

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 ⁽¹⁾ | L | ±20% | 1.0 | μH |
| Resistance | R_{DC} | Typ | 50 | mΩ |
| Resistance _{MAX} | $R_{DC\ MAX}$ | Max | 60 | mΩ |
| Rated Current ⁽²⁾ | I_R | Typ | 3.3 | A |
| Saturation Current _{25°C} ⁽³⁾ | $I_{SAT\ 25°C}$ | Typ | 4.2 | A |
| Saturation Current _{100°C} ⁽⁴⁾ | $I_{SAT\ 100°C}$ | Typ | 4.2 | A |
| Resonance Frequency | f_r | Typ | 66 | MHz |

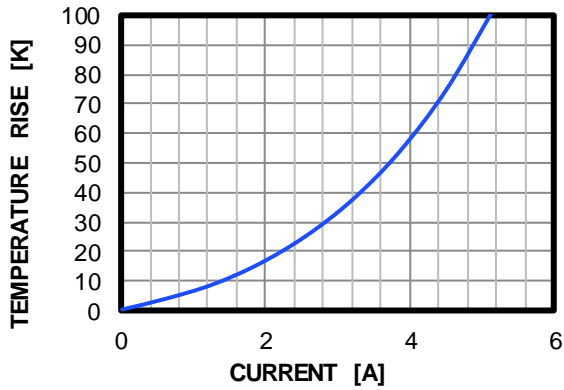
GENERAL SPECIFICATIONS

| | |
|--|--|
| ⁽¹⁾ Inductance | Measured at 100kHz, 100mA |
| ⁽²⁾ Rated Current | Rated current will cause the coil temperature rise ΔT 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. |
| ⁽³⁾ Saturation Current _{25°C} | Saturation current will cause L to drop from 30% at 25°C ambient temperature |
| ⁽⁴⁾ Saturation Current _{100°C} | 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 |

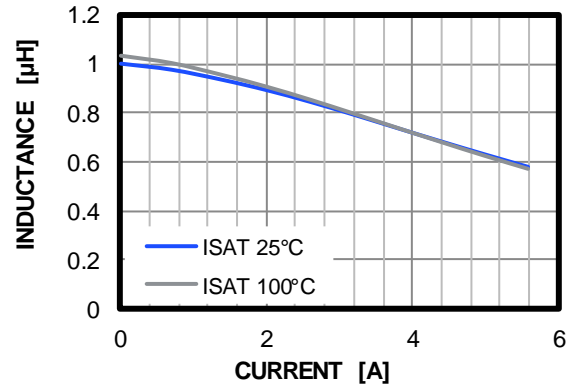
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TYPICAL PERFORMANCE CURVES

