ACE509

Low noise, fast response 500mA LDO regulator

Description

ACE509 series is a group of positive voltage output, low power consumption, low dropout voltage regulator.

ACE509 can provide output value in the range of 1.2V~4.5V every 0.1V step. It also can be customized on command.

ACE509 includes high accuracy voltage reference, error amplifier, current limit circuit and output driver module with discharge capability.

ACE509 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±2%.

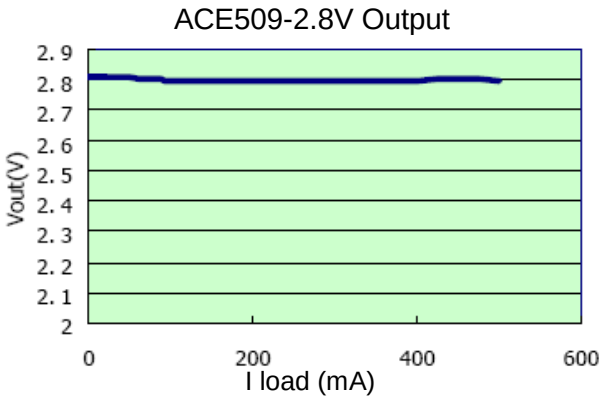
Features

- Low Power Consumption: 75uA（Typ.）
- Low output noise (47uVRMS)
- Standby Mode: 0.1uA
- Low dropout Voltage: 0.46V@500mA (Typ.)
- High Ripple Rejection: 66dB@100Hz (Typ.)
- Low Temperature Coefficient: ±100ppm/°C
- Excellent Line regulation: 0.05%/V
- Build-in chip enable and discharge circuit
- Output Voltage Range: 1.2V~4.5V (customized on command every 0.1V step)
- Highly Accurate: ±2% (±1% customized)
- Output Current Limit

Application

- 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

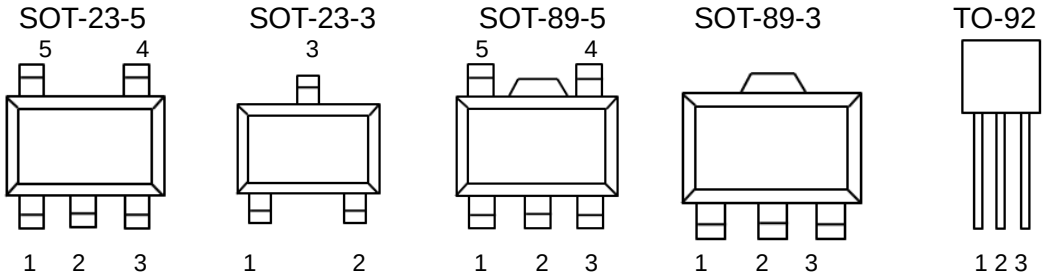
Typical Performance Characteristic:



Absolute Maximum Ratings

Parameter	Symbol	Max	Unit
Input Voltage		12	V
Output Current		500	mA
Power Dissipation SOT-23-5 SOT-23-3 SOT-89-3 SOT-89-5 TO-92		 250 250 500 50mW for normal application 800mW with 10mm*20mm heat dissipation coil 500	mW
Junction temperature	T_J	125	°C
Storage temperature	T_S	- 45 to 150	°C

Packaging Type



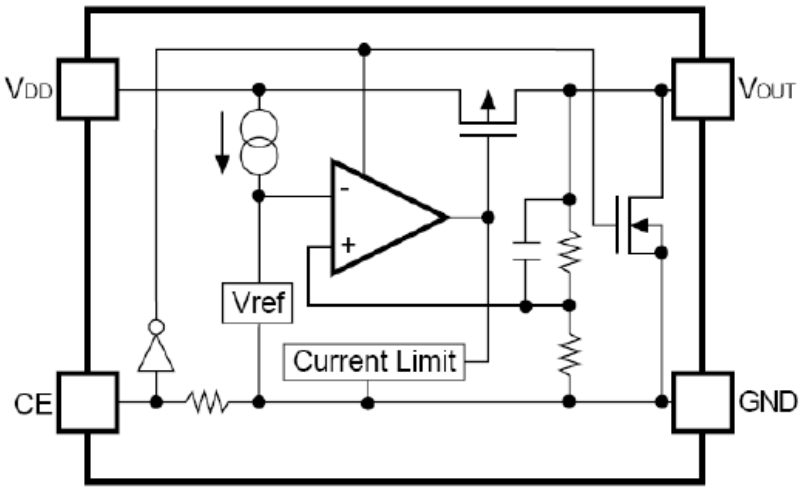
SOT-23-5	SOT-23-3	SOT-89-5	SOT-89-3	TO-92	Description	Function
5	2	5	3	3	V_{OUT}	Output pin
1	3	4	2	1	V_{DD}	Input Pin
2	1	2	1	2	V_{SS}	Ground Pin
3		3			CE	Chip Enable Pin
4		1			NC	No Connection

Ordering information

ACE509 XX XX + H

- Halogen - free
- Pb - free
- BN: SOT-23-5
- BM: SOT-23-3
- AN: SOT-89-5
- AMB: SOT-89-3
- EP: TO-92
- Output Voltage：1.2V/1.5V…..4.5V

Block Diagram



Recommended Work Conditions

Item	Min	Max	Unit
Input Voltage Range		10	V
Ambient Temperature	-40	85	℃

Electrical Characteristics

(Test Conditions: Cin=1uF, Cout=3.4uF,T_A=25℃, unless otherwise specified.)

