

General Description

The TPNCP114 is a low-dropout (LDO) voltage regulator with enable function that operates from a 1.2V to 5.5V supply. It provides up to 300mA of output current in miniaturized packaging.

The feature of 25 μ A low quiescent current and 0.5 μ A 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

- 25 μ A Ground Current at no Load
- $\pm 2\%$ Output Accuracy
- 450mA Output Current
- 10nA Disable Current (by option)
- Wide Operating Input Voltage Range: 1.2V to 5.5V
- Dropout Voltage: 0.32V at 450mA ($V_{OUT}=3.3V$)
- 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

Applications

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

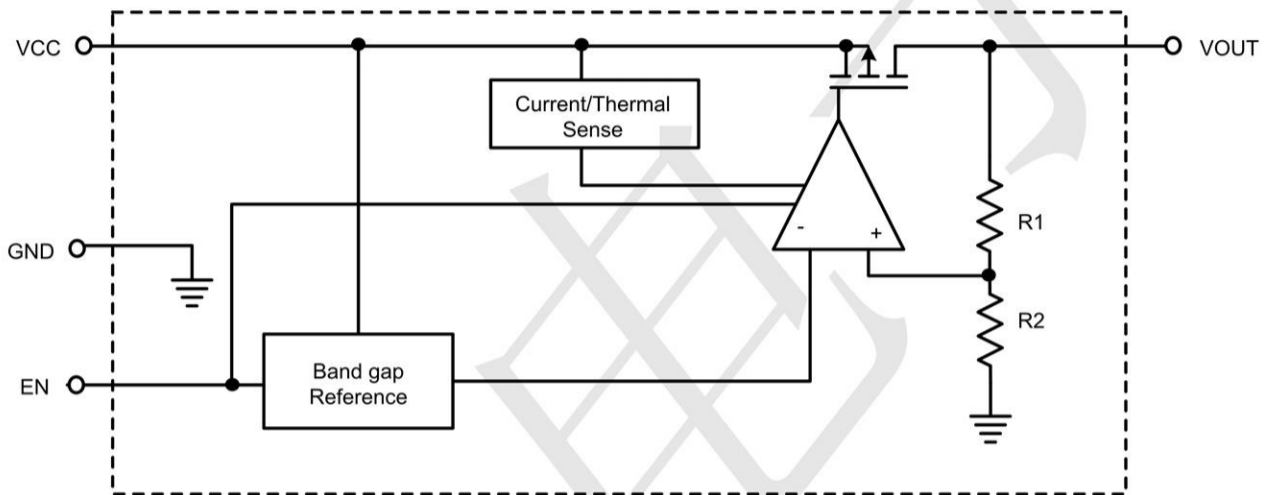
Ordering Information

TPNCP114ASN300T1G

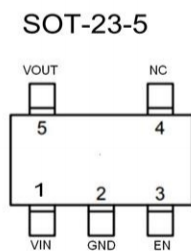
Output voltage: 120=1.2V
150=1.5V
180=1.8V
300=3.0V
330=3.3V
360=3.6V

ASN:SOT23-5 Package

BLOCK DIAGRAM



PIN CONFIGURATION



Absolute Maximum Rating ($T_A=25^{\circ}\text{C}$ unless otherwise noted)

VIN Pin to GND Pin Voltage	-0.3V to 6.5V
VOUT Pin and EN Pin to GND Pin 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 =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		μ A
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			25	μ A
Shutdown GND Current	V _{EN} =0V, V _{OUT} =0V	I _{SD}		0.1	0.5	μ A
V _{OUT} Shutdown Leakage Current	V _{EN} =0V, V _{OUT} =0V	I _{LEAK}		0.1	0.5	μ A
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	Δ LINE		0.2		%
Load Regulation	10mA≤I _{LOAD} ≤300mA	Δ LOAD		0.2		%
Output Current Limit	V _{OUT} =0V	I _{LIM}	300	400		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} =1 μ F, V _{OUT} =1.2V			80		μ V _{RMS}
	V _{IN} =3.5V, I _{LOAD} =0.1A, BW=10Hz to 100kHz, C _{OUT} =1 μ F, V _{OUT} =2.8V			120		
Thermal Shutdown Temperature	I _{LOAD} =10mA	T _{SD}		155		°C
Thermal Shutdown Hysteresis	I _{LOAD} =10mA	Δ T _{SD}		15		°C
Discharge Resistance	V _{EN} =0V, V _{OUT} =0.1V			100		Ω

