

### APPLICATIONS



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

### FEATURES

- Size 4.1mmx4.1mmx1.9mm
- 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% | 4.7   | μH   |
| Resistance                                         | $R_{DC}$         | typ  | 52.2  | mΩ   |
| Resistance <sub>MAX</sub>                          | $R_{DC\ MAX}$    | max  | 57.4  | mΩ   |
| Rated Current <sup>(2)</sup>                       | $I_R$            | typ  | 3.65  | A    |
| Saturation Current <sub>25°C</sub> <sup>(3)</sup>  | $I_{SAT\ 25°C}$  | typ  | 4.2   | A    |
| Saturation Current <sub>100°C</sub> <sup>(4)</sup> | $I_{SAT\ 100°C}$ | typ  | 4.2   | A    |
| Resonance Frequency                                | $f_r$            | typ  | 21    | MHz  |

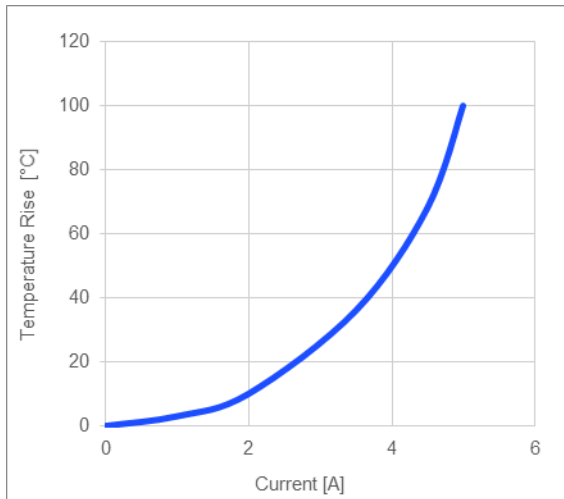
### GENERAL SPECIFICATIONS

|                                                |                                                                                                                                                                                                                                                                                                                              |
|------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <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>$I_R$ 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. |
| <b>(3) Saturation Current <sub>25°C</sub></b>  | Saturation current will cause L to drop from 30% at 25°C ambient temperature                                                                                                                                                                                                                                                 |
| <b>(4) Saturation Current <sub>100°C</sub></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                                                                                                                                                                                                                                                                 |

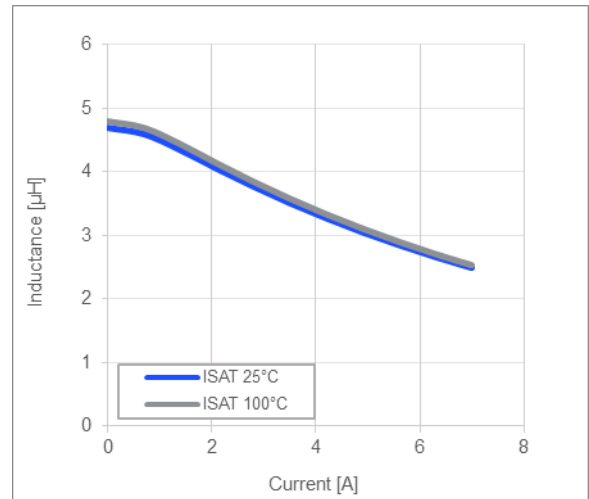
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TYPICAL PERFORMANCE CURVES

