

300mA High PSRR, Fast Response Linear Regulator

DESCRIPTION

BL8563G series is a group of positive voltage output, low power consumption, low dropout voltage regulator.

BL8563G can provide output value in the range of 0.9V~3.6V every 0.1V step. It also can be customized on command.

BL8563G includes high accuracy voltage reference, error amplifier, current limit circuit and output driver module with discharge capability.

BL8563G 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 $\pm 2\%$.

BL8563G is available in SC70-5, SOT23-3, TSOT-23, SOT23-5 and DFN1x1-4 packages which are lead free.

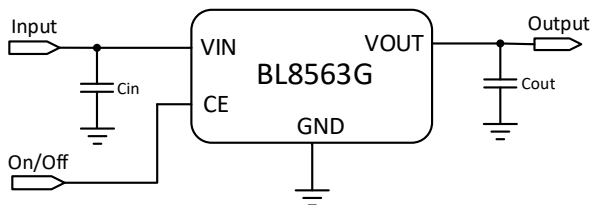
FEATURES

- Low power consumption: 60uA (Typ.)
- Standby mode: 0.1uA
- Low dropout voltage:
195mV @ $I_{OUT}=300mA$, $V_{OUT}=3.3V$ (Typ.)
- High PSRR: 70dB@1KHz (Typ.)
- Low temperature coefficient: $\pm 100ppm/^{\circ}C$
- Excellent line regulation: 0.05%/V
- Output voltage range: 0.9V~3.6V
- Highly accurate: $\pm 2\%$
- Build-in chip enable and discharge circuit
- Thermal shutdown
- Overcurrent protection

APPLICATIONS

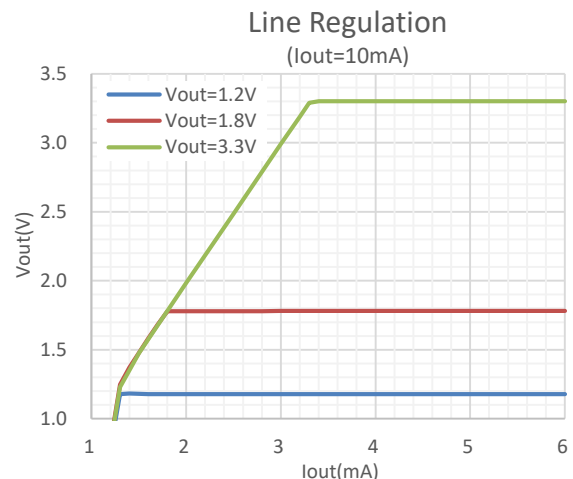
- Power source for cellular phones and various kind of PCSs
- Battery powered equipment
- Power management of MP3, PDA, DSC, mouse, PS2 games
- Reference voltage source
- Regulation after switching power

TYPICAL APPLICATION



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

ELECTRICAL CHARACTERISTICS



ORDERING INFORMATION

BL8563G ①②③

Code	Description
①	Output voltage: e.g. 10=1.0V 18=1.8V 36=3.6V
②	Temperature&RoHS: P:-40~85°C, Pb Free RoHS Std.
③	Package type: Q: SC70-5 RM: SOT23-3 RO: TSOT-23 RA: SOT23-5(A)

BL8563G ①②③④

Code	Description
①	Temperature&RoHS: C:-40~85°C, Pb Free RoHS Std.
②	Package type: KE:DFN1x1-4
③	Packing type: TR: Tape&Reel (Standard)
④	Output voltage: e.g. 10=1.0V 18=1.8V 36=3.6V

MARKING DEScriptON

X: Output Voltage (for SC70-5, SOT23-3, TSOT-23, SOT23-5)

Vout	Code	Vout	Code	Vout	Code
0.9V	9	1.9V	9	2.9V	9
1.0V	0	2.0V	0	3.0V	0
1.1V	1	2.1V	1	3.1V	1
1.2V	2	2.2V	2	3.2V	2
1.3V	3	2.3V	3	3.3V	3
1.4V	4	2.4V	4	3.4V	4
1.5V	5	2.5V	5	3.5V	5
1.6V	6	2.6V	6	3.6V	6
1.7V	7	2.7V	7		
1.8V	8	2.8V	8		

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.

