

LOW CURRENT 1.2V TO 37V ADJUSTABLE VOLTAGE REGULATOR

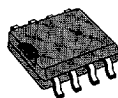
- OUTPUT VOLTAGE RANGE : 1.2 TO 37V
- OUTPUT CURRENT IN EXCESS OF 100 mA
- LINE REGULATION TYP. 0.01%
- LOAD REGULATION TYP. 0.1%
- THERMAL OVERLOAD PROTECTION
- SHORT CIRCUIT PROTECTION
- OUTPUT TRANSISTOR SAFE AREA COMPENSATION
- FLOATING OPERATION FOR HIGH VOLTAGE APPLICATIONS

DESCRIPTION

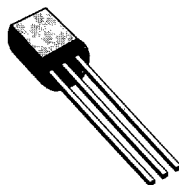
The LM317L is a monolithic integrated circuit in SO-8 and TO-92 packages intended for use as positive adjustable voltage regulators.

It is designed to supply until 100 mA of load current with an output voltage adjustable over a 1.2 to 37V range.

The nominal output voltage is selected by means of only a resistive divider, making the device exceptionally easy to use and eliminating the stocking of many fixed regulators.

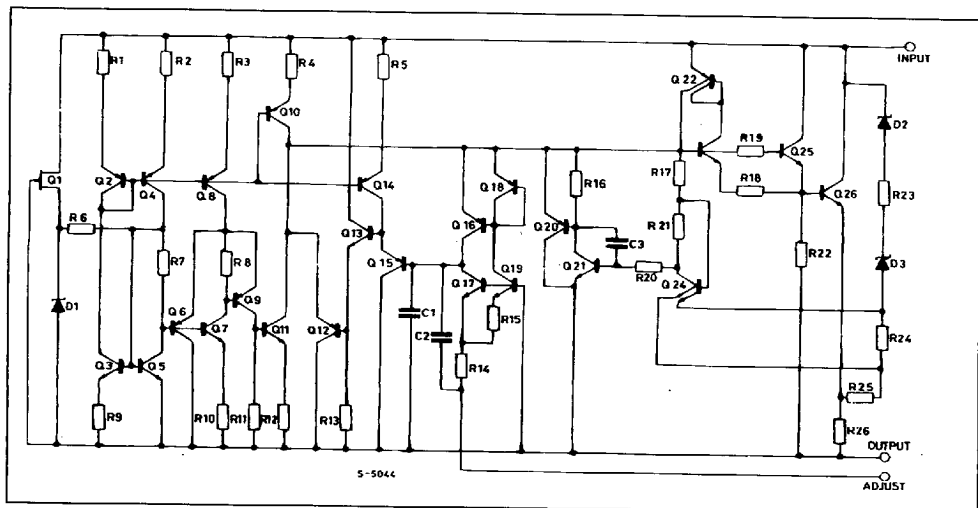


SO-8



TO-92

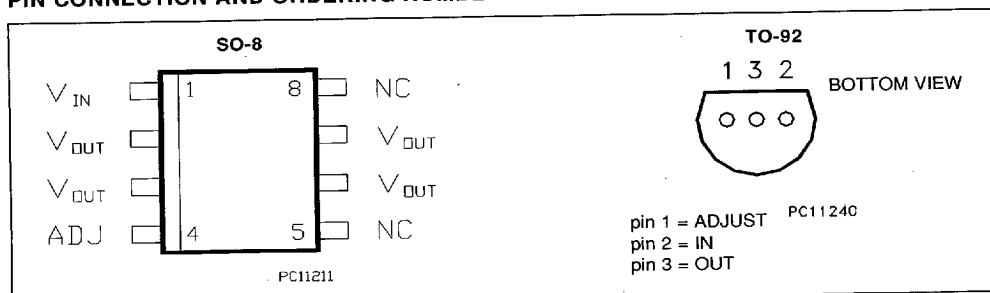
SCHEMATIC DIAGRAM



ABSOLUTE MAXIMUM RATING

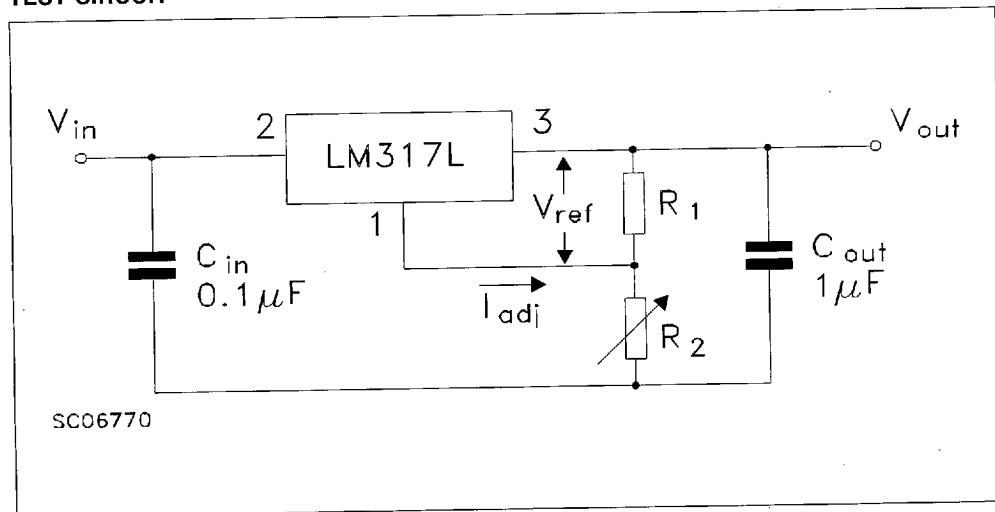
Symbol	Parameter	Value	Unit
$V_i - V_o$	Input-Output Differential Voltage	40	V
P_d	Power Dissipation	Internally Limited	
T_{opr}	Operating Junction Temperature Range	0 to 125	°C
T_{stg}	Storage Temperature Range	-55 to 150	°C

PIN CONNECTION AND ORDERING NUMBER



Type	SO-8	TO-92
LM317L	LM317LD	LM317LZ

TEST CIRCUIT

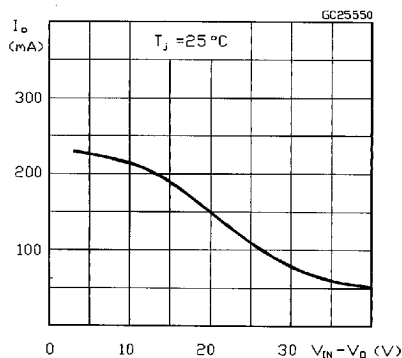


