General Description

The TPMIC5504 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 15μA 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

- 15μA Ground Current at no Load
- ±2% Output Accuracy
- 300mA Output Current
- 10nA Disable Current (by option)
- Wide Operating Input Voltage Range: 1.2V to 5.5V
- Dropout Voltage: 0.22V 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
- Stable with Ceramic or Tantalum Capacitor
- Current Limit Protection
- Over-Temperature Protection
- SOT23-5, DFN1X1-4

Applications

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

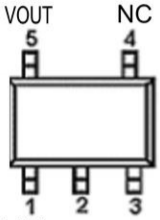
Ordering Information

TPMIC5504-3.0YM5

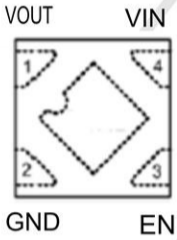
YM5:SOT23-5 Package
YMT: DFN1X1-4 Package

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

PIN CONFIGURATION

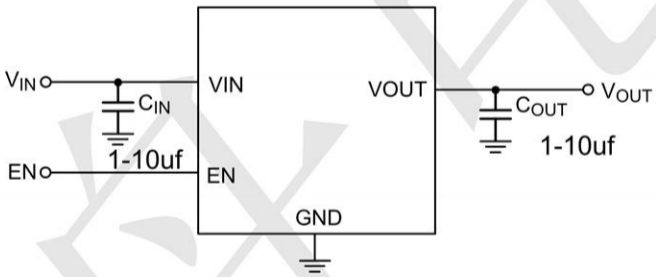


SOT23-5



DFN4(1X1)

Typical Application Circuit



ABSOLUTE MAXIMUM RATINGS

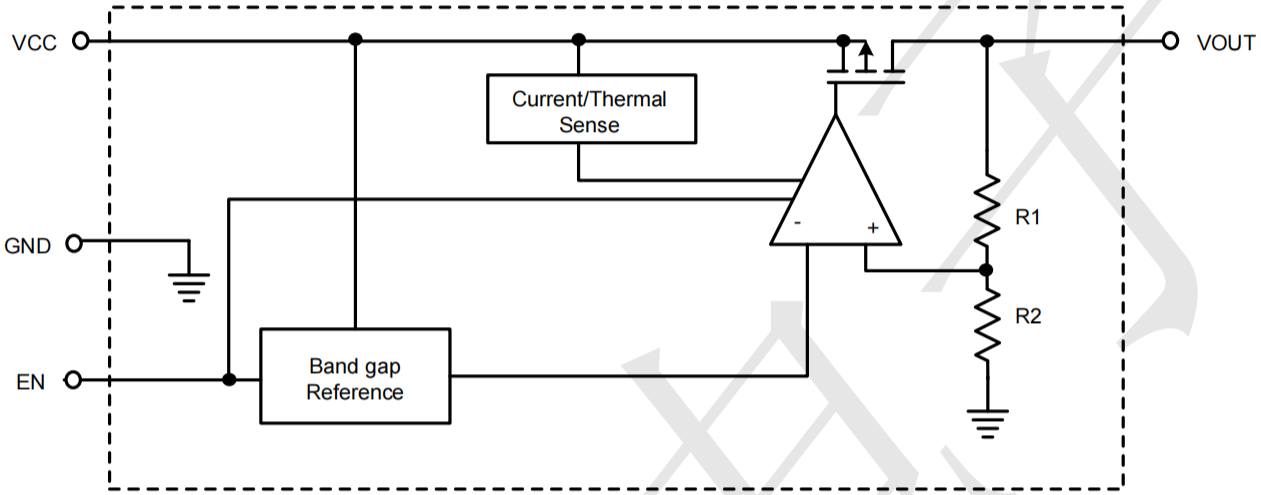
Parameter		Value	Unit
Supply Voltage		-0.3~+6.5	V
Power Dissipation	SOT-23-5	400	mW
	SOT-89	600	mW
Thermal Resistance,Junction-to-Ambient	SOT-23-5	380	°C/W
	SOT-89	180	°C/W
Operating Junction Temperature		-40 ~ +125	°C
Storage Temperature Range		-65 ~ +150	°C
Lead Temperature (Soldering, 10 sec)		300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

