



General Description

The AP2126 is a 300mA, positive Voltage regulator ICs fabricated by CMOS process.

Each of AP2126 is equipped with a voltage reference, an error amplifier, a resistor network for setting output voltage, a chip enable circuit, a current limit circuit and OSTD (over temperature shut down) circuit to prevent the IC from over current and over temperature.

The AP2126 has features of high ripple rejection, low dropout voltage, low noise, high output voltage accuracy, and low current consumption which make it ideal for use in various battery-powered apparatus.

AP2126 has 3.3V fixed voltage version. It is available in SOT-23-5 Package.

Features

- Low Dropout Voltage: 170mV@300mA
- High Output Voltage Accuracy: $\pm 2\%$
- High Ripple Rejection:
65dB@ f=1kHz, 45dB@ f=10kHz
- Low Standby Current: 0.1 μ A
- Low Quiescent Current: 60 μ A Typical
- Low Output Noise: 60 μ Vrms
- Short Current Limit: 50mA
- Over Temperature Protection
- Compatible with Low ESR Ceramic Capacitor:
1 μ F for C_{IN} and C_{OUT}
- Excellent Line/Load Regulation
- Soft Start Time: 50 μ s
- Auto Discharge Resistance: R_{DS(ON)}=60 Ω

Applications

- Datacom
- Notebook Computers
- Mother Board

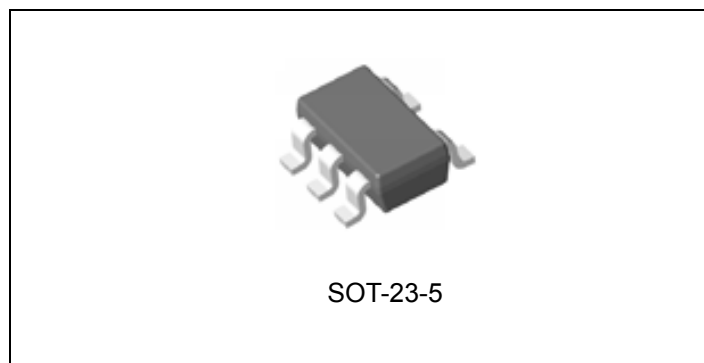


Figure 1. Package Type of AP2126

Pin Configuration

K Package
(SOT-23-5)

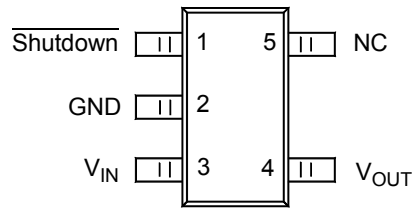


Figure 2. Pin Configuration of AP2126 (Top View)

