LINEAR TECHNOLOGY

RH117

Positive Adjustable Regulator

DESCRIPTION

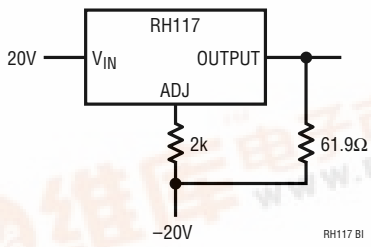
The RH117 is a 3-terminal positive adjustable regulator capable of supplying up to 0.5A (H package) or 1.5A (K package). The output is adjusted using two external resistors for a range of 1.2V to 37V. The devices have full current limit thermal overload safe area protection, all of which remain functional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

The wafer lots are processed to LTC'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.

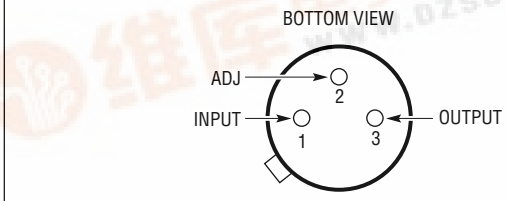
ABSOLUTE MAXIMUM RATINGS

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

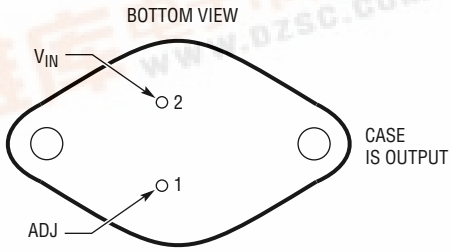
BURN-IN CIRCUIT



PACKAGE/ORDER INFORMATION



H PACKAGE
3-LEAD TO-39 METAL CAN



K PACKAGE
2-LEAD TO-3 METAL CAN

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

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

TABLE 1A: ELECTRICAL CHARACTERISTICS (Postirradiation) (Note 4)

SYMBOL	PARAMETER	CONDITIONS	NOTES	10KRAD(Si) MIN	MAX	20KRAD(Si) MIN	MAX	50KRAD(Si) MIN	MAX	100KRAD(Si) MIN	MAX	UNITS
V_{REF}	Reference Voltage	3V ($V_{IN} - V_{OUT}$) 40V, 10mA I_{OUT} I_{MAX}, P P_{MAX}		1.20	1.30	1.20	1.30	1.20	1.30	1.20	1.30	V
$\frac{V_{OUT}}{V_{IN}}$	Line Regulation	3V ($V_{IN} - V_{OUT}$) 40V, I_{OUT} = 10mA	2		0.02		0.02		0.02		0.03	%/V
$\frac{V_{OUT}}{I_{OUT}}$	Load Regulation	10mA I_{OUT} I_{MAX}, V_{OUT} 5V	2		36		42		48		60	mV
		10mA I_{OUT} I_{MAX}, V_{OUT} 5V	2		0.72		0.84		0.96		1.20	%

TABLE 1A: ELECTRICAL CHARACTERISTICS (Postirradiation) (Note 5)

SYMBOL	PARAMETER	CONDITIONS	NOTES	10KRAD(Si) MIN	10KRAD(Si) MAX	20KRAD(Si) MIN	20KRAD(Si) MAX	50KRAD(Si) MIN	50KRAD(Si) MAX	100KRAD(Si) MIN	100KRAD(Si) MAX	UNITS
I_{ADJ}	Adjust Pin Current				100		100		100		100	µA
I_{ADJ}	Adjust Pin Current Change	10mA I_{OUT} I_{MAX}			5		5		5		5	µA
		2.5V $(V_{IN} - V_{OUT})$ 40V, I_{OUT} = 10mA			5		5		5		5	µA
I_{MIN}	Minimum Load Current	$(V_{IN} - V_{OUT})$ = 40V			5		5		5		5	mA
	Current Limit	$(V_{IN} - V_{OUT})$ 15V H Package K Package		0.5 1.5		0.5 1.5		0.5 1.5		0.5 1.5		A A
		$(V_{IN} - V_{OUT})$ = 40V H Package K Package		0.15 0.30		0.15 0.30		0.15 0.30		0.15 0.30		A 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°C unless otherwise noted.

