

Description

The 6051 series are highly precise, low noise, positive voltage LDO regulators manufactured using CMOS processes. The series achieves high ripple rejection and low dropout and consists of a standard voltage source, an error correction, current limiter and a phase compensation circuit plus a driver transistor. External output feedback, customers can easily get the required voltage. In order to make the load current does not exceed the current capacity of the output transistor, built-in over-current protection, over temperature protection and short circuit protection. The internal op amp with advanced structure, the output capacitor can be omitted.

Features

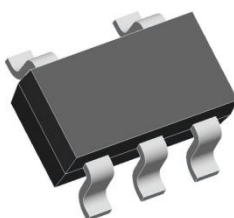
- Dropout Voltage: 100mV @ 100mA(3.0V type)
- High Ripple Rejection: 70dB@1KHz
- Internal protector: current limiter, short protector and over temperature protection
- FB voltage: 0.8V
- Low Power Consumption: 50uA (TYP.)
- Minimum Output Current : 600mA.
- Standby current: < 0.1μA
- Instructions with Power Good
- No fast discharge function

Applications

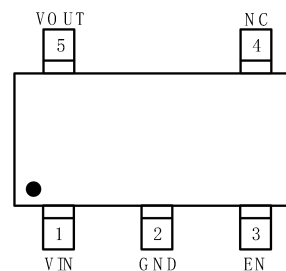
- Cellular Handsets
- Battery - Powered Equipment
- Wi-Fi Router Portable AV equipment
- Portable Information Application



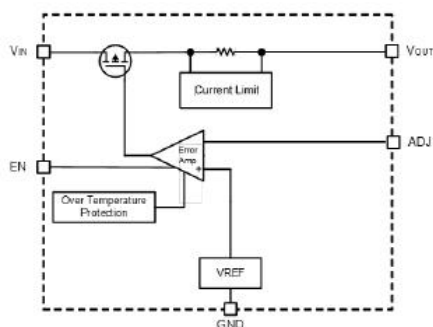
Pin Assignment



SOT-23-5L



Function Block Diagram



Order Information

Device	Package	Unit/Tape
SP6051CL5	SOT-23-5L	3000

Thermal Information

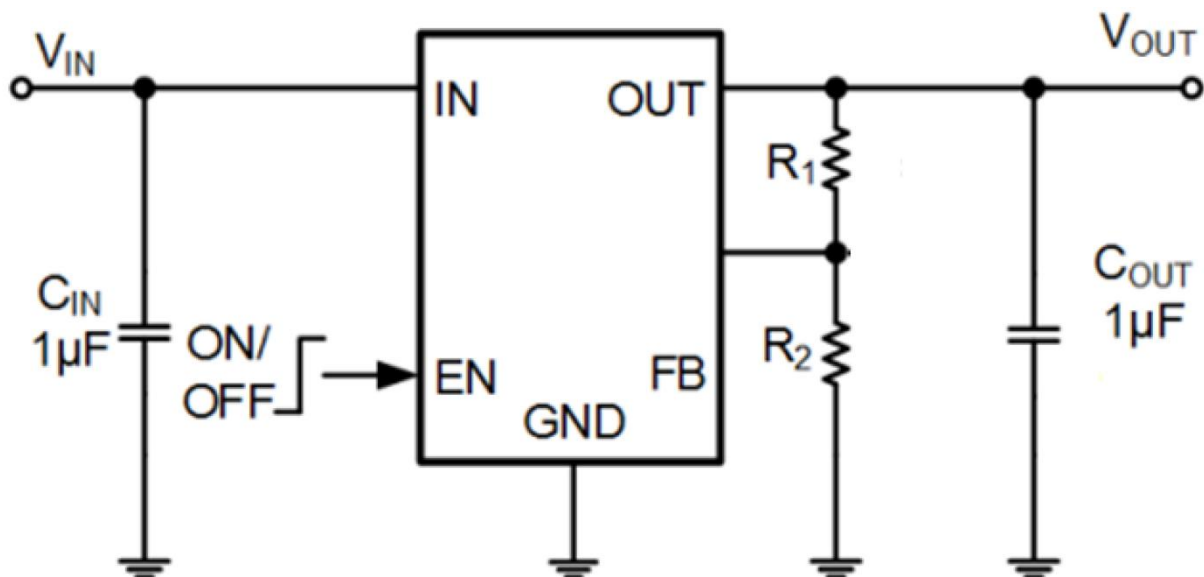
Item	Description	Value	Unit
$R_{\theta JA}$	Junction-to-ambient thermal resistance	120	$^{\circ}\text{C}/\text{W}$
$R_{\theta JC(\text{top})}$	Junction-to-case (top) thermal resistance	90	$^{\circ}\text{C}/\text{W}$

