



## DESCRIPTION

The A317B is an adjustable 3-terminal positive voltage regulator, designed to supply more than 1.5A of output current with voltage adjustable from 1.3V~37V.

The A317B is available in TO220-3, TO-252 and TO-263 Packages.

## ORDERING INFORMATION

| Package Type                   | Part Number                                          |           |
|--------------------------------|------------------------------------------------------|-----------|
| TO220-3                        | T3                                                   | A317BT3U  |
|                                |                                                      | A317BT3VU |
| TO-252                         | D                                                    | A317BDR   |
|                                |                                                      | A317BDVR  |
| TO-263                         | S                                                    | A317BSR   |
|                                |                                                      | A317BSVR  |
| Note                           | V: Halogen free Package<br>R: Tape & Reel<br>U: Tube |           |
| AiT provides all RoHS products |                                                      |           |

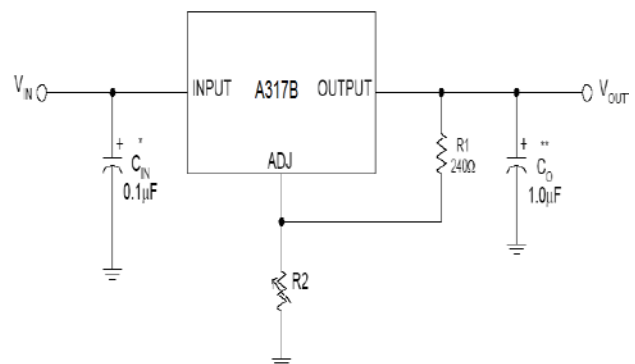
## FEATURES

- Output current up to 1.5A
- Output voltage adjustable from 1.3V to 37V
- Internal short circuit protection
- Internal over temperature protection
- Safe-Area compensation for output transistor
- Available in TO220-3, TO-252 and TO-263 Packages

## APPLICATION

- PC Motherboard
- LCD Monitor
- Graphic Card
- DVD Player
- Network Interface Card/Switch
- Telecom Equipment
- Printer and other Peripheral Equipment

## TYPICAL APPLICATION



\*= $C_{IN}$  is required if regulator is located near power supply filter.

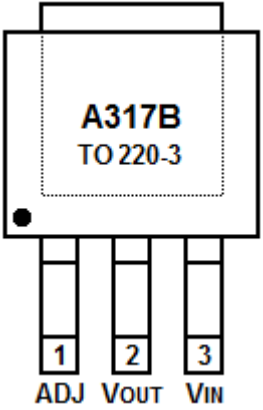
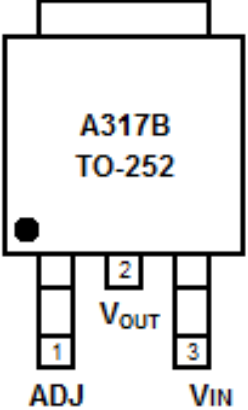
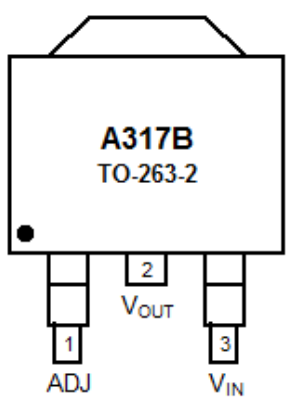
\*\*= $C_O$  is needed for stability and it improves transient response.

$$V_{OUT} = V_{REF} \times (1 + R2/R1) + I_{ADJ} \times R2$$

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



## PIN DESCRIPTION

|  <p>Top View</p> |  <p>Top View</p> |  <p>Top View</p> |
|---------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------|
| Pin #                                                                                             | Symbol                                                                                            | Function                                                                                            |
| 1                                                                                                 | ADJ                                                                                               | Adjustable                                                                                          |
| 2                                                                                                 | $V_{OUT}$                                                                                         | Output                                                                                              |
| 3                                                                                                 | $V_{IN}$                                                                                          | Input                                                                                               |



