

MPIA25-V2

Automotive grade

High current, low profile, miniature power inductors



Product features

- AEC-Q200 qualified
- 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

- Body electronics
 - Central body control module
 - Vehicle access control system
 - Headlamps, tail lamps, 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
 - 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 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

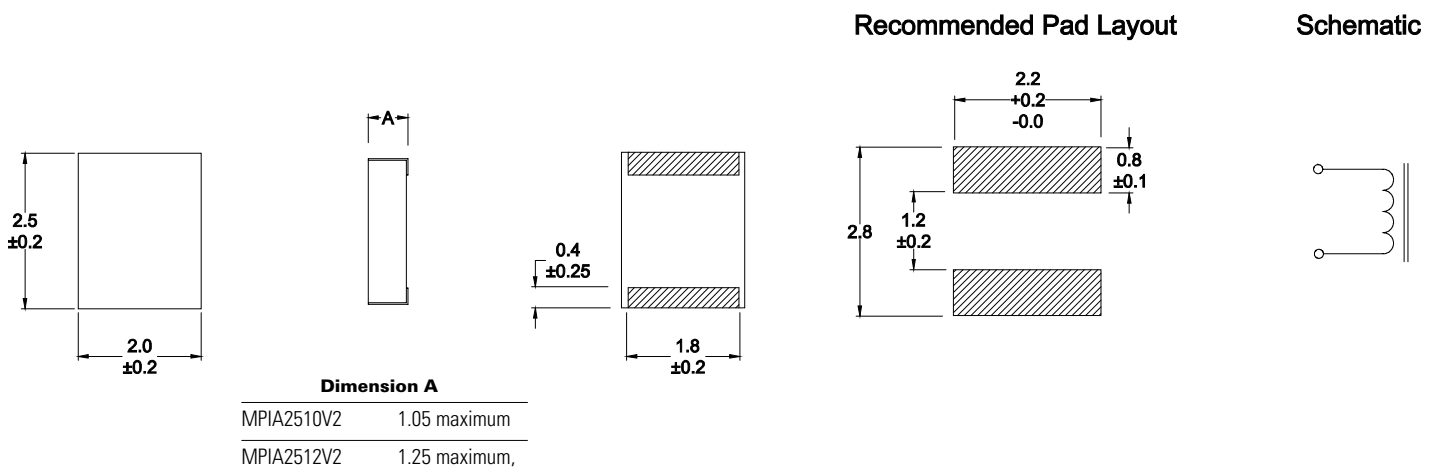
Product specifications

Part Number ⁵	OCL ¹ (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							
MPIA2510V2-R33-R	0.33	4.8	6.6	15	20	120	6336
MPIA2510V2-R47-R	0.47	4.4	6.0	19	25	100	5039
MPIA2510V2-R68-R	0.68	3.1	4.3	37	44	80	5733
MPIA2510V2-1R0-R	1.00	3.1	4.3	41	52	55	3372
MPIA2510V2-1R5-R	1.50	2.5	2.5	65	85	45	4695
MPIA2510V2-2R2-R	2.20	2.1	2.8	88	110	45	2873
MPIA2510V2-3R3-R	3.30	1.6	2.1	140	170	35	1893
MPIA2510V2-4R7-R	4.70	1.22	1.8	220	262	25	1616
1.2 mm height							
MPIA2512V2-R33-R	0.33	5.1	7.5	14	19	130	6560
MPIA2512V2-R47-R	0.47	4.9	6.7	17	23	100	3628
MPIA2512V2-R68-R	0.68	3.4	6.0	29	35	70	3633
MPIA2512V2-1R0-R	1.00	3.3	4.4	36	44	70	3083
MPIA2512V2-1R5-R	1.50	2.3	3.2	64	77	45	4850
MPIA2512V2-2R2-R	2.20	2.2	3.5	73	87	30	2924
MPIA2512V2-3R3-R	3.30	1.8	2.8	110	135	35	1965
MPIA2512V2-4R7-R	4.70	1.4	1.9	196	235	25	1580

1. Open Circuit Inductance (OCL) Test Parameters: 1.0 MHz, 0.1 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: MPIA25xxV2-xxx-R
MPIA25 = 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)



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

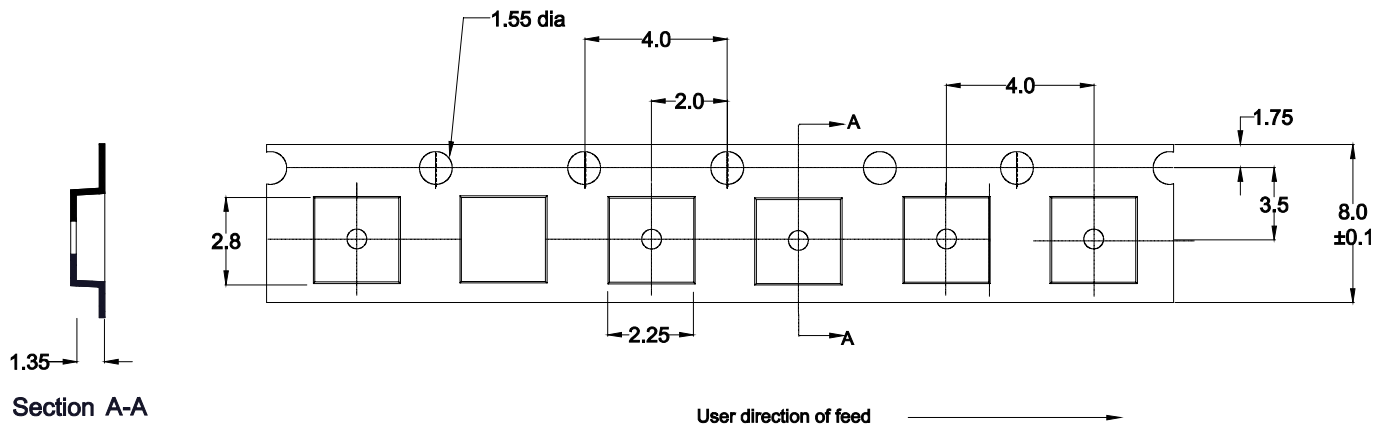
Do not route traces or vias underneath the inductor

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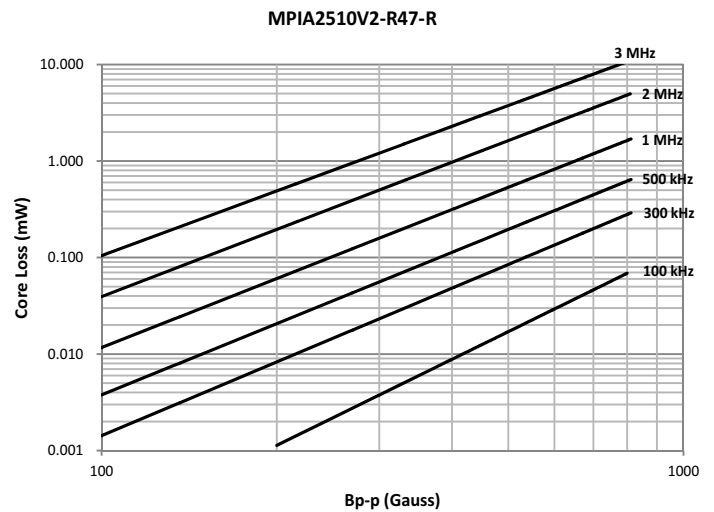
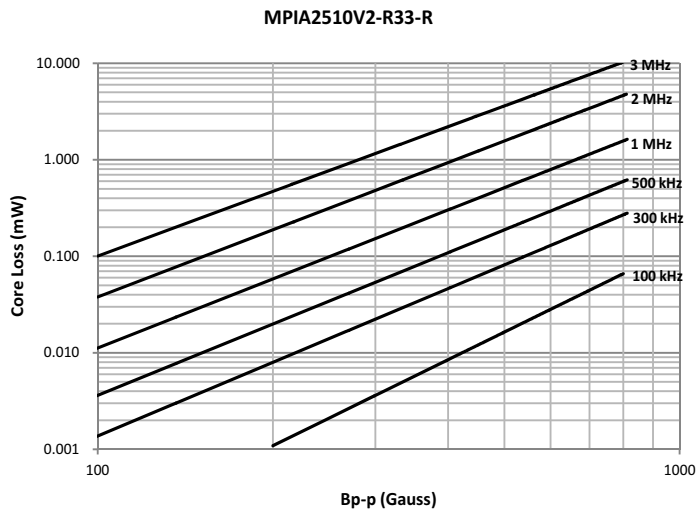
Technical Data 10650
 Effective July 2018