ACE509, for arbitrary output voltage

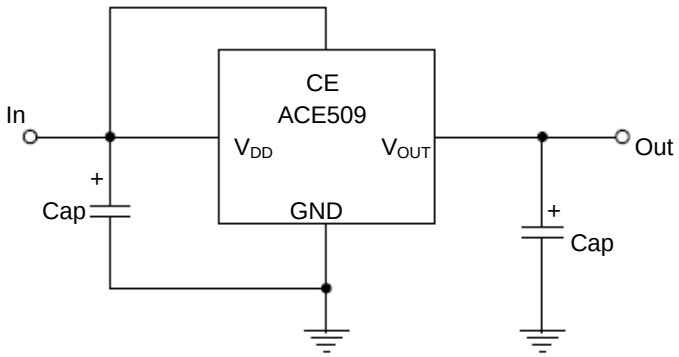
Symbol	Parameter		Conditions	Min	Typ	Max	Units
Vin	Input Voltage					10	V
Vout	Output Voltage	Vout>1.5V	Vin=Set Vout+1V 1mA≤Iout≤30mA	Vout x0.98	Vout	Vout X1.02	V
		Vout<=1.5V		Vout -0.03	Vout	Vout +0.03	
Iout (Max.)	Maximun Output Current		Vin-Vout=1V	500			mA
Vdrop[1]	Dropout Voltage,Vout≥2.8V		Iout=100mA		88	120	mV
			Iout=300mA		270	350	mV
			Iout=500mA		460	600	mV
△Vout/△Vin·Vout	Line Regulation		Iout=40mA 2.8V≤Vin≤8V		0.05	0.2	%/V
△Vout/△Iout	Load Regulation		Vin=Set Vout+1V 1mA≤Iout≤500mA		20	40	mV
Iss	Supply Current		Vin=Set Vout+1V		75	90	uA
Istandby	Supply Current (Srandby)		Vin=Set Vout+1V Vce=GND		0.1	1.0	uA

△Vout/△T·Vout	Output Voltage Temperature Coefficiency	Iout=30mA		±100		ppm/°C
PSRR	Ripple Rejection	F=100Hz, Ripple=0.5Vp-p Vin=Set Vout+1V		65		dB
Ilim	Short Current Limit	Vout=0V		200		mA
Rpd	CE Pull down Resistance		2.0	5.0	10.0	MΩ
Vceh	CE Input Voltage "H"		1.5		Vin	V
Vcel	CE Input Voltage "L"		0		0.25	V

Vdrop=Vin1-(Vout2*0.98) Vout2 is the output voltage when Vin=Vout1+1.0V and Iout=300mA or Iout=500mA.

Vin1 is the input voltage at which the output voltage becomes 98% of Vout1 after gradually decreasing the input voltage.

Typical Application Circuit



Note :Input capacitor (Cin=1uF) and Output capacitor (Cout=1uF/2.2uF) are recommended in all application circuit.

Explanation：

ACE509 series is a group of positive voltage output, low noise, low power consumption, low dropout voltage regulator.

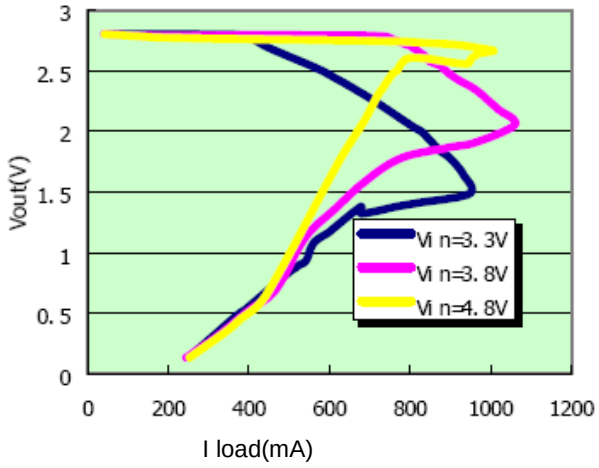
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ACE509 includes high accuracy voltage reference, error amplifier, current limit circuit and output driver module.

