

# 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  $\mu$ H to 4.7  $\mu$ 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

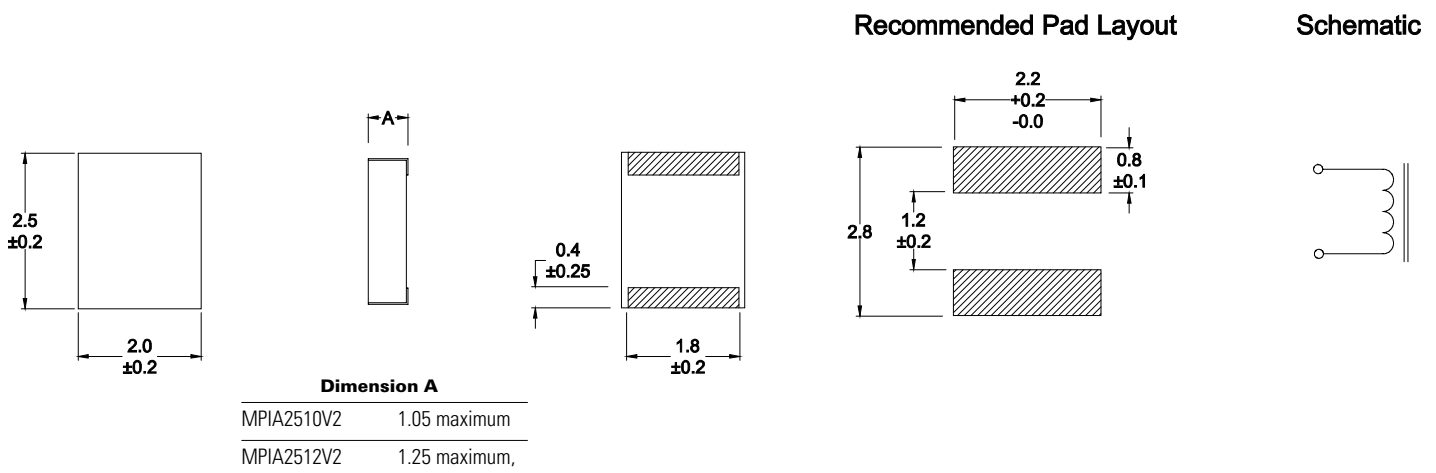


**Product specifications**

Part Number <sup>5</sup>	OCL <sup>1</sup> ( $\mu$ H) $\pm 20\%$	$I_{rms}^2$ (A)	$I_{sat}^3$ (A)	DCR (m $\Omega$ ) typical @ +20 °C	DCR (m $\Omega$ ) maximum @ +20 °C	SRF (MHz) typical	K-factor <sup>4</sup>
<b>1.0 mm height</b>							
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
<b>1.2 mm height</b>							
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

- 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 uH),  $\Delta I$  (Peak to peak ripple current in Amps).
- Part Number Definition: MPIA25xxV2-xxx-R  
 MPIA25 = Product code  
 xx= Height indicator  
 V2=Version indicator  
 xxx= inductance value in  $\mu$ H, R= decimal point, If no R is present then last character equals number of zeros  
 -R suffix = RoHS compliant

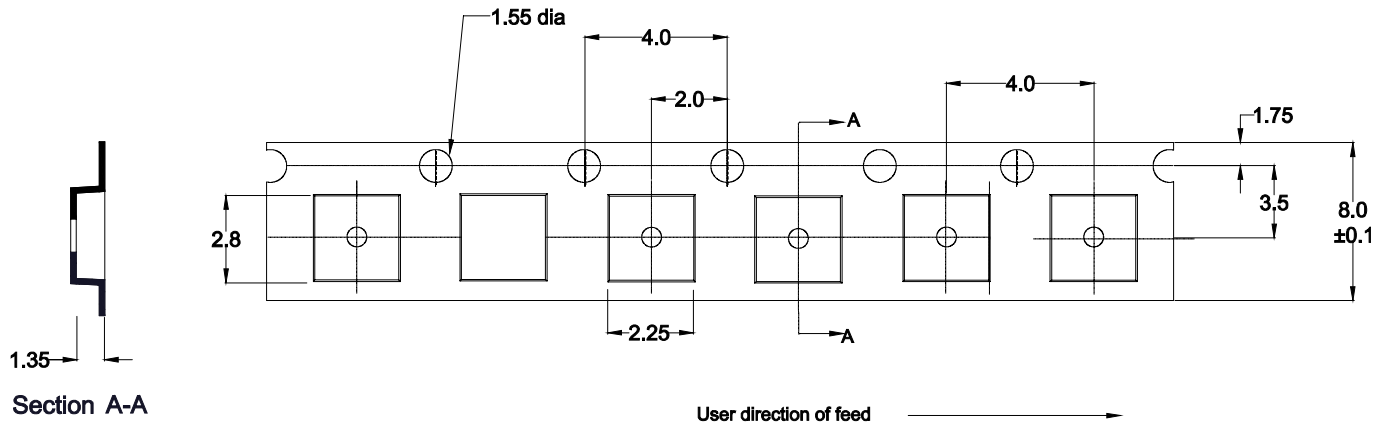
**Dimensions (mm)**



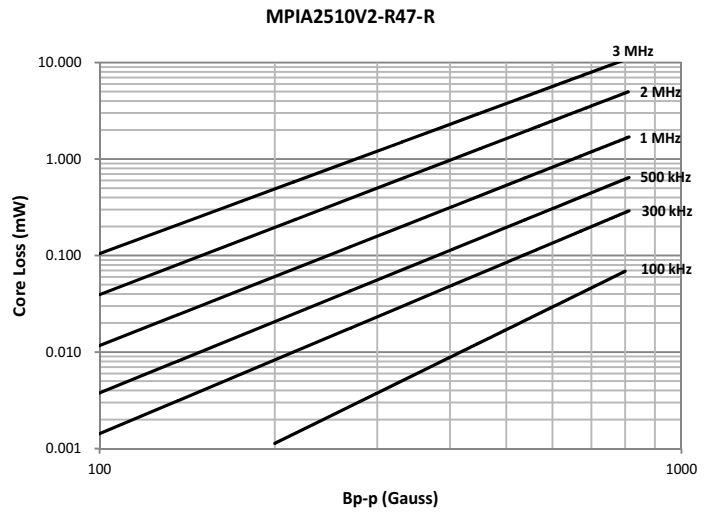
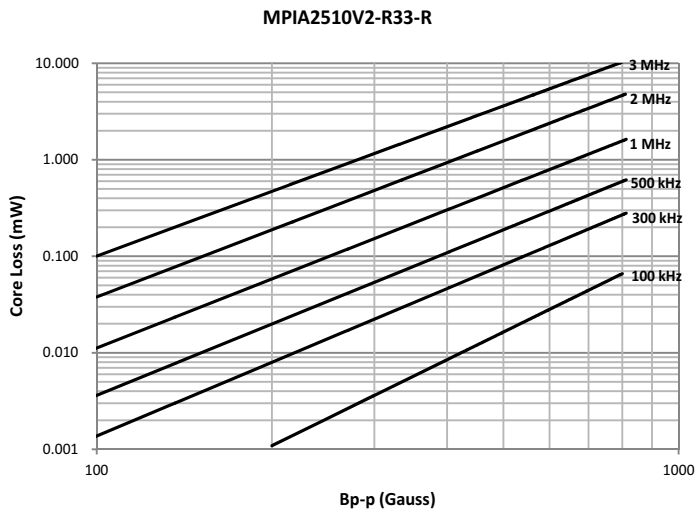
No marking  
 All soldering surfaces to be coplanar within 0.10 millimeters  
 Tolerances are  $\pm 0.2$  millimeters unless stated otherwise  
 Pad layout tolerances are  $\pm 0.1$  millimeters unless stated otherwise  
 Do not route traces or vias underneath the inductor

