



### APPLICATIONS

- Battery-powered devices
- High-efficiency SMPS
- Embedded computing
- Input filters

### FEATURES

- Size 4.9mmx4.9mmx4mm
- Semi-Shielded Construction
- Low DCR
- Low Stray Field
- Max Operating Temp +125°C
- RoHS/REACH-Compliant, Halogen-Free

### ELECTRICAL CHARACTERISTICS

| Parameter                                          |                  |      | Value | Unit |
|----------------------------------------------------|------------------|------|-------|------|
| Inductance <sup>(1)</sup>                          | $L$              | ±20% | 1.0   | μH   |
| Resistance                                         | $R_{DC}$         | typ  | 9.4   | mΩ   |
| Resistance <sub>MAX</sub>                          | $R_{DC\ MAX}$    | max  | 11    | mΩ   |
| Rated Current <sup>(2)</sup>                       | $I_R$            | typ  | 7.6   | A    |
| Saturation Current <sub>25°C</sub> <sup>(3)</sup>  | $I_{SAT\ 25°C}$  | typ  | 10.5  | A    |
| Saturation Current <sub>100°C</sub> <sup>(4)</sup> | $I_{SAT\ 100°C}$ | typ  | 9     | A    |
| Resonance Frequency                                | $f_r$            | typ  | 105   | MHz  |

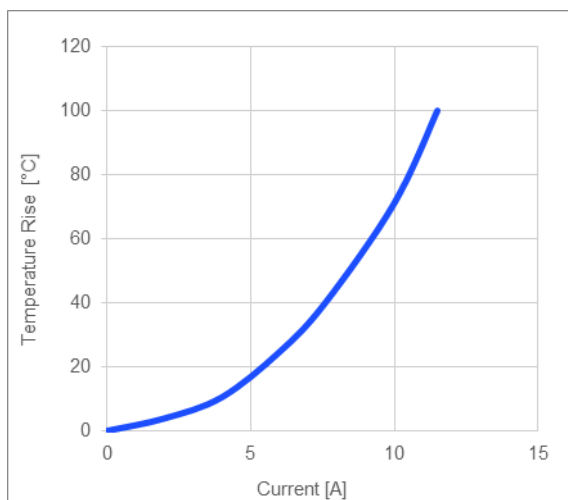
### GENERAL SPECIFICATIONS

|                                                    |                                                                                                                                                                                                                                                                                                                                     |
|----------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <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>I<sub>R</sub> 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> |
| <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 +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                                                                                                                                                                                                                                                                        |

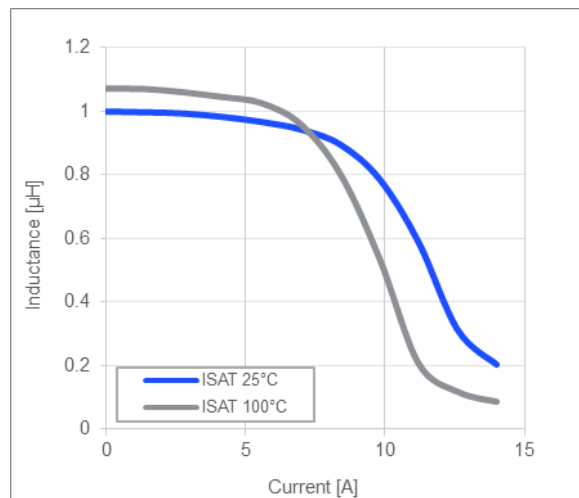
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**TYPICAL PERFORMANCE CURVES**

