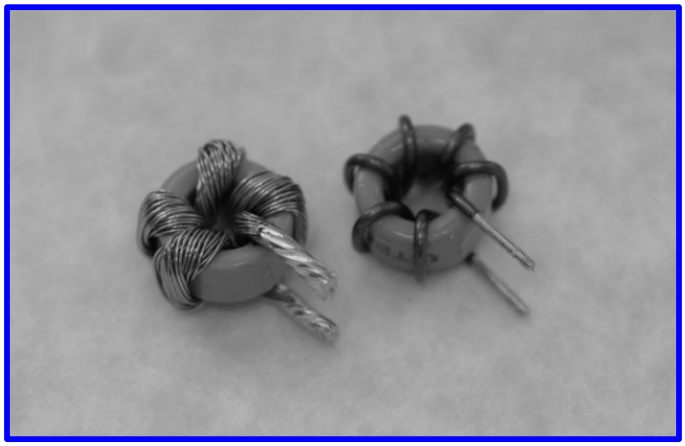
High Frequency Power Inductor

Designed for Multi-Phase Voltage Regulator Applications

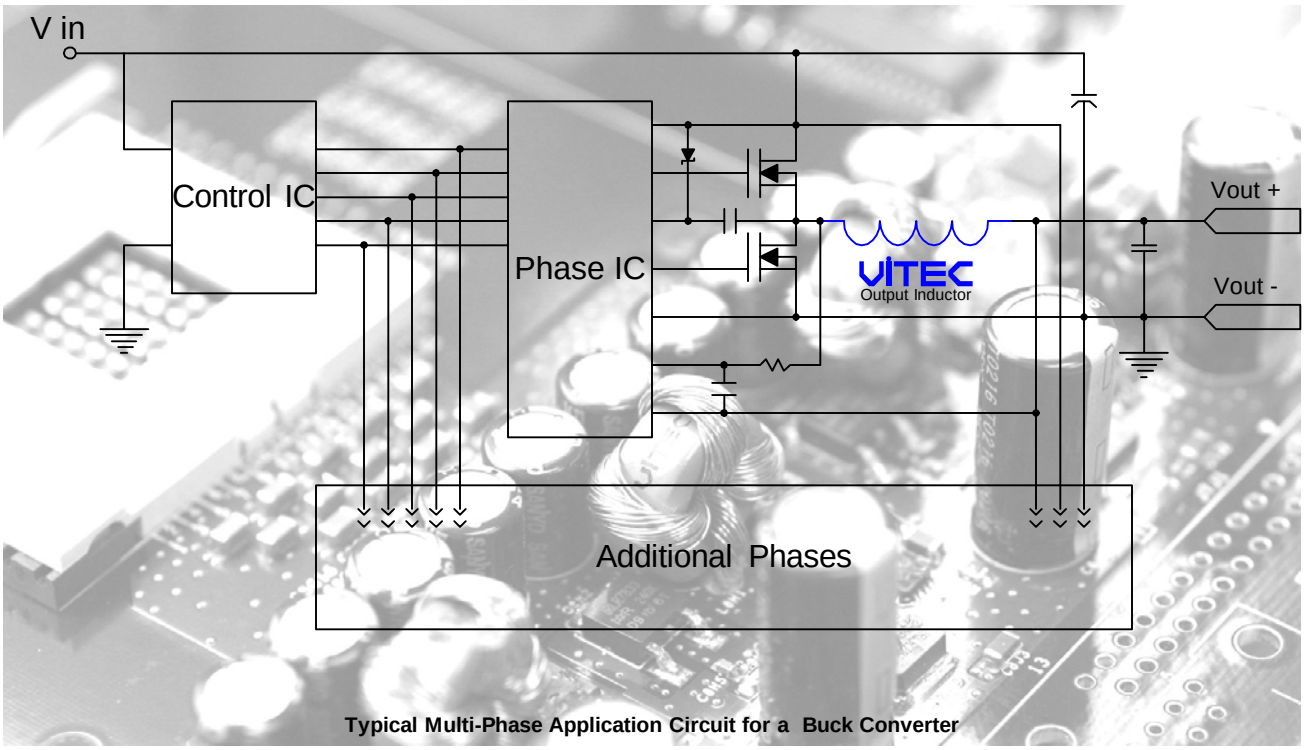
FEATURES

- **Recommended for use with Voltage Regulator ICs**
- **High Current handling capability in a small footprint**
- **100KHz to 2MHz operating frequency**
- **Extended operating temperature range: -40C to 125C**
- **Ferrite based design with a very low Core Loss**
- **No thermal aging issues**
- **Litz wire for reduced skin effect**
- **Toroidal Design for efficient thermal management**
- **Meets flammability requirements of UL 94V-0**
- **Manufactured to UL recognized 155C insulation system (UL File#E107307)**



