

# ADJUSTABLE VOLTAGE REGULATOR (POSITIVE)

LM317L

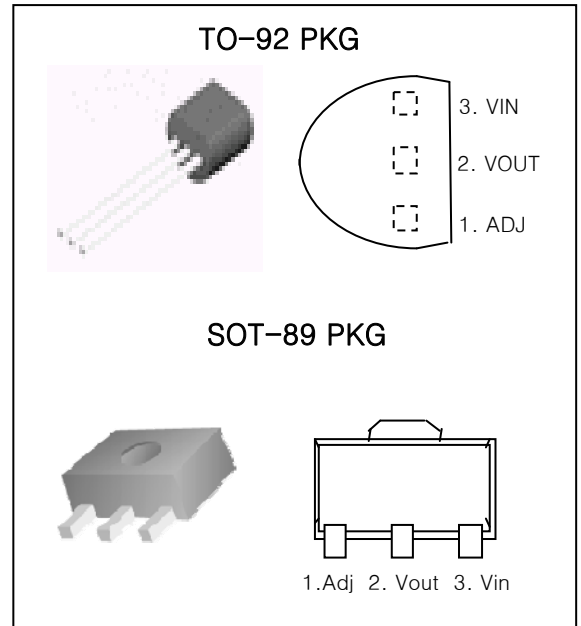
## 3-TERMINAL 100mA POSITIVE ADJUSTABLE REGULATOR

### FEATURES

- Output current in Excess of 100mA
- Output Adjustable Between 1.2V and 37V
- Internal Thermal-Overload Protection
- Internal Short-Circuit Current-Limiting
- Output Transistor Safe-Area Compensation
- Floating operation for high voltage applications
- Moisture Sensitivity Level 3

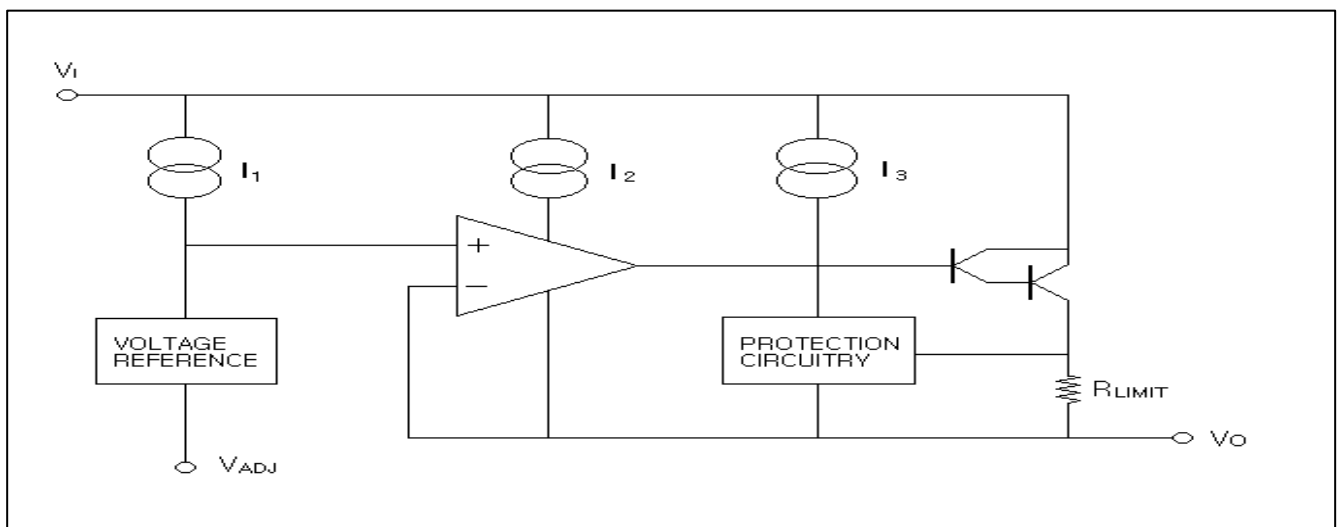
### DISCRIPTION

This monolithic integrated circuit is an adjustable 3-terminal positive voltage regulator designed to supply more than 100mA 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.



