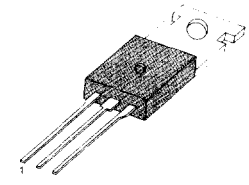
3-TERMINAL POSITIVE ADJUSTABLE REGULATOR

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.

TO-220



1: Adj 2: Output 3: Input

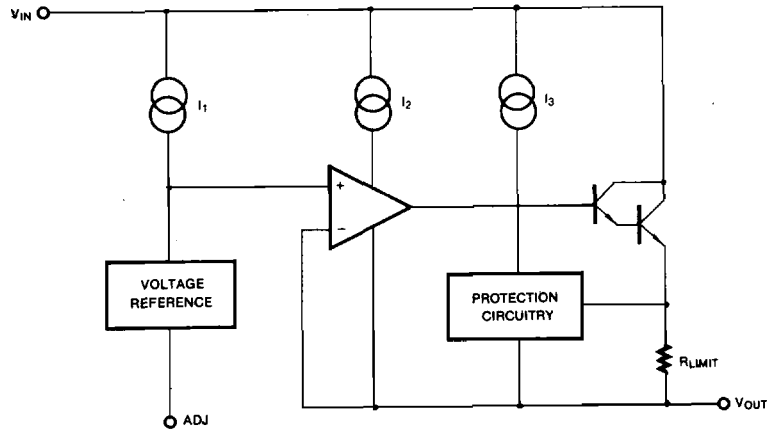
FEATURE

- **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**

ORDERING INFORMATION

Device	Package	Operating Temperature
LM317T	TO-220	$-25°C \sim 125°C$

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

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

Characteristic	Symbol	Test Conditions	Min	Typ	Max	Unit
Line Regulation	ΔV_O	Ta = 25°C, $3V \leq V_{IN} - V_{OUT} \leq 40V$		0.01	0.04	%/V
		$3V \leq V_{IN} - V_{OUT} \leq 40V$		0.02	0.07	%/V
Load Regulation	ΔV_O	Ta = 25°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}	$V_{IN} - V_{OUT} \leq 15V$, $P_D \leq P_{MAX}$	1.5	2.2		A
		$V_{IN} - V_{OUT} \leq 15V$, $P_D \leq P_{MAX}$, Ta = 25°C	0.15	0.4		
RMS Noise, % of V_{OUT}	e_N	Ta = 25°C, $10Hz \leq f \leq 10KHz$		0.003	0.01	%/V_O
Ripple Rejection	RR	$V_{OUT} = 10V$, f = 120Hz, without C_{ADJ}		60		dB
		$C_{ADJ} = 10\mu F$	66	75		
Long-Term Stability, $T_j = T_{high}$	S	Ta = 25°C for end point measurements, 100HR		0.3	1	%
Thermal Resistance Junction to Case	R_{sJC}			5		°C/W

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

TYPICAL PERFORMANCE CHARACTERISTICS

Fig. 1 LOAD REGULATION

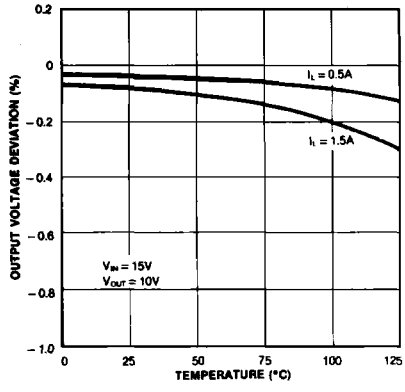


Fig. 2 ADJUSTMENT CURRENT

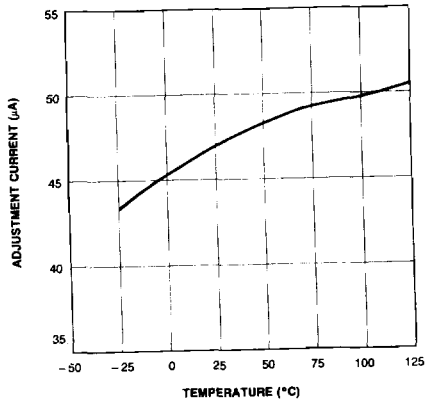


Fig. 3 DROPOUT VOLTAGE

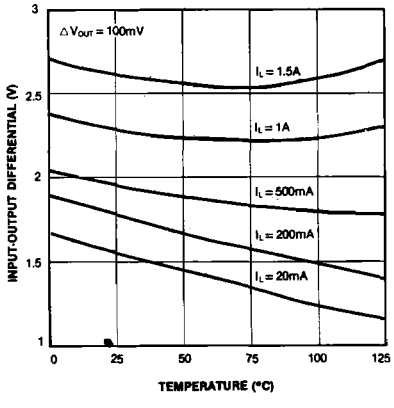
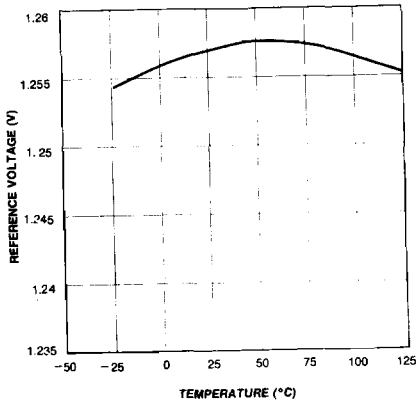
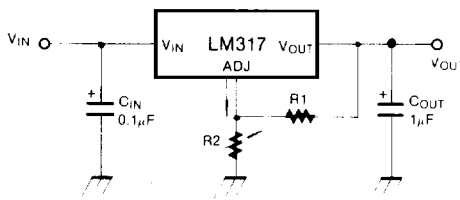


Fig. 4 REFERENCE VOLTAGE



TYPICAL APPLICATIONS

Fig. 5 Programmable Regulator



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

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 100μA, the error associated with this term is negligible in most applications.