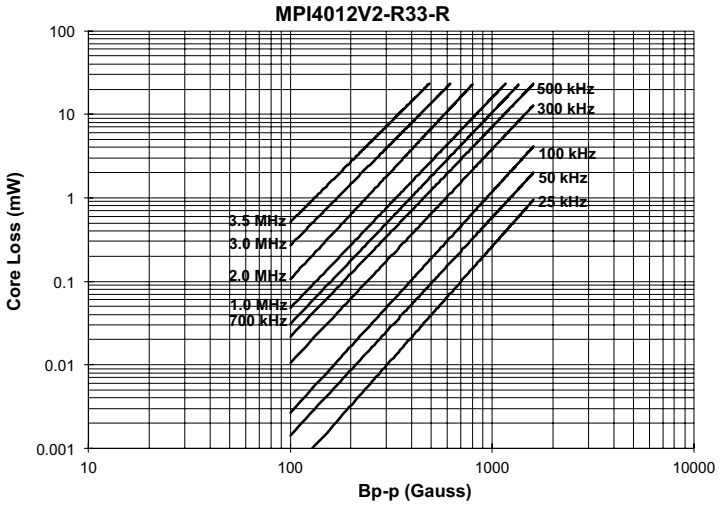


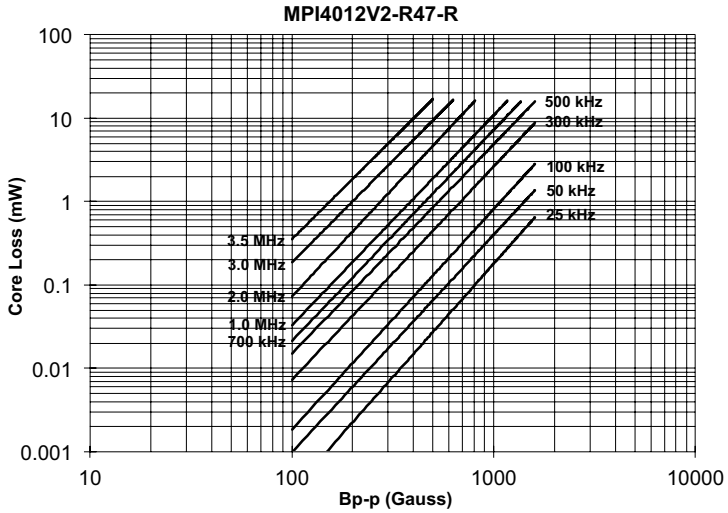
KO	
MPI4012V2	1.4
MPI4015V2	1.8
MPI4020V2	2.5