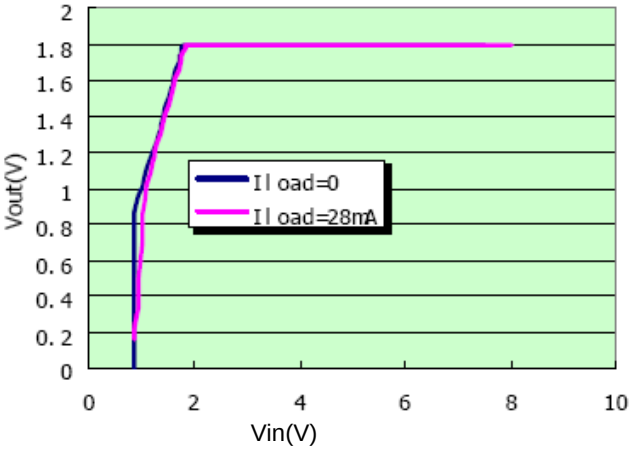
ACE509 has excellent load and line transient response and good temperature characteristics, which can assure the stability of chip and power system. And it uses trimming technique to guarantee output voltage accuracy within±2%.

Typical Performance Characteristics

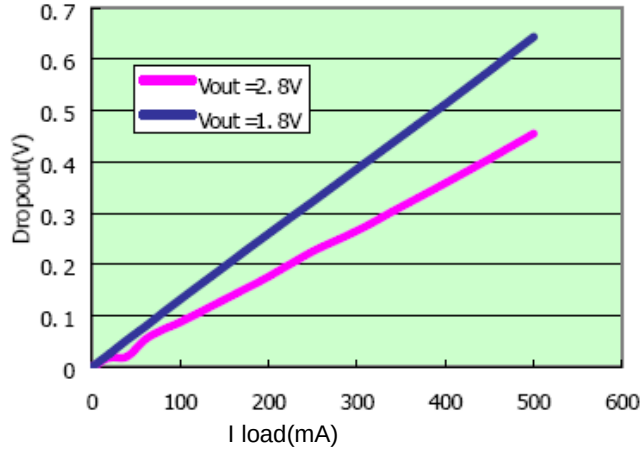
1.Output Voltage vs. Output Current
(with output short protection)



