SMD High Frequency Power Inductor

Designed for VRM 9.x, 10.x, & 11.x Applications

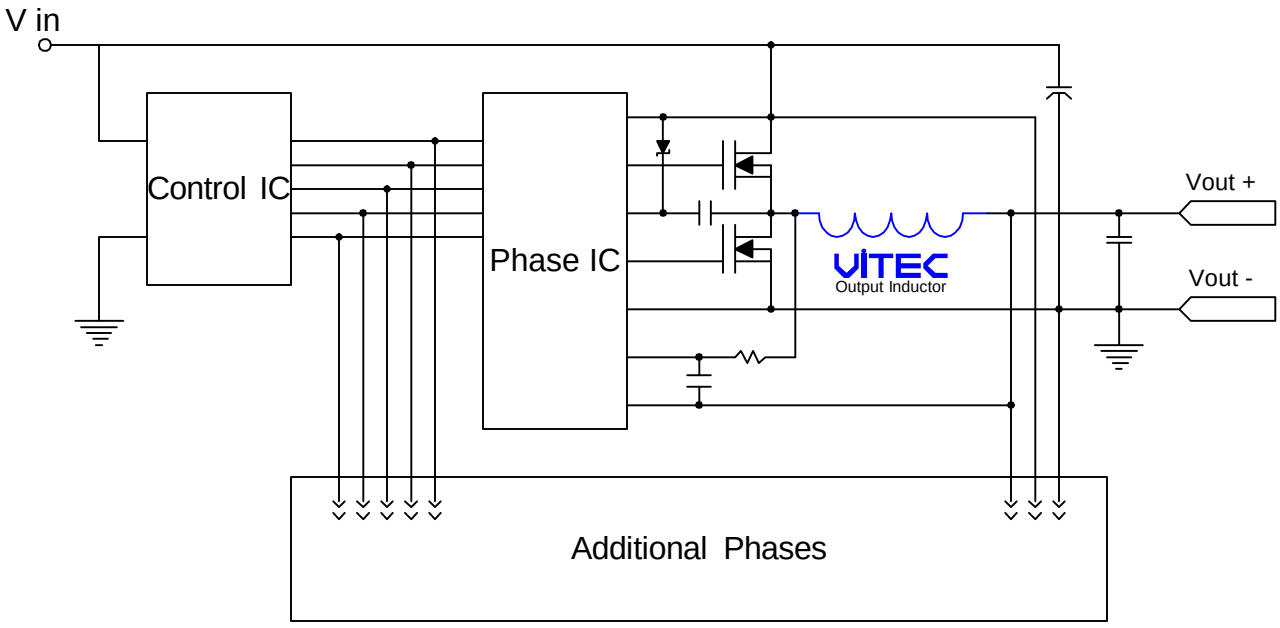
FEATURES

- **Recommended for use with all major Voltage Regulator ICs**
- **High Current handling capability in the smallest footprint & profile**
- **Up to 2MHz operating frequency**
- **Extended operating temperature range: -40ºC to 125ºC**
- **Robust SMD package capable of handling the most aggressive SMT assembly process**
- **RoHS compliant version available**

PRELIMINARY

APPLICATIONS

- VRM 9.0, 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



Typical Multi-Phase Application Circuit for a Buck Converter

Vitec Electronics Corporation
www.VitecCorp.com

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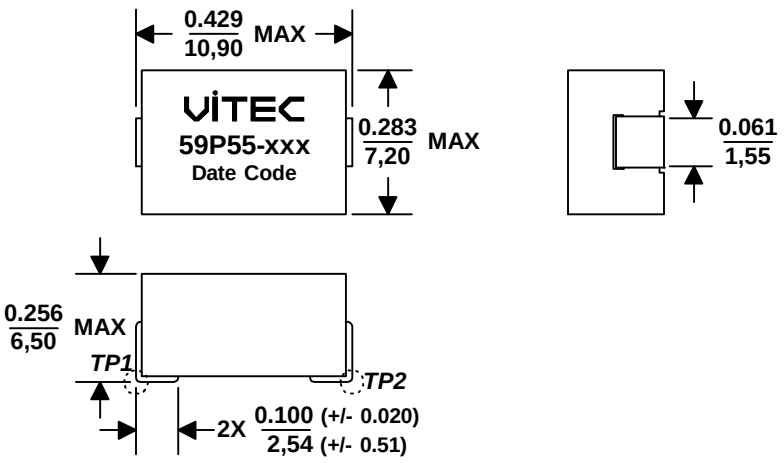
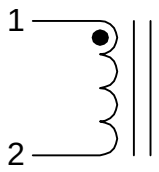
PACKAGE

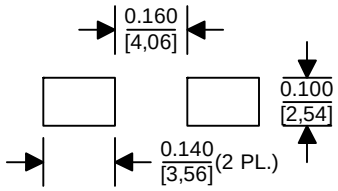


All dimensions given in inches [mm].
Tolerances unless otherwise specified. 0.XX±0.01 [0.X±0.25] 0.XXX±0.005 [0.XX±0.13] Angular ± 1°

