SMD High Frequency Power Inductor

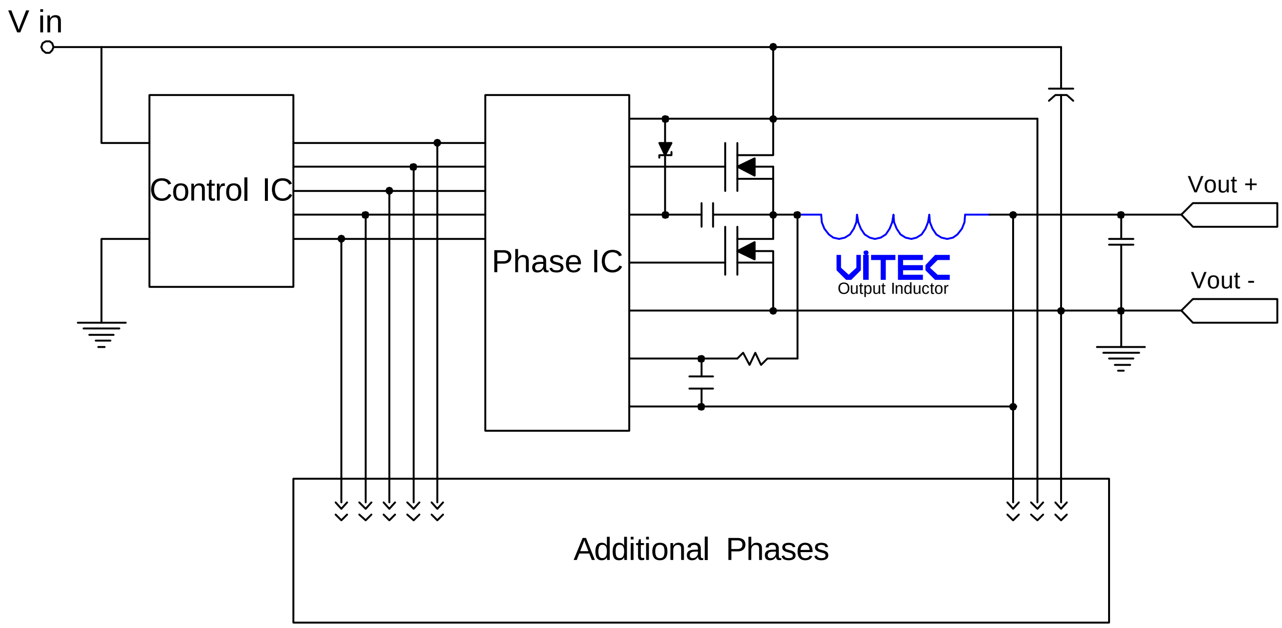
Designed for Utility Regulator Applications

FEATURES

- **Recommended for use with all major Voltage Regulator ICs**
- **High Current handling capability in the smallest footprint**
- **Up to 2MHz operating frequency**
- **Extended operating temperature range: -40C to 125C**
- **Robust SMD package capable of handling the most aggressive SMT assembly process**
- **RoHS compliant version available**

APPLICATIONS

- Powering Utility Regulator functions such as input/output (I/O), memory and application-specific integrated circuit (ASICs).
- 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

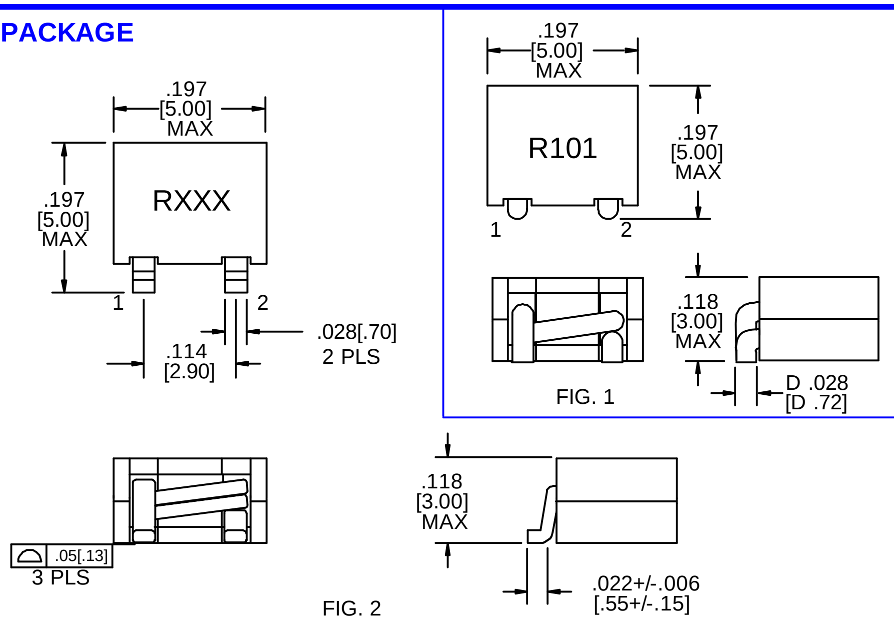
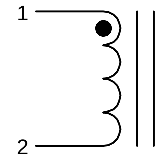


