

Positive Adjustable Regulator

DESCRIPTION

The RH117 is a 3-terminal positive adjustable regulator capable of supplying up to 0.5A (H package) or 1.5A (K package). The output is adjusted using two external resistors for a range of 1.2V to 37V. The devices have full current limit thermal overload safe area protection, all of which remain functional even if the adjustment terminal is disconnected.

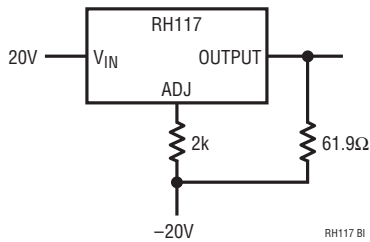
The wafer lots are processed to ADI's in-house Class S flow to yield circuits usable in stringent military applications. In addition to 883 processing, the RH117 is subjected to 100% burn-in in thermal limit.

ABSOLUTE MAXIMUM RATINGS

Power Dissipation	Internally Limited
Input-to-Output Voltage Differential	40V
Operating Junction Temperature Range.....	-55°C to 150°C
Storage Temperature Range	-65°C to 150°C
Lead Temperature (Soldering, 10 sec).....	300°C

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BURN-IN CIRCUIT



PACKAGE/ORDER INFORMATION

BOTTOM VIEW

H PACKAGE
3-LEAD TO-39 METAL CAN
*CASE IS TIED TO OUTPUT.

BOTTOM VIEW

K PACKAGE
2-LEAD TO-3 METAL CAN

OBsolete PACKAGE: FOR REFERENCE ONLY

TABLE 1: ELECTRICAL CHARACTERISTICS (Preirradiation) (Note 1)

SYMBOL	PARAMETER	CONDITIONS	NOTES	$T_A = 25^\circ\text{C}$			SUB-GROUP	$-55^\circ\text{C} \leq T_J \leq 150^\circ\text{C}$			SUB-GROUP	UNITS
				MIN	TYP	MAX		MIN	TYP	MAX		
V_{REF}	Reference Voltage	$3V \leq (V_{IN} - V_{OUT}) \leq 40V$, $10\text{mA} \leq I_{OUT} \leq I_{MAX}$, $P \leq P_{MAX}$		1.20		1.30	1	1.20		1.30	2,3	V
$\frac{\Delta V_{OUT}}{\Delta V_{IN}}$	Line Regulation	$3V \leq (V_{IN} - V_{OUT}) \leq 40V$, $I_{OUT} = 10\text{mA}$	2			0.02	1			0.05	2,3	%/V
$\frac{\Delta V_{OUT}}{\Delta I_{OUT}}$	Load Regulation	$10\text{mA} \leq I_{OUT} \leq I_{MAX}$, $V_{OUT} \leq 5V$ $10\text{mA} \leq I_{OUT} \leq I_{MAX}$, $V_{OUT} \geq 5V$	2			15	1			50	2,3	mV
			2			0.3	1			1	2,3	%
	Thermal Regulation	20ms Pulse				0.07	1					%/W
	Ripple Rejection	$V_{OUT} = 10V$, $f = 120\text{Hz}$, $C_{ADJ} = 0$				65				65		dB
		$V_{OUT} = 10V$, $f = 120\text{Hz}$, $C_{ADJ} = 10\mu\text{F}$	3			66				66		dB
I_{ADJ}	Adjust Pin Current					100	1			100	2,3	μA
ΔI_{ADJ}	Adjust Pin Current Change	$10\text{mA} \leq I_{OUT} \leq I_{MAX}$				5	1			5	2,3	μA
		$2.5V \leq (V_{IN} - V_{OUT}) \leq 40V$, $I_{OUT} = 10\text{mA}$				5	1			5	2,3	μA
I_{MIN}	Minimum Load Current	$(V_{IN} - V_{OUT}) = 40V$				5	1			5	2,3	mA
	Current Limit	$(V_{IN} - V_{OUT}) \leq 15V$ H Package K Package		0.5 1.5			1 1		0.5 1.5		2,3 2,3	A A
		$(V_{IN} - V_{OUT}) \leq 40V$ H Package K Package		0.15 0.30			1 1					A A
$\frac{\Delta V_{OUT}}{\Delta T_{EMP}}$	Temperature Stability	$-55^\circ\text{C} \leq T_J \leq 150^\circ\text{C}$							1			%
$\frac{\Delta V_{OUT}}{\Delta T_{IME}}$	Long Term Stability	$T_A = 125^\circ\text{C}$	3							1		%
e_n	RMS Output Noise	$10\text{Hz} \leq f \leq 10\text{kHz}$				0.001						%
θ_{JC}	Thermal Resistance (Junction to Case)	H Package	3			15						$^\circ\text{C/W}$
		K Package	3			3						$^\circ\text{C/W}$

