

## 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.

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

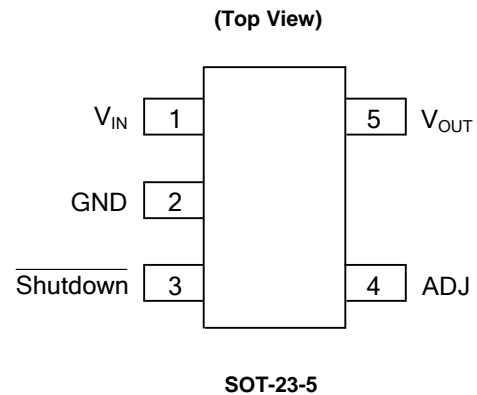
The AP2126 series are available in SOT-23-5 Package.

## Features

- Wide Operating Voltage: 3.0V to 6V
- High Output Voltage Accuracy:  $\pm 2\%$
- High Ripple Rejection: 68dB@  $f = 1\text{kHz}$ , 54dB@  $f = 10\text{kHz}$
- Low Standby Current: 0.1 $\mu\text{A}$
- Low Dropout Voltage: 170mV@300mA for  $V_{\text{OUT}} = 3.3\text{V}$ , 140mV@ 300mA for  $V_{\text{OUT}} = 5.2\text{V}$
- Low Quiescent Current: 60 $\mu\text{A}$  Typical
- Low Output Noise: 80 $\mu\text{Vrms}$ @ $V_{\text{OUT}} = 1.25\text{V}$
- Short Current Limit: 50mA
- Over Temperature Protection
- Compatible with Low ESR Ceramic Capacitor: 1 $\mu\text{F}$  for  $C_{\text{IN}}$  and  $C_{\text{OUT}}$
- Excellent Line/Load Regulation
- Soft Start Time: 50 $\mu\text{s}$
- Auto Discharge Resistance:  $R_{\text{DS(ON)}} = 60\Omega$
- **Totally Lead-free & Fully RoHS Compliant (Notes 1 & 2)**
- **Halogen & Antimony Free. "Green" Device (Note 3)**

- Notes:
1. No purposely added lead. Fully EU Directive 2002/95/EC (RoHS) & 2011/65/EU (RoHS 2) compliant.
  2. See [http://www.diodes.com/quality/lead\\_free.html](http://www.diodes.com/quality/lead_free.html) for more information about Diodes Incorporated's definitions of Halogen- and Antimony-free, "Green" and Lead-free.
  3. Halogen- and Antimony-free "Green" products are defined as those which contain <900ppm bromine, <900ppm chlorine (<1500ppm total Br + Cl) and <1000ppm antimony compounds.

