

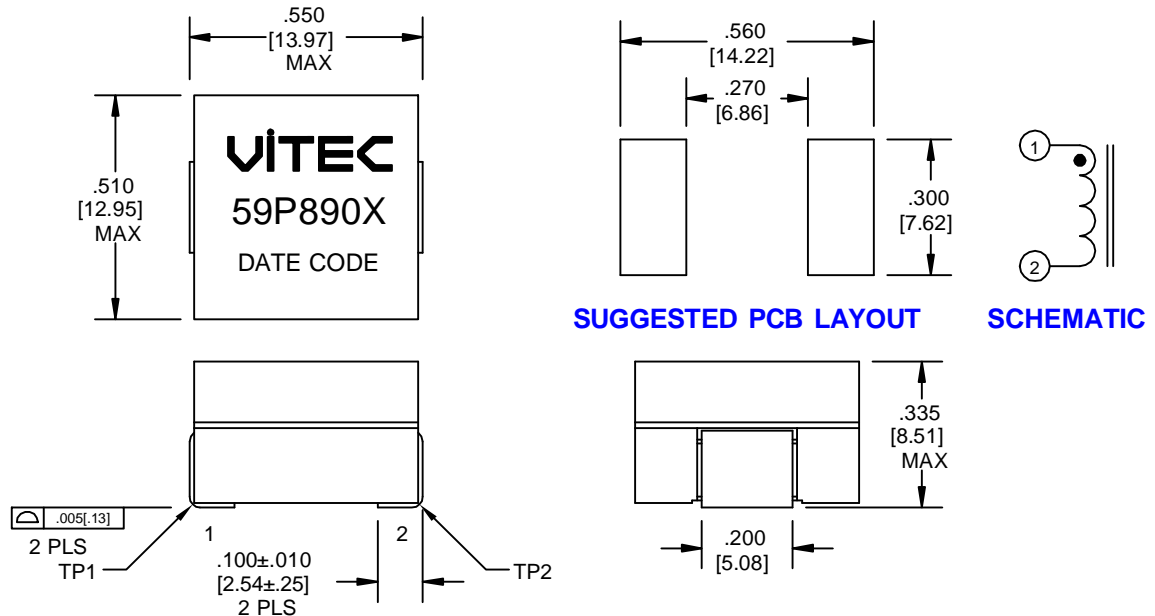
# High Frequency Power Inductor

## 59P890X

### FEATURES

- Designed to be used with Advanced Voltage Regulators ICs.
- Operating Frequency 0.100 - 2.0 MHz.
- Operating Temperature Range of -40°C to 125°C.
- RoHS Compliant Version Available.
- Surface Mount Package for pick and place assembly.

### MECHANICAL



ALL DIMENSIONS GIVEN IN INCHES [MM].  
TOLERANCES UNLESS OTHERWISE SPECIFIED.  
.XX +/-01 [X +/-25] .XXX +/-005 [XX +/-13] ANGULAR: +/-1°

### ELECTRICAL SPECIFICATIONS @ 25°C

Part Number		Inductance <sup>3</sup> @ 0 Adc	Inductance <sup>3</sup> @ Isat <sup>1</sup>	DCR <sup>5</sup>	Isat <sup>1</sup> Max Saturation Current			Temp. Rise Current <sup>2</sup>	Temp. Rise Factor A (TRFA) <sup>4</sup>	Temp. Rise Factor B (TRFB) <sup>4</sup>	Temp. Rise Factor C (TRFC) <sup>4</sup>
					ADC	ADC	ADC				
Classic	RoHS	nH +/- 10%	nH MIN	mOhms +/-10%	25°C	100°C	125°C	ADC MAX			
59P8900	59PR8900	110	79	0.17	143	123	115	80	9.93	0.013116	0.01252
59P8901	59PR8901	210	152	0.17	75	64	61	80	9.93	0.012849	0.02401
59P8902	59PR8902	260	187	0.17	60	53	49	80	9.93	0.012796	0.02975
59P8903	59PR8903	320	230	0.17	50	43	40	80	9.93	0.012772	0.03662
59P8904	59PR8904	440	317	0.17	35	30	28	80	9.93	0.012727	0.05037

Add an "R" to the part number after "P" for the RoHS compliant version (i.e. 59PR8900 is the RoHS compliant version of 59P8900).

#### Notes:

- 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 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.
- 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).

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

$$\text{DCR Loss (mW)} = \left[ \text{Idc}^2 + \left( \frac{\Delta I}{2} \right)^2 \right] \times \text{NOM DCR (mOHMS)}$$

$$\text{Core Loss (mW)} = \text{TRFB} \times (\text{F})^{1.84} \times (\text{TRFC} \times \Delta I)^{2.28}$$

IDC = DC Output Current (ADC)

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

F = Switching Frequency (kHz)

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REF: AF4142, AF4143, AF4144, AF4145

