



### APPLICATIONS

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

### FEATURES

- Size 6mmx6mmx4mm
- 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% | 6.8   | μH   |
| Resistance                                         | $R_{DC}$         | typ  | 33    | mΩ   |
| Resistance <sub>MAX</sub>                          | $R_{DC\ MAX}$    | max  | 40    | mΩ   |
| Rated Current <sup>(2)</sup>                       | $I_R$            | typ  | 4.4   | A    |
| Saturation Current <sub>25°C</sub> <sup>(3)</sup>  | $I_{SAT\ 25°C}$  | typ  | 4.1   | A    |
| Saturation Current <sub>100°C</sub> <sup>(4)</sup> | $I_{SAT\ 100°C}$ | typ  | 3.7   | A    |
| Resonance Frequency                                | $f_r$            | typ  | 25    | MHz  |

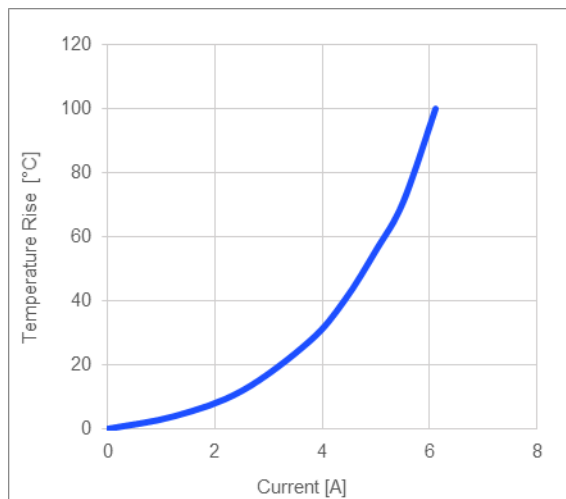
### GENERAL SPECIFICATIONS

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

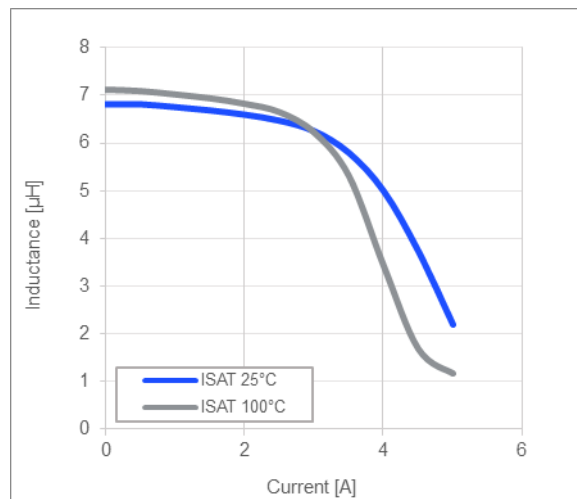
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**TYPICAL PERFORMANCE CURVES**