SCHEMATIC



SUGGESTED PCB LAYOUT



Drawing NOT to scale

ELECTRICAL CHARACTERISTICS @ 25°C (unless otherwise noted)

Part Number		Inductance @ 0Adc[4]	Inductance[4] @ Isat[2]	DCR[5]	Isat[2] Max Saturation Current			Temp. Rise Current[3]		Temp. Rise Factor[6] (TRF)		
Classic	RoHS	nH	nH	mOhm	ADC			ADC MAX		A	B	C
		± 10%	MIN	± 8%	25°C	100°C	125°C	50°C	60°C			
59P55-121	59PR55-121	120	86	0.48	75	65	61	38	40	6.33	0.003695	0.02469
59P55-171	59PR55-171	170	122	0.48	52	45	43	38	40	6.33	0.003655	0.03505
59P55-221	59PR55-221	220	158	0.48	40	35	33	38	40	6.33	0.003630	0.04542
59P55-301	59PR55-301	300	216	0.48	29	26	24	38	40	6.33	0.003616	0.06197
59P55-471	59PR55-471	470	338	0.48	17	16	15	38	40	6.33	0.003600	0.09713

Add an "R" to the part number after "P" for the RoHS compliant version (i.e. 59PR55-121 is the RoHS compliant version of 59P55-121).

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 1.75 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. The normal DCR tolerance is by design, DCR is measured from lead to lead at test point *TP1 - TP2*.
6. Temperature Rise can be estimated using the following formulas:

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

$$\text{DCR Loss (mW)} = \left(Idc^2 + \left(\frac{\triangle I}{2}\right)^2\right) \text{ x TYP DCR (mOhms)}$$

$$\text{Core Loss (mW)} = \text{TRF B x } (F)^{1.84} \text{ x } (\text{TRF C x } \triangle I)^{2.28}$$

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

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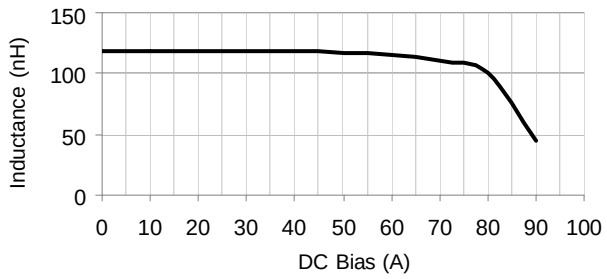
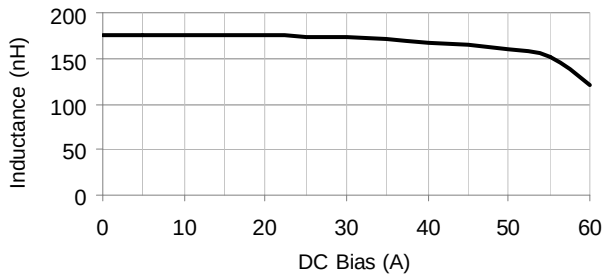
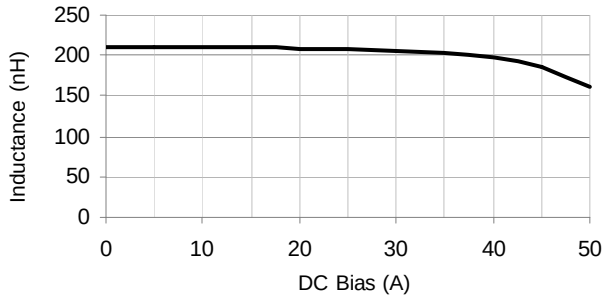
59P55-121 Inductance vs DC Bias @ 25°C



