BL8503

250mA CMOS Low Dropout Voltage Low consumption Regulator

Features：

- Low Power Consumption：3.0uA（Typ.）
- Maximum Output Current： 250mA
- Small Dropout Voltage：
  170mV@100mA (Vout=3.0V)
  400mV@250mA (Vout=3.0V)
- Input Voltage Range：1.5V～10V
- Output Voltage Range：1.2V~6.0V（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

Outline：

BL8503 series is a group of positive voltage output, low power consumption, low dropout voltage, three terminal regulator. It can provide 250mA output current when input / output voltage differential drops to 400mV（Vin =4.0V、Vout=3.0V）。The very low power consumption of BL8503（Iq=3.0uA）can greatly improve natural life of batteries.

BL8503 can provide output value in the range of 1.2V~6.0V in 0.1V steps. It also can customized on command.

BL8503 includes high accuracy voltage reference, error amplifier, current limit circuit and output driver module.

BL8503 has well load transient response and good temperature characteristic, which can assure the stability of chip and power system. And it uses trimming technique to guarantee output voltage accuracy within±2%.

BL8503 is available in SOT-89-3、SOT-23-3 packages which is lead free，it also can available in these packages with lead.
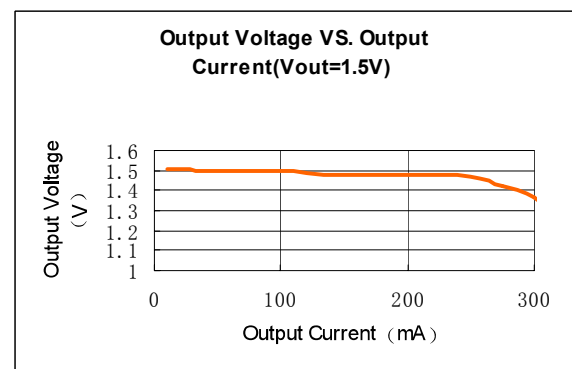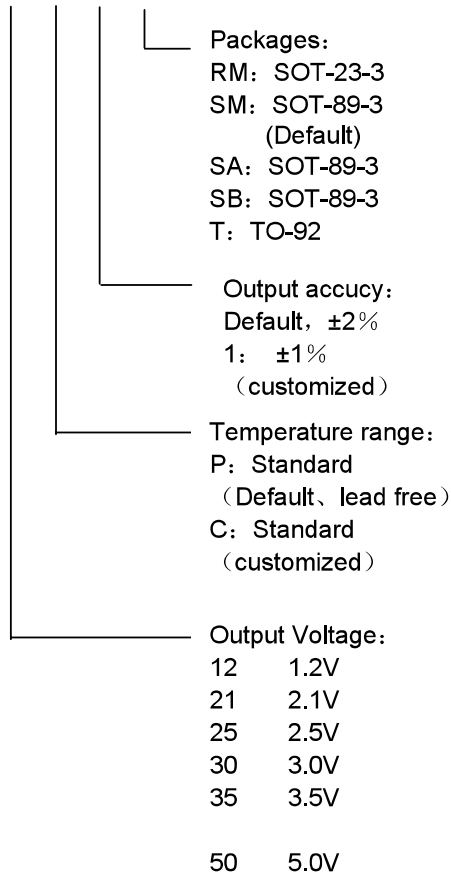
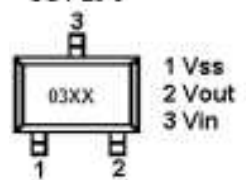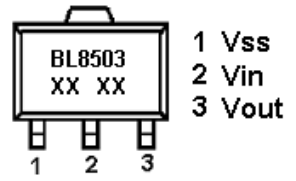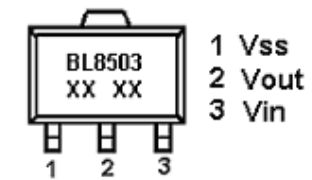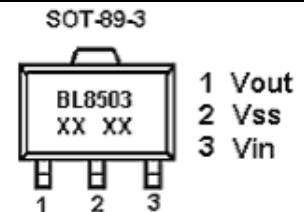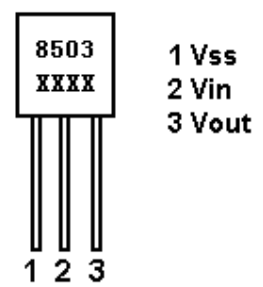## BL8503 Typical Application Circuit
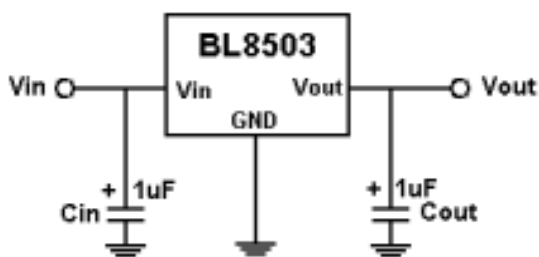
Application hints：

NOTE1：Input capacitor (Cin=1uF) is recommended in all application circuit. Tantalum capacitor is recommended.

