SMD High Frequency Power Inductor

Designed for VRD & VRM 10.x & 11.x Applications

FEATURES

- Recommended for use with all major Voltage Regulator ICs
- High Current handling capability in the smallest footprint
- Up to 2MHz operating frequency
- Extended operating temperature range: -40°C to 125°C
- Robust SMD package capable of handling the most aggressive SMT assembly process
- RoHS compliant
- 100% tested to a 10% DCR tolerance

APPLICATIONS

- VRD and VRM 10.x and 11.x based designs
- Multi-Phase Voltage regulator designs
- Server, Desktop, PDA, Graphics cards, Notebook computers, DDR, telecom switches and routers
- DC-DC converters, Battery powered devices, high current power supplies
- High Current NPUs in networking equipment
- Point-of-load Modules
- DCR sensing

Typical Multi-Phase Application Circuit for a Buck Converter
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**PACKAGE**

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Inductance(^1) @ 0 Adc</th>
<th>Inductance(^1) @ Isat(^2) (25(^°)C)</th>
<th>DCR</th>
<th>Isat(^2) (Max Saturation Current)</th>
<th>Temp. Rise Current(^3)</th>
<th>Temp. Rise Factor A (TRF A)(^5)</th>
<th>Temp. Rise Factor B (TRF B)(^5)</th>
<th>Temp. Rise Factor C (TRF C)(^5)</th>
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</thead>
<tbody>
<tr>
<td>59P9870</td>
<td>59PR9870</td>
<td>70</td>
<td>48</td>
<td>0.47</td>
<td>138</td>
<td>120</td>
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<tr>
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<td>59PR9874</td>
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<td>0.47</td>
<td>17</td>
<td>15</td>
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</tbody>
</table>

Add an "R" to the part number after "P" for the RoHS compliant version (i.e. 59PR9871 is the RoHS compliant version of 59P9871).

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1. The Rated Current (Irated) is either the Saturation Current at 25°C or the Temperature Rise Current; the lowest number of the two specified currents.
2. The Saturation Current (Isat) is the current at which the Inductance drops by a maximum of 20% below the lower limit of its value specified at 0 ADC Bias. Inductance at Isat is measured at the specified Ambient Temperature by applying DC Bias by a short period of time to minimize the self-heating effect of the component.
3. The Temperature Rise Current is the current at which the temperature of the part increases by 50°C. This test is performed with the part mounted on a PCB with traces having 1.7 times the cross sectional area of the copper leads of the part. The temperature of the part is measured after applying the DC current for a minimum of 10 minutes.
4. Inductance is measured at 100 KHz and 1.0 Vrms.
5. Temperature Rise can be estimated using the following formulas:

\[
\text{Trise (°C)} = 0.833 \left( \frac{\text{Core Loss} + \text{DCR Loss}}{\text{TRF A}} \right)^{0.833}
\]

\[
\text{DCR Loss (mW)} = \left( \text{IDC}^2 + \left( \frac{\Delta I}{2} \right)^2 \right) \times \text{TYP DCR (mOhms)}
\]

\[
\text{Core Loss (mW)} = \text{TRF B} \times (F)^{0.84} \times (\text{TRF C} \times \Delta I)^{2.28}
\]

-IDC = DC output current (ADC)
-ΔI = Delta I across the inductor (Amps)
-F = Switching frequency (kHz)

**Dimensions:** Inches [mm]. Tolerances: +/- 0.005" [0,13mm] unless otherwise noted

**DRAWING NOT TO SCALE**
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**ENVIRONMENTAL & RELIABILITY DATA**

- Storage Temperature: -40°C to +125°C
- Operating Temperature: -40°C to +125°C
- Resistance to Solder Reflow: 3 passes thru. +235°C for 30 seconds minimum
- Marking permanency: Tested per JESD22-B107-A
- Solderability: Tested per MIL-STD-750D
- Life Test: Tested per MIL-STD-202F, Method 108A
- Thermal Cycle: Tested per JESD22-B104-B, Test Condition G

**ABOUT US**

Vitec Electronics Corporation, founded in 1986, is a worldwide leader in the design, manufacture and sale of magnetic solutions. Vitec's market focus includes the power, power conditioning, telecom, networking, communications and computing. Vitec has also established strong alliances with chip manufacturers whereby magnetic solutions are designed in conjunction with unique silicon requirements and are offered as reference designs by the chip companies.

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**QUALITY POLICY**

Vitec will provide products and services that meet or exceed our Customer's requirements, conform to company policies and standards, and exhibit continuously improving levels of Quality.

**COMMITMENT**

VITEC Electronics empowers each of its employees by providing a business environment that encourages a commitment to excellence, a sense of ownership and personal accountability to all Vitec Customers.

Competitive Pricing, Quality Products, and On Time Deliveries are expected from today's World Class Magnetics Suppliers. The high standards of today's customer are strengthening the dedication and commitment of VITEC Electronics to provide Total Customer Service.

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