APPLICATIONS

- VRD 9.x, 10.x and 11.x based designs
- Multi-Phase Voltage regulator designs
- Server, Desktop, 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



Typical Multi-Phase Application Circuit for a Buck Converter

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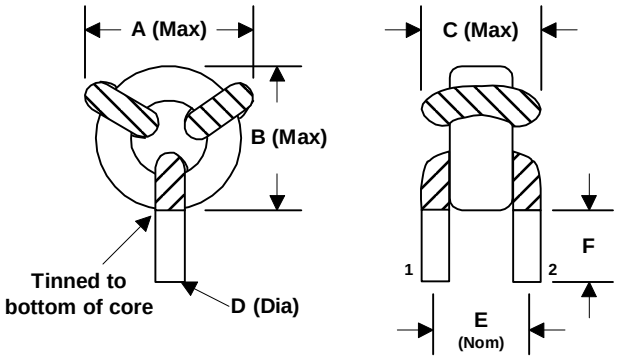
PACKAGE 1



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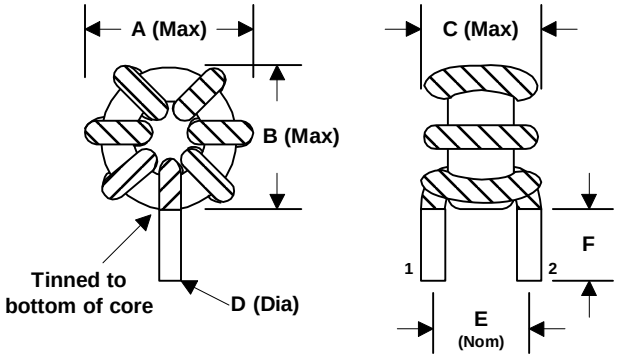

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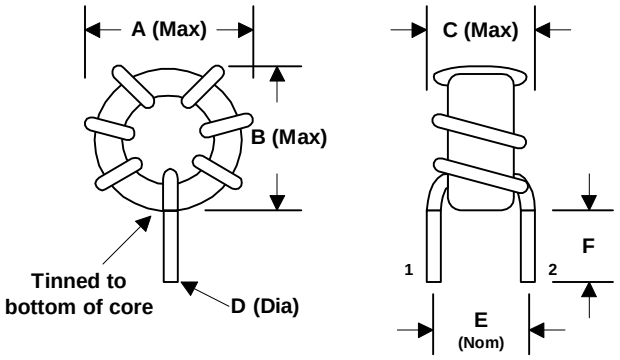

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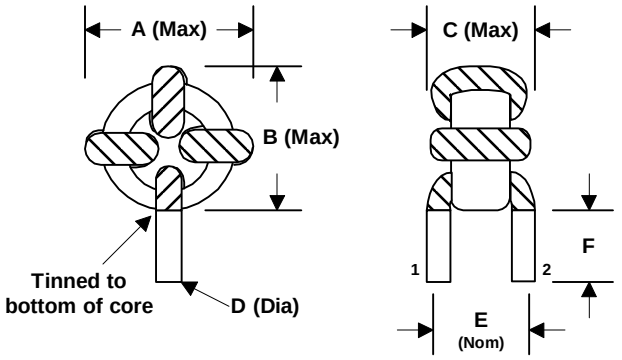
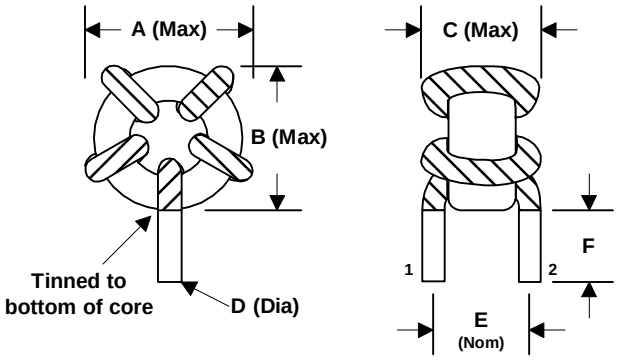


