ACE511

500mA LDO Linear Voltage Regulator

Description

The ACE511 series is a low-drop-out (LDO) linear regulator. The devices have been optimized for applications where fast transient response and minimum input voltages are critical.

At light loads the typical dropout voltage is 10mV, and at full load the maximum dropout voltage is less than 500mV. The internal over-current protection and thermal protection ,makes the device extremely easy to use in a wide range of applications.

Features

- Low dropout performance
- Output current of 500mA typical
- Thermal shutdown protection
- Fixed 1.5V/1.8V/2.5V/2.8V/3.0V/3.3V/3.6V output voltages available
- SOT-89-3, and SOT-23-3 packages available

Application

- Active SCSI terminators
- Battery chargers
- High efficiency linear regulators
- Wireless communication systems
- Digital camera

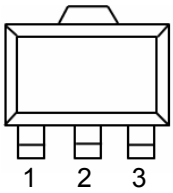
Absolute Maximum Ratings

Parameter	Symbol	Max	Unit
Input supply voltage	V_{IN}	6	V
Thermal resistance junction to ambient SOT-89-3 SOT-23-3	θ_{JA}	 180 230	°C/W
Junction temperature	T_J	150	°C
Storage temperature range	T_{STG}	- 10 to 150	°C
Lead temperature (soldering) 10sec	T_{LEAD}	260	°C

Note : Exceeding these ratings could cause damage to the device. All voltages are with respect to Ground. Currents are positive into, negative out of the specified terminal.

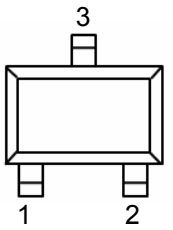
Packaging Type

SOT-89-3



ACE5111XXAM+		ACE5112XXAM+	
1	VOUT	1	GND
2	GND	2	VIN
3	VIN	3	VOUT

SOT-23-3



ACE5111XXBM+		ACE5112XXBM+	
1	VOUT	1	GND
2	VIN	2	VOUT
3	GND	3	VIN

Ordering information

Selection Guide

ACE511 X XX XX + H

- Halogen - free
- Pb - free
- AM : SOT-89-3
  BM : SOT-23-3
- Output Voltage：
  1.5V/1.8V/2.5V/2.8V/3.0V/3.3V/3.6V
- Pin

Power Dissipation Table

Package	θ_{JA} (°C /W)	$T_A \leq 25$°C Power rating(mW)	T_A=70°C Power rating(mW)	T_A= 85°C Power rating (mW)
AM	180	694	444	361
BM	230	543	348	283

Note:

1.Exceeding the maximum allowable power dissipation will result in excessive die temperature, and the regulator will go into Thermal shutdown.

2.T_J: Junction Temperature Calculation $T_J = T_A + (P_D \times \theta_{JA})$

The θ_{JA} numbers are guidelines for the thermal performance of the device/PC-board system. All of the above assume no Ambient airflow.

3.θ_{JA} : Thermal Resistance-Junction to Ambient, D_F: Derating factor, Po: Power consumption

Recommended Operating Conditions

Parameter	Symbol	Operating Conditions			Unit
		Min.	Typ.	Max.	
Input Voltage	V_{IN}	2.8		5.5	V
Load Current (with adequate heat sinking)	I_O	5			mA
Junction temperature Range	T_J			125	°C

Electrical Characteristics

Operating Conditions: V_{IN} = 5V, I_{OUT} =10mA; T_J=25 ℃,unless otherwise specified.(C_{OUT}=2.2uF, ,C_{IN}=2.2 uF)

