Technical Data Preliminary 030817

MPI25-V1

High current, low profile, miniature power inductors

Applications

- Smart phones
- Handheld/mobile devices
- Digital cameras
- Media players
- GPS
- MP3 Players
- Wearable electronics
- Tablets/e-readers

Product features

- High current carrying capacity in compact standard 1008 (2520 metric) footprint
- Magnetically shielded, Low EMI
- Rugged flexible construction
- Inductance range from 0.33 µH to 4.7 µH
- Current range from 1.22 A to 6.8 A
- 2.7 mm x 2.2 mm footprint surface mount package in 1.0 mm and 1.2 mm heights
- Moisture Sensitivity Level (MSL): 1

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

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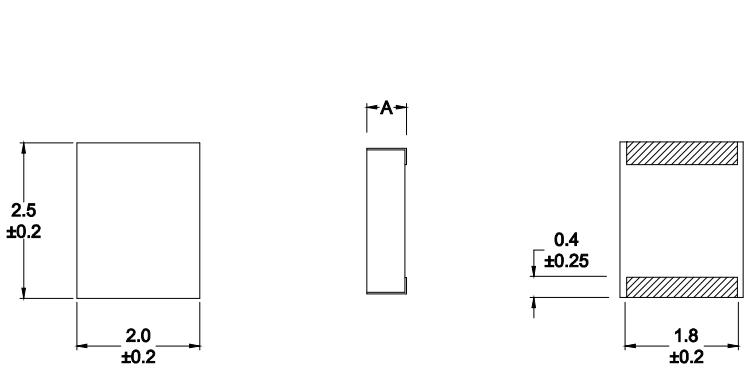
Product specifications

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							
MPI2510V1-R33-R	0.33	4.0	6.6	21	26	199	2837
MPI2510V1-R47-R	0.47	4.4	6.6	23	29	154	2699
MPI2510V1-R68-R	0.68	3.1	4.3	37	44	118	2599
MPI2510V1-1R0-R	1.0	3.1	4.4	41	52	94	2451
MPI2510V1-1R5-R	1.5	2.3	2.6	76	91	74	1705
MPI2510V1-2R2-R	2.2	2.1	3.3	88	110	58	1710
MPI2510V1-4R7-R	4.7	1.22	1.8	220	262	41	849
1.2 mm height							
MPI2512V1-R47-R	0.47	4.9	6.8	16	22	156	2306
MPI2512V1-R68-R	0.68	3.4	5.0	29	35	128	2084
MPI2512V1-1R0-R	1.0	3.3	4.8	36	44	85	2040
MPI2512V1-1R5-R	1.5	2.3	3.2	64	77	71	1431
MPI2512V1-2R2-R	2.2	2.2	3.5	74	89	55	1193
MPI2512V1-4R2-R	4.2	1.4	1.9	196	235	40	975

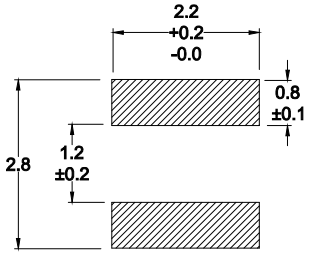
1. Open Circuit Inductance (OCL) Test Parameters: 1.0 MHz, 0.1 V_{rms}, 0.0 Adc, +25 °C
2. I_{rms}: DC current for an approximate temperature rise of 40 °C without core loss. Derating is necessary for AC currents. PCB layout, trace thickness and width, air-flow, and proximity of other heat generating 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 µH), ΔI (Peak to peak ripple current in Amps).
5. Part Number Definition: MPI25xxV1-xxx-R
   MPI25 = Product code
   xx= Height indicator
   V1=Versionl 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

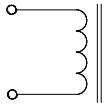


Dimension A	
MPI2510V1	1.0 max
MPI2512V1	1.2 max

Recommended Pad Layout



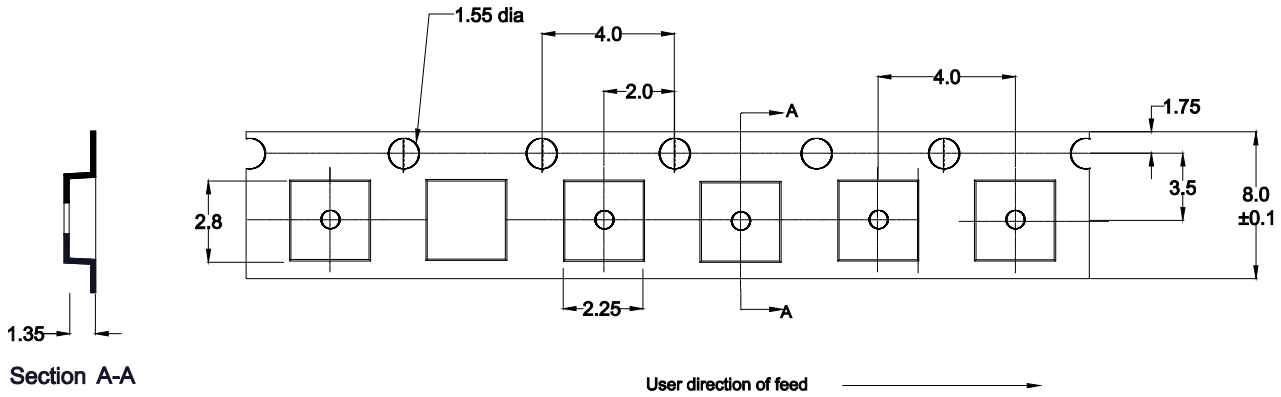
Schematic



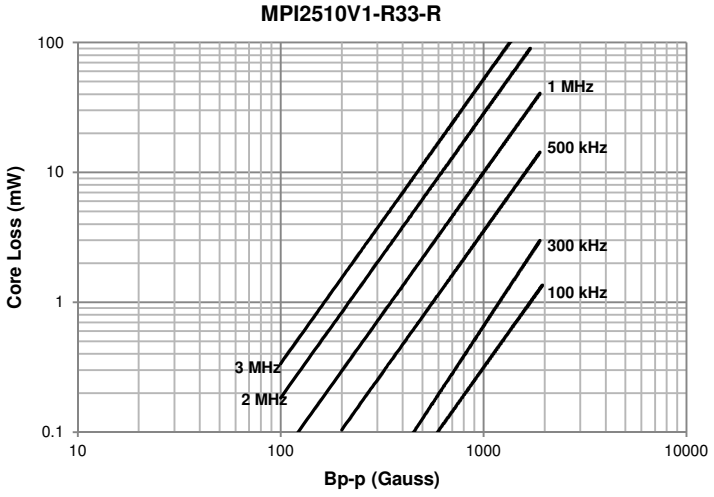
No marking
Tolerances are ±0.20 millimeters unless stated otherwise
All soldering surfaces to be coplanar within 0.1 millimeters
Pad layout tolerances are ±0.1 millimeters unless stated otherwise
Do not route traces or vias underneath the inductor