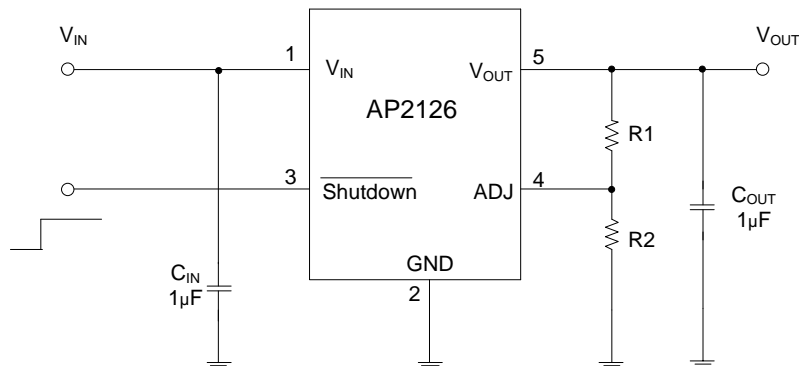
## Pin Assignments



## Applications

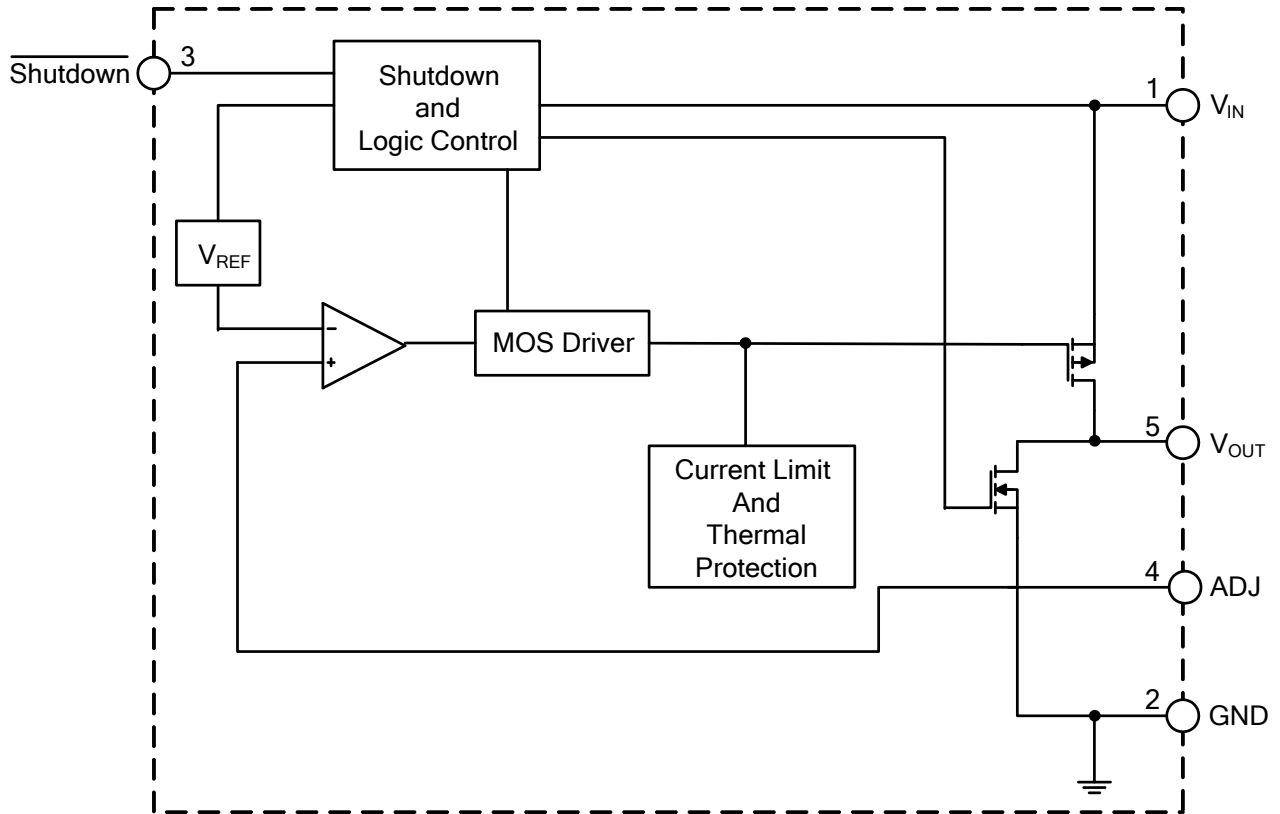
- Datacom
- Notebook Computers
- Mother Board

## Typical Applications Circuit



$$V_{\text{OUT}} = 1.25 \cdot (1 + R1/R2) \text{ V}$$

**Functional Block Diagram**



**Absolute Maximum Ratings** (Note 4)

Symbol	Parameter	Rating	Unit
$V_{IN}$	Input Voltage	6.5	V
$V_{CE}$	Shutdown Input Voltage	-0.3 to $V_{IN} + 0.3$	V
$I_{OUT}$	Output Current	450	mA
$T_J$	Junction Temperature	+150	°C
$T_{STG}$	Storage Temperature Range	-65 to +150	°C
$T_{LEAD}$	Lead Temperature (Soldering, 10sec)	+260	°C
$\theta_{JA}$	Thermal Resistance (Junction to Ambient)	250	°C/W
ESD	ESD (Human Body Model)	6000	V
ESD	ESD (Machine Model)	250	V

Note 4: 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

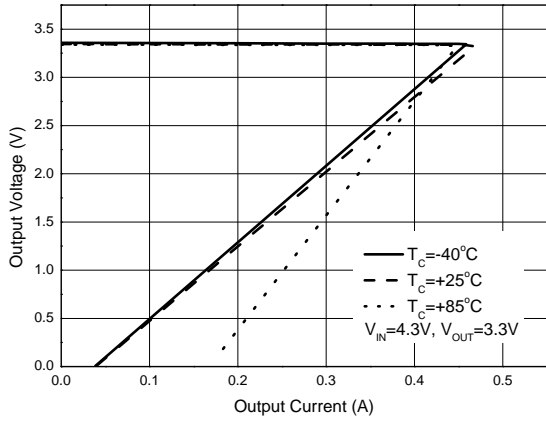
Symbol	Parameter	Min	Max	Unit
$V_{IN}$	Input Voltage	3.0	6	V
$T_A$	Operating Ambient Temperature Range	-40	+85	°C

## Electrical Characteristics (AP2126-ADJ, $V_{IN}$ min = 3.0V, $C_{IN}$ = 1 $\mu$ F, $C_{OUT}$ = 1 $\mu$ F, unless otherwise specified.)

