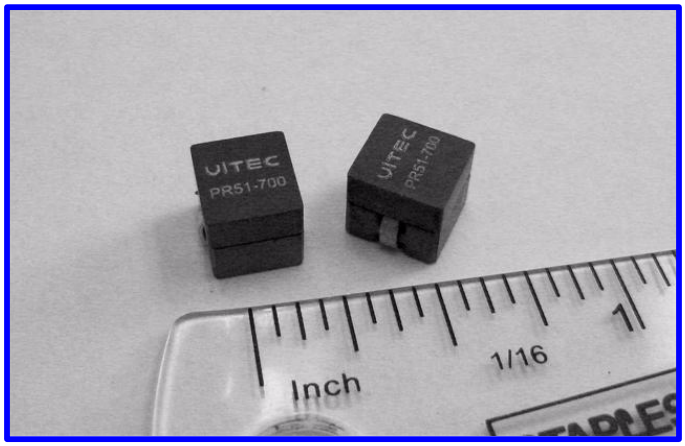
SMD High Frequency Power Inductor

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

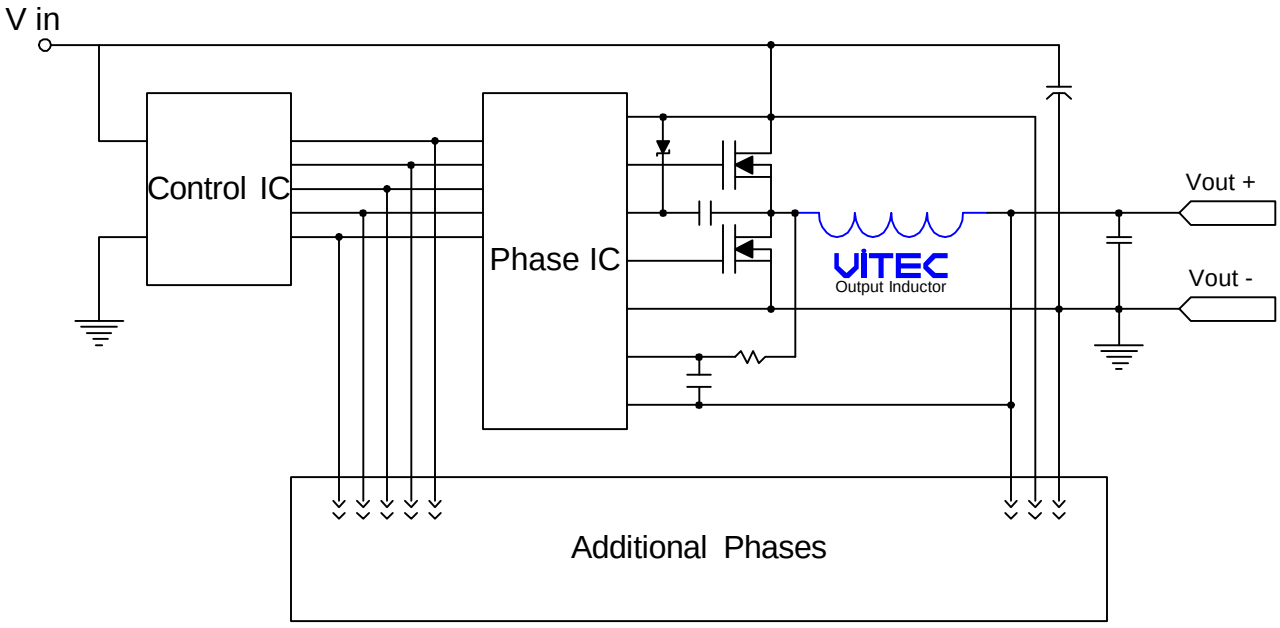
FEATURES

- **Designed for use in VRM 9.x, 10.x, & 11.x applications.**
- **Operating frequency 0.1 - 2.0 MHz.**
- **Operating temperature range: -40ºC to 125ºC.**
- **RoHS compliant version available.**
- **Surface mount package for pick and place assembly.**



