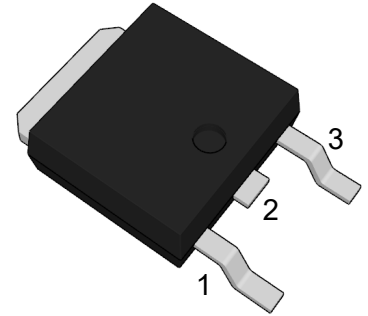


### Description

The PJ79XXTE series of three-terminal negative regulators are available in TO-252 package. Each type employs internal current limiting, thermal shut-down and safe area protection, making it essentially indestructible. If adequate heat sinking is provided, it can deliver over 1.5A output current. Although designed as fixed voltage regulator, This device can be used with external components to obtain adjustable voltage and currents.

### TO-252



1. GND 2. VIN 3. VOUT

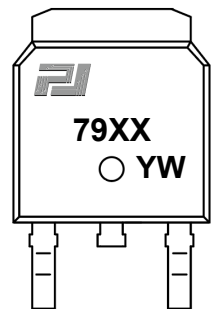
### Features

- Input voltage: up to -35V
- Output voltage: -5V, -6V, -8V, -9V, -10V, -12V, -15V
- Output current up to 1.5 A
- Thermal overload protection
- Short circuit current limiting

### Applications

- DC motor drivers
- Household electric appliances
- Industrial power supplies
- Test and measurement equipment

### Ordering Information

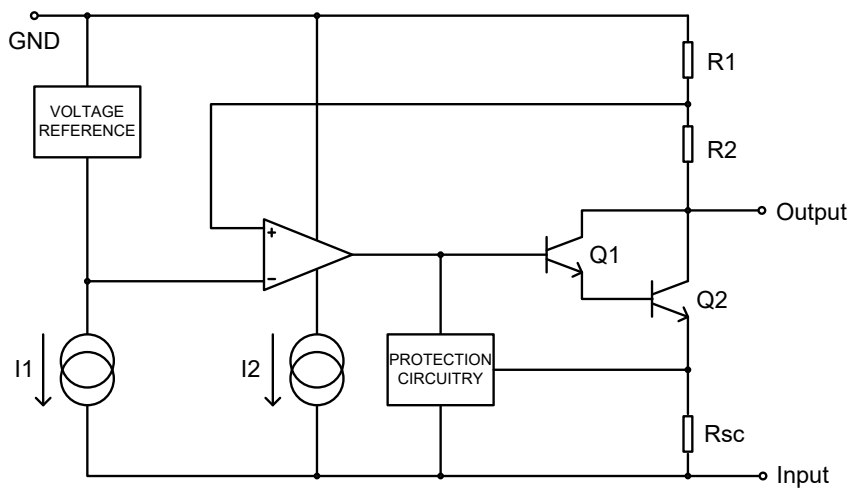
| Orderable Device | Package | Reel (inch) | Package Qty (PCS) | Eco Plan <sup>Note</sup> | MSL Level | Marking Code                                                                                                                                                           |
|------------------|---------|-------------|-------------------|--------------------------|-----------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| PJ7905TE         | TO-252  | 13          | 2500              | RoHS & Green             | MSL3      |  <p>79XX: Product code<br/>e.g. PJ7905TE:7905<br/>YW: Year code and Week code</p> |
| PJ7906TE         |         |             |                   |                          |           |                                                                                                                                                                        |
| PJ7908TE         |         |             |                   |                          |           |                                                                                                                                                                        |
| PJ7909TE         |         |             |                   |                          |           |                                                                                                                                                                        |
| PJ7910TE         |         |             |                   |                          |           |                                                                                                                                                                        |
| PJ7912TE         |         |             |                   |                          |           |                                                                                                                                                                        |
| PJ7915TE         |         |             |                   |                          |           |                                                                                                                                                                        |

#### Note:

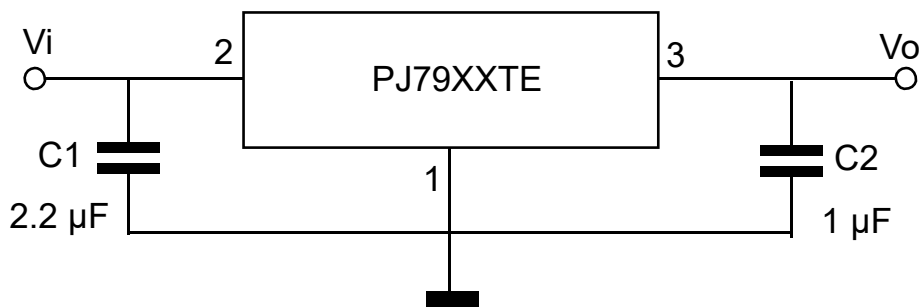
RoHS: PJ defines "RoHS" to mean semiconductor products that are compliant with the current EU RoHS requirements for all 10 RoHS substances, including the requirement that RoHS substance do not exceed 0.1% by weight in homogeneous materials.