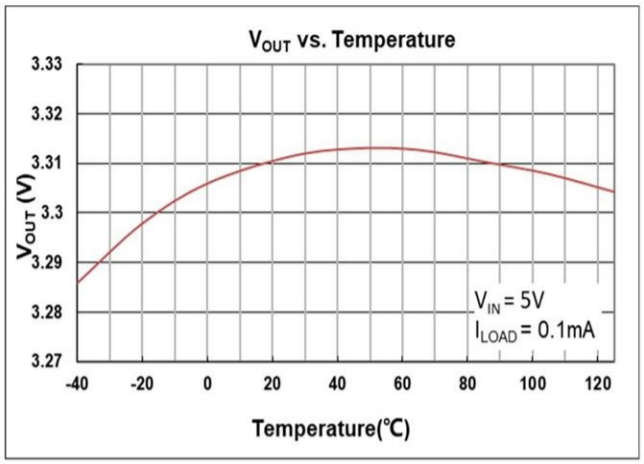
Electrical Characteristics (T =25°C unless otherwise noted)

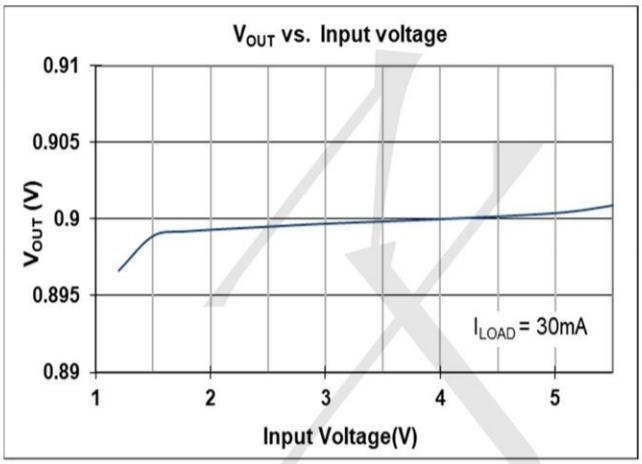
(V_{IN}=5V, V_{EN}=5V, T_A=25°C, unless otherwise specified) (Note 1)

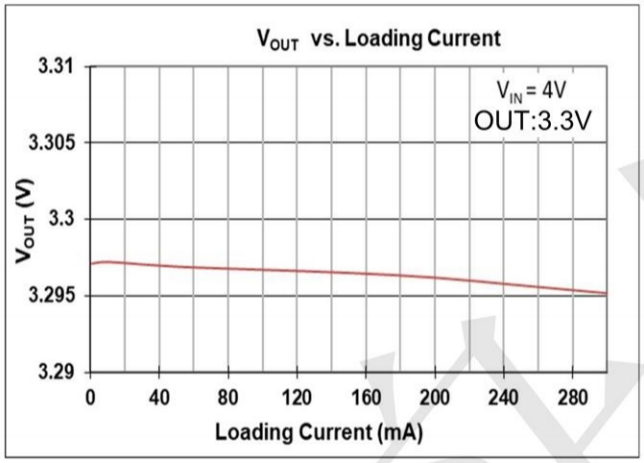
PARAMETER	TEST CONDITIONS	SYMBOL	MIN.	TYP.	MAX.	UNIT
Supply Voltage		V_{IN}	1.2		5.5	V
DC Output Voltage Accuracy	I_{LOAD}=0.1mA		-2		2	%
SNS Input Current	SNS=V_{OUT}	I_{SNS}		0.5		μA
Dropout Voltage (Note 2)	I_{LOAD}=300mA, V_{OUT}≥3V	V_{DROP_3V}		0.18		V
	I_{LOAD}=300mA, V_{OUT}=2.8V	$V_{DROP_2.8V}$		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		15		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}	450	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

