

## Features

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- Output Current in Excess of 1.5 Ampere
- Output Adjustable between 1.2 V and 37 V
- Internal Thermal Overload Protection
- Internal Short - Circuit Current Limiting Constant with Temperature
- Output Transistor Safe-Area Compensation
- Floating Operation for High Voltage Applications
- Standard 3-lead Transistor Packages
- Eliminates Stocking Many Fixed

## Applications

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- Post regulation for switching supplies
- Constant-current regulator
- Microprocessor supplies
- Automotive LED lighting
- Battery chargers

## Description

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The CBM317 is adjustable 3-terminal positive voltage regulator capable of supplying in excess of 1.5 A over an output voltage range of 1.25 V to 37 V. These voltage regulator is exceptionally easy to use and require only two external resistors to set the output voltage. Further, it employ internal current limiting, thermal shutdown and safe area compensation, making them essentially blow-out proof.

The CBM317 serve a wide variety of applications to make a programmable output regulator, or by connecting a fixed resistor between the adjustment and output, the CBM317 series can be used as a precision current regulator.

## Catalog

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## Pin Configuration

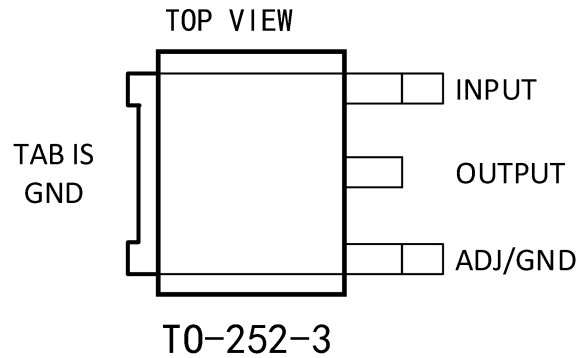


Figure 1. TO252-3 Pin Configuration

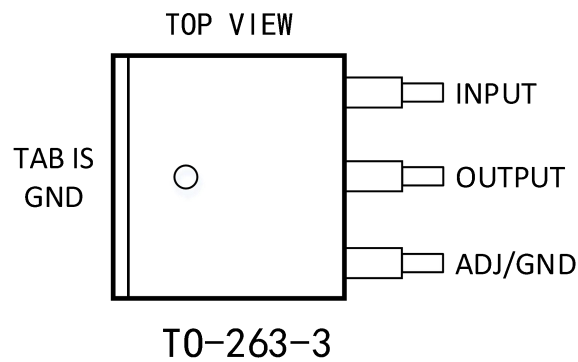


Figure 2. TO263-3 Pin Configuration

## Pin Description

| Num | Symbol | I/O | Description  |
|-----|--------|-----|--|
| 1   | ADJUST | I   | Output voltage adjustment pin. Connect to a resistor divider to set VO |
| 2   | OUTPUT | O   | Voltage output pin   |
| 3   | INPUT  | I   | Supply input pin   |

## Standard application

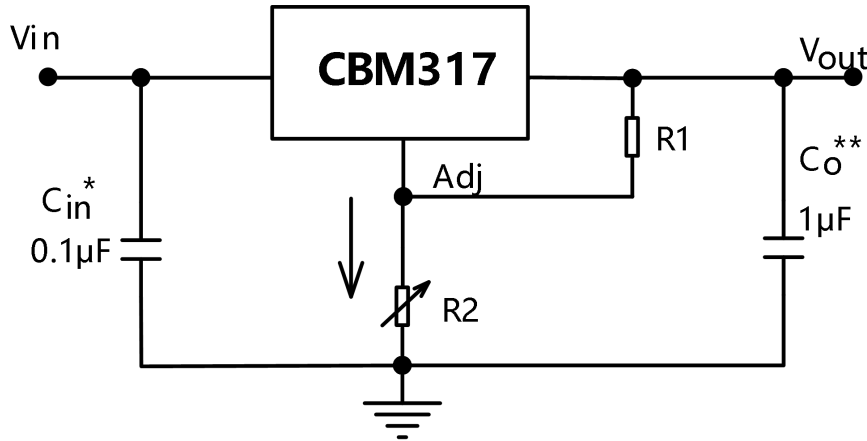


Figure 3. Application Circuit

\*= Cin is required if regulator is located an appreciable distance from power supply filter.

