

### APPLICATIONS



- Battery-powered devices
- High switching frequency SMPS
- IoT
- Wearable
- Portable devices
- Input filters

### FEATURES

- Size 2.0mmx1.6mmx1.0mm
- Low Profile
- Low Audible Noise
- Molded Construction
- Soft Saturation
- Stable Over High Temperatures
- Low DCR
- Max Operating Temp +125°C
- RoHS/REACH-Compliant, Halogen-Free

### ELECTRICAL CHARACTERISTICS

Parameter			Value	Unit
Inductance <sup>(1)</sup>	$L$	±20%	0.47	μH
Resistance	$R_{DC}$	Typ	27	mΩ
Resistance <sub>MAX</sub>	$R_{DC\ MAX}$	Max	32	mΩ
Rated Current <sup>(2)</sup>	$I_R$	Typ	4.5	A
Saturation Current <sub>25°C</sub> <sup>(3)</sup>	$I_{SAT\ 25°C}$	Typ	5.7	A
Saturation Current <sub>100°C</sub> <sup>(4)</sup>	$I_{SAT\ 100°C}$	Typ	5.7	A
Resonance Frequency	$f_r$	Typ	142	MHz

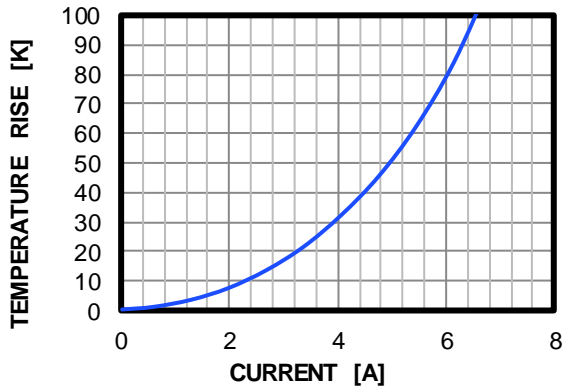
### GENERAL SPECIFICATIONS

<sup>(1)</sup> Inductance	Measured at 100kHz, 100mA
<sup>(2)</sup> Rated Current	Rated current will cause the coil temperature rise $\Delta T$ of 40K $I_R$ measured with the inductor soldered in a single-layer PCB. Copper layer thickness 35μm Cu / PCB size 30x50mm. Temperature behavior dependent on circuit design, PCB layout, proximity to other components, and trace dimensions and thickness.
<sup>(3)</sup> Saturation Current <sub>25°C</sub>	Saturation current will cause L to drop from 30% at 25°C ambient temperature
<sup>(4)</sup> Saturation Current <sub>100°C</sub>	Saturation current will cause L to drop from 30% at 100°C ambient temperature
Temperature Test Condition	Electrical specifications measured at 25°C, 35% RH if not given differently
Operating Condition	Operating temperature: -40°C to +125°C (including temp rise) Should not exceed +125°C under worst-case operation conditions
Storage Condition	Tape and Reel packaging: -10°C to +40°C Humidity: <50% RH

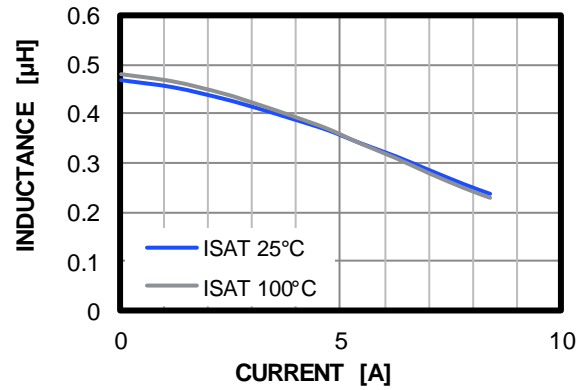
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TYPICAL PERFORMANCE CURVES