## ABSOLUTE MAXIMUM RATINGS

|                                                                       |                  |
|-----------------------------------------------------------------------|------------------|
| V <sub>IN</sub> -V <sub>OUT</sub> , Input - Output Voltage Difference | 40V              |
| P <sub>D</sub> , Power Dissipation                                    | Internal limited |
| T <sub>OPR</sub> , Operating Temperature Range                        | 0°C~125°C        |
| T <sub>S</sub> , Storage Temperature                                  | -65°C~150°C      |
| T <sub>LEAD</sub> , Lead Temperature ( soldering, 10 sec)             | 260°C            |

Stress beyond above listed "Absolute Maximum Ratings" may lead permanent damage to the device. These are stress ratings only and operations of the device at these or any other conditions beyond those indicated in the operational sections of the specifications are not implied. Exposure to absolute maximum rating conditions for extended periods may affect device reliability.

## THERMAL DATA

| Parameter           |        | Symbol        | Rating | Units |
|---------------------|--------|---------------|--------|-------|
| Junction-to-Ambient | TO-252 | $\theta_{JA}$ | 112    | °C/W  |
|                     | TO-220 |               | 54     |       |
|                     | TO-263 |               | 64     |       |
| Junction-to-Case    | TO-252 | $\theta_{JC}$ | 12     | °C/W  |
|                     | TO-220 |               | 5      |       |
|                     | TO-263 |               | 5      |       |



## ELECTRICAL CHARACTERISTICS

$V_I - V_O = 5V$ ,  $0^\circ C < T_J < 125^\circ C$ ,  $I_O = 500mA$ ,  $I_{MAX} = 1.5A$ ,  $P_{MAX} = 20W$ , unless otherwise specified

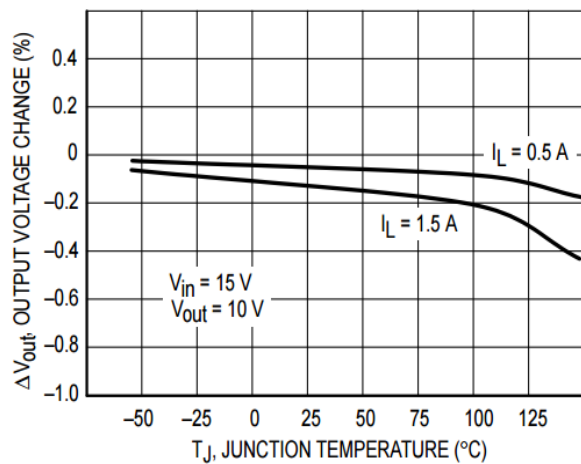
| Parameter                                | Symbol           | Conditions                                                                            | Min.          | Typ.  | Max. | Unit      |
|------------------------------------------|------------------|---------------------------------------------------------------------------------------|---------------|-------|------|-----------|
| Line Regulation                          | $\Delta V_O$     | $T_A = 25^\circ C$ ,<br>$3V \leq V_I - V_O \leq 40V$                                  |               | 0.01  | 0.04 | % / V     |
|                                          |                  | $T_A = 0 \sim 125^\circ C$ ,<br>$3V \leq V_I - V_O \leq 40V$                          |               | 0.02  | 0.07 |           |
| Load Regulation                          | $\Delta V_O$     | $T_A = 25^\circ C$<br>$10mA \leq I_O \leq I_{MAX}$                                    | $V_O \leq 6V$ | 18    | 25   | mV        |
|                                          |                  |                                                                                       | $V_O \leq 5V$ | 0.4   | 0.5  | % / $V_O$ |
|                                          |                  | $10mA \leq I_O \leq I_{MAX}$                                                          | $V_O \leq 5V$ | 40    | 70   | mV        |
|                                          |                  |                                                                                       | $V_O \leq 6V$ | 0.8   | 1.5  | % / $V_O$ |
| Adjustable Pin Current                   | $I_{ADJ}$        |                                                                                       |               | 46    | 100  | $\mu A$   |
| Adjustable Pin Current Change            | $\Delta I_{ADJ}$ | $2.5V \leq V_I - V_O \leq 40V$ ,<br>$10mA \leq I_O \leq I_{MAX}$ , $P_D \leq P_{MAX}$ |               | 2.0   | 5.0  | $\mu A$   |
| Reference Voltage                        | $V_{REF}$        | $3V \leq V_I - V_O \leq 40V$ ,<br>$10mA \leq I_O \leq I_{MAX}$ , $P_D \leq P_{MAX}$   | 1.20          | 1.25  | 1.30 | V         |
| Temperature Stability                    | STT              |                                                                                       |               | 0.7   |      | % / $V_O$ |
| Minimum Load Current for Regulation      | $I_{L(MIN)}$     | $V_I - V_O = 40V$                                                                     |               | 3.5   | 10   | mA        |
| Maximum output Current                   | $I_{O(MAX)}$     | $V_I - V_O \leq 15V$ , $P_D \leq P_{MAX}$                                             | 1.5           | 2.2   |      | A         |
|                                          |                  | $V_I - V_O \leq 15V$ , $P_D \leq P_{MAX}$ ,<br>$T_A = 25^\circ C$                     | 0.15          | 0.4   |      |           |
| RMS Noise vs. % of $V_{OUT}$             | eN               | $T_A = 25^\circ C$ , $10Hz \leq f \leq 10kHz$                                         |               | 0.003 | 0.01 | % / $V_O$ |
| Ripple Rejection                         | RR               | $V_O = 10V$ , $f = 120Hz$ , $C_{ADJ} = 0$                                             |               | 60    |      | dB        |
|                                          |                  | $V_O = 10V$ , $f = 120Hz$ ,<br>$C_{ADJ} = 10\mu F$                                    | 66            | 75    |      |           |
| Long-term Stability,<br>$T_J = T_{HIGH}$ | ST               | $T_A = 25^\circ C$ , 1000hr                                                           |               | 0.3   | 1    | %         |