Functional Block Diagram

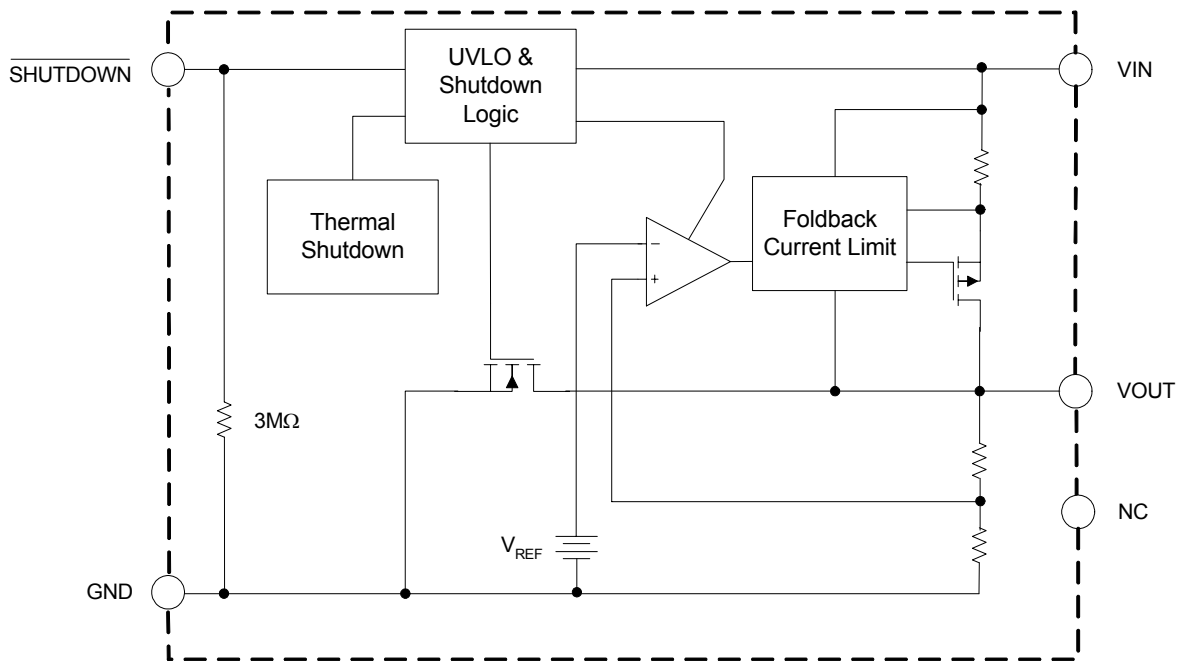
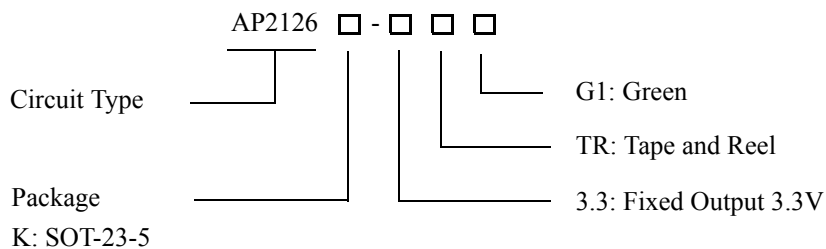


Figure 3. Functional Block Diagram of AP2126



300mA HIGH SPEED, EXTREMELY LOW NOISE CMOS LDO REGULATOR AP2126

Ordering Information



| Product | Package | Temperature Range | Part Number | Marking ID | Packing Type |
|---------|----------|-------------------|-----------------|------------|--------------|
| | | | Green | Green | |
| AP2126 | SOT-23-5 | -40 to 85°C | AP2126K-3.3TRG1 | FEF | Tape & Reel |

BCD Semiconductor's products, as designated with "G1" suffix in the part number, are RoHS compliant and Green.

**300mA HIGH SPEED, EXTREMELY LOW NOISE CMOS LDO REGULATOR****AP2126****Absolute Maximum Ratings (Note 1)**

| Parameter | Symbol | Value | Unit |
|-------------------------------------|-----------------|----------------------|------|
| Input Voltage | V_{IN} | 6.5 | V |
| Shutdown Input Voltage | V_{CE} | -0.3 to $V_{IN}+0.3$ | V |
| Output Current | I_{OUT} | 450 | mA |
| 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 | $R_{\theta JA}$ | 250 | °C/W |
| ESD (Human Body Model) | ESD | 6000 | V |
| ESD (Machine Model) | ESD | 300 | 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.

Recommended Operating Conditions

| Parameter | Symbol | Min | Max | Unit |
|--------------------------------------|----------|-----|-----|------|
| Input Voltage | V_{IN} | - | 6 | V |
| Operating Junction Temperature Range | T_J | -40 | 85 | °C |



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Electrical Characteristics (Continued)

(AP2126-3.3V, C_{IN}=1μF, C_{OUT}=1μF, Bold typeface applies over -40°C≤T_J≤85°C, unless otherwise specified.)

