

MPI25-V2

High current, low profile, miniature power inductors



Product features

- High current carrying capacity in a compact standard 1008 (2520 metric) footprint
- Magnetically shielded, Low EMI
- Rugged construction
- Self resonant frequency (SRF) greater than 25 MHz
- Inductance range from 0.33 μ H to 4.7 μ H
- Current range from 1.2 A to 7.5 A
- 2.7 mm x 2.2 mm footprint surface mount package in 1.05 mm, 1.25 mm heights
- 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
- Halogen free, lead free, RoHS compliant



Powering Business Worldwide

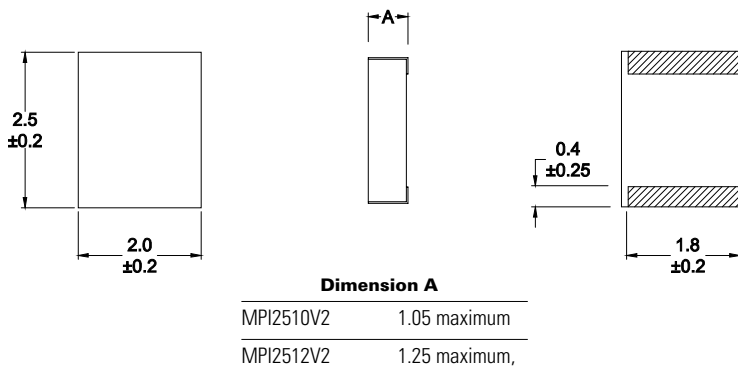
Product specifications

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							
MPI2510V2-R33-R	0.33	4.8	6.6	15	20	120	6336
MPI2510V2-R47-R	0.47	4.4	6.0	19	25	100	5039
MPI2510V2-R68-R	0.68	3.1	4.3	37	44	80	5733
MPI2510V2-1R0-R	1.00	3.1	4.3	41	52	55	3372
MPI2510V2-1R5-R	1.50	2.5	2.5	65	85	45	4695
MPI2510V2-2R2-R	2.20	2.1	2.8	88	110	45	2873
MPI2510V2-3R3-R	3.30	1.6	2.1	140	170	35	1893
MPI2510V2-4R7-R	4.70	1.22	1.8	220	262	25	1616
1.2 mm height							
MPI2512V2-R33-R	0.33	5.1	7.5	14	19	130	6560
MPI2512V2-R47-R	0.47	4.9	6.7	17	23	100	3628
MPI2512V2-R68-R	0.68	3.4	6.0	29	35	70	3633
MPI2512V2-1R0-R	1.00	3.3	4.4	36	44	70	3083
MPI2512V2-1R5-R	1.50	2.3	3.2	64	77	45	4850
MPI2512V2-2R2-R	2.20	2.2	3.5	73	87	30	2924
MPI2512V2-3R3-R	3.30	1.8	2.8	110	135	35	1965
MPI2512V2-4R7-R	4.70	1.4	1.9	196	235	25	1580

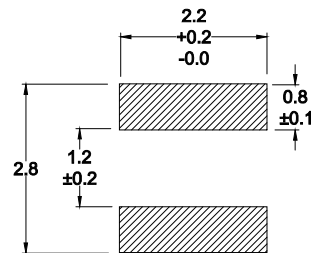
- Open Circuit Inductance (OCL) Test Parameters: 1.0 MHz, 0.1 Vrms, 0.0 Adc, +25 °C.
- I_{rms} : DC current for an approximate temperature rise of 40 °C without core loss. Derating is necessary for AC currents. PCB layout, trace thickness and width, air-flow, and proximity of other heat generating components 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). $Bp-p = K * L * \Delta I$. Bp-p (Gauss), K: (K-factor from table), L: (Inductance in μ H), ΔI (Peak to peak ripple current in Amps).
- Part Number Definition: MPI25xxV2-xxx-R
MPI25 = Product code
xx= Height indicator
V2=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

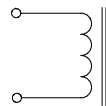
Dimensions (mm)



Recommended Pad Layout



Schematic



No marking

All soldering surfaces to be coplanar within 0.10 millimeters

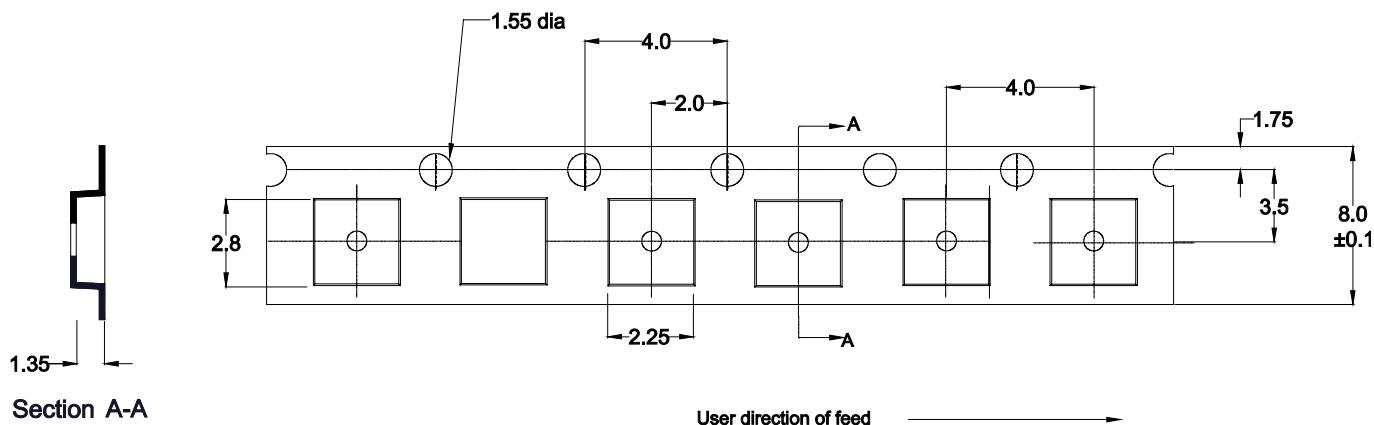
Tolerances are ± 0.2 millimeters unless stated otherwise

Pad layout tolerances are ± 0.1 millimeters unless stated otherwise

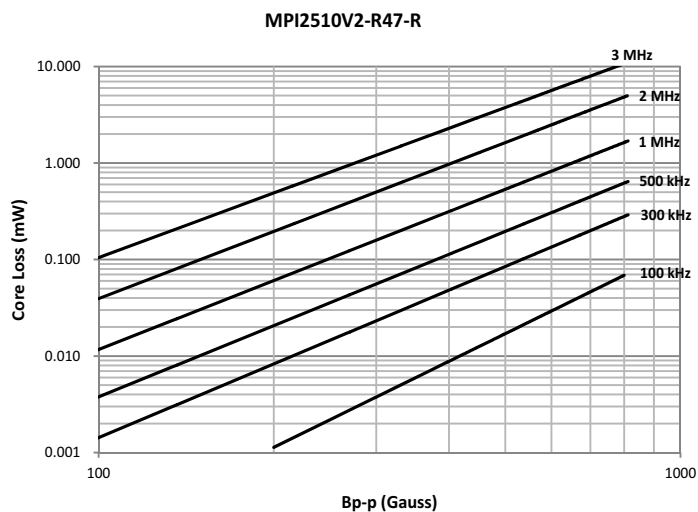
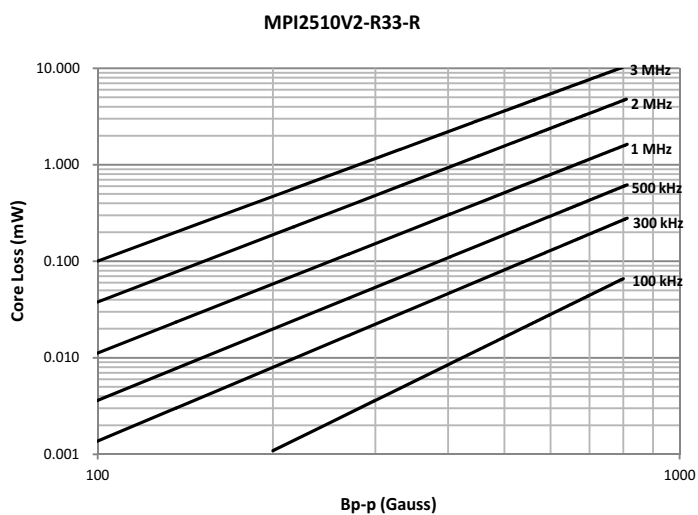
Do not route traces or vias underneath the inductor

