

## Standard Products

# VRG8661

## Adjustable Regulator Negative Voltage Radiation Tolerant


[www.aeroflex.com/voltreg](http://www.aeroflex.com/voltreg)

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### FEATURES

- ❑ Manufactured using  Linear Technology Corporation® Space Qualified RH137 die
- ❑ Radiation performance
  - Total dose: 100 krad(Si), Dose rate = 50 - 300 rad(Si)/s
- ❑ Thermal shutdown
- ❑ Output voltage adjustable: -1.25V to -27V
- ❑ 3-Terminal
- ❑ Output current: 1.5A
- ❑ Voltage reference: -1.25V ±4%
- ❑ Load regulation: 1.0% max
- ❑ Line regulation: 0.05% max
- ❑ Ripple rejection: >66dB
- ❑ Packaging – Hermetic Ceramic
  - SMD-0.5 Surface mount
  - 3 Pads, .301"W x .405"L x .130"Ht max
  - Power package
  - Weight - 2 gm max
- ❑ Designed for aerospace and high reliability space applications
- ❑ DSCC SMD 5962-09206 pending


*Note: Aeroflex Plainview does not currently have a DSCC certified Radiation Hardened Assurance Program.*

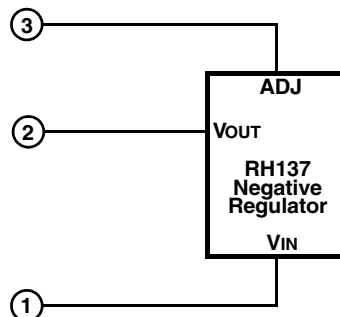
### DESCRIPTION

The Aeroflex Plainview VRG8661 consists of a Negative Adjustable (RH137) voltage regulator capable of supplying 1.5Amps over the output voltage range as defined under recommended operating conditions. The VRG8661 offers excellent line and load regulation specifications and ripple rejection. Dropout ( $V_{in} - V_{out}$ ) decreases at lower load currents.

The VRG8661 serves a wide variety of applications including High Efficiency Linear Regulators, Post Regulators for Switching Supplies, Constant Current Regulators, Battery Chargers and Microprocessor Supply.

The VRG8661 has been specifically designed to meet exposure to radiation environments and is configured for a SMD-0.5 SMT power package. It is guaranteed operational from -55°C to +125°C. Available screened to MIL-STD-883, the VRG8661 is ideal for demanding military and space applications.

For detailed performance characteristic curves, applications information and typical applications see the latest  Linear Technology Corporation® data sheets for their RH137, which is available on-line at [www.linear.com](http://www.linear.com).



**FIGURE 1 – BLOCK DIAGRAM / SCHEMATIC**

## ABSOLUTE MAXIMUM RATINGS

PARAMETER	RANGE	UNITS
Lead temperature (soldering 10 Sec)	300	°C
Input-Output Voltage Differential	-30	VDC
ESD	1.999 <sup>1/</sup>	KV
Operating Junction Temperature Range	-55 to +150	°C
Storage Temperature Range	-65 to +150	°C

<sup>1/</sup> Meets ESD testing per MIL-STD-883, method 3015, Class 1C.

NOTICE: Stresses above those listed under "Absolute Maximums Rating" 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

