

40V 150mA Low Consumption Linear Regulator

DESCRIPTION

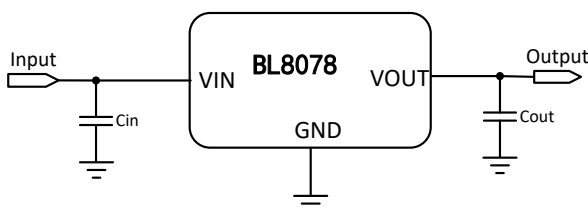
BL8078 series is a group of positive voltage output, low power consumption, low dropout voltage regulator. It can provide 150mA output current when input / output voltage differential drops to 400mV ($V_{OUT}=5V$), and it also provides foldback short-circuit protection, thermal protection and output current limit function. The very low power consumption of BL8078 ($I_Q=2.5\mu A$) can greatly improve natural life of batteries.

BL8078 can provide output value in the range of 1.2V~5.0V in 0.1V steps. It also can customize on command.

BL8078 includes high accuracy voltage reference, error amplifier, current limit circuit and output driver module.

BL8078 has well load transient response and good temperature characteristic, And it uses trimming technique to guarantee output voltage accuracy within $\pm 2\%$.

TYPICAL APPLICATION



Note: Input capacitor ($C_{IN}=1\mu F$) and Output capacitor ($C_{OUT}=1\mu F$) are recommended in all application circuit. Ceramic capacitor is recommended.

FEATURES

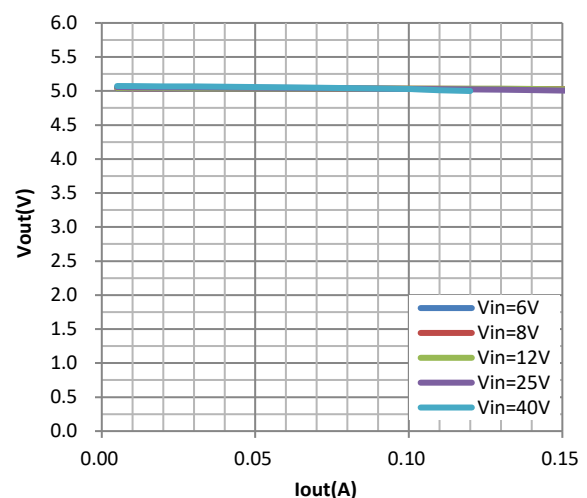
- Low power consumption: 2.5 μA (Typ.)
- Maximum output current: 150mA
- Small dropout voltage
400mV@100mA ($V_{OUT}=5V$)
- Input voltage range: 3V~40V
- Output voltage range: 1.2V~5.0V ($V_{OUT}>5V$ customized)
- Highly accurate: $\pm 2\%$ ($\pm 1\%$ customized)
- Output current limit: 180mA

APPLICATIONS

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

ELECTRICAL CHARACTERISTICS

Load Regulation



ORDERING INFORMATION

BL8078 12345

Code	Description
1	Temperature&RoHS: C:-40~85°C ,Pb Free RoHS Std.
2	Package type: C3:SOT-89-3 C3B:SOT-89-3(B)
3	Packing type: TR:Tape&Reel (Standard)
4	Output voltage: e.g. 12=1.2V 15=1.5V 50=5.0V
5	Voltage accuracy: 1=±1% Blank(default)=±2%

ABSOLUTE MAXIMUM RATING

Parameter	Value
Max input voltage	50V
Operating junction temperature(T _J)	125°C
Ambient temperature(T _A)	-40°C -85°C
Power dissipation (P _D @T _A =25°C)	500mW
Package thermal resistance (θ _{JC})	25°C/W
Package thermal resistance (θ _{JA})	90°C/W
Storage temperature(T _S)	-40°C -150°C
Lead temperature & time	260°C,10S

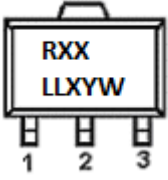
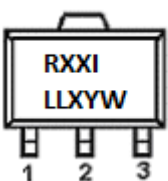
Note:

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

RECOMMENDED WORK CONDITIONS

Item	Min	Recom- mended	Max	Unit
Input voltage range	3		40	V
Ambient temperature	-40		85	°C

