

# MPI40-V2

High current, low profile, miniature power inductors



## Applications

- Handheld/mobile devices
- Portable media players
- Notebook/netbook/laptop regulators
- Tablets/smartbooks
- Battery operated devices
- LED drivers
- LCD displays
- Point-of-load (POL) converters

## Product features

- High current carrying capacity
- Magnetically shielded, Low EMI
- Rugged flexible construction
- Frequency range up to 5 MHz
- Inductance range from 0.1  $\mu$ H to 22  $\mu$ H
- Current range from 1.2 A to 22 A
- 4.75 mm x 4.45 mm footprint surface mount package in 1.2 mm, 1.5 mm, and 2.0 mm heights
- Moisture Sensitivity Level (MSL): 1
- Halogen free, lead free, RoHS compliant

## Environmental data

- Storage temperature range (Component): -55 °C to +125 °C
- Operating temperature range: -55 °C to +125 °C (ambient plus self-temperature rise)
- Solder reflow temperature: J-STD-020 (latest revision) compliant



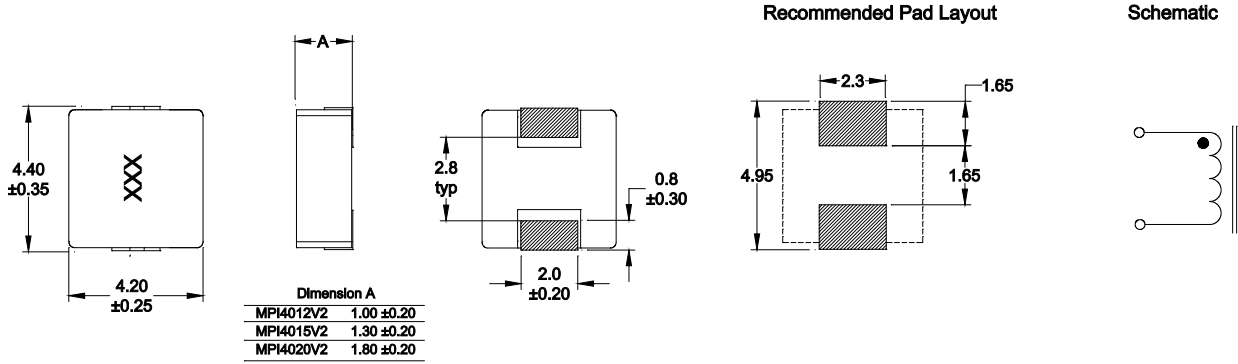
**Product specifications**

Part Number <sup>4</sup>	OCL <sup>1</sup> ( $\mu$ H) $\pm 20\%$	Part marking designator	$I_{rms}$ <sup>2</sup> (A)	$I_{sat}$ <sup>3</sup> (A)	DCR (m $\Omega$ ) typical @ +25 °C	DCR (m $\Omega$ ) maximum @ +25 °C
<b>1.2 mm height</b>						
MPI4012V2-R33-R	0.33	A	6.5	8.4	11	13.5
MPI4012V2-R47-R	0.47	B	5.6	6.8	19	23
MPI4012V2-R68-R	0.68	C	4.3	6.0	28	33.5
MPI4012V2-1R0-R	1.0	D	3.9	5.5	38.5	46.5
MPI4012V2-1R5-R	1.5	E	2.8	4.0	55	66
MPI4012V2-2R2-R	2.2	F	2.6	3.5	75	90
MPI4012V2-4R7-R	4.7	G	1.8	2.8	175	210
<b>1.5 mm height</b>						
MPI4015V2-R22-R	0.22	A	10	12	6.0	7.5
MPI4015V2-R33-R	0.33	B	9.0	10	7.0	8.5
MPI4015V2-R47-R	0.47	C	7.5	8.0	11	14
MPI4015V2-R56-R	0.56	D	6.5	7.5	12	14
MPI4015V2-R68-R	0.68	E	6.2	7.0	16	19
MPI4015V2-1R0-R	1.0	F	5.5	6.0	23	27
MPI4015V2-1R5-R	1.5	G	3.8	5.5	48	58
MPI4015V2-2R2-R	2.2	H	3.2	4.5	65	78
MPI4015V2-3R3-R	3.3	I	2.8	3.5	77	92
MPI4015V2-4R7-R	4.7	J	2.2	3.0	108	130
MPI4015V2-6R8-R	6.8	K	2.0	2.2	172	207
<b>2.0 mm height</b>						
MPI4020V2-R10-R	0.10	A	17	22	3.5	4.5
MPI4020V2-R22-R	0.22	B	12	12.5	5.5	6.6
MPI4020V2-R33-R	0.33	C	10	12	7.5	9.0
MPI4020V2-R47-R	0.47	D	8.5	9.5	10.5	13
MPI4020V2-R56-R	0.56	E	8.0	10	12	15
MPI4020V2-R68-R	0.68	F	7.5	9.0	12.5	16
MPI4020V2-1R0-R	1.0	G	6.5	7.0	20	24
MPI4020V2-1R2-R	1.2	H	6.5	6.8	23	28
MPI4020V2-1R5-R	1.5	I	4.8	6.0	25	30
MPI4020V2-2R2-R	2.2	J	4.2	5.0	40	48
MPI4020V2-3R3-R	3.3	K	3.3	4.0	71	85
MPI4020V2-4R7-R	4.7	L	2.5	3.0	98	118
MPI4020V2-6R8-R	6.8	M	2.0	2.5	167	192
MPI4020V2-100-R	10	N	1.5	2.2	245	281
MPI4020V2-220-R	22	O	1.2	1.65	350	402