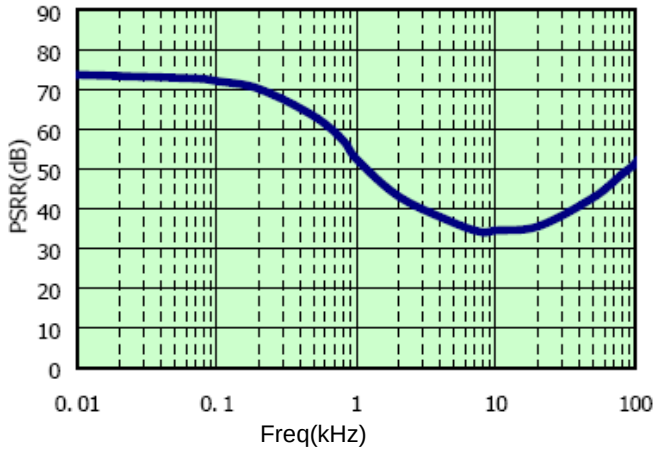
2.Output Voltage vs. Input Voltage



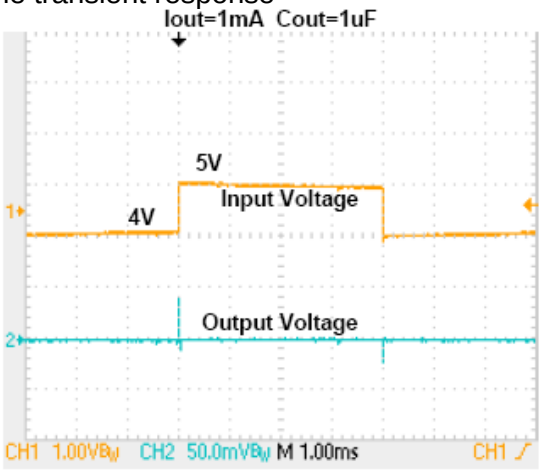
3.Droput Voltage vs. Output Current

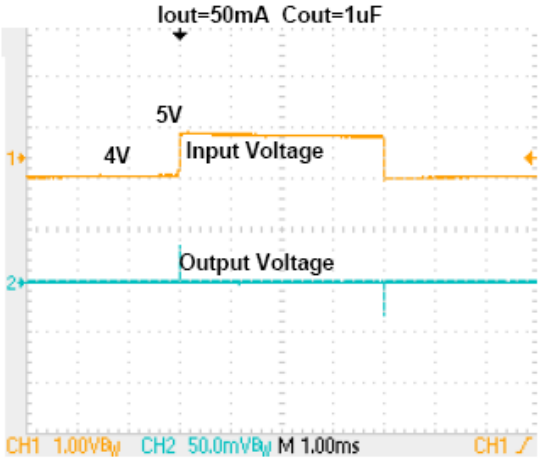


4.Ripple rejection vs. Frequency