| Parameter | Symbol | Conditions | Min | Typ | Max | Unit | |
|---|---|---|--------------------------|------|---------------------------|--------|----|
| Output Voltage | V _{OUT} | V _{IN} =V _{OUT} +1V 1mA≤I _{OUT} ≤300mA | 98%* V _{OUT} | | 102%* V _{OUT} | V | |
| Input Voltage | V _{IN} | | | | 6 | V | |
| Maximum Output Current | I _{OUT(MAX)} | | | 450 | | mA | |
| Load Regulation | $\frac{\Delta V_{OUT}}{(\Delta I_{OUT} * V_{OUT})}$ | V _{IN} -V _{OUT} =1V, 1mA≤I _{OUT} ≤300mA | | | 0.6 | %/A | |
| Line Regulation | $\frac{\Delta V_{OUT}}{(\Delta V_{IN} * V_{OUT})}$ | V _{OUT} +0.5V≤V _{IN} ≤6V I _{OUT} =30mA | | | 0.06 | %/V | |
| Dropout Voltage | V _{DROP} | V _{OUT} =3.3V, I _{OUT} =300mA | | 170 | 300 | mV | |
| Quiescent Current | I _Q | V _{IN} =V _{OUT} +1V, I _{OUT} =0mA | | 60 | 90 | μA | |
| Standby Current | I _{STD} | V _{IN} =V _{OUT} +1V, V _{SHUTDOWN} in off mode | | 0.1 | 1.0 | μA | |
| Power Supply Rejection Ratio | PSRR | Ripple 1Vp-p V _{IN} =V _{OUT} +1V | f=100Hz | | 65 | | dB |
| | | | f=1KHz | | 65 | | dB |
| | | | f=10KHz | | 45 | | dB |
| Output Voltage Temperature Coefficient | $\frac{(\Delta V_{OUT}/V_{OUT})}{\Delta T}$ | I _{OUT} =30mA, -40°C≤T _J ≤85°C | | ±100 | | ppm/°C | |
| Output Current Limit | I _{LIMIT} | V _{IN} -V _{OUT} =1V, V _{OUT} =0.98*V _{OUT} | | 400 | | mA | |
| Short Current Limit | I _{SHORT} | V _{OUT} =0V | | 50 | | mA | |
| Soft Start Time | t _{UP} | | | 50 | | μs | |
| RMS Output Noise | V _{NOISE} | T _A =25°C, 10Hz≤f≤100kHz | | 60 | | μVrms | |
| Shutdown "High" Voltage | | Shutdown input voltage "High" | 1.5 | | 6 | V | |
| Shutdown "Low" Voltage | | Shutdown input voltage "Low" | 0 | | 0.4 | V | |
| V _{OUT} Discharge MOSFET R _{DS(ON)} | | Shutdown input voltage "Low" | | 60 | | Ω | |
| Shutdown Pull Down Resistance | | | | 3 | | MΩ | |
| Thermal Shutdown | | | | 165 | | °C | |
| Thermal Shutdown Hysteresis | | | | 30 | | °C | |



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Typical Performance Characteristics