NOTE2：Output capacitor (Cout=1uF) is recommended in all application to assure the stability of circuit. Tantalum capacitor is recommended.

BL8503 Typical Performance Characteristic：

Output Voltage VS. Output Current(Vout=1.5V)

Selection Guide：

BL8503-*XX* *X* *X* *X*

Packages：
RM：SOT-23-3
SM：SOT-89-3
　　（Default）
SA：SOT-89-3
SB：SOT-89-3
T：TO-92

Output accucy：
Default，±2％
1： ±1％
　（customized）

Temperature range：
P：Standard
　（Default、lead free）
C：Standard
　（customized）

Output Voltage：
12　　1.2V
21　　2.1V
25　　2.5V
30　　3.0V
35　　3.5V

50　　5.0V

Pin Assignment：

Product Classification	Pin Configuration
BL8503-□□□PRM	SOT-23-3 — 1 Vss, 2 Vout, 3 Vin
BL8503-□□□PSM	SOT-89-3 — 1 Vss, 2 Vin, 3 Vout
BL8503-□□□PSA	SOT-89-3 — 1 Vss, 2 Vout, 3 Vin
BL8503-□□□PSB	SOT-89-3 — 1 Vout, 2 Vss, 3 Vin
BL8503-□□□PT	TO-92 — 1 Vss, 2 Vin, 3 Vout

Pin Description：

Pin number				PIN Name	Function
SOT-23-3	SOT-89-3 （SM）	SOT-89-3 (SA)	SOT-89-3 (SB)		
1	1	1	2	**Vss**	Ground
3	2	3	3	**Vin**	Supply voltage input
2	3	2	1	**Vout**	Output Voltage
—	—	—	—	**NC**	No connect
—	—	—	—	**NC**	No connect

Product Classification：

Product Name	Output Voltage	Package Type	Package Marking
BL8503-12PRM	1.2V	SOT-23-3	
BL8503-15PRM	1.5V	SOT-23-3	
BL8503-21PRM	2.1V	SOT-23-3	03XX / 1 1 Output voltage
BL8503-25PRM	2.5V	SOT-23-3	
BL8503-30PRM	3.0V	SOT-23-3	
——	———	SOT-23-3	
BL8503-50PRM	5.0V	SOT-23-3	
BL8503-12PSM	1.2V	SOT-89-3	
BL8503-15PSM	1.5V	SOT-89-3	
BL8503-21PSM	2.1V	SOT-89-3	BL8503 / XX XX / 1 2 1 Output voltage 2 Lot No.
BL8503-25PSM	2.5V	SOT-89-3	
BL8503-30PSM	3.0V	SOT-89-3	
——	———	SOT-89-3	
BL8503-50PSM	5.0V	SOT-89-3	
BL8503-12PSA	1.2V	SOT-89-3	
BL8503-15PSA	1.5V	SOT-89-3	
BL8503-21PSA	2.1V	SOT-89-3	BL8503 / XX XX / 1 2 1 Output voltage 2 Lot No.
BL8503-25PSA	2.5V	SOT-89-3	
BL8503-30PSA	3.0V	SOT-89-3	
——	———	SOT-89-3	
BL8503-50PSA	5.0V	SOT-89-3	
BL8503-12PSB	1.2V	SOT-89-3	
BL8503-15PSB	1.5V	SOT-89-3	BL8503 / XX XX / 1 2 1 Output voltage 2 Lot No.
BL8503-21PSB	2.1V	SOT-89-3	
BL8503-25PSB	2.5V	SOT-89-3	
BL8503-30PSB	3.0V	SOT-89-3	
——	———	SOT-89-3	
BL8503-50PSB	5.0V	SOT-89-3	
BL8503-12PT	1.2V	TO-92	
BL8503-15PT	1.5V	TO-92	
BL8503-21PT	2.1V	TO-92	BL8503 / XX XX / 1 2 1 Output voltage 2 Lot No.
BL8503-25PT	2.5V	TO-92	
BL8503-30PT	3.0V	TO-92	
——	———	TO-92	
BL8503-50PT	5.0V	TO-92	