NOTE: Testing with low duty pulse should be used to avoid heating effect

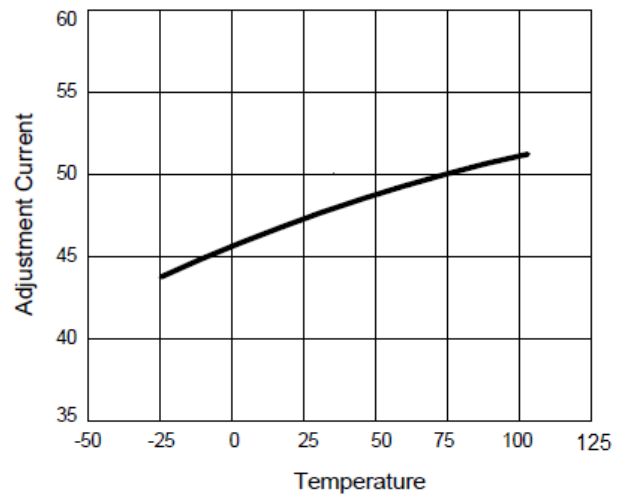


## TYPICAL PERFORMANCE CHARACTERISTICS

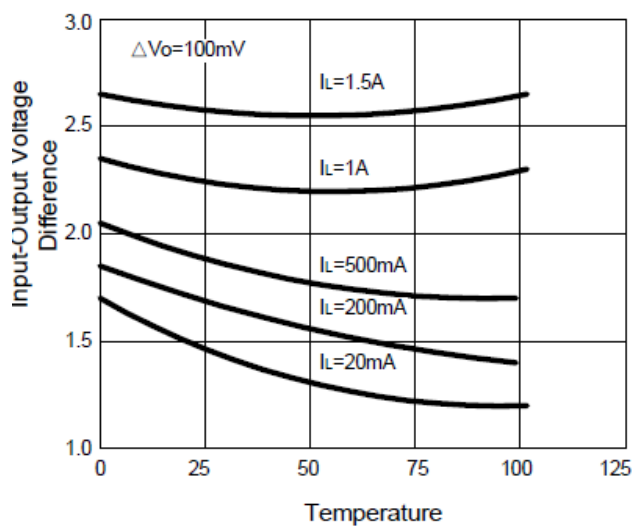
### 1. Load Regulation



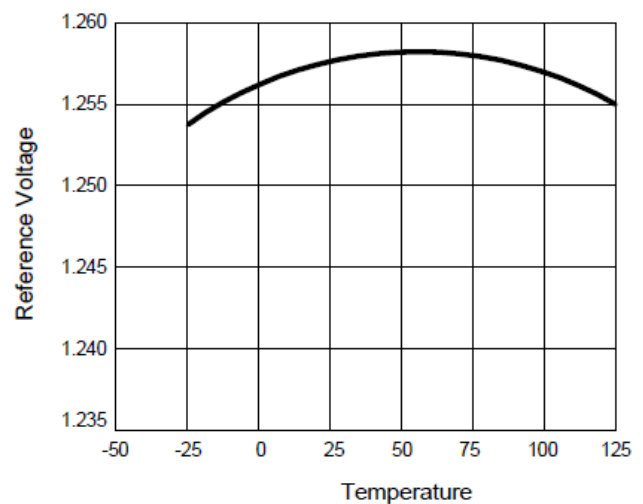
### 2. Adjustment Current vs. Temperature



