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1A ULDO REGULATOR WITH ENABLE**AP2318A****General Description**

The AP2318A is a series of ultra low dropout regulators optimized for low voltage applications where transient response and minimum input voltage are critical.

The AP2318A provides current limit and thermal shutdown function. Its circuit includes a trimmed bandgap reference to assure output voltage accuracy to be within $\pm 1.5\%$. On-chip thermal shutdown provides protection against any combination of overload and ambient temperatures that would cause excessive junction temperatures.

The AP2318A has adjustable version, which can set the output voltage through two external resistors.

The AP2318A is available in the standard DFN-3x3-8 and PSOP-8 packages.

Features

- Wide Operating Voltage Range: 2.5V to 12V
- Output Voltage Accuracy: $\pm 1.5\%$
- On-chip Thermal Shutdown
- ESD Rating: 3000V (Human Body Model)
600V (Machine Model)
- Operation Junction Temperature: -40°C to 125°C

Applications

- Notebook
- USB Device
- Add-on Card
- DVD Player
- PC Motherboard

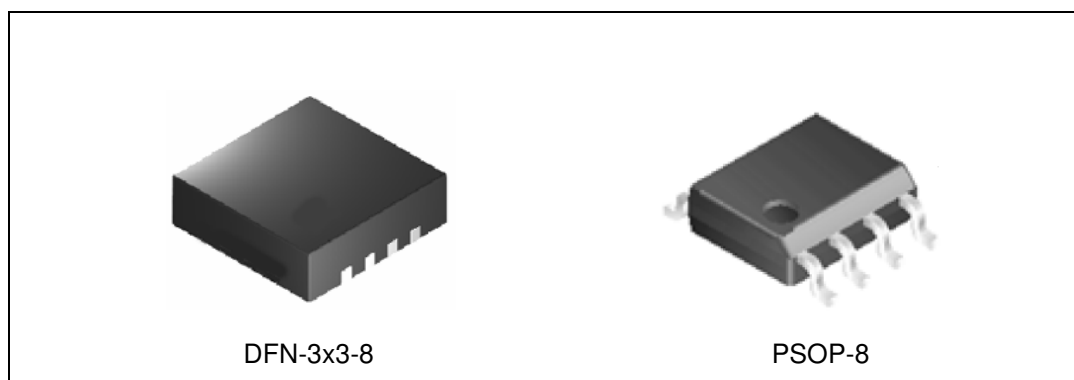


Figure 1. Package Type of AP2318A

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Pin Configuration

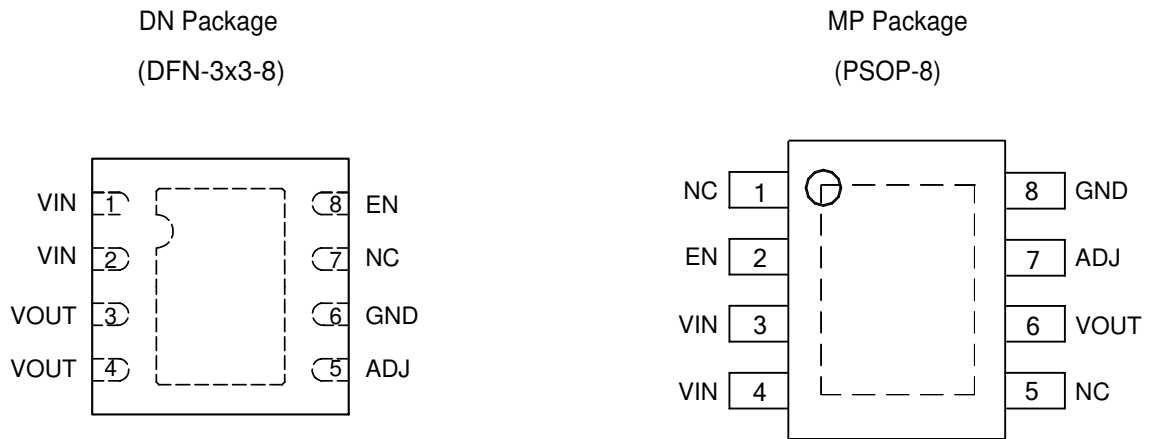


Figure 2. Pin Configuration of AP2318A (Top View)

