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

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: ±2%
- High Ripple Rejection:
  68dB@ f=1kHz, 54dB@ f=10kHz
- Low Standby Current: 0.1μA
- Low Dropout Voltage: 170mV@300mA for V_{OUT}=3.3V, 140mV@300mA for V_{OUT}=5.2V
- Low Quiescent Current: 60μA Typical
- Low Output Noise: 80μVrms@V_{OUT}=1.25V
- 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)

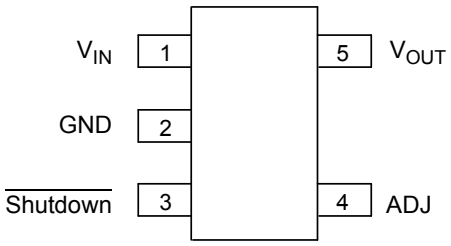


Figure 2. Pin Configuration of AP2126 (Top View)

Functional Block Diagram

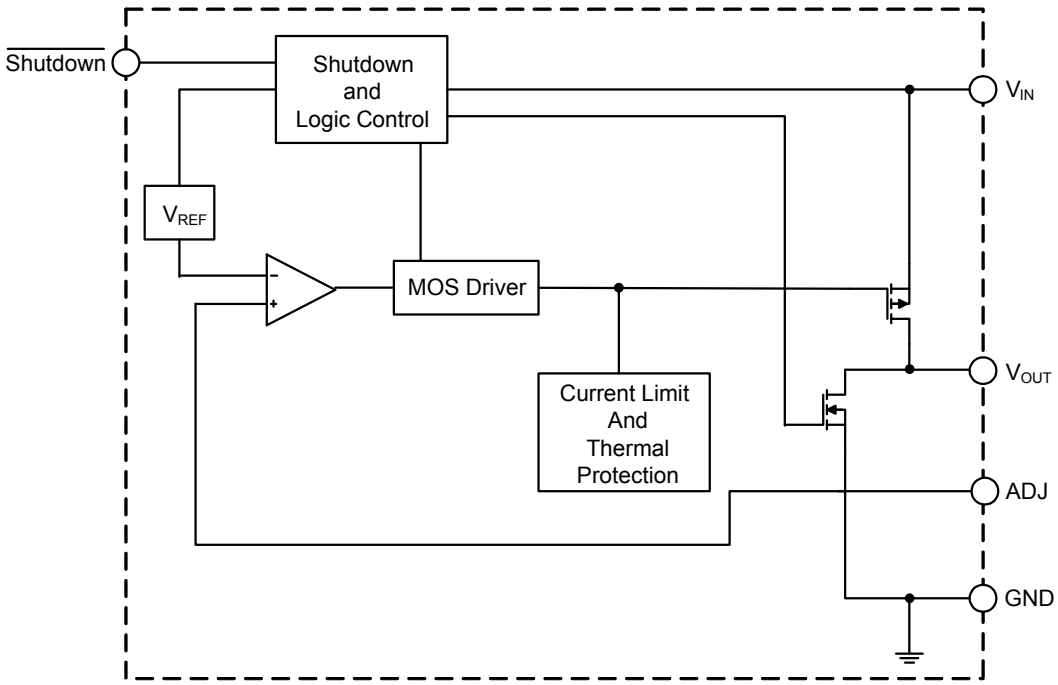
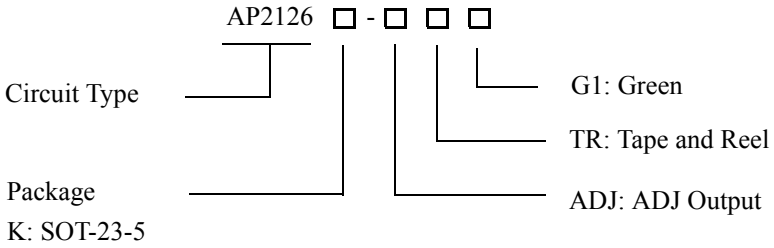


Figure 3. Functional Block Diagram of AP2126

Ordering Information



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.