\*\*=Co is not needed for stability ; however, it does improve transient response.

$$V_{OUT} = 1.25V \left( 1 + \frac{R2}{R1} \right) + I_{Adj} * R2$$

## Maximum ratings

| Rating  | Symbol      | Value              | Unit |
|---|-------------|--------------------|------|
| Input - Output Voltage Differential           | $V_I - V_O$ | 40                 | Vdc  |
| Power Dissipation and Thermal Characteristics | PD          | Internally Limited |      |
| Operating Junction Temperature Rang           | $T_J$       | -40 to +150        | °C   |
| Storage Junction Temperature Rang             | $T_{STG}$   | -65 to +150        | °C   |

\* Stresses beyond those listed under "absolute maximum ratings" 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 under "recommended operating conditions" is not implied.

Exposure to absolute-maximum-rated conditions for extended periods may affect device reliability.

## Electrical characteristics

( $V_I - V_O = 5.0V$ ,  $I_O = 0.5A$ ,  $T_J = T_{LOW}$  to  $T_{HIGH}$  (see Note 1);  $I_{MAX} = 1.5A$  and  $P_{MAX} = 20W$  unless otherwise noted)

| Characteristic   | Symbol           | Min                                 | Typ   | Max  | Unit             |                  |
|--|------------------|-------------------------------------|-------|------|------------------|------------------|
| Line Regulation ( $T_A = +25^\circ C$ ) $3.0V \leq V_I - V_O \leq 40V$   | Regline          | -                                   | 0.01  | 0.04 | %/V              |                  |
| Load Regulation ( $T_J = +25^\circ C$ )<br>$10mA \leq I_O \leq I_{MAX}$  | Regload          | $V_{IN} \geq 5V$                    | -     | 5.0  | 25               | mV               |
|  |                  | $V_{IN} \leq 5V$                    | -     | 0.1  | 0.5              | %/V <sub>O</sub> |
| Thermal Regulation ( $T_A = +25^\circ C$ ) 20 ms Pulse   | -                | -                                   | 0.03  | 0.07 | %/W              |                  |
| Adjustment Pin Current   | $I_{ADJ}$        | -                                   | 50    | 100  | $\mu A$          |                  |
| Adjustment Pin Current Change<br>$2.5 \leq V_I - V_O \leq 40V$ $10mA \leq I_L \leq I_{MAX}$ , $P_D \leq P_{MAX}$ | $\Delta I_{ADJ}$ | -                                   | 0.2   | 5.0  | $\mu A$          |                  |
| Reference Voltage (Note 4)<br>$3.0 \leq V_I - V_O \leq 40V$ $10mA \leq I_L \leq I_{MAX}$ , $P_D \leq P_{MAX}$    | Vref             | 1.2                                 | 1.25  | 1.3  | V                |                  |
| Line Regulation (Note 3) $3.0V \leq V_I - V_O \leq 40V$  | Regline          | -                                   | 0.02  | 0.07 | %/V              |                  |
| Load Regulation (Note 3)<br>$10mA \leq I_O \leq I_{MAX}$   | Regload          | $V_{IN} \geq 5V$                    | -     | 20   | 70               | mV               |
|  |                  | $V_{IN} \leq 5V$                    | -     | 0.3  | 1.5              | %/V              |
| Temperature Stability ( $T_{LOW} \leq T_J \leq T_{HIGH}$ )   | $T_S$            | -                                   | 0.7   | -    |                  |                  |
| Minimum Load Current to Maintain Regulation<br>( $V_I - V_O = 40V$ )   | $I_{L_{MIN}}$    | -                                   | 3.5   | 10   | mA               |                  |
| Maximum Output Current<br>( $T_A = +25^\circ C$ )  | $I_{MAX}$        | $V_I - V_O \leq 15V$ , $P \leq 20W$ | 1.5   | 2.2  | -                | A                |
|  |                  | $V_I - V_O = 40V$ , $P \leq 20W$    | 0.15  | 0.4  | -                |                  |
| RMS Noise, % of $V_O$ $T_A = +25^\circ C$ , $10Hz \leq f \leq 10kHz$   | N                | -                                   | 0.003 | -    | %/V <sub>O</sub> |                  |
| Ripple Rejection<br>$V_O = 10V$ , $f = 120Hz$ (Note 5)   | RR               | Without $C_{ADJ}$                   | - 66  | 65   | -                | dB               |
|  |                  | $C_{ADJ} = 10\mu F$                 |       | 80   | -                |                  |
| Long-Term Stability, $T_J = T_{HIGH}$ (Note 6) $T_A = +25^\circ C$ for Endpoint Measurements                     | S                | -                                   | 0.3   | 1.0  | %/1.0k Hrs.      |                  |
| Thermal Resistance Junction to Case  | $R_{\theta JC}$  | -                                   | 5.0   | -    | $^\circ C/W$     |                  |