Pin Description

| Pin Number | | Pin Name | Function |
|------------|--------|----------|--------------------|
| DFN-3x3-8 | PSOP-8 | | |
| 1, 2 | 3, 4 | VIN | Input voltage |
| 3, 4 | 6 | VOUT | Output voltage |
| 5 | 7 | ADJ | Adjustable voltage |
| 6 | 8 | GND | Ground |
| 7 | 1, 5 | NC | No connection |
| 8 | 2 | EN | On/Off control |

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Functional Block Diagram

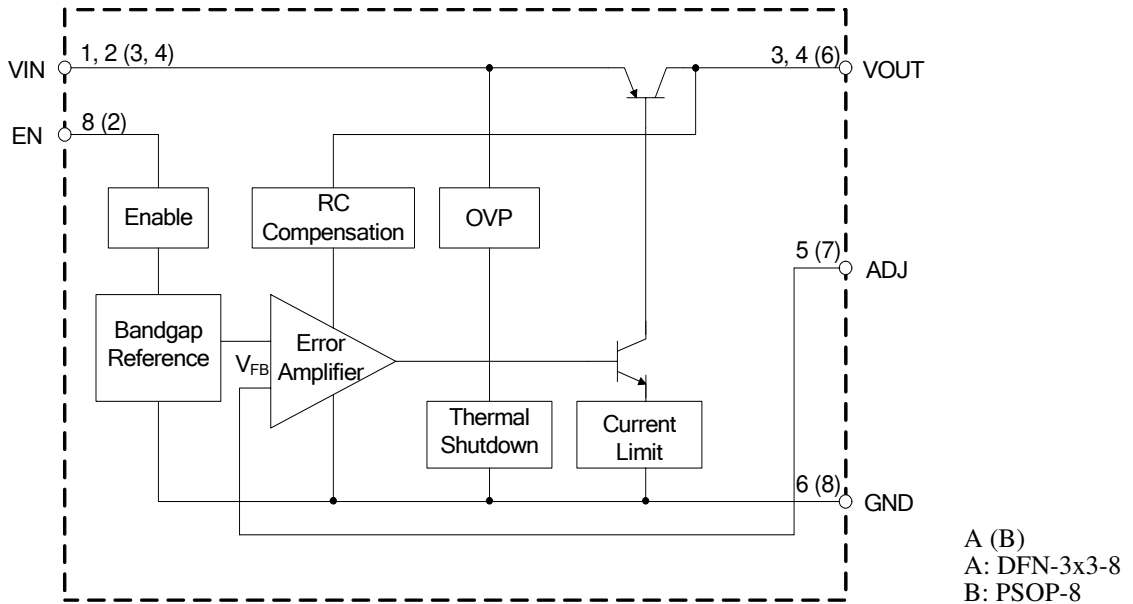


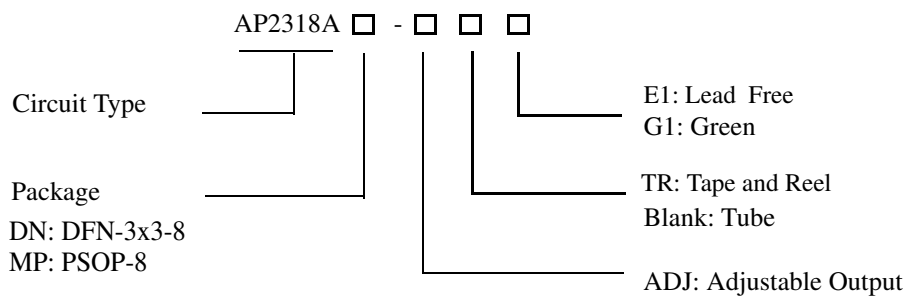
Figure 3. Functional Block Diagram of AP2318A



