

## TO-252/TO-251 Plastic Encapsulate Voltage Regulators

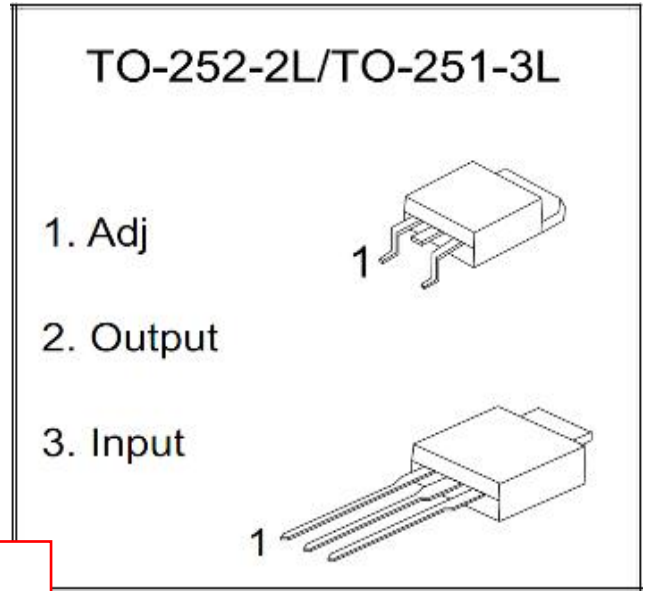
### Three-terminal positive voltage regulator

#### DESCRIPTION:

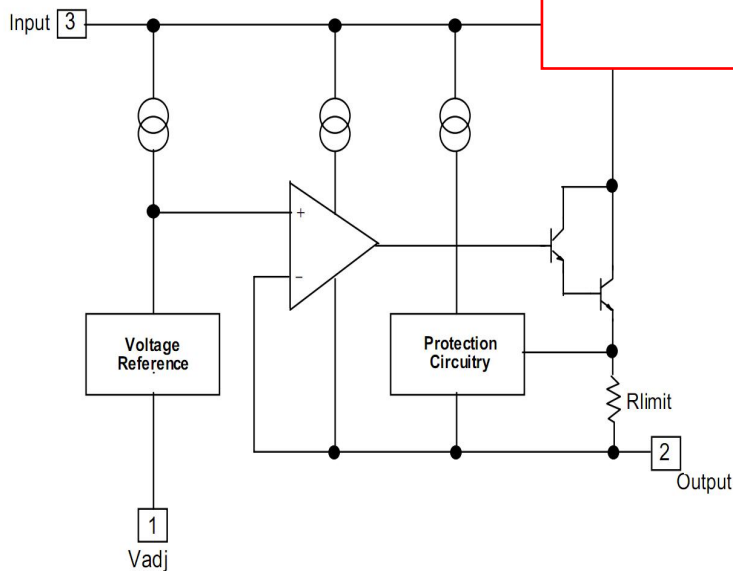
This monolithic integrated circuit is an adjustable 3-terminal positive voltage regulator designed to supply more than 1.5A of load current with an output voltage adjustable over a 1.2V to 37V. It employs internal current limiting, thermal shut-down and safe area compensation.

#### FEATURES:

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



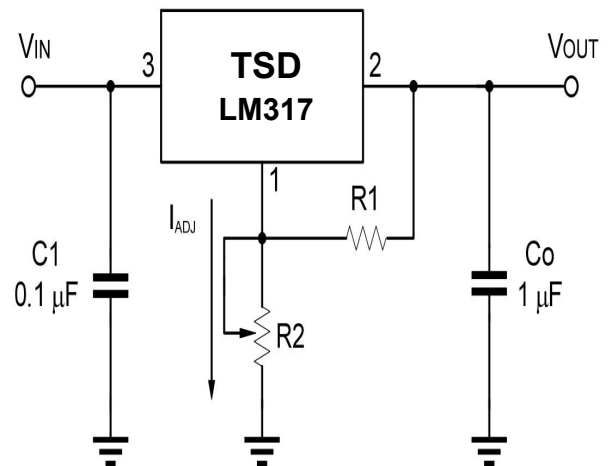
#### Internal Block Diagram:



#### MARKING:

**TSDLM317 TSDD / U \*\*\*\***  
 → logo (D→252) / (U→251) \*\*\*\*→Date

#### Typical Application:



$C_1$  is required when regulator is located an appreciable distance from power supply filter

$C_0$  is not needed for stability, however, it does improve transient response.  $\mu\text{F}$

Since  $I_{ADJ}$  is controlled to less than  $100\mu\text{A}$ , the error associated with this term is negligible in most applications.