Packaging information (mm)

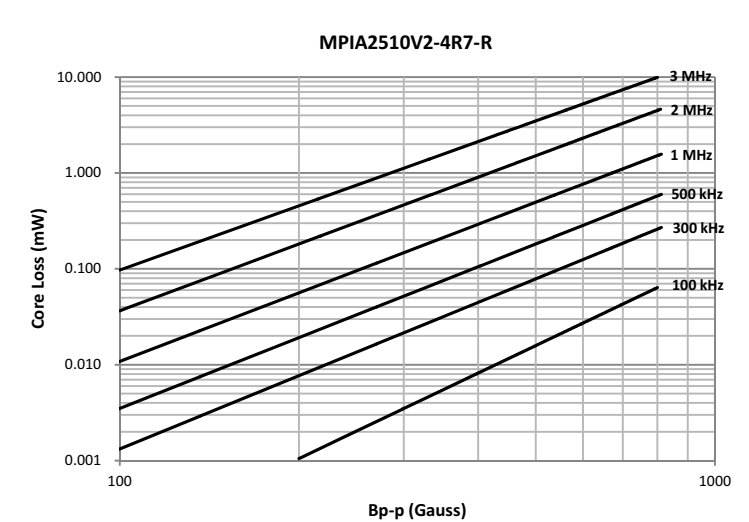
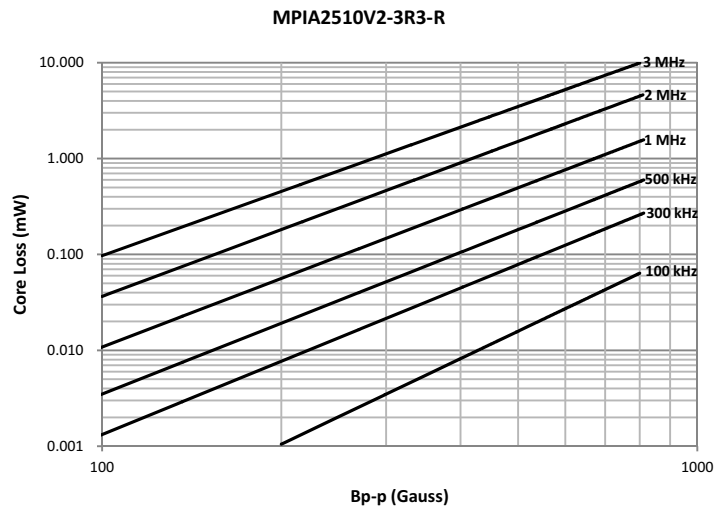
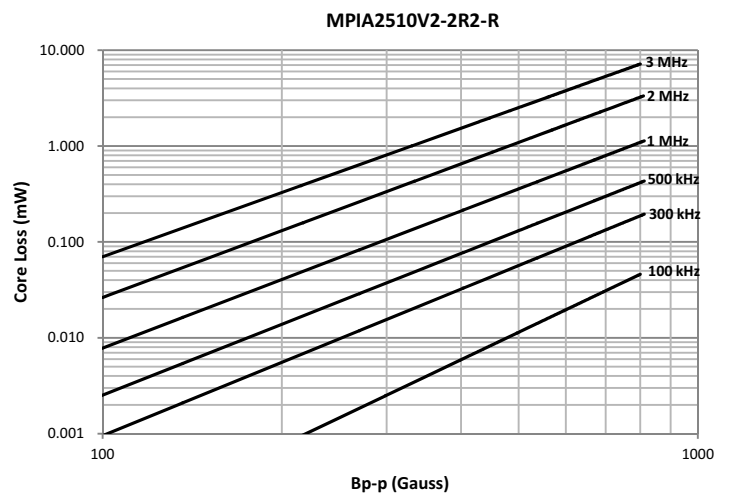
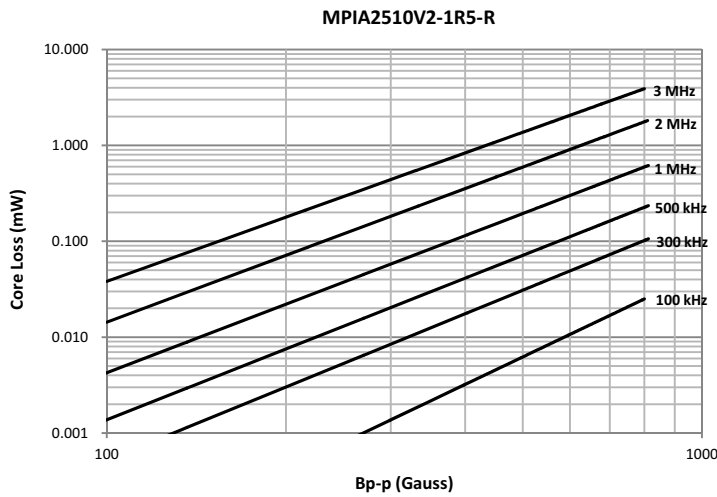
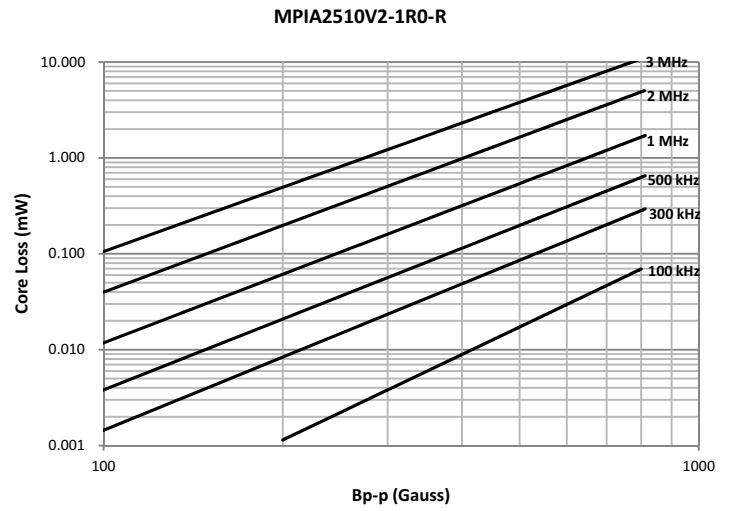
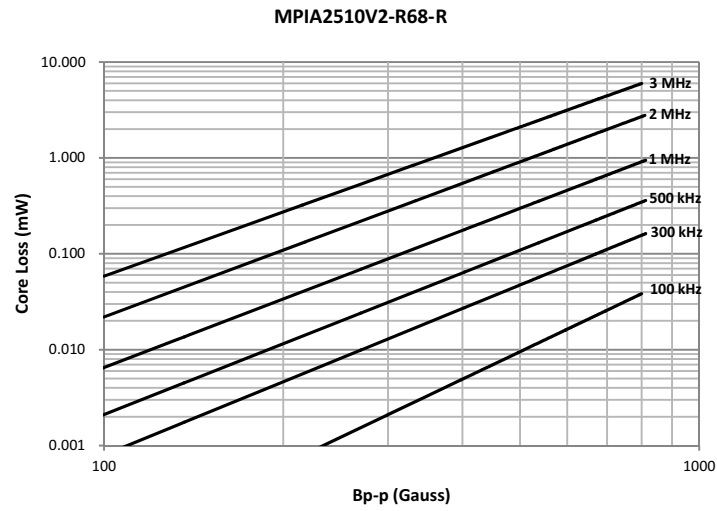
Supplied in tape and reel packaging, 3000 parts per 7" diameter reel