Green: PJ defines "Green" to mean Halogen-Free and Antimony-Free.

### Function Block Diagram



### Typical Application Circuit



### Absolute Maximum Ratings

Ratings at 25°C ambient temperature unless otherwise specified.

| Parameter                   | Symbol    | Value       | Unit |
|-----------------------------|-----------|-------------|------|
| Input Voltage               | $-V_I$    | 35          | V    |
| Output Current              | $I_O$     | 1.5         | A    |
| Maximum Power Dissipation   | $P_D$     | 2           | W    |
| Operating Temperature Range | $T_{OPR}$ | 0 to +125   | °C   |
| Storage Temperature Range   | $T_{STG}$ | -65 to +150 | °C   |



# PJ79XXTE

## 3-Terminal Voltage Regulators

### PJ7905TE Electrical Characteristics

$V_I = -10V$ ,  $I_O = 500mA$ ,  $0 < T_J < 125^\circ C$ ,  $C_I = 2.2\mu F$ ,  $C_O = 1\mu F$ , unless otherwise specified.

| Parameter                        | Symbol                  | Test Conditions                                | Min. | Typ. | Max. | Unit           |
|----------------------------------|-------------------------|------------------------------------------------|------|------|------|----------------|
| Output Voltage                   | $-V_O$                  | $T_J = 25^\circ C$                             | 4.8  | 5.0  | 5.2  | V              |
|                                  |                         | $I_O = 5mA$ to 1A<br>$V_I = -7V$ to $-20V$     | 4.75 | 5.0  | 5.25 | V              |
| Line Regulation                  | $\Delta V_O$            | $V_I = -7V$ to $-25V$ , $T_J = 25^\circ C$     | --   | --   | 100  | mV             |
|                                  |                         | $V_I = -8V$ to $-12V$ , $T_J = 25^\circ C$     | --   | --   | 50   | mV             |
| Load Regulation                  | $\Delta V_O$            | $I_O = 5mA$ to 1.5A, $T_J = 25^\circ C$        | --   | --   | 100  | mV             |
|                                  |                         | $I_O = 250mA$ to 750mA, $T_J = 25^\circ C$     | --   | --   | 50   | mV             |
| Ripple Rejection                 | RR                      | $\Delta V_I = 10V$ , $f = 120Hz$               | 54   | 60   | --   | dB             |
| Dropout Voltage                  | $V_D$                   | $I_O = 1A$ , $T_J = 25^\circ C$                | --   | 2    | --   | V              |
| Quiescent Current                | $I_Q$                   | $T_J = 25^\circ C$                             | --   | --   | 6    | mA             |
| Temperature coefficient of $V_O$ | $\Delta V_O / \Delta T$ | $I_O = 5mA$                                    | --   | 0.5  | --   | mV/ $^\circ C$ |
| Quiescent Current Change         | $\Delta I_Q$            | $I_O = 5mA$ to 1A                              | --   | --   | 0.8  | mA             |
|                                  |                         | $I_O = 500mA$ , $V_I = -8V$ to $-25V$          | --   | --   | 0.5  | mA             |
| Output Noise Voltage             | $V_N$                   | $10Hz \leq f \leq 100kHz$ , $T_A = 25^\circ C$ | --   | 40   | --   | $\mu V$        |



# PJ79XXTE

## 3-Terminal Voltage Regulators

### PJ7906TE Electrical Characteristics

$V_I = -11V$ ,  $I_O = 500mA$ ,  $0 < T_J < 125^\circ C$ ,  $C_I = 2.2\mu F$ ,  $C_O = 1\mu F$ , unless otherwise specified.