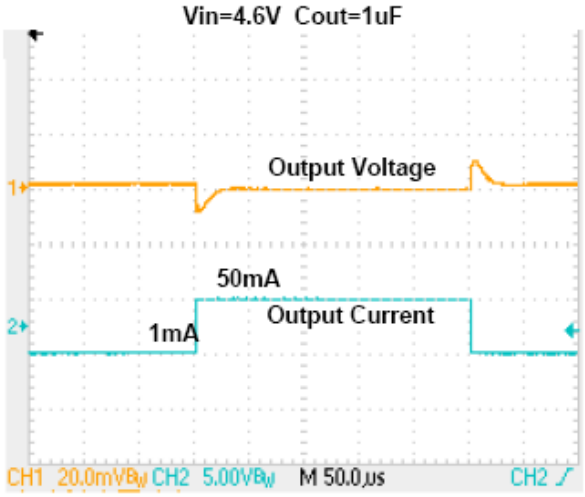


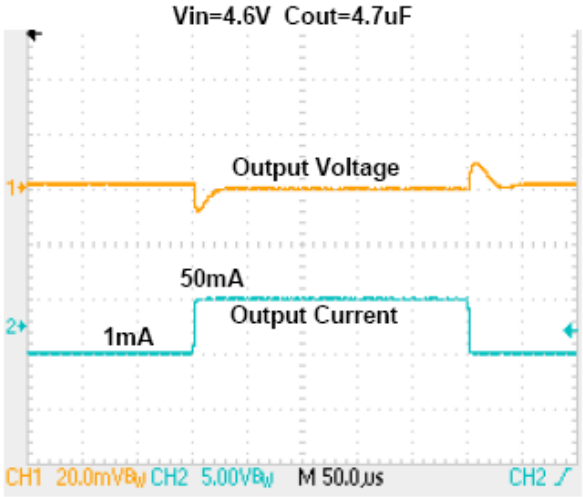
5.Line transient response

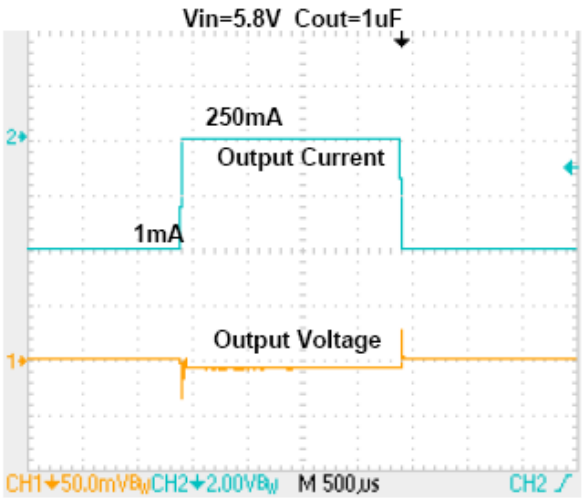


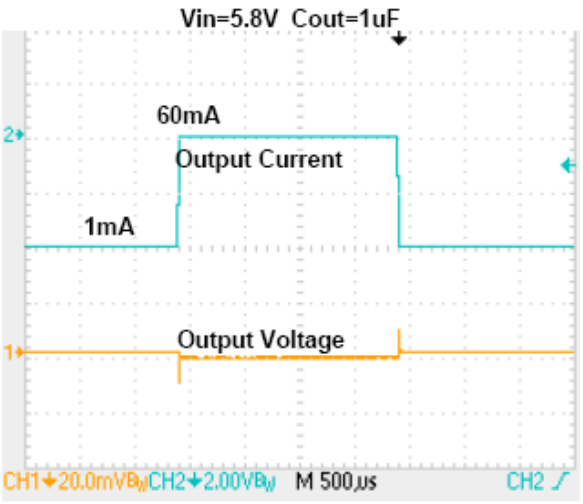


6.Load transient response

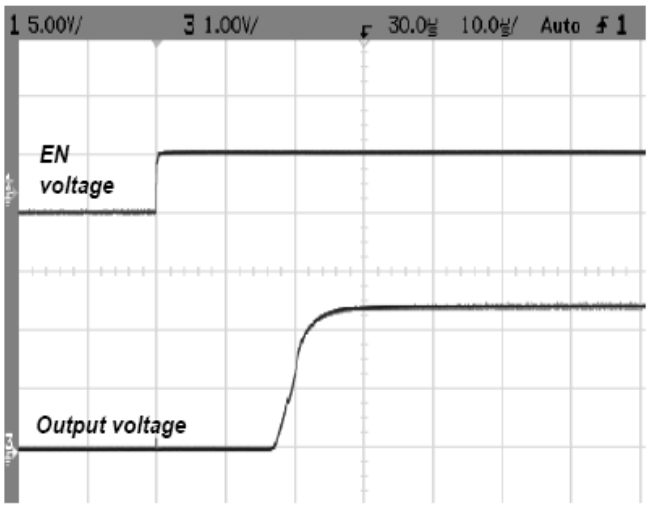