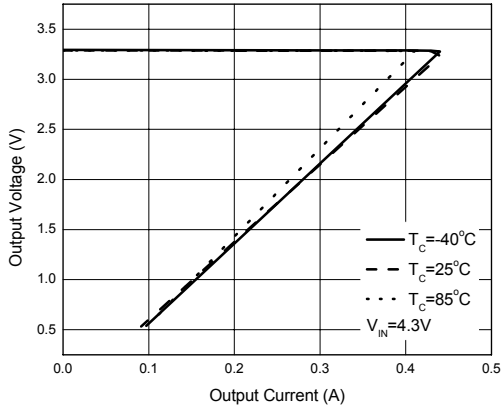


Figure 4. Output Voltage vs. Output Current

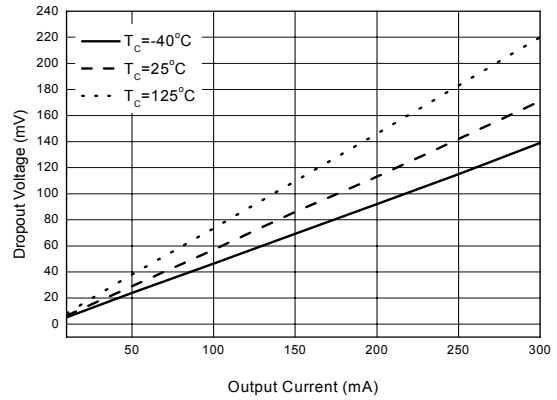


Figure 5. Dropout Voltage vs. Output Current, $V_{OUT}=3.3V$

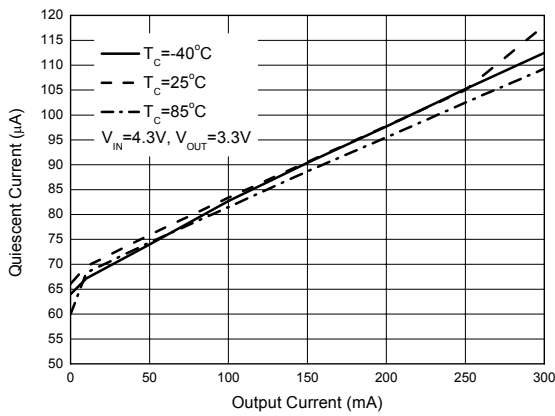


Figure 6. Quiescent Current vs. Output Current

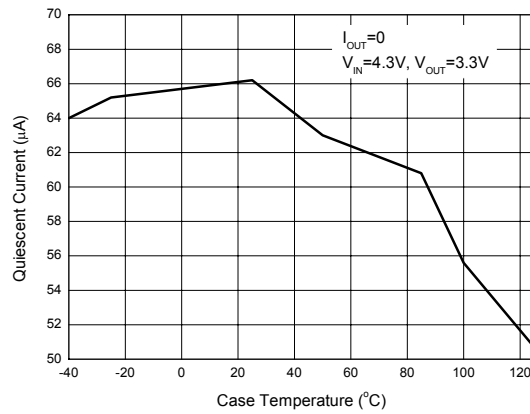


Figure 7. Quiescent Current vs. Case Temperature



300mA HIGH SPEED, EXTREMELY LOW NOISE CMOS LDO REGULATOR AP2126

Typical Performance Characteristics (Continued)

