FAIRCHILD SEMICONDUCTOR®

LM317

3-Terminal Positive Adjustable Regulator

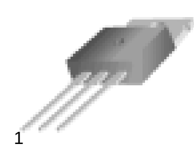
Features

- 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 Operating Area Compensation
- TO-220 Package

Description

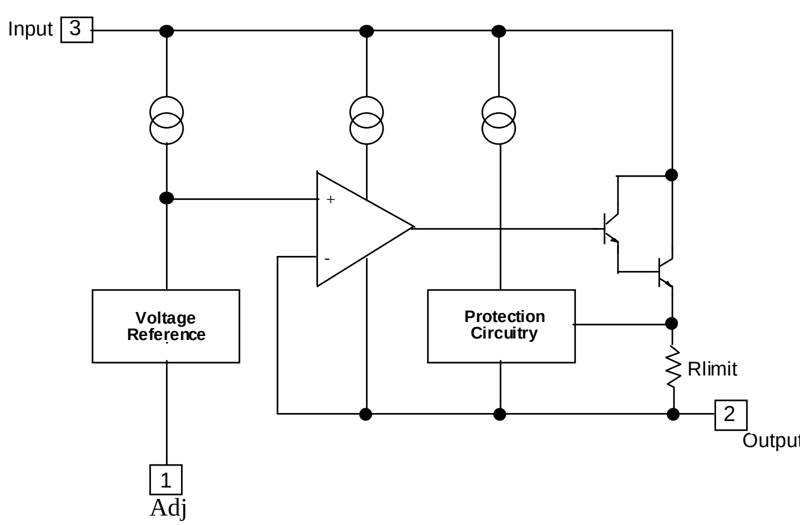
This monolithic integrated circuit is an adjustable 3-terminal positive voltage regulator designed to supply more than 1.5A of load current with an output voltage adjustable over a 1.2 to 37V. It employs internal current limiting, thermal shut-down and safe area compensation.

TO-220



1. Adj 2. Output 3. Input

Internal Block Diagram



Rev. 1.0.0

Absolute Maximum Ratings

Parameter	Symbol	Value	Unit
Input-Output Voltage Differential	$V_I - V_O$	40	V
Lead Temperature	T_{LEAD}	230	°C
Power Dissipation	P_D	Internally limited	W
Operating Junction Temperature Range	T_j	0 ~ +125	°C
Storage Temperature Range	T_{STG}	-65 ~+125	°C
Temperature Coefficient of Output Voltage	ΔVo/ΔT	±0.02	%/°C

Electrical Characteristics

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

Parameter	Symbol	Conditions	Min	Typ.	Max.	Unit
Line Regulation (Note1)	Rline	T_A = +25°C 3V ≤ V_I - V_O ≤ 40V	-	0.01	0.04	% / V
		3V ≤ V_I - V_O ≤ 40V	-	0.02	0.07	% / V
Load Regulation (Note1)	Rload	T_A = +25°C, 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	mV% / V_O
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	μA
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°C	1.0	2.2 0.3	-	A
RMS Noise, % of V_{OUT}	e_N	T_A= +25°C, 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°C for end point measurements, 1000HR	-	0.3	1	%
Thermal Resistance Junction to Case	$R_{\theta JC}$	-	-	5	-	°C / W

Note:

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. C_{ADJ}, when used, is connected between the adjustment pin and ground.

