DATASHEET

REV T: 03/10/22

SCD8666
1A ULDO Adjustable Positive Voltage Regulator

VRG8666

Features

- Manufactured using Space Qualified RH3080 die
- Radiation performance
  - Total dose: 100 krad(Si), Dose rate = 50-300 rad(Si)/s
  - ELDRS: 50 krad(Si), Dose rate ≤ 0.01 rad(Si)/s
- Current Limit with Foldback and Over-temperature protection
- Output voltage adjustable: 0V to 35V
- Outputs may be paralleled for higher current
- Post Radiated Dropout voltage:
  - 0.60V @ 0.9 Amps
  - 0.39V @ 0.5 Amps
- Output current: 1.0 Amps
- Packaging – Hermetic Ceramic
  - Hermetic Surface Mount Power
  - 5 Pads, .550"L x .301"W x .127"Ht
  - Weight - 2.0 gm max
- Designed for aerospace and high reliability space applications

- **Radiation Hardness Assurance Plan: DLA Certified to MIL-PRF-38534, Appendix G.**

Description

The VRG8666 consists of a Positive Adjustable (RH3080) ULDO voltage regulator capable of supplying 1.0 Amps 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 Vin and Vcontrol. For stable operation, a 0.1uF capacitor should be placed on Vset and a low ESR capacitor on Vout. See Figure 5.

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

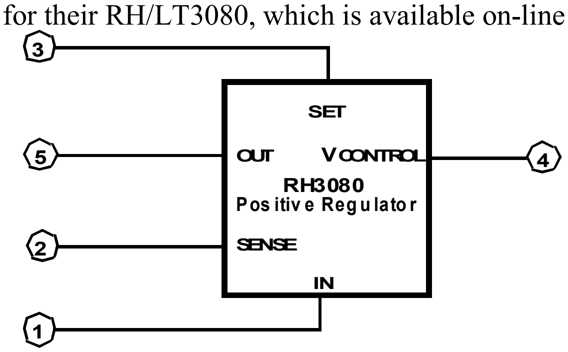

FIGURE 2 - MAXIMUM POWER vs CASE TEMPERATURE

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ABSOLUTE MAXIMUM RATINGS

Parameter	Rating	Units
Input Voltage, VCONTROL (Voltages are Relative to VOUT)	+40, -0.3	VDC
Output Current	1.2	A
Lead temperature (soldering 10 Sec)	300	°C
Input Output Differential	26	VDC
Output Voltage	+36	VDC
ESD 1/	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) Θ_{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	VDC
Input Output Differential	0.5 to 26	VDC
Case Operating Temperature Range	-55 to +125	°C
Input Voltage (Voltages are Relative to VOUT)	1 to 36	V
VCONTROL (Voltages are Relative to VOUT)	1.6 to 36	V