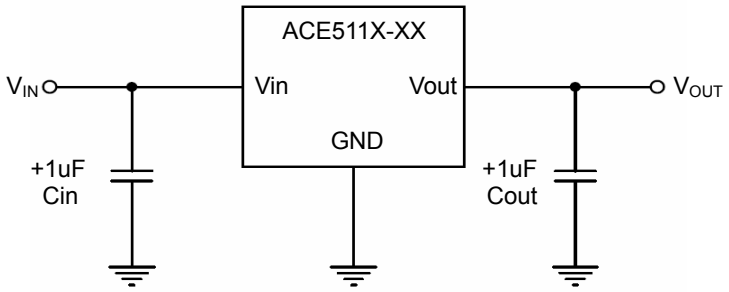
Parameter	Symbol	Test Conditions		Min	Typ	Max	Unit
Output Voltage	V_{OUT}	ACE511-1.5 (V_{IN}=3.3V) ACE511-1.8 (V_{IN}=3.3V) ACE511-2.5 ACE511-2.8 ACE511-3.0 ACE511-3.3 ACE511-3.6		1.470 1.764 2.450 2.744 2.940 3.234 3.528	1.5 1.8 2.5 2.8 3.0 3.3 3.6	1.530 1.836 2.550 2.856 3.060 3.366 3.672	V
Line Regulation	V_{SR}	V_{IN}=(V_{OUT}+1)V to 5.5V			1		%
Load Regulation (2)	V_{LR}	V_{IN}=(V_{OUT}+1)V	I_{OUT}=10~250mA		1		%
			I_{OUT}=10~500mA		1.5		
Ground Current	I_{GND}	I_{OUT}=10mA			65		uA
Dropout Voltage (3)	V_D	I_{OUT}=500mA			0.8		V
Current Limit	I_{LIMIT}	V_{OUT}=0V			0.7		A
Output Voltage Temperature Coefficient	T_C	Note 1			50		ppm/℃
Thermal Protection	T_{PRO}	Thermal protection temperature			150		°C,
		Protection Hysterisys			20		
RMS Output Noise	V_N	T_A=25°C,,10Hz≤f≤10KHz,			0.003		%/V_O
Ripple Rejection Ratio	PSRR	f = 120Hz,			51		dB

Notes:

1. Output voltage temperature coefficient is the worst case voltage change divided by the total temperature range.
2. Regulation is measured at constant junction temperature using low duty cycle pulse testing. Parts are tested for load regulation in the load range from 100 μA to 500mA. Changes in output voltage due to heating effects are covered by the thermal regulation specification.
3. Dropout voltages is defined as the input to output differential at which the output voltage drops 2% below its nominal value measured at 1V differential.

Typical Applications

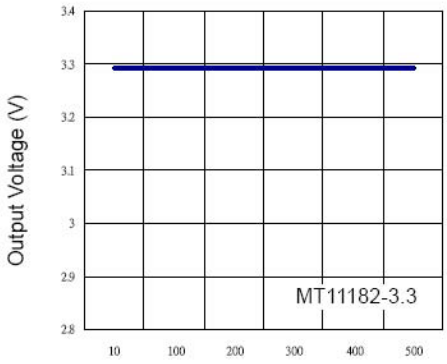
Fix Voltage Regulator:



Application Note

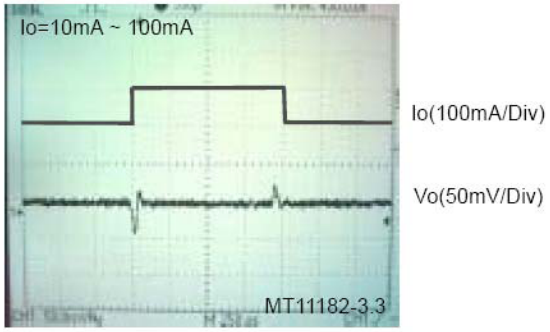
1.Output voltage temperature coefficient is the worst case voltage change divided by the total temperature range.

