Description

The ACE78LXX series of positive regulators are available in the SOT-89-3 package and with 5V, 6V, 8V, 9V, 10V, 12V, 15V, 18V and 24V fixed output voltages, marking it useful in a wide range of applications. These regulators can provide local on-card regulation, eliminating the distribution problems associated with single point regulation. Each type employs internal current limiting, thermal shut-down and safe operating area protection, making it essentially indestructible. If adequate heat sinking is provided, they can deliver over 100mA output current. Although designed primarily as fixed voltage regulators, these devices can be used with external components to obtain adjustable voltages and currents. ACE78LXX is characterized for operation from 0℃ to +125℃.

Features

- Internal Short-Circuit Current Limiting
- Internal Thermal Overload Protection
- No External Components Required

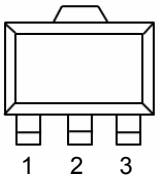
Absolute Maximum Ratings

Parameter		Max	Unit
Input Voltage	ACE78L05~10	30	V
	ACE78L12~18	35	
	ACE78L24	40	
Output current		100	mA
Operating junction temperature range		0 ~125	°C
Storage temperature range		- 55 ~ 150	°C
Power Dissipation		350*	mW

* When tested in free air condition, without heat sinking.

Packaging Type

SOT-89-3



1	V_{OUT}
2	GND
3	V_{IN}

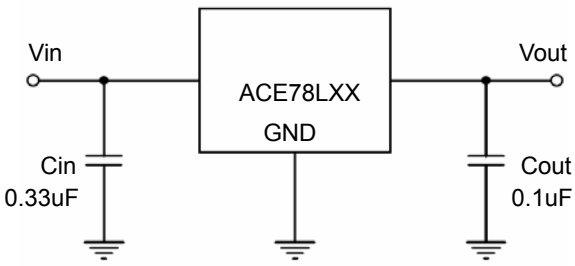
Ordering information

Selection Guide

ACE78L XX XX + H

- H — Halogen-free
- + — Pb-free
- XX — AM : SOT-89-3
- XX — Output Voltage : 5V, 6V, 8V, 9V, 10V, 12V, 15V, 18V and 24V

Typical Application



Electrical Characteristics

ACE78L05 (Refer to the test circuits, T_J=0~125℃, I_O=40mA, V_{IN}=10V, C_{in}=0.33μF, Co=0.1μF unless otherwise specified) (Note1)

Symbol		Test Condition	Min	Typ	Max	Unit
VO	A-Rank (3%)	V_{IN}=10V, I_O=40mA, T_J=25℃ 7V≦V_{IN}≦20V, 1mA≦I_O≦40mA 7V≦V_{IN}≦Vmax, 1mA≦I_O≦70mA (Note2)	4.85	5.0	5.15	V
	B-Rank (5%)		4.75		5.25	
ΔVO (Line Regulation)		7V≦V_{IN}≦20V, I_O=40mA, T_J=25℃		18	75	mV
		8V≦V_{IN}≦20V, I_O=40mA, T_J=25℃		10	64	
ΔVO (Load Regulation)		V_{IN}=10V, 1mA≦I_O≦100mA, T_J=25℃		20	60	mV
		V_{IN}=10V, 1mA≦I_O≦40mA, T_J=25℃		5	30	
IQ		V_{IN}=10V, I_O=0mA,T_J=25℃		3.0	5.0	mA
ΔIQ		V_{IN}=10V, 1mA≦I_O≦40mA			0.1	mA
		8V≦V_{IN}≦20V, I_O=40mA			1.0	
Vn		10Hz≦f≦100KHz		40		μV
RR		8V≦V_{IN}≦20V, I_O=40mA, f=120Hz,T_J=25℃	47	62		dB
VD		I_O=100mA, T_J=25℃		1.7		V
$\Delta V_O/\Delta T_J$		I_O=5mA, 0℃≦T_J≦125℃		-0.65		mV/℃

