



### 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% | 22    | μH   |
| Resistance   | $R_{DC}$         | typ  | 124   | mΩ   |
| Resistance <sub>MAX</sub>                          | $R_{DC\ MAX}$    | max  | 149   | mΩ   |
| Rated Current <sup>(2)</sup>                       | $I_R$            | typ  | 2.1   | A    |
| Saturation Current <sub>25°C</sub> <sup>(3)</sup>  | $I_{SAT\ 25°C}$  | typ  | 2.4   | A    |
| Saturation Current <sub>100°C</sub> <sup>(4)</sup> | $I_{SAT\ 100°C}$ | typ  | 2.15  | A    |
| Resonance Frequency                                | $f_r$            | typ  | 14    | MHz  |

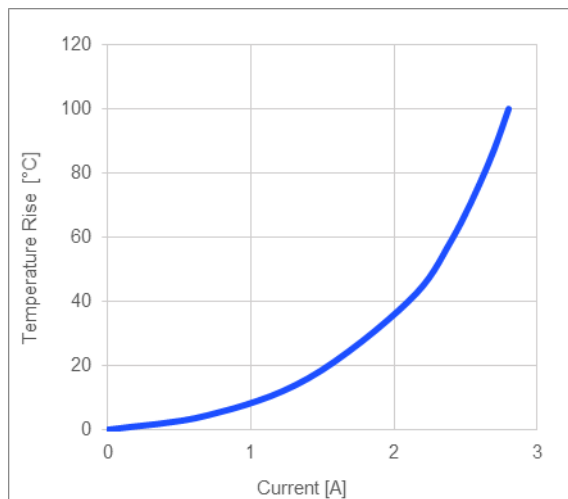
### GENERAL SPECIFICATIONS

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

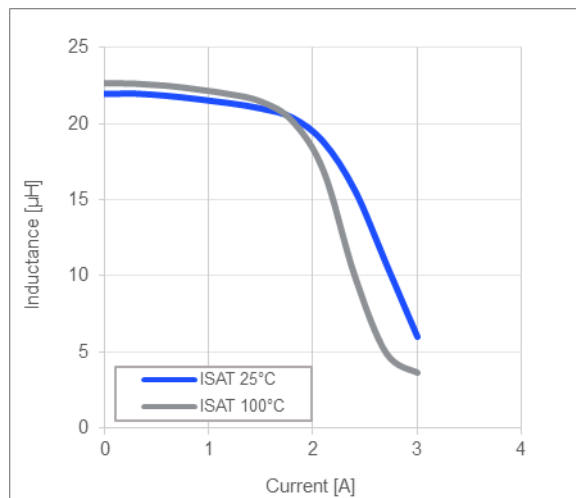
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**TYPICAL PERFORMANCE CURVES**