Typical Perfomance Characteristics

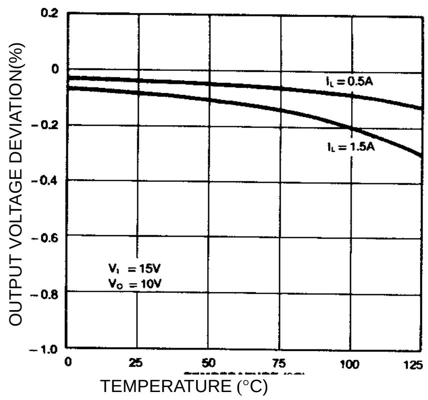


Figure 1. Load Regulation

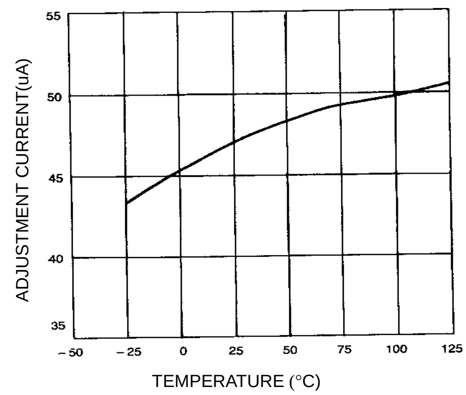


Figure 2. Adjustment Current

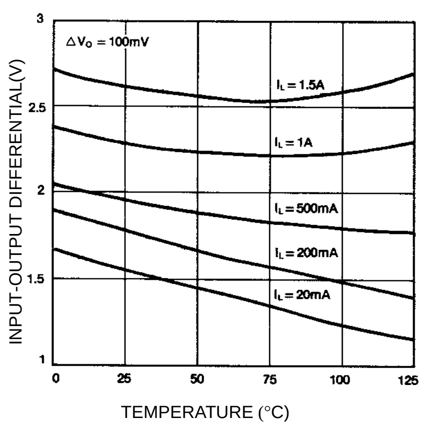


Figure 3. Dropout Voltage

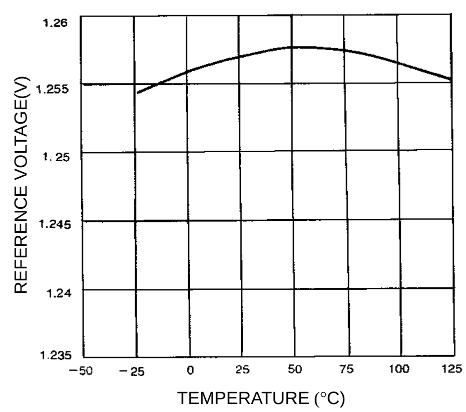
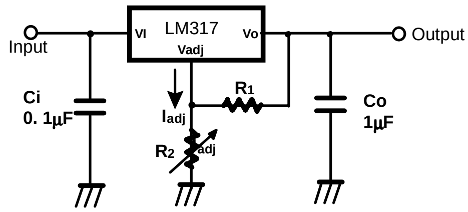


Figure 4. Reference Voltage

Typical Application



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

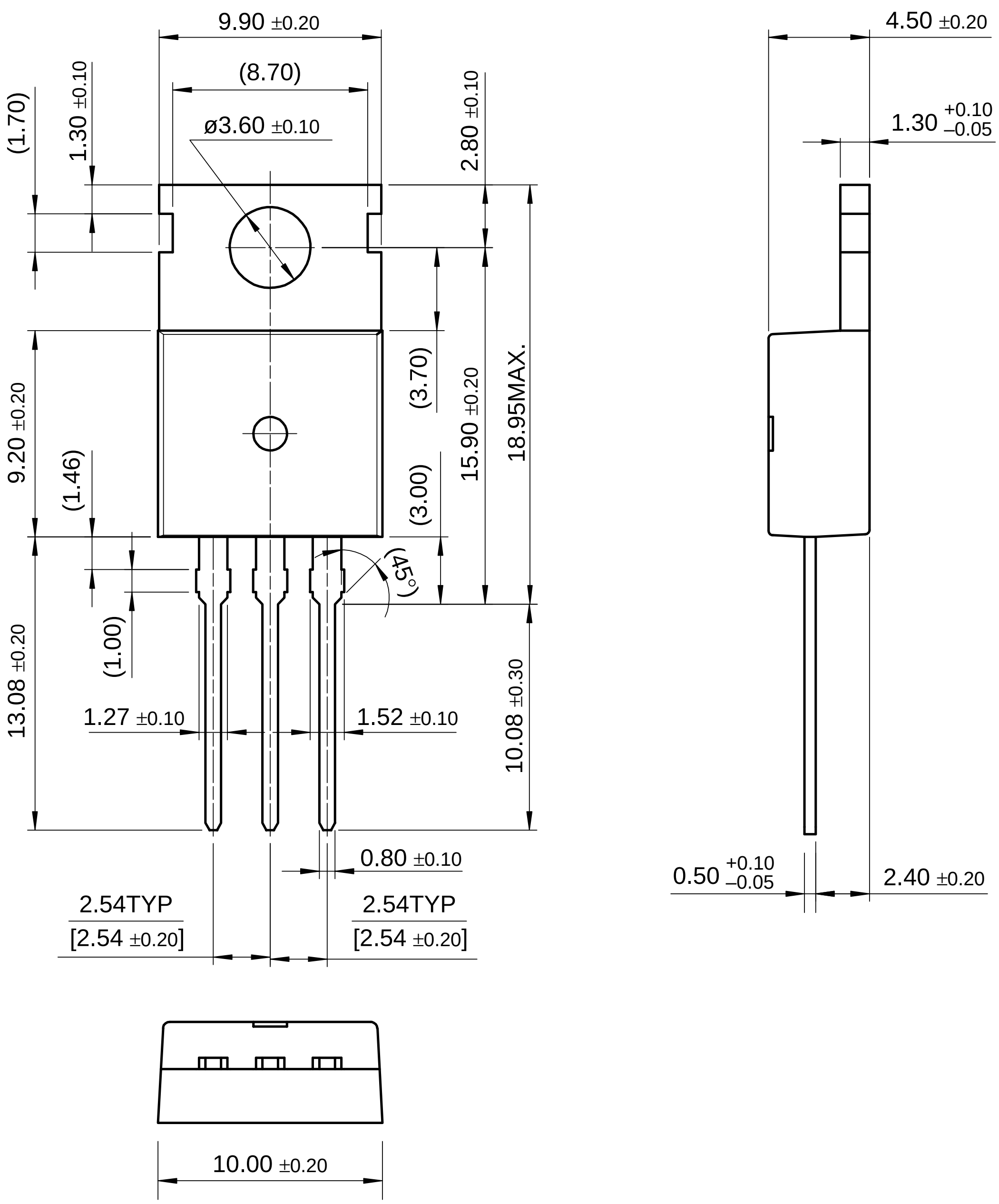
Figure 5. Programmable Regulator

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.

Mechanical Dimensions

Package

TO-220



Ordering Information

Product Number	Package	Operating Temperature
LM317T	TO-220	0°C to + 125°C

6/1/01 0.0m 001
Stock#DSxxxxxxxx