**Packaging information (mm)**

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

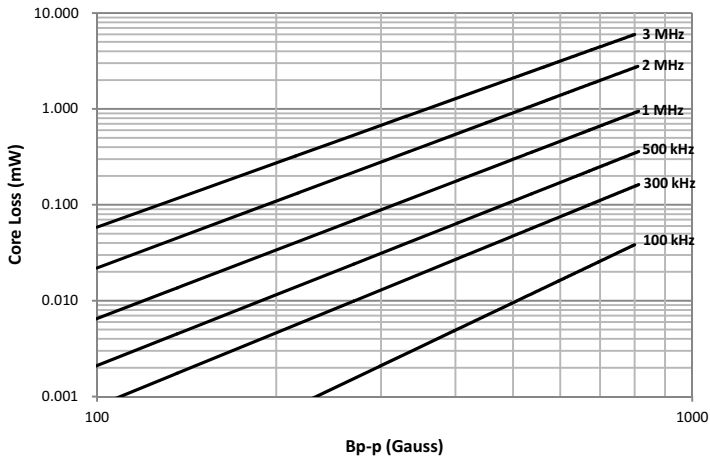


**Core loss vs. Bp-p (+25 °C)**

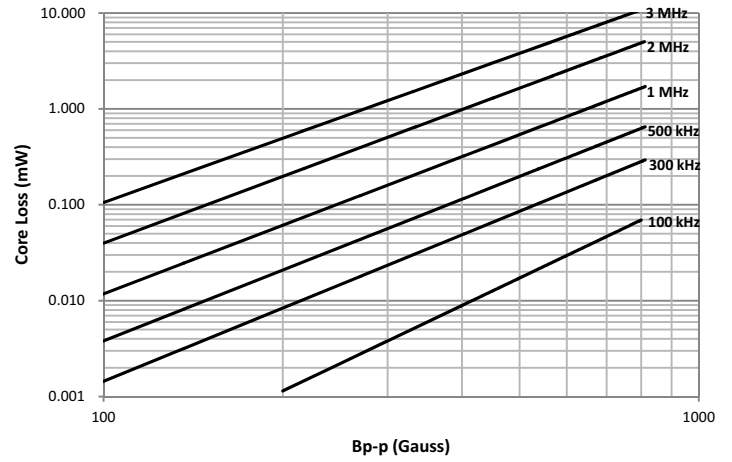


Core loss vs. Bp-p (+25 °C)

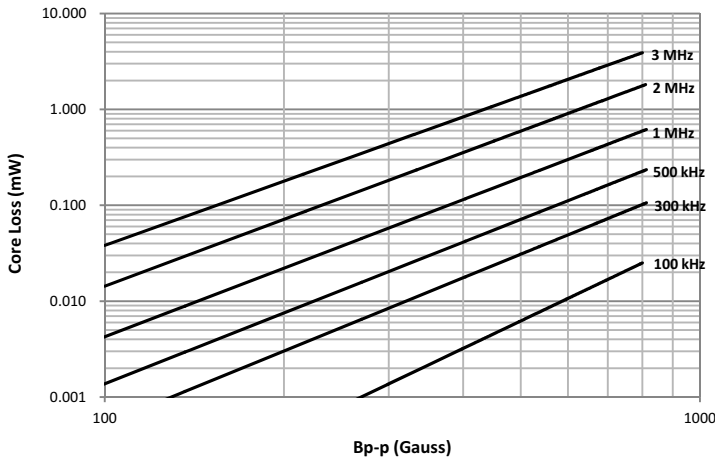
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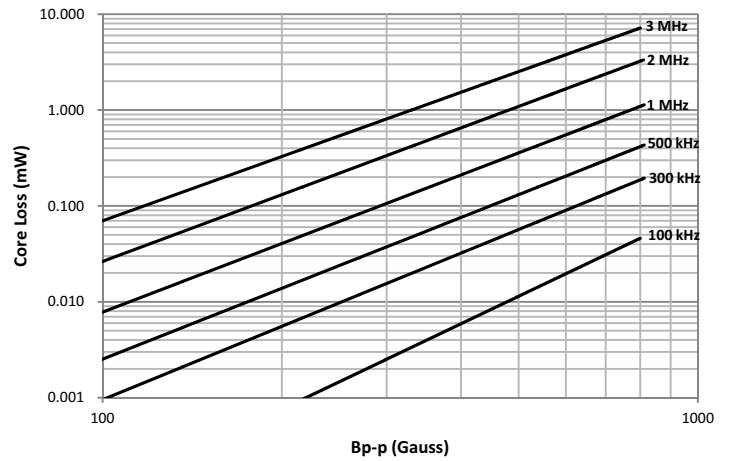
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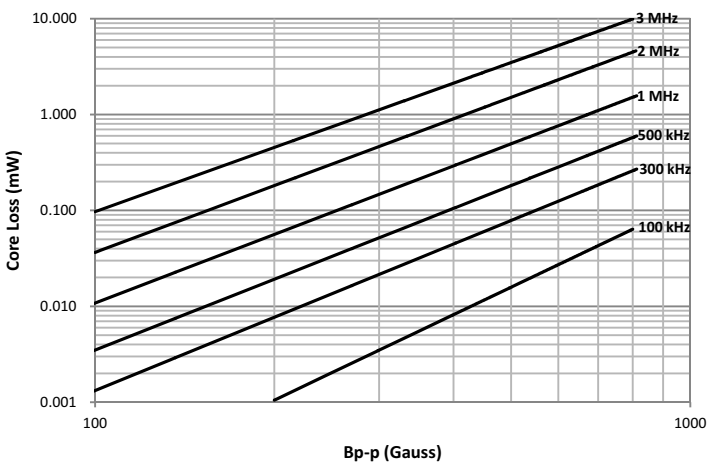
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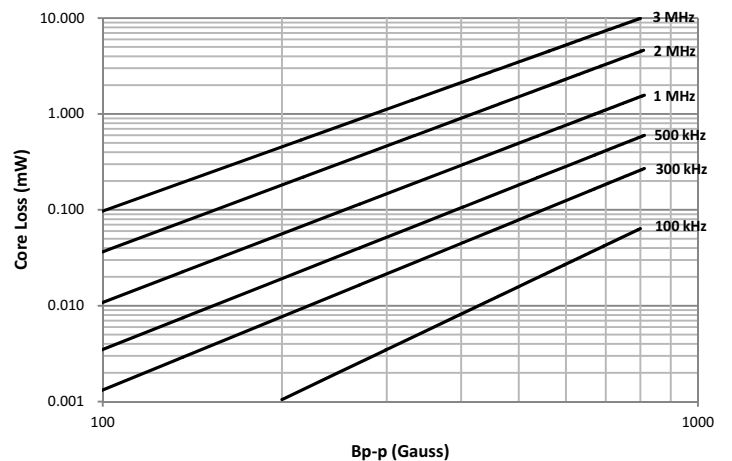
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MPIA2510V2-3R3-R