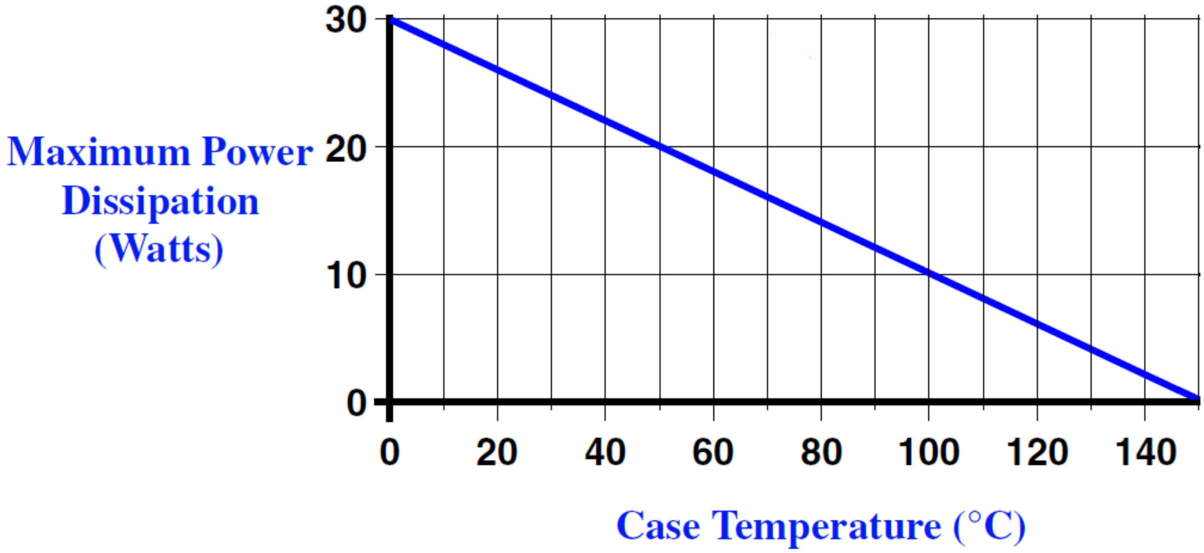
ELECTRICAL PERFORMANCE CHARACTERISTICS

Unless otherwise specified: -55°C ≤ Tc ≤ +125°C

Parameter	Symbol	Conditions (P ≤ PMAX), Vin and Vcontrol are relative to Vout		Min	Max	Units
Set Pin Current	I_{REF1}	VIN= 1V, VCONTROL = 2V, 1.0mA ≤ ILOAD ≤ 1.0A,		9.80	10.60	µA
Set Pin Current 1/, 4/	I_{REF2}	VIN = 1V, VCONTROL = 2V, ILOAD = 1mA	+25°C	9.80	10.55	µA
Output Offset Voltage (VOUT - VSET)	VOS	VIN = 1V, VCONTROL = 2V, ILOAD = 1mA,		-7.5	7.5	mV
		VIN = 1V, VCONTROL = 2V, ILOAD = 1mA, 1/	+25°C	-7.5	7.5	
Line Regulation	ΔVOS	1V ≤ VIN ≤ 26V, 2V ≤ VCONTROL ≤ 26V, ILOAD = 1mA		-0.06	0.06	mV/V
		1V ≤ VIN ≤ 26V, 2V ≤ VCONTROL ≤ 26V, ILOAD = 1mA 1/, 4/	+25°C	-0.15	0.15	
Load Regulation	ΔVOS	VIN = 1.6V, ILOAD = 1mA to 100mA	+25°C	-1	1	mV
		VIN = 1.6V, ILOAD = 1mA to 100mA	-55°C, +125°C	-1.5	1.5	
		ILOAD = 1mA to 0.9A 1/, 4/	+25°C	-1.4	1.4	
VCONTROL Dropout Voltage 2/	VCDROP	VIN = 1V, ILOAD = 1.0A	+25°C, +125°C	-	1.60	V
		VIN = 1V, ILOAD = 0.9A	-55°C	-	1.70	
		VIN = 1V, ILOAD = 0.1A to 0.9A, 1/, 4/	+25°C	-	1.60	
VIN Dropout Voltage 2/	VINDROP	VCONTROL = 2V, ILOAD = 1.0A	+25°C, -55°C	-	0.5	V
		VCONTROL = 2V, ILOAD = 0.8A	+125°C	-	0.6	
		VCONTROL = 2V, ILOAD = 0.1A, 1/, 4/	+25°C	-	0.25	
		VCONTROL = 2V, ILOAD = 0.8A, 1/, 4/	+25°C	-	0.55	
Current Limit 3/	IMAX	VIN = VCONTROL = +5V, VOUT = 1.0V	+25°C	1.1	-	A
Minimum Load Current, 4/	IMIN	VIN = VCONTROL = 26V, 1/	+25°C	-	0.9	mA
		VIN = VCONTROL = 26V	-55°C, +125°C	-	1	
Ripple Rejection	-	ILOAD = 0.2A, VIN= 3V, f = 120Hz, COUT = CSET = 25µF		60	-	dB
Thermal Regulation	-	30ms pulse	+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, VCONTROL, or minimum input voltage, VIN, both specified with respect to VOUT. 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 production tested. Shall be guaranteed to the specified limits.

VRG8666



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 (Θ_{JC}) of 5°C/W.

