MPIA25V3

Automotive grade high current, low profile, miniature power inductors

Photo is representative

Product features

- AEC-Q200
- High current carrying capacity in a compactstandard 1008 (2520 metric) footprint
- Magnetically shielded, low EMI
- Filtering applications up to Self resonant frequency (SRF) [See product specification table]
- Inductance range from 0.33 µH to 4.7 µH
- Current range from 1.4 A to 7.5 A
- 2.7 mm x 2.2 mm footprint surface mount package in 1.05 and 1.25 mm heights
- Alloy powder core material
- Moisture sensitivity level (MSL): 1

Applications

- Body electronics
  - Central body control module
  - Vehicle access control system
  - Headlamps, tail lamps and interior lighting and LED lighting
  - Doors, window lift and seat control
- Advanced driver assistance systems
  - 77 GHz radar system
  - Basic and smart surround, and rear and front-view camera
  - Adaptive cruise control (ACC)
  - Automatic parking control
  - Collision avoidance system/ Car black box system
- Infotainment and cluster electronics
  - Active noise cancellation (ANC)
  - Audio subsystem: head unit and trunk amp
  - Digital instrument cluster
  - In-vehicle infotainment (IVI) and navigation

Environmental compliance and general specifications

- Storage temperature (component): -40 °C to +125 °C
- Operating temperature range: -40 °C to +125 °C (ambient plus self-temperature rise)

RoHS HALOGEN HF FREE Pb

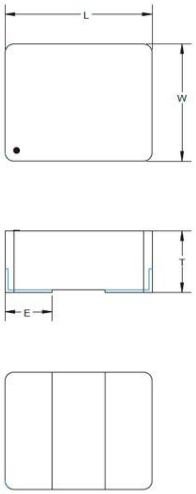
Powering Business Worldwide

Product specifications

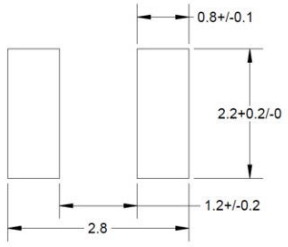
Part number[6]	OCL[1] (µH) ±20%	FLL[2] (µH) minimum	I_{rms}[3] (A)	I_{sat}[4] (A)	DCR (mΩ) typical @ +20 °C	DCR (mΩ) maximum @ +20 °C	SRF (MHz) typical	K-factor[5]
1.0 mm height								
MPIA2510V3-R33-R	0.33	0.19	6.2	6.6	15	20	160	6855
MPIA2510V3-R47-R	0.47	0.27	4.4	6.0	19	25	120	5877
MPIA2510V3-R68-R	0.68	0.38	3.1	4.3	37	44	90	5050
MPIA2510V3-1R0-R	1.0	0.56	3.6	4.3	41	52	85	5138
MPIA2510V3-1R5-R	1.5	0.84	2.5	2.5	65	85	58	2753
MPIA2510V3-2R2-R	2.2	1.24	2.1	2.8	88	110	58	3245
MPIA2510V3-3R3-R	3.3	1.85	1.6	2.1	140	170	39	2313
MPIA2510V3-4R7-R	4.7	2.64	1.55	1.8	220	262	30	1820
1.2 mm height								
MPIA2512V3-R33-R	0.33	0.19	5.1	7.5	14	19	158	7025
MPIA2512V3-R47-R	0.47	0.27	6.0	6.7	17	23	120	6102
MPIA2512V3-R68-R	0.68	0.38	5.0	6.0	29	35	105	5085
MPIA2512V3-1R0-R	1.0	0.56	4.1	4.4	36	44	75	4582
MPIA2512V3-1R5-R	1.5	0.84	3.3	3.2	64	77	55	2803
MPIA2512V3-2R2-R	2.2	1.24	2.8	3.5	73	87	48	3388
MPIA2512V3-3R3-R	3.3	1.85	1.8	2.8	110	135	35	2354
MPIA2512V3-4R7-R	4.7	2.63	1.4	1.9	196	235	29	1890

1. Open circuit inductance (OCL) test parameters: 1.0 MHz, 0.10 Vrms, 0.0 Adc, +25 °C
2. Full load inductance (FLL) test parameters: 1.0 MHz, 0.10 Vrms, Isat, , +25 °C
3. Irms: 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.
4. Isat: Peak current for approximately 30% rolloff @ +25 °C
5. 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).
6. Part Number Definition: MPIA25xxV3-xxx-R
   MPIA25= Product code
   xx= Height indicator
   V3=Version indicator
   xxx= Inductance value in µH, R= decimal point, if no R is present last digit indicates number of zeros
   -R = RoHS compliant

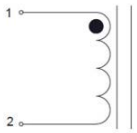
Dimensions- (mm)



Recommended pad layout



Schematic



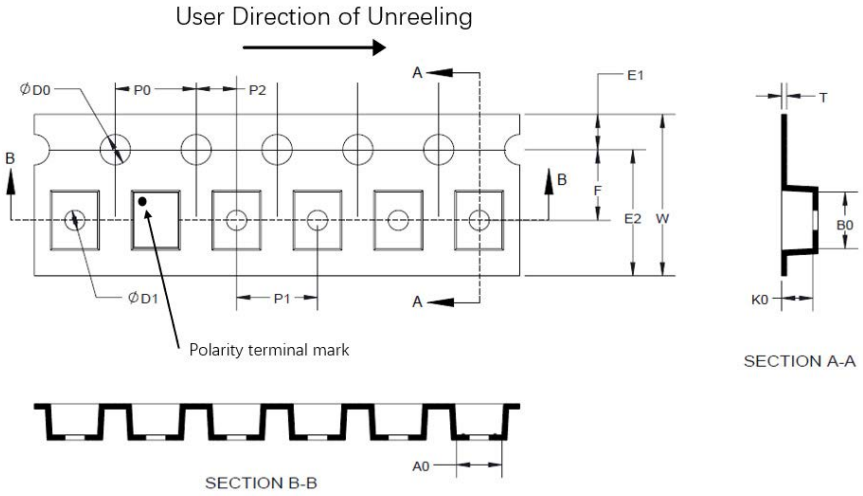
Part number	L	W	T	E
MPIA2510V3-R	2.5 ±0.2	2.0 ±0.2	1.05 maximum	0.7 typical
MPIA2512V3-R	2.5 ±0.2	2.0 ±0.2	1.25 maximum	0.7 typical

Part marking: Pin 1 indicator dot
All soldering surfaces to be coplanar within 0.1 millimeters
Tolerances are ±0.15 millimeters unless stated otherwise
Traces or vias underneath the inductor is not recommended

Packaging information (mm)