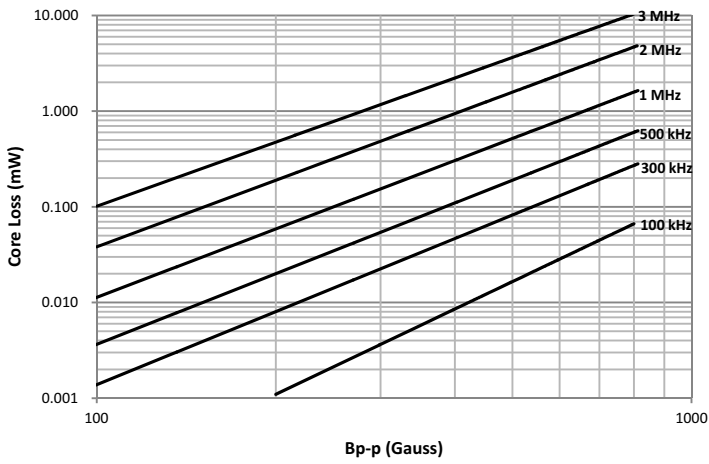


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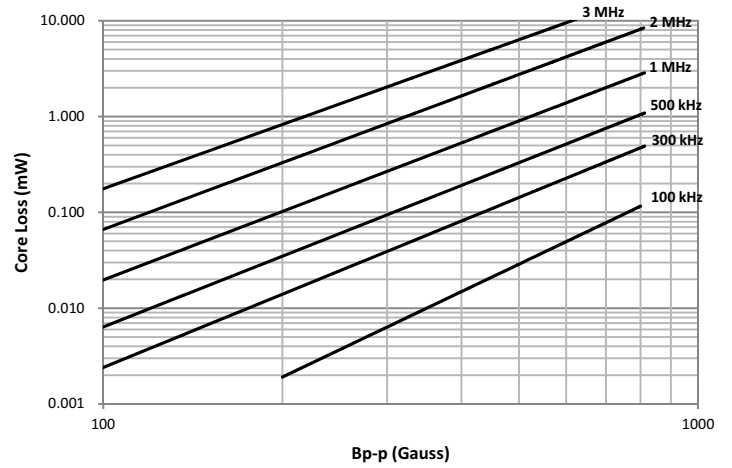


Core loss vs. Bp-p (+25 °C)