ACE78L06 (Refer to the test circuits, T_J=0~125℃, I_O=40mA, V_{IN}=12V, C_{in}=0.33μF, Co=0.1μF unless otherwise specified) (Note1)

Symbol		Test Condition	Min	Typ	Max	Unit
VO	A-Rank (3%)	V_{IN}=12V, I_O=40mA, T_J=25℃ 8.5V≦V_{IN}≦20V, 1mA≦I_O≦40mA 8.5V≦V_{IN}≦Vmax, 1mA≦I_O≦70mA (Note2)	5.82	6.0	6.18	V
	B-Rank (5%)		5.70		6.30	
ΔVO (Line Regulation)		8.5V≦V_{IN}≦20V, I_O=40mA, T_J=25℃		65	175	mV
		9V≦V_{IN}≦20V, I_O=40mA, T_J=25℃		54	125	
ΔVO (Load Regulation)		V_{IN}=12V, 1mA≦I_O≦100mA, T_J=25℃		12.8	80	mV
		V_{IN}=12V, 1mA≦I_O≦70mA, T_J=25℃		5.8	40	
IQ		V_{IN}=12V, I_O=0mA,T_J=25℃		3.9	6.0	mA
ΔIQ		V_{IN}=12V, 1mA≦I_O≦40mA			0.1	mA
		9V≦V_{IN}≦20V, I_O=40mA			1.5	
Vn		10Hz≦f≦100KHz		49		μV
RR		10V≦V_{IN}≦20V, I_O=40mA, f=120Hz,T_J=25℃	40	46		dB
VD		I_O=100mA, T_J=25℃		1.7		V
$\Delta V_O/\Delta T_J$		I_O=5mA, 0℃≦T_J≦125℃		0.75		mV/℃

ACE78L08 (Refer to the test circuits, T_J=0~125℃, I_O=40mA, V_{IN}=14V, C_{in}=0.33μF, Co=0.1μF unless otherwise specified) (Note1)

Symbol		Test Condition	Min	Typ	Max	Unit
VO	A-Rank (3%)	V_{IN}=14V, I_O=40mA, T_J=25℃ 10.5V≦V_{IN}≦23V, 1mA≦I_O≦40mA 10.5V≦V_{IN}≦Vmax, 1mA≦I_O≦70mA (Note2)	7.76	8.0	8.24	V
	B-Rank (5%)		7.60		8.40	
ΔVO (Line Regulation)		10.5V≦V_{IN}≦23V, I_O=40mA, T_J=25℃		10	175	mV
		11V≦V_{IN}≦23V, I_O=40mA, T_J=25℃		8	125	
ΔVO (Load Regulation)		V_{IN}=14V, 1mA≦I_O≦100mA, T_J=25℃		15	80	mV
		V_{IN}=14V, 1mA≦I_O≦70mA, T_J=25℃		8	40	
IQ		V_{IN}=14V, I_O=0mA,T_J=25℃		2.0	5.5	mA
ΔIQ		V_{IN}=14V, 1mA≦I_O≦40mA			0.1	mA
		11V≦V_{IN}≦23V, I_O=40mA			1.5	
Vn		10Hz≦f≦100KHz		49		μV
RR		11V≦V_{IN}≦21V, I_O=40mA, f=120Hz,T_J=25℃	39	45		dB
VD		I_O=100mA, T_J=25℃		1.7		V
$\Delta V_O/\Delta T_J$		I_O=5mA, 0℃≦T_J≦125℃		0.75		mV/℃

ACE78L09 (Refer to the test circuits, T_J=0~125℃, I_O=40mA, V_{IN}=15V, C_{in}=0.33μF, Co=0.1μF unless otherwise specified) (Note1)

