

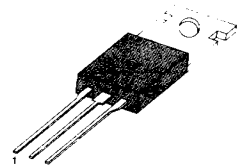
3-TERMINAL POSITIVE ADJUSTABLE REGULATOR

This monolithic integrated circuit is an adjustable 3-terminal positive voltage regulator designed to supply more than 1.5A of load current with an output voltage adjustable over a 1.2 to 37V. It employs internal current limiting, thermal shut-down and safe area compensation.

FEATURE

- Output Current In Excess of 1.5A
- Output Adjustable Between 1.2V and 37V
- Internal Thermal-Overload Protection
- Internal Short-Circuit Current-Limiting
- Output Transistor Safe-Area Compensation

TO-220

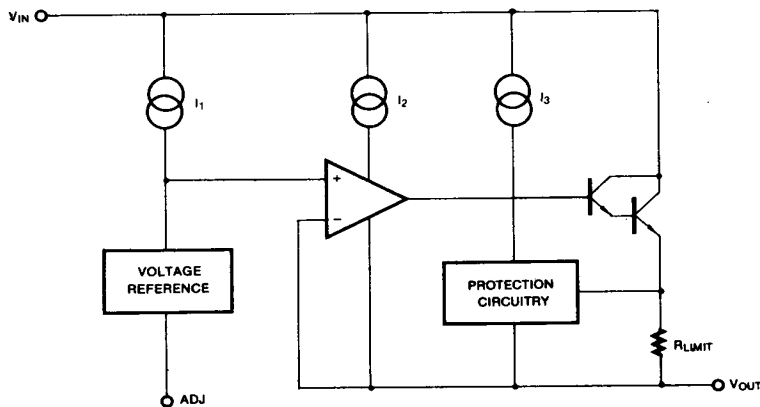


1: Adj 2: Output 3: Input

ORDERING INFORMATION

Device	Package	Operating Temperature
LM317T	TO-220	-25°C ~ 125°C

BLOCK DIAGRAM



ABSOLUTE MAXIMUM RATINGS

Characteristic	Symbol	Value	Unit
Input-Output Voltage Differential	$V_{IN} - V_{OUT}$	40	V
Lead Temperature	T_{lead}	230	°C
Power Dissipation	P_D	Internally limited	—
Operating Temperature Range	T_{opr}	-25 ~ +125	°C
Storage Temperature Range	T_{stg}	-65 ~ +150	°C

ELECTRICAL CHARACTERISTICS

($V_{IN} - V_{OUT} = 5V$, $I_{OUT} = 0.5A$, $0^\circ C \leq T_J \leq 125^\circ C$, $I_{MAX} = 1.5A$, $P_{MAX} = 20W$, unless otherwise specified)

Characteristic	Symbol	Test Conditions	Min	Typ	Max	Unit	
Line Regulation	ΔV_O	$T_a = 25^\circ C$					
		$3V \leq V_{IN} - V_{OUT} \leq 40V$		0.01	0.04	%/V	
Load Regulation	ΔV_O	$T_a = 25^\circ C$, $10mA \leq I_{OUT} \leq I_{MAX}$	$V_{OUT} \leq 6V$		18	25	mV
			$V_{OUT} \geq 5V$		0.4	0.5	%/V _O
		$10mA \leq I_{OUT} \leq I_{MAX}$	$V_{OUT} \leq 5V$		40	70	mV
			$V_{OUT} \geq 5V$		0.8	1.5	%/V _O
Adjustable Pin Current	I_{adj}			46	100	μA	
Adjustable Pin Current Change	ΔI_{adj}	$2.5V \leq V_{IN} - V_{OUT} \leq 40V$ $10mA \leq I_{OUT} \leq I_{MAX}$ $P \leq P_{MAX}$		2.0	5	μA	
Reference Voltage	V_{REF}	$3V \leq V_{IN} - V_{OUT} \leq 40V$ $10mA \leq I_{OUT} \leq I_{MAX}$ $P_D \leq P_{MAX}$	1.20	1.25	1.30	V	
Temperature Stability	T_S			0.7		%/V _O	
Minimum Load Current to Maintain Regulation	I_{MIN}	$V_{IN} - V_{OUT} = 40V$		3.5	10	mA	
Maximum Output Current	I_{MAX}	$V_{IN} - V_{OUT} \leq 15V$, $P_D \leq P_{MAX}$ $V_{IN} - V_{OUT} \leq 15V$, $P_D \leq P_{MAX}$, $T_a = 25^\circ C$	1.5	2.2		A	
RMS Noise, % of V _{OUT}	e_N	$T_a = 25^\circ C$, $10Hz \leq f \leq 10KHz$		0.003	0.01	%/V _O	
Ripple Rejection	RR	$V_{OUT} = 10V$, $f = 120Hz$ without C_{ADJ} $C_{ADJ} = 10\mu F$	66	60	75	dB	
Long-Term Stability, $T_J = T_{high}$	S	$T_a = 25^\circ C$ for end point measurements, 100HR		0.3	1	%	
Thermal Resistance Junction to Case	$R_{\theta JC}$			5		°C/W	