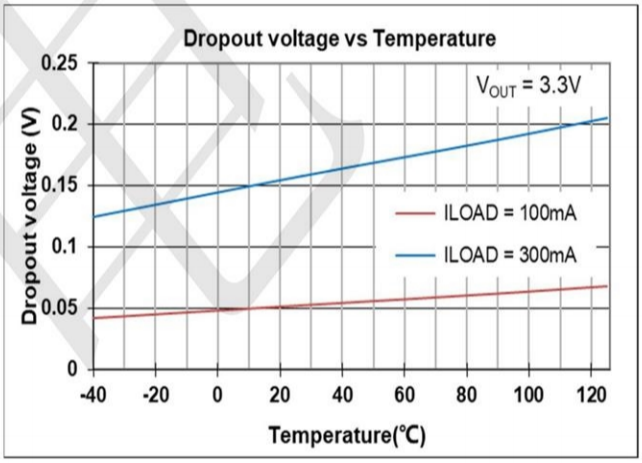
BLOCK DIAGRAM

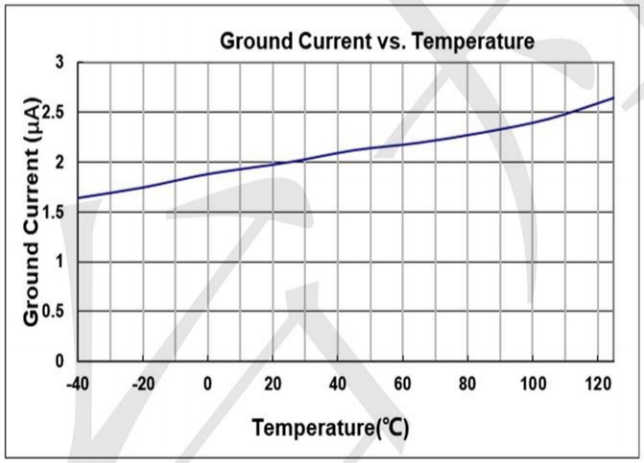


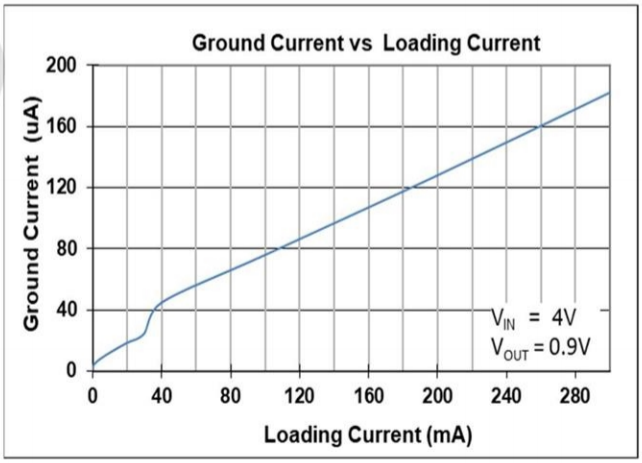

V_{OUT} vs. Temperature
V_{OUT} (V)
3.33
3.32
3.31
3.3
3.29
3.28
3.27
-40 -20 0 20 40 60 80 100 120
Temperature(℃)
V_{IN} = 5V
I_{LOAD} = 0.1mA

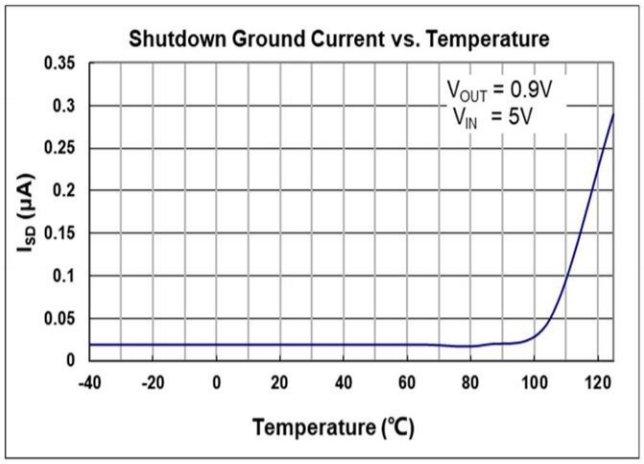

V_{OUT} vs. Input voltage
V_{OUT} (V)
0.91
0.905
0.9
0.895
0.89
1 2 3 4 5
Input Voltage(V)
I_{LOAD} = 30mA