Symbol		Test Condition	Min	Typ	Max	Unit
VO	A-Rank (3%)	V_{IN}=15V, I_O=40mA, T_J=25℃ 11.5V≦V_{IN}≦24V, 1mA≦I_O≦40mA 11.5V≦V_{IN}≦Vmax, 1mA≦I_O≦70mA (Note2)	8.73	9.0	9.27	V
	B-Rank (5%)		8.55		9.45	
ΔVO (Line Regulation)		11.5V≦V_{IN}≦24V, I_O=40mA, T_J=25℃		90	200	mV
		13V≦V_{IN}≦24V, I_O=40mA, T_J=25℃		100	150	
ΔVO (Load Regulation)		V_{IN}=15V, 1mA≦I_O≦100mA, T_J=25℃		20	90	mV
		V_{IN}=15V, 1mA≦I_O≦40mA, T_J=25℃		10	45	
IQ		V_{IN}=15V, I_O=0mA,T_J=25℃		2.0	6.0	mA
ΔIQ		V_{IN}=15V, 1mA≦I_O≦40mA			0.1	mA
		13V≦V_{IN}≦24V, I_O=40mA			1.5	
Vn		10Hz≦f≦100KHz		49		μV
RR		12V≦V_{IN}≦23V, I_O=40mA, f=120Hz,T_J=25℃	38	44		dB
VD		I_O=100mA, T_J=25℃		1.7		V
$\Delta V_O/\Delta T_J$		I_O=5mA, 0℃≦T_J≦125℃		0.75		mV/℃

ACE78L10 (Refer to the test circuits, T_J=0~125℃, I_O=40mA, V_{IN}=17V, C_{in}=0.33μF, Co=0.1μF unless otherwise specified) (Note1)

Symbol		Test Condition	Min	Typ	Max	Unit
VO	A-Rank (3%)	V_{IN}=17V, I_O=40mA, T_J=25℃ 13V≦V_{IN}≦25V, 1mA≦I_O≦40mA 13V≦V_{IN}≦Vmax, 1mA≦I_O≦70mA (Note2)	9.70	10.0	10.3	V
	B-Rank (5%)		9.50		10.5	
ΔVO (Line Regulation)		13V≦V_{IN}≦25V, I_O=40mA, T_J=25℃		51	175	mV
		14V≦V_{IN}≦25V, I_O=40mA, T_J=25℃		42	125	
ΔVO (Load Regulation)		V_{IN}=17V, 1mA≦I_O≦100mA, T_J=25℃		20	90	mV
		V_{IN}=17V, 1mA≦I_O≦40mA, T_J=25℃		11	40	
IQ		V_{IN}=17V, I_O=0mA,T_J=25℃		4.2	6.0	mA
ΔIQ		V_{IN}=17V, 1mA≦I_O≦40mA			0.1	mA
		14V≦V_{IN}≦25V, I_O=40mA			1.5	
Vn		10Hz≦f≦100KHz		62		μV
RR		15V≦V_{IN}≦25V, I_O=40mA, f=120Hz,T_J=25℃	37	44		dB
VD		I_O=100mA, T_J=25℃		1.7		V

ACE78L12 (Refer to the test circuits, T_J=0~125℃, I_O=40mA, V_{IN}=19V, C_{in}=0.33μF, Co=0.1μF unless otherwise specified) (Note1)

Symbol		Test Condition	Min	Typ	Max	Unit
VO	A-Rank (3%)	V_{IN}=19V, I_O=40mA, T_J=25℃ 14.5V≦V_{IN}≦27V, 1mA≦I_O≦40mA 14.5V≦V_{IN}≦Vmax, 1mA≦I_O≦70Ma (Note2)	11.64	12.0	12.36	V
	B-Rank (5%)		11.40		12.60	
ΔVO (Line Regulation)		14.5V≦V_{IN}≦27V, I_O=40mA, T_J=25℃		25	300	mV
		16V≦V_{IN}≦27V, I_O=40mA, T_J=25℃		20	250	
ΔVO (Load Regulation)		V_{IN}=19V, 1mA≦I_O≦100mA, T_J=25℃		25	150	mV
		V_{IN}=19V, 1mA≦I_O≦40mA, T_J=25℃		12	75	
IQ		V_{IN}=19V, I_O=0mA,T_J=25℃		2.0	6.0	mA
ΔIQ		V_{IN}=19V, 1mA≦I_O≦40mA			0.1	mA
		16V≦V_{IN}≦27V, I_O=40mA			1.5	
Vn		10Hz≦f≦100KHz		80		μV
RR		15V≦V_{IN}≦25V, I_O=40mA, f=120Hz,T_J=25℃	37	65		dB
VD		I_O=100mA, T_J=25℃		1.7		V
$\Delta V_O/\Delta T_J$		I_O=5mA, 0℃≦T_J≦125℃		-1.0		mV/℃