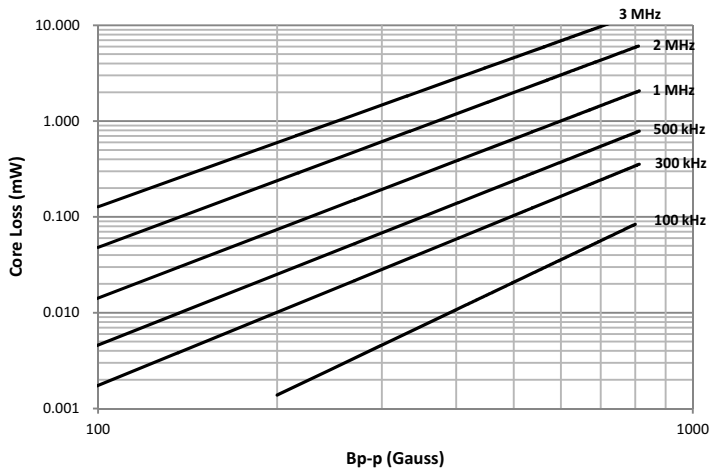
MPIA2512V2-R33-R



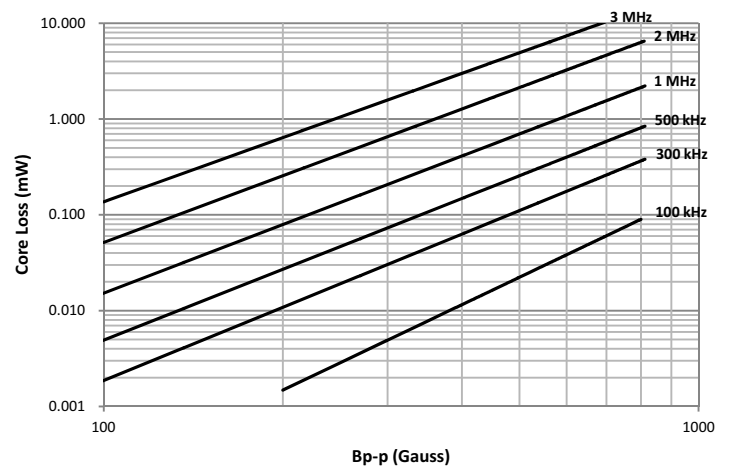
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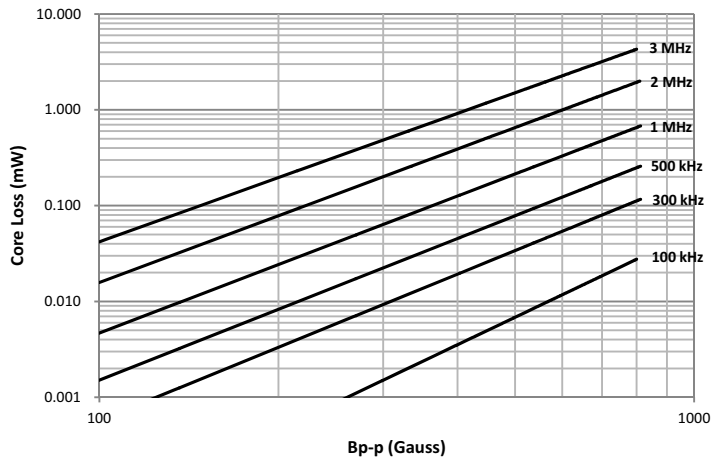
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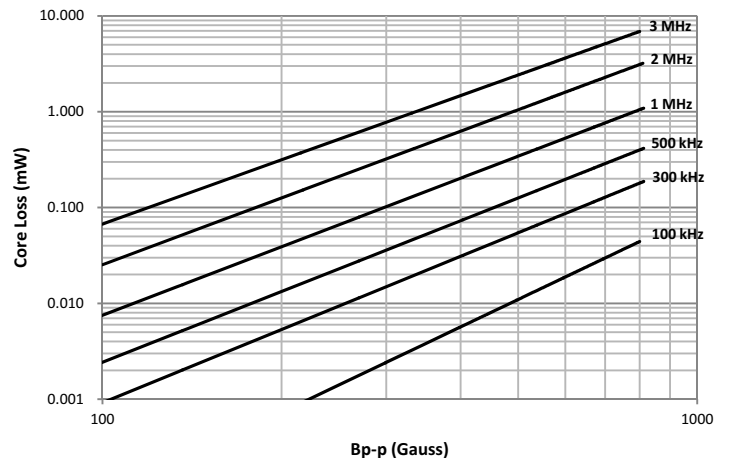
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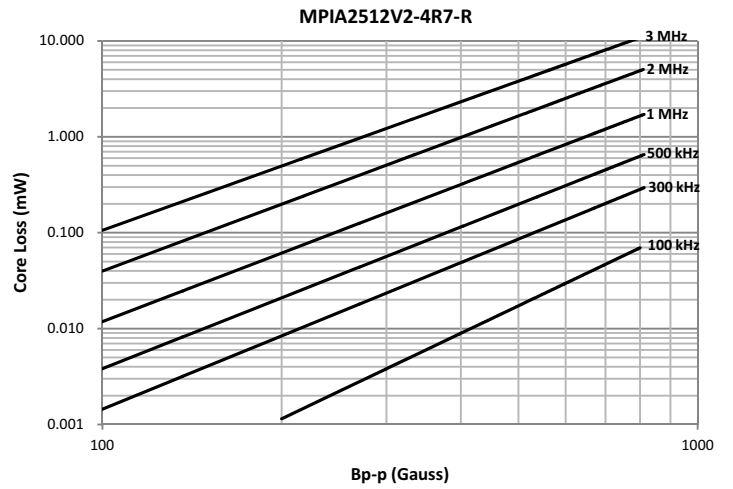
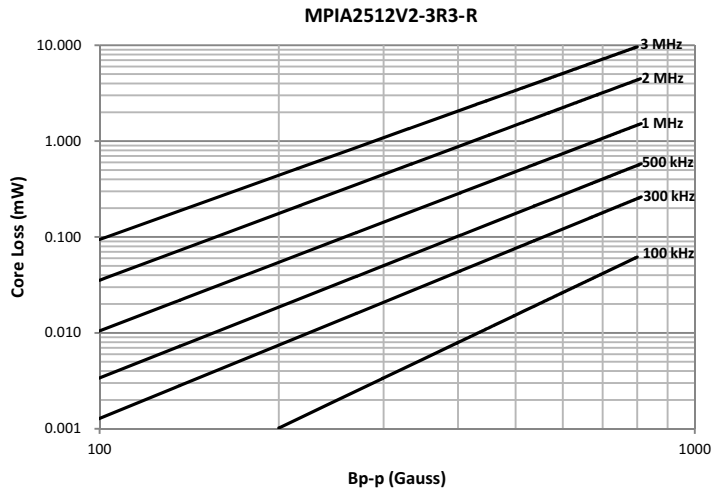
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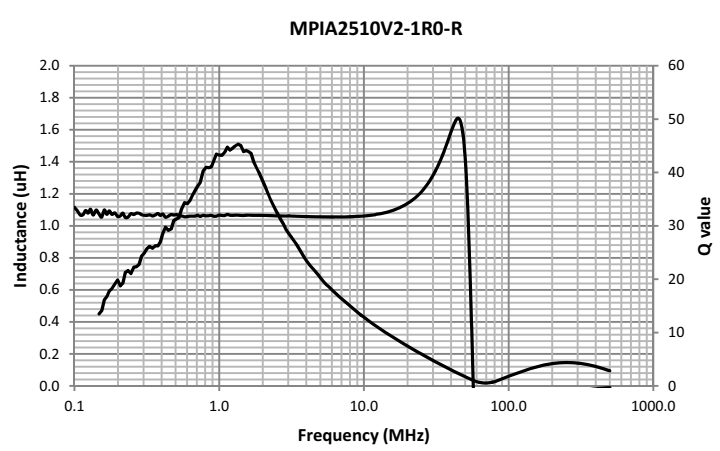
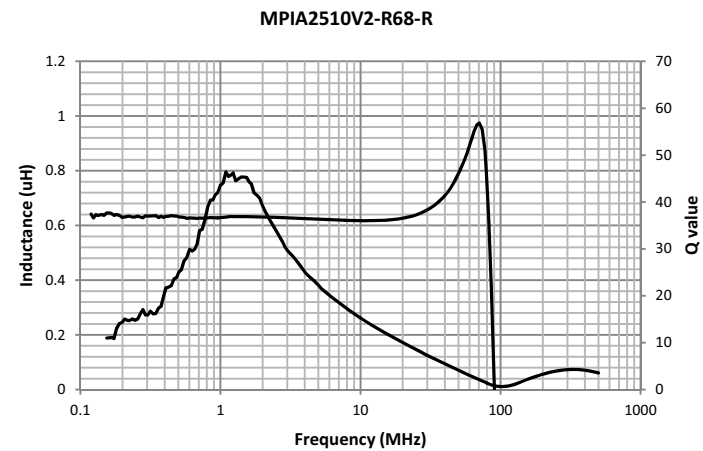
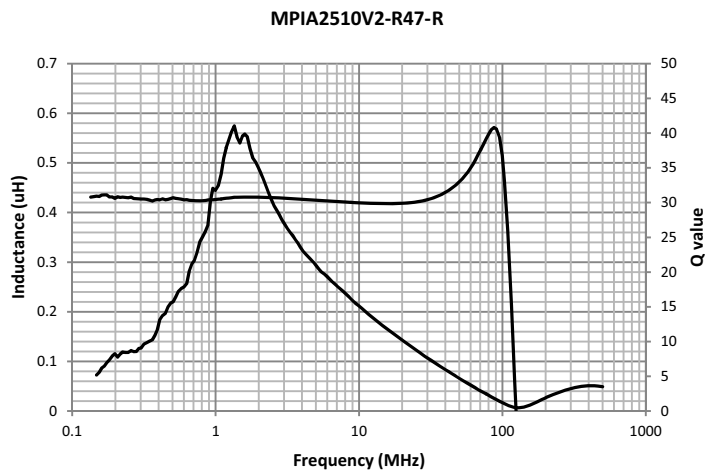
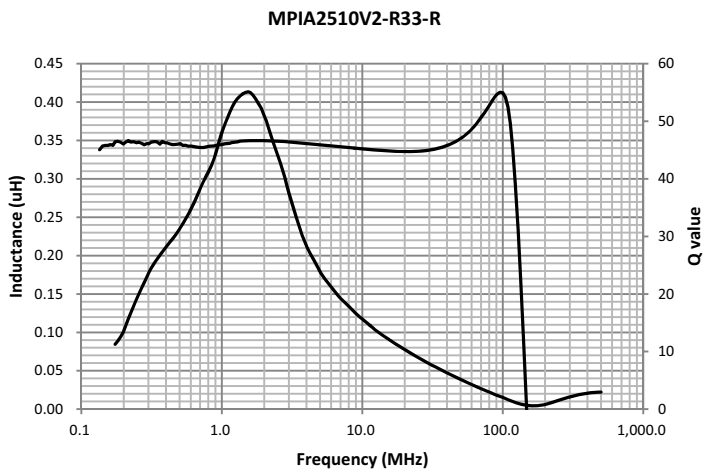
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Core loss vs. Bp-p (+25 °C)