Packaging information (mm)

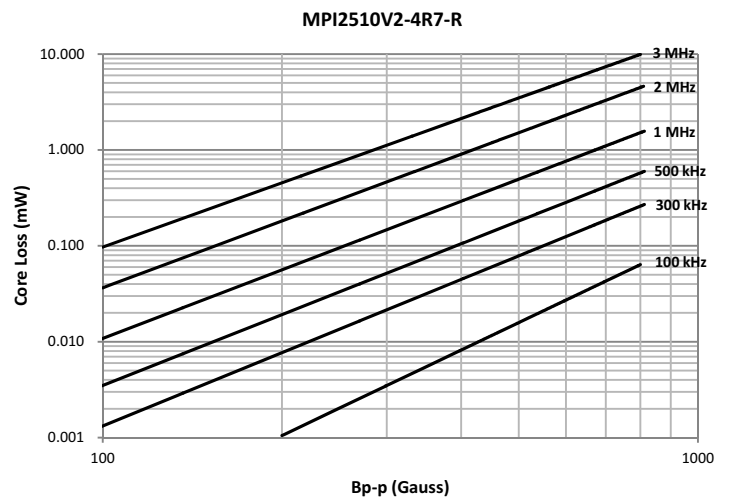
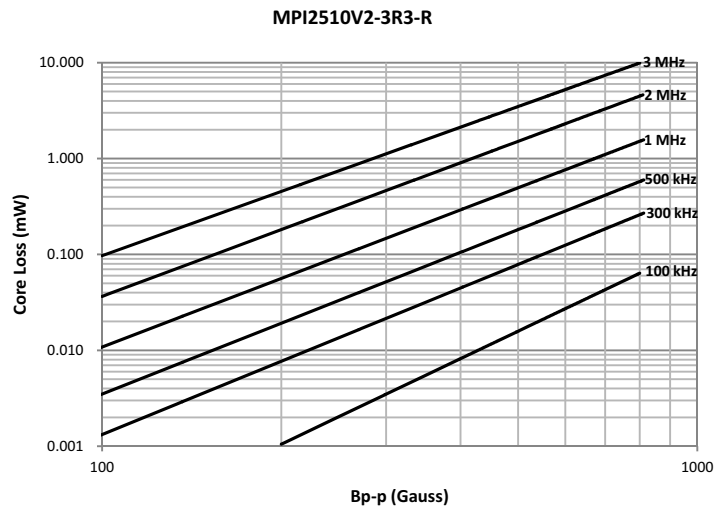
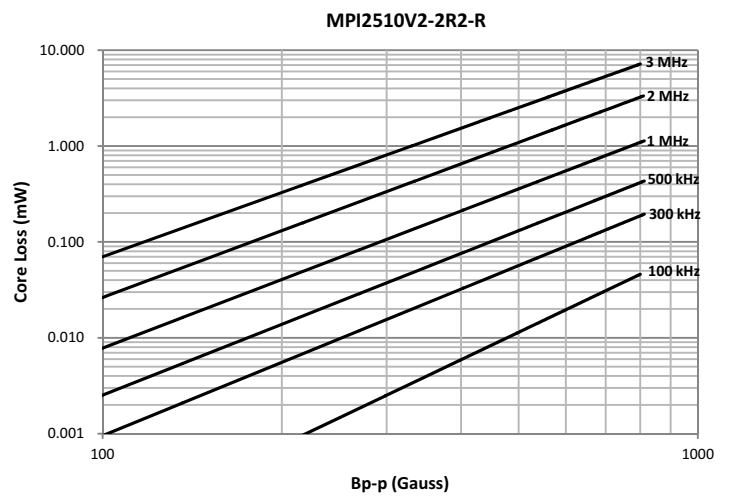
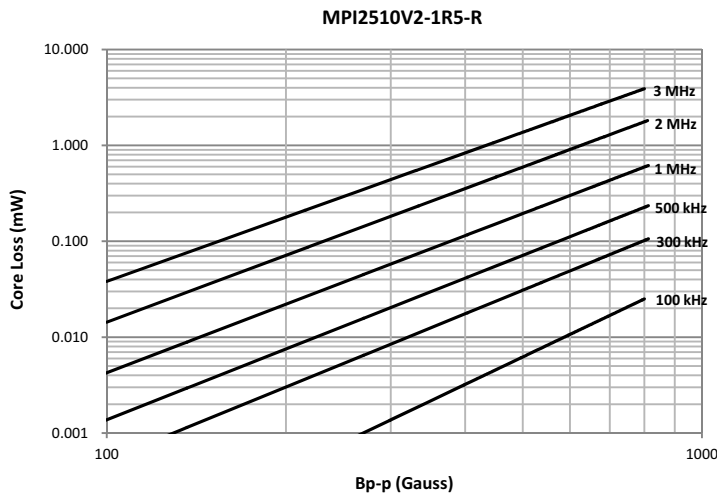
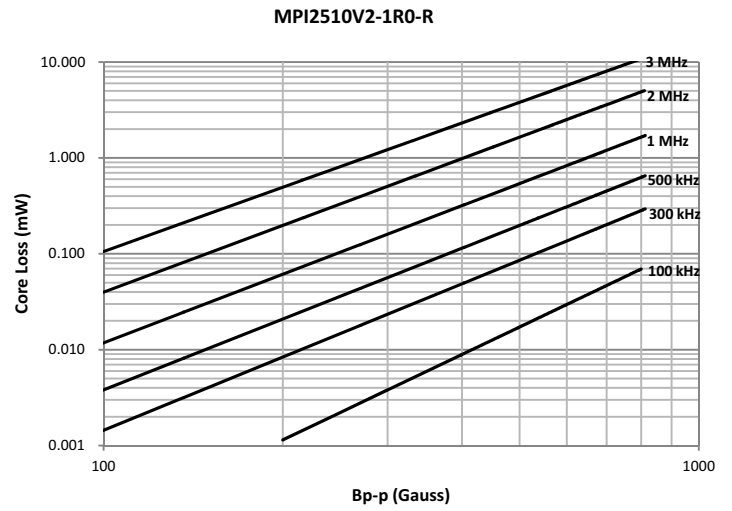
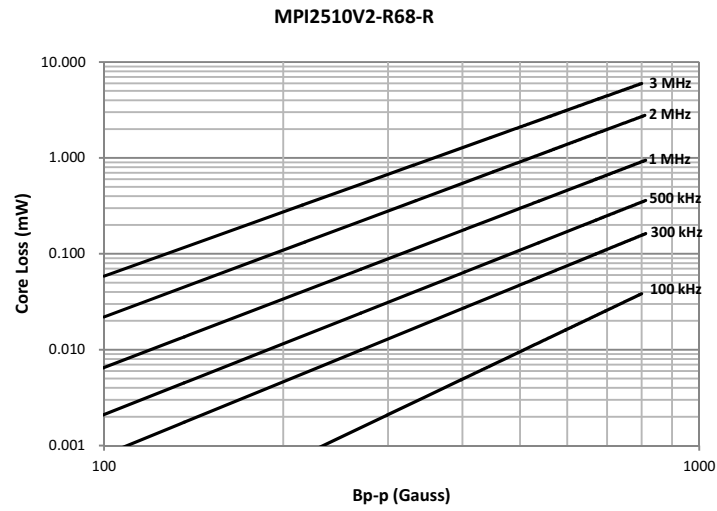
Supplied in tape and reel packaging, 3000 parts per 7" diameter reel



