

Features

- 2μA Ground Current at no Load
- ±2% Output Accuracy
- 600mA Output Current
- 10nA Disable Current (by option)
- Wide Operating Input Voltage Range: 1.2V to 5.5V
- Dropout Voltage: 0.32V at 600mA/ V_{OUT} 3.3V
- Support Fixed Output Voltage 1.2V, 1.5V, 1.6V, 1.8V, 2.5V, 2.8V, 3.0V, 3.3V
- Stable with Ceramic or Tantalum Capacitor
- Current Limit Protection
- Over Temperature Protection
- SOT23-5 Packages

General Descri tion

This production is group of low -dropout (LDO) voltage regulators offering the benefits of wide input voltage range from 1.2V to 5.5V, low dropout voltage, low power consumption, and miniaturized packaging. Quiescent current of only 2μA makes these devices ideal for powering the battery-powered, always-on systems that require very little idle-state power dissipation to a longer service life. There is an option of

Ordering Information

TPNCP500SN33T1G

Applications

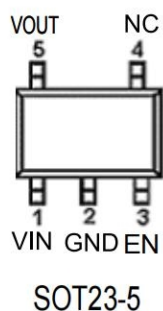
- Portable, Battery Powered Equipment
- Low Power Microcontrollers
- Laptop, Palmtops and PDAs
- Wireless Communication Equipment
- Audio/Video Equipment
- Car Navigation Systems

shutdown mode by selecting the parts with the EN pin and pulling it low. The shutdown current in this mode goes down to only 10nA (typical).

This production is of linear regulators are stable with the ceramic output capacitor over its wide input range from 1.2V to 5.5V and the entire range of output load current (0mA to 600mA).

Output voltage: 12=1.2V
15=1.5V
18=1.8V
30=3.0V
33=3.3V
XX=X.XV

PIN CONFIGURATION



Typical Application Circuit

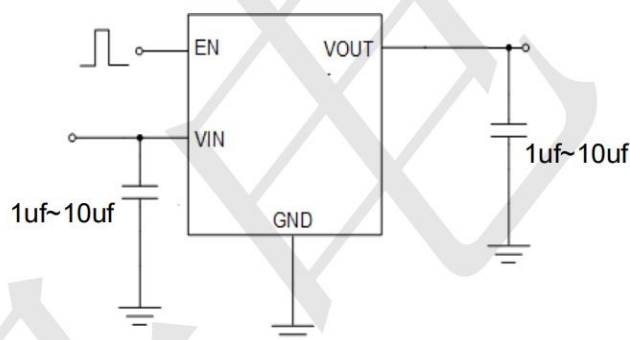


Figure 2: Application circuit of Fixed V_{OUT} LDO with enable function

ABSOLUTE MAXIMUM RATINGS

VIN Pin to GND Pin Voltage	-0.3V to 6.5V
VOUT Pin and EN Voltage	-0.3V to 6V
VOUT Pin to VIN Pin Voltage	-6V to 0.3V
Storage Temperature Range	-60°C~150°C
Lead Temperature (Soldering, 10 sec)	260°C
Junction Temperature	150°C
Operating Ambient Temperature Range T_A	-40°C~85°C
Thermal Resistance Junction to Case, $R_{\theta JC}$	
SOT23-3	115°C/W
SOT23-5	115°C/W
DFN-4(1x1)	65°C/W
DFN-6(2x2)	30°C/W
Thermal Resistance Junction to Ambient, $R_{\theta JA}$	
SOT23-3	250°C/W
SOT23-5	250°C/W
DFN-4(1x1)	195°C/W
DFN-6(2x2)	165°C/W

Electrical Characteristics ($T_A=25^\circ\text{C}$ unless otherwise noted)

($V_{IN}=5\text{V}$, $V_{EN}=5\text{V}$ $T_A=25^\circ\text{C}$ unless otherwise specified)

