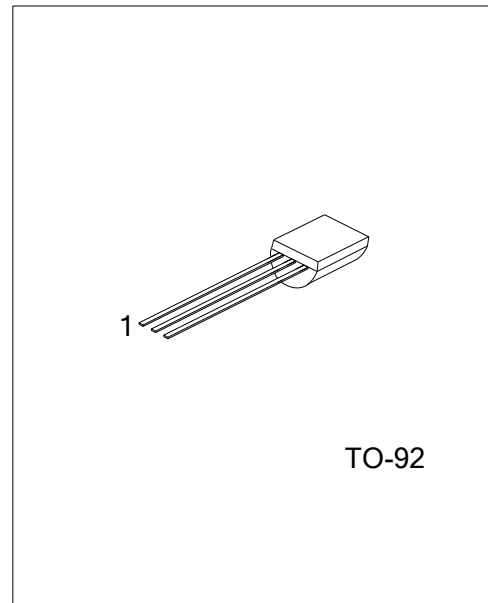


## 3-TERMINAL ADJUSTABLE OUTPUT POSITIVE VOLTAGE REGULATOR BL317L

### DESCRIPTION:

The BL317L is an Adjustable 3-terminal positive voltage regulator capable of supplying in excess of 100mA over voltage range of 1.2V to 37V. This voltage regulator is exceptionally easy to use and requires only two external resistors to set the output voltage. What's more, it employs internal current limiting, thermal shutdown and safe area compensation, making them essentially blow-out proof.

The BL317L serves a wide variety of applications including local, on card regulation. It can also be used to make a programmable output regulator, or by connecting a fixed resistor between the Adjustment and output, the BL317L can be used as a precision current regulator.

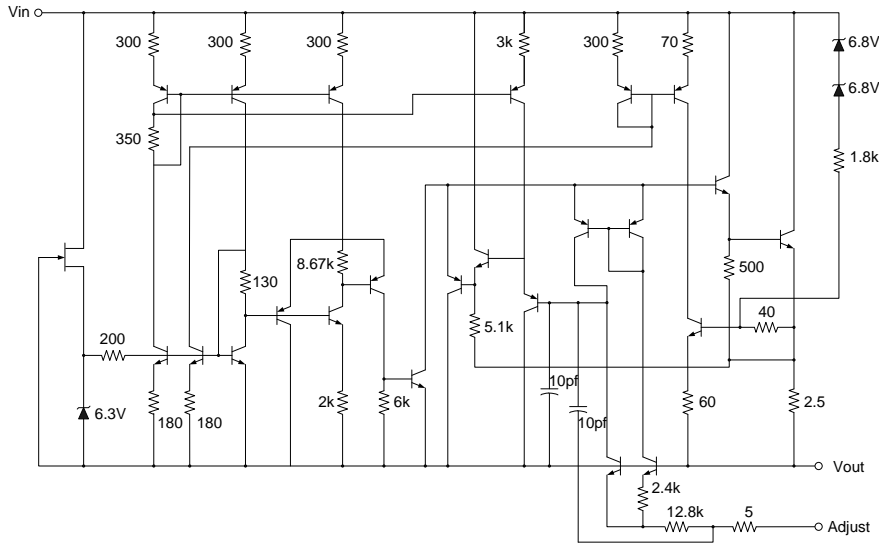


### FEATURES:

- Output current in excess of 100mA
- Output voltage Adjustable from 1.3V to 37V
- Internal short circuit current limiting
- Internal thermal overload protection
- Output transistor safe-area compensation
- Floating Operation for High Voltage Applications
- Eliminates Stocking Many Fixed Voltages

### ABSOLUTE MAXIMUM RATINGS:

Parameters	Symbol	Rating	Units
Input - Output Voltage Differential	VI-VO	40	V
Power Dissipation	PD	Internal limited	W
Operating Junction Temperature Range	TJ	-40~+125	°C
Storage Temperature Range	Tstg	-65~+150	°C

