300mA HIGH SPEED, EXTREMELY LOW NOISE CMOS LDO REGULATOR

Description

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

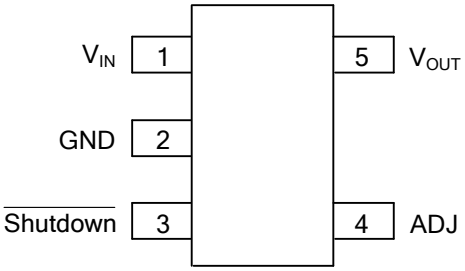
The AP2126 series have features of low dropout voltage, low noise, high output voltage accuracy, and low current consumption which make them ideal for use in various battery-powered devices.

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

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

Pin Assignments

(Top View)



SOT-23-5

Features

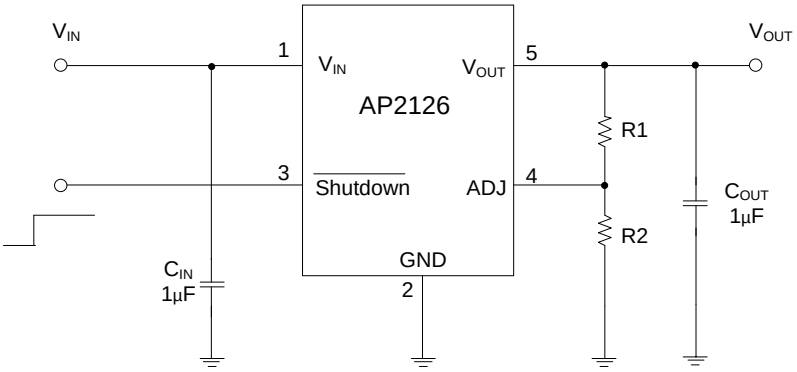
- Wide Operating Voltage: 3.0V to 6V
- High Output Voltage Accuracy: ±2%
- High Ripple Rejection: 68dB@ f = 1kHz, 54dB@ f = 10kHz
- Low Standby Current: 0.1μA
- Low Dropout Voltage: 170mV@300mA for V_{OUT} = 3.3V, 140mV@ 300mA for V_{OUT} = 5.2V
- Low Quiescent Current: 60μA Typical
- Low Output Noise: 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
- **Totally Lead-free & Fully RoHS Compliant (Notes 1 & 2)**
- **Halogen & Antimony Free. "Green" Device (Note 3)**

Applications

- Datacom
- Notebook Computers
- Mother Board

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 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.

Typical Applications Circuit



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

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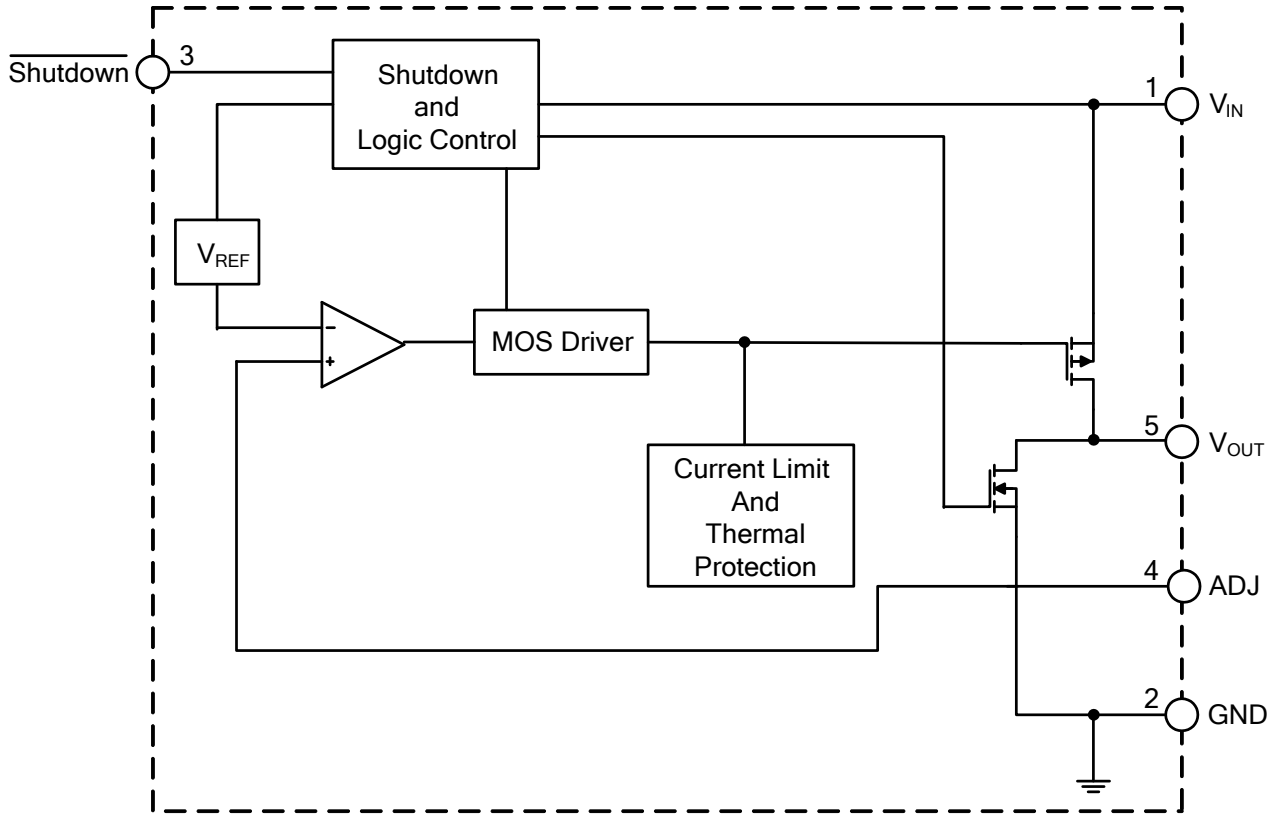
Functional Block Diagram



