



ACE521

250mA CMOS Low consumption Linear Regulator

Description

ACE521 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 420mV($V_{out}=3.3V$), And it also provides foldback short-circuit protection and output current limit function. The very low power consumption of ACE521 ($I_q=2.0\mu A$) can greatly improve natural life of batteries.

ACE521 can provide output value in the range of 1.1V~5.0V in 0.1V steps. It also can customized on command.

ACE521 includes high accuracy voltage reference, error amplifier, current limit circuit and output driver module.

ACE521 has well load transient response and good temperature characteristic, And it uses trimming technique to guarantee output voltage accuracy within $\pm 2\%$.

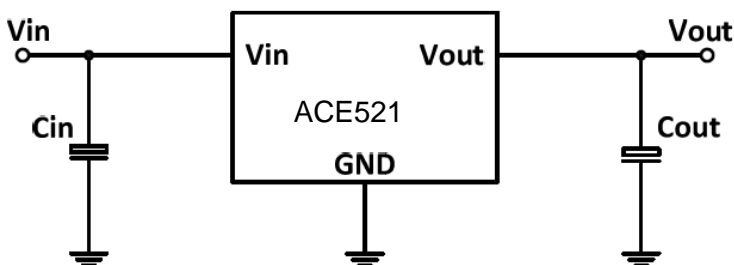
Features

- Low Power Consumption: $2.0\mu A$ (Typ.)
- Maximum Output Current: $250mA$
- Small Dropout Voltage
210mV@100mA ($V_{out}=3.3V$)
420mV@200mA ($V_{out}=3.3V$)
- Input Voltage Range: $2V\sim 16V$
- Output Voltage Range: $1.1V\sim 5.0V$ (customized on command in 0.1V steps)
- Highly Accurate: $\pm 2\%$ ($\pm 1\%$ customized)
- Output Current Limit $330mA@V_{out}=3.3V$
- Foldback Short-circuit Current $56mA@V_{out}=3.3V$

Application

- Battery Powered equipment
- Power Management of MP3. PDA. DSC. Mouse. PS2 Games
- Reference Voltage Source Regulation after Switching Power

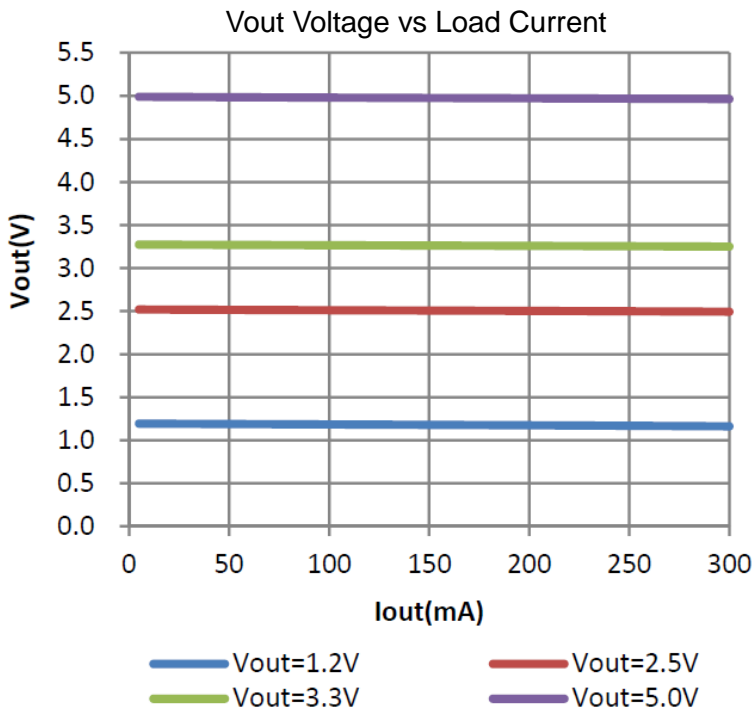
Typical Application



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



Electrical Characteristics



Absolute Maximum Ratings

Parameter	Symbol	Max	Unit
Max Input Voltage		20	V
Power Dissipation			mW
SOT-23-3		250	
SOT-23-5		250	
SOT-89-3		500	
Operating Junction temperature	T _J	125	°C
Storage temperature	T _S	- 45 ~ 150	°C
Ambient Temperature	T _A	-40 ~ 85	°C

Note: Exceed these limits to damage to the device.