| ORDERING INFORMATION |         |         |
|----------------------|---------|---------|
| Device               | Marking | Package |
| LM317L               | LM317L  | TO-92   |
| LM317F               | 317     | SOT-89  |

### BLOCK DIAGRAM



TYPICAL APPLICATIONS

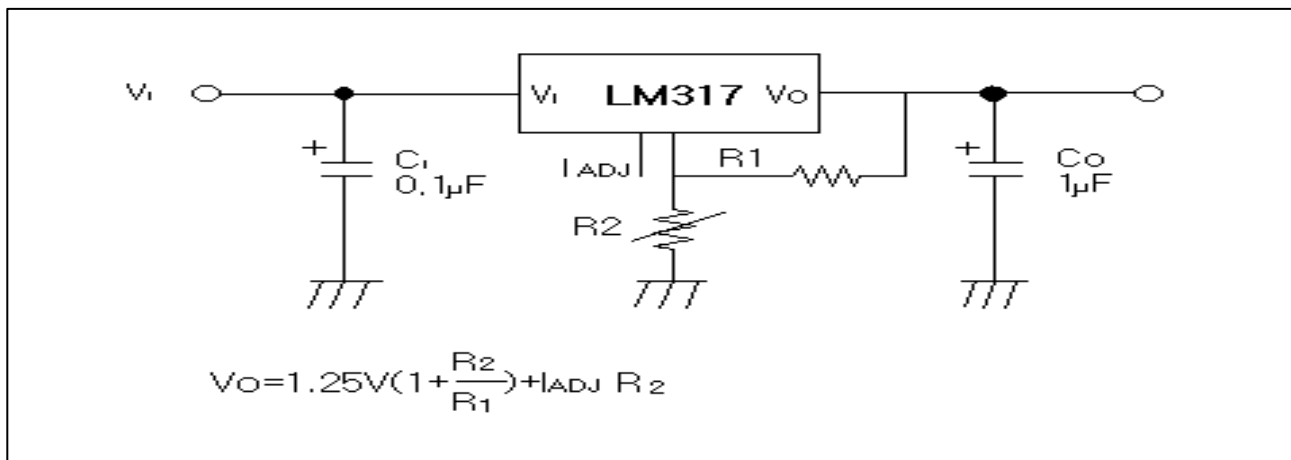


Fig.5 Programmable Regulator

$C_i$  is required when regulator is located in appreciable distance from power supply filter.  $C_o$  is not needed for stability, however, it does improve transient response. Since  $I_{ADJ}$  is controlled to less than  $100\mu A$ , the error associated with this term is negligible in most applications.

## ABSOLUTE MAXIMUM RATINGS (T<sub>A</sub>=25°C, unless otherwise specified)

| Characteristic                    | Symbol                         | Value              | Unit |
|-----------------------------------|--------------------------------|--------------------|------|
| Input-output Voltage Differential | V <sub>I</sub> -V <sub>O</sub> | 40                 | V    |
| Lead Temperature                  | T <sub>LEAD</sub>              | 230                | °C   |
| Power Dissipation                 | P <sub>D</sub>                 | Internally limited | —    |
| Operating Temperature Range       | T <sub>OPR</sub>               | 0 ~ +125           | °C   |
| Storage Temperature Range         | T <sub>STG</sub>               | -65 ~ +125         | °C   |