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
θ_{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.

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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} = 1µF, C_{OUT} = 1µF, unless otherwise specified.)

Symbol	Parameter	Conditions		Min	Typ	Max	Unit
V_{REF}	Reference Voltage	V_{IN} = 3.0V, 1mA ≤ I_{OUT} ≤ 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% x V_{OUT}		300	400	—	mA
ΔV_{OUT} /(ΔI_{OUT}*V_{OUT})	Load Regulation	V_{IN} = 3.0V, 1mA ≤ I_{OUT} ≤ 300mA		—	—	0.6	%/A
ΔV_{OUT} /(ΔV_{IN}*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	µA
I_{STD}	Standby Current	V_{IN} = 3.0V, $V_{\overline{Shutdown}}$ in Off Mode		—	0.1	1.0	µA
PSRR	Power Supply Rejection Ratio	Ripple 1Vp-p V_{IN} = 3.5V	f = 100Hz	—	68	—	dB
			f = 1kHz	—	68	—	dB
			f = 10kHz	—	54	—	dB
(ΔV_{OUT}/V_{OUT}) /ΔT	Output Voltage Temperature Coefficient	I_{OUT} = 30mA, -40°C ≤ T_A ≤ +85°C		—	±100	—	ppm/°C
I_{SHORT}	Short Current Limit	V_{OUT} = 0V		—	50	—	mA
t_{UP}	Soft Start Time	—		—	50	—	µs
V_{NOISE}	RMS Output Noise	T_A = +25°C, 10Hz ≤ f ≤ 100kHz, V_{OUT} = 1.25V		—	80	—	µVrms
—	$\overline{Shutdown}$ "High" Voltage	$\overline{Shutdown}$ Input Voltage "High"		1.5	—	6	V
—	$\overline{Shutdown}$ "Low" Voltage	$\overline{Shutdown}$ Input Voltage "Low"		0	—	0.4	V
—	V_{OUT} Discharge MOSFET $R_{DS(ON)}$	$\overline{Shutdown}$ Input Voltage "Low"		—	60	—	Ω
—	$\overline{Shutdown}$ Pull Down Resistance	—		—	3	—	MΩ
—	Thermal Shutdown	—		—	+165	—	°C
—	Thermal Shutdown Hysteresis	—		—	+30	—	°C
θ_{JC}	Thermal Resistance	SOT-23-5		—	150	—	°C/W