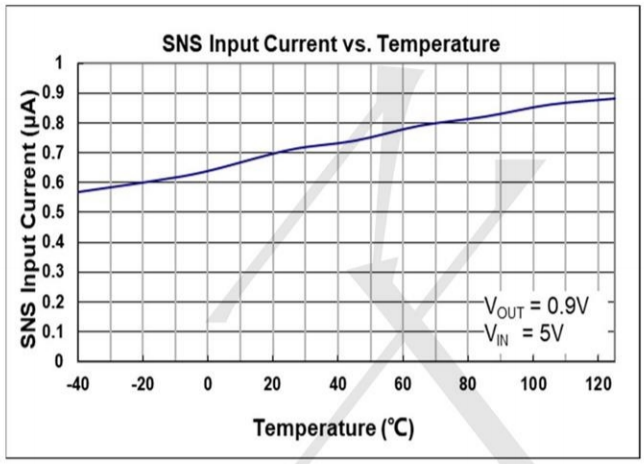

V_{OUT} vs. Loading Current
V_{OUT} (V)
3.31
3.305
3.3
3.295
3.29
0 40 80 120 160 200 240 280
Loading Current (mA)
V_{IN} = 4V
OUT:3.3V

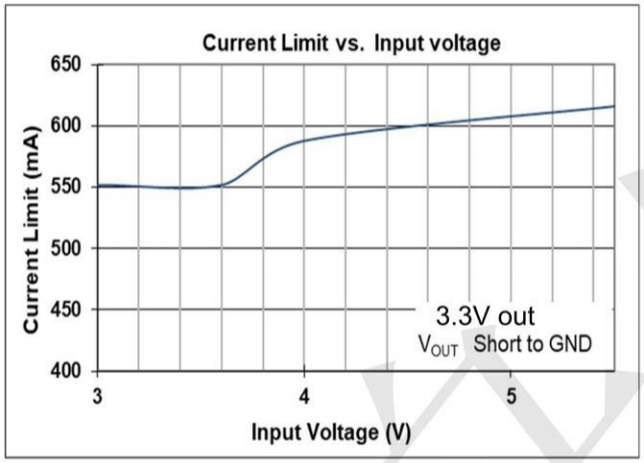

Dropout voltage vs Temperature
Dropout voltage (V)
0.25
0.2
0.15
0.1
0.05
0
-40 -20 0 20 40 60 80 100 120
Temperature(℃)
V_{OUT} = 3.3V
ILOAD = 100mA
ILOAD = 300mA


Ground Current vs. Temperature
Ground Current (μA)
3
2.5
2
1.5
1
0.5
0
-40 -20 0 20 40 60 80 100 120
Temperature(℃)

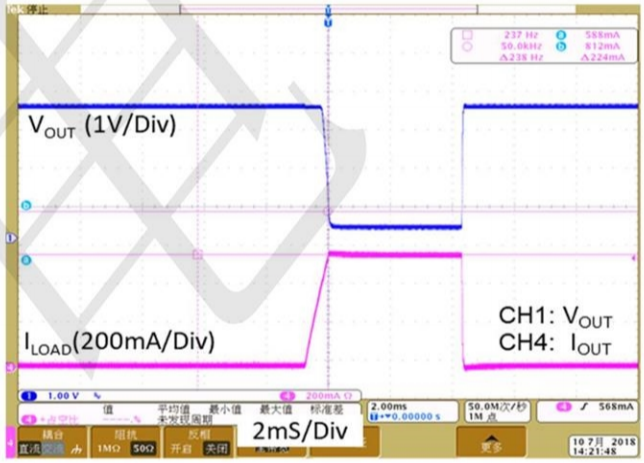

Ground Current vs Loading Current
Ground Current (uA)
200
160
120
80
40
0
0 40 80 120 160 200 240 280
Loading Current (mA)
V_{IN} = 4V
V_{OUT} = 0.9V