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Ordering Information



| Package | Temperature Range | Part Number | | Marking ID | | Packing Type |
|-----------|-------------------|-------------------|-------------------|-------------|-------------|--------------|
| | | Lead Free | Green | Lead Free | Green | |
| DFN-3x3-8 | -40 to 125°C | | AP2318ADN-ADJTRG1 | | B7B | Tube |
| PSOP-8 | -40 to 125°C | AP2318AMP-ADJE1 | AP2318AMP-ADJG1 | 2318A-ADJE1 | 2318A-ADJG1 | Tube |
| | | AP2318AMP-ADJTRE1 | AP2318AMP-ADJTRG1 | 2318A-ADJE1 | 2318A-ADJG1 | Tape & Reel |

BCD Semiconductor's Pb-free products, as designated with "E1" suffix in the part number, are RoHS compliant. Products with "G1" suffix are available in green packages.

**1A ULDO REGULATOR WITH ENABLE****AP2318A****Absolute Maximum Ratings (Note 1)**

| Parameter | Symbol | Value | Unit |
|--|---------------|------------|------|
| Input Voltage | V_{IN} | 15 | V |
| Operating Junction Temperature | T_J | 150 | °C |
| Storage Temperature Range | T_{STG} | -65 to 150 | °C |
| Lead Temperature (Soldering, 10sec) | T_{LEAD} | 260 | °C |
| Thermal Resistance, Junction to Ambient (Note 2) | θ_{JA} | DFN-3x3-8 | 120 |
| | | PSOP-8 | 108 |
| ESD (Human Body Model) | ESD | 3000 | V |
| ESD (Machine Model) | ESD | 600 | V |

Note 1: Stresses greater than 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 Ratings" for extended periods may affect device reliability.

Note 2: Absolute maximum ratings indicate limits beyond which damage to the component may occur. Electrical specifications do not apply when operating the device outside of its operating ratings. The maximum allowable power dissipation is a function of the maximum junction temperature, $T_J(\text{Max})$, the junction-to-ambient thermal resistance, θ_{JA} , and the ambient temperature, T_A . The maximum allowable power dissipation at any ambient temperature is calculated using: $P_D(\text{max}) = (T_J(\text{Max}) - T_A) / \theta_{JA}$. Exceeding the maximum allowable power dissipation will result in excessive die temperature, and the regulator will go into thermal shutdown.

Recommended Operating Conditions

| Parameter | Symbol | Min | Max | Unit |
|--------------------------------------|----------|-----|-----|------|
| Input Voltage | V_{IN} | 2.5 | 12 | V |
| Enable Voltage | V_{EN} | | 12 | V |
| Operating Junction Temperature Range | T_J | -40 | 125 | °C |



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Electrical Characteristics

Operating Conditions: $2.5V \leq V_{IN} \leq 12V$, $C_{IN} = 1\mu F$, $C_{OUT} = 2.2\mu F$, $T_J = 25^\circ C$, unless otherwise specified. ($P \leq$ Maximum Power Dissipation). Limits appearing in **Boldface** type apply over the entire junction temperature range for operation of $-40^\circ C$ to $125^\circ C$.