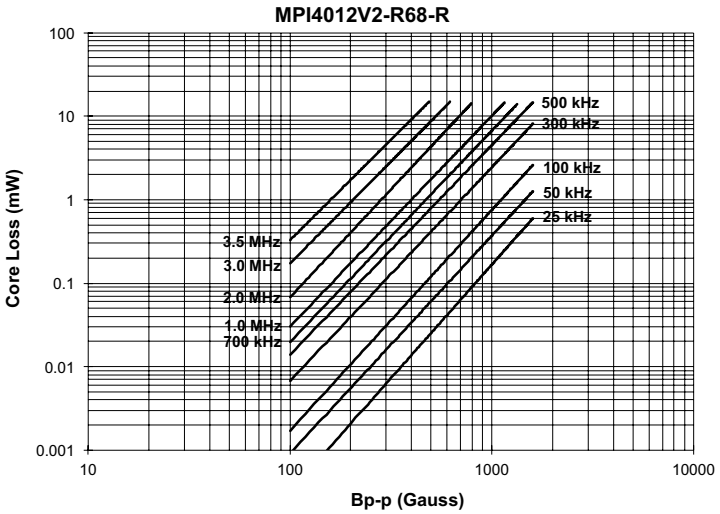


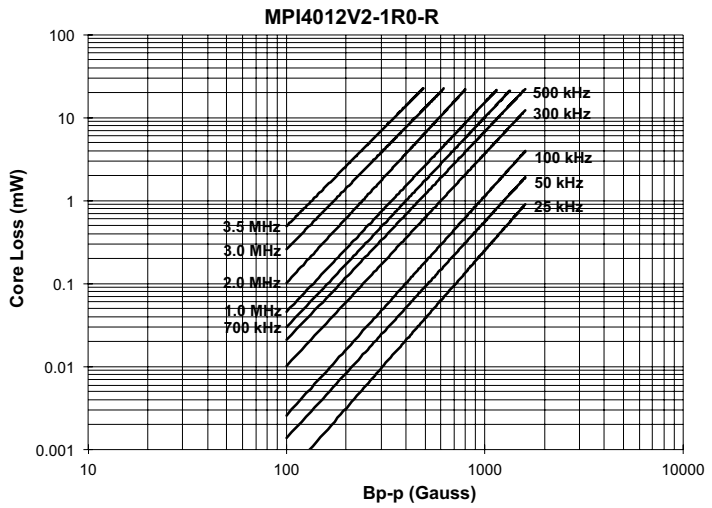
Section A-A

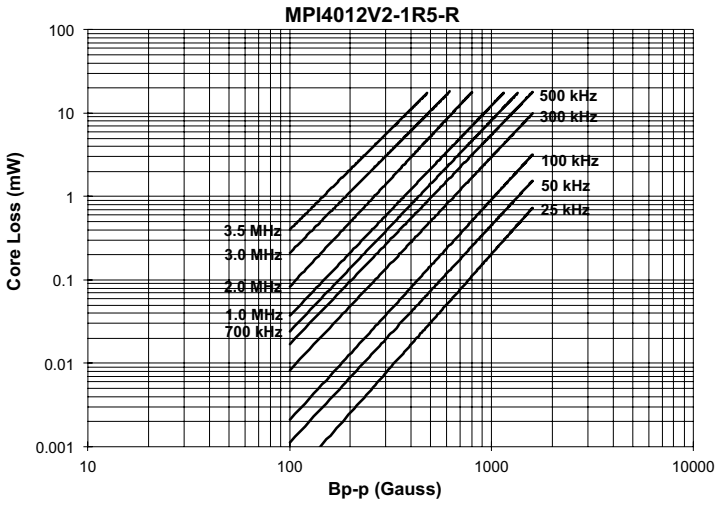
Core loss vs Bp-p

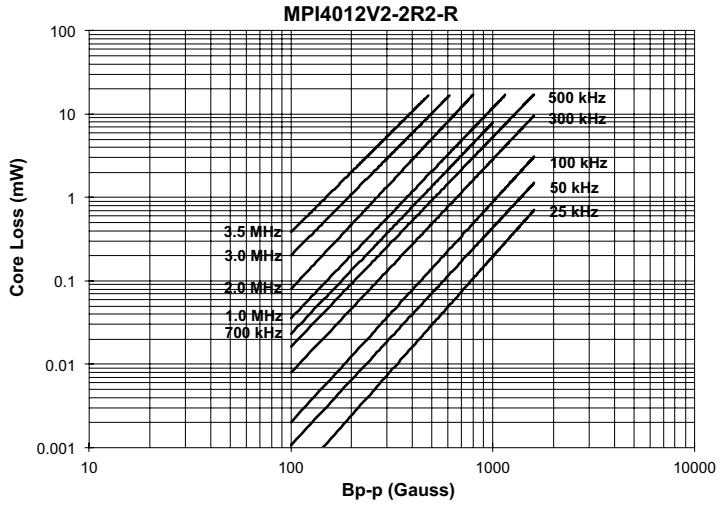






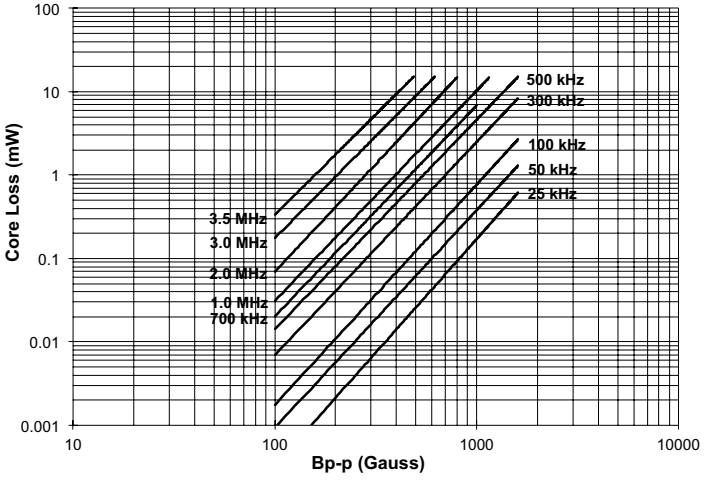




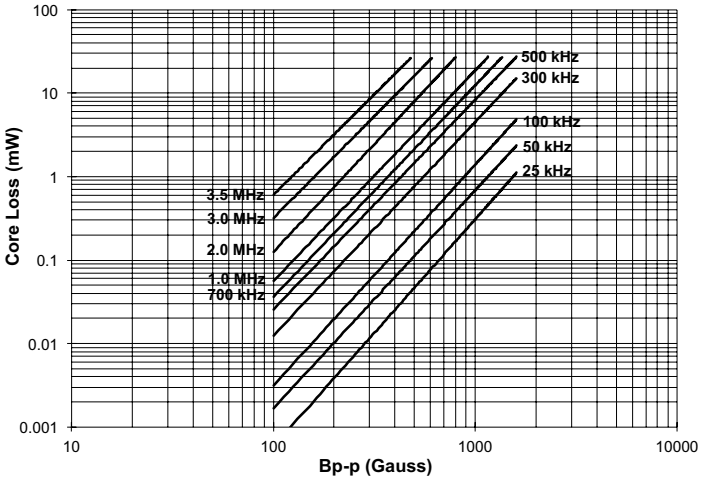


Core loss vs Bp-p

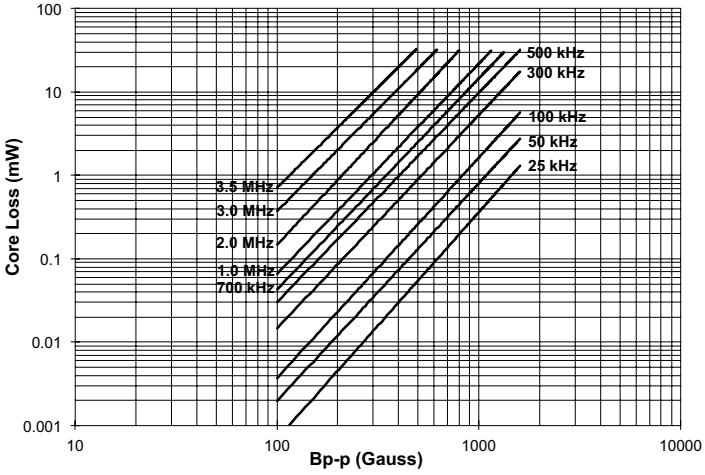
MPI4012V2-4R7-R



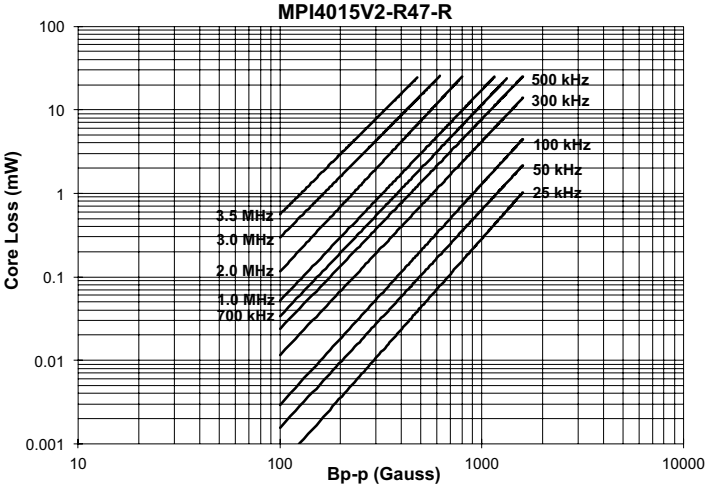
MPI4015V2-R22-R



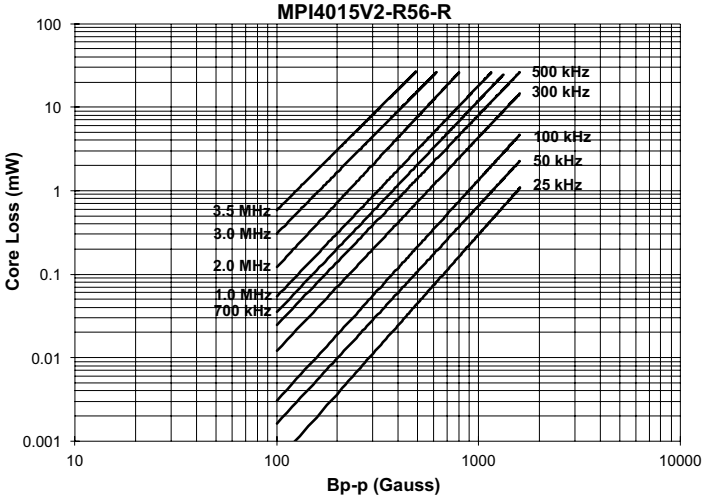
MPI4015V2-R33-R



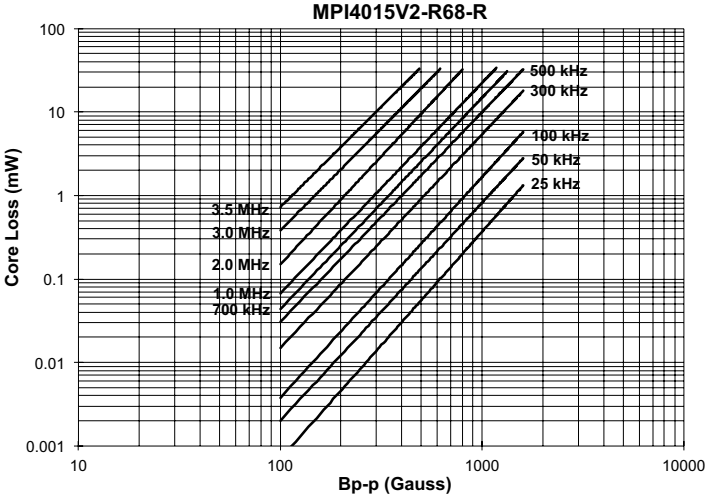
MPI4015V2-R47-R



MPI4015V2-R56-R

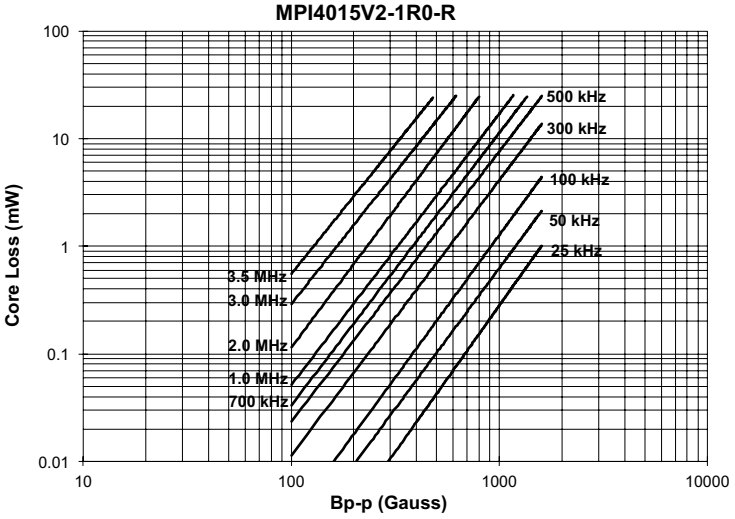


MPI4015V2-R68-R

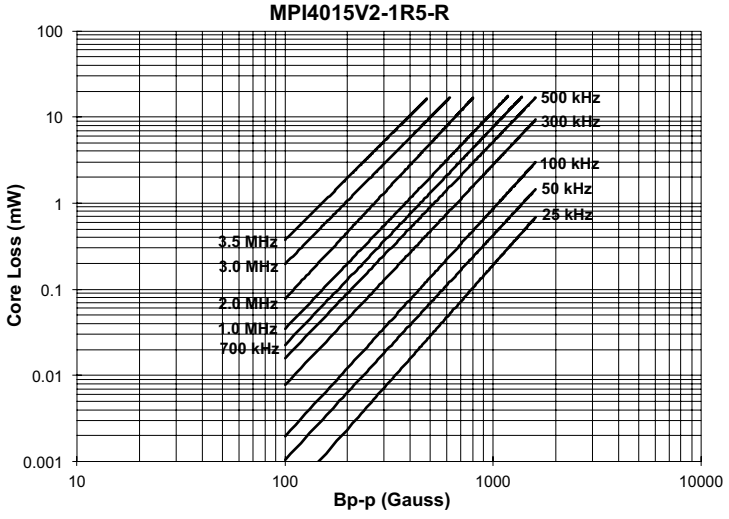


Core loss vs Bp-p

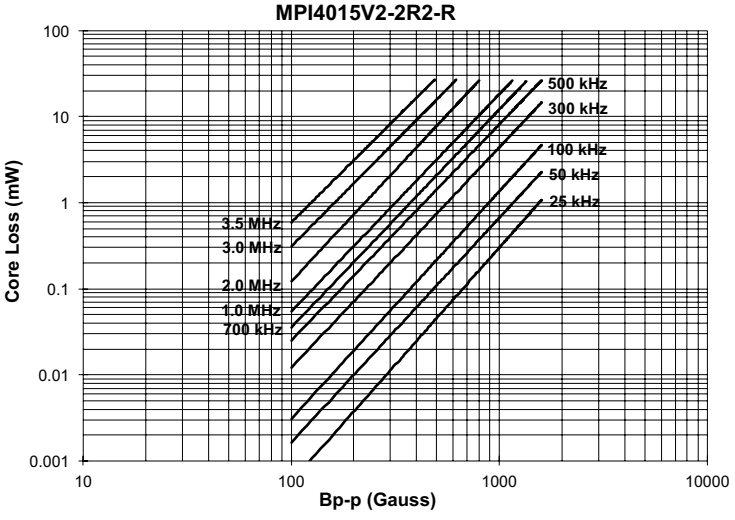
MPI4015V2-1R0-R



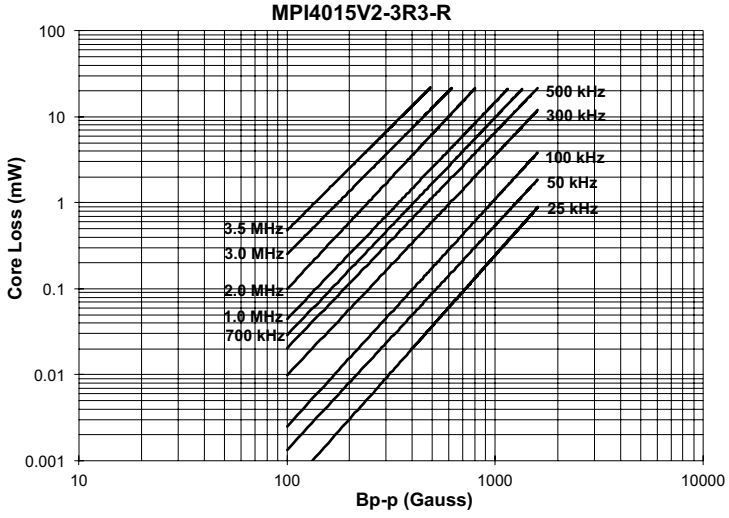
MPI4015V2-1R5-R



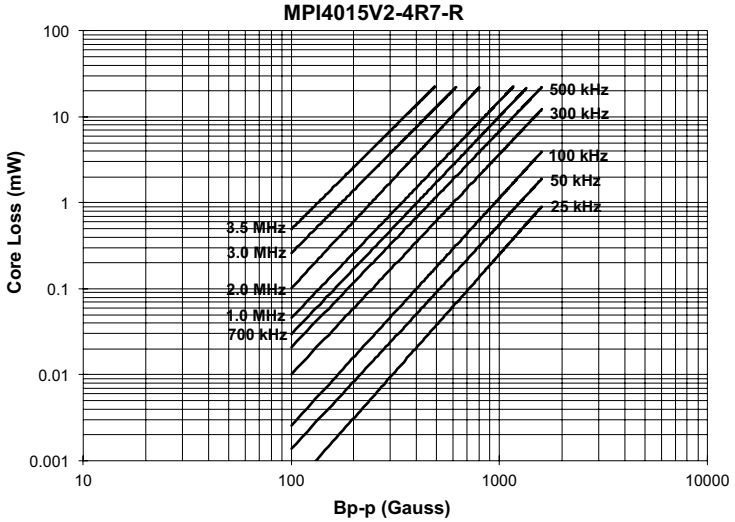
MPI4015V2-2R2-R



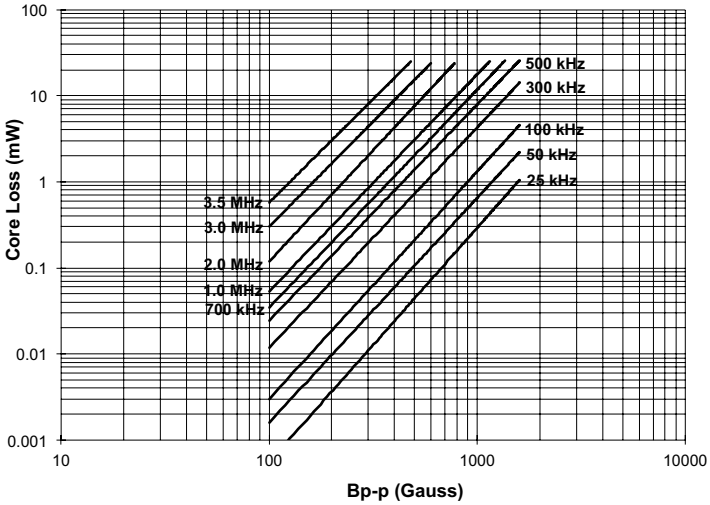
MPI4015V2-3R3-R



MPI4015V2-4R7-R