PACKAGE 5



DIMENSIONS

P/N (package)		A	B	C	D	E	F
55P9263	1	0.710 18,03	0.570 14,48	0.450 11,44	0.100 2,54	0.320 8,13	0.250 - 0.350 6,35 - 8,89
55P9323	2	0.690 17,53	0.650 16,53	0.440 11,18	0.070 1,78	0.350 8,89	0.200 - 0.300 5,08 - 7,62
55P9327	3	0.520 13,21	0.500 12,71	0.340 8,64	0.035 0,89	0.265 6,74	0.230 - 0.270 5,84 - 6,86
55P9328	4	0.730 18,54	0.660 16,76	0.450 11,44	0.095 2,41	0.350 8,89	0.200 - 0.300 5,08 - 7,62
55P9331	4	0.730 18,54	0.660 16,76	0.430 10,92	0.095 2,41	0.350 8,89	0.250 - 0.350 6,35 - 8,89
55P9344	1	0.710 18,03	0.560 14,22	0.450 11,44	0.100 2,54	0.300 7,62	0.250 - 0.350 6,35 - 8,89
55P9345	5	0.550 13,97	0.500 12,70	0.360 9,14	0.080 2,03	0.270 6,86	0.250 - 0.350 6,35 - 8,89
55P9346	5	0.690 17,53	0.600 15,24	0.380 9,65	0.080 2,03	0.350 8,89	0.200 - 0.300 5,08 - 7,62
55P9347	4	0.630 16,00	0.520 13,21	0.350 8,89	0.100 2,54	0.270 6,86	0.250 - 0.350 6,35 - 8,89

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

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ELECTRICAL CHARACTERISTICS @ 25ºC (unless otherwise noted)

Part Number		Inductance @ 0Adc[4]	Inductance @ Irated[4]	Irated[1]	DCR		MAX Saturation Current[2]			Temp. Rise Current[3]	Temp. Rise Factor[5]
Classic	RoHS compliant	nH ± 10%	nH MIN	ADC MAX	mOhm TYP	mOhm MAX	ADC -40ºC	ADC 25ºC	ADC 125ºC	ADC MAX	
55P9263	**55PR9263**	310	223	70	0.49	0.55	73	70	50	38	0.0192
55P9323	**55PR9323**	1800 (+/- 15%)	1224	24	1.80	2.00	25	24	21	26	0.0739
55P9327	**55PR9327**	1250	900	23	3.30	3.80	25	23	15	14	0.0911
55P9328	**55PR9328**	470	338	62	0.64	0.72	64	62	43	37	0.0338
55P9331	**55PR9331**	330	238	80	0.64	0.72	83	80	60	36	0.0237
55P9344	**55PR9344**	200	144	98	0.46	0.55	100	98	68	38	0.0197
55P9345	**55PR9345**	610	439	26	1.15	1.45	28	26	19	27	0.0612
55P9346	**55PR9346**	1000	720	34	1.15	1.50	36	34	26	28	0.0575
55P9347	**55PR9347**	310	230	44	0.67	0.74	47	44	37	34	0.0395

Add an "R" to the part number after "P" for the RoHS compliant version (i.e. 55PR9263 is the RoHS compliant version of 55P9263).

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 0.250" 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:

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

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

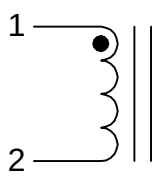
$$\text{Core Loss} = B \times (F)^{1.84} \times (\text{Temp. Rise Factor} \times \triangle I)^{2.2}$$

$\triangle I$ = Delta I across the inductor

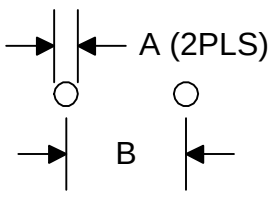
F = Switching Frequency (kHz)

TABLE		
Part #	A	B
55P9263	7.25	0.0072
55P9323	7.25	0.0072
55P9327	5.49	0.0033
55P9328	7.25	0.0072
55P9331	7.25	0.0072
55P9344	7.25	0.0072
55P9345	5.49	0.0033
55P9346	7.25	0.0072
55P9347	5.49	0.0033