## ELECTRICAL CHARACTERISTICS

(V<sub>I</sub>-V<sub>O</sub>=5V, I<sub>O</sub>=40mA, 0°C ≤ T<sub>J</sub> ≤ 125°C, I<sub>MAX</sub>=100mA, unless otherwise specified)

| Characteristic   | Symbol              | Test condition   | Min.                                      | Typ.  | Max. | Unit             |     |
|--|---------------------|--|---|-------|------|------------------|-----|
| Line Regulation  | ΔV <sub>O</sub>     | T <sub>A</sub> =0 ~ 125°C  | 3V ≤ V <sub>I</sub> -V <sub>O</sub> ≤ 40V |       | 0.01 | 0.04             | %/V |
|  |                     |  | 3V ≤ V <sub>I</sub> -V <sub>O</sub> ≤ 40V |       | 0.02 | 0.07             | %/V |
| Load Regulation  | ΔV <sub>O</sub>     | T <sub>A</sub> =25°C, 10mA ≤ I <sub>O</sub> ≤ I <sub>MAX</sub>   |   |       | 10   | 25               | mV  |
|  |                     | V <sub>O</sub> ≤ 5V  |   | 0.1   | 0.5  | %/V <sub>O</sub> |     |
|  |                     | 10mA ≤ I <sub>O</sub> ≤ I <sub>MAX</sub>   |   |       | 20   | 70               | mV  |
|  |                     | V <sub>O</sub> ≥ 5V  |   | 0.3   | 1.5  | %/V <sub>O</sub> |     |
| Adjustable Pin Current                                 | I <sub>ADJ</sub>    |  |   | 46    | 100  | μA               |     |
| Adjustable Pin Current Cha                             | ΔI <sub>ADJ</sub>   | 3V ≤ V <sub>I</sub> -V <sub>O</sub> ≤ 40V<br>10mA ≤ I <sub>O</sub> ≤ I <sub>MAX</sub><br>P ≤ P <sub>MAX</sub>              |   | 0.2   | 5    | μA               |     |
| Reference Voltage                                      | V <sub>REF</sub>    | 3V ≤ V <sub>I</sub> -V <sub>O</sub> ≤ 40V<br>10mA ≤ I <sub>O</sub> ≤ I <sub>MAX</sub><br>P <sub>D</sub> ≤ P <sub>MAX</sub> | 1.20                                      | 1.25  | 1.30 | V                |     |
| Temperature Stability                                  | ST <sub>T</sub>     |  |   | 0.7   |      | %/V <sub>O</sub> |     |
| Minimum Load Current to Maintain Regulation            | L <sub>(MIN)</sub>  | V <sub>I</sub> -V <sub>O</sub> =40V  |   | 3.5   | 10   | mA               |     |
| Maximum Output Current                                 | I <sub>O(MAX)</sub> | V <sub>I</sub> -V <sub>O</sub> ≤ 5V, P <sub>D</sub> ≤ P <sub>MAX</sub>   | 100                                       | 200   |      | mA               |     |
|  |                     | V <sub>I</sub> -V <sub>O</sub> ≤ 40V, P <sub>D</sub> ≤ P <sub>MAX</sub> , T <sub>A</sub> = 25°C                            | 156                                       | 400   |      | mA               |     |
| RMS Noise, % of V <sub>OUT</sub>                       | e <sub>N</sub>      | T <sub>A</sub> =25°C, 10Hz ≤ f ≤ 10KHz   |   | 0.003 | 0.01 | %/V <sub>O</sub> |     |
| Ripple Rejection                                       | RR                  | V <sub>O</sub> =10V, f=120Hz<br>without C <sub>ADJ</sub>   |   | 60    |      | dB               |     |
|  |                     | C <sub>ADJ</sub> =10 μF  | 66  | 75    |      |                  |     |
| Long-Term Stability, T <sub>J</sub> =T <sub>HIGH</sub> | ST                  | T <sub>A</sub> =25°C, for end point measurements, 1000HR   |   | 0.3   | 1    | %                |     |

\* Load and line regulation are specified at constant junction temperature. Change in V<sub>O</sub> due to heating effects must be taken into account separately. Pulse testing with low duty is used.

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