Absolute Maximum Ratings(Note)

Items	Min	Max	Unit
V_{IN}	2	$V_{SS}+6.5$	V
V_{EN}	$V_{SS}-0.3$	$V_{IN}+0.3$	V
V_{FB}	$V_{SS}-0.3$	$V_{IN}+0.3$	V
V_{OUT}	$V_{SS}-0.3$	$V_{IN}+0.3$	V
Power dissipation	500		mW
Operating Ambient Temperature	-40	85	$^{\circ}\text{C}$
Maximum junction temperature		125	$^{\circ}\text{C}$
Storage temperature, T_{stg}	-40	125	$^{\circ}\text{C}$

Note: Exceed these limits to damage to the device. Exposure to absolute maximum rating conditions may affect device reliability.

Typical Application



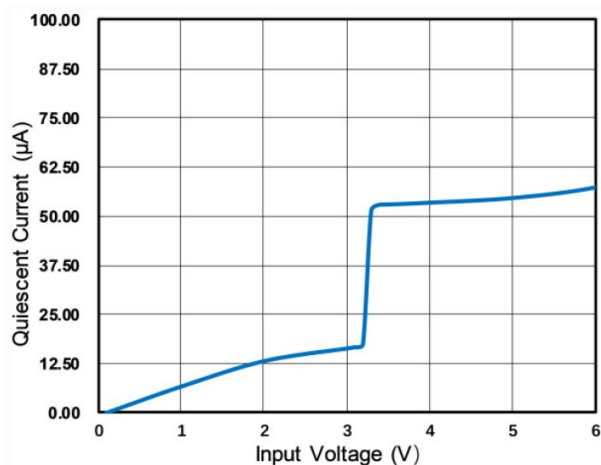
Electrical Characteristics($V_{IN} = V_{OUT} + 1V$, $T_A = 25^\circ C$, unless otherwise noted.)

Symbol	Items	Conditions	Min	Typ	Max	Unit
A- V_{FB}	Feedback Voltage	$V_{IN}=4.2V$, $V_{OUT}=3.3V$, $I_{OUT}=30mA$	580	600	620	mV
B- V_{FB}			730	750	770	
C- V_{FB}			780	800	820	
I_{OUT}	Output Current	$V_{IN}=4.2V@V_{OUT}=3.3V$	-	600	-	mA
V_{drop}	Dropout Voltage	$I_{OUT}=50\text{ mA}$	-	0.08	0.11	V
		$I_{OUT}=100\text{ mA}$	-	0.10	0.15	
$\frac{\Delta V_{OUT}}{\Delta V_{IN} \times \Delta V_{OUT}}$	Line Regulations	$V_{OUT(S)}+0.5\text{ V} \leq V_{IN} \leq 7V$, $I_{OUT}=30mA$	-	0.10	0.20	%/V
ΔV_{OUT2}	Load Regulation	$V_{IN}=V_{OUT(S)}+1.0\text{ V}$, $1.0mA \leq I_{OUT} \leq 100mA$	-	50	100	mV
$\frac{\Delta V_{OUT}}{T_a \times \Delta V_{OUT}}$	Output Voltage Temperature Characteristics	$V_{IN}=V_{OUT(S)}+1.0V$, $I_{OUT}=10mA$, $-40^\circ C \leq T_A \leq 85^\circ C$	-	± 100	-	ppm/ $^\circ C$
I_{SS1}	Supply Current	$V_{IN}=V_{OUT(S)}+1.0\text{ V}$	-	50	-	μA
I_{shut}	Shutdown Current	$V_{IN}=5V$, $V_{EN}=0$	-	-	0.1	μA
V_{IN}	Input Voltage	-	-	-	6	V
PSRR	Power Supply Rejection Rate	$V_{IN}=V_{OUT(S)}+1V$ $f=1k\text{ Hz}$, $V_{RIP}=0.5V_{rms}$, $I_{OUT}=50mA$	-	70	-	dB
I_{short}	Short-circuit Current	$V_{IN}=V_{OUT}+1.0\text{ V}$, ON/OFF Terminal is ON, $V_{OUT}=0\text{ V}$	-	200	-	mA
V_{ENH}	EN "High" Voltage	-	1.2	-	-	V
V_{ENL}	EN "Low" Voltage	-	-	-	0.4	V
I_{ENH}	EN "High" Current	$V_{IN}=V_{EN}=V_{OUT(T)}+1V$	-0.1	-	0.1	μA
I_{ENL}	EN "Low" Current	$V_{IN}=V_{OUT(T)}+1V$, $V_{EN}=V_{SS}$	-0.1	-	0.1	μA