SCHEMATIC



SUGGESTED PCB LAYOUT



Drawing NOT to scale

Part #	A	B
55P9263	0.120 / 3,05	0.320 / 8,13
55P9323	0.090 / 2,29	0.350 / 8,89
55P9327	0.050 / 1,27	0.265 / 6,73
55P9328	0.120 / 3,05	0.350 / 8,89
55P9331	0.120 / 3,05	0.350 / 8,89
55P9344	0.120 / 3,05	0.300 / 7,62
55P9345	0.090 / 2,28	0.270 / 6,86
55P9346	0.100 / 2,54	0.350 / 8,89
55P9347	0.120 / 3,05	0.270 / 6,86

Dimension (inch / mm)

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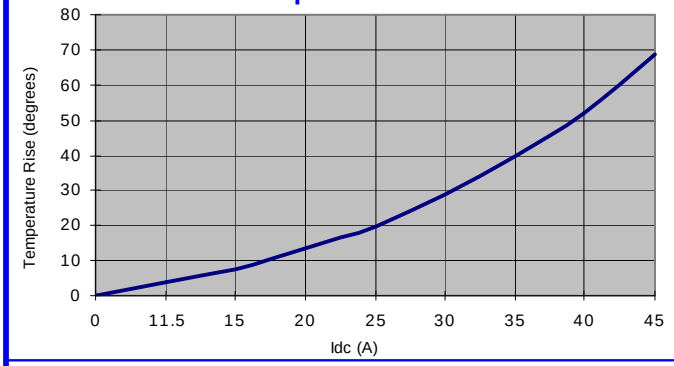
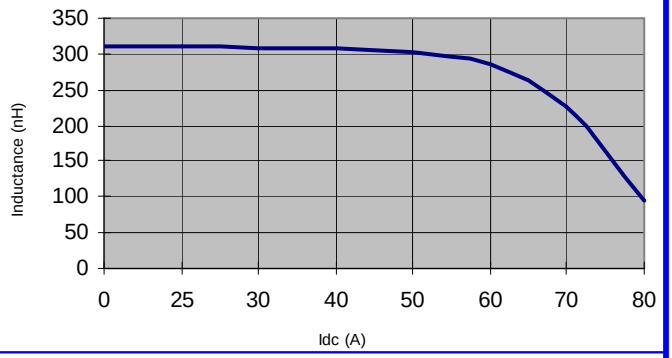
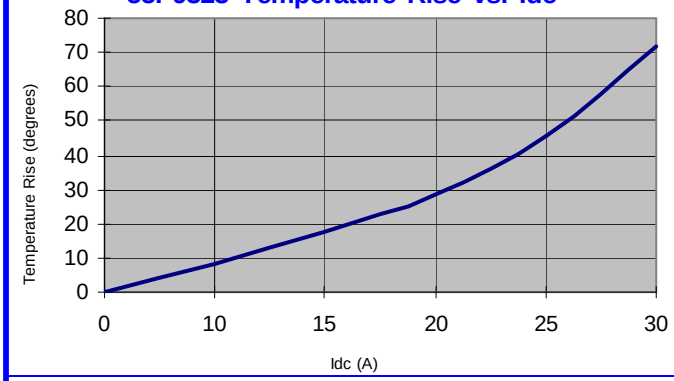
55P9263 Temperature Rise vs. Idc