**Notes:** (1)  $T_{LOW} = -40^\circ C$ ,  $T_{HIGH} = +125^\circ C$

(2)  $I_{MAX} = 0.5A$ ,  $P_{MAX}$

(3) Load and line regulation are specified at constant junction temperature. Changes in  $V_O$  due to heating effects must be taken into account separately. Pulse testing with low duty cycle is used.

- (4) Selected devices with tightened tolerance reference voltage available.
- (5)  $C_{adj}$  , when used, connected between the adjustment pin and ground.
- (6) Since Long - Term Stability cannot be measured on each device before shipment, this specification is an engineering estimate of average stability from lot to lot.

## Typical characteristics

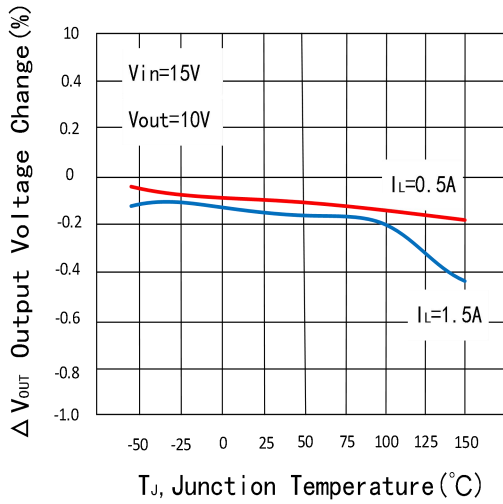


Figure 4. Load Regulation

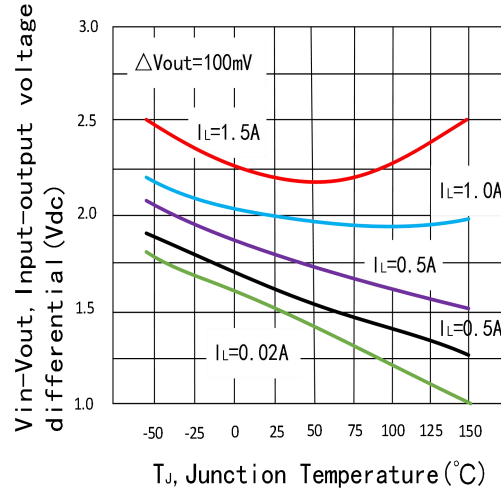


Figure 5. Dropout Voltage

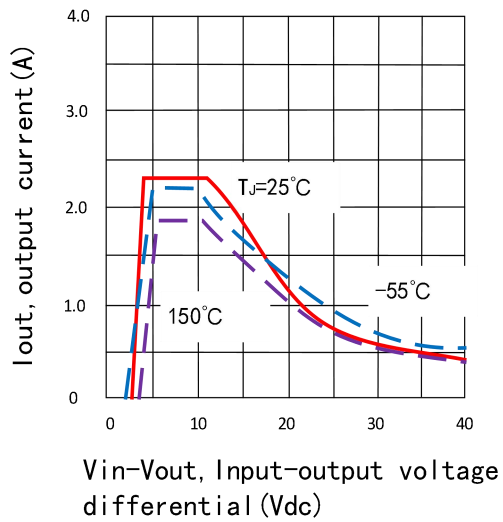


Figure 6. Current Limit

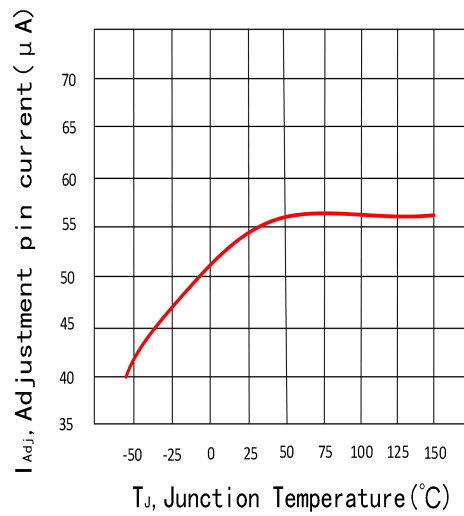
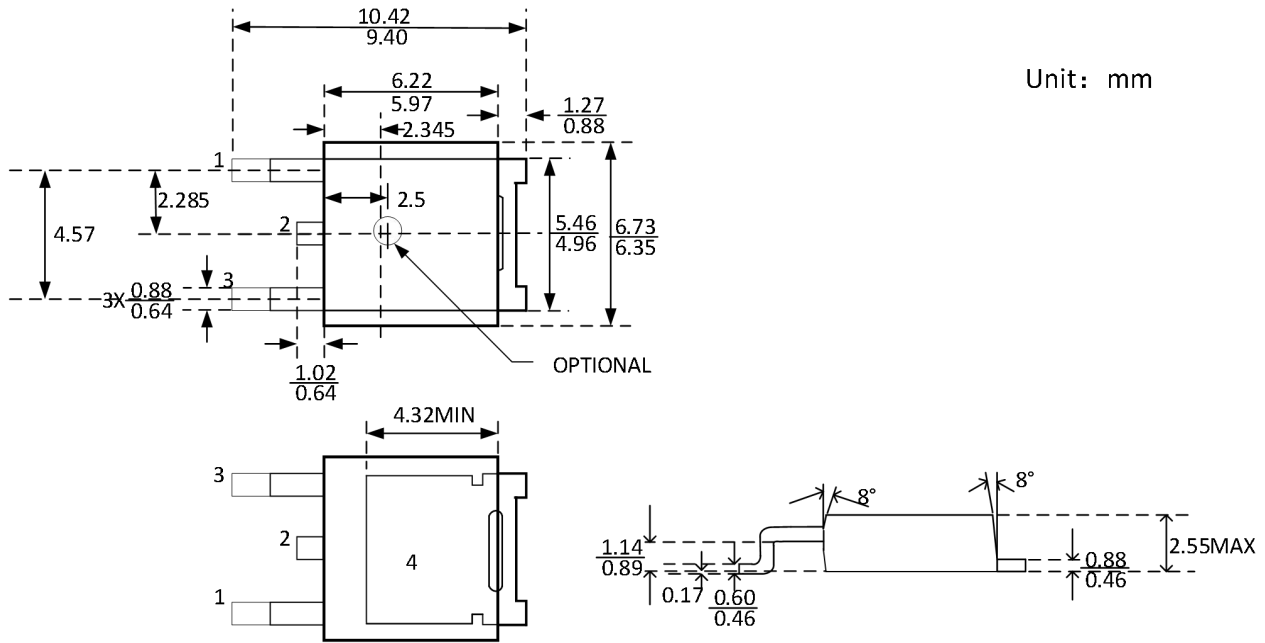