Load Regulator



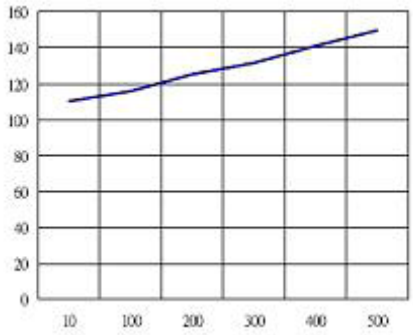
Output Current (mA)

Load transient response



Time (250us/Div)

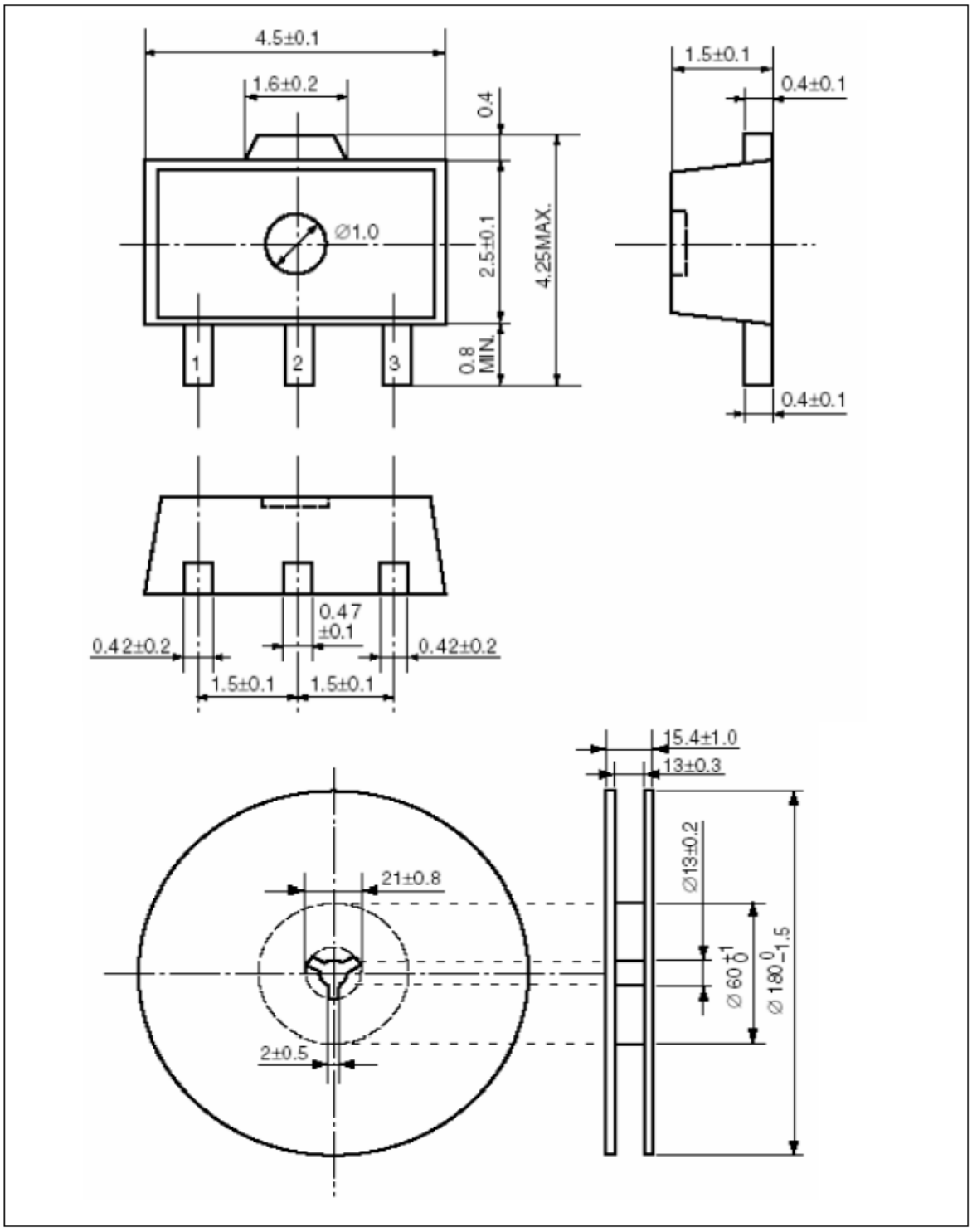
Quiescent Current vs I_{OUT}



Output Current (mA)

