ACE557U

250mA, Low Consumption, Wide Input Voltage Linear Regulator

Description

The ACE557U series are a group of positive voltage output, high precise and low power consumption voltage regulators. The maximum input voltage is 16V. The output voltages are available in 100mV steps within a range of 2.5V to 5V. It can also be customized on request.

The ACE557U series have very low power consumption (IQ=2μA) which can greatly extend battery life.

The ACE557U series are available in SOT23-5 & SOT89-5 packages.

Features

- Maximum Input Voltage: 16V
- Low Quiescent Current: 2μA (Typ.)
- Maximum Output Current: 250mA
- Low Dropout: 210mV@100mA (V_{OUT}=3.3V)
  420mV@200mA (V_{OUT}=3.3V)
- Low Temperature Coefficient: ±150ppm/°C
- Output Current Limit: 330mA@ V_{OUT}=3.3V

Application

- Battery-Powered Equipment
- Power Management of MP3, PDA, DSC, Mouse, PS2 