TYPICAL APPLICATION

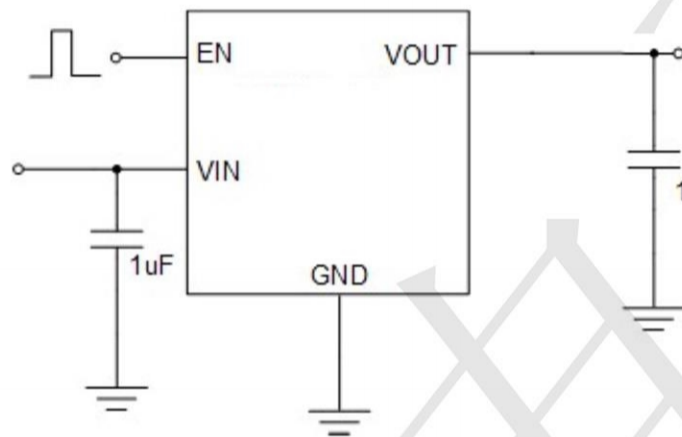
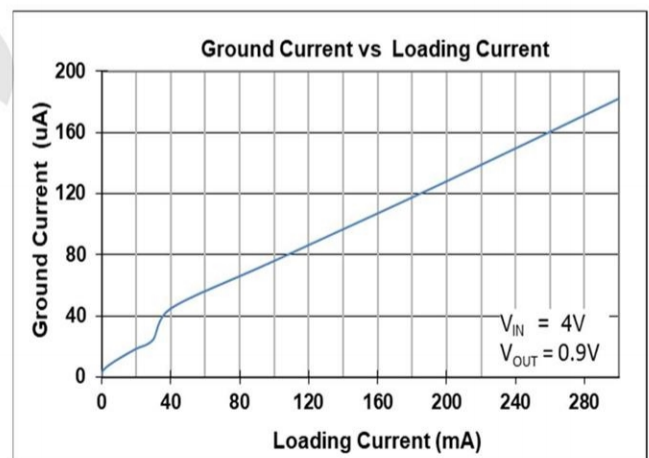
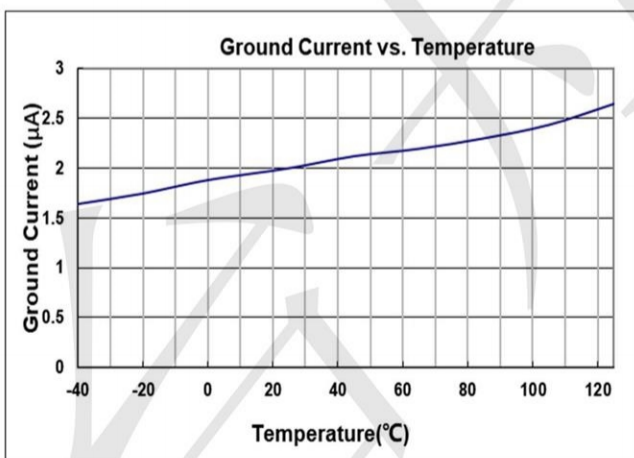
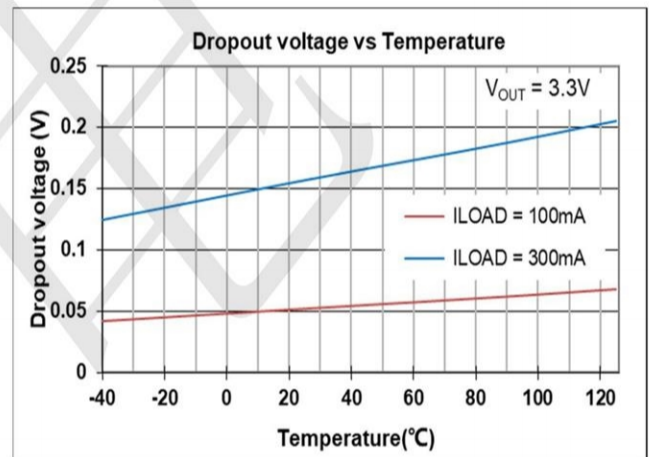
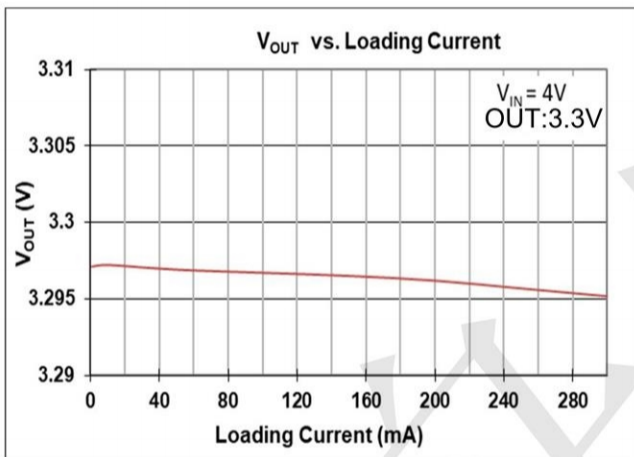