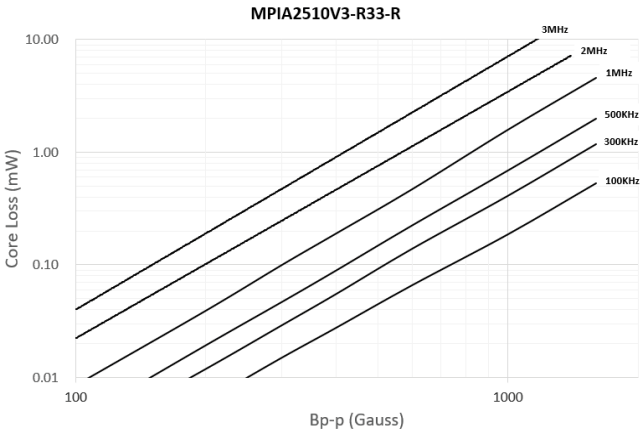
Drawing not to scale

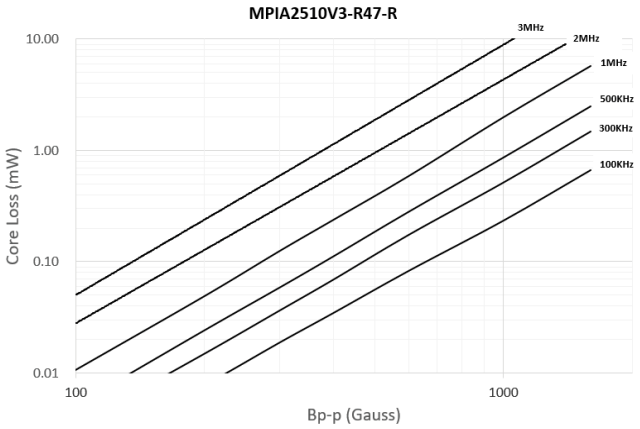
Supplied in tape and reel packaging, 3000 parts per 7" diameter reel

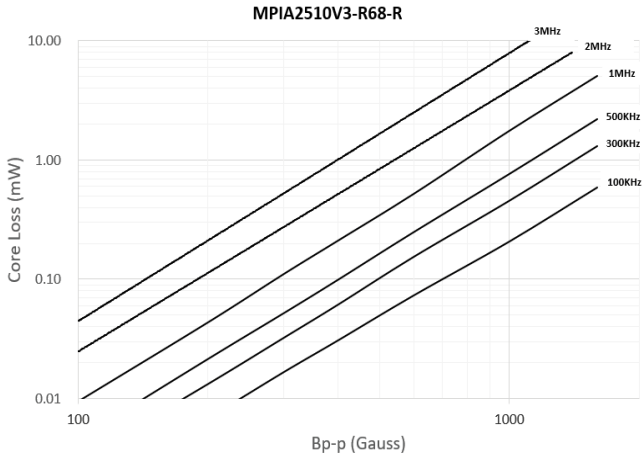


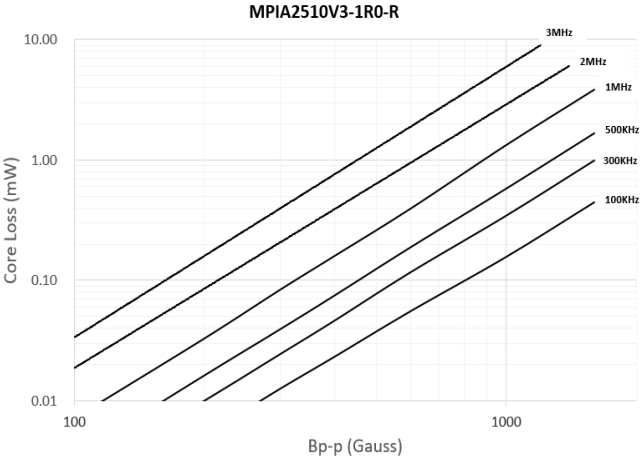
Dimension	Value
W ±0.30	8.0
F ±0.05	3.5
E1 ±0.10	1.75
E2 Min	6.25
P0 ±0.10	4.0
P1 ±0.10	4.0
P2 ±0.05	2.0
D0 +0.10/-0	1.5
D1 +0.10/-0	1.5
A0	2.25 ±0.05
B0	2.8 ±0.10
K0	1.35 ±0.10
T	0.25 ±0.05