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	BL8563G-□□PQ
H: Product code	
X: Output voltage	
YW: Date code	
Product classification	BL8563G-□□PRM
H: Product code	
X: Output voltage	
YW: Date code	
Product classification	BL8563G-□□PRO
H: Product code	
X: Output voltage	
YW: Date code	
Product classification	BL8563G-□□PRA
H: Product code	
X: Output voltage	
YW: Date code	
Product classification	BL8563GCKETR□□
XX: Output voltage	
VIN	Supply voltage input
GND	Ground pin
CE	Chip enable
NC	No connection
VOUT	Output voltage

ABSOLUTE MAXIMUM RATING

Parameter		Value
Max input voltage		8V
Operating junction temperature(T_J)		125°C
Output current		300mA
Power dissipation	SC70-5	400mW
	SOT23-3	500mW
	TSOT-23	500mW
	SOT23-5	600mW
	DFN1x1-4	500mW
Package thermal resistance (θ_{JA})	SC70-5	300°C / W
	SOT23-3	220°C / W
	TSOT-23	250°C / W
	SOT23-5	200°C / W
	DFN1x1-4	250°C / W
Storage temperature(T_S)		-40°C -150°C
Lead temperature & time		260°C,10S
ESD (HBM)		>2000V

Note:

- 1) Package Thermal Resistance value can be affected by PCB design, outside radiator, ambient airflow, operating power, it just shows for reference.
- 2) Exceed these limits to damage to the device.
- 3) Exposure to absolute maximum rating conditions may affect device reliability.

RECOMMENDED WORK CONDITIONS

Item	Min	Recommended	Max.	Unit
Input voltage range	1.5 ¹		6	V
Ambient temperature	-40		85	°C

Note:

- 1) The output current capability depends on the input voltage and the minimum dropout voltage.

ELECTRICAL CHARACTERISTICS

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

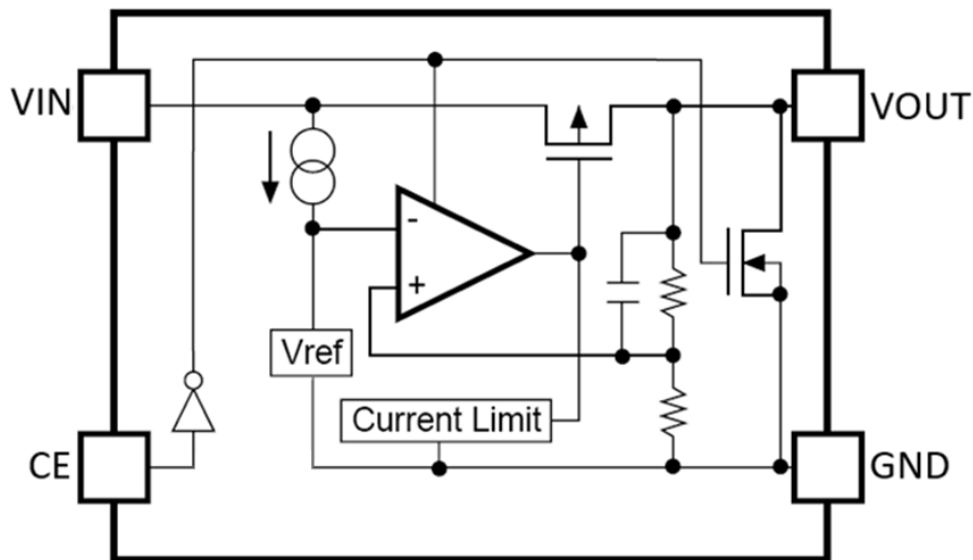
Symbol	Parameter		Conditions	Min	Typ	Max	Units
V_{IN}	Input voltage			1.5 ¹		6	V
V_{OUT}	Output voltage	$V_{OUT}>1.5V$	$V_{IN}=\text{Set } V_{OUT}+1V$, $1mA \leq I_{OUT} \leq 30mA$	$V_{OUT} \times 0.98$	V_{OUT}	$V_{OUT} \times 1.02$	V
		$V_{OUT} \leq 1.5V$		$V_{OUT} - 0.03$		$V_{OUT} + 0.03$	
$I_{OUT}(\text{Max.})$	Maximum output current		$V_{IN}-V_{OUT}=1V$	300			mA
V_{DROP}^2	Dropout voltage		$V_{OUT}=1.2V$, $I_{OUT}=300mA$		640	960	mV
			$V_{OUT}=1.8V$, $I_{OUT}=300mA$		395	600	mV
			$V_{OUT}=3.3V$, $I_{OUT}=300mA$		195	300	mV
$\frac{\Delta V_{out}}{\Delta V_{in} \cdot V_{out}}$	Line regulation		$I_{OUT}=10mA$, Set $V_{OUT}+1V \leq V_{IN} \leq 6V$		0.05	0.2	%/V
ΔV_{out}	Load regulation		$V_{IN}=\text{Set } V_{OUT}+1V$, $1mA \leq I_{OUT} \leq 300mA$		50	80	mV
I_Q	Supply current		$V_{IN}=\text{Set } V_{OUT}+1V$		60		uA
$I_{STANDBY}$	Supply current (Standby)		$V_{IN}=\text{Set } V_{OUT}+1V$, $V_{CE}=\text{GND}$		0.1	1.0	uA

