General Description

The TPSP6201 is a low-dropout (LDO) voltage regulator with enable function that operates from a 1.2V to 5.5V supply. It provides up to 200mA of output current in miniaturized packaging.

The feature of 2µA low quiescent current and 0.5µA shutdown current are ideal for the battery application with long service life. The other features include current limit function, over temperature protection and output discharge function.

Features

- 6 µA Ground Current at no Load
- ±2% Output Accuracy
- 200mA Output Current
- 10nA Disable Current (by option)
- Wide Operating Input Voltage Range: 1.2V to 5.5V
- Dropout Voltage: 0.15V at 300mA (V_{OUT}=3.3V)
- Support Fixed Output Voltage 1.2V, 1.5V, 1.6V, 1.8V, 2.5V, 2.8V, 3.0V, 3.3V,3.6V
- Stable with Ceramic or Tantalum Capacitor
- Current Limit Protection
- Over-Temperature Protection
- SOT23-5, Packages

Applications
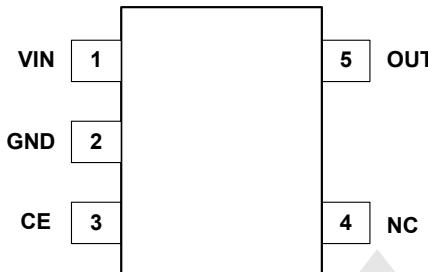
- Portable, Battery Powered Equipment
- Low Power Microcontrollers
- Laptop, Palmtops and PDAs
- Wireless Communication Equipment
- Audio/Video Equipment

Ordering Information
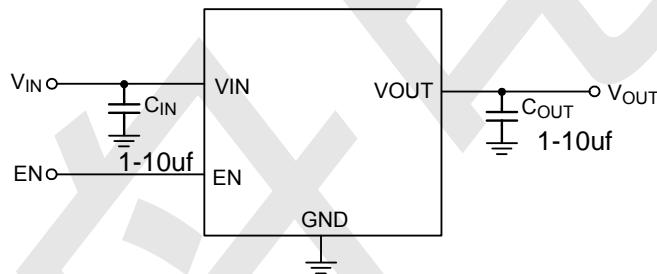
TPSP6201EM5-L-3-3

Output voltage: 1-2=1.2V
          1-5=1.5V
          1-8=1.8V
          3-0=3.0V
          3-3=3.3V
          3-6=3.6V

EM5:SOT23-5 Package

PIN CONFIGURATION


SOT23-5

Typical Application Circuit

ABSOLUTE MAXIMUM RATINGS

| Parameter		Value	Unit
Supply Voltage		-0.3~+6.5	V
Power Dissipation			
	SOT-23-5	400	mW
	SOT-89	600	mW
Thermal Resistance,Junction-to-Ambient			
	SOT-23-5	380	°C/W
	SOT-89	180	°C/W
Operating Junction Temperature		-40 ~ +125	°C
Storage Temperature Range		-65 ~ +150	°C
Lead Temperature (Soldering, 10 sec)		300	°C

Electrical Characteristics (T =25°C unless otherwise noted)

(V$_{IN}$=5V, V$_{EN}$=5V, T$_A$=25°C, unless otherwise specified) (Note 1)