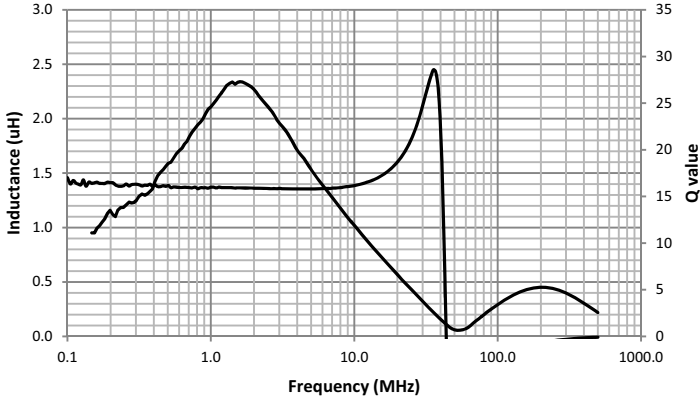


Inductance and Q vs. Frequency

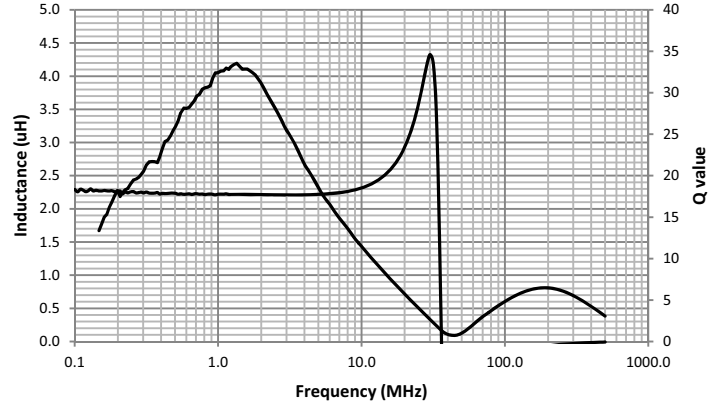


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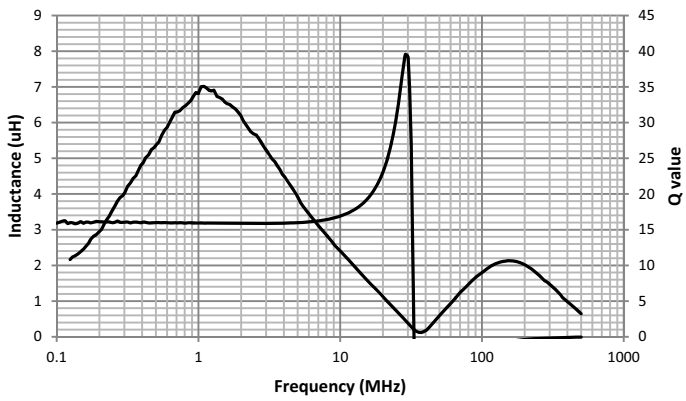
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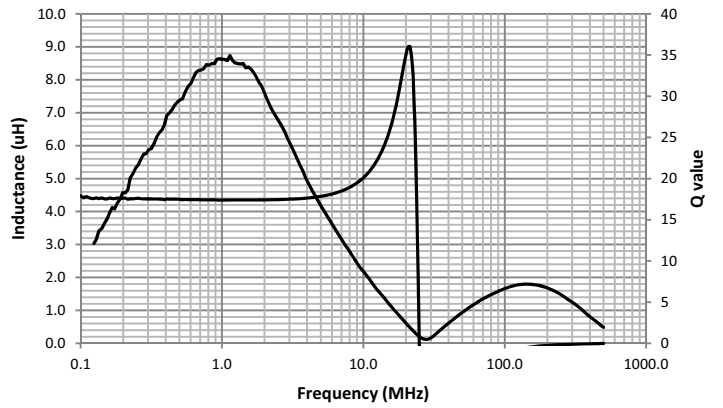
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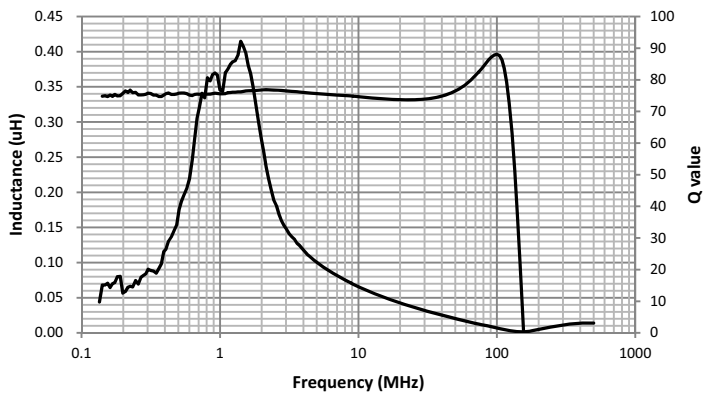
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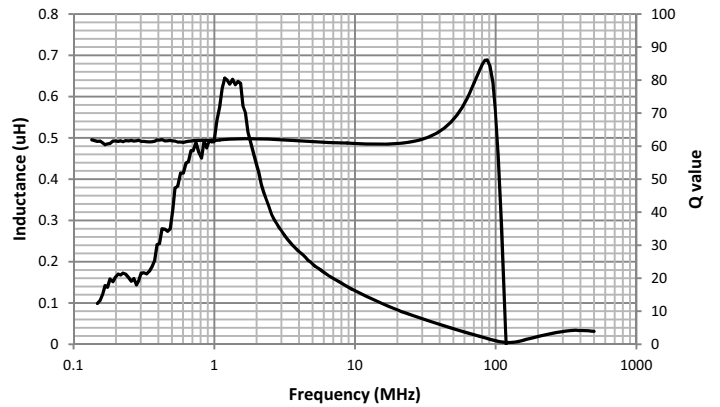
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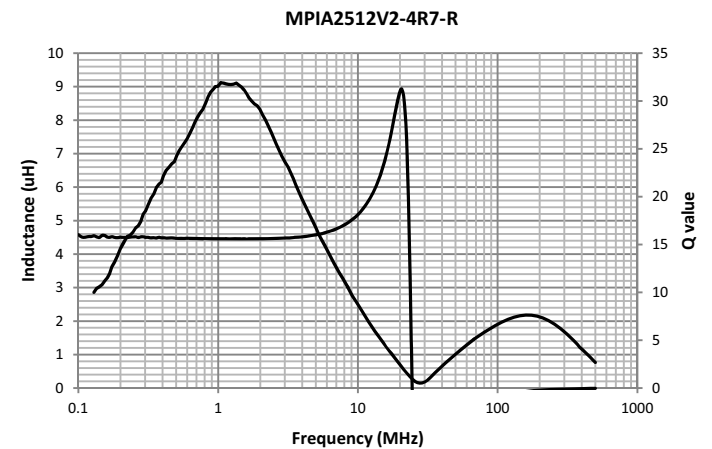
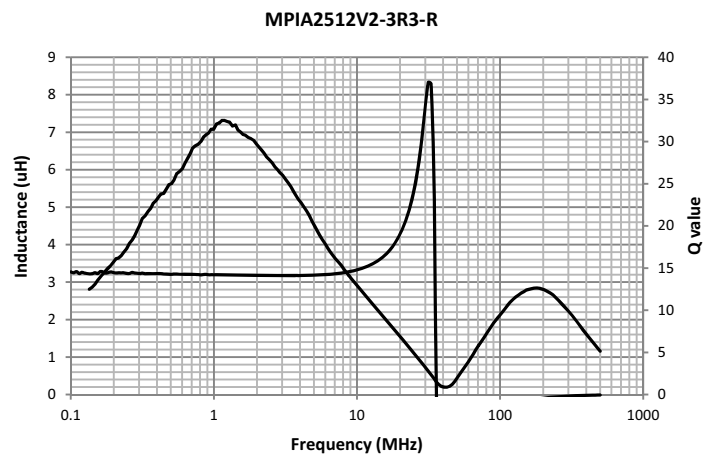
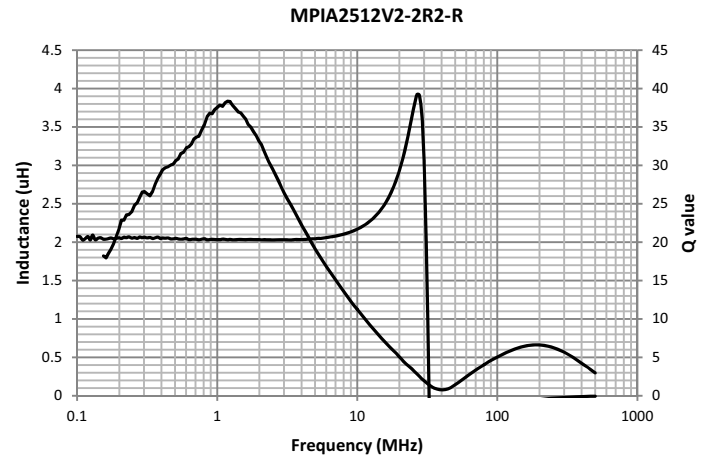
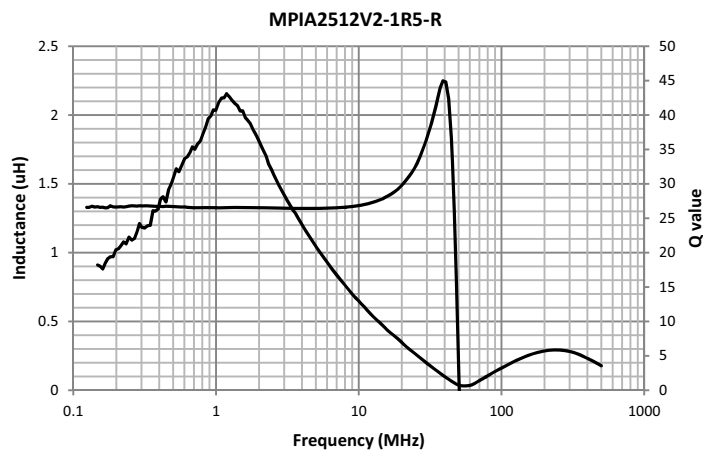
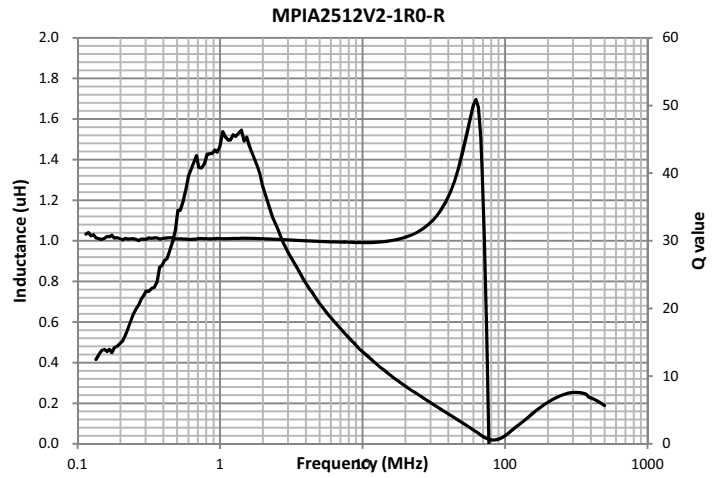
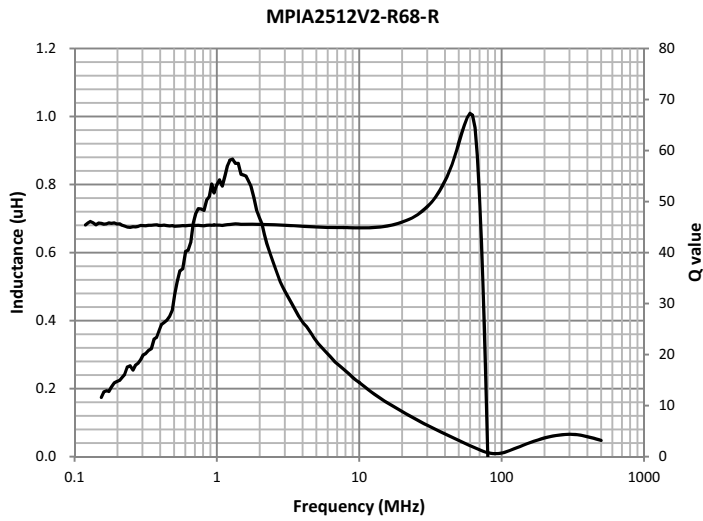
MPIA2512V2-R33-R