$\frac{\Delta V_{out}}{\Delta T \cdot V_{out}}$	Output voltage temperature coefficient	$I_{OUT}=10mA$		± 100		ppm/°C
PSRR	Ripple rejection	$F=1KHz$, Ripple=0.5Vp-p $V_{IN}=\text{Set } V_{OUT}+1V$		70		dB
I_{SHORT}	Short current limit	$V_{IN}=5V$, $V_{OUT}=0V$		100		mA
R_{PD}	CE pull down resistance			500K		Ω
$R_{DISCHARGE}$	Discharge resistor	$V_{CE}=\text{GND}$, $V_{OUT}=3.0V$		1.5K		Ω
T_{SD}	Thermal shutdown temp	$V_{IN}=\text{Set } V_{OUT}+1V$, $I_{OUT}=10mA$		160		°C
T_{SH}	Thermal shutdown hysteresis	$V_{IN}=\text{Set } V_{OUT}+1V$, $I_{OUT}=10mA$		30		°C
V_{CEH}	CE input voltage "H"		1		V_{IN}	V
V_{CEL}	CE input voltage "L"		0		0.5	V

Note:

- 1) The output current capability depends on the input voltage and the minimum dropout voltage.
- 2) $V_{DROP}=V_{IN}-V_{OUT}$ when V_{OUT} drops below 98% of the normal V_{OUT} .