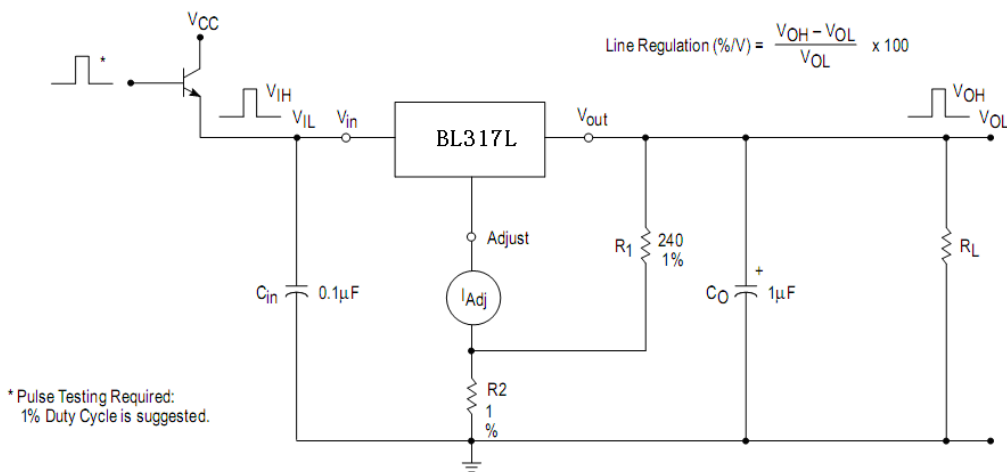
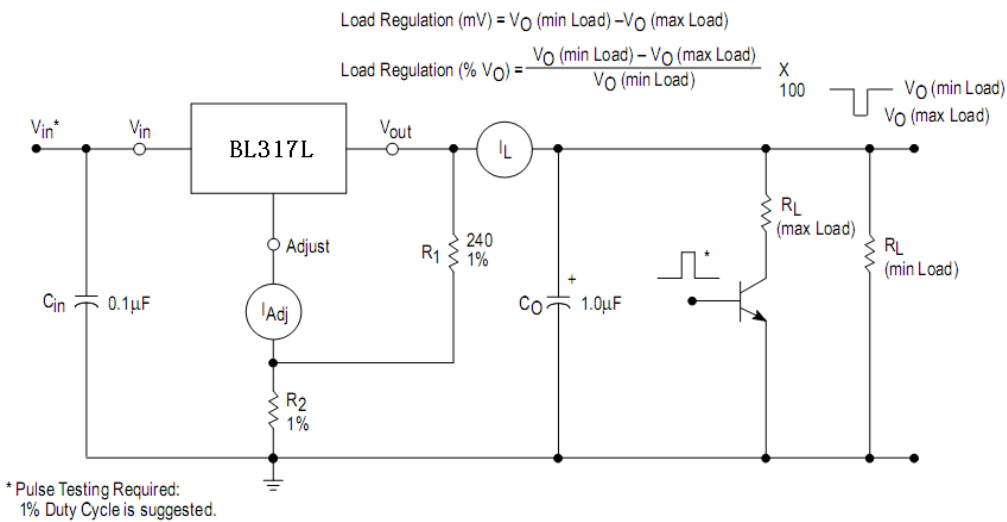
**BLOCK DIAGRAM:**

**ELECTRICAL CHARACTERISTICS:**

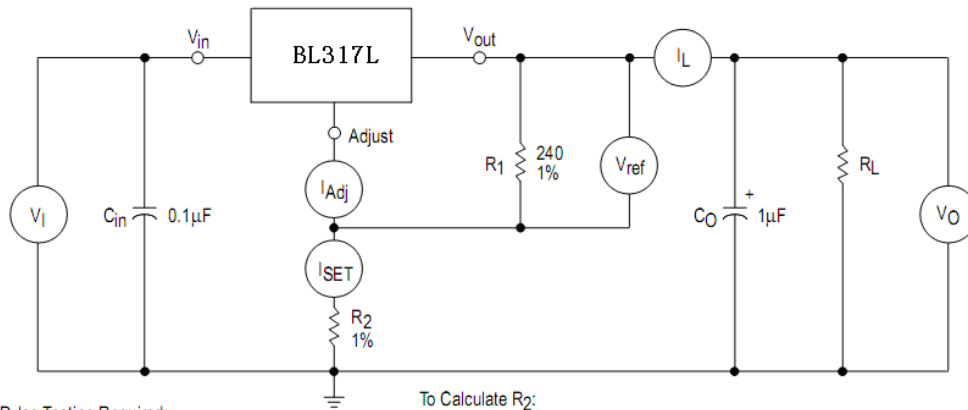
( $V_I - V_O = 5V$ ,  $-40^\circ C < T_J < 125^\circ C$ ,  $I_O = 40mA$ ,  $I_{MAX} = 100mA$ ,  $P_{MAX} = 625mW$ , unless otherwise specified)