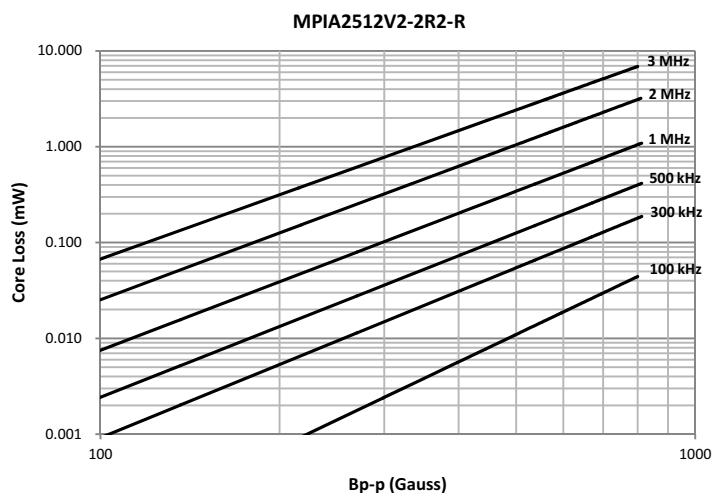
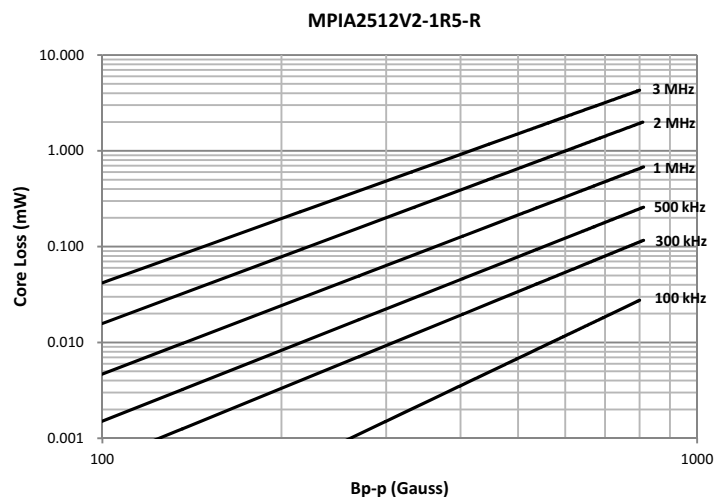
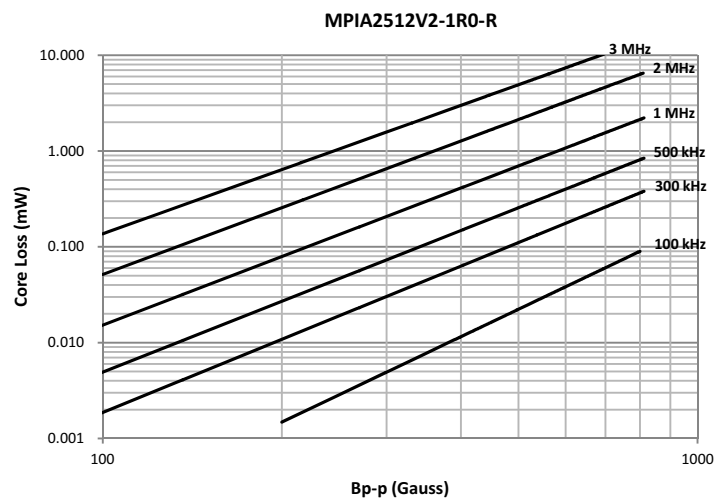
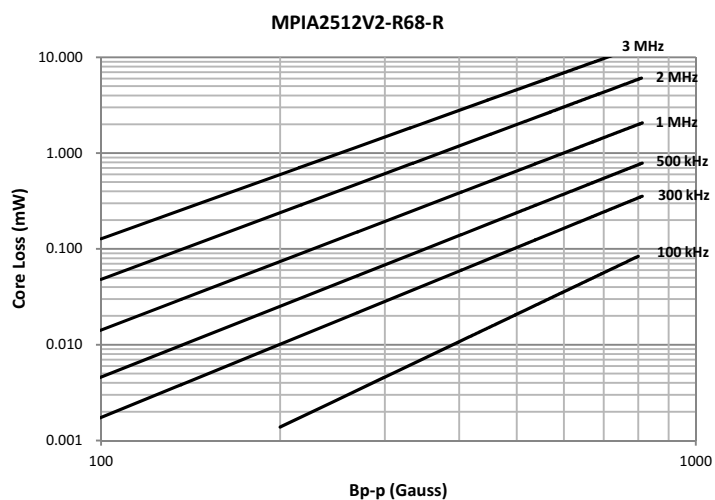
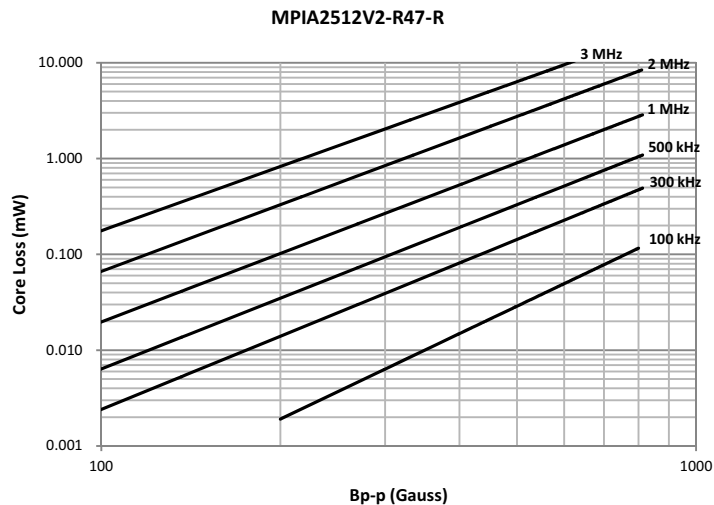
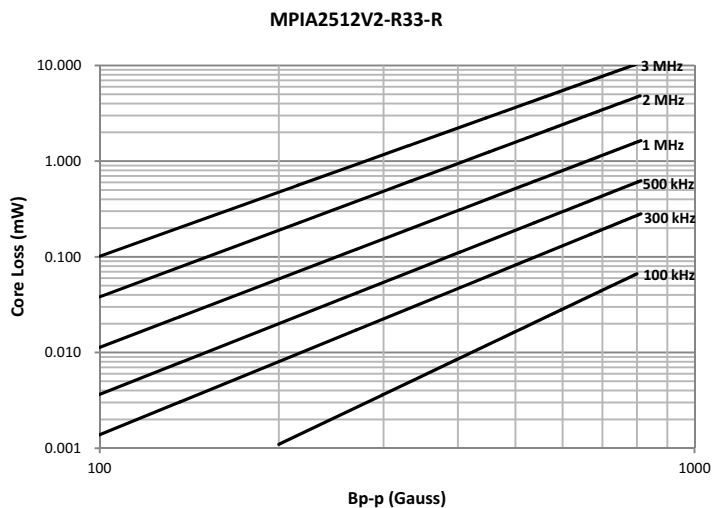
Core loss vs. Bp-p (+25 °C)