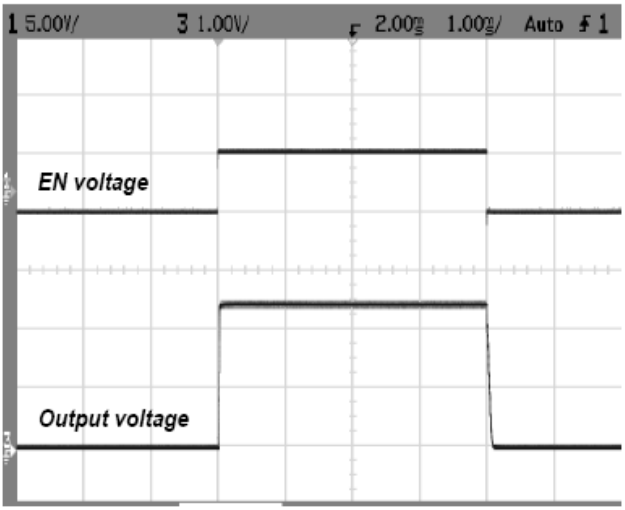




7.Startup response

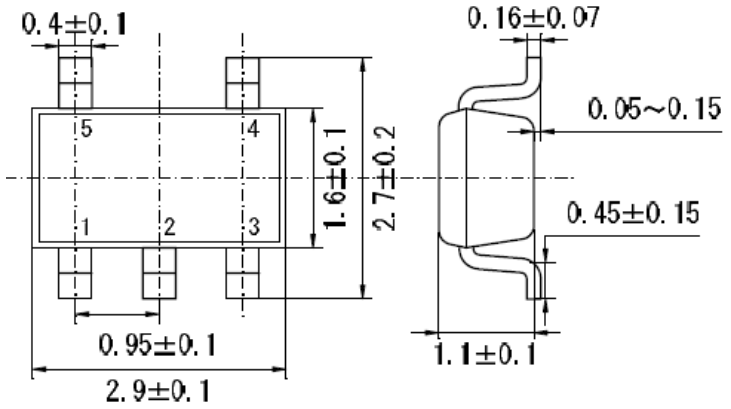


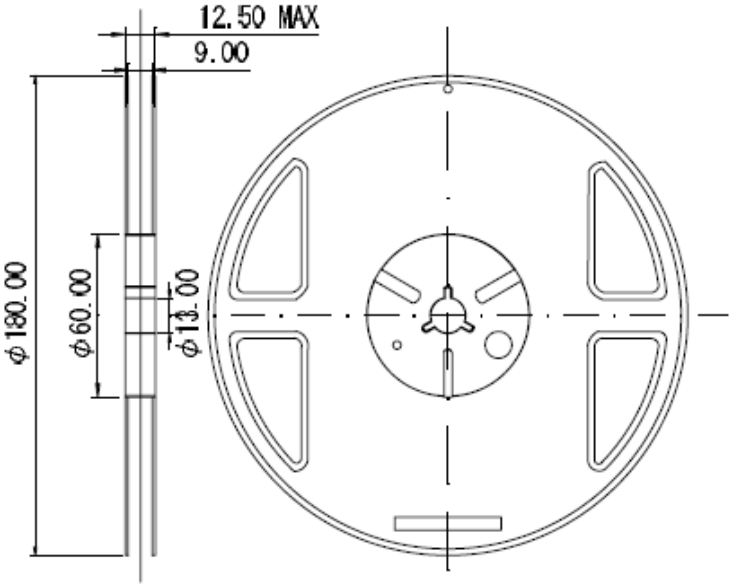
8.Shutdown response



Packing Information

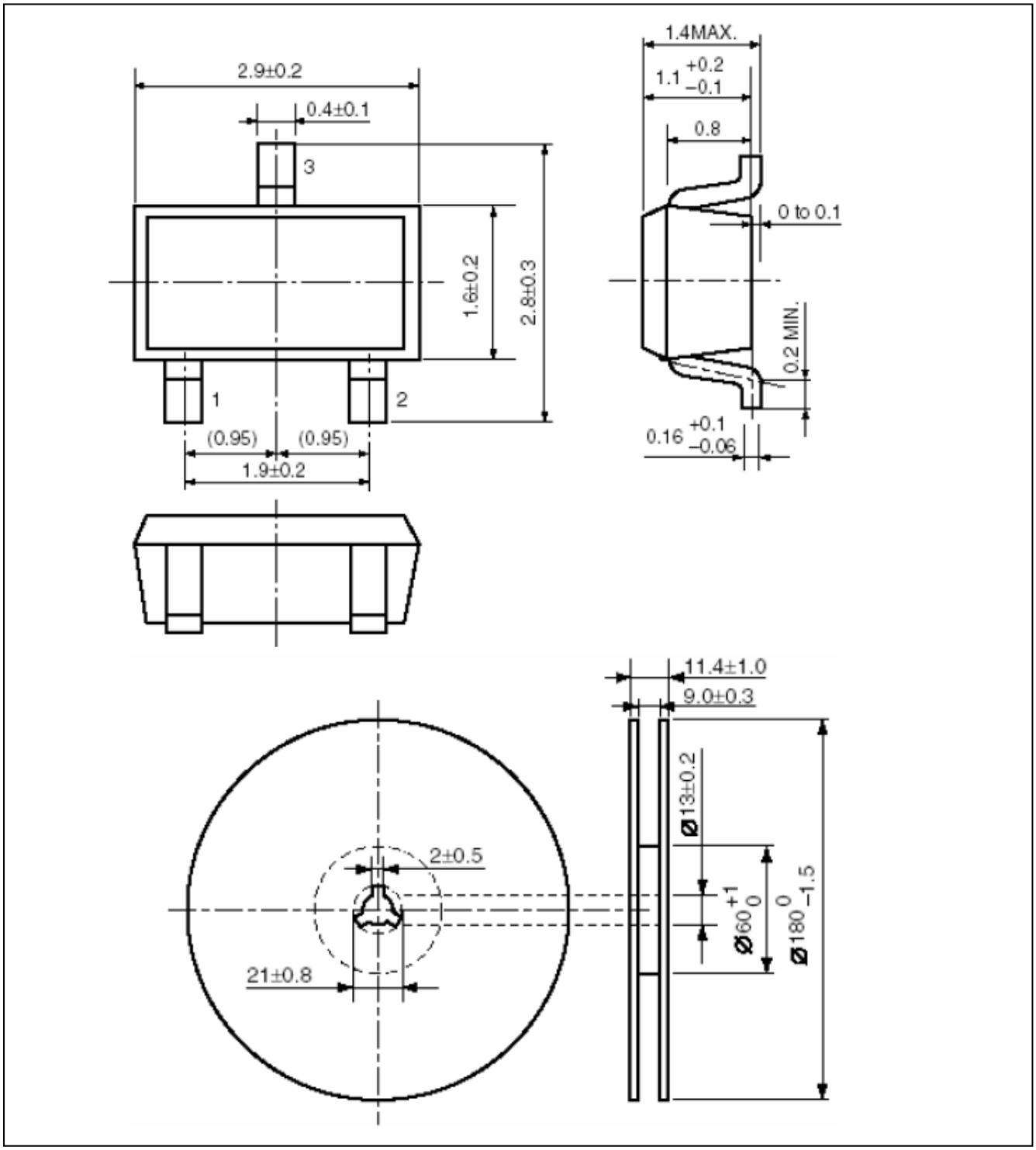