Exposure to absolute maximum rating conditions may affect device reliability.

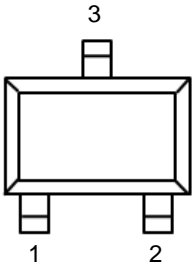


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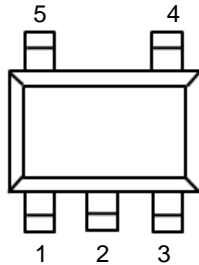
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Packaging Type

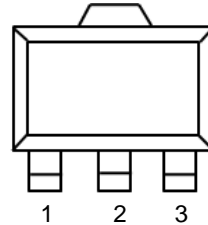
SOT-23-3



SOT-23-5



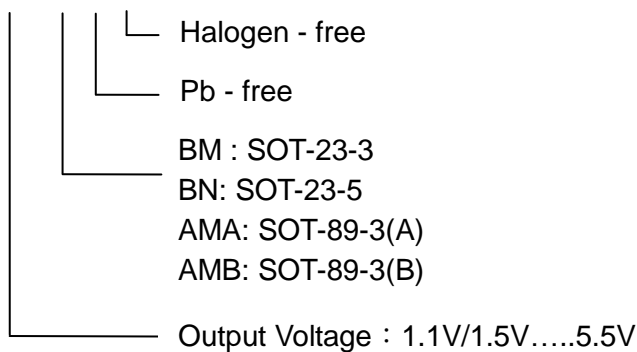
SOT-89-3



SOT-23-3	SOT-23-5	SOT-89-3(A)	SOT-89-3(B)	Description
1	2	1	2	GND
2	5	3	1	Vout
3	1	2	3	Vin
	3.4			NC