Core loss vs. Bp-p (+25 °C)

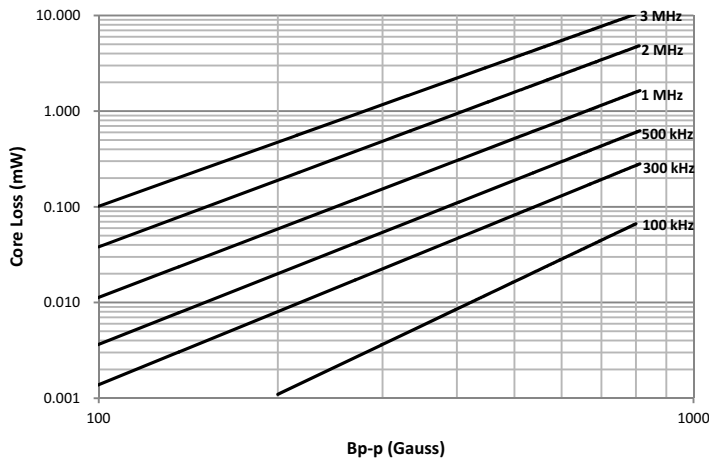


Core loss vs. Bp-p (+25 °C)

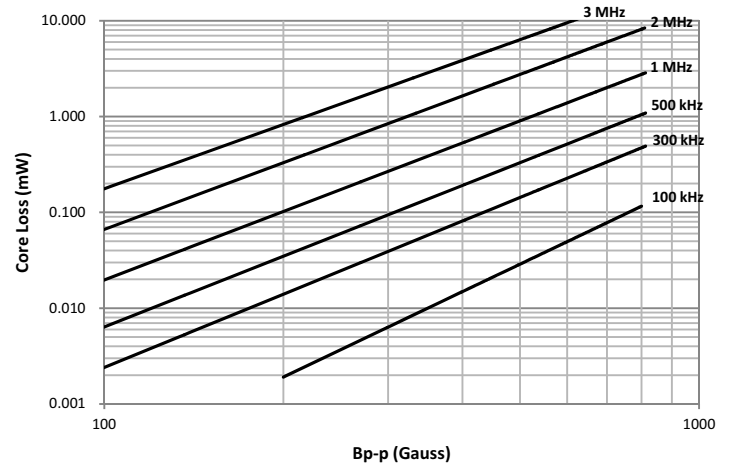


Core loss vs. Bp-p (+25 °C)

