

# BL8565

REV1.0-Revised DEC 2007

## 500mA High PSRR, Low Dropout Voltage Linear Regulator

### DESCRIPTION

BL8565 series is a group of positive voltage output, low noise, low power consumption, low dropout voltage regulator.

BL8565 can provide output value in the range of 1.5V~4.5V every 0.1V step. It also can be customized on command.

BL8565 includes high accuracy voltage reference, error amplifier, current limit circuit and output driver module with discharge capability.

BL8565 has excellent load and line transient response and good temperature characteristics, which can assure the stability of chip and power system. And it uses trimming technique to guarantee output voltage accuracy within  $\pm 2\%$ .

BL8565 is available in SOT-89-3 packages which is lead free.

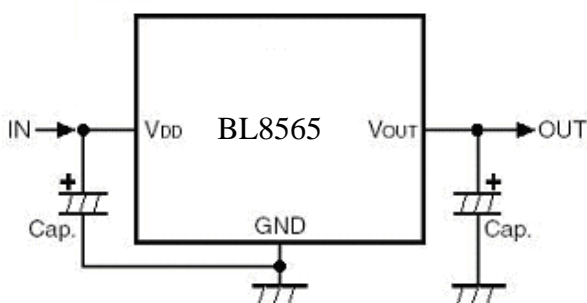
### FEATURES

- Low Power Consumption: 20uA (Typ.)
- Low output noise (47uVRMS)
- Low dropout Voltage: 0.16V@300mA (Typ.)
- High Ripple Rejection: 73dB@100Hz (Typ.)
- Low Temperature Coefficient:  $\pm 100\text{ppm}/^\circ\text{C}$
- Excellent Line regulation: 0.05%/V
- Build-in chip enable and discharge circuit
- Output Voltage Range: 1.5V~4.5V (customized on command every 0.1V step)
- Highly Accurate:  $\pm 2\%$
- Output Current Limit

### APPLICATIONS

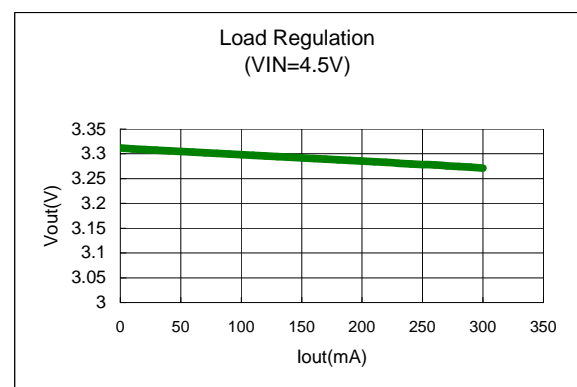
- Power Management for Computer, Mother Board, Graphic Card
- LCD Monitor and LCD TV
- DVD Decode Board
- Reference Voltage Source
- Regulation after Switching Power

### TYPICAL APPLICATION



**NOTE:** Input capacitor ( $C_{in}=1\mu\text{F}$ ) and Output capacitor ( $C_{out}=3.3\mu\text{F}/4.7\mu\text{F}$ ) are recommended in all application circuit.

### ELECTRICAL CHARACTERISTICS



## ORDERING INFORMATION

BL8565 [1] [2] [3] [4] [5]

Code	Description
[1]	Temperature&RoHS: C:-40~85°C ,Pb Free RoHS Std.
[2]	Package type: C3A:SOT-89-3(A) C3B:SOT-89-3(B) C3C:SOT-89-3(C)
[3]	Packing type: TR:Tape&Reel (Standard)
[4]	Output voltage: e.g. 15=1.5V 18=1.8V 45=4.5V
[5]	Voltage accuracy: Blank(default)= ± 2%

## MARKING DESCRIPTON

AD: Product Code

XX: Output Voltage

Vout	Code	Vout	Code	Vout	Code
		2.5V	25	3.8V	38
		2.6V	26	3.9V	39
		2.7V	27	4.0V	40
1.5V	15	2.8V	28	4.1V	41
1.6V	16	2.9V	29	4.2V	42
1.7V	17	3.0V	30	4.3V	43
1.8V	18	3.1V	31	4.4V	44
1.9V	19	3.2V	32	4.5V	45
2.0V	20	3.3V	33		
2.1V	21	3.4V	34		
2.2V	22	3.5V	35		
2.3V	23	3.6V	36		
2.4V	24	3.7V	37		

YY:LOT NO.

