TDSEMIC

LM317

1.5A Bipolar Linear Regulator

Features

- Output current greater than 1.5A
- Range Output voltage range adjustable from 1.25V to 37V

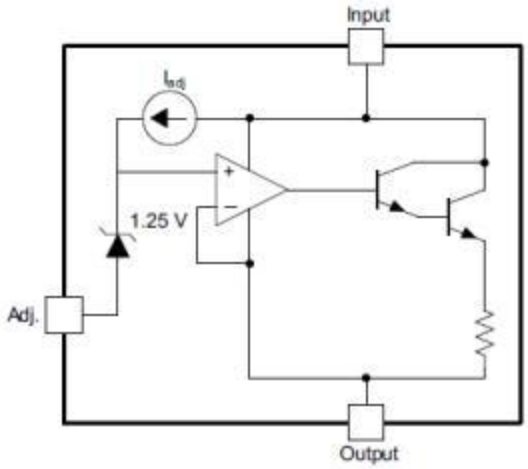
Applications

- Power Management for Computer Mother Board, Graphic Card
- LCD Monitor and LCD TV
- DVD Decode Board
- ADSL Modem
- Post Regulators for Switching Supplies

General Description

The LM317device is an adjustable three-terminal positive-voltage regulator capable of supplying more than 1.5A over an output-voltage range of 1.25V to 37V. LM317features a very low standby current 1.5mA . 317 is available in SOT89-3,TO220 and SOT223 package.

Block Diagram



Pin Configuration

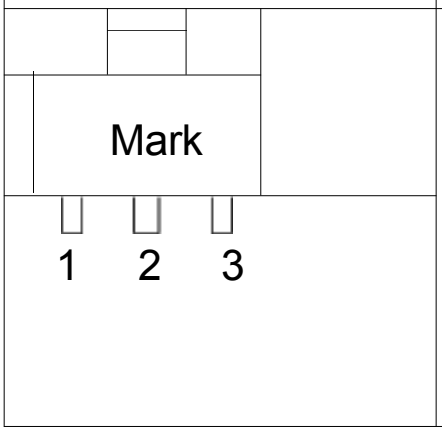
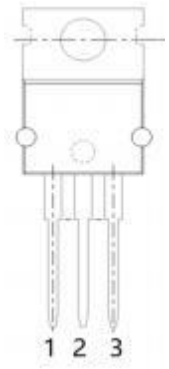
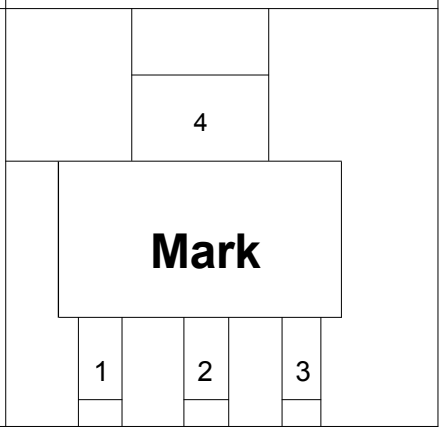
SOT89-3 Top View	TO220 Top View	SOT223 Top View
		

Table1: 317 series (SOT89-3 PKG)

PIN NO.	PIN NAME	FUNCTION
1	ADJ	ADJ pin
2	VOUT	Output voltage pin
3	VIN	Input voltage pin

Table2: 317 series (TO220 PKG)

PIN NO.	PIN NAME	FUNCTION
1	ADJ	ADJ pin
2	VOUT	Output voltage pin
3	VIN	Input voltage pin

Table3: 317 series (SOT223 PKG)

PIN NO.	PIN NAME	FUNCTION
1	ADJ	ADJ pin
2	VOUT	Output voltage pin
3	VIN	Input voltage pin
4	VOUT	Output voltage pin

Absolute Maximum Ratings

Max Input Voltage 40V

Max Operating Junction Temperature(Tj) ..... 150℃

Ambient Temperature(Ta) ..... -20℃~ 85℃

Storage Temperature(Ts) ..... -40℃~150℃

Caution: Exceed these limits to damage to the device. Exposure to absolute maximum rating conditions may affect device reliability.