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Supply Voltage	V_{IN}		1.2	--	5.5	V
DC Output Voltage Accuracy		$I_{LOAD}=0.1\text{mA}$	-2		2	%
Dropout Voltage ($I_{LOAD}=600\text{mA}$) (Note 3)	V_{DROP_3V}	$V_{OUT} \geq 3\text{V}$		0.32		V
	$V_{DROP_2.8V}$	$V_{OUT} = 2.8\text{V}$		0.36		
	$V_{DROP_2.5V}$	$V_{OUT} = 2.5\text{V}$		0.36		
	$V_{DROP_1.8V}$	$V_{OUT} = 1.8\text{V}$		0.57		
	$V_{DROP_1.5V}$	$V_{OUT} = 1.5\text{V}$		0.71		
	V	$V = 1.2\text{V}$		0.8		
Ground Current	I_Q	$I_{LOAD} = 0\text{mA}$		2		μA
Shutdown Ground Current	I_{SD}	$V_{EN} = 0\text{V}$,		0.01	0.5	μA
V_{OUT} Shutdown Leakage Current	I_{LEAK}	$V_{OUT} = 0\text{V}$		0.01	0.5	
Enable Threshold Voltage	V_{IH}	EN Rising			2	V
	V_{IL}	EN Falling	0.6			
EN Input Current	I_{EN}	$V_{EN} = 5\text{V}$		10	100	nA
Line Regulation	Δ_{LINE}	$I_{LOAD}=30\text{mA}$, $1.5\text{V} \leq V_{IN} \leq 5.5\text{V}$ or $(V_{OUT} + 0.2\text{V}) \leq V_{IN} \leq 5.5\text{V}$		0.2		%
Load Regulation	Δ_{LOAD}	$10\text{mA} \leq I_{LOAD} \leq 0.3\text{A}$		0.2		%
Output Current Limit	I_{LIM}	$V_{OUT}=0$	601	1100		mA
Power Supply Rejection Ratio ($I_{LOAD}=5\text{mA}$)	PSRR	$V_{OUT}=1.2\text{V}$, $V_{IN}=2\text{V}$	$f=100\text{Hz}$	--	80	dB
			$f=1\text{kHz}$	--	75	
Output Voltage Noise (BW = 10Hz to 100kHz, $C_{OUT}=1\mu\text{F}$.)		$V_{IN}=3.5\text{V}$, $I_{LOAD}=0.1\text{A}$	$V_{OUT}=0.9\text{V}$	--	40	μV_{RMS}
			$V_{OUT}=2.8\text{V}$	--	50	
Thermal Shutdown Temperature	T_{SD}	$I_{LOAD}=10\text{mA}$	--	155	--	$^\circ\text{C}$
Thermal Shutdown Hysteresis	ΔT_{SD}		--	15	--	$^\circ\text{C}$
Discharge Resistance		$EN=0\text{V}$, $V_{OUT}=0.1\text{V}$	--	100	--	Ω

Note 1. Stresses beyond those listed “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 in the operational sections of the specifications is not implied. Exposure to absolute maximum rating conditions may affect device reliability.

Note 2. θ_{JA} is measured at $T_A = 25^{\circ}\text{C}$ on a TECH PUBLICboard.

Note 3. $V_{\text{DROP}} = V_{\text{IN}} - V_{\text{OUT}}$ when the V_{OUT} is 98% of its target value.