| Parameter | Symbol | Conditions | Min | Typ | Max | Unit |
|---------------------------------------|-----------------|---|-----------------------|-----------------------|-----------------------|--------------|
| Reference Voltage | V_{REF} | AP2318A-ADJ, $I_{OUT} = 10mA$, $V_{IN} - V_{OUT} = 2V$, $T_J = 25^\circ C$, $10mA \leq I_{OUT} \leq 1A$, $V_{OUT} + 2V \leq V_{IN} \leq 12V$ | 1.231 1.225 | 1.250 1.250 | 1.269 1.275 | V |
| Maximum Output Current | $I_{OUT(Max)}$ | $V_{IN} - V_{OUT} = 2V$ | 1.2 | 1.5 | | A |
| Line Regulation | V_{RLINE} | AP2318A-ADJ $I_{OUT} = 10mA$, $V_{OUT} + 2V \leq V_{IN} \leq 12V$ | | 1 | 6 | mV |
| | | $I_{OUT} = 10mA$, $2.5V \leq V_{IN} \leq 12V$ | | 1 | 6 | mV |
| Load Regulation | V_{RLOAD} | AP2318A-ADJ $V_{IN} = V_{OUT} + 2V$, $10mA \leq I_{OUT} \leq 1A$ | | 1 | 15 | mV |
| | | $V_{IN} = 2.5V$, $10mA \leq I_{OUT} \leq 1A$ | | 1 | 15 | mV |
| Dropout Voltage | V_{DROPP} | $\Delta V_{OUT} (\Delta V_{REF}) = 1\%$, $V_{OUT} > 2V$, $I_{OUT} = 1A$ | | 0.5 | | V |
| Adjust Pin Current | I_{ADJ} | | | 0.05 | 1 | μA |
| Minimum Load Current | $I_{LOAD(Min)}$ | $V_{OUT} + 2V \leq V_{IN} \leq 12V$ (ADJ only) | | 1.7 | 5 | mA |
| Quiescent Current | I_Q | $V_{IN} = V_{OUT} + 2V$, $I_{OUT} = 0mA$ | | 250 | | μA |
| RMS Output Noise (% of V_{OUT}) | V_{NOI} | $T_A = 25^\circ C$, $10Hz \leq f \leq 20kHz$ | | 0.003 | | % |
| Thermal Shutdown Temperature | | | | 150 | | $^\circ C$ |
| Thermal Shutdown Hysteresis | | | | 25 | | $^\circ C$ |
| Enable Input Voltage | V_{EN} | Enable logic low | | | 0.8 | V |
| | | Enable logic high | 2.25 | | | |
| Enable Input Current | I_{EN} | $V_{EN} = 2.25V$ | | 5 | | μA |
| | | $V_{EN} = 0.8V$ | | | 4 | μA |
| Thermal Resistance (Junction to Case) | θ_{JC} | DFN-3x3-8 | | 15 | | $^\circ C/W$ |
| | | PSOP-8 | | 12 | | |



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Typical Performance Characteristics