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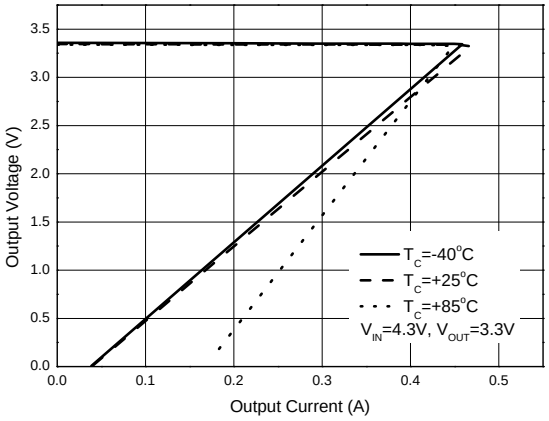
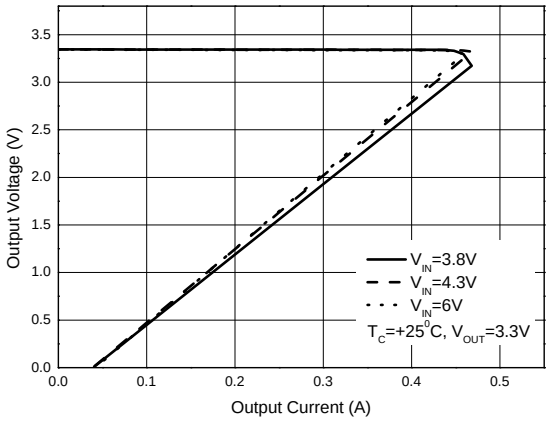
Performance Characteristics