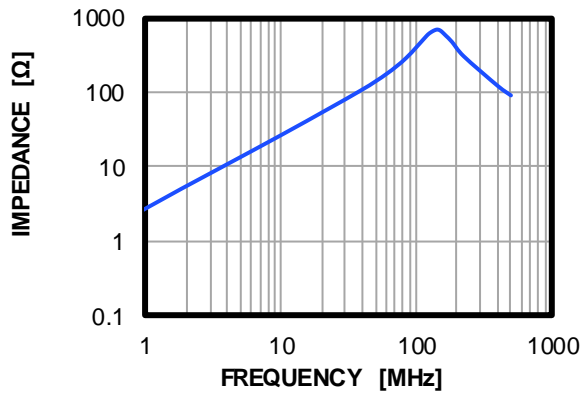
Temperature Rise vs. Current



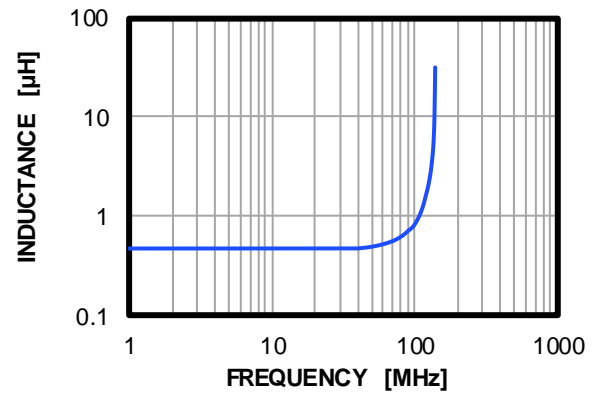
Inductance vs. Current



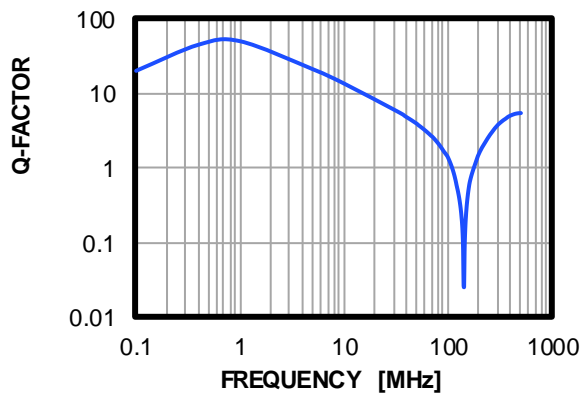
Impedance vs. Frequency



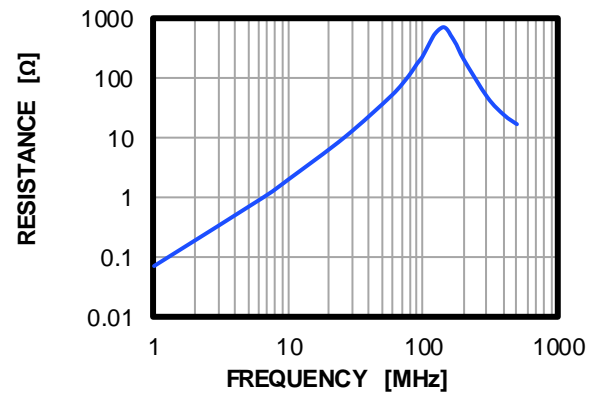
Inductance vs. Frequency



Quality Factor vs. Frequency

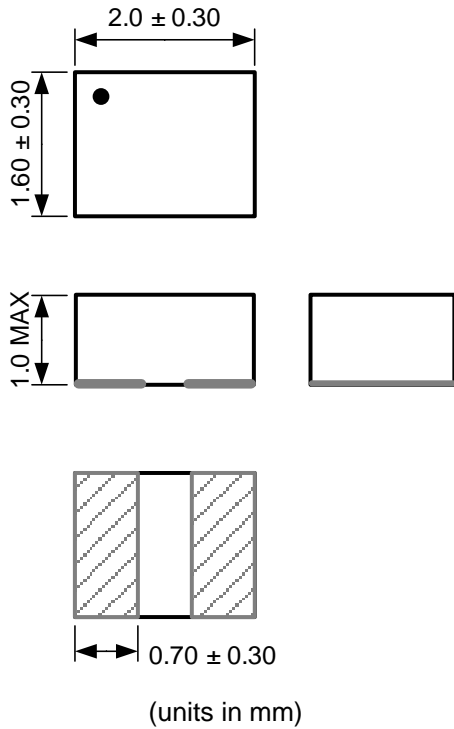


AC Resistance vs. Frequency

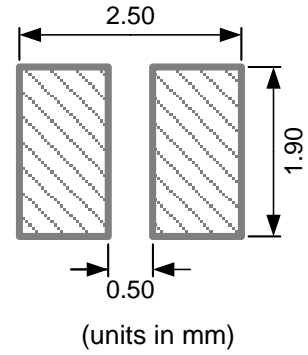


**DIMENSIONS**

**PRODUCT PACKAGE**



**RECOMMENDED LAND PATTERN**



**TOP MARKING**

**Marking**

Start of Winding . (dot)

**ORDERING INFORMATION**

Part Number	$L^{(1)}$	$R_{DC}$	$I_R^{(2)}$	$I_{SAT\ 25^\circ C}^{(3)}$	$I_{SAT\ 100^\circ C}^{(4)}$
	±20% (μH)	Typ (mΩ)	Typ (A)	Typ (A)	Typ (A)
MPL-AT2010-R47	0.47	27	4.5	5.7	5.7
MPL-AT2010-R68	0.68	41	3.6	4.9	4.9
MPL-AT2010-1R0	1.0	50	3.3	4.2	4.2
MPL-AT2010-1R5	1.5	85	2.4	3.2	3.2
MPL-AT2010-2R2	2.2	125	2.0	2.6	2.6
MPL-AT2010-4R7	4.7	215	1.5	1.9	1.9

**GENERAL SPECIFICATIONS**

<b>(1) Inductance</b>	Measured at 100kHz, 100mA
<b>(2) Rated Current</b>	Rated current will cause the coil temperature rise $\Delta T$ of 40K <i><math>I_R</math> measured with the inductor soldered in a single-layer PCB. Copper layer thickness 35μm Cu / PCB size 30x50mm. Temperature behavior dependent on circuit design, PCB layout, proximity to other components, and trace dimensions and thickness.</i>
<b>(3) Saturation Current 25°C</b>	Saturation current will cause L to drop from 30% at 25°C ambient temperature
