BL8064

200mA Low Consumption Linear Regulator

Description

BL8064 series is a group of positive voltage output, low power consumption, low dropout voltage, three terminal regulator. It can provide 200mA output current when input/output voltage differential drops to 430mV (V_{OUT}=2.8V). The very low power consumption of BL8064 (I_Q=1.0uA) can greatly improve natural life of batteries.

BL8064 can provide output value in the range of 1.1V~5.5V in 0.1V steps. It also can be customized on command.

BL8064 includes high accuracy voltage reference, error amplifier, current limit circuit and output driver module.

BL8064 has well load transient response and good temperature characteristic, and it uses trimming technique to guarantee output voltage accuracy within ±2%.

Features

- Low power consumption: 1.0uA (Typ.)
- Maximum output current: 200mA
- Small dropout voltage:

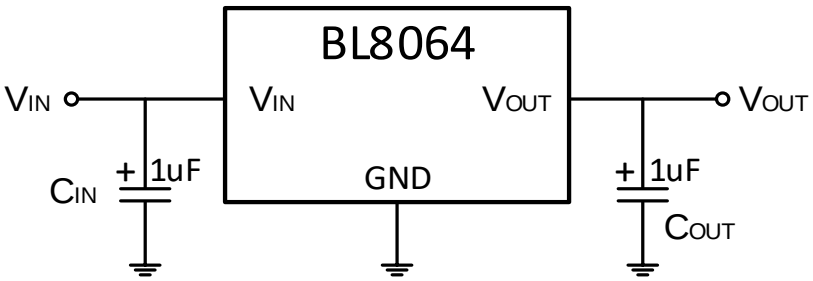
  210mV@100mA (V_{OUT}=2.8V)

  430mV@200mA (V_{OUT}=2.8V)
- Input voltage range: 1.5V~8V
- Output voltage range: 1.1V~5.5V (customized on command in 0.1V steps)
- Highly accurate: ±2% (±1% customized)
- Output current limit

Applications

- Battery powered equipment
- Power management of MP3, PDA, DSC, mouse, PS2 games
- Reference voltage source regulation after switching power

Typical application circuit



Note: Input capacitor (C_{IN}=1uF) and output capacitor (C_{OUT}=1uF) are recommended in all application circuit. Ceramic capacitor is recommended.

Ordering Information

BL8064 [1] [2] [3] [4] [5]

Code	Description
[1]	Temperature & Rohs: C: -40~125°C, Pb Free Rohs Std.
[2]	Package type: B3: SOT23-3 B3A: SOT23 B5: SOT23-5 C3: SOT89-3
[3]	Packing type: TR: Tape & Reel (Standard)
[4]	Output voltage: e.g. 11=1.1V 15=1.5V 55=5.5V
[5]	Voltage accuracy: 1=±1% Blank(default)=±2%

Marking Description

Output Voltage Code

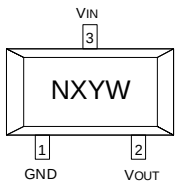
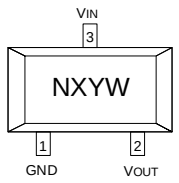
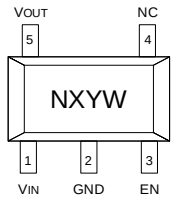
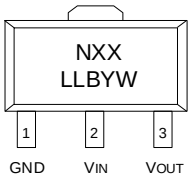
V_{OUT}	Code	V_{OUT}	Code	V_{OUT}	Code
1.1V	1	2.8V	$\overline{8}$	4.2V	$\underline{\overline{2}}$
1.2V	2	2.9V	$\overline{9}$	4.3V	$\underline{\overline{3}}$
1.3V	3	3.0V	$\underline{0}$	4.4V	$\underline{\overline{4}}$
1.4V	4	3.1V	$\underline{1}$	4.5V	$\underline{\overline{5}}$
1.5V	5	3.2V	$\underline{2}$	4.6V	$\underline{\overline{6}}$
1.8V	8	3.3V	$\underline{3}$	4.7V	$\underline{\overline{7}}$
2.0V	$\overline{0}$	3.4V	$\underline{4}$	4.8V	$\underline{\overline{8}}$
2.1V	$\overline{1}$	3.5V	$\underline{5}$	4.9V	$\underline{\overline{9}}$
2.2V	$\overline{2}$	3.6V	$\underline{6}$	5.0V	$\underline{\overline{\overline{0}}}$
2.3V	$\overline{3}$	3.7V	$\underline{7}$	5.1V	$\underline{\overline{\overline{1}}}$
2.4V	$\overline{4}$	3.8V	$\underline{8}$	5.2V	$\underline{\overline{\overline{2}}}$
2.5V	$\overline{5}$	3.9V	$\underline{9}$	5.3V	$\underline{\overline{\overline{3}}}$
2.6V	$\overline{6}$	4.0V	$\underline{\overline{0}}$	5.4V	$\underline{\overline{\overline{4}}}$
2.7V	$\overline{7}$	4.1V	$\underline{\overline{1}}$	5.5V	$\underline{\overline{\overline{5}}}$

