Description

ACE502 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 470mV（Vout=2.0V）。The very low power consumption of ACE502（Iq=7uA）can greatly improve natural life of batteries.

ACE502 can provide output value in the range of 1.5V~6.0V in 0.1V steps. It also can customized on command.

ACE502 includes high accuracy voltage reference, error amplifier, current limit circuit and output driver module.

ACE502 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%.

ACE502 is available in SOT-89-3、SOT-23-3、SOT-23-5 packages which is lead free，it also can available in these packages with lead.

Features

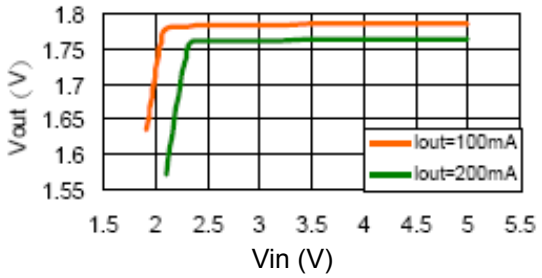
- Low Power Consumption: 7uA (Typ)
- Maximum Output Current: 400mA
- Small Dropout Voltage 250mV@100mA (Vout=2.0V) / 470mV@200mA (Vout=2.0V)
- Input Voltage Range: 2.0V~10V
- Output Voltage Range: 1.5V~6.0V (customized on command in 0.1V steps)
- High Accurate: ±2% (±1% customized)
- Output Current Limit

Application

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

Typical Performance Characteristic:

A CE50218AM+ Dropout Voltage

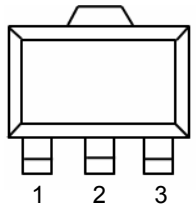


Absolute Maximum Ratings

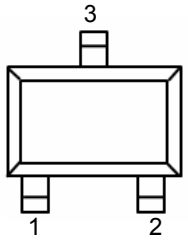
Parameter	Symbol	Max	Unit
Max Input voltage	V_{IN}	10	V
Power Dissipation SOT-23-3 SOT-23-5 SOT-89-3		 0.15 0.25 0.5	W
Junction temperature	T_J	125	°C
Storage temperature	T_S	- 45 to 150	°C
Ambient Temperature	T_A	-40 ~85	°C

Packaging Type

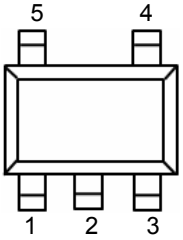
SOT-89-3



SOT-23-3



SOT-23-5



Pin	SOT-89-3	SOT-23-3	SOT-23-5(A)	SOT-23-5(B)	Function
V_{IN}	2	3	1	3	Supply Voltage Input
V_{SS}	1	1	2	2	Ground
CE			3	4	Enable Pin
NC			4	5	No connect
V_{OUT}	3	2	5	1	Output Voltage

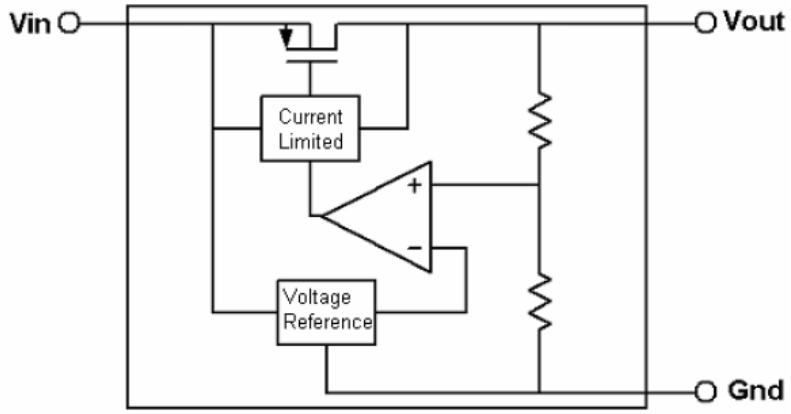
Ordering information

Selection Guide

ACE502 XX XX + H

- Halogen - free
- Pb - free
- AM : SOT-89-3
  BM: SOT-23-3
  BNA: SOT-23-5
  BNB: SOT-23-5
- Output Voltage：
  1.5V/2.2V…..6.0V

Block Diagram



Recommended Work Conditions

Item	Min	Recommended	Max	Unit
Input Voltage Range			8	V
Ambient Temperature	-40		+125	℃