FIG. 1

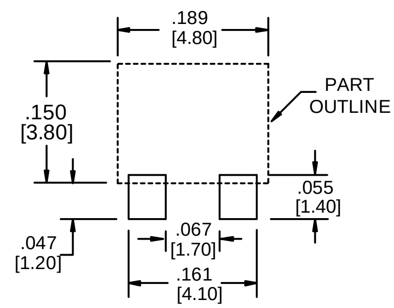
FIG. 2

Dimensions: Inches/mm. Tolerances: +/- 0.008"/0,20mm unless otherwise noted

SCHEMATIC



SUGGESTED PCB LAYOUT



Drawing NOT to scale

ELECTRICAL CHARACTERISTICS @ 25ºC (unless otherwise noted)

Part Number	FIG	Inductance @ 0Adc[4] nH ± 10%	Inductance @ Irated[4] nH MIN	Irated[1] ADC MAX	DCR mOhm TYP	DCR mOhm MAX	MAX Saturation Current[2] ADC -40ºC	MAX Saturation Current[2] ADC 25ºC	MAX Saturation Current[2] ADC 125ºC	Temp. Rise Current[3] ADC MAX	Temp. Rise Factor[5] A	Temp. Rise Factor[5] B
59PR21-101	1	100	72	23.0	0.9	1.0	23.5	23.0	18.0	15.0	0.07200	1.05
59PR21-201	2	200	144	15.0	2.0	2.5	18.0	17.5	13.5	8.0	0.09466	1.17
59PR21-331	2	330	238	10.5	2.0	2.5	11.0	10.5	8.2	8.0	0.15851	1.17
59PR21-471	2	470	338	10.0	3.7	4.3	10.5	10.0	7.8	6.3	0.16878	1.34
59PR21-681	2	680	490	6.8	3.7	4.1	6.9	6.8	5.3	6.3	0.24419	1.34
59PR21-102	2	1000	680	5.7	5.5	6.1	6.0	5.8	4.5	5.5	0.28785	1.52

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. Temperature Rise can be estimated using the following formulas:

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

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

$$\text{Core Loss (mW)} = 0.00224 \times (F)^{1.84} \times (\text{Temp. Rise factor} \times \Delta I)^{2.2}$$

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

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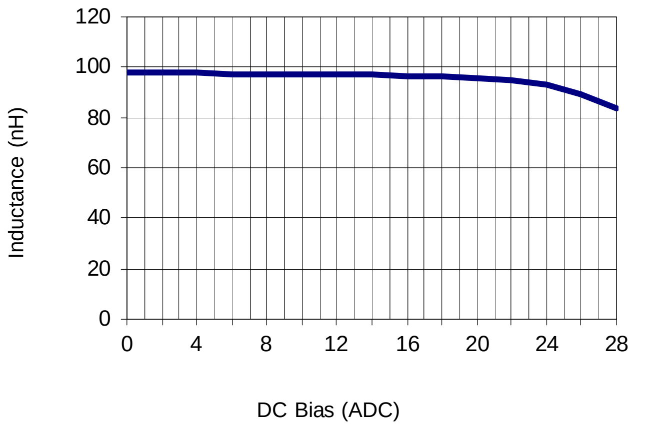
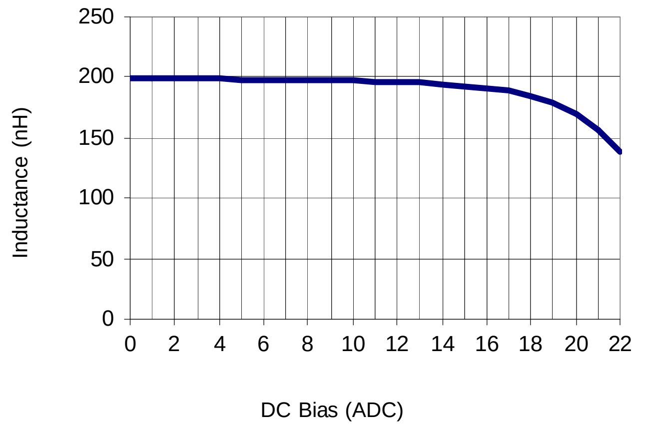
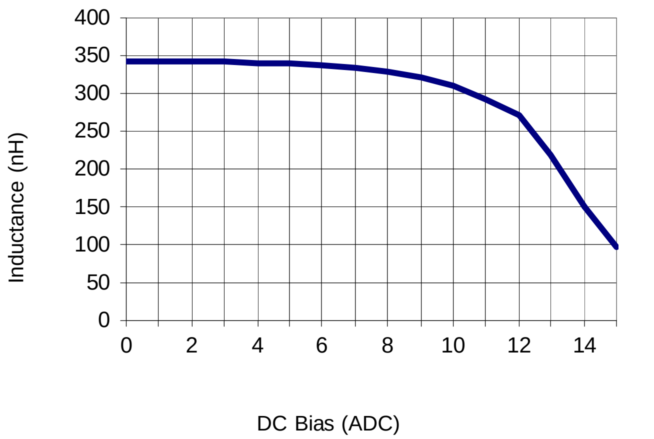
59P21-101 Inductance vs. Idc @ 25ºC