ACE78L15 (Refer to the test circuits, T_J=0~125℃, I_O=40mA, V_{IN}=23V, C_{in}=0.33μF, Co=0.1μF unless otherwise specified) (Note1)

Symbol		Test Condition	Min	Typ	Max	Unit
VO	A-Rank (3%)	V_{IN}=23V, I_O=40mA, T_J=25℃ 17.5V≦V_{IN}≦30V, 1mA≦I_O≦40mA 17.5V≦V_{IN}≦Vmax, 1mA≦I_O≦70mA (Note2)	14.55	15.0	15.45	V
	B-Rank (5%)		14.25		15.75	
ΔVO (Line Regulation)		17.5V≦V_{IN}≦30V, I_O=40mA, T_J=25℃		25	150	mV
		20V≦V_{IN}≦30V, I_O=40mA, T_J=25℃		15	75	
ΔVO (Load Regulation)		V_{IN}=23V, 1mA≦I_O≦100mA, T_J=25℃		20	150	mV
		V_{IN}=23V, 1mA≦I_O≦70mA, T_J=25℃		25	150	
IQ		V_{IN}=23V, I_O=0mA,T_J=25℃		2.2	6.5	mA
ΔIQ		V_{IN}=23V, 1mA≦I_O≦40mA			0.1	mA
		20V≦V_{IN}≦30V, I_O=40mA			1.5	
Vn		10Hz≦f≦100KHz		90		μV
RR		18.5V≦V_{IN}≦28.5V, I_O=40mA, f=120Hz,T_J=25℃	34	63		dB
VD		I_O=100mA, T_J=25℃		1.7		V
$\Delta V_O/\Delta T_J$		I_O=5mA, 0℃≦T_J≦125℃		-1.3		mV/℃

ACE78L18 (Refer to the test circuits, T_J=0~125℃, I_O=40mA, V_{IN}=27V, C_{in}=0.33μF, Co=0.1μF unless otherwise specified) (Note1)

Symbol		Test Condition	Min	Typ	Max	Unit
VO	A-Rank (3%)	V_{IN}=27V, I_O=40mA, T_J=25℃ 21V≦V_{IN}≦33V, 1mA≦I_O≦40mA 21V≦V_{IN}≦Vmax, 1mA≦I_O≦70mA (Note2)	17.46	18.0	18.54	V
	B-Rank (5%)		17.10		18.9	
ΔVO (Line Regulation)		21V≦V_{IN}≦33V, I_O=40mA, T_J=25℃		145	300	mV
		22V≦V_{IN}≦33V, I_O=40mA, T_J=25℃		135	250	
ΔVO (Load Regulation)		V_{IN}=27V, 1mA≦I_O≦100mA, T_J=25℃		30	170	mV
		V_{IN}=27V, 1mA≦I_O≦40mA, T_J=25℃		15	85	
IQ		V_{IN}=27V, I_O=0mA,T_J=25℃		2.0	6.0	mA
ΔIQ		V_{IN}=27V, 1mA≦I_O≦40mA			0.1	mA
		21V≦V_{IN}≦33V, I_O=40mA			1.5	
Vn		10Hz≦f≦100KHz		150		μV
RR		23V≦V_{IN}≦33V, I_O=40mA, f=120Hz,T_J=25℃	34	48		dB
VD		I_O=100mA, T_J=25℃		1.7		V
$\Delta V_O/\Delta T_J$		I_O=5mA, 0℃≦T_J≦125℃		-1.8		mV/℃