SOT-23-5





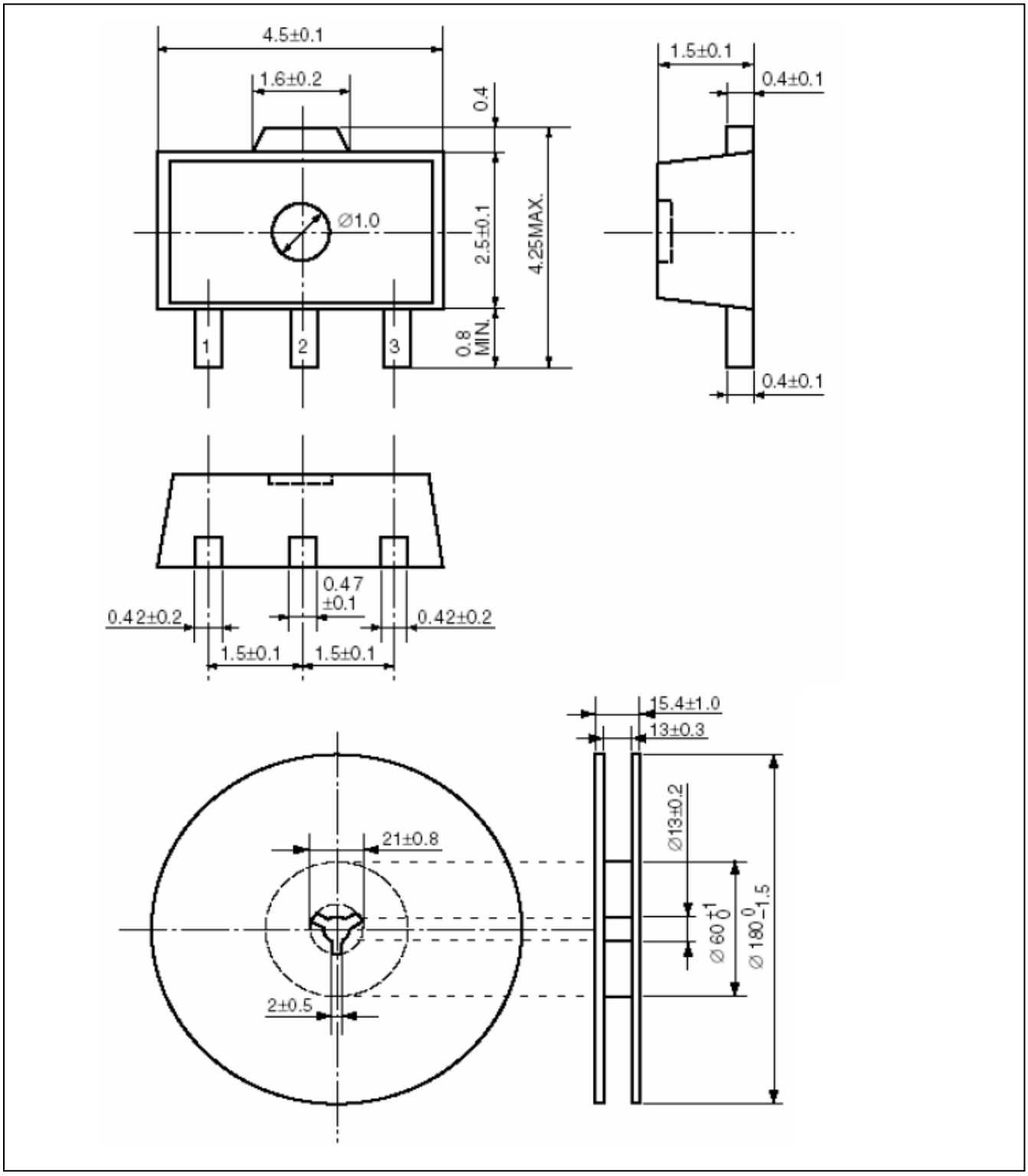
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SOT-23-3



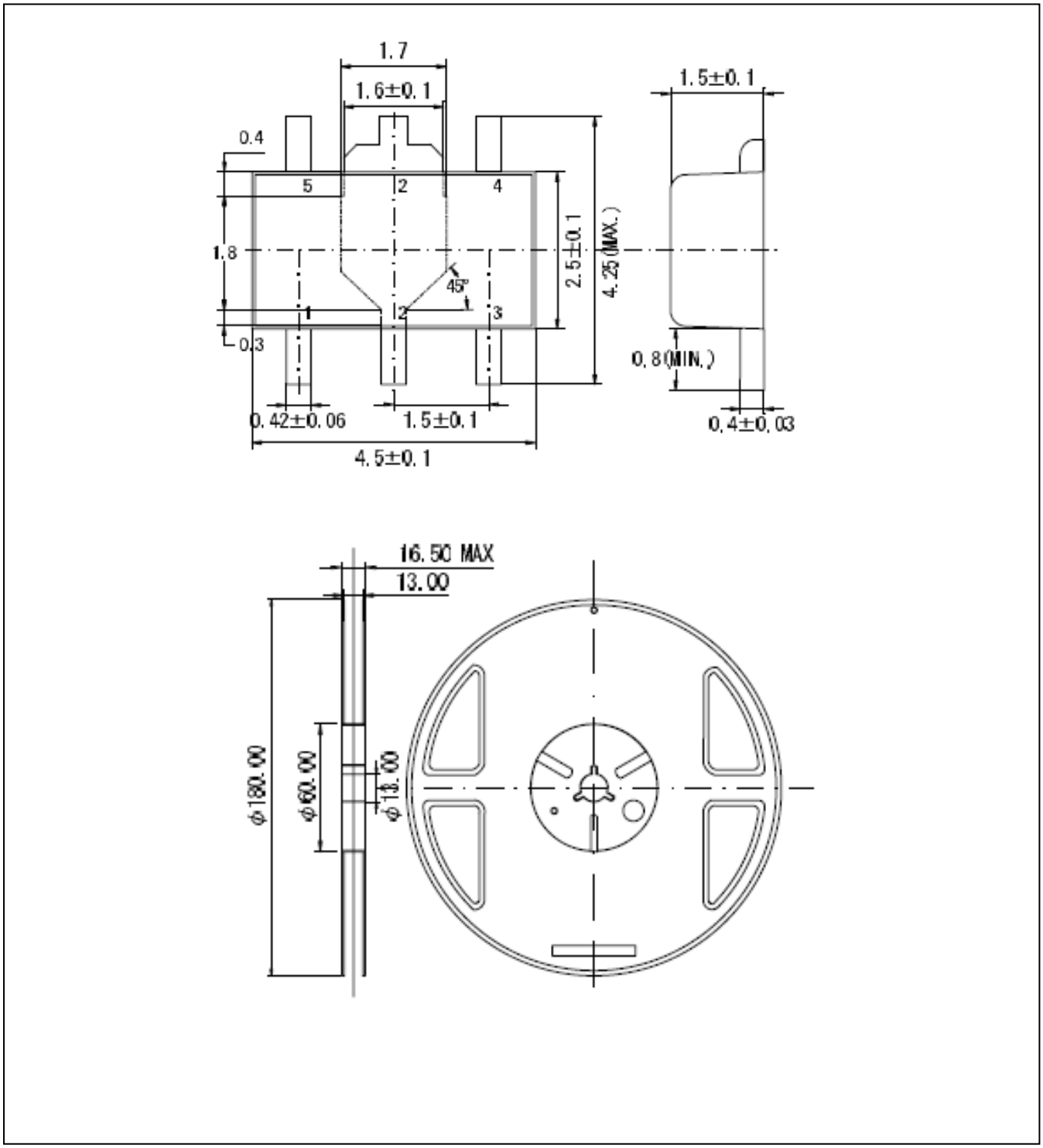
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SOT-89-3