Electrical Characteristics

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

ACE502-1.8V

Parameter	Symbol	Conditions	Min	Typ	Max	Units
Input Voltage	V_{IN}				8	V
Output Voltage	V_{OUT}		1.764	1.8	1.53	V
Maximum Output Current	I_{OUT}(Max.)	$V_{IN}=V_{OUT}+1.0V, V_{OUT}>1.8V*0.95$	400			mA
Input-Output Voltage Differential	Dropout Voltage	I_{OUT}=100mA		300	400	mV
		I_{OUT}=200mA		600	700	
Line Regulation	$\Delta V_{OUT} / \Delta V_{IN} \bullet V_{OUT}$	I_{OUT}=40mA $2 \leqq V_{IN} \leqq 8A$		0.2	0.3	%/V
Load Regulation	ΔV_{OUT}	V_{IN}=2.8V $1mA \leqq I_{OUT} \leqq 100mA$		20	40	mA
Quiescent Current	Iq	$V_{IN}=V_{OUT}+1V$		7	10	uA
Output Noise	Noise	f=10Hz to 100kHz, C_{OUT}=1 μF		40		uVrms
Ripple Rejection	PSRR	f=100Hz,I_{OUT}=40mA, C_{OUT}=1 μF		60		dB
Output Voltage Temperature Coefficient	$\Delta V_{OUT} / \Delta T \bullet V_{OUT}$	I_{OUT}=10mA		50		ppm/℃

ACE502-2.0V

Parameter	Symbol	Conditions	Min	Typ	Max	Units
Input Voltage	V_{IN}				8	V
Output Voltage	V_{OUT}	$V_{IN}=V_{OUT}+1.0V, I_{OUT}=40mA$	1.96	2.0	2.04	V
Maximum Output Current	I_{OUT}(Max.)	$V_{IN}=V_{OUT}+1.0V, V_{OUT}>2.0*0.95$	400			mA
Input-Output Voltage Differential	Dropout Voltage	$I_{OUT}=100mA$		250	400	mV
		$I_{OUT}=200mA$		470	600	
Line Regulation	$\Delta V_{OUT} / \Delta V_{IN} \bullet V_{OUT}$	$I_{OUT}=40mA$ $2.2 \leqq V_{IN} \leqq 8A$		0.2	0.3	%/V
Load Regulation	ΔV_{OUT}	$V_{IN}=3.0V$ $1mA \leqq I_{OUT} \leqq 100mA$		20	40	mA
Quiescent Current	Iq	$V_{IN}=V_{OUT}+1V$		7	10	uA
Output Noise	Noise	f=10Hz to 100kHz, $C_{OUT}=1 \mu F$		40		uVrms
Ripple Rejection	PSRR	f=100Hz, $I_{OUT}=40mA$, $C_{OUT}=1 \mu F$		60		dB
Output Voltage Temperature Coefficient	$\Delta V_{OUT} / \Delta T \bullet V_{OUT}$			50		ppm/℃

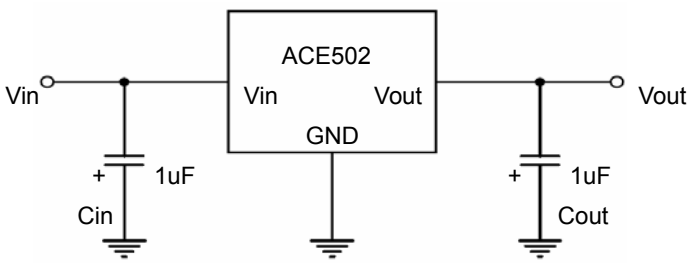
ACE502-3.0V

Parameter	Symbol	Conditions	Min	Typ	Max	Units
Input Voltage	V_{IN}				8	V
Output Voltage	V_{OUT}	$V_{IN}=V_{OUT}+1.0V, I_{OUT}=40mA$	2.94	3.0	3.06	V
Maximum Output Current	I_{OUT}(Max.)	$V_{IN}=V_{OUT}+1.0V, V_{OUT}>3.0*0.95$	400			mA
Input-Output Voltage Differential	Dropout Voltage	$I_{OUT}=100Ma$		200	400	mV
		$I_{OUT}=200mA$		400	600	
Line Regulation	$\Delta V_{OUT} / \Delta V_{IN} \bullet V_{OUT}$	$I_{OUT}=40mA$ $3.2 \leqq V_{IN} \leqq 8A$		0.2	0.3	%/V
Load Regulation	ΔV_{OUT}	$V_{IN}=4.0V$ $1mA \leqq I_{OUT} \leqq 100mA$		20	40	mA
Quiescent Current	Iq	$V_{IN}=V_{OUT}+1V$		7	10	uA
Output Noise	Noise	f=10Hz to 100kHz, $C_{OUT}=1 \mu F$		40		uVrms
Ripple Rejection	PSRR	f=100Hz, $I_{OUT}=40mA$, $C_{OUT}=1 \mu F$		60		dB
Output Voltage Temperature Coefficient	$\Delta V_{OUT} / \Delta T \bullet V_{OUT}$			50		ppm/℃