ELECTRICAL CHARACTERISTICS (Refer to the test circuits, $0 \leq T_j \leq 125^\circ\text{C}$ $V_i - V_o = 5\text{ V}$, $I_o = 40\text{ mA}$, unless otherwise specified)

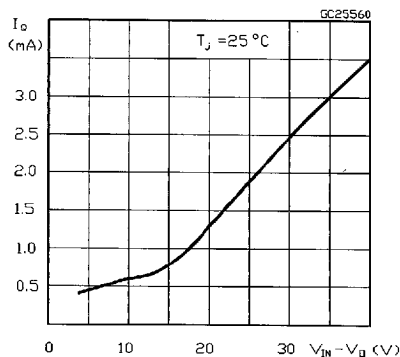
Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
ΔV_o	Line Regulation	$V_i - V_o = 3\text{ to }40\text{ V}$ $I_L < 20\text{ mA}$	$T_j = 25^\circ\text{C}$	0.01	0.04	%/V
				0.02	0.07	%/V
ΔV_o	Load Regulation	$V_o \leq 5\text{ V}$ $I_o = 5\text{ mA to }100\text{ mA}$	$T_j = 25^\circ\text{C}$	5	25	mV
				20	70	mV
		$V_o \geq 5\text{ V}$ $I_o = 5\text{ mA to }100\text{ mA}$	$T_j = 25^\circ\text{C}$	0.1	0.5	%
				0.3	1.5	%
I_{ADJ}	Adjustment Pin Current			50	100	μA
ΔI_{ADJ}	Adjustment Pin Current	$V_i - V_o = 3\text{ to }40\text{ V}$ $I_o = 5\text{ mA to }100\text{ mA}$ $P_d < 625\text{ mW}$		0.2	5	μA
V_{REF}	Reference Voltage	$V_i - V_o = 3\text{ to }40\text{ V}$ $I_o = 5\text{ mA to }100\text{ mA}$ $P_d < 625\text{ mW}$	1.2	1.25	1.3	V
$\frac{\Delta V_o}{V_o}$	Output Voltage Temperature Stability			0.7		%
$I_{o(min)}$	Minimum Load Current	$V_i - V_o = 40\text{ V}$		3.5	5	mA
$I_{o(max)}$	Maximum Output Current	$V_i - V_o = 3\text{ to }13\text{ V}$ $V_i - V_o = 40\text{ V}$	100	200 50		mA
ϵ_N	Output Noise Voltage (percentance of V_o)	$B = 10\text{ Hz to }10\text{ KHz}$ $T_j = 25^\circ\text{C}$		0.003		%
SVR	Supply Voltage Rejection (*)	$T_j = 25^\circ\text{C}$ $f = 120\text{ Hz}$	$C_{ADJ}=0$	65		dB
			$C_{ADJ}=10\mu\text{F}$	66	80	dB

(*) C_{ADJ} is connected between Adjust pin and Ground.

