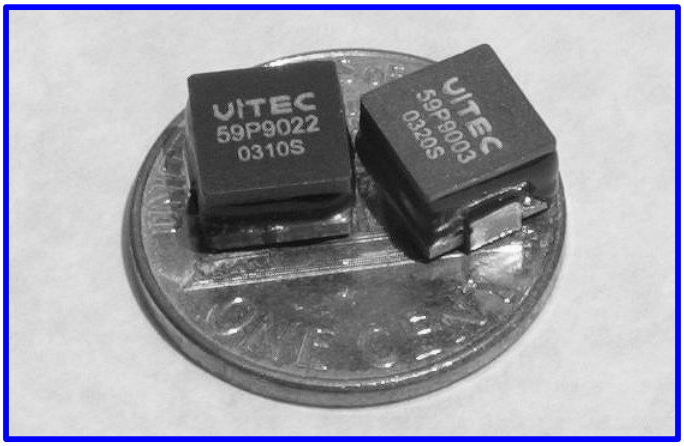
SMD High Frequency Power Inductor

Designed for Advanced Voltage Regulator Modules

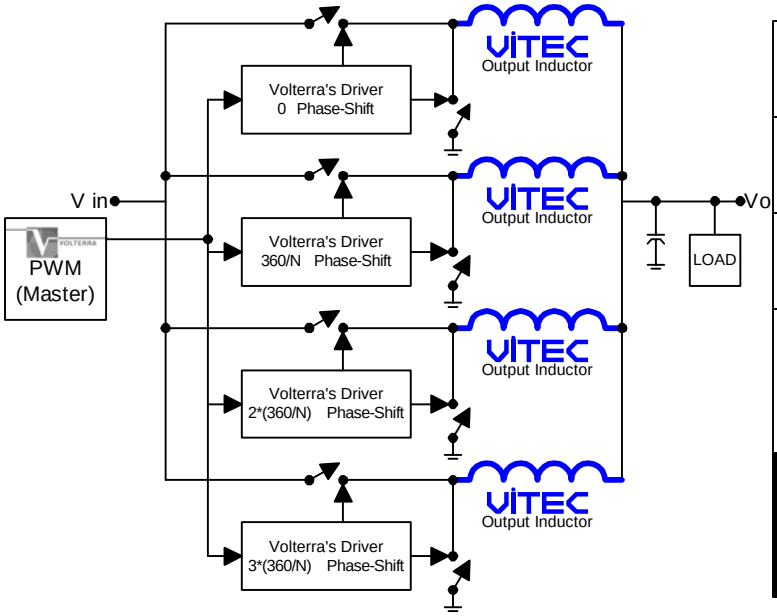
FEATURES

- **Recommended for use with Volterra's 3rd Generation Advanced Regulator Modules.**
- **Tested and approved by Volterra.**
- **High current handling capability in the smallest footprint & profile.**
- **Up to 2MHz operating frequency.**
- **Extended operating temperature range: -40ºC to 125ºC.**
- **Robust SMD package and RoHS compliant.**



APPLICATIONS

- Multi-Phase synchronous Buck Voltage Regulator designs.
- Low voltage, high current, high frequency, DC-DC voltage regulator modules (LVRMs).
- Server, Desktop, PDA, Graphic Cards, Notebook Computers, Telecom Switches and Routers.
- DC-DC Converters, battery powered devices, high current power supplies.



Typical Multi-Phase Application Circuit for a Synchronous Buck Converter

Vitec P/N	Matches Volterra's IC Part Number
59P9002	VT223, VT233 VT1103 Next-Gen ICs
59P9003	VT223, VT233 VT1103 Next-Gen ICs
59P9022	VT222, VT223, VT232, VT233, VT1000, VT1001, VT1102, VT1103.

NOTES

Volterra's VT2xx series is Single-Phase Integrated Synchronous Buck Voltage Regulator Chipset.
Volterra's VT1xxx series is Multi-Phase Synchronous Buck Voltage Regulator Chipset.

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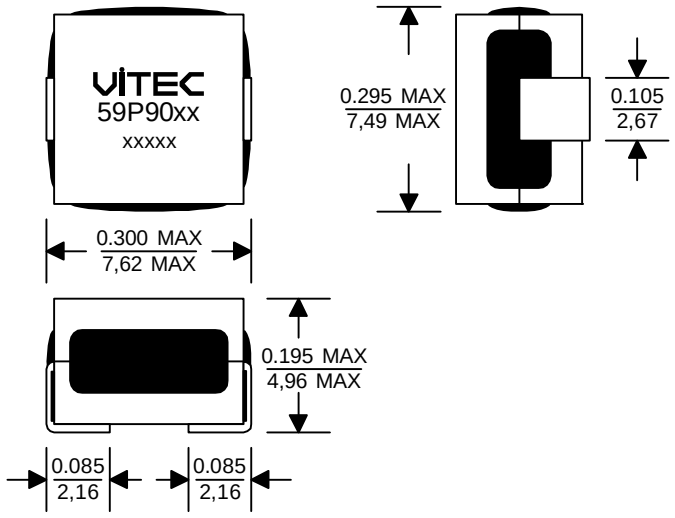
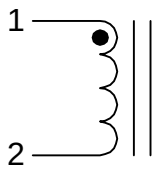
PACKAGE

