

General Description

The AP2126 series are positive voltage regulator ICs fabricated by CMOS process.

The AP2126 series have features of low dropout voltage, low noise, high output voltage accuracy, and low current consumption which make them ideal for use in various battery-powered devices.

AP2126 is available in 1.25V to 5.5V adjustable voltage versions.

AP2126 series are available in SOT-23-5 Package.

Features

- Wide Operating Voltage: 3.0V to 6V
- High Output Voltage Accuracy: $\pm 2\%$
- High Ripple Rejection:
68dB@ f=1kHz, 54dB@ f=10kHz
- Low Standby Current: 0.1 μ A
- Low Dropout Voltage: 170mV@300mA for $V_{OUT}=3.3V$, 140mV@300mA for $V_{OUT}=5.2V$
- Low Quiescent Current: 60 μ A Typical
- Low Output Noise: 80 μ Vrms@ $V_{OUT}=1.25V$
- 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: $R_{DS(ON)}=60\Omega$

Applications

- Datacom
- Notebook Computers
- Mother Board

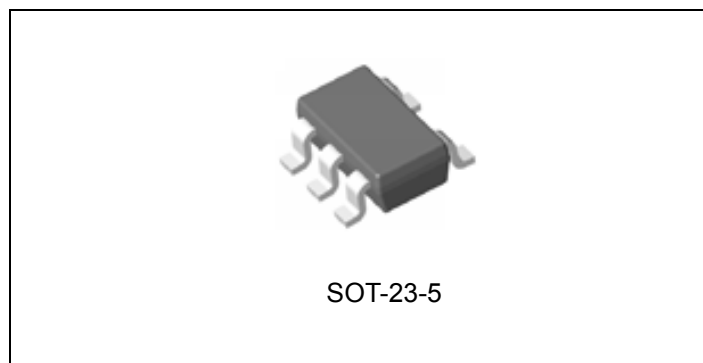


Figure 1. Package Type of AP2126

Pin Configuration

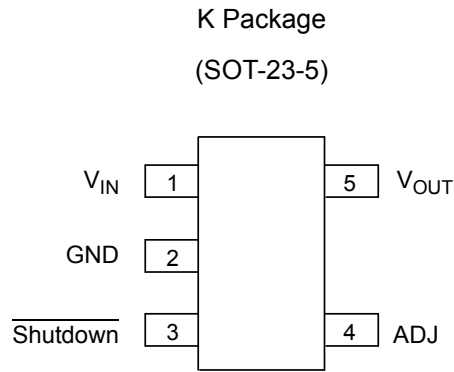


Figure 2. Pin Configuration of AP2126 (Top View)