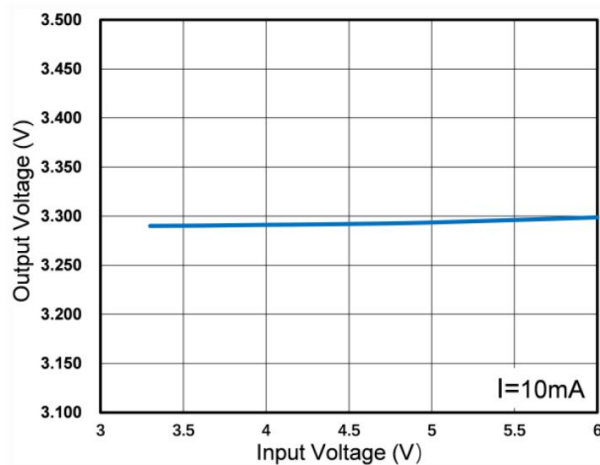
Typical Performance Characteristics

Note: $C_{IN}=1\mu F$ $C_{OUT}=1\mu F$ $V_{OUT}=3.3V$ $T=25^{\circ}C$ unless specified otherwise

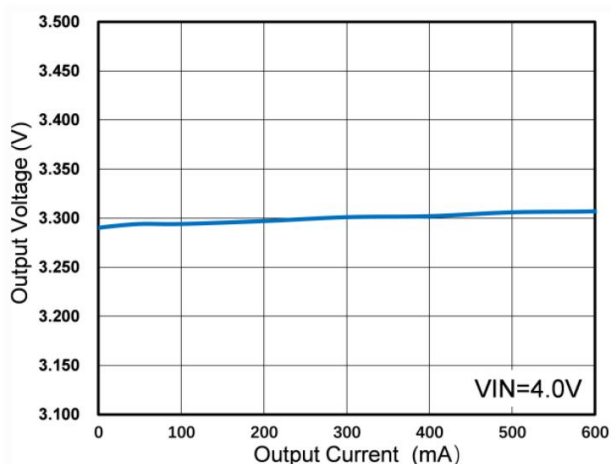
(1) Quiescent Current VS Input Voltage



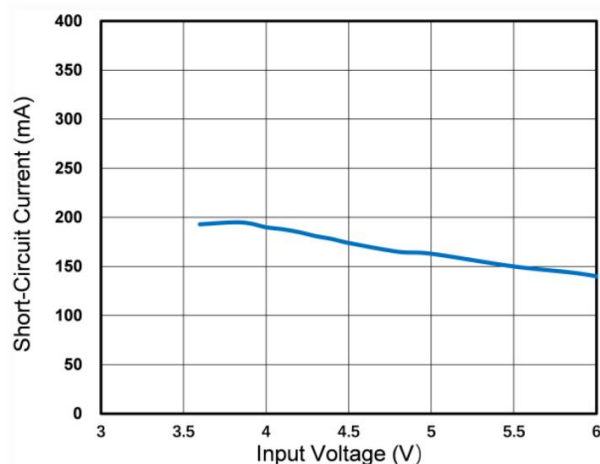
(2) Output Voltage VS Input Voltage



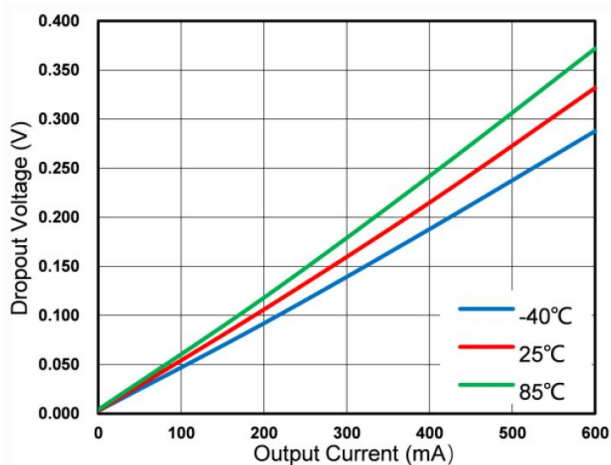
(3) Output Voltage VS Output Current



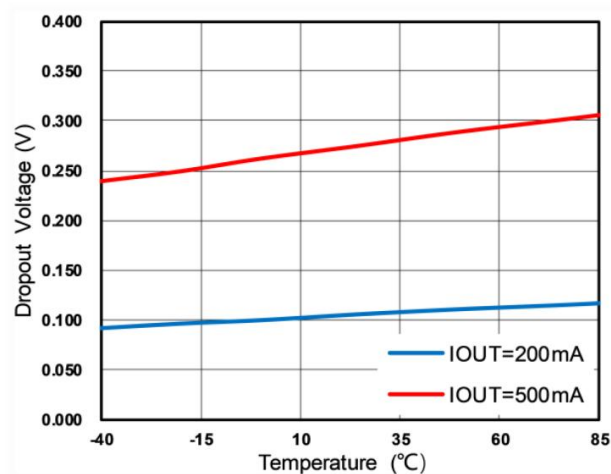
(4) Short-Circuit Current VS Input Voltage