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**Absolute Maximum ratings (Operating temperature range applies unless otherwise specified)**

| Parameter                                 | Symbol                  | Value              | Unit |
|---|-------------------------|--------------------|------|
| Input-Output Voltage Differential         | VI-VO                   | 40                 | V    |
| Lead Temperature                          | TLEAD                   | 230                | °C   |
| Power Dissipation                         | PD                      | Internally limited | W    |
| Operating Junction Temperature Range      | TJ                      | -25~+125           | °C   |
| Storage Temperature Range                 | Tstg                    | -55~+150           | °C   |
| Temperature Coefficient of Output Voltage | $\Delta V_O / \Delta T$ | ±0.02              | %/°C |

**Electrical Characteristics At Specified Virtual Junction Temperature  
(Vo-Vi=5V, Io=0A, 0°C≤Tj≤+125°C, I<sub>MAX</sub>=1.5A, P<sub>MAX</sub>=20W. Unless Otherwise Specified)**

| Parameter  | Symbol               | Test Condition   | Min      | Typ       | Max        | Unit             |     |
|--|----------------------|--|----------|-----------|------------|------------------|-----|
| Line Regulation(note1)                                 | Rline                | 3V≤V <sub>I</sub> -V <sub>O</sub> ≤40V   | 25°C     |           | 0.01       | 0.04             | %/V |
|  |                      | 3V≤V <sub>I</sub> -V <sub>O</sub> ≤40V   | -25~+125 |           | 0.02       | 0.07             | %/V |
| Load Regulation(note1)                                 | Rload                | 10mA≤I <sub>O</sub> ≤I <sub>MAX</sub> , V <sub>O</sub> <5V<br>V <sub>O</sub> ≥5V                                     | 25°C     | 18<br>0.4 | 25<br>0.5  | mV               |     |
|  |                      | 10mA≤I <sub>O</sub> ≤I <sub>MAX</sub> , V <sub>O</sub> <5V<br>V <sub>O</sub> ≥5V                                     | 25°C     | 40<br>0.8 | 70<br>1.5  | %/V <sub>O</sub> |     |
| Adjustable Pin Current                                 | IADJ                 |  | 25°C     | 46        | 100        | µA               |     |
| Adjustable Pin Current Change                          | ΔIADJ                | 3V≤V <sub>I</sub> -V <sub>O</sub> ≤40V<br>10mA≤I <sub>O</sub> ≤I <sub>MAX</sub> , PD≤P <sub>MAX</sub>                | 25°C     | 2.0       | 5          | µA               |     |
| Reference Voltage                                      | VREF                 | 3V≤V <sub>I</sub> -V <sub>O</sub> ≤40V<br>10mA≤I <sub>O</sub> ≤I <sub>MAX</sub> , PD≤P <sub>MAX</sub>                | 25°C     | 1.2       | 1.25       | 1.3              | V   |
| Temperature Stability                                  | STT                  |  | -25~+125 | 0.7       |            | %/V <sub>O</sub> |     |
| Minimum Load Current to Maintain Regulation            | IL(MIN)              | V <sub>O</sub> -V <sub>I</sub> =40V  | -25~+125 | 3.5       | 12         | mA               |     |
| Maximum Output Current                                 | I <sub>O</sub> (MAX) | V <sub>I</sub> -V <sub>O</sub> ≤15V, PD≤P <sub>MAX</sub><br>V <sub>I</sub> -V <sub>O</sub> ≤40V, PD≤P <sub>MAX</sub> | 25°C     | 1.0       | 2.2<br>0.3 | A                |     |
| RMS Noise,% of V <sub>OUT</sub>                        | eN                   | 10Hz≤f≤10KHz   | -25~+125 | 0.003     | 0.01       | %/V <sub>O</sub> |     |
| Ripple Rejection                                       | RR                   | V <sub>O</sub> =10V, f =120Hz<br>without CADJ,   | 25°C     | 66        | 60<br>75   | dB               |     |
| Long-Term Stability, T <sub>J</sub> =T <sub>HIGH</sub> | ST                   | T <sub>A</sub> =25°C for end point<br>mesasurements,1000H  | 25°C     | 0.3       | 1          | %                |     |
| Thermal Resistance Junction to case                    | R <sub>θJC</sub>     |  | 25°C     | 5         |            | °C/W             |     |