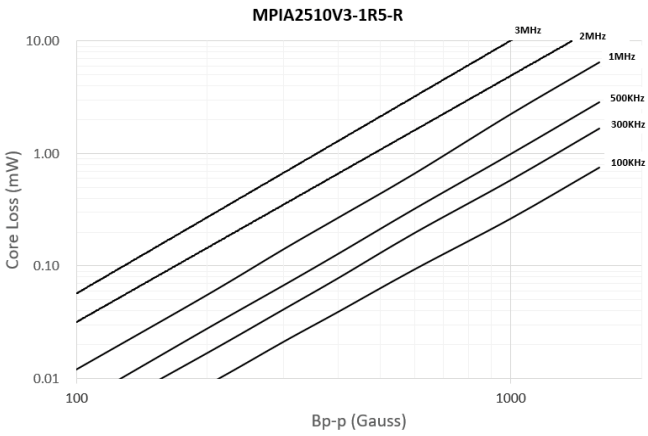
Core loss vs. Bp-p

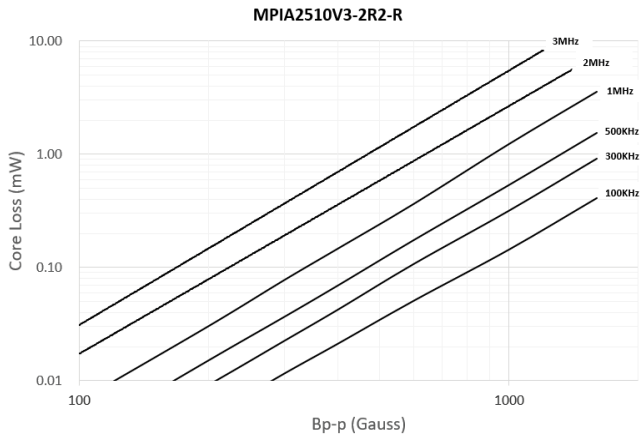




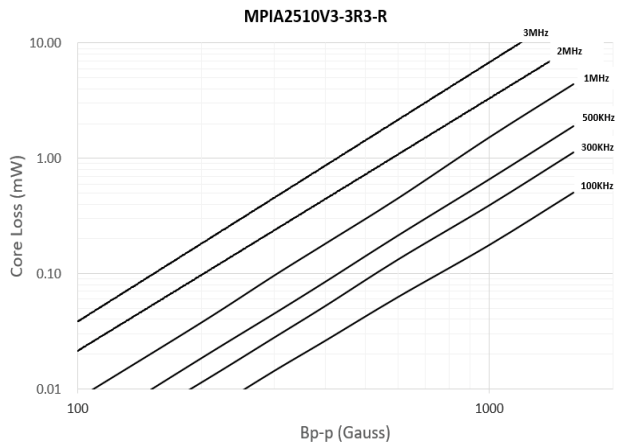


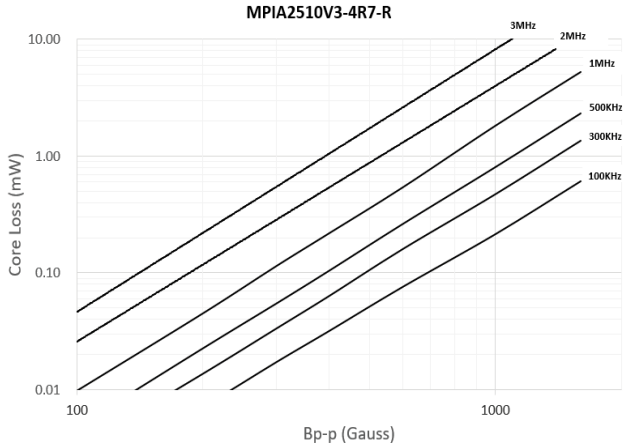


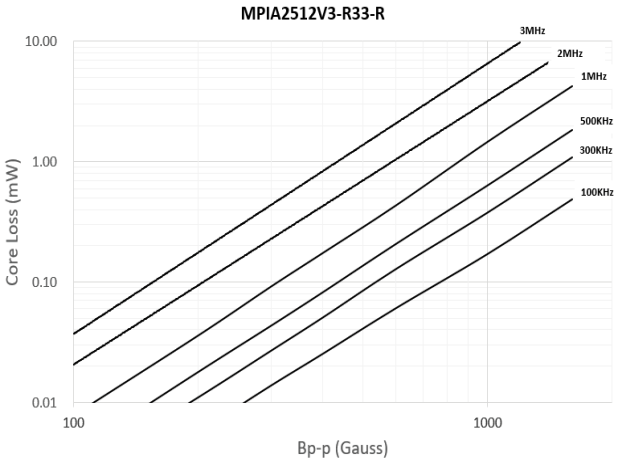


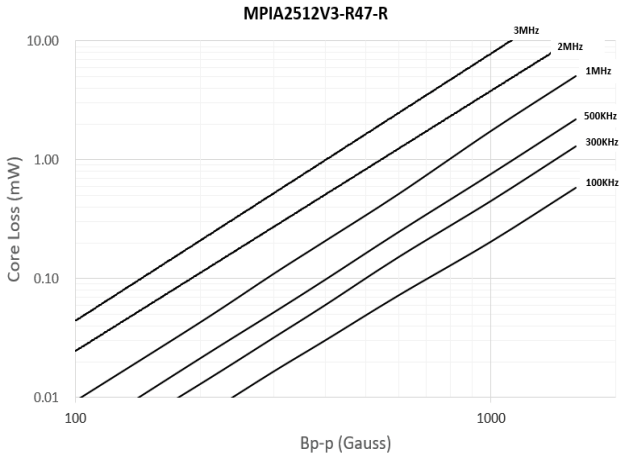


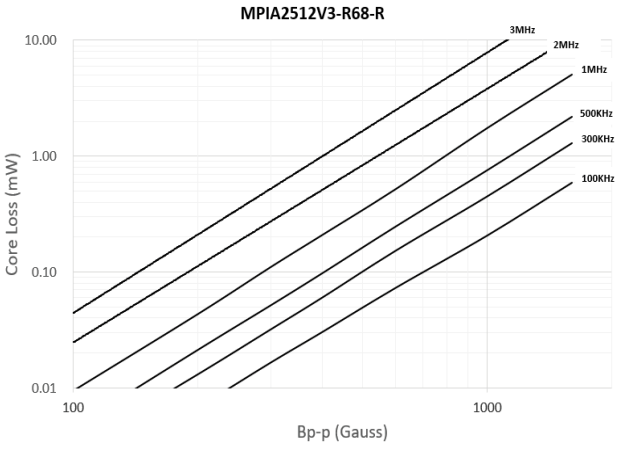
Core loss vs. Bp-p

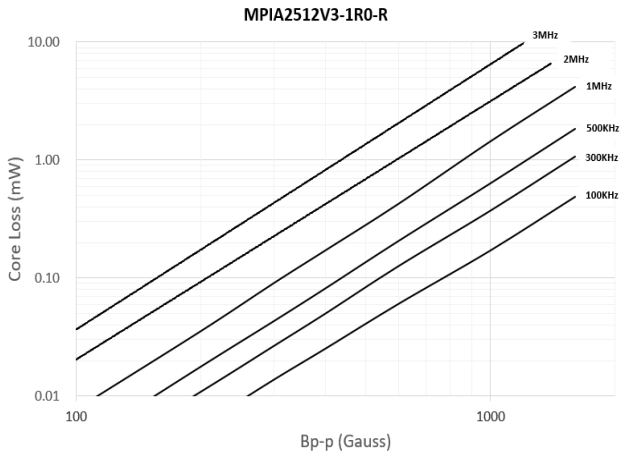




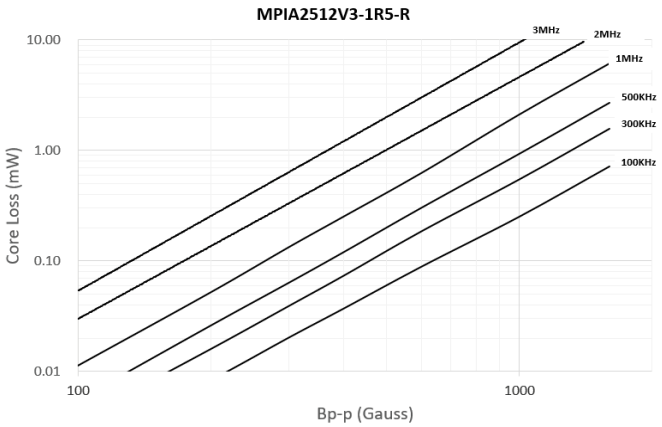


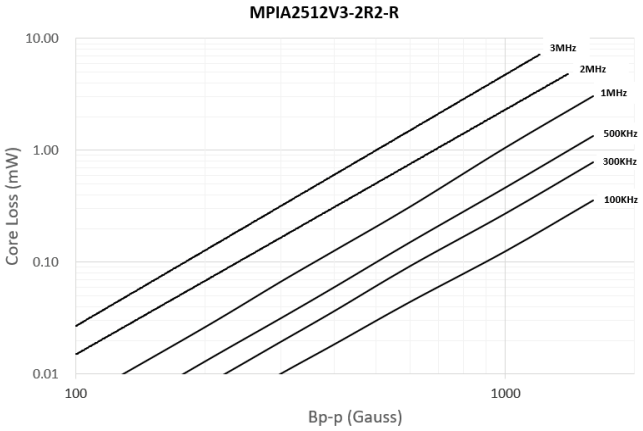