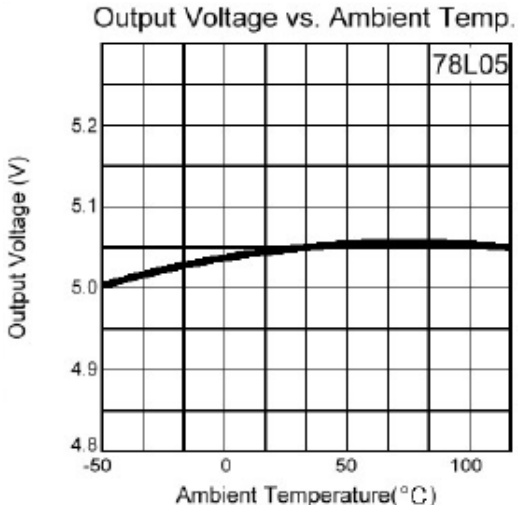
ACE78L24 (Refer to the test circuits, T_J=0~125℃, I_O=40mA, V_{IN}=33V, C_{in}=0.33μF, Co=0.1μF unless otherwise specified) (Note1)

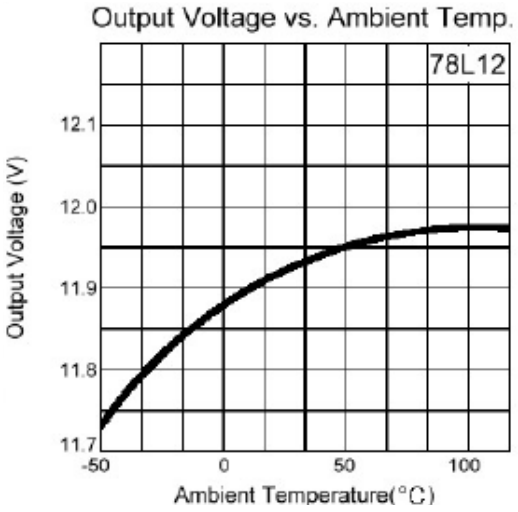
Symbol		Test Condition	Min	Typ	Max	Unit
VO	A-Rank (3%)	V_{IN}=33V, I_O=40mA, T_J=25℃ 27V≦V_{IN}≦38V, 1mA≦I_O≦40mA 27V≦V_{IN}≦Vmax, 1mA≦I_O≦70mA (Note2)	23.28	24.0	24.72	V
	B-Rank (5%)		22.80		25.20	
ΔVO (Line Regulation)		27V≦V_{IN}≦38V, I_O=40mA, T_J=25℃		160	300	mV
		28V≦V_{IN}≦38V, I_O=40mA, T_J=25℃		150	250	
ΔVO (Load Regulation)		V_{IN}=33V, 1mA≦I_O≦100mA, T_J=25℃		40	200	mV
		V_{IN}=33V, 1mA≦I_O≦40mA, T_J=25℃		20	100	
IQ		V_{IN}=33V, I_O=0mA,T_J=25℃		2.2	6.0	mA
ΔIQ		V_{IN}=33V, 1mA≦I_O≦40mA			0.1	mA
		27V≦V_{IN}≦38V, I_O=40mA			1.5	
Vn		10Hz≦f≦100KHz		200		μV
RR		27V≦V_{IN}≦38V, I_O=40mA, f=120Hz,T_J=25℃	34	45		dB
VD		I_O=100mA, T_J=25℃		1.7		V
$\Delta V_O/\Delta T_J$		I_O=5mA, 0℃≦T_J≦125℃		-2.0		mV/℃