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

Electrical Characteristics

(AP2126-ADJ, V_{IN} min=3.0V, C_{IN}=1μF, C_{OUT}=1μF, Bold typeface applies over -40°C≤T_A≤85°C, unless otherwise specified.)

Parameter	Symbol	Conditions		Min	Typ	Max	Unit
Reference Voltage	V_{REF}	V_{IN}=3.0V 1mA≤I_{OUT}≤300mA		1.225	1.25	1.275	V
Input Voltage	V_{IN}			3.0		6	V
Maximum Output Current	$I_{OUT(MAX)}$	V_{IN}=3.0V, V_{OUT}=98%×V_{OUT}		300	400		mA
Load Regulation	ΔV_{OUT} /(ΔI_{OUT}*V_{OUT})	V_{IN}=3.0V, 1mA≤I_{OUT}≤300mA				0.6	%/A
Line Regulation	ΔV_{OUT} /(ΔV_{IN}*V_{OUT})	V_{IN}=3.0V to 6V I_{OUT}=30mA				0.06	%/V
Quiescent Current	I_Q	V_{IN}=3.0V, I_{OUT}=0mA			60	90	μA
Standby Current	I_{STD}	V_{IN}=3.0V, $V_{\overline{SHUTDOWN}}$ in off mode			0.1	1.0	μA
Power Supply Rejection Ratio	PSRR	Ripple 1Vp-p V_{IN}=3.5V	f=100Hz		68		dB
			f=1KHz		68		dB
			f=10KHz		54		dB
Output Voltage Temperature Coefficient	(ΔV_{OUT}/V_{OUT}) /ΔT	I_{OUT}=30mA, -40°C≤T_A≤85°C			±100		ppm/°C
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, V_{OUT}=1.25V			80		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
Thermal Resistance	θ_{JC}	SOT-23-5			150		°C/W

