



LM317L

3-TERMINAL ADJUSTABLE OUTPUT POSITIVE VOLTAGE REGULATOR

GENERAL DESCRIPTION

The LM317L is an adjustable 3-terminal positive voltage regulator capable of supplying in excess of 100mA of load current with adjustable output voltage range between 1.2V to 37V. It is exceptionally easy to use and requires only two external resistors to set the output voltage.

An optional output capacitor can be added to improve transient response. The adjustment terminal can be bypassed to achieve very high ripple rejection ratios, which are difficult to achieve with standard 3-terminal regulators.

FEATURES

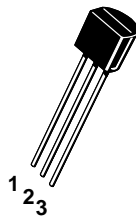
- Adjustable Output Voltage down to 1.2V
- Guaranteed 100mA output current
- Thermal Overload Protection
- Short circuit Protection
- Output Transistor safe area compensation
- Floating Operation for High voltage Application
- Line Regulation typically 0.01%V
- Load Regulation Typically 0.1%
- 80dB ripple rejection

ABSOLUTE MAXIMUM RATINGS

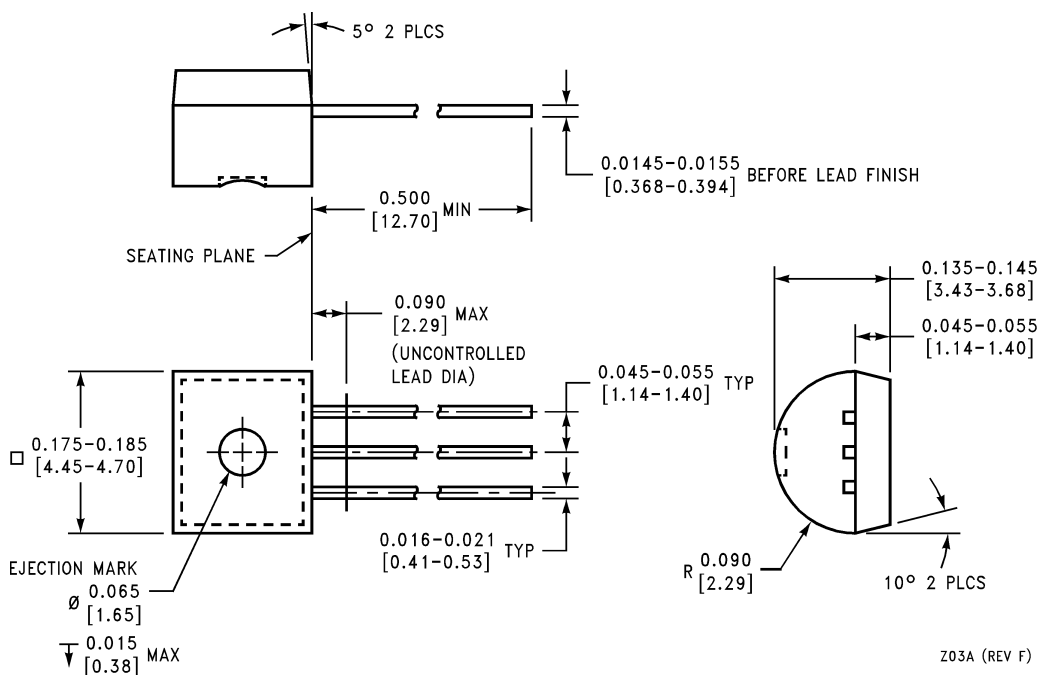
PARAMETER	SYMBOL	VALUE
Power Dissipation	P_D	Internally Limited
Input-Output Voltage Differential	$V_I - V_O$	$40V_{DC}$
Operating junction Temperature Range	T_A	-25 to +125
Storage Temperature Range	T_{STG}	-55 to 125

