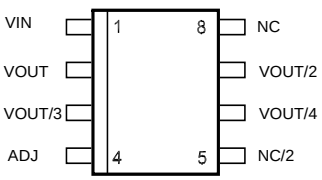
## DESCRIPTION

This monolithic integrated circuit is an adjustable 3-terminal positive voltage regulator designed to supply more than 0.1A 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.

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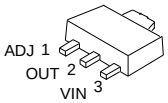
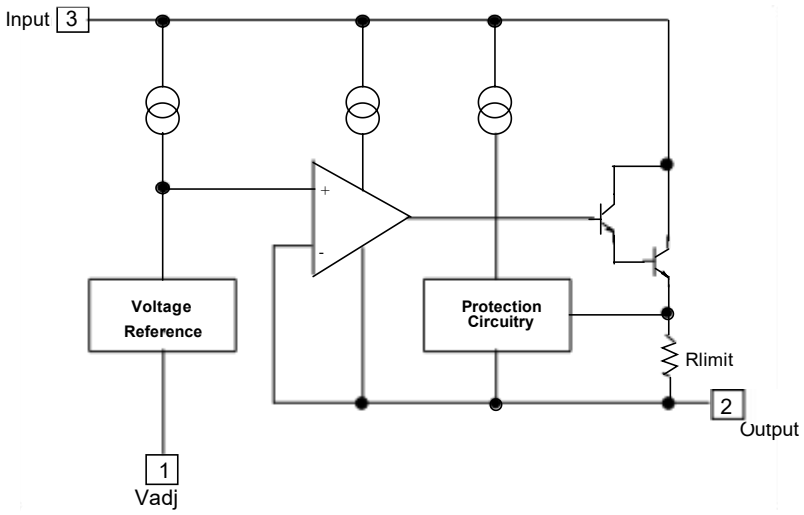



SOT-89-3

## FEATURE

⌘ Internal thermal overload protection
⌘ Internal short circuit current limiting
⌘ Output transistor safe operating area compensation

## Internal Block Diagram



## Absolute Maximum Ratings

| Symbol | Parameter | | Value | Unit |
|---|---|---|---|---|
| $V_I$-$V_O$ | Input-Output Voltage Differential | | 40 | V |
| $T_{LEAD}$ | Lead Temperature | | 230 | ℃ |
| $P_D$ | Power Dissipation | SOT-89 | 400 | mW |
| | | SOP-8 | 400 | |
| $T_J$ | Operating Junction Temperature Range | | -40°-+125° | ℃ |
| $T_{stg}$ | Storage Temperature Range | | -55~125 | |
| $\Delta V_O/\Delta T$ | Temperature Coefficient of Output Voltage | | ±0.02 | %/℃ |

## ELECTRICAL CHARACTERISTICS

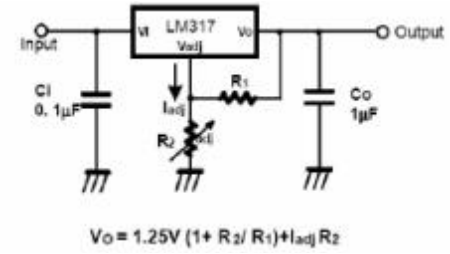
($V_O$-$V_I$=5V,$I_O$=0.5A,0℃≤$T_J$≤+125℃ ,$I_{MAX}$=1.5A,$P_{DMAX}$=20W,unless otherwise specified)