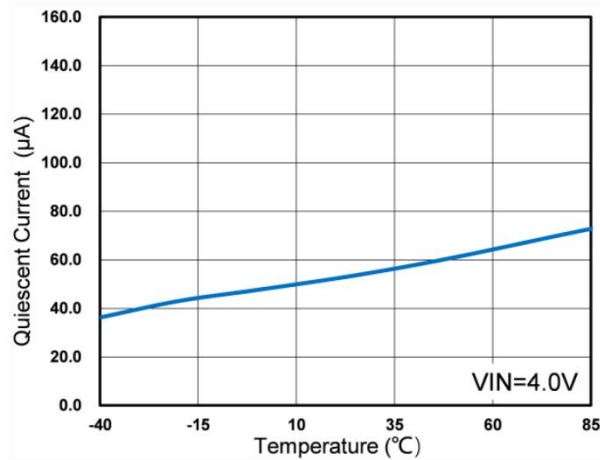
(5) Dropout Voltage VS Output Current



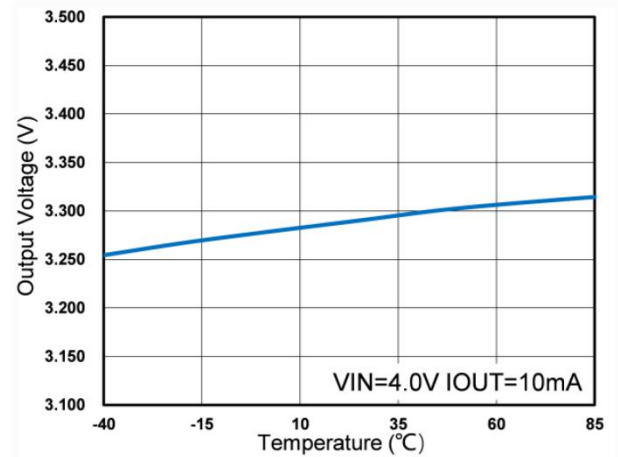
(6) Dropout Voltage VS Temperature



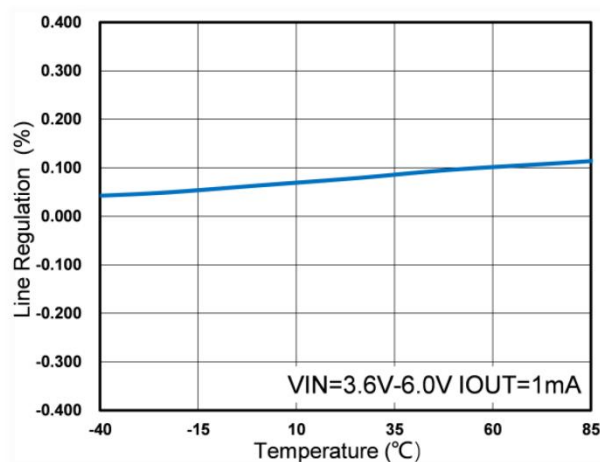
(7) Quiescent Current VS Temperature



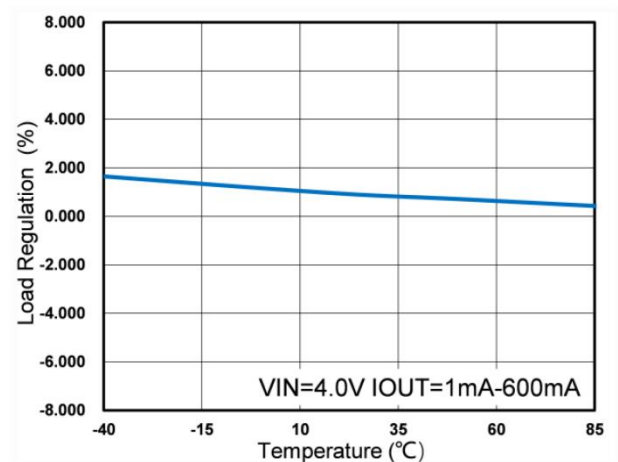
(8) Output Voltage VS Temperature