BLOCK DIAGRAM



EXPLANATION

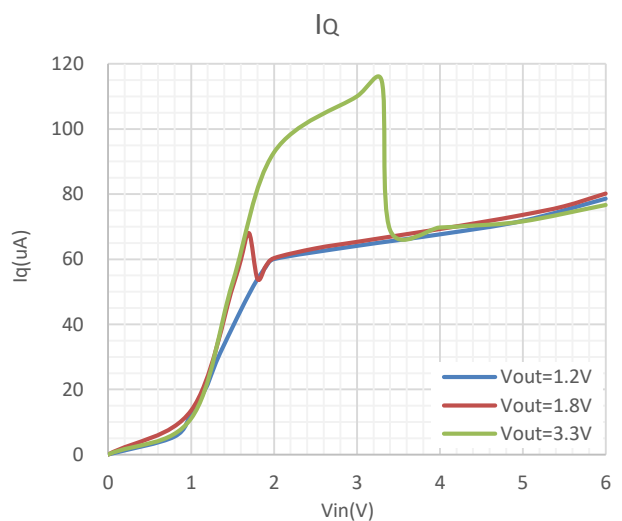
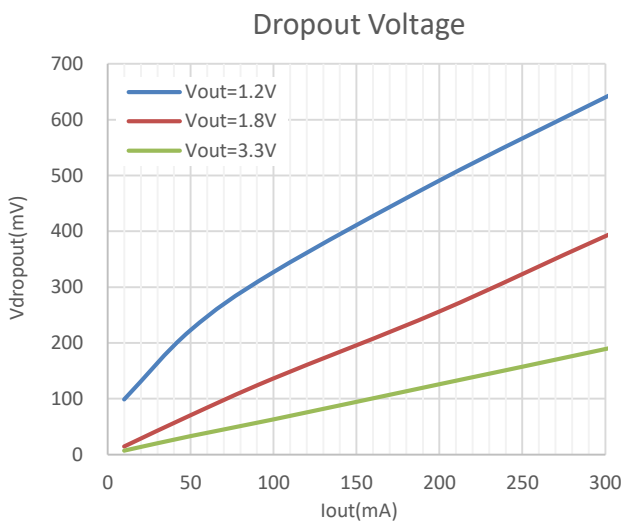
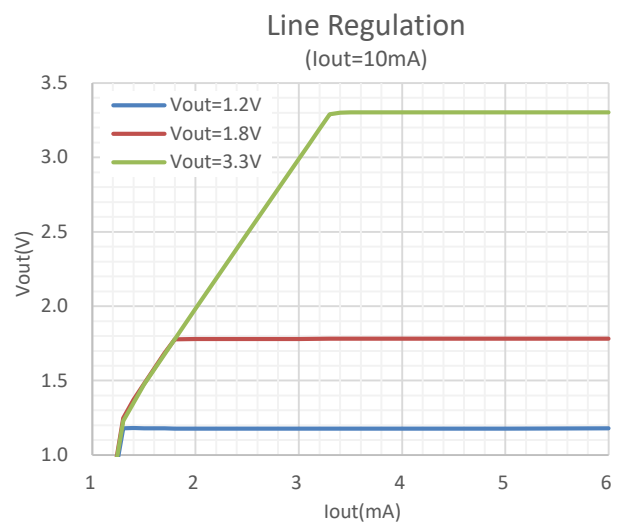
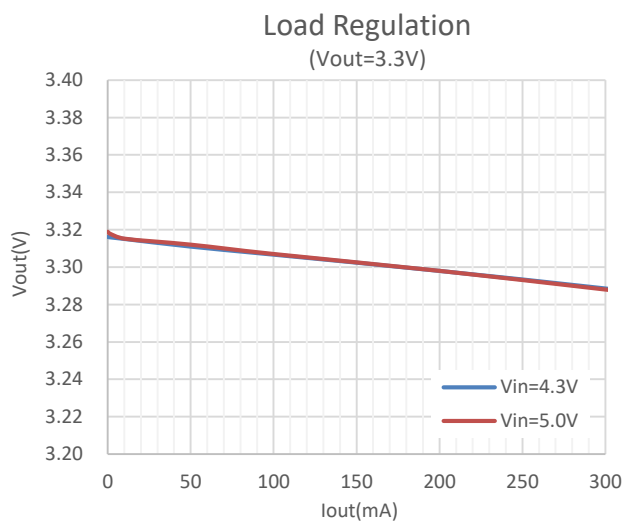
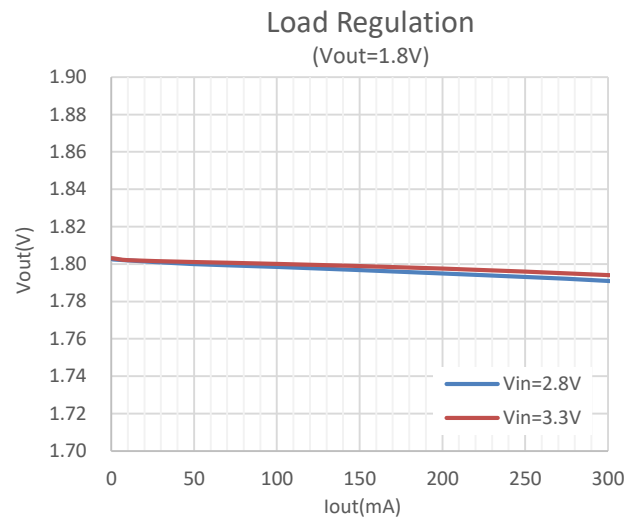
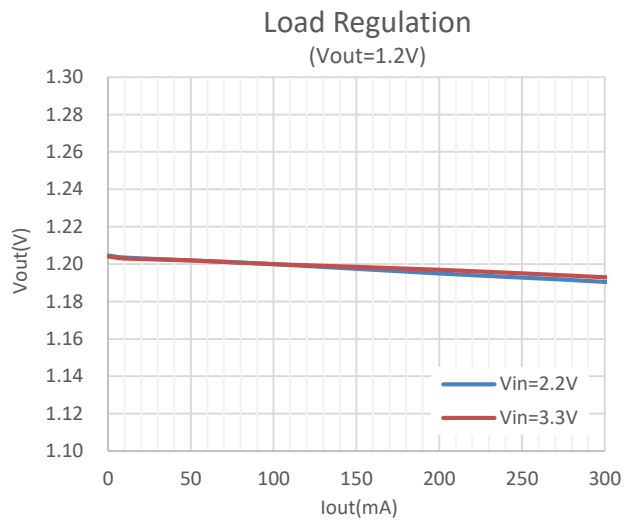
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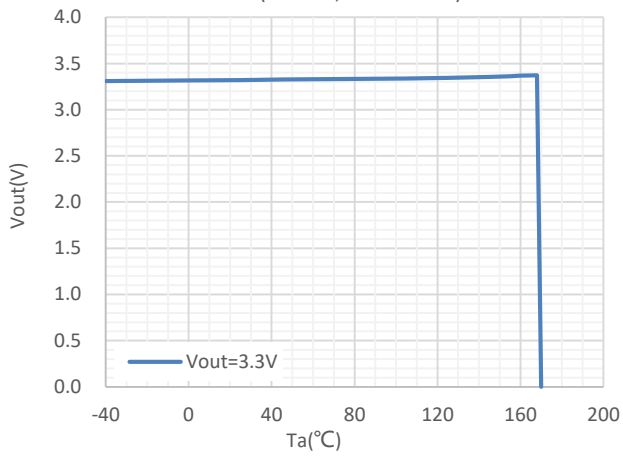
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BL8563G has excellent load and line transient response and good temperature characteristics, which can assure the stability of chip and power system. And it uses trimming technique to guarantee output voltage accuracy within $\pm 2\%$.