Thermal Information

Symbol	Parameter	TO220	UNIT
$R_{\theta(JA)}$	Junction-to-ambient thermal resistance	37.9	℃/W
$R_{\theta JC(top)}$	Junction-to-case (top) thermal resistance	51.1	℃/W
$R_{\theta JB}$	Junction-to-board thermal resistance	23.2	℃/W
Ψ_{JT}	Junction-to-top characterization parameter	13.0	℃/W
Ψ_{JB}	Junction-to-board characterization parameter	22.8	℃/W
$R_{\theta JC(bot)}$	Junction-to-case (bottom) thermal resistance	4.2	℃/W

Electrical Characteristics

T_A=25℃, unless otherwise noted.

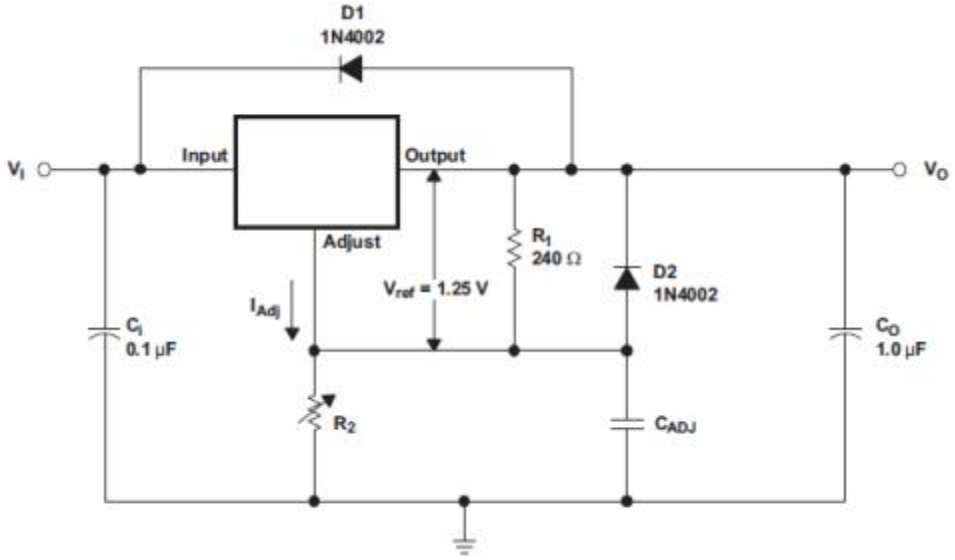
Parameter	Test Conditions		Min	Typ	Max	Unit
Line regulation	VI-VO=3V to 40V	Tj=25℃	-5	--	5	mV
Load regulation	Io=10mAto 1500mA		-25	--	25	mV
Reference viltage	$V_I - V_O$ =3V to 40V, $P_D \leqslant$20W, I_O=10mAto 1.5A		1.2	1.25	1.3	V
Output-voltage Temperature stability	T_J = 0℃ to 125℃			0.7		%V_O
Maximum output current	$V_I - V_O \leqslant$ 15V, T_J=25℃		--	1.5	--	A

Detailed Description

317 device is an adjustable three-terminal positive-voltage regulator capable of supplying up to 1.5A over an output-voltage range of 1.25V to 37V. It requires only two external resistors to set the ouput voltage. The device features a typical line regulation of 1mV and typical load regulation of 7 mV.

The 317 device is versatile in its applications, including uses in programmable output regulation and local on-card regulation. Or, by connecting a fixed resistor between the ADJUST and OUTPUT terminals, the 317 device can function as a precision current regulator. An optional output capacitor can be added to improve transient response.