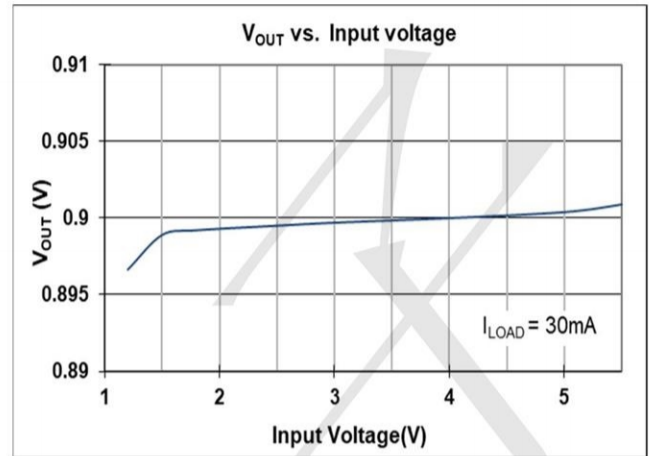
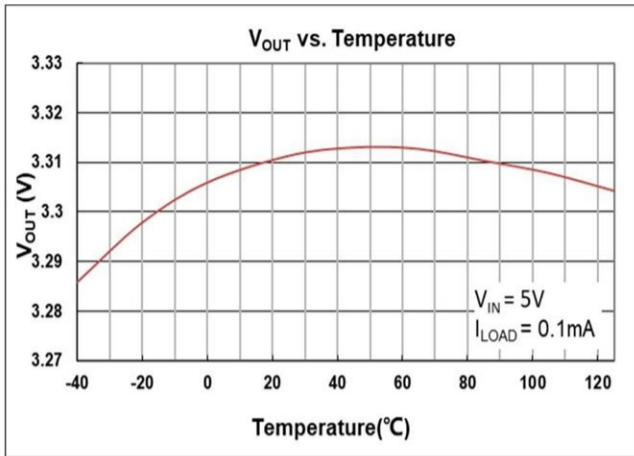
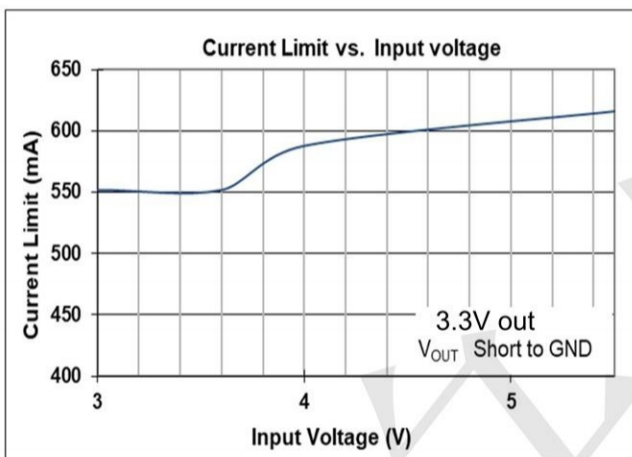
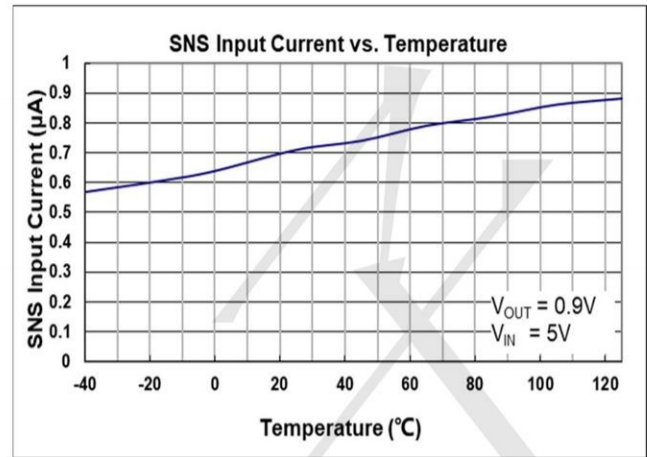
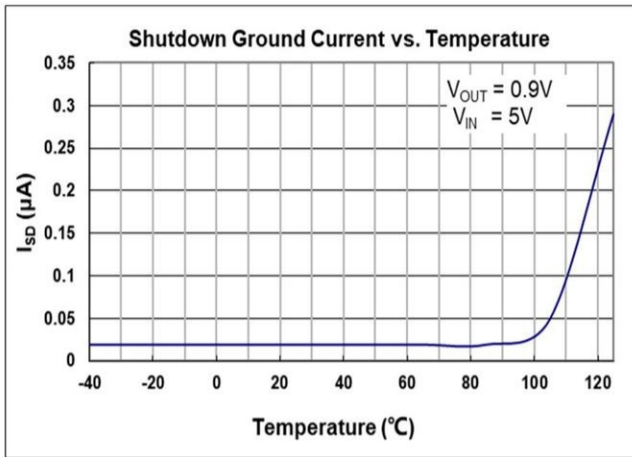
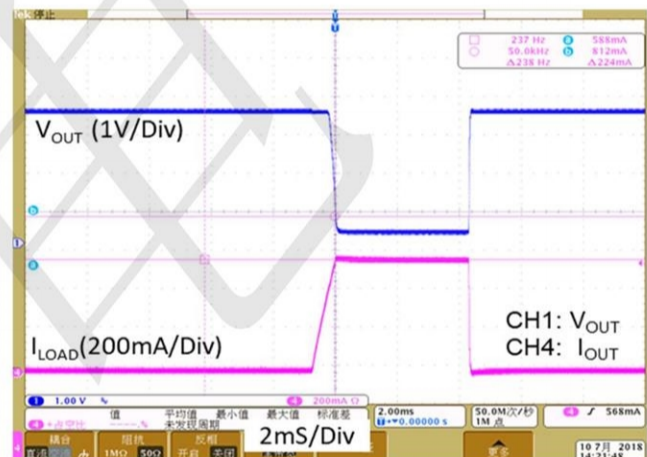