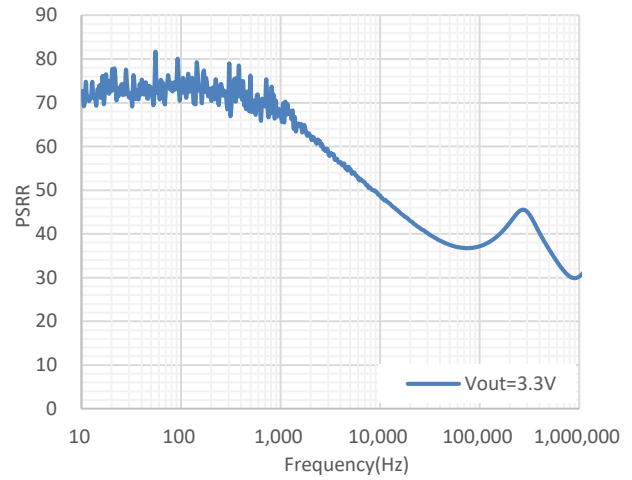
TYPICAL PERFORMANCE CHARACTERISTICS



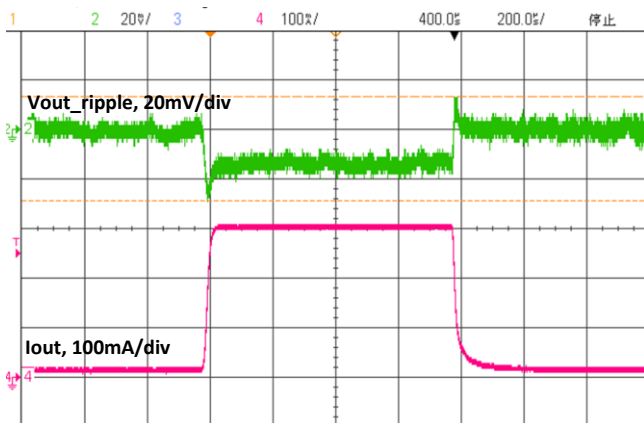
Vout vs. Temp
(Vin=5V, Iout=10mA)



PSRR

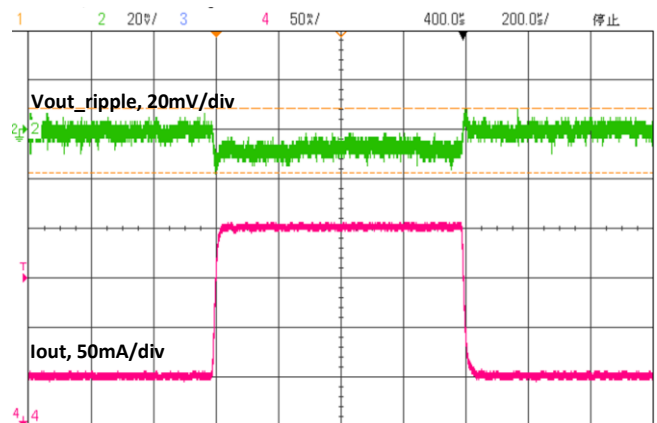


Load Transient Response
(Vin=5V, Vout=3.3V, Iout=10-300mA)



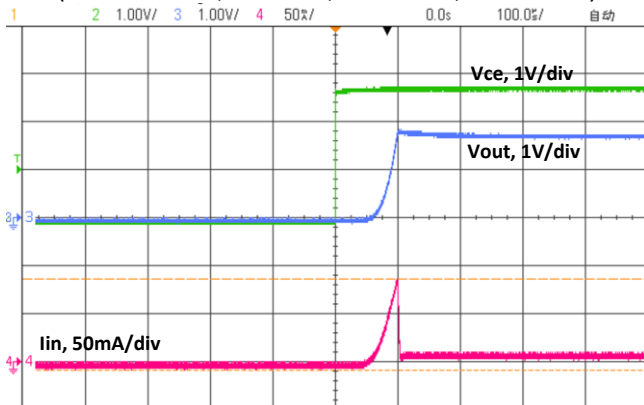
CH2: Vout_ripple, CH4: Iout

Load Transient Response
(Vin=5V, Vout=3.3V, Iout=150-300mA)



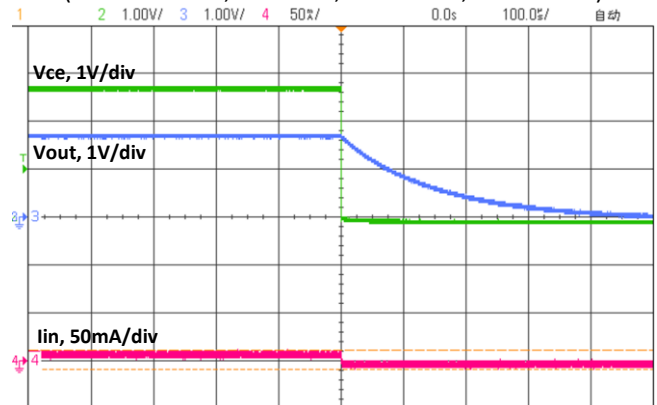
CH2: Vout_ripple, CH4: Iout

CE Chip Enable Response
(CE=0V to 2.8V, Vin=2.8V, Vout=1.8V, Iout=10mA)