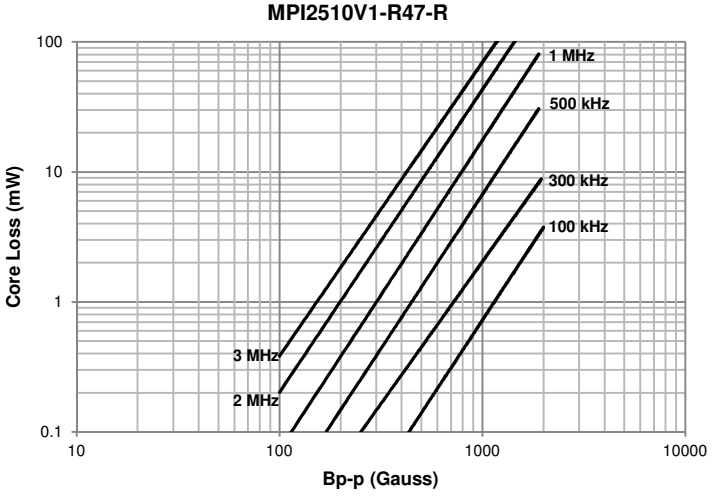
Packaging information- mm

Drawing not to scale
Supplied in tape and reel packaging , 3,000 parts per 7" diameter reel



Core loss vs. B_{p-p}





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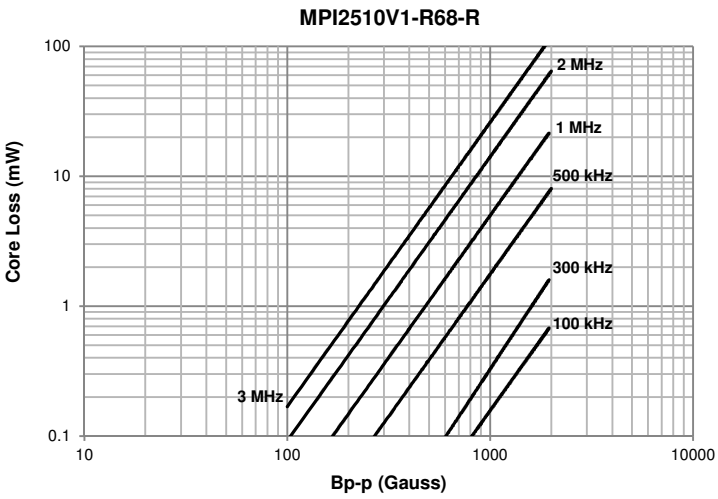
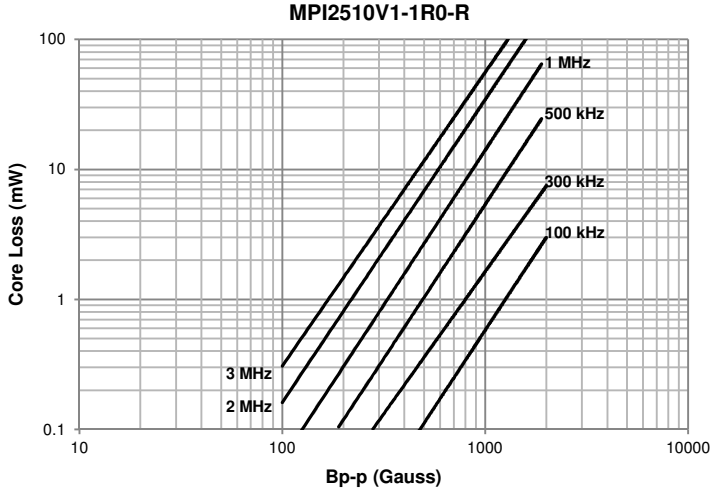
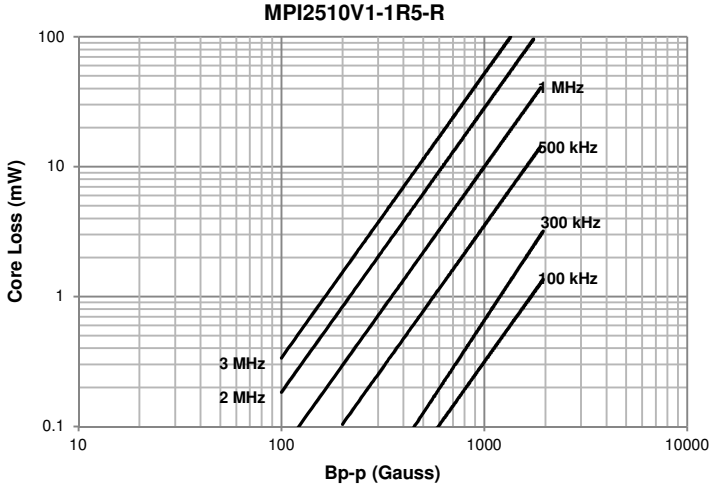
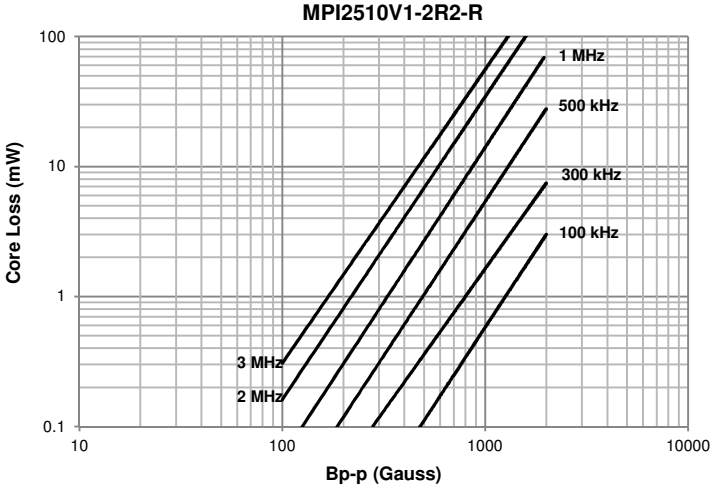
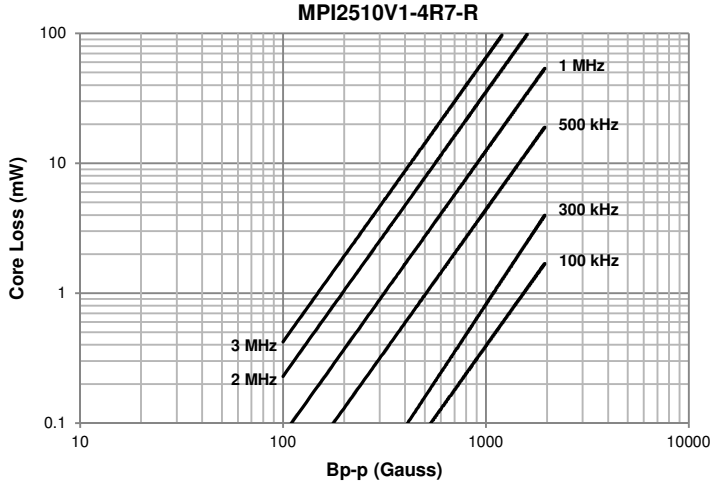
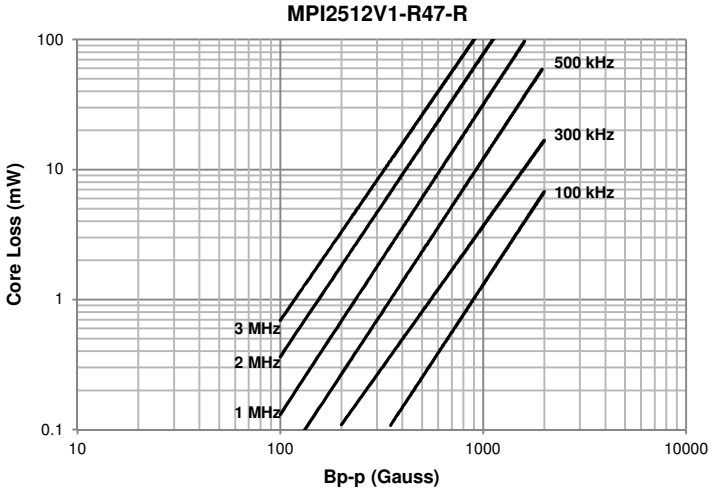




