

General Description

The XC6504A 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 2 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

- 2 μ A Ground Current at no Load
- $\pm 2\%$ Output Accuracy
- 300mA Output Current
- 10nA Disable Current (by option)
- Wide Operating Input Voltage Range: 1.2V to 5.5V
- Dropout Voltage: 0.18V 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

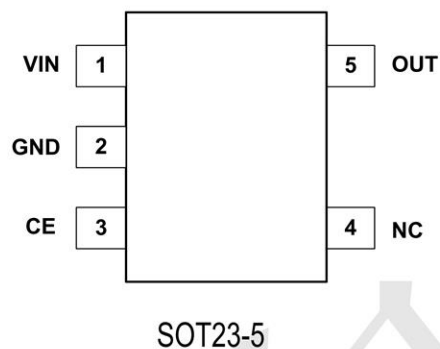
- Portable, Battery Powered Equipment
- Low Power Microcontrollers
- Laptop, Palmtops and PDAs
- Wireless Communication Equipment
- Audio/Video Equipment

Ordering Information

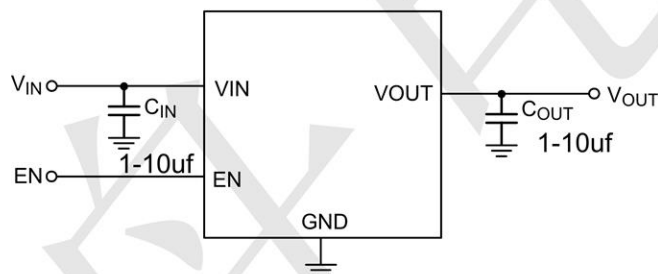
XC6504A331MR

Output voltage: 12=1.2V
15=1.5V
18=1.8V
30=3.0V
33=3.3V
36=3.6V

PIN CONFIGURATION



Typical Application Circuit



ABSOLUTE MAXIMUM RATINGS

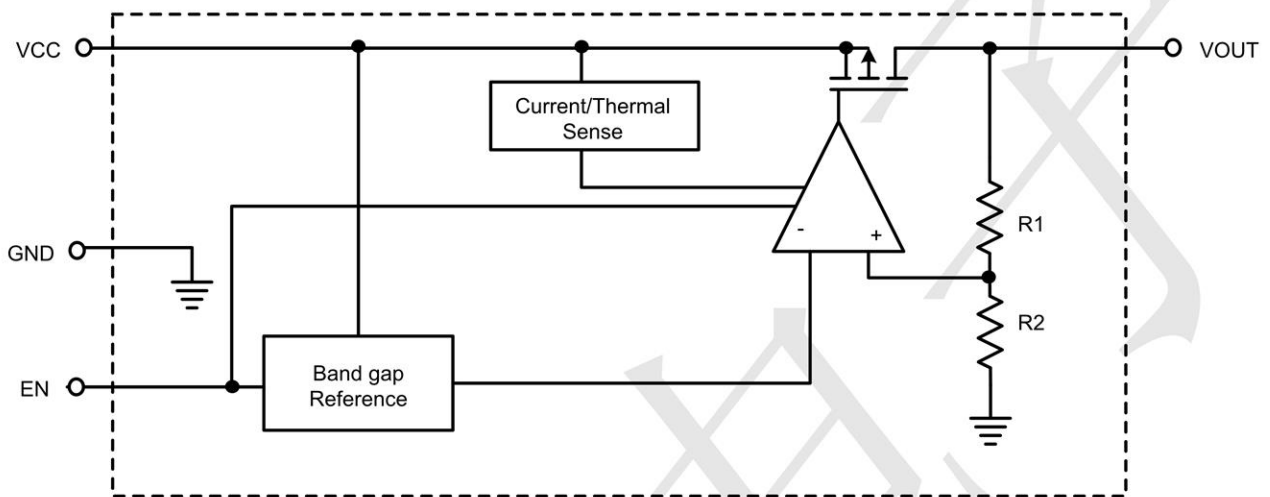
| Parameter | | Value | Unit |
|---|----------|------------|------|
| Supply Voltage | | -0.3~+6.5 | V |
| Power Dissipation | SOT-23-5 | 400 | mW |
| | SOT-89 | 600 | mW |
| Thermal Resistance, Junction-to-Ambient | SOT-23-5 | 380 | °C/W |
| | SOT-89 | 180 | °C/W |
| Operating Junction Temperature |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

