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

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: ±2%
- High Ripple Rejection:
  65dB@ f=1kHz, 45dB@ f=10kHz
- Low Standby Current: 0.1μA
- Low Quiescent Current: 60μA Typical
- Low Output Noise: 60μVrms
- Short Current Limit: 50mA
- Over Temperature Protection
- Compatible with Low ESR Ceramic Capacitor: 1μF for C_{IN} and C_{OUT}
- Excellent Line/Load Regulation
- Soft Start Time: 50μs
- Auto Discharge Resistance: $R_{DS(ON)}$=60Ω

Applications

- Datacom
- Notebook Computers
- Mother Board

SOT-23-5

Figure 1. Package Type of AP2126

Pin Configuration

K Package

(SOT-23-5)

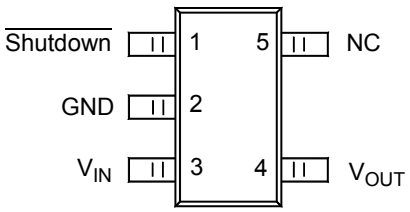


Figure 2. Pin Configuration of AP2126 (Top View)

Functional Block Diagram

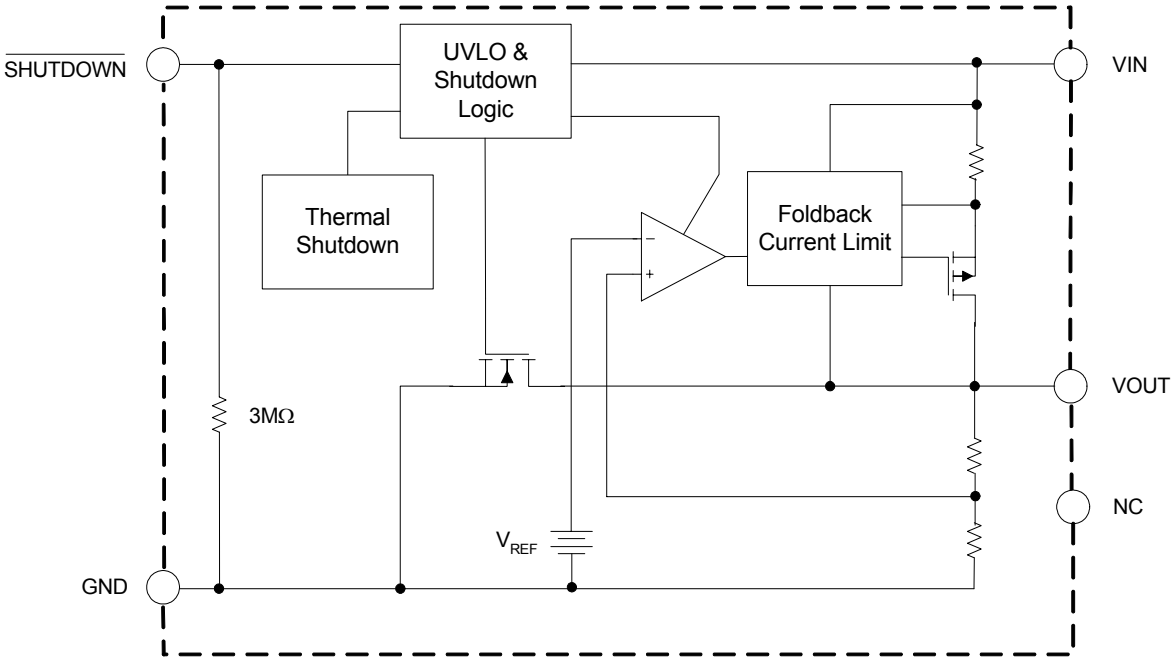
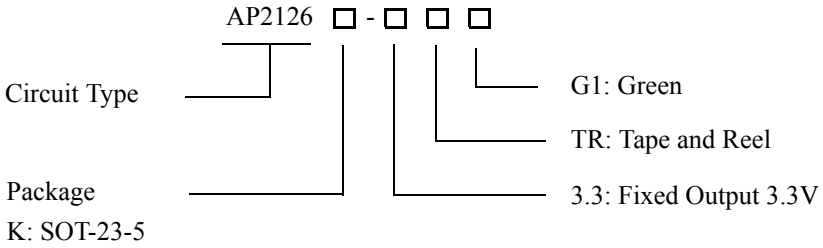


Figure 3. Functional Block Diagram of AP2126

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.