PARAMETER	TEST CONDITIONS	SYMBOL	MIN.	TYP.	MAX.	UNIT
Supply Voltage		V$_{IN}$	1.2		5.5	V
DC Output Voltage Accuracy	I$_{LOAD}$=0.1mA		-2		2	%
SNS Input Current	SNS=V$_{OUT}$	I$_{SNS}$		0.5		µA
Dropout Voltage (Note 2)	I$_{LOAD}$=300mA, V$_{OUT}$≥3V	V$_{DROP\_3V}$		0.18		V
	I$_{LOAD}$=300mA, V$_{OUT}$=2.8V	V$_{DROP\_2.8V}$		0.23		
	I$_{LOAD}$=300mA, V$_{OUT}$=2.5V	V$_{DROP\_2.5V}$		0.23		
	I$_{LOAD}$=300mA, V$_{OUT}$=1.8V	V$_{DROP\_1.8V}$		0.28		
	I$_{LOAD}$=300mA, V$_{OUT}$=1.5V	V$_{DROP\_1.5V}$		0.36		
	I$_{LOAD}$=300mA, V$_{OUT}$=1.2V	V$_{DROP\_1.2V}$		0.45		
GND Current	I$_{LOAD}$=0mA	I$_Q$		6		µA
Shutdown GND Current	V$_{EN}$=0V, V$_{OUT}$=0V	I$_{SD}$		0.1	0.5	µA
V$_{OUT}$ Shutdown Leakage Current	V$_{EN}$=0V, V$_{OUT}$=0V	I$_{LEAK}$		0.1	0.5	µA
Enable Threshold Voltage	EN Rising	V$_{IH}$	1.0			V
	EN Falling	V$_{IL}$			0.4	
EN Input Current	V$_{EN}$=5V	I$_{EN}$		10	100	nA
Line Regulation	I$_{LOAD}$=30mA, 1.5V≤V$_{IN}$≤5.5V or (V$_{OUT}$+0.2V)≤V$_{IN}$≤5.5V	ΔLINE		0.2		%
Load Regulation	10mA≤I$_{LOAD}$≤300mA	ΔLOAD		0.2		%
Output Current Limit	V$_{OUT}$=0V	I$_{LIM}$	300	500		mA
Power Supply Rejection Ratio	V$_{OUT}$=1.2V, I$_{LOAD}$=5mA, V$_{IN}$=2V, f=100Hz	PSRR		80		dB
	V$_{OUT}$=1.2V, I$_{LOAD}$=5mA, V$_{IN}$=2V, f=1kHz			75		
Output Voltage Noise	V$_{IN}$=3.5V, I$_{LOAD}$=0.1A, BW=10Hz to 100kHz, C$_{OUT}$=1µF, V$_{OUT}$=1.2V			80		µV$_{RMS}$
	V$_{IN}$=3.5V, I$_{LOAD}$=0.1A, BW=10Hz to 100kHz, C$_{OUT}$=1µF, V$_{OUT}$=2.8V			120		
Thermal Shutdown Temperature	I$_{LOAD}$=10mA	T$_{SD}$		155		°C
Thermal Shutdown Hysteresis	I$_{LOAD}$=10mA	ΔT$_{SD}$		15		°C
Discharge Resistance	V$_{EN}$=0V, V$_{OUT}$=0.1V			100		Ω
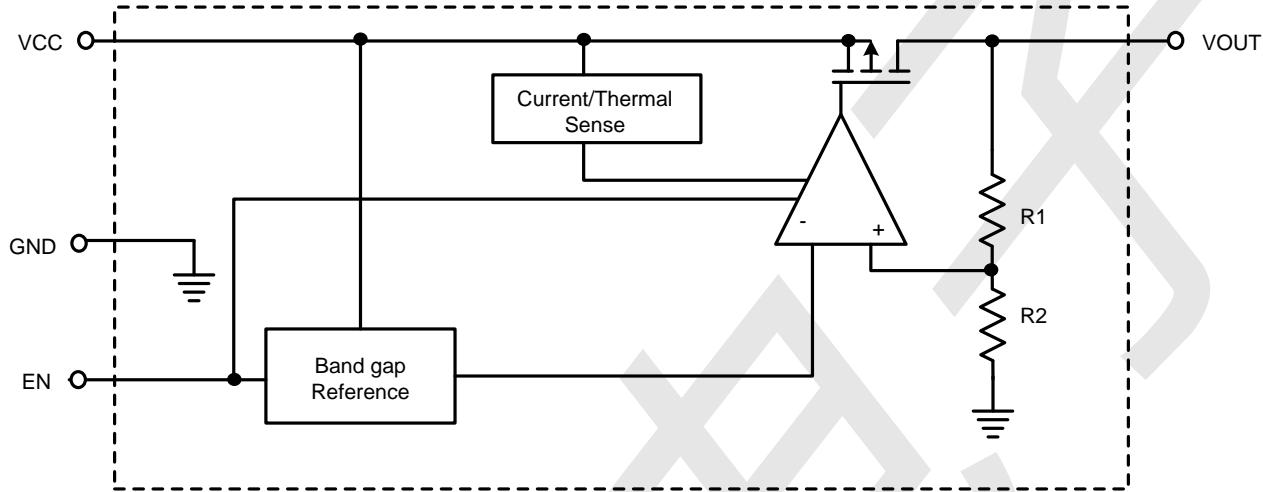
BLOCK DIAGRAM