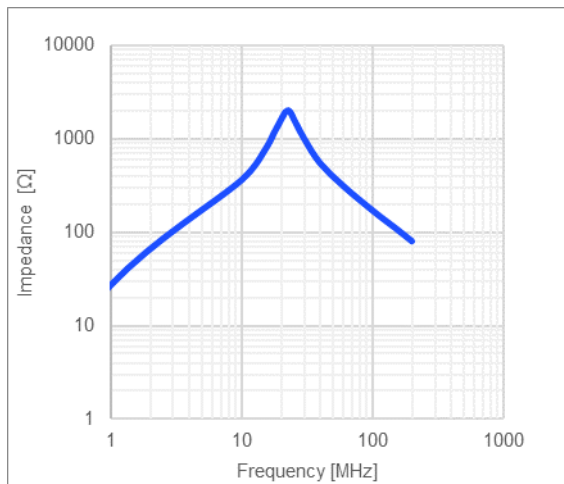
Temperature Rise vs. Current



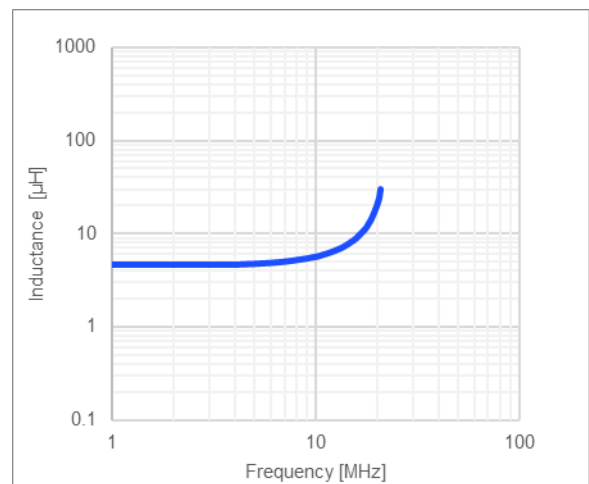
Inductance vs. Current



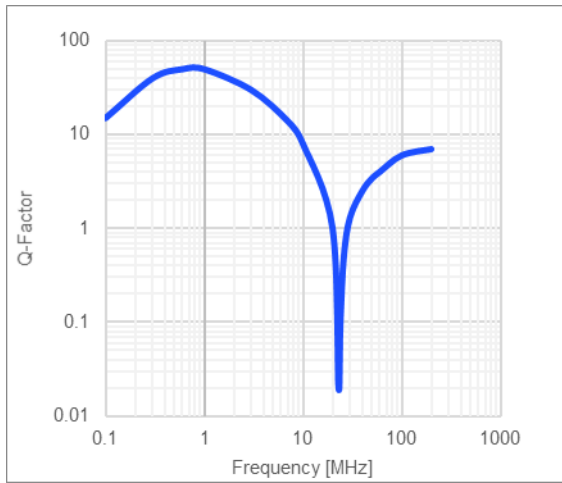
Impedance vs. Frequency



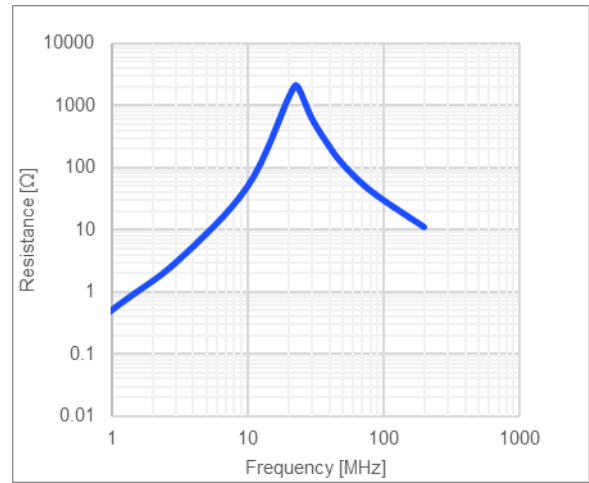
Inductance vs. Frequency



Quality Factor vs. Frequency



AC Resistance vs. Frequency



**LAND PATTERN**

**Dimensions**

|   |           |
|---|-----------|
| A | 3.80 ref. |
| B | 1.40 ref. |
| C | 3.40 ref. |

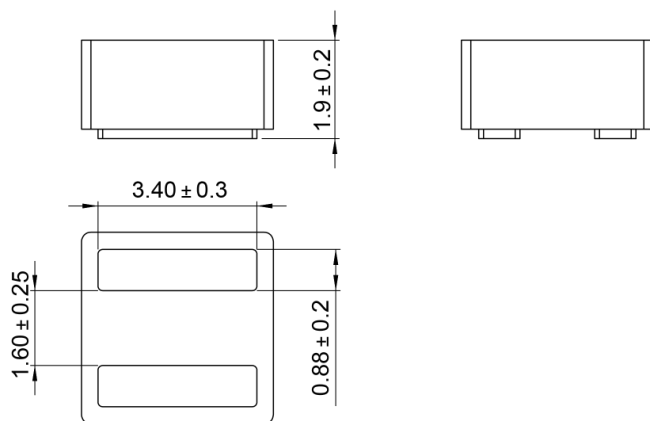
(unit in mm)



**PRODUCT PACKAGE AND DIMENSIONS**

**Dimensions**

(unit in mm)



**TOP MARKING**

**Marking**

|                  |         |
|------------------|---------|
| Start of Winding | · (dot) |
| Inductance Code  | 4R7     |
| 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-AL4020-R47 | 0.47      | 6.2      | 9.2         | 12.5                        | 12.5                         |
| MPL-AL4020-R68 | 0.68      | 7.5      | 8.7         | 11                          | 11                           |
| MPL-AL4020-R82 | 0.82      | 9.0      | 8.4         | 9.5                         | 9.5                          |
| MPL-AL4020-1R0 | 1.0       | 10.1     | 7.9         | 8.6                         | 8.6                          |
| MPL-AL4020-1R2 | 1.2       | 12.2     | 7.4         | 7.5                         | 7.5                          |
| MPL-AL4020-1R5 | 1.5       | 14.5     | 6.4         | 7.1                         | 7.1                          |
| MPL-AL4020-2R2 | 2.2       | 21.5     | 5.5         | 6.2                         | 6.2                          |
| MPL-AL4020-3R3 | 3.3       | 34.5     | 4.4         | 5.2                         | 5.2                          |
| MPL-AL4020-4R7 | 4.7       | 52.2     | 3.65        | 4.2                         | 4.2                          |

**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 25°C</b>  | Saturation current will cause L to drop from 30% at 25°C ambient temperature                                                                                                                                                                                                                                                                   |
| <b>(4) Saturation Current 100°C</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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