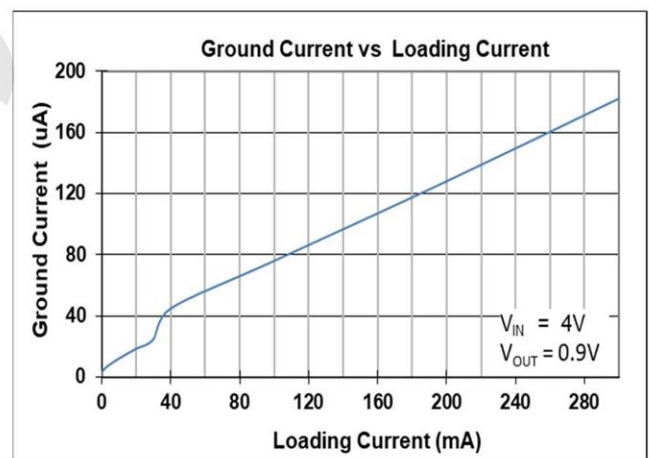
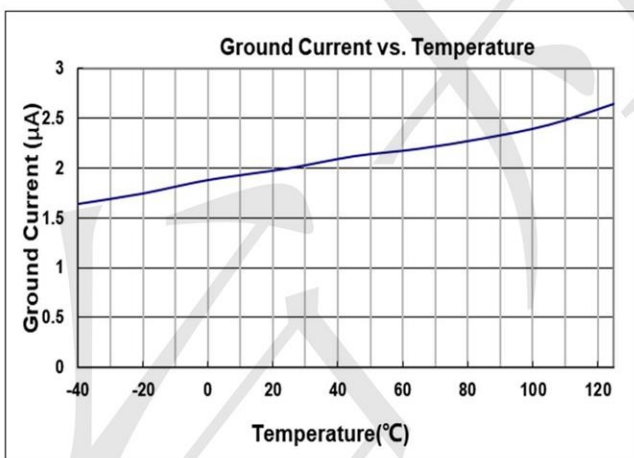
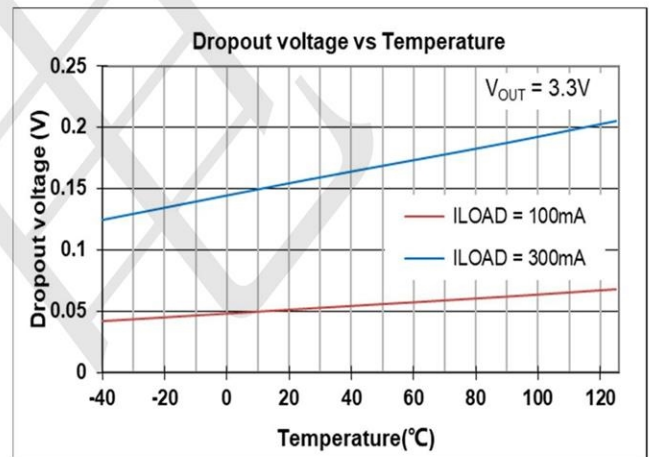
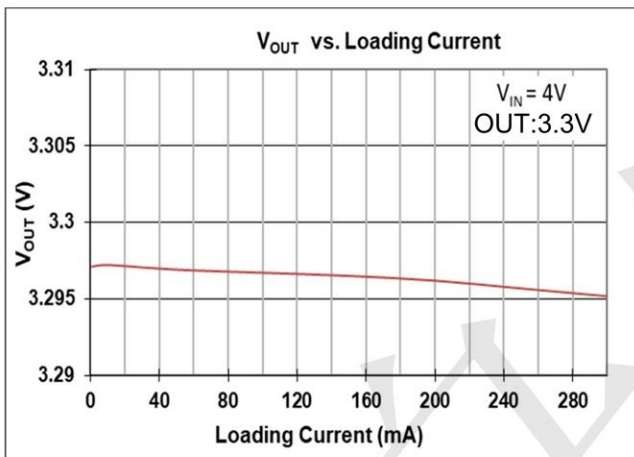
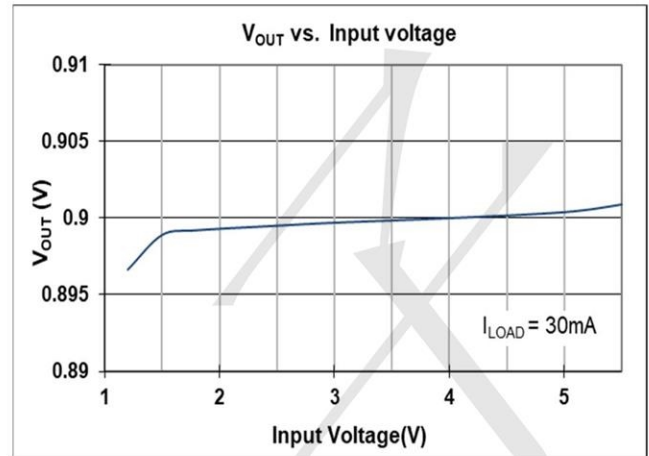
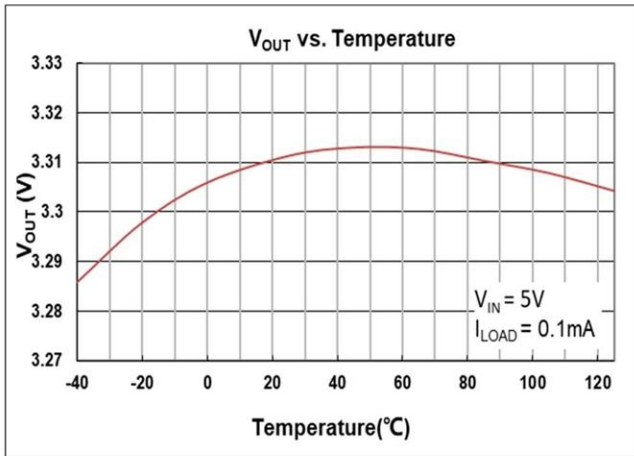
Electrical Characteristics (T =25°C unless otherwise noted)