VOUT vs. Temperature

VOUT vs. Input voltage

VOUT vs. Loading Current

Dropout voltage vs Temperature

Ground Current vs. Temperature

Ground Current vs Loading Current

Shutdown Ground Current vs. Temperature

SNS Input Current vs. Temperature

## Current Limit Response

Current Limit vs. Input voltage

Load Transient Response I

Load Transient Response II

Line Transient Response

out:3.3V
VIN: 3.6V to 5V
I_{LOAD}=30mA

CH1: V_{OUT} (50mV/Div)
CH2: V_{IN}(1V/Div)

80μS/Div

V_{OUT} Turn On/Off by EN

out:3.3V V_{IN}=4V
I_{LOAD}=5mA

CH1: V_{OUT} (1V/Div)
CH2: V_{EN} (1V/Div)
CH3: V_{IN} (2V/Div)

200μS/Div
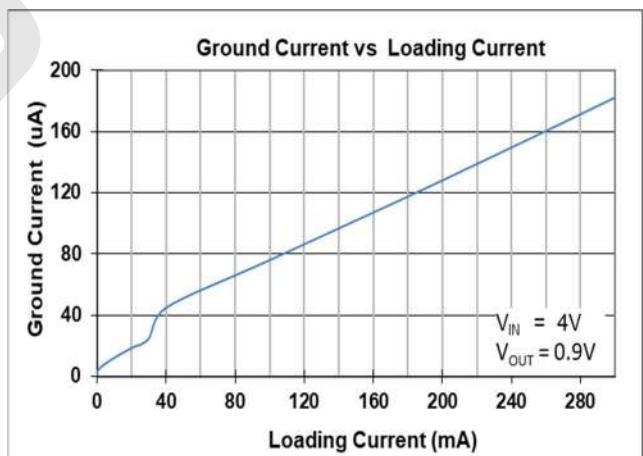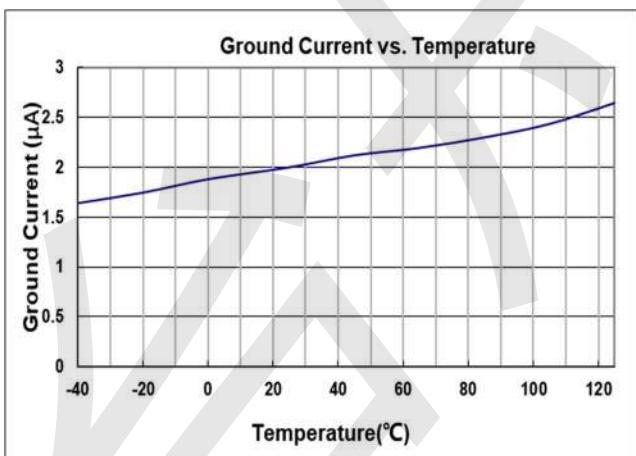