Typical Characteristics

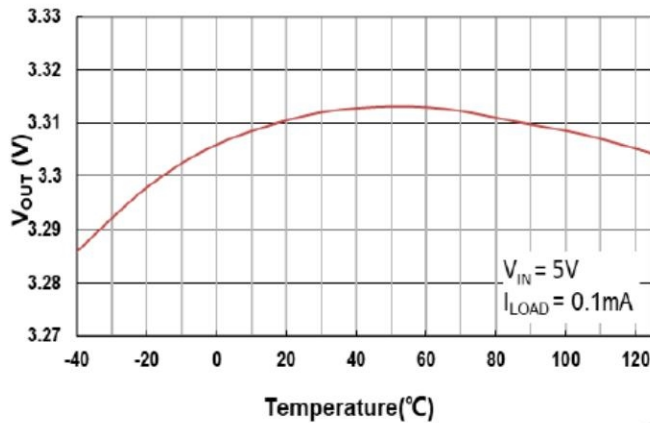


Fig. 5 Output Voltage vs. Temperature

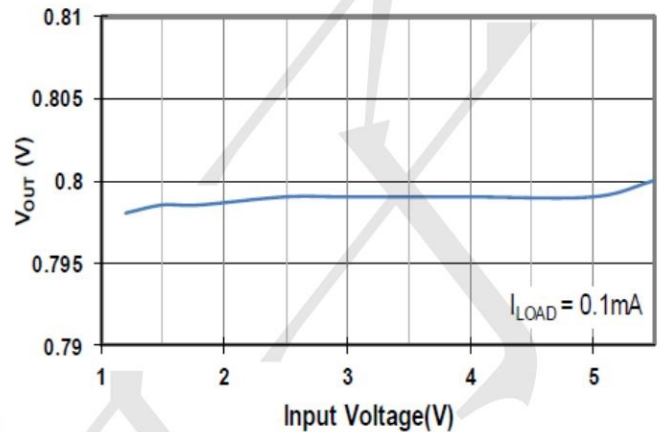


Fig. 6 Output Voltage vs. Input Voltage

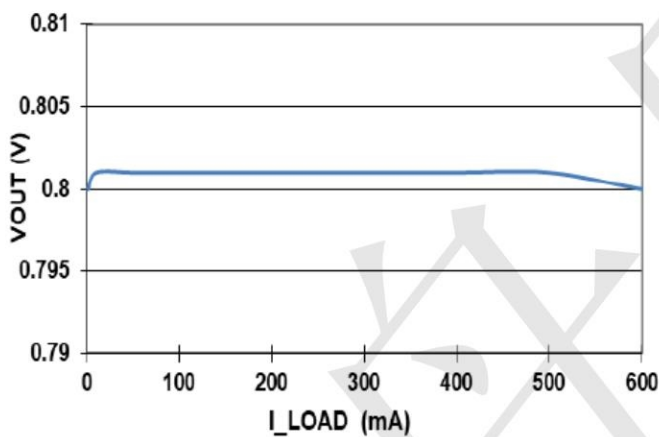