| Parameter                        | Symbol                  | Test Conditions                                | Min. | Typ. | Max. | Unit           |
|----------------------------------|-------------------------|------------------------------------------------|------|------|------|----------------|
| Output Voltage                   | $-V_O$                  | $T_J = 25^\circ C$                             | 5.75 | 6.0  | 6.25 | V              |
|                                  |                         | $I_O = 5mA$ to 1A<br>$V_I = -9V$ to -21V       | 5.7  | 6.0  | 6.3  | V              |
| Line Regulation                  | $\Delta V_O$            | $V_I = -8V$ to -25V, $T_J = 25^\circ C$        | --   | --   | 120  | mV             |
|                                  |                         | $V_I = -9V$ to -13V, $T_J = 25^\circ C$        | --   | --   | 60   | mV             |
| Load Regulation                  | $\Delta V_O$            | $I_O = 5mA$ to 1.5A, $T_J = 25^\circ C$        | --   | --   | 120  | mV             |
|                                  |                         | $I_O = 250mA$ to 750mA, $T_J = 25^\circ C$     | --   | --   | 60   | mV             |
| Ripple Rejection                 | RR                      | $\Delta V_I = 10V$ , $f = 120Hz$               | 54   | 60   | --   | dB             |
| Dropout Voltage                  | $V_D$                   | $I_O = 1A$ , $T_J = 25^\circ C$                | --   | 2    | --   | V              |
| Quiescent Current                | $I_Q$                   | $T_J = 25^\circ C$                             | --   | --   | 6    | mA             |
| Temperature coefficient of $V_O$ | $\Delta V_O / \Delta T$ | $I_O = 5mA$                                    | --   | 0.6  | --   | mV/ $^\circ C$ |
| Quiescent Current Change         | $\Delta I_Q$            | $I_O = 5mA$ to 1A                              | --   | --   | 0.5  | mA             |
|                                  |                         | $V_I = -8V$ to -25V                            | --   | --   | 1    | mA             |
| Output Noise Voltage             | $V_N$                   | $10Hz \leq f \leq 100kHz$ , $T_A = 25^\circ C$ | --   | 130  | --   | $\mu V$        |



# PJ79XXTE

## 3-Terminal Voltage Regulators

### PJ7908TE Electrical Characteristics

$V_I = -14V$ ,  $I_O = 500mA$ ,  $0 < T_J < 125^\circ C$ ,  $C_I = 2.2\mu F$ ,  $C_O = 1\mu F$ , unless otherwise specified.

| Parameter                        | Symbol                  | Test Conditions                                | Min. | Typ. | Max. | Unit           |
|----------------------------------|-------------------------|------------------------------------------------|------|------|------|----------------|
| Output Voltage                   | $-V_O$                  | $T_J = 25^\circ C$                             | 7.7  | 8.0  | 8.3  | V              |
|                                  |                         | $I_O = 5mA$ to $1A$<br>$V_I = -10V$ to $-23V$  | 7.6  | 8.0  | 8.4  | V              |
| Line Regulation                  | $\Delta V_O$            | $V_I = -10.5V$ to $-25V$ , $T_J = 25^\circ C$  | --   | --   | 160  | mV             |
|                                  |                         | $V_I = -11V$ to $-17V$ , $T_J = 25^\circ C$    | --   | --   | 80   | mV             |
| Load Regulation                  | $\Delta V_O$            | $I_O = 5mA$ to $1.5A$ , $T_J = 25^\circ C$     | --   | --   | 160  | mV             |
|                                  |                         | $I_O = 250mA$ to $750mA$ , $T_J = 25^\circ C$  | --   | --   | 80   | mV             |
| Ripple Rejection                 | RR                      | $\Delta V_I = 10V$ , $f = 120Hz$               | 54   | 60   | --   | dB             |
| Dropout Voltage                  | $V_D$                   | $I_O = 1A$ , $T_J = 25^\circ C$                | --   | 2    | --   | V              |
| Quiescent Current                | $I_Q$                   | $T_J = 25^\circ C$                             | --   | --   | 6    | mA             |
| Temperature coefficient of $V_O$ | $\Delta V_O / \Delta T$ | $I_O = 5mA$                                    | --   | 0.8  | --   | mV/ $^\circ C$ |
| Quiescent Current Change         | $\Delta I_Q$            | $I_O = 5mA$ to $1A$                            | --   | --   | 0.5  | mA             |
|                                  |                         | $V_I = -10.5V$ to $-25V$                       | --   | --   | 1    | mA             |
| Output Noise Voltage             | $V_N$                   | $10Hz \leq f \leq 100kHz$ , $T_A = 25^\circ C$ | --   | 175  | --   | $\mu V$        |