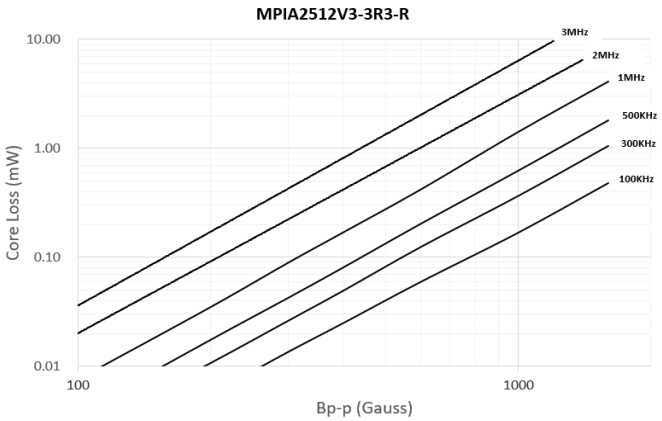


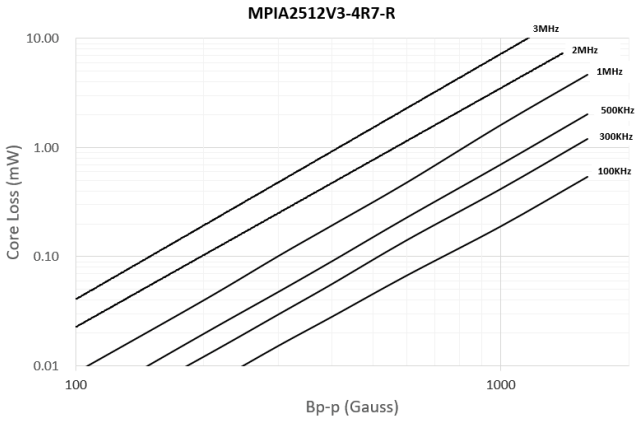


Core loss vs. Bp-p

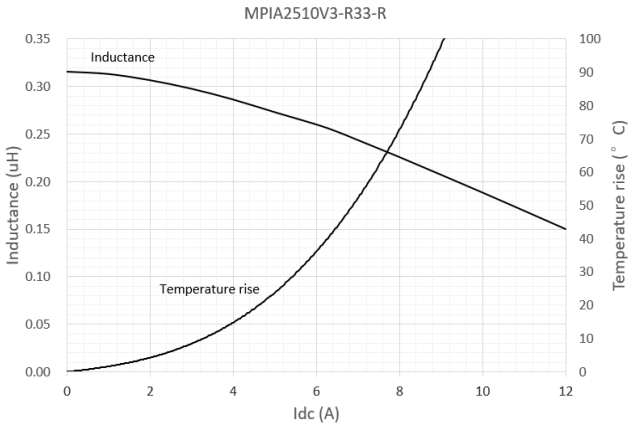


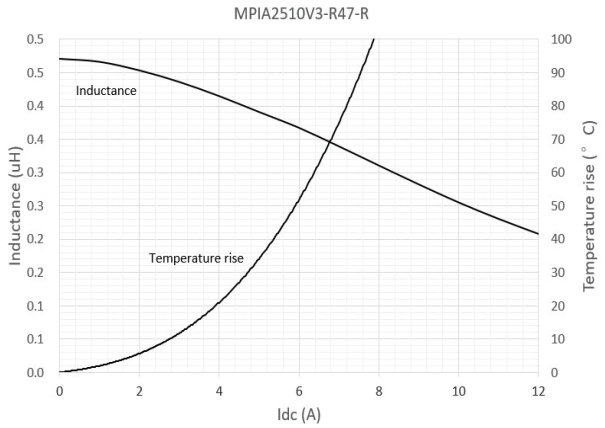


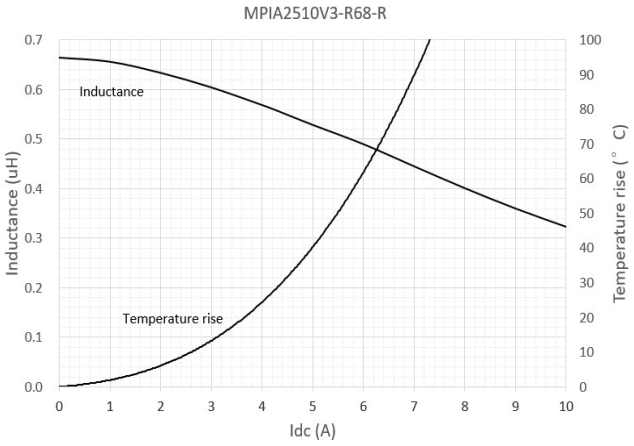


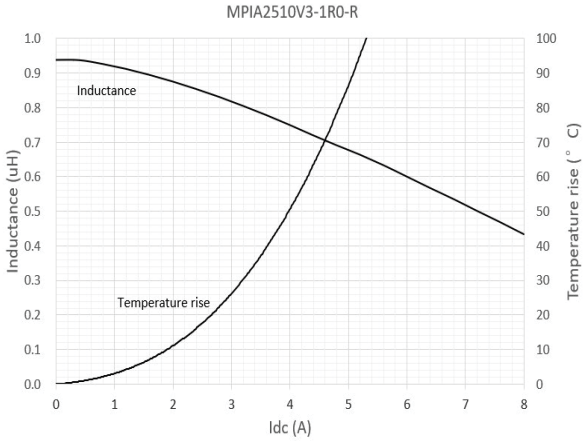


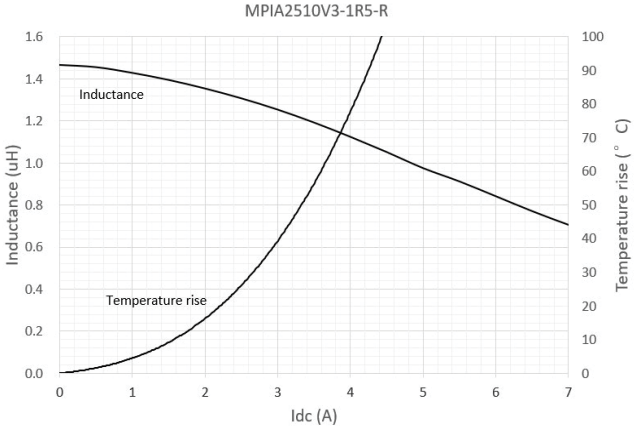
Inductance and temperature rise vs. Idc

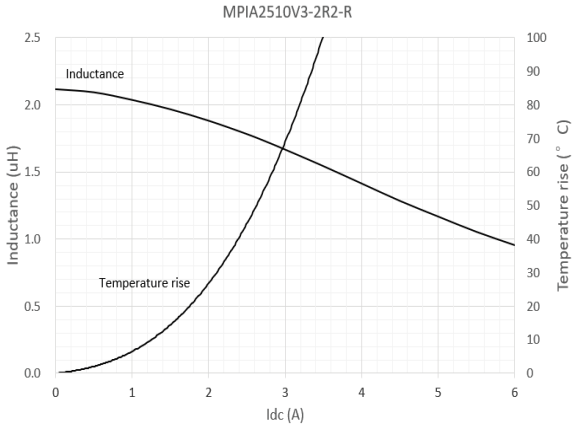




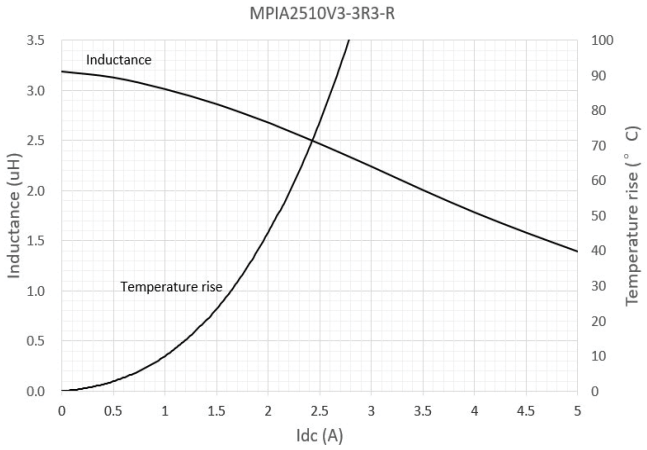


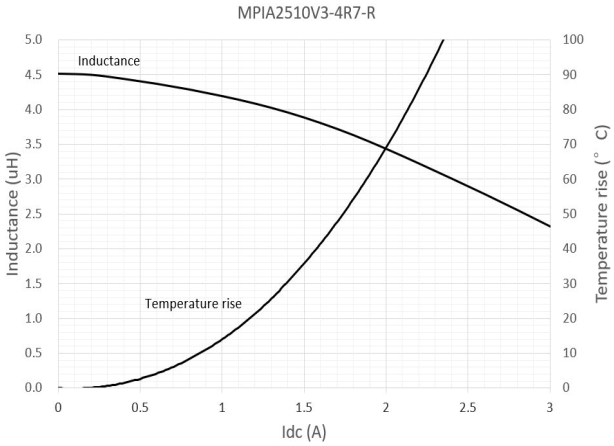