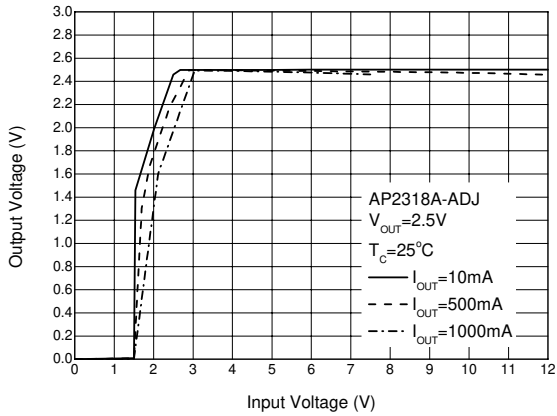


Figure 4. Output Voltage vs. Input Voltage

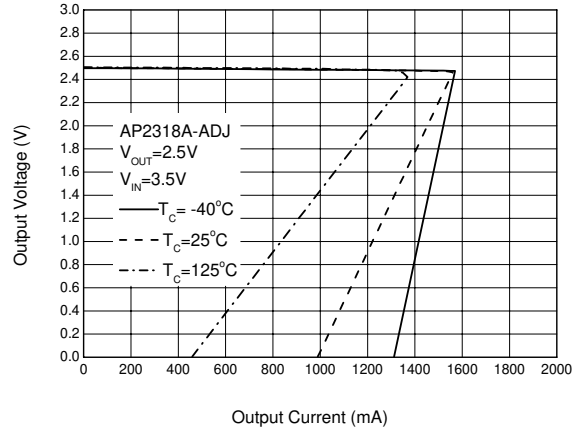


Figure 5. Output Voltage vs. Output Current

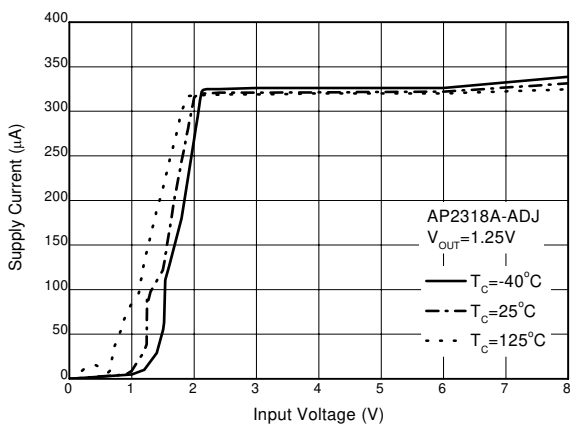


Figure 6. Supply Current vs. Input Voltage

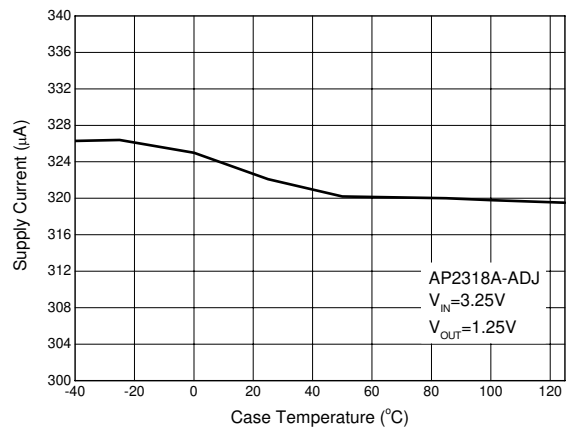


Figure 7. Supply Current vs. Case Temperature



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Typical Performance Characteristics(Continued)