Typical Performance Characteristics

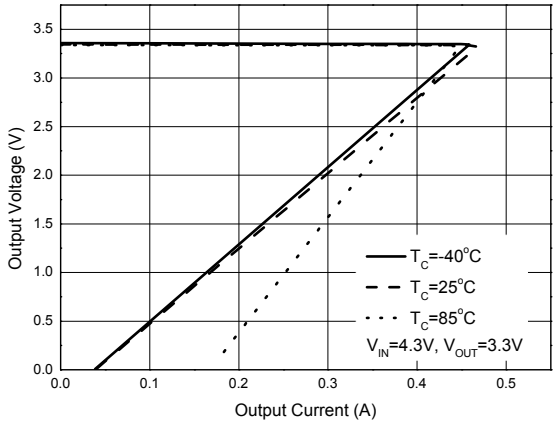


Figure 4. Output Voltage vs. Output Current

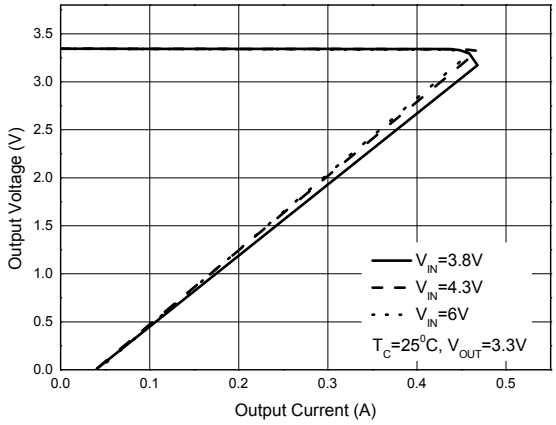


Figure 5. Output Voltage vs. Output Current

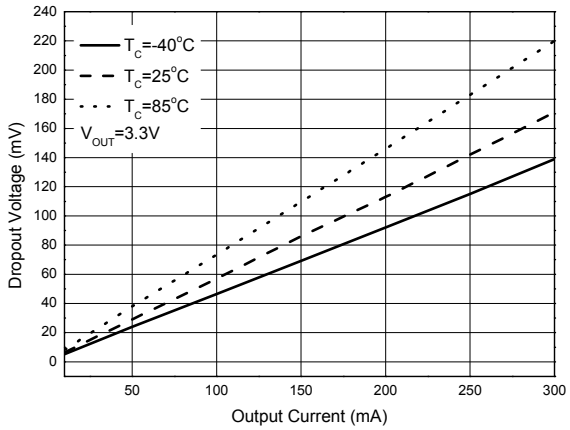


Figure 6. Dropout Voltage vs. Output Current

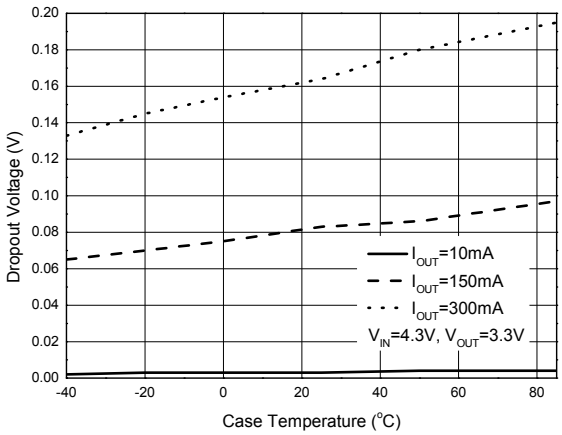


Figure 7. Dropout Voltage vs. Case Temperature

Typical Performance Characteristics (Continued)