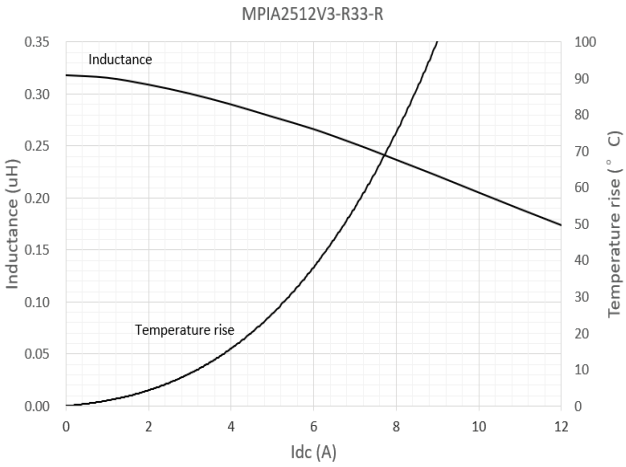


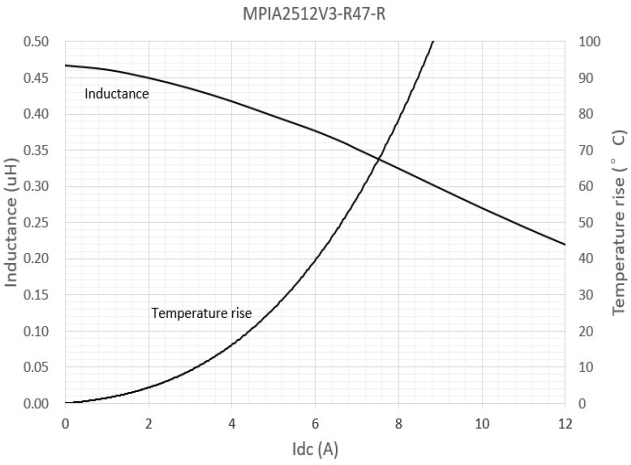


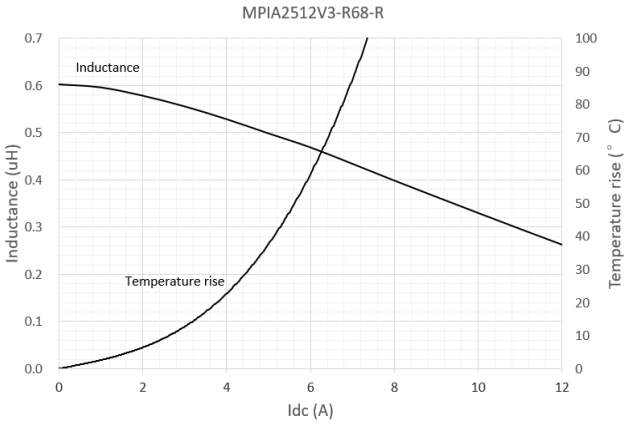
Inductance and temperature rise vs. Idc

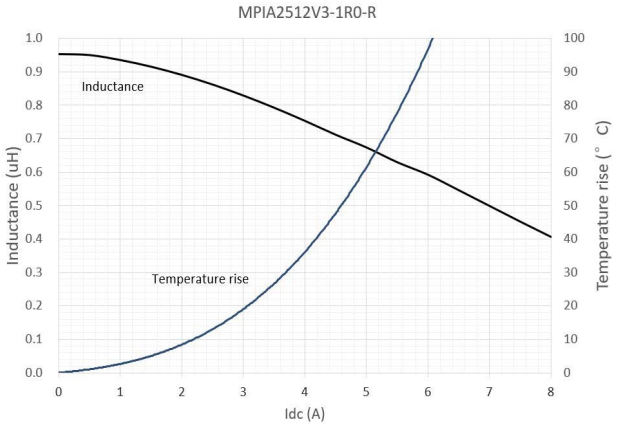




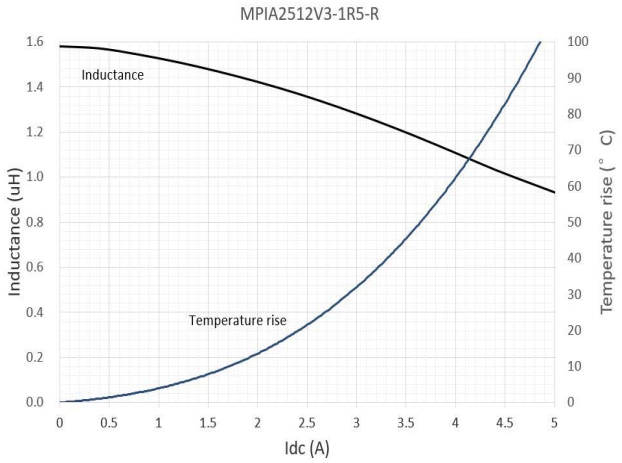


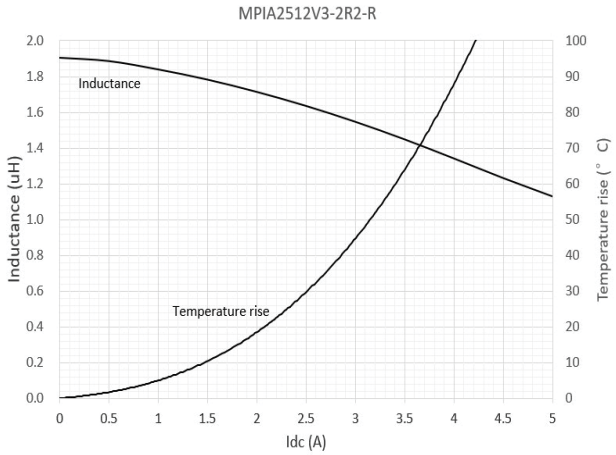


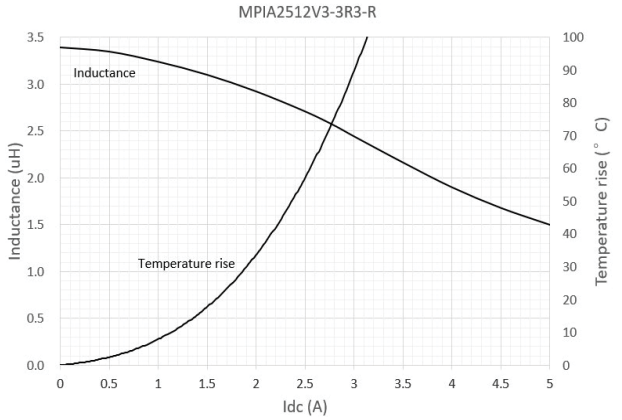


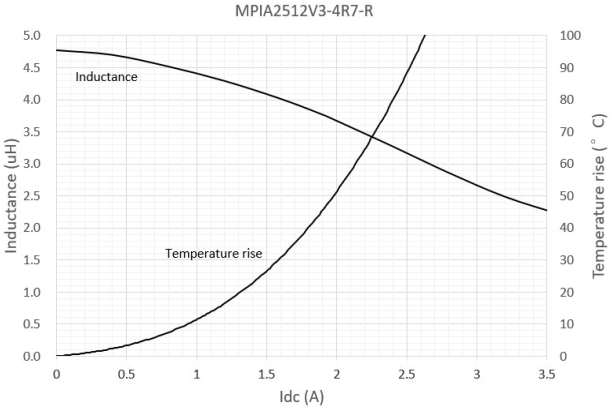


Inductance and temperature rise vs. Idc

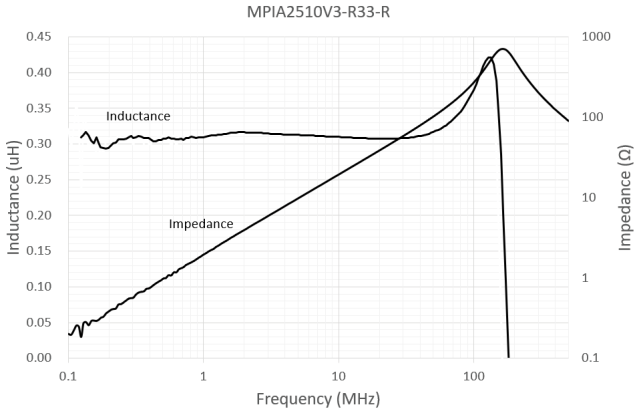


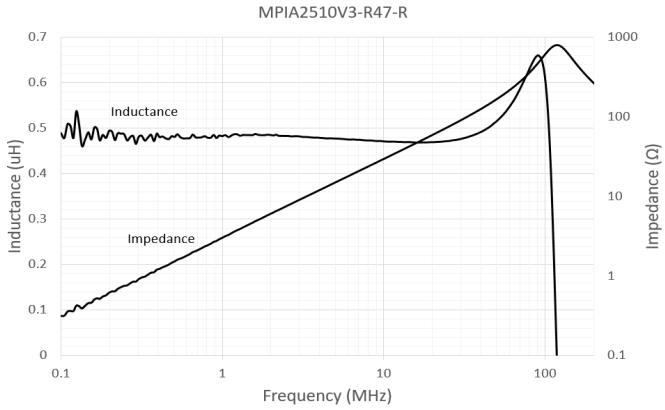