Y: The Year of manufacturing, "1" stands for year 20X1, "2" stands for year 20X2, and "8" stands for year 20X8. (X=0,1,2, …, 9)

W: The week of manufacturing. "A" stands for week 1, "Z" stands for week 26, "$\overline{A}$" stands for week 27, "$\overline{Z}$" stands for week 52.

The date code of the 53rd week is the same as that of the first week of the next year. For example, the date code of the 53rd week of 2017 is the same as that of the first week of 2018, which are 1801 and 8A.

Pin Configuration

Product classification		BL8064CB3TR□□
NXYW	N: Product code X: Output voltage YW: Date code	SOT23-3 
Product classification		**BL8064CB3ATR□□**
NXYW	N: Product code X: Output voltage YW: Date code	SOT23 
Product classification		**BL8064CB5TR□□**
NXYW	N: Product code X: Output voltage YW: Date code	SOT23-5 
Product classification		**BL8064CC3TR□□**
NXX LLBYW	N: Product code XX: Output voltage LL: LOT No. B: FAB code YW: Date code	SOT89-3 
GND	Ground	
V_{IN}	Supply voltage input	
V_{OUT}	Output voltage	
EN	Chip enable	
NC	No connection	

Absolute Maximum Ratings

Parameter		Value	Unit
Maximum input voltage		10	V
Operating junction temperature (T_J)		150	°C
Ambient temperature (T_A)		-40 ~ +125	°C
Power dissipation	SOT23-3	0.54	W
	SOT23	0.38	
	SOT23-5	0.59	
	SOT89-3	1.25	
Package thermal resistance (θ_{JA})	SOT23-3	230	°C/W
	SOT23	328	
	SOT23-5	210	
	SOT89-3	100	
Storage temperature (T_S)		-40 ~ +150	°C
ESD (HBM)		>2000	V
Lead temperature & time		260°C, 10s	

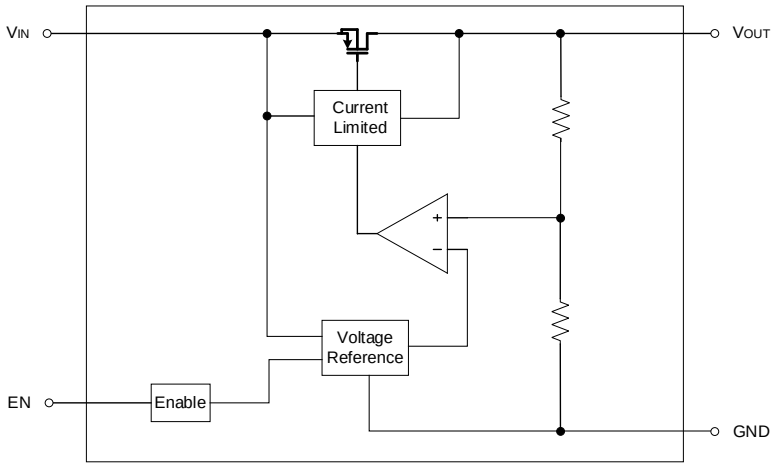
Note:

1. Stresses at or above those listed under Absolute Maximum Ratings may cause permanent damage to the product.
2. The maximum allowable power dissipation is a function of the maximum junction temperature $T_{J(MAX)}$, the junction-to-ambient thermal resistance θ_{JA}, and the ambient temperature T_A. The maximum allowable continuous power dissipation at any ambient temperature is calculated by $P_{D(MAX)}=(T_{J(MAX)}-T_A)/\theta_{JA}$.
3. The θ_{JA} values given in this table are for comparison with other packages only and cannot be used for design purposes. They do not represent the performance achieved in real-world applications.