# PJ79XXTE

## 3-Terminal Voltage Regulators

### PJ7909TE Electrical Characteristics

$V_I = -15V$ ,  $I_O = 500mA$ ,  $0 < T_J < 125^\circ C$ ,  $C_I = 2.2\mu F$ ,  $C_O = 1\mu F$ , unless otherwise specified.

| Parameter                        | Symbol                  | Test Conditions                                | Min. | Typ. | Max. | Unit           |
|----------------------------------|-------------------------|------------------------------------------------|------|------|------|----------------|
| Output Voltage                   | $-V_O$                  | $T_J = 25^\circ C$                             | 8.7  | 9.0  | 9.3  | V              |
|                                  |                         | $I_O = 5mA$ to $1A$<br>$V_I = -7V$ to $-20V$   | 8.6  | 9.0  | 9.4  | V              |
| Line Regulation                  | $\Delta V_O$            | $V_I = -11.5V$ to $-26V$ , $T_J = 25^\circ C$  | --   | --   | 180  | mV             |
|                                  |                         | $V_I = -12V$ to $-18V$ , $T_J = 25^\circ C$    | --   | --   | 90   | mV             |
| Load Regulation                  | $\Delta V_O$            | $I_O = 5mA$ to $1.5A$ , $T_J = 25^\circ C$     | --   | --   | 180  | mV             |
|                                  |                         | $I_O = 250mA$ to $750mA$ , $T_J = 25^\circ C$  | --   | --   | 90   | mV             |
| Ripple Rejection                 | RR                      | $\Delta V_I = 10V$ , $f = 120Hz$               | 54   | 60   | --   | dB             |
| Dropout Voltage                  | $V_D$                   | $I_O = 1A$ , $T_J = 25^\circ C$                | --   | 2    | --   | V              |
| Quiescent Current                | $I_Q$                   | $T_J = 25^\circ C$                             | --   | 3    | 6    | mA             |
| Temperature coefficient of $V_O$ | $\Delta V_O / \Delta T$ | $I_O = 5mA$                                    | --   | 0.9  | --   | mV/ $^\circ C$ |
| Quiescent Current Change         | $\Delta I_Q$            | $I_O = 5mA$ to $1A$                            | --   | --   | 0.5  | mA             |
|                                  |                         | $V_I = -11.5V$ to $-26V$                       | --   | --   | 1    | mA             |
| Output Noise Voltage             | $V_N$                   | $10Hz \leq f \leq 100kHz$ , $T_A = 25^\circ C$ | --   | 175  | --   | $\mu V$        |



# PJ79XXTE

## 3-Terminal Voltage Regulators

### PJ7910TE Electrical Characteristics

$V_I = -17V$ ,  $I_O = 500mA$ ,  $0 < T_J < 125^\circ C$ ,  $C_I = 2.2\mu F$ ,  $C_O = 1\mu F$ , unless otherwise specified.

| Parameter                        | Symbol                  | Test Conditions                                | Min. | Typ. | Max. | Unit           |
|----------------------------------|-------------------------|------------------------------------------------|------|------|------|----------------|
| Output Voltage                   | $-V_O$                  | $T_J = 25^\circ C$                             | 9.6  | 10   | 10.4 | V              |
|                                  |                         | $I_O = 5mA$ to $1A$<br>$V_I = -10V$ to $-23V$  | 9.5  | 10   | 10.5 | V              |
| Line Regulation                  | $\Delta V_O$            | $V_I = -12.5V$ to $-28V$ , $T_J = 25^\circ C$  | --   | --   | 200  | mV             |
|                                  |                         | $V_I = -14V$ to $-20V$ , $T_J = 25^\circ C$    | --   | --   | 100  | mV             |
| Load Regulation                  | $\Delta V_O$            | $I_O = 5mA$ to $1.5A$ , $T_J = 25^\circ C$     | --   | --   | 200  | mV             |
|                                  |                         | $I_O = 250mA$ to $750mA$ , $T_J = 25^\circ C$  | --   | --   | 100  | mV             |
| Ripple Rejection                 | RR                      | $\Delta V_I = 10V$ , $f = 120Hz$               | 54   | 60   | --   | dB             |
| Dropout Voltage                  | $V_D$                   | $I_O = 1A$ , $T_J = 25^\circ C$                | --   | 2    | --   | V              |
| Quiescent Current                | $I_Q$                   | $T_J = 25^\circ C$                             | --   | --   | 6    | mA             |
| Temperature coefficient of $V_O$ | $\Delta V_O / \Delta T$ | $I_O = 5mA$                                    | --   | 1    | --   | mV/ $^\circ C$ |
| Quiescent Current Change         | $\Delta I_Q$            | $I_O = 5mA$ to $1A$                            | --   | --   | 0.5  | mA             |
|                                  |                         | $V_I = -12.5V$ to $-28V$                       | --   | --   | 1    | mA             |
| Output Noise Voltage             | $V_N$                   | $10Hz \leq f \leq 100kHz$ , $T_A = 25^\circ C$ | --   | 280  | --   | $\mu V$        |



