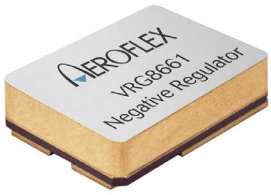
Standard Products

VRG8661
Adjustable Regulator Negative Voltage Radiation Tolerant

www.aeroflex.com/voltreg

April 16, 2012



FEATURES

- Manufactured using LINEAR TECHNOLOGY Space Qualified RH137 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
- 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, .400"L x .296"W x .120"Ht
  - Power package
  - Weight - 2 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 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 (Vin - Vout) 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.

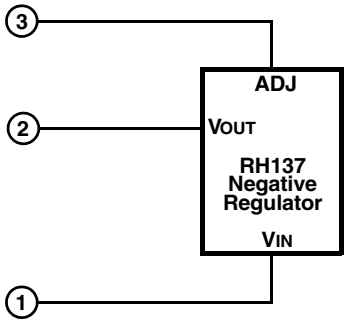


FIGURE 1 – BLOCK DIAGRAM / SCHEMATIC

ABSOLUTE MAXIMUM RATINGS

PARAMETER	RANGE	UNITS
Lead temperature (soldering 10 Sec)	300	°C
Input-Output Voltage Differential	-30	V_{DC}
ESD	2.000-3.999 1/	KV
Operating Junction Temperature Range	-55 to +150	°C
Storage Temperature Range	-65 to +150	°C

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

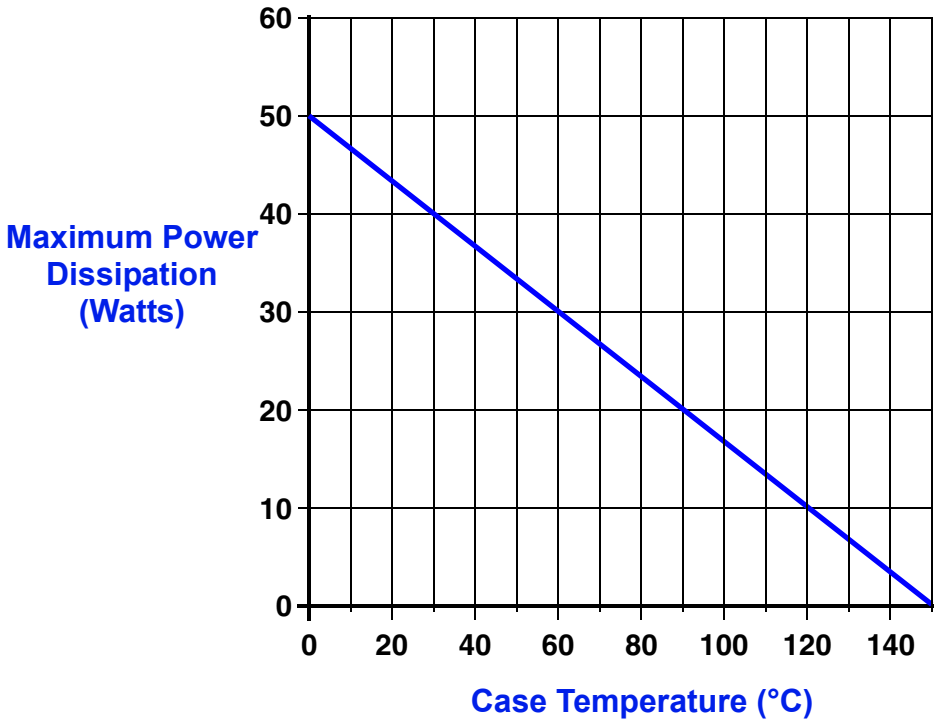
PARAMETER	RANGE	UNITS
Output Voltage Range	-1.25 to -27	V_{DC}
Case Operating Temperature Range	-55 to +125	°C