ACE502-3.3V

Parameter	Symbol	Conditions	Min	Typ	Max	Units
Input Voltage	V_{IN}				8	V
Output Voltage	V_{OUT}	$V_{IN}=V_{OUT}+1.0V, I_{OUT}=40mA$	3.234	3.3	3.366	V
Maximum Output Current	I_{OUT}(Max.)	$V_{IN}=V_{OUT}+1.0V, V_{OUT}>3.3*0.95$	400			mA
Input-Output Voltage Differential	Dropout Voltage	I_{OUT}=100Ma		200	400	mV
		I_{OUT}=200mA		400	600	
Line Regulation	$\Delta V_{OUT} / \Delta V_{IN} \bullet V_{OUT}$	I_{OUT}=40mA $3.5 \leqq V_{IN} \leqq 8A$		0.2	0.3	%/V
Load Regulation	ΔV_{OUT}	V_{IN}=4.3V $1mA \leqq I_{OUT} \leqq 100mA$		20	40	mA
Quiescent Current	Iq	$V_{IN}=V_{OUT}+1V$		7	10	uA
Output Noise	Noise	f=10Hz to 100kHz, C_{OUT}=1 μF		40		uVrms
Ripple Rejection	PSRR	f=100Hz, I_{OUT}=40mA, C_{OUT}=1 μF		60		dB
Output Voltage Temperature Coefficient	$\Delta V_{OUT} / \Delta T \bullet V_{OUT}$			50		ppm/℃

Typical Application Circuit



Application hints:

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

Note 2:Output capacitor (Cout=1uF) is recommended in all application to assure the stability of circuit. Tantalum capacitor is recommended.

Explanation：

ACE502 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 400mA.

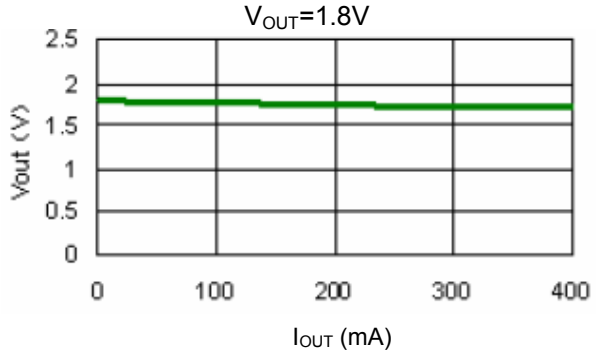
ACE502 uses trimming technique to assure the accuracy of output value within±2%, at the same time, temperature compensated is elaborately considered in this chip, which makes ACE502 's temperature coefficient within 50ppm/℃.

Typical Performance Characteristics

1. Load regulation

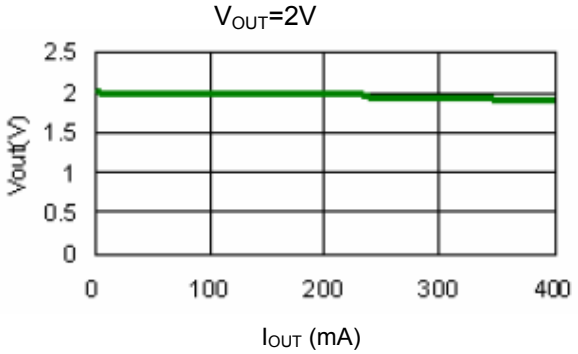
V_{OUT}=1.8V Load regulation (V_{IN}=2.8V)

Output Voltage vs. Output Current



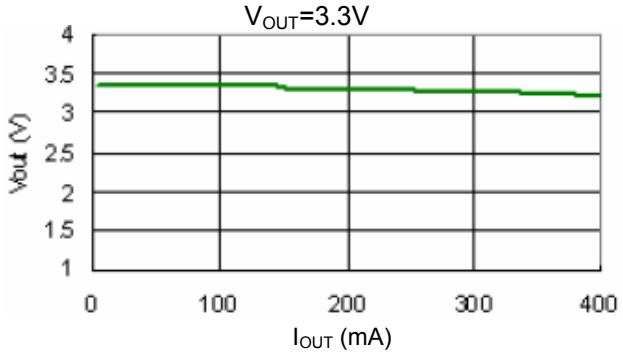
V_{OUT}=2V Load regulation (V_{IN}=3V)