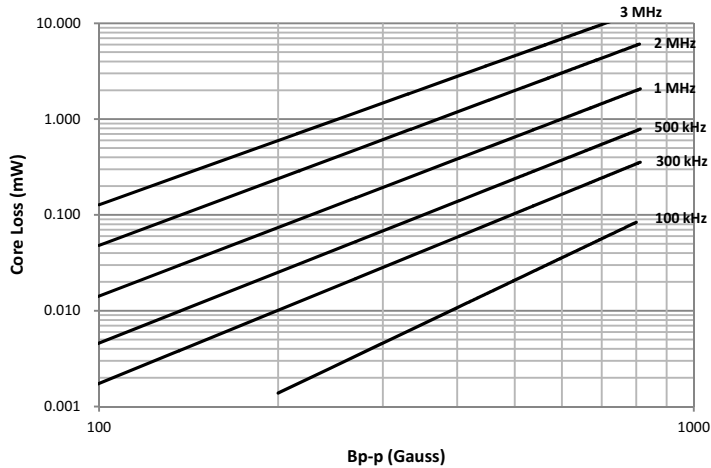
MPI2512V2-R33-R



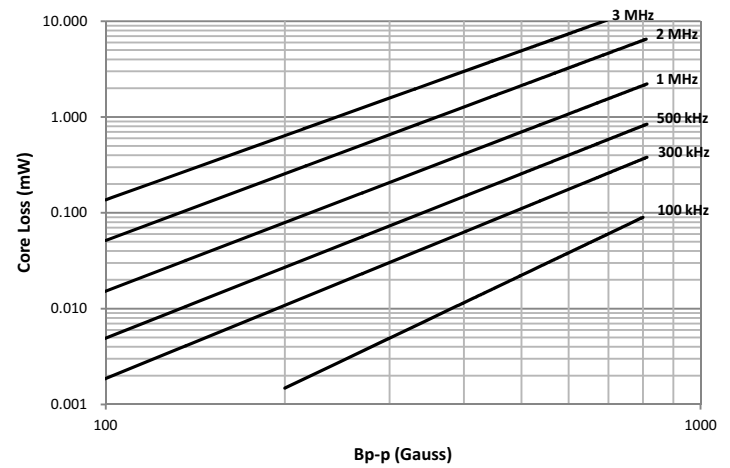
MPI2512V2-R47-R



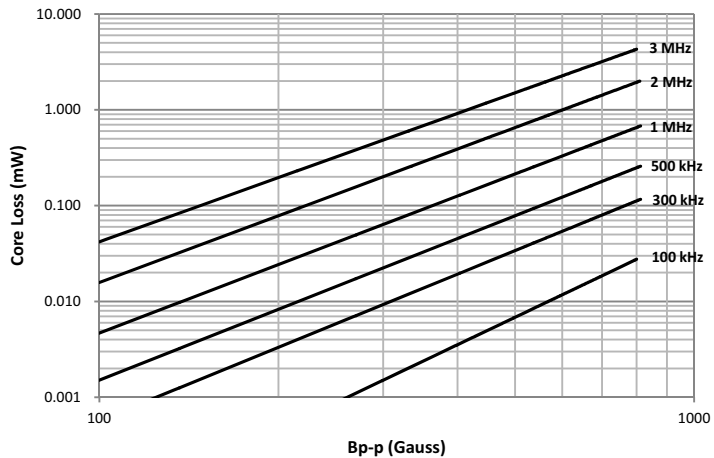
MPI2512V2-R68-R



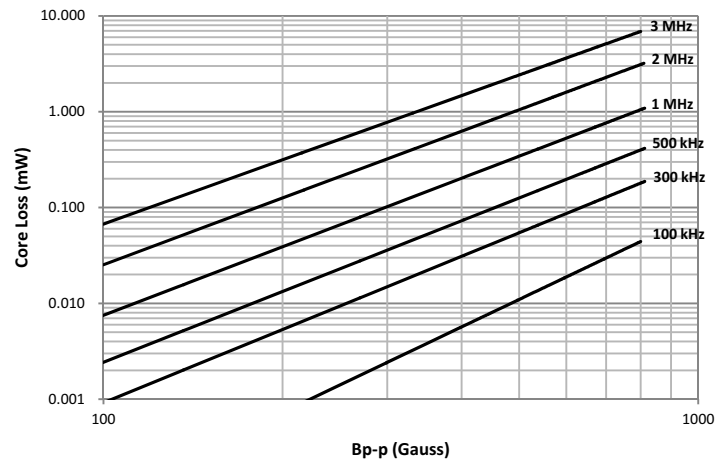
MPI2512V2-1R0-R



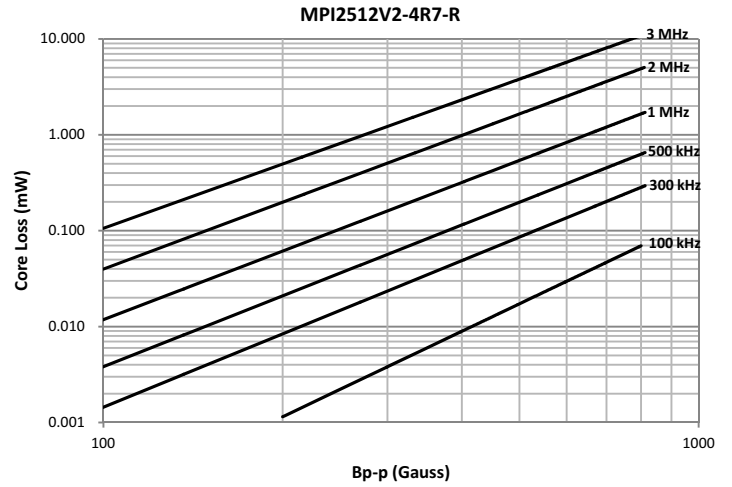
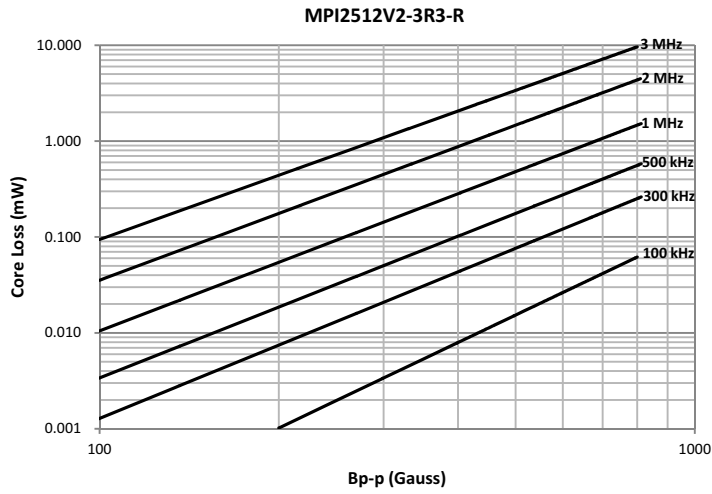
MPI2512V2-1R5-R



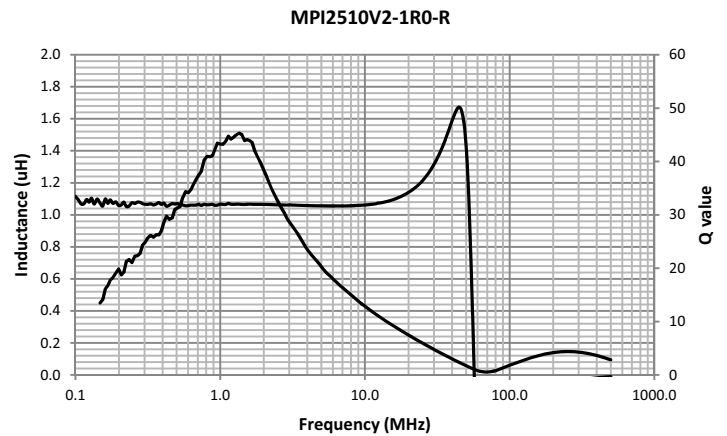
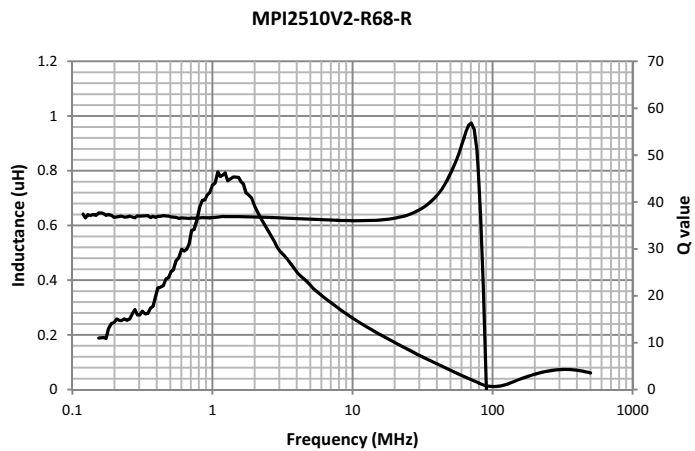
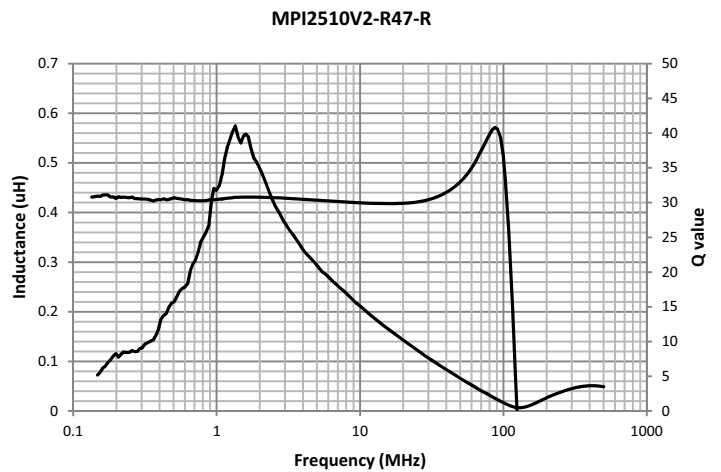
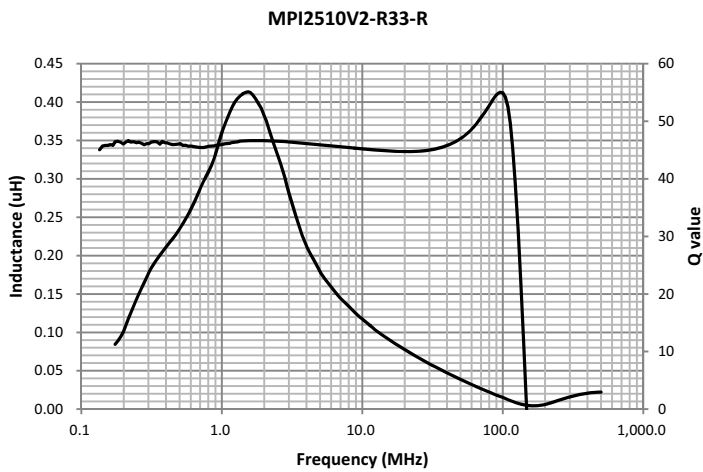
MPI2512V2-2R2-R



Core loss vs. Bp-p (+25 °C)