1. Open Circuit Inductance (OCL) Test Parameters: 100 kHz, 1.0 V<sub>rms</sub>, 0.0 Adc, +25 °C  
 2. I<sub>rms</sub>: 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<sub>sat</sub>: Peak current for approximately 30% rolloff @ +25 °C  
 4. Part Number Definition: MPI40xxV2-xxx-R  
 MPI40 = Product code  
 xx= Height indicator  
 V2=Model 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

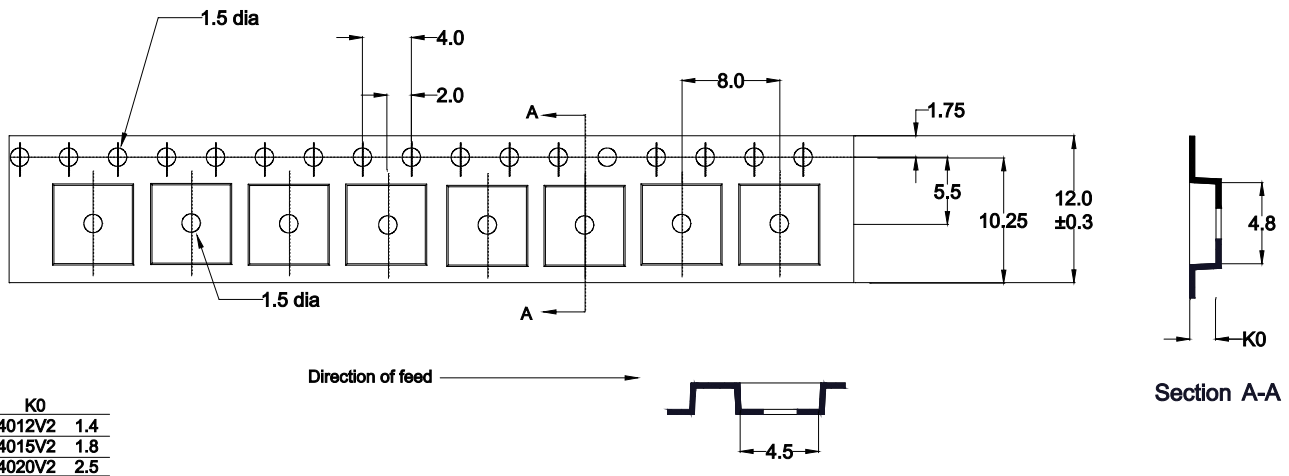


Part marking: xxx (first digit = inductance value per "Part marking designator" listed in Product specification table, second digit = bi-weekly date code, third digit = last digit of year produced)  
 All soldering surfaces to be coplanar within 0.10 millimeters  
 Tolerances are ±0.3 millimeters unless stated otherwise  
 Pad layout tolerances are ±0.1 millimeters unless stated otherwise  
 Do not route traces or vias underneath the inductor