Typical Application

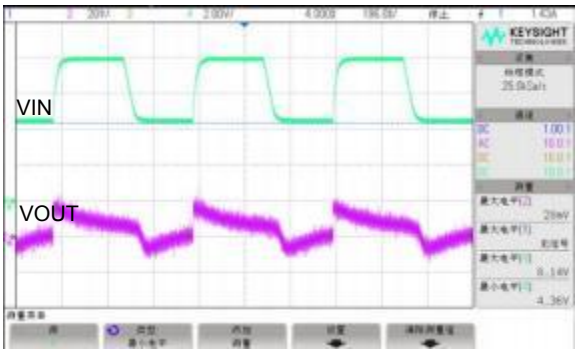


Adjustable Voltage Regulator

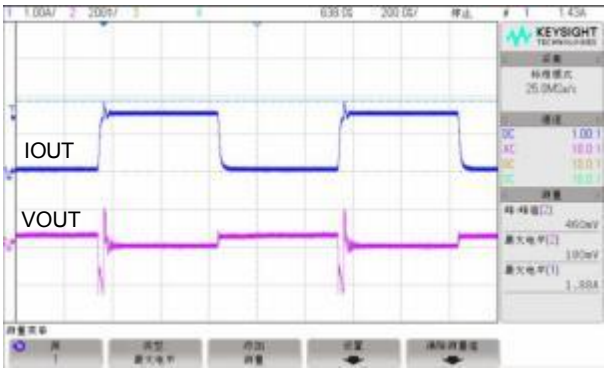
1. R1 and R2 are required to set the output voltage.
2. C_{ADJ} is recommended to improve ripple rejection. It prenents amplification of the ripple as the output voltage is adjusted higher.
3. C_I is recommended, particularly if the regulator is not in clouse proximity to the power-supply filter capacitors. A 0.1uF or 1uF ceramic or tantalum capacitor provides sufficient bypassing for most applications, especially when adjustment and output capactiors are used.
4. C_O improves transient response, but is not needed for stability.
5. Protection diode D2 is recommended if C_{ADJ} is used. The diode provides a low-impedance discharge path to prevent the capacitor from discharging into the output of the regulator.
6. Protection diode D1 is recommended if C_O is used. The diode provides a low-impedance diacharge path to prevent the capactior from discharging into the output of the regulator.
7. Vo is calculated as shown: $Vo= V_{REF}(1+R2/R1) + (I_{ADJ}xR2)$, I_{ADJ} is typically 50uA and negligible in most applications.