Parameters	Symbol	Figure	Min	Typ	Max	Unit
Line Regulation <sup>1</sup> , $T_A = 25^\circ C$ , $3.0V \leq V_I - V_O \leq 40V$	$Reg_{line}$	1		0.01	0.04	%/V
Load Regulation <sup>1</sup> , $T_A = 25^\circ C$ , $10mA \leq I_O \leq I_{max}$ -BL317L $V_O \leq 5.0V$ $V_O \geq 5.0V$	$Reg_{load}$	2		5.0 0.1	25 0.5	mV % $V_O$
Adjustable Pin current	$I_{Adj}$	3		50	100	$\mu A$
Adjustment Pin Current Change $2.5V \leq V_I - V_O \leq 40V$ , $P_D \leq P_{max}$ , $10mA \leq I_O \leq I_{max}$ -BL317L	$\Delta I_{Adj}$	1, 2		0.2	5.0	$\mu A$
Reference Voltage $2.5V \leq V_I - V_O \leq 40V$ , $P_D \leq P_{max}$ , $10mA \leq I_O \leq I_{max}$ -BL317L	$V_{ref}$	3	1.20	1.25	1.30	V
Line Regulation <sup>1</sup> , $3.0V \leq V_I - V_O \leq 40V$	$Reg_{line}$	1		0.02	0.07	%/V
Load Regulation <sup>1</sup> , $10mA \leq I_O \leq I_{max}$ -BL317L $V_O \leq 5.0V$ $V_O \geq 5.0V$	$Reg_{load}$	2		20 0.3	70 1.5	mV % $V_O$
Temperature Stability ( $T_{low} \leq T_J \leq T_{high}$ )	$T_s$	3		0.7		% $V_O$
Minimum Load Current to Maintain Regulation ( $V_I - V_O = 40V$ )	$I_L(MIN)$	3		3.5	10	mA
Maximum output Current $V_I - V_O \leq 6.25V$ , $P_D \leq P_{max}$ $V_I - V_O \leq 40V$ , $P_D \leq P_{max}$	$I_{MAX}$	3	100	200 20		mA
RMS Noise, % of $V_O$ , $T_A = 25^\circ C$ , $10Hz \leq f \leq 10kHz$	N			0.003		%/ $V_O$
Ripple Rejection <sup>2</sup> $V_O = 1.2V$ , $f = 120Hz$ $C_{Adj} = 10\mu F$ , $V_O = 10.0V$	RR	4	60	80 80		dB
Long-term Stability, $T_J = High^3$ $T_A = 25^\circ C$ for Endpoint Measurements	S	3		0.3	1.0	%/1.0k Hrs.

Thermal Resistance, Junction-to-Case	R $\theta$ JC		83	°C/W
Thermal Resistance, Junction-to-Air	R $\theta$ JA		160	°C/W

- Notes:
1. Load and line regulation are specified at constant junction temperature. Changes in  $V_o$  due to heating effects must be taken into account separately. Pulse testing with low duty cycle is used.
  2.  $C_{Adj}$ , when used, is connected between the Adjustment pin and ground.
  3. Since Long-Term Stability cannot be measured on each device before shipment, this specification is an engineering estimate of average stability from lot to lot.

