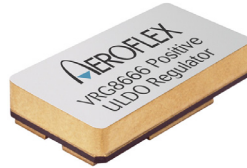



**VRG8666****Voltage Regulator, 1.0 Amp, Positive  
Ultra Low Dropout (ULDO), Adjustable  
Radiation Tolerant**

www.aeroflex.com/voltreg

February 29, 2016

**FEATURES**

- ❑ Manufactured using  Space Qualified RH3080 die
- ❑ Radiation performance
  - ♦ Total dose: 100 krads(Si), Dose rate = 50 - 300 rads(Si)/s
  - ♦ ELDRS: 50 krads(Si), Dose rate ≤ 0.01 rads(Si)/s
- ❑ Current Limit with Foldback and Over-temperature protection
- ❑ Output voltage adjustable: 0V to 36V
- ❑ Outputs may be paralleled for higher current
- ❑ Post Radiated Dropout voltage:
  - ♦ 0.60V @ 1.0Amps
  - ♦ 0.39V @ 0.5Amps
- ❑ Output current: 1.0Amps
- ❑ Packaging – Hermetic Ceramic
  - ♦ Hermetic Surface Mount Power
  - ♦ 5 Pads, .545"L x .296"W x .120"Ht
  - ♦ Weight - 2.0 gm max
- ❑ Designed for aerospace and high reliability space applications
- ❑ Aeroflex Plainview's Radiation Hardness Assurance Plan is DLA Certified to MIL-PRF-38534, Appendix G.

**DESCRIPTION**


The Aeroflex Plainview VRG8666 consists of a Positive Adjustable (RH3080) ULDO voltage regulator capable of supplying 1.0Amps over the output voltage range as defined under recommended operating conditions. The VRG8666 offers excellent line and load regulation specifications and ripple rejection.

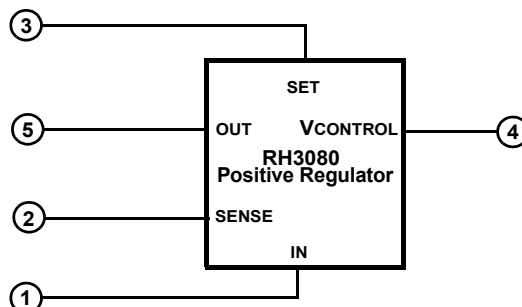
The VRG8666 serves a wide variety of applications including SCSI-2 Active Terminator, High Efficiency Linear Regulators, Post Regulators for Switching Supplies, Constant Current Regulators, Battery Chargers and Microprocessor Supply.

The VRG8666 has been specifically designed to meet exposure to radiation environments and is configured for an SMD power package. It is guaranteed operational from -55°C to +125°C. Available screened to MIL-STD-883, the VRG8666 is ideal for demanding military and space applications.

Dropout ( $V_{IN} - V_{OUT}$ ) decreases at lower load currents.

Input capacitance is required for load regulation. 1uF is recommended on  $V_{in}$  and  $V_{control}$ . For stable operation, a 0.1uF capacitor should be placed on  $V_{set}$  and a low ESR capacitor on  $V_{out}$ . See Figure 5.

For detailed performance characteristic curves, applications information and typical applications see the latest  Linear Technology Corporation® data sheets for their RH/LT3080, which is available on-line at www.linear.com.

**FIGURE 1 – BLOCK DIAGRAM / SCHEMATIC**

## ABSOLUTE MAXIMUM RATINGS

| Parameter  | Rating        | Units           |
|--|---------------|-----------------|
| Input Voltage, V <sub>CONTROL</sub> (Voltages are Relative to V <sub>OUT</sub> ) | +40, -0.3     | V <sub>DC</sub> |
| Output Current   | 1.2           | A               |
| Lead temperature (soldering 10 Sec)  | 300           | °C              |
| Input Output Differential  | 26            | V <sub>DC</sub> |
| Output Voltage   | +36           | V <sub>DC</sub> |
| ESD <u>1/</u>  | 2,000 - 3,999 | V               |
| Operating Junction Temperature Range   | -55 to +150   | °C              |
| Storage Temperature Range  | -65 to +150   | °C              |
| Thermal Resistance (Junction to Case) $\Theta_{JC}$                              | 5             | °C/W            |

1/ Meets ESD testing per MIL-STD-883, method 3015, Class 2.