Output Voltage vs. Output Current



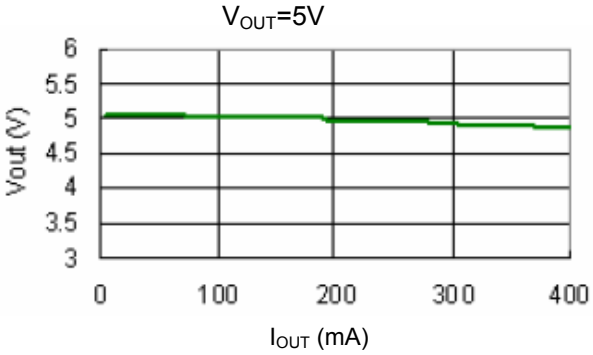
V_{OUT}=3.3V Load regulation (V_{IN}=4.3V)

Output Voltage vs. Output Current



V_{OUT}=5V Load regulation (V_{IN}=6V)

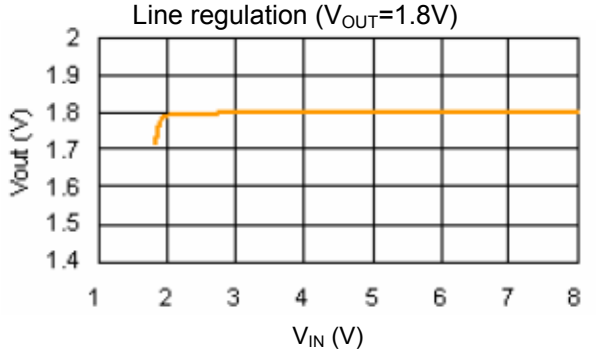
Output Voltage vs. Output Current



2. Line Regulation

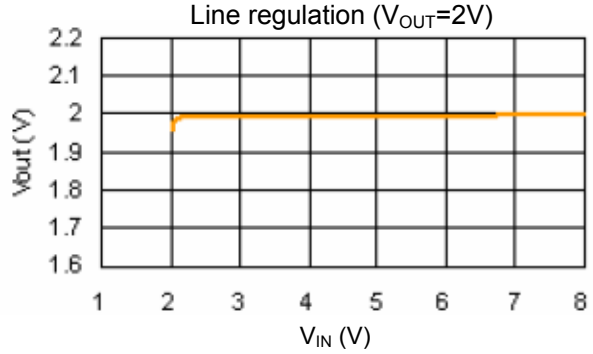
V_{OUT}=1.8V Line regulation (I_{OUT}=40mA)

Line regulation (V_{OUT}=1.8V)

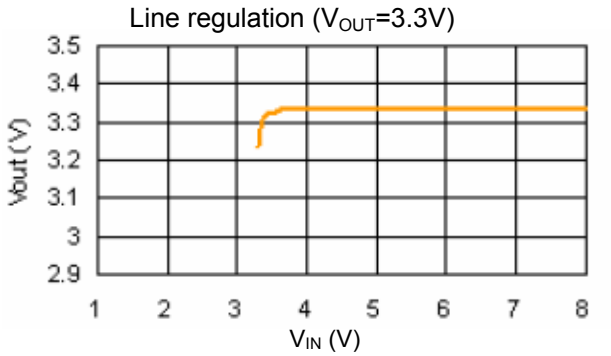


V_{OUT}=2.0V Line regulation (I_{OUT}=40mA)

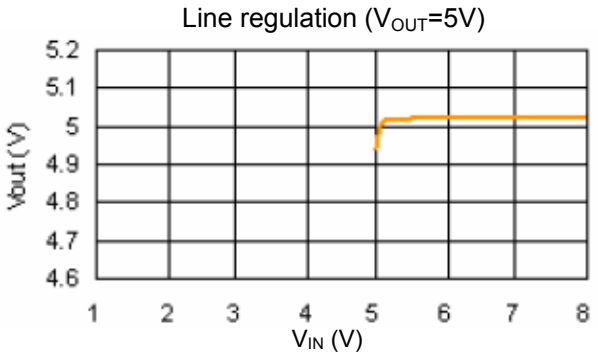
Line regulation (V_{OUT}=2V)



V_{OUT}=3.3V Line regulation (I_{OUT}=40mA)

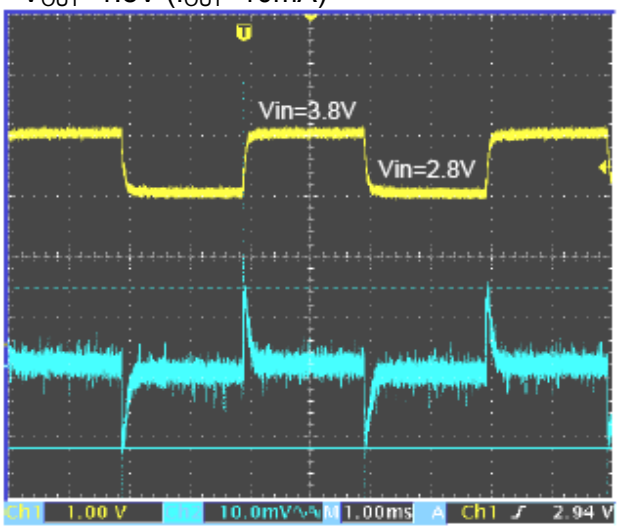


V_{OUT}=5.0V Line regulation (I_{OUT}=40mA)