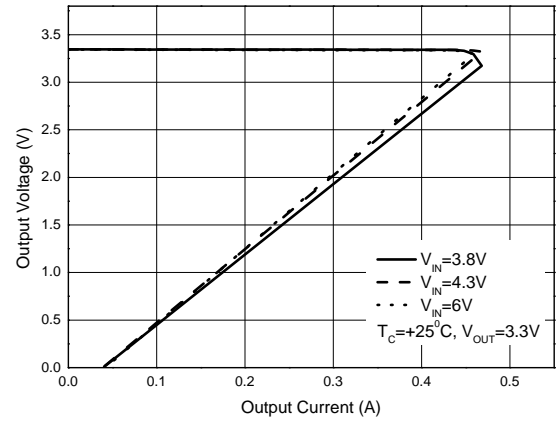
Symbol	Parameter	Conditions	Min	Typ	Max	Unit	
$V_{REF}$	Reference Voltage	$V_{IN} = 3.0V, 1mA \leq I_{OUT} \leq 300mA$	1.225	1.25	1.275	V	
$V_{IN}$	Input Voltage	—	3.0	—	6	V	
$I_{OUT(MAX)}$	Maximum Output Current	$V_{IN} = 3.0V, V_{OUT} = 98\% \times V_{OUT}$	300	400	—	mA	
$\frac{\Delta V_{OUT}}{(\Delta I_{OUT} \times V_{OUT})}$	Load Regulation	$V_{IN} = 3.0V, 1mA \leq I_{OUT} \leq 300mA$	—	—	0.6	%/A	
$\frac{\Delta V_{OUT}}{(\Delta V_{IN} \times V_{OUT})}$	Line Regulation	$V_{IN} = 3.0V$ to 6V, $I_{OUT} = 30mA$	—	—	0.06	%/V	
$I_Q$	Quiescent Current	$V_{IN} = 3.0V, I_{OUT} = 0mA$	—	60	90	$\mu$ A	
$I_{STD}$	Standby Current	$V_{IN} = 3.0V, V_{Shutdown}$ in Off Mode	—	0.1	1.0	$\mu$ A	
PSRR	Power Supply Rejection Ratio	Ripple 1Vp-p $V_{IN} = 3.5V$	f = 100Hz	—	68	—	dB
			f = 1kHz	—	68	—	dB
			f = 10kHz	—	54	—	dB
$\frac{(\Delta V_{OUT}/V_{OUT})}{\Delta T}$	Output Voltage Temperature Coefficient	$I_{OUT} = 30mA, -40^\circ C \leq T_A \leq +85^\circ C$	—	$\pm 100$	—	ppm/°C	
$I_{SHORT}$	Short Current Limit	$V_{OUT} = 0V$	—	50	—	mA	
$t_{UP}$	Soft Start Time	—	—	50	—	$\mu$ s	
$V_{NOISE}$	RMS Output Noise	$T_A = +25^\circ C, 10Hz \leq f \leq 100kHz, V_{OUT} = 1.25V$	—	80	—	$\mu$ Vrms	
—	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	—	$\Omega$	
—	Shutdown Pull Down Resistance	—	—	3	—	M $\Omega$	
—	Thermal Shutdown	—	—	+165	—	°C	
—	Thermal Shutdown Hysteresis	—	—	+30	—	°C	
$\theta_{JC}$	Thermal Resistance	SOT-23-5	—	150	—	°C/W	