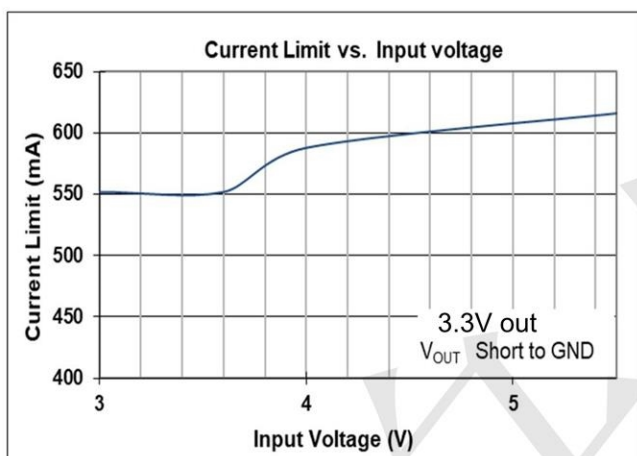
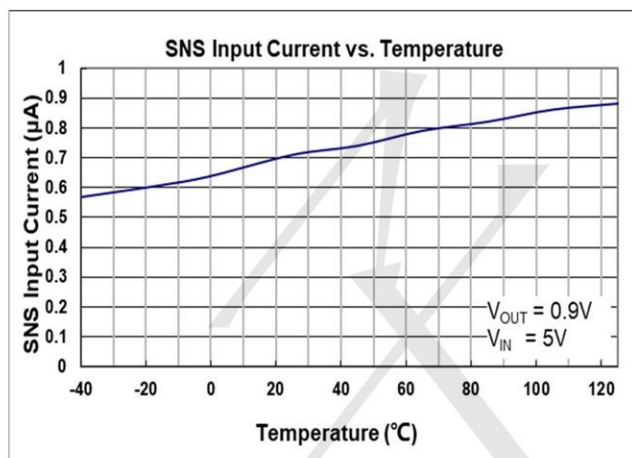
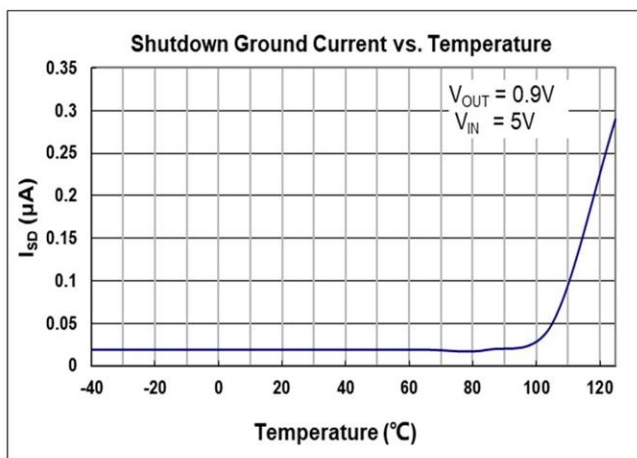
(V_{IN}=5V, V_{EN}=5V, T_A=25°C, unless otherwise specified) (Note 1)

| 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 | | 2 | | 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 |