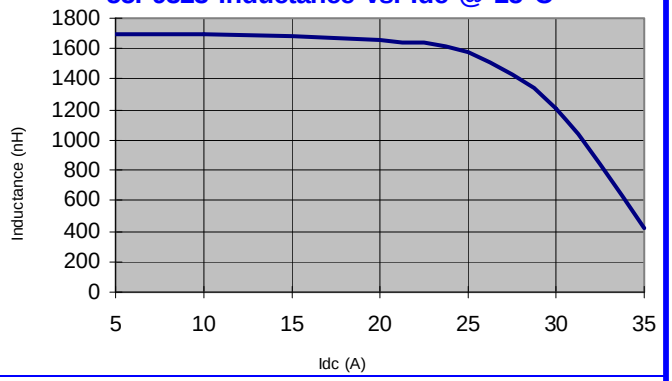
55P9263 Inductance vs. Idc @ 25ºC



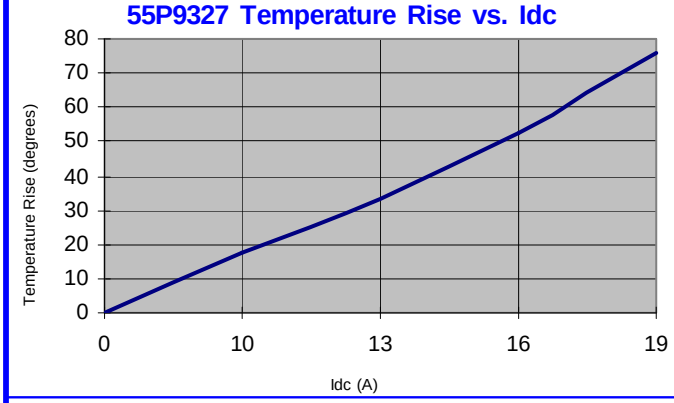
55P9323 Temperature Rise vs. Idc



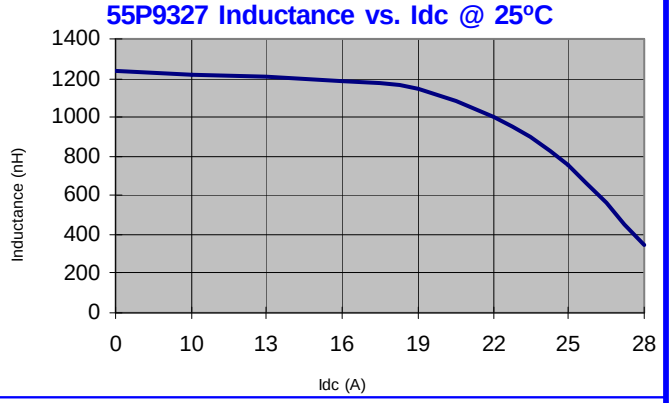
55P9323 Inductance vs. Idc @ 25ºC



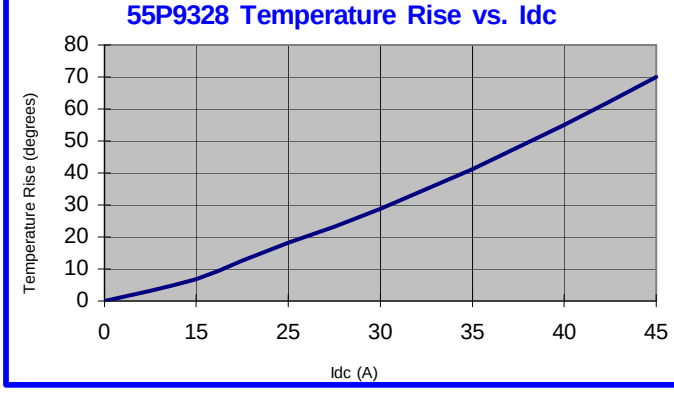
55P9327 Temperature Rise vs. Idc



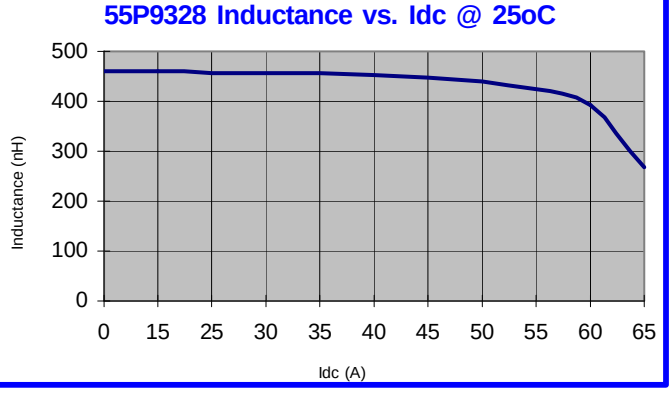