TABLE 2: ELECTRICAL CHARACTERISTICS (Postirradiation, Note 4, Note 5)

SYMBOL	PARAMETER	CONDITIONS	NOTES	100KRAD(Si)		UNITS
				MIN	MAX	
V_{REF}	Reference Voltage	$3V \leq (V_{IN} - V_{OUT}) \leq 40V$, $10\text{mA} \leq I_{OUT} \leq I_{MAX}$, $P \leq P_{MAX}$		1.20	1.30	V
$\frac{\Delta V_{OUT}}{\Delta V_{IN}}$	Line Regulation	$3V \leq (V_{IN} - V_{OUT}) \leq 40V$, $I_{OUT} = 10\text{mA}$	2		0.03	%/V
$\frac{\Delta V_{OUT}}{\Delta I_{OUT}}$	Load Regulation	$10\text{mA} \leq I_{OUT} \leq I_{MAX}$, $V_{OUT} \leq 5V$ $10\text{mA} \leq I_{OUT} \leq I_{MAX}$, $V_{OUT} \geq 5V$	2		60	mV
			2		1.20	%

TABLE 2: ELECTRICAL CHARACTERISTICS (CONTINUED) (Postirradiation, Note 4, Note 5)

SYMBOL	PARAMETER	CONDITIONS	NOTES	100KRAD(Si)		UNITS
				MIN	MAX	
I_{ADJ}	Adjust Pin Current				100	μA
ΔI_{ADJ}	Adjust Pin Current Change	$10mA \leq I_{OUT} \leq I_{MAX}$			5	μA
		$3V \leq (V_{IN} - V_{OUT}) \leq 40V$, $I_{OUT} = 10mA$			5	μA
I_{MIN}	Minimum Load Current	$(V_{IN} - V_{OUT}) = 40V$			5	mA
	Current Limit	$(V_{IN} - V_{OUT}) \leq 15V$ H Package		0.5		A
		K Package		1.5		A
		$(V_{IN} - V_{OUT}) \leq 40V$ H Package		0.15		A
		K Package		0.30		A

Note 1: Unless otherwise specified, these specifications apply for $V_{IN} - V_{OUT} = 5V$; and $I_{OUT} = 0.1A$ for the H package (TO-39) and $I_{OUT} = 0.5A$ for the K package (TO-3) package. Although power dissipation is internally limited, these specifications are applicable for power dissipations of 2W for the TO-39 and 20W for the TO-3. I_{MAX} is 0.5A for the TO-39 and 1.5A for the TO-3.

Note 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.

Note 3: Guaranteed by design, characterization or correlation to other tested parameters.

Note 4: $T_J = 25^\circ C$ unless otherwise noted.

Note 5: Device is characterized at 10KRAD, 20KRAD, 50KRAD, and 100KRAD; it is production tested at 100KRAD only.

TOTAL DOSE BIAS CIRCUIT

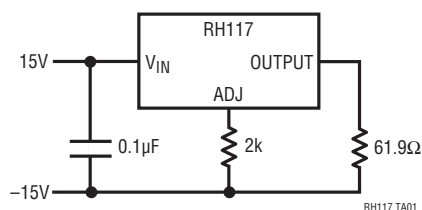


TABLE 3: ELECTRICAL CHARACTERISTICS

MIL-PRF-38535 TEST REQUIREMENTS	SUBGROUP
Final Electrical Test Requirements	1*, 2, 3, 4, 5, 6, 7
Group A Test Requirements	1, 2, 3, 4, 5, 6, 7
Group C End Point Electrical Parameters	1
Group D End Point Electrical Parameters	1
Group E End Point Electrical Parameters	1

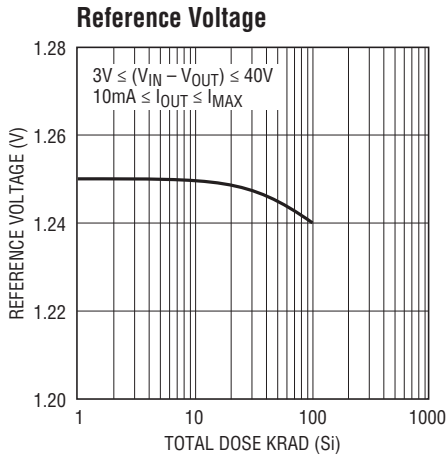
*PDA applies to subgroup 1. See PDA Test Notes.