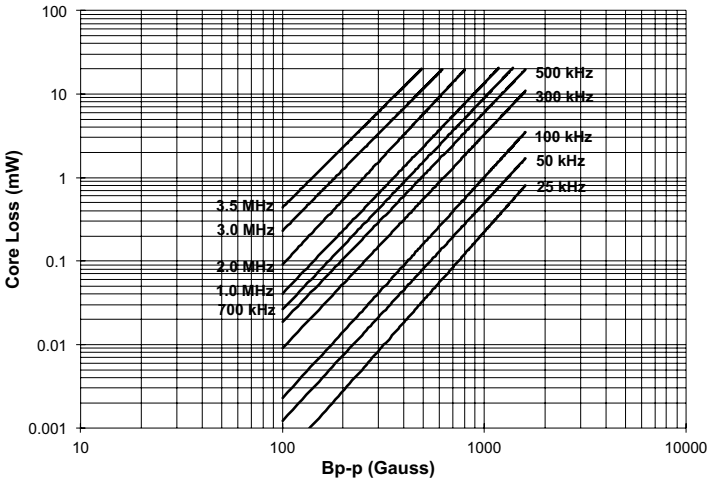


MPI4015V2-6R8-R

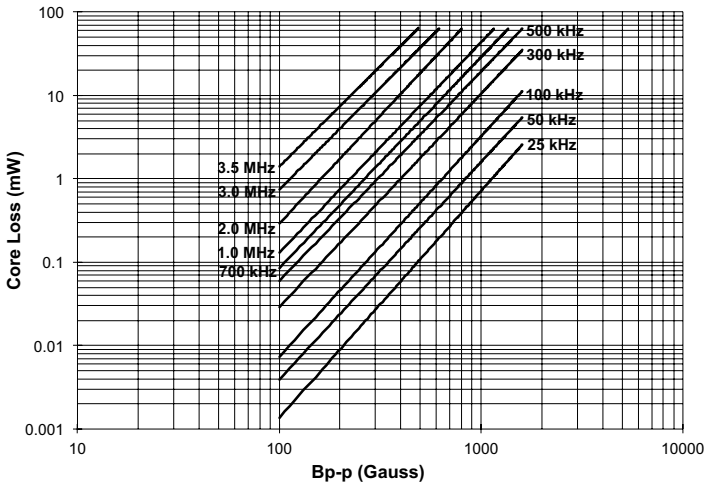


Core loss vs Bp-p

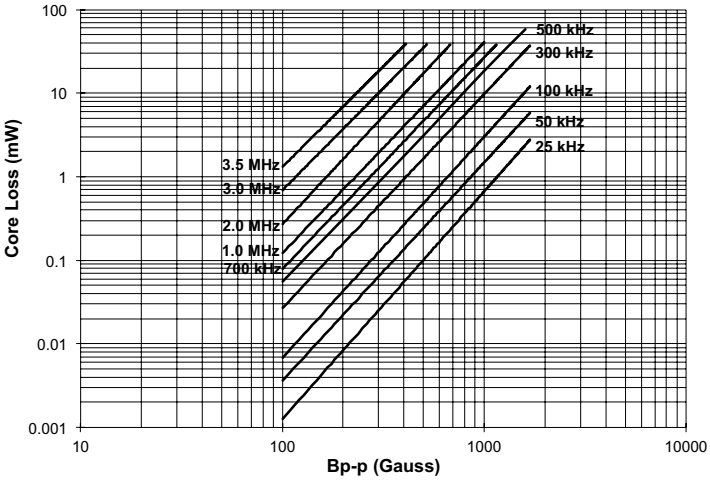
MPI4015V2-100-R



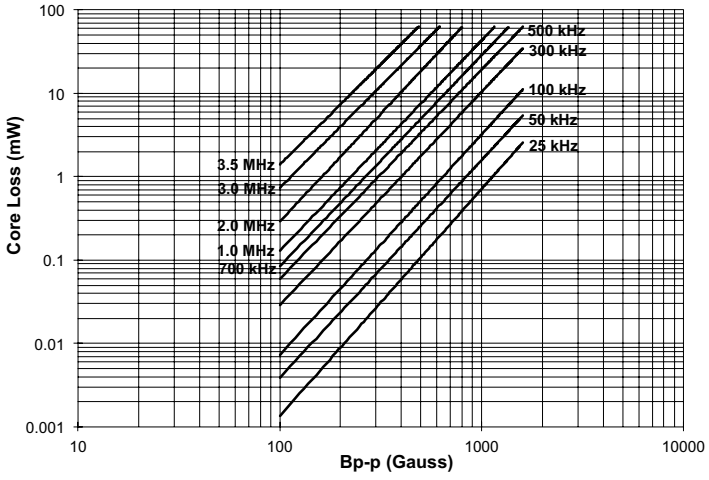
MPI4020V2-R10-R



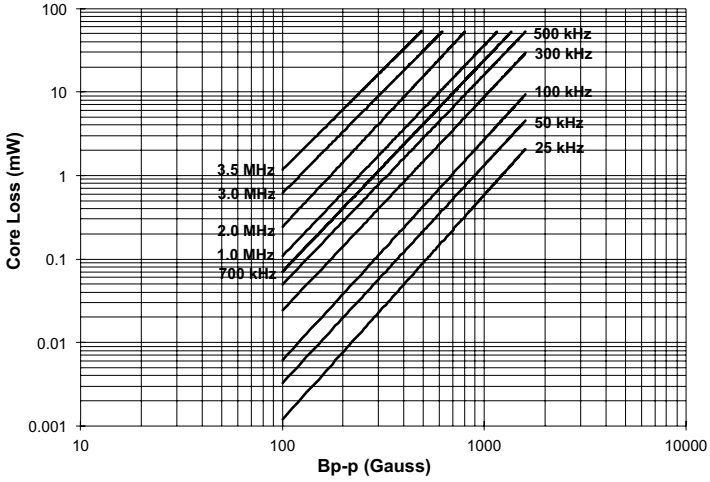
MPI4020V2-R22-R



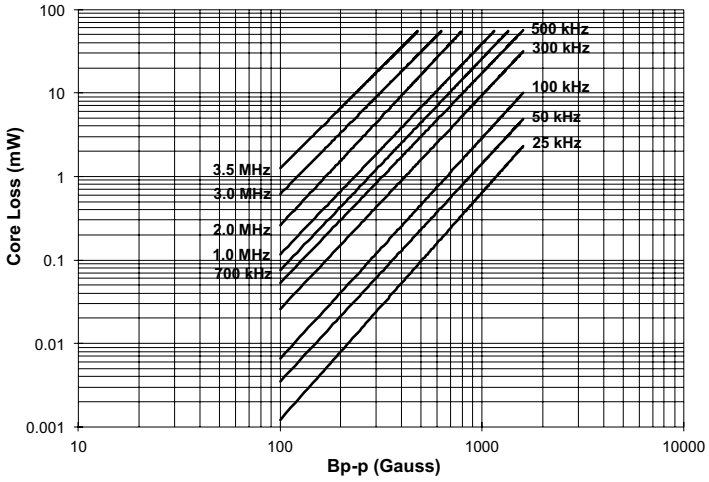
MPI4020V2-R33-R



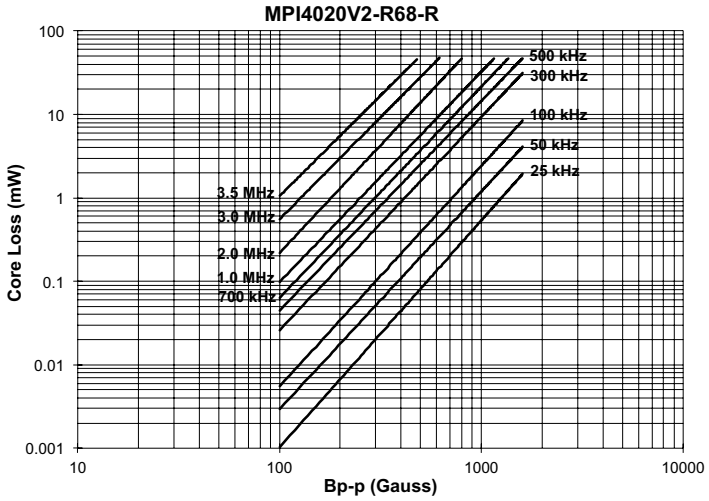
MPI4020V2-R47-R

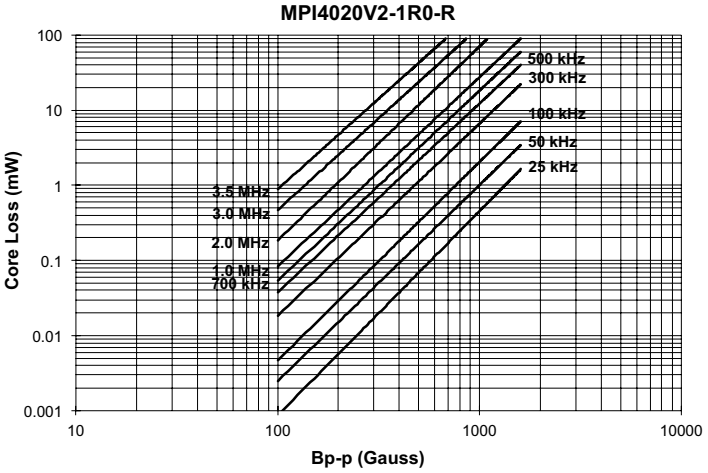


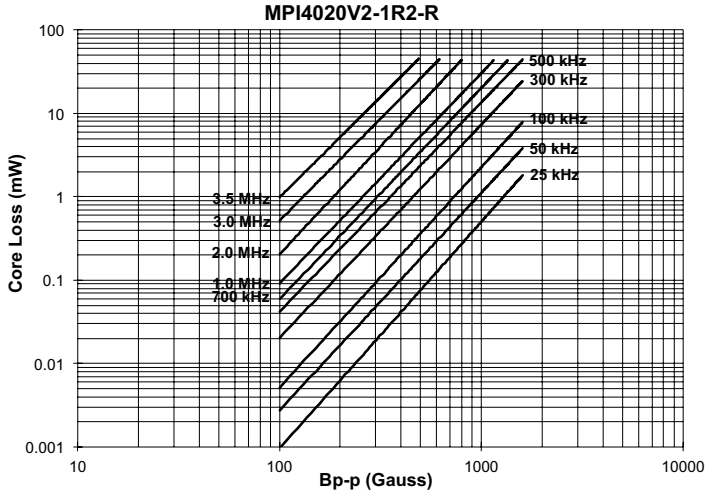
MPI4020V2-R56-R

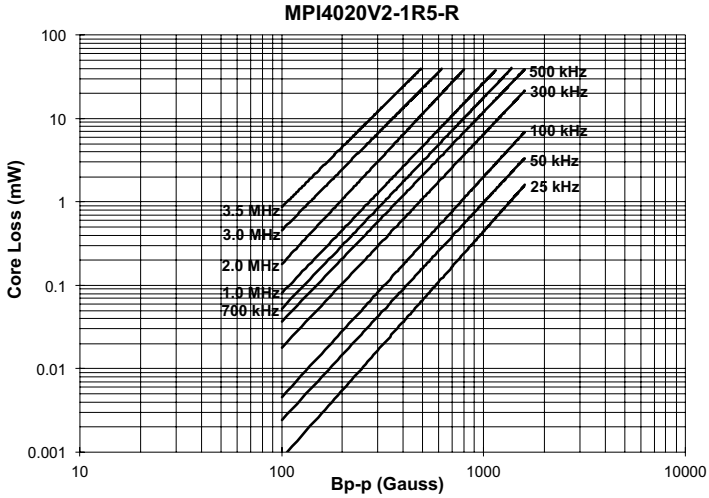


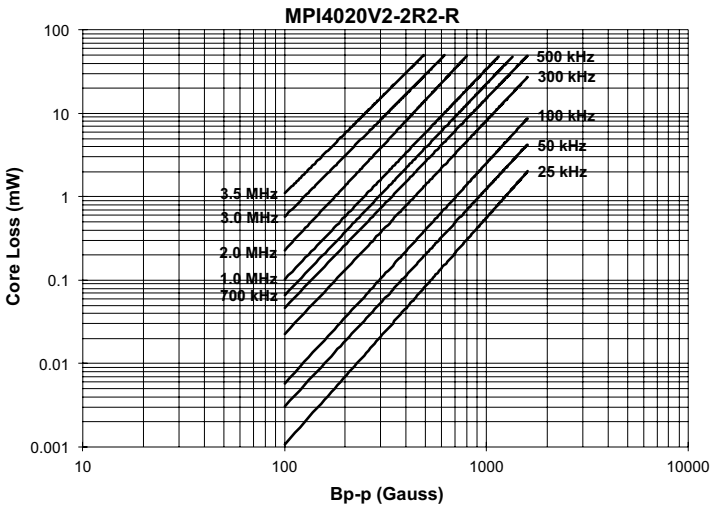
Core loss vs Bp-p

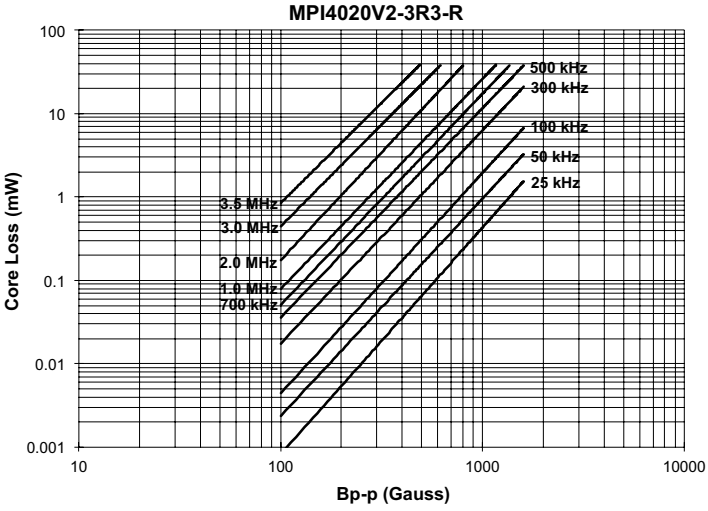






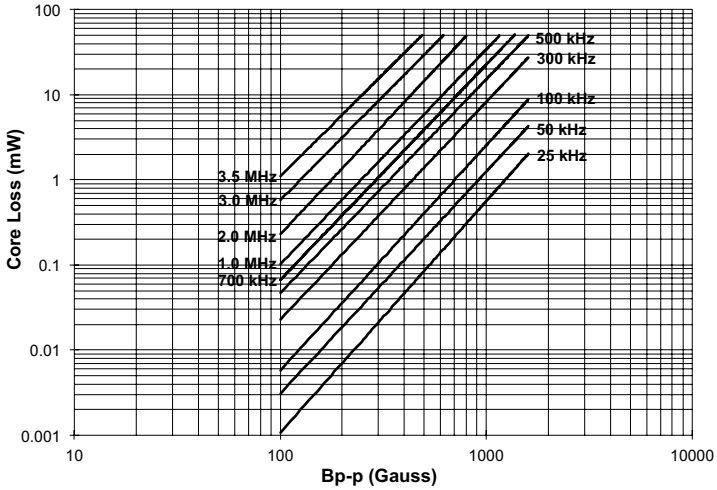




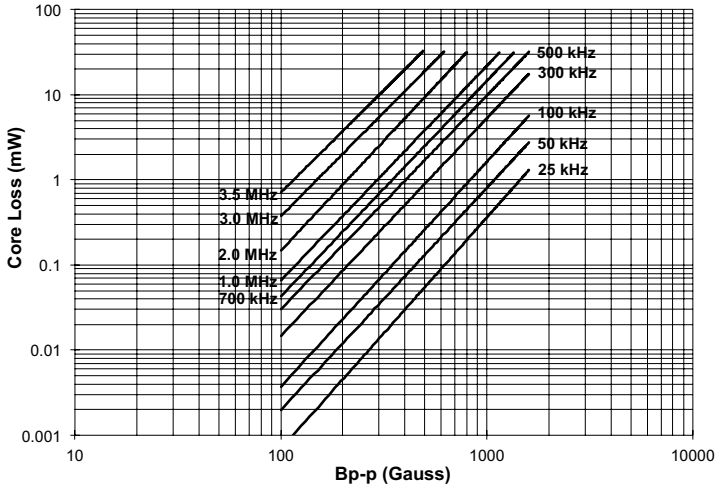


Core loss vs Bp-p

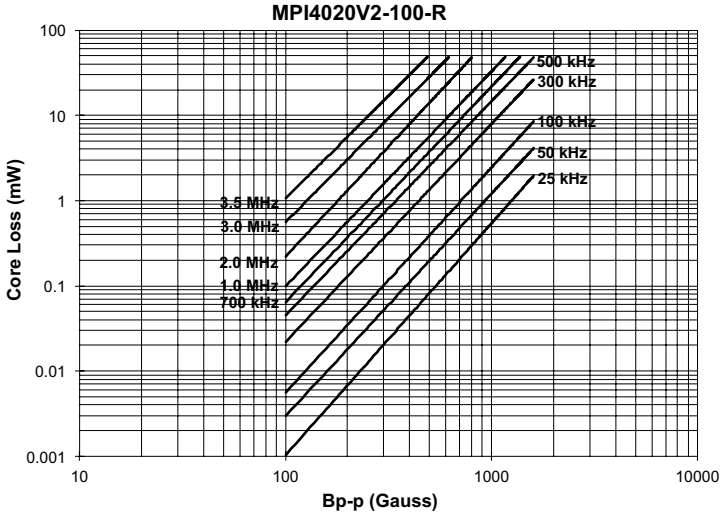
MPI4020V2-4R7-R



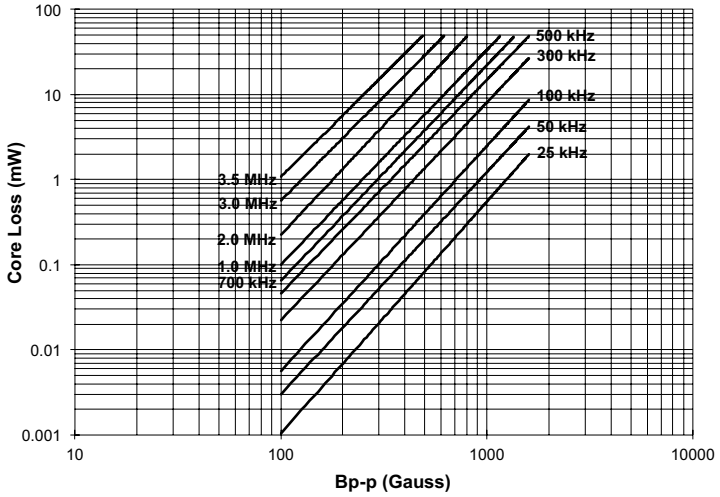
MPI4020V2-6R8-R



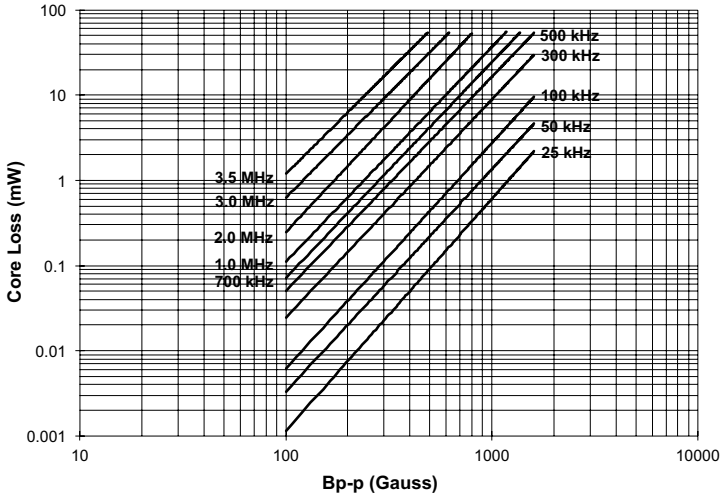
MPI4020V2-100-R