**Performance Characteristics**

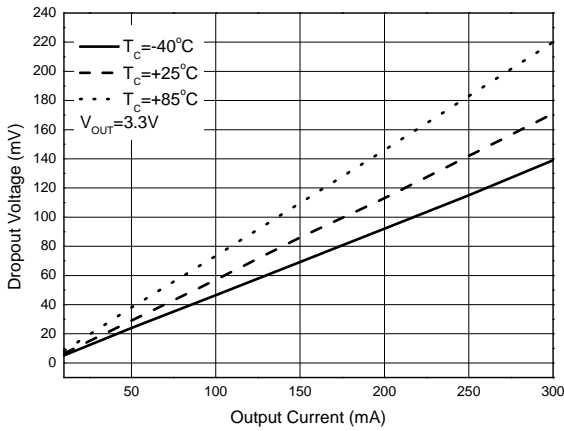
**Output Voltage vs. Output Current**



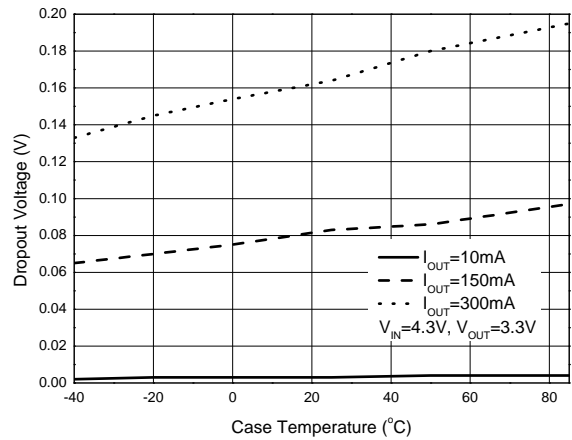
**Output Voltage vs. Output Current**



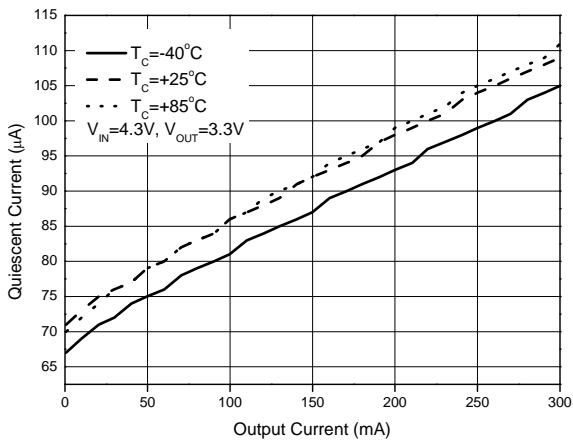
**Dropout Voltage vs. Output Current**



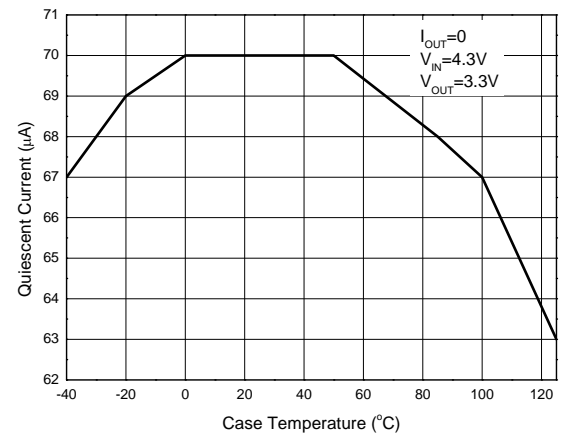
**Dropout Voltage vs. Case Temperature**



