

# High Freq., High Power Inductor

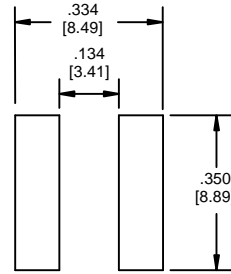
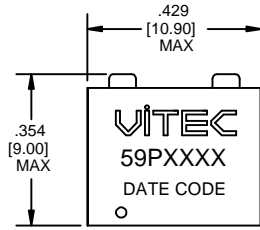
## Designed for VRD & VRM Applications

### FEATURES

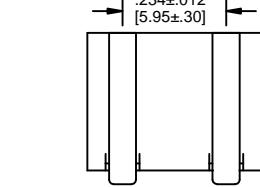
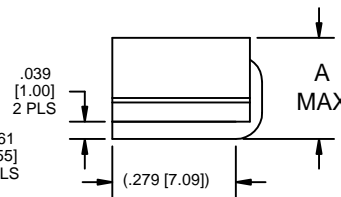
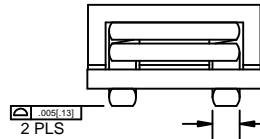
- Designed for use in VRM 10.X & 11.X Applications.
- Operating Frequency 0.350 - 2.0 MHz.
- Operating Temperature Range of -40°C to 125°C.
- RoHS Compliant Version Available.
- Low DC Resistance for higher efficiency.
- Surface Mount Package for pick and place assembly.

### DRAWING

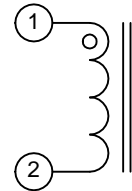
P/N	A
59P9043	0.256 [6.50]
59P9044	0.236 [6.00]
59P22-152	0.232 [5.90]



SUGGESTED PCB LAYOUT



### SCHEMATIC



ALL DIMENSIONS GIVEN IN INCHES (MM).  
TOLERANCES UNLESS OTHERWISE SPECIFIED.  
XX±.01 [X±.25] XX±.004 [XX±.10] ANGULAR: ±1°

### ELECTRICAL CHARACTERISTICS @ 25°C

Part Number		Inductance @ 0Adc <sup>4</sup>	Inductance @ Irated <sup>4</sup>	Irated <sup>1</sup>	DCR		MAX Saturation Current <sup>2</sup>			Temp. Rise Current <sup>3</sup>	Temp. Rise Factor <sup>5</sup>
Classic	RoHS	nH	nH	ADC	mOhms		ADC	ADC	ADC	ADC	
		± 15%	MIN	MAX	TYP	MAX	-40°C	25°C	125°C	MAX	
59P9043	59PR9043	205	140	48	0.54±10%		51	48	36	35	0.03557
59P9044	59PR9044	510	347	29	1.3	1.5	35	29	22	28	0.05889
59P22-152	59PR22-152	1500	1020	13	3.0	3.5	13.5	13	10	18.5	0.13138

Add an "R" to the part number after "P" for the RoHS compliant version (i.e. 59PR9043 is the RoHS compliant version of 59P9043).

#### Notes:

- 1 - The rated current is the saturation current @ 25°C.
- 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 50°C. This test is performed with the part mounted on a PCB with 0.250" wide, 0.004" 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 additional Temperature Rise due to High ET (Voltage x Time) can be estimated using the following formula:

$$\text{Trise (}^{\circ}\text{C)} = \left( \frac{\text{Core Loss} + \text{DCR Loss}}{5.59} \right)^{0.833}$$

$$\text{Core Loss} = 0.002648 \times (F)^{1.84} \times (\text{Temp. Rise Factor} \times \Delta I)^{2.28}$$

$\Delta I$  = Delta I across the inductor

F = Switching Frequency (kHz)

$$\text{DCR Loss} = \left( I_{dc}^2 + \left( \frac{\Delta I}{2} \right)^2 \right) \times \text{TYP DCR}$$

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AF4321 4489 091406



6213 El Camino Real, Carlsbad, CA 92009  
TEL: (760) 918-8831 FAX: (760) 918-8840