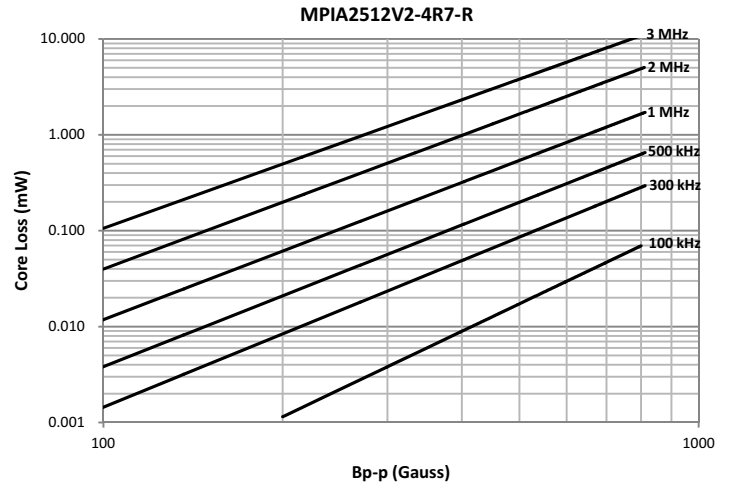
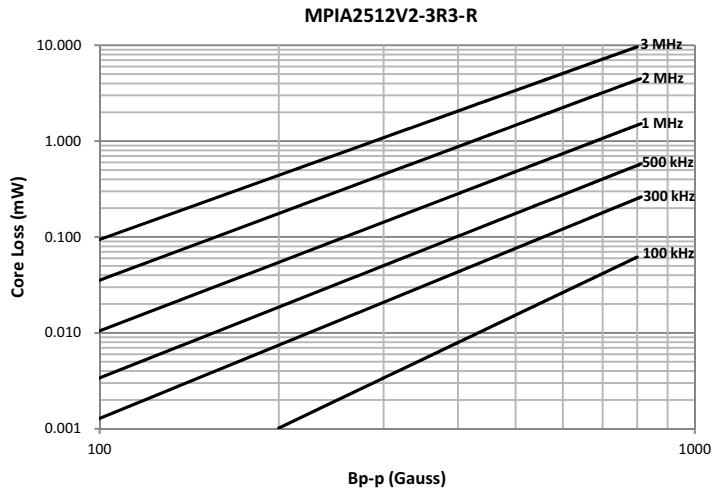
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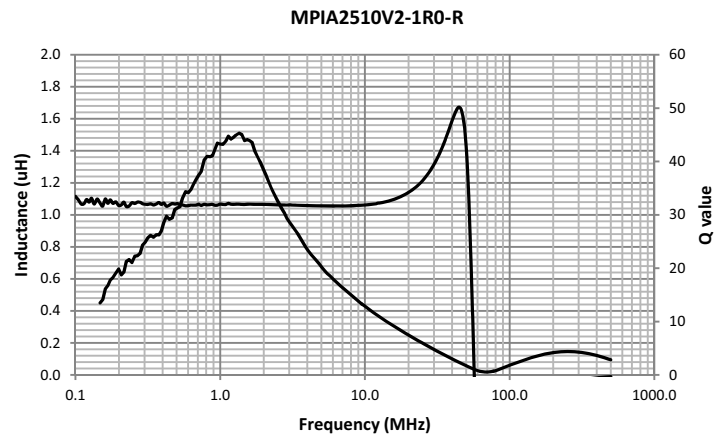
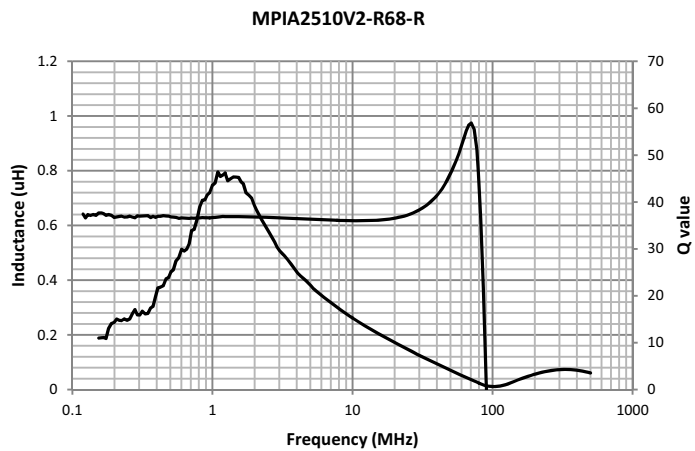
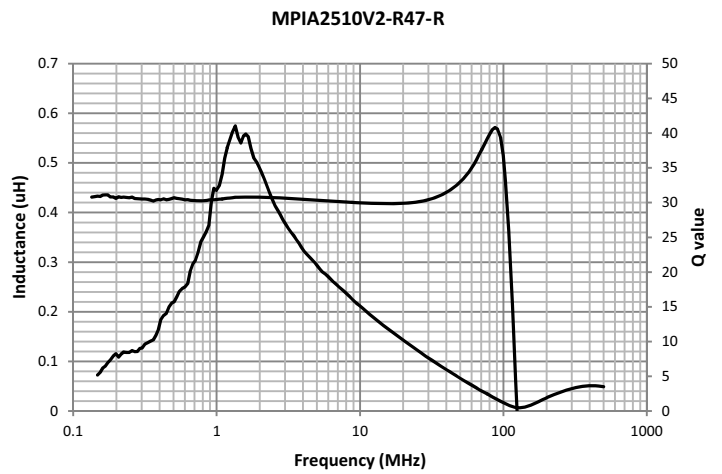
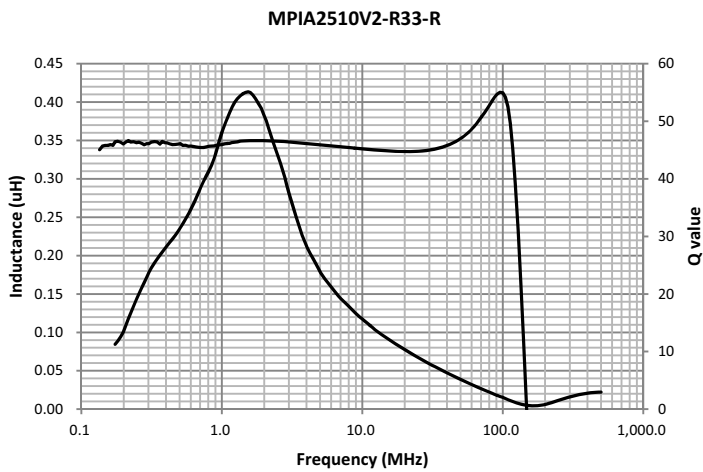
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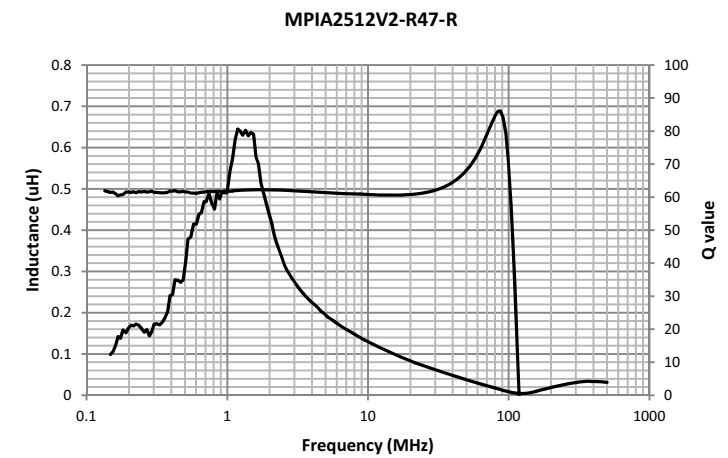
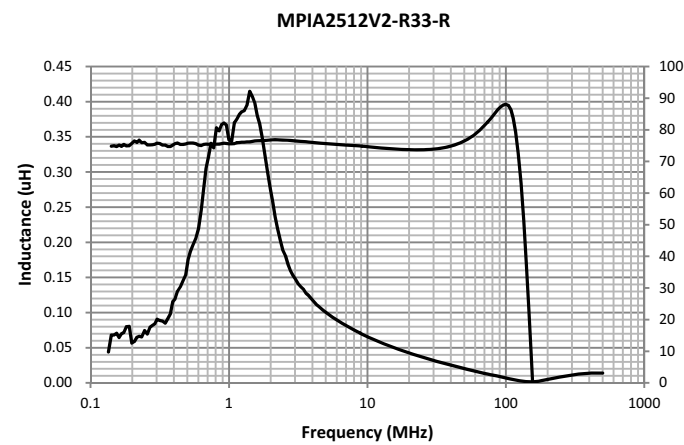
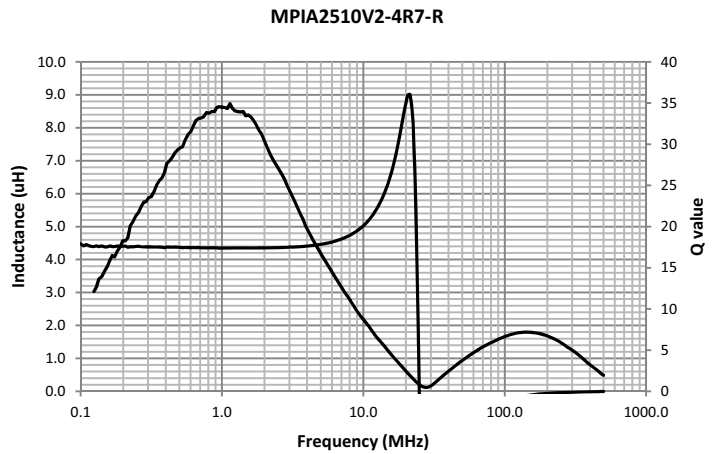
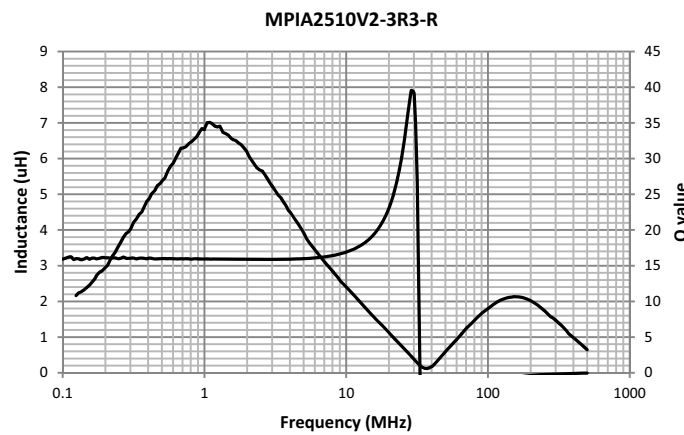
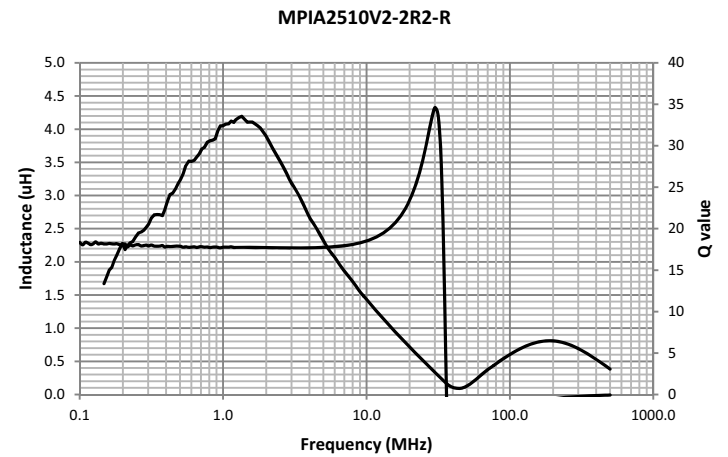
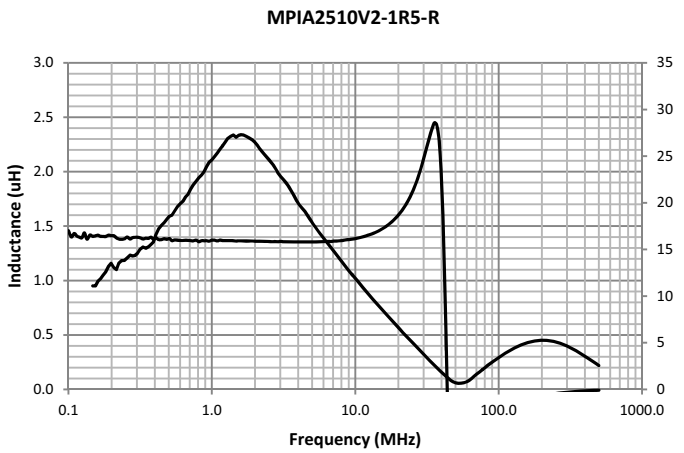
Core loss vs. Bp-p (+25 °C)