Functional Block Diagram

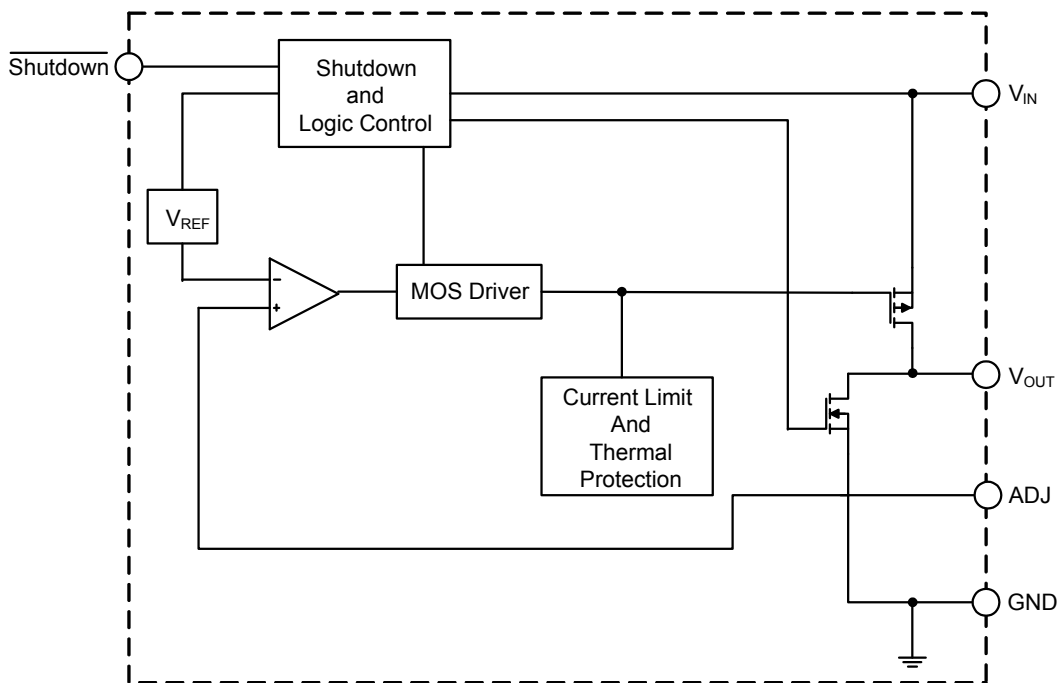
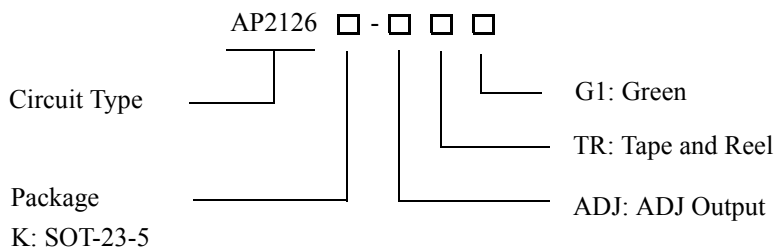


Figure 3. Functional Block Diagram of AP2126



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

Ordering Information



| Package | Temperature Range | Part Number | Marking ID | Packing Type |
|----------|-------------------|-----------------|------------|--------------|
| SOT-23-5 | -40 to 85°C | AP2126K-ADJTRG1 | GHH | 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 (Junction to Ambient) | θ_{JA} | 250 | °C/W |
| ESD (Human Body Model) | ESD | 6000 | V |
| ESD (Machine Model) | ESD | 250 | 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} | 3.0 | 6 | V |
| Operating Ambient Temperature Range | T_A | -40 | 85 | °C |



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Electrical Characteristics

(AP2126-ADJ, $V_{IN} \text{ min}=3.0\text{V}$, $C_{IN}=1\mu\text{F}$, $C_{OUT}=1\mu\text{F}$, Bold typeface applies over $-40^{\circ}\text{C}\leq T_A\leq 85^{\circ}\text{C}$, unless otherwise specified.)

| Parameter | Symbol | Conditions | Min | Typ | Max | Unit |
|---|---|--|------------------|-----------|-------|-----------------------------|
| Reference Voltage | V_{REF} | $V_{IN}=3.0\text{V}$ $1\text{mA}\leq I_{OUT}\leq 300\text{mA}$ | 1.225 | 1.25 | 1.275 | V |
| Input Voltage | V_{IN} | | 3.0 | | 6 | V |
| Maximum Output Current | $I_{OUT(MAX)}$ | $V_{IN}=3.0\text{V}$, $V_{OUT}=98\%\times V_{OUT}$ | 300 | 400 | | mA |
| Load Regulation | $\frac{\Delta V_{OUT}}{(\Delta I_{OUT}\times V_{OUT})}$ | $V_{IN}=3.0\text{V}$, $1\text{mA}\leq I_{OUT}\leq 300\text{mA}$ | | | 0.6 | %/A |
| Line Regulation | $\frac{\Delta V_{OUT}}{(\Delta V_{IN}\times V_{OUT})}$ | $V_{IN}=3.0\text{V}$ to 6V $I_{OUT}=30\text{mA}$ | | | 0.06 | %/V |
| Quiescent Current | I_Q | $V_{IN}=3.0\text{V}$, $I_{OUT}=0\text{mA}$ | | 60 | 90 | μA |
| Standby Current | I_{STD} | $V_{IN}=3.0\text{V}$, $V_{SHUTDOWN}$ in off mode | | 0.1 | 1.0 | μA |
| Power Supply Rejection Ratio | PSRR | Ripple 1Vp-p $V_{IN}=3.5\text{V}$ | $f=100\text{Hz}$ | | 68 | dB |
| | | | $f=1\text{KHz}$ | | 68 | dB |
| | | | $f=10\text{KHz}$ | | 54 | dB |
| Output Voltage Temperature Coefficient | $\frac{(\Delta V_{OUT}/V_{OUT})}{\Delta T}$ | $I_{OUT}=30\text{mA}$, $-40^{\circ}\text{C}\leq T_A\leq 85^{\circ}\text{C}$ | | ± 100 | | ppm/ $^{\circ}\text{C}$ |
| Short Current Limit | I_{SHORT} | $V_{OUT}=0\text{V}$ | | 50 | | mA |
| Soft Start Time | t_{UP} | | | 50 | | μs |
| RMS Output Noise | V_{NOISE} | $T_A=25^{\circ}\text{C}$, $10\text{Hz}\leq f\leq 100\text{kHz}$, $V_{OUT}=1.25\text{V}$ | | 80 | | 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 | | M Ω |
| Thermal Shutdown | | | | 165 | | $^{\circ}\text{C}$ |
| Thermal Shutdown Hysteresis | | | | 30 | | $^{\circ}\text{C}$ |
| Thermal Resistance | θ_{JC} | SOT-23-5 | | 150 | | $^{\circ}\text{C}/\text{W}$ |