Typical Performance Characteristics

Line Transient Response

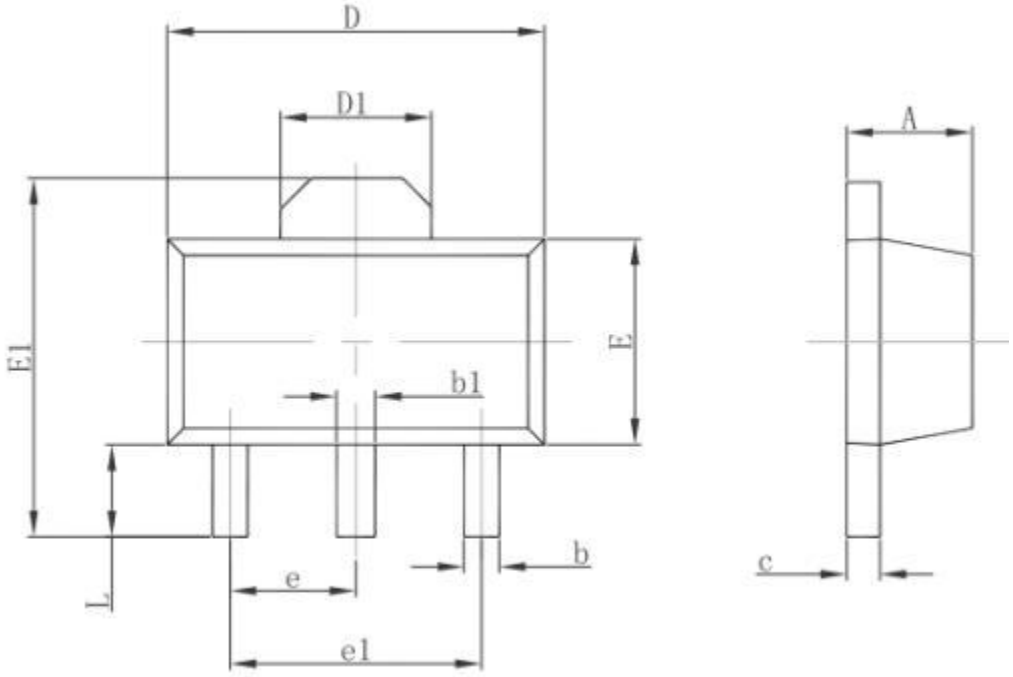


Load Transient Response



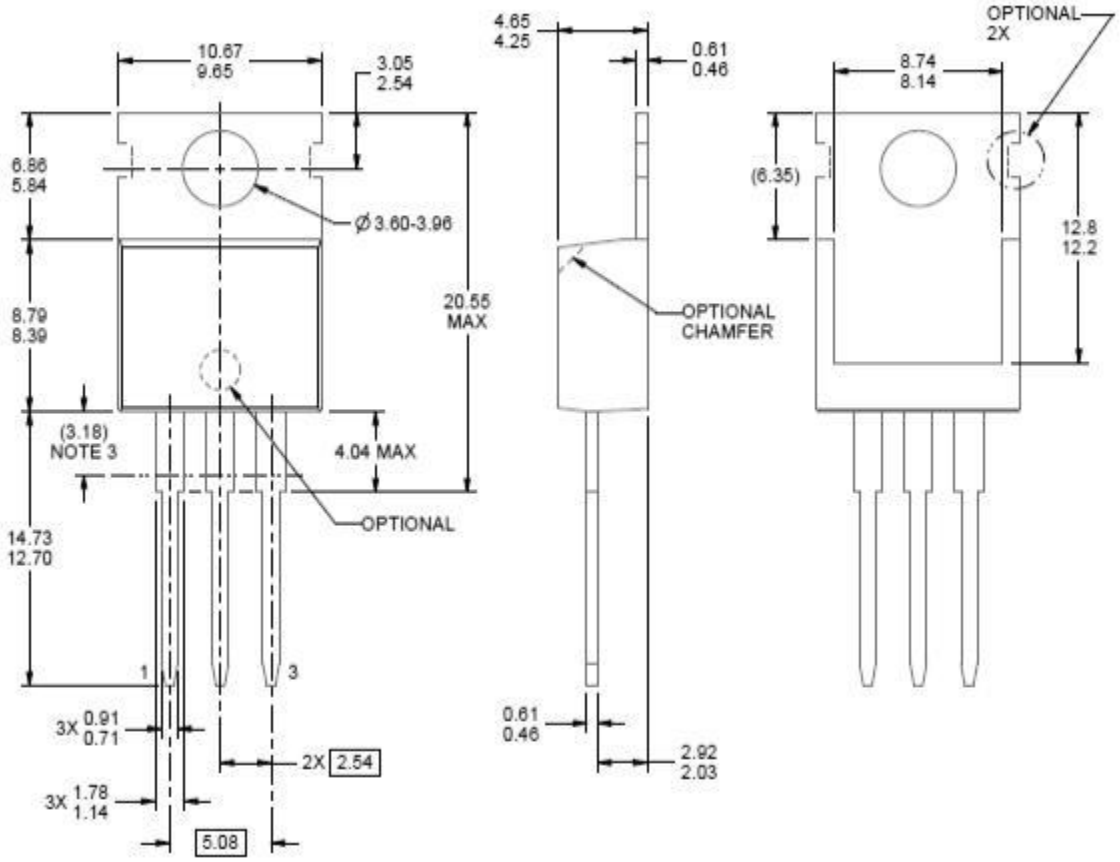
Package Information

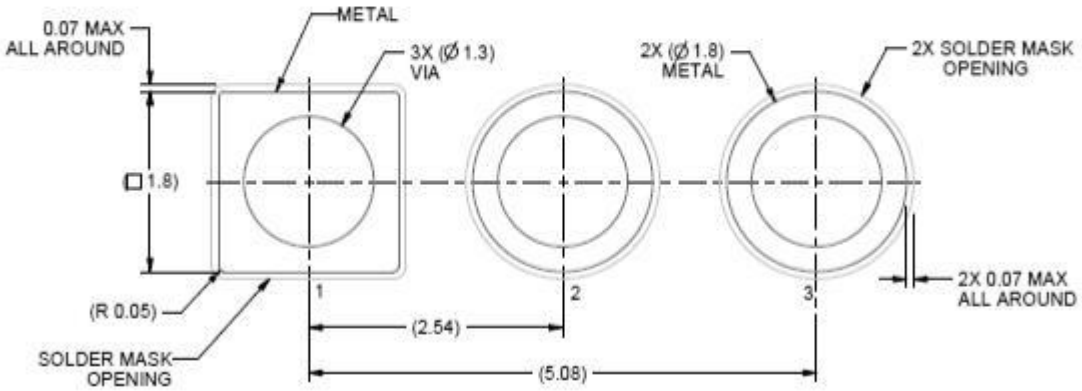
SOT89 Package



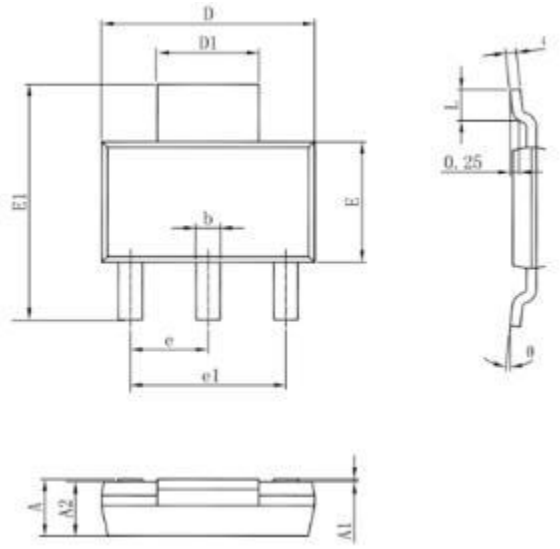
Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	1.400	1.600	0.055	0.063
b	0.320	0.520	0.013	0.020
b1	0.400	0.580	0.016	0.023
c	0.350	0.440	0.014	0.017
D	4.400	4.600	0.173	0.181
D1	1.550 REF.		0.061 REF.	
E	2.300	2.600	0.091	0.102
E1	3.940	4.250	0.155	0.167