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

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	ΔV_{OUT} /(ΔI_{OUT}*V_{OUT})	V_{IN}-V_{OUT}=1V, 1mA≤I_{OUT}≤300mA				0.6	%/A
Line Regulation	ΔV_{OUT} /(ΔV_{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, $V_{\overline{SHUTDOWN}}$ 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	(ΔV_{OUT}/V_{OUT}) /ΔT	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
$\overline{\text{Shutdown}}$ "High" Voltage		$\overline{\text{Shutdown}}$ input voltage "High"		1.5		6	V
$\overline{\text{Shutdown}}$ "Low" Voltage		$\overline{\text{Shutdown}}$ input voltage "Low"		0		0.4	V
V_{OUT} Discharge MOSFET $R_{DS(ON)}$		$\overline{\text{Shutdown}}$ input voltage "Low"			60		Ω
$\overline{\text{Shutdown}}$ Pull Down Resistance					3		MΩ
Thermal Shutdown					165		°C
Thermal Shutdown Hysteresis					30		°C

Typical Performance Characteristics

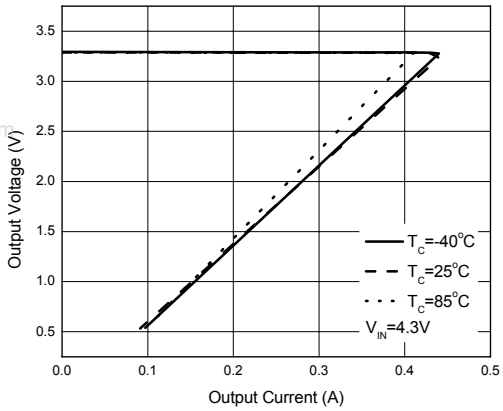


Figure 4. Output Voltage vs. Output Current

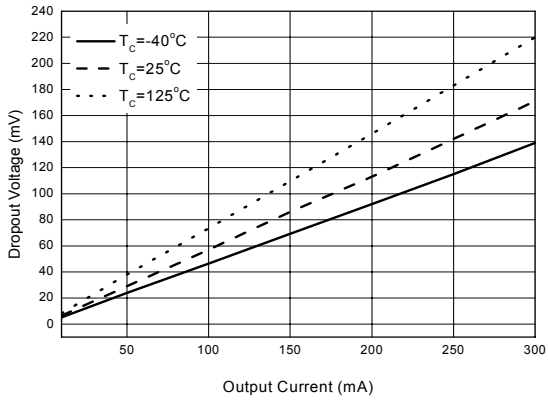


Figure 5. Dropout Voltage vs. Output Current, V_{OUT}=3.3V

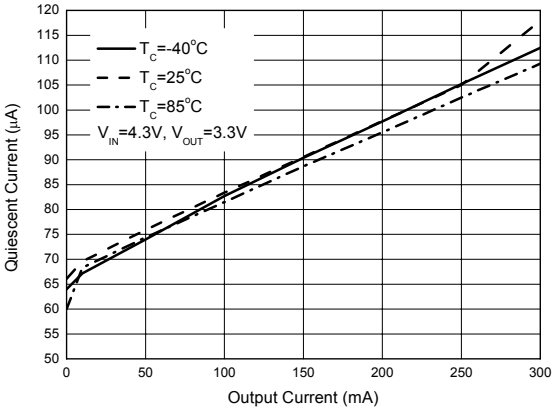


Figure 6. Quiescent Current vs. Output Current

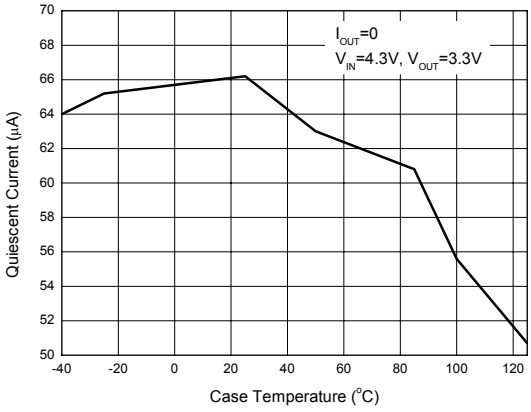


Figure 7. Quiescent Current vs. Case Temperature

Typical Performance Characteristics (Continued)