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

Typical Performance Characteristics

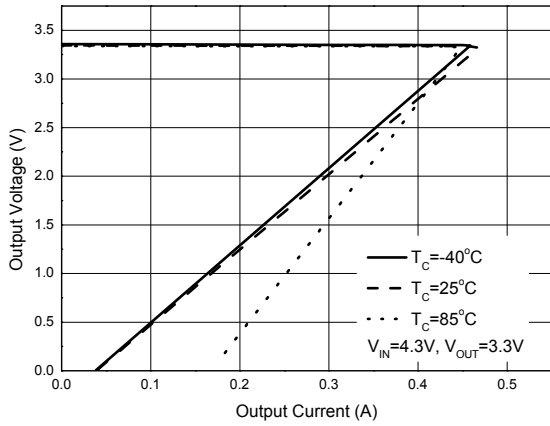


Figure 4. Output Voltage vs. Output Current

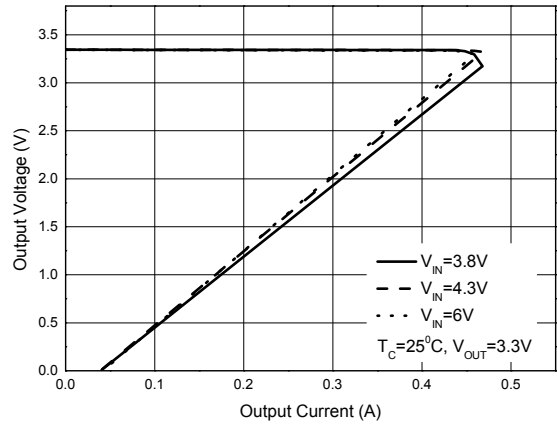


Figure 5. Output Voltage vs. Output Current

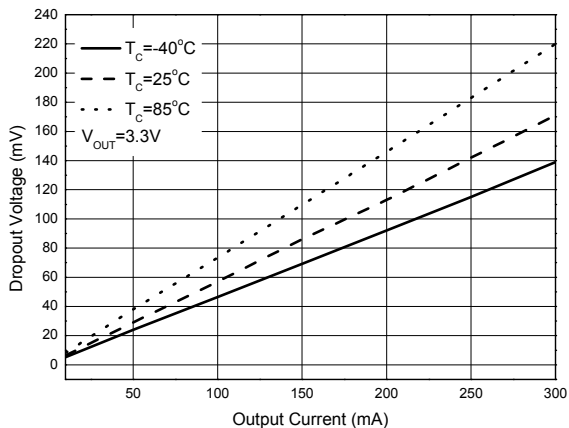


Figure 6. Dropout Voltage vs. Output Current

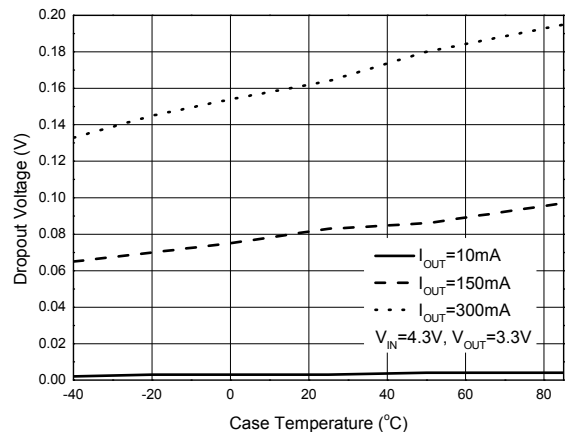


Figure 7. Dropout Voltage vs. Case Temperature



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

Typical Performance Characteristics (Continued)