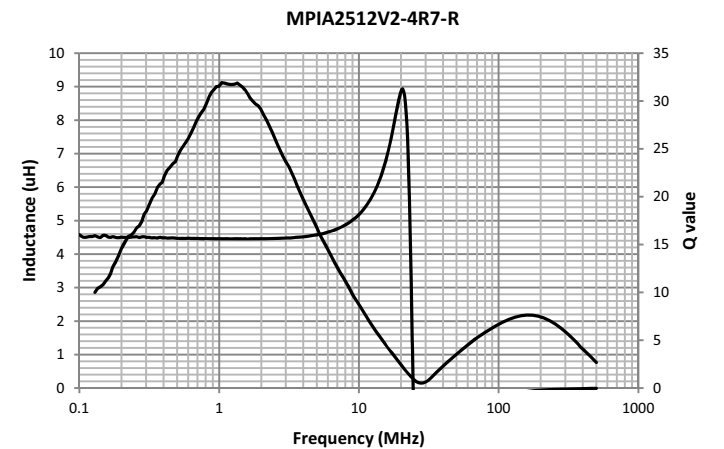
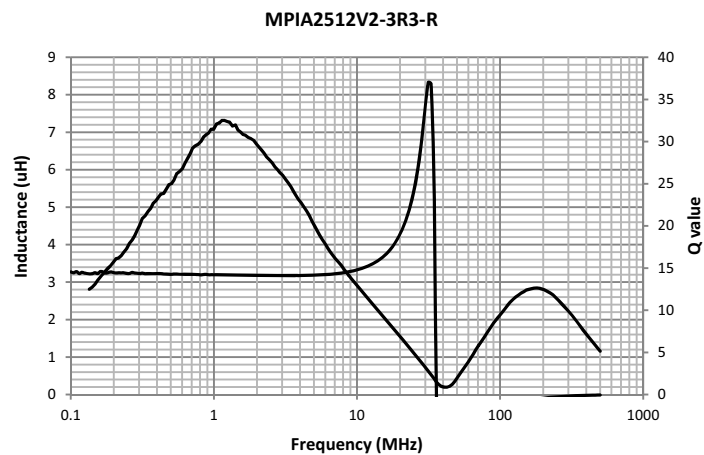
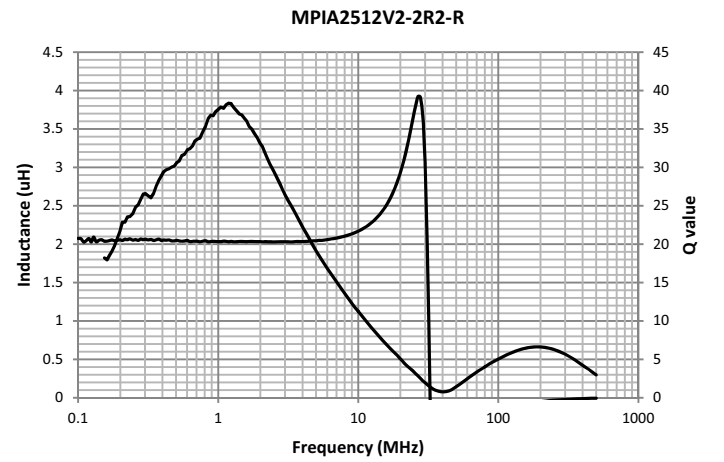
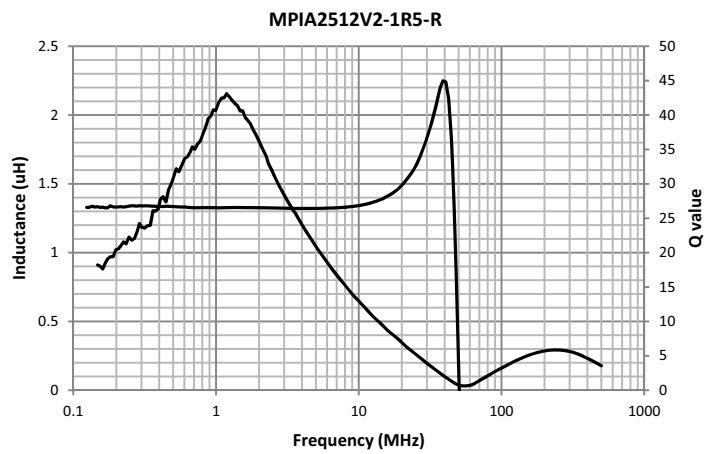
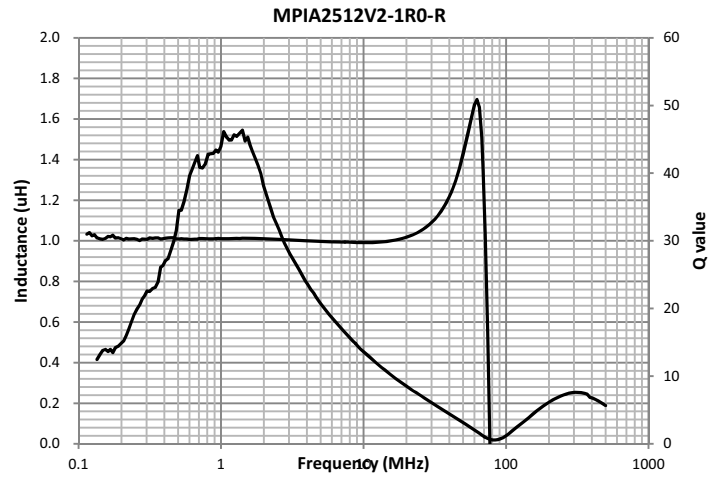
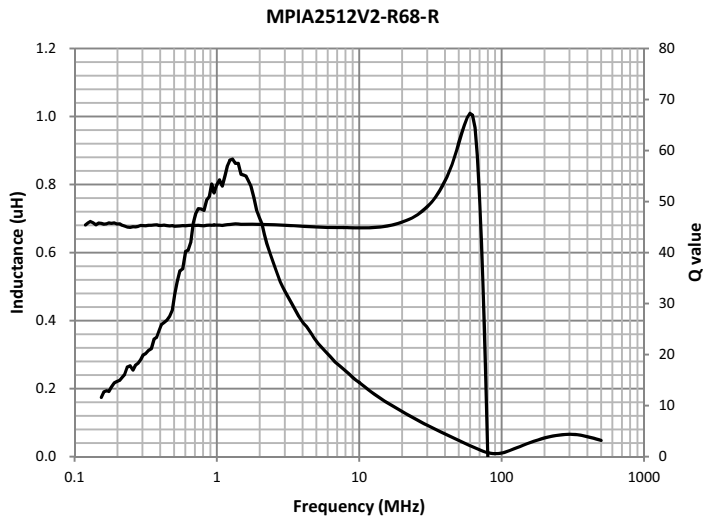
Inductance and Q vs. Frequency