e	1.500 TYP.		0.060 TYP.	
e1	3.000 TYP.		0.118 TYP.	
L	0.900	1.200	0.035	0.047

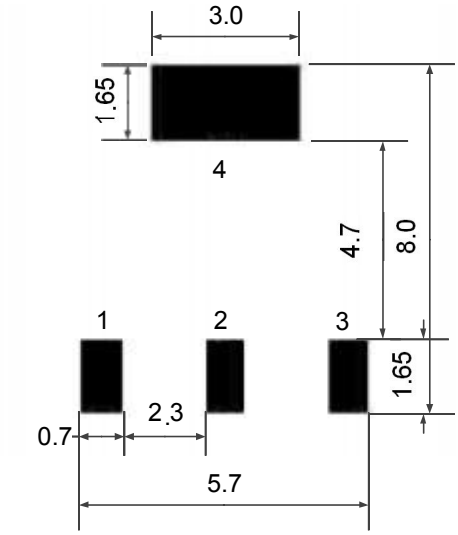
TO220 Package





SOT223 Package





PCB Board

Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	1.520	1.800	0.060	0.071
A1	0.000	0.100	0.000	0.004
A2	1.500	1.700	0.059	0.067
b	0.660	0.820	0.026	0.032
c	0.250	0.350	0.010	0.014
D	6.200	6.400	0.244	0.252
D1	2.900	3.100	0.114	0.122
E	3.300	3.700	0.130	0.146
E1	6.830	7.070	0.269	0.278
e	2.300(BSC)		0.091(BSC)	
e1	4.500	4.700	0.177	0.185
L	0.900	1.150	0.035	0.045
θ	0°	10°	0°	10°