FIGURE 2 - MAXIMUM POWER vs CASE TEMPERATURE

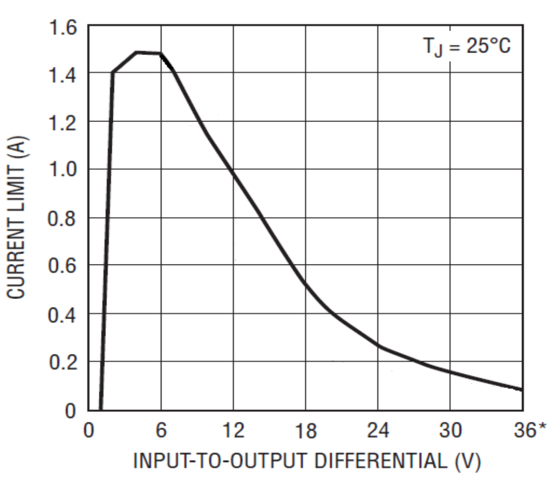


FIGURE 3 – RH3080 TYPICAL CURRENT LIMIT

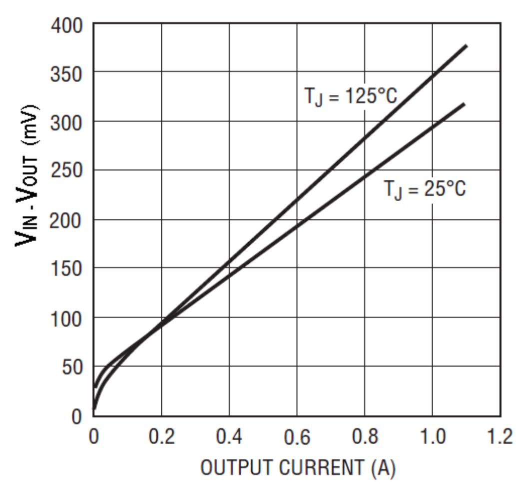


FIGURE 4 – RH3080 TYPICAL DROPOUT VOLTAGE CURVE, $V_{CONTROL}$ ≥ 1.6V

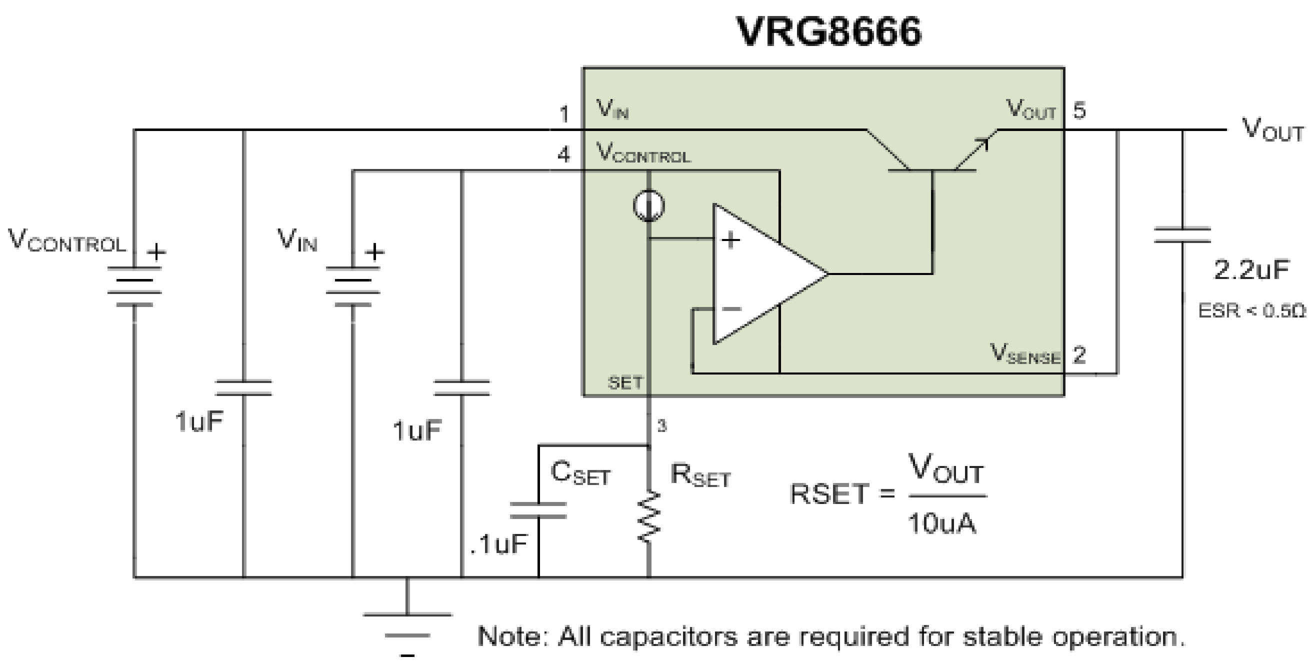


FIGURE 5 – BASIC VRG8666 ADJUSTABLE REGULATOR APPLICATION

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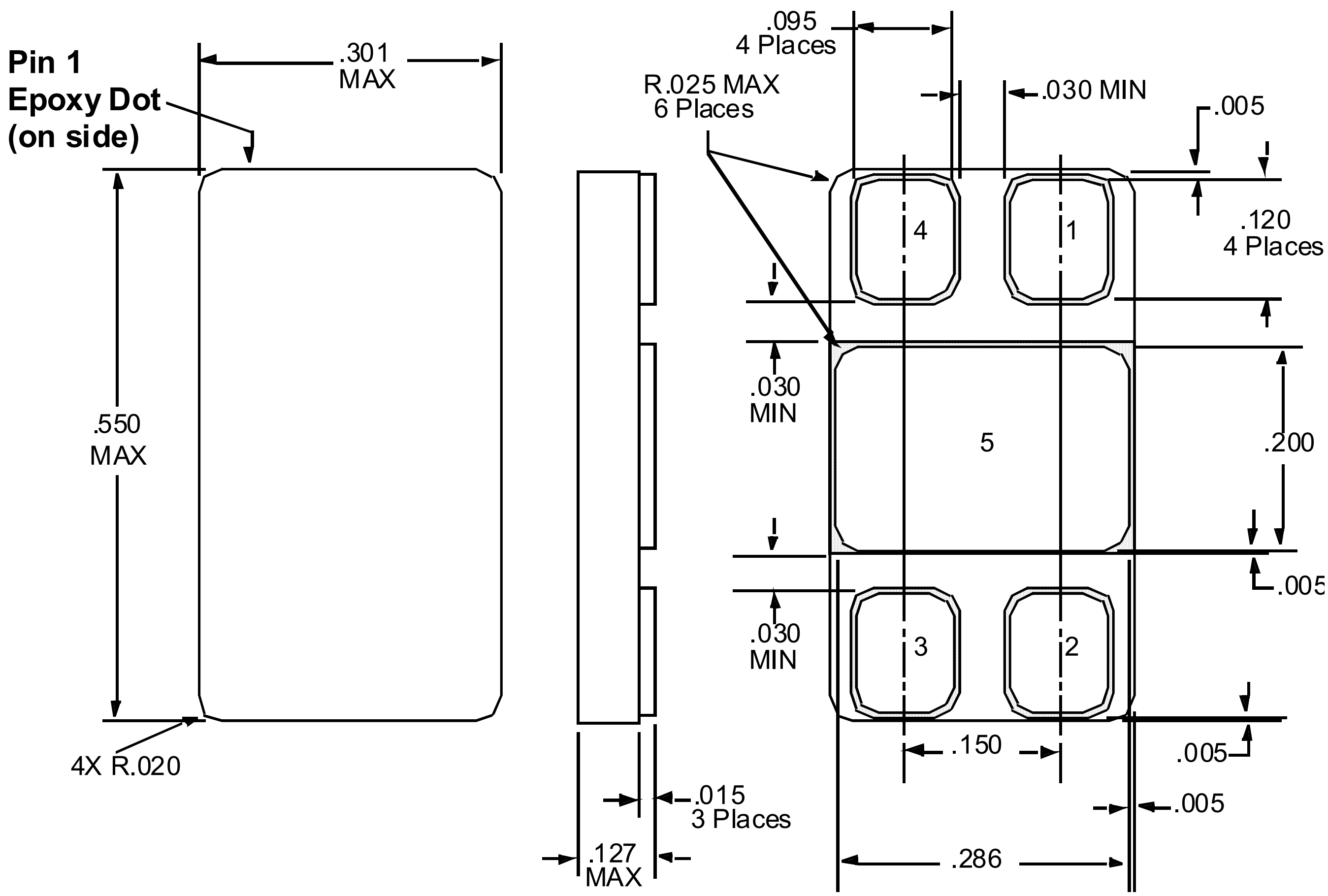

NOTES:

1. Package & Lid are electrically isolated from signal pads

FIGURE 6 – PACKAGE OUTLINE – SURFACE MOUNT

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Ordering Information

Model	DLA SMD #	Screening	Package
VRG8666- 7	-	Commercial Flow, +25°C testing only	SMD 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”, 100 krad(Si	
VRG8666-901-2S	5962R1120501KYA		

Revision History

Date	Revision	Change Description
3/31/2016	M	Import into Cobham Format
01/10/2017	N	Conform to RH3080 Dropout spec, Package dimensions to the Outline drawing, Add note 4/ to Set Pin Current test, Add note 5/ to all, change Load Reg, Current Limits and Ripple Reject conditions to reflect testing, Break out Dropout tests for test limit at -55°C, Break out post rad tests limits.
01/12/2017	P	Incorporate the text of Note 5 into the Conditions heading, Change $I_{REF}1$ conditions, add $V_{CONTROL}$ to V_{OS} conditions, change conditions for Line Reg, Change Load Reg, $V_{CONTROL}$ Dropout, V_{IN} Dropout, V_{IN} Dropout conditions for Room and Temp, Change V_{IN} for $V_{CONTROL}$ Dropout Test, Change the order of I_{MIN} conditions.
12/6/2021	R	Import into the latest CAES format, Make changes to the Electrical Performance Characteristics: Set Pin Current $I_{REF}1$, Set Pin Current $I_{REF}2$, Output Offset Voltage, $V_{CONTROL}$ Dropout, V_{IN} Dropout

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Datasheet Definitions

	DEFINITION
Advanced Datasheet	CAES reserves the right to make changes to any products and services described herein at any time without notice. The product is still in the development stage and the datasheet **is subject to change**. Specifications can be **TBD** and the part package and pinout are **not final**.
Preliminary Datasheet	CAES reserves the right to make changes to any products and services described herein at any time without notice. The product is in the characterization stage and prototypes are available.
Datasheet	Product is in production and any changes to the product and services described herein will follow a formal customer notification process for form, fit or function changes.

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