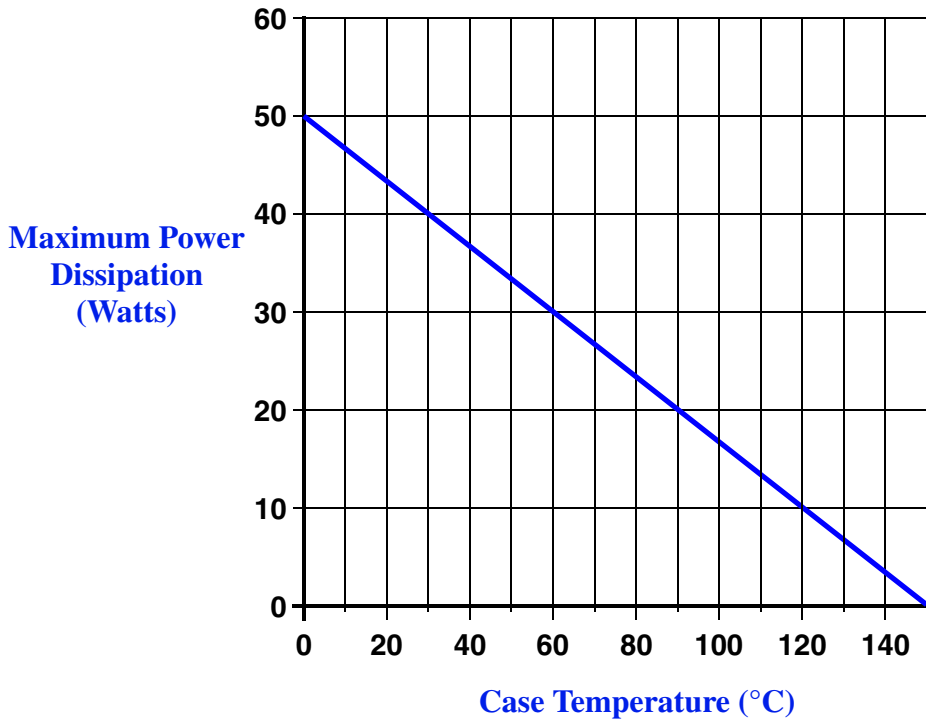
PARAMETER	RANGE	UNITS
Output Voltage Range	-1.25 to -27	VDC
Case Operating Temperature Range	-55 to +125	°C

## ELECTRICAL PERFORMANCE CHARACTERISTICS <sup>1/</sup>

PARAMETER	SYM	CONDITIONS (P ≤ P <sub>MAX</sub> )	MIN	MAX	UNITS
Reference Voltage	V <sub>REF</sub>	-3V ≤ (V <sub>IN</sub> - V <sub>OUT</sub> ) ≤ V <sub>DIFF</sub> MAX, 10mA ≤ I <sub>OUT</sub> ≤ I <sub>MAX</sub>	-1.200	-1.300	V
Line Regulation <sup>2/</sup>	$\frac{\Delta V_{OUT}}{\Delta V_{IN}}$	-3V ≤ (V <sub>IN</sub> - V <sub>OUT</sub> ) ≤ -27V,	-	0.05	%/V
Load Regulation <sup>2/</sup>	$\frac{\Delta V_{OUT}}{\Delta I_{OUT}}$	10mA ≤ I <sub>OUT</sub> ≤ I <sub>MAX</sub> , V <sub>OUT</sub> ≤ -5V 10mA ≤ I <sub>OUT</sub> ≤ I <sub>MAX</sub> , V <sub>OUT</sub> ≥ -5V	- -	50 1.0	mV %
Thermal Regulation		I <sub>OUT</sub> = 1.5A, (V <sub>IN</sub> - V <sub>OUT</sub> ) = -13.3V, 20ms Pulse, 20W, T <sub>C</sub> = +25°C	-	0.02	%/W
Ripple Rejection		V <sub>OUT</sub> = -10V, f = 120Hz, C <sub>ADJ</sub> = 10μF	66	-	dB
Adjustment Pin Current	I <sub>ADJ</sub>		-	100	μA
Adjustment Pin Current Change	ΔI <sub>ADJ</sub>	10mA ≤ I <sub>OUT</sub> ≤ I <sub>MAX</sub> -3V ≤ (V <sub>IN</sub> - V <sub>OUT</sub> ) ≤ -27V	- -	5 5	μA
Minimum Load Current <sup>3/</sup>	I <sub>MIN</sub>	(V <sub>IN</sub> - V <sub>OUT</sub> ) = -27V (V <sub>IN</sub> - V <sub>OUT</sub> ) ≤ -10V	- -	5 3	mA
Current Limit	I <sub>MAX</sub>	(V <sub>IN</sub> - V <sub>OUT</sub> ) ≤ -15V (V <sub>IN</sub> - V <sub>OUT</sub> ) = -27V, T <sub>C</sub> = +25°C	1.5 0.24	- -	A
Long Term Stability <sup>3/</sup>	$\frac{\Delta V_{OUT}}{\Delta TIME}$	T <sub>A</sub> = +125°C	-	1	%
Thermal Resistance (Junction to Case) <sup>3/</sup>	Θ <sub>JC</sub>		-	3	°C/W

