

### APPLICATIONS



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

### FEATURES

- Size 2.5mmx2.0mmx1.2mm
- 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

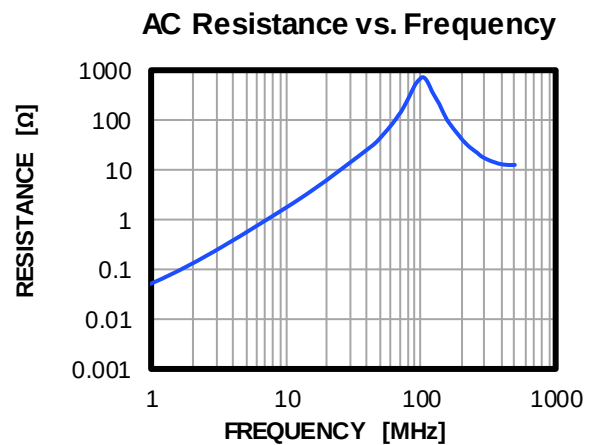
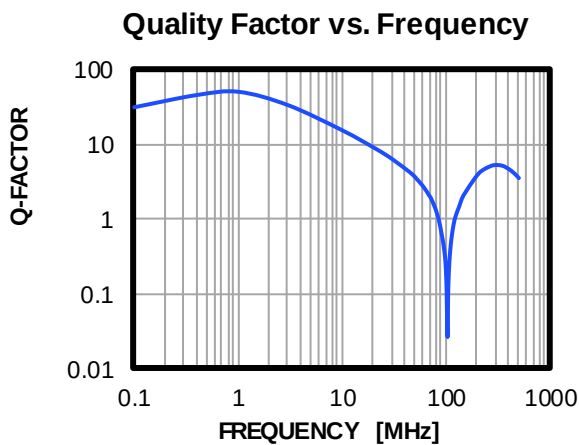
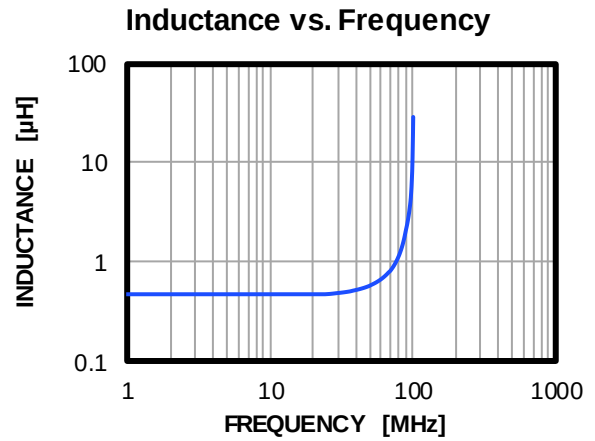
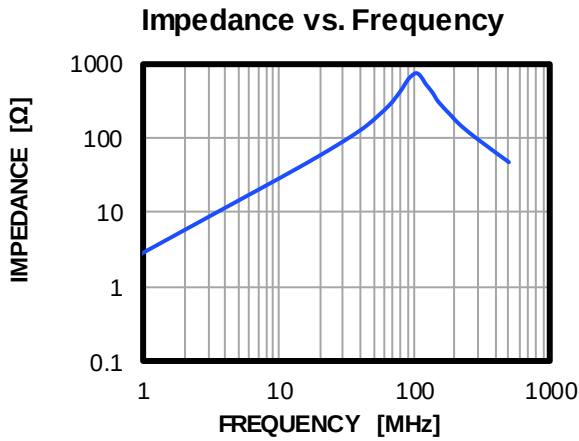
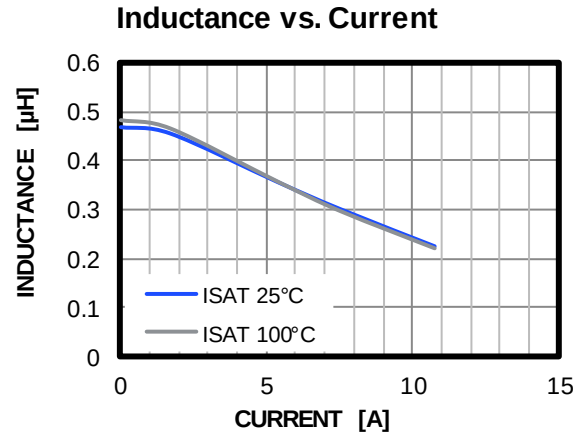
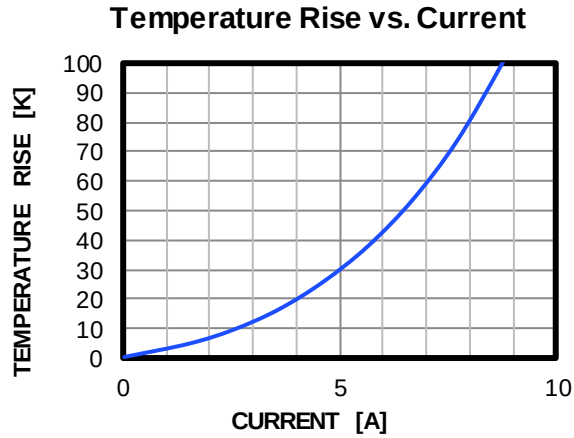
| Parameter                               |                 |      | Value | Unit |
|-----------------------------------------|-----------------|------|-------|------|
| Inductance <sup>(1)</sup>               | $L$             | ±20% | 0.47  | μH   |
| Resistance                              | $R_{DC}$        | Typ  | 14    | mΩ   |
| Resistance $_{MAX}$                     | $R_{DC MAX}$    | Max  | 18    | mΩ   |
| Rated Current <sup>(2)</sup>            | $I_R$           | Typ  | 5.8   | A    |
| Saturation Current 25°C <sup>(3)</sup>  | $I_{SAT 25°C}$  | Typ  | 6.4   | A    |
| Saturation Current 100°C <sup>(4)</sup> | $I_{SAT 100°C}$ | Typ  | 6.4   | A    |
| Resonance Frequency                     | $f_r$           | Typ  | 102   | MHz  |