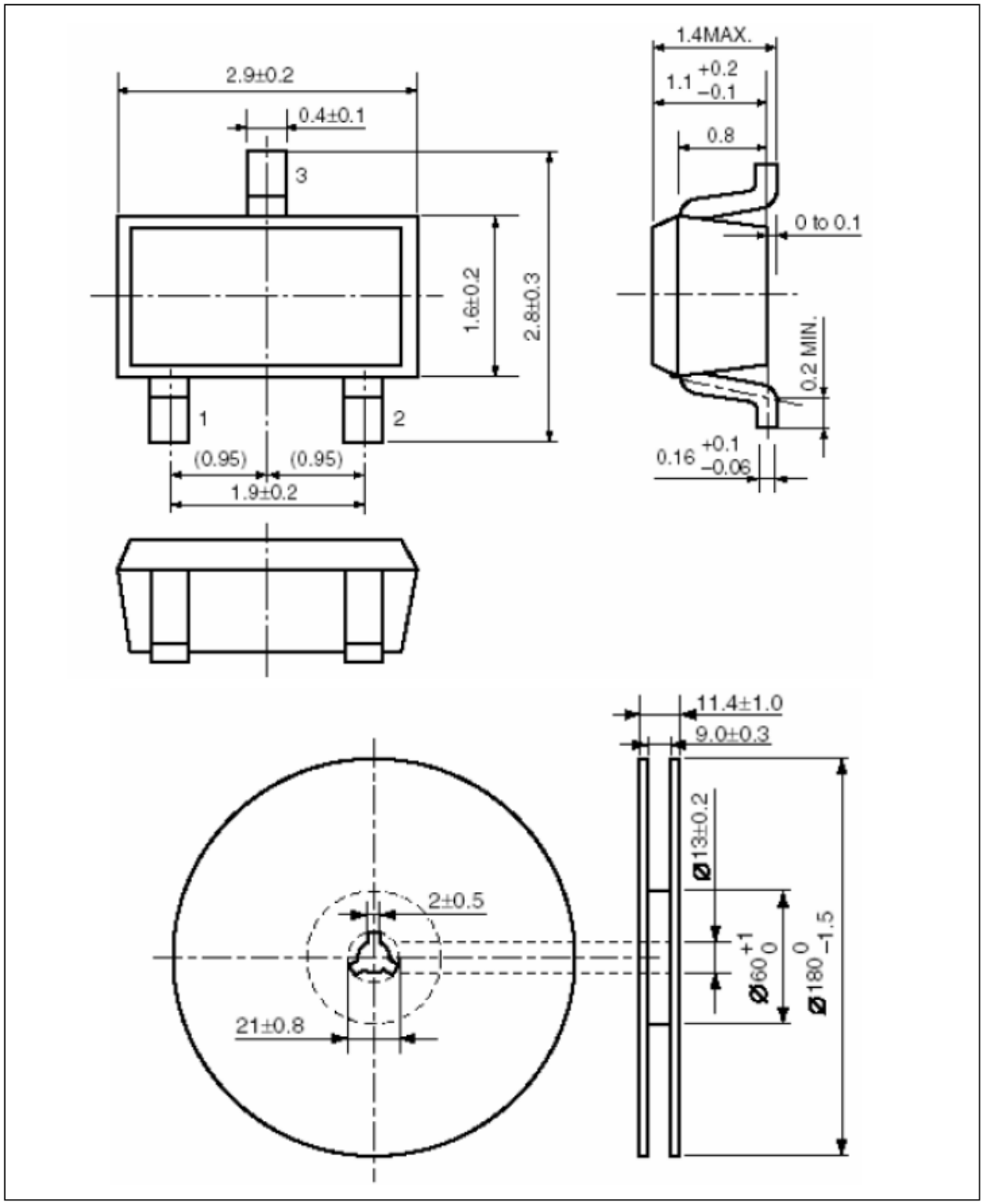
Packing Information

SOT-89-3



Packing Information

SOT-23-3



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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