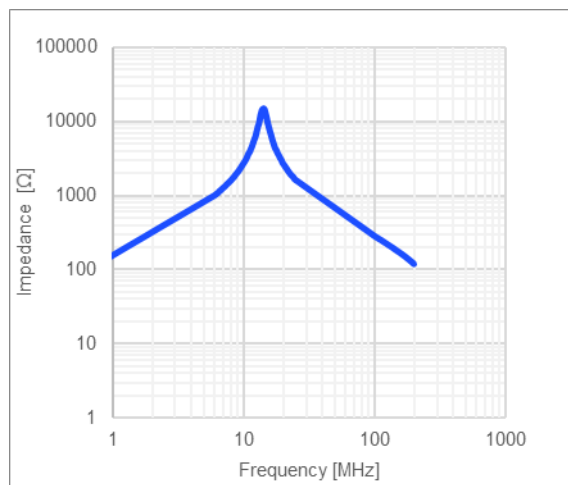
**Temperature Rise vs. Current**



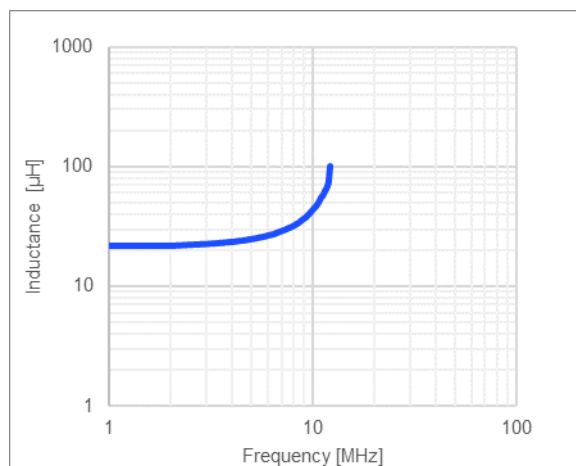
**Inductance vs. Current**



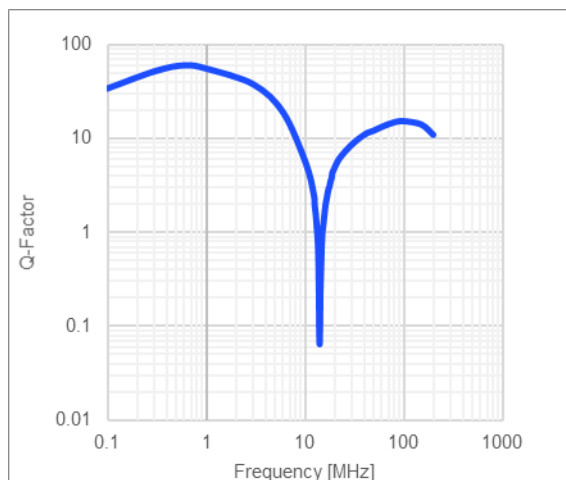
**Impedance vs. Frequency**



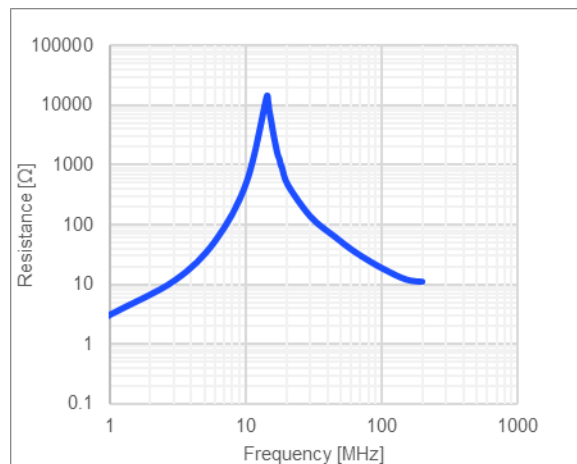
**Inductance vs. Frequency**



**Quality Factor vs. Frequency**



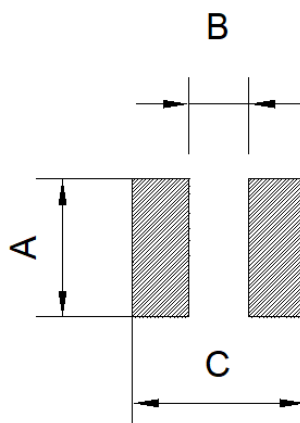
**AC Resistance vs. Frequency**



# LAND PATTERN

## Dimensions

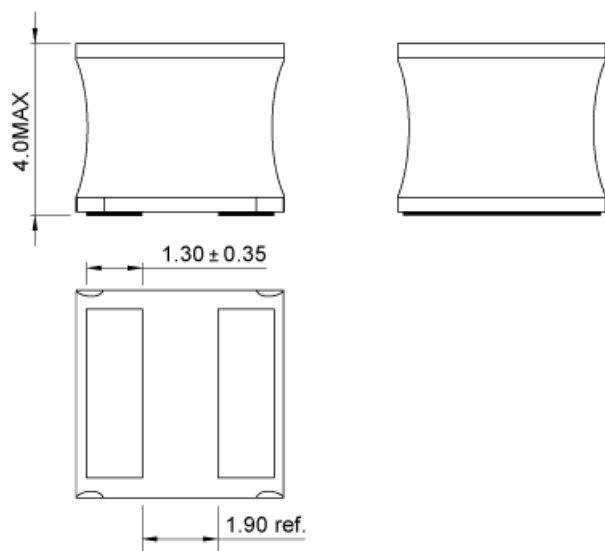
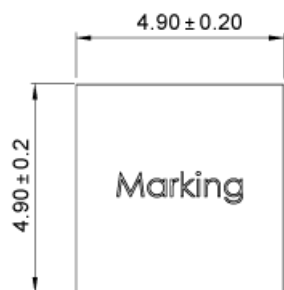
|   |                           |
|---|---------------------------|
| A | 4.0 ref.                  |
| B | 2.10 ref.                 |
| C | 5.10 ref.<br>(unit in mm) |



# PRODUCT PACKAGE AND DIMENSIONS

## Dimensions

(unit in mm)



# TOP MARKING

## Marking

Inductance Code 220

## 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-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

|  |  |
|--|--|
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| <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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