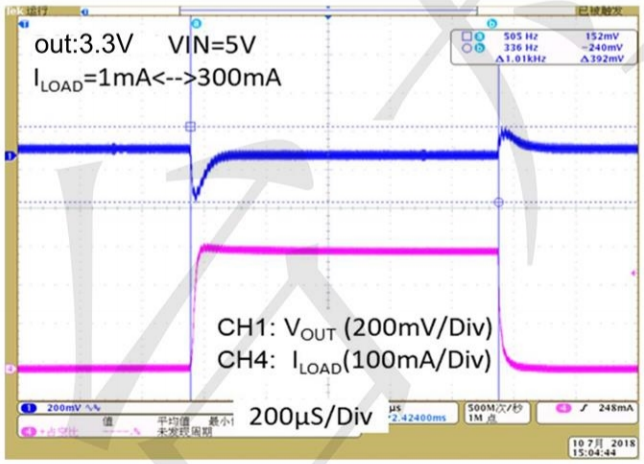




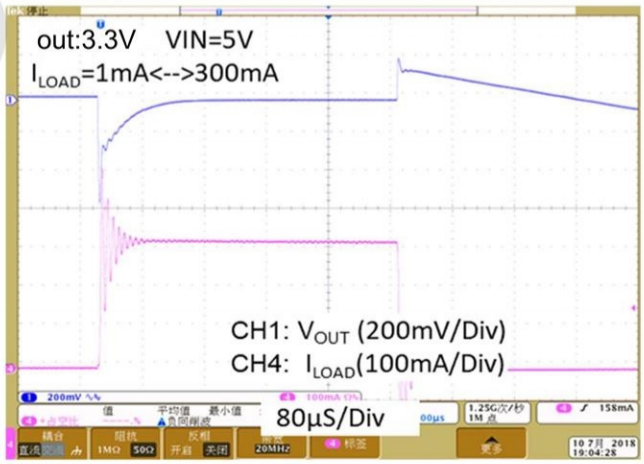
Current Limit Response



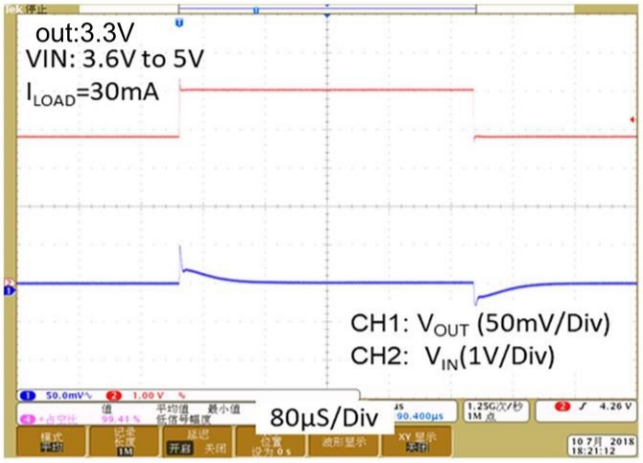
Load Transient Response I



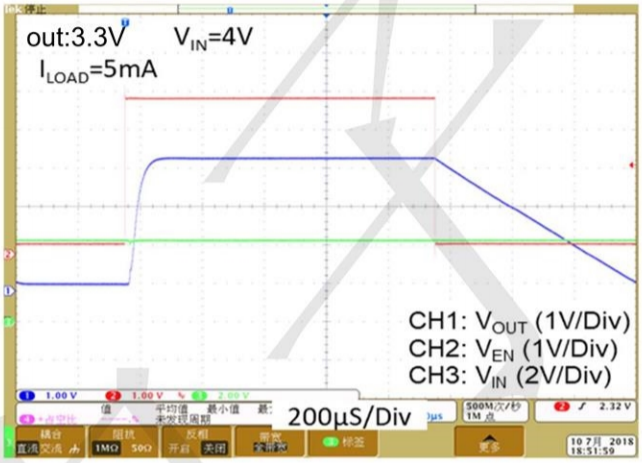
Load Transient Response II



Line Transient Response