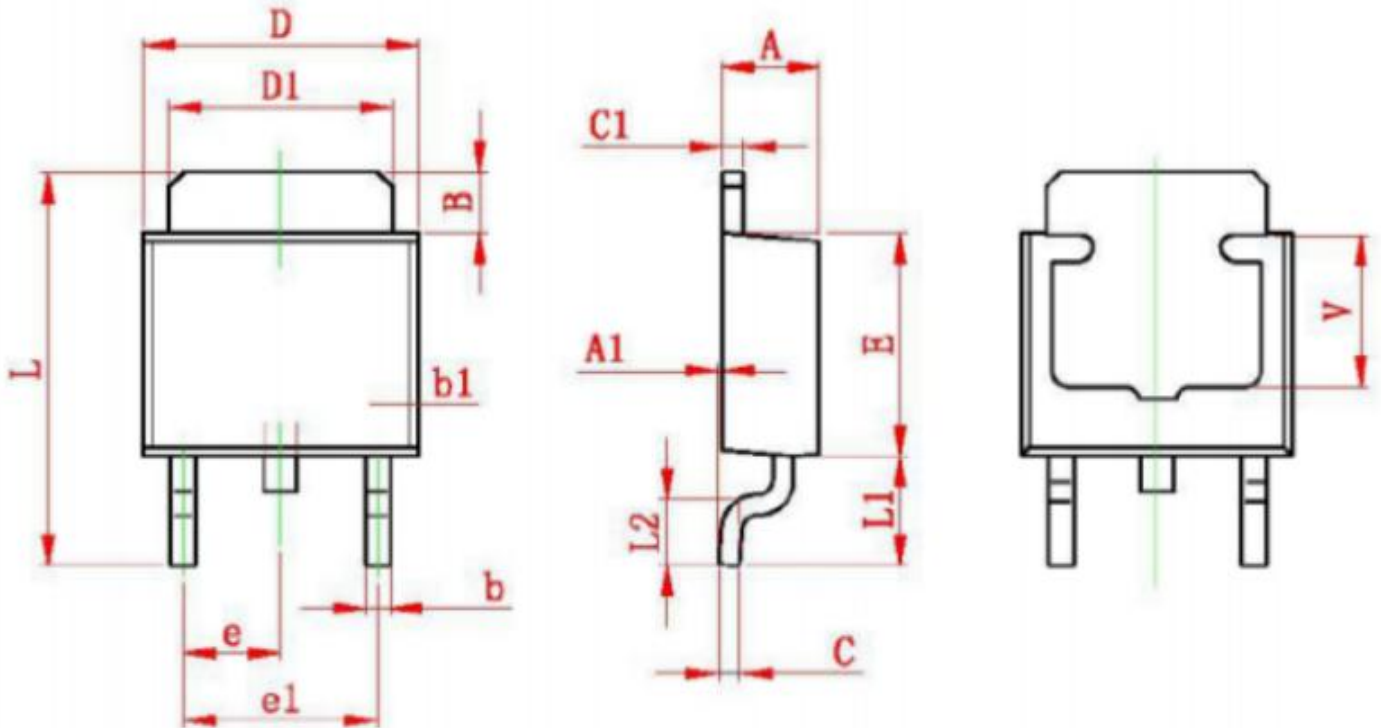
### Note :

1.Load and line regulation are specified at constant junction temperature. Change in VD due to heating effects must be taken into account separately. Pulse testing with low duty is used.(P<sub>MAX</sub>=20W)

2.CADJ. when used, is connected between the adjustment pin and ground.