Physical Dimensions inches (millimeters) unless otherwise noted

TO-92 PACKAGE



- 1. ADJ
- 2. OUTPUT
- 3. INPUT





LM317L

ELECTRICAL CHARACTERISTICS

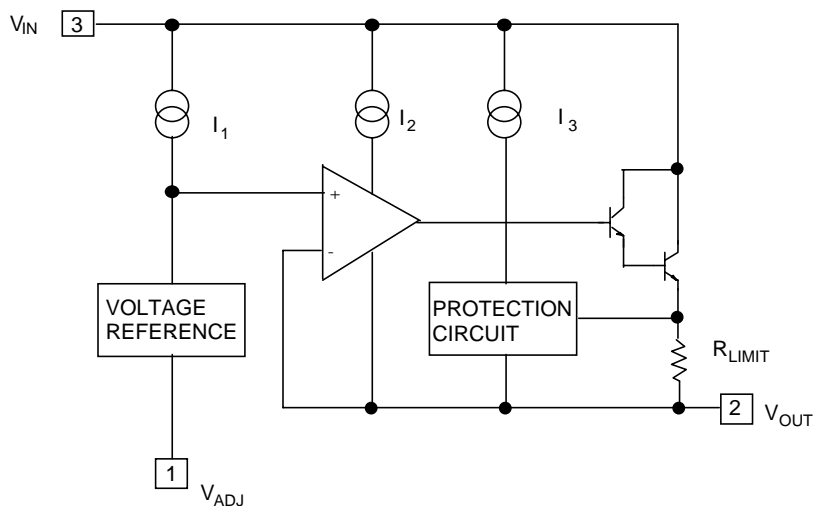
$V_{IN}-V_{OUT}=5V$, $I_O=40mA$, $0^{\circ}C \leq T_A \leq 125^{\circ}C$, unless otherwise specified.

PARAMETER	TEST CONDITIONS	MIN	TYP	MAX	UNITS
Line Regulation	$I_L \leq 20mA$, $3V \leq V_{IN}-V_{OUT} \leq 40V$		0.02	0.05	%/V
Load Regulation	$5mA \leq I_{OUT} \leq 100mA$		0.3	1.2	%
Thermal Regulation	$T_A = 25^{\circ}C$, 10ms Pulse		0.04	0.2	%/W
Adjustment Pin Current			50	110	μA
Adjustment Pin Current Charge	$5mA \leq I_L \leq 100mA$, $3V \leq V_{IN}-V_{OUT} \leq 40V$, $P \leq 625mW$		0.2	6	μA
Reference Voltage	$5mA \leq I_{OUT} \leq 100mA$, $3V \leq V_{IN}-V_{OUT} \leq 40V$, $P \leq 625mW$	1.15	1.25	1.35	V
Temperature Stability	$T_{MIN} \leq T_J \leq T_{MAX}$		0.65		%
Minimum Load Current	$V_{IN}-V_{OUT} \leq 40V$		3.5	17	mA
	$3V \leq V_{IN}-V_{OUT} \leq 15V$		1.5	6	mA
Current Limit	$3V \leq V_{IN}-V_{OUT} \leq 13V$	100	200	260	mA
	$V_{IN}-V_{OUT} = 40V$	25	50	70	mA
Ripple Rejection Ratio	$V_{OUT} = 10V$, $f = 120Hz$, $C_{ADJ} = 0$		65	80	dB
	$C_{ADJ} = 10\mu F$	66	80		dB

* Regulation is measured at constant junction temperature, using pulse testing with a low duty cycle. Changes in output voltage due to heating effects are covered under the specification for thermal regulation.

** Thermal resistance of the TO-92 package is $180^{\circ}C/W$ junction to ambient with 0.4" leads from a PC board and $160^{\circ}C/W$ junction to ambient with 0.125" lead length to PC board.