ELECTRICAL PERFORMANCE CHARACTERISTICS

Unless otherwise specified -55°C ≤ T_C ≤ +125°C & (V_{IN}-V_{OUT}) = -5V, I_{OUT} = 0.5A

PARAMETER	SYM	CONDITIONS ($P \leq P_{MAX}$)	MIN	MAX	UNITS
Reference Voltage 1/ 5/	V_{REF}	-3V ≤ (V_{IN} - V_{OUT}) ≤ $V_{DIFF\ MAX}$, 10mA ≤ I_{OUT} ≤ I_{MAX}	-1.200	-1.300	V
Line Regulation 1/ 2/	$\frac{\Delta V_{OUT}}{\Delta V_{IN}}$	-3V ≤ (V_{IN} - V_{OUT}) ≤ -27V,	-	0.05	%/V
Load Regulation 1/ 2/	$\frac{\Delta V_{OUT}}{\Delta I_{OUT}}$	10mA ≤ I_{OUT} ≤ I_{MAX}, V_{OUT} ≤ -5V	-	50	mV
		10mA ≤ I_{OUT} ≤ I_{MAX}, V_{OUT} ≥ -5V	-	1.0	%
Thermal Regulation		I_{OUT} = 1.5A, (V_{IN} - V_{OUT}) = -13.3V, 20ms Pulse, 20W, T_C = +25°C	-	0.02	%/W
Ripple Rejection		V_{OUT} = -10V, f = 120Hz, C_{ADJ} = 10µF	66	-	dB
Adjustment Pin Current 1/	I_{ADJ}		-	100	µA
Adjustment Pin Current 1/ Change	ΔI_{ADJ}	10mA ≤ I_{OUT} ≤ I_{MAX}, -3V ≤ (V_{IN} - V_{OUT}) ≤ -27V	-	5	µA
Minimum Load Current 1/ 3/	I_{MIN}	(V_{IN} - V_{OUT}) = -27V	-	5	mA
		(V_{IN} - V_{OUT}) ≤ -10V	-	3	
Current Limit 1/ 4/	I_{MAX}	(V_{IN} - V_{OUT}) ≤ -15V	1.5	-	A
		(V_{IN} - V_{OUT}) = -27V, T_C = +25°C	0.24	-	
Long Term Stability 3/	$\frac{\Delta V_{OUT}}{\Delta T_{IME}}$	T_A = +125°C	-	1	%
Thermal Resistance (Junction to Case) 3/	Θ_{JC}		-	3	°C/W

Notes:
1/ Specification derated to reflect Total Dose exposure to 100 Krad (Si) @25°C.
2/ 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.
3/ Not tested. Shall be guaranteed to the specified limits.
4/ Pulsed @ <10% duty cycle @ 25°C.
5/ Testing over 12 watts is not performed over + 25°C.

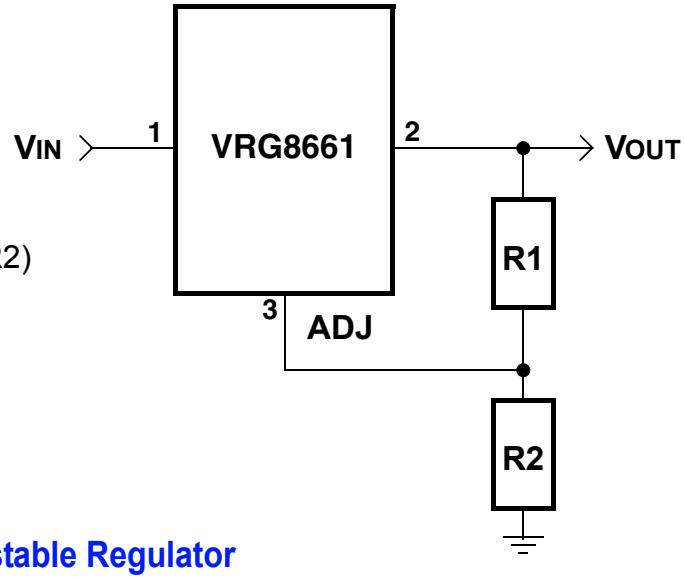


The maximum Power dissipation is limited by the thermal shutdown function of the regulator chip in the VRG8661. The graph above represents the achievable power before the chip shuts down. The line in the graph represents the maximum power dissipation of the VRG8661 This graph is based on the maximum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