MPI4020V2-150-R

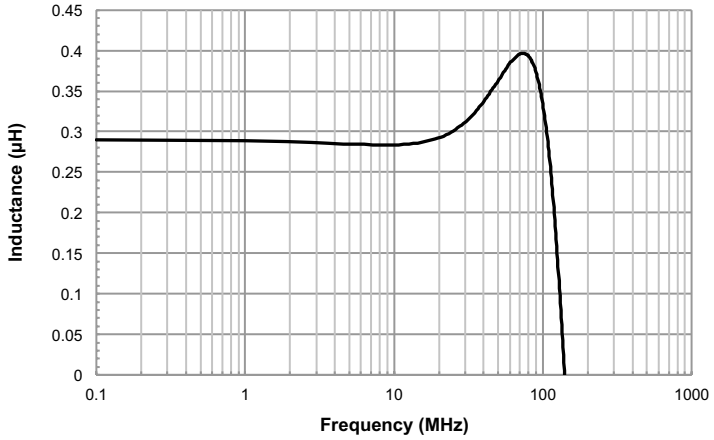


MPI4020V2-220-R

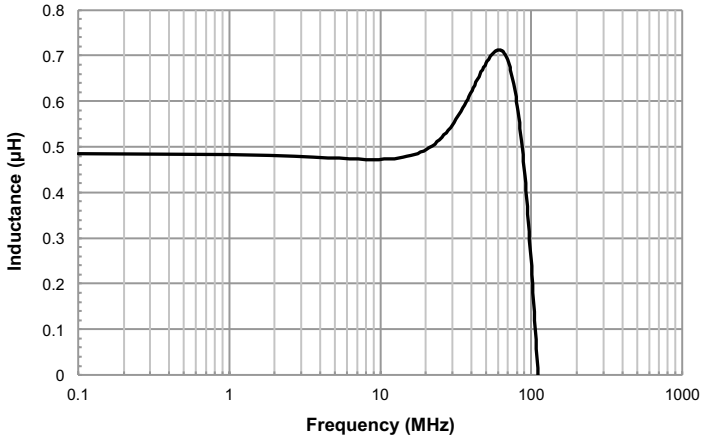


Inductance vs. Frequency

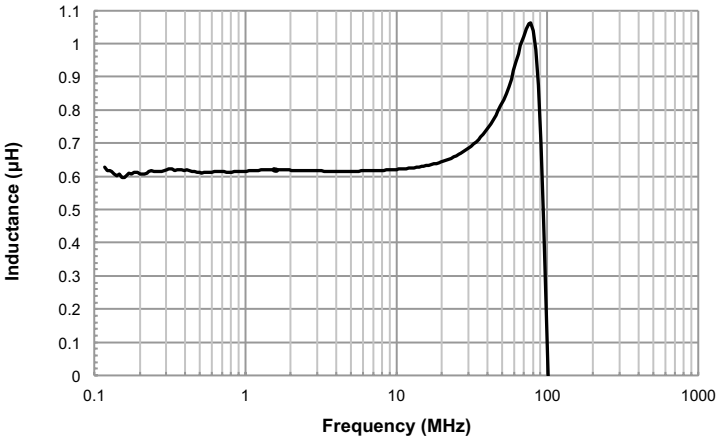
MPI4012V2-R33-R



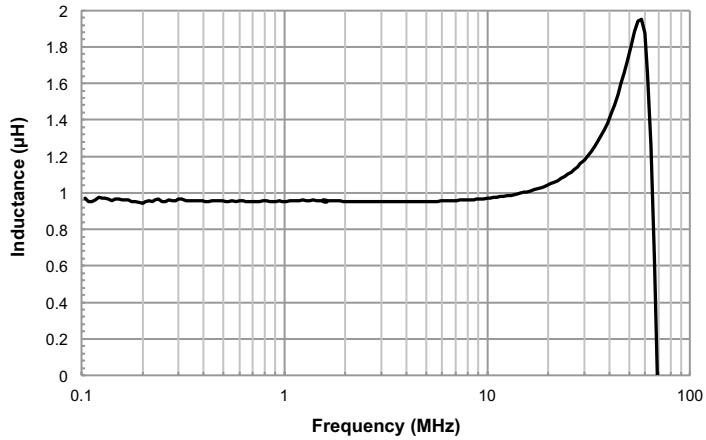
MPI4012V2-R47-R



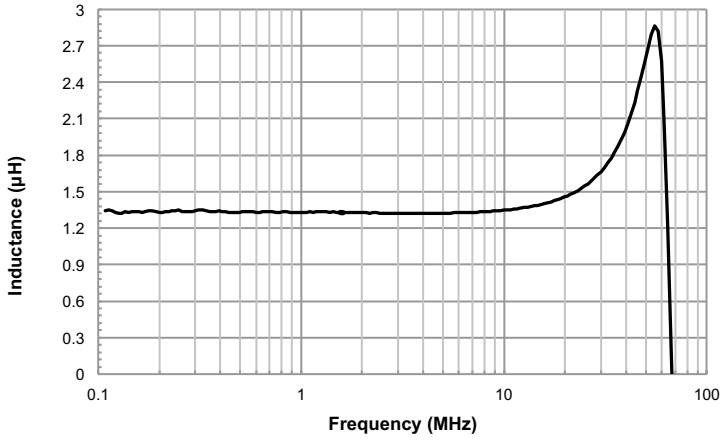
MPI4012V2-R68-R



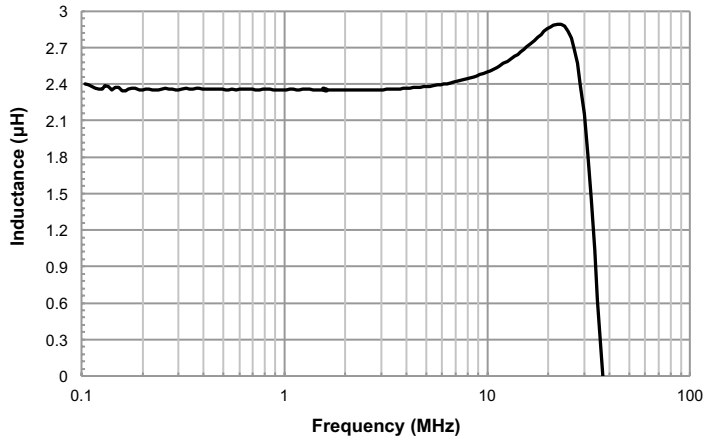
MPI4012V2-1R0-R



MPI4012V2-1R5-R

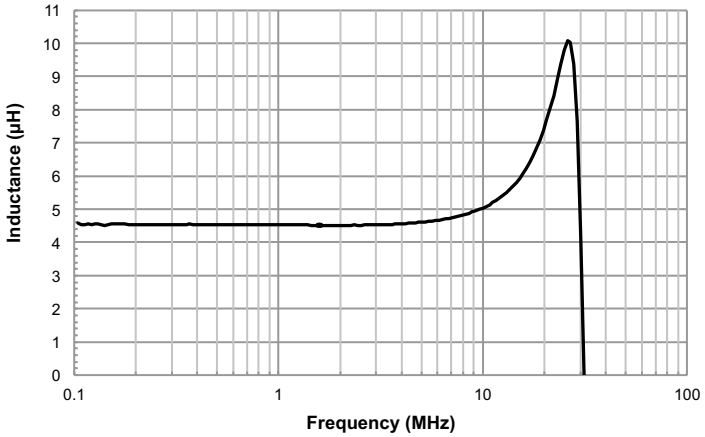


MPI4012V2-2R2-R

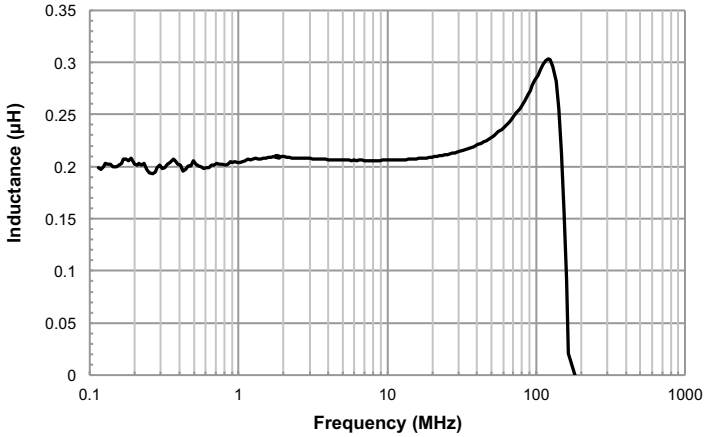


Inductance vs. Frequency

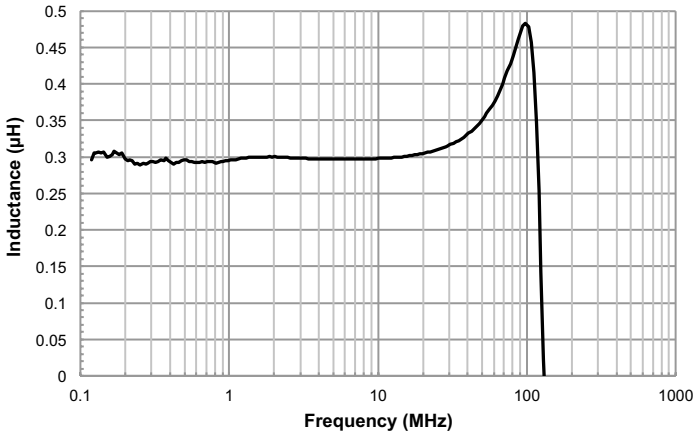
MPI4012V2-4R7-R



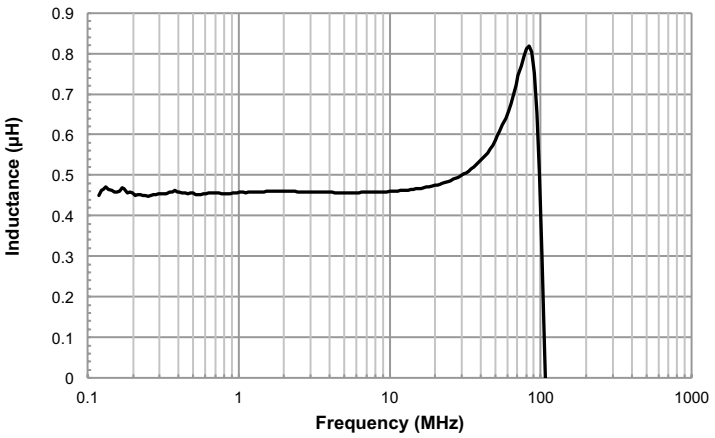
MPI4015V2-R22-R



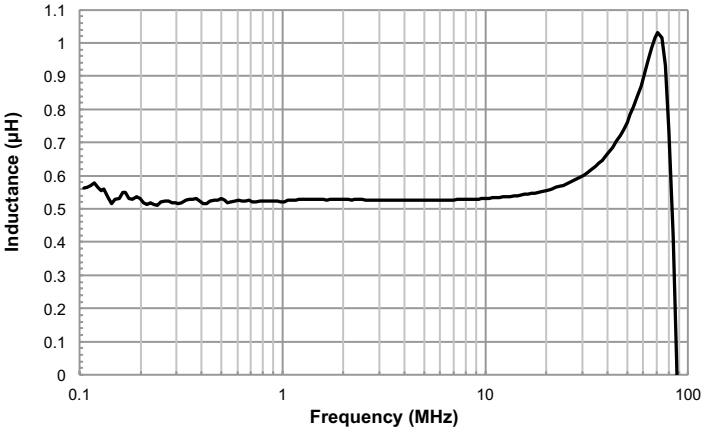
MPI4015V2-R33-R



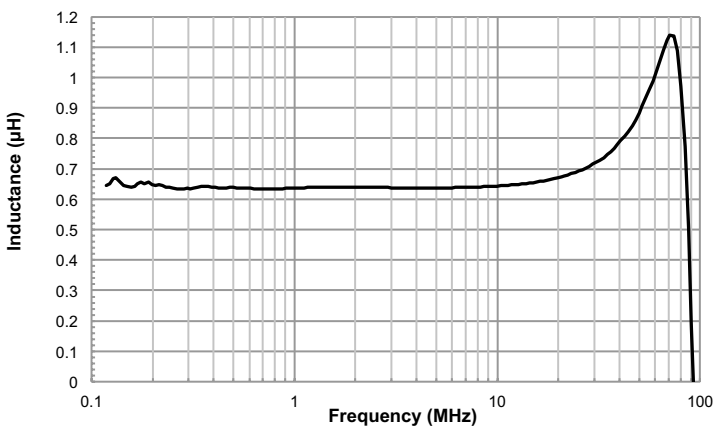
MPI4015V2-R47-R



MPI4015V2-R56-R

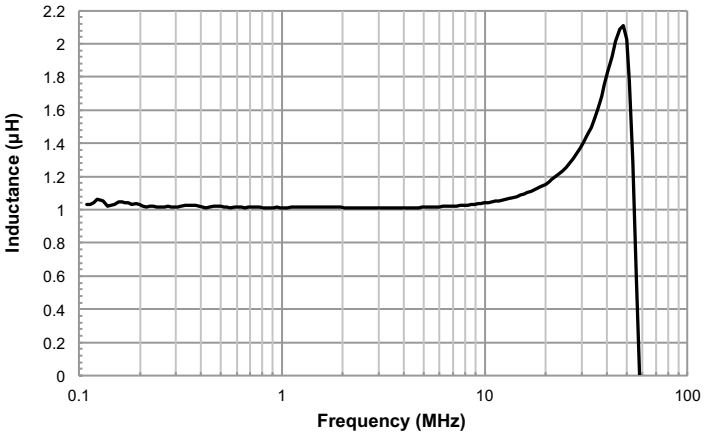


MPI4015V2-R68-R

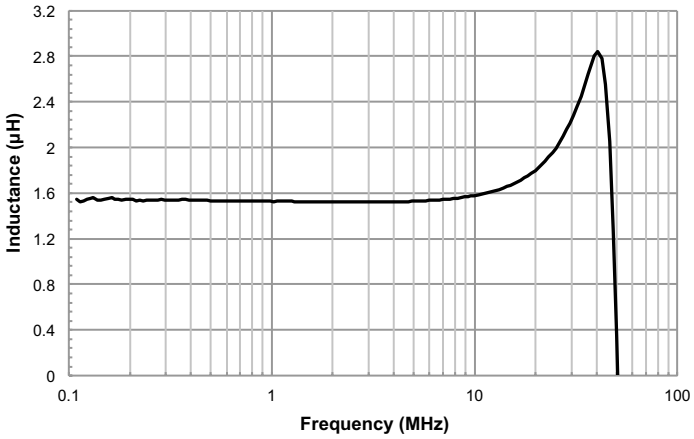


Inductance vs. Frequency

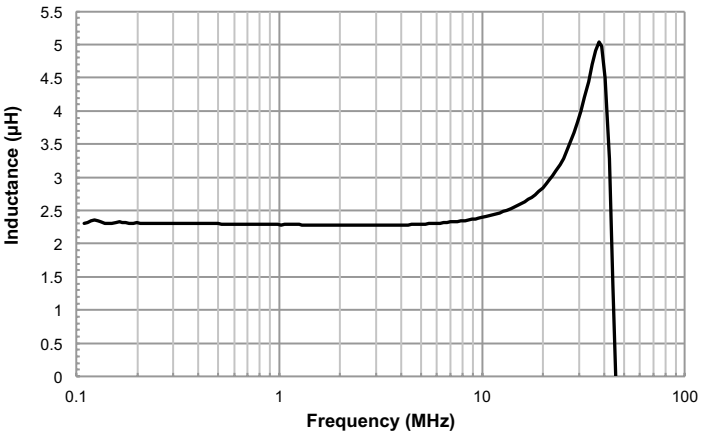