BLOCK DIAGRAM

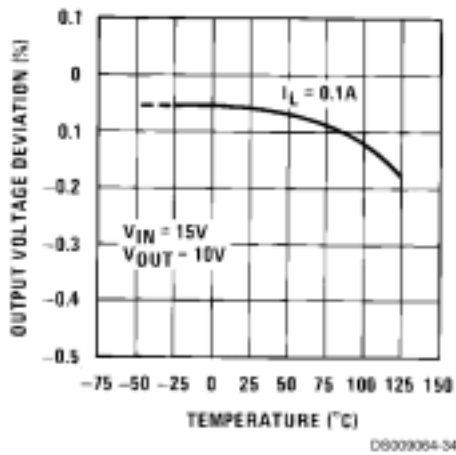




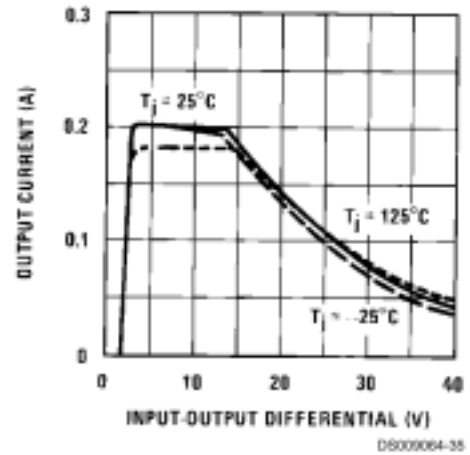
LM317L

TYPICAL PERFORMANCE CHARACTERISTICS

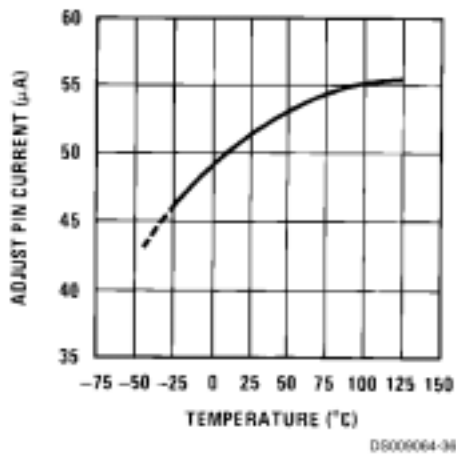
Load Regulation



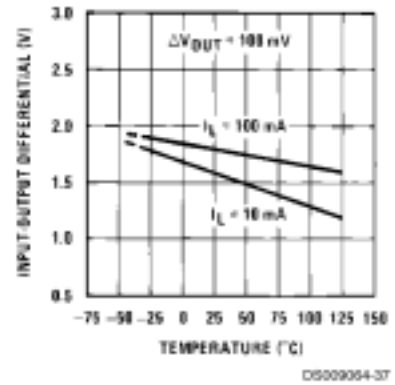
Current Limit



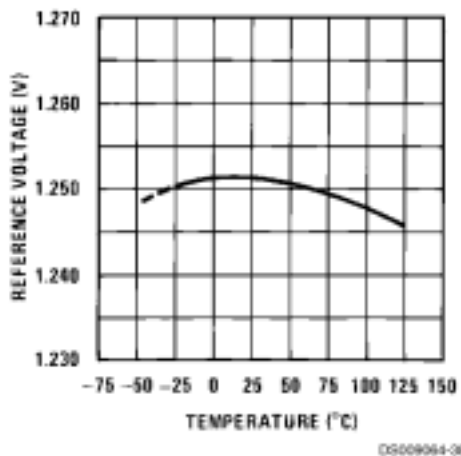