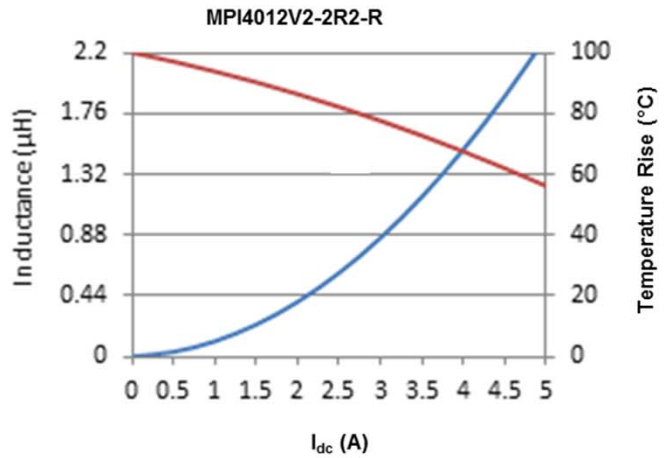
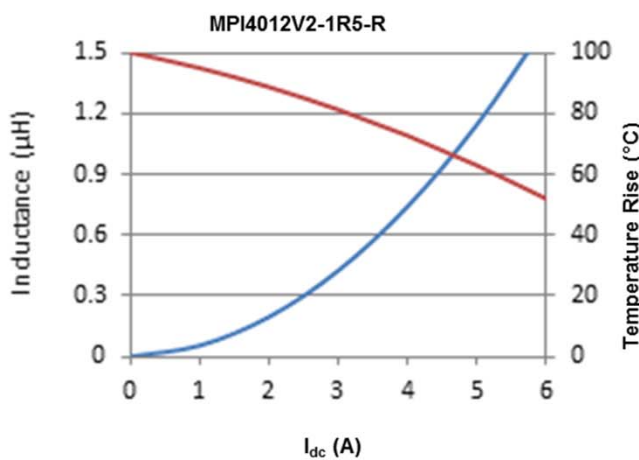
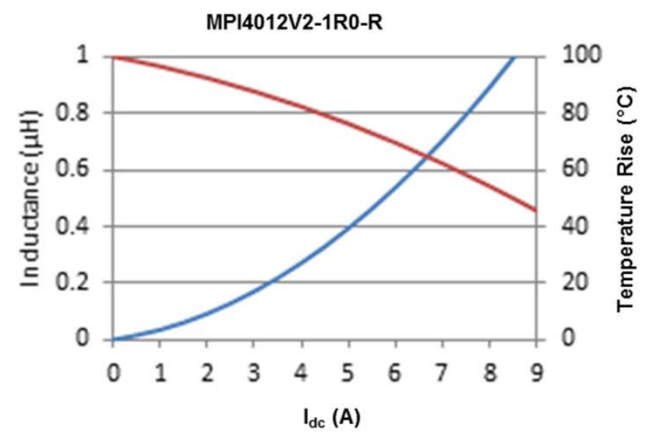
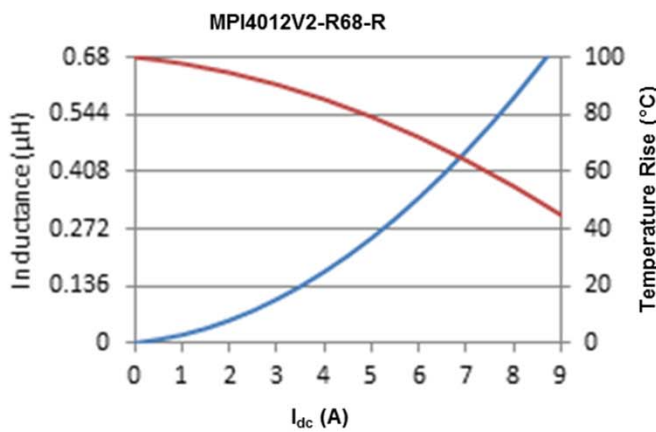
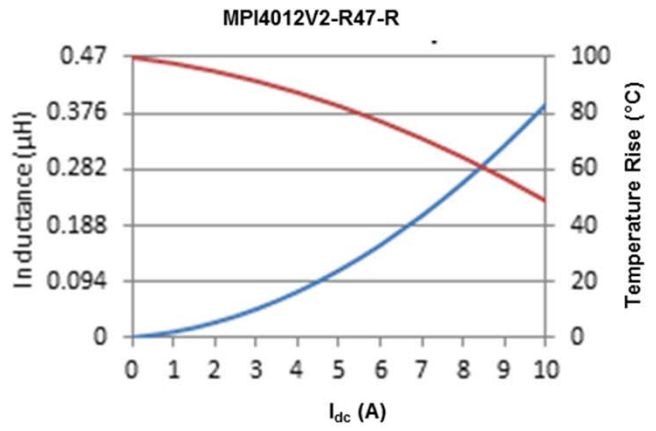
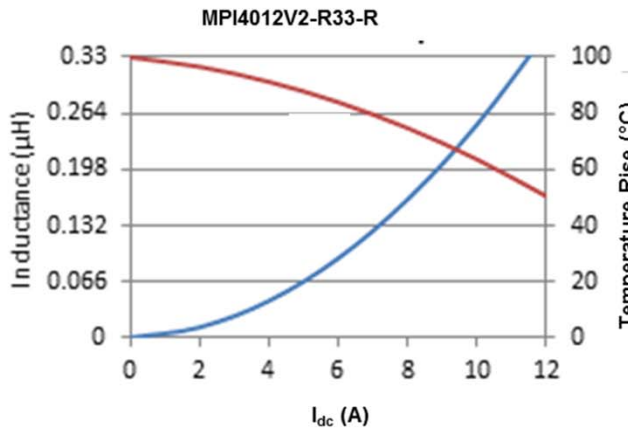
Packaging information- mm