MPI4015V2-1R0-R



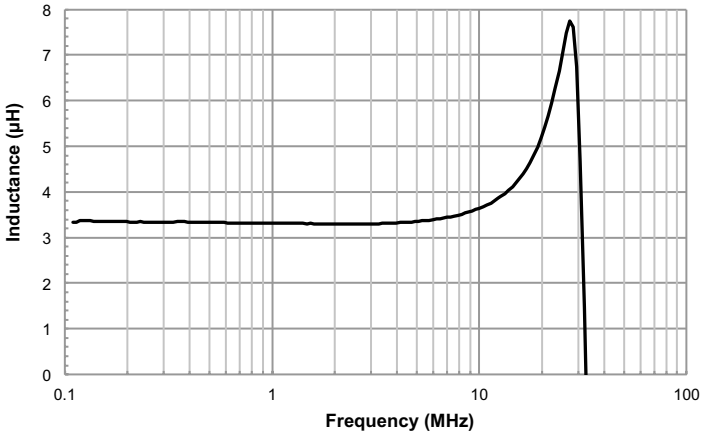
MPI4015V2-1R5-R



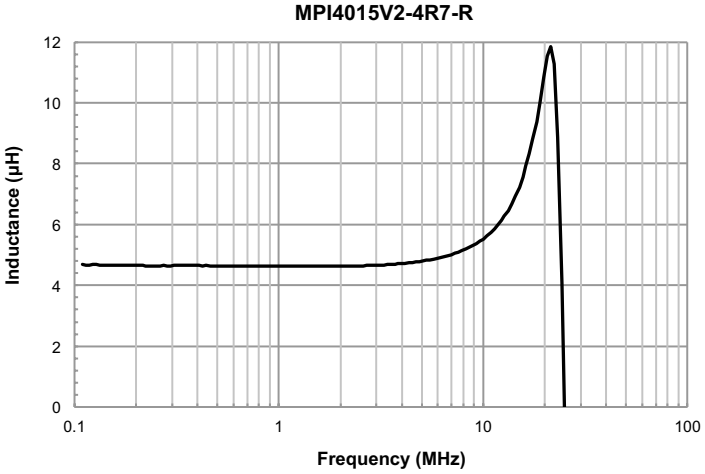
MPI4015V2-2R2-R



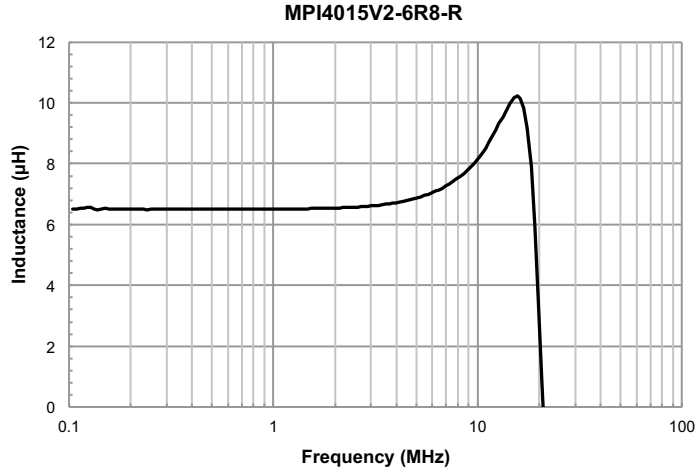
MPI4015V2-3R3-R



MPI4015V2-4R7-R

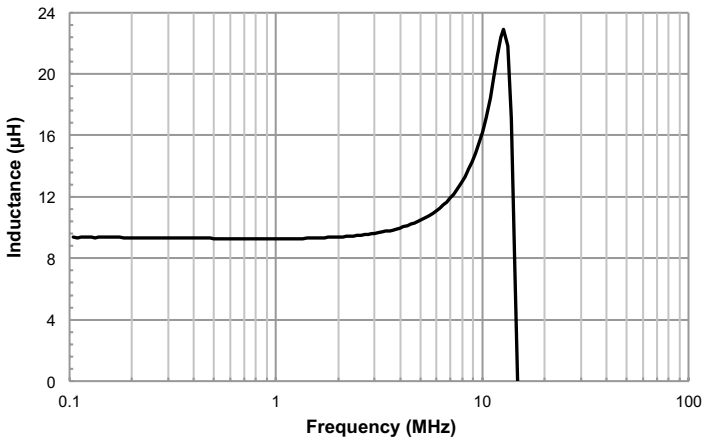


MPI4015V2-6R8-R

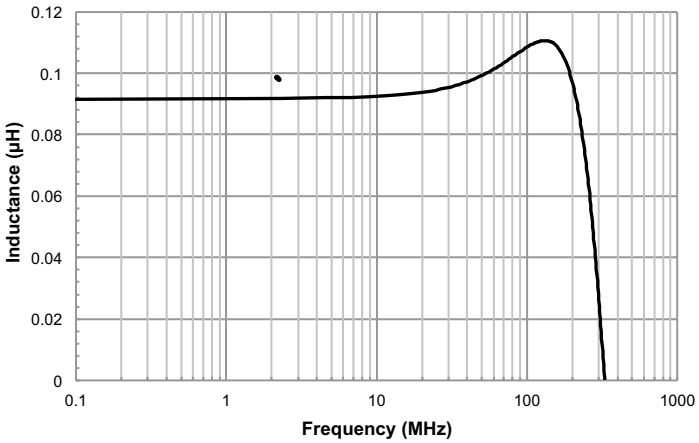


Inductance vs. Frequency

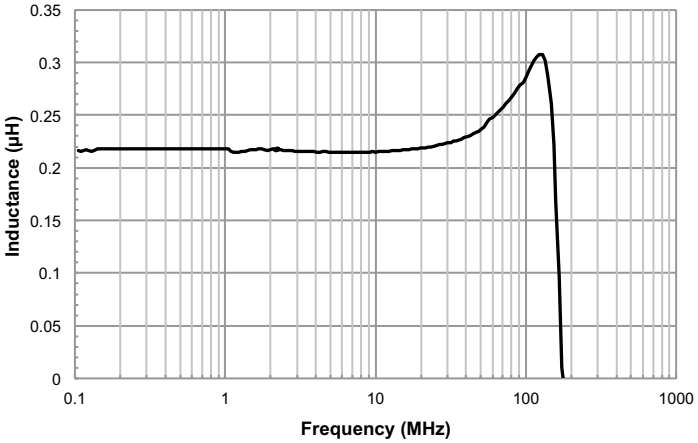
MPI4015V2-100-R



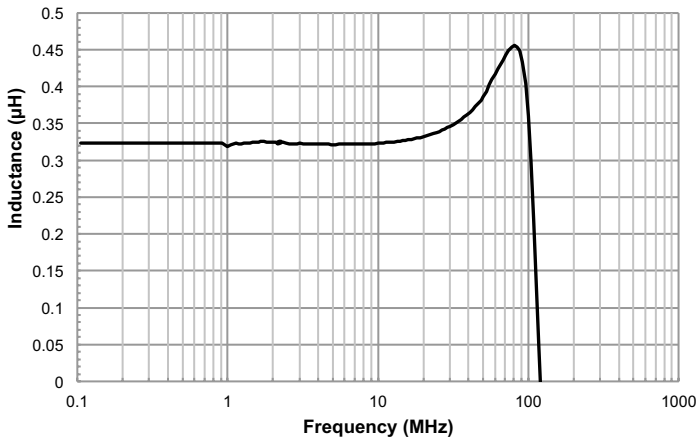
MPI4020V2-R10-R



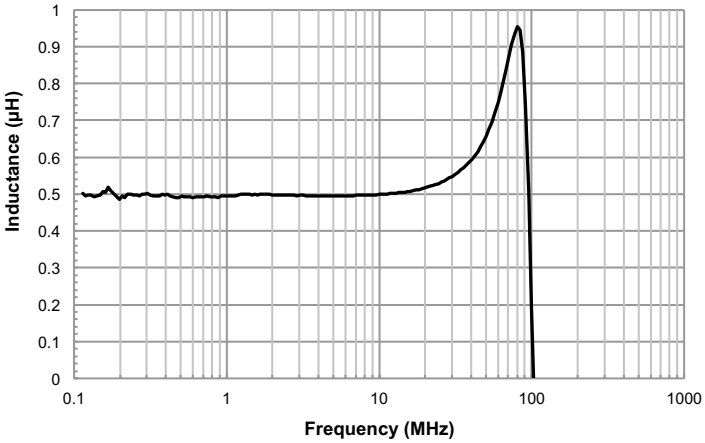
MPI4020V2-R22-R



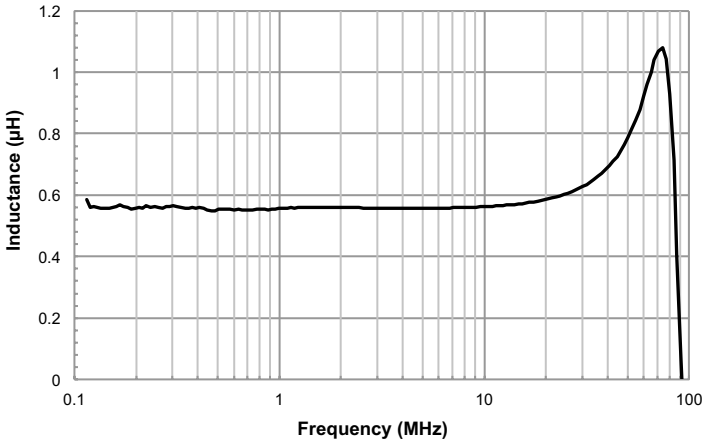
MPI4020V2-R33-R



MPI4020V2-R47-R

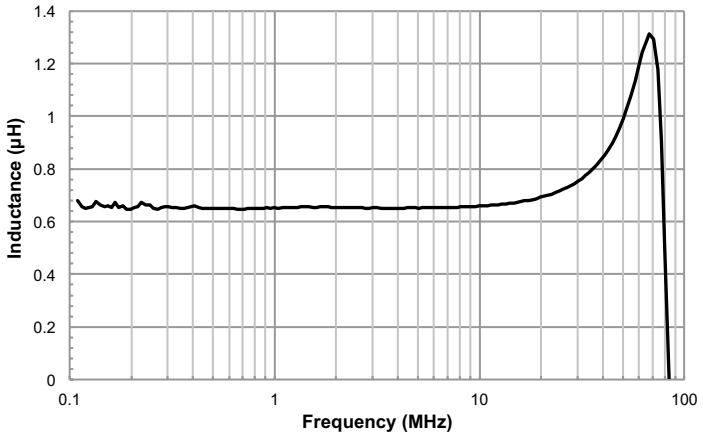


MPI4020V2-R56-R

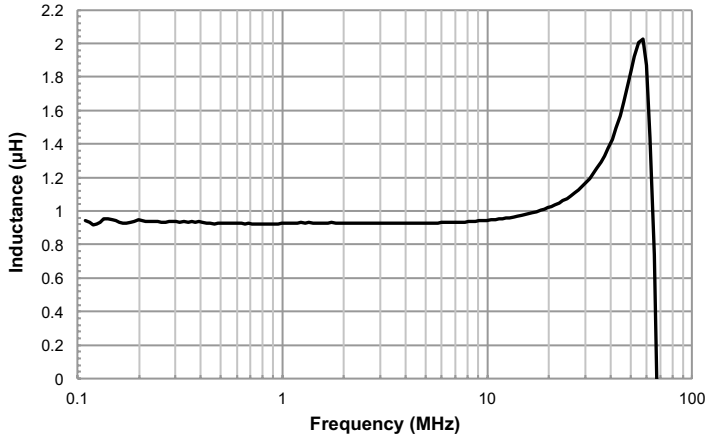


Inductance vs. Frequency

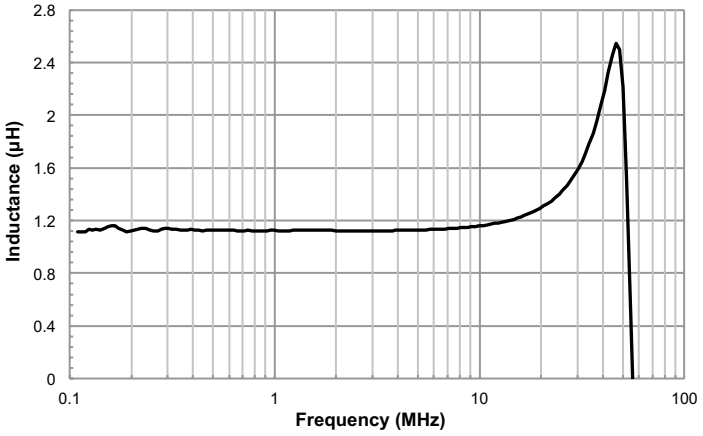
MPI4020V2-R68-R



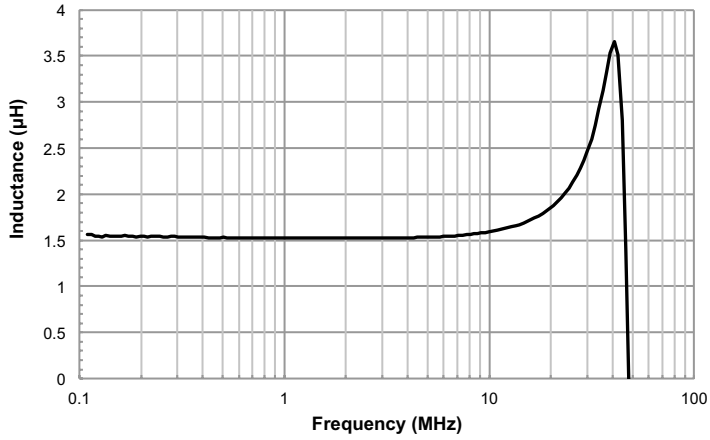
MPI4020V2-1R0-R



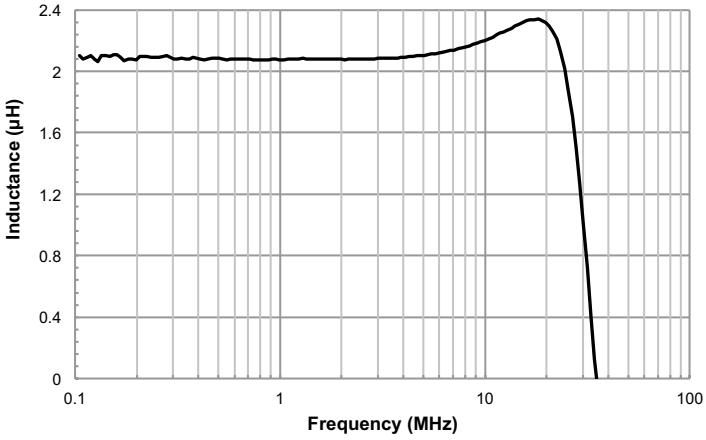
MPI4020V2-1R2-R



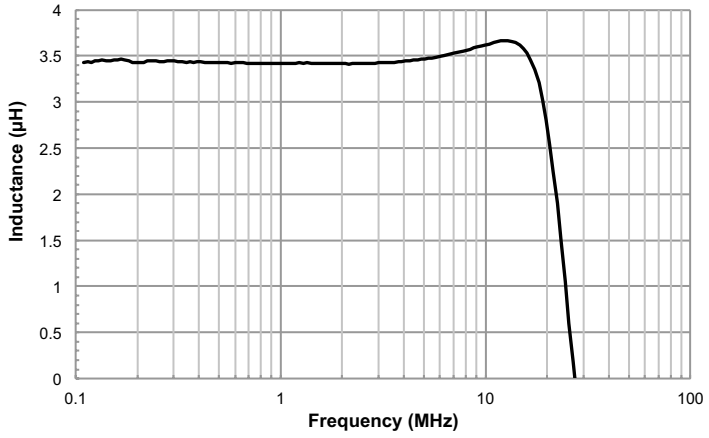