Adjustment Current



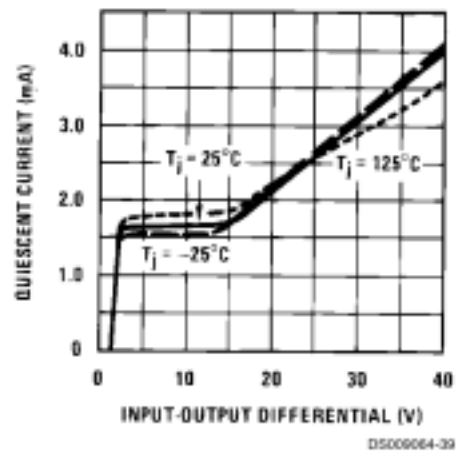
Dropout Voltage



Reference Voltage Temperature Stability



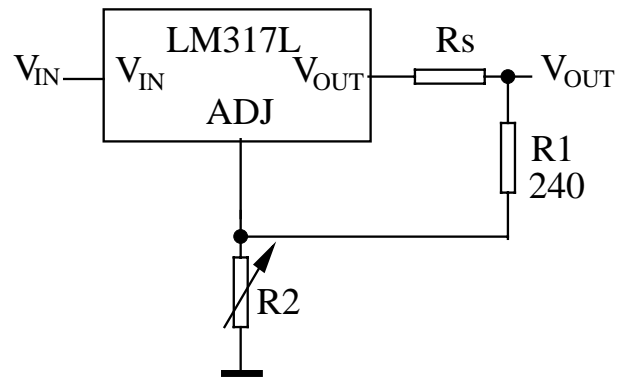
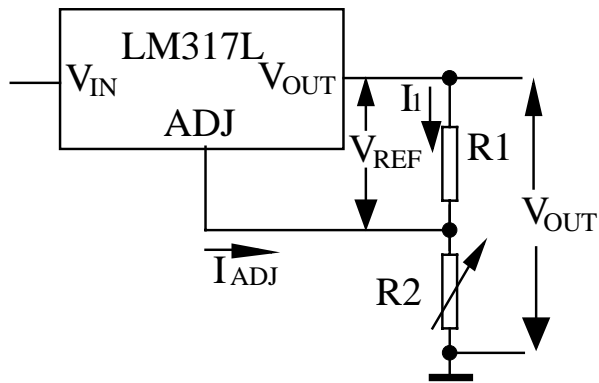
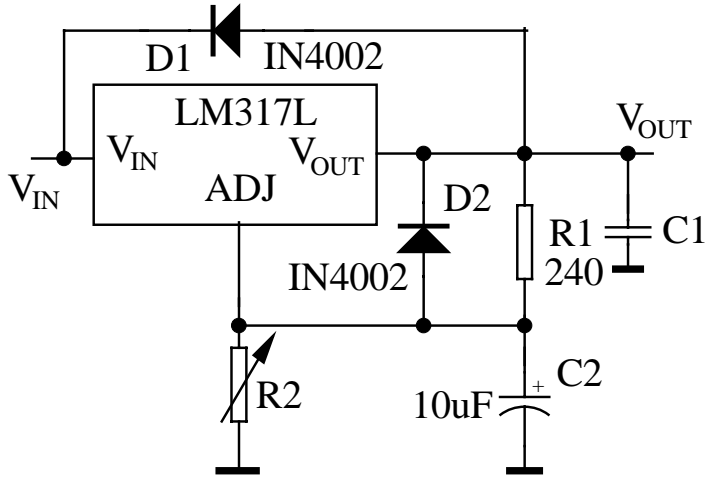
Minimum Operating Current