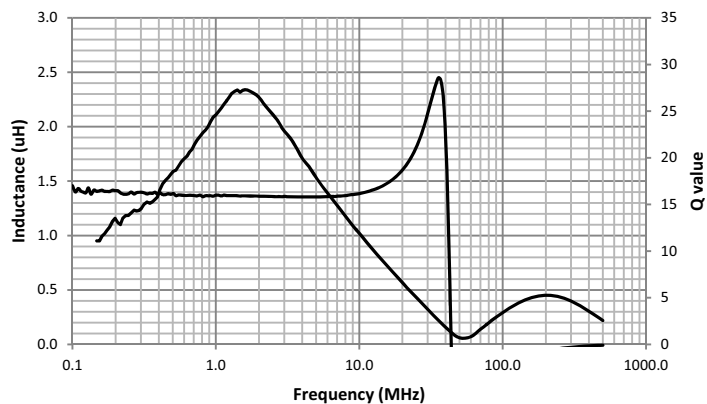


Inductance and Q vs. Frequency

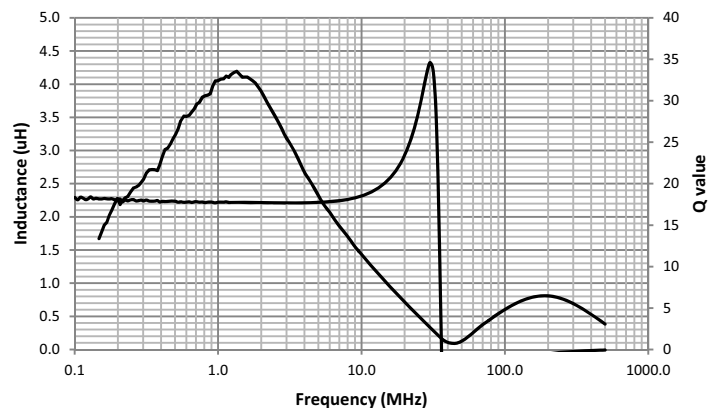


Inductance and Q vs. Frequency

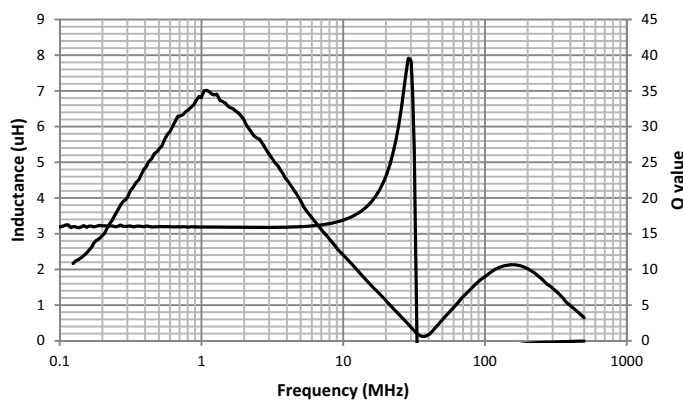
MPI2510V2-1R5-R



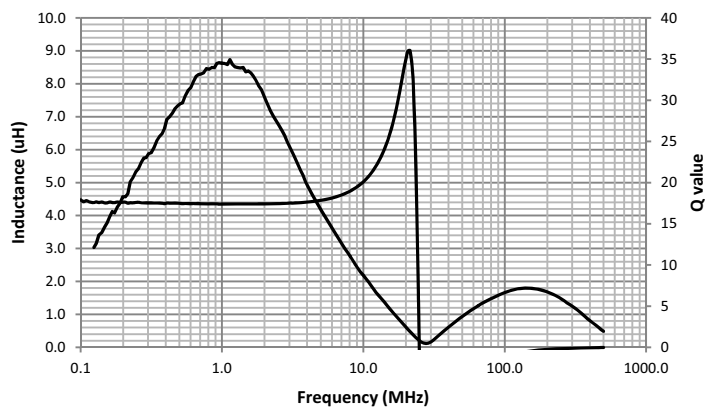
MPI2510V2-2R2-R



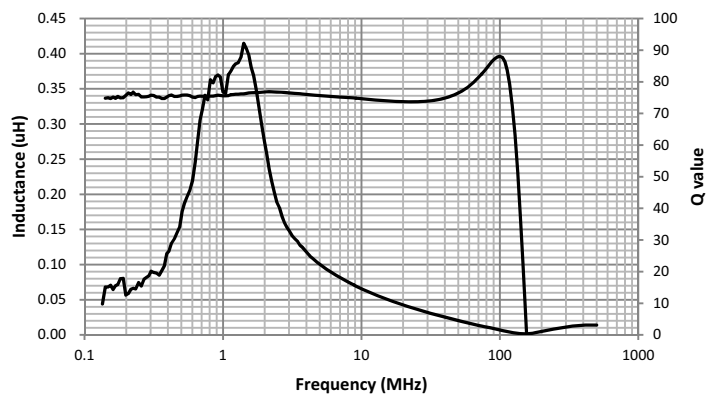
MPI2510V2-3R3-R



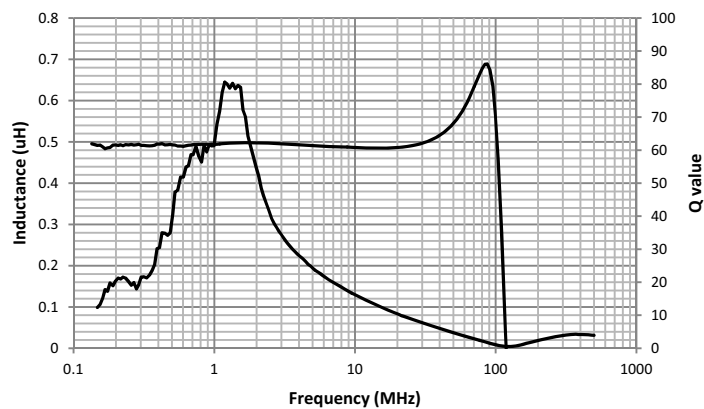
MPI2510V2-4R7-R



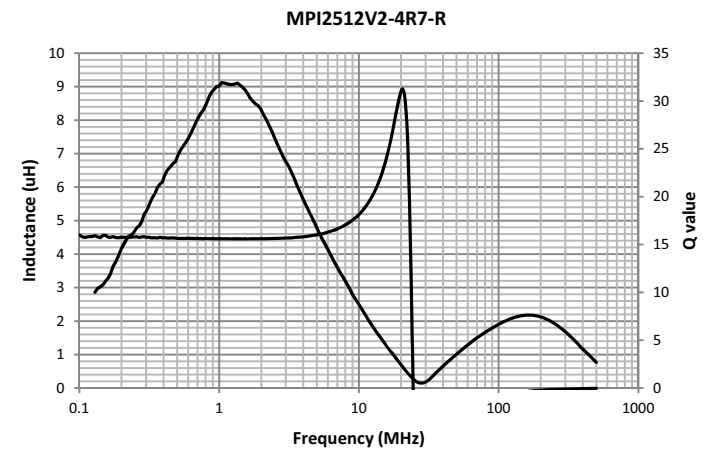
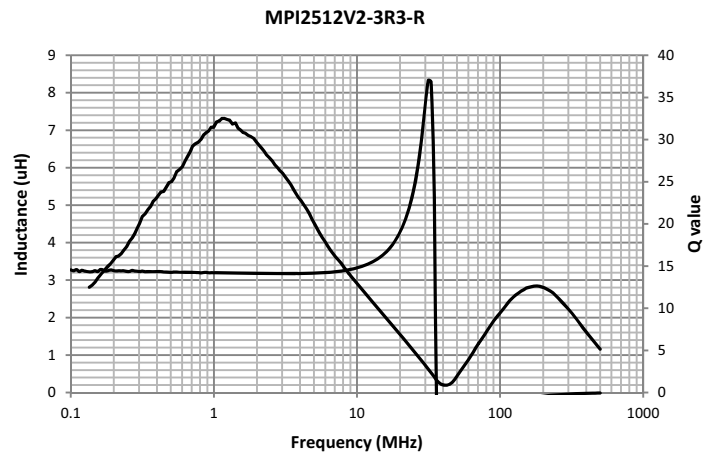