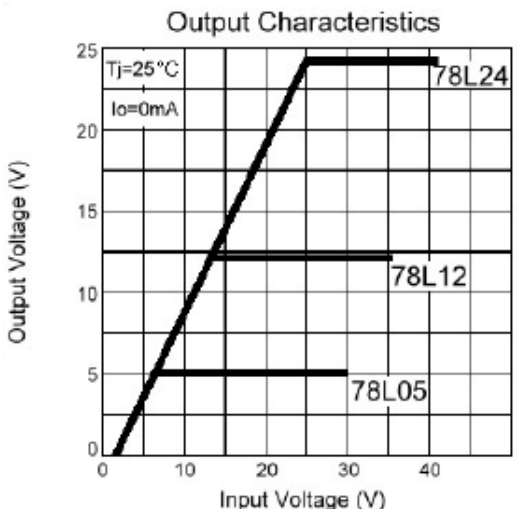
Note 1: The Maximum steady state usable output current is dependent on input voltage, heat sinking, lead length of the package and copper of PCB. The data above represent pulse test conditions with junction temperatures specified at the initiation of test.

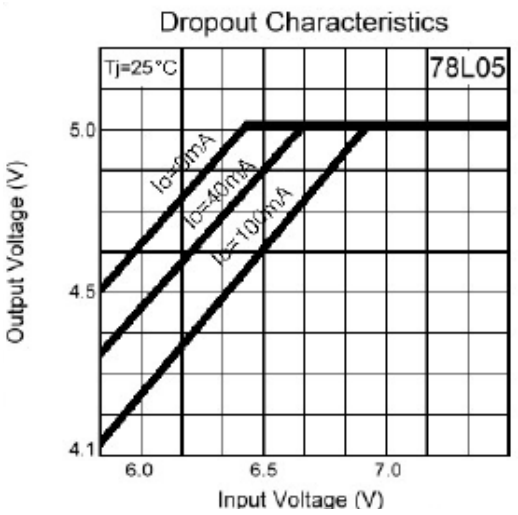
Note 2: Power dissipation<0.5W.