Block Diagram：
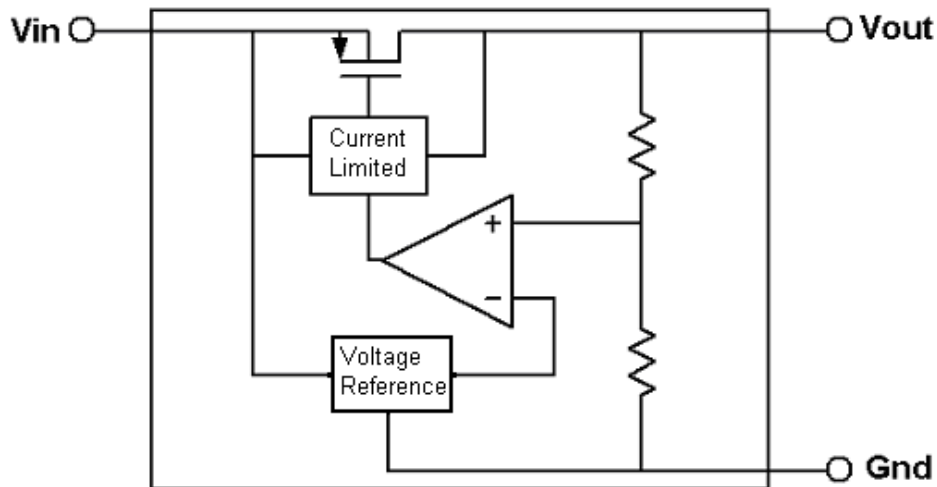
Absolute Maximum Ratings：

Max input voltage ————————————————————————————10V
Junction Temperature (T$_J$) ————————————————————————125°C
Ambient Temperature(T$_A$) ————————————————————————-40°C～85°C
Power Dissipation
   SOT-23-3 ————————————————————————————0.15W
   SOT-23-5 ————————————————————————————0.25W
   SOT-89-3 ————————————————————————————0.5W
Storage Temperature(Ts) ————————————————————————-45°C～150°C
Lead Temperature and Time ————————————————————260°C,10S

Recommended Work Conditions：

Item	Min	Recommended	Max	unit
Input Voltage Range			8	V
Ambient Temperature	-40		+125	°C

Electrical Characteristics：
（Test Conditions：Cin=1uF,Cout=1uF,T$_A$=25°C, unless otherwise specified.）
BL8503-1.5V

Symbol	Parameter	Conditions	Min	Typ	Max	Units
Vin	Input Voltage				8	V
Vout	Output Voltage		1.47	1.5	1.53	V
Iout(Max.)	Maximum Output Current	Vin=2.5V,Vout>1.47	250			mA
Dropout Voltage	Input-Output Voltage Differential	Iout=100mA		270	400	mV
$\frac{\Delta Vout}{\Delta Vin \cdot Vout}$	Line Regulation	Iout=40mA 1.6V≤Vin≤8V		0.2	0.3	%/V
$\Delta Vout$	Load Regulation	Vin=2.5V 1mA≤Iout≤100mA		20	40	mV
Iq	Quiescent Current	Vin=2.5V		3.0	5.0	uA

$\dfrac{\Delta Vout}{\Delta T \cdot Vout}$	Output Voltage Temperature Coefficient	Iout=10mA		50		ppm/°C

BL8503-3.0V

Symbol	Parameter	Conditions	Min	Typ	Max	Units
Vin	Input Voltage				8	V
Vout	Output Voltage		2.94	3.0	3.06	V
Iout(Max.)	Maximum Output Current	Vin=4V,Vout>2.94V	250			mA
Dropout Voltage	Input-Output Voltage Differential	Iout=100mA		170	300	mV
		Iout=200mA		320	500	
$\dfrac{\Delta Vout}{\Delta Vin \cdot Vout}$	Line Regulation	Iout=40mA 3.2V≤Vin≤8V		0.2	0.3	%/V
$\Delta Vout$	Load Regulation	Vin=4.0V 1mA≤Iout≤100mA		20	40	mV
Iq	Quiescent Current	Vin=4V		3.0	5.0	uA
$\dfrac{\Delta Vout}{\Delta T \cdot Vout}$	Output Voltage Temperature Coefficient	Iout=10mA		50		ppm/°C

Typical Application Circuit：
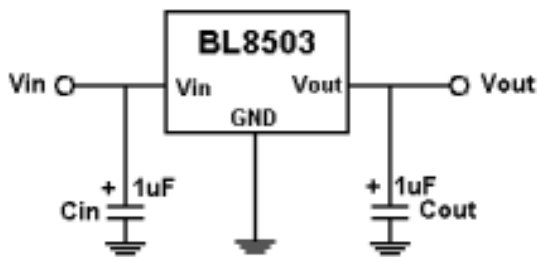
Application hints：

