



### APPLICATIONS

- Battery-powered devices
- Portable devices
- Embedded computing
- High-current SMPS
- High-frequency SMPS
- POL converters
- FPGA

### FEATURES

- Size 11mmx10mmx4.8mm
- Molded Construction
- Low Audible Noise
- Soft Saturation
- Stable Over High Temperatures
- Max Operating Temp +155°C
- RoHS/REACH-Compliant, Halogen-Free

### ELECTRICAL CHARACTERISTICS

| Parameter                                           |                        |            | Value | Unit       |
|-----------------------------------------------------|------------------------|------------|-------|------------|
| Inductance <sup>(1)</sup>                           | $L$                    | $\pm 20\%$ | 4.7   | $\mu$ H    |
| Resistance                                          | $R_{DC}$               | typ        | 9.5   | m $\Omega$ |
| Resistance $_{MAX}$                                 | $R_{DC MAX}$           | max        | 10.7  | m $\Omega$ |
| Rated Current <sup>(2)</sup>                        | $I_R$                  | typ        | 11.5  | A          |
| Saturation Current $_{25^{\circ}C}$ <sup>(3)</sup>  | $I_{SAT 25^{\circ}C}$  | typ        | 15    | A          |
| Saturation Current $_{100^{\circ}C}$ <sup>(4)</sup> | $I_{SAT 100^{\circ}C}$ | typ        | 15    | A          |
| Resonance Frequency                                 | $f_r$                  | typ        | 15    | MHz        |

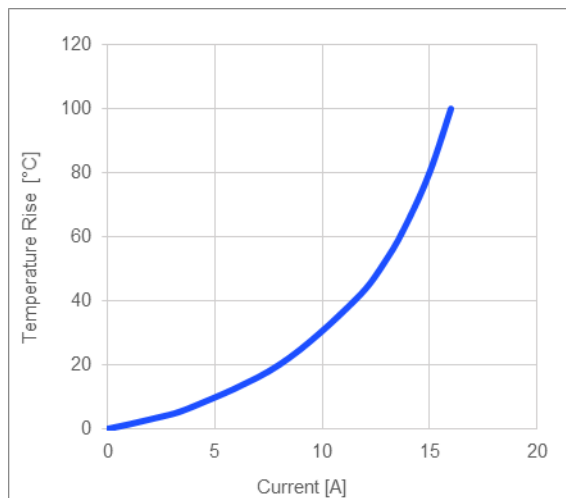
### GENERAL SPECIFICATIONS

|                                                     |                                                                                                                                                                                                                                                                                                                                    |
|-----------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <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<br>$I_R$ measured with the inductor soldered in a single-layer PCB. Copper layer thickness 35 $\mu$ m 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 $_{25^{\circ}C}$  | Saturation current will cause L to drop from 30% at 25°C ambient temperature                                                                                                                                                                                                                                                       |
| <sup>(4)</sup> Saturation Current $_{100^{\circ}C}$ | 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 +155°C (including temp rise)<br>Should not exceed +155°C under worst-case operation conditions                                                                                                                                                                                                     |
| Storage Condition                                   | Tape and Reel packaging: -10°C to +40°C<br>Humidity: <50% RH                                                                                                                                                                                                                                                                       |

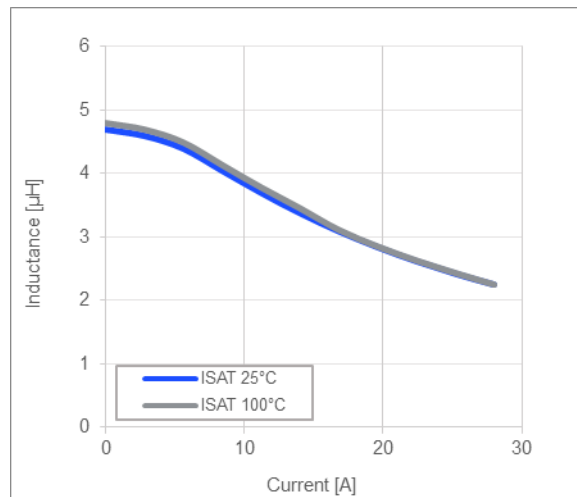
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**TYPICAL PERFORMANCE CURVES**

