# MPL-AT2010-1R5

## Low-Profile Molded Inductor 1.5µH

## 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% | 1.5 | µH |
| Resistance | $R_{DC}$ | Typ | 85 | mΩ |
| Resistance MAX | $R_{DC\ MAX}$ | Max | 100 | mΩ |
| Rated Current (2) | $I_R$ | Typ | 2.4 | A |
| Saturation Current 25°C (3) | $I_{SAT\ 25°C}$ | Typ | 3.2 | A |
| Saturation Current 100°C (4) | $I_{SAT\ 100°C}$ | Typ | 3.2 | A |
| Resonance Frequency | $f_r$ | Typ | 58 | MHz |

## GENERAL SPECIFICATIONS

| | |
|---|---|
| (1) Inductance | Measured at 100kHz, 100mA |
| (2) Rated Current | Rated current will cause the coil temperature rise ΔT of 40K<br>*$I_R$ 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)<br>Should not exceed +125°C under worst-case operation conditions |
| Storage Condition | Tape and Reel packaging: -10°C to +40°C<br>Humidity: <50% RH |

All MPS parts are lead-free, halogen-free, and adhere to the RoHS directive. For MPS green status, please visit the MPS website under Quality Assurance. “MPS”, the MPS logo, and “Simple, Easy Solutions” are registered trademarks of Monolithic Power Systems, Inc. or its subsidiaries.


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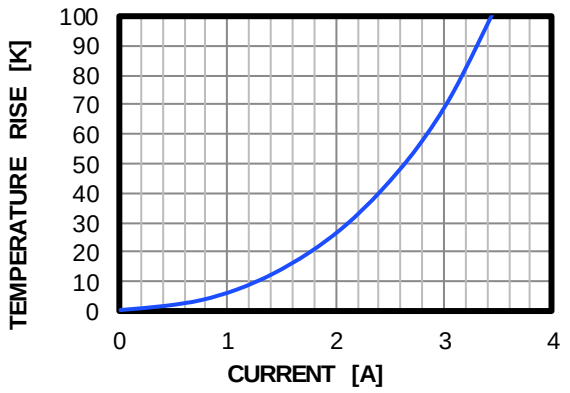
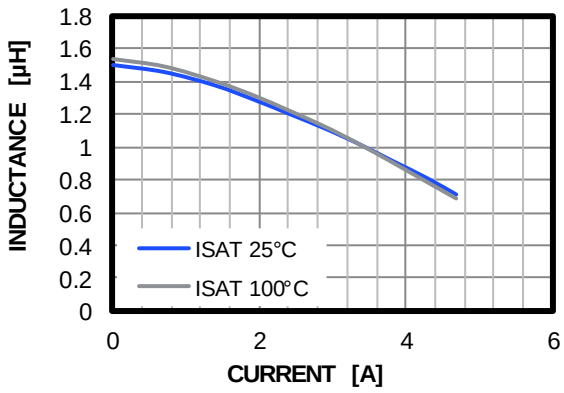
## TYPICAL PERFORMANCE CURVES