Recommended Operate Conditions

Parameter	Min	Max	Unit
Input voltage range	-	8	V
Ambient temperature	-40	125	°C

Block Diagram



Explanation

BL8064 is a series of low dropout voltage and low power consumption three pins regulator. Its application circuit is very simple, which only needs two outside capacitors. It is composed of these modules: high accuracy voltage reference, current limit circuit, error amplifier, output driver and power transistor.

Current Limit module can keep chip and power system away from danger when load current is more than 200mA.

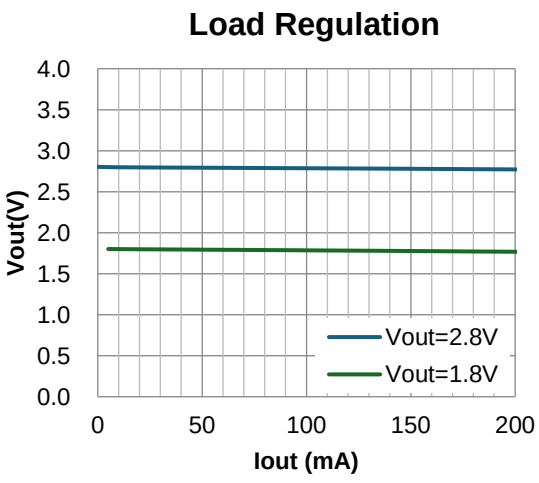
BL8064 uses trimming technique to assure the accuracy of output value within ±2%, at the same time, temperature compensation is elaborately considered in this chip, which makes BL8064's temperature coefficient within 100ppm/°C.

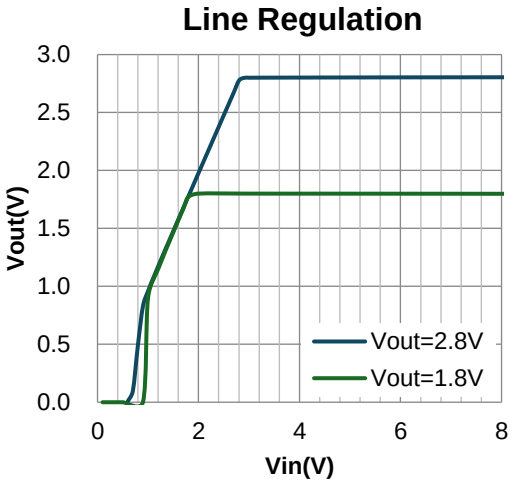
Electrical Characteristics

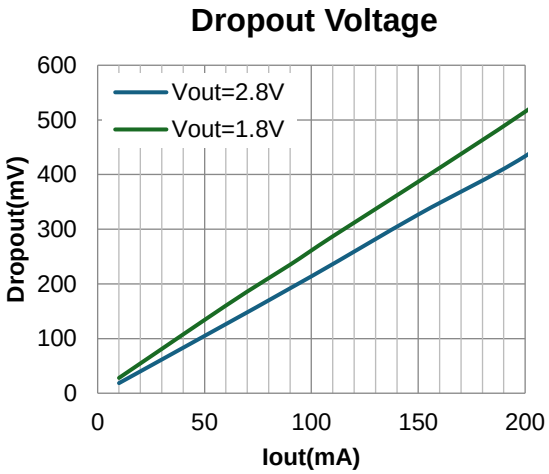
(Test conditions: C_{IN}=1uF, C_{OUT}=1uF, T_A=25°C, unless otherwise specified.)