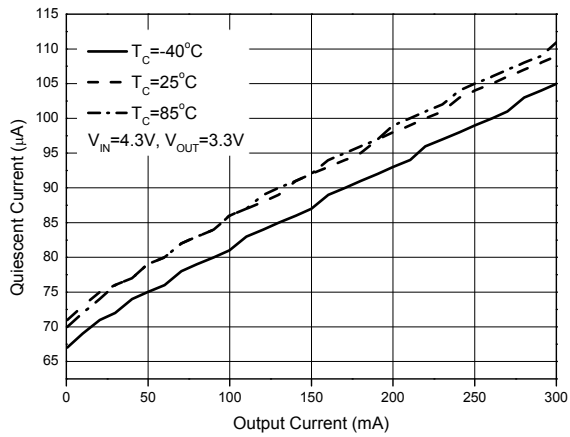


Figure 8. Quiescent Current vs. Output Current

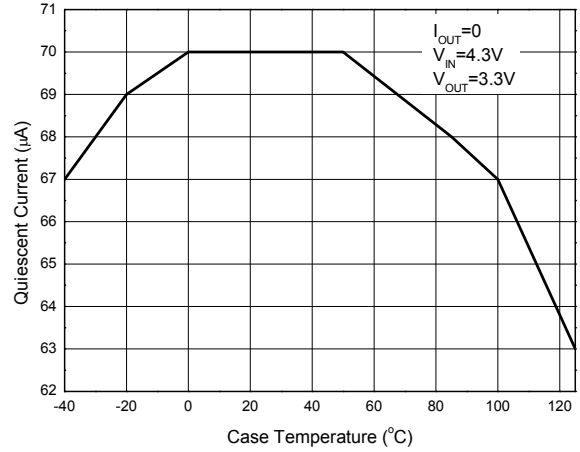


Figure 9. Quiescent Current vs. Case Temperature

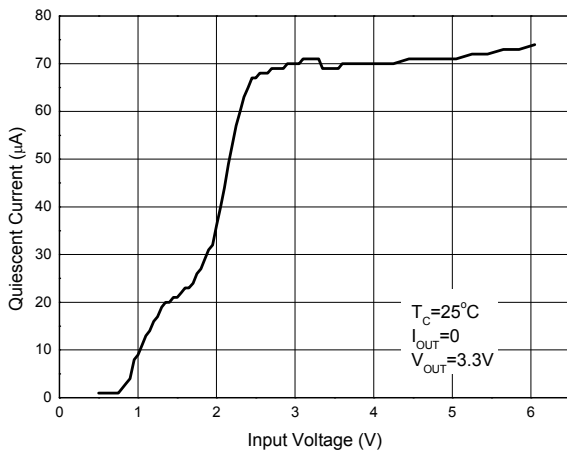


Figure 10. Quiescent Current vs. Input Voltage

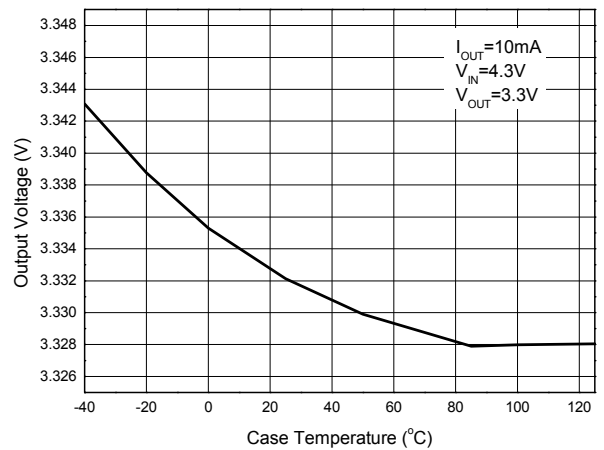


Figure 11. Output Voltage vs. Case Temperature



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