Z: The Year of manufacturing, "7" stands for year 2007, "8" stands for year 2008, and "0" stands for year 2010.

Z: The week of manufacturing. "A" stands for week 1, "Z" stands for week 26, "A" stands for week 27, "Z" stands for week 52.

## PIN CONFIGURATION

Product Classification		BL8565CC3ATR□□□
Marking		
ADXXA YYBZZ	AD:Product Code	
	XX: Output Voltage	
	A:Package	
	YY:Lot No.	
	B:Fab Code	
	ZZ:Data Code	
Product Classification		BL8565CC3BTR□□□
Marking		
ADXXB YYBZZ	AD:Product Code	
	XX: Output Voltage	
	B:Package	
	YY:Lot No.	
	B:Fab Code	
	ZZ:Data Code	
Product Classification		BL8565CC3CTR□□□
Marking		
ADXXC YYBZZ	AD:Product Code	
	XX: Output Voltage	
	C:Package	
	YY:Lot No.	
	B:Fab Code	
	ZZ:Data Code	
Vss	Ground Pin	
Vin	Supply Voltage Input	
Vout	Output Voltage	

## ABSOLUTE MAXIMUM RATING

Parameter		Value
Max Input Voltage		8V
Operating Junction Temperature(Tj)		125°C
Output Current		500mA
Ambient Temperature(Ta)		-40°C -85°C
Power Dissipation	SOT-89-3	500mW
Storage Temperature(Ts)		-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	Recommended	Max.	Unit
Input Voltage Range			6	V
Ambient Temperature	-40		85	°C

## ELECTRICAL CHARACTERISTICS

( Test Conditions: Cin=1uF,Cout=3.3uF,TA=25°C, unless otherwise specified. )

BL8565, For Arbitrary Output Voltage

Symbol	Parameter	Conditions	Min	Typ	Max	Units
Vin	Input Voltage				6	V
Vout	Output Voltage	Vin=Set Vout+1V 1mA≤Iout≤30mA	Vout x0.98	Vout1	Vout X1.02	V
Iout (Max.)	Maximun Output Current	Vin-Vout=1V	500			mA
Vdrop <sup>1</sup>	Dropout Voltage,Vout≥2.8V	Iout=100mA		50	80	mV
		Iout=300mA		160	220	mV
$\frac{\Delta V_{out}}{\Delta V_{in} \cdot V_{out}}$	Line Regulation	Iout=40mA 2.8V≤Vin≤6V		0.05	0.2	%/V
$\Delta V_{out} / \Delta I_{out}$	Load Regulation	Vin=Set Vout+1V 1mA≤Iout≤300mA		30	50	mV
I <sub>ss</sub>	Supply Current	Vin=Set Vout+1V		20	30	uA
I <sub>standby</sub>	Supply Current (Standby)	Vin=Set Vout+1V Vce=GND		0.1	1.0	uA
$\frac{\Delta V_{out}}{\Delta T \cdot V_{out}}$	Output Voltage Temperature Coefficiency	Iout=30mA		±100		ppm/°C

# BL8565

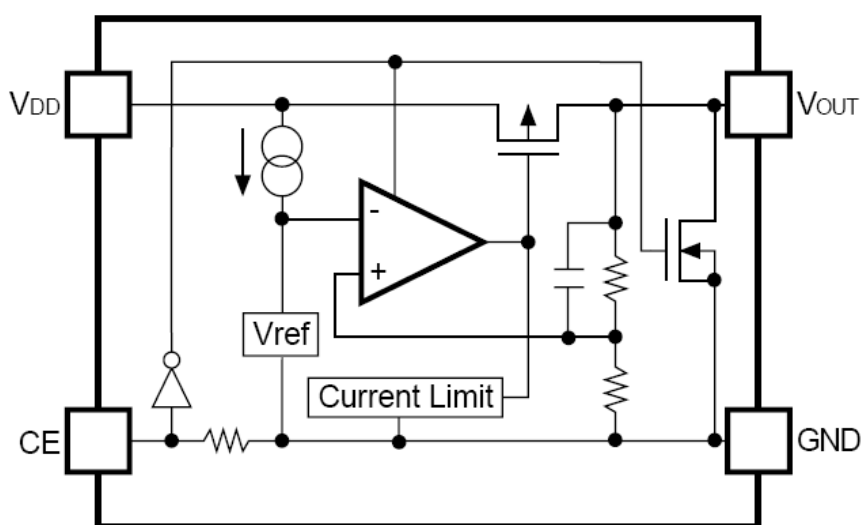
PSRR	Ripple Rejection	F=100Hz, Ripple=0.5Vp-p Vin=Set Vout+1V		70		dB
Ilim	Short Current Limit	Vout=0V		1000		mA
Rpd	CE Pull down Resistance		2.0	5.0	10.0	MΩ
en	Output Noise	BW=10Hz~100kHz		47		uVrms