Ordering information

ACE521 XX XX + H



Recommended Work Conditions

Item	Min	Max	Unit
Input Voltage Range		16	V
Ambient Temperature	-40	+85	°C

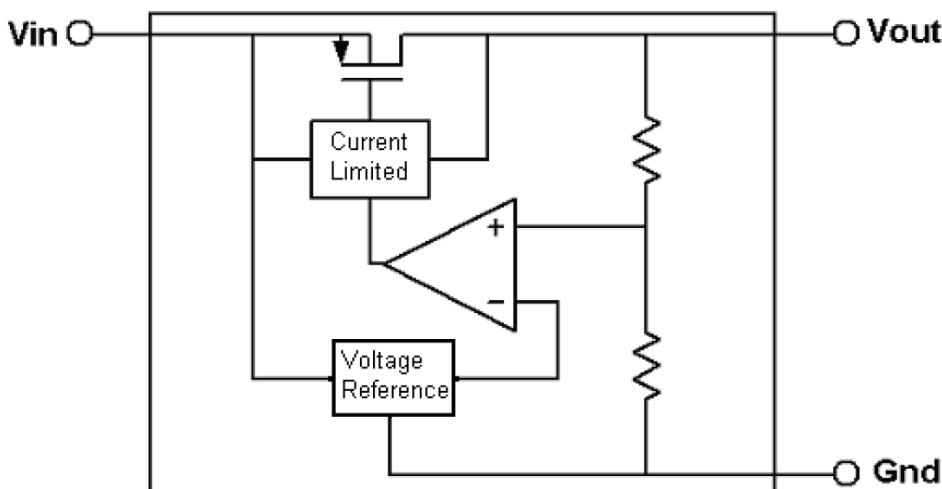


Electrical Characteristics

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

Parameter	Symbol	Conditions	Min	Typ	Max	Units
Input Voltage	V_{IN}				16	V
Output Voltage	V_{OUT}		$V_{out} \cdot 0.98$		$V_{out} \cdot 1.02$	V
Maximum Output Current	$I_{OUT}(\text{Max.})$	$V_{IN}-V_{OUT}=1V$	250			mA
Input-Output Voltage Differential	Dropout Voltage	$I_{OUT}=100mA$	$V_{out} \leq 2.5V$	600	1,000	mV
			$V_{out} \geq 2.5V$	300	600	
Line Regulation	$\frac{\Delta V_{OUT}}{\Delta V_{IN} \cdot V_{OUT}}$	$I_{OUT}=10mA$ $2V \leq V_{IN} \leq 16V$		0.2	0.3	%/V
Load Regulation	ΔV_{OUT}	$V_{IN}=\text{Set } V_{out}+1V$ $1mA \leq I_{OUT} \leq 100mA$		20	40	mV
Quiescent Current	I_q	$V_{IN}=\text{Set } V_{out}+1V$		2.0	5.0	μA
Output Voltage Temperature Coefficient	$\frac{\Delta V_{OUT}}{\Delta T \cdot V_{OUT}}$	$I_{OUT}=10mA$		100		ppm/ $^\circ C$

Block Diagram



Explanation

ACE521 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.

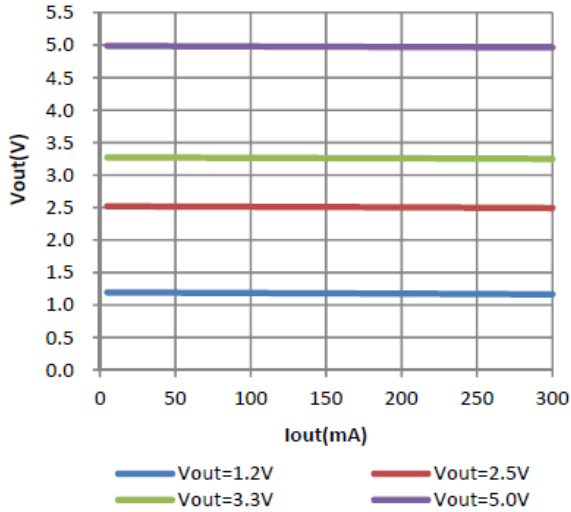
Current Limit module can keep chip and power system away from danger when load current is more than 250mA.

ACE521 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 ACE521's temperature coefficient within 100ppm/ $^\circ C$.