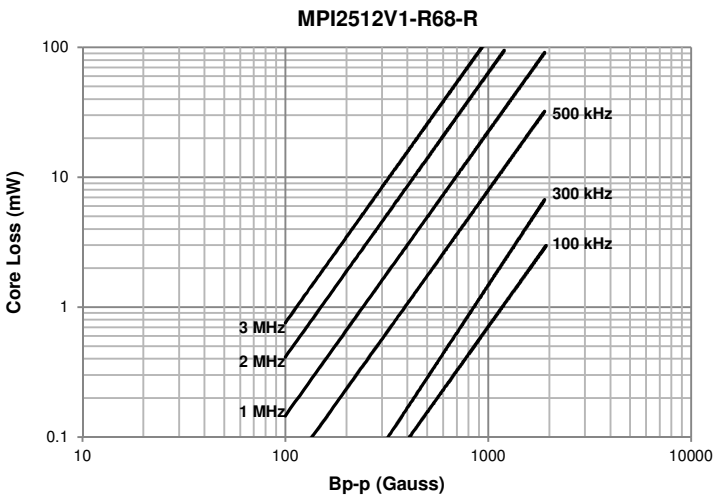


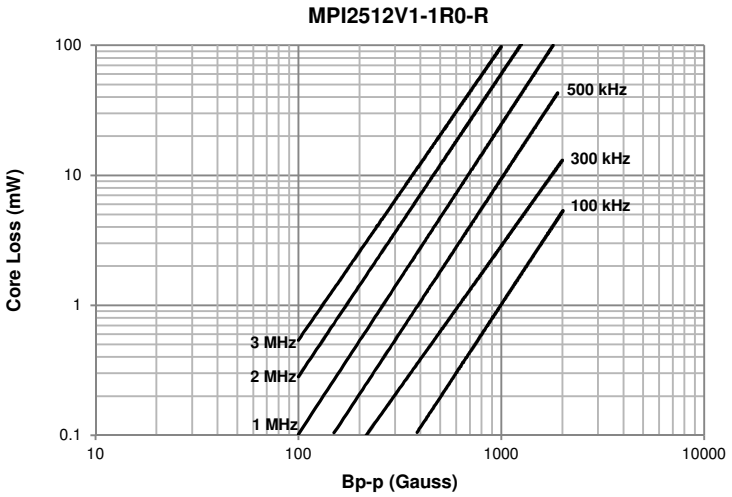


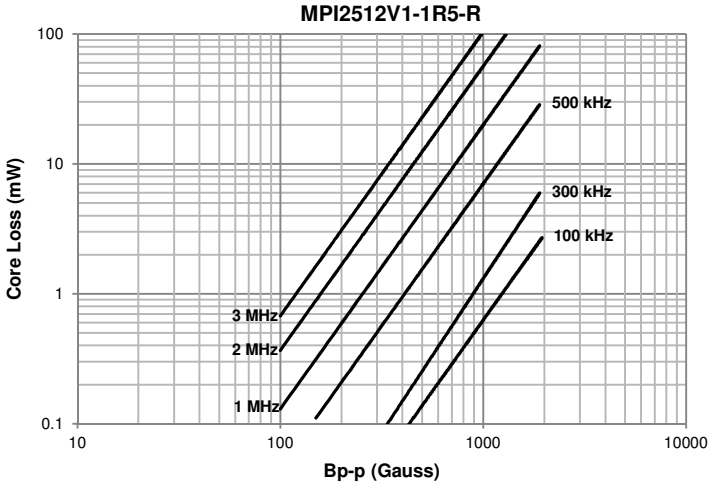


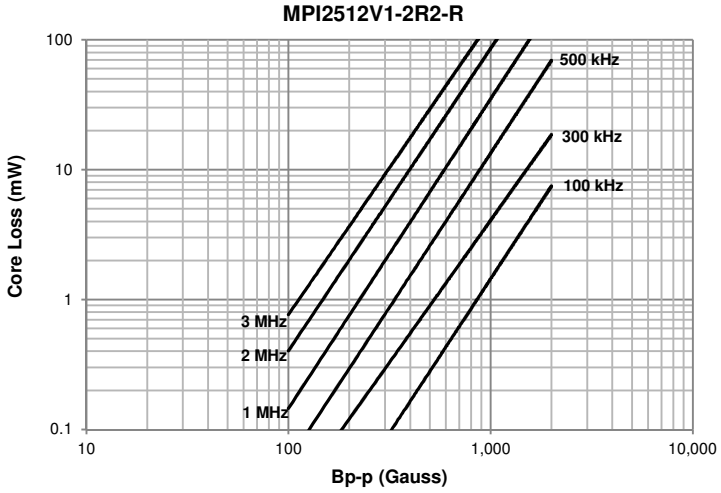


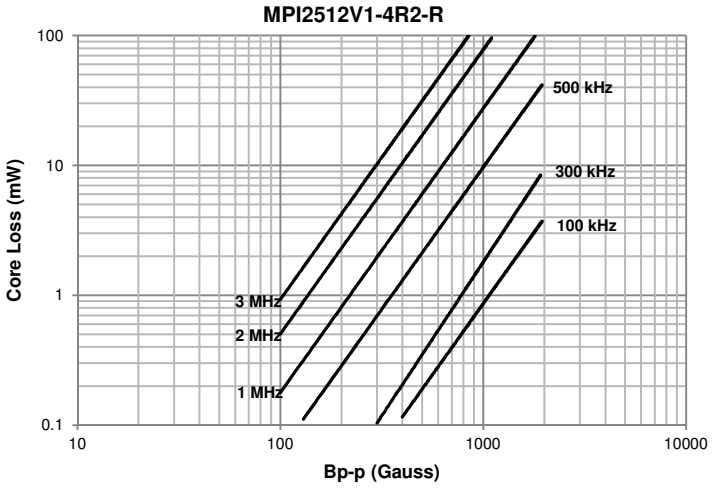
Core loss vs. B_{p-p}



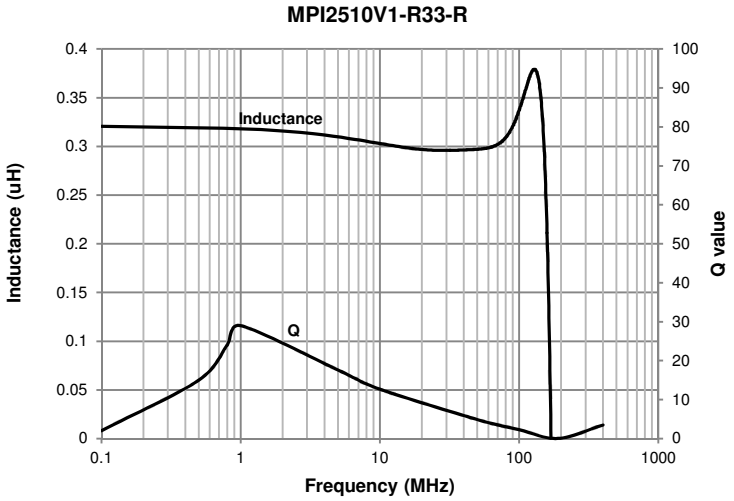


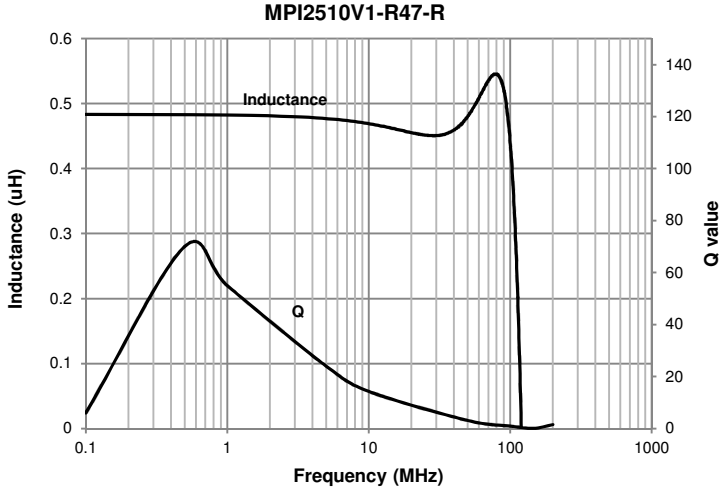


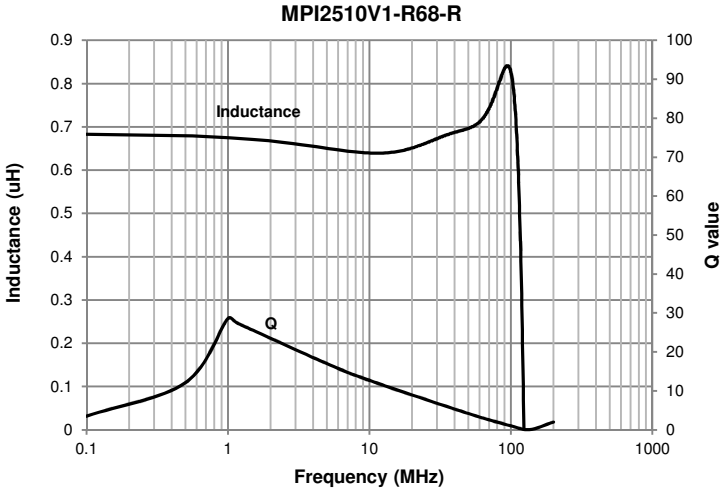


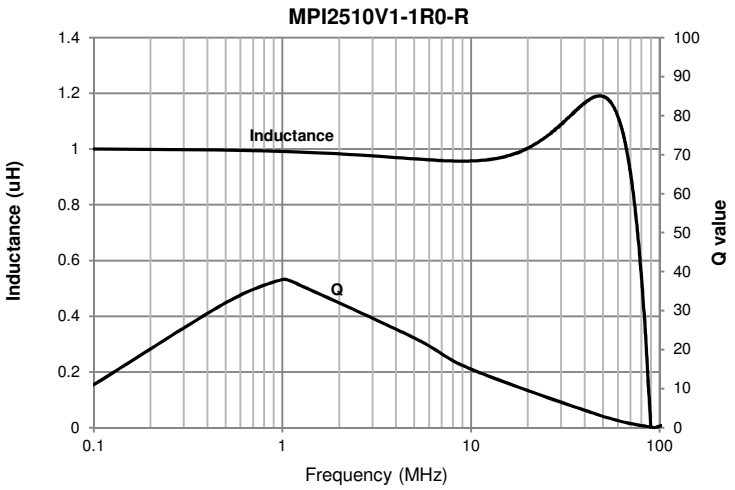


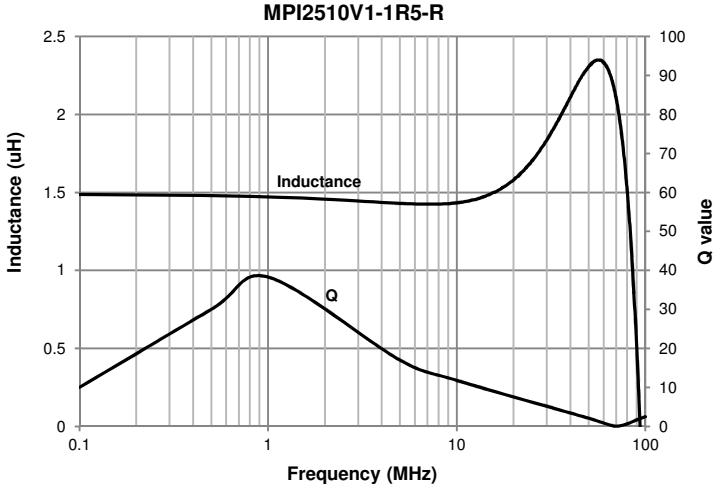
Inductance and Q vs. Frequency

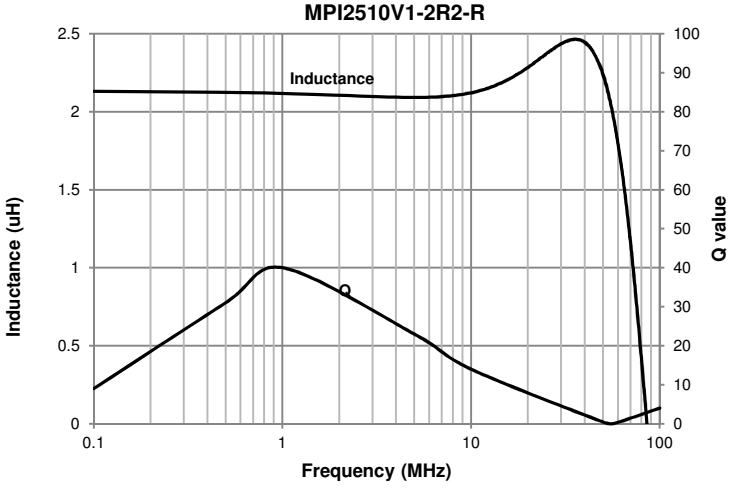












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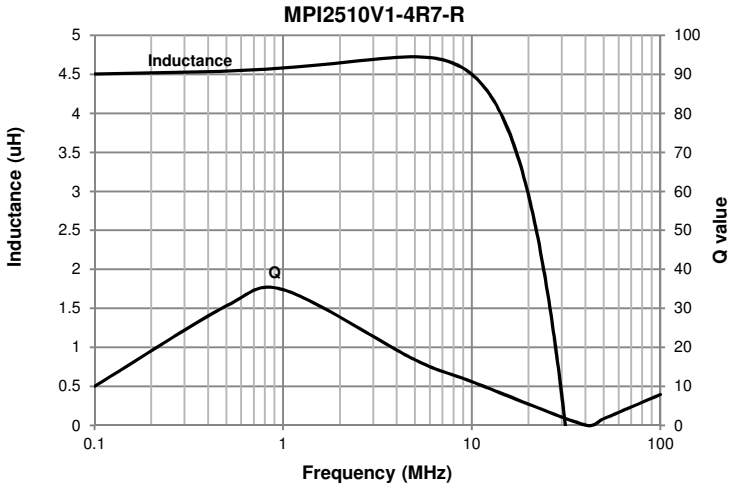
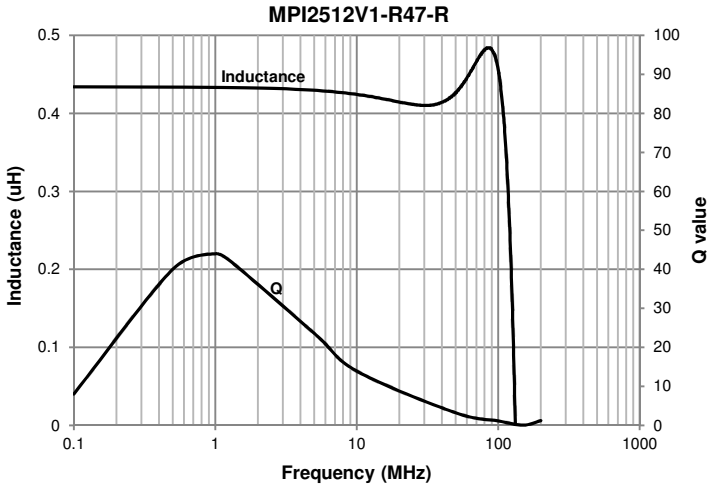
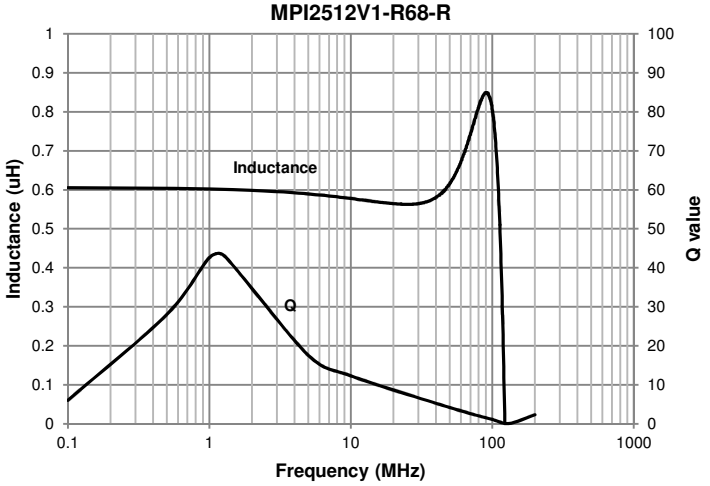
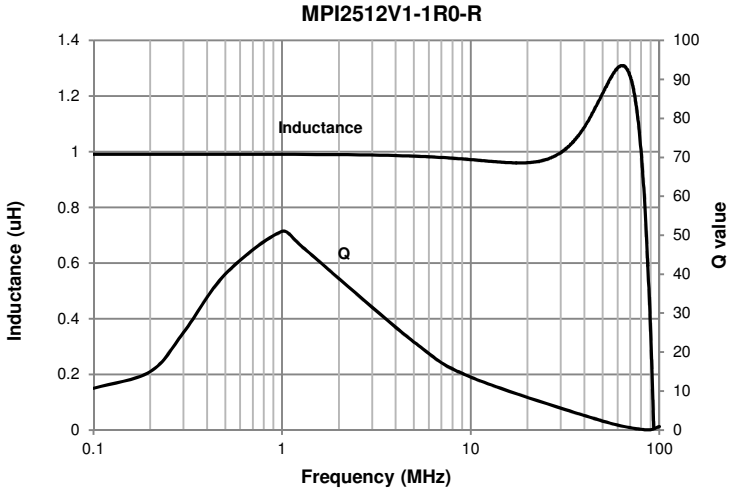
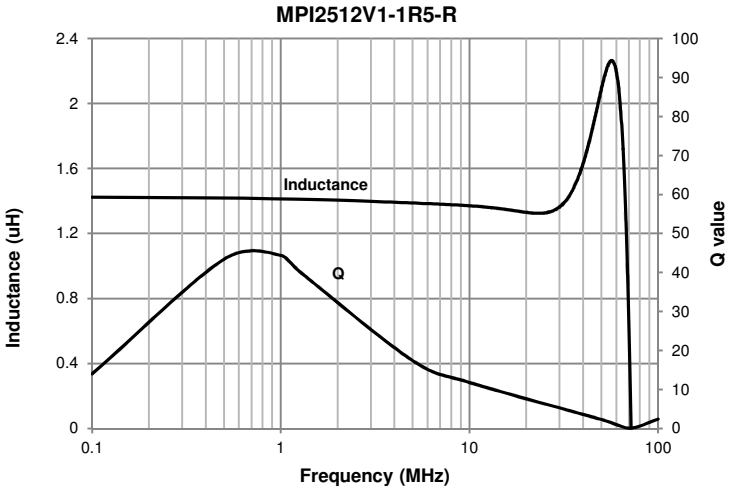
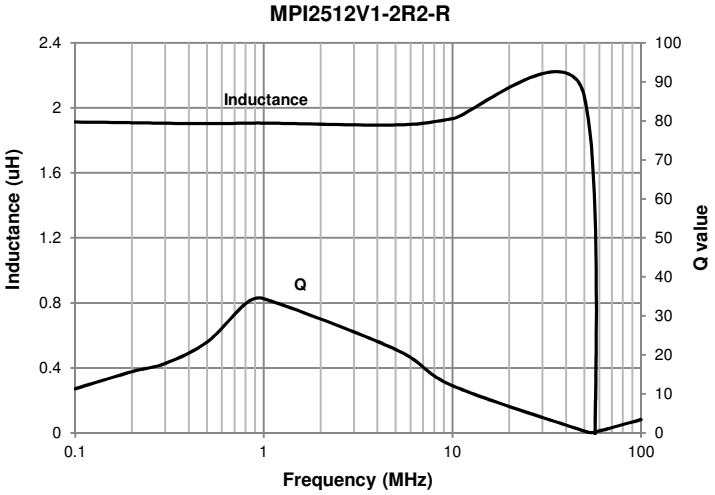




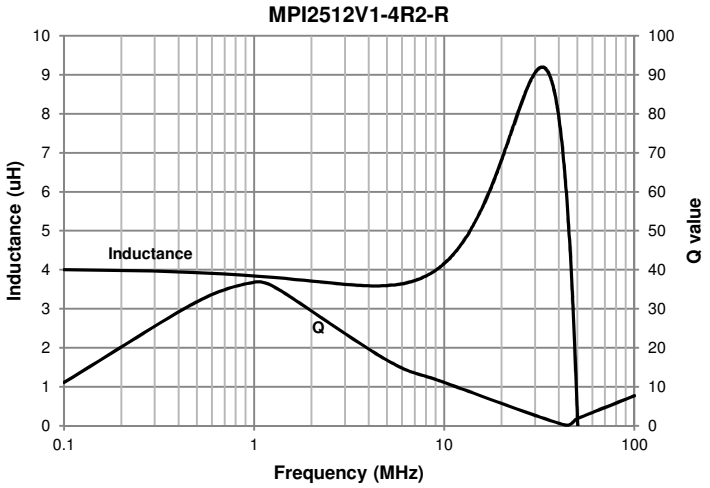




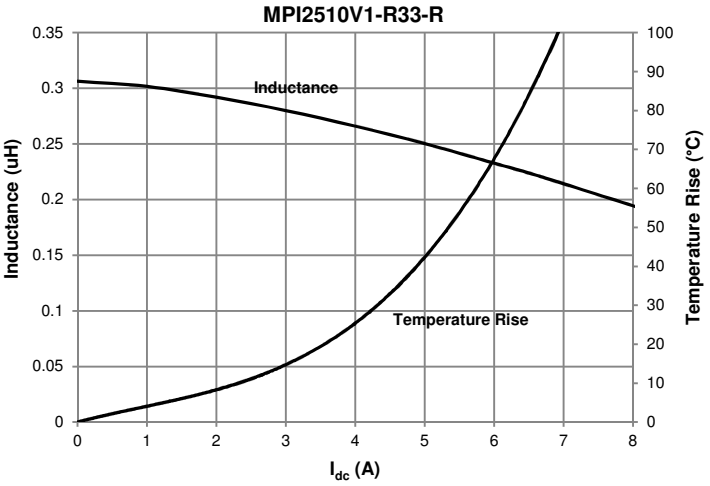


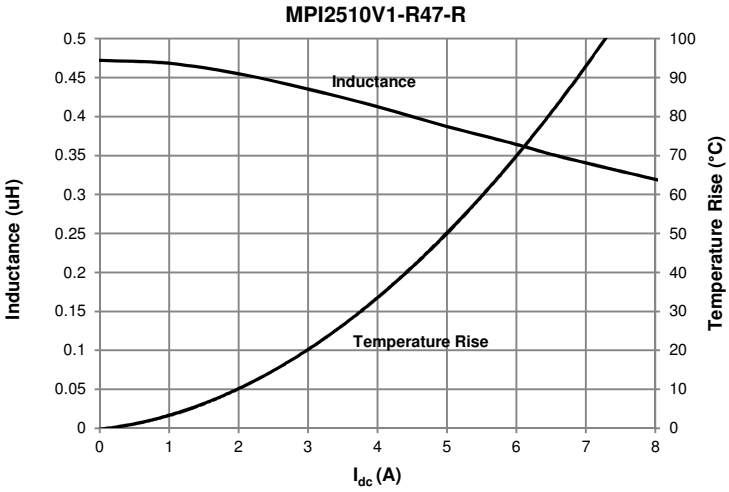


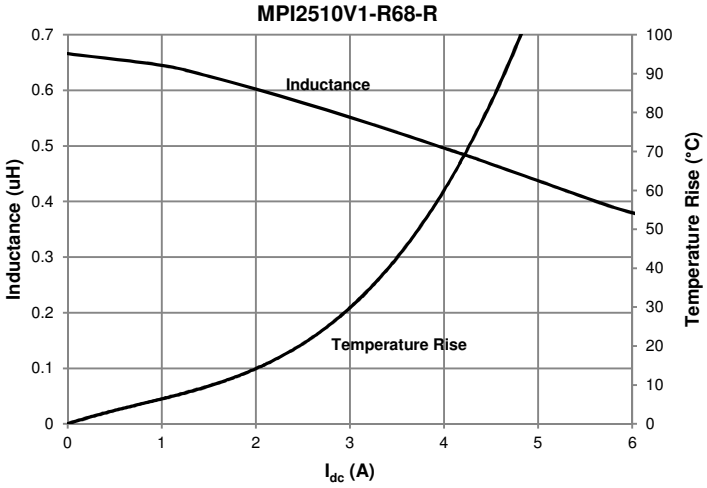
Inductance and Q vs. Frequency

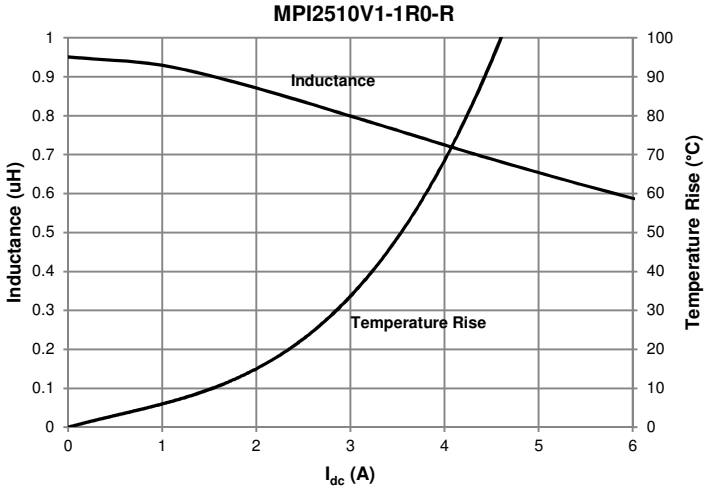


Inductance and temperature rise vs. current

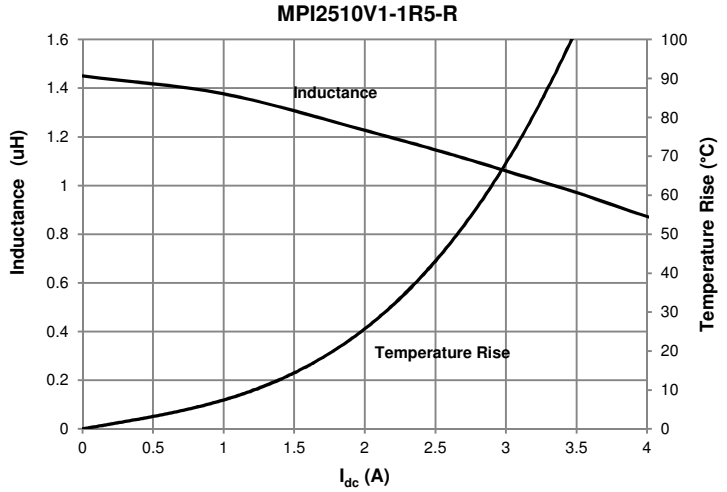


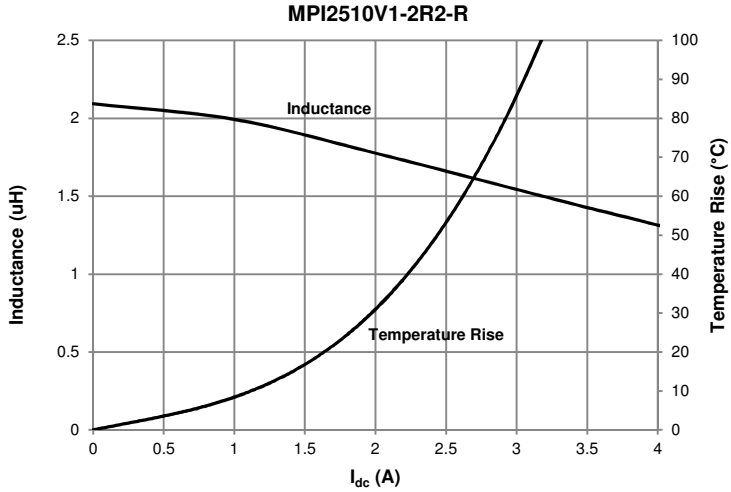


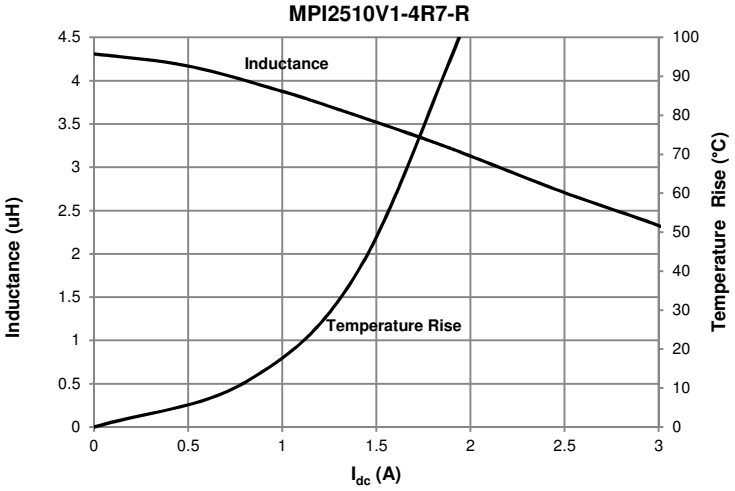


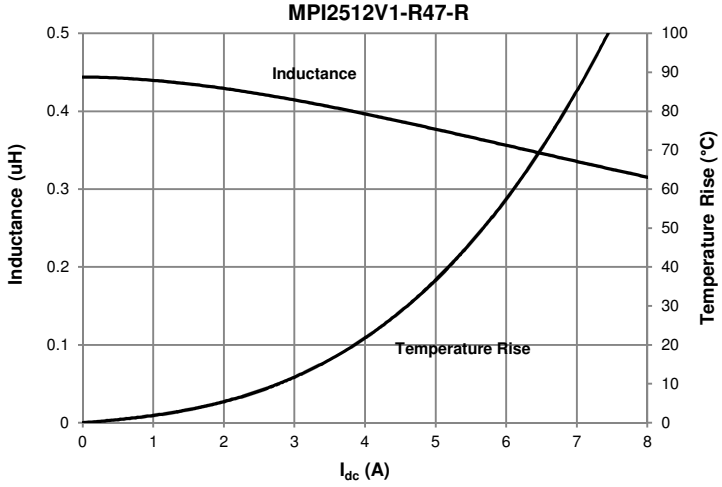


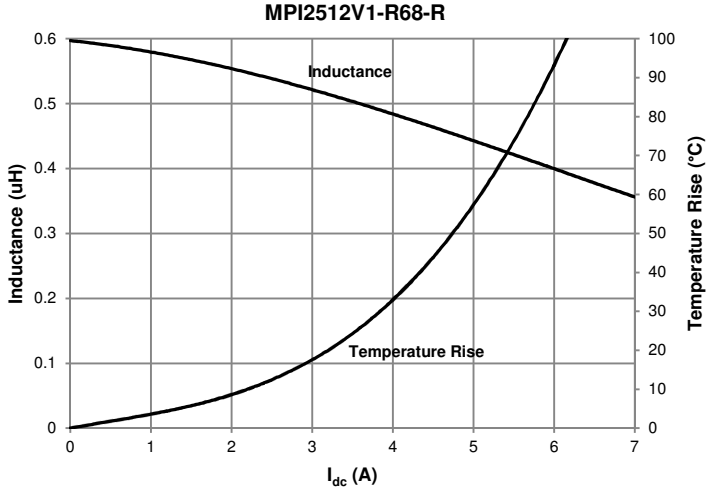
Inductance and temperature rise vs. current

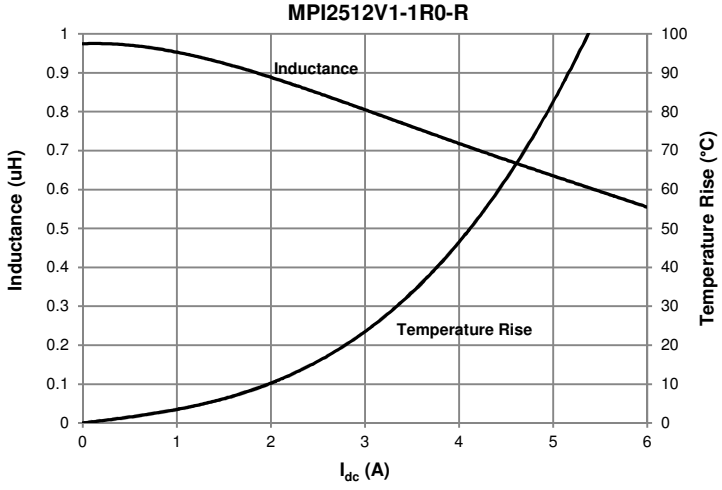




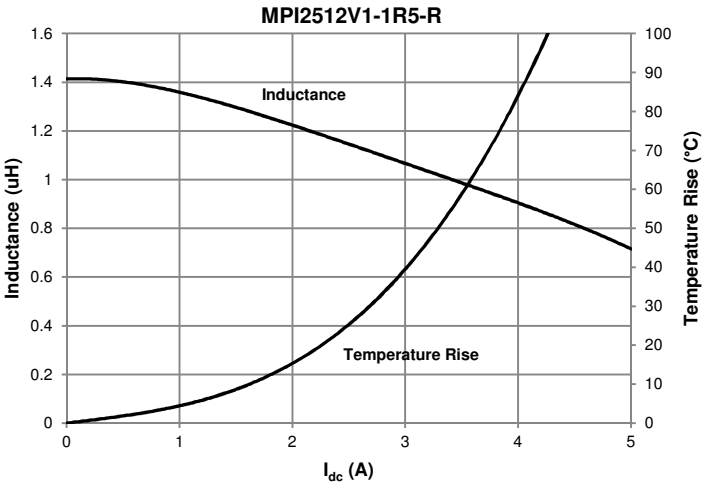


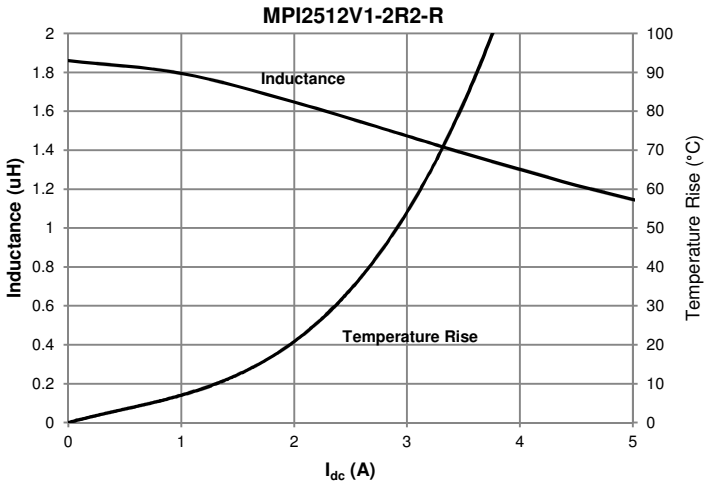


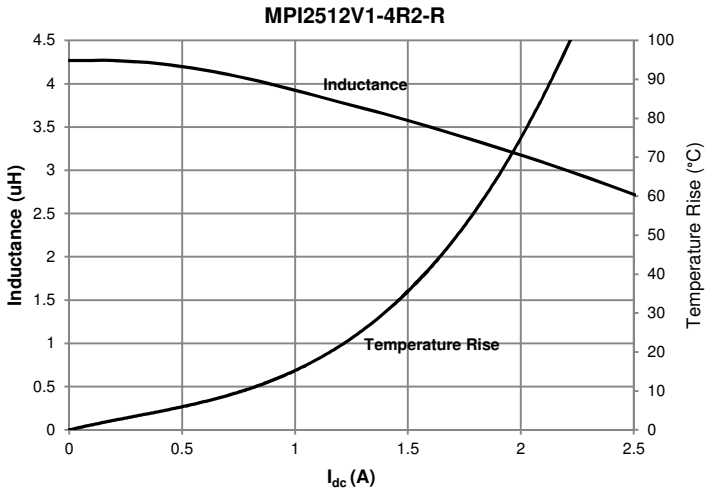




Inductance and temperature rise vs. current







Solder reflow profile

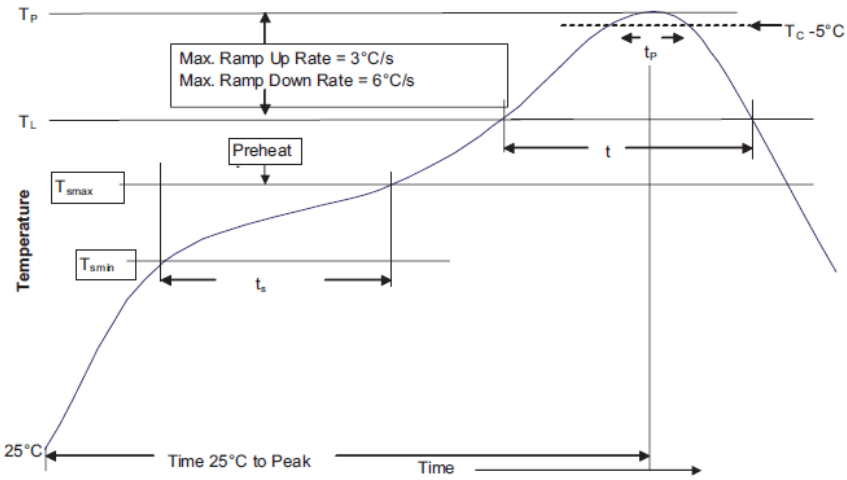


Table 1 - Standard SnPb Solder (T_C)

Package Thickness	Volume 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 (Tp)*		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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