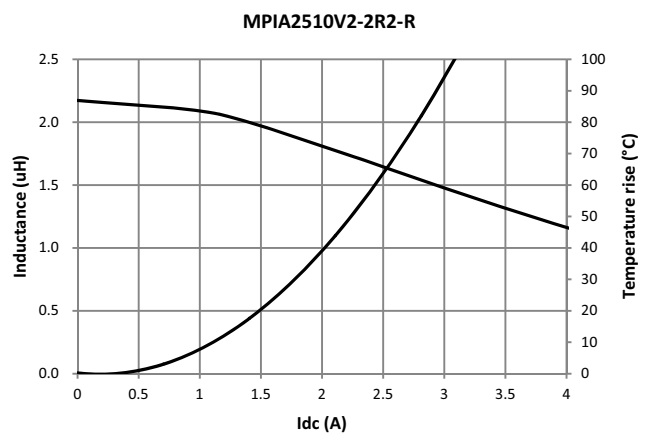
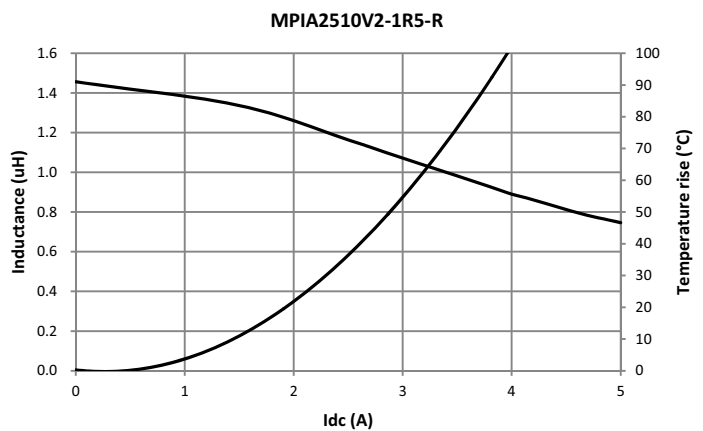
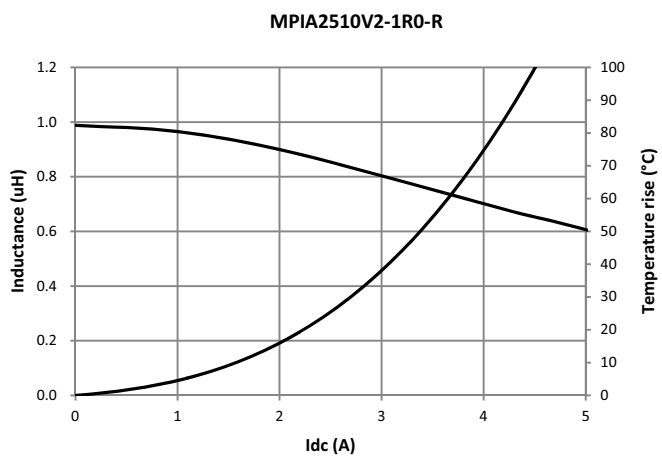
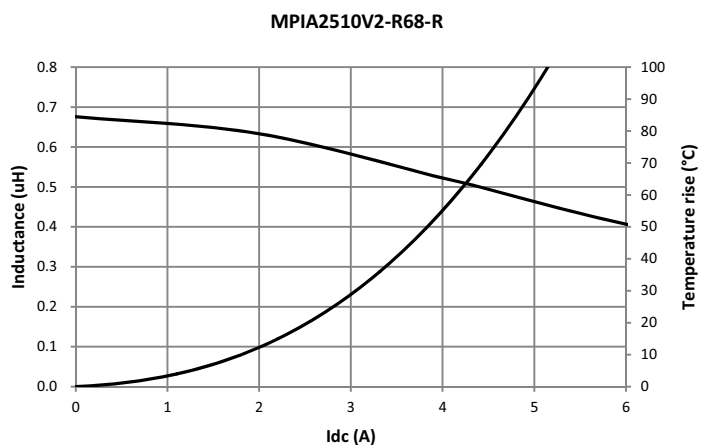
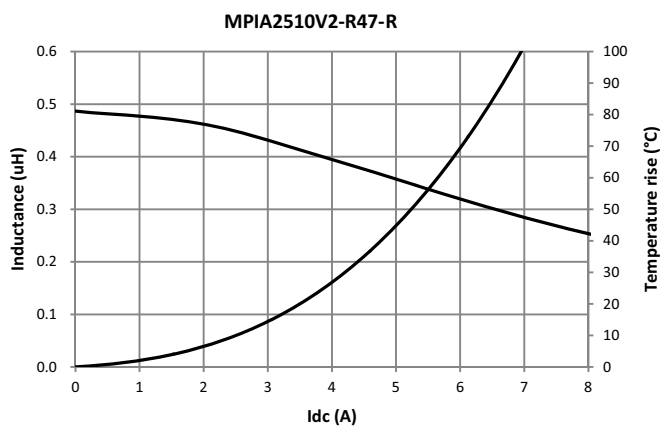
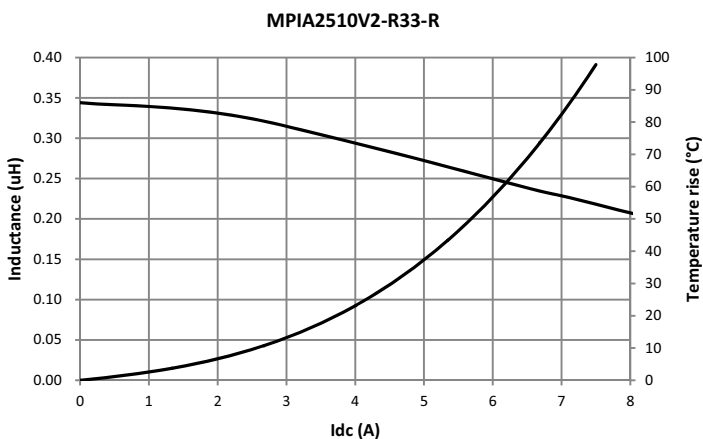
Inductance and Q vs. Frequency