NOTICE: Stresses above those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. These are stress rating only; functional operation beyond the "Operation Conditions" is not recommended and extended exposure beyond the "Operation Conditions" may effect device reliability.

## RECOMMENDED OPERATING CONDITIONS

| Parameter   | Range       | Units           |
|---|-------------|-----------------|
| Output Voltage Range  | 0 to 35     | V <sub>DC</sub> |
| Input Output Differential   | 0.5 to 26   | V <sub>DC</sub> |
| Case Operating Temperature Range                                  | -55 to +125 | °C              |
| Input Voltage (Voltages are Relative to V <sub>OUT</sub> )        | 1 to 36     | V               |
| V <sub>CONTROL</sub> (Voltages are Relative to V <sub>OUT</sub> ) | 1.6 to 36   | V               |

## ELECTRICAL PERFORMANCE CHARACTERISTICS

Unless otherwise specified: -55°C ≤ T<sub>c</sub> ≤ +125°C.

| Parameter  | Symbol              | Conditions (P ≤ P <sub>MAX</sub> )  | Min   | Max   | Units |
|--|---------------------|---|-------|-------|-------|
| Set Pin Current  | I <sub>REF1</sub>   | 1.0mA ≤ I <sub>LOAD</sub> ≤ 1.0A, (V <sub>IN</sub> - V <sub>OUT</sub> ) = 1.6V  | 9.85  | 10.35 | μA    |
| Set Pin Current <u>1/</u>  | I <sub>REF2</sub>   | V <sub>IN</sub> = 1V, V <sub>CONTROL</sub> = 2V, I <sub>LOAD</sub> = 1mA  | 9.85  | 10.35 | μA    |
| Output Offset Voltage (V <sub>OUT</sub> - V <sub>SET</sub> ) <u>1/</u> | V <sub>OS</sub>     | V <sub>IN</sub> = 1V, V <sub>CONTROL</sub> = 2V, I <sub>LOAD</sub> = 1mA,   | -9.0  | 9.0   | mV    |
| Line Regulation <u>1/</u>  | ΔV <sub>OS</sub>    | 1V ≤ V <sub>IN</sub> ≤ 26V, 2V ≤ V <sub>CONTROL</sub> ≤ 26V, I <sub>LOAD</sub> = 1mA  | -0.15 | 0.15  | mV/V  |
| Load Regulation <u>1/</u>  | ΔV <sub>OS</sub>    | (V <sub>IN</sub> - V <sub>OUT</sub> ) = 3V, I <sub>LOAD</sub> = 1mA to 0.1A   | -1.4  | 1.4   | mV    |
| V <sub>CONTROL</sub> Dropout Voltage <u>2/</u>                         | V <sub>CDROP</sub>  | I <sub>LOAD</sub> = 1.0A  | -     | 1.60  | V     |
|  |                     | I <sub>LOAD</sub> = 0.1A <u>1/</u> , <u>4/</u>  | -     | 1.60  |       |
| V <sub>IN</sub> Dropout Voltage <u>2/</u>                              | V <sub>INDROP</sub> | I <sub>LOAD</sub> = 1.0A  | -     | 0.5   | V     |
|  |                     | I <sub>LOAD</sub> = 0.1A <u>1/</u> , <u>4/</u>  | -     | 0.25  |       |
| Current Limit <u>3/</u>  | I <sub>MAX</sub>    | V <sub>IN</sub> = V <sub>CONTROL</sub> = +5V, V <sub>SET</sub> = 0V, V <sub>OUT</sub> = 0.1V  | 1.1   | -     | A     |
| Minimum Load Current <u>1/</u> , <u>4/</u>                             | I <sub>MIN</sub>    | V <sub>IN</sub> = V <sub>CONTROL</sub> = 26V, V <sub>OUT</sub> = 0.1V   | -     | 0.9   | mA    |
| Ripple Rejection   | -                   | I <sub>LOAD</sub> = 0.2A, (V <sub>IN</sub> - V <sub>OUT</sub> ) = 3V, f = 120Hz, C <sub>OUT</sub> = 2.2μF, C <sub>SET</sub> = 0.1μF | 60    | -     | dB    |
| Thermal Regulation   | -                   | 30ms pulse, T <sub>c</sub> = +25°C  | -     | 0.03  | %/W   |