Figure 2: Application circuit of Fixed V_{OUT} LDO with enable function

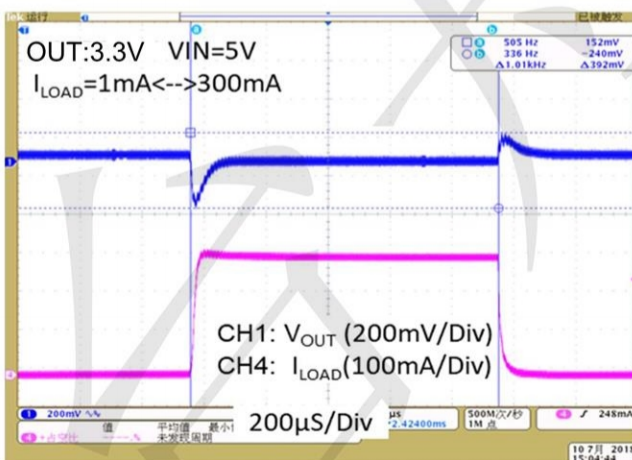




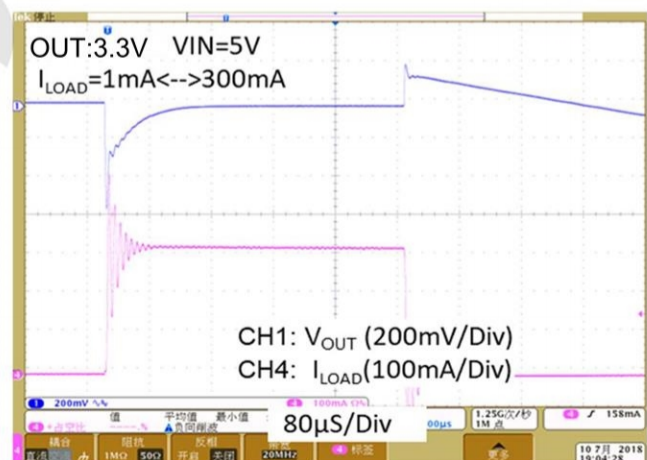
Current Limit Response



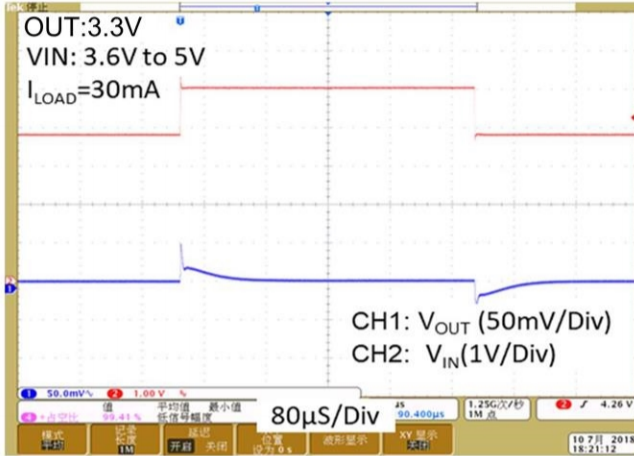
Load Transient Response I