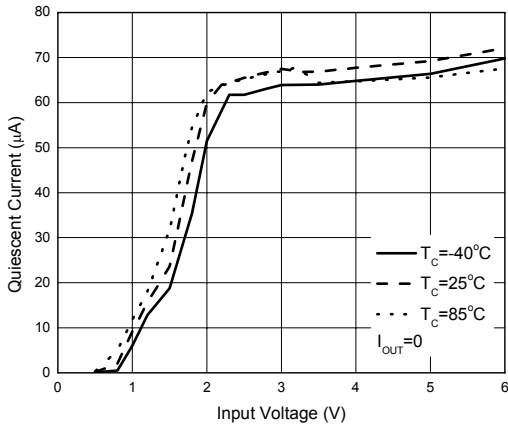


Figure 8. Quiescent Current vs. Input Voltage

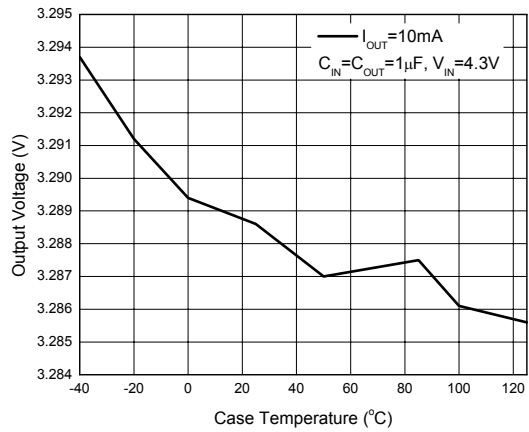


Figure 9. Output Voltage vs. Case Temperature

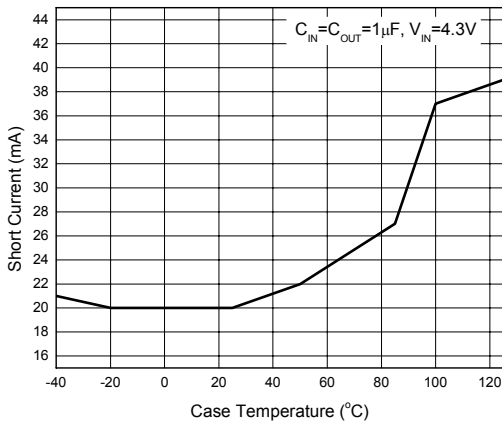


Figure 10. Short Current vs. Case Temperature

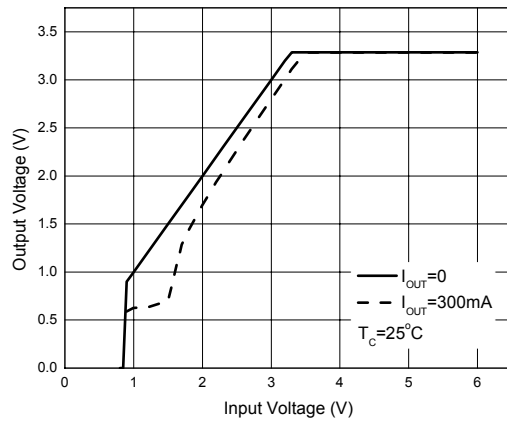


Figure 11. Output Voltage vs. Input Voltage



300mA HIGH SPEED, EXTREMELY LOW NOISE CMOS LDO REGULATOR AP2126

Typical Performance Characteristics (Continued)

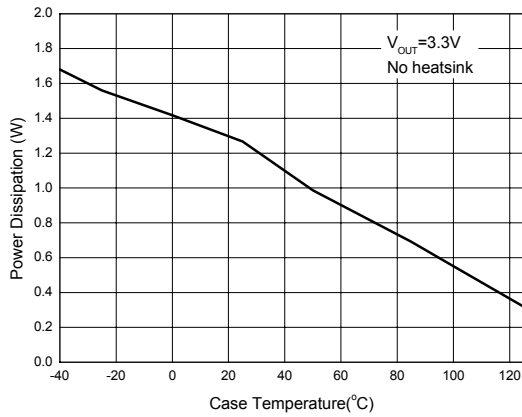


Figure 12. Power Dissipation vs. Case Temperature

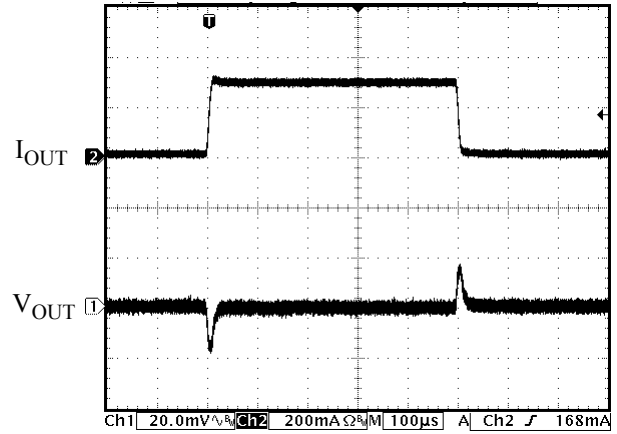


Figure 13. Load Transient
(Conditions: $C_{IN}=C_{OUT}=1\mu F$, $V_{IN}=4.4V$, $V_{OUT}=3.3V$)

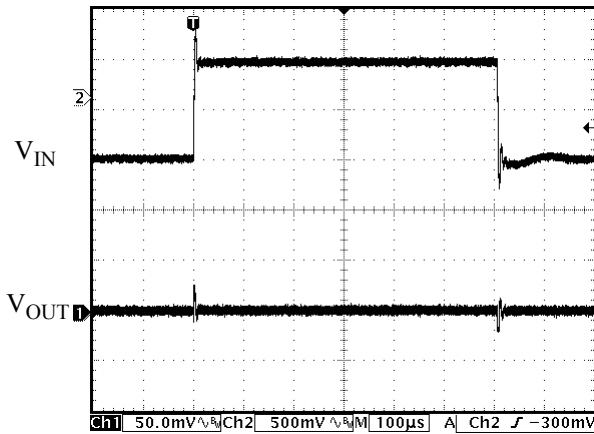


Figure 14. Line Transient
(Conditions: $I_{OUT}=30mA$, $C_{IN}=C_{OUT}=1\mu F$, $V_{IN}=4$ to $5V$, $V_{OUT}=3.3V$)