Typical Performance Characteristics (Continued)

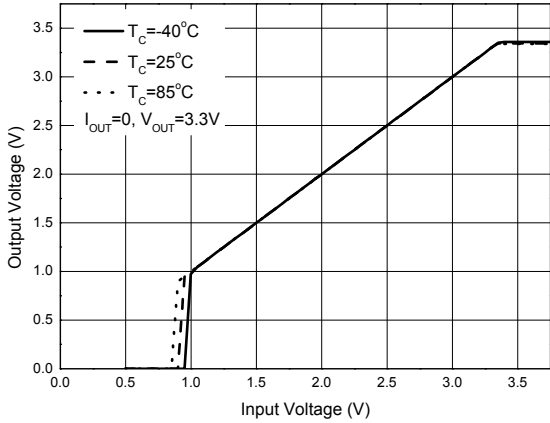


Figure 12. Output Voltage vs. Input Voltage

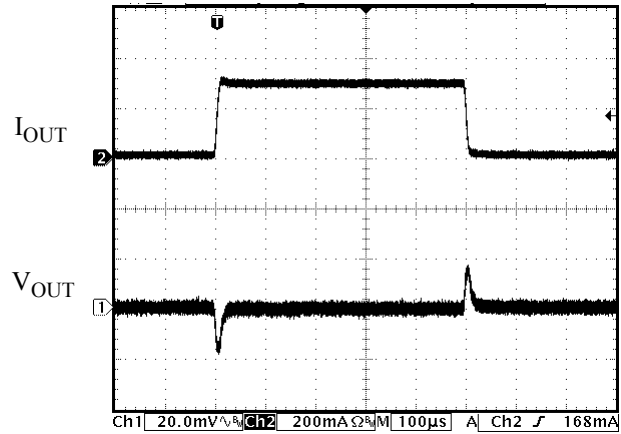


Figure 13. Load Transient
(Conditions: $C_{IN}=C_{OUT}=1\mu F$, $V_{IN}=4.4V$, $V_{OUT}=3.3V$, $I_{OUT}=10mA$ to $300mA$)

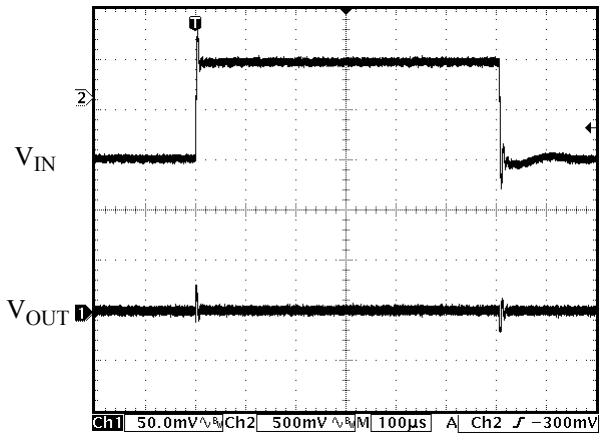


Figure 14. Line Transient
(Conditions: $I_{OUT}=30mA$, $C_{IN}=C_{OUT}=1\mu F$, $V_{IN}=4$ to $5V$, $V_{OUT}=3.3V$)