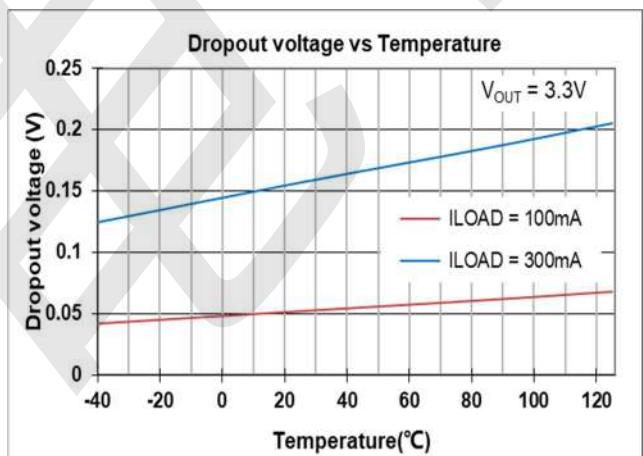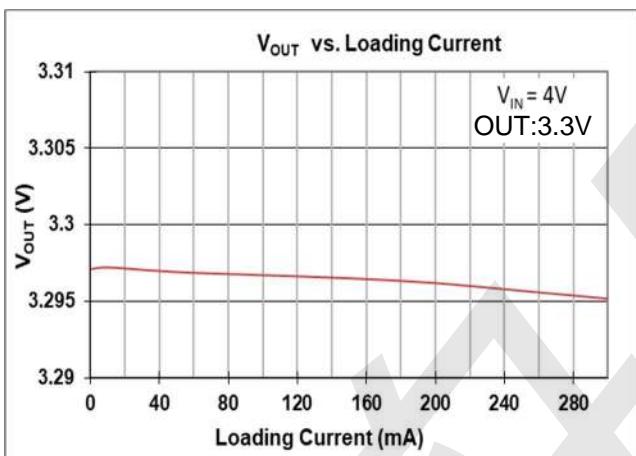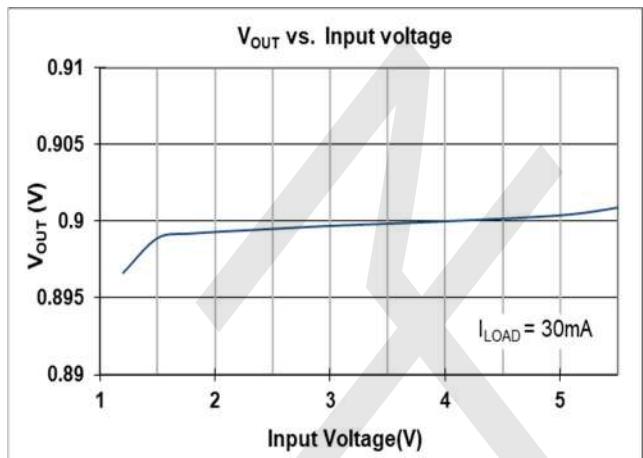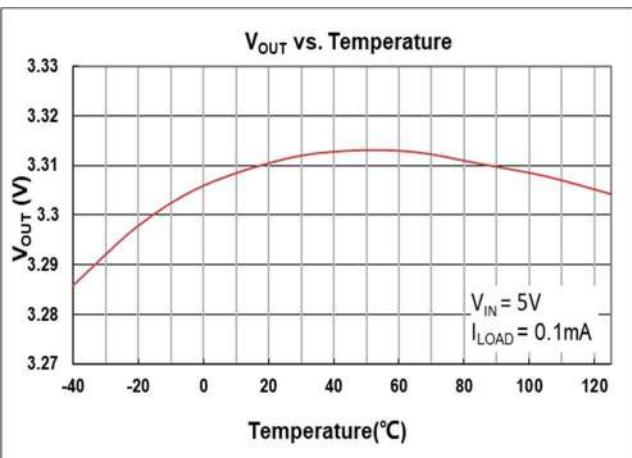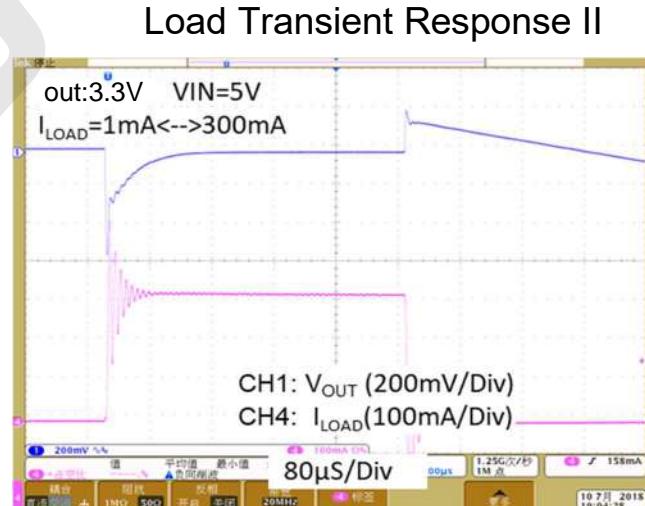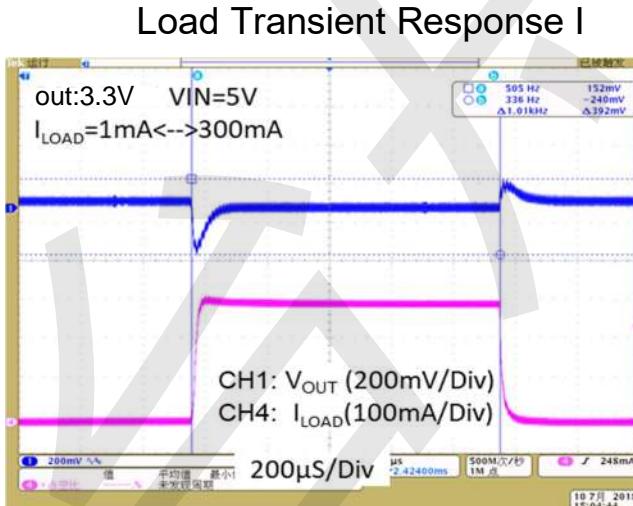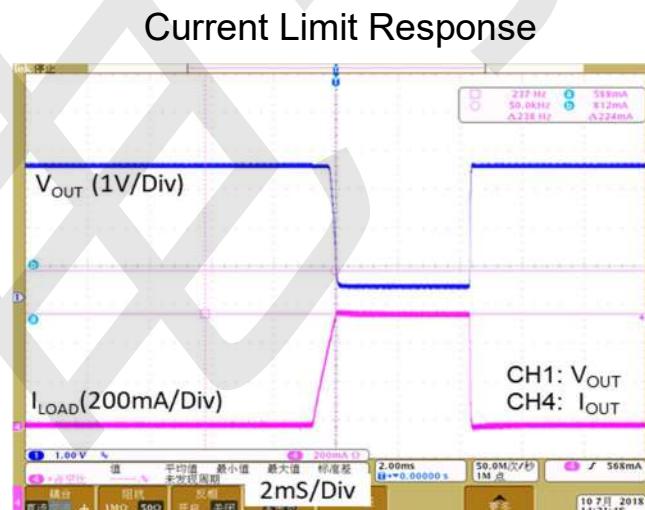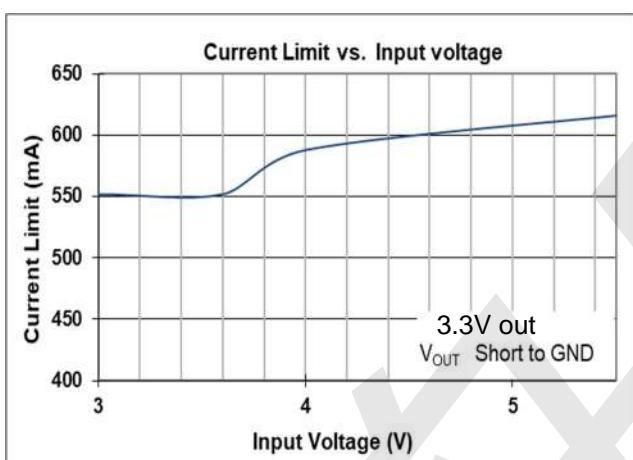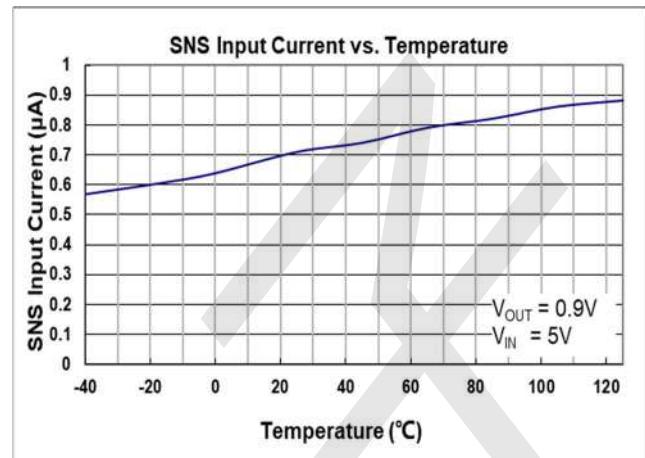