### 3. Dropout Voltage vs. Input-Output Voltage Difference

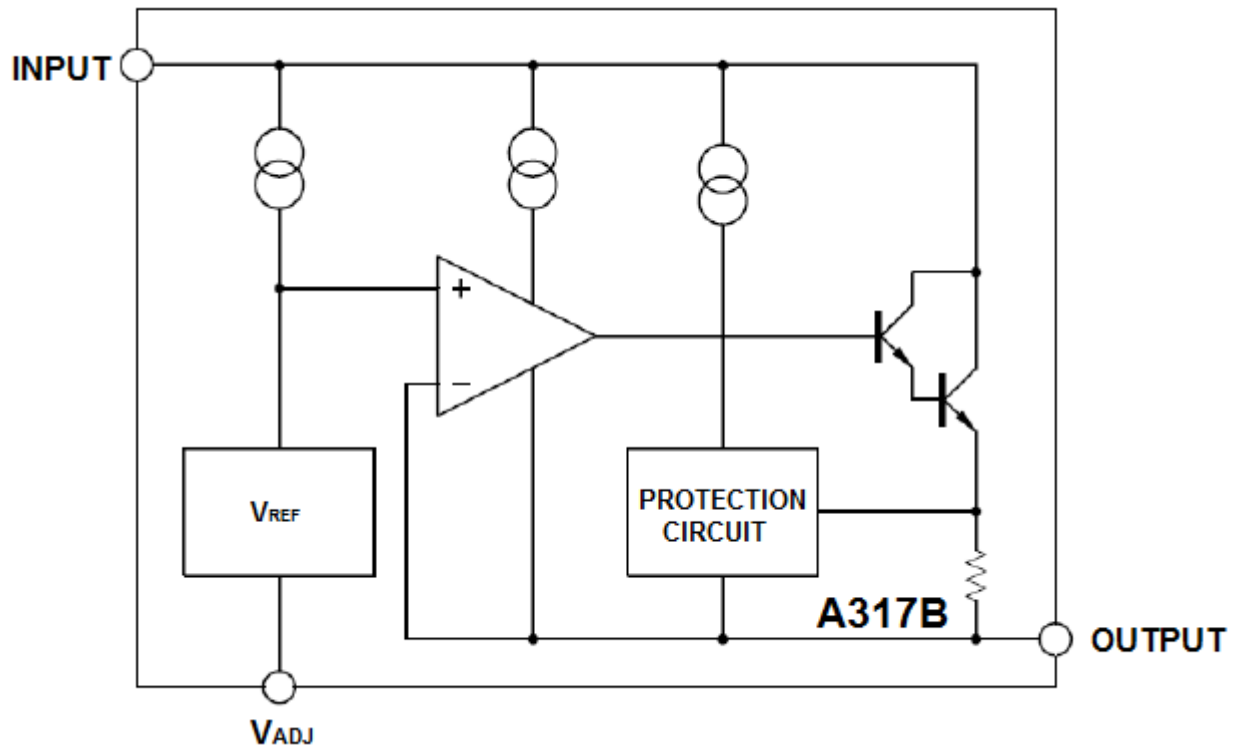


### 4. Reference Voltage vs. Temperature