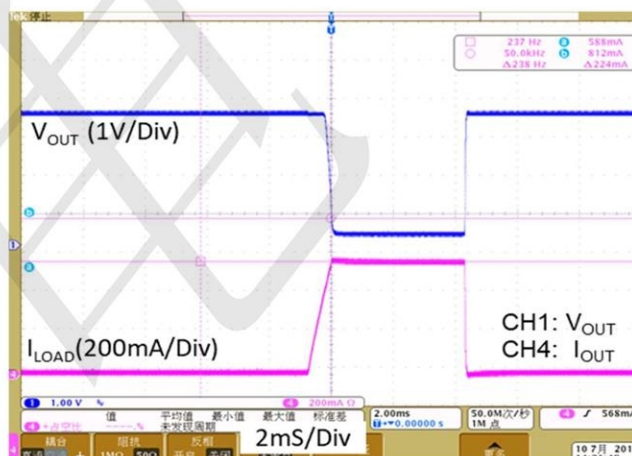
BLOCK DIAGRAM



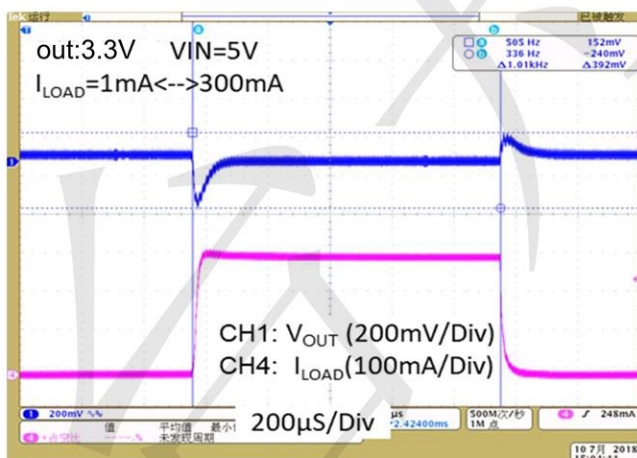




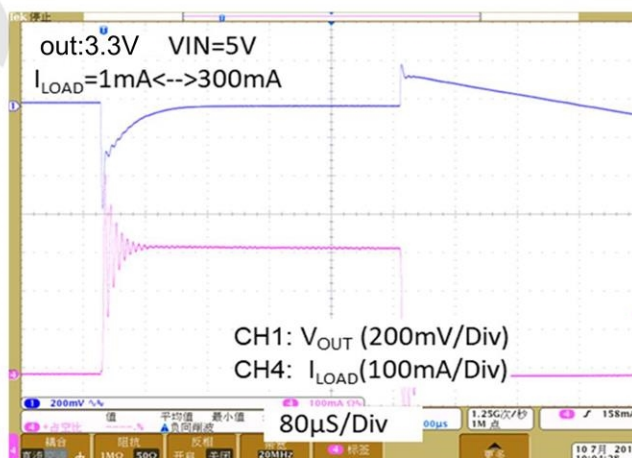
Current Limit Response



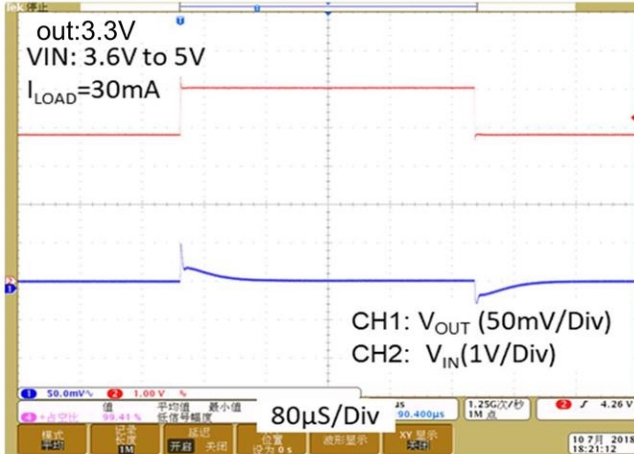
Load Transient Response I