### GENERAL SPECIFICATIONS

|                                         |                                                                                                                                                                                                                                                                                                                      |
|-----------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <sup>(1)</sup> Inductance               | Measured at 100kHz, 100mA                                                                                                                                                                                                                                                                                            |
| <sup>(2)</sup> 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. |
| <sup>(3)</sup> Saturation Current 25°C  | Saturation current will cause L to drop from 30% at 25°C ambient temperature                                                                                                                                                                                                                                         |
| <sup>(4)</sup> 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                                                                                                                                                                                                                                                         |

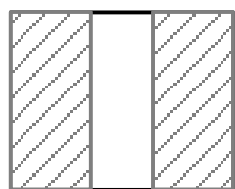
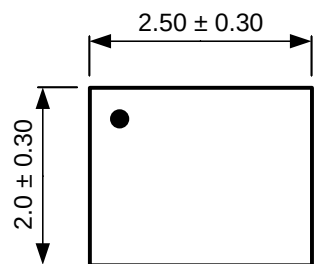
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**TYPICAL PERFORMANCE CURVES**



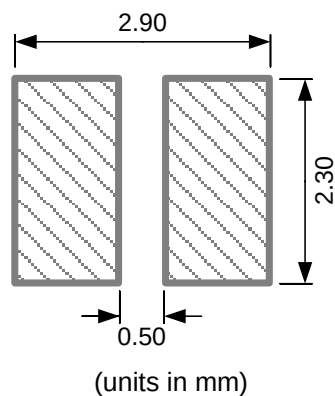
## DIMENSIONS

### PRODUCT PACKAGE



0.90 ± 0.30  
(units in mm)