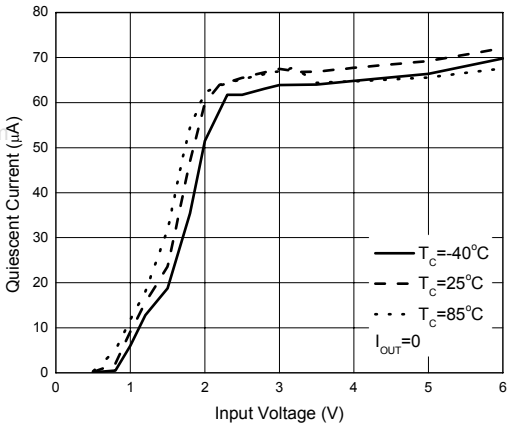


Figure 8. Quiescent Current vs. Input Voltage

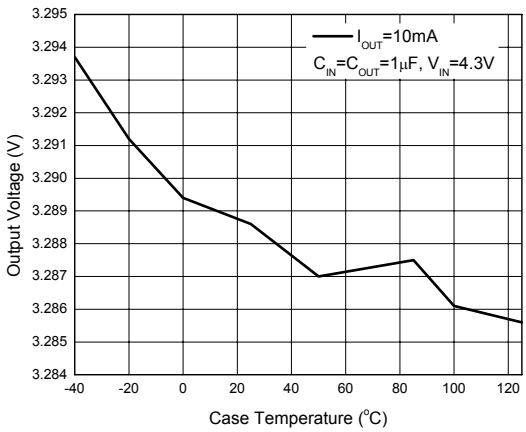


Figure 9. Output Voltage vs. Case Temperature

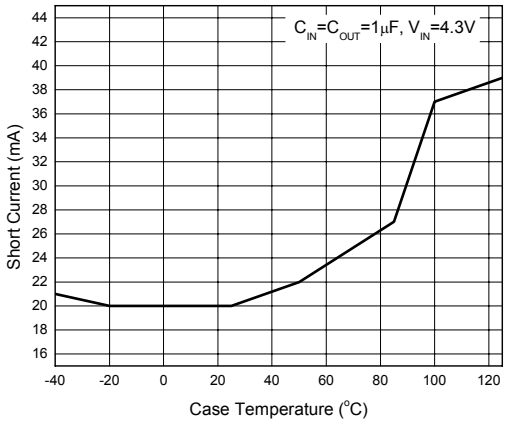


Figure 10. Short Current vs. Case Temperature

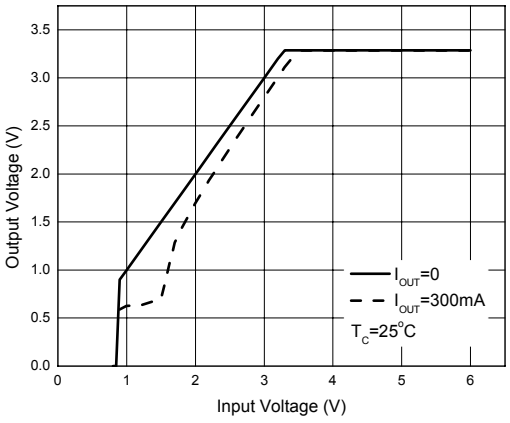


Figure 11. Output Voltage vs. Input Voltage

Typical Performance Characteristics (Continued)

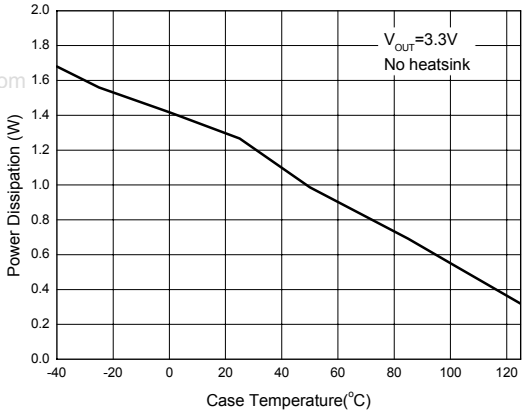


Figure 12. Power Dissipation vs. Case Temperature

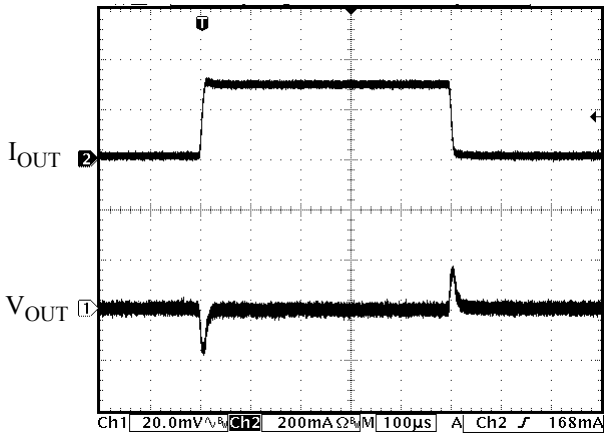


Figure 13. Load Transient
(Conditions: C_{IN}=C_{OUT}=1µF, V_{IN}=4.4V, V_{OUT}=3.3V)

