



## DESCRIPTION

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

The A317 is available in SOT-223 package.

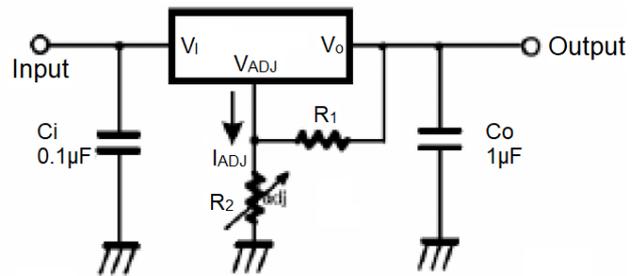
## ORDERING INFORMATION

| Package Type                   | Part Number                               |         |
|--------------------------------|---|---------|
| SOT-223<br>SPQ: 2,500pcs/Reel  | N   | A317NR  |
|                                |   | A317NVR |
| Note                           | V: Halogen free Package<br>R: Tape & Reel |         |
| AiT provides all RoHS products |   |         |

## FEATURES

- Internal thermal overload protection
- Internal short circuit current limiting
- Output transistor safe operating area compensation
- Available in SOT-223 package

## TYPICAL APPLICATION



$$V_O = 1.25V(1 + R_2/R_1) + I_{ADJ}R_2$$

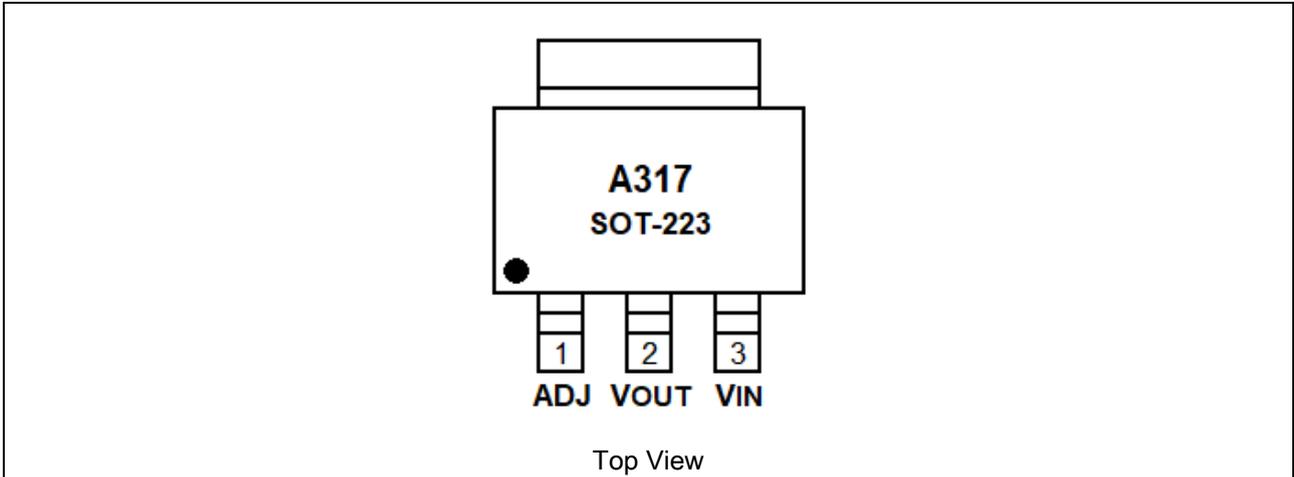
$C_i$  is required when regulator is located an appreciable distance from power supply filter.

$C_o$  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.



## PIN DESCRIPTION



Top View

| Pin # | Symbol           | Function   |
|-------|------------------|------------|
| 1     | ADJ              | Adjustable |
| 2     | V <sub>OUT</sub> | Output     |
| 3     | V <sub>IN</sub>  | Input      |



## ABSOLUTE MAXIMUM RATINGS

|   |                  |
|---|------------------|
| $V_{IN}-V_{OUT}$ , Input - Output Voltage Difference                | 40V              |
| $T_{LEAD}$ , Lead Temperature                                       | 230°C            |
| $P_D$ , Power Dissipation   | Internal limited |
| $T_J$ , Operating Junction Temperature Range                        | 0°C~+150°C       |
| $T_{STG}$ , Storage Temperature Range                               | -55°C~150°C      |
| $\Delta V_O / \Delta T$ , Temperature Coefficient of Output Voltage | ±0.02%/°C        |

Stresses above may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated in the Electrical Characteristics is not implied. Exposure to absolute maximum rating conditions for extended periods may affect device reliability.