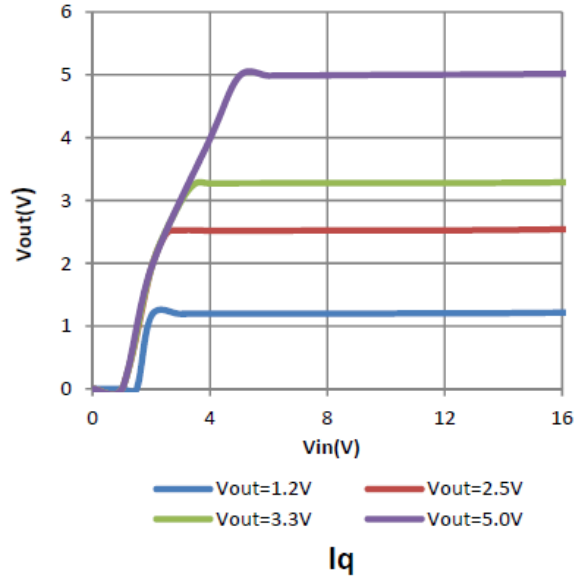


Typical Performance Characteristics

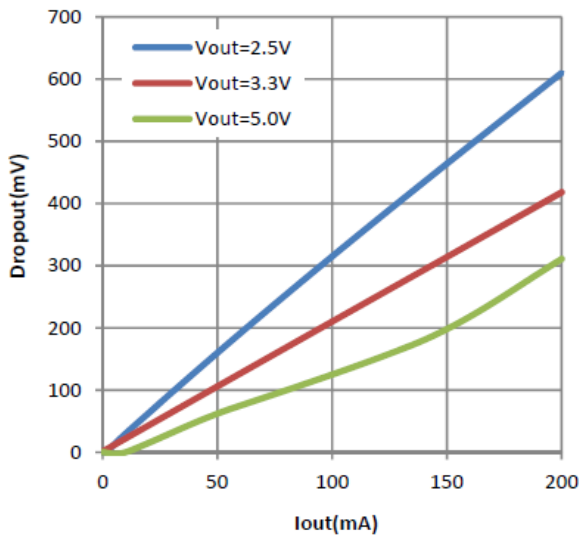
Vout Voltage vs Load Current



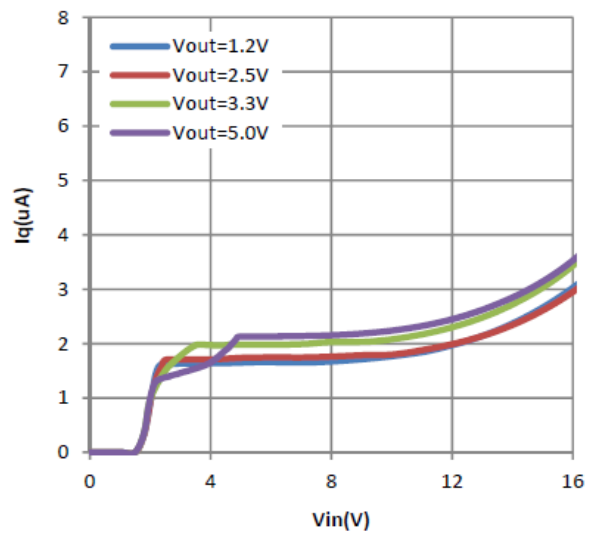
Line Regulation



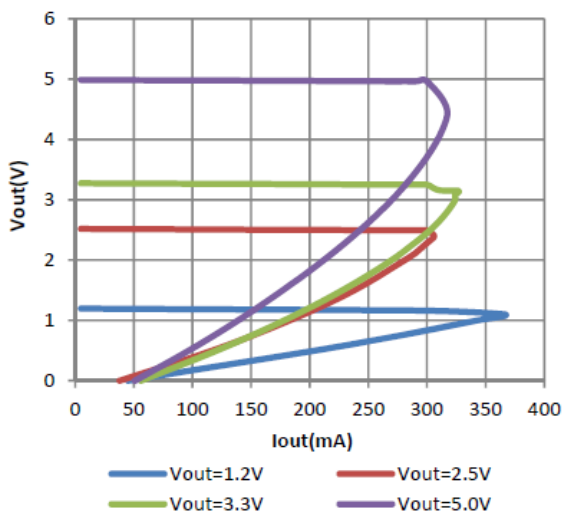
Dropout Voltage vs Load Current



Iq



Current Limit





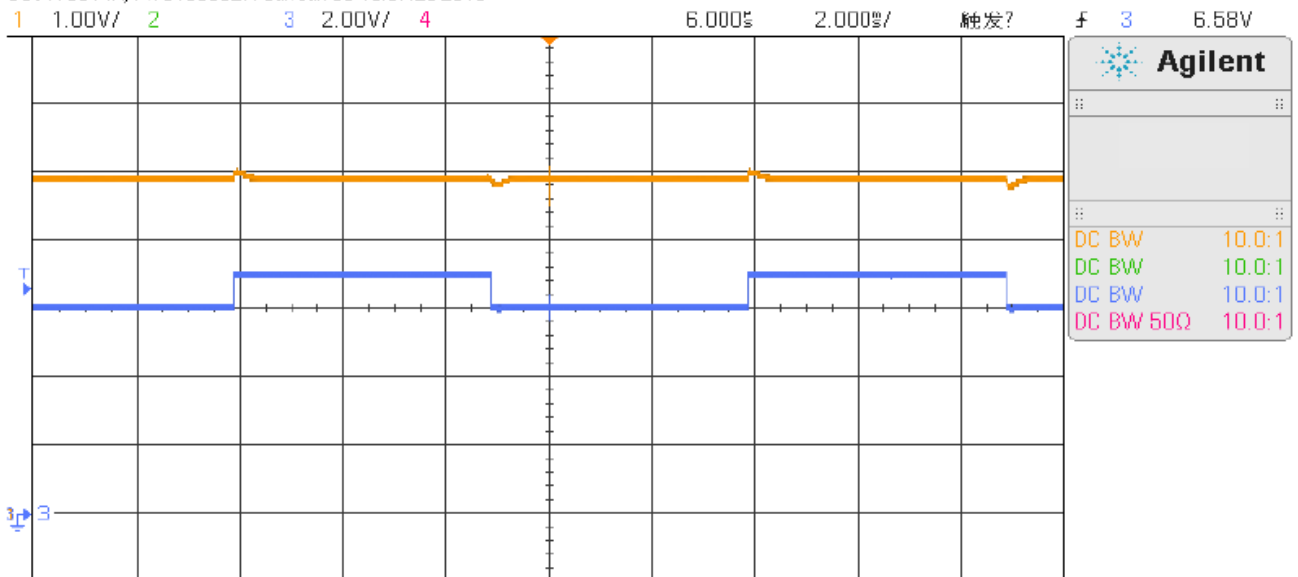
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Line transient response