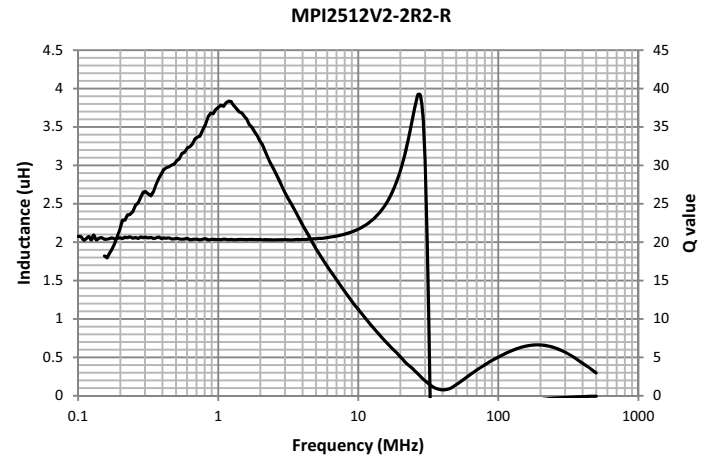
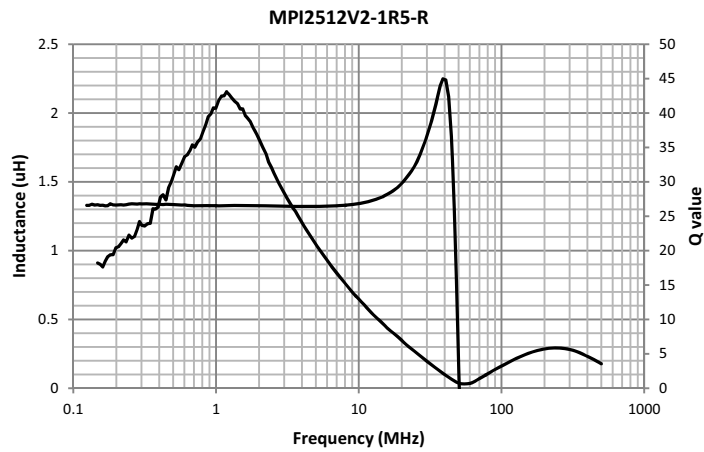
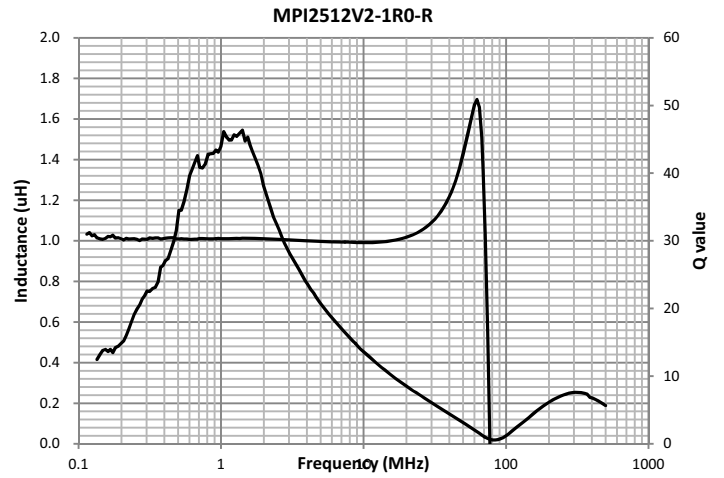
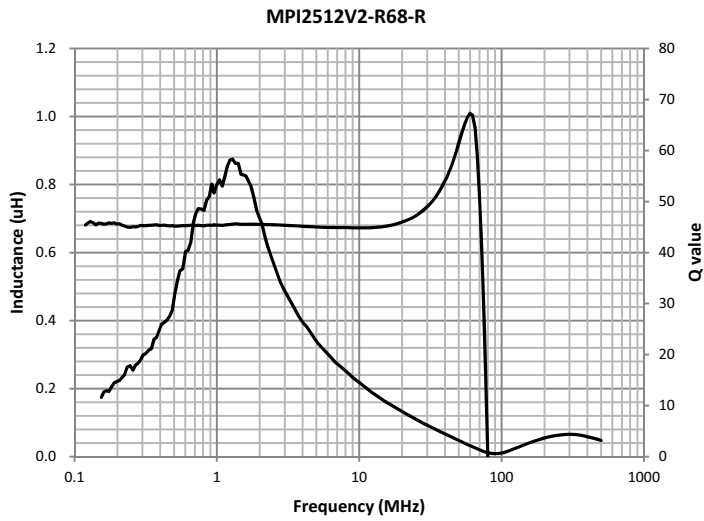
MPI2512V2-R33-R



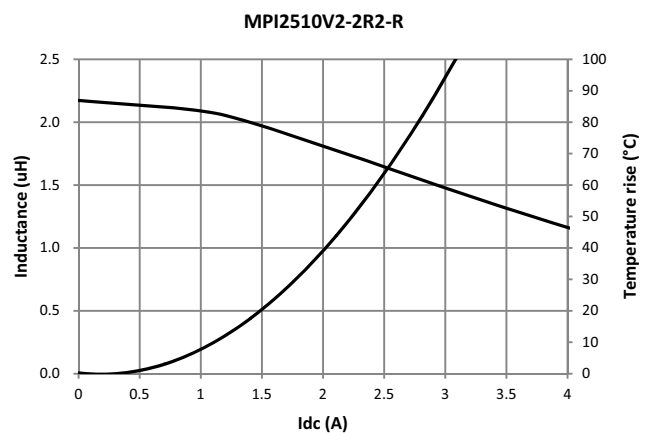
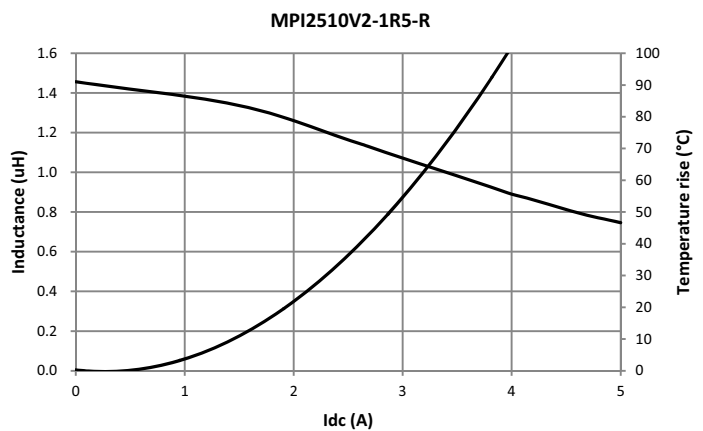
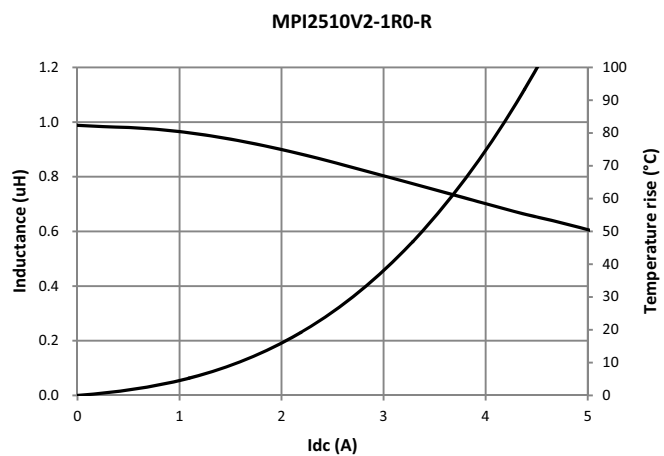
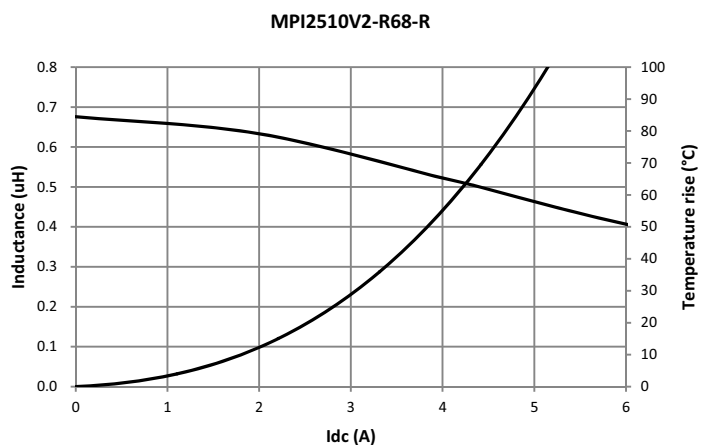
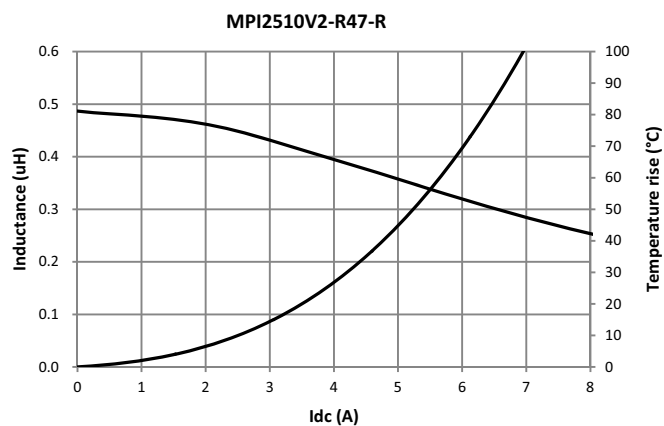
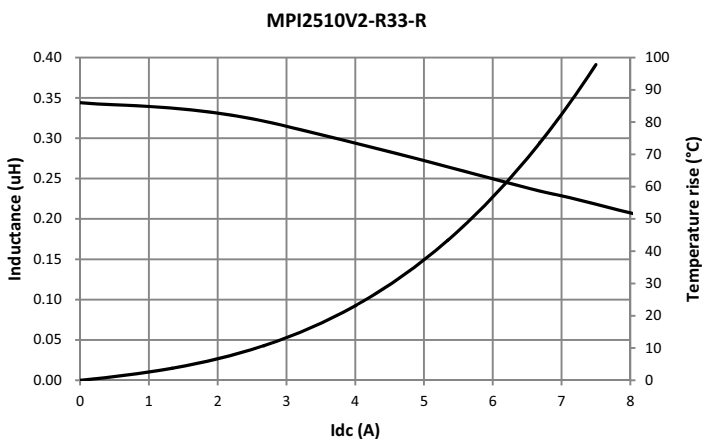
MPI2512V2-R47-R



