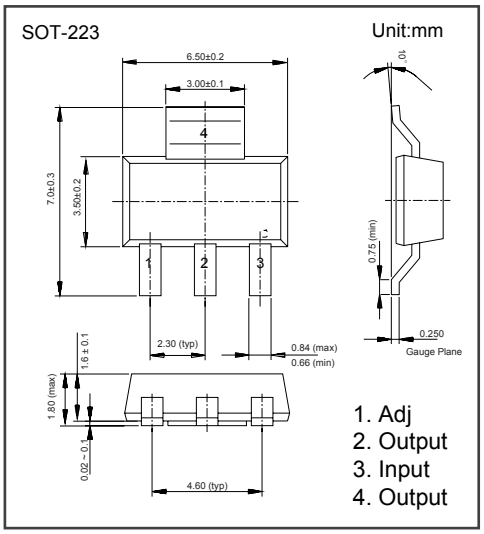
Three Terminal Positive Voltage Regulator
LM317

■ Features

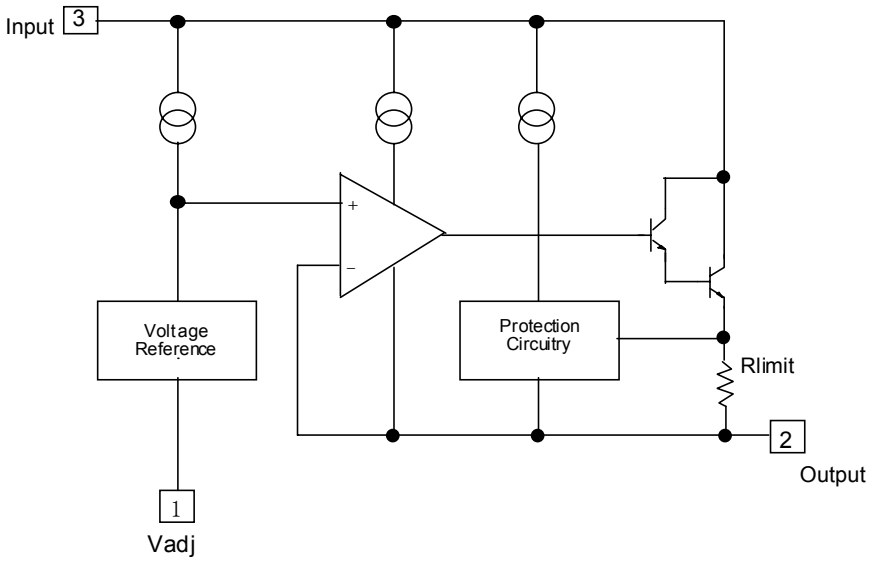
- Internal thermal overload protection
- Internal short circuit current limiting
- Output transistor safe operating area compensation
- This monolithic integrated circuit is an adjustable 3-terminal positive voltage regulator designed to supply more than 1.5A of load current with an output voltage adjustable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



■ Absolute Maximum Ratings Ta = 25℃

Parameter	Symbol	Rating	Unit
Input-Output Voltage Differential	V_I-V_O	40	V
Temperature Coefficient of Output Voltage	ΔV_O /ΔT	±0.02	%/℃
Power Dissipation	P_D	Internally limited	W
Thermal Resistance Junction to Case	$R_{\theta JC}$	5	℃/W
Lead Temperature	T_{LEAD}	230	℃
Operating Junction Temperature Range	T_J	150	
Storage Temperature Range	T_{stg}	-55 to 150	

■ Internal Block Diagram



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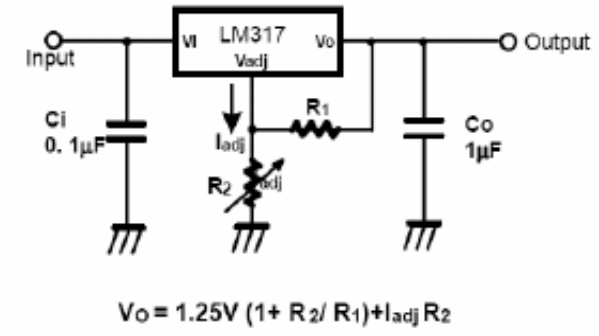
■ Electrical Characteristics（V_O-V_I=5V,I_O=0.5A,0℃≤T_J≤+125℃,I_{MAX}=1.5A,P_{MAX}=20W, unless otherwise specified)

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Line Regulation	R_{line}	3V≤V_I-V_O≤40V Ta=25℃		0.01	0.04	%/V
		3V≤V_I-V_O≤40V		0.02	0.07	
Load Regulation	R_{load}	Ta=25℃,10mA≤I_O≤IMAX V_O<5V		18	25	mV%/Vo
		Ta=25℃,10mA≤I_O≤IMAX V_O≥5V		0.4	0.5	
		10mA≤I_O≤IMAX V_O<5V		40	70	
		10mA≤I_O≤IMAX V_O≥5V		0.8	1.5	
Adjustable Pin Current	I_{ADJ}			46	100	uA
Adjustable Pin Current Change	△I_{ADJ}	3V≤V_I-V_O≤40V 10mA≤I_O≤IMAX, P_D≤P_{MAX}		2	5	
Reference Voltage	V_{REF}	3V≤V_I-V_O≤40V 10mA≤I_O≤IMAX, P_D≤P_{MAX}	1.2	1.25	1.3	V
Temperature Stability	ST_T			0.7	1.5	%/Vo
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}	1	2.2		A
		V_I-V_O≤40V, P_D≤P_{MAX} Ta=25℃		0.3		
RMS Noise,% of V_{OUT}	e_N	Ta=25℃,10Hz≤f≤10kHz		0.003	0.01	%/Vo
Ripple Rejection	RR	V_O=10V, f =120Hz without C_{ADJ}		60		dB
		V_O=10V, f =120Hz ,C_{ADJ}=10uF	66	75		
Long-Term Stability,TJ=T_{HIGH}	ST	Ta=25℃ for end point mesasurements,1000HR		0.3	1	%

■ Typical Application



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

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

C_o 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.