**NOTE:**

$V_{drop} = V_{in1} - (V_{out2} * 0.98)$   $V_{out2}$  is the output voltage when  $V_{in} = V_{out1} + 1.0V$  and  $I_{out} = 500mA$ .

$V_{in1}$  is the input voltage at which the output voltage becomes 98% of  $V_{out1}$  after gradually decreasing the input voltage.

## BLOCK DIAGRAM



## Explanation

BL8565 series is a group of positive voltage output, low noise, low power consumption, low dropout voltage regulator.

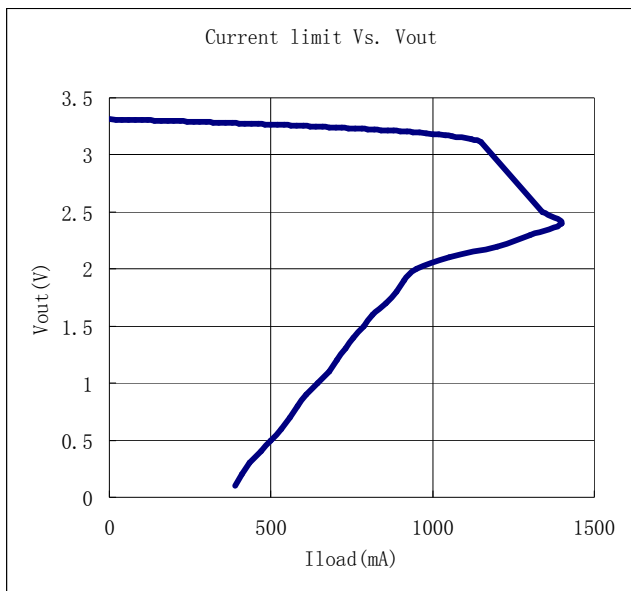
BL8565 can provide output value in the range of 1.5V~4.5V every 0.1V step. It also can be customized on command.

BL8565 includes high accuracy voltage reference, error amplifier, current limit circuit and output driver module.

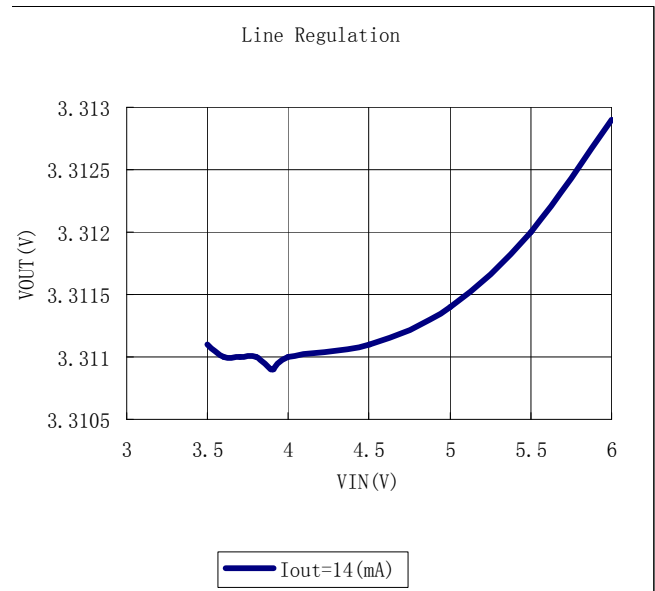
BL8565 has excellent load and line transient response and good temperature characteristics, which can assure the stability of chip and power system. And it uses trimming technique to guarantee output voltage accuracy within  $\pm 2\%$ .