MPIA2512V2-R47-R

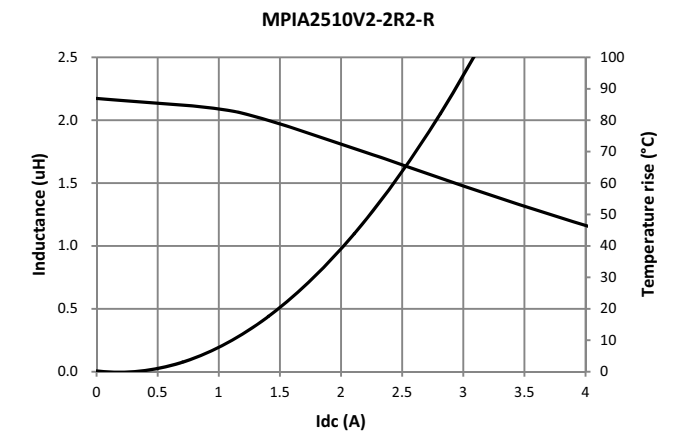
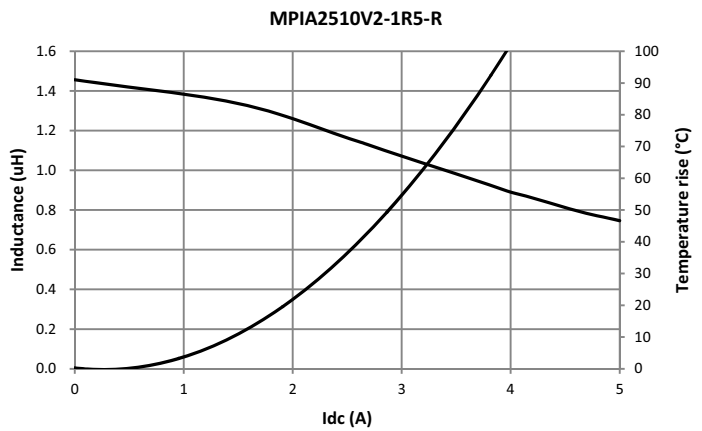
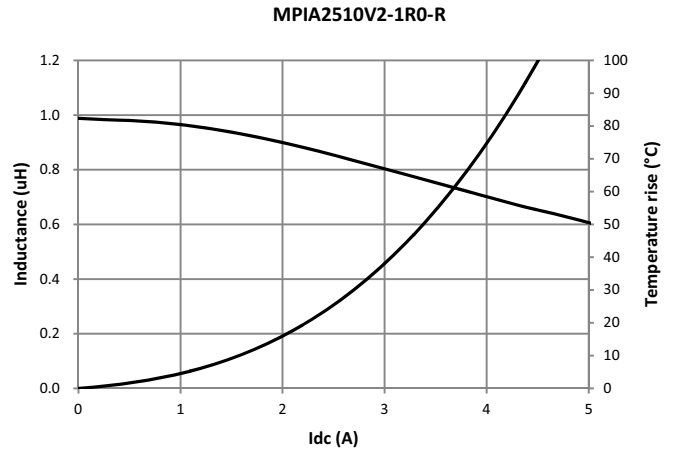
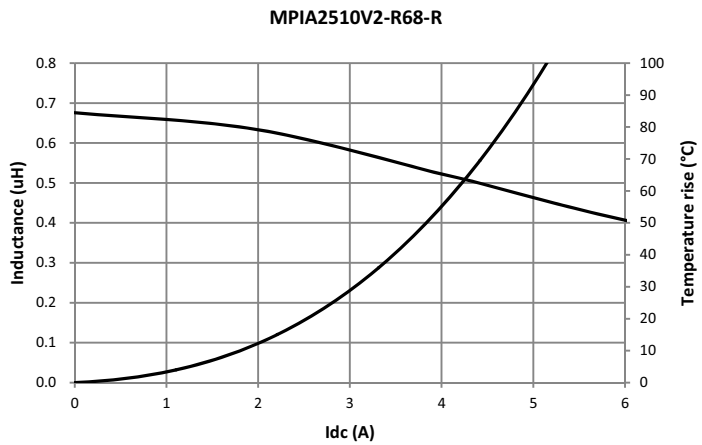
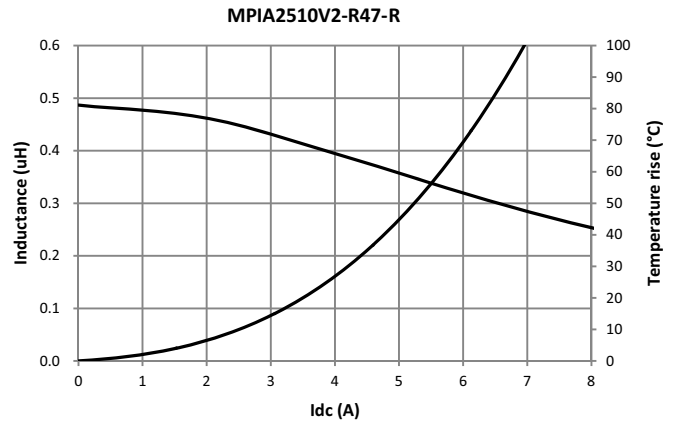
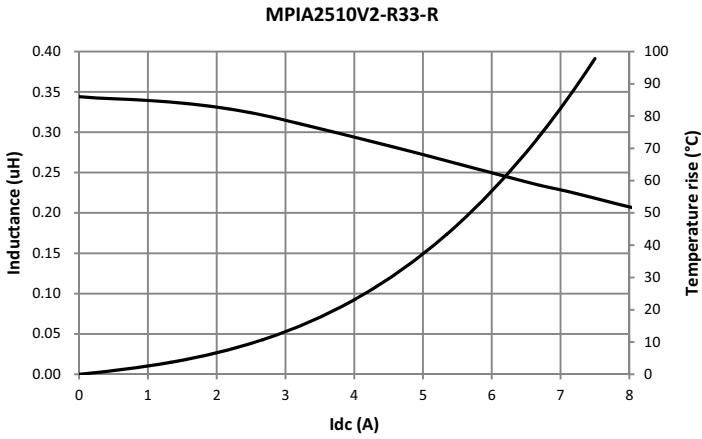