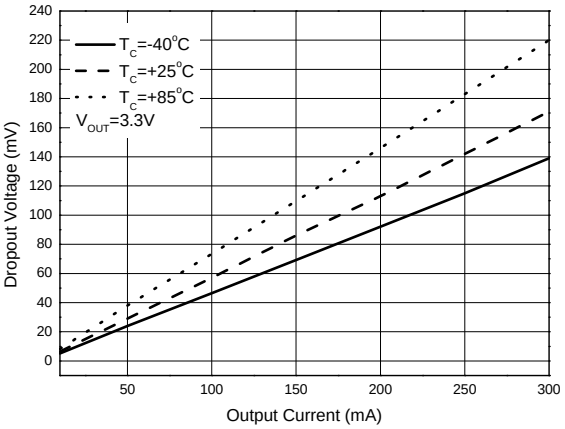
Output Voltage vs. Output Current



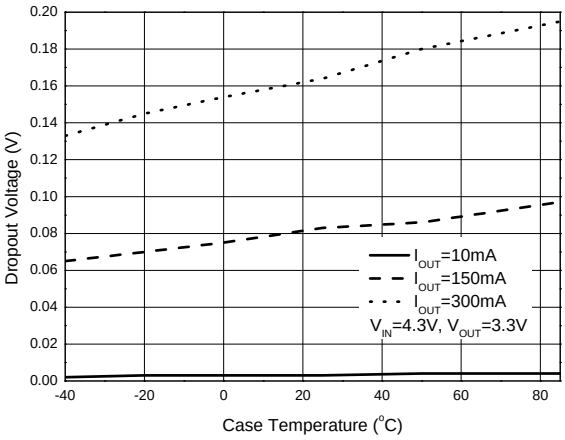
Output Voltage vs. Output Current



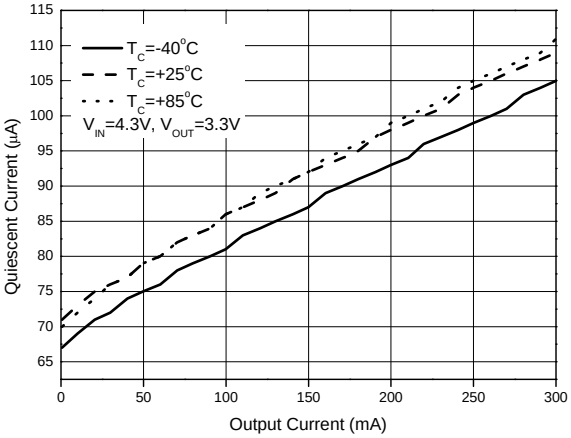
Dropout Voltage vs. Output Current



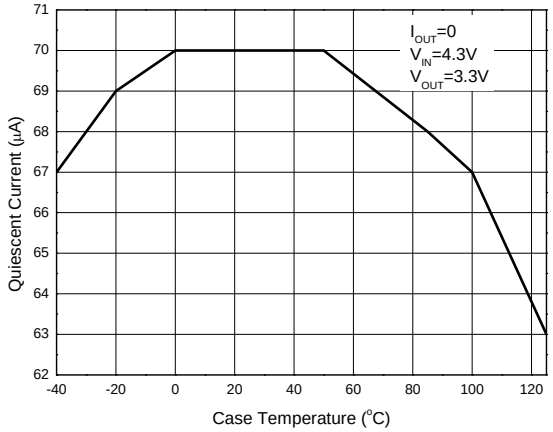
Dropout Voltage vs. Case Temperature



Quiescent Current vs. Output Current



Quiescent Current vs. Case Temperature



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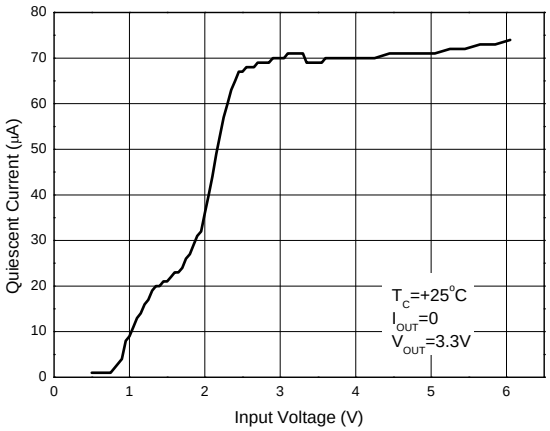
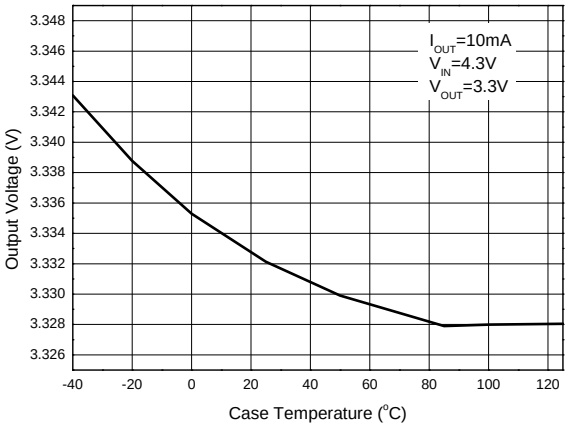
Performance Characteristics (Cont.)