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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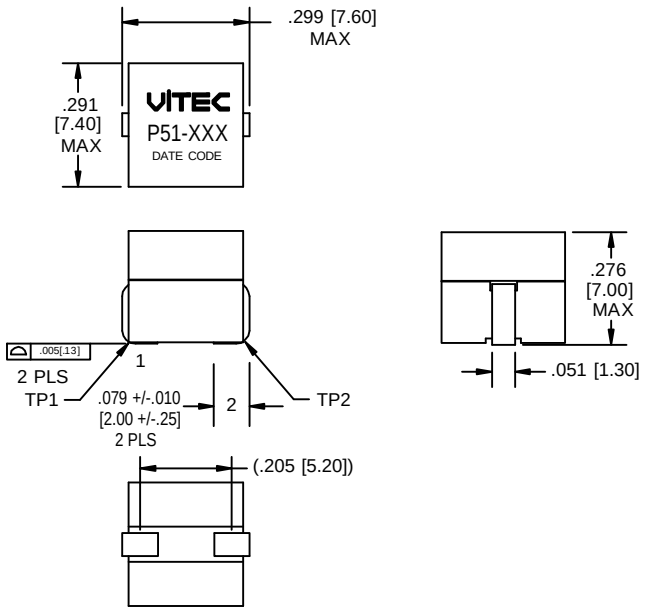
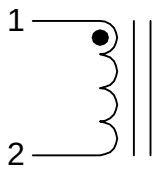
PACKAGE

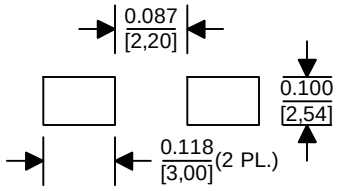


Dimensions: Inches [mm]. Tolerances unless otherwise specified. .xx +/-.01 [.x +/-.25] .xxx +/- .005 [.xx +/-.13] Angular +/- 1º

SCHEMATIC



SUGGESTED PCB LAYOUT



Drawing NOT to scale

ELECTRICAL CHARACTERISTICS @ 25ºC (unless otherwise noted)

Part Number		Inductance[3] @ 0 Adc	Inductance[3] @ Isat[1] (25ºC)	DCR[5]	Isat[1] (Max Saturation Current)			Temp. Rise Current[2]	Temp. Rise Factor A (TRF A)[4]	Temp. Rise Factor B (TRF B)[4]	Temp. Rise Factor C (TRF C)[4]
		nH	nH	mOhms	ADC			ADC			
Classic	RoHS	± 15%	MIN	± 8%	25ºC	100ºC	125ºC	MAX			
59P51-700	59PR51-700	70	48	0.55	85	72	67	26	3.39	0.002737	0.01944
59P51-101	59PR51-101	100	68	0.55	60	51	47	26	3.39	0.002693	0.02788
59P51-121	59PR51-121	120	82	0.55	50	42	39	26	3.39	0.002679	0.03349
59P51-151	59PR51-151	150	102	0.55	40	34	32	26	3.39	0.002664	0.04190
59P51-181	59PR51-181	180	122	0.55	33	28	26	26	3.39	0.002657	0.05030
59P51-221	59PR51-221	220	150	0.55	27	23	22	26	3.39	0.002649	0.06150

Add an "R" to the part number after "P" for the RoHS compliant version (i.e. 59PR51-700 is the RoHS compliant version of 59P51-700).

1. 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.
2. The Temperature Rise Current is the current at which the temperature of the part increases by 50ºC. 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.
3. Inductance is measured at 100 KHz and 1.0 Vrms.
4. Temperature Rise can be estimated using the provided formulas.
5. DCR is measured at test points (TP1-TP2).