Fig. 7 Output Voltage vs. Load Current

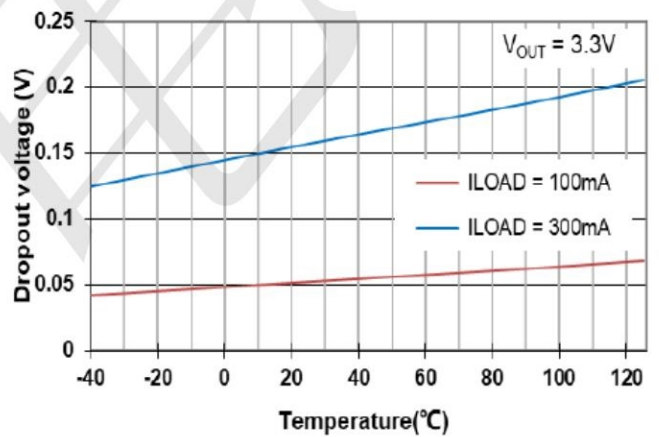


Fig. 8 Dropout Voltage vs. Temperature

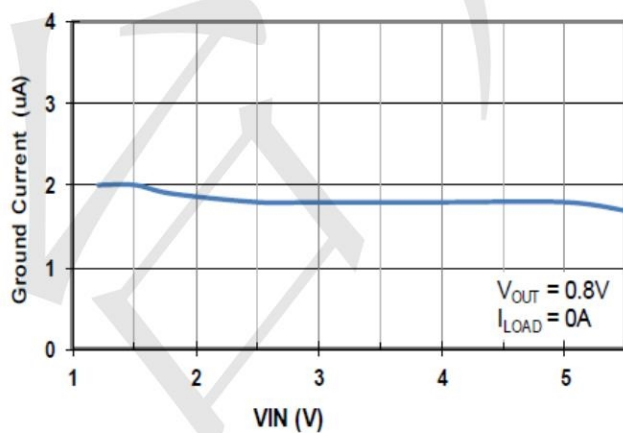


Fig. 9 Ground Current vs. Input Voltage