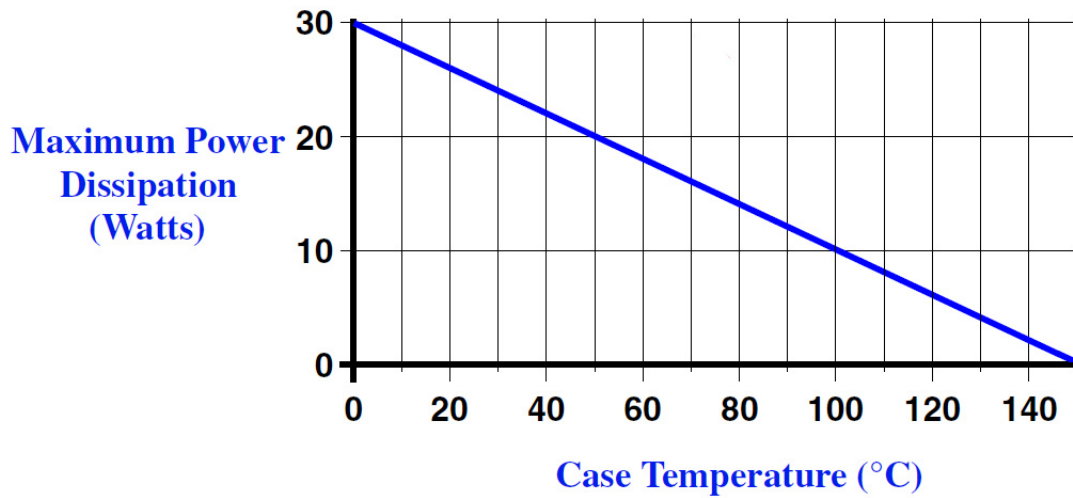
Notes:

1/ Specification derated to reflect Total Dose exposure to 100 Krad (Si) @+25°C.

2/ Dropout results from either minimum control voltage, V<sub>CONTROL</sub>, or minimum input voltage, V<sub>IN</sub>, both specified with respect to V<sub>OUT</sub>. These specifications represent the minimum input-to-output differential voltage required to maintain regulation.

3/ Pulsed @ <10% duty cycle @ +25°C for characterization only. (See note 1/).

4/ Not tested. Shall be guaranteed to the specified limits.



**FIGURE 2 – MAXIMUM POWER vs CASE TEMPERATURE**

The maximum Power dissipation is limited by the thermal shutdown function of the regulator chip in the VRG8666. The graph above represents the achievable power before the chip shuts down. The line in the graph represents the maximum power dissipation of the VRG8666. This graph is based on the maximum junction temperature of 150°C and a thermal resistance ( $\theta_{JC}$ ) of 5°C/W.