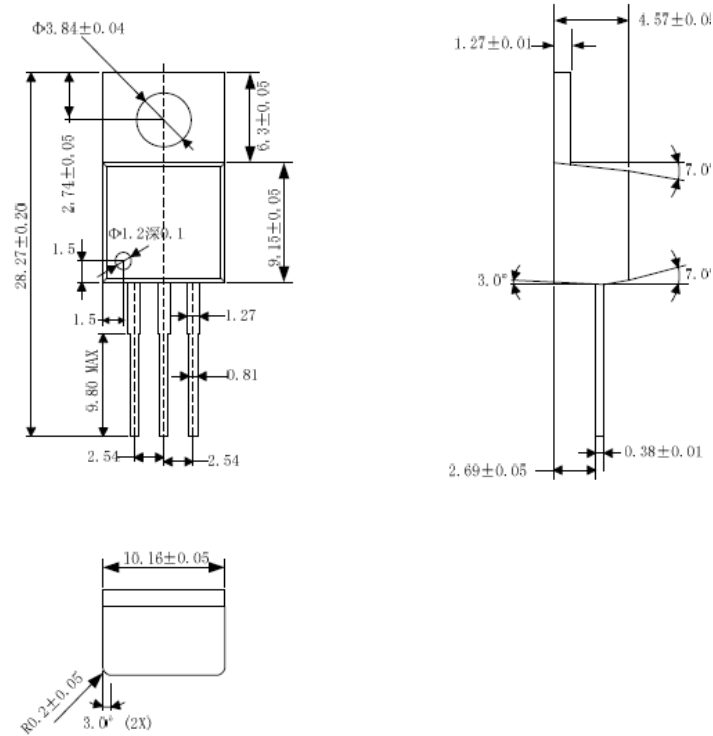
## BLOCK DIAGRAM



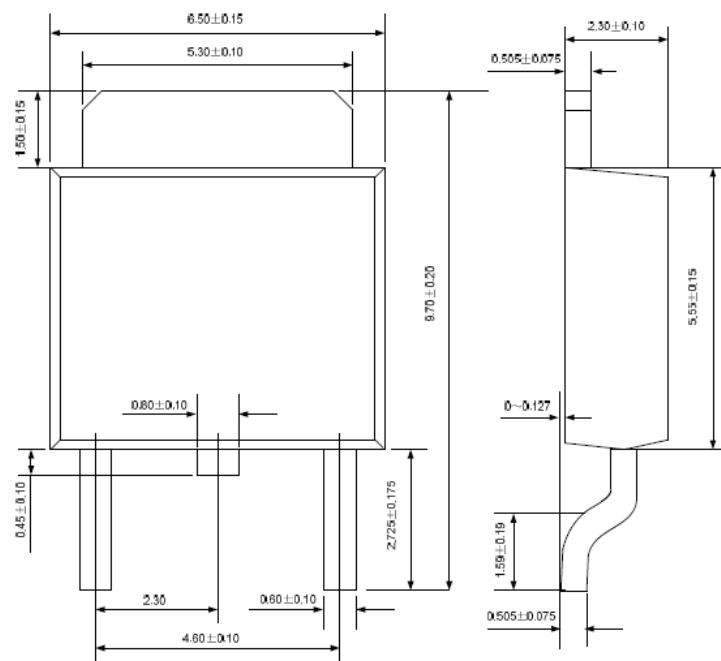


## PACKAGE INFORMATION

Dimension in TO220-3 (Unit: mm)