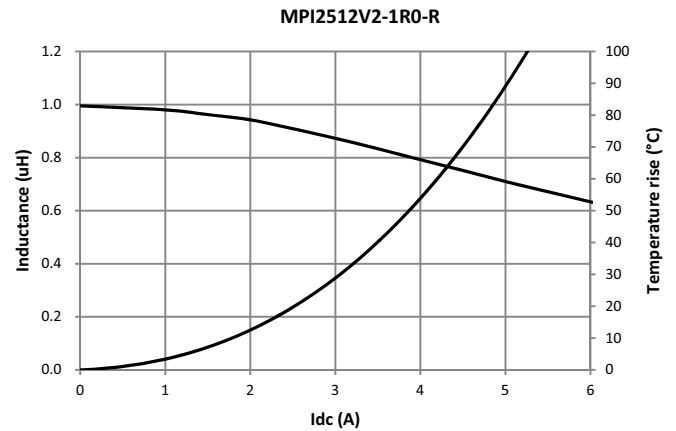
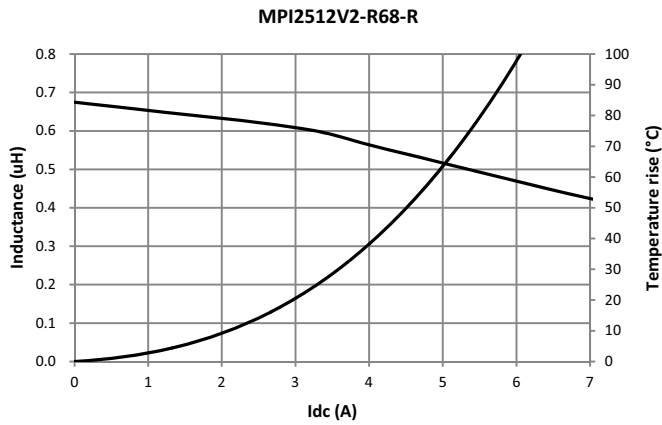
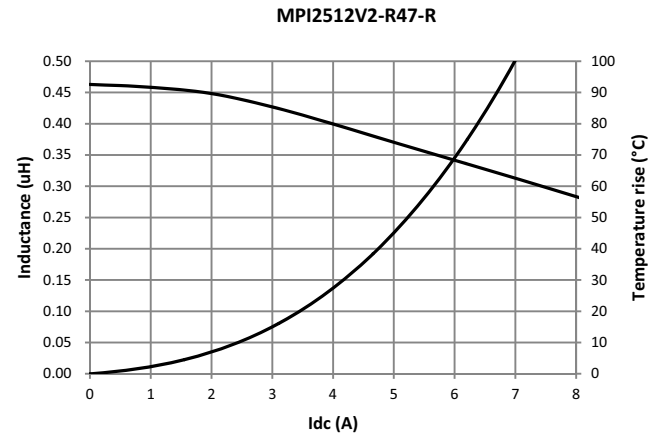
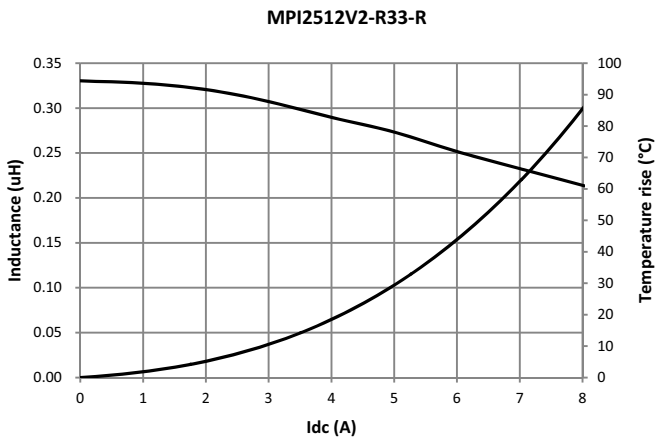
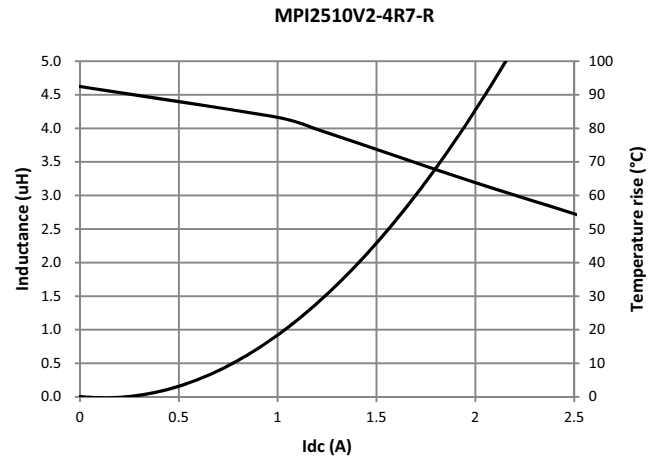
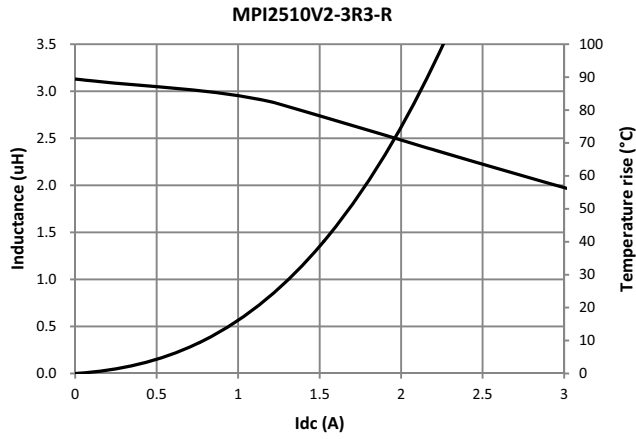
Inductance and Q vs. Frequency