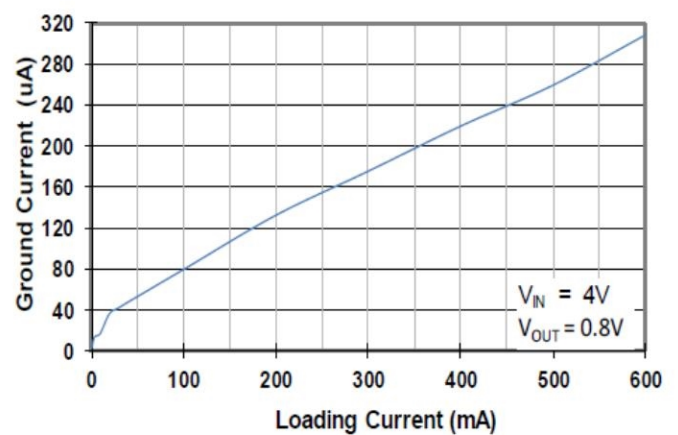
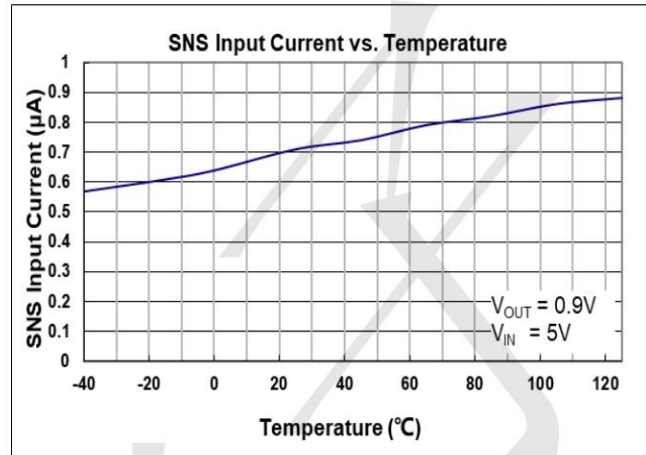
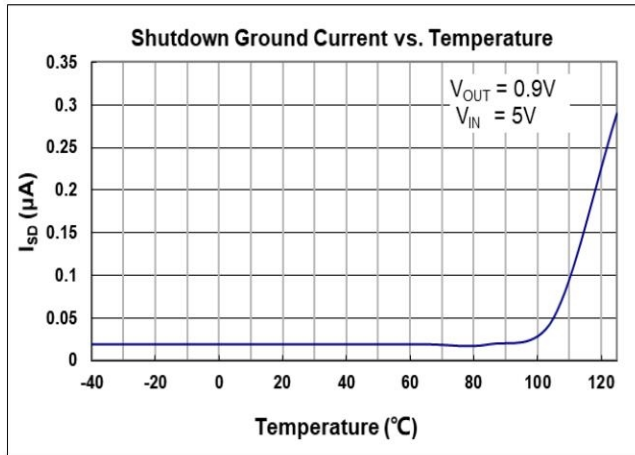
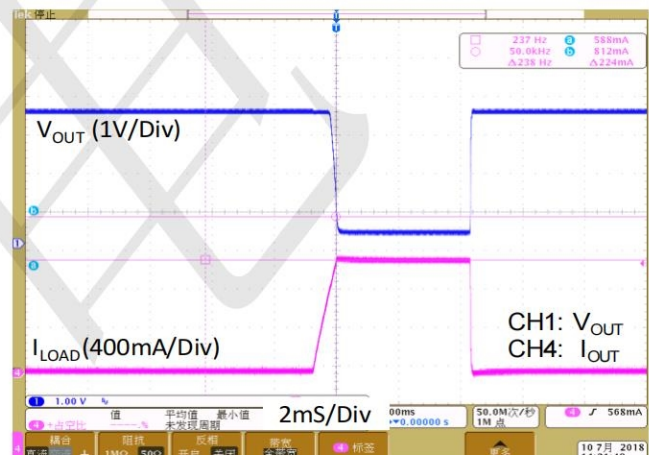
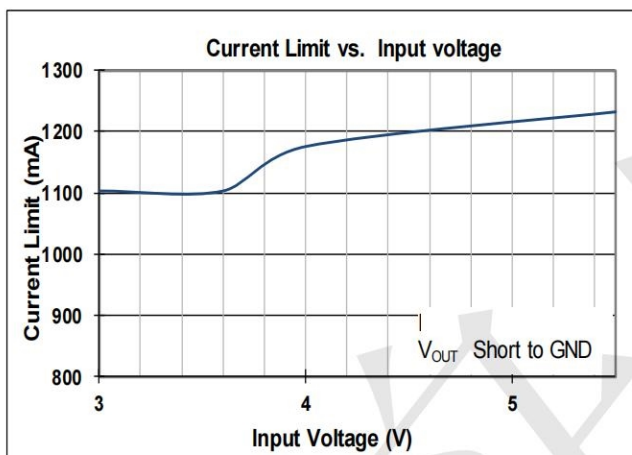


