

### APPLICATIONS



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

### FEATURES

- Size 5.5mmx5.3mmx4.8mm
- Low DCR
- Low AC Losses
- Low Audible Noise
- Molded Construction
- 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>                          | $L$              | ±20% | 5.6   | μH   |
| Resistance                                         | $R_{DC}$         | typ  | 20    | mΩ   |
| Resistance <sub>MAX</sub>                          | $R_{DC\ MAX}$    | max  | 24.2  | mΩ   |
| Rated Current <sup>(2)</sup>                       | $I_R$            | typ  | 6.8   | A    |
| Saturation Current <sub>25°C</sub> <sup>(3)</sup>  | $I_{SAT\ 25°C}$  | typ  | 8     | A    |
| Saturation Current <sub>100°C</sub> <sup>(4)</sup> | $I_{SAT\ 100°C}$ | typ  | 8     | A    |
| Resonance Frequency                                | $f_r$            | typ  | 19    | MHz  |

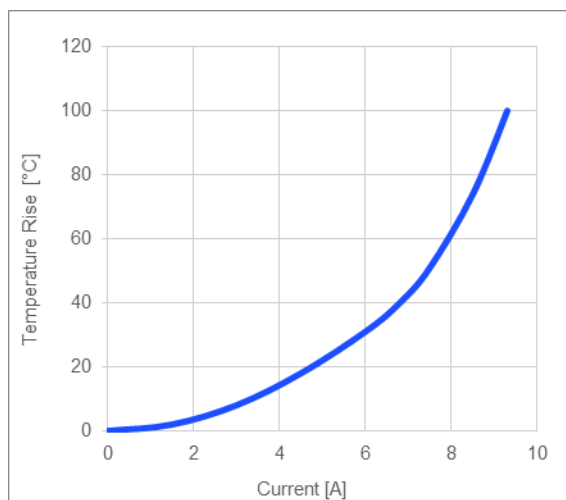
### GENERAL SPECIFICATIONS

|                                                    |                                                                                                                                                                                                                                                                                                                      |
|----------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <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 <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 +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                                                                                                                                                                                                                                                         |

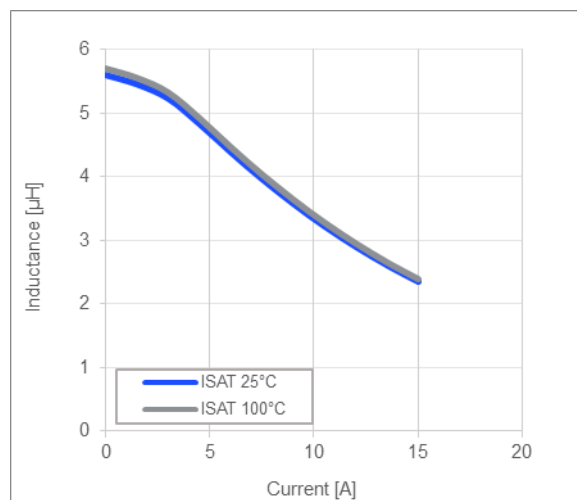
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## TYPICAL PERFORMANCE CURVES

