



# TO-220-3L Plastic-Encapsulate Voltage Regulators

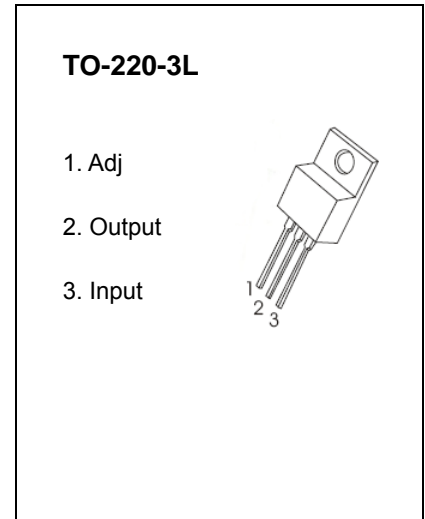
## **LM317** Three-terminal positive voltage regulator

### DESCRIPTION

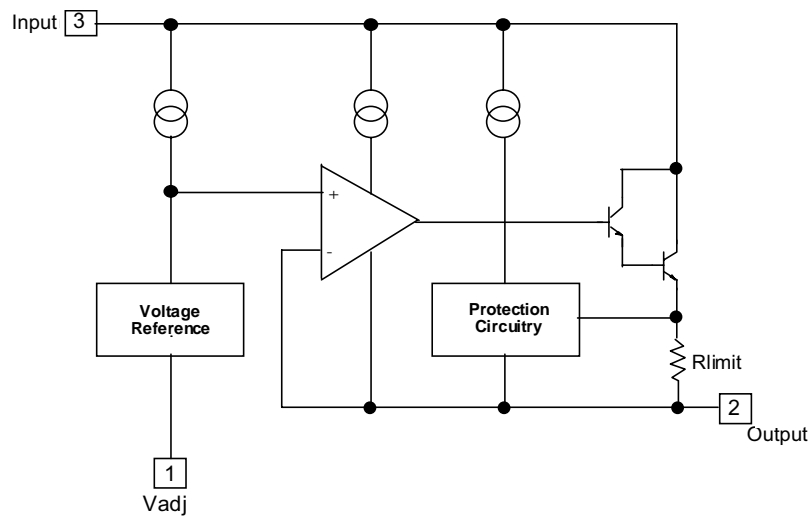
This monolithic integrated circuit is an adjustable 3-terminal positive voltage regulator designed to supply more than 1.5A of load current with an output voltage adjustable over a 1.2 to 37V. It employs internal current limiting, thermal shut-down and safe area compensation.

### FEATURE

- Internal thermal overload protection
- Internal short circuit current limiting
- Output transistor safe operating area compensation



### Internal Block Diagram



## Absolute Maximum Ratings

Symbol	Parameter	Value	Unit
$V_I-V_O$	Input-Output Voltage Differential	40	V
$T_{LEAD}$	Lead Temperature	230	°C
$P_D$	Power Dissipation	Internally limited	W
$T_J$	Operating Junction Temperature Range	0~125	°C
$T_{stg}$	Storage Temperature Range	-55~125	
$\Delta V_O / \Delta T$	Temperature Coefficient of Output Voltage	±0.02	%/°C

## ELECTRICAL CHARACTERISTICS

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

Parameter	Symbol	Test conditions	MIN	TYP	MAX	UNIT
Line Regulation(note1)	$R_{line}$	$T_A=25^\circ C$ $3V \leq V_I-V_O \leq 40V$		0.01	0.04	% / V
		$3V \leq V_I-V_O \leq 40V$		0.02	0.07	
Load Regulation(note1)	$R_{load}$	$T_A=25^\circ C, 10mA \leq I_O \leq I_{MAX}$ $V_O < 5V$ $V_O \geq 5V$		18 0.4	25 0.5	mV% / $V_O$
		$10mA \leq I_O \leq I_{MAX}$ $V_O < 5V$ $V_O \geq 5V$		40 0.8	70 1.5	
Adjustable Pin Current	$I_{ADJ}$	-		46	100	$\mu A$
Adjustable Pin Current Change	$\Delta I_{ADJ}$	$3V \leq V_I-V_O \leq 40V$ $10mA \leq I_O \leq I_{MAX}, P_D \leq P_{MAX}$		2.0	5	
Reference Voltage	$V_{REF}$	$3V \leq V_{IN}-V_O \leq 40V$ $10mA \leq I_O \leq I_{MAX}, P_D \leq P_{MAX}$	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	$I_{O(MAX)}$	$V_I-V_O \leq 15V, P_D \leq P_{MAX}$ $V_I-V_O \leq 40V, P_D \leq P_{MAX}$ $T_A=25^\circ C$	1.0	2.2 0.3		A
RMS Noise, % of $V_{OUT}$	$e_N$	$T_A=25^\circ C, 10Hz \leq f \leq 10KHz$		0.003	0.01	% / $V_O$
Ripple Rejection	RR	$V_O=10V, f=120Hz$ without $C_{ADJ}$ $C_{ADJ}=10\mu F$ (note2)	66	60 75		dB
Long-Term Stability, $T_J=T_{HIGH}$	ST	$T_A=25^\circ C$ for end point measurements, 1000HR		0.3	1	%
Thermal Resistance Junction to case	$R_{\theta JC}$	-		5		°C/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.  $C_{ADJ}$ . when used, is connected between the adjustment pin and ground.