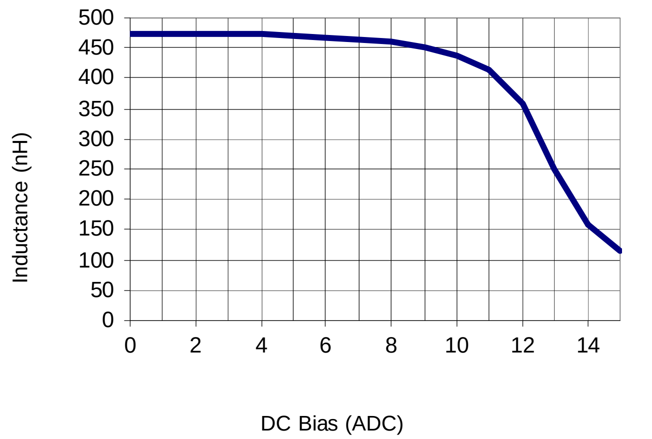
59P21-201 Inductance vs. Idc @ 25ºC



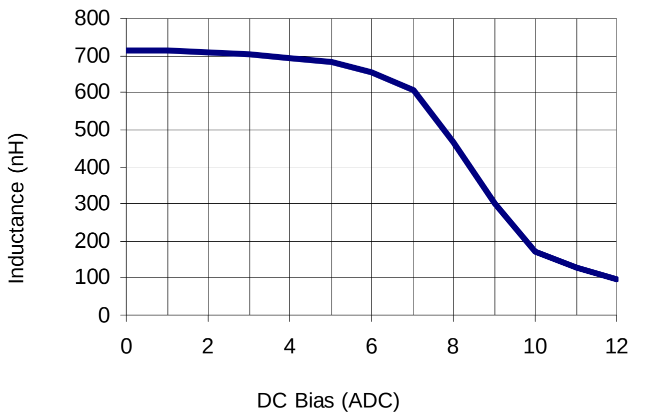
59P21-331 Inductance vs. Idc @ 25ºC



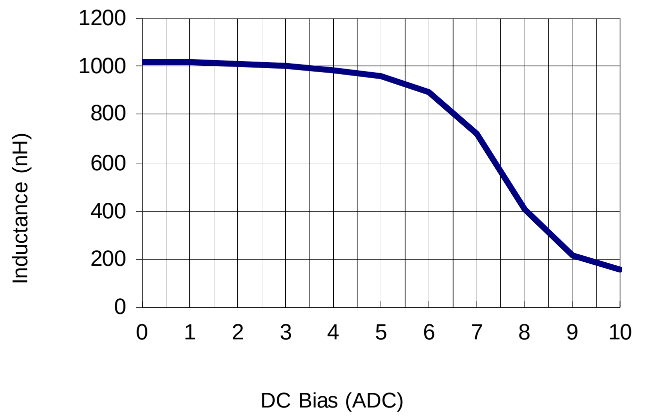
59P21-471 Inductance vs. Idc @ 25ºC



59P21-681 Inductance vs. Idc @ 25ºC