## TYPICAL PERFORMANCE CHARACTERISTICS

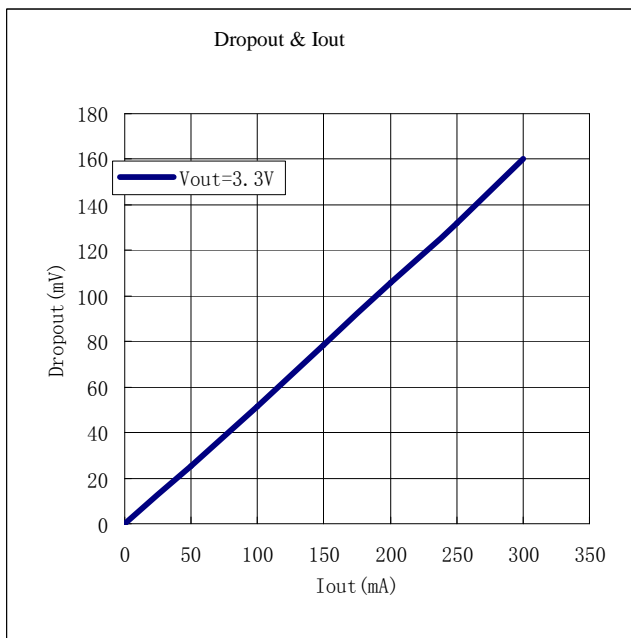
1) Output Voltage vs. Output Current (with output short protection)



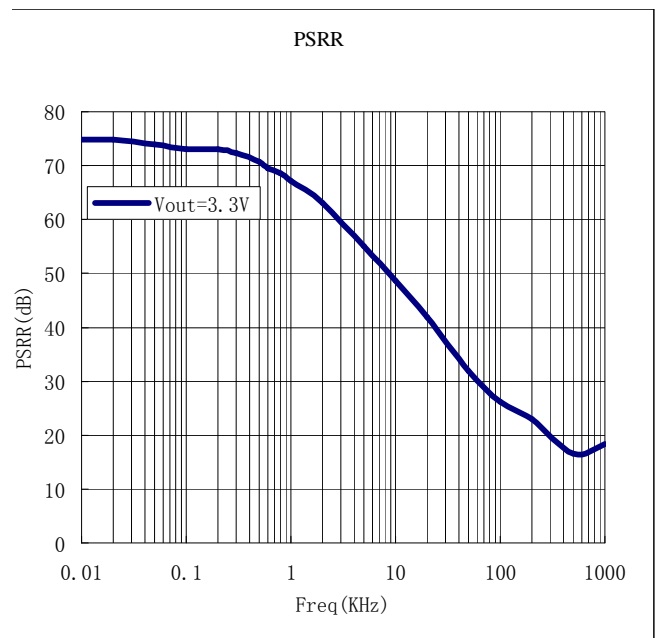
2) Output Voltage vs. Input Voltage



3) Dropout Voltage vs. Output Current

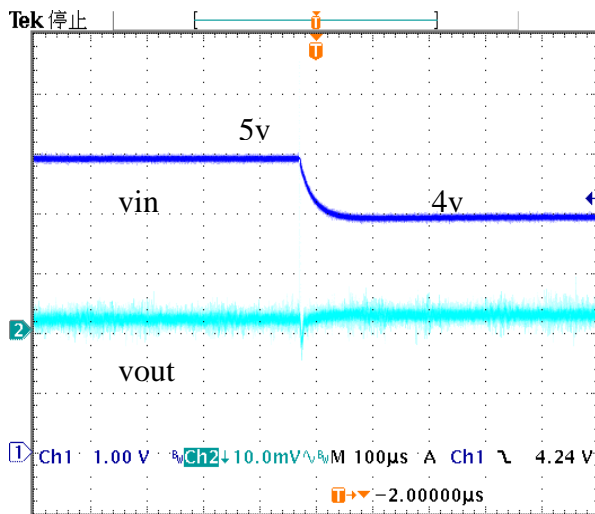
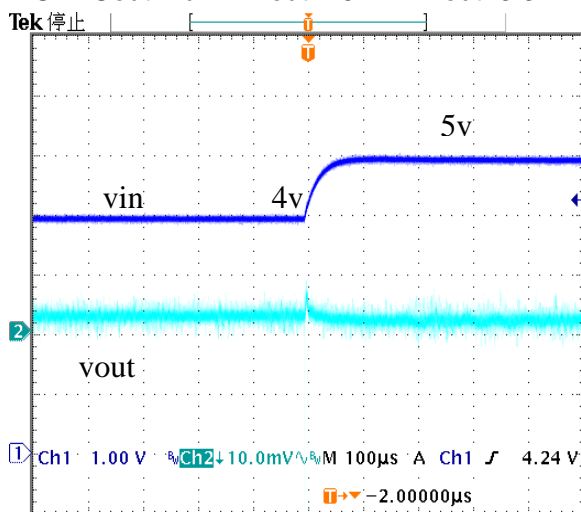