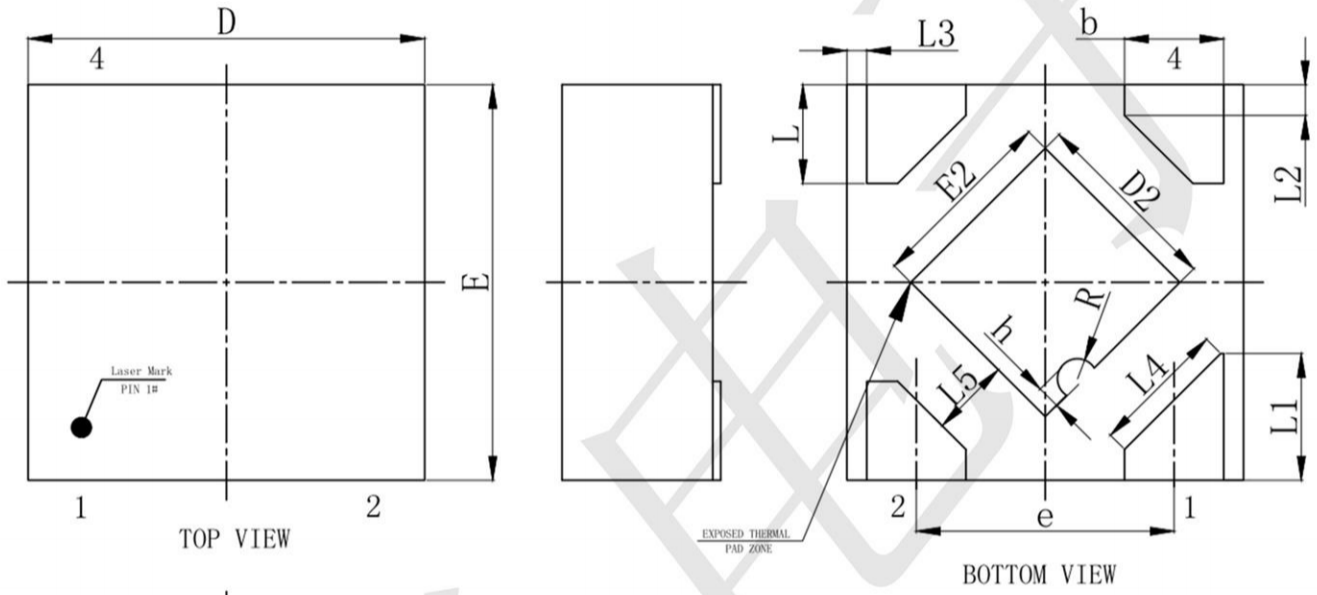


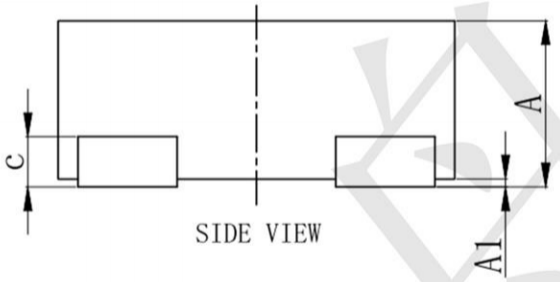
V_{OUT} Turn On/Off by EN



Package information

4-pin DFN-4L Outline Dimensions

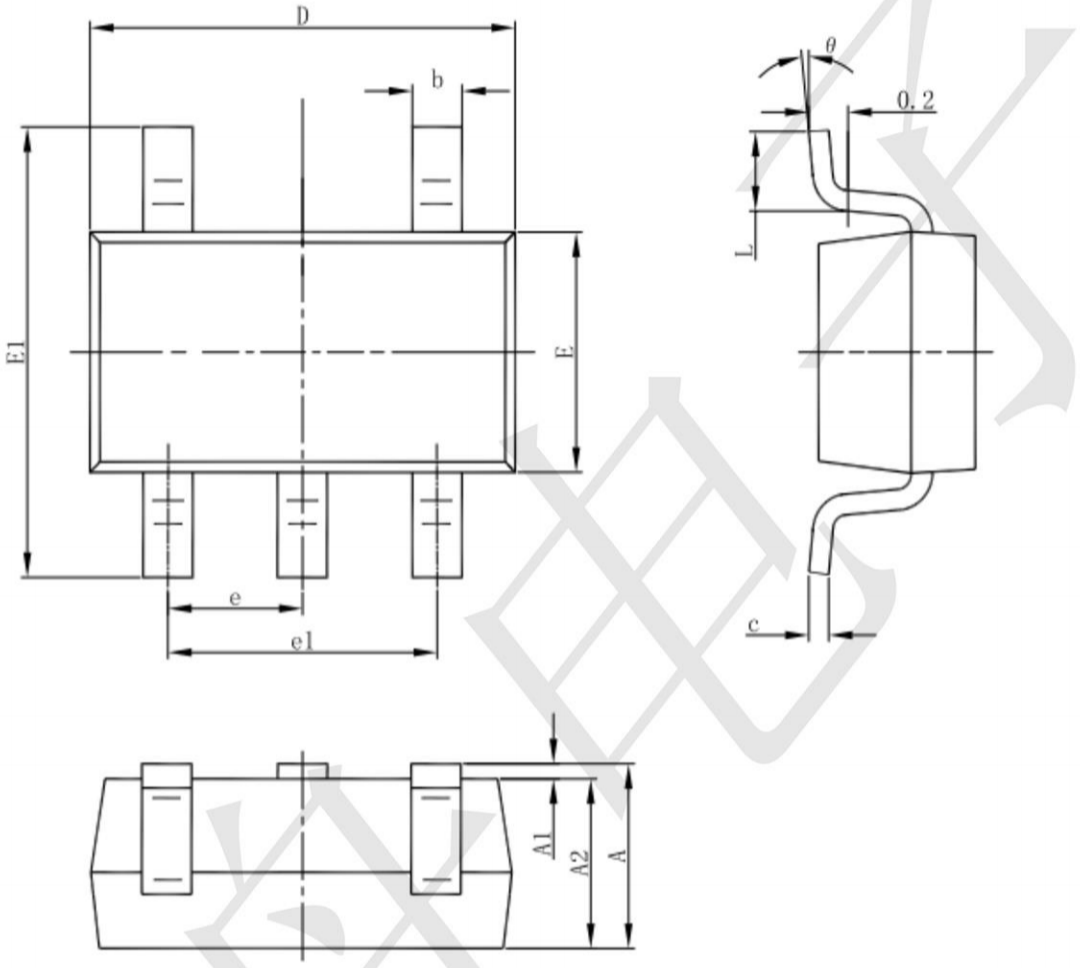




SYMBOL	MILLIMETER		
	MIN	NOM	MAX
A	0.35	-	0.40
A1	0.00	0.02	0.05
b	0.20	0.25	0.30
c	0.07	0.12	0.17
D	0.95	1.00	1.05
D2	0.38	0.48	0.58
e	0.65BSC		
E	0.95	1.00	1.05
E2	0.38	0.48	0.58
L	0.20	0.25	0.30
L1	0.27	0.32	0.37
L2	0.077REF		
L3	0.05REF		
L4	0.34REF		
L5	0.20REF		
R	0.05REF		
h	0.06REF		

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°