NOTE1 ： Input capacitor (Cin=1uF) is recommended in all application circuit. Tantalum capacitor is recommended.
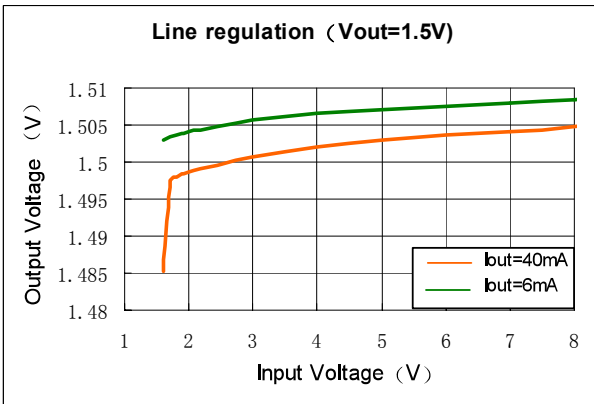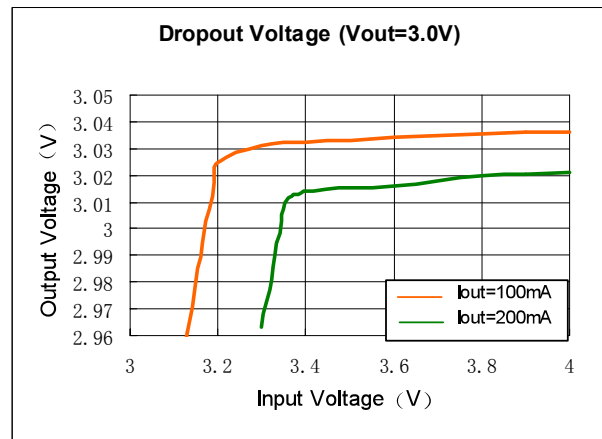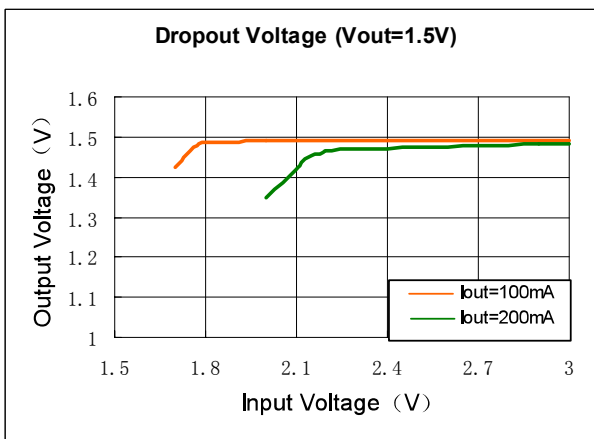
NOTE2 ： Output capacitor (Cout=1uF) is recommended in all application to assure the stability of circuit. Tantalum capacitor is recommended.
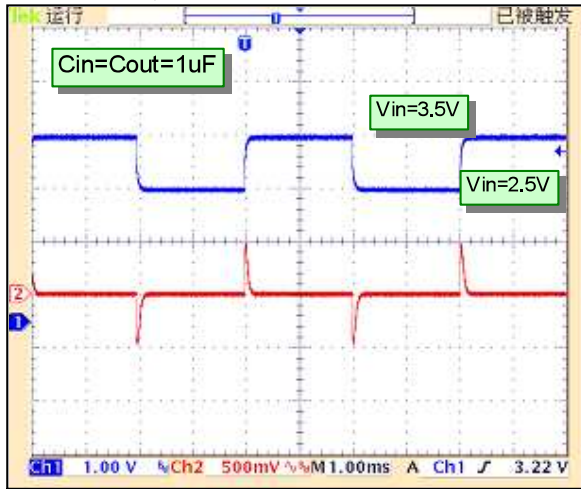
Explanation：

BL8503 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 250mA.

BL8503 uses trimming technique to assure the accuracy of output value within±2%, at the same time, temperature compensated is elaborately considered in this chip, which makes BL8503's temperature coefficient within 50ppm/℃。

Typical Performance Characteristics：

1.Load regulation

Output Voltage VS Output Current(Vout=1.5V)

Output Voltage VS Output Current(Vout=3.0V)

2.Line Regulation

Line regulation（Vout=1.5V）

Iout=40mA
Iout=6mA

Line regulation (Vout=3.0V)

Iout=40mA
Iout=3mA

3.Dropout Voltage

Dropout Voltage (Vout=1.5V)

Iout=100mA
Iout=200mA

Dropout Voltage (Vout=3.0V)