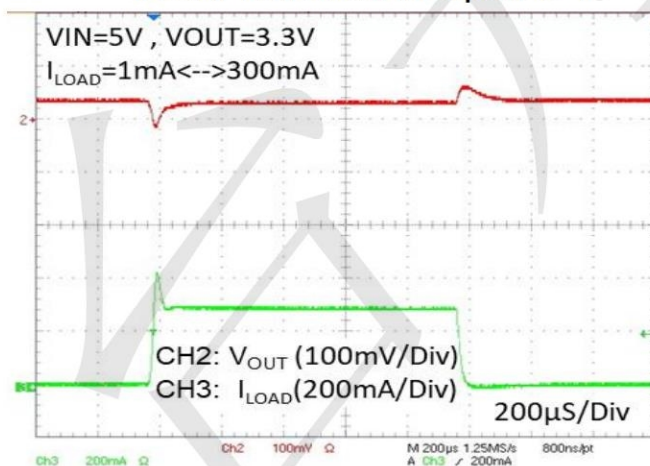
Fig. 10 Ground Current vs. Loading Current



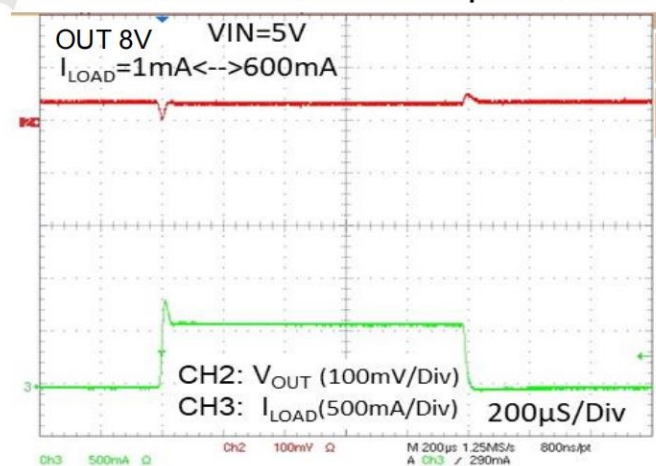
Current Limit Response



Load Transient Response I



Load Transient Response II



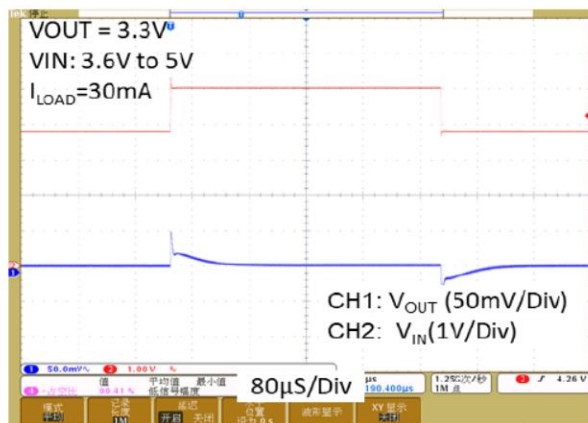


Fig. 17 Line Transient Response

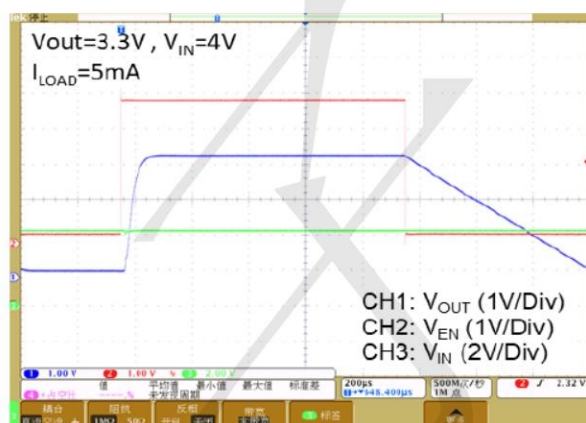
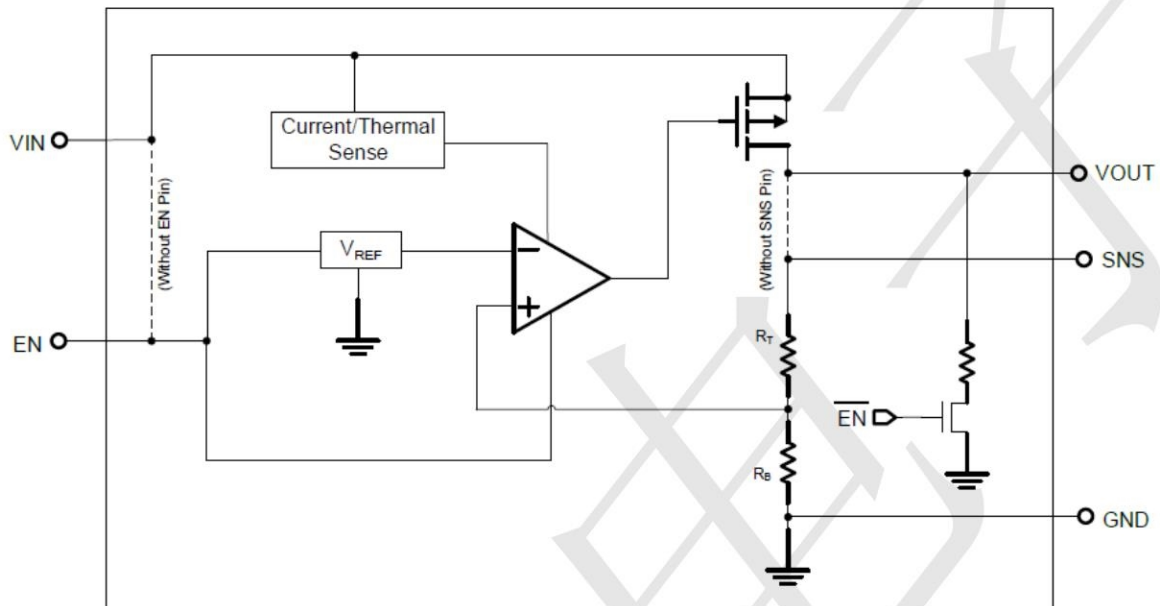