Figure 7. Adjustment Pin Current

## Package Outline Dimensions

### TO-252-3





**TO-263-3**

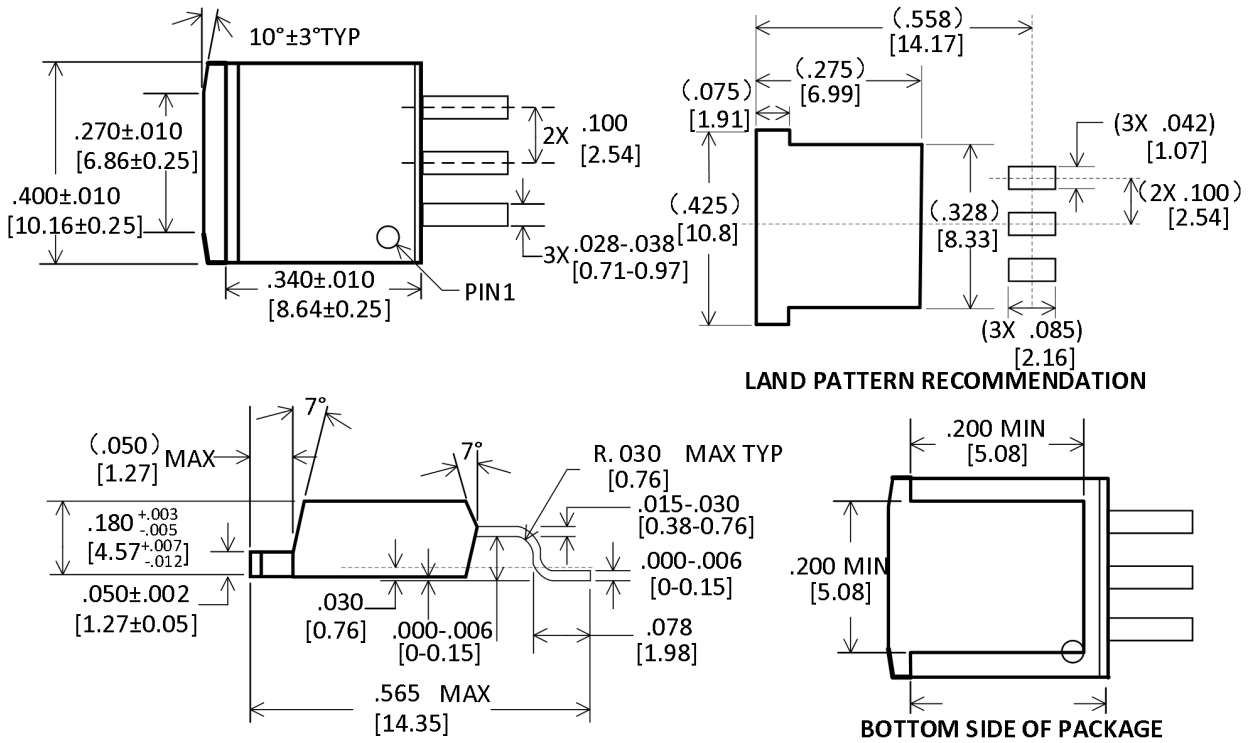


Figure 9. TO263-3 Packaging Dimensional Drawing

## Package/Ordering Information

| ORDERING NUMBER | TEMPRANGE   | PACKAGE  | PAKEAGE MARKING | TRANSPOT MEDIA,QUANTILY |
|-----------------|-------------|----------|-----------------|-------------------------|
| CBM317DT        | -40°C~125°C | TO263-3  | CBM317DT        | Tape and Reel,800       |
| CBM317DS        | -40°C~125°C | TO-252-3 | CBM317DS        | Tape and Reel,500       |