Drawing not to scale

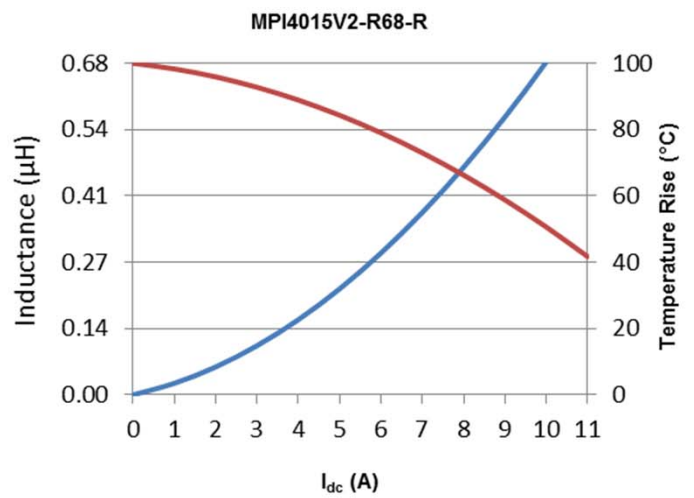
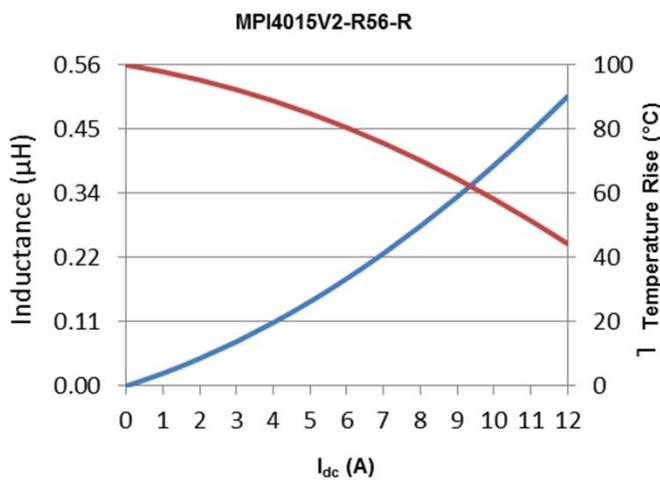
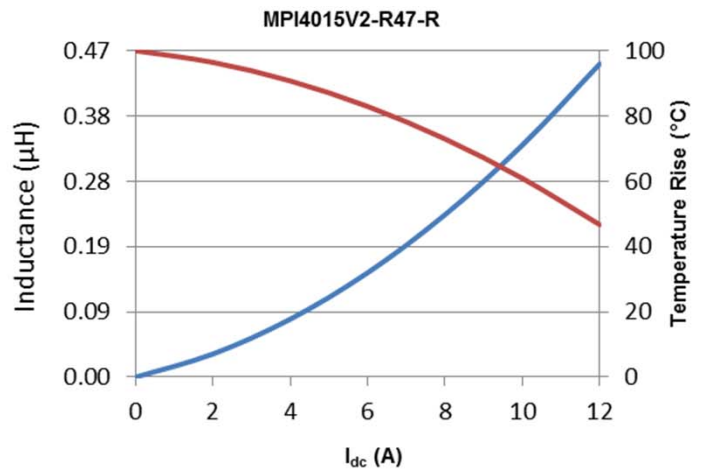
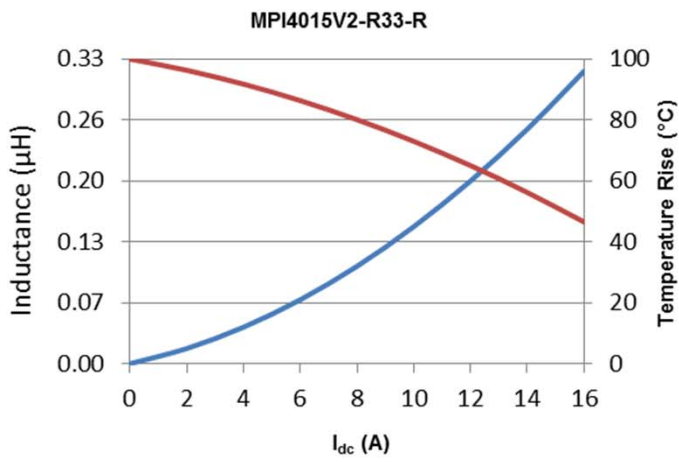
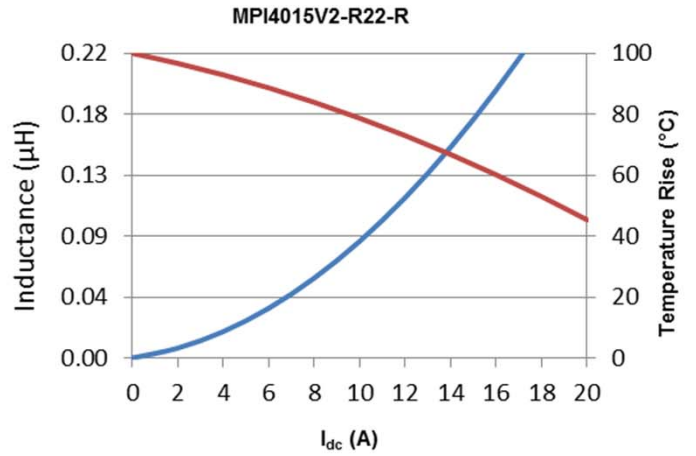
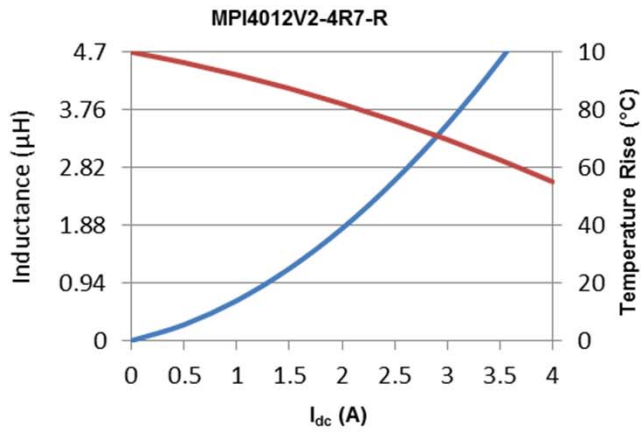
Supplied in tape and reel packaging, 3000 parts per 13" diameter reel