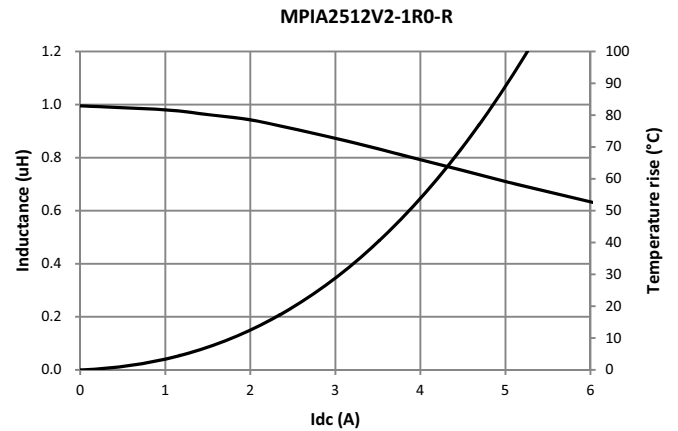
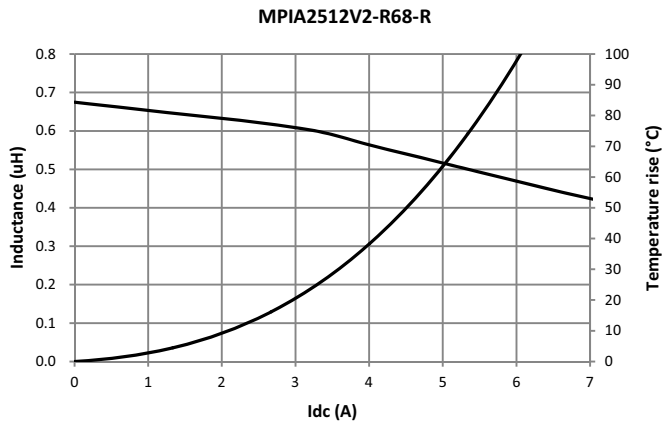
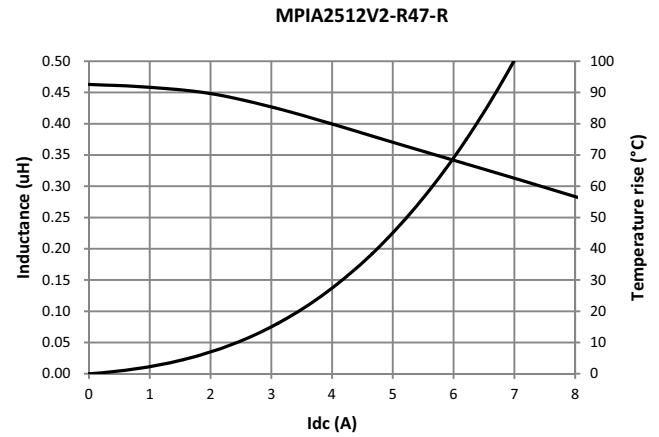
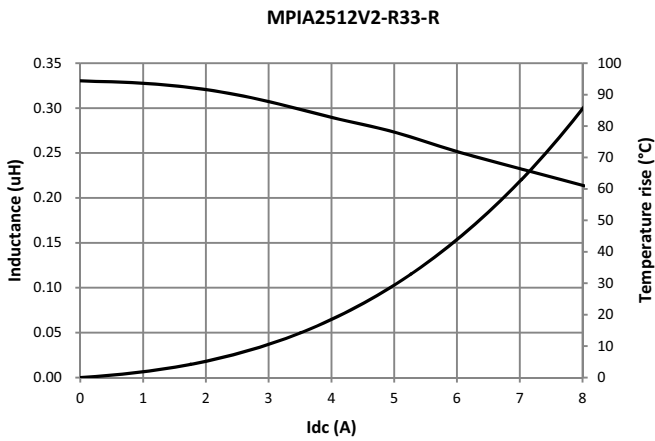
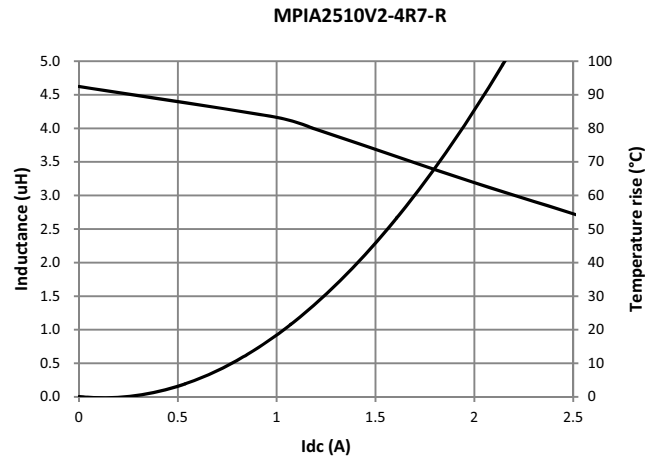
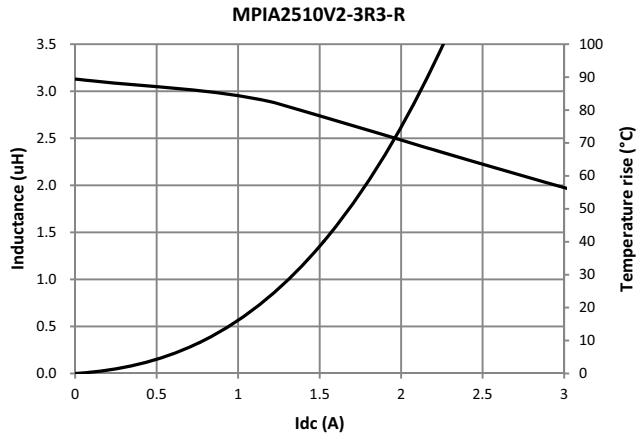
Inductance and Q vs. Frequency