4) Ripple rejection vs. Frequency



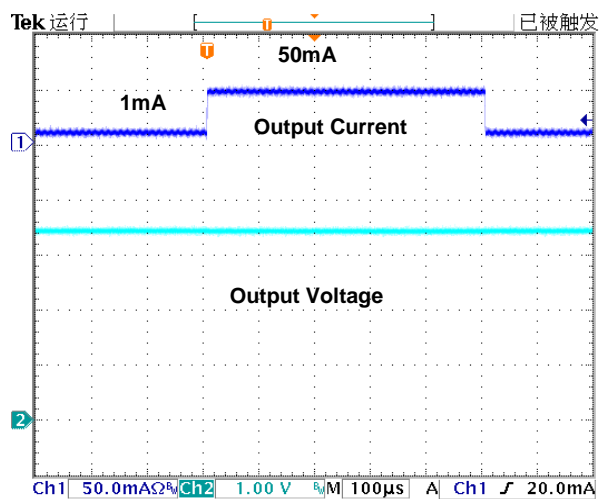
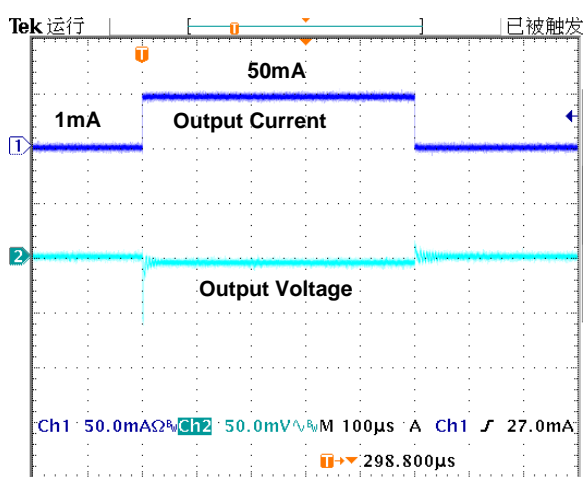
## 5) Line transient response

$C_{in}=C_{out}=1\mu F$   $I_{out}=25mA$   $V_{out}=3.3V$



## 6) Load transient response

$C_{in}=C_{out}=1\mu F$   $V_{in}=4.5V$   $V_{out}=3.3V$



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## PACKAGE LINE

Package	SOT-89-3	Devices per reel	1000Pcs	Unit	mm
<p>Package dimension:</p> <p>The technical drawing illustrates the SOT-89-3 package dimensions in millimeters. It includes three views: a top view, a side view, and a bottom view. The top view shows a rectangular body with a diameter of <math>\varnothing 1.0</math> mm for the central feature. The overall width is <math>4.5 \pm 0.1</math> mm, and the length is <math>2.5 \pm 0.1</math> mm. The maximum height is <math>4.25</math> mm. The side view shows a height of <math>0.4</math> mm for the top flange and a base width of <math>1.5 \pm 0.1</math> mm. The bottom view shows three leads with a width of <math>0.42 \pm 0.2</math> mm and a spacing of <math>1.5 \pm 0.1</math> mm between them. The lead height is <math>0.8</math> mm minimum. The lead width is <math>0.47 \pm 0.1</math> mm.</p>					