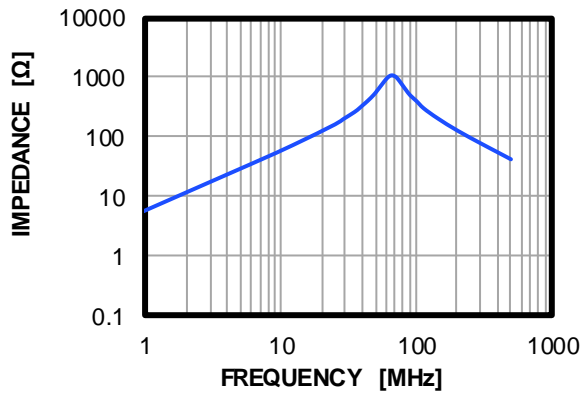
Temperature Rise vs. Current



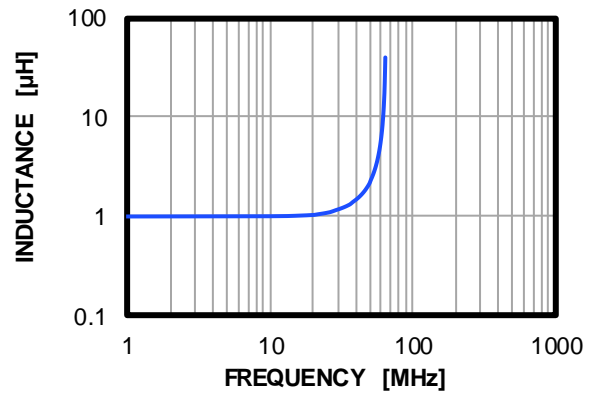
Inductance vs. Current



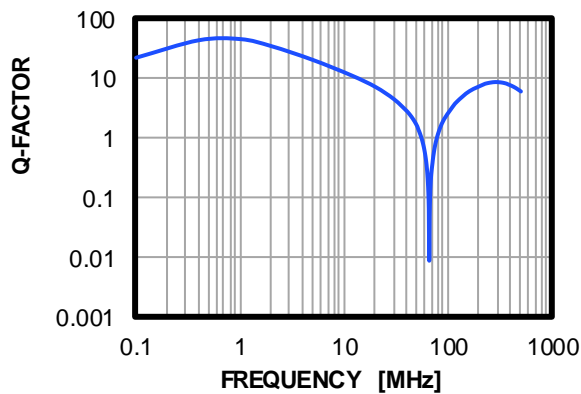
Impedance vs. Frequency



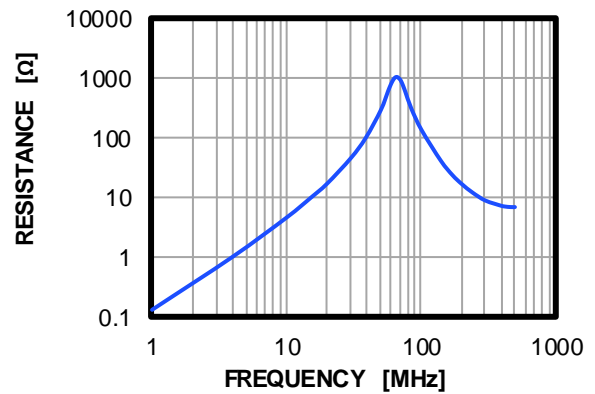
Inductance vs. Frequency



Quality Factor vs. Frequency

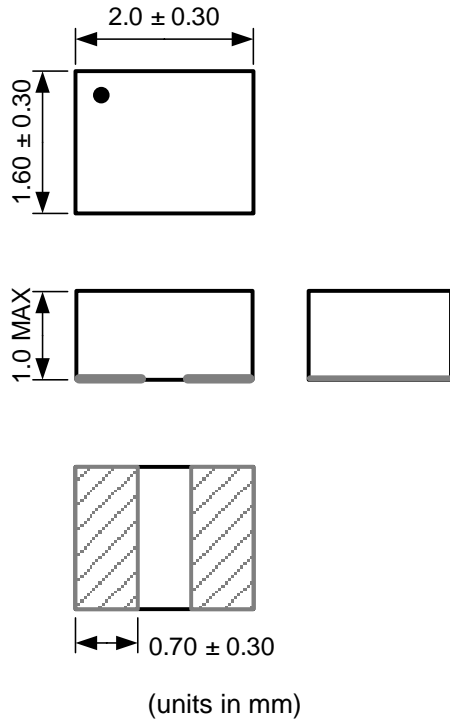


AC Resistance vs. Frequency

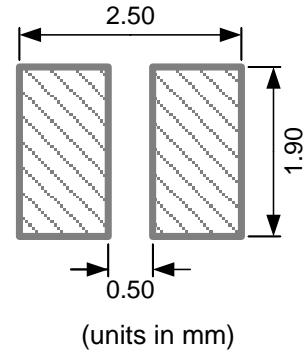


DIMENSIONS

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

| | |
|-------------------------------------|--|
| (1) Inductance | Measured at 100kHz, 100mA |
| (2) Rated Current | Rated current will cause the coil temperature rise ΔT of 40K <i>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.</i> |
| (3) Saturation Current 25°C | Saturation current will cause L to drop from 30% at 25°C ambient temperature |
| (4) Saturation Current 100°C | 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 |

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"> • MPL-AT2010-R47: Updated I_R (Typ) • MPL-AT2010-R68: Updated I_R (Typ) • MPL-AT2010-1R0: Updated I_R (Typ) • MPL-AT2010-1R5: Updated R_{DC} (Typ) • MPL-AT2010-2R2: Updated R_{DC} (Typ), I_R (Typ), I_{SAT} 25°C (Typ), and I_{SAT} 100°C (Typ) | 4 |

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