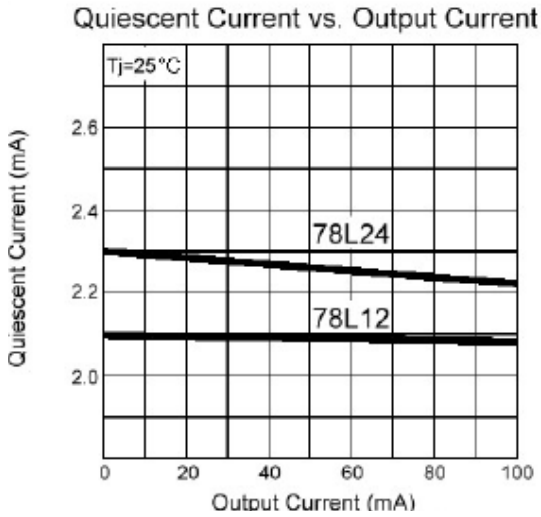
Characteristics Curve

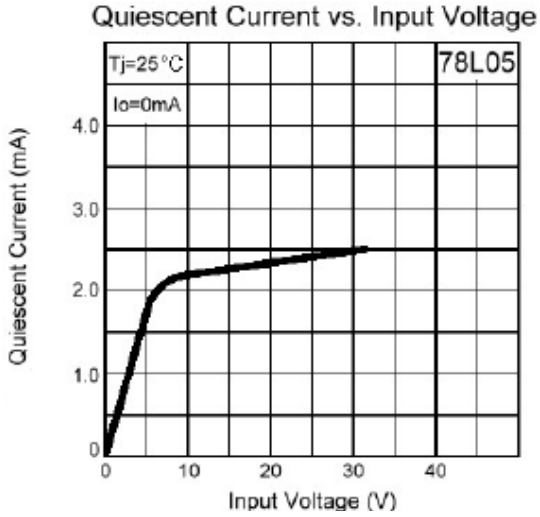






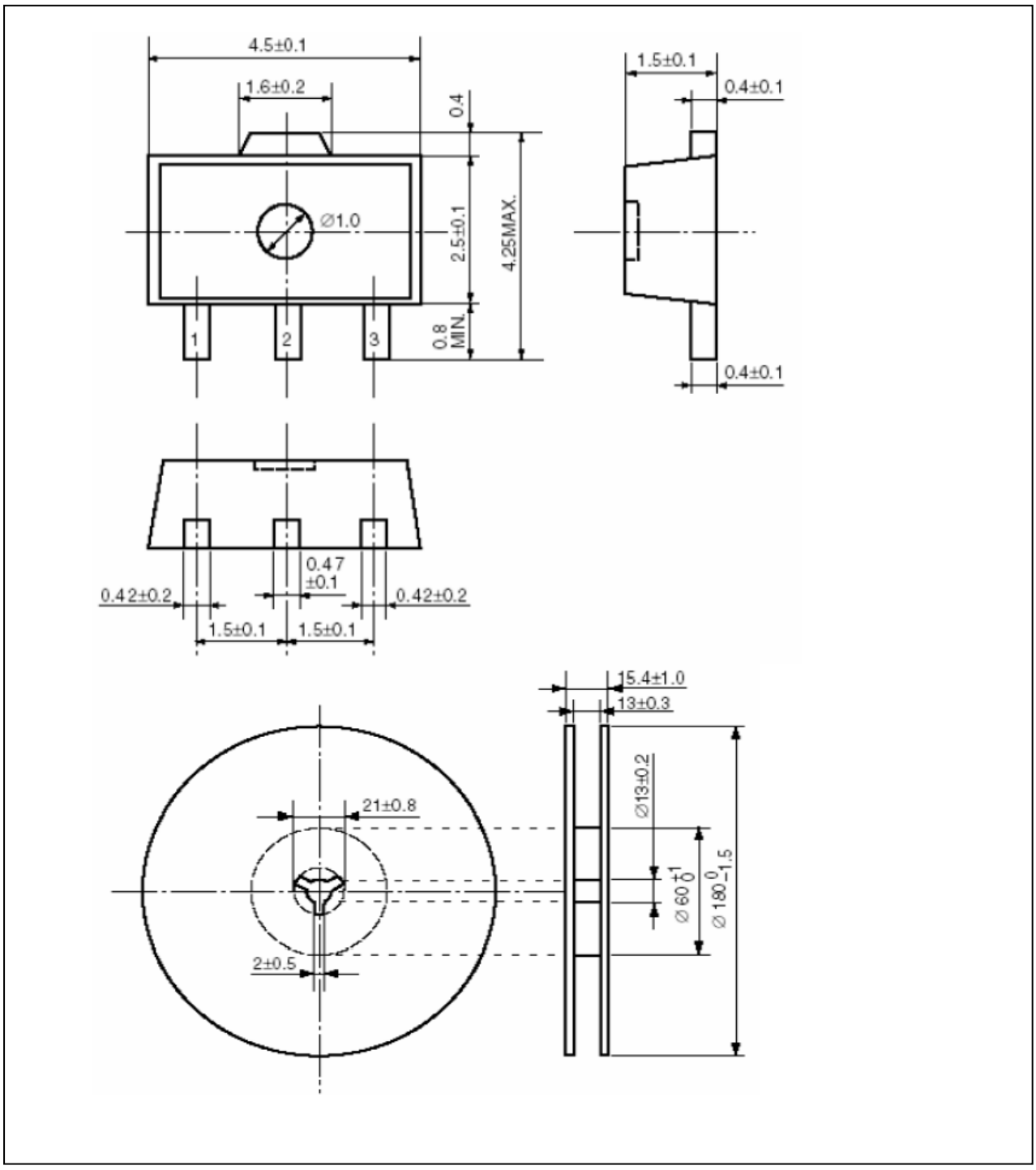






Packing Information

SOT-89-3



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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