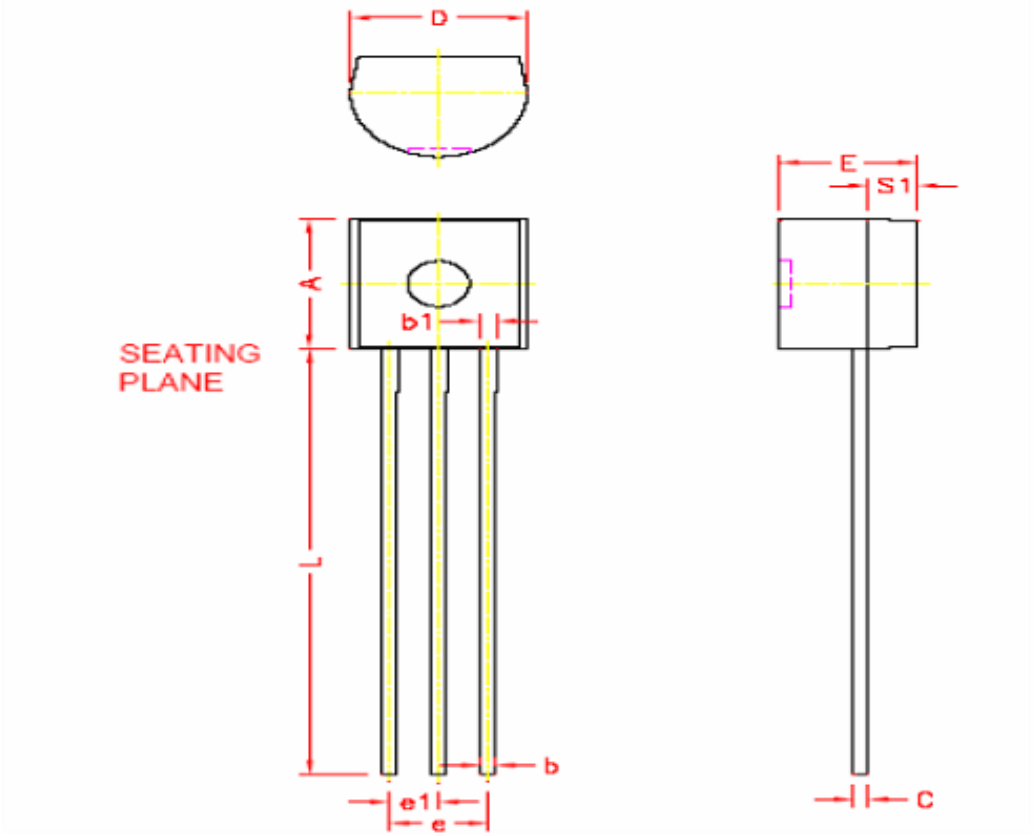
Packing Information

SOT-89-5



Packing Information

TO-92



REF.	Millimeter		REF.	Millimeter	
	Min.	Max.		Min.	Max.
A	4.45	4.70	D	4.44	4.7
S1	1.02	—	E	3.30	3.81
b	0.36	0.51	L	12.70	—
b1	0.36	0.76	e1	1.15	1.39
C	0.36	0.51	e	2.42	2.66

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:

1. Life support devices or systems are devices or systems which, (a) are intended for surgical implant into the body, or (b) support or sustain life, and shoes failure to perform when properly used in accordance with instructions for use provided in the labeling, can be reasonably expected to result in a significant injury to the user.
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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