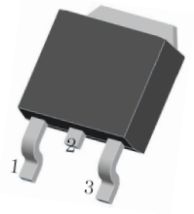
LM317

Three-terminal positive voltage regulator

DESCRIPTION

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-252



1. Adj
2. Output
3. Input

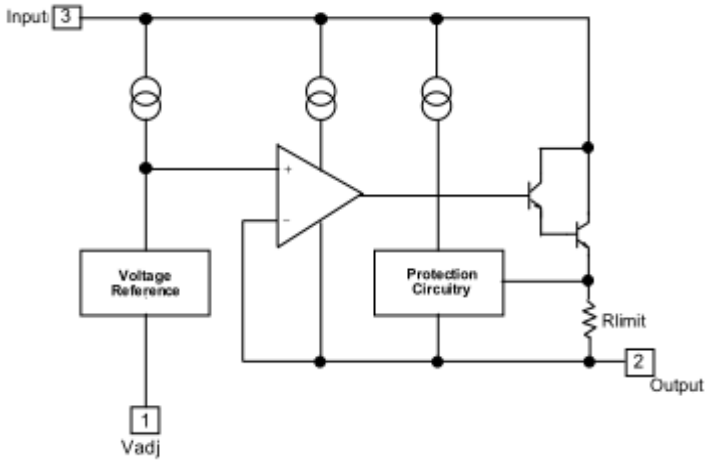
FEATURE

Internal thermal overload protection

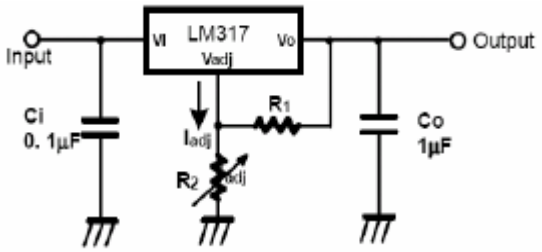
Internal short circuit current limiting

Output transistor safe operating area compensation

Block Diagram



Typical Application



$V_O = 1.25V\ (1+ R_2/ R_1)+I_{adj} R_2$

Ci is required when regulator is located an appreciable distance from power supply filter.

Co 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.

Absolute Maximum Ratings

Symbol	Parameter	Value	Units
V_I-V_O	Input-Output Voltage Differential	40	V
T_{LEAD}	Lead Temperature	230	℃
P_D	Power Dissipation	Internally limited	W
T_J	Operating Junction Temperature Range	0~125	℃
T_{stg}	Storage Temperature Range	-55~125	
ΔV_O /ΔT	Temperature Coefficient of Output Voltage	±0.02	%/℃

Electrical Characteristics

(Vo-Vi = 5 V, Io = 500 mA, I MAX = 1.5A and P MAX = 20W, unless otherwise specified)

Parameter	Symbol	Test conditions	MIN	TYP	MAX	UNIT
Line Regulation(note1)	R_{line}	T_A=25℃ 3V≤V_I-V_O≤40V		0.01	0.04	%/V
		3V≤V_I-V_O≤40V		0.02	0.07	
Load Regulation(note1)	R_{load}	T_A=25℃, 10mA≤I_O≤I_{MAX} V_O<5V V_O≥5V		18 0.4	25 0.5	mV%/ V_O
		10mA≤I_O≤I_{MAX} V_O<5V V_O≥5V		40 0.8	70 1.5	
Adjustable Pin Current	I_{ADJ}	-		46	100	μA
Adjustable Pin Current Change	ΔI_{ADJ}	3V≤V_I-V_O≤40V 10mA≤I_O≤I_{MAX}, P_D≤P_{MAX}		2.0	5	
Reference Voltage	V_{REF}	3V≤V_{IN}-V_O≤40V 10mA≤I_O≤I_{MAX}, P_D≤P_{MAX}	1.20	1.25	1.30	V
Temperature Stability	ST_T	-		0.7		%/ V_O
Minimum Load Current to Maintain Regulation	$I_{L(MIN)}$	V_I-V_O=40V		3.5	12	mA
Maximum Output Current	$I_{O(MAX)}$	V_I-V_O≤15V, P_D≤P_{MAX} V_I-V_O≤40V, P_D≤P_{MAX} T_A=25℃	1.0	2.2 0.3		A
RMS Noise,% of V_{OUT}	e_N	T_A=25℃,10Hz≤f≤10KHz		0.003	0.01	%/ V_O
Ripple Rejection	RR	V_O=10V, f =120Hz without C_{ADJ} C_{ADJ}=10μF(note2)	66	60 75		dB
Long-Term Stability,T_J=T_{HIGH}	ST	T_A=25℃ for end point mesasurements,1000HR		0.3	1	%
Thermal Resistance Junction to case	$R_{\theta JC}$	-		5		℃/W

Notes:

1. 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.(P MAX =20W)

2.CADJ . when used, is connected between the adjustment pin and ground.