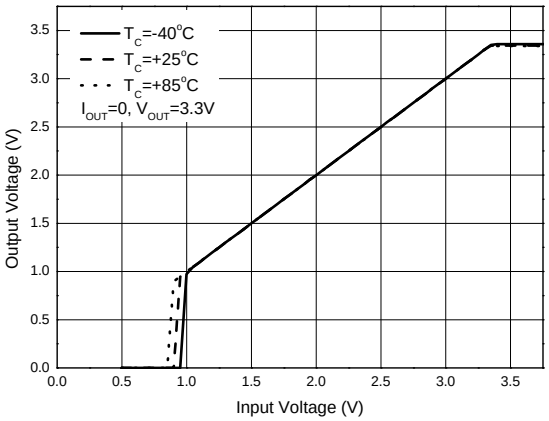
Quiescent Current vs. Input Voltage



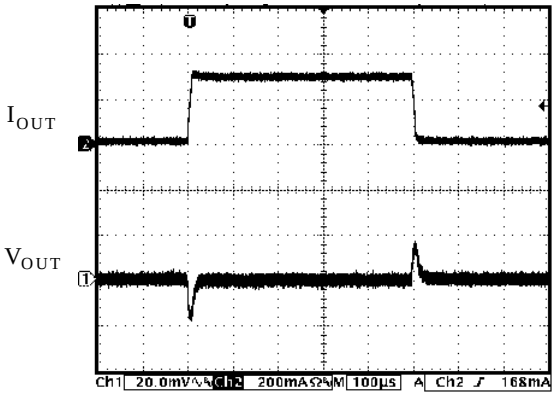
Output Voltage vs. Case Temperature



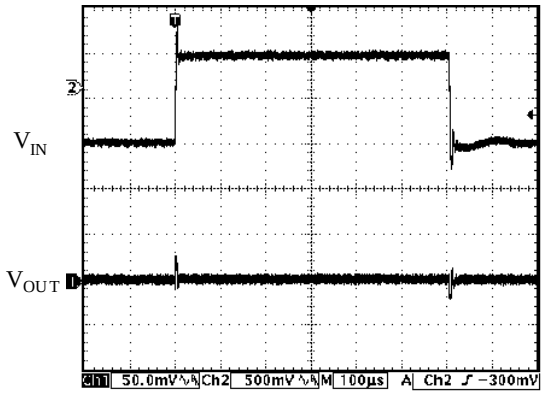
Output Voltage vs. Input Voltage



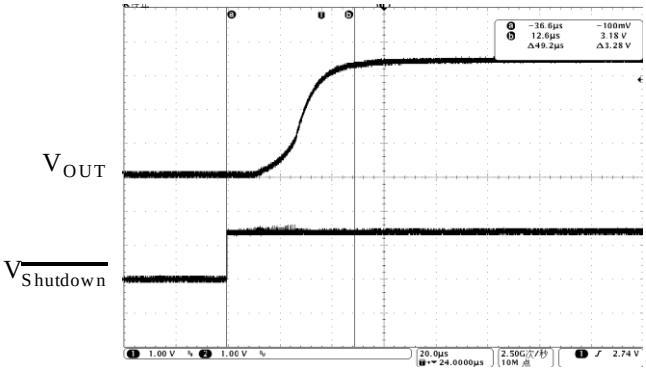
Load Transient
(Conditions: C_{IN}=C_{OUT}=1μF, V_{IN}=4.4V, V_{OUT}=3.3V I_{OUT}=10mA to 300mA)



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



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



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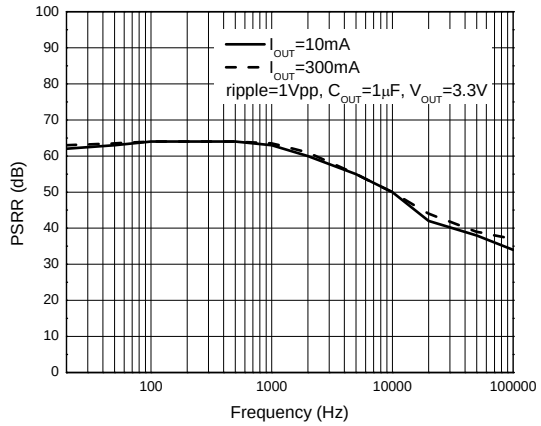
Performance Characteristics (Cont.)

PSRR vs. Frequency



Ordering Information

AP2126 X - X X X

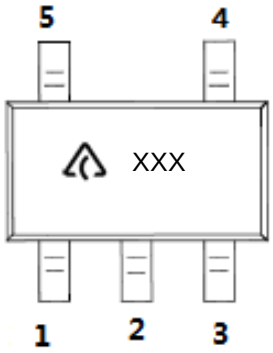
Product Name	Package	Output Voltage	Packing	RoHS/Green
	K : SOT-23-5	ADJ : ADJ Output	TR : Tape & Reel	G1 : Green

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

(Top View)



: Logo
XXX: Marking ID
(See Ordering Information)