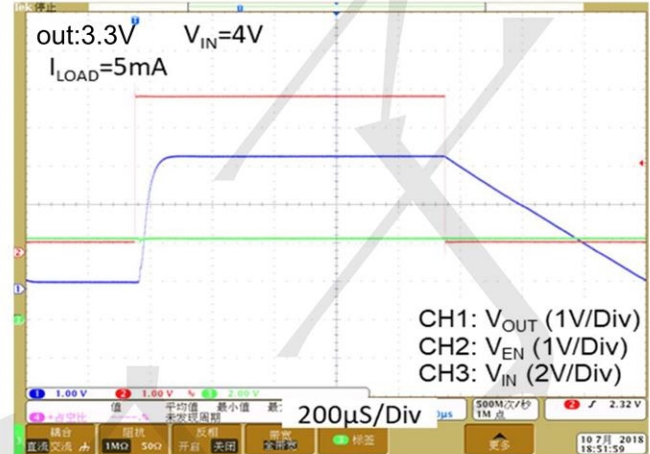
Load Transient Response II



Line Transient Response

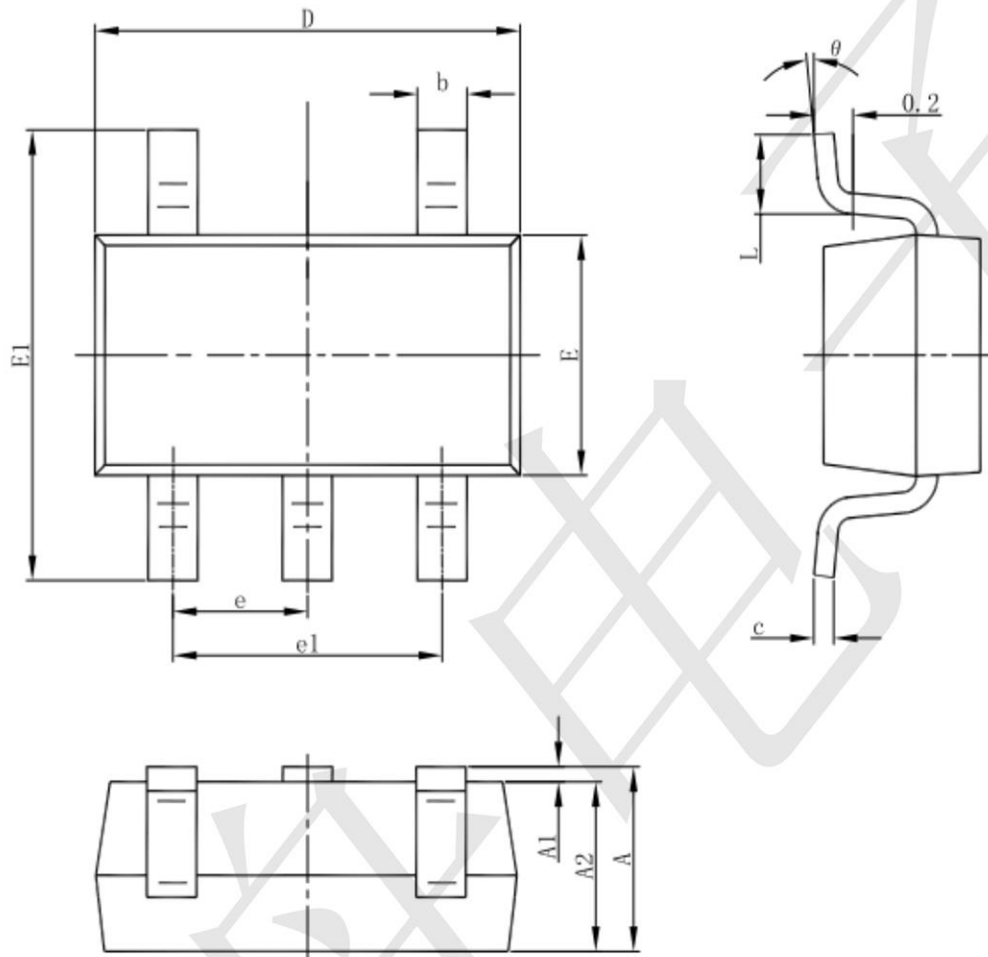


V_{OUT} Turn On/Off by EN



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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