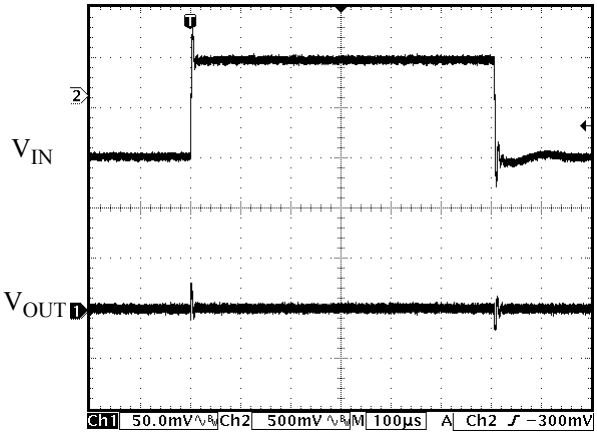


Figure 14. Line Transient
(Conditions: I_{OUT}=30mA, C_{IN}=C_{OUT}=1µF,
V_{IN}=4 to 5V, V_{OUT}=3.3V)

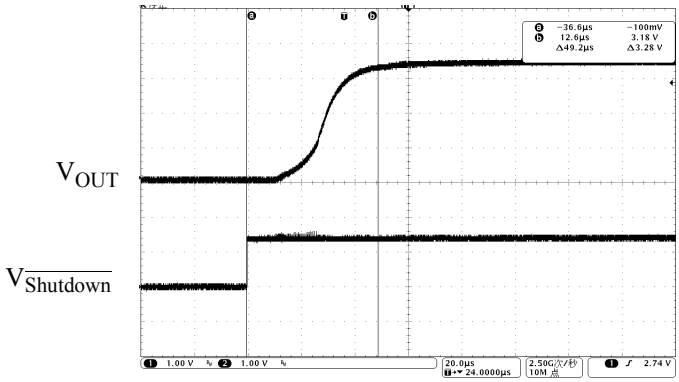


Figure 15. Soft Start Time
(Conditions: I_{OUT}=0mA, C_{IN}=C_{OUT}=1µF,
$V_{\overline{Shutdown}}$=0 to 2V, V_{OUT}=3.3V)

Typical Performance Characteristics (Continued)

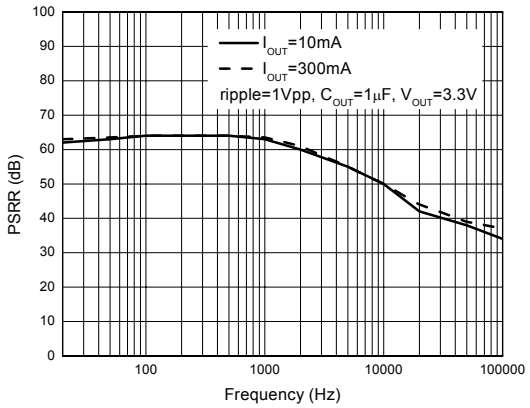
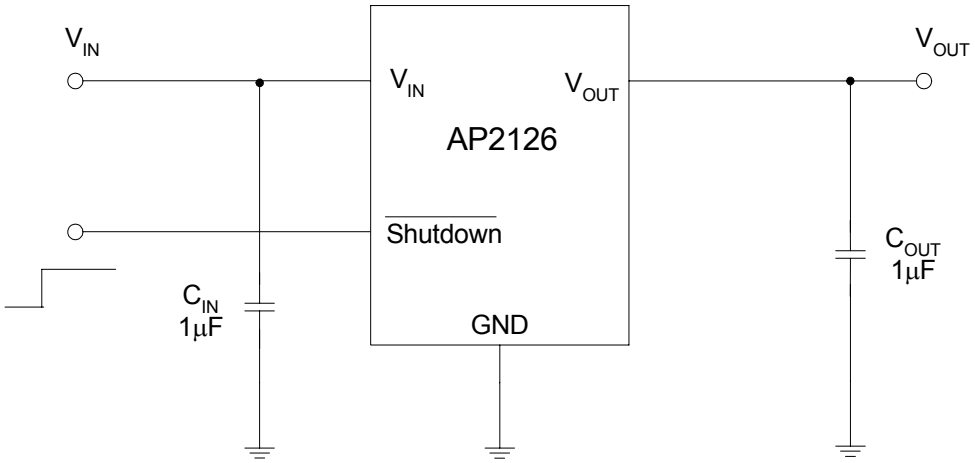