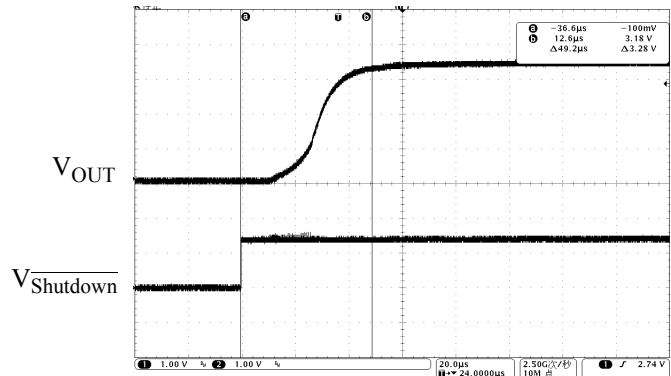


Figure 15. Soft Start Time
(Conditions: $I_{OUT}=0mA$, $C_{IN}=C_{OUT}=1\mu F$, $V_{Shutdown}=0$ to $2V$, $V_{OUT}=3.3V$)



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Typical Performance Characteristics (Continued)

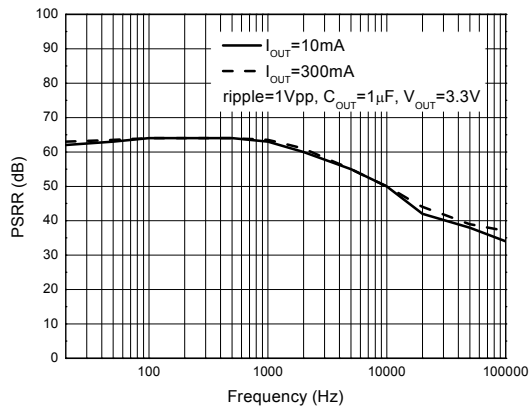
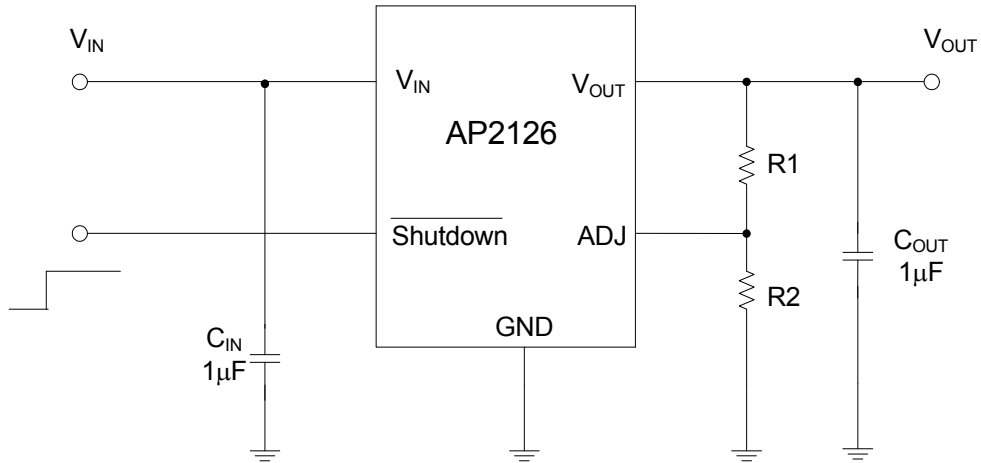