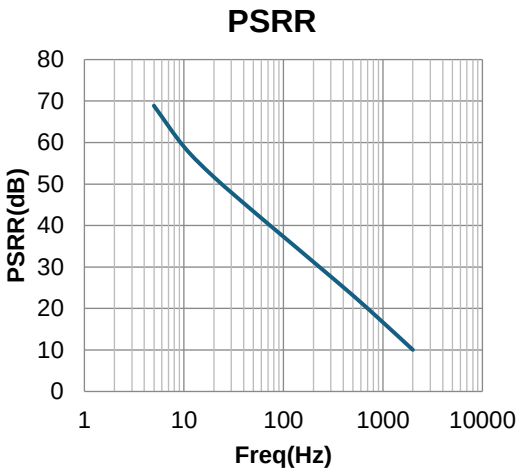
Parameter	Symbol	Conditions		Min	Typ.	Max	Units
Input voltage	V_{IN}					8	V
Output voltage	V_{OUT}			V_{OUT} x0.98		V_{OUT} x1.02	V
Maximum output current	I_{OUT} (Max.)	V_{IN}-V_{OUT}=1V		200			mA
Input-output voltage differential		I_{OUT}=10mA	V_{OUT}=1.8V		30	40	mV
			V_{OUT}=3.3V		20	26	
		I_{OUT}=100mA	V_{OUT}=1.8V		280	360	mV
			V_{OUT}=3.3V		200	240	mV
Line regulation	$\frac{\Delta V_{OUT}}{\Delta V_{IN} \times V_{OUT}}$	I_{OUT}=10mA Set V_{OUT}+0.5V≤V_{IN}≤8V			0.2	0.3	%/V
Load regulation	ΔV_{OUT}	V_{IN}=Set V_{OUT}+1V 1mA≤I_{OUT}≤100mA			20	40	mV
Quiescent current	I_Q	V_{IN}=Set V_{OUT}+1V			1.0	5.0	uA
Output voltage temperature coefficient	$\frac{\Delta V_{OUT}}{\Delta T \times V_{OUT}}$	I_{OUT}=10mA			100		ppm/°C
EN input voltage "H"	V_{ENH}			1.5		V_{IN}	V
EN input voltage "L"	V_{ENL}			0		0.2	V

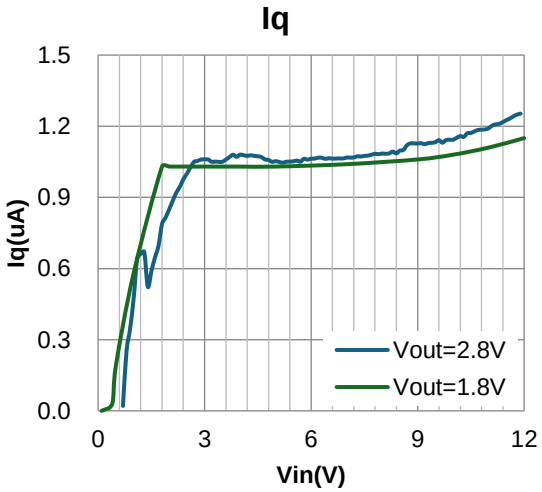
Typical Performance Characteristics

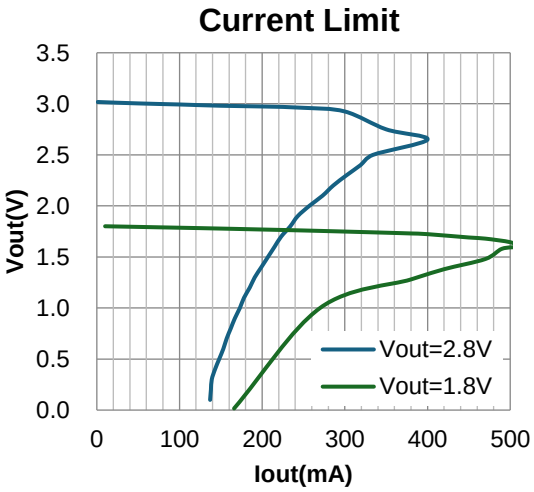


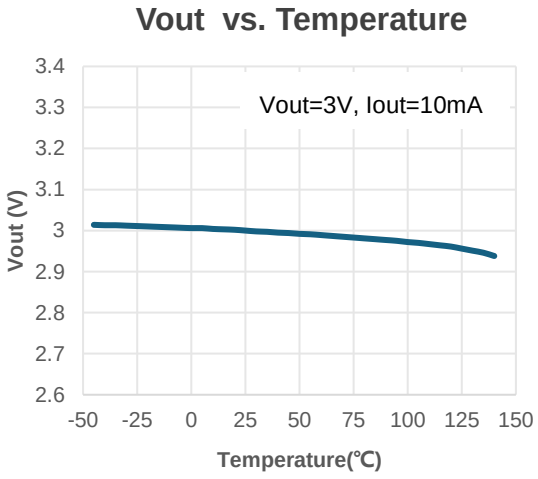



Dropout Voltage
Vout=2.8V
Vout=1.8V
Dropout(mV)
600
500
400
300
200
100
0
0
50
100
150
200
Iout(mA)


PSRR
PSRR(dB)
80
70
60
50
40
30
20
10
0
1
10
100
1000
10000
Freq(Hz)