Iout=100mA
Iout=200mA
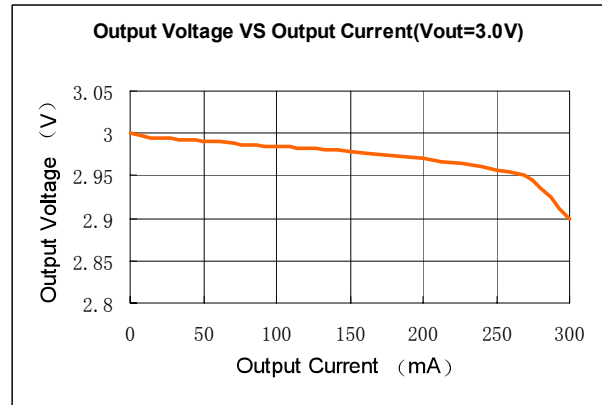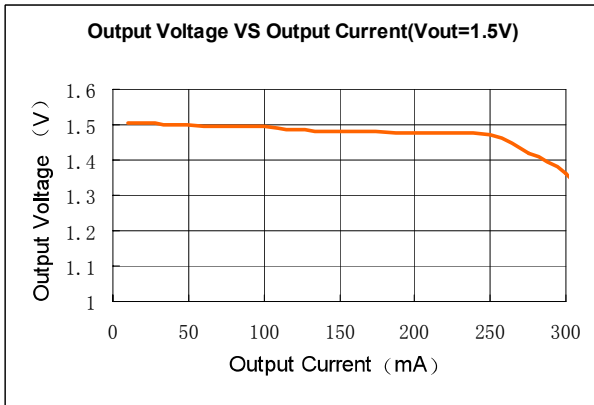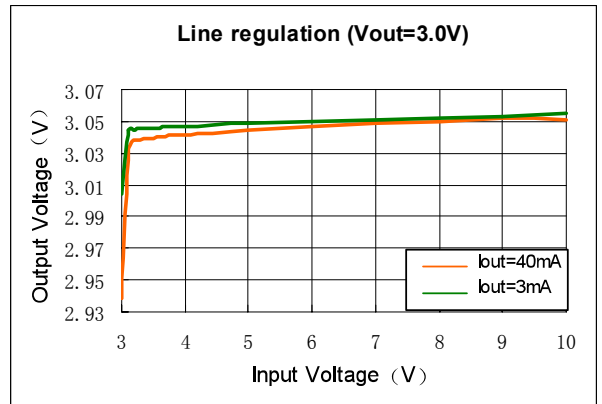
4．Input Voltage transient response
（Vout=1.5V,Iout=10mA）

Input Voltage transient response
（Vout=1.5V,Iout=1mA）
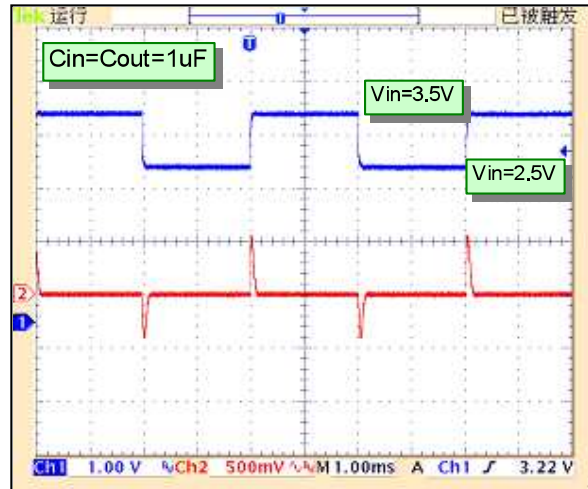
Input Voltage transient response
（Vout=3.0V,Iout=10mA）
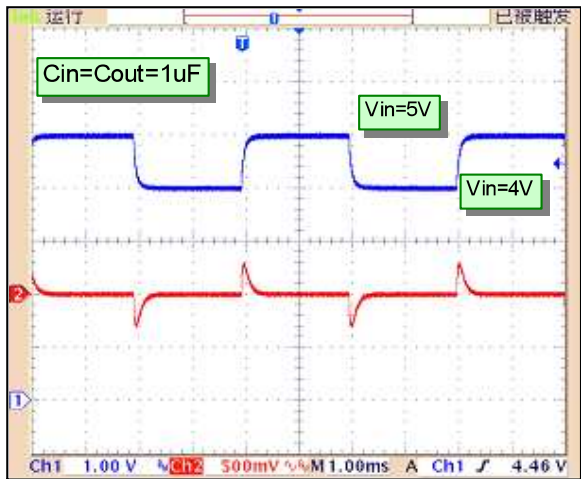
Input Voltage transient response
（Vout=3.0V,Iout=1mA）
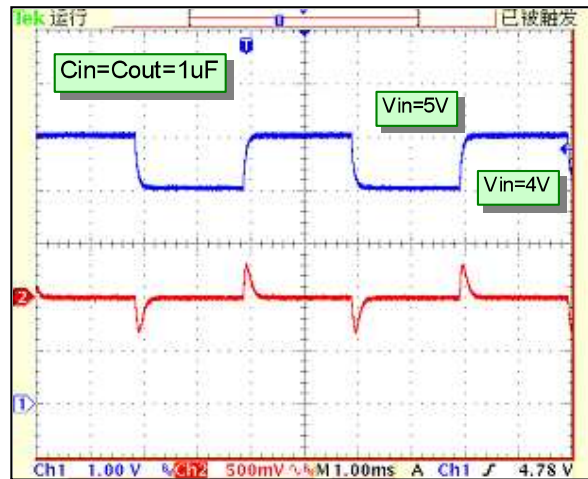
5．Load transient response（Vout=1.5V）
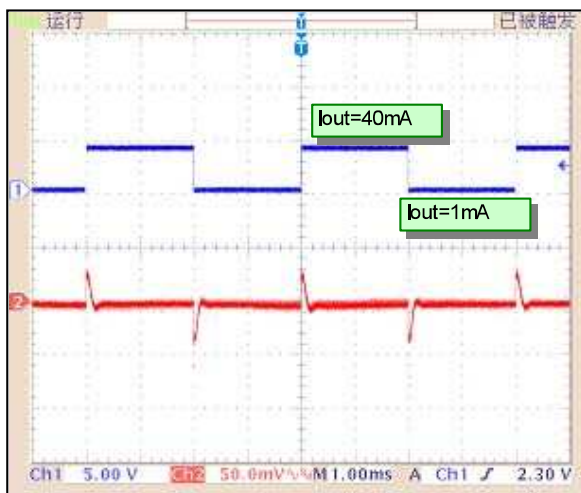
Load transient response（Vout=3.0V）
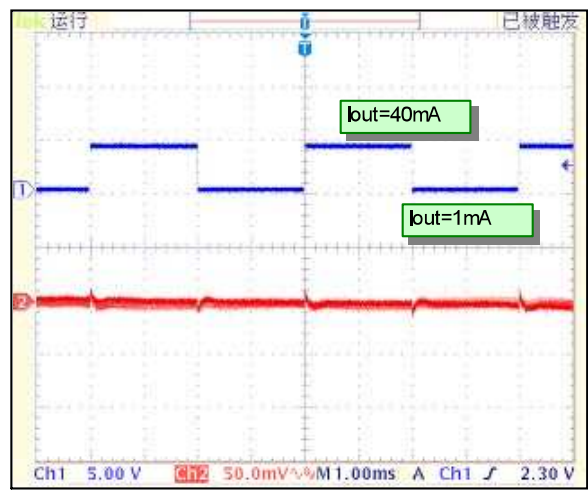
Package Outline：