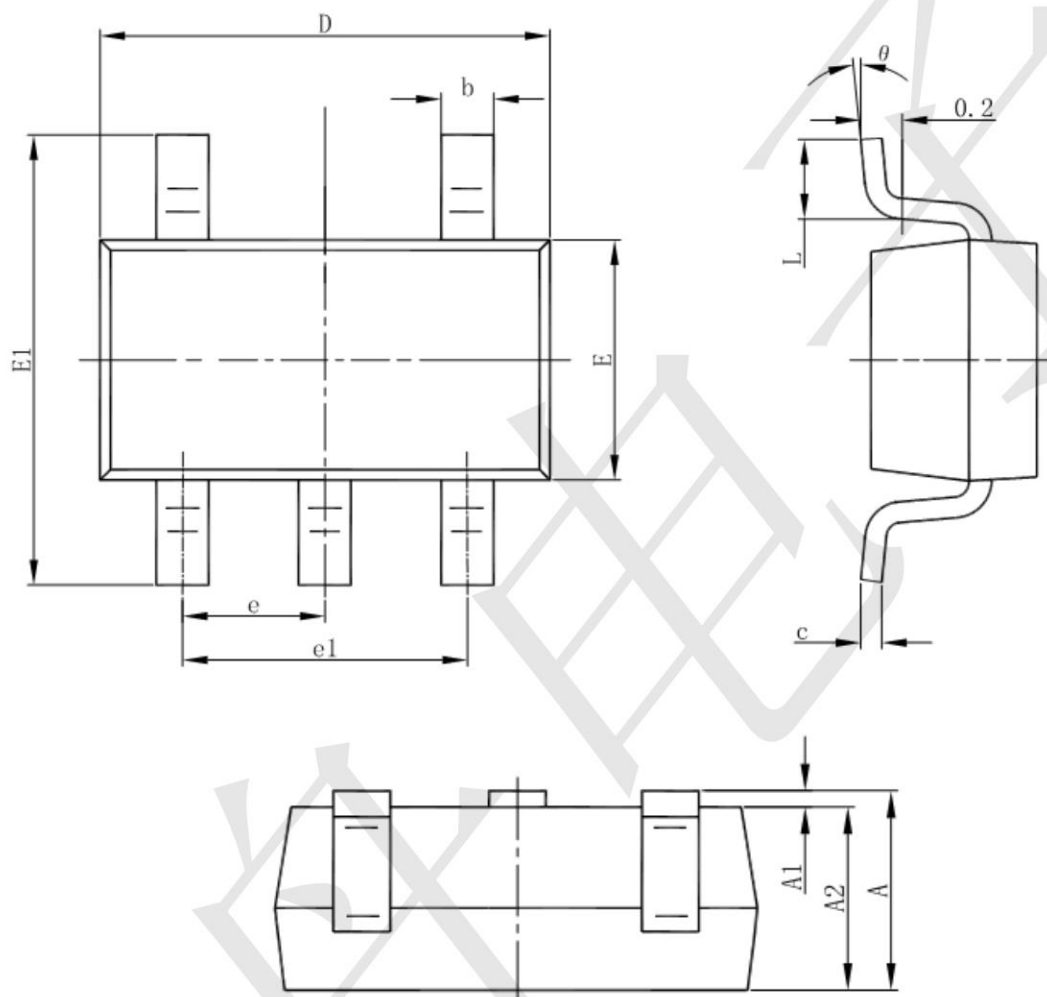
Fig. 18 V_{OUT} Turn On/Off by EN

BLOCK DIAGRAM



Package informantion

SOT23-5



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°