FIGURE 2 – MAXIMUM POWER vs CASE TEMPERATURE

V_{REF} = 1.25V, I_{ADJ} = 50µA

$V_{OUT} = -V_{REF} (1+R2/R1) + (-I_{ADJ} \times R2)$



Adjustable Regulator

FIGURE 3 – TYPICAL APPLICATIONS

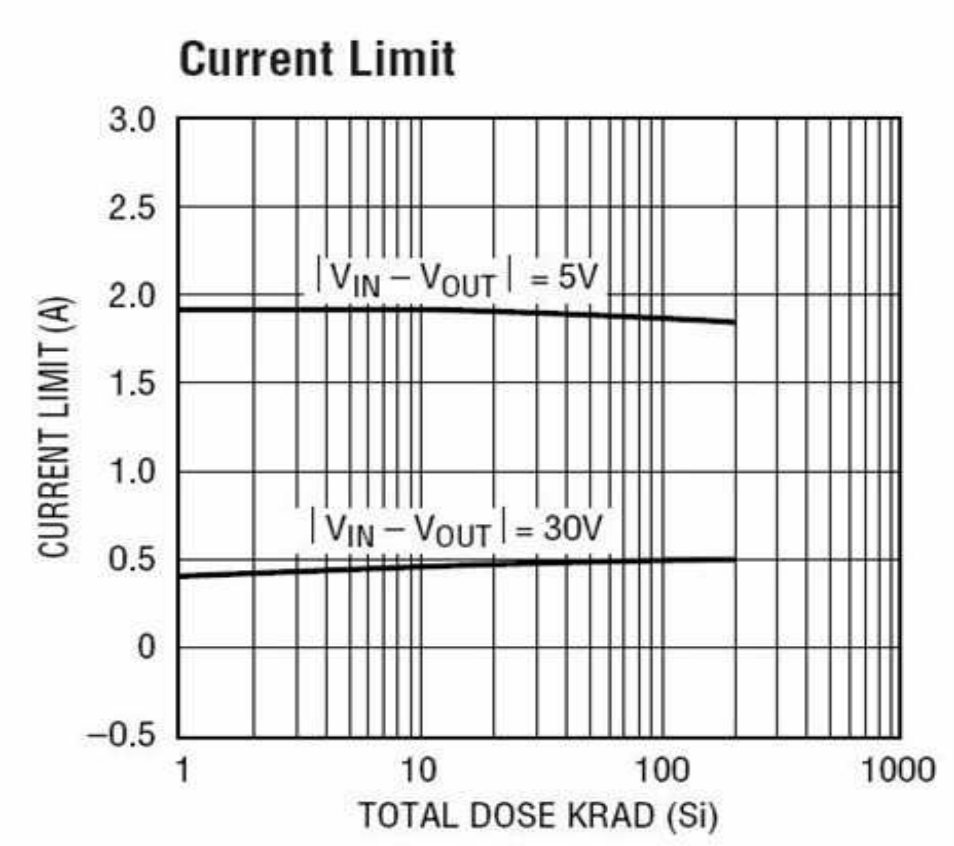
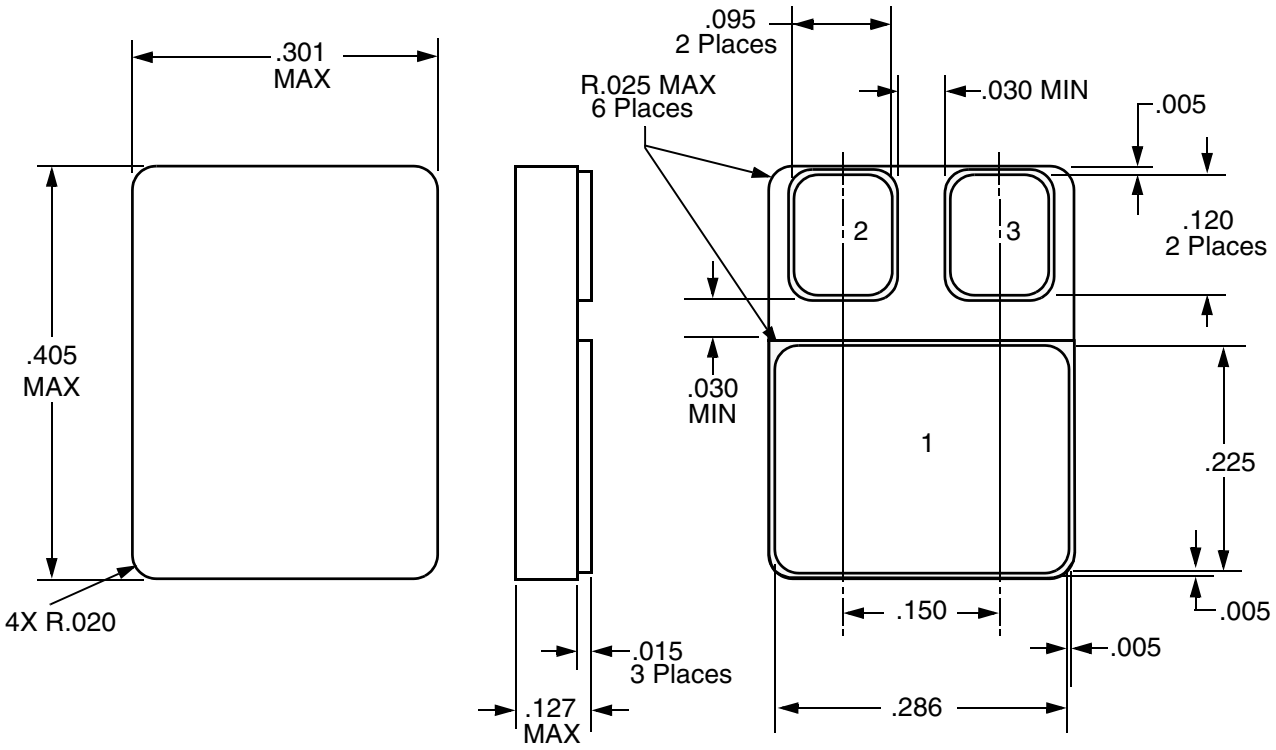


FIGURE 4 – TYPICAL CURRENT LIMIT



NOTES:

1. Package & Lid are electrically isolated from signal pads.
2. ESD symbol denotes Pin 1.

FIGURE 5– PACKAGE OUTLINE — SURFACE MOUNT

ORDERING INFORMATION

MODEL	DLA SMD #	SCREENING	PACKAGE
VRG8661-7	-	Commercial Flow, +25°C testing only	SMD-0.5 Power Pkg
VRG8661-S	-	Military Temperature, -55°C to +125°C Screened in accordance with the individual Test Methods of MIL-STD-883 for Space Applications	
VRG8661-201-1S	5962-0920602KXC	In accordance with DLA SMD	
VRG8661-201-2S	5962-0920602KXA		
VRG8661-901-1S	5962R0920602KXC	In accordance with DLA Certified RHA Program Plan to RHA Level "R", 100krads(Si)	
VRG8661-901-2S	5962R0920602KXA		

For detailed performance characteristic curves, applications information and typical applications see the latest LINEAR TECHNOLOGY datasheet for their RH137, which is available on-line at www.linear.com.

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