59P21-102 Inductance vs. Idc @ 25ºC



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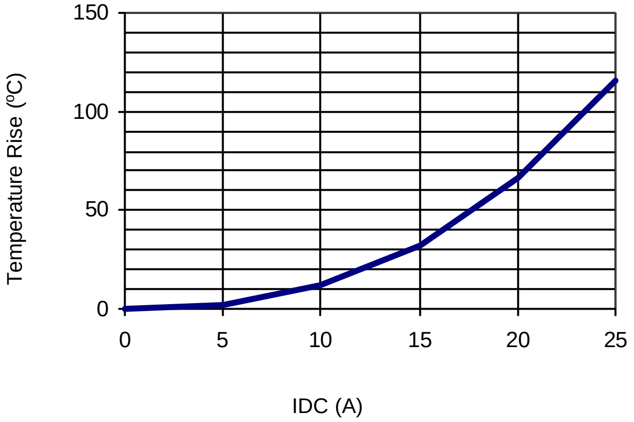
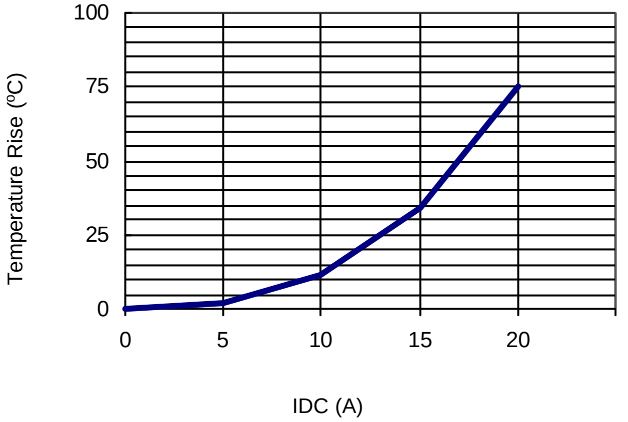
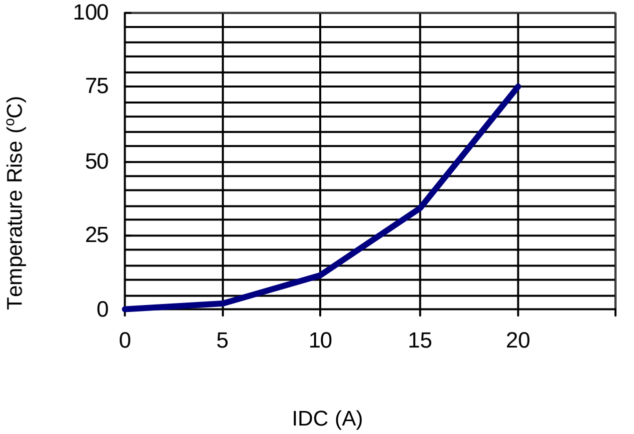
59P21-101 Temp. Rise vs. Idc