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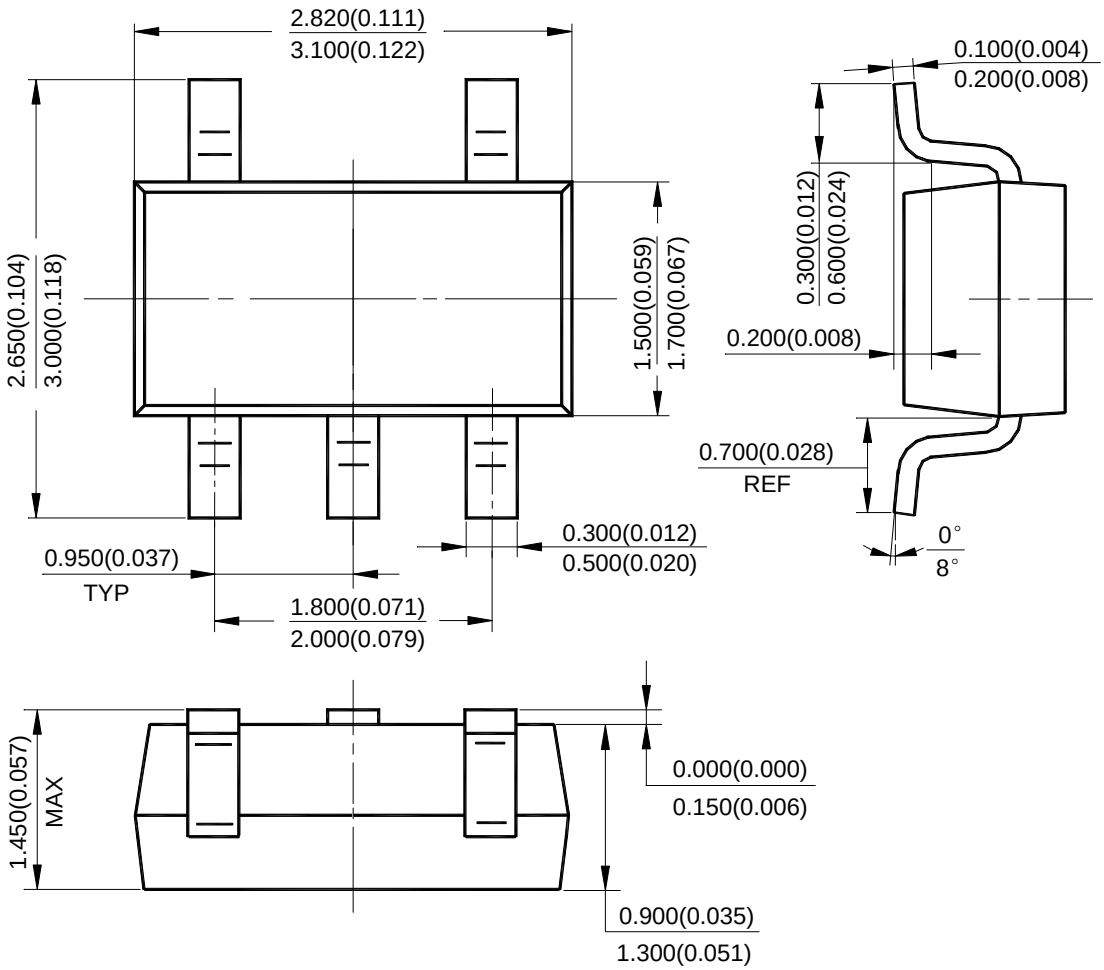
Package Outline Dimensions (All dimensions in mm(inch).)

(1) Package Type: SOT-23-5



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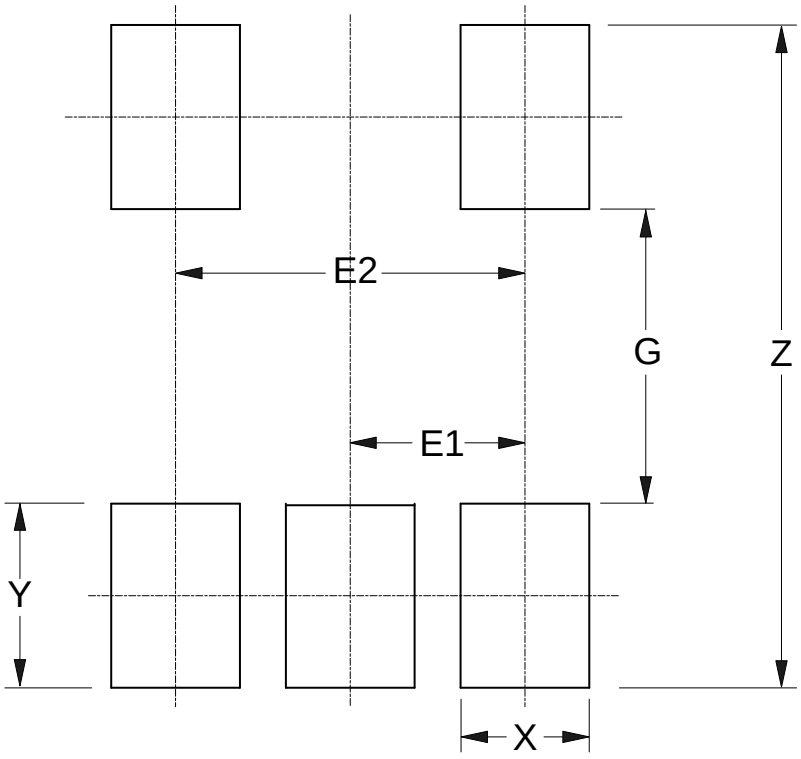
Suggested Pad Layout

(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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