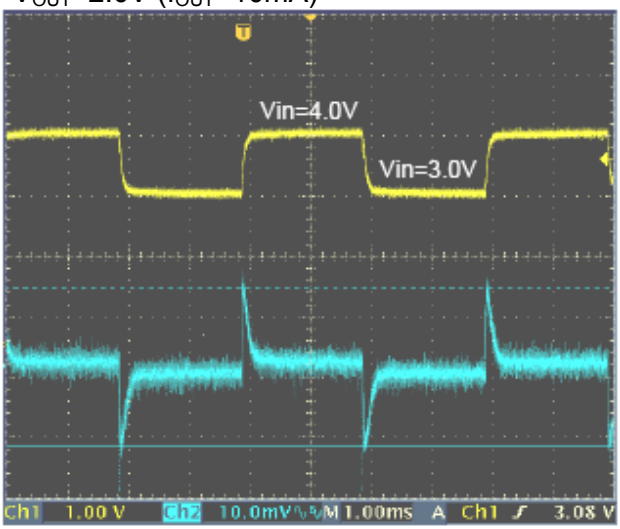


3. Input Voltage transient response

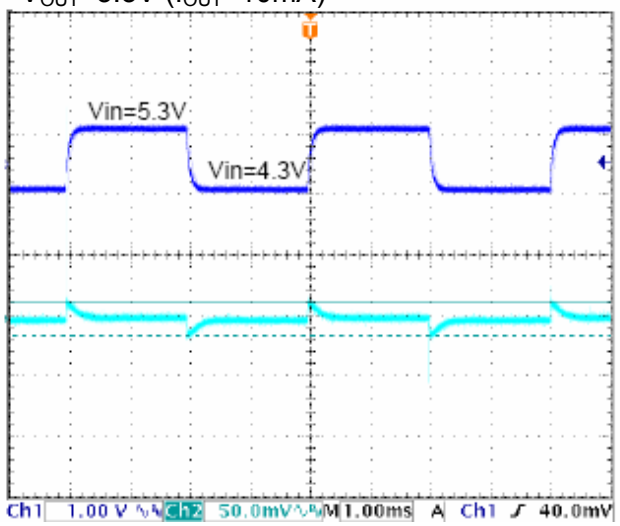
V_{OUT}=1.8V (I_{OUT}=10mA)



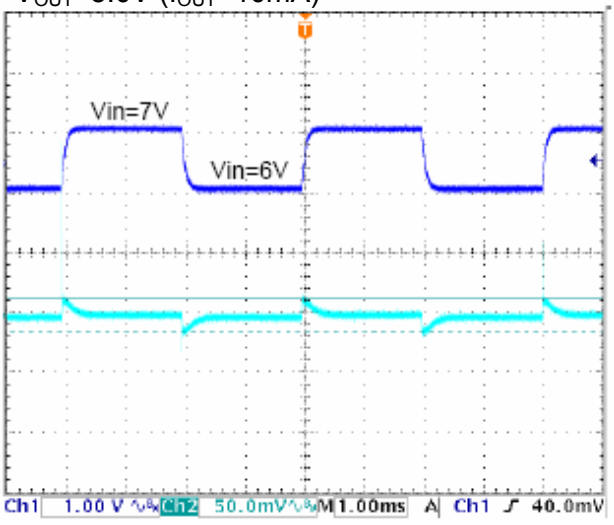
V_{OUT}=2.0V (I_{OUT}=10mA)



V_{OUT}=3.3V (I_{OUT}=10mA)

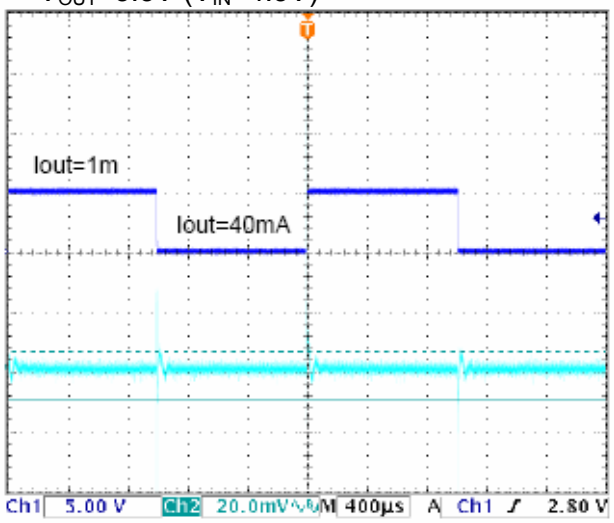


V_{OUT}=5.0V (I_{OUT}=10mA)