# PJ79XXTE

## 3-Terminal Voltage Regulators

### PJ7912TE Electrical Characteristics

$V_I = -19V$ ,  $I_O = 500mA$ ,  $0 < T_J < 125^\circ C$ ,  $C_I = 2.2\mu F$ ,  $C_O = 1\mu F$ , unless otherwise specified.

| Parameter                        | Symbol                  | Test Conditions                                | Min. | Typ. | Max. | Unit           |
|----------------------------------|-------------------------|------------------------------------------------|------|------|------|----------------|
| Output Voltage                   | $-V_O$                  | $T_J = 25^\circ C$                             | 11.5 | 12   | 12.5 | V              |
|                                  |                         | $I_O = 5mA$ to $1A$<br>$V_I = -7V$ to $-20V$   | 11.4 | 12   | 12.6 | V              |
| Line Regulation                  | $\Delta V_O$            | $V_I = -14.5V$ to $-30V$ , $T_J = 25^\circ C$  | --   | --   | 240  | mV             |
|                                  |                         | $V_I = -16V$ to $-22V$ , $T_J = 25^\circ C$    | --   | --   | 120  | mV             |
| Load Regulation                  | $\Delta V_O$            | $I_O = 5mA$ to $1.5A$ , $T_J = 25^\circ C$     | --   | --   | 240  | mV             |
|                                  |                         | $I_O = 250mA$ to $750mA$ , $T_J = 25^\circ C$  | --   | --   | 120  | mV             |
| Ripple Rejection                 | RR                      | $\Delta V_I = 10V$ , $f = 120Hz$               | 54   | 60   | --   | dB             |
| Dropout Voltage                  | $V_D$                   | $I_O = 1A$ , $T_J = 25^\circ C$                | --   | 2    | --   | V              |
| Quiescent Current                | $I_Q$                   | $T_J = 25^\circ C$                             | --   | --   | 6    | mA             |
| Temperature coefficient of $V_O$ | $\Delta V_O / \Delta T$ | $I_O = 5mA$                                    | --   | 1.2  | --   | mV/ $^\circ C$ |
| Quiescent Current Change         | $\Delta I_Q$            | $I_O = 5mA$ to $1A$                            | --   | --   | 0.5  | mA             |
|                                  |                         | $V_I = -14.5V$ to $-30V$                       | --   | --   | 1    | mA             |
| Output Noise Voltage             | $V_N$                   | $10Hz \leq f \leq 100kHz$ , $T_A = 25^\circ C$ | --   | 200  | --   | $\mu V$        |



# PJ79XXTE

## 3-Terminal Voltage Regulators

### PJ7915TE Electrical Characteristics

$V_I = -23V$ ,  $I_O = 500mA$ ,  $0 < T_J < 125^\circ C$ ,  $C_I = 2.2\mu F$ ,  $C_O = 1\mu F$ , unless otherwise specified.