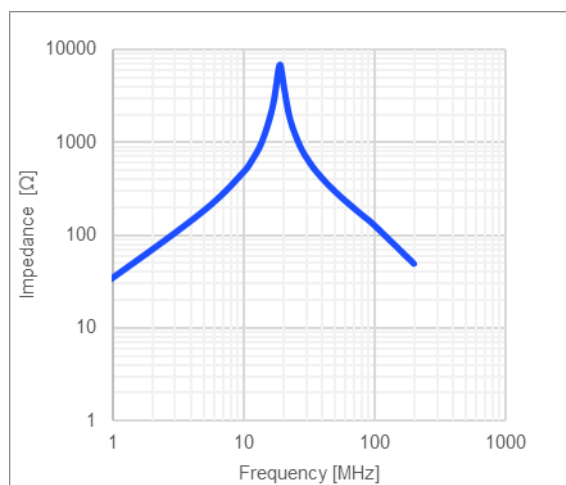
Temperature Rise vs. Current



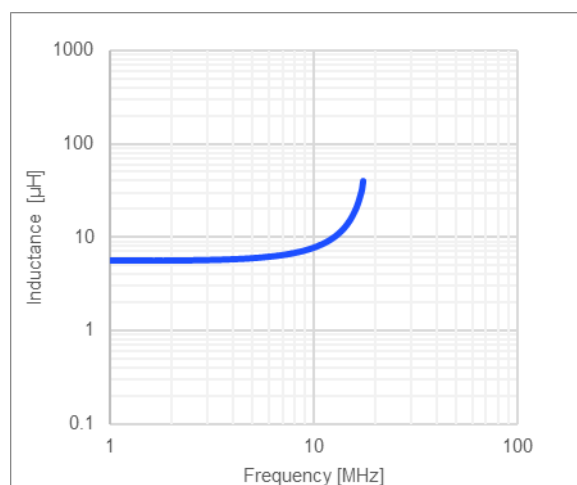
Inductance vs. Current



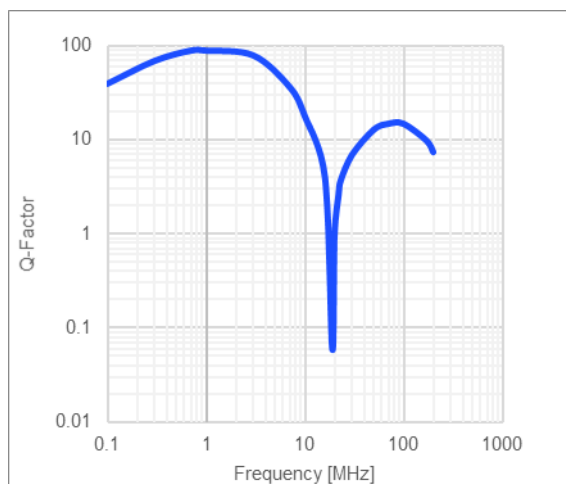
Impedance vs. Frequency



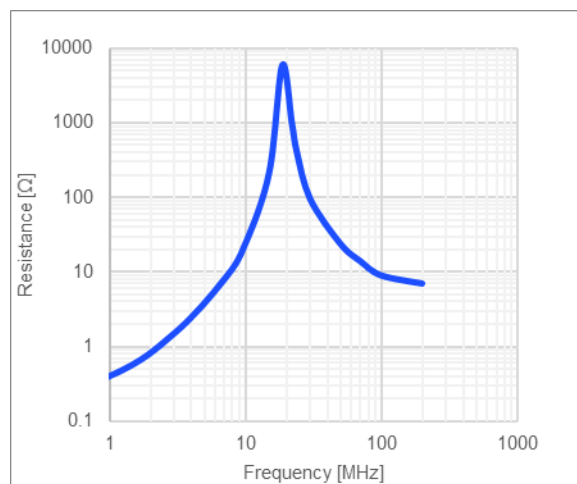
Inductance vs. Frequency



**Quality Factor vs. Frequency**



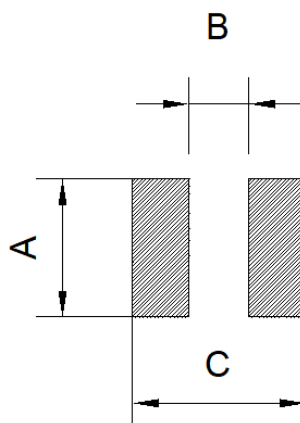
**AC Resistance vs. Frequency**



## LAND PATTERN

### Dimensions

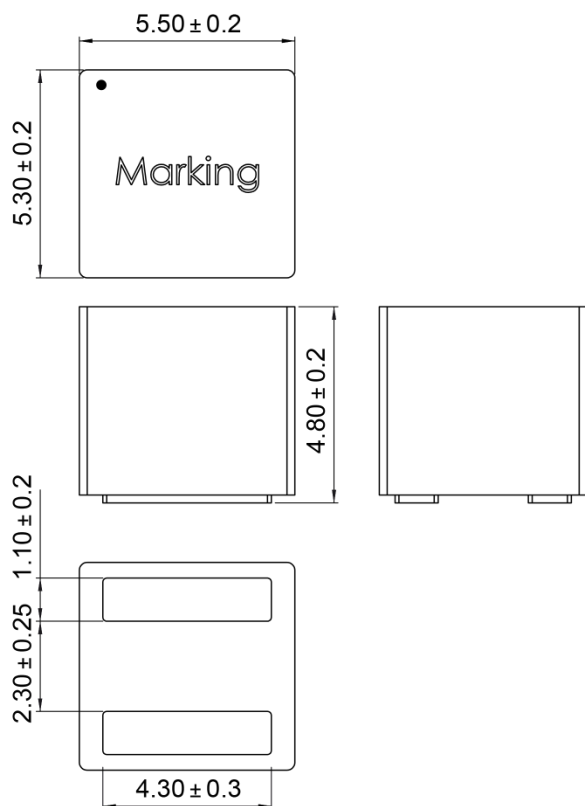
|   |                           |
|---|---------------------------|
| A | 4.70 ref.                 |
| B | 2.0 ref.                  |
| C | 4.50 ref.<br>(unit in mm) |



## PRODUCT PACKAGE AND DIMENSIONS

### Dimensions

(unit in mm)



## TOP MARKING

### Marking

|                  |         |
|------------------|---------|
| Start of Winding | · (dot) |
| Inductance Code  | 5R6     |
| MPS Code         | MPS     |

## ORDERING INFORMATION

| Part Number    | $L^{(1)}$ | $R_{DC}$ | $I_R^{(2)}$ | $I_{SAT\ 25^\circ C}^{(3)}$ | $I_{SAT\ 100^\circ C}^{(4)}$ |
|----------------|-----------|----------|-------------|-----------------------------|------------------------------|
|                | typ (μH)  | typ (mΩ) | typ (A)     | typ (A)                     | typ (A)                      |
| MPL-AL5050-5R6 | 5.6       | 20       | 6.8         | 8                           | 8                            |
| MPL-AL5050-6R8 | 6.8       | 25       | 6.1         | 7.6                         | 7.6                          |
| MPL-AL5050-8R2 | 8.2       | 28       | 5.8         | 7.2                         | 7.2                          |
| MPL-AL5050-100 | 10        | 37       | 4.8         | 5.5                         | 5.5                          |

## 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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