## ELECTRICAL CHARACTERISTICS

$V_O - V_I = 5V$ ,  $I_O = 0.5A$ ,  $0^\circ C \leq T_J \leq +125^\circ C$ ,  $I_{MAX} = 1.5A$ ,  $P_{MAX} = 20W$ , unless otherwise specified

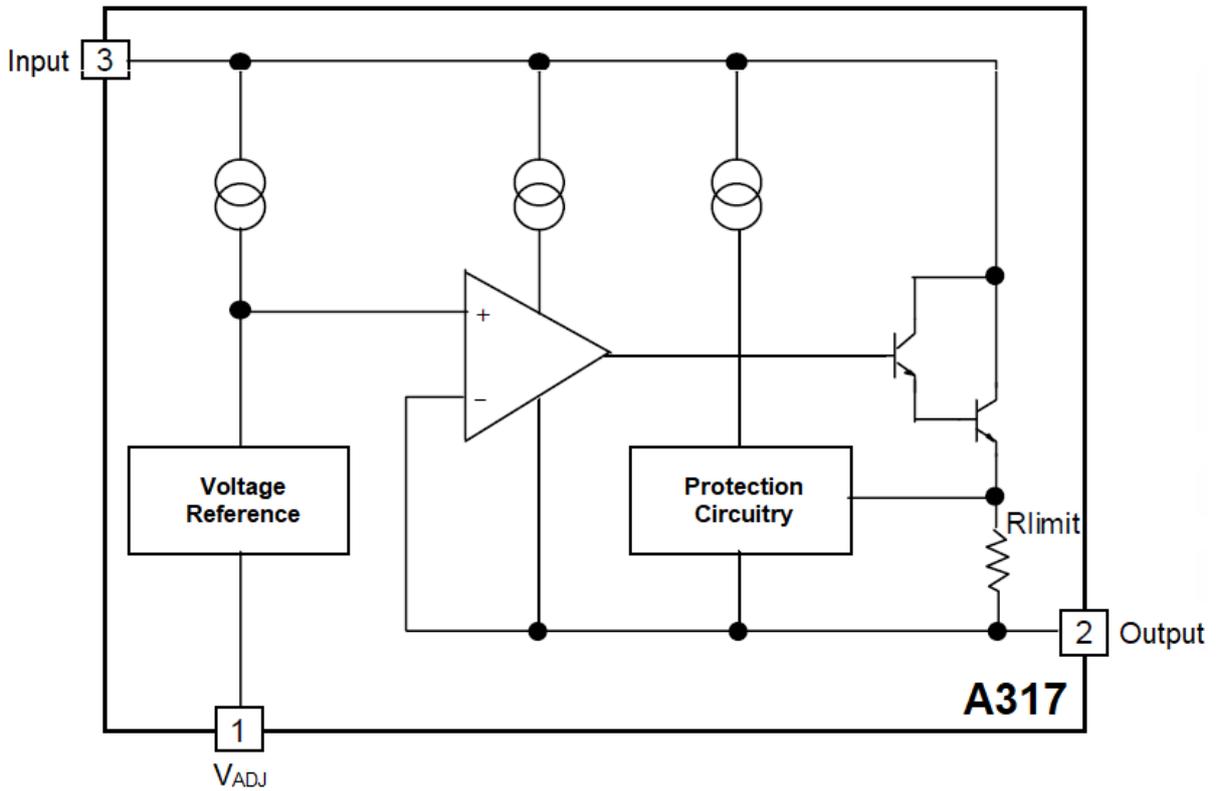
| Parameter                                   | Symbol           | Conditions   | Min.          | Typ.  | Max. | Unit          |
|---|------------------|--|---------------|-------|------|---------------|
| Line Regulation <sup>NOTE1</sup>            | $R_{LINE}$       | $3V \leq V_I - V_O \leq 40V$ , $T_A = 25^\circ C$                                    | -             | 0.01  | 0.04 | %/ $V$        |
|   |                  | $3V \leq V_I - V_O \leq 40V$   | -             | 0.02  | 0.07 |               |
| Load Regulation <sup>NOTE1</sup>            | $R_{LOAD}$       | $10mA \leq I_O \leq I_{MAX}$ ,<br>$T_A = 25^\circ C$                                 | -             | 18    | 25   | mV%/<br>$V_O$ |
|   |                  |  |               | 0.4   | 0.5  |               |
|   |                  | $10mA \leq I_O \leq I_{MAX}$   | $V_O < 5V$    | -     | 40   | 70            |
|   |                  |  | $V_O \geq 5V$ | -     | 0.8  | 1.5           |
| Adjustable Pin Current                      | $I_{ADJ}$        |  | -             | 46    | 100  | $\mu A$       |
| Adjustable Pin Current Change               | $\Delta I_{ADJ}$ | $3V \leq V_I - V_O \leq 40V$<br>$0mA \leq I_O \leq I_{MAX}$ , $P_D \leq P_{MAX}$     | -             | 2.0   | 5.0  | $\mu A$       |
| Reference Voltage                           | $V_{REF}$        | $3V \leq V_{IN} - V_O \leq 40V$<br>$10mA \leq I_O \leq I_{MAX}$ , $P_D \leq P_{MAX}$ | 1.20          | 1.25  | 1.30 | V             |
| Temperature Stability                       | $ST_T$           |  | -             | 0.7   | -    | %/ $V_O$      |
| Minimum Load Current to Maintain Regulation | $I_{L(MIN)}$     | $V_{IN} - V_{OUT} = 40V$   | -             | 3.5   | 12   | mA            |
| Maximum Output Current                      | $I_{O(MAX)}$     | $V_I - V_O \leq 15V$ , $P_D \leq P_{MAX}$  | 1.0           | 2.2   | -    | A             |
|   |                  | $V_I - V_O \leq 40V$ , $P_D \leq P_{MAX}$ , $T_A = 25^\circ C$                       |               | 0.3   |      |               |
| RMS Noise, % of $V_{OUT}$                   | en               | $T_A = 25^\circ C$ , $10Hz \leq f \leq 10kHz$  | -             | 0.003 | 0.01 | %/ $V_O$      |
| Ripple Rejection                            | RR               | $V_O = 10V$ , $f = 120Hz$<br>without $C_{ADJ}$                                       |               | 60    | -    | dB            |
|   |                  | $C_{ADJ} = 10\mu F$ <sup>NOTE2</sup>   | 66            | 75    |      |               |
| Long-Term Stability,<br>$T_J = T_{HIGH}$    | ST               | $T_A = 25^\circ C$ for end point<br>mesasurements, 1000HR                            | -             | 0.3   | 1    | %             |
| Thermal Resistance<br>Junction to case      | $R_{\theta JC}$  |  | -             | 5     | -    | $^\circ C/W$  |