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

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

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

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

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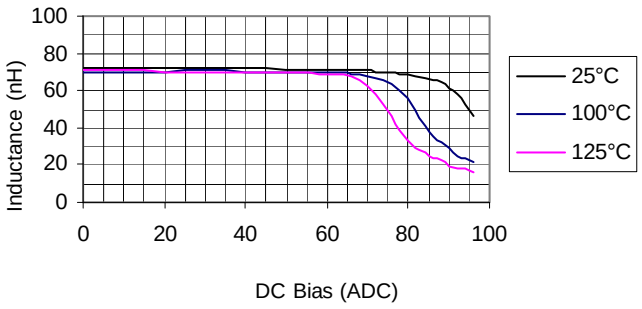
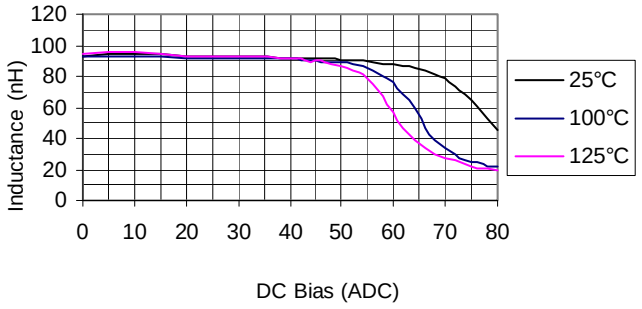
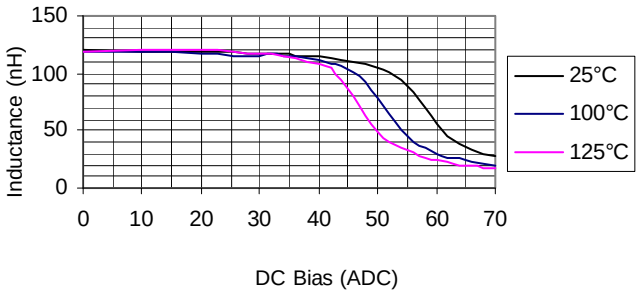
59P51-700 Inductance vs. Idc @ 25ºC