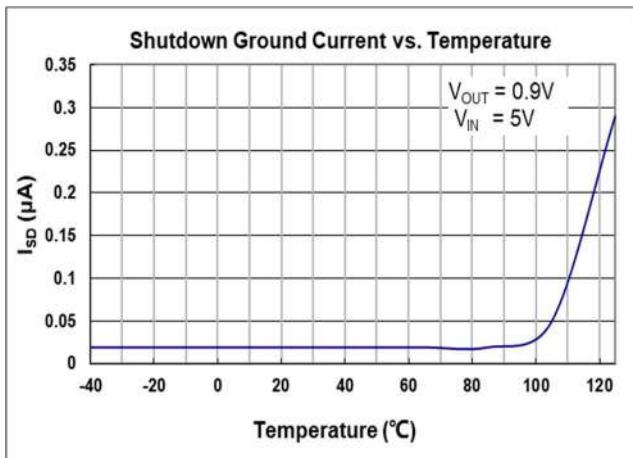
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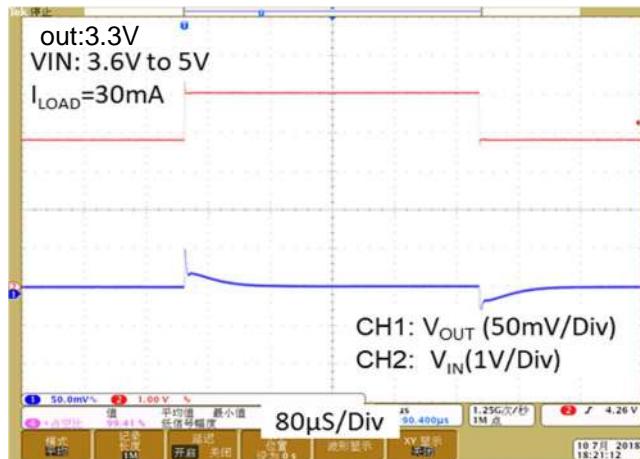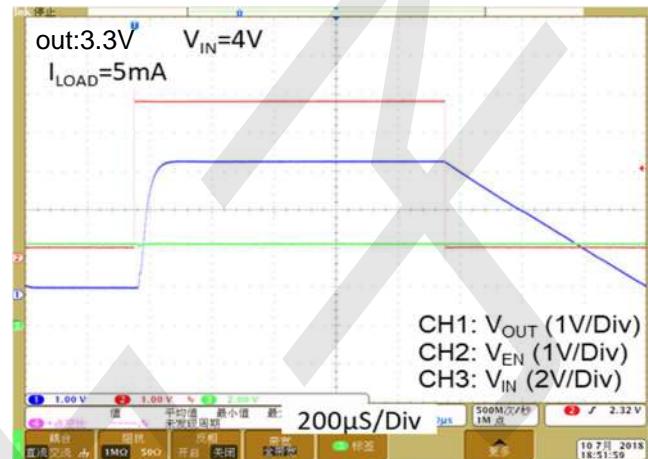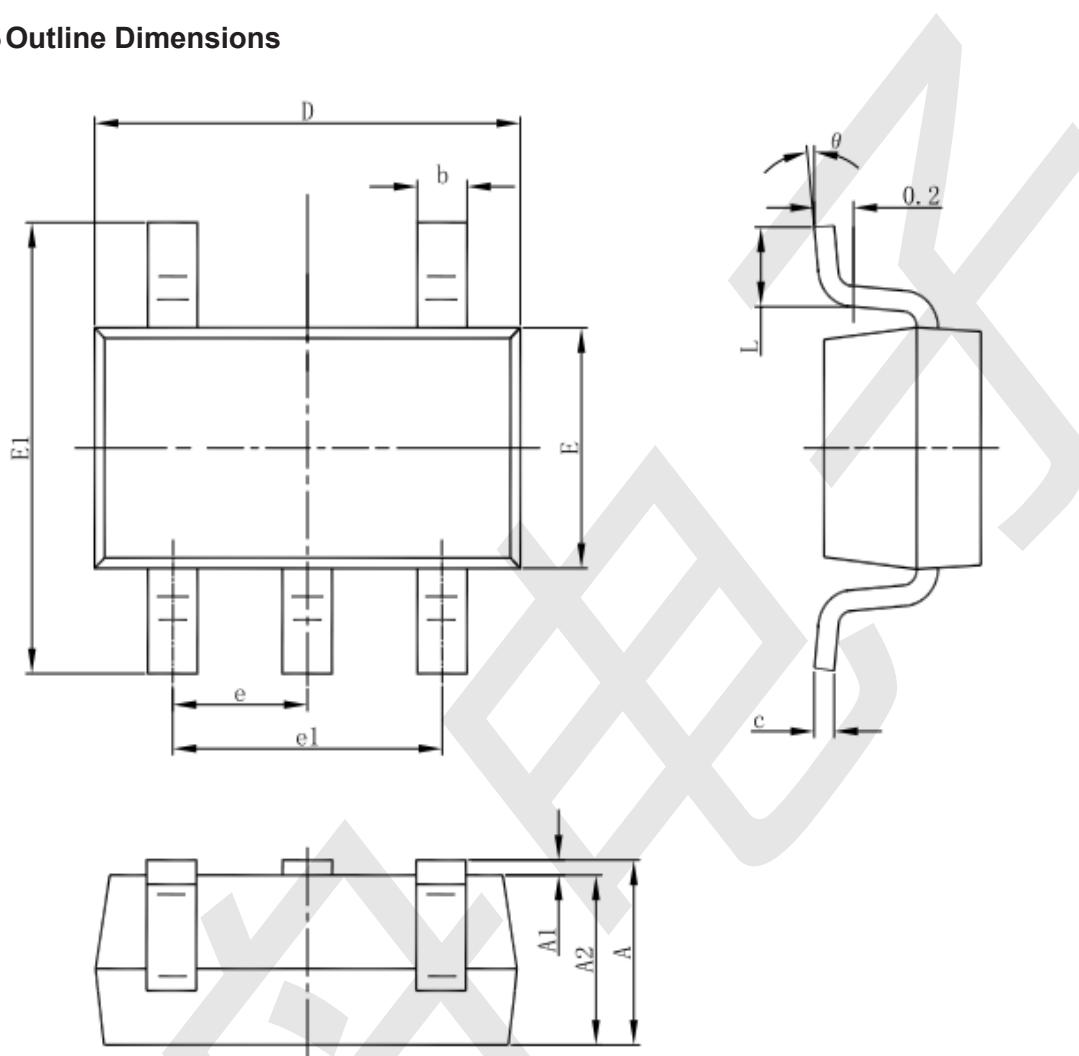
Package informantion

3-pin SOT23-5 Outline Dimensions

Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	1.050	1.250	0.041	0.049
A1	0.000	0.100	0.000	0.004
A2	1.050	1.150	0.041	0.045
b	0.300	0.500	0.012	0.020
c	0.100	0.200	0.004	0.008
D	2.820	3.020	0.111	0.119
E	1.500	1.700	0.059	0.067
E1	2.650	2.950	0.104	0.116
e	0.950(BSC)		0.037(BSC)	
e1	1.800	2.000	0.071	0.079
L	0.300	0.600	0.012	0.024
θ	0°	8°	0°	8°

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