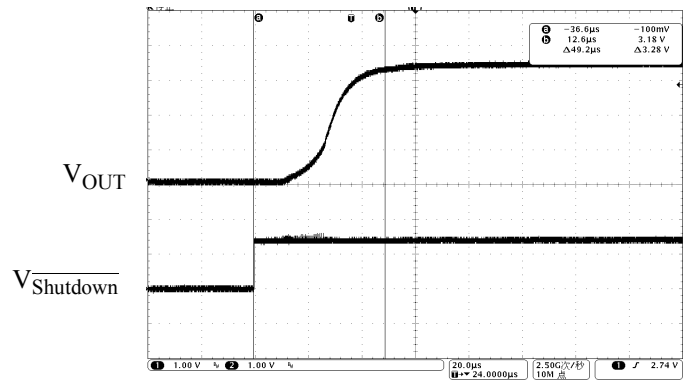


Figure 15. Soft Start Time
(Conditions: $I_{OUT}=0mA$, $C_{IN}=C_{OUT}=1\mu F$, $V_{Shutdown}=0$ to $2V$, $V_{OUT}=3.3V$)



Typical Performance Characteristics (Continued)

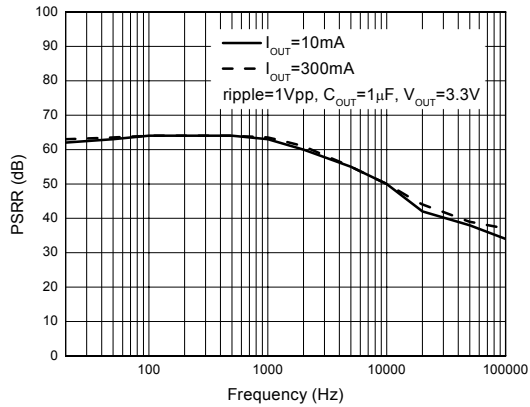


Figure 16. PSRR vs. Frequency

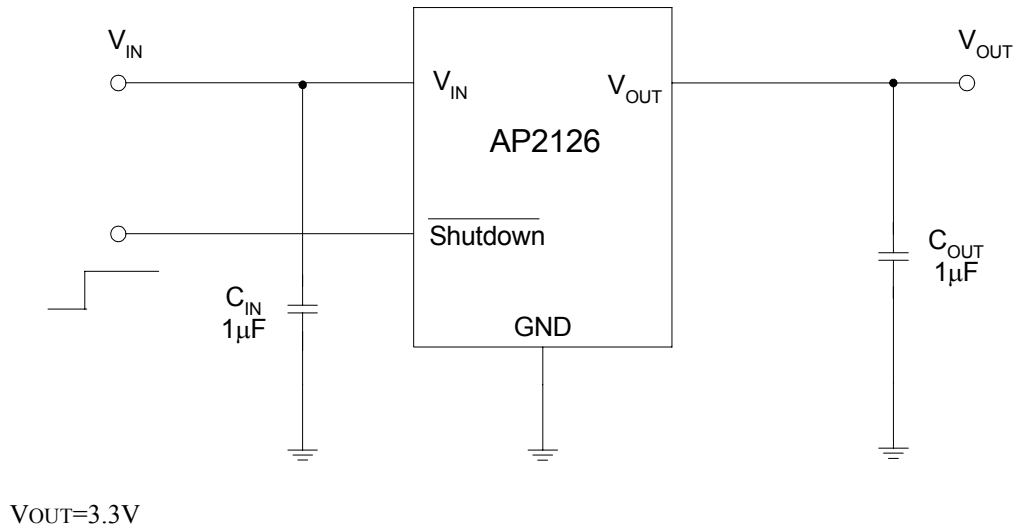