* Load and line regulation are specified at constant junction temperature. Change in V_O due to heating effects must be taken into account separately. Pulse testing with low duty is used.

TYPICAL PERFORMANCE CHARACTERISTICS

Fig. 1 LOAD REGULATION

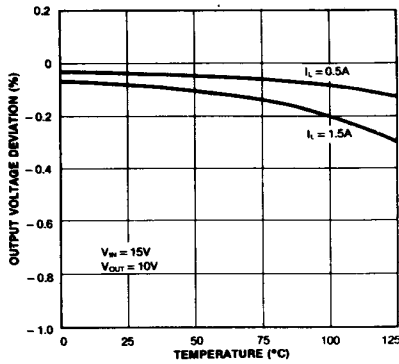


Fig. 2 ADJUSTMENT CURRENT

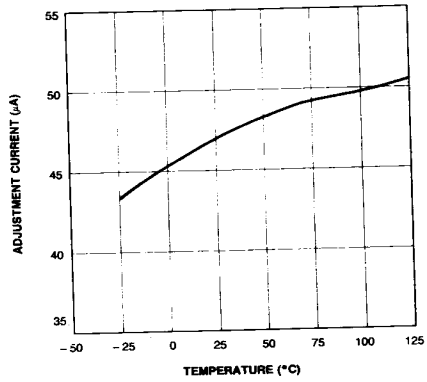


Fig. 3 DROPOUT VOLTAGE

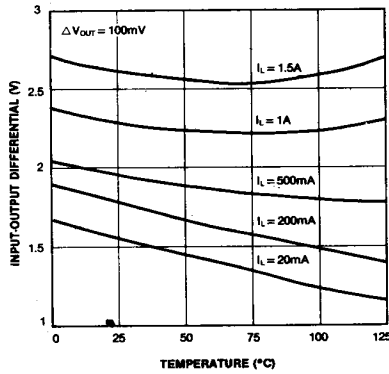
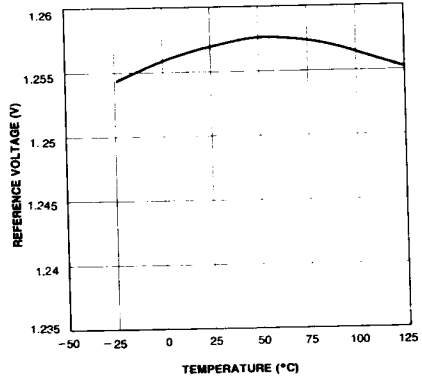
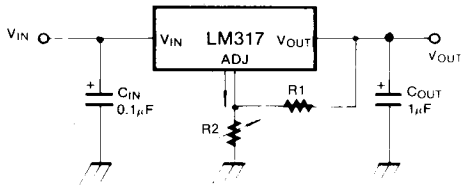


Fig. 4 REFERENCE VOLTAGE



TYPICAL APPLICATIONS

Fig. 5 Programmable Regulator



$$V_{OUT} = 1.25V \left(1 + \frac{R_2}{R_1}\right) + I_{adj} R_2$$

C_{IN} is required when regulator is located an appreciable distance from power supply filter.

C_{OUT} is not needed for stability, however, it does improve transient response.

Since I_{adj} is controlled to less than $100\mu A$, the error associated with this term is negligible in most applications.