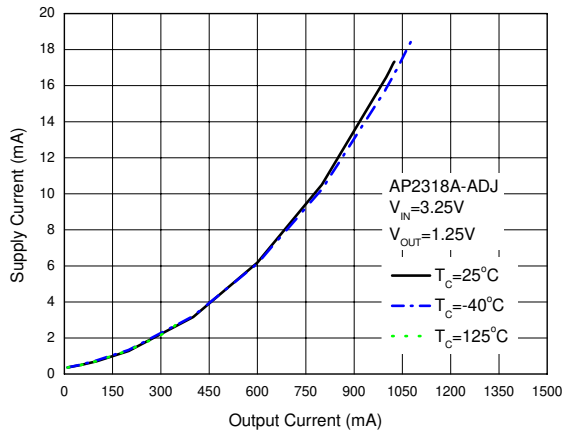


Figure 8. Supply Current vs. Output Current

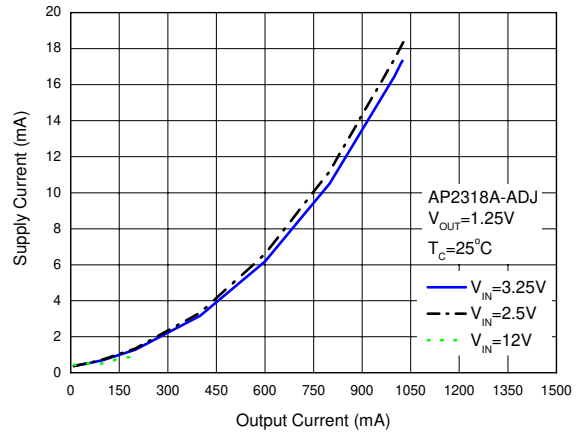


Figure 9. Supply Current vs. Output Current

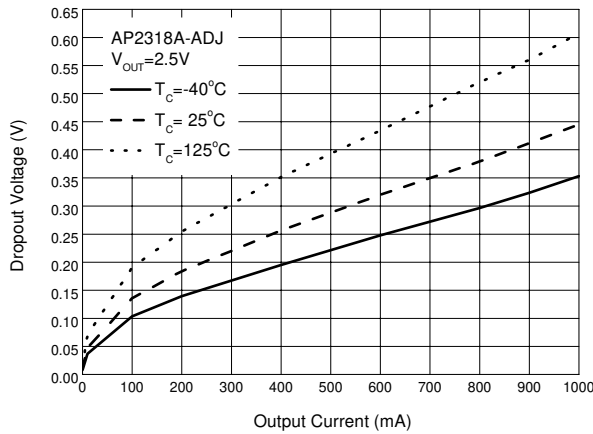


Figure 10. Dropout Voltage vs. Output Current

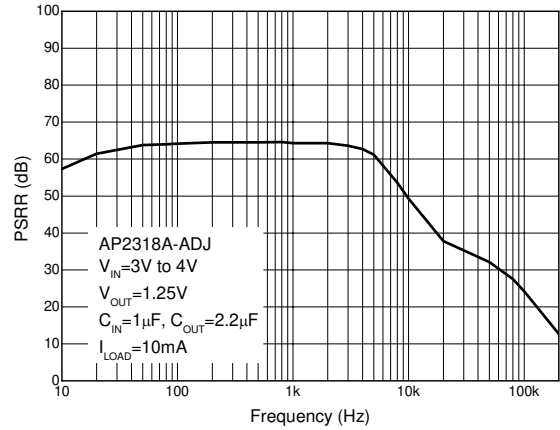


Figure 11. PSRR vs. Frequency

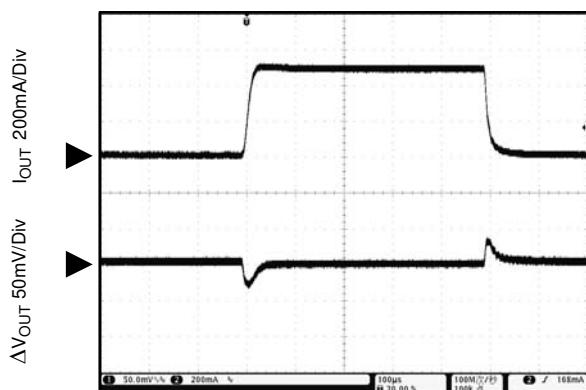
Typical Performance Characteristics (Continued)


Figure 12. Load Transient Response
 $V_{IN}=2.5V$, $V_{OUT}=1.25V$, $I_{OUT}=1$ to $500mA$,
 $C_{IN}=1\mu F$, $C_{OUT}=2.2\mu F$

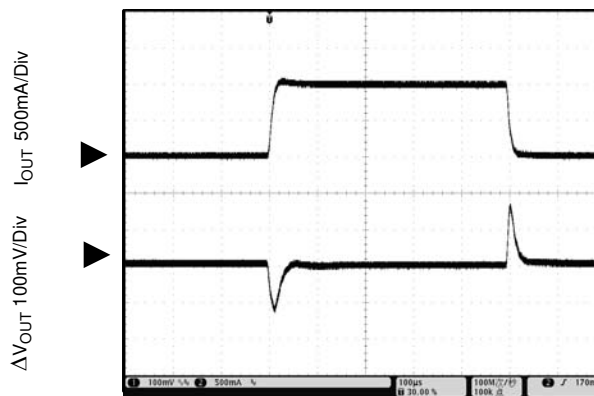


Figure 13. Load Transient Response
 $V_{IN}=2.5V$, $V_{OUT}=1.8V$, $I_{OUT}=1mA$ to $1A$,
 $C_{IN}=1\mu F$, $C_{OUT}=2.2\mu F$