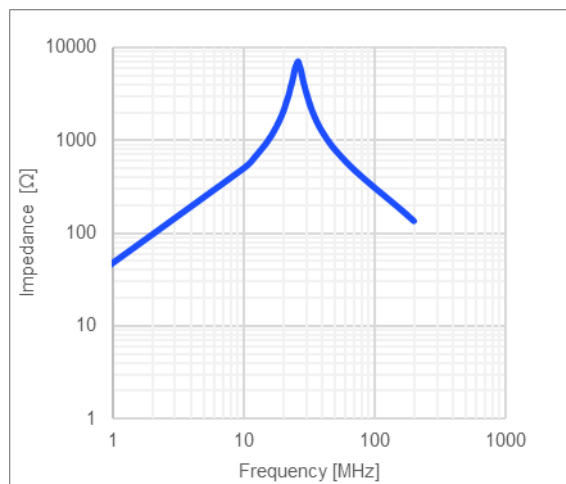
**Temperature Rise vs. Current**



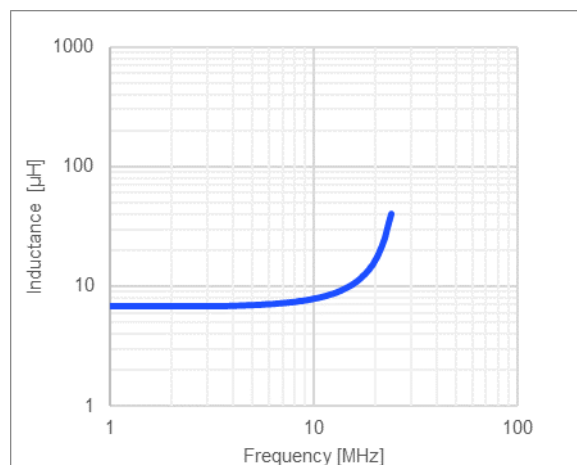
**Inductance vs. Current**



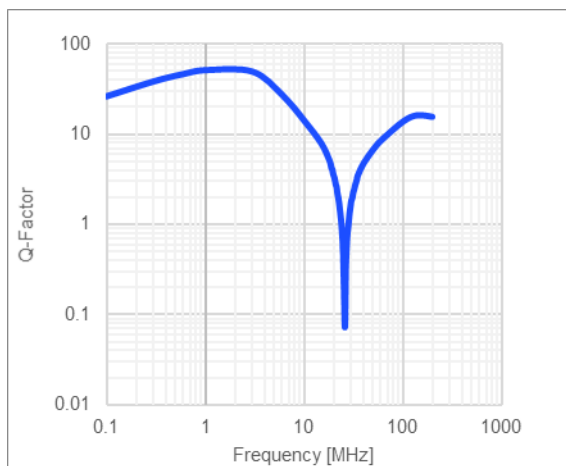
**Impedance vs. Frequency**



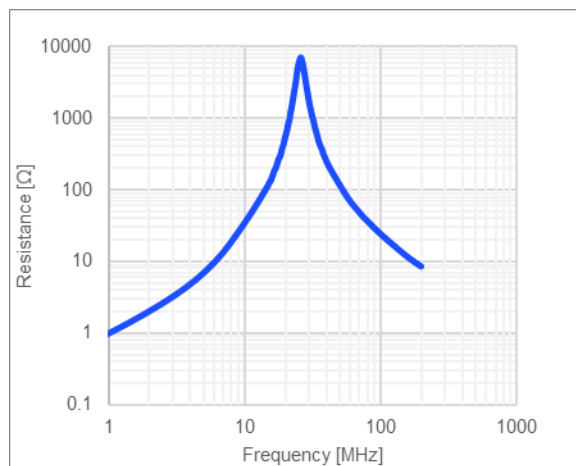
**Inductance vs. Frequency**



**Quality Factor vs. Frequency**



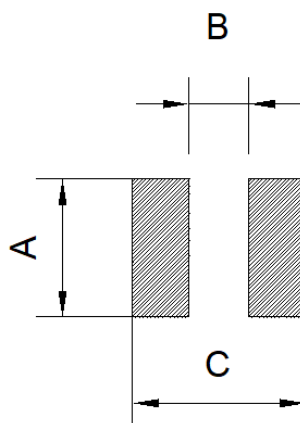
**AC Resistance vs. Frequency**



# LAND PATTERN

## Dimensions

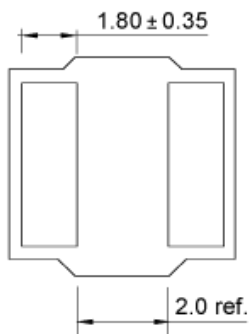
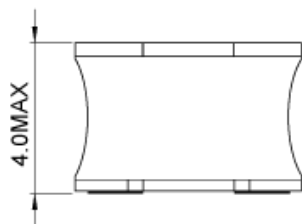
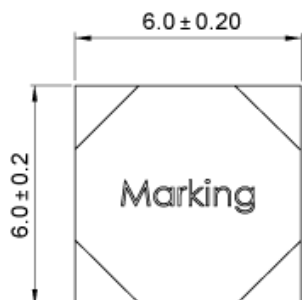
|   |                           |
|---|---------------------------|
| A | 4.50 ref.                 |
| B | 2.20 ref.                 |
| C | 6.50 ref.<br>(unit in mm) |



# PRODUCT PACKAGE AND DIMENSIONS

## Dimensions

(unit in mm)



# TOP MARKING

## Marking

Inductance Code 6R8

## 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-SE6040-1R5 | 1.5                   | 11.5                 | 6.8                    | 8.9                                    | 7.8                                     |
| MPL-SE6040-2R2 | 2.2                   | 14.5                 | 6.3                    | 7.2                                    | 6.7                                     |
| MPL-SE6040-3R3 | 3.3                   | 19.5                 | 5.6                    | 5.6                                    | 4.9                                     |
| MPL-SE6040-4R7 | 4.7                   | 23                   | 5.2                    | 5                                      | 4.5                                     |
| MPL-SE6040-6R8 | 6.8                   | 33                   | 4.4                    | 4.1                                    | 3.7                                     |
| MPL-SE6040-8R2 | 8.2                   | 39                   | 4.0                    | 3.6                                    | 3.2                                     |
| MPL-SE6040-100 | 10                    | 41                   | 3.8                    | 3.4                                    | 2.8                                     |
| MPL-SE6040-150 | 15                    | 70                   | 2.8                    | 2.7                                    | 2.4                                     |
| MPL-SE6040-220 | 22                    | 97                   | 2.35                   | 2.25                                   | 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 <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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