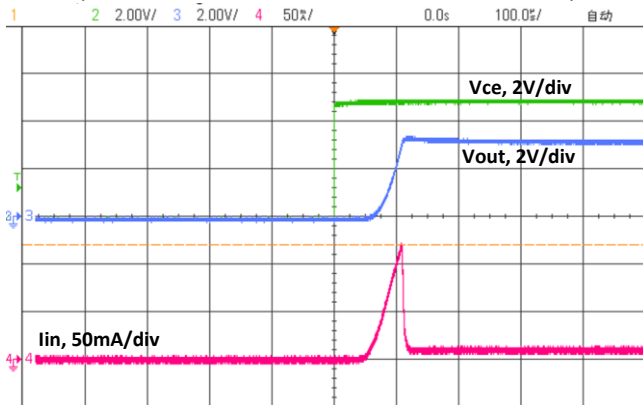
CH2: CE; CH3: Vout; CH4: Iin

CE Chip Enable Response
(CE=2.8V to 0V, Vin=2.8V, Vout=1.8V, Iout=10mA)



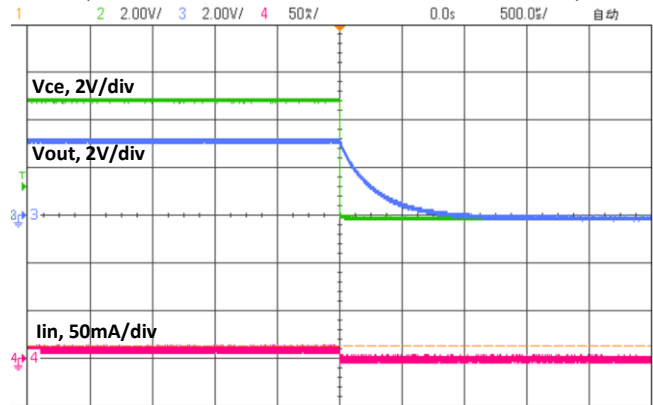
CH2: CE; CH3: Vout; CH4: Iin

CE Chip Enable Response
(CE=0V to 5V, Vin=5V, Vout=3.3V, Iout=10mA)



CH2: CE; CH3: Vout; CH4: Iin

CE Chip Enable Response
(CE=5V to 0V, Vin=5V, Vout=3.3V, Iout=10mA)



CH2: CE; CH3: Vout; CH4: Iin

PACKAGE OUTLINE

Package	SC70-5	Devices per reel	3000Pcs	Vendor	TongFu Microelectronics Co., Ltd
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Package dimension:

Unit: mm

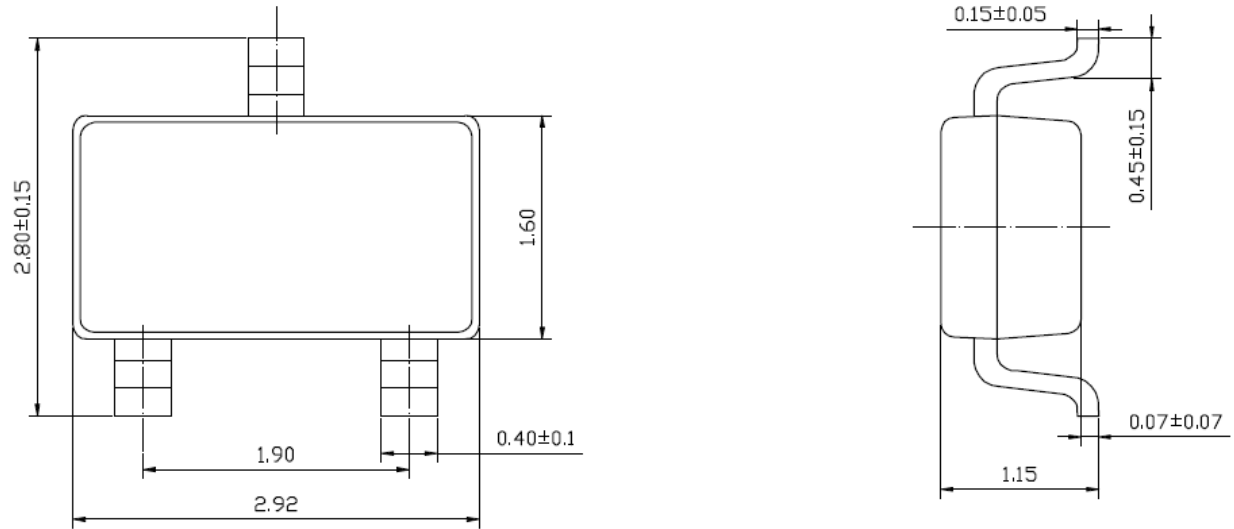
COMMON DIMENSIONS
(UNITS OF MEASURE=MILLIMETER)