Current Limit



Minimum Operating Current



7929237 0051523 067

APPLICATION INFORMATION

The LM317L provides an internal reference voltage of 1.25V between the output and adjustments terminals. This is used to set a constant current flow across an external resistor divider (see fig. 4), giving an output voltage V_O of:

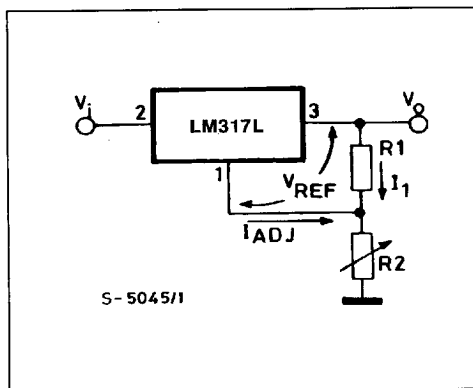
$$V_O = V_{REF} \left(1 + \frac{R_2}{R_1}\right) + I_{ADJ} R_2$$

The device was designed to minimize the term I_{ADJ} (100µA max) and to maintain it very constant with line and load changes. Usually, the error term $I_{ADJ} R_2$ can be neglected. To obtain the previous requirement, all the regulator quiescent current is returned to the output terminal, imposing a minimum load current condition. If the load is insufficient, the output voltage will rise.

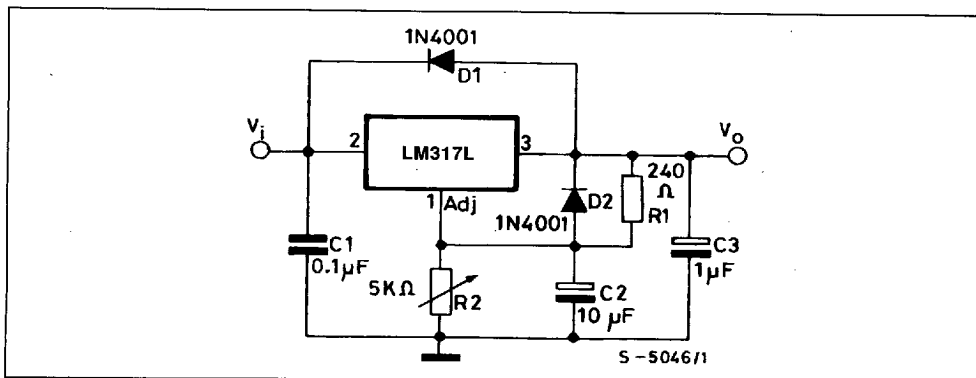
Since the LM317L is a floating regulator and "sees" only the input-to-output differential voltage, supplies of very high voltage with respect to ground can be regulated as long as the maximum input-to-output differential is not exceeded. Furthermore, programmable regulator are easily obtainable and, by connecting a fixed resistor between the adjustment and output, the device can be used as a precision current regulator.

In order to optimise the load regulation, the current set resistor R_1 (see fig. 4) should be tied as close as possible to the regulator, while the ground terminal of R_2 should be near the ground of the load to provide remote ground sensing.

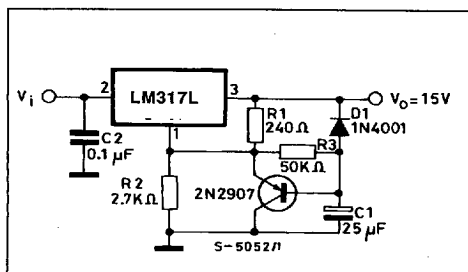
Figure 4 : Basic Adjustable Regulator.



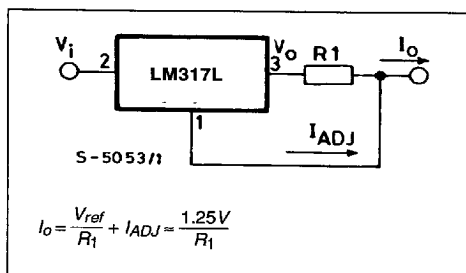
Voltage Regulator with Protection Diodes.



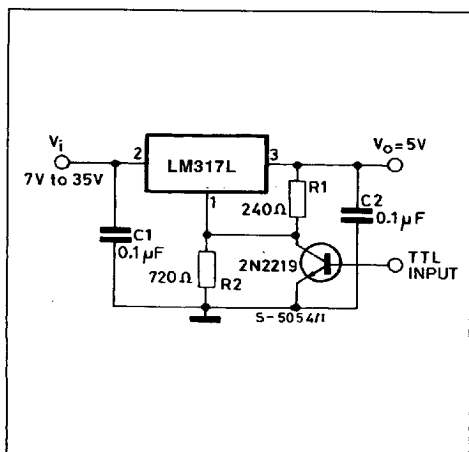
Slow Turn-on 15V Regulator.



Current Regulator.



5V Electronic Shut-down Regulator.



Digitally Selected Outputs.