Vin=6~7V, Ch1-Vout, Ch3-Vin

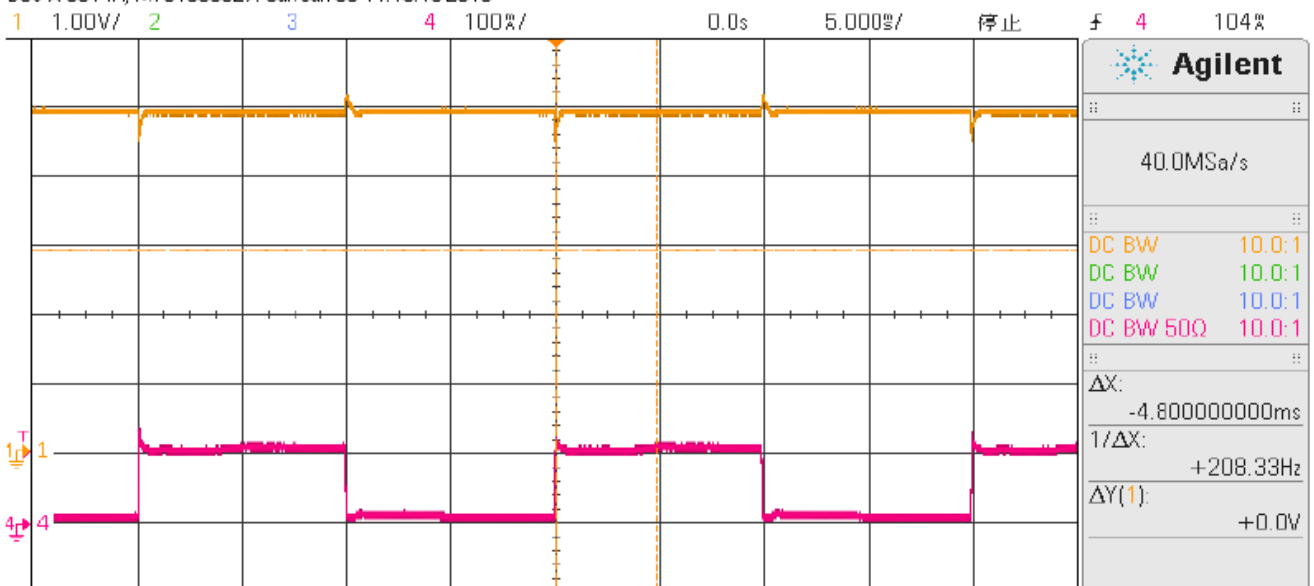
DSO-X 3014A, MY51360527: Sun Jan 06 13:37:20 2013