SYMBOL	MIN	NOM	MAX
A	0.85	—	1.05
A1	0	—	0.10
A2	0.80	0.90	1.00
A3	0.47	0.52	0.57
b	NiPdAu PURE Sn	0.22 0.23	— 0.29 0.33
b1	0.22	0.25	0.28
c	NiPdAu PURE Sn	0.115 0.12	— 0.15 0.18
c1	0.115	0.13	0.14
D	2.02	2.07	2.12
E	2.20	2.30	2.40
E1	1.25	1.30	1.35
e	0.60	0.65	0.70
e1	1.20	1.30	1.40
L	0.28	0.33	0.38
L1	0.50REF		
L2	0.15BSC		
R	0.10	—	—
R1	0.10	—	0.25
θ	0°	—	8°
θ 1	6°	9°	12°
θ 2	6°	9°	12°

NOTES:
ALL DIMENSIONS REFER TO JEDEC STANDARD MO-203 AA
DO NOT INCLUDE MOLD FLASH , PROTRUSIONS OR GATE BURRS.
MOLD FLASH , PROTRUSIONS OR GATE BURRS WILL NOT EXCEED 0.15mm PER SIDE.

Package	SOT23-3	Devices per reel	3000Pcs	Vendor	Qingdao TRS Microelectronics Co., Ltd
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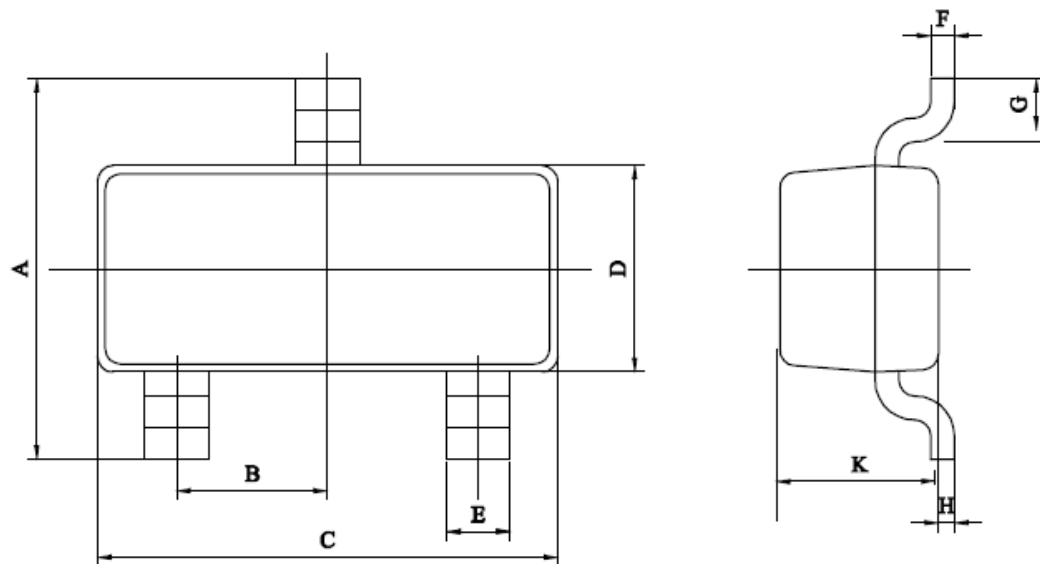
Package dimension:



Unit: mm

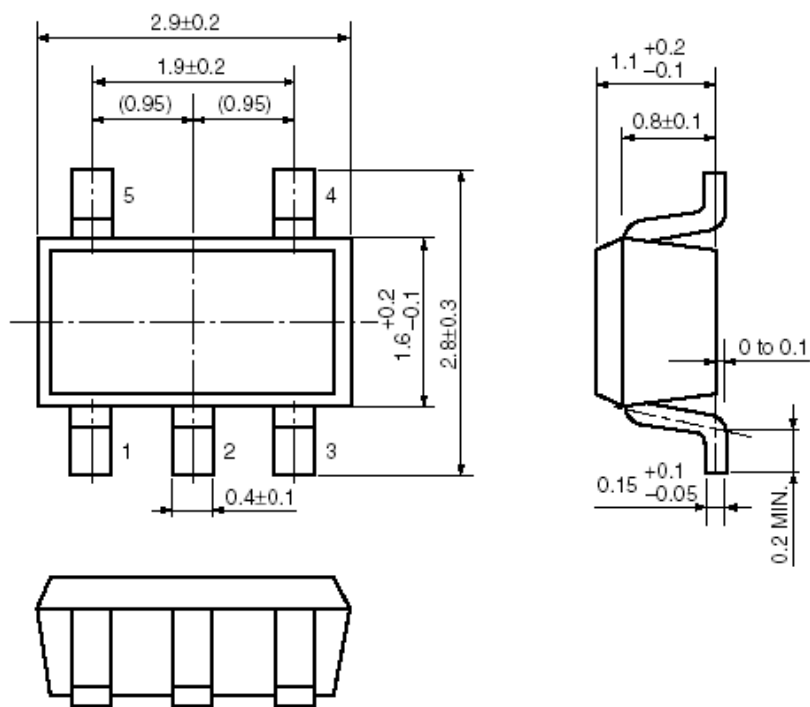
Package	TSOT-23	Devices per reel	3000Pcs	Vendor	Qingdao TRS Microelectronics Co., Ltd
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Package dimension:



	A	B	C	D	E	F	G	H	K
出厂标准	2.4±0.15	0.95±0.05	2.9±0.1	1.3±0.1	0.40±0.1	0.15±0.08	0.4±0.1	0.07±0.07	1.00±0.05

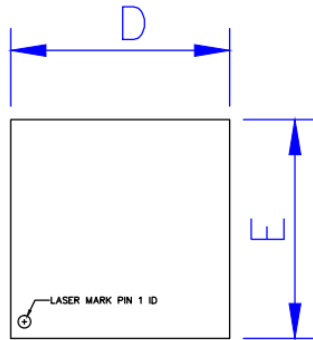
Unit: mm

Package	SOT23-5	Devices per reel	3000Pcs	Vendor	Qingdao TRS Microelectronics Co., Ltd
Package dimension:  The technical drawing illustrates the SOT23-5 package dimensions. The top view shows a central body with a width of 2.9 ± 0.2 mm and a length of 1.9 ± 0.2 mm. The distance between the two side pins (4 and 5) is 0.95 mm, and the distance between the three bottom pins (1, 2, and 3) is 0.4 ± 0.1 mm. The side view shows a maximum height of 2.8 ± 0.3 mm, with a body height of 1.6 ± 0.1 mm and a pin height of 0.15 ± 0.1 mm. The pin thickness is 0.15 ± 0.1 mm, and the pin length is 1.1 ± 0.2 mm. The pin width is 0.8 ± 0.1 mm. The pin angle is 0 to 0.1 degrees. The minimum pin length is 0.2 mm. The isometric view shows the package from a three-dimensional perspective. Unit: mm					

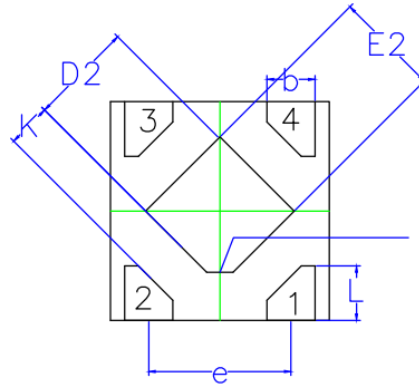
Package	DFN1x1-4	Devices per reel	5000Pcs	Vendor	Ningbo TRS Microelectronics Co., Ltd
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Package dimension:

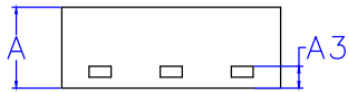
DFN1010-4L-0.5mm PACKAGE OUTLINE



TOP VIEW



BOTTOM VIEW



SIDE VIEW



SIDE VIEW

COMMON DIMENSION (MM)				DIMENSION In Inches		
PKG	DFN1010			DFN1010		
REF.	MIN.	NOM.	MAX	MIN.	NOM.	MAX
A	0.45	0.50	0.55	0.013	0.015	0.016
A1	0.00	—	0.05	0.000	—	0.002
A3	—	0.10REF	—	—	0.004REF	—
b	0.17	0.22	0.27	0.007	0.009	0.011
D	0.95	1.00	1.05	0.037	0.039	0.041
E	0.95	1.00	1.05	0.037	0.039	0.041
D2	0.43	0.48	0.53	0.017	0.019	0.021
E2	0.43	0.48	0.53	0.017	0.019	0.021
L	0.20	0.25	0.30	0.008	0.010	0.012
e	0.60	0.65	0.70	0.024	0.026	0.028
K	0.15	—	—	0.006	—	—

Unit: mm