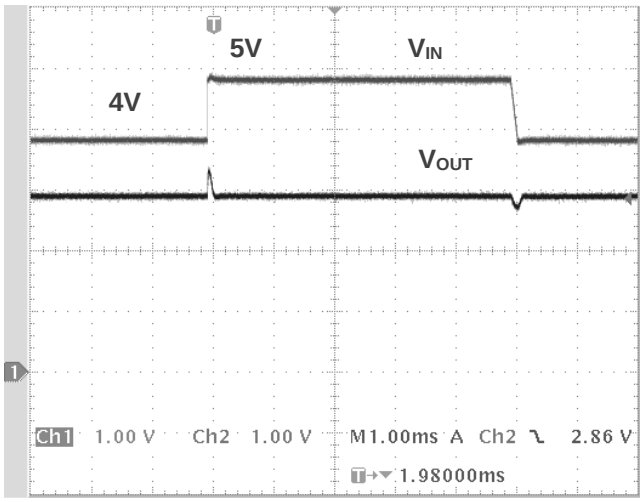

Iq
Iq(uA)
1.5
1.2
0.9
0.6
0.3
0.0
0
3
6
9
12
Vin(V)
Vout=2.8V
Vout=1.8V


Current Limit
Vout(V)
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
0
100
200
300
400
500
Iout(mA)
Vout=2.8V
Vout=1.8V

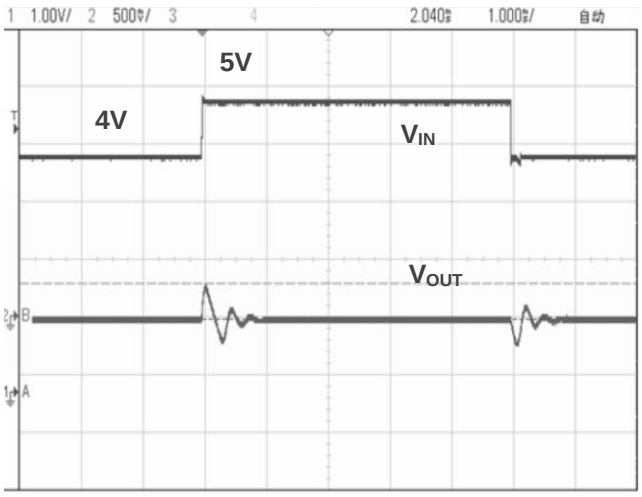

Vout vs. Temperature
Vout=3V, Iout=10mA
Vout (V)
3.4
3.3
3.2
3.1
3
2.9
2.8
2.7
2.6
-50
-25
0
25
50
75
100
125
150
Temperature(℃)