PIN CONFIGURATION

Product classification		BL8078CC3TR□□□	
Marking		SOT-89-3	
RXX LLXYW	R:product code		1 GND 2 VIN 3 VOUT
	XX: output voltage		
	LL: LOT NO.		
	X: FAB code		
	YW: date code		
Product classification		BL8078CC3BTR□□□	
Marking		SOT-89-3(B)	
RXXI LLXYW	R:product code		1 VOUT 2 GND 3 VIN
	XX: output voltage		
	LL: LOT NO.		
	X: FAB code		
	YW: date code		
VIN	Supply voltage input		
GND	Ground pin		
VOUT	Output voltage		

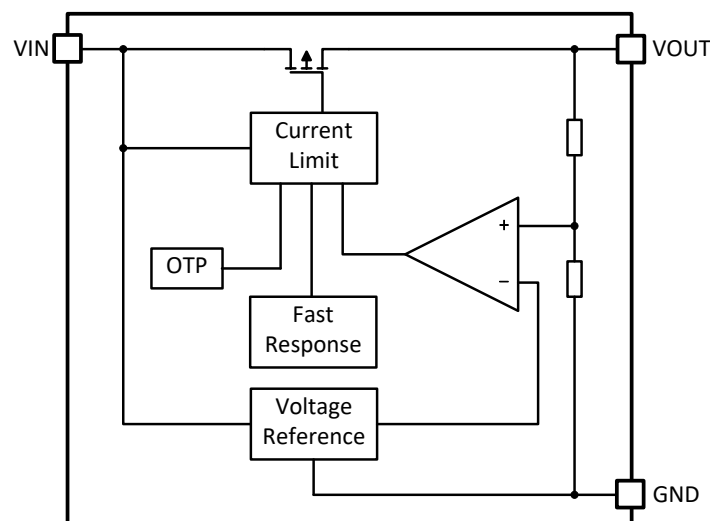
Y: The Year of manufacturing, "1" stands for year 20X1, "2" stands for year 20X2, and "8" stands for year 20X8. (X=0,1,2,...9)
W: The week of manufacturing. "A" stands for week 1, "Z" stands for week 26, "A" stands for week 27, "Z" stands for week 52.

ELECTRICAL CHARACTERISTICS

(Test Conditions: $C_{IN}=1\mu F$, $C_{OUT}=1\mu F$, $T_A=25^\circ C$, unless otherwise stated)

Symbol	Parameter		Conditions	Min	Type	Max	Units
V_{IN}	Input Voltage			3		40	V
V_{OUT}	Output Voltage	$V_{OUT}>1.5V$	$V_{IN}-V_{OUT}=1V$ $1mA \leq I_{OUT} \leq 30mA$	$V_{OUT} \times 0.98$	V_{OUT}	$V_{OUT} \times 1.02$	V
		$V_{OUT} \leq 1.5V$		$V_{OUT} - 0.03$		$V_{OUT} + 0.03$	
$I_{OUT(Max)}$	Maximum Output Current		$V_{IN}-V_{OUT}=1V$	150			mA
V_{DROP}	Input-Output Voltage Differential		$I_{OUT}=100mA$, $V_{OUT} = 5V$		400		mV
$\frac{\Delta V_{out}}{\Delta V_{in} \cdot V_{out}}$	Line Regulation		$I_{OUT}=10mA$, $4V \leq V_{IN} \leq 40V$		0.2	0.3	%/V
ΔV_{out}	Load Regulation		$V_{IN}=\text{Set } V_{OUT}+1V$ $1mA \leq I_{OUT} \leq 100mA$		20	40	mV
I_Q	Quiescent Current		$V_{IN}=\text{Set } V_{OUT}+1V$		2.5	5	μA
$\frac{\Delta V_{out}}{\Delta T \cdot V_{out}}$	Output Voltage Temperature Coefficient		$I_{OUT}=10mA$		± 100		ppm/ $^\circ C$
T_{SD}	Thermal Shutdown				130		$^\circ C$