MPI4020V2-1R5-R



MPI4020V2-2R2-R

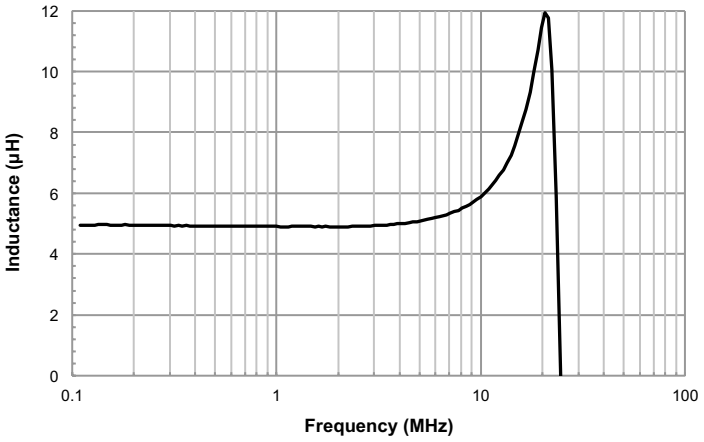


MPI4020V2-3R3-R

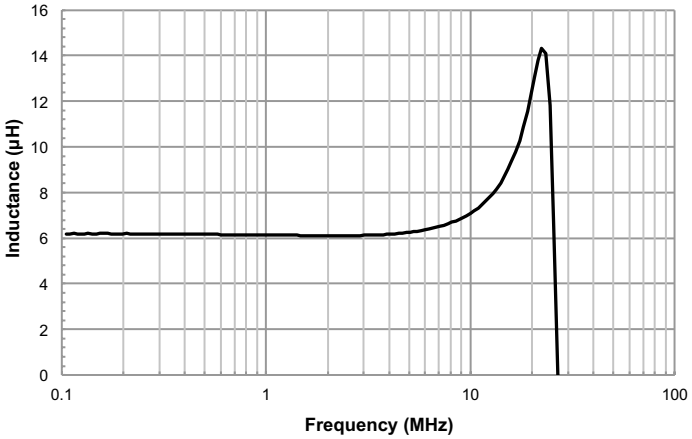


Inductance vs. Frequency

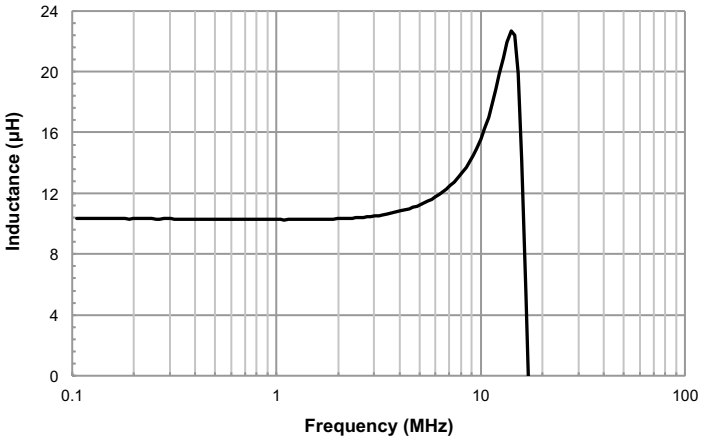
MPI4020V2-4R7-R



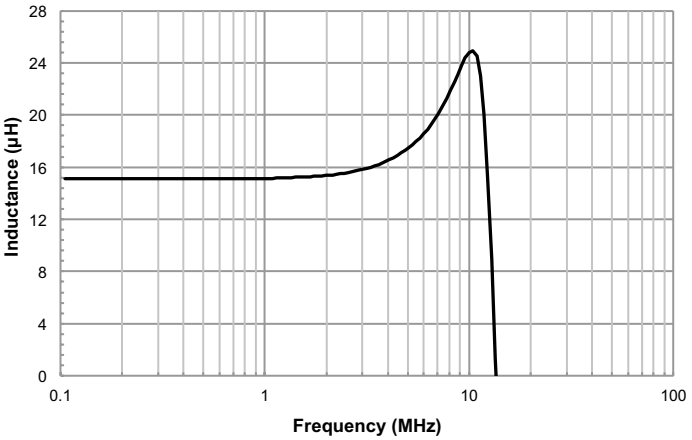
MPI4020V2-6R8-R



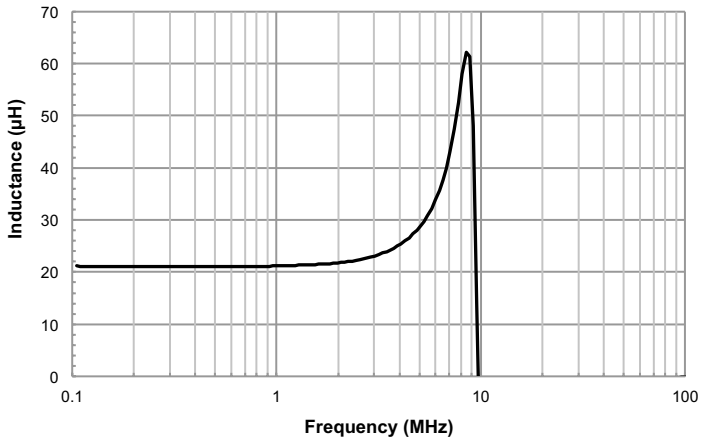
MPI4020V2-100-R



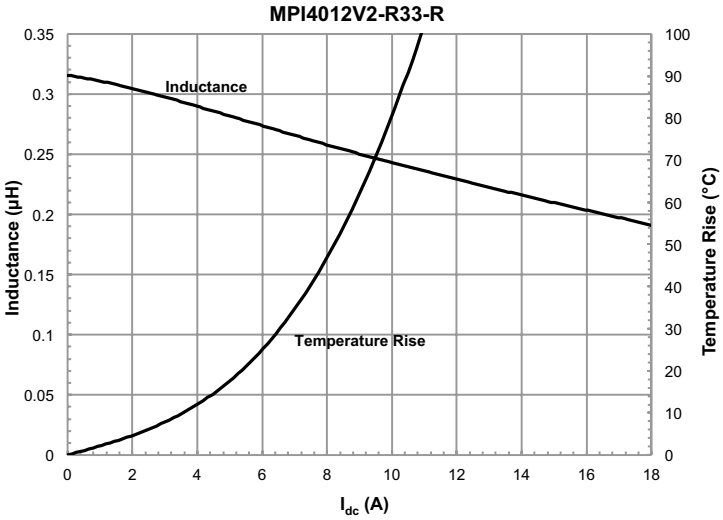
MPI4020V2-150-R

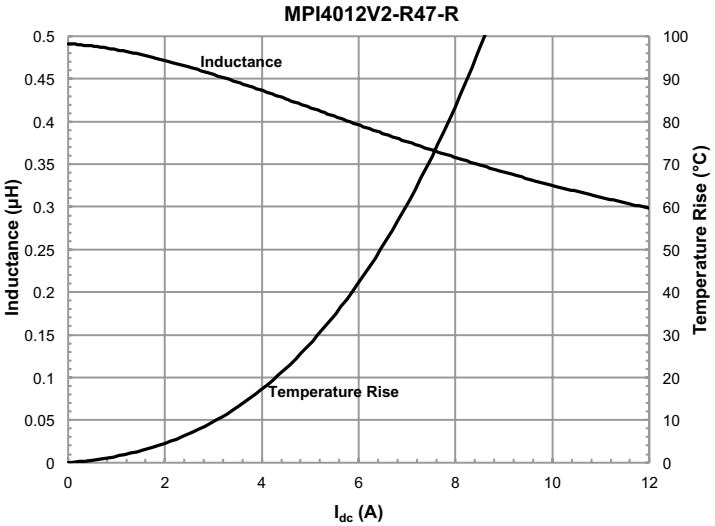


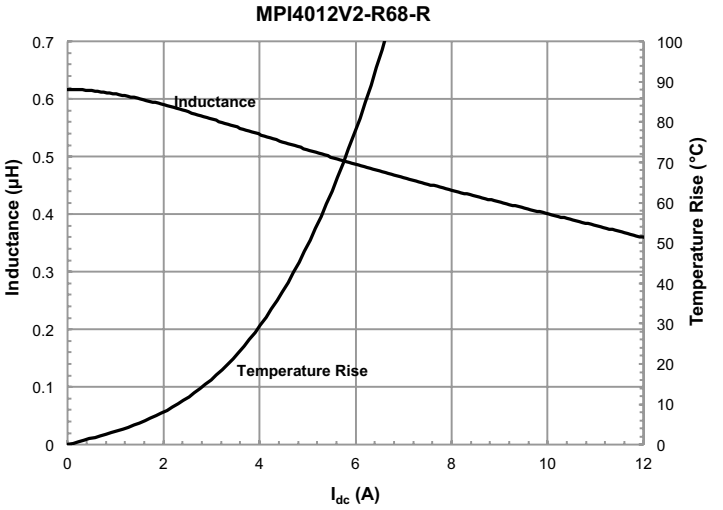
MPI4020V2-220-R

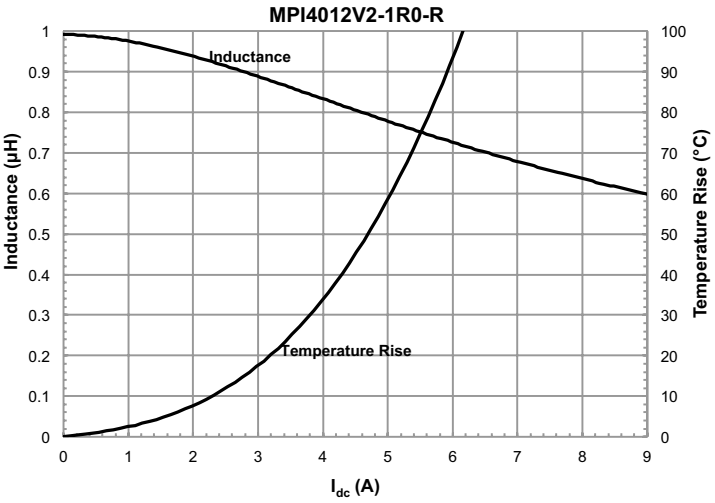


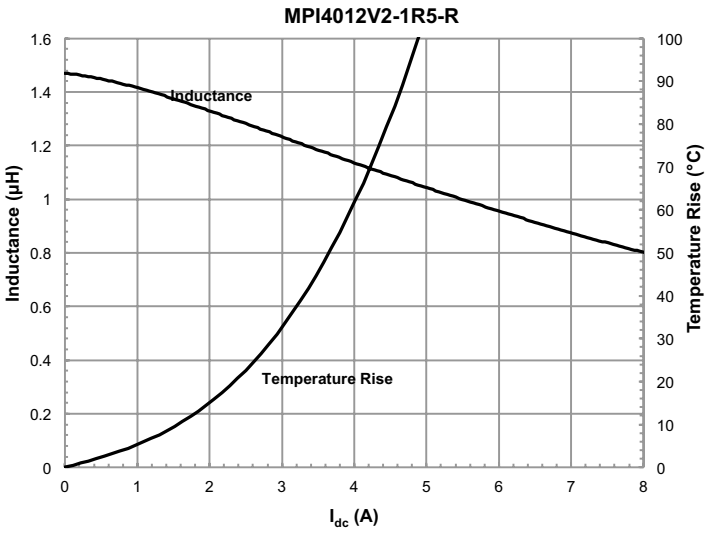
Inductance and temperature rise vs. Current

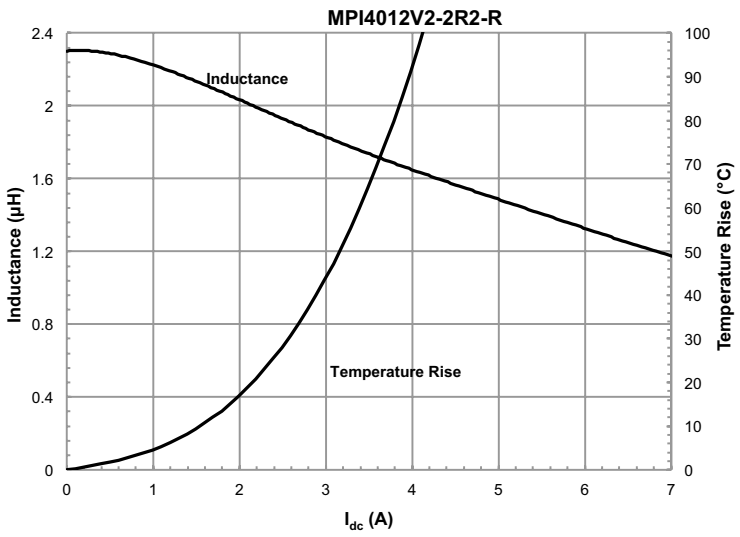




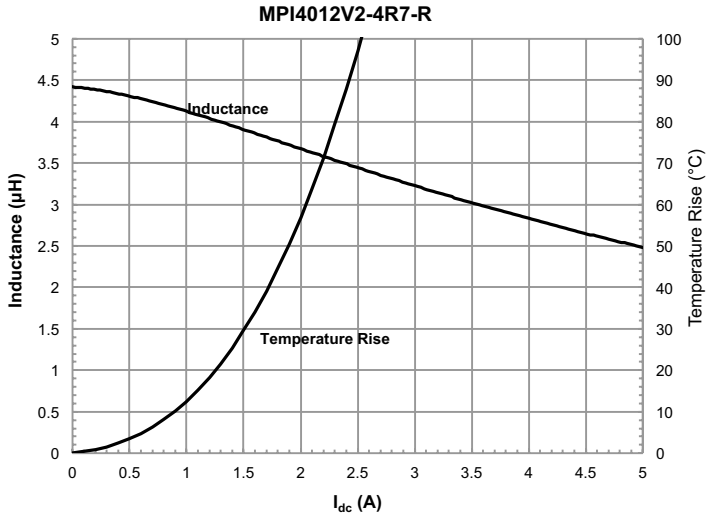


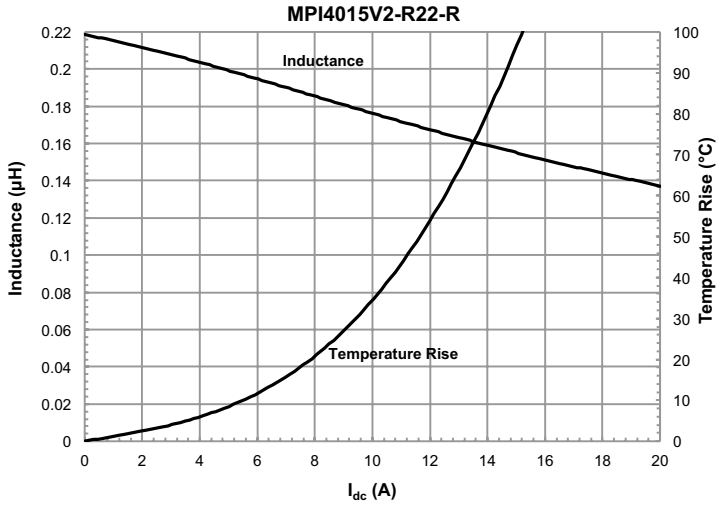


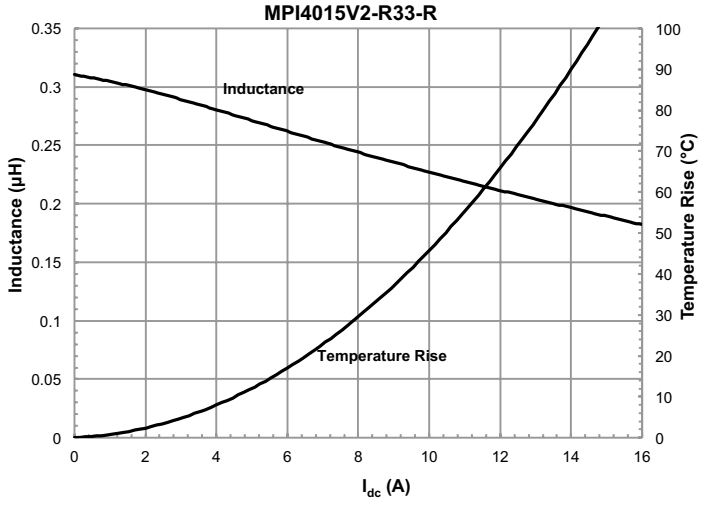


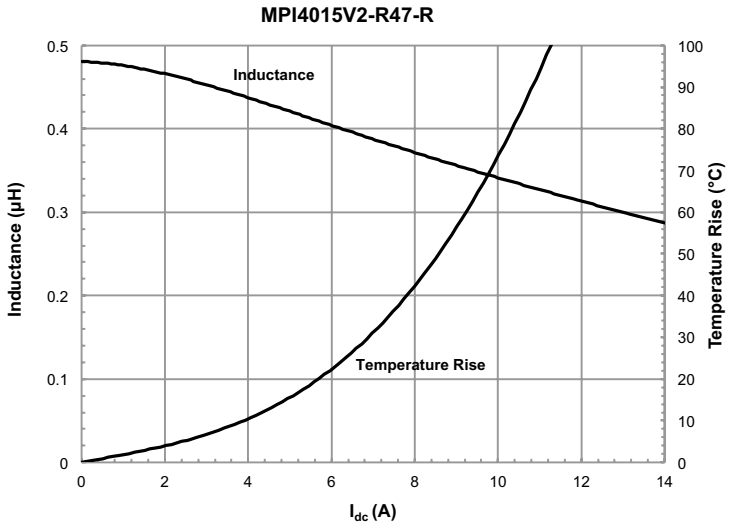


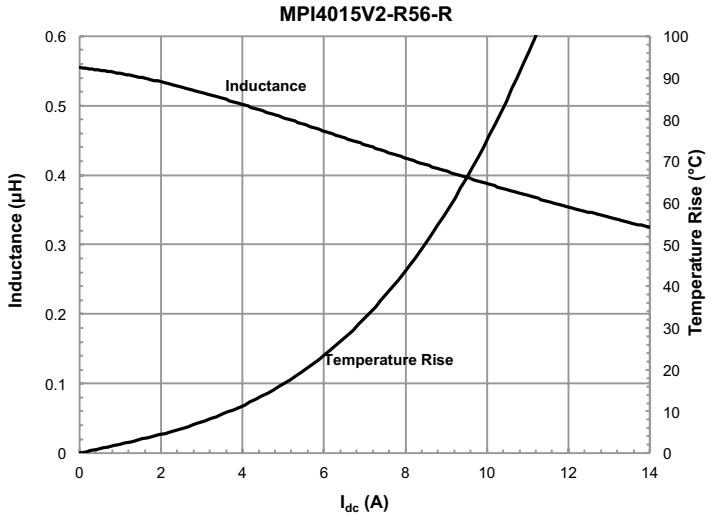
Inductance and temperature rise vs. Current