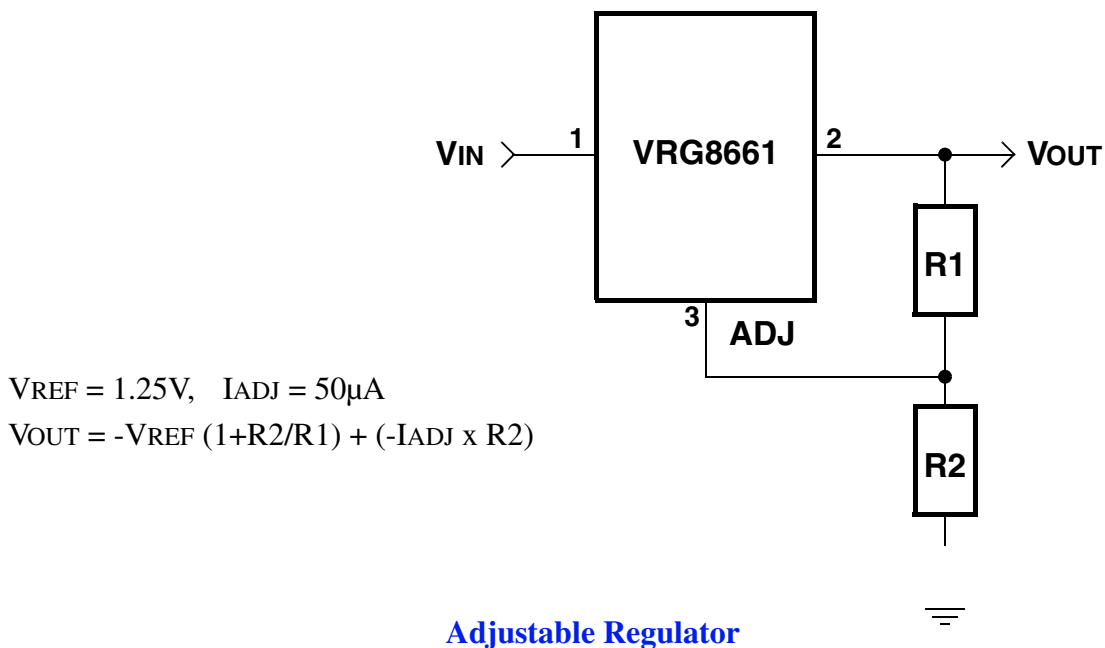
Notes:

- Unless otherwise specified, these specifications apply for post radiation, (V<sub>in</sub> - V<sub>out</sub>) = 5V, I<sub>out</sub> = 0.5A and -55°C < T<sub>c</sub> < +125°C.
- Regulation is measured at a constant junction temperature, using pulse testing with a low duty cycle. Changes in output voltage due to heating effects are covered under the specification for thermal regulation. Measurements taken at the output lead must be adjusted for lead resistance.
- Not tested. Shall be guaranteed to the specified limits.