55P9327 Inductance vs. Idc @ 25ºC



55P9328 Temperature Rise vs. Idc



55P9328 Inductance vs. Idc @ 25oC



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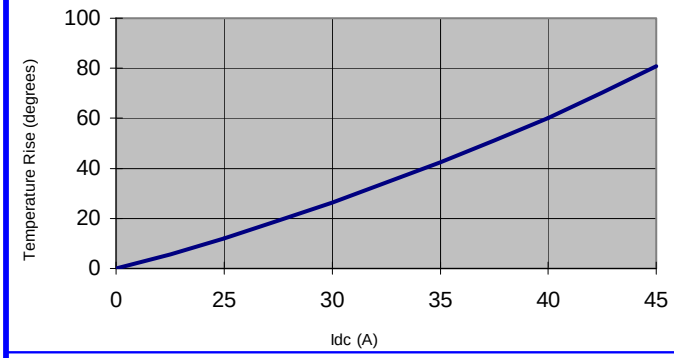
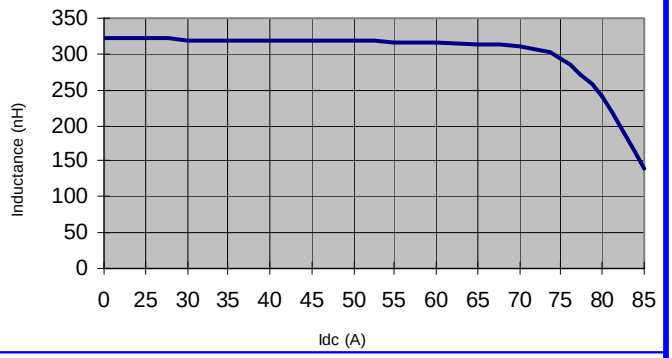
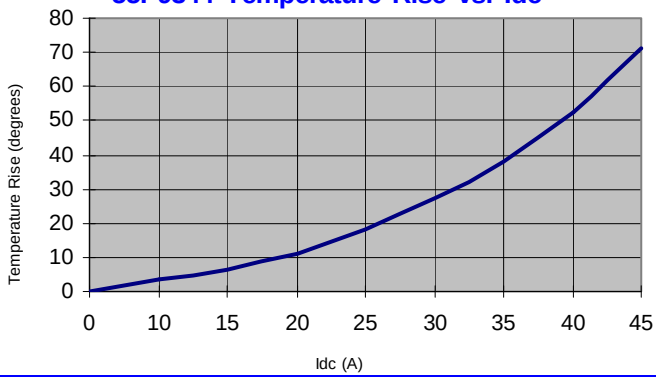
55P9331 Temperature Rise vs. Idc