Inductance and Q vs. Frequency

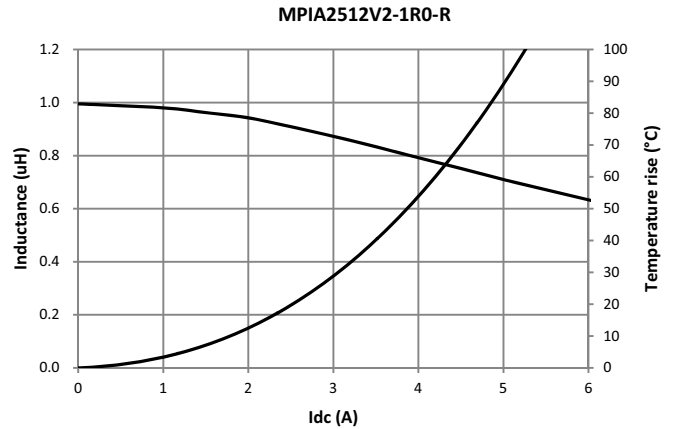
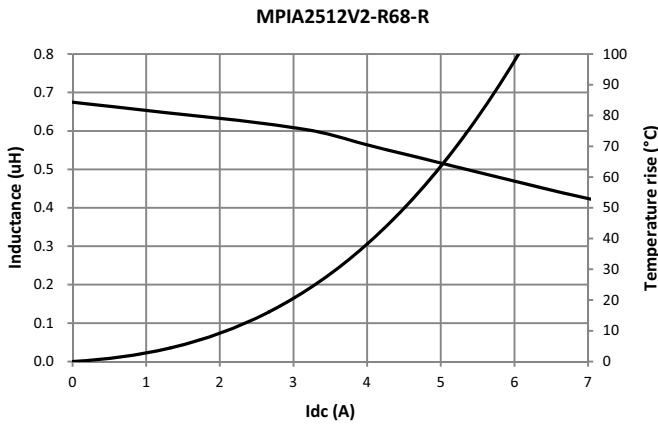
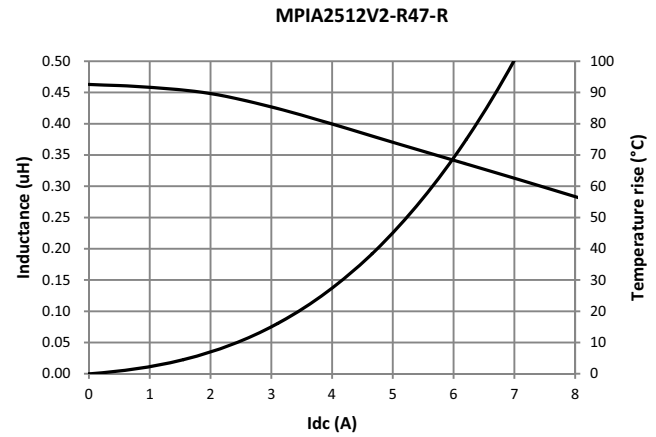
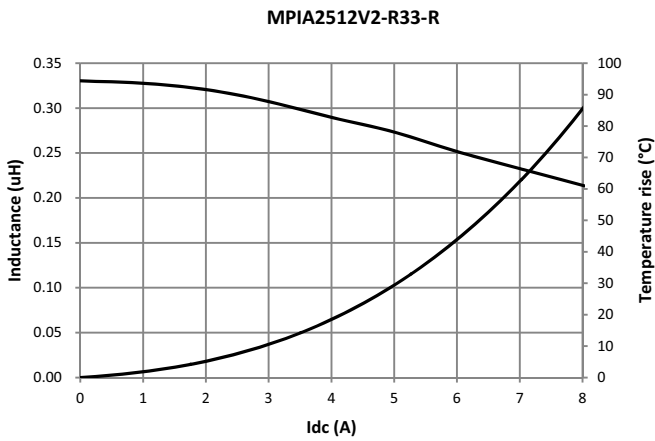
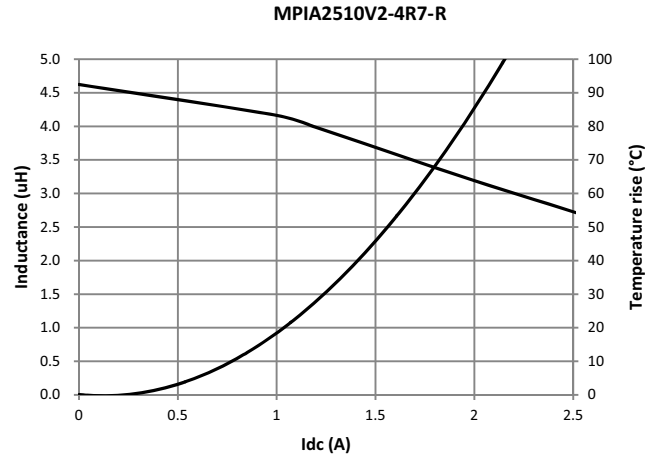
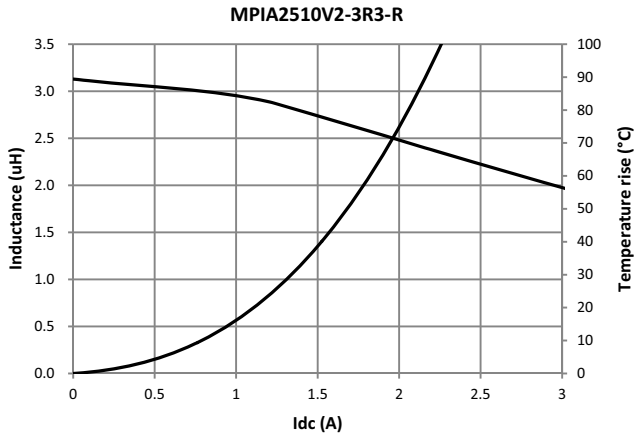