Line transient response

Iout=1mA~100mA, Ch1-Vout, Ch4-Iout

DSO-X 3014A, MY51360527: Sun Jan 06 11:19:19 2013





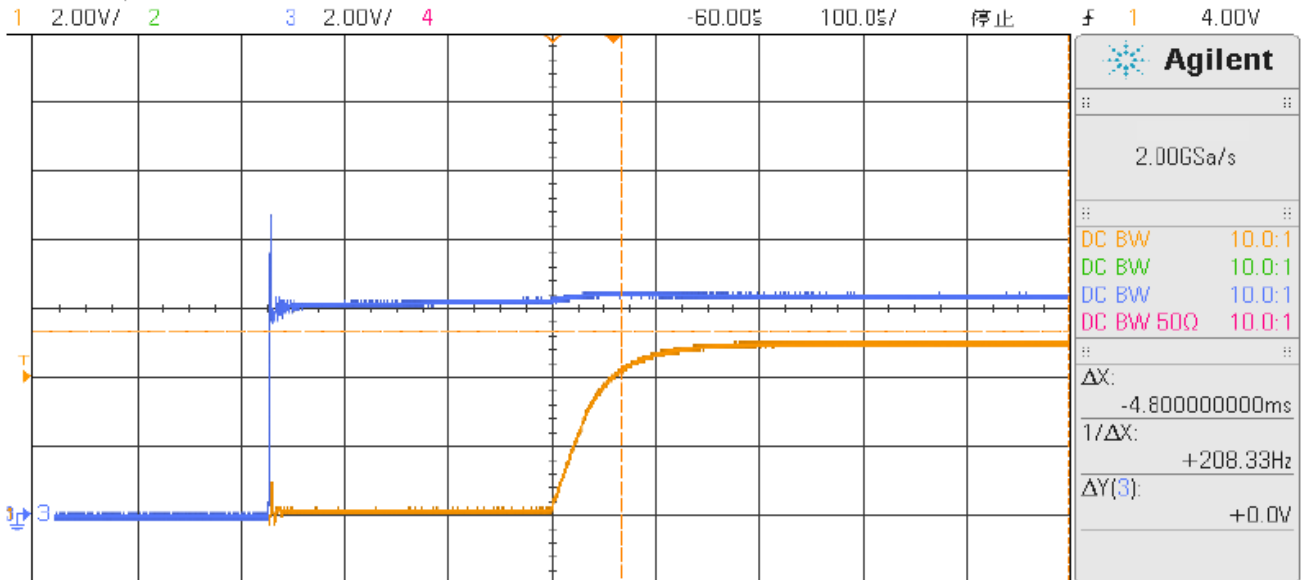
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Line transient response