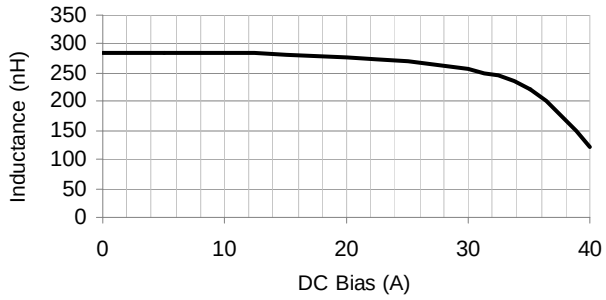
59P55-171 Inductance vs DC Bias @ 25°C



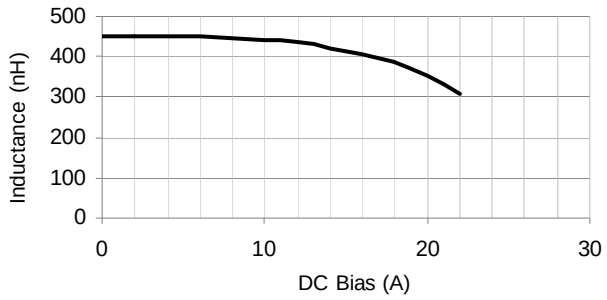
59P55-221 Inductance vs DC Bias @ 25°C



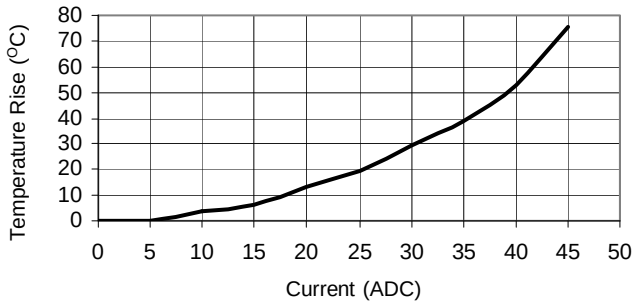
59P55-301 Inductance vs DC Bias @ 25°C



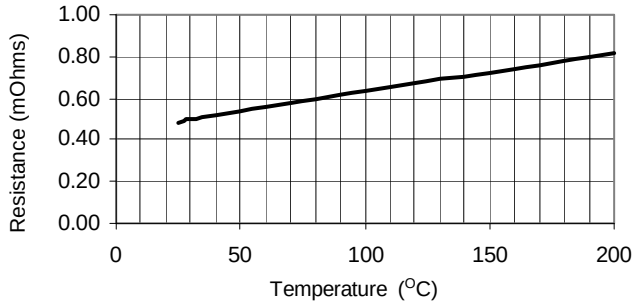
59P55-471 Inductance vs DC Bias @ 25°C



59P55-xxx Temp. Rise vs. IDC



59P55-xxx RDC vs. Temperature



ENVIRONMENTAL & RELIABILITY DATA

Storage Temperature: -40C to +125C
Operating Temperature: -40C to +125C
Resistance to Solder Reflow: 3 passes thru. +235C for 30 seconds minimum

Marking permanency: Tested per JESD22-B107-A
Solderability: Tested per JESD22-B102D
Life Test: Tested per MIL-STD-202F, Method 108A
Thermal Cycle: Tested per JESD22-B104-B, Test Condition G

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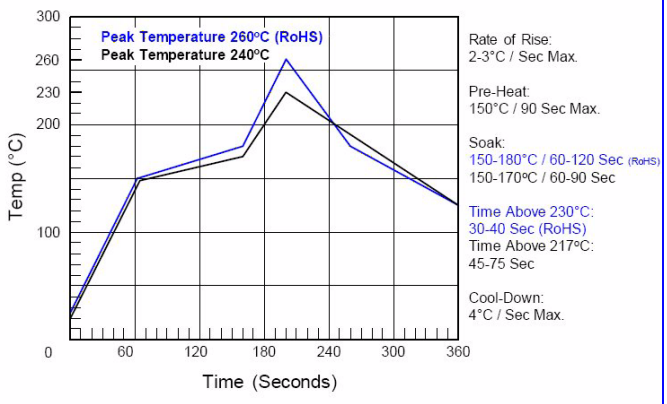
IR Profile



Rate of Rise:
2-3°C / Sec Max.

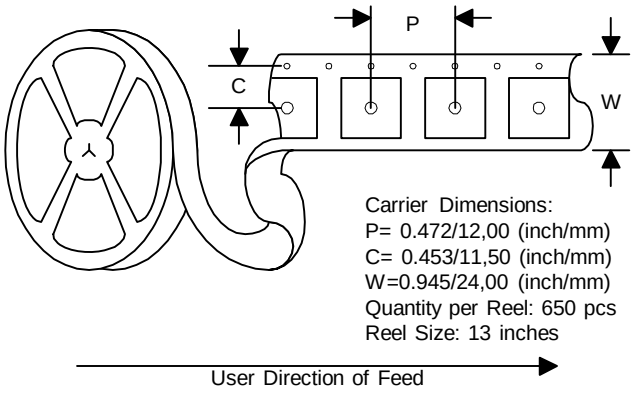
Pre-Heat:
150°C / 90 Sec Max.

Soak:
150-180°C / 60-120 Sec (RoHS)
150-170°C / 60-90 Sec

Time Above 230°C:
30-40 Sec (RoHS)
Time Above 217°C:
45-75 Sec

Cool-Down:
4°C / Sec Max.

Tape and Reel



Carrier Dimensions:
P= 0.472/12,00 (inch/mm)
C= 0.453/11,50 (inch/mm)
W=0.945/24,00 (inch/mm)
Quantity per Reel: 650 pcs
Reel Size: 13 inches

User Direction of Feed

63-224A1

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.

With its Corporate Headquarters and Research & Development center located in Carlsbad, California, and its state of the art manufacturing facility and material sourcing in China, Vitec is uniquely positioned to supply the latest technology at the lowest cost. Vitec offers both standard and custom product design capabilities with all of its facilities being ISO certified.

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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