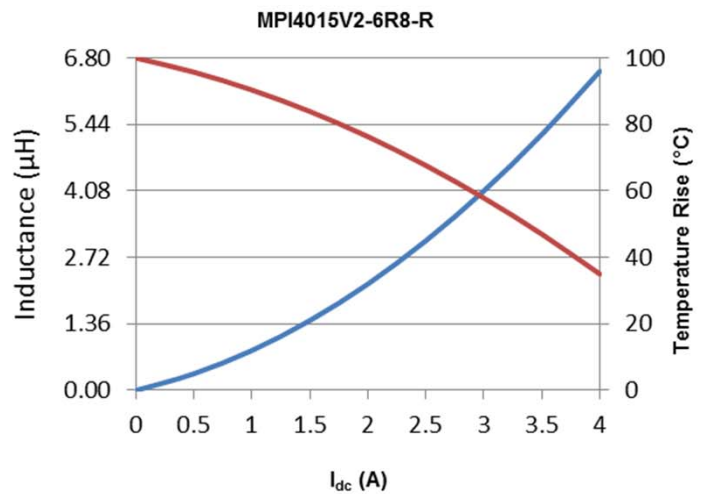
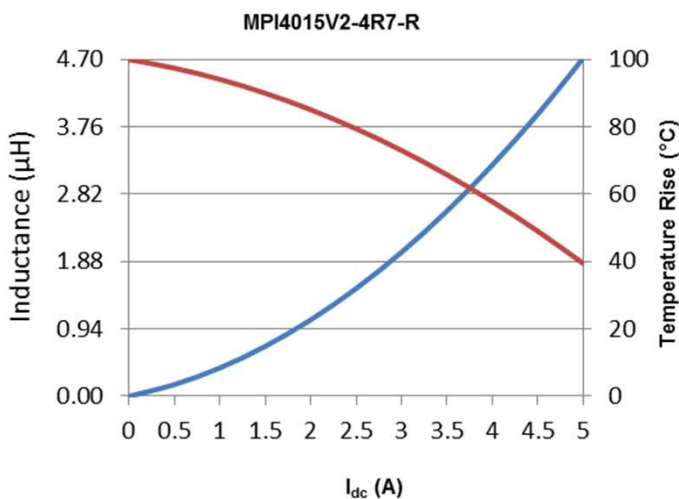
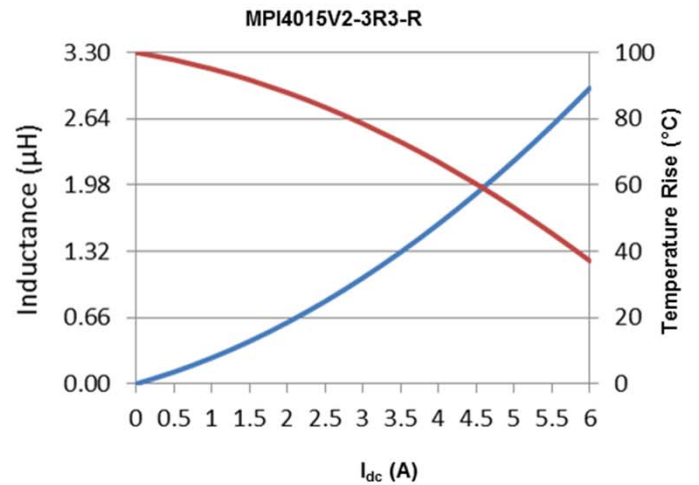
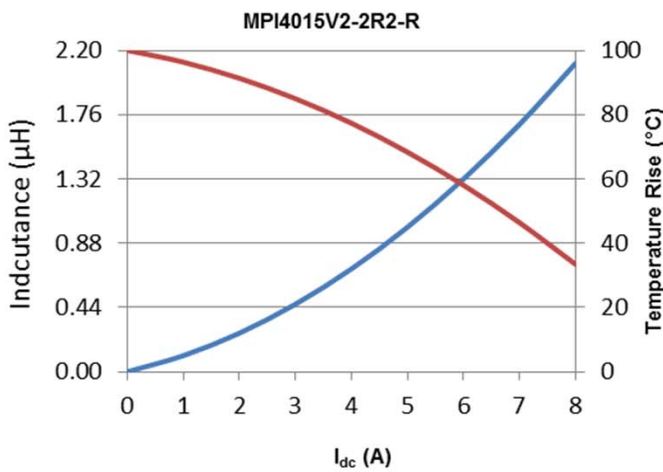
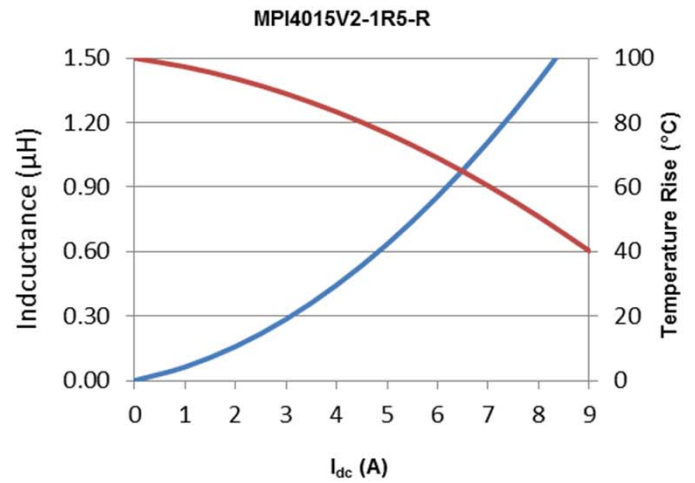
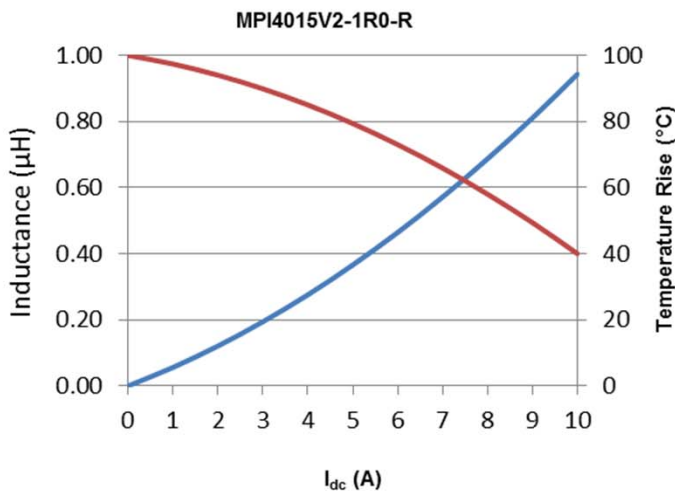
Inductance and temperature rise vs. current