<b>(4) Saturation Current 100°C</b>	Saturation current will cause L to drop from 30% at 100°C ambient temperature
<b>Temperature Test Condition</b>	Electrical specifications measured at 25°C, 35% RH if not given differently
<b>Operating Condition</b>	Operating temperature: -40°C to +125°C (including temp rise) Should not exceed +125°C under worst-case operation conditions
<b>Storage Condition</b>	Tape and Reel packaging: -10°C to +40°C Humidity: <50% RH

## REVISION HISTORY

Revision #	Revision Date	Description	Pages Updated
1.0	7/11/2019	Initial Release	-
1.1	8/1/2019	Updated Impedance vs. Frequency Curve	2
1.2	7/7/2023	Updated the $I_R$ (Typ) and $f_r$ (Typ) values, and made minor formatting edits in the Electrical Characteristics section	1
		Updated all the Typical Performance Curves	2
		Reordered the Dimensions section; updated the Product Package and Recommended Land Pattern images	3
		Updated the following values in the Ordering Information section: <ul style="list-style-type: none"> <li>• MPL-AT2010-R47: Updated <math>I_R</math> (Typ)</li> <li>• MPL-AT2010-R68: Updated <math>I_R</math> (Typ)</li> <li>• MPL-AT2010-1R0: Updated <math>I_R</math> (Typ)</li> <li>• MPL-AT2010-1R5: Updated <math>R_{DC}</math> (Typ)</li> <li>• MPL-AT2010-2R2: Updated <math>R_{DC}</math> (Typ), <math>I_R</math> (Typ), <math>I_{SAT}</math> 25°C (Typ), and <math>I_{SAT}</math> 100°C (Typ)</li> </ul>	4

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