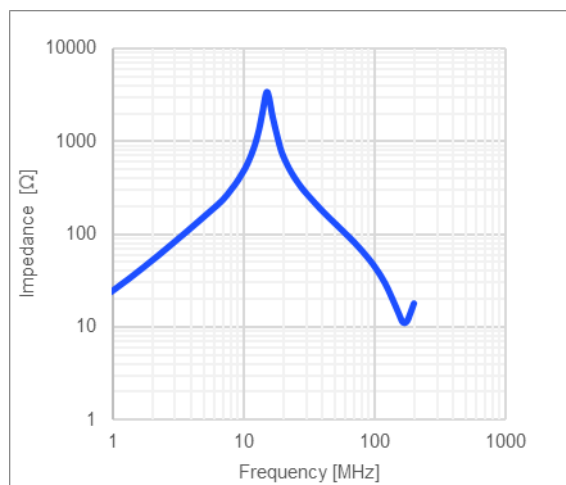
**Temperature Rise vs. Current**



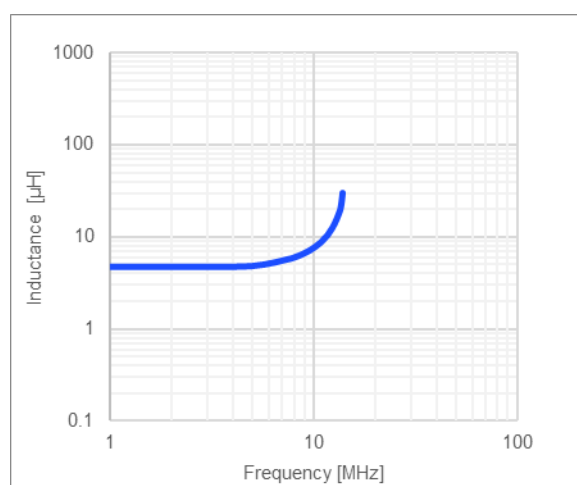
**Inductance vs. Current**



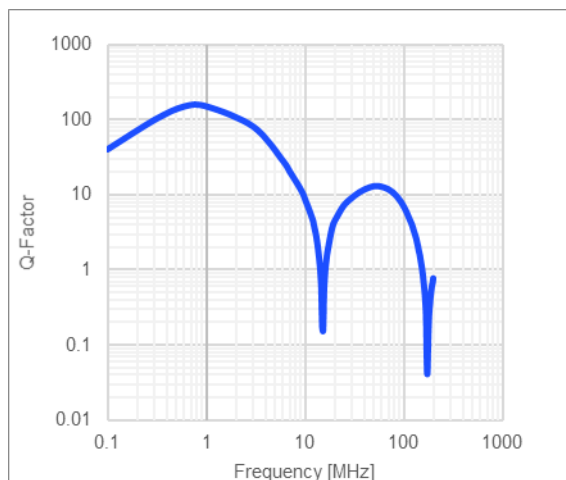
**Impedance vs. Frequency**



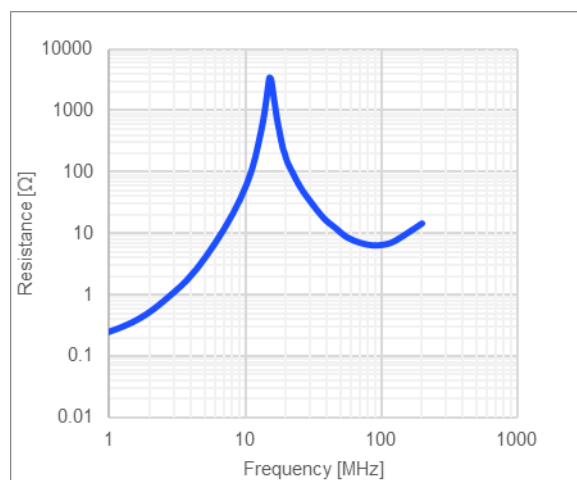
**Inductance vs. Frequency**



**Quality Factor vs. Frequency**



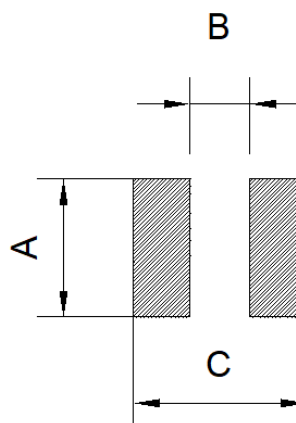
**AC Resistance vs. Frequency**



# LAND PATTERN

## Dimensions

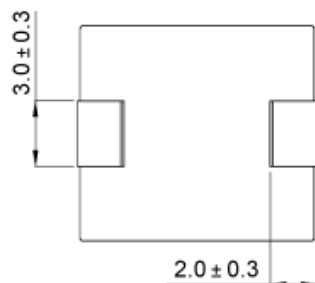
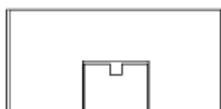
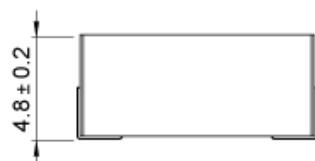
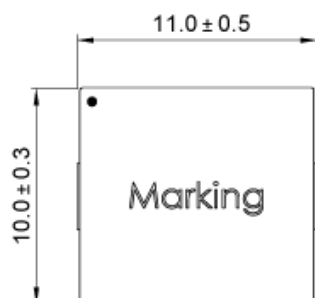
|   |                            |
|---|----------------------------|
| A | 3.50 ref.                  |
| B | 5.40 ref.                  |
| C | 12.50 ref.<br>(unit in mm) |



# PRODUCT PACKAGE AND DIMENSIONS

## Dimensions

(unit in mm)



# TOP MARKING

## Marking

|                  |         |
|------------------|---------|
| Start of Winding | · (dot) |
| Inductance Code  | 4R7     |
| MPS Code         | MPS     |
| Date Code        | YYWW    |

## ORDERING INFORMATION

| Part Number    | $L^{(1)}$<br>typ (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-AY1050-R47 | 0.47                  | 1.25                 | 25                     | 41                                     | 41                                      |
| MPL-AY1050-R68 | 0.68                  | 1.75                 | 23                     | 36                                     | 36                                      |
| MPL-AY1050-1R0 | 1.0                   | 2.6                  | 19                     | 33                                     | 33                                      |
| MPL-AY1050-1R5 | 1.5                   | 3.4                  | 17                     | 26.5                                   | 26.5                                    |
| MPL-AY1050-2R2 | 2.2                   | 4.9                  | 15                     | 19.5                                   | 19.5                                    |
| MPL-AY1050-3R3 | 3.3                   | 8                    | 12.5                   | 17                                     | 17                                      |
| MPL-AY1050-4R7 | 4.7                   | 9.5                  | 11.5                   | 15                                     | 15                                      |
| MPL-AY1050-5R6 | 5.6                   | 13                   | 9.8                    | 14                                     | 14                                      |
| MPL-AY1050-6R8 | 6.8                   | 15                   | 9                      | 13                                     | 13                                      |
| MPL-AY1050-100 | 10                    | 19                   | 7.8                    | 12                                     | 12                                      |

## 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 +155°C (including temp rise)<br>Should not exceed +155°C under worst-case operation conditions                                                                                                                                                                                                                 |
| <b>Storage Condition</b>                                  | Tape and Reel packaging: -10°C to +40°C<br>Humidity: <50% RH                                                                                                                                                                                                                                                                                   |

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