Typical Application

Figure 17. Typical Application of AP2126

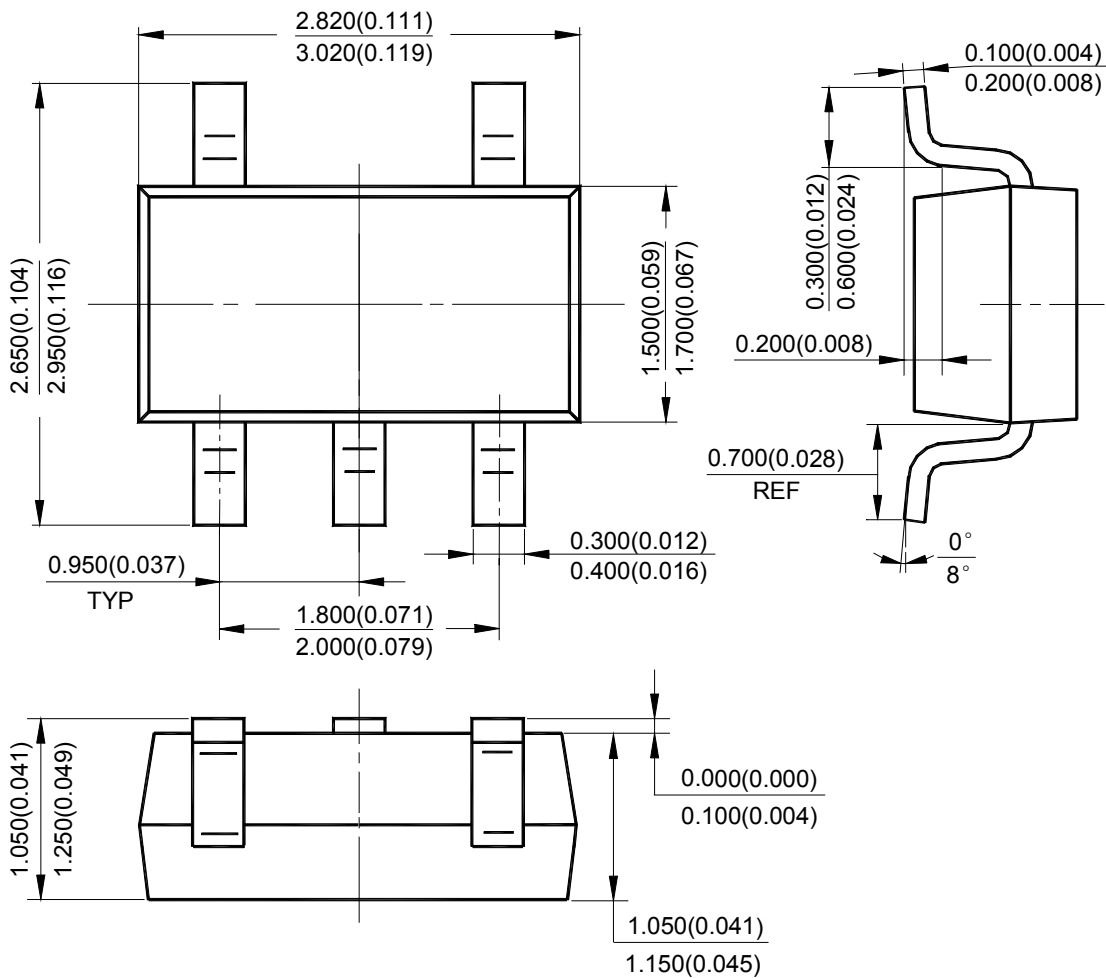


300mA HIGH SPEED, EXTREMELY LOW NOISE CMOS LDO REGULATOR AP2126

Mechanical Dimensions

SOT-23-5

Unit: mm(inch)





BCD Semiconductor Manufacturing Limited

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