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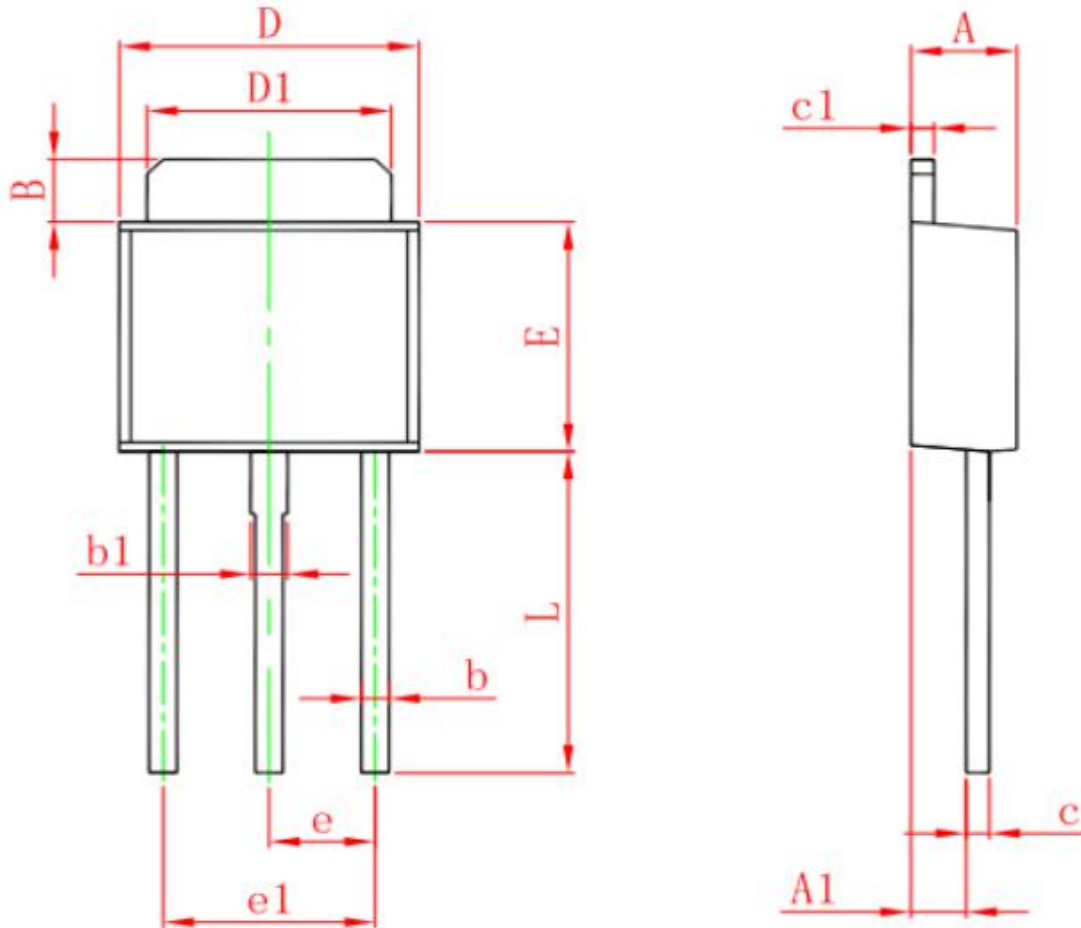
### Package Dimensions:



| Symbol | Dimensions In Millimeters |       | Dimensions In Inches |       |
|--------|---------------------------|-------|----------------------|-------|
|        | Min                       | Max   | Min                  | Max   |
| A      | 2.200                     | 2.400 | 0.087                | 0.094 |
| A1     | 0.000                     | 0.127 | 0.000                | 0.005 |
| B      | 1.350                     | 1.650 | 0.053                | 0.065 |
| b      | 0.500                     | 0.700 | 0.020                | 0.028 |
| b1     | 0.700                     | 0.900 | 0.028                | 0.035 |
| c      | 0.430                     | 0.580 | 0.017                | 0.023 |
| c1     | 0.430                     | 0.580 | 0.017                | 0.023 |
| D      | 6.350                     | 6.650 | 0.250                | 0.262 |
| D1     | 5.200                     | 5.400 | 0.205                | 0.213 |
| E      | 5.400                     | 5.700 | 0.213                | 0.224 |
| e      | 2.300 TYP                 |       | 0.091 TYP            |       |
| e1     | 4.500                     | 4.700 | 0.177                | 0.185 |
| L      | 9.500                     | 9.900 | 0.374                | 0.390 |
| L1     | 2.550                     | 2.900 | 0.100                | 0.114 |
| L2     | 1.400                     | 1.780 | 0.055                | 0.070 |
| V      | 3.80 REF                  |       | 0.150 REF            |       |

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|--------|---------------------------|-------|----------------------|-------|
|        | Min.                      | Max.  | Min.                 | Max.  |
| A      | 2.200                     | 2.400 | 0.087                | 0.094 |
| A1     | 1.050                     | 1.350 | 0.042                | 0.054 |
| B      | 1.350                     | 1.650 | 0.053                | 0.065 |
| b      | 0.500                     | 0.700 | 0.020                | 0.028 |
| b1     | 0.700                     | 0.900 | 0.028                | 0.035 |
| c      | 0.430                     | 0.580 | 0.017                | 0.023 |
| c1     | 0.430                     | 0.580 | 0.017                | 0.023 |
| D      | 6.350                     | 6.650 | 0.250                | 0.262 |
| D1     | 5.200                     | 5.400 | 0.205                | 0.213 |
| E      | 5.400                     | 5.700 | 0.213                | 0.224 |
| e      | 2.300 TYP.                |       | 0.091 TYP.           |       |
| e1     | 4.500                     | 4.700 | 0.177                | 0.185 |
| L      | 7.500                     | 7.900 | 0.295                | 0.311 |