| Parameter | Symbol | Test conditions | MIN | TYP | MAX | UNIT |
|---|---|---|---|---|---|---|
| Line Regulation(note1) | $R_{line}$ | $T_A$=25℃<br>3V≤$V_I$-$V_O$≤40V | | 0.01 | 0.04 | %/V |
| | | 3V≤$V_I$-$V_O$≤40V | | 0.02 | 0.07 | |
| Load Regulation(note1) | $R_{load}$ | $T_A$=25℃ , 10mA≤ $I_O$≤ $I_{MAX}$<br>$V_O$<5V<br>$V_O$ ⩾5V | | 18<br>0.4 | 25<br>0.5 | mV |
| | | 10mA≤ $I_O$≤ $I_{MAX}$<br>$V_O$<5V<br>$V_O$≥5V | | 40<br>0.8 | 70<br>1.5 | %$V_O$ |
| Adjustable Pin Current | $I_{ADJ}$ | - | | 46 | 100 | μA |
| Adjustable Pin Current Change | $\Delta I_{ADJ}$ | 3V≤$V_I$-$V_O$≤40V<br>10mA≤ $I_O$≤ $I_{MAX}$ , $P_D$≤ $P_{MAX}$ | | 0.2 | 5 | |
| Reference Voltage | $V_{REF}$ | 3V≤$V_{IN}$-$V_O$≤40V<br>10mA≤ $I_O$≤ $I_{MAX}$ , $P_D$≤ $P_{MAX}$ | 1.20 | 1.25 | 1.30 | V |
| Temperature Stability | $ST_T$ | - | | 0.7 | | %/ $V_O$ |
| Minimum Load Current to Maintain Regulation | $I_{L(MIN)}$ | $V_I$-$V_O$=40V | | 3.5 | 5 | mA |
| Maximum Output Current | $I_{O(MAX)}$ | $V_I$-$V_O$≤3-13V, $P_D$≤ $P_{MAX}$<br>$V_I$-$V_O$≤40V, $P_D$≤ $P_{MAX}$ | 100 | 200<br>50 | | mA |
| RMS Noise,% of $V_{OUT}$ | $e_N$ | $T_A$=25℃<br>$T_A$=25℃ ,10Hz≤f≤10KHz | | 0.003 | 0.01 | %/ $V_O$ |
| Ripple Rejection | RR | $V_O$=10V, f =120Hz<br>without $C_{ADJ}$<br>$C_{ADJ}$=10μF( note2 ) | 66 | 65<br>80 | | dB |
| Long-Term Stability,$T_J$=$T_{HIGH}$ | ST | $T_A$=25℃ for end point<br>mesasurements, 1000 HR | | 0.3 | 1 | % |
| Thermal Resistance Junction to case | $R_{\theta JC}$ | - | | 25.2 | | ℃/W |

**Notes**:

1. Load and line regulation are specified at constant junction temperature. Change in $V_D$ due to heating effects must be taken into account separately. Pulse testing with low duty is used.($P_{MAX}$=20W)
2. $C_{ADJ}$ . when used, is connected between the adjustment pin and ground.

## Typical Application




$C_i$ is required when regulator is located an 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 100μA, the error associated with this term is negligible in most applications.

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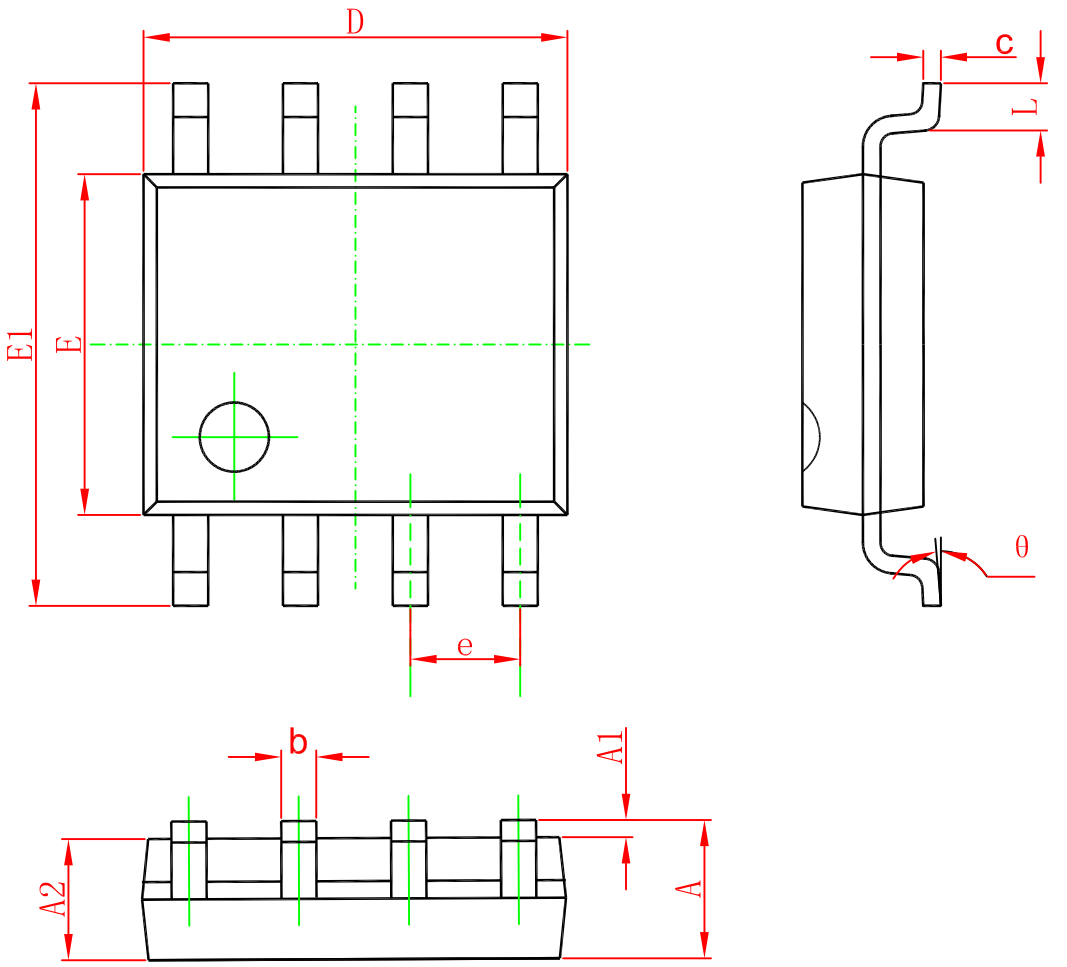
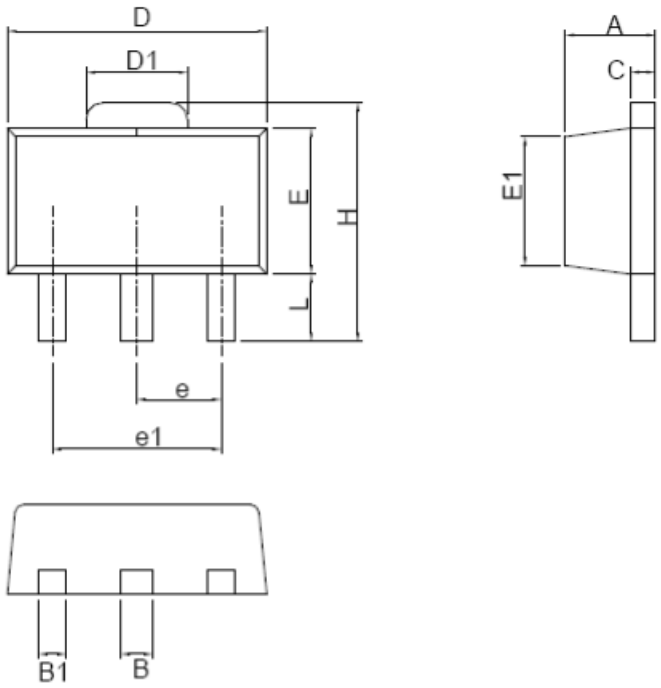