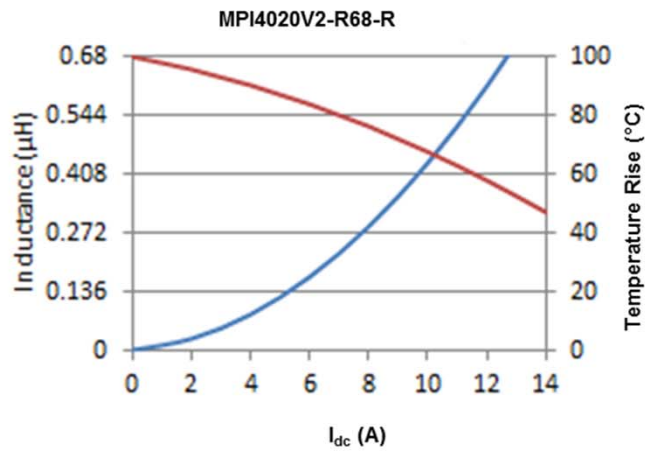
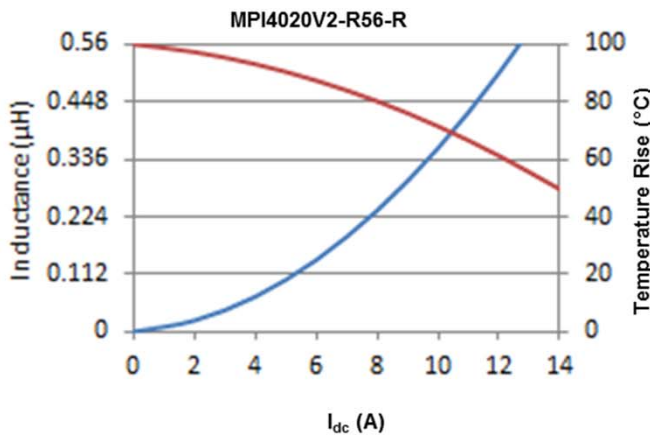
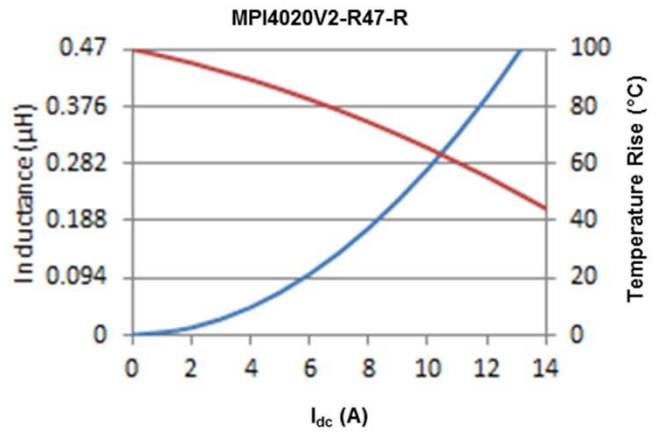
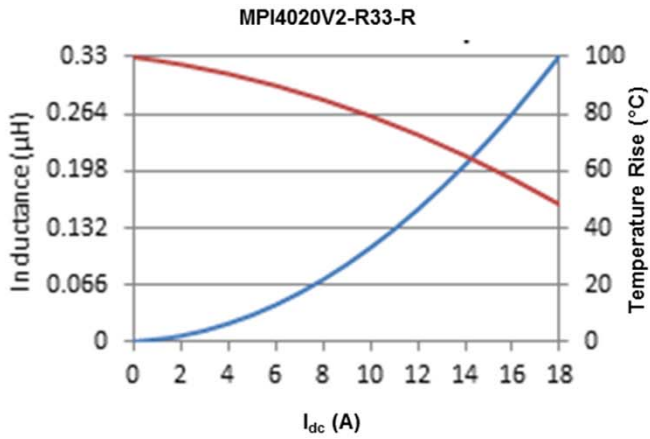
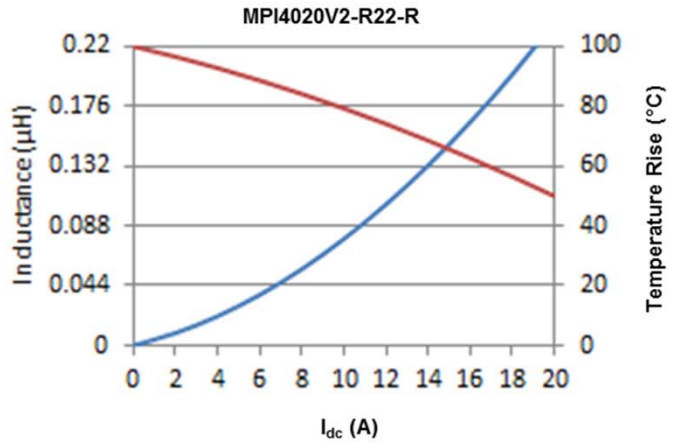
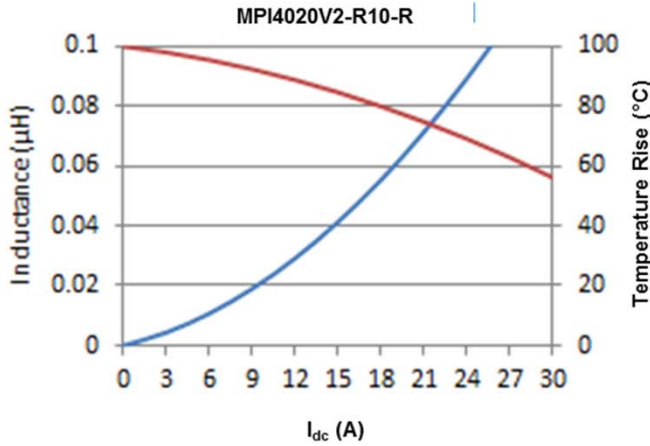
Inductance and temperature rise vs. current