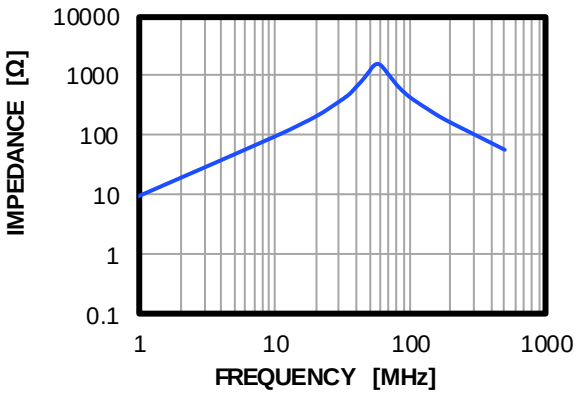
### Temperature Rise vs. Current



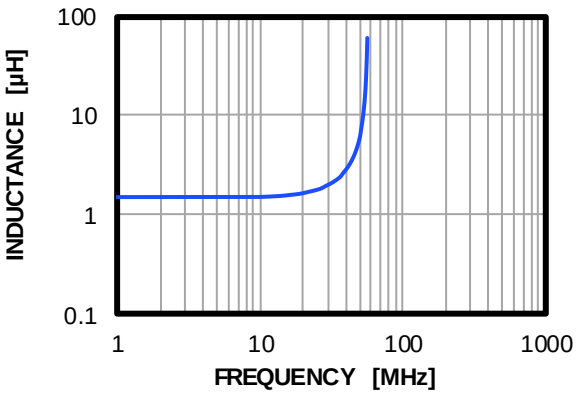

### Inductance vs. Current



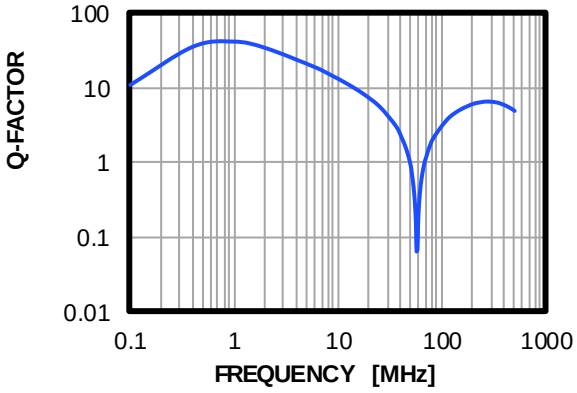

### Impedance vs. Frequency



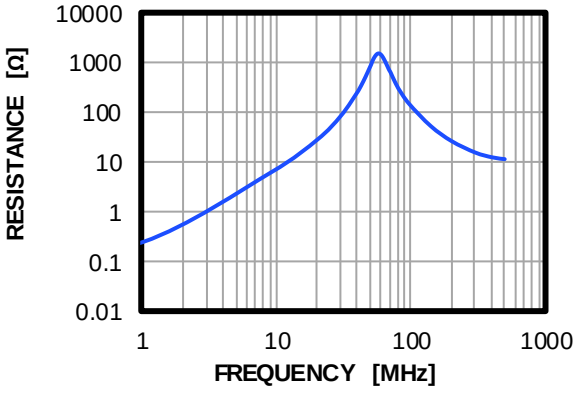

### Inductance vs. Frequency




### Quality Factor vs. Frequency




### AC Resistance vs. Frequency





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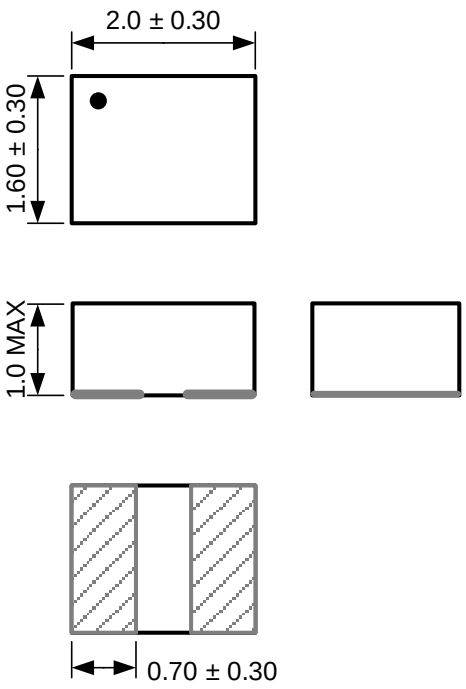
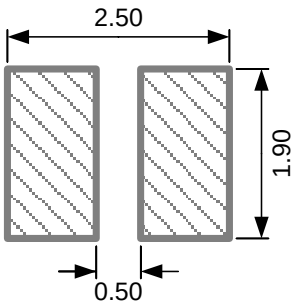
## DIMENSIONS

### PRODUCT PACKAGE




(units in mm)

### RECOMMENDED LAND PATTERN




(units in mm)

### TOP MARKING

| Marking | |
|---|---|
| Start of Winding | . (dot) |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## ORDERING INFORMATION

| Part Number | $L$ (1) ±20% (µH) | $R_{DC}$ Typ (mΩ) | $I_R$ (2) Typ (A) | $I_{SAT\ 25°C}$ (3) Typ (A) | $I_{SAT\ 100°C}$ (4) 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<br>*$I_R$ 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)<br>Should not exceed +125°C under worst-case operation conditions |
| **Storage Condition** | Tape and Reel packaging: -10°C to +40°C<br>Humidity: <50% RH |


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## REVISION HISTORY

| Revision # | Revision Date | Description | Pages Updated |
|---|---|---|---|
| 1.0 | 7/11/2019 | Initial Release | - |
| 1.1 | 7/29/2019 | Updated Impedance vs. Frequency Curve | 2 |
| 1.2 | 7/7/2023 | Updated the $R_{DC}$ (Typ), $R_{DC\ MAX}$, 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:<br>• MPL-AT2010-R47: Updated $I_R$ (Typ)<br>• MPL-AT2010-R68: Updated $I_R$ (Typ)<br>• MPL-AT2010-1R0: Updated $I_R$ (Typ)<br>• MPL-AT2010-1R5: Updated $R_{DC}$ (Typ)<br>• 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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