LM317L

TYPICAL APPLICATIONS



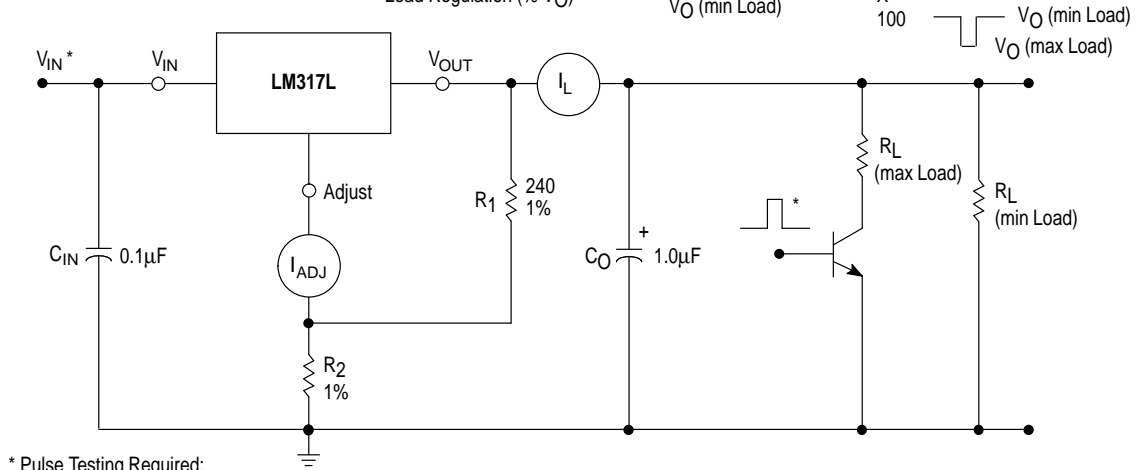
LM317L

TEST CIRCUIT

LOAD REGULATION AND ΔI_{ADJ} /LOAD TEST CIRCUIT

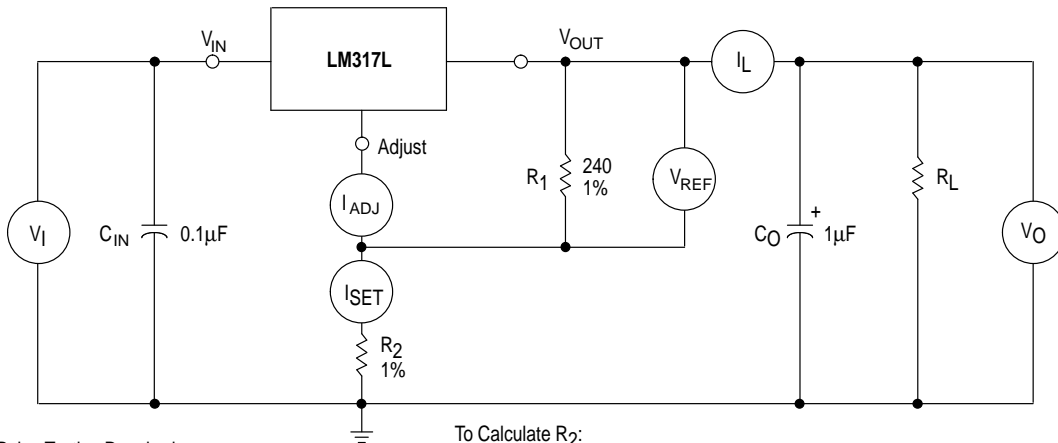
$$\text{Load Regulation (mV)} = V_O (\text{min Load}) - V_O (\text{max Load})$$

$$\text{Load Regulation (\% } V_O) = \frac{V_O (\text{min Load}) - V_O (\text{max Load})}{V_O (\text{min Load})} \times 100$$



* Pulse Testing Required:
1% Duty Cycle is suggested.

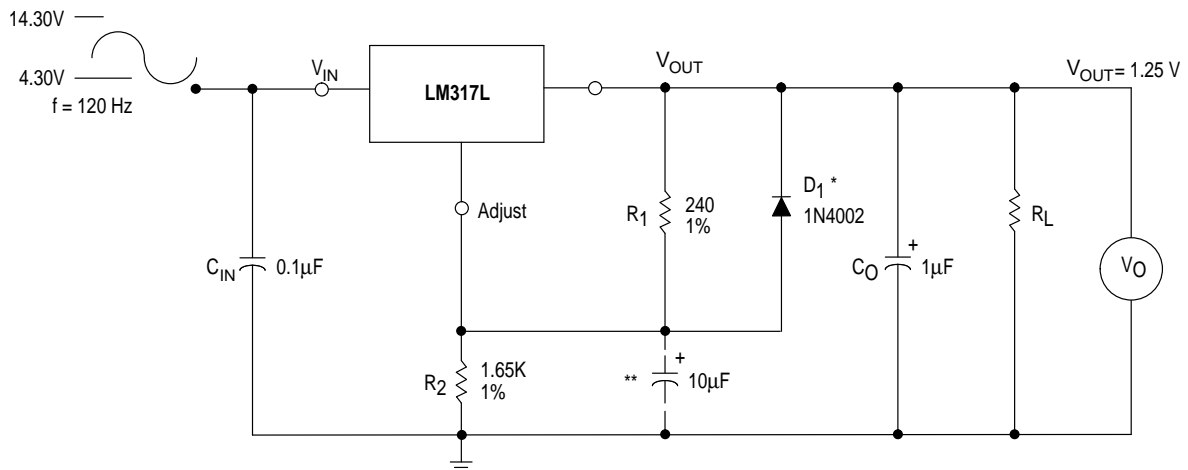
STANDARD TEST CIRCUIT



Pulse Testing Required:
1% Duty Cycle is suggested.

To Calculate R_2 :
 $V_{OUT} = I_{SET} R_2 + 1.250 \text{ V}$
Assume $I_{SET} = 5.25 \text{ mA}$

RIPPLE REJECTION TEST CIRCUIT



* D_1 Discharges C_{ADJ} if Output is shorted to ground.

** C_{ADJ} provides an AC ground to the adjust pin.