Line transient response

$C_{IN}=C_{OUT}=1uF$, $I_{OUT}=10mA$, $V_{OUT}=2.8V$

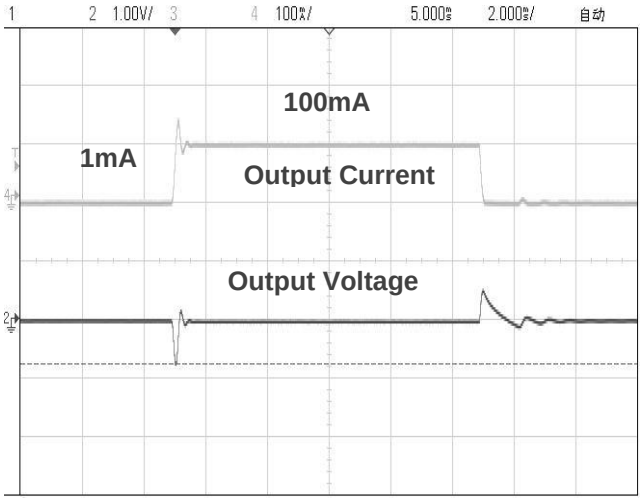


$C_{IN}=C_{OUT}=1uF$, $I_{OUT}=10mA$, $V_{OUT}=1.8V$

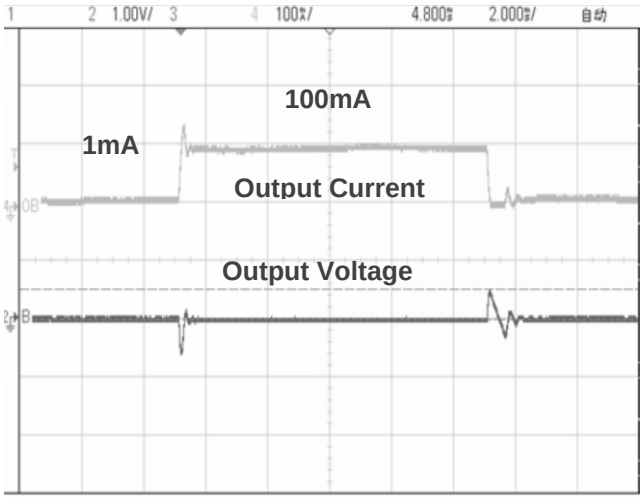


Load transient response

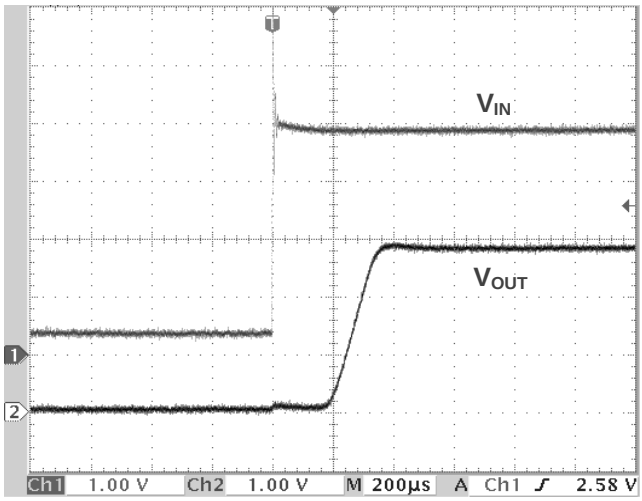
$C_{IN}=C_{OUT}=1uF$, $V_{IN}=4V$, $V_{OUT}=2.8V$