TOTAL DOSE BIAS CIRCUIT

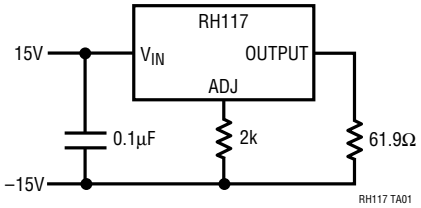


TABLE 2: ELECTRICAL TEST REQUIREMENTS

MIL-STD-883 TEST REQUIREMENTS	SUBGROUP
Final Electrical Test Requirements (Method 5004)	1*,2,3
Group A Test Requirements (Method 5005)	1,2,3
Group C and D End Point Electrical Parameters (Method 5005)	1

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

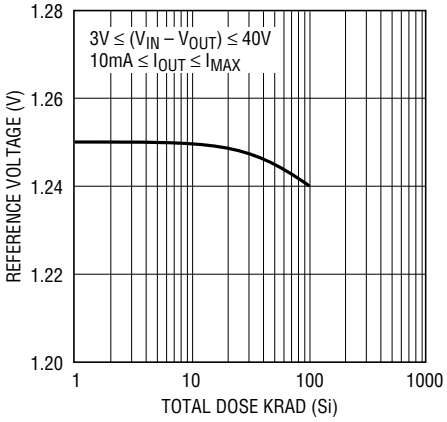
PDA Test Notes

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.

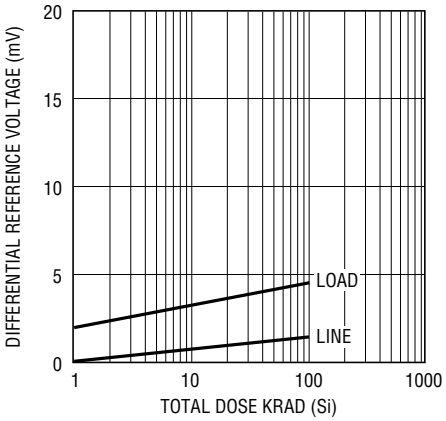
Linear Technology Corporation reserves the right to test to tighter limits than those given.

TYPICAL PERFORMANCE CHARACTERISTICS

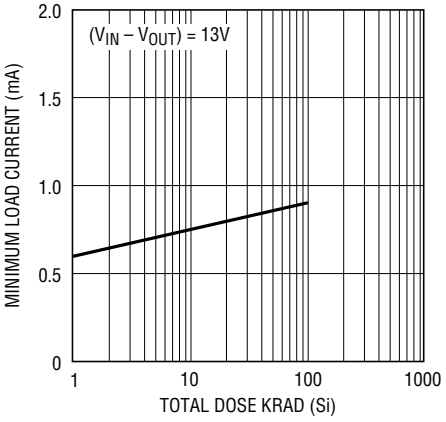
Reference Voltage



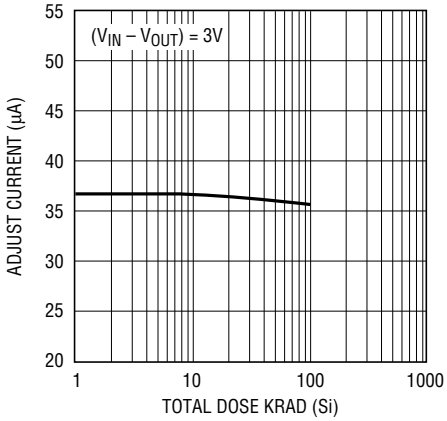
Regulation



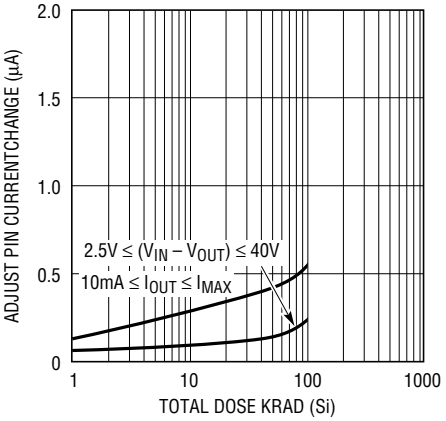
Minimum Load Current



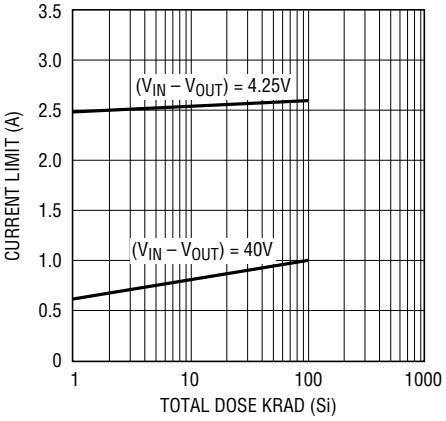
Adjust Pin Current



Adjust Pin Current Change



Current Limit



I.D. No. 66-11-0117 Rev. B 0796