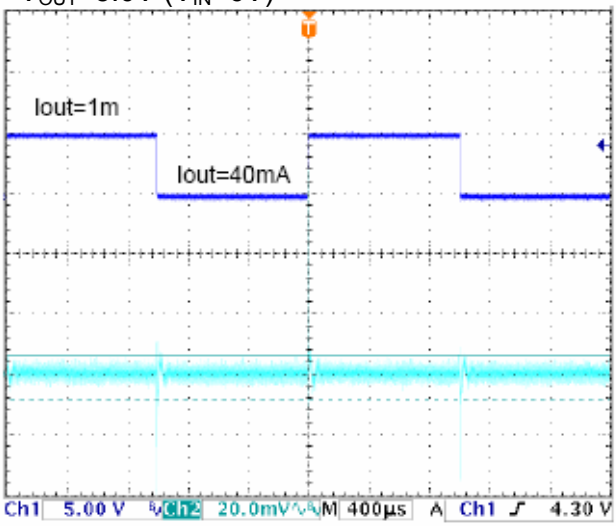


4. Load transient response

V_{OUT}=3.3V (V_{IN}=4.3V)



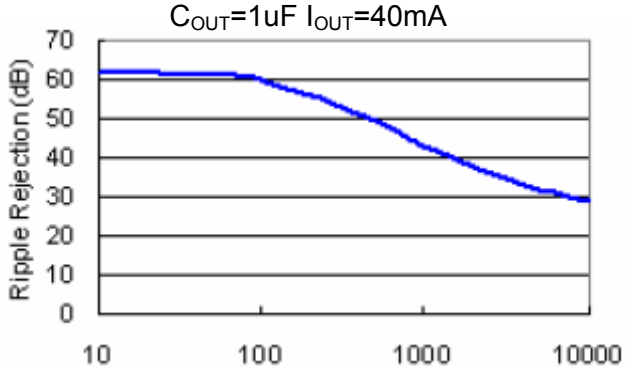
V_{OUT}=5.0V (V_{IN}=6V)