BLOCK DIAGRAM



EXPLANATION

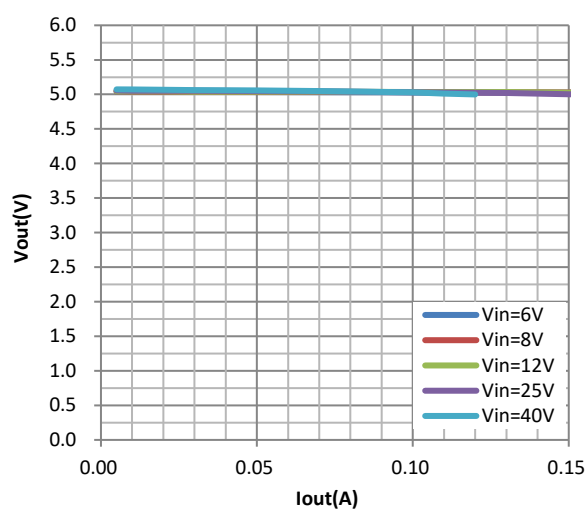
BL8078 is a series of low dropout voltage and low power consumption regulator. Its application circuit is very simple, which only needs two outside capacitors. It is composed of these modules: high accuracy voltage reference, current limit circuit, error amplifier, output driver and power transistor.

Current Limit module can keep chip and power system away from danger when load current is more than 180mA.

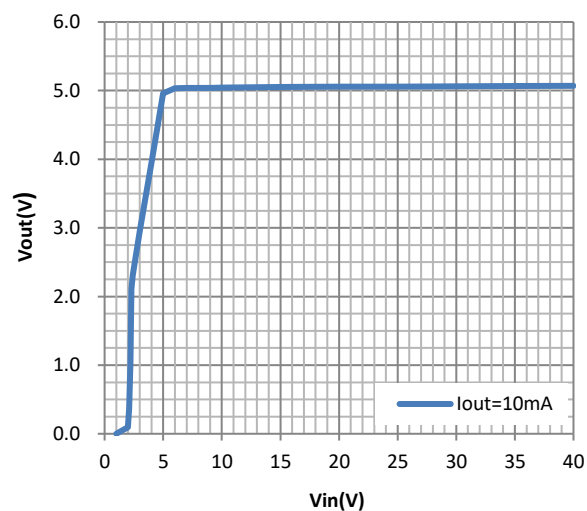
BL8078 uses trimming technique to assure the accuracy of output value within $\pm 2\%$, at the same time, temperature compensation is elaborately considered in this chip, which makes BL8078's temperature coefficient within $\pm 100\text{ppm}/^\circ C$.