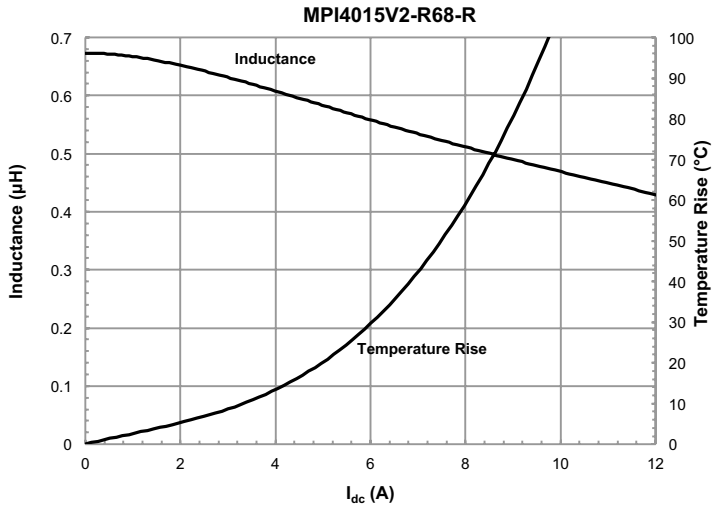






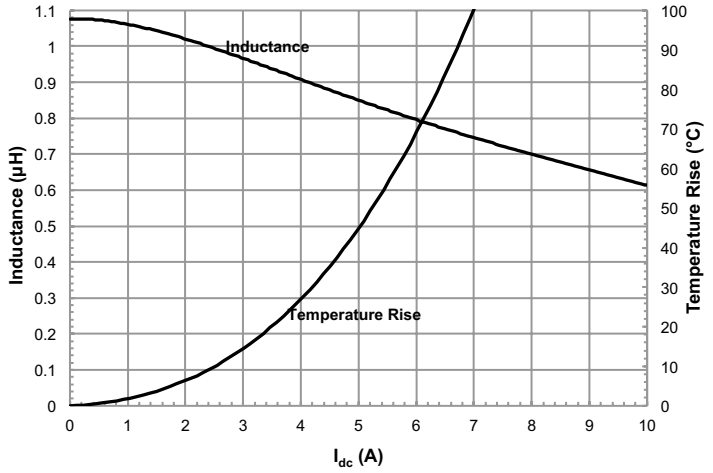




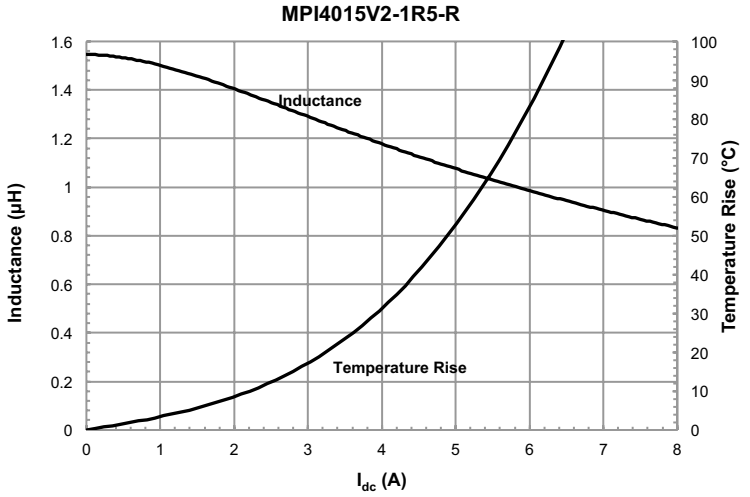


Inductance and temperature rise vs. Current

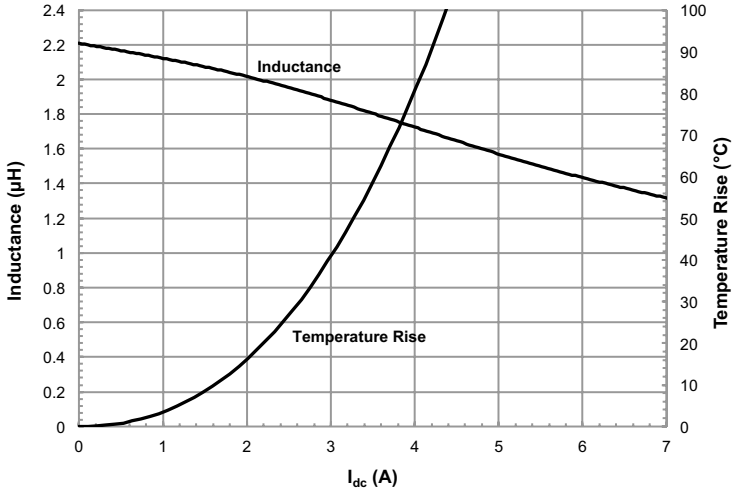
MPI4015V2-1R0-R



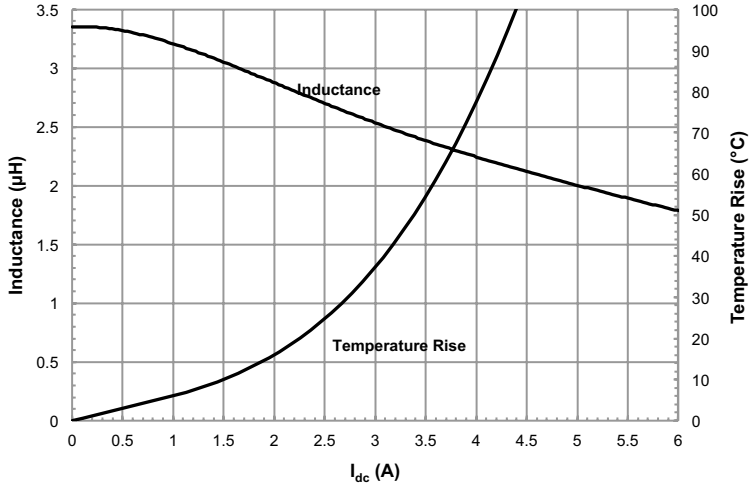
MPI4015V2-1R5-R



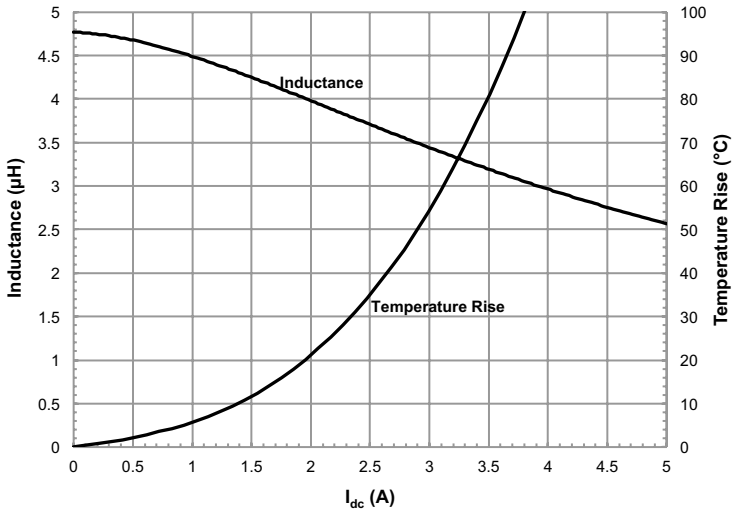
MPI4015V2-2R2-R



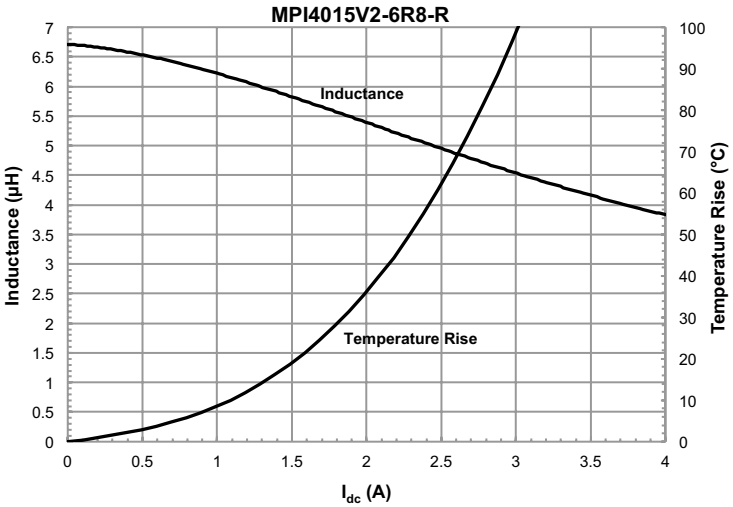
MPI4015V2-3R3-R



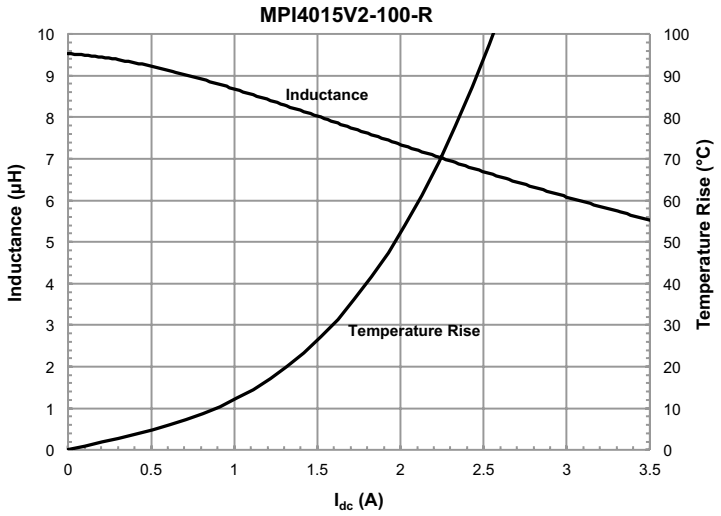
MPI4015V2-4R7-R

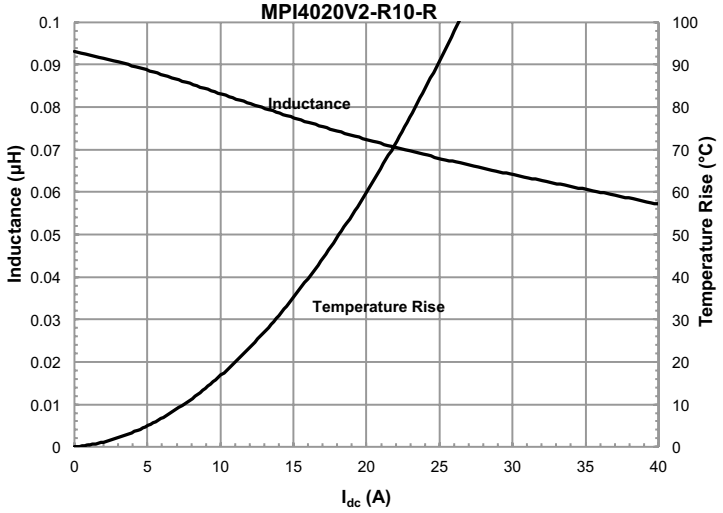


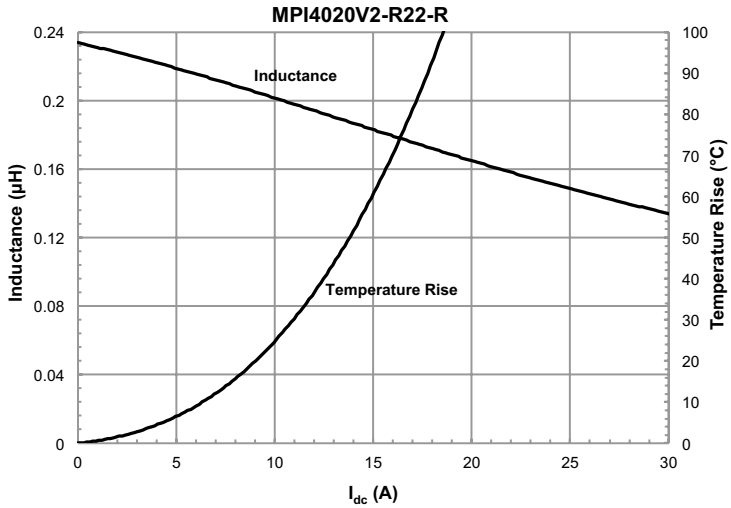
MPI4015V2-6R8-R

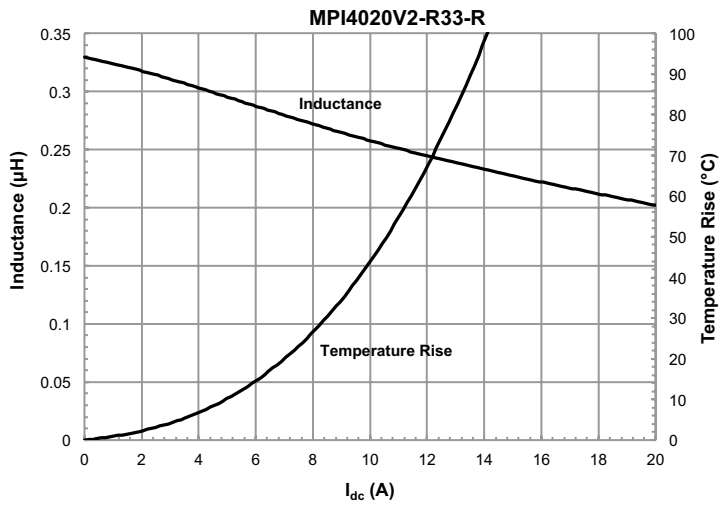


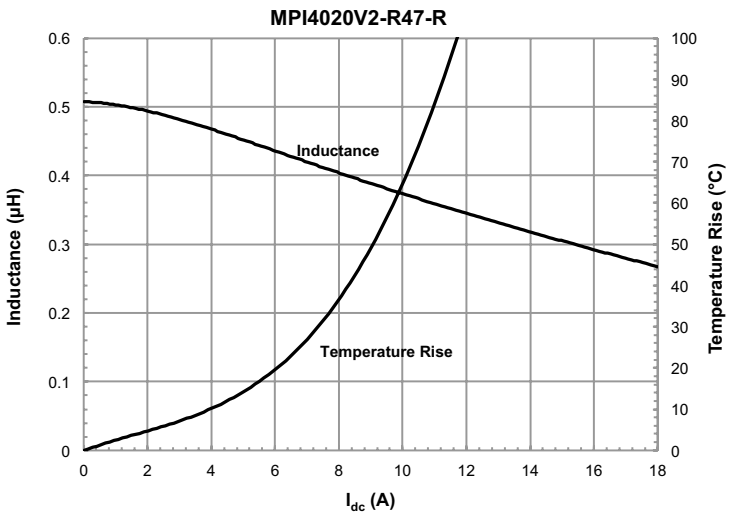
Inductance and temperature rise vs. Current