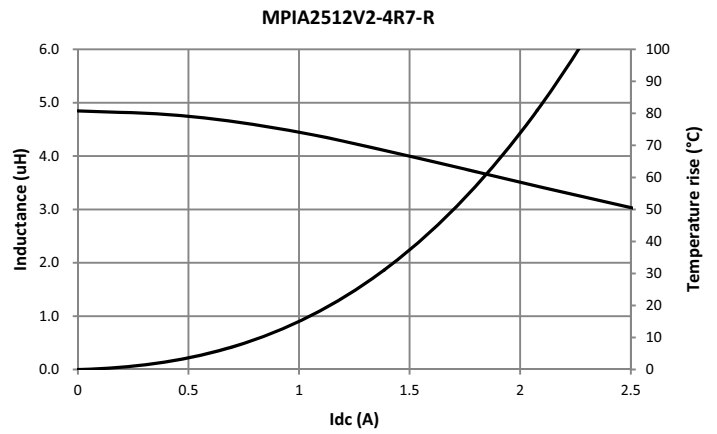
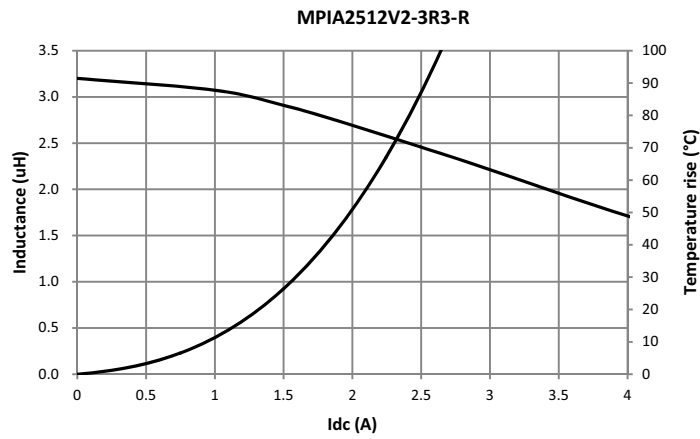
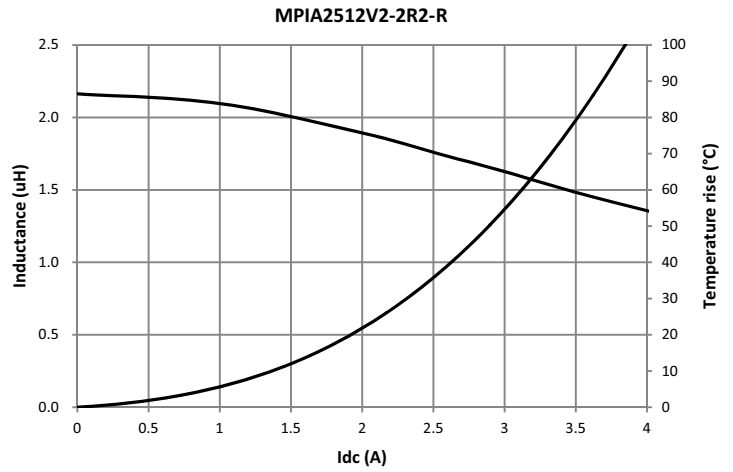
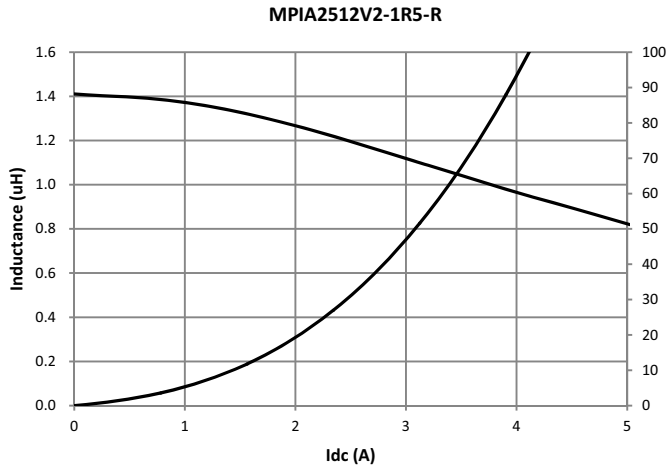
Inductance and temperature rise vs. Current



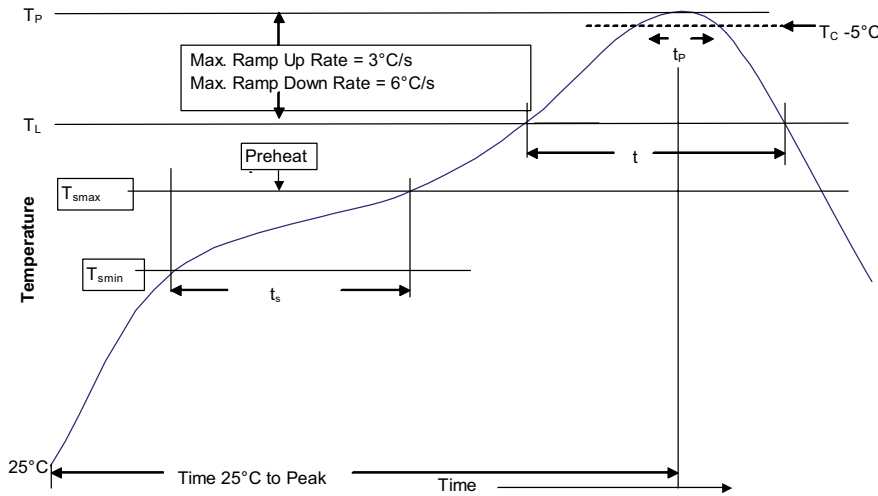
Inductance and temperature rise vs. Current



**Inductance and temperature rise vs. Current**



**Solder reflow profile**



**Table 1 - Standard SnPb Solder (T<sub>C</sub>)**

Package Thickness	Volume mm <sup>3</sup> <350	Volume mm <sup>3</sup> ≥350
<2.5mm)	235 °C	220 °C
≥2.5mm	220 °C	220 °C

**Table 2 - Lead (Pb) Free Solder (T<sub>C</sub>)**

Package Thickness	Volume mm <sup>3</sup> <350	Volume mm <sup>3</sup> 350 - 2000	Volume mm <sup>3</sup> >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 <sub>smin</sub> )	100 °C	150 °C
• Temperature max. (T <sub>smax</sub> )	150 °C	200 °C
• Time (T <sub>smin</sub> to T <sub>smax</sub> ) (t <sub>s</sub> )	60-120 Seconds	60-120 Seconds
Average ramp up rate T <sub>smax</sub> to T <sub>p</sub>	3°C/ Second Max.	3 °C/ Second Max.
Liquidous temperature (T <sub>L</sub> )	183 °C	217 °C
Time at liquidous (t <sub>L</sub> )	60-150 Seconds	60-150 Seconds
Peak package body temperature (T <sub>p</sub> )*	Table 1	Table 2
Time (t <sub>p</sub> )** within 5 °C of the specified classification temperature (T <sub>C</sub> )	20 Seconds**	30 Seconds**
Average ramp-down rate (T <sub>p</sub> to T <sub>smax</sub> )	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<sub>p</sub>) is defined as a supplier minimum and a user maximum.  
\*\* Tolerance for time at peak profile temperature (t<sub>p</sub>) is defined as a supplier minimum and a user maximum.

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[MPIA2512V2-R68-R](#) [MPIA2512V2-3R3-R](#) [MPIA2512V2-1R5-R](#) [MPIA2510V2-1R0-R](#) [MPIA2510V2-4R7-R](#)  
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