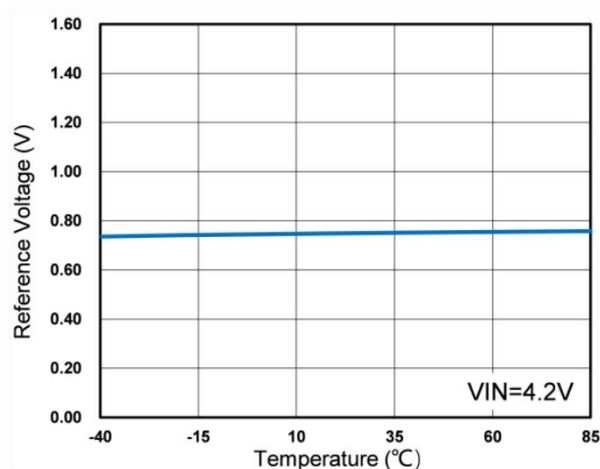
(9) Line Regulation VS Temperature



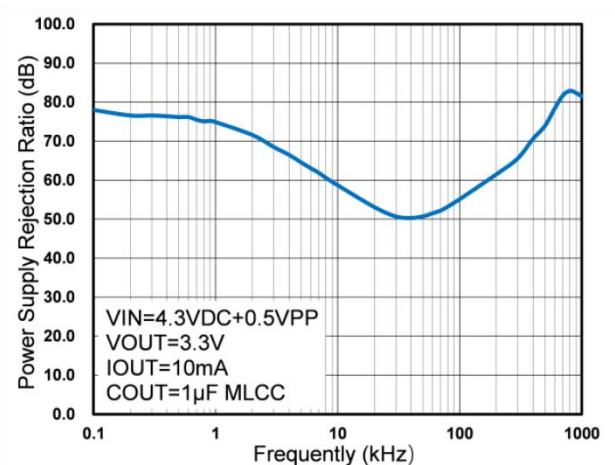
(10) Load Regulation VS Temperature



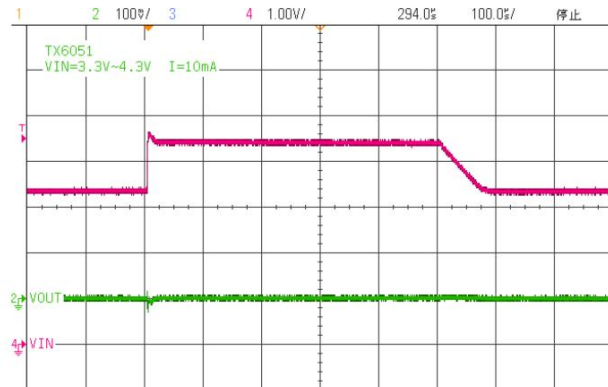
(11) Reference Voltage VS Temperature



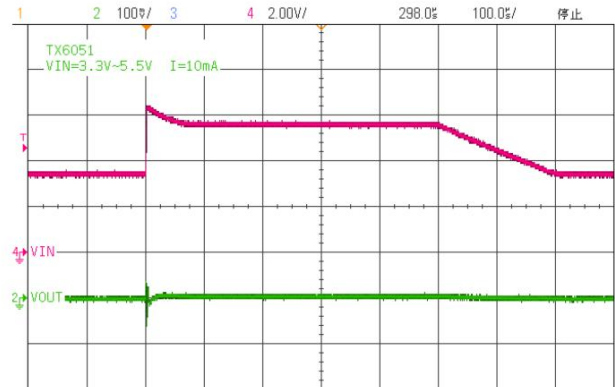
(12) PSRR



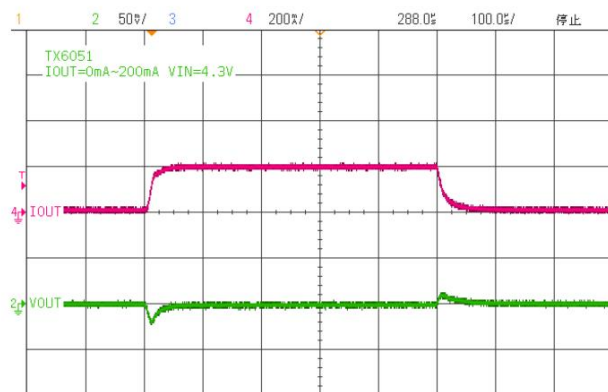