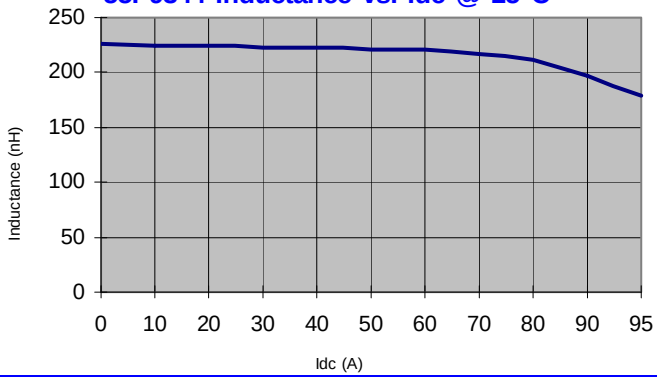
55P9331 Inductance vs. Idc @ 25ºC



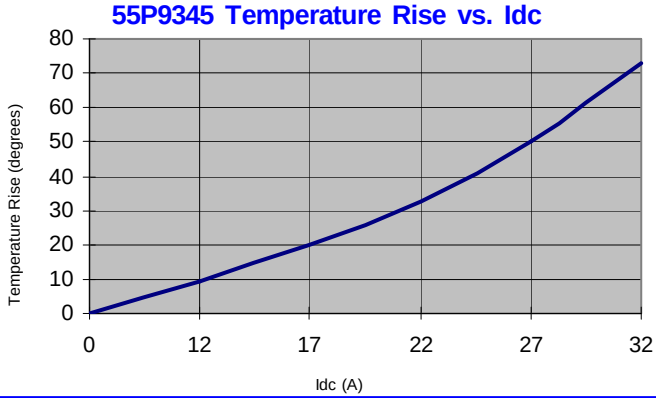
55P9344 Temperature Rise vs. Idc



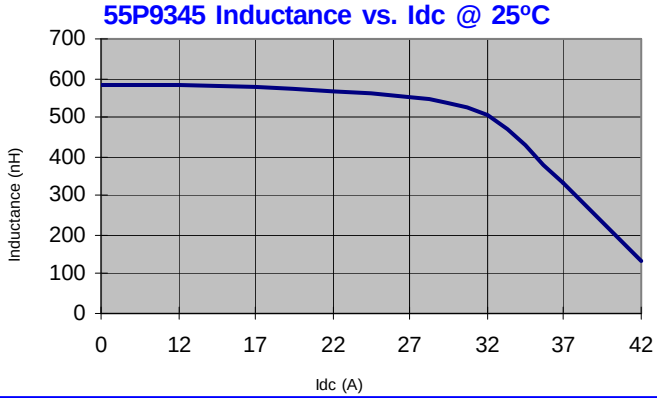
55P9344 Inductance vs. Idc @ 25ºC



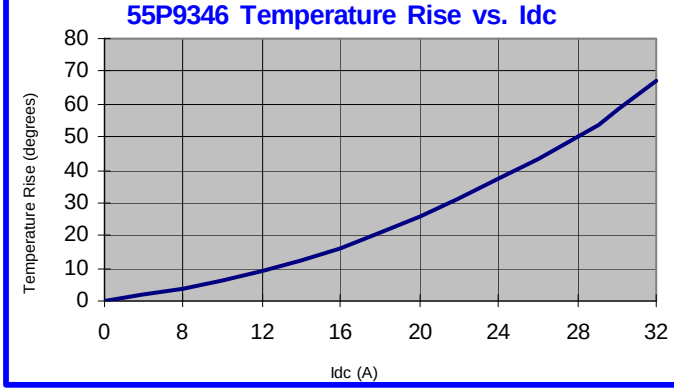
55P9345 Temperature Rise vs. Idc



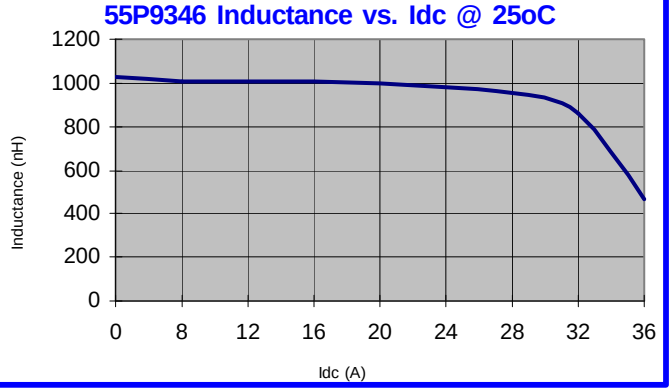
55P9345 Inductance vs. Idc @ 25ºC



55P9346 Temperature Rise vs. Idc



55P9346 Inductance vs. Idc @ 25oC



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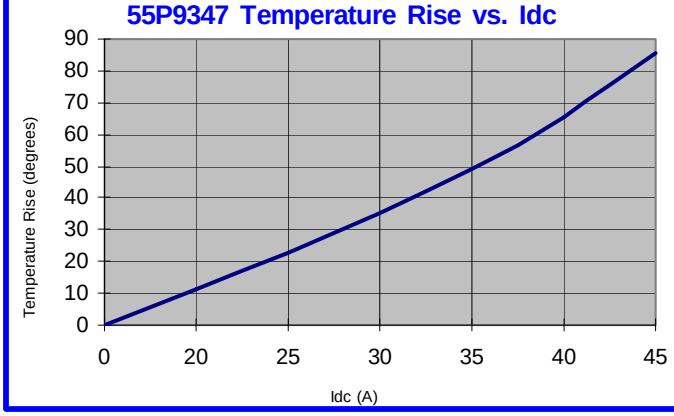
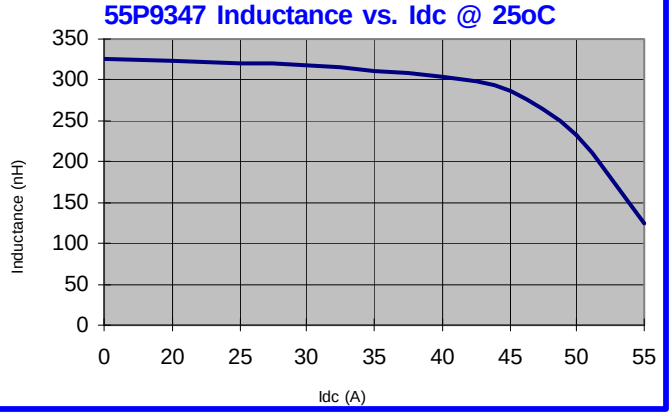
55P9347 Temperature Rise vs. Idc



55P9347 Inductance vs. Idc @ 25oC



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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