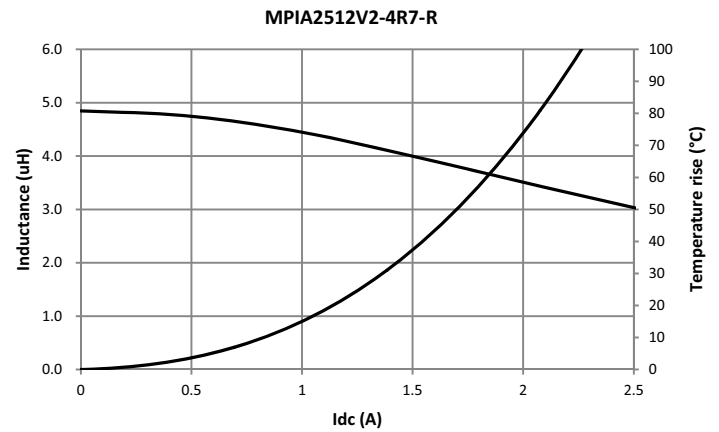
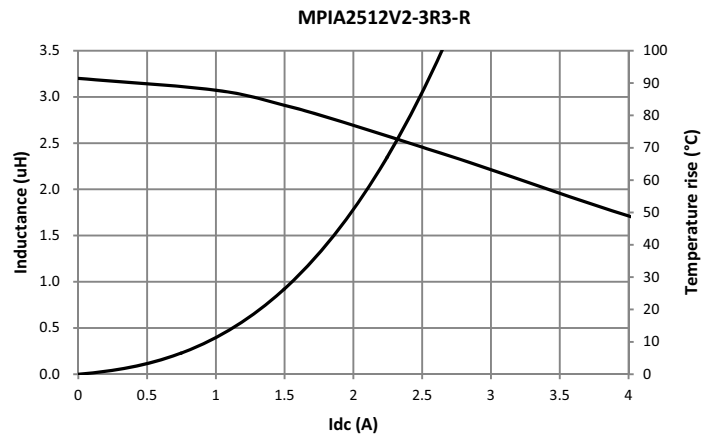
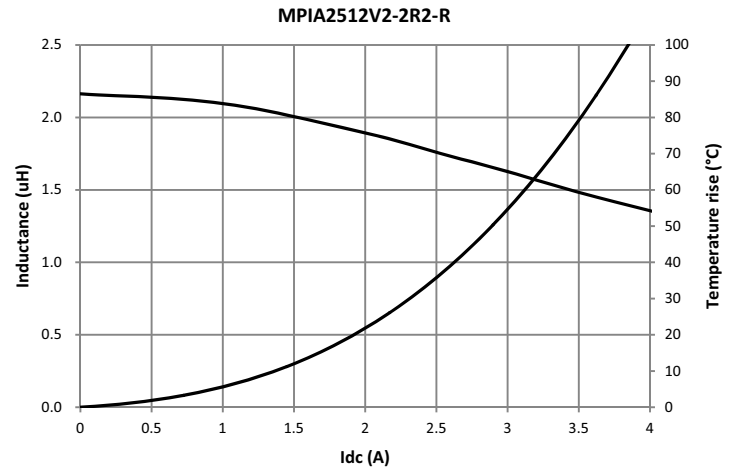
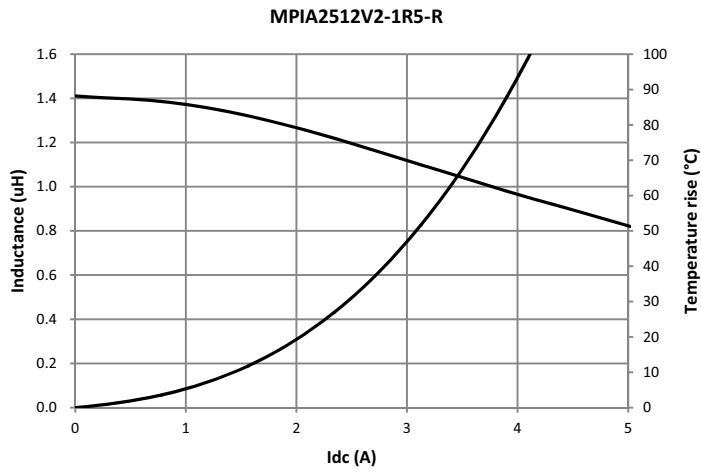
Inductance and temperature rise vs. Current



Inductance and temperature rise vs. Current



Inductance and temperature rise vs. Current



Solder reflow profile

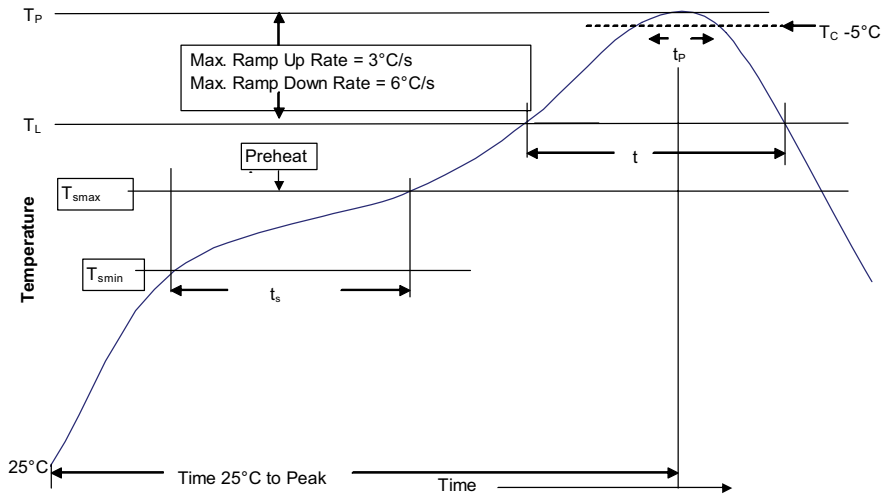


Table 1 - Standard SnPb Solder (T_C)

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.

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

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Printed in USA
Publication No. 10650 BU-MC18046
July 2018