Typical Application

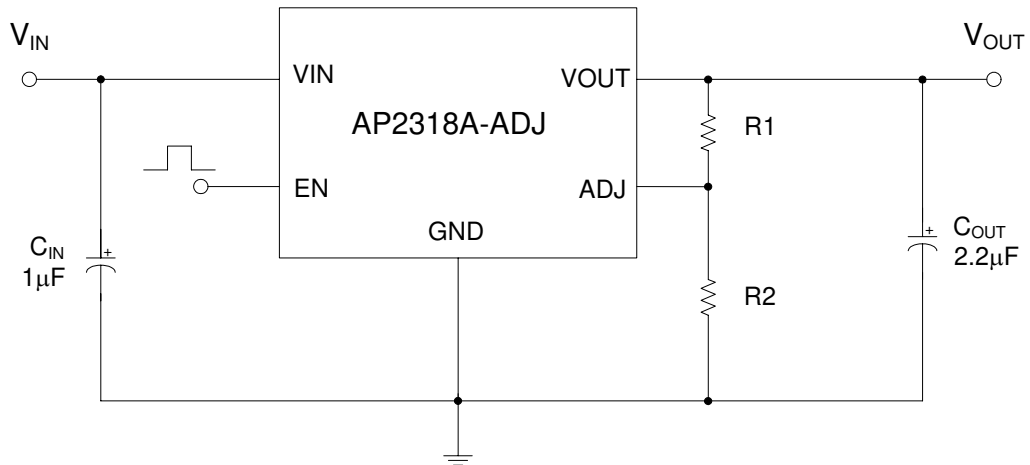


Figure 14. Typical Application of AP2318A ADJ Version, $V_{OUT}=1.25*(R1+R2)/R2$



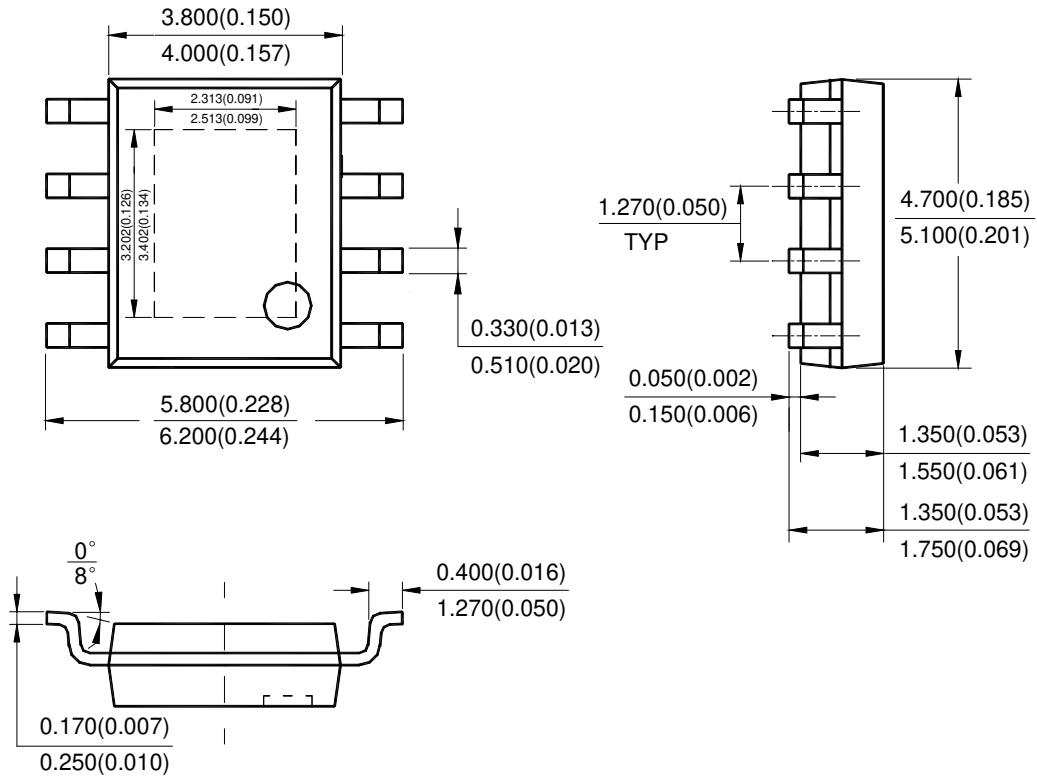
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Mechanical Dimensions (Continued)

PSOP-8

Unit: mm(inch)



Note: Eject hole, oriented hole and mold mark is optional.



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