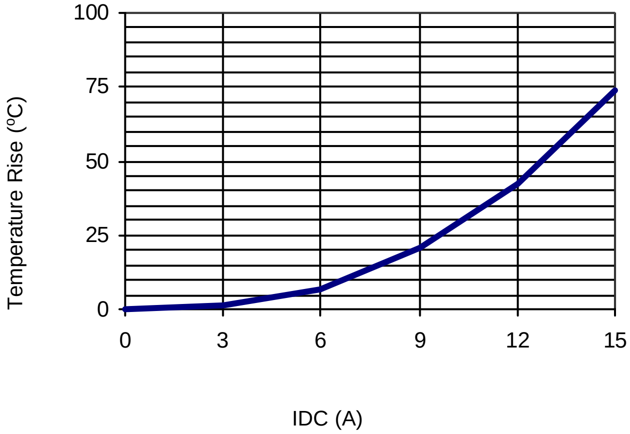
59P21-201 Temp. Rise vs. Idc



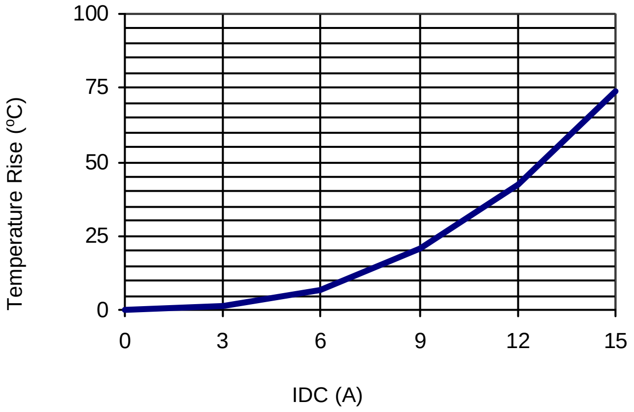
59P21-331 Temp. Rise vs. Idc



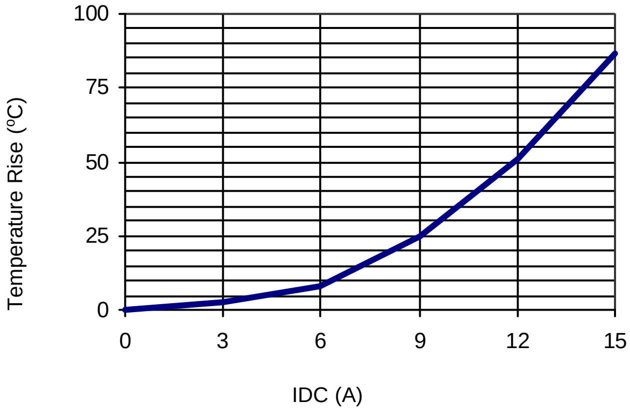
59P21-471 Temp. Rise vs. Idc



59P21-681 Temp. Rise vs. Idc



59P21-102 Temp. Rise vs. Idc



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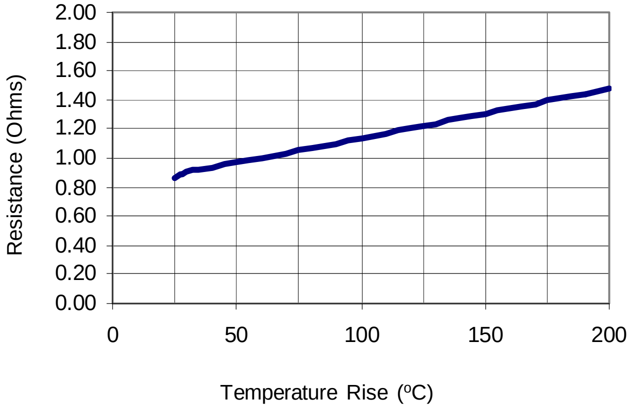
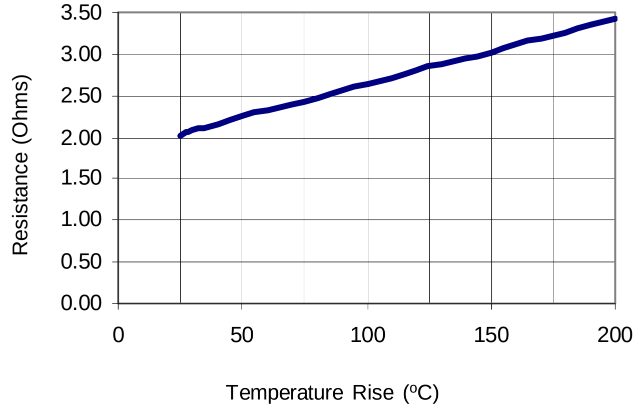
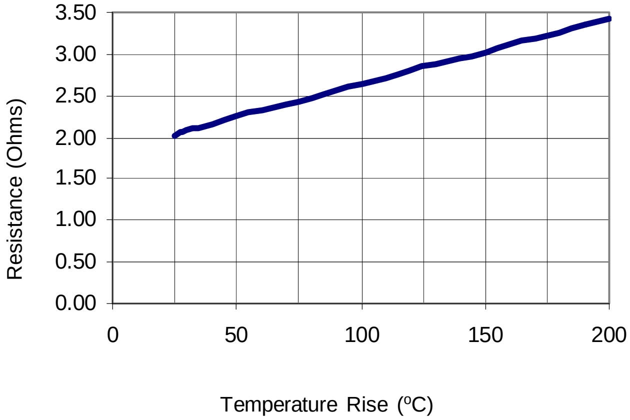
59P21-101 Rdc vs. Temp. Rise