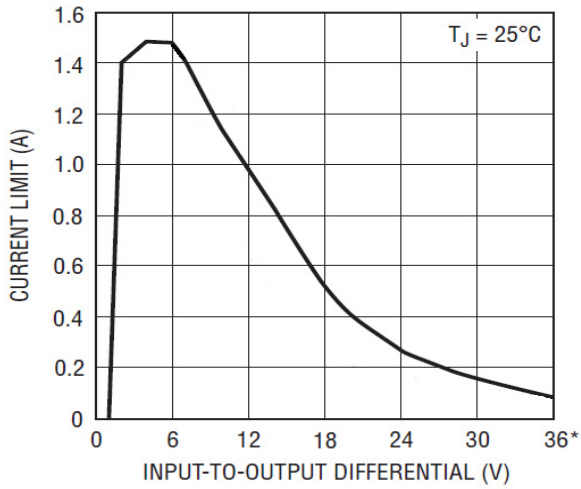


FIGURE 3 – RH3080 TYPICAL CURRENT LIMIT

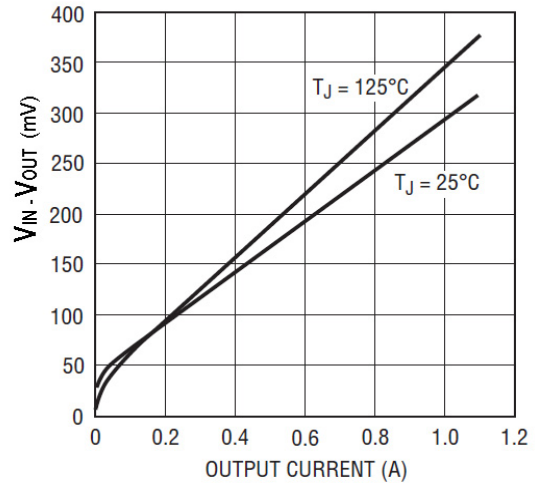


FIGURE 4 – RH3080 TYPICAL DROPOUT VOLTAGE CURVE, V<sub>CONTROL</sub> ≥ 1.6V

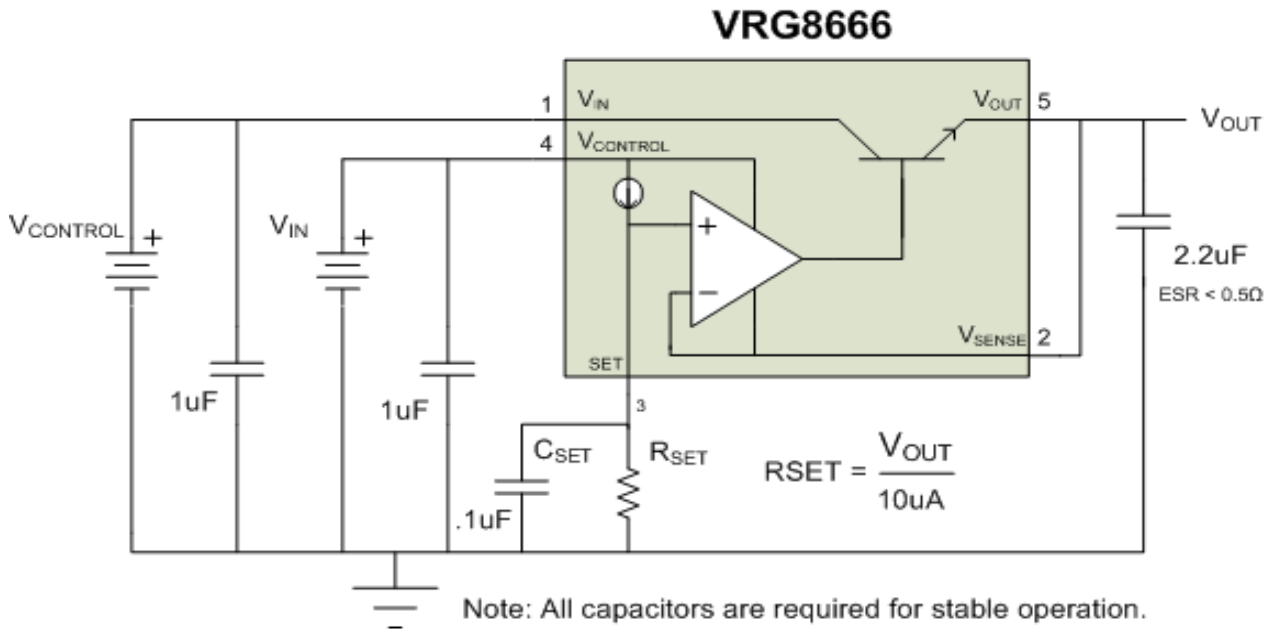



FIGURE 5 – BASIC VRG8666 ADJUSTABLE REGULATOR APPLICATION



## ORDERING INFORMATION

| Model          | DLA SMD #       | Screening  | Package          |
|----------------|-----------------|--|------------------|
| VRG8666-7      | -               | Commercial Flow, +25°C testing only  | SMD<br>Power Pkg |
| VRG8666-201-1S | 5962-1120501KYC | In accordance with DLA SMD   |                  |
| VRG8666-201-2S | 5962-1120501KYA |  |                  |
| VRG8666-901-1S | 5962R1120501KYC | In accordance with DLA Certified RHA Program Plan to RHA Level "R", 100krads(Si) |                  |
| VRG8666-901-2S | 5962R1120501KYA |  |                  |

For detailed performance characteristic curves, applications information and typical applications see the latest  datasheet for their RH3080, which is available on-line at [www.linear.com](http://www.linear.com).

**EXPORT CONTROL:**

*This product is controlled for export under the Export Administration Regulations (EAR), 15 CFR Parts 730-774. A license from the Department of Commerce may be required prior to the export of this product from the United States.*

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*Datasheet Definitions:*

|                                       |   |
|---------------------------------------|---|
| <i>Advanced Preliminary Datasheet</i> | <i>Product in Development Shipping Non-Flight Prototypes Shipping QML and Reduced HiRel</i> |
|---------------------------------------|---|



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Solution-Minded



Performance-Driven



Customer-Focused

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