I_{out}=1mA~100mA, Ch1-V_{out}, Ch4-I_{out}

DSO-X 3014A, MY51360527: Sun Jan 06 11:30:56 2013



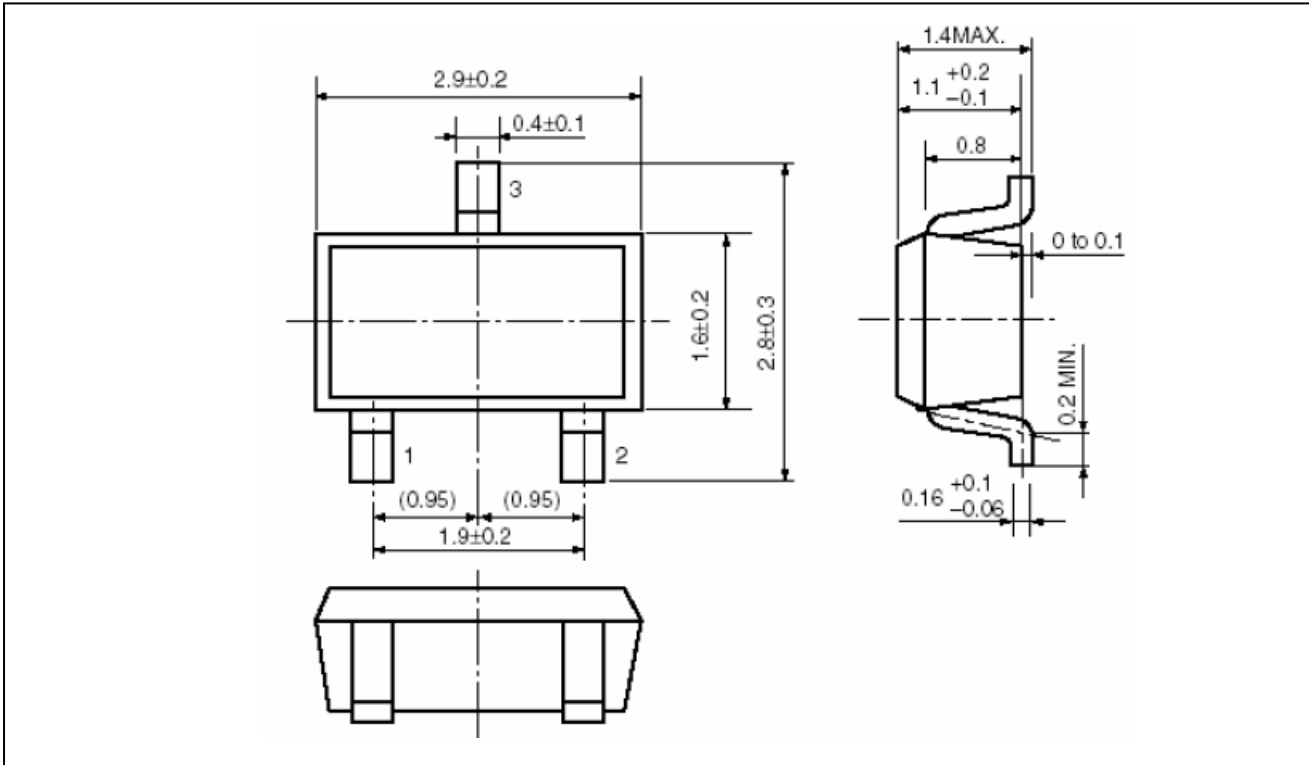


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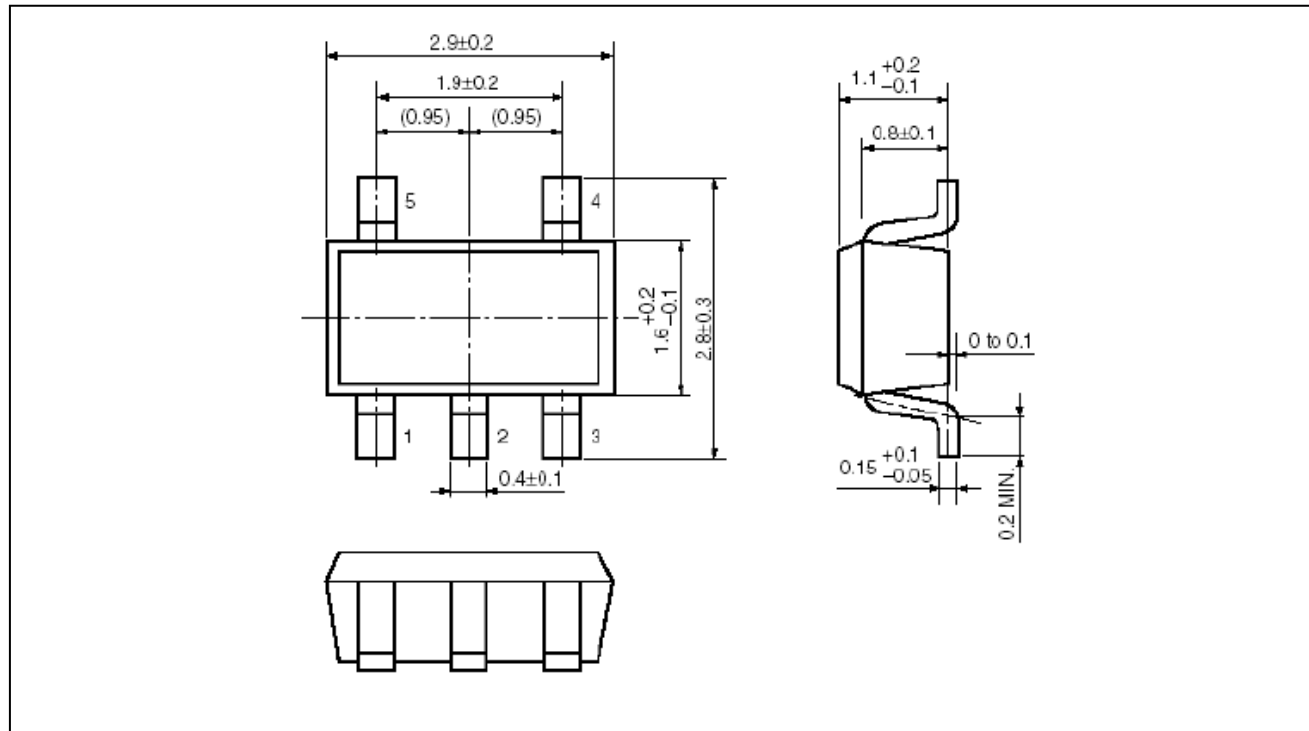
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Packing Information