Figure 16. PSRR vs. Frequency

Typical Application

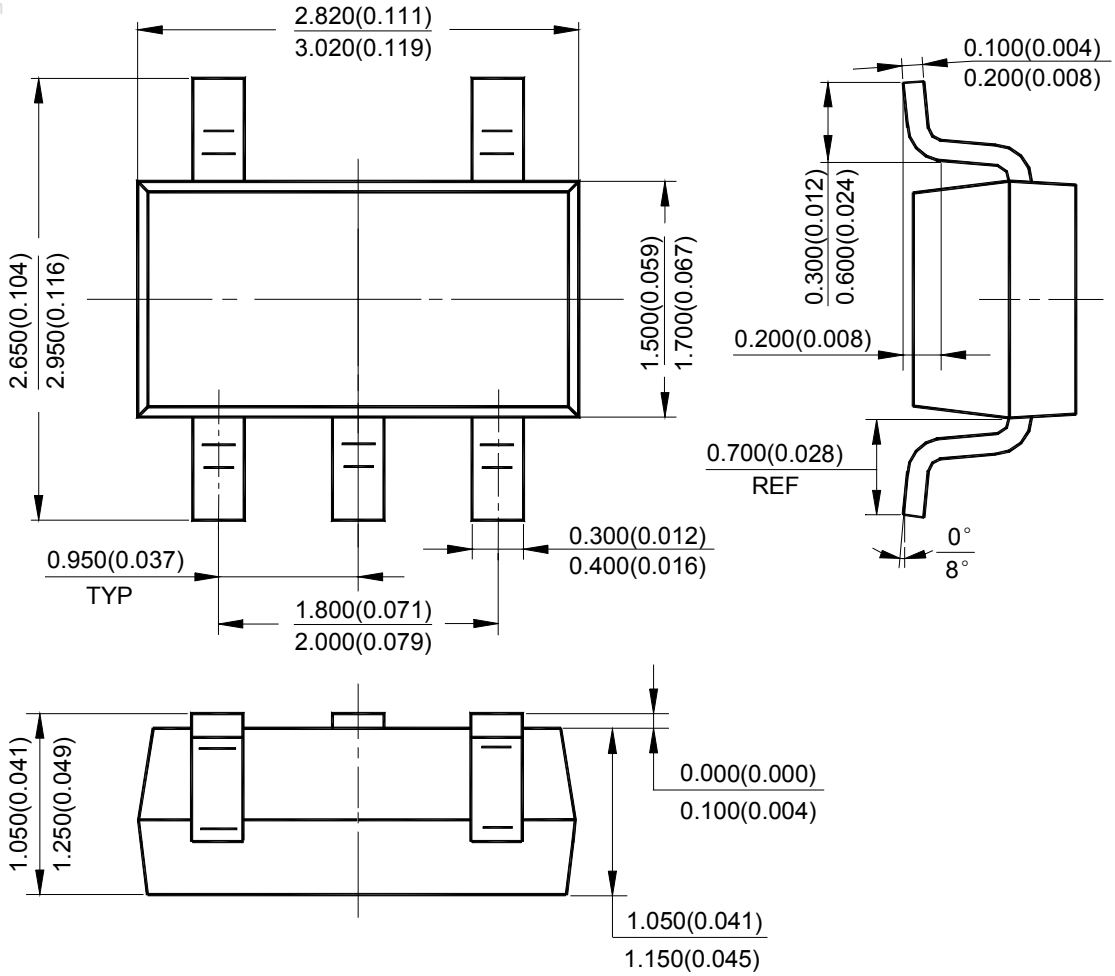


VOUT=3.3V

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
Room E, 5F, Noble Center, No.1006, 3rd Fuzhong Road, Futian District, Shenzhen, 518026, 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