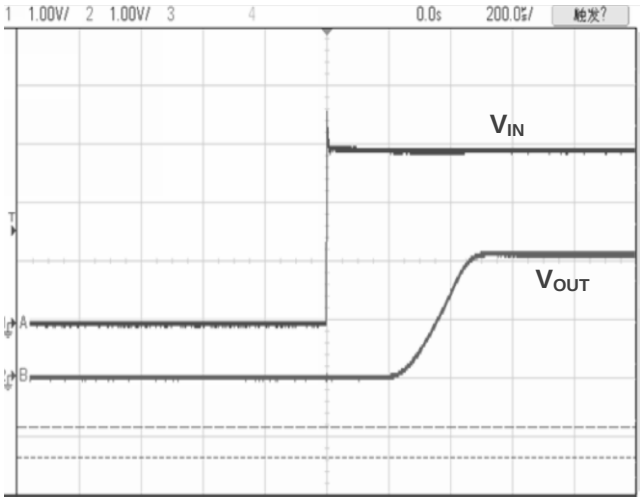


$C_{IN}=C_{OUT}=1uF$, $V_{IN}=3V$, $V_{OUT}=1.8V$



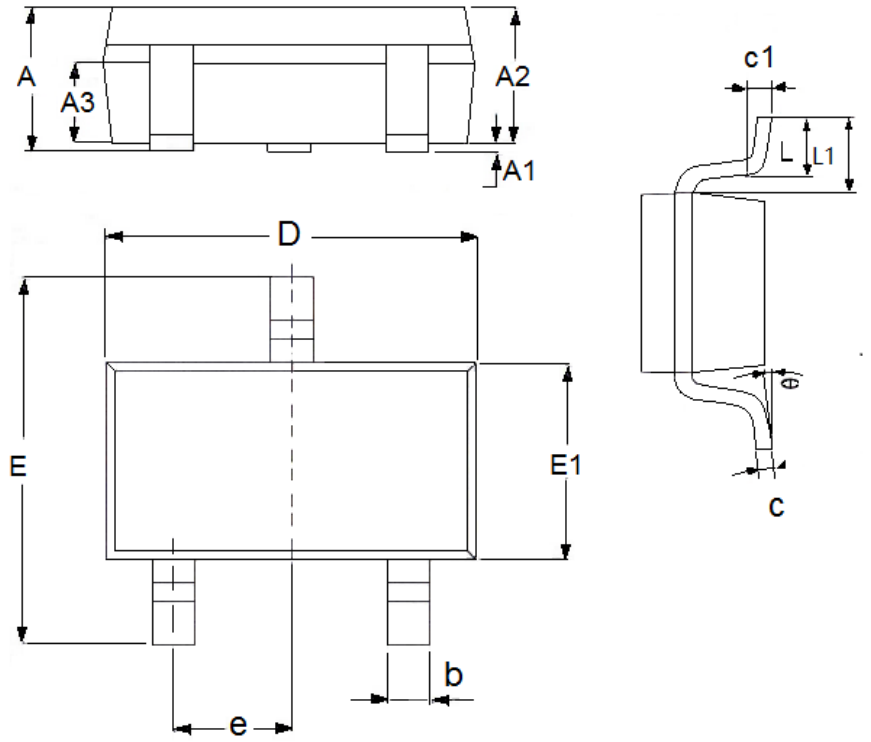
Start up





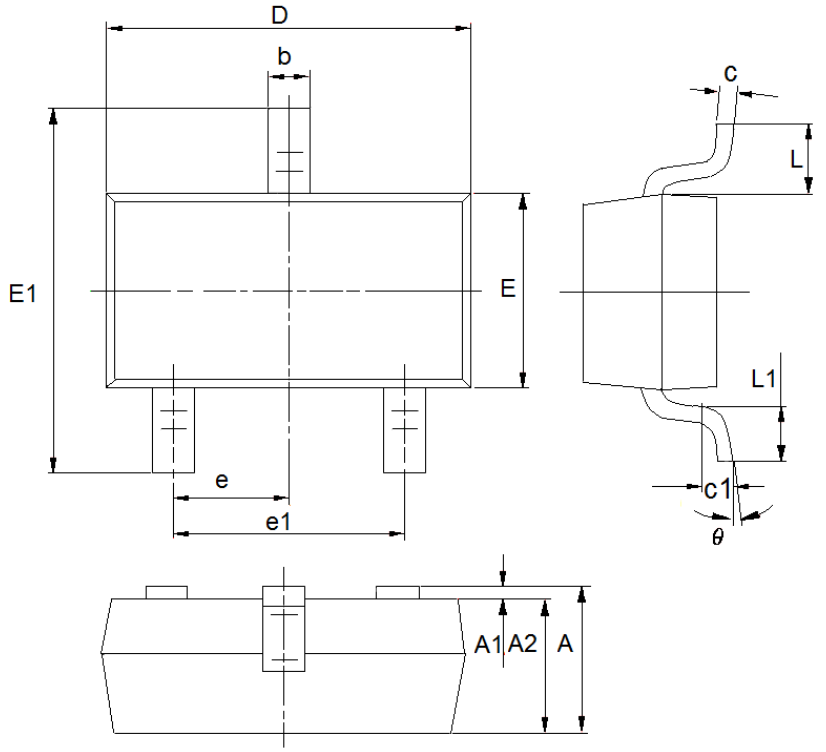
Package Information

Package	SOT23-3	Devices per reel	3000 pcs



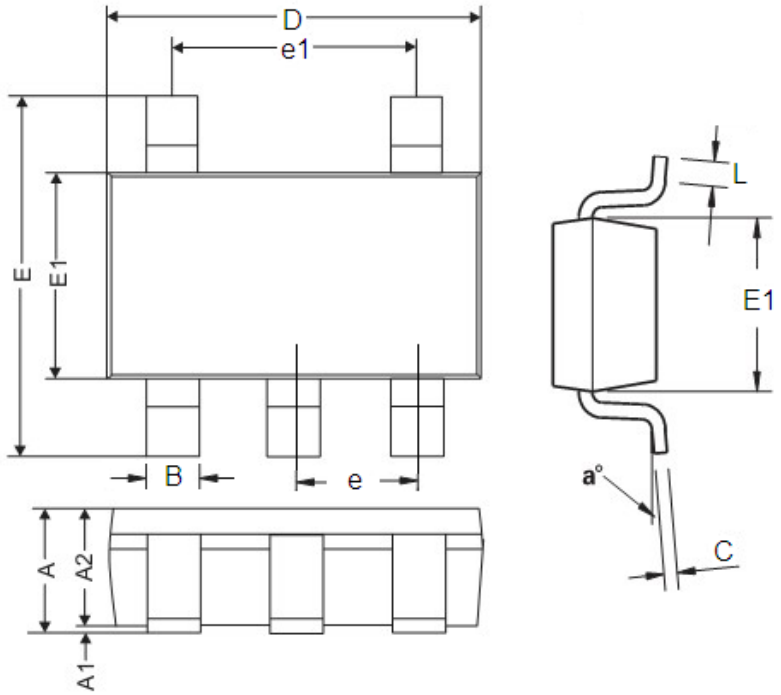
DIM	Millimeters		Inches	
	Min	Max	Min	Max
A	1.05	1.45	0.0413	0.0571
A1	0	0.15	0.0000	0.0059
A2	0.9	1.3	0.0354	0.0512
A3	0.6	0.7	0.0236	0.0276
b	0.25	0.5	0.0098	0.0197
c	0.1	0.25	0.0039	0.0098
D	2.8	3.1	0.1102	0.1220
E	2.6	3.1	0.1023	0.1220
E1	1.5	1.8	0.0591	0.0709
e	0.95(TYP)		0.0374(TYP)	
L	0.25	0.6	0.0098	0.0236
L1	0.59(TYP)		0.0232(TYP)	
θ	0	8°	0.0000	8°
c1	0.2(TYP)		0.0079(TYP)	