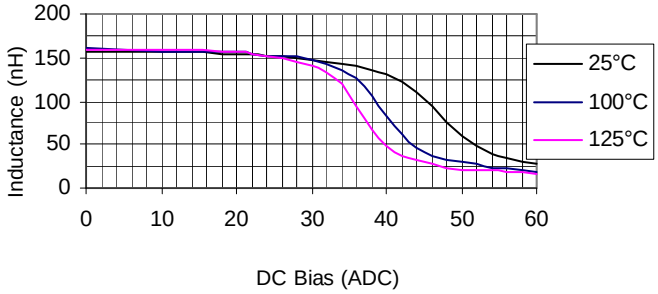
59P51-101 Inductance vs. Idc @ 25ºC



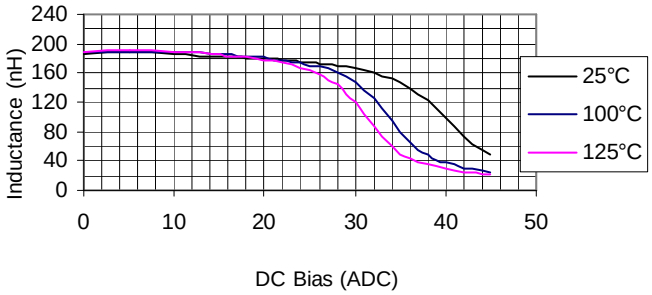
59P51-121 Inductance vs. Idc @ 25ºC



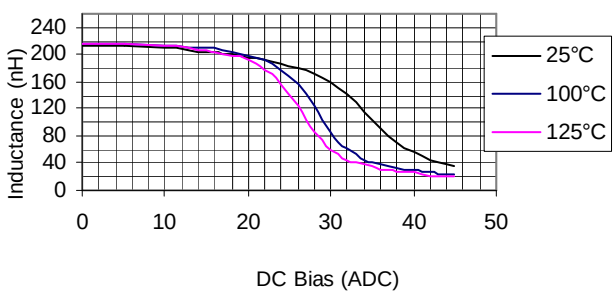
59P51-151 Inductance vs. Idc @ 25ºC



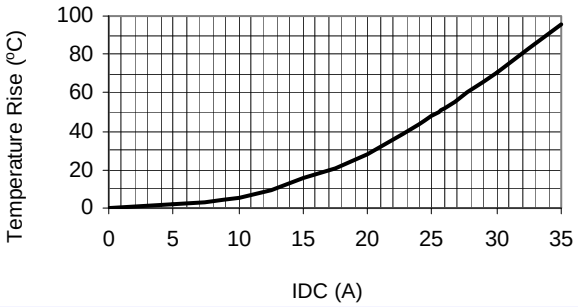
59P51-181 Inductance vs. Idc @ 25ºC



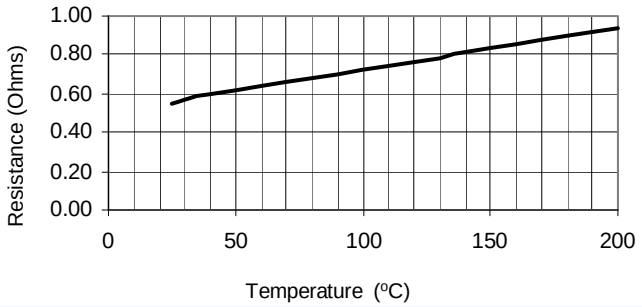
59P51-221 Inductance vs. Idc @ 25ºC



59P51-xxx Temp. Rise vs. Idc



59P51-xxx Rdc vs. Temp. Rise



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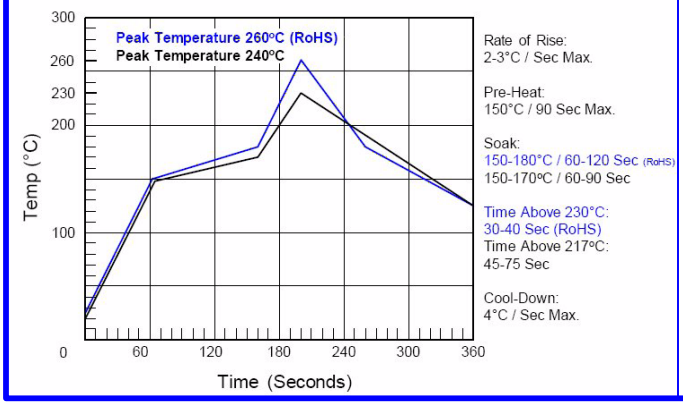
IR Profile



Rate of Rise:
2-3°C / Sec Max.

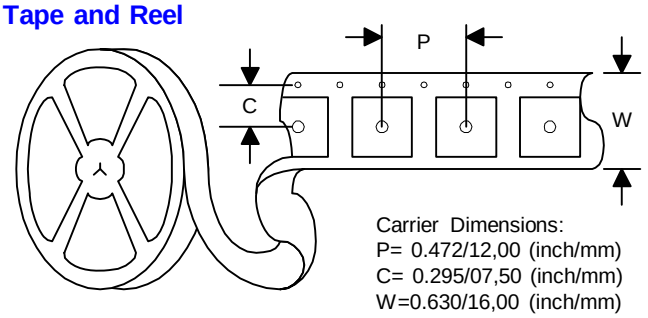
Pre-Heat:
150°C / 90 Sec Max.

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= 0.295/07,50 (inch/mm)
W=0.630/16,00 (inch/mm)
Quantity per Reel: 700 pcs
Reel Size: 13 inches

User Direction of Feed

63-116C1-R

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 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.

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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