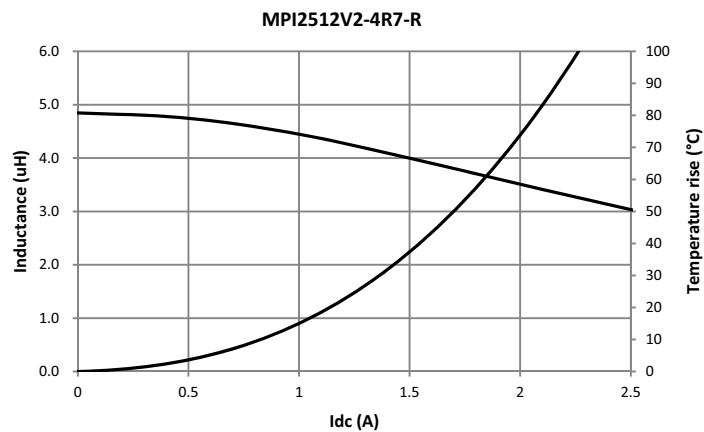
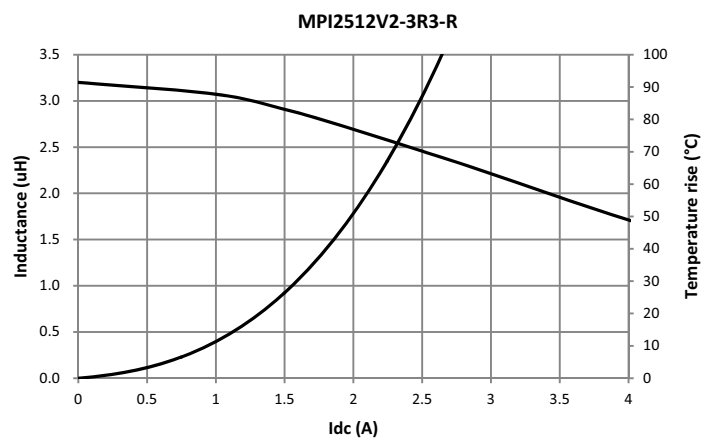
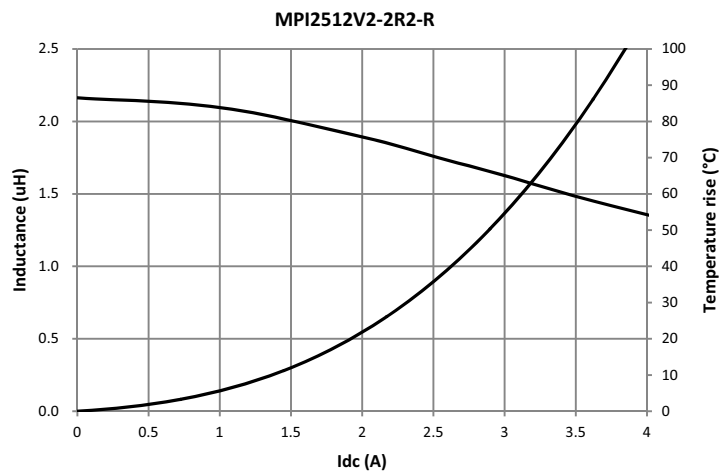
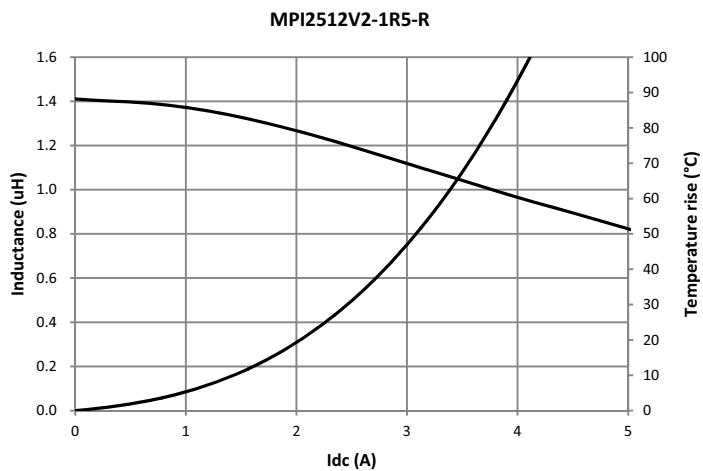
Inductance and temperature rise vs. Current



Inductance and temperature rise vs. Current



Inductance and temperature rise vs. Current



Solder reflow profile

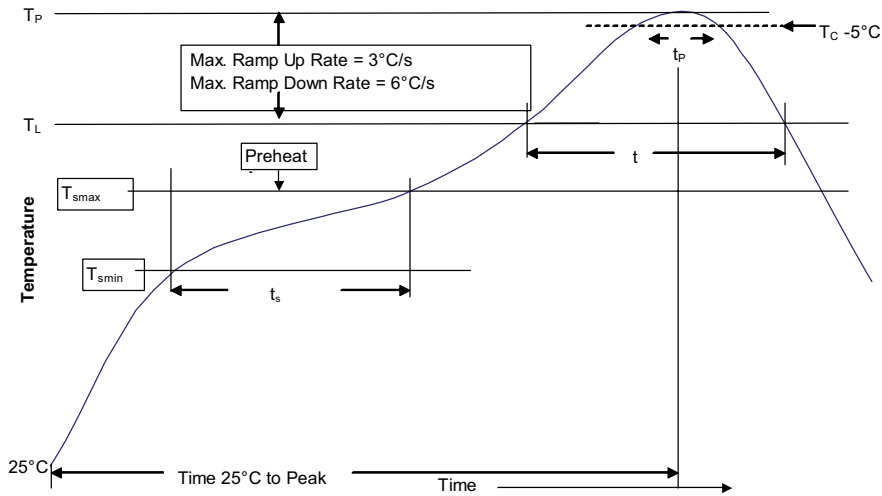


Table 1 - Standard SnPb Solder (T_C)

Package Thickness	Volume mm ³ <350	Volume mm ³ ≥350
<2.5mm)	235 °C	220 °C
≥2.5mm	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
<1.6mm	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)	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_{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.

Life Support Policy: Eaton does not authorize the use of any of its products for use in life support devices or systems without the express written approval of an officer of the Company. Life support systems are devices which support or sustain life, and whose failure to perform, when properly used in accordance with instructions for use provided in the labeling, can be reasonably expected to result in significant injury to the user.

Eaton reserves the right, without notice, to change design or construction of any products and to discontinue or limit distribution of any products. Eaton also reserves the right to change or update, without notice, any technical information contained in this bulletin.

Eaton
Electronics Division
1000 Eaton Boulevard
Cleveland, OH 44122
United States
www.eaton.com/electronics

© 2018 Eaton
All Rights Reserved
Printed in USA
Publication No. 10649 BU-MC18045
July 2018