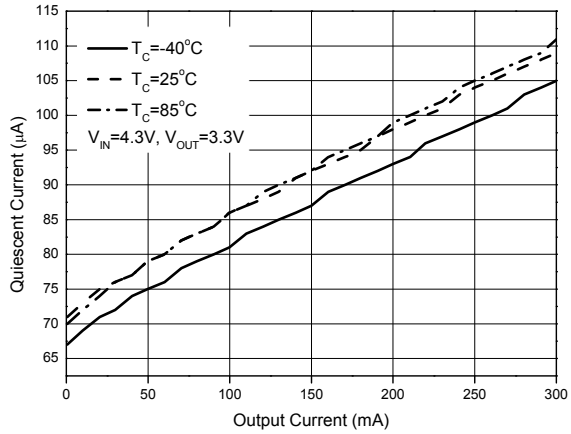


Figure 8. Quiescent Current vs. Output Current

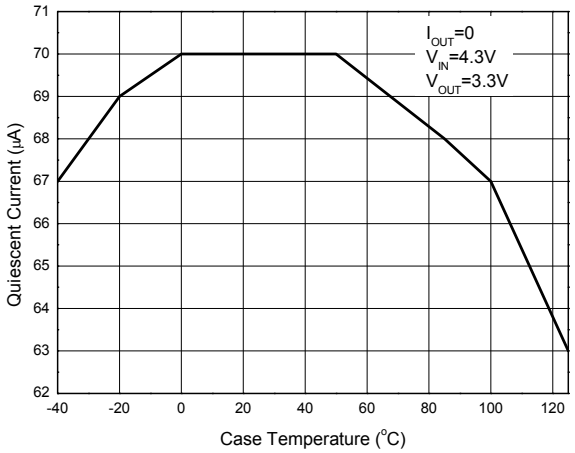


Figure 9. Quiescent Current vs. Case Temperature

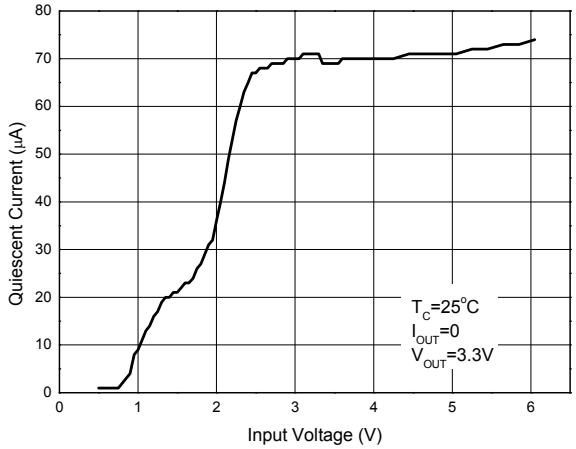


Figure 10. Quiescent Current vs. Input Voltage

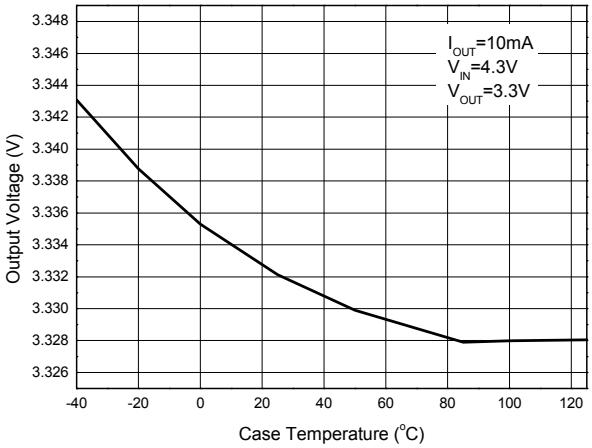


Figure 11. Output Voltage vs. Case Temperature

Typical Performance Characteristics (Continued)

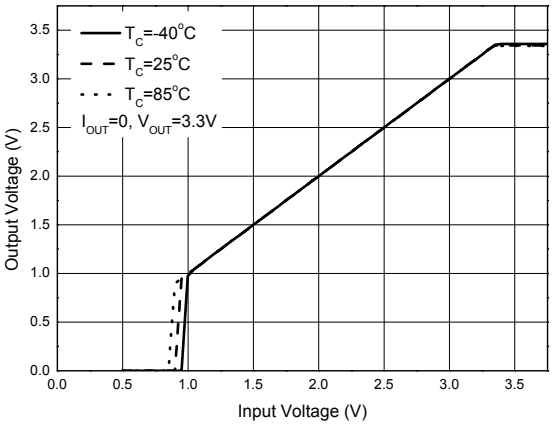


Figure 12. Output Voltage vs. Input Voltage

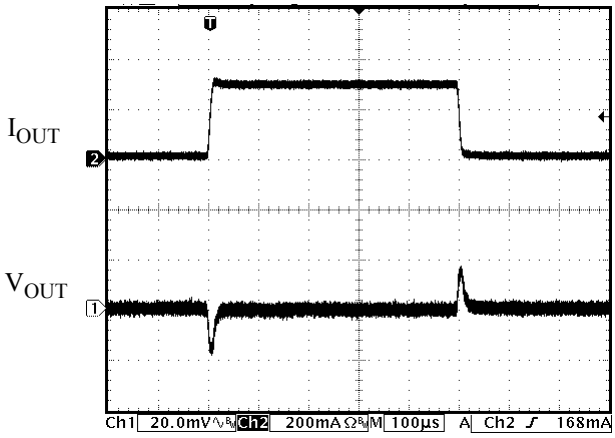


Figure 13. Load Transient
(Conditions: C_{IN}=C_{OUT}=1µF, V_{IN}=4.4V, V_{OUT}=3.3V
I_{OUT}=10mA to 300mA)