(13) Input Transient Response (VIN=3.3V-4.3V)



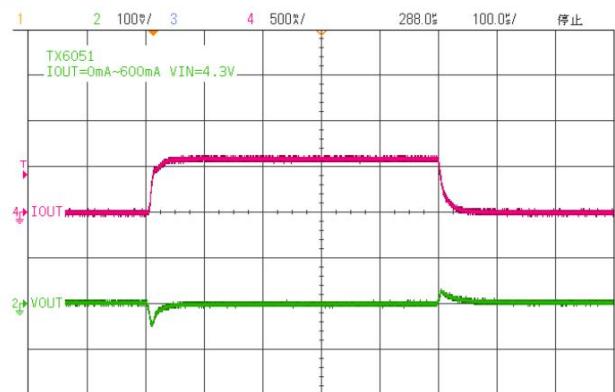
(14) Input Transient Response (VIN=3.3V-5.5V)



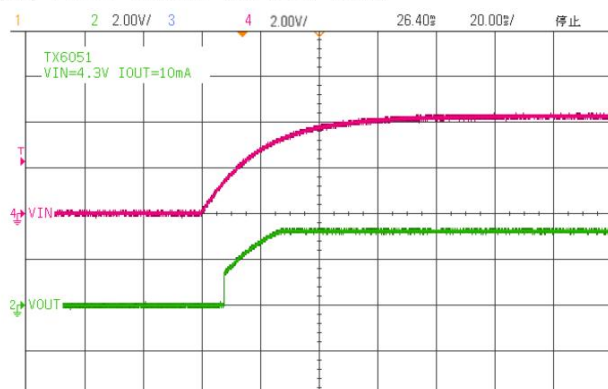
(15) Load Transient Response (IOUT=0mA-200mA)



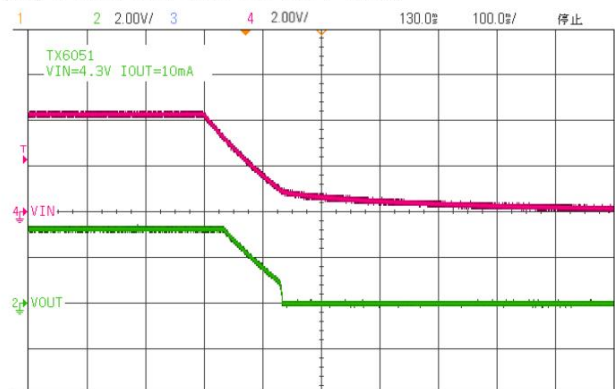
(16) Load Transient Response (IOUT=0mA-600mA)



