FAIRCHILD SEMICONDUCTOR®

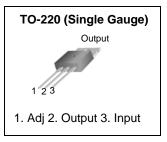
# LM317AHV 3-Terminal Positive Adjustable Regulator

### Features

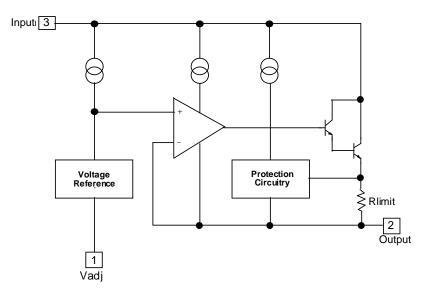
- Output Current in Excess of 1.5A
- Output Adjustable Between 1. 2V and 57V
- Internal Thermal Overload Protection
- Internal Short Circuit Current Limiting
- Output Transistor Safe Area Compensation
- TO-220 Package

### 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 57V. It employs internal current limiting, thermal shut down and safe area compensation.



### **Internal Block Diagram**



## **Absolute Maximum Ratings**

Parameter	Symbol	Value	Unit
Input-Output Voltage Differential	VI - VO	60	V
Lead Temperature	TLEAD	230	°C
Power Dissipation	PD	Internally limited	W
Operating Junction Temperature Range	Tj	0 ~ +125	°C
Storage Temperature Range	TSTG	-65 ~ +125	°C
Temperature Coefficient of Output Voltage	$\Delta Vo/\Delta T$	±0.02	%/°C

### **Electrical Characteristics**

(VI-VO=5V, IO= 0.5A, 0°C  $\leq$  TJ  $\leq$  + 125°C, IMAX = 1.5A, PDMAX = 20W, unless otherwise specified)

Parameter	Symbol	Conditions	Min.	Тур.	Max.	Unit
Line Regulation (Note1)	Rline	$ \begin{array}{l} T_A = +25^\circ C \\ 3V \leq V_I - V_O \leq 60V \end{array} $	-	0.01	0.04	%/V
		$3V \le V_I - V_O \le 60V$	-	0.02	0.07	%/V
Load Regulation (Note1)	Rload	$\begin{array}{l} T_A = +25^\circ C, \ 10mA \leq I_O \leq I_{MAX} \\ V_O < 5V \\ V_O \geq 5V \end{array}$	-	18 0.4	25 0.5	mV %/VO
		$10mA \le I_O \le I_{MAX}$ V_O < 5V V_O \ge 5V	- -	40 0.8	70 1.5	mV %/Vo
Adjustable Pin Current	IADJ	-	-	46	100	μΑ
Adjustable Pin Current Change	ΔIADJ	$3V \le VI - VO \le 60V$ $10mA \le IO \le IMAX, PD \le PMAX$	-	2.0	5	μA
Reference Voltage	Vref	$3V \le V_{IN} - V_O \le 60V$ $10mA \le I_O \le I_{MAX}, P_D \le P_{MAX}$	1.20	1.25	1.30	V
Temperature Stability	STT	-	-	0.7	-	%/Vo
Minimum Load Current to Maintain Regulation	IL(MIN)	VI - VO = 60V	-	3.5	12	mA
Maximum Output Current	IO(MAX)	$\label{eq:VI-VO} \begin{array}{l} VI \mbox{-} VO \leq 15 \mbox{V}, \mbox{PD} \leq \mbox{PMAX} \\ VI \mbox{-} VO \leq 60 \mbox{V}, \mbox{PD} \leq \mbox{PMAX} \\ TA = 25^{\circ} \mbox{C} \end{array}$	1.0 -	2.2 0.3	-	A A
RMS Noise, % of VOUT	еN	$T_A$ = +25°C, 10Hz $\leq$ f $\leq$ 10kHz	-	0.003	0.01	%/Vo
Ripple Rejection	RR	$V_O = 10V$ , f = 120Hz without C <sub>ADJ</sub> C <sub>ADJ</sub> = 10 $\mu$ F (Note2)	- 66	60 75	-	dB dB
Long-Term Stability, TJ = THIGH	ST	$T_A = +25^{\circ}C$ for end point measurements, 1000HR	-	0.3	1	%
Thermal Resistance Junction to Case	R <sub>0</sub> JC	-	-	5	-	°C/W

#### Note :

 Load and line regulation are specified at constant junction temperature. Change in VD due to heating effects must be taken into account separately. Pulse testing with low duty is used. (PMAX = 20W)

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

# **Typical Performance Characteristics**

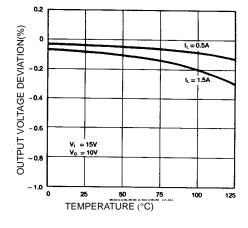


Figure 1. Load Regulation

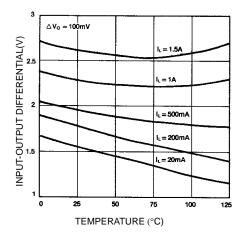


Figure 3. Dropout Voltage

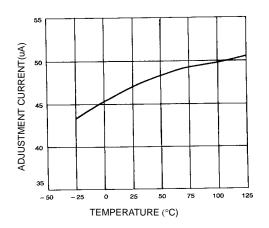


Figure 2. Adjustment Current

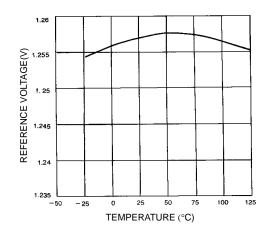
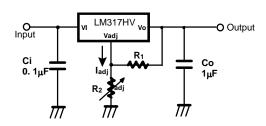


Figure 4. Reference Voltage

### **Typical Application**



 $V_0 = 1.25V (1 + R_2/R_1) + I_{adj}R_2$ 

#### Figure 5. Programmable Regulator

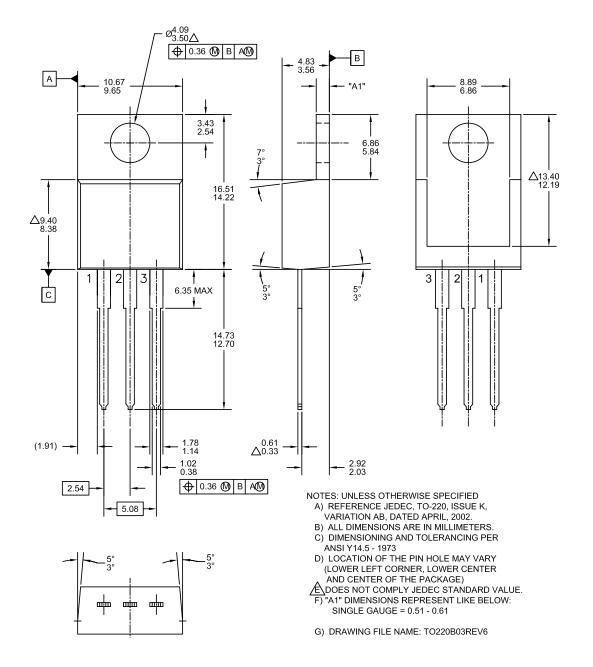
C<sub>i</sub> is required when regulator is located an appreciable distance from power supply filter.
C<sub>0</sub> is not needed for stability, however, it does improve transient response.
Since IADJ is controlled to less than 100µA, the error associated with this term is negligible in most applications.

#### **Mechanical Dimensions**

Package

#### **Dimensions in millimeters**

# TO-220 [ SINGLE GAUGE ]



#### **Ordering Information**

Product Number	Package	Operating Temperature
LM317AHVT	TO-220 (Single Gauge)	0°C to +125°C

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