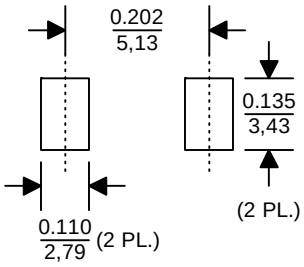


Dimensions: Inches/mm. Tolerances: +/- 0.010"/0,25mm unless otherwise noted

SCHEMATICS



SUGGESTED PCB LAYOUT



Drawing NOT to scale

ELECTRICAL CHARACTERISTICS @ 25ºC (unless otherwise noted)

Part Number		Inductance @ 0Adc[4]	Inductance @ Irated[4]	Irated[1]	DCR		Saturation Current[2]			Temp. Rise Current[3]	Temp. Rise Factor[5]
Classic	RoHS	nH ± 15%	nH MIN	ADC MAX	mOhm TYP	mOhm MAX	ADC -40ºC	ADC 25ºC	ADC 125ºC	ADC MAX	
59P9001	**59PR9001**	32	22	100	0.23	0.30	102	100	95	40	.01369
59P9002	**59PR9002**	58	39	81	0.23	0.30	83	81	63	40	.02504
59P9003	**59PR9003**	72	49	65	0.23	0.30	67	65	50	40	.03117
59P9022	**59PR9022**	100	68	46	0.23	0.30	48	46	35	40	.04334
59P9024	**59PR9024**	200	136	19	0.23	0.30	21	19	16	40	.08680

Add an "R" to the part number after "P" for the RoHS compliant version (i.e. 59PR9001 is the RoHS compliant version of 59P9001).

Notes:

1 - The rated current is the saturation current @ 25ºC.
2 - The I(Saturation) is the current at which the inductance drops by 20% maximum of its value at 0ADC. This current is measured at the stated ambient environment and by applying a short duration pulse current to the component, minimizing the self-heating effects.
3 - The I(Temp. Rise) is the current at which the temperature of the part increases by a maximum of 50ºC. This test is performed with the part mounted on a PCB with 0.400" wide, 0.006" thick copper traces and applying the DC current for a minimum of 30 minutes.
4 - Inductance is measured at 100 KHz and 1.0 Vrms.
5 - The Temperature Rise can be estimated using the following formulas:

$$\text{Trise } (^{O}C) = \left(\frac{\text{Core Loss + DCR Loss}}{3.36} \right)^{0.833}$$

$$\text{DCR Loss (mw)} = \left(Idc^2 + \left(\frac{\triangle I}{2} \right)^2 \right) \times 0.23 \times 1000$$

$$\text{Core Loss} = 0.001749 \times (F)^{1.84} \times (\text{Temp. Rise Factor} \times \triangle I)^{2.28}$$

$\triangle I$ = Delta I across the inductor (Amps)

F = Switching frequency (kHz)

IDC = Converter output current (ADC)

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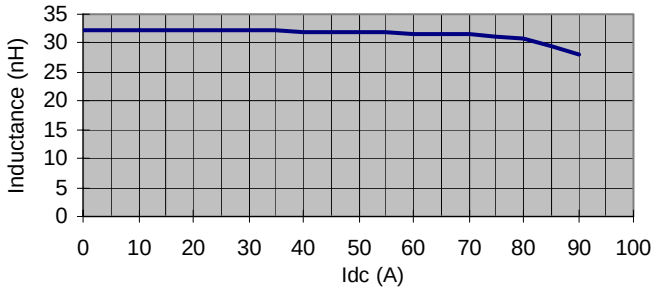
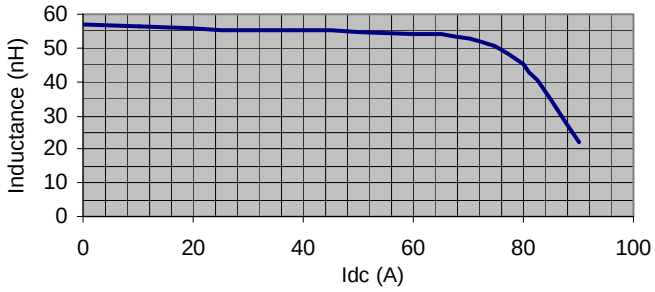
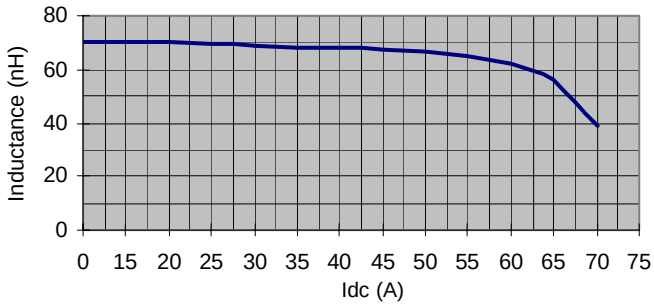
59P9001 Inductance vs. Idc @ 25ºC