Package	SOT23	Devices per reel	3000 pcs



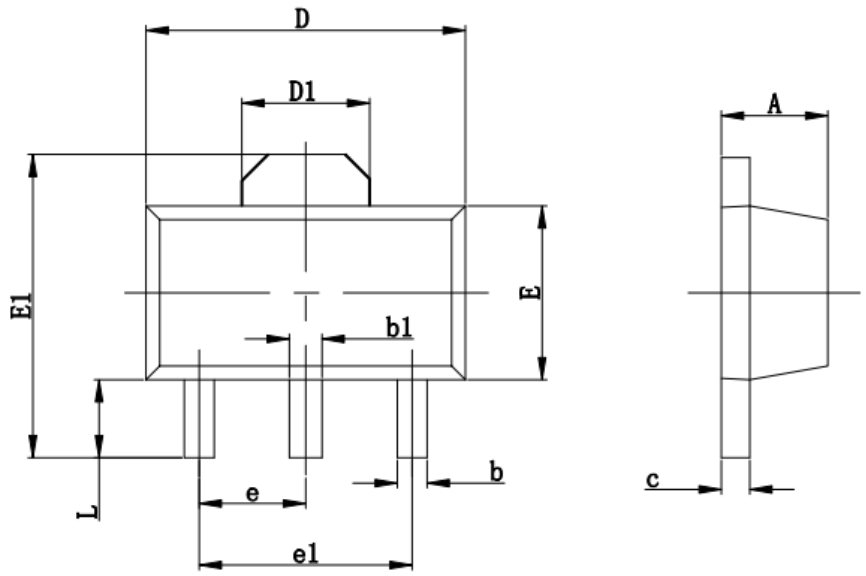
DIM	Millimeters		Inches	
	Min	Max	Min	Max
A	0.9	1.15	0.0354	0.0453
A1	0	0.14	0.0000	0.0055
A2	0.9	1.05	0.0354	0.0413
b	0.28	0.52	0.0110	0.0205
c	0.07	0.23	0.0028	0.0091
D	2.8	3.0	0.1102	0.1181
e1	1.8	2.0	0.0709	0.0787
E	1.2	1.4	0.0472	0.0551
E1	2.2	2.6	0.0866	0.1024
e	0.95(TYP)		0.0374(TYP)	
L	0.55(TYP)		0.0217(TYP)	
L1	0.25	0.55	0.0098	0.0217
θ	0	8°	0.0000	8°
c1	0.25(TYP)		0.0098(TYP)	

Package	SOT23-5	Devices per reel	3000 pcs



DIM	Millimeters		Inches	
	Min	Max	Min	Max
A	1.05	1.45	0.0413	0.0570
A1	0	0.15	0	0.0059
A2	0.9	1.3	0.0354	0.0511
B	0.25	0.5	0.0098	0.0196
C	0.10	0.23	0.0039	0.0090
D	2.82	3.05	0.1110	0.1200
E	2.60	3.05	0.1023	0.1200
E1	1.50	1.75	0.0590	0.0688
e	0.95REF		0.0374REF	
e1	1.90REF		0.0748REF	
L	0.10	0.60	0.0039	0.0236
a^0	0^0	30^0	0^0	30^0

Package	SOT89-3	Devices per reel	1000 pcs



DIM	Millimeters		Inches	
	Min	Max	Min	Max
A	1.4	1.6	0.0551	0.0630
b	0.35	0.52	0.0138	0.0205
b1	0.4	0.58	0.0157	0.0228
c	0.35	0.44	0.0138	0.0173
D	4.4	4.6	0.1732	0.1811
D1	1.55 REF		0.061 REF	
E	2.35	2.55	0.0925	0.1004
E1	3.94	4.25	0.1551	0.1673
e	1.5 TYP		0.0591 TYP	
e1	3 TYP		0.1181 TYP	
L	0.9	1.1	0.0354	0.0433