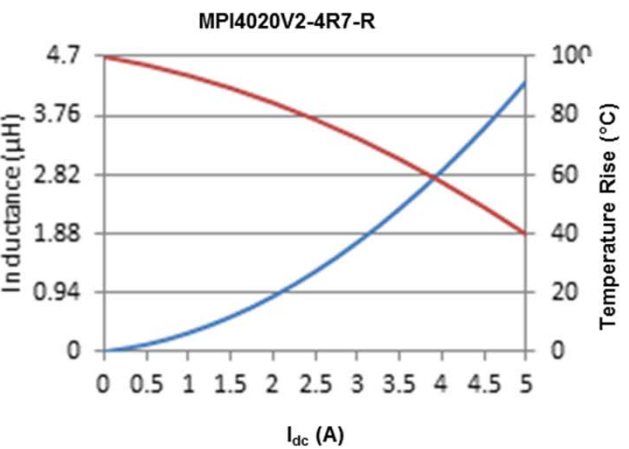
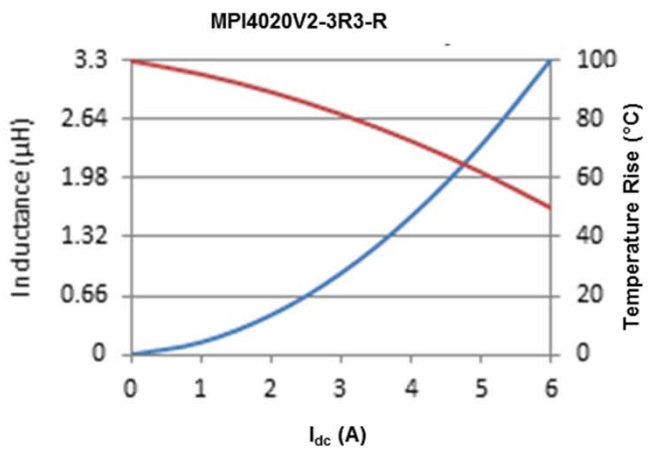
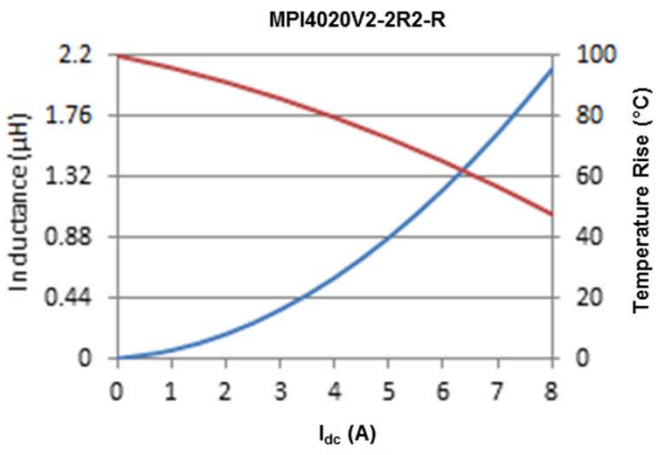
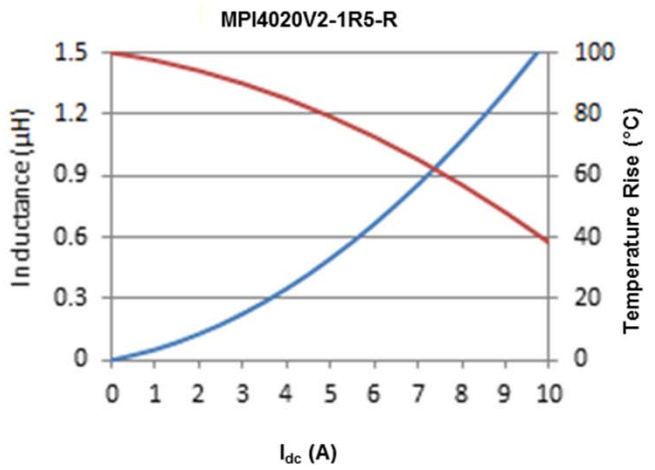
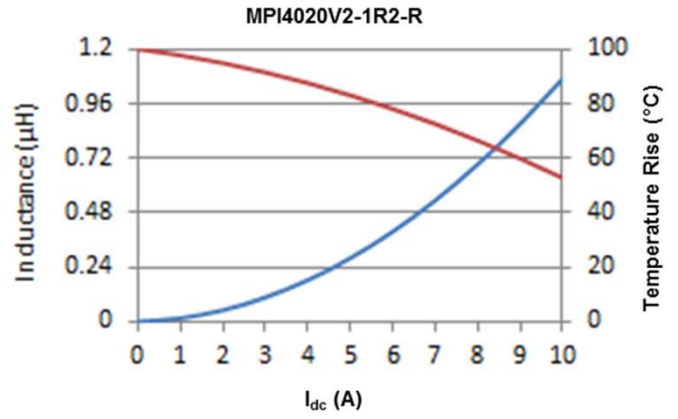
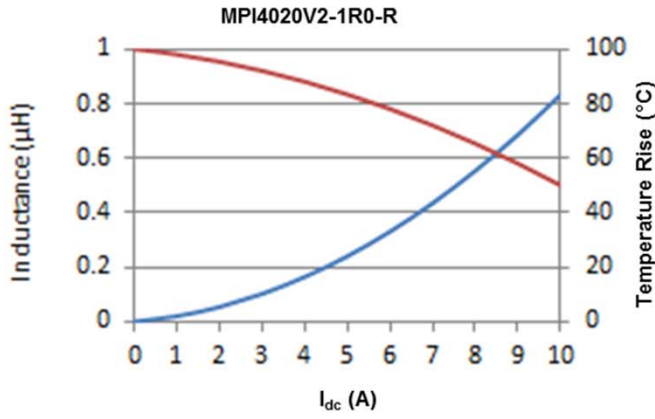
Inductance and temperature rise vs. current