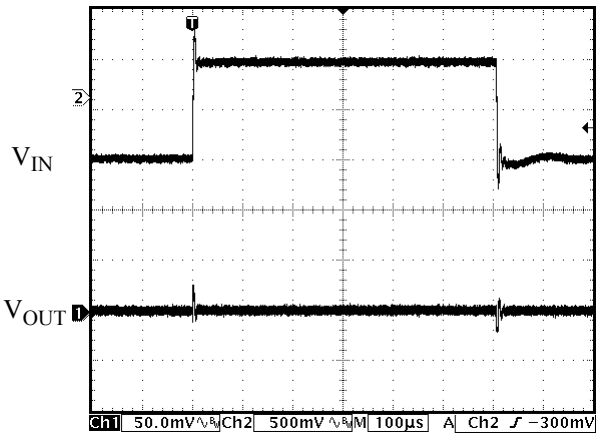


Figure 14. Line Transient
(Conditions: I_{OUT}=30mA, C_{IN}=C_{OUT}=1µF,
V_{IN}=4 to 5V, V_{OUT}=3.3V)

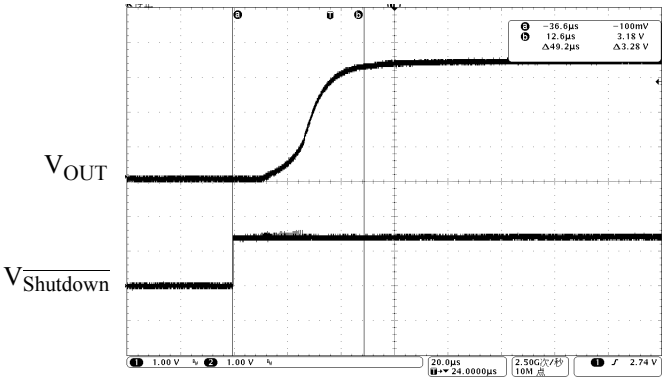


Figure 15. Soft Start Time
(Conditions: I_{OUT}=0mA, C_{IN}=C_{OUT}=1µF,
$V_{\overline{Shutdown}}$=0 to 2V, V_{OUT}=3.3V)

Typical Performance Characteristics (Continued)

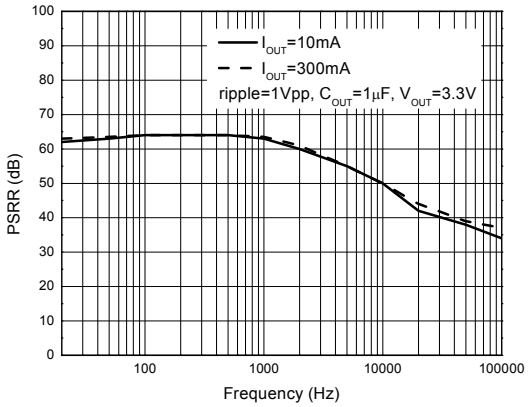
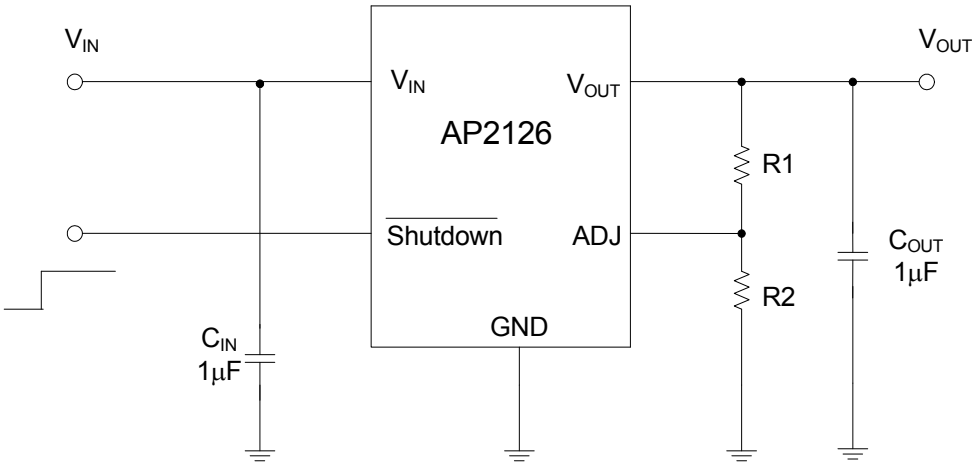