Package	SOT-89-3	Devices per reel	1000	Unit	mm

Package Dimension:
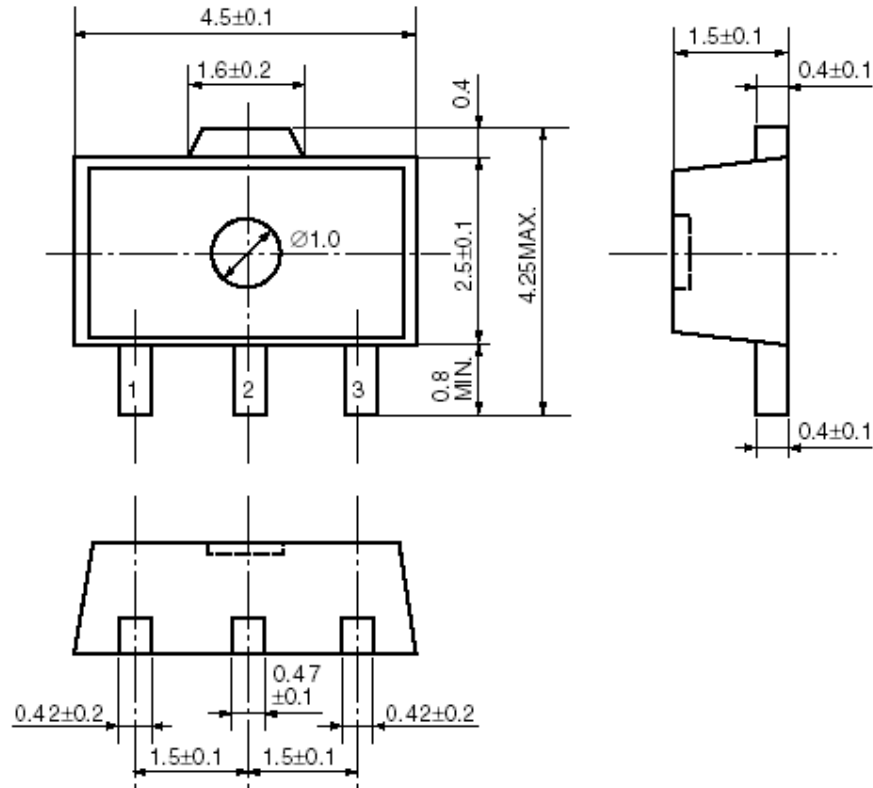
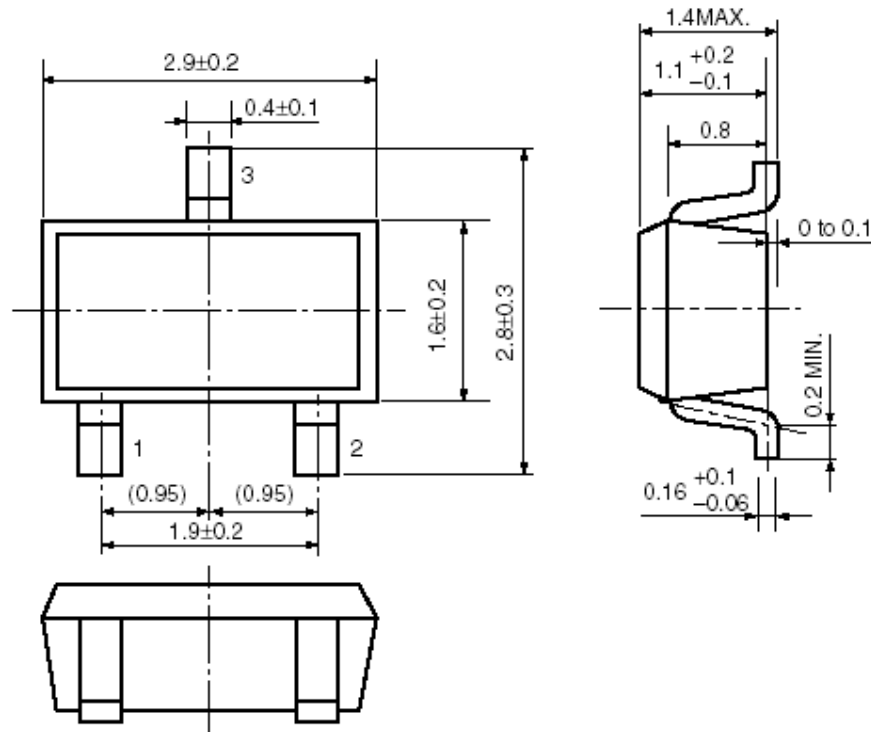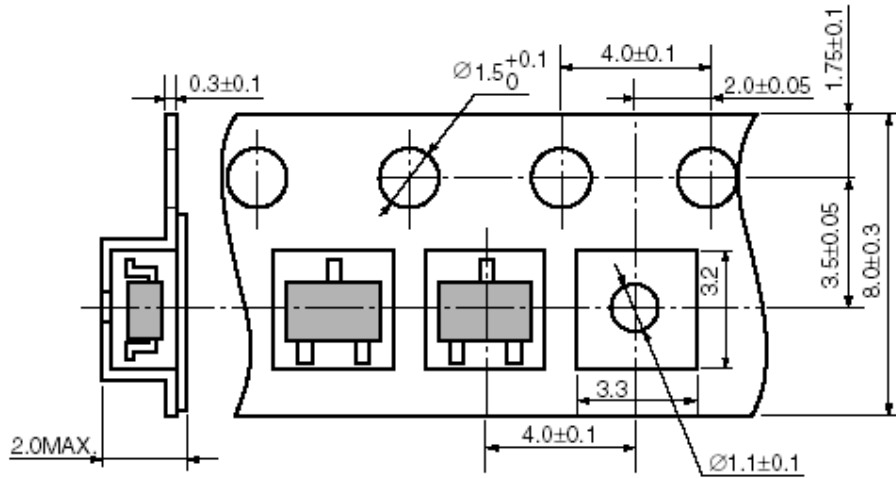Taping Specification:（M1：Standard Type，M2：Customized）