TYPICAL PERFORMANCE CHARACTERISTICS

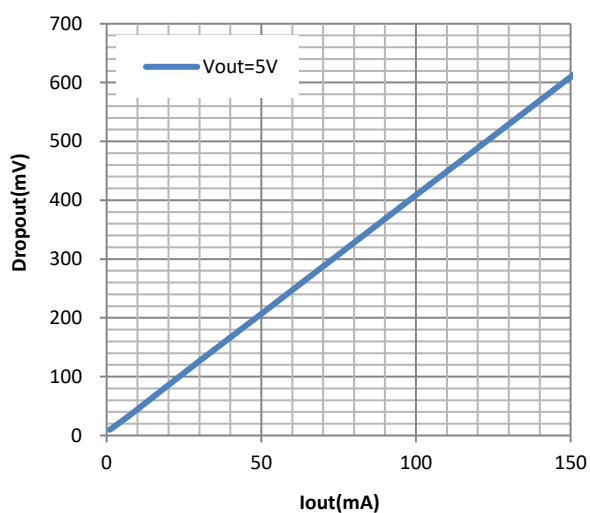
Load Regulation



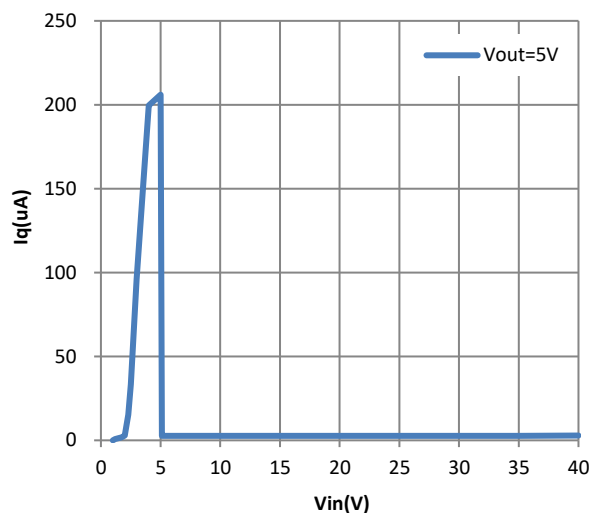
Line Regulation



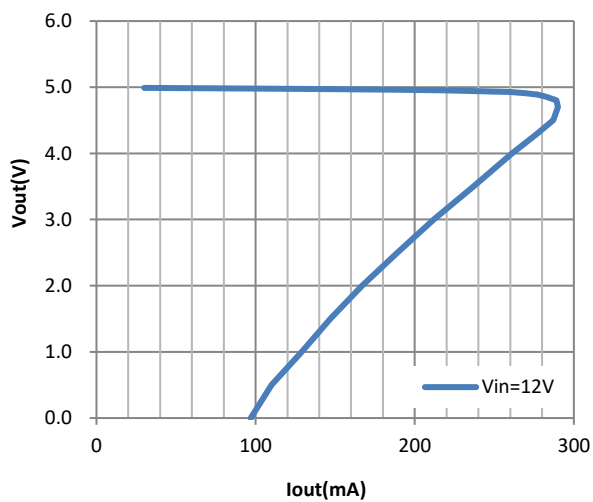
Dropout



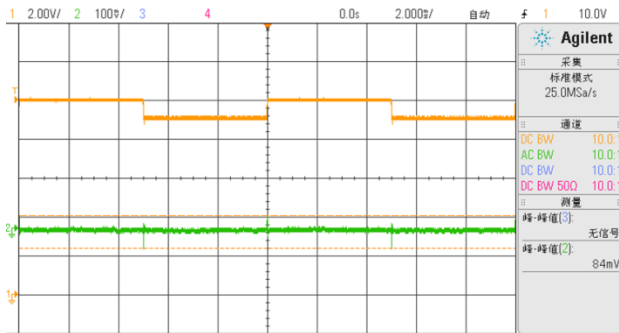
I_q



Current Limit

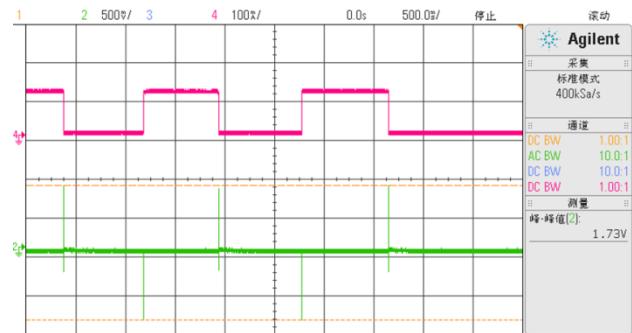


Line transient response
($V_{in}=9V\sim 10V$, $I_{out}=10mA$)



CH1: Vin, CH2: Vout

Load transient response
($V_{in}=12V$, $I_{out}=10mA\sim 100mA$)



CH2: Vout, CH4: Iout

PACKAGE OUTLINE

Package	SOT-89-3	Devices per reel	1000Pcs
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Package dimension:

SECTION A-A

SECTION B-B

SYMBOL	MILLIMETER		
	MIN	NOM	MAX
A2	1.40	1.50	1.60
b	0.38	—	0.46
b1	0.37	0.40	0.43
c	0.38	—	0.42
c1	0.37	0.38	0.39
a	0.46	—	0.56
a1	0.45	0.48	0.51
D	4.40	4.50	4.60
D1	1.62	—	1.83
E	3.95	—	4.25
E1	2.40	2.50	2.60
e	1.50BSC		
L1	0.89	—	1.20

Size(mm)	A D2	A E2
66.9*63	1.75REF	2.84REF

Unit: mm

Unit: mm

Package	SOT-89-3	Devices per reel	1000Pcs
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Package dimension:

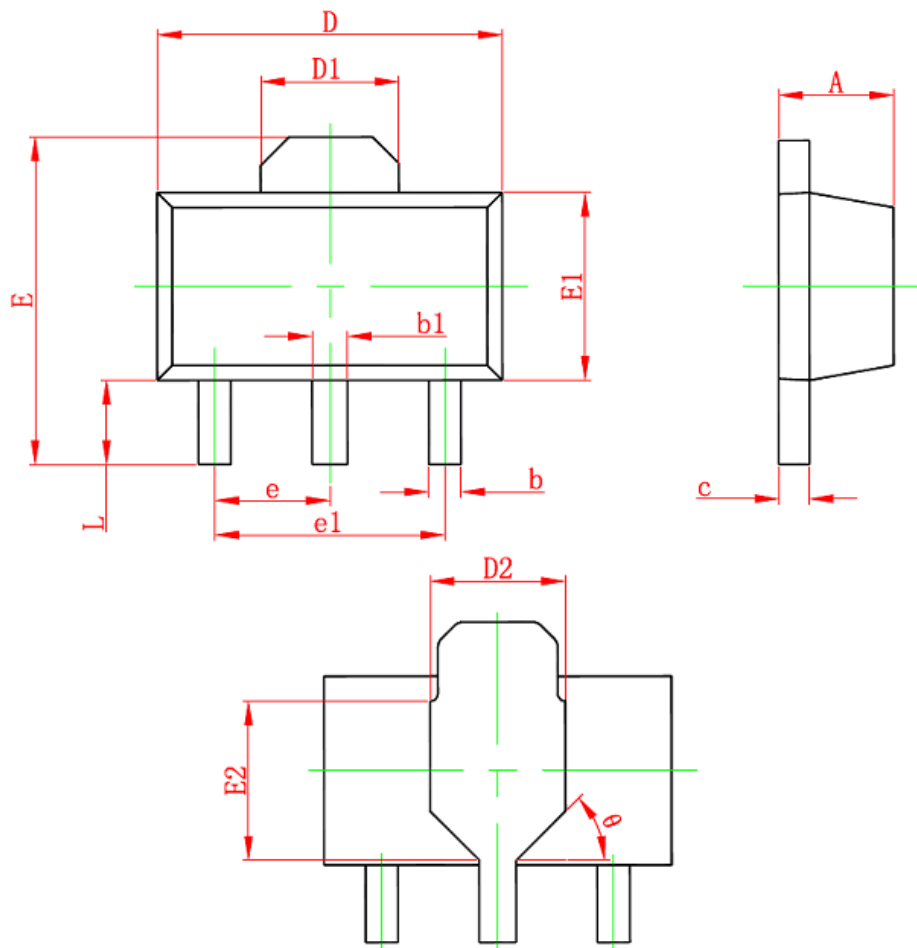
The diagram shows the mechanical dimensions of the BL8078 package. The top view shows a rectangular package with a central square feature. Dimensions include overall width D, central width D1, overall height E1, central height E, and various spacing dimensions b, b1, e, e1, and L. The side view shows the package profile with dimensions A (height of the central feature), c (width of the central feature), and b (width of the package body).

Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	1.400	1.600	0.055	0.063
b	0.350	0.520	0.013	0.197
b1	0.400	0.580	0.016	0.023
c	0.350	0.440	0.014	0.017
D	4.400	4.600	0.173	0.181
D1	1.550 REF		0.061 REF	
E	2.350	2.550	0.091	0.102
E1	3.940	4.250	0.155	0.167
e	1.500 TYP		0.060TYP	
e1	3.000 TYP		0.118TYP	
L	0.900	1.100	0.035	0.047

Unit: mm

Package	SOT-89-3	Devices per reel	1000Pcs
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Package dimension:



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	1.400	1.600	0.055	0.063
b	0.320	0.520	0.013	0.020
b1	0.380	0.580	0.015	0.023
c	0.350	0.440	0.014	0.017
D	4.400	4.600	0.173	0.181
D1	1.550 REF.		0.061 REF.	
D2	1.750 REF.		0.069 REF.	
E	3.940	4.250	0.155	0.167
E1	2.300	2.600	0.091	0.102
E2	1.900 REF.		0.075 REF.	
e	1.500 TYP.		0.060 TYP.	
e1	3.000 TYP.		0.118 TYP.	
L	0.900	1.200	0.035	0.047
θ	45°		45°	

Unit: mm