SOT-23-3



SOT-23-5



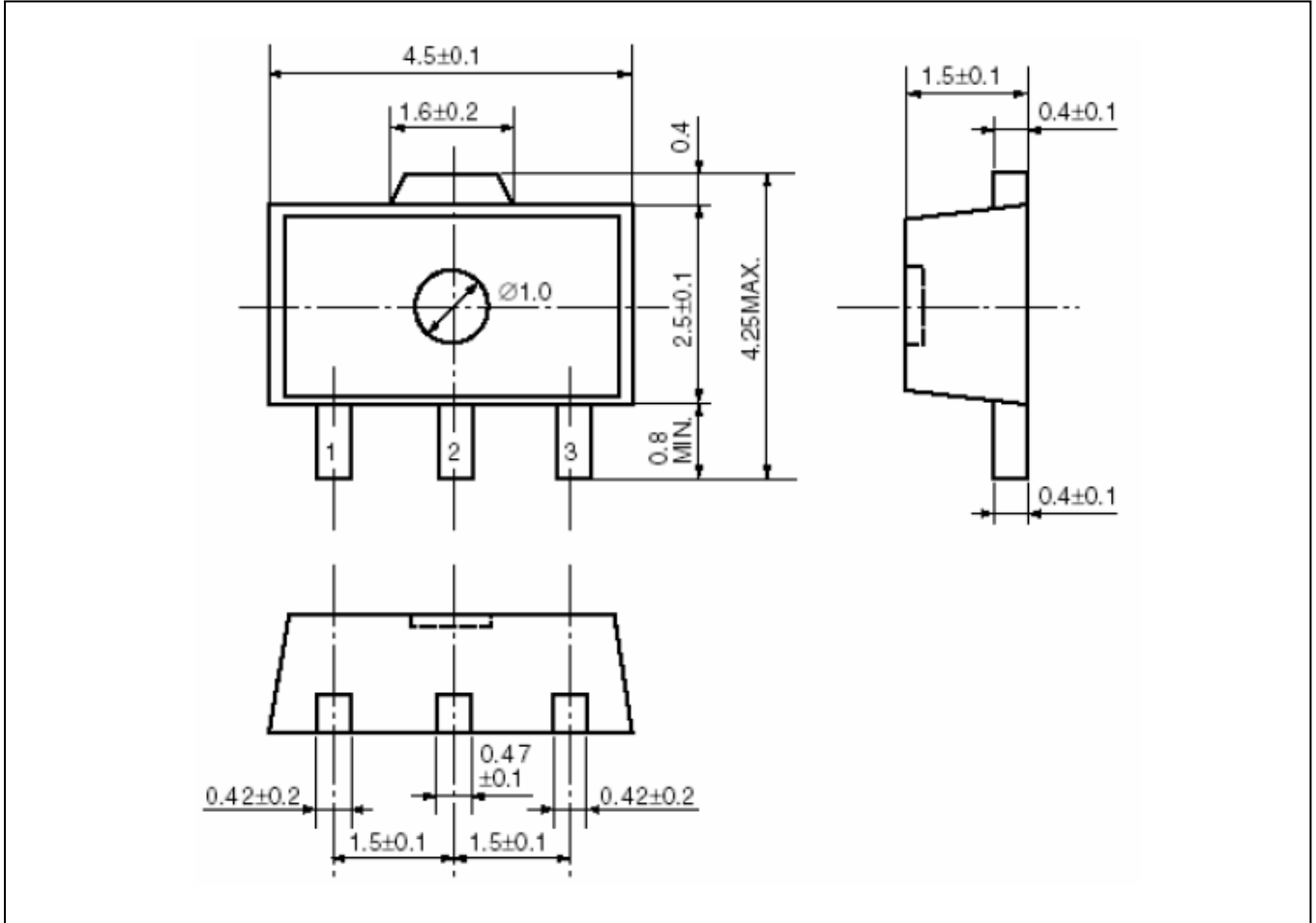


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Packing Information

SOT-89-3





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Notes

ACE does not assume any responsibility for use as critical components in life support devices or systems without the express written approval of the president and general counsel of ACE Electronics Co., LTD. As sued herein:

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2. A critical component is any component of a life support device or system whose failure to perform can be reasonably expected to cause the failure of the life support device or system, or to affect its safety or effectiveness.

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