5. Ripple rejection

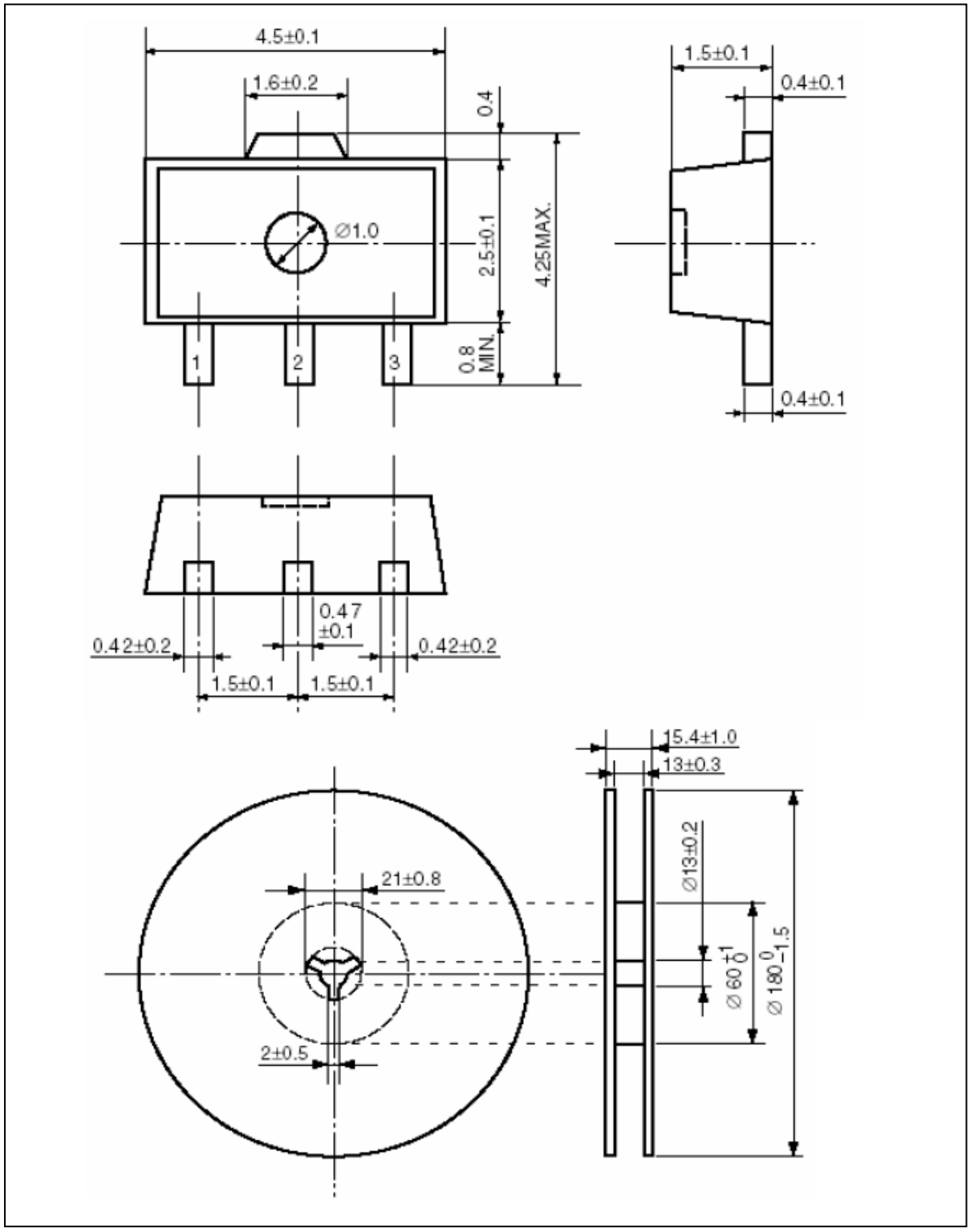
Ripple rejection

C_{OUT}=1uF I_{OUT}=40mA



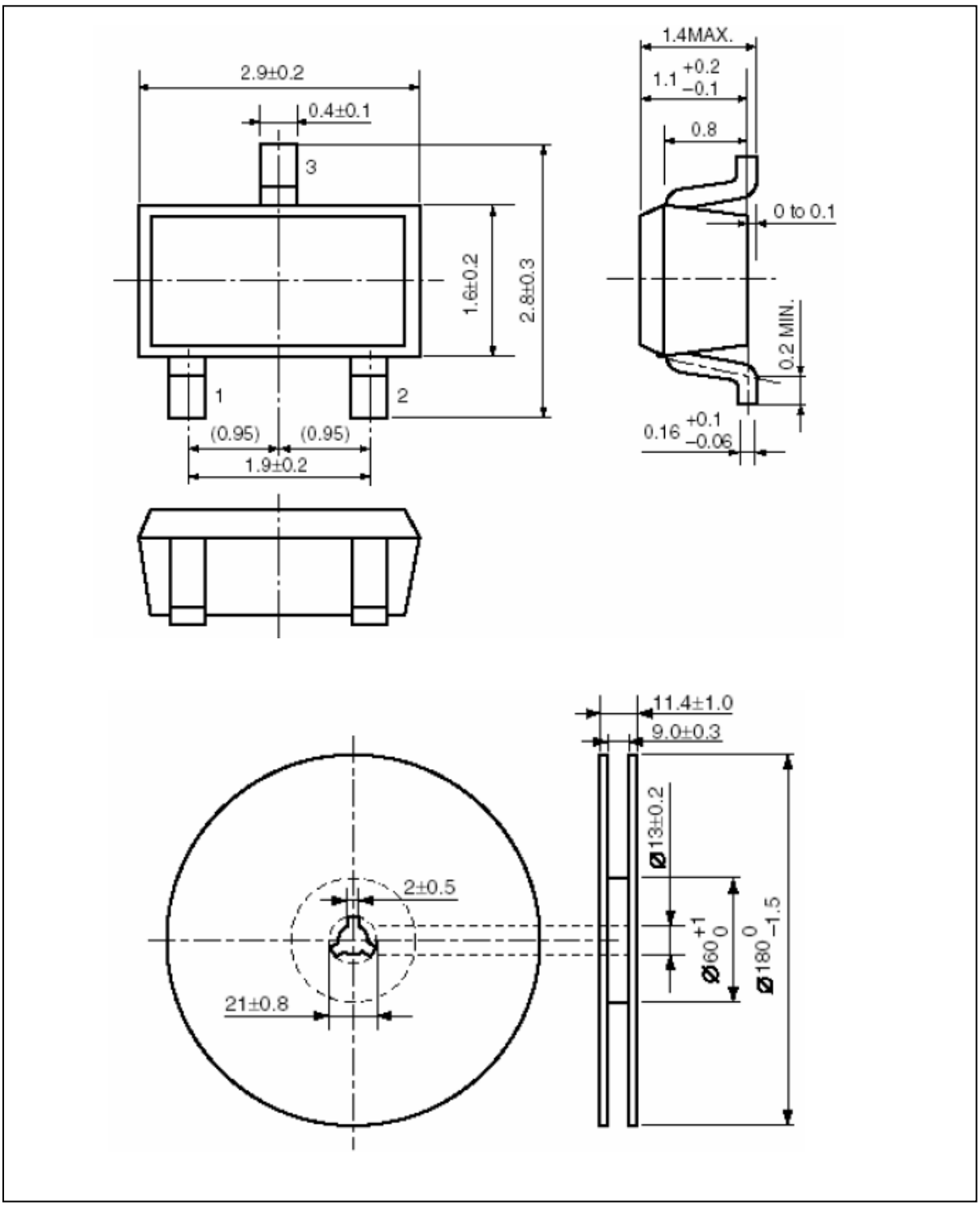
Packing Information

SOT-89-3



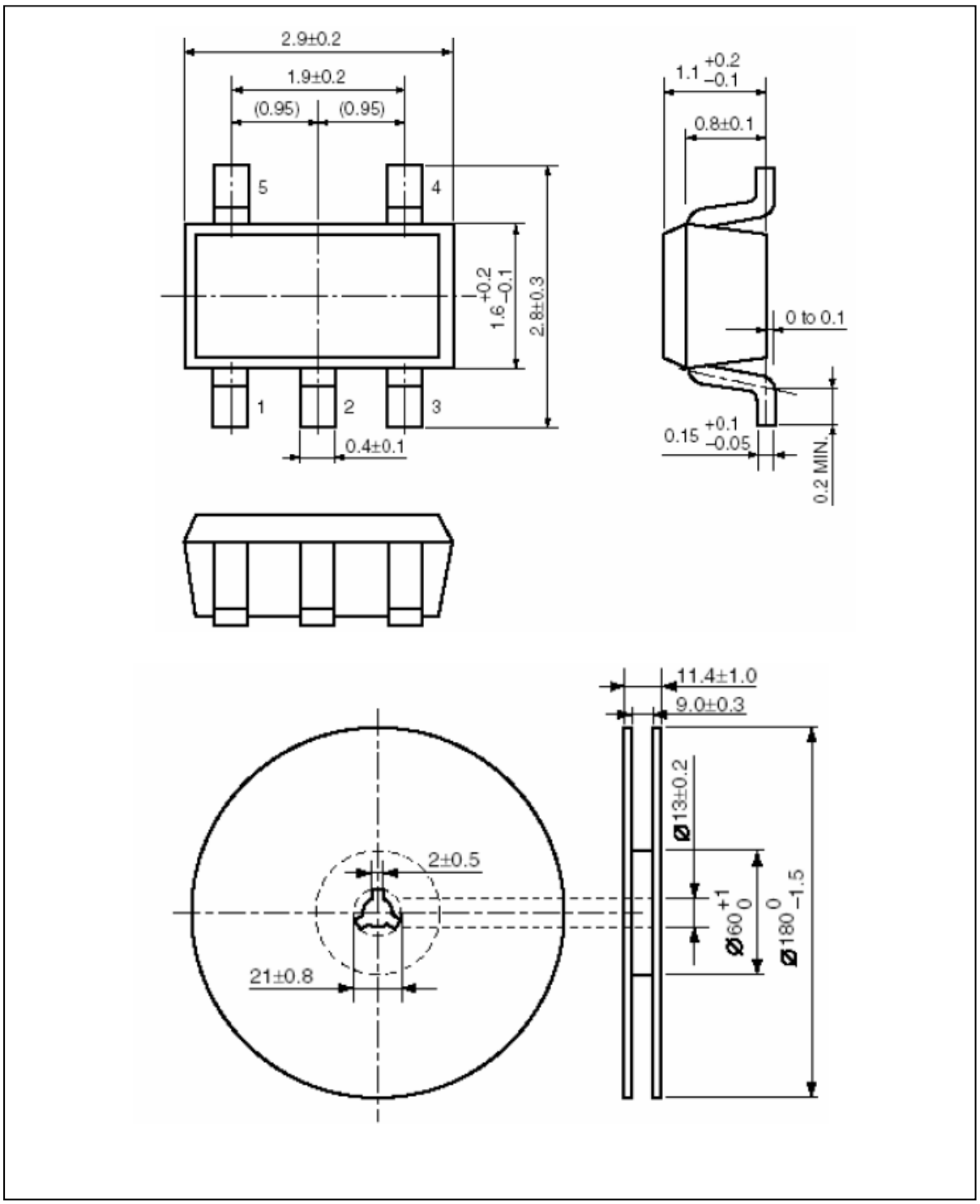
Packing Information

SOT-23-3



Packing Information

SOT-23-5



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.

ACE Technology Co., LTD.
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