NOTE1: 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. ( $P_{MAX} = 20W$ )

NOTE2:  $C_{ADJ}$ , when used, is connected between the adjustment pin and ground.



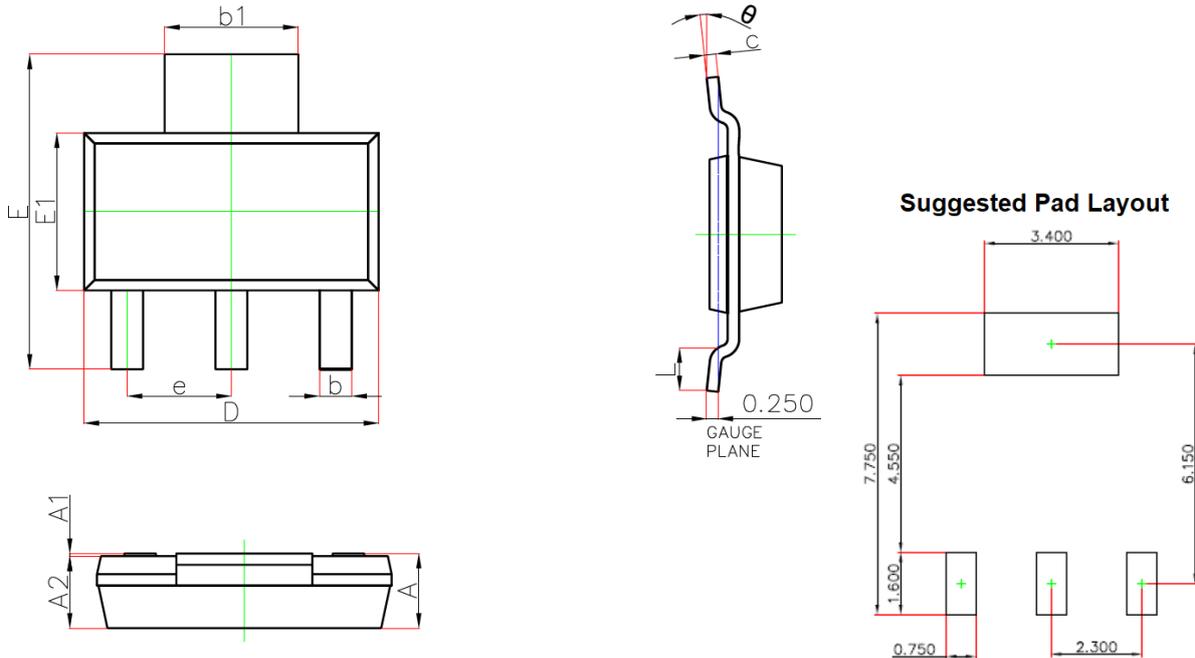
**BLOCK DIAGRAM**





**PACKAGE INFORMATION**

Dimension in SOT-223 (Unit: mm)



| Symbol   | Millimeters |       | Inches    |       |
|----------|-------------|-------|-----------|-------|
|          | Min.        | Max.  | Min.      | Max.  |
| A        | -           | 1.800 | -         | 0.071 |
| A1       | 0.020       | 0.100 | 0.001     | 0.004 |
| A2       | 1.500       | 1.700 | 0.059     | 0.067 |
| b        | 0.660       | 0.840 | 0.026     | 0.033 |
| $b_1$    | 2.900       | 3.100 | 0.114     | 0.122 |
| c        | 0.230       | 0.350 | 0.009     | 0.014 |
| D        | 6.300       | 6.700 | 0.248     | 0.264 |
| E        | 6.700       | 7.300 | 0.264     | 0.287 |
| $E_1$    | 3.300       | 3.700 | 0.130     | 0.146 |
| e        | 2.300 BSC   |       | 0.091 BSC |       |
| L        | 0.750       | -     | 0.030     | -     |
| $\theta$ | 0°          | 10°   | 0°        | 10°   |



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