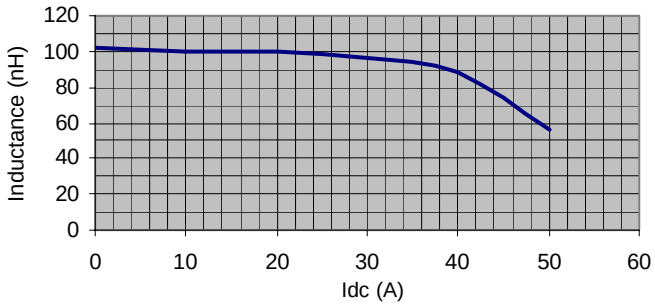
59P9002 Inductance vs. Idc @ 25ºC



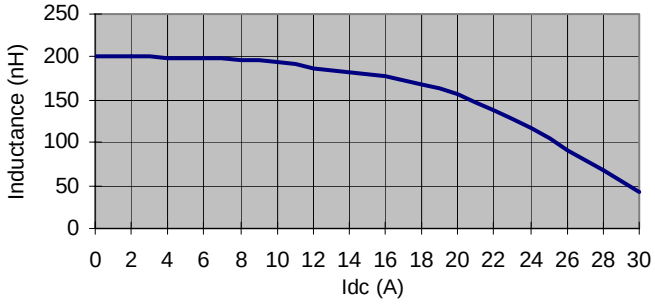
59P9003 Inductance vs. Idc @ 25ºC



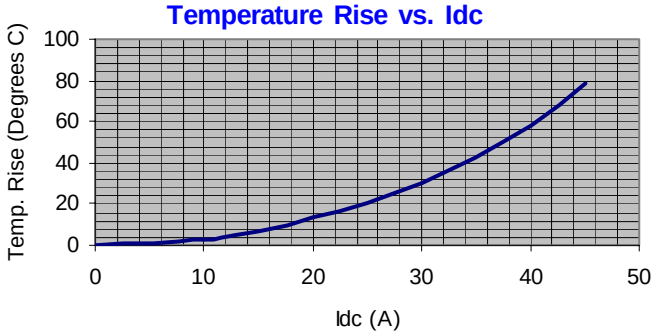
59P9022 Inductance vs. Idc @ 25ºC



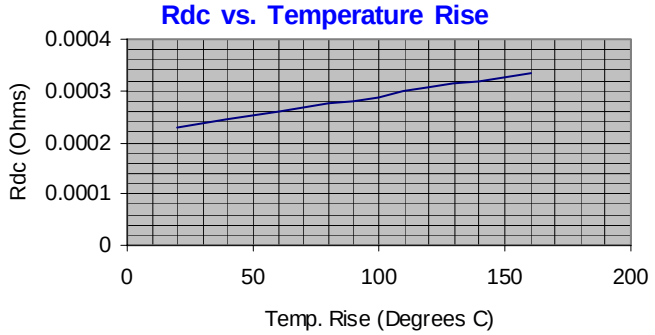
59P9024 Inductance vs. Idc @ 25ºC



Temperature Rise vs. Idc



Rdc vs. Temperature Rise



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

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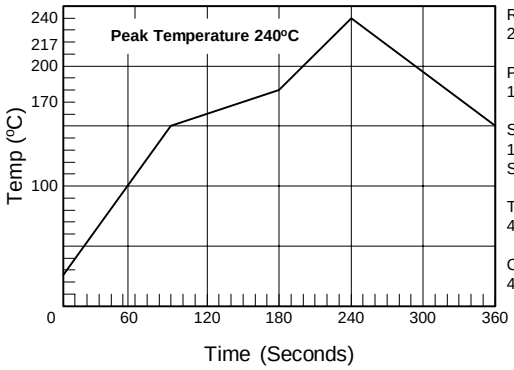
IR Profile



Rate of Rise:
2-3C / Sec Max.

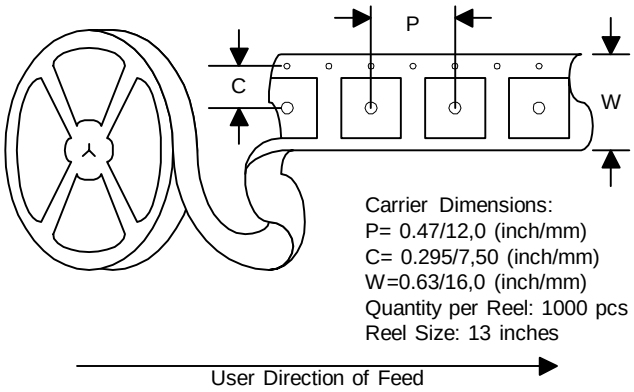
Pre-Heat:
150C / 90 Sec Max.

Soak:
150-170C / 60-90 Sec

Time Above 217C:
45-75 Sec

Cooldown:
4C Max. / Sec

Tape and Reel



Carrier Dimensions:
P= 0.47/12,0 (inch/mm)
C= 0.295/7,50 (inch/mm)
W=0.63/16,0 (inch/mm)
Quantity per Reel: 1000 pcs
Reel Size: 13 inches

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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