PDA Test Notes

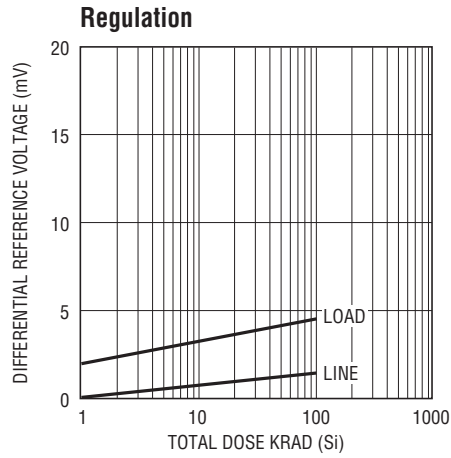
The PDA is specified as 5% based on failures from group A, subgroup 1, tests after cooldown as the final electrical test in accordance with method 5004 of MIL-STD-883 Class B. The verified failures of group A, subgroup 1, after burn-in divided by the total number of devices submitted for burn-in in that lot shall be used to determine the percent for the lot.

ADI reserves the right to test to tighter limits than those given.

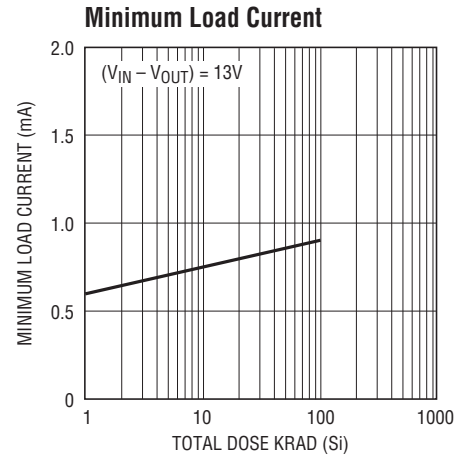
TYPICAL PERFORMANCE CHARACTERISTICS



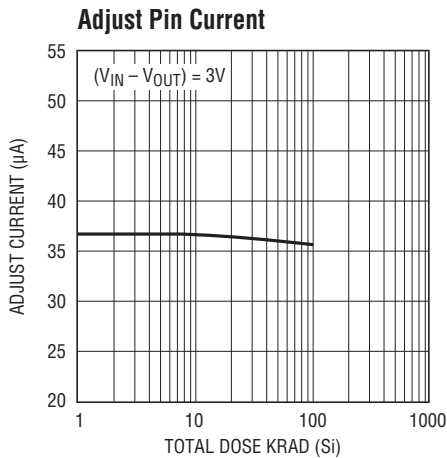
RH117 G01



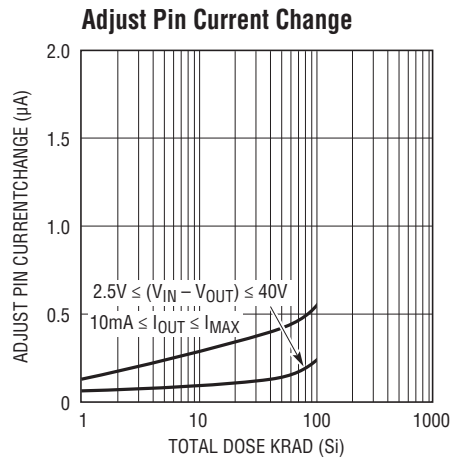
RH117 G02



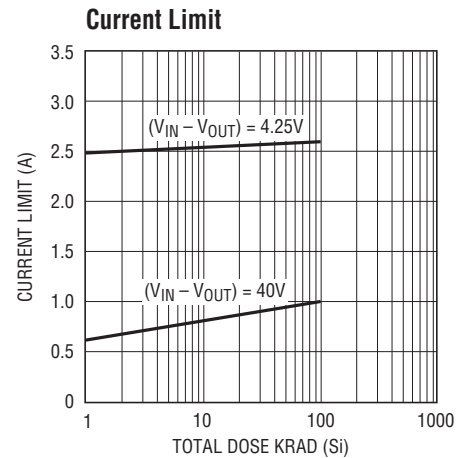
RH117 G03



RH117 G04

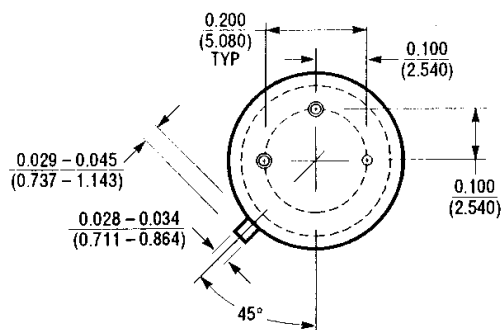