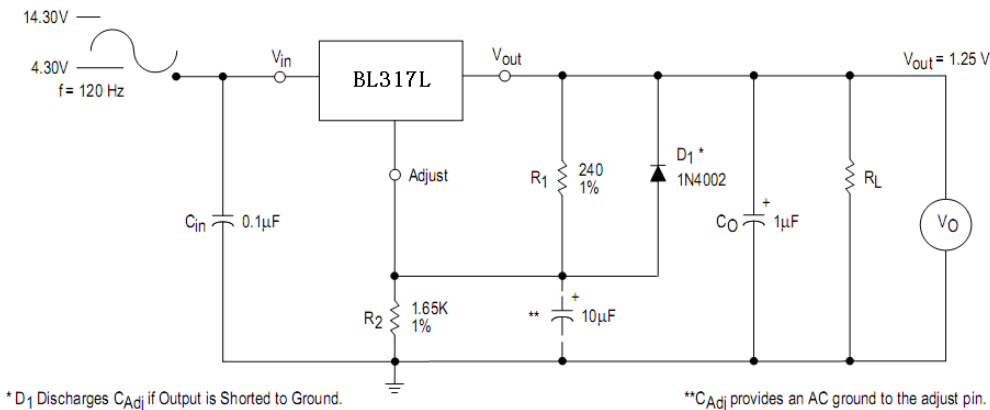
**TEST CIRCUITS:**

 Figure 1. Line Regulation and  $\Delta I_{Adj}/Line$  Test Circuit

 Figure 2. Load Regulation and  $\Delta I_{Adj}/Load$  Test Circuit



Pulse Testing Required:  
1% Duty Cycle is suggested.

To Calculate R2:  
 $V_{out} = I_{SET} R_2 + 1.250 V$   
Assume  $I_{SET} = 5.25 mA$

Figure 3. Standard Test Circuit



\* D1 Discharges CAadj if Output is Shorted to Ground.

\*\* CAadj provides an AC ground to the adjust pin.