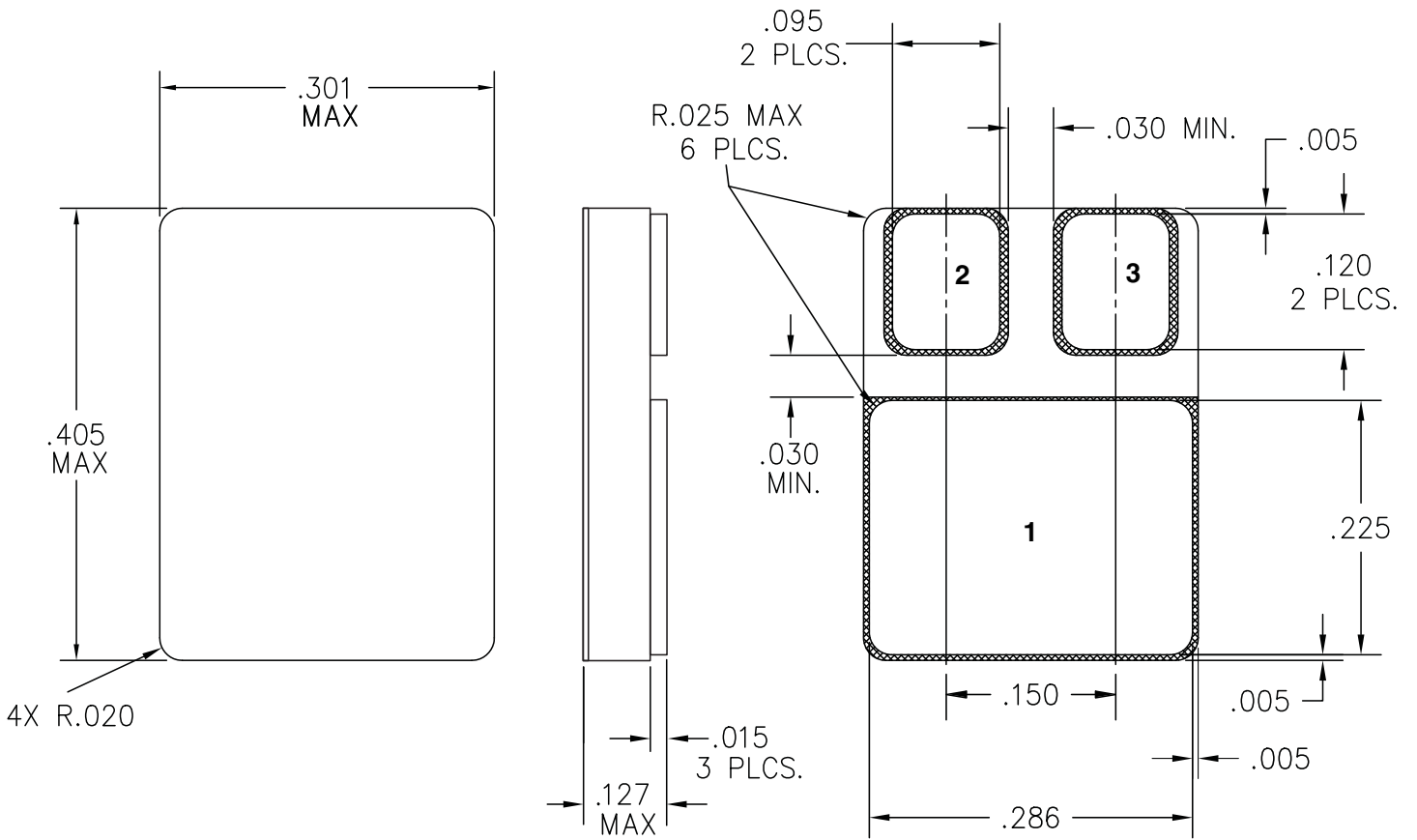


**FIGURE 2 – MAXIMUM POWER vs CASE TEMPERATURE**

The maximum Power dissipation is limited by the thermal shutdown function of the regulator chip in the VRG8661. The graph above represents the achievable power before the chip shuts down. The line in the graph represents the maximum power dissipation of the VRG8661. This graph is based on the maximum junction temperature of 150°C and a thermal resistance ( $\Theta_{JC}$ ) of 3°C/W.



**FIGURE 3 – TYPICAL APPLICATIONS**



NOTE: Package & Lid are electrically isolated from signal pads.

**FIGURE 4 – PACKAGE OUTLINE — SURFACE MOUNT**

## ORDERING INFORMATION

MODEL	DSCC SMD #	SCREENING	PACKAGE
VRG8661-S	-	Military Temperature, -55°C to +125°C Screened in accordance with MIL-PRF-38534, Class K.	SMD-0.5 Power Pkg
VRG8661-7	-	Commercial Flow, +25°C testing only	
VRG8661-201-1S VRG8661-201-2S	5962-0920602KXC 5962-0920602KXA	In accordance with DSCC SMD	

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*This product is controlled for export under the International Traffic in Arms Regulations (ITAR). A license from the U.S. Department of State is required prior to the export of this product from the United States.*

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#### PLAINVIEW, NEW YORK

Toll Free: 800-THE-1553  
Fax: 516-694-6715

#### INTERNATIONAL

Tel: 805-778-9229  
Fax: 805-778-1980

#### NORTHEAST

Tel: 603-888-3975  
Fax: 603-888-4585

#### SE AND MID-ATLANTIC

Tel: 321-951-4164  
Fax: 321-951-4254

#### WEST COAST

Tel: 949-362-2260  
Fax: 949-362-2266

#### CENTRAL

Tel: 719-594-8017  
Fax: 719-594-8468

[www.aeroflex.com](http://www.aeroflex.com)    [info-ams@aeroflex.com](mailto:info-ams@aeroflex.com)



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