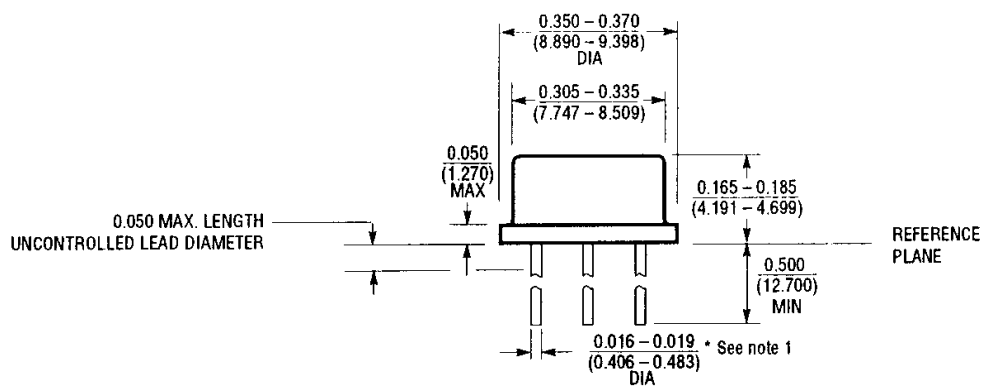


RH117 G05



RH117 G06

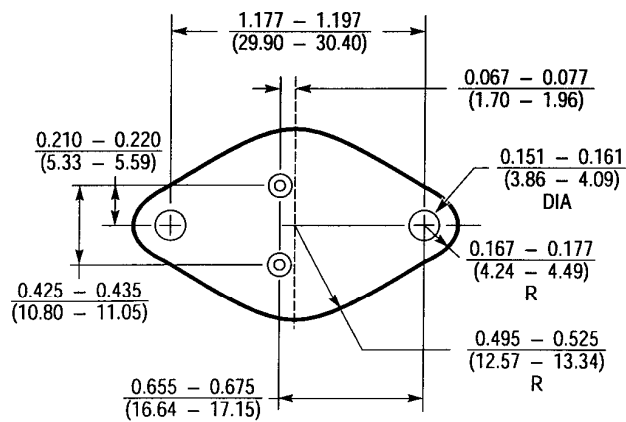
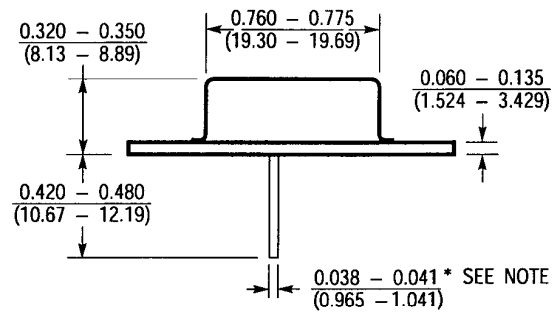
PACKAGE OUTLINE



NOTE: 1. FOR SOLDER DIP LEAD FINISH, LEAD DIAMETER IS $0.016 - 0.024$ (0.406 - 0.610)

$\theta_{ja} = +150^\circ\text{C/W}$
 $\theta_{jc} = +15^\circ\text{C/W}$

PACKAGE OUTLINE (CONTINUED)



NOTE: FOR SOLDER DIP LEAD FINISH, LEAD DIAMETER IS $\frac{0.038 - 0.044}{(0.965 - 1.118)}$

$$\theta_{ja} = +35^{\circ}\text{C/W}$$

$$\theta_{jc} = +3^{\circ}\text{C/W}$$

REVISION HISTORY (Revision history begins at Rev D)

REV	DATE	DESCRIPTION	PAGE NUMBER
D	01/19	Obsolete K Package	1
E	07/24	Updated Table 1: Electrical Characteristics	3
F	11/24	Updated Package/Order Information, Table 2, added Note 5 and package outline drawings	1-3, 5, 6