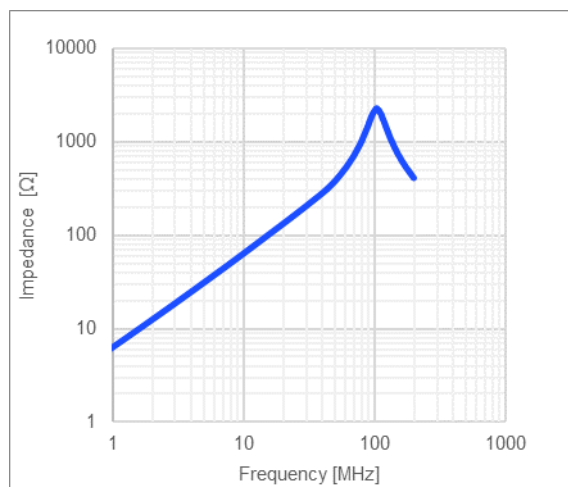
**Temperature Rise vs. Current**



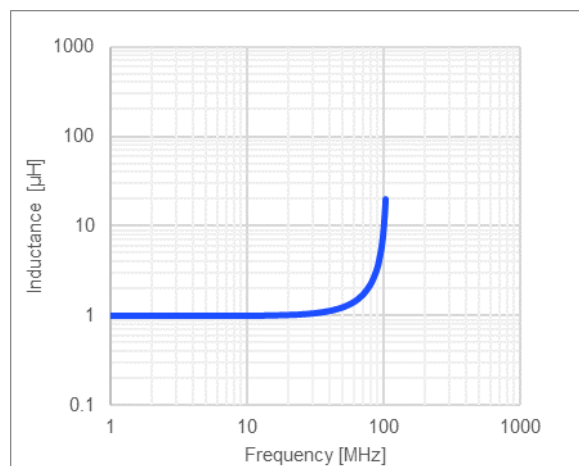
**Inductance vs. Current**



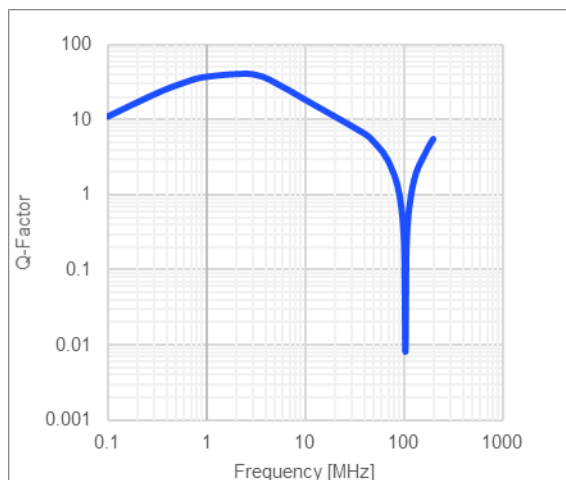
**Impedance vs. Frequency**



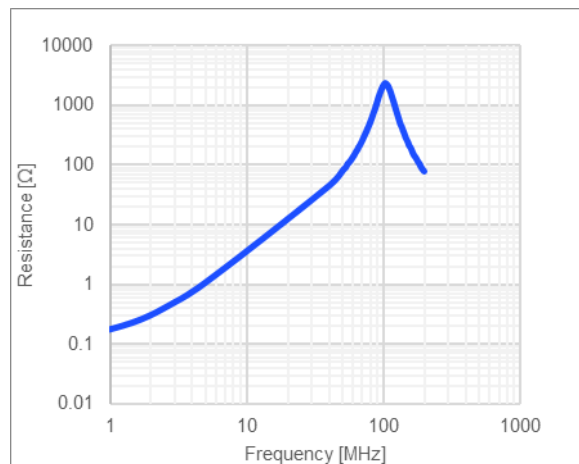
**Inductance vs. Frequency**



**Quality Factor vs. Frequency**



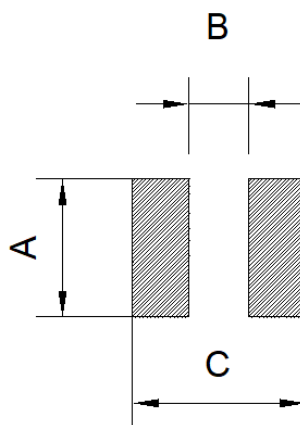
**AC Resistance vs. Frequency**



## LAND PATTERN

### Dimensions

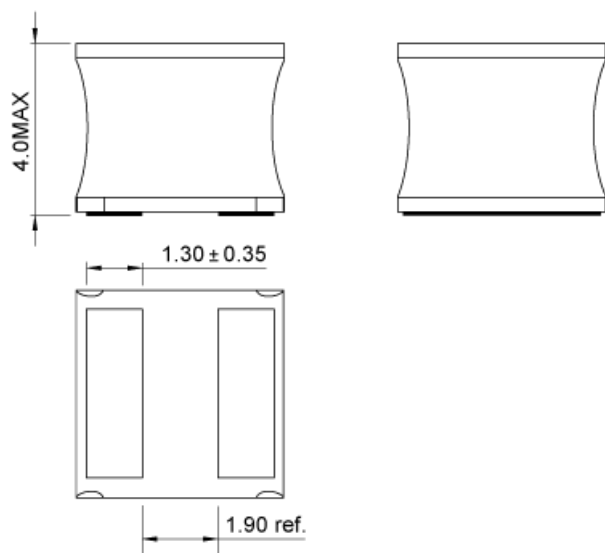
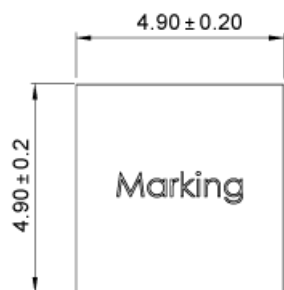
|   |                           |
|---|---------------------------|
| A | 4.0 ref.                  |
| B | 2.10 ref.                 |
| C | 5.10 ref.<br>(unit in mm) |



## PRODUCT PACKAGE AND DIMENSIONS

### Dimensions

(unit in mm)



## TOP MARKING

### Marking

|                 |     |
|-----------------|-----|
| Inductance Code | 1R0 |
|-----------------|-----|

## 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-SE5040-R47 | 0.47      | 7.3      | 8.0         | 16                          | 13.5                         |
| MPL-SE5040-1R0 | 1.0       | 9.4      | 7.6         | 10.5                        | 9                            |
| MPL-SE5040-1R5 | 1.5       | 14       | 6.2         | 9.3                         | 8.4                          |
| MPL-SE5040-2R2 | 2.2       | 16       | 5.4         | 7.9                         | 7.3                          |
| MPL-SE5040-3R3 | 3.3       | 22       | 5.2         | 6.4                         | 5.2                          |
| MPL-SE5040-4R7 | 4.7       | 33       | 4.3         | 5                           | 4.6                          |
| MPL-SE5040-6R8 | 6.8       | 45       | 3.5         | 4.6                         | 4                            |
| MPL-SE5040-100 | 10        | 56       | 3.2         | 3.6                         | 3                            |
| MPL-SE5040-150 | 15        | 83       | 2.5         | 2.9                         | 2.6                          |
| MPL-SE5040-220 | 22        | 124      | 2.1         | 2.4                         | 2.15                         |

## 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                                                                                                                                                                                                                                                                                   |

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