| Symbol | Dimensions In Millimeters | | Dimensions In Inches | |
|---|---|---|---|---|
| | Min | Max | Min | Max |
| A | 1.350 | 1.750 | 0.053 | 0.069 |
| A1 | 0.100 | 0.250 | 0.004 | 0.010 |
| A2 | 1.350 | 1.550 | 0.053 | 0.061 |
| b | 0.330 | 0.510 | 0.013 | 0.020 |
| c | 0.170 | 0.250 | 0.006 | 0.010 |
| D | 4.700 | 5.100 | 0.185 | 0.200 |
| E | 3.800 | 4.000 | 0.150 | 0.157 |
| E1 | 5.800 | 6.200 | 0.228 | 0.244 |
| e | 1.270(BSC) | | 0.050(BSC) | |
| L | 0.400 | 1.270 | 0.016 | 0.050 |
| θ | 0° | 8° | 0° | 8° |

SOT-89




| SYMBOL | SOT-89 | | | |
|---|---|---|---|---|
| | MILLIMETERS | | INCHES | |
| | MIN. | MAX. | MIN. | MAX. |
| A | 1.40 | 1.60 | 0.055 | 0.063 |
| B | 0.44 | 0.56 | 0.017 | 0.022 |
| B1 | 0.36 | 0.48 | 0.014 | 0.019 |
| C | 0.35 | 0.44 | 0.014 | 0.017 |
| D | 4.40 | 4.60 | 0.173 | 0.181 |
| D1 | 1.62 | 1.83 | 0.064 | 0.072 |
| E | 2.29 | 2.60 | 0.090 | 0.102 |
| E1 | 2.13 | 2.29 | 0.084 | 0.090 |
| e | 1.50 BSC | | 0.059 BSC | |
| e1 | 3.00 BSC | | 0.118 BSC | |
| H | 3.94 | 4.25 | 0.155 | 0.167 |
| L | 0.89 | 1.20 | 0.035 | 0.047 |

## Ordering information

| Order Code | Package | Baseqty | Deliverymode |
|---|---|---|---|
| UMW LM317LD | SOP-8 | 2500 | Tape and reel |
| UMW LM317LIPK | SOT-89 | 1000 | Tape and reel |

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