### RECOMMENDED LAND PATTERN



## TOP MARKING

### Marking

Start of Winding . (dot)

## ORDERING INFORMATION

| Part Number    | $L^{(1)}$<br>±20% (μH) | $R_{DC}$<br>Typ (mΩ) | $I_R^{(2)}$<br>Typ (A) | $I_{SAT\ 25^{\circ}C}^{(3)}$<br>Typ (A) | $I_{SAT\ 100^{\circ}C}^{(4)}$<br>Typ (A) |
|----------------|------------------------|----------------------|------------------------|-----------------------------------------|------------------------------------------|
| MPL-AT2512-R33 | 0.33                   | 13                   | 6.4                    | 7.8                                     | 7.8                                      |
| MPL-AT2512-R47 | 0.47                   | 14                   | 5.8                    | 6.4                                     | 6.4                                      |
| MPL-AT2512-R68 | 0.68                   | 23                   | 4.8                    | 6                                       | 6                                        |
| MPL-AT2512-1R0 | 1                      | 33                   | 4.1                    | 5.2                                     | 5.2                                      |
| MPL-AT2512-1R5 | 1.5                    | 43                   | 3.4                    | 4.2                                     | 4.2                                      |
| MPL-AT2512-2R2 | 2.2                    | 68                   | 2.8                    | 3.4                                     | 3.4                                      |
| MPL-AT2512-3R3 | 3.3                    | 116                  | 2.2                    | 3                                       | 3                                        |
| MPL-AT2512-4R7 | 4.7                    | 170                  | 1.8                    | 2.4                                     | 2.4                                      |
| MPL-AT2512-6R8 | 6.8                    | 280                  | 1.4                    | 2.2                                     | 2.2                                      |
| MPL-AT2512-100 | 10                     | 355                  | 1.2                    | 1.7                                     | 1.7                                      |

## 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<br><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 <math>_{25^{\circ}C}</math></b>  | Saturation current will cause L to drop from 30% at 25°C ambient temperature                                                                                                                                                                                                                                                                   |
| <b>(4) Saturation Current <math>_{100^{\circ}C}</math></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)<br>Should not exceed +125°C under worst-case operation conditions                                                                                                                                                                                                                 |
| <b>Storage Condition</b>                                   | Tape and Reel packaging: -10°C to +40°C<br>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        | 7/6/2023      | Updated the R <sub>DC</sub> (Typ), R <sub>DC MAX</sub> , I <sub>R</sub> (Typ), and f <sub>r</sub> (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             |
|            |               | Made minor formatting edits and updated the following values in the Ordering Information section:<br><ul style="list-style-type: none"> <li>• Replaced the MPL-AT2514-2R2 and MPL-AT2514-4R7 with the MPL-AT2512-2R2 and MPL-AT2512-4R7, respectively</li> <li>• MPL-AT2512-R33: Updated R<sub>DC</sub> (Typ), I<sub>SAT 25°C</sub> (Typ), and I<sub>SAT 100°C</sub> (Typ)</li> <li>• MPL-AT2512-R47: Updated R<sub>DC</sub> (Typ) and I<sub>R</sub> (Typ)</li> <li>• MPL-AT2512-R68: Updated R<sub>DC</sub> (Typ) and I<sub>R</sub> (Typ)</li> <li>• MPL-AT2512-1R0: Updated R<sub>DC</sub> (Typ) and I<sub>R</sub> (Typ)</li> <li>• MPL-AT2512-1R5: Updated R<sub>DC</sub> (Typ) and I<sub>R</sub> (Typ)</li> <li>• MPL-AT2512-3R3: Updated R<sub>DC</sub> (Typ), I<sub>R</sub> (Typ), I<sub>SAT 25°C</sub> (Typ), and I<sub>SAT 100°C</sub> (Typ)</li> </ul> | 4             |

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