Figure 16. PSRR vs. Frequency

Typical Application



$$V_{OUT} = 1.25 * (1 + R1/R2) V$$

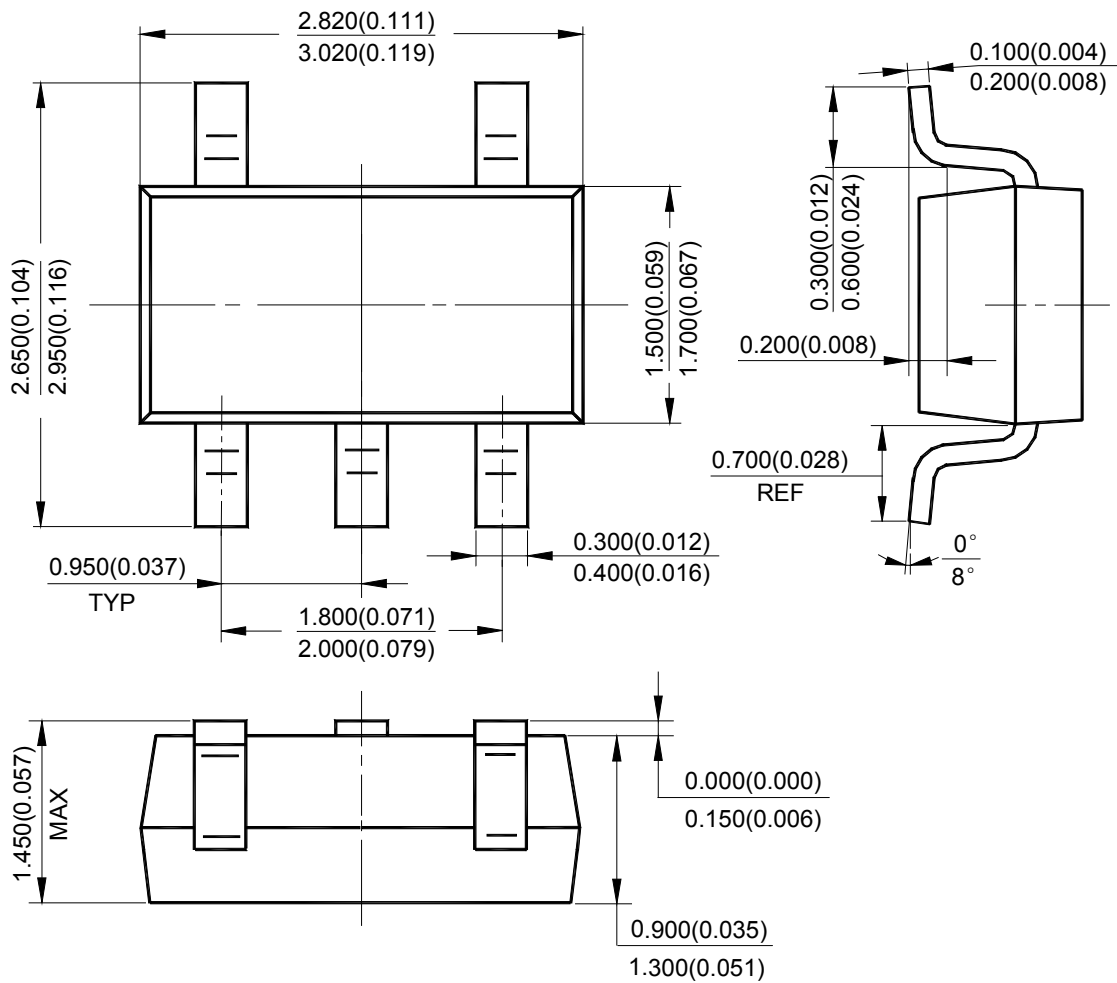
Figure 17. Typical Application of AP2126



Mechanical Dimensions

SOT-23-5

Unit: mm(inch)





BCD Semiconductor Manufacturing Limited

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MAIN SITE

- Headquarters

BCD Semiconductor Manufacturing Limited

No. 1600, Zi Xing Road, Shanghai Zizhu Science-based Industrial Park, 200241, China
Tel: +86-21-24162266, Fax: +86-21-24162277

- Wafer Fab

Shanghai SIM-BCD Semiconductor Manufacturing Co., Ltd.

800 Yi Shan Road, Shanghai 200233, China
Tel: +86-21-6485 1491, Fax: +86-21-5450 0008

REGIONAL SALES OFFICE

Shenzhen Office

Shanghai SIM-BCD Semiconductor Manufacturing Co., Ltd., Shenzhen Office

Unit A Room 1203, Skyworth Bldg., Gaoxin Ave. 1.S., Nanshan District, Shenzhen, China
Tel: +86-755-8826 7951
Fax: +86-755-8826 7865

Taiwan Office

BCD Semiconductor (Taiwan) Company Limited

4F, 298-1, Rui Guang Road, Nei-Hu District, Taipei, Taiwan
Tel: +886-2-2656 2808
Fax: +886-2-2656 2806

USA Office

BCD Semiconductor Corp.

30920 Huntwood Ave. Hayward, CA 94544, USA
Tel : +1-510-324-2988
Fax: +1-510-324-2788