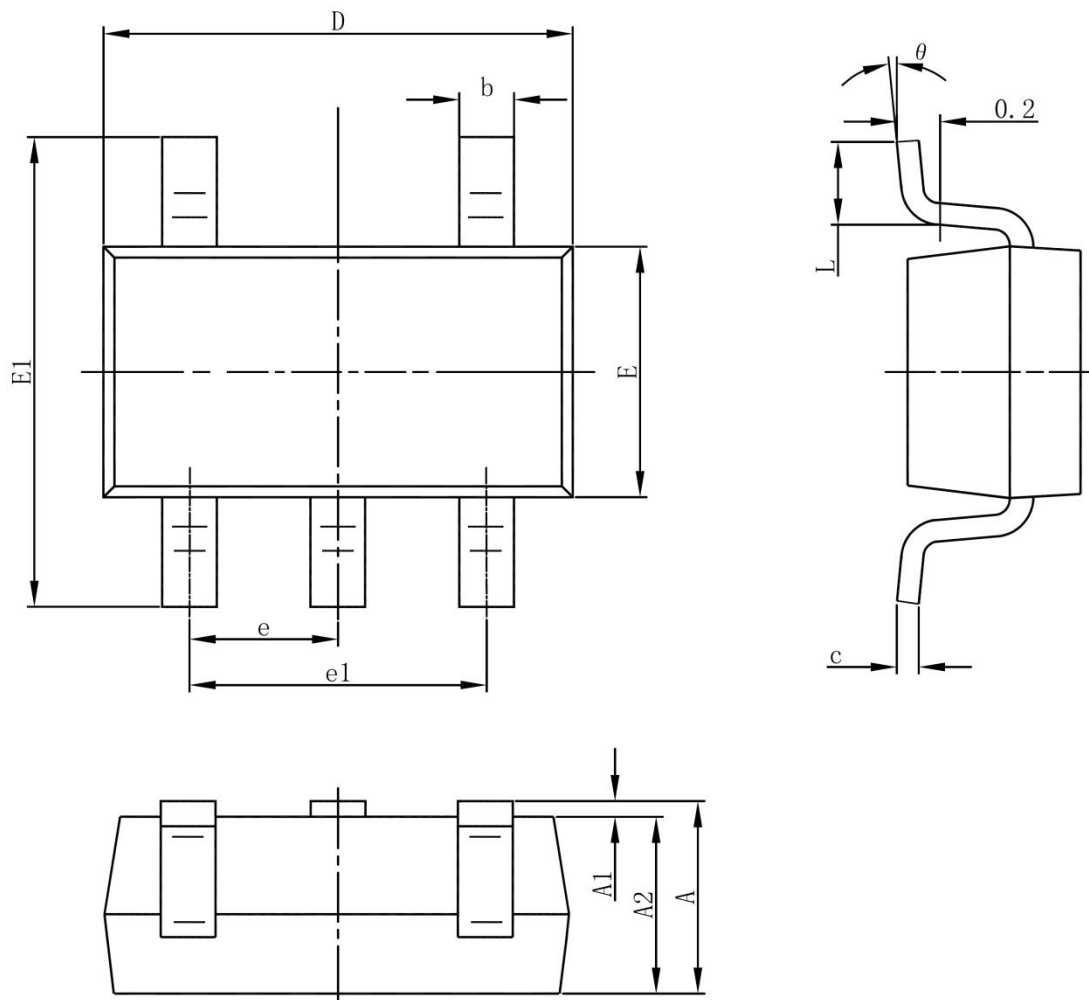
(17) Power ON (VIN=4.3V IOUT=10mA)



(18) Power OFF (VIN=4.3V IOUT=10mA)



SOT-23-5L Package Information



Symbol	Dimensions In Millimeters	
	Min	Max
A	1.050	1.250
A1	0.000	0.100
A2	1.050	1.150
b	0.300	0.500
c	0.100	0.200
D	2.820	3.020
E	1.500	1.700
E1	2.650	2.950
e	0.950(BSC)	
e1	1.800	2.000
L	0.300	0.600
θ	0°	8°