**Quiescent Current vs. Output Current**

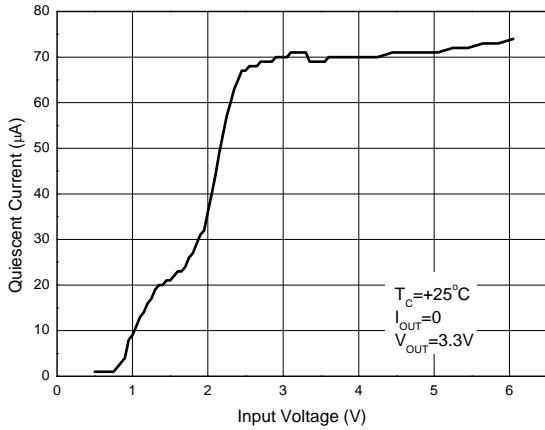


**Quiescent Current vs. Case Temperature**

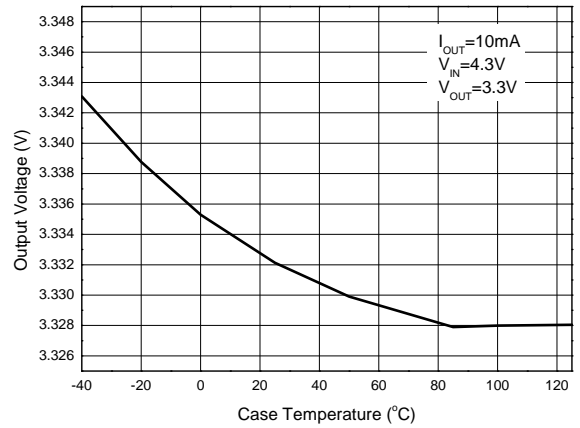


**Performance Characteristics (Cont.)**

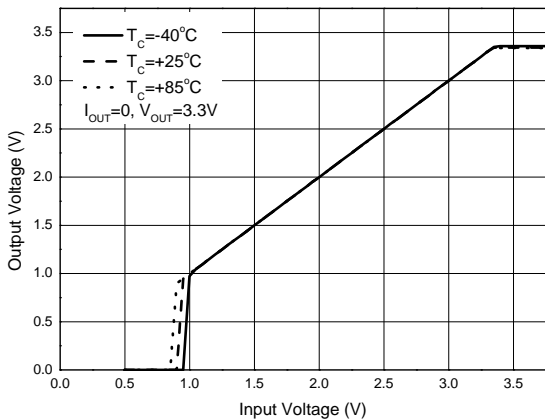
**Quiescent Current vs. Input Voltage**



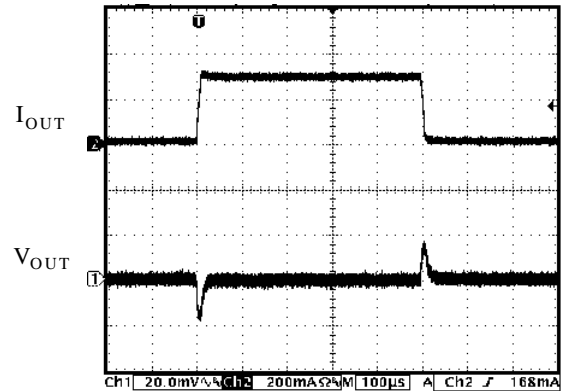
**Output Voltage vs. Case Temperature**



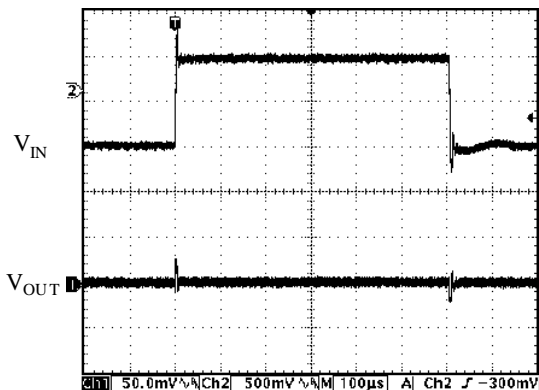
**Output Voltage vs. Input Voltage**



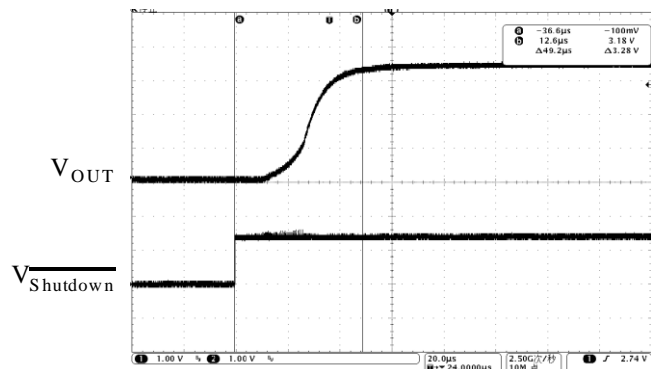
**Load Transient**  
(Conditions:  $C_{IN}=C_{OUT}=1\mu F$ ,  $V_{IN}=4.4V$ ,  $V_{OUT}=3.3V$ ,  $I_{OUT}=10mA$  to  $300mA$ )