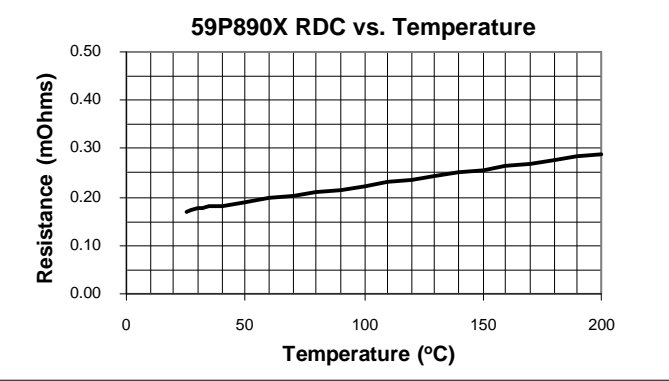
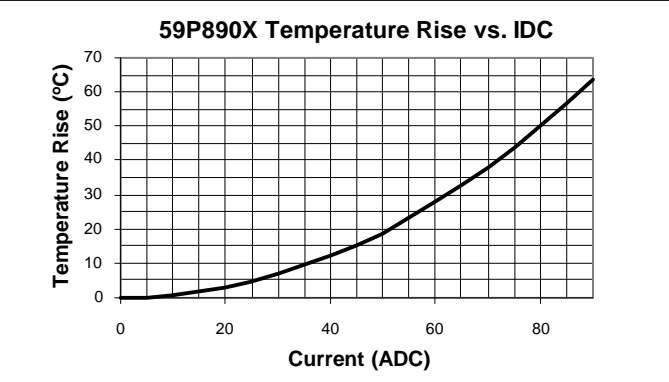
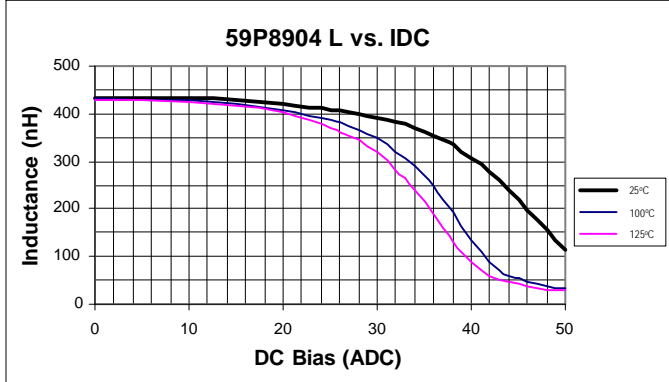
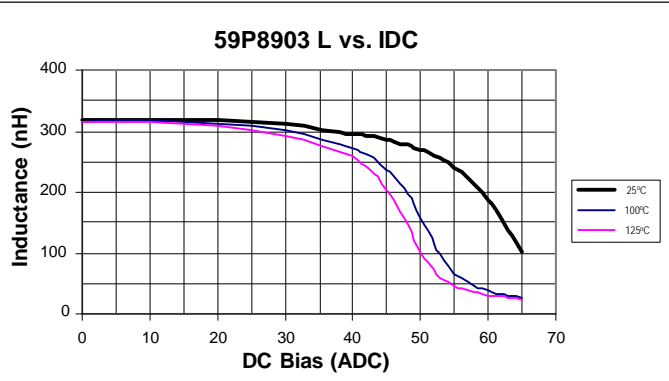
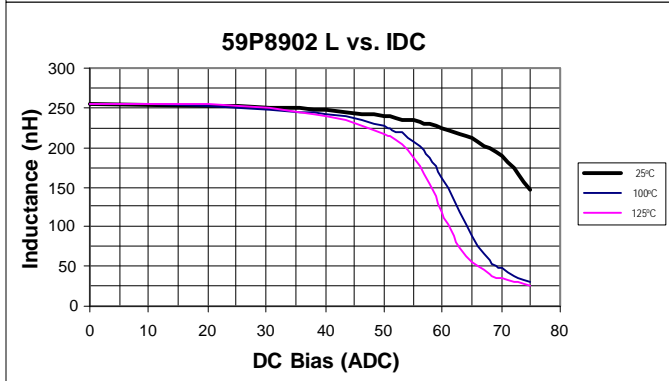
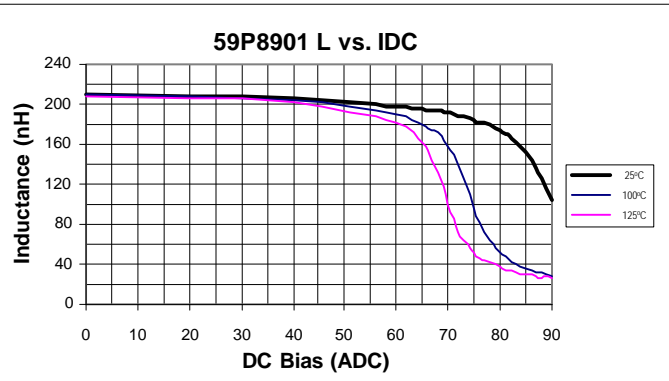
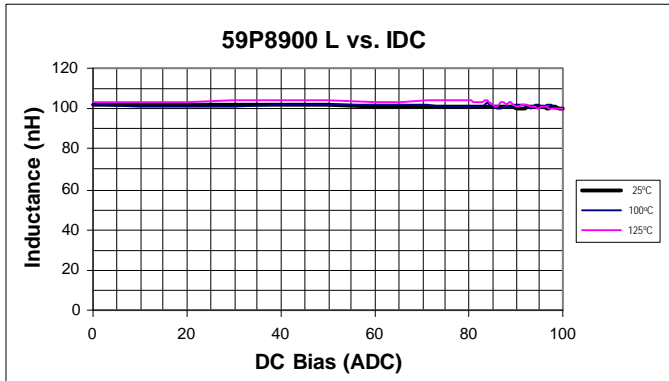
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### PERFORMANCE GRAPHS



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