Figure 4. Ripple Rejection Test Circuit

**TYPICAL CHARACTERISTICS PERFORMANCE:**

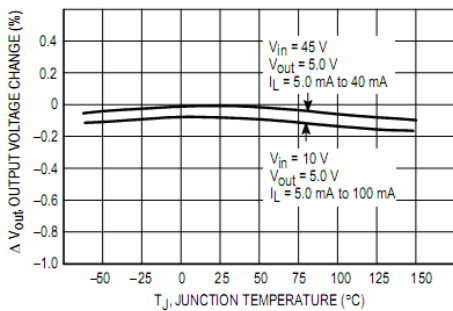


Figure 5. Load Regulation

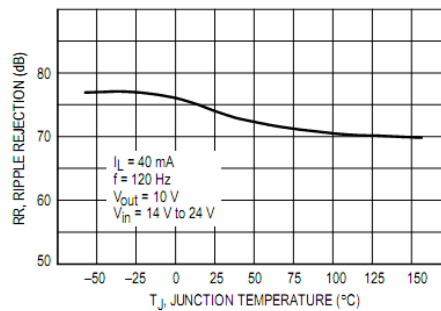


Figure 6. Ripple Rejection

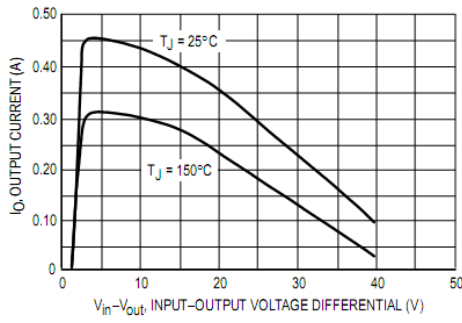


Figure 7. Current Limit

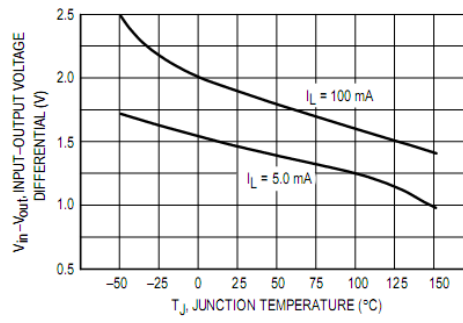


Figure 8. Dropout Voltage

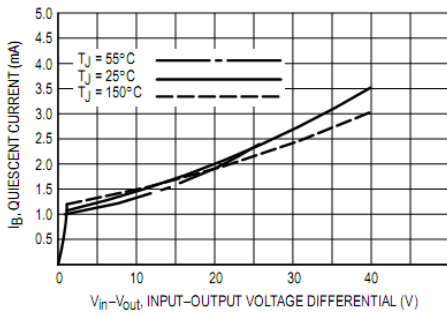


Figure 9. Minimum operating Current

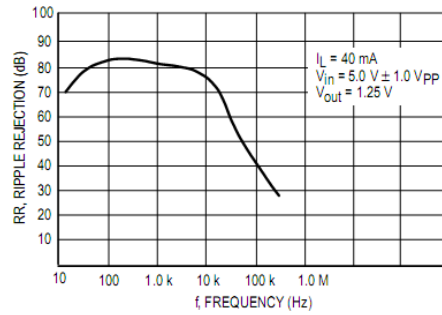


Figure 10. Ripple Rejection Versus Frequency

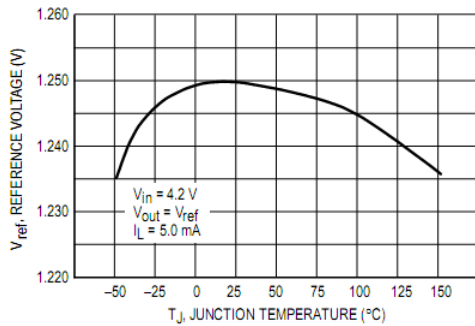


Figure 11. Temperature Stability

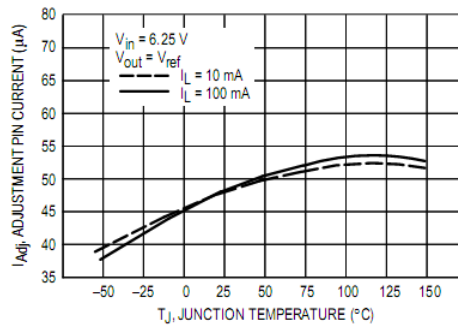


Figure 12. Adjustment Pin Current

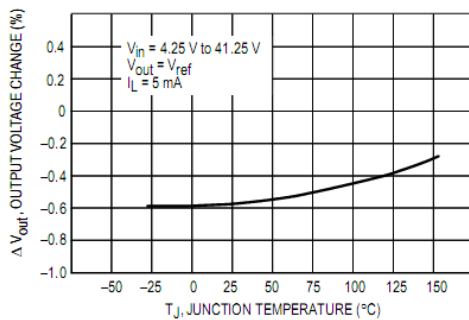


Figure 13. Line Regulation

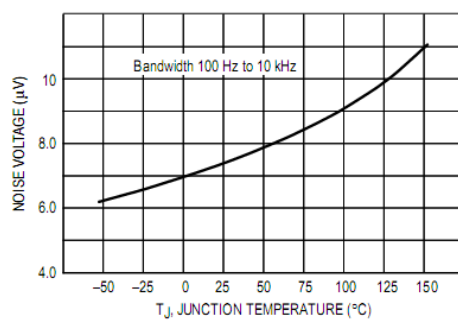


Figure 14. Output Noise

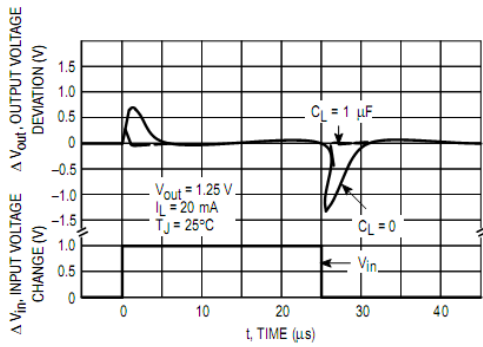


Figure 15. Line Transient Response

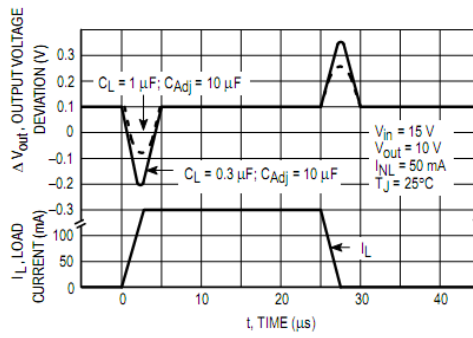


Figure 16. Load transient response

**PACKAGE DIMENSIONS:**