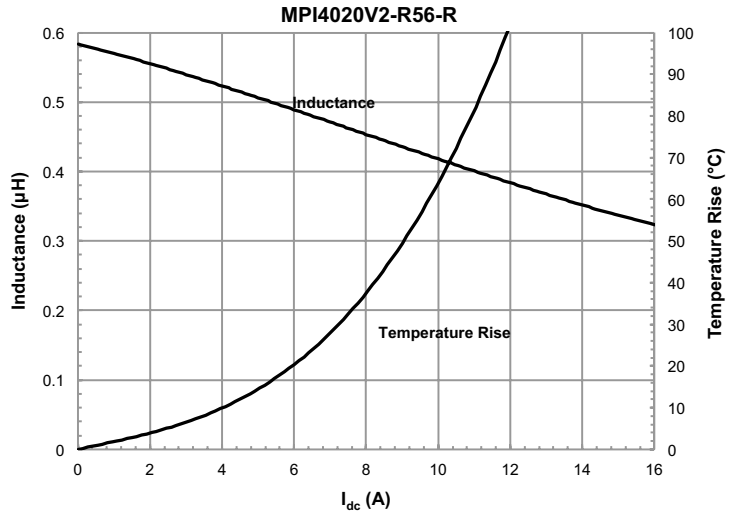




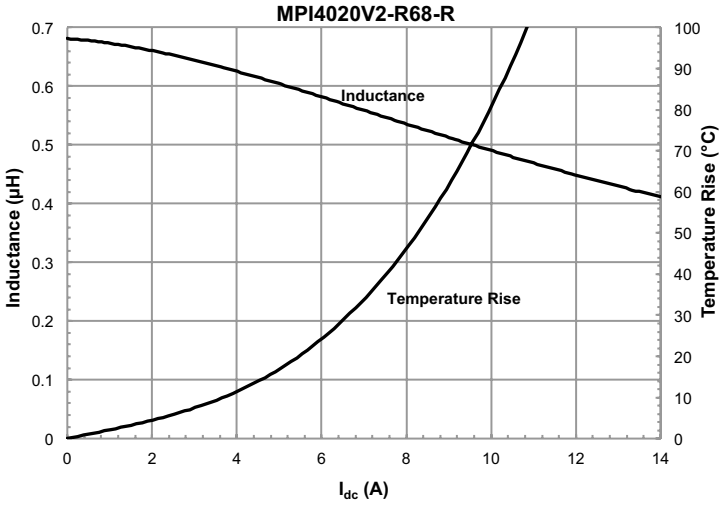


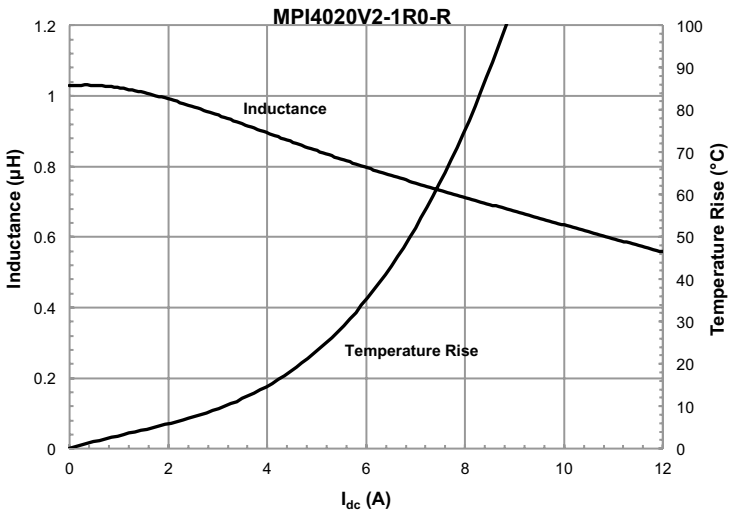


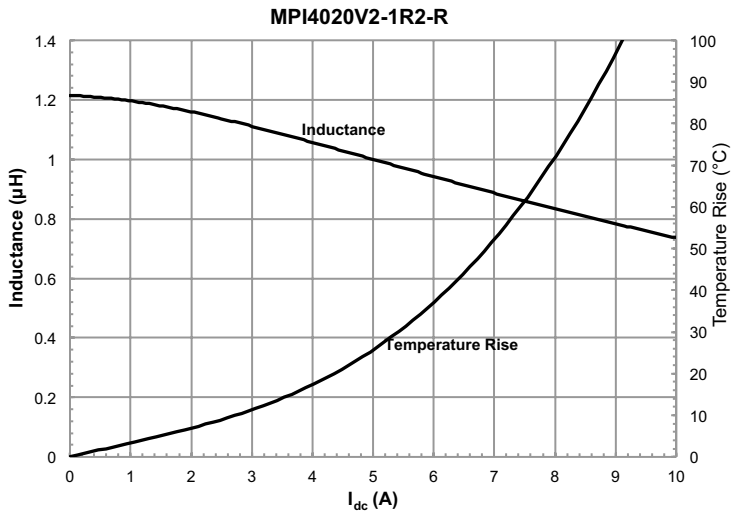


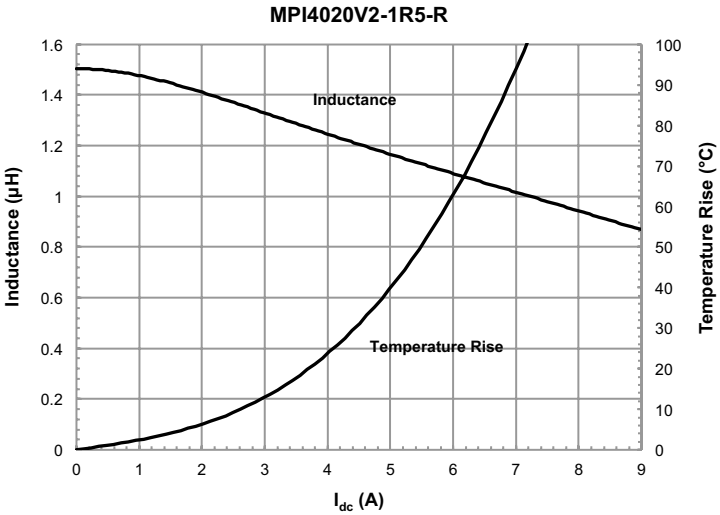


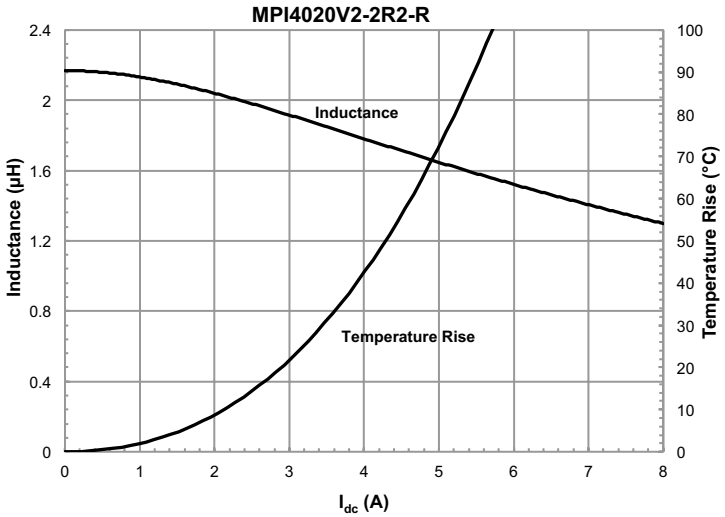
Inductance and temperature rise vs. Current

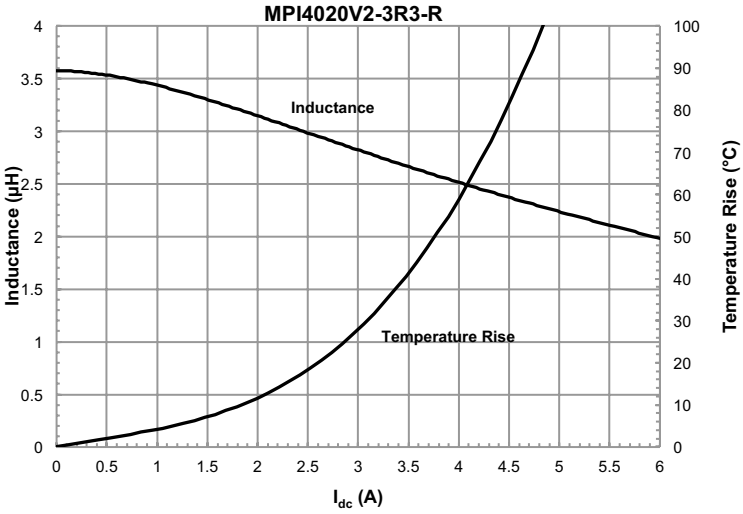




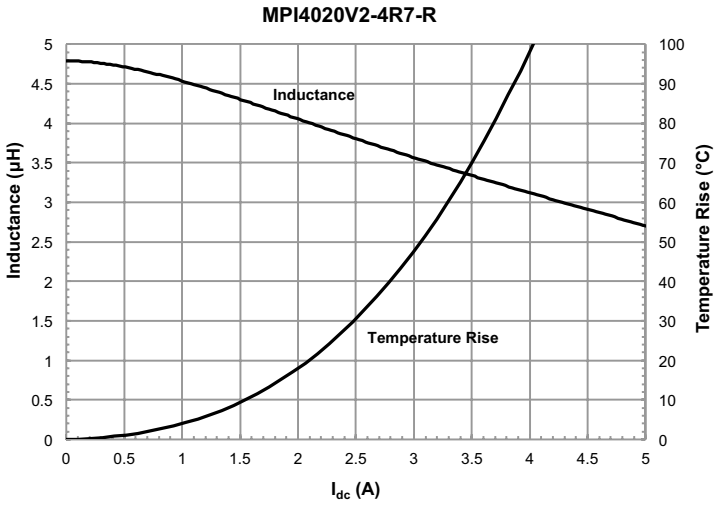


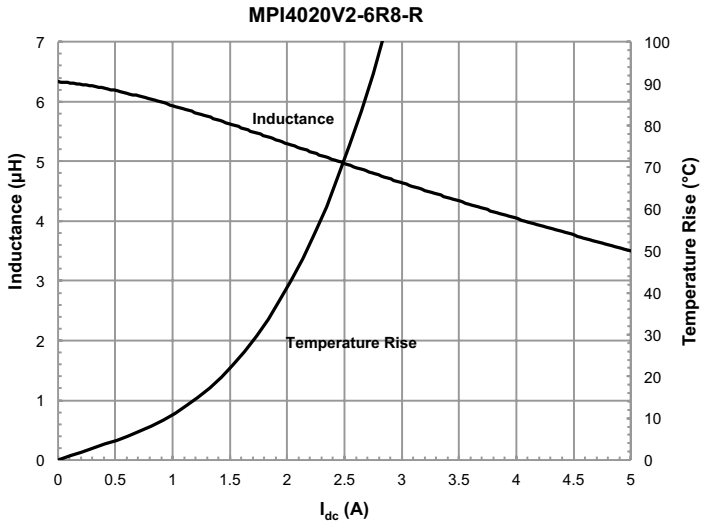


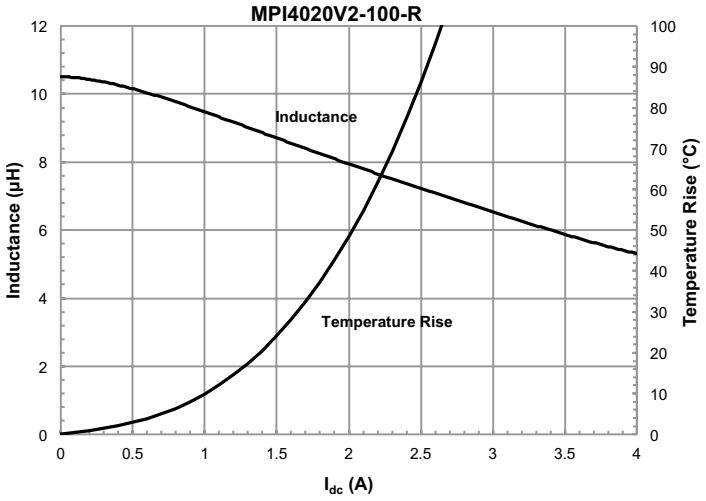


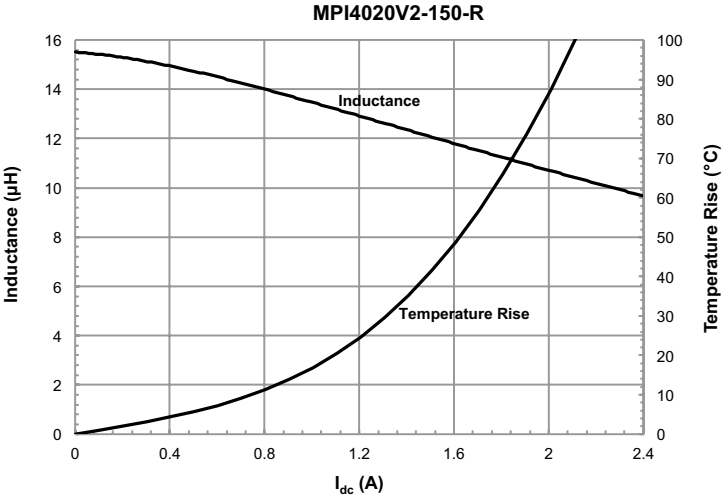


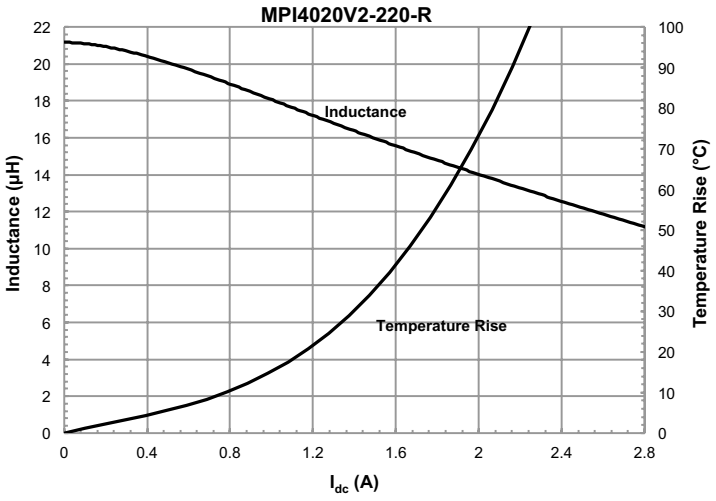
Inductance and temperature rise vs. Current











Solder reflow profile

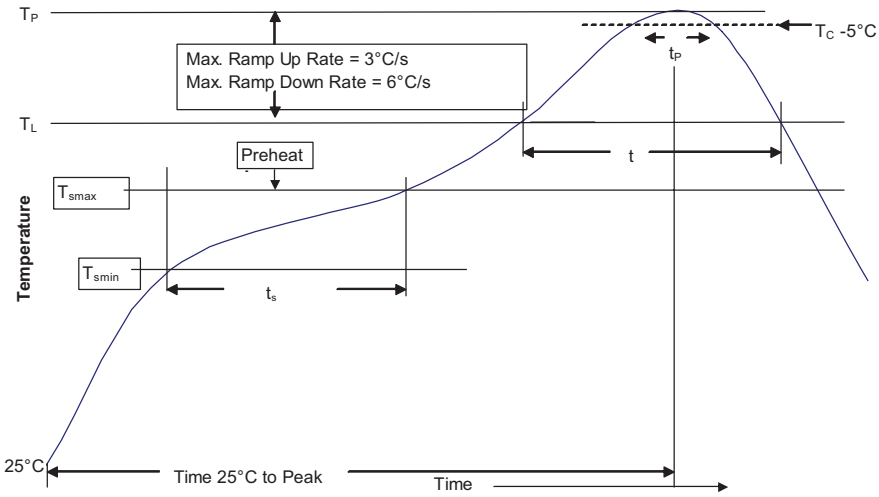


Table 1 - Standard SnPb Solder (T_C)

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

Table 2 - Lead (Pb) Free Solder (T_C)

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

Reference JDEC 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)		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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- Поставка электронных компонентов под контролем ВП;
- Система менеджмента качества сертифицирована по Международному стандарту ISO 9001;
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