| Parameter                        | Symbol                  | Test Conditions                                | Min.  | Typ. | Max.  | Unit           |
|----------------------------------|-------------------------|------------------------------------------------|-------|------|-------|----------------|
| Output Voltage                   | $-V_O$                  | $T_J = 25^\circ C$                             | 14.4  | 15   | 15.6  | V              |
|                                  |                         | $I_O = 5mA$ to $1A$<br>$V_I = -7V$ to $-20V$   | 14.25 | 15   | 15.75 | V              |
| Line Regulation                  | $\Delta V_O$            | $V_I = -17.5V$ to $-30V$ , $T_J = 25^\circ C$  | --    | --   | 300   | mV             |
|                                  |                         | $V_I = -20V$ to $-26V$ , $T_J = 25^\circ C$    | --    | --   | 150   | mV             |
| Load Regulation                  | $\Delta V_O$            | $I_O = 5mA$ to $1.5A$ , $T_J = 25^\circ C$     | --    | --   | 300   | mV             |
|                                  |                         | $I_O = 250mA$ to $750mA$ , $T_J = 25^\circ C$  | --    | --   | 150   | mV             |
| Ripple Rejection                 | RR                      | $\Delta V_I = 10V$ , $f = 120Hz$               | 54    | 60   | --    | dB             |
| Dropout Voltage                  | $V_D$                   | $I_O = 1A$ , $T_J = 25^\circ C$                | --    | 2    | --    | V              |
| Quiescent Current                | $I_Q$                   | $T_J = 25^\circ C$                             | --    | --   | 6     | mA             |
| Temperature coefficient of $V_O$ | $\Delta V_O / \Delta T$ | $I_O = 5mA$                                    | --    | 1.5  | --    | mV/ $^\circ C$ |
| Quiescent Current Change         | $\Delta I_Q$            | $I_O = 5mA$ to $1A$                            | --    | --   | 0.5   | mA             |
|                                  |                         | $V_I = -17.5V$ to $-30V$                       | --    | --   | 1     | mA             |
| Output Noise Voltage             | $V_N$                   | $10Hz \leq f \leq 100kHz$ , $T_A = 25^\circ C$ | --    | 250  | --    | $\mu V$        |



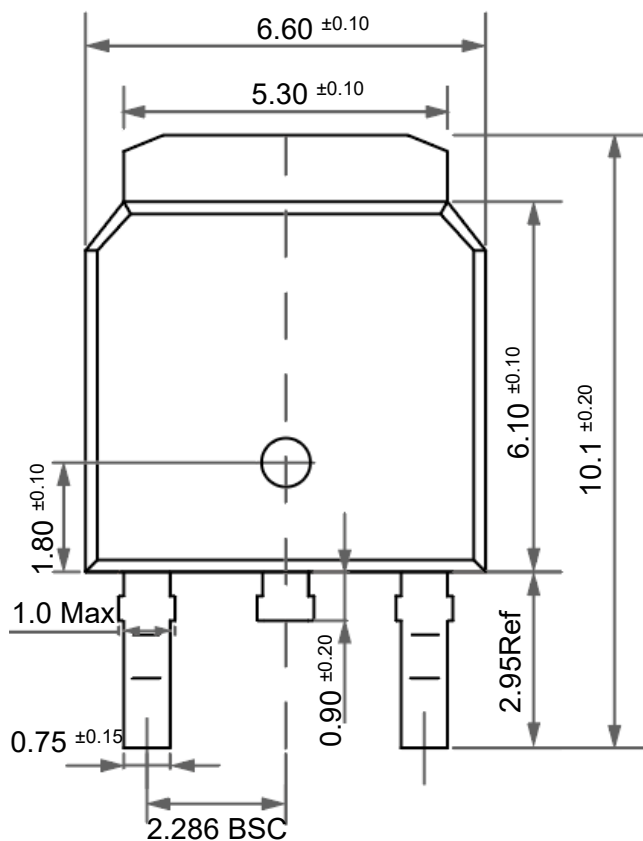
# PJ79XXTE

## 3-Terminal Voltage Regulators

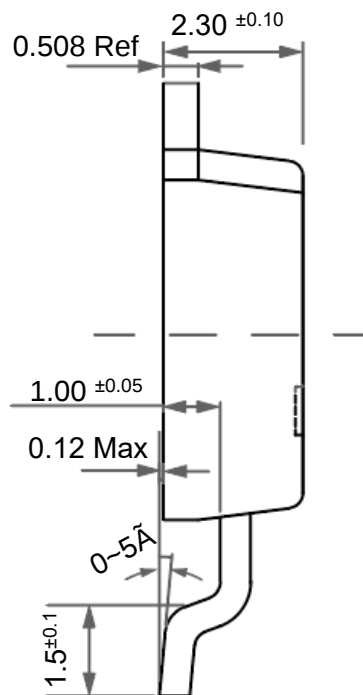
### Package Outline

TO-252

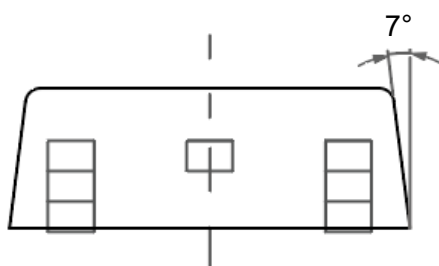
Dimensions in mm



Front View



Side View



Bottom View