Inductance and temperature rise vs. current

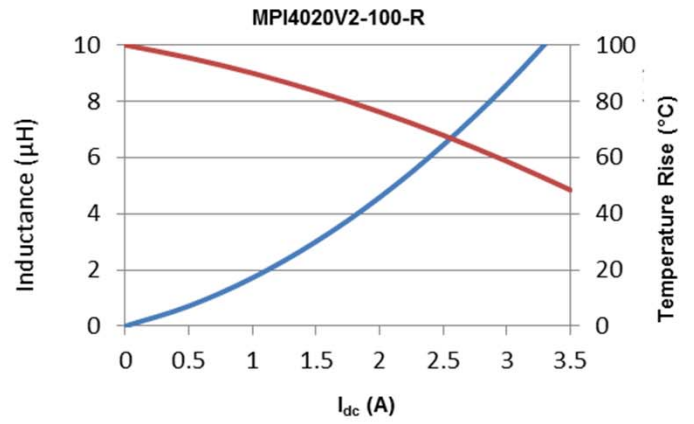
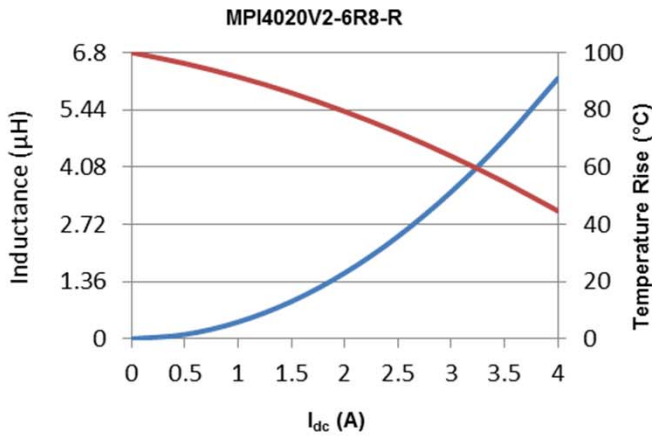


Inductance and temperature rise vs. current

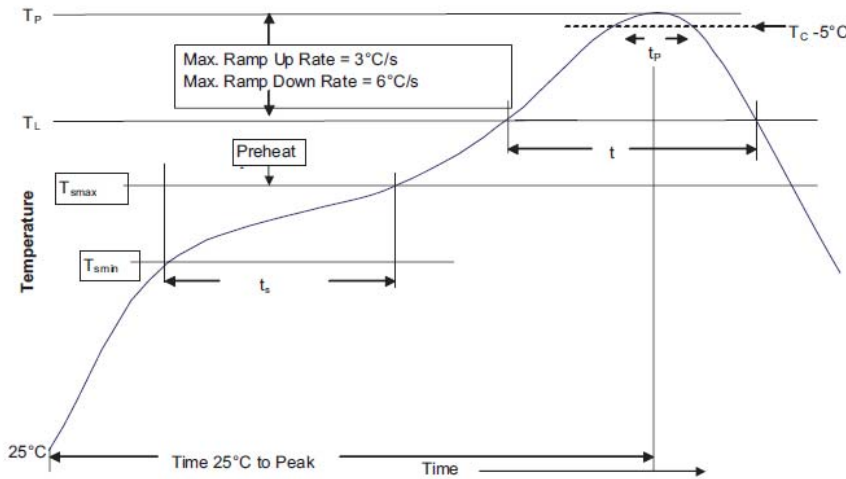




Inductance and temperature rise vs. current



**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
	• Temperature max. (T <sub>smax</sub> )	150°C
	• Time (T <sub>smin</sub> to T <sub>smax</sub> ) (t <sub>s</sub> )	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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