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

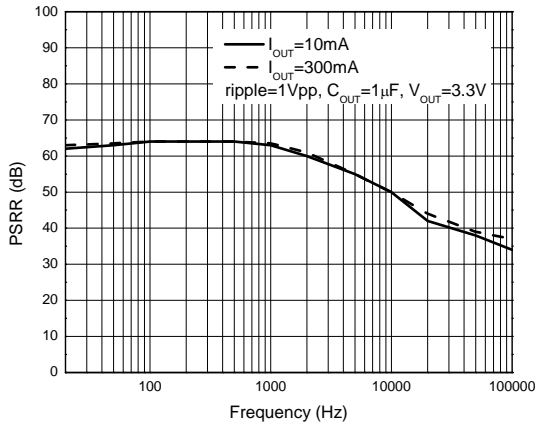


**Soft Start Time**  
(Conditions:  $I_{OUT}=0mA$ ,  $C_{IN}=C_{OUT}=1\mu F$ ,  $V_{Shutdown}=0$  to  $2V$ ,  $V_{OUT}=3.3V$ )

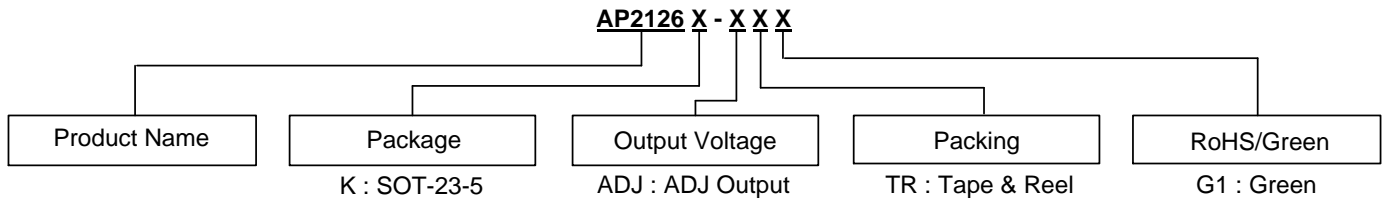


**Performance Characteristics (Cont.)**

**PSRR vs. Frequency**



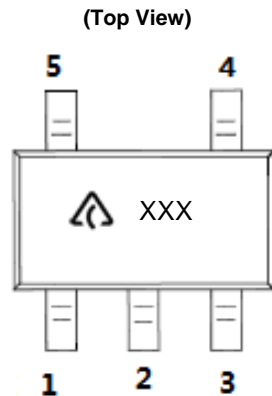
**Ordering Information**



Package	Temperature Range	Part Number	Marking ID	Packing
SOT-23-5	-40 to +85°C	AP2126K-ADJTRG1	GHH	3000/Tape & Reel