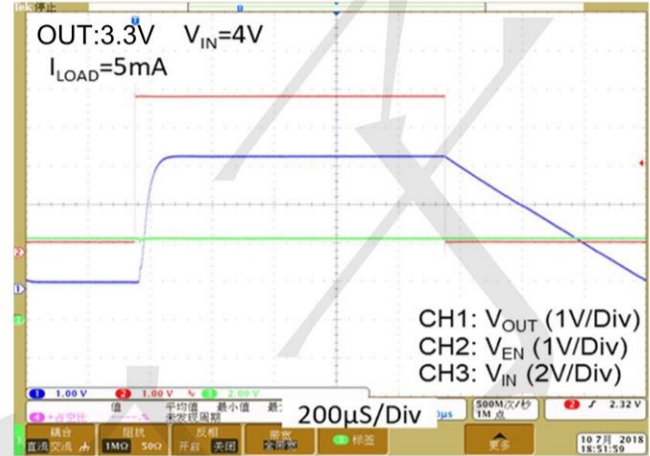
Load Transient Response II



Line Transient Response

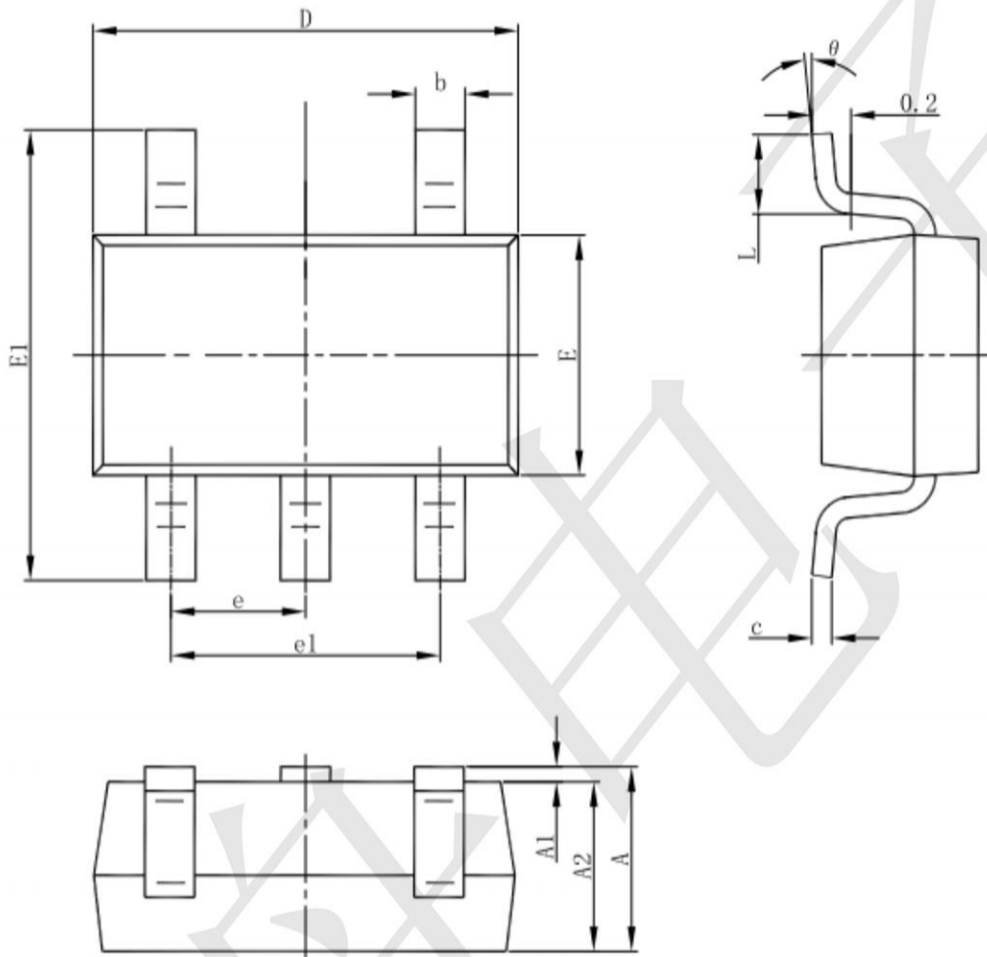


V_{OUT} Turn On/Off by EN



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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