M1 OR M2
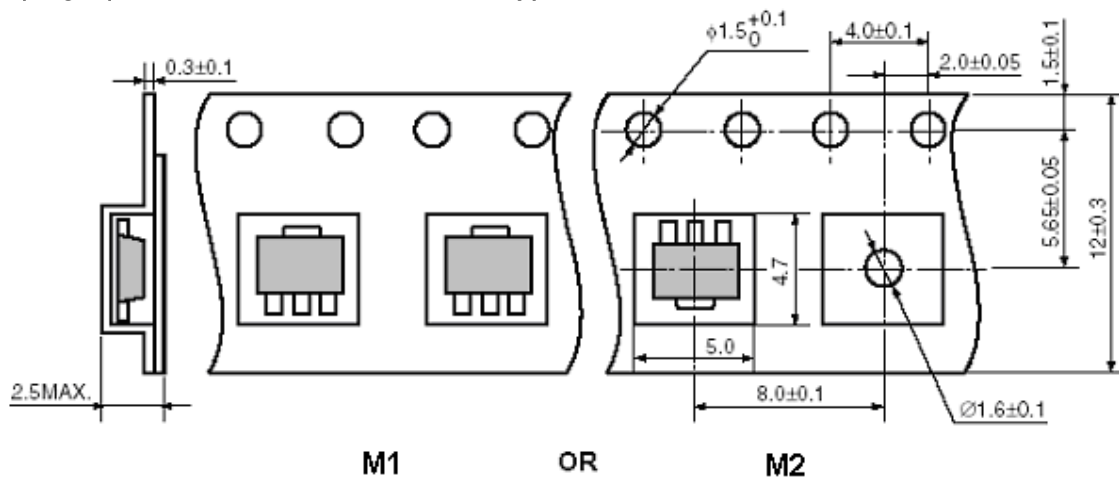
Taping Reel Dimension：
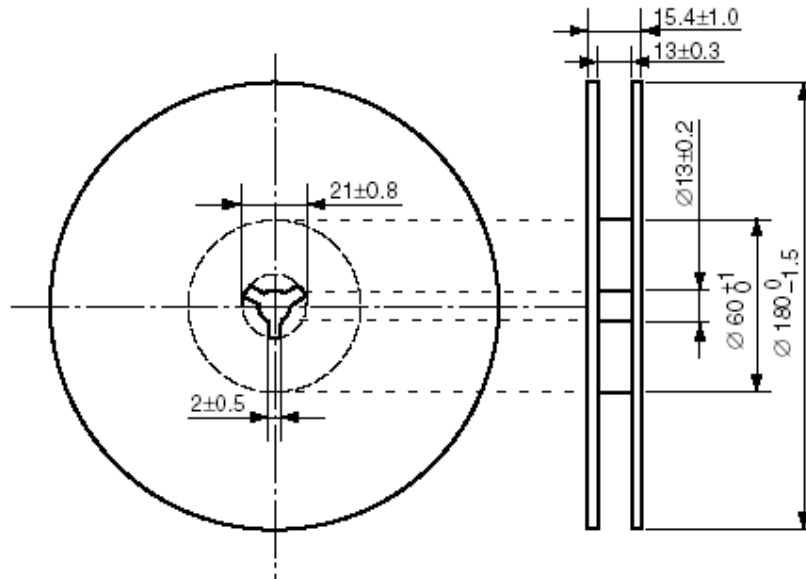
SOT-23-3:

Package	SOT-23-3	Devices per reel	3000	Unit	mm

Package dimension：

Taping Specification：

Taping reel dimension：
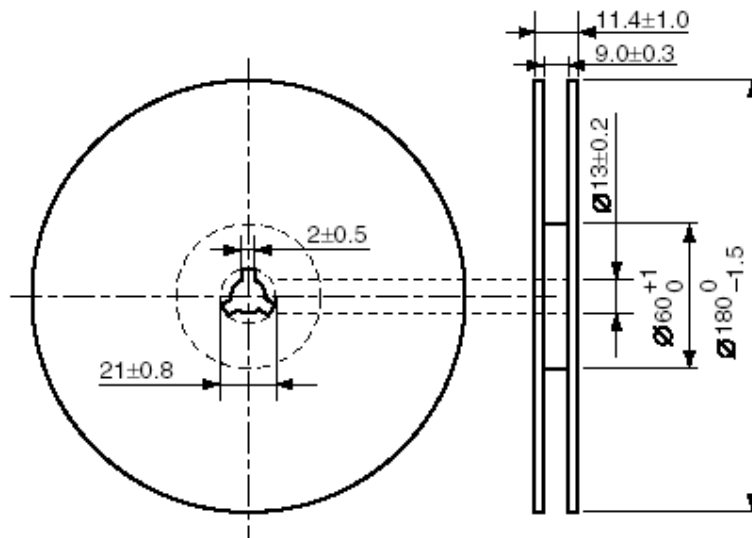
SOT-23-5:

Package	SOT-23-5	Devices per reel	3000	Unit	mm

Package specification：
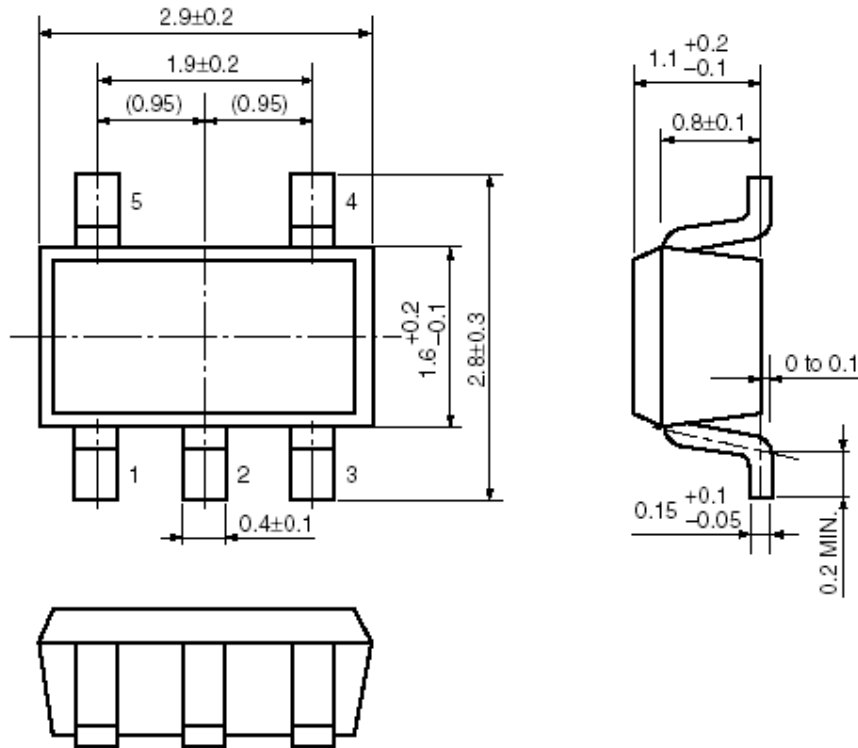
Taping dimension： （M1：Standard Type ， M2：Customized）

M1   OR   M2

Taping reel dimension：