Figure 16. PSRR vs. Frequency

Typical Application

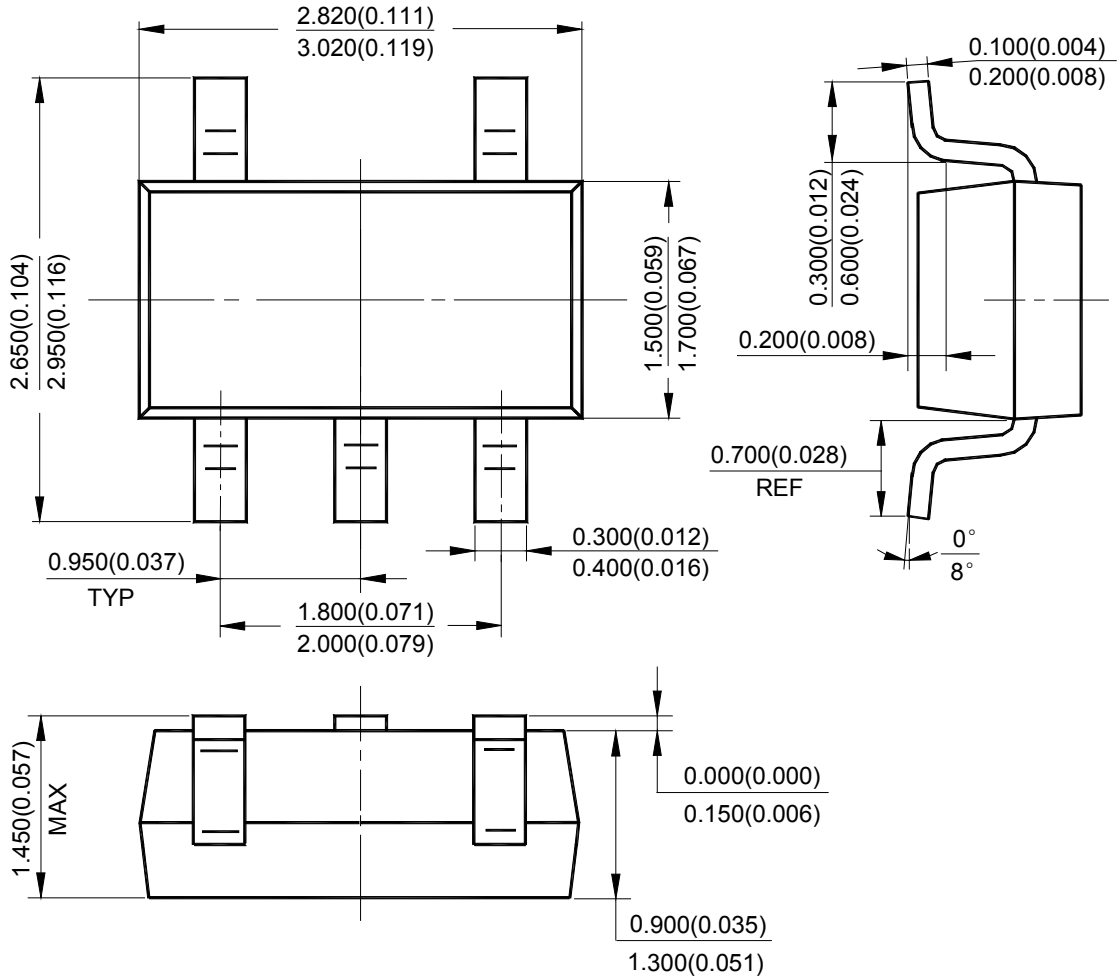


V_{OUT}=1.25*(1+R1/R2) V

Figure 17. Typical Application of AP2126

Mechanical Dimensions

SOT-23-5 **Unit: mm(inch)**



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