**Marking Information**

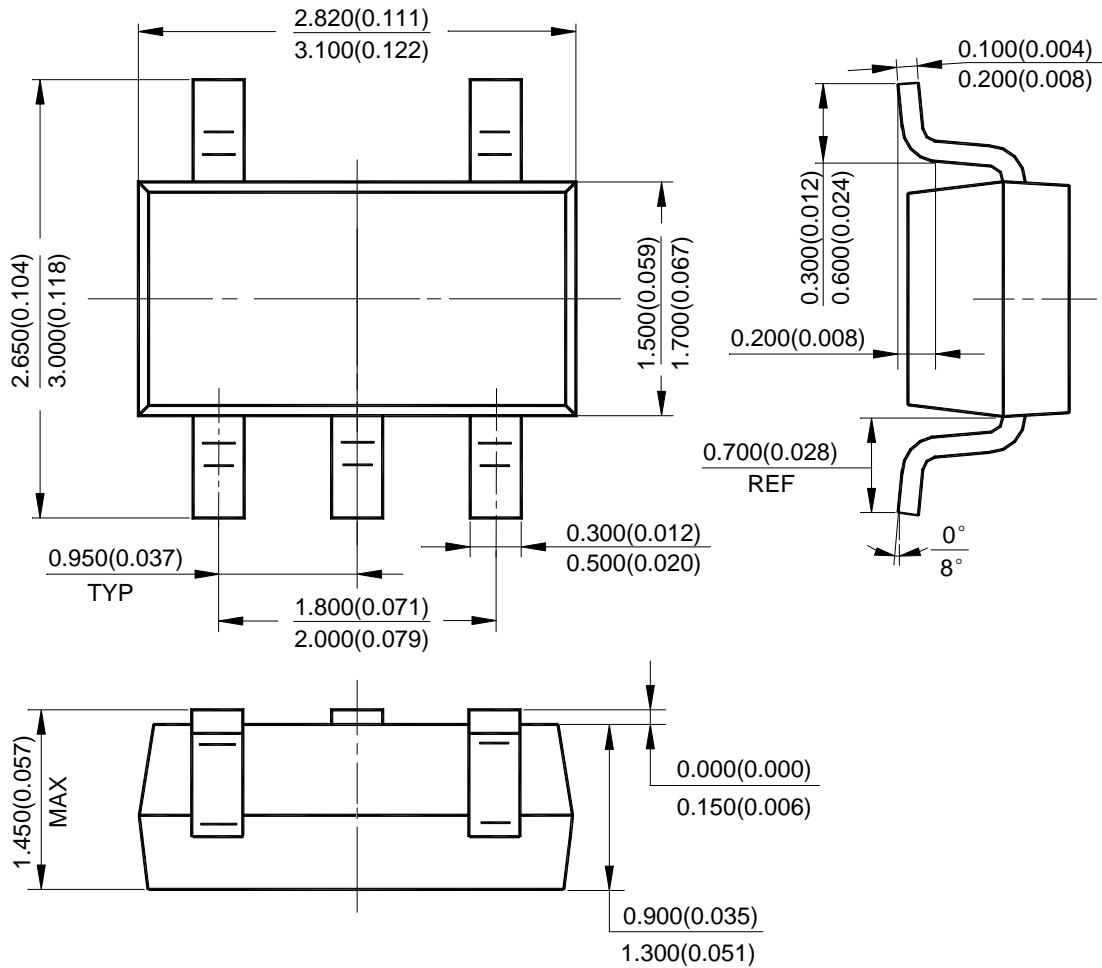
(1) SOT-23-5



: Logo  
 XXX: Marking ID  
 (See Ordering Information)

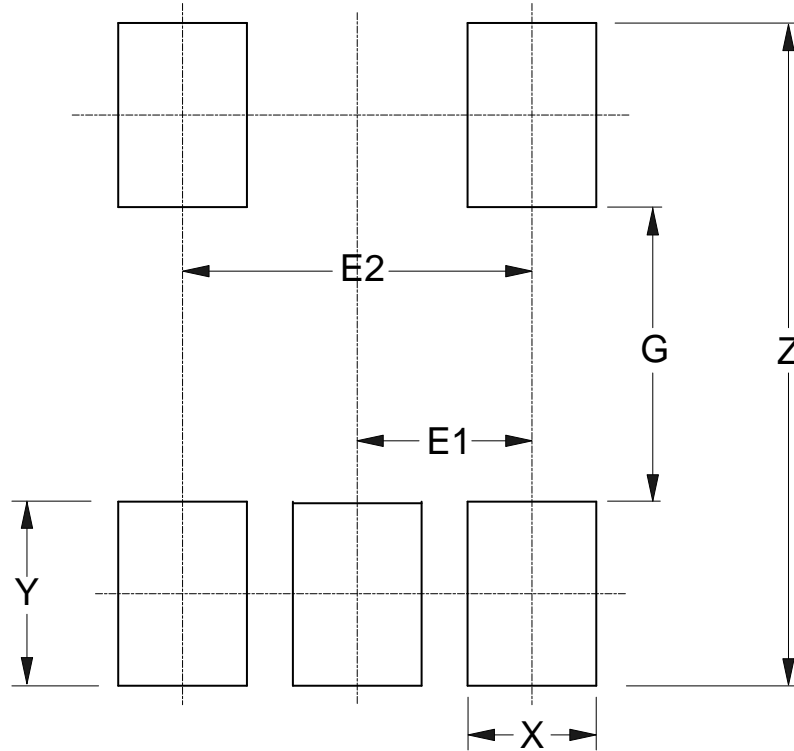
**Package Outline Dimensions** (All dimensions in mm(inch).)

(1) Package Type: SOT-23-5



**Suggested Pad Layout**

(1) Package Type: SOT-23-5



Dimensions	Z (mm)/(inch)	G (mm)/(inch)	X (mm)/(inch)	Y (mm)/(inch)	E1 (mm)/(inch)	E2 (mm)/(inch)
Value	3.600/0.142	1.600/0.063	0.700/0.028	1.000/0.039	0.950/0.037	1.900/0.075

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