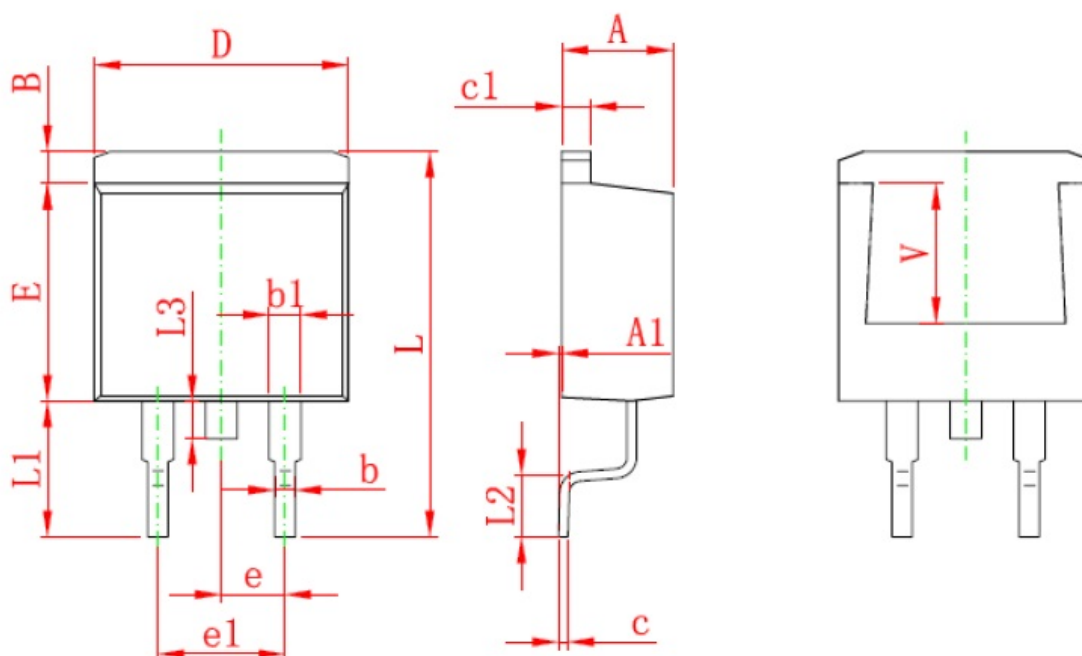


Dimension in TO-252 (Unit: mm)





Dimension in TO-263 (Unit: mm)



| Symbol | Millimeters |        | Inches    |       |
|--------|-------------|--------|-----------|-------|
|        | Min         | Max    | Min       | Max   |
| A      | 4.470       | 4.670  | 0.176     | 0.184 |
| A1     | 0.000       | 0.150  | 0.000     | 0.006 |
| B      | 1.170       | 1.370  | 0.046     | 0.054 |
| b      | 0.710       | 0.910  | 0.028     | 0.036 |
| b1     | 1.170       | 1.370  | 0.046     | 0.054 |
| c      | 0.310       | 0.530  | 0.012     | 0.021 |
| c1     | 1.170       | 1.370  | 0.046     | 0.054 |
| D      | 10.010      | 10.310 | 0.394     | 0.406 |
| E      | 8.500       | 8.900  | 0.335     | 0.350 |
| e      | 2.540 TYP   |        | 0.100 TYP |       |
| e1     | 4.980       | 5.180  | 0.196     | 0.204 |
| L      | 15.050      | 15.450 | 0.593     | 0.608 |
| L1     | 5.080       | 5.480  | 0.200     | 0.216 |
| L2     | 2.340       | 2.740  | 0.092     | 0.108 |
| L3     | 1.300       | 1.700  | 0.051     | 0.067 |
| V      | 5.600 REF   |        | 0.220 REF |       |



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