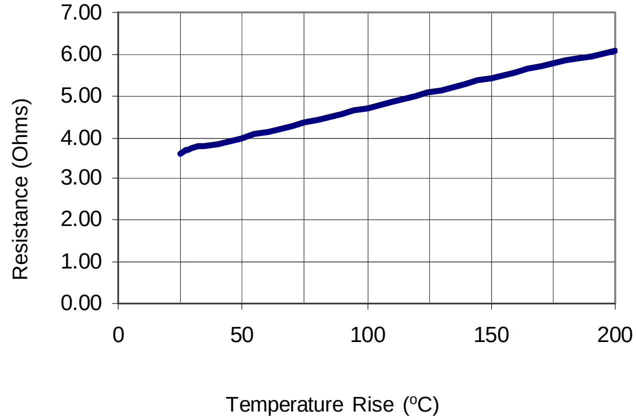
59P21-201 Rdc vs. Temp. Rise



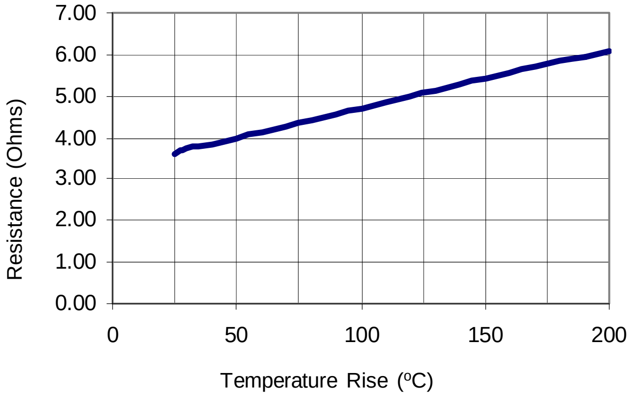
59P21-331 Rdc vs. Temp. Rise



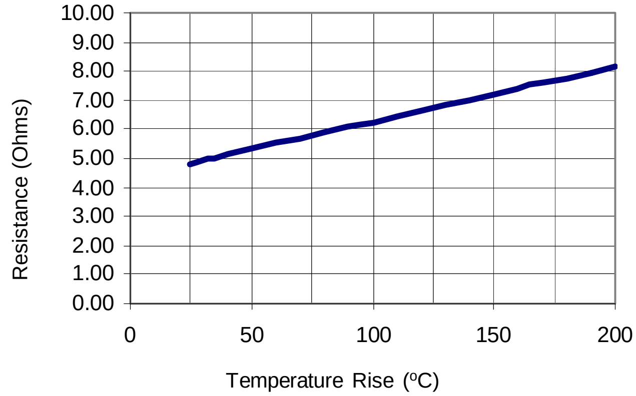
59P21-471 Rdc vs. Temp. Rise



59P21-681 Rdc vs. Temp. Rise



59P21-102 Rdc vs. Temp. Rise



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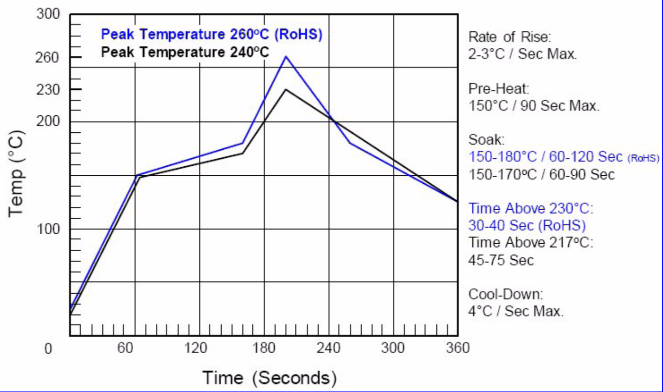
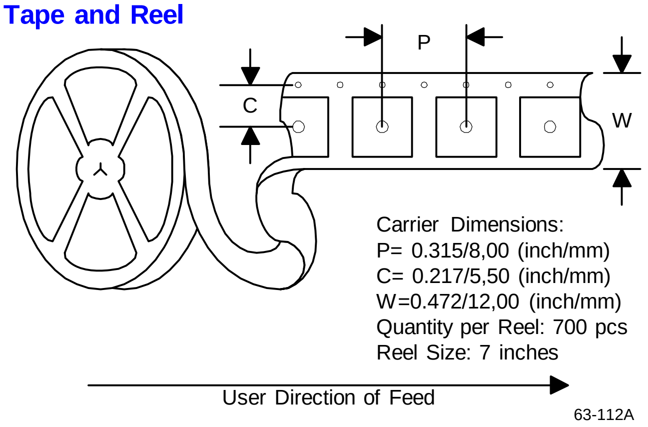
IR Profile



Tape and Reel



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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