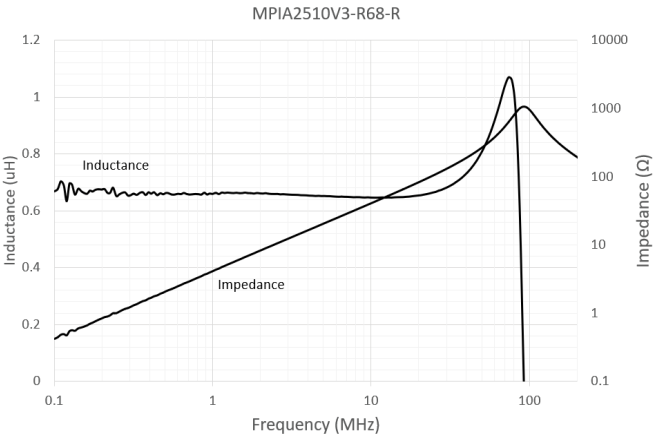


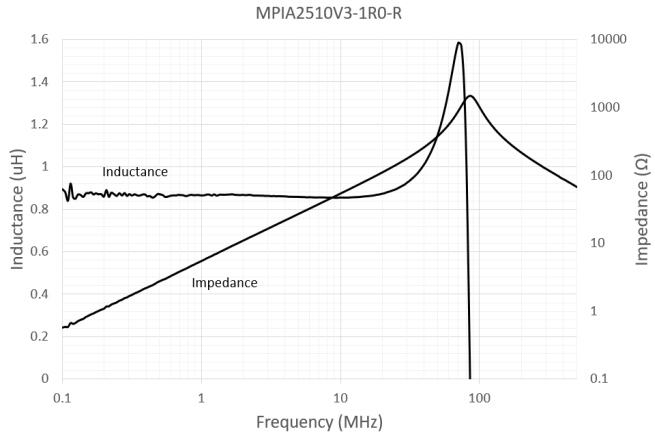


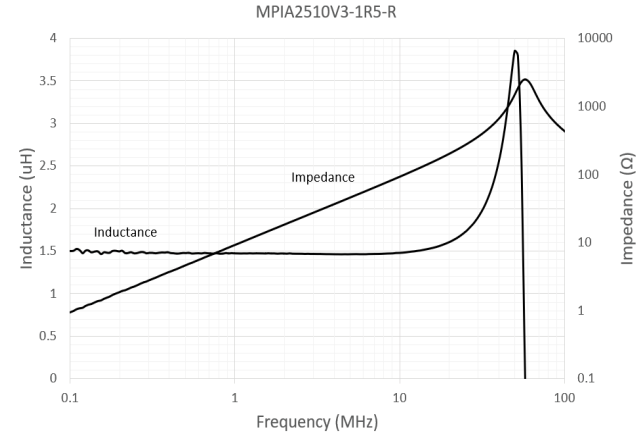
Inductance and impedance vs. frequency

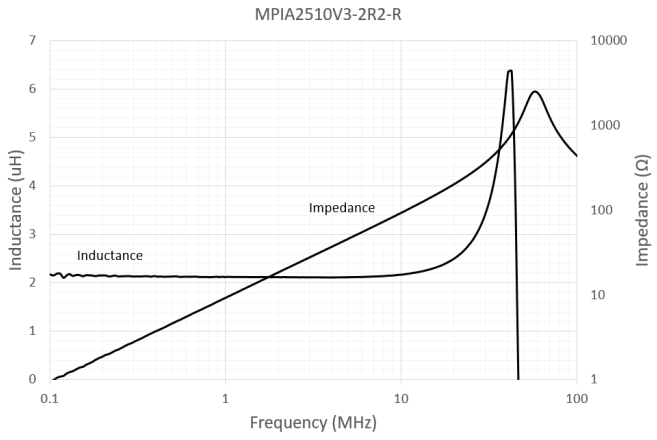




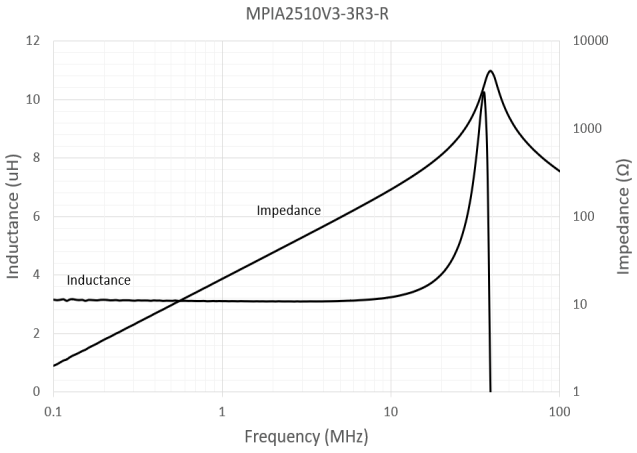


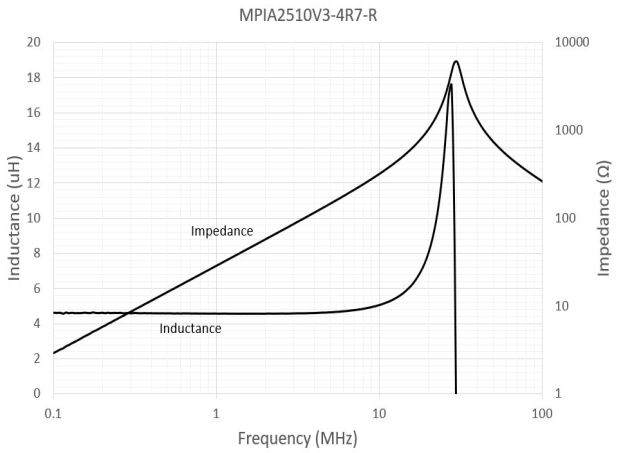


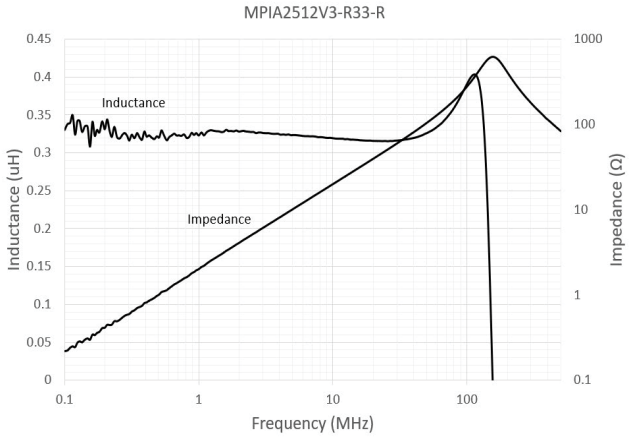


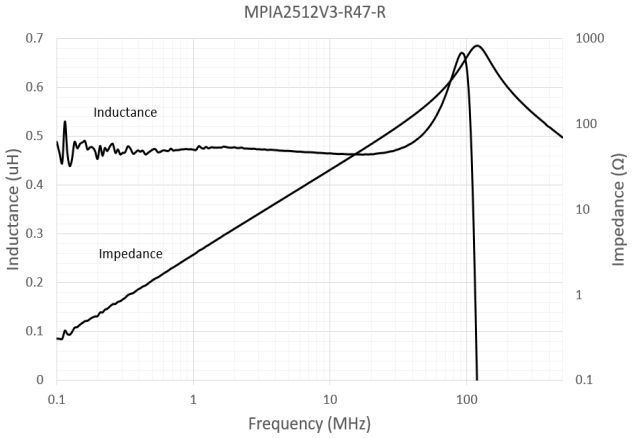


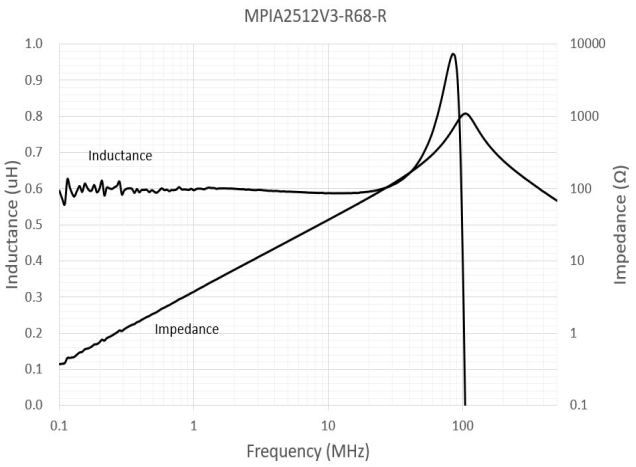
Inductance and impedance vs. frequency

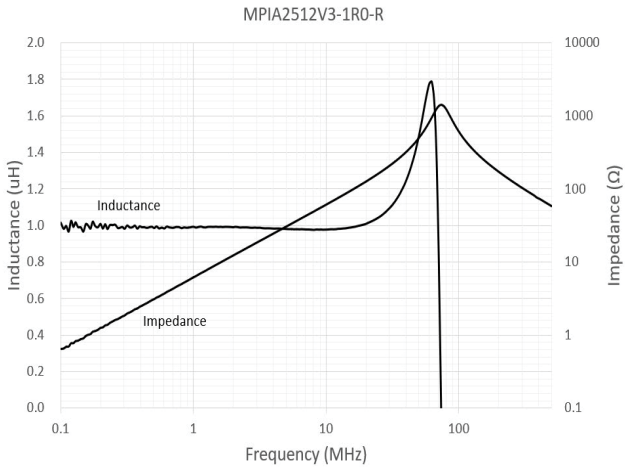




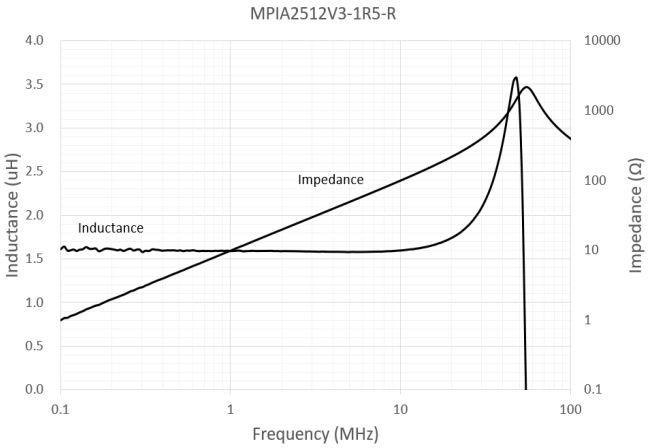


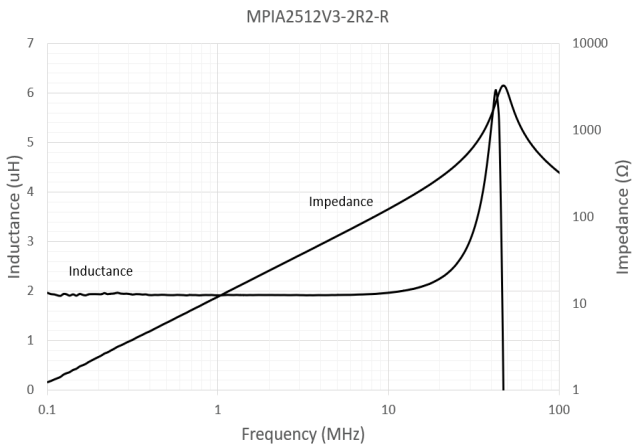


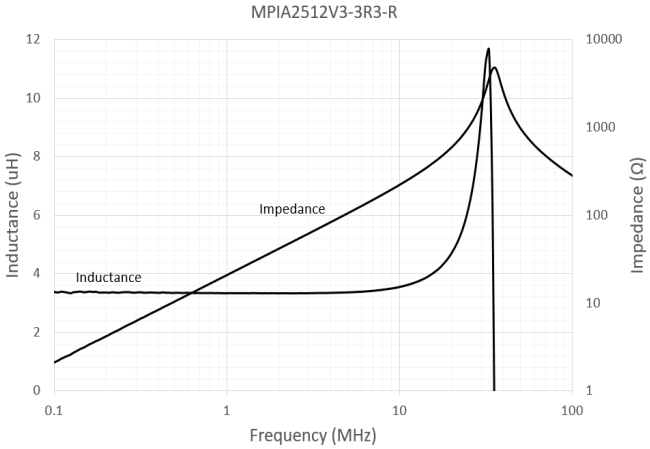


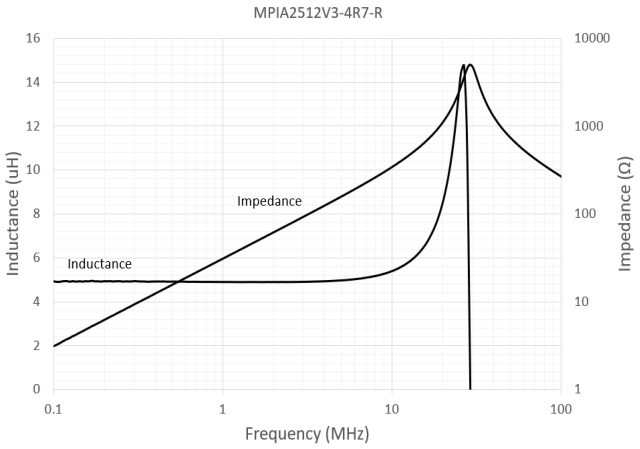


Inductance and impedance vs. frequency









Solder reflow profile

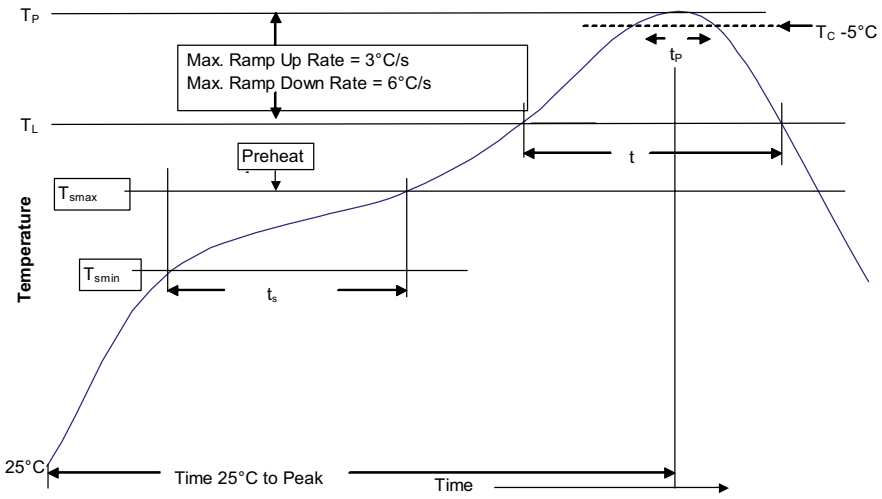


Table 1 - Standard SnPb solder (T_C)

Package thickness	Volume mm3 <350	Volume mm3 ≥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 mm³ <350	Volume mm³ 350 - 2000	Volume mm³ >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_{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
Ramp up rate T_L to T_p		3 °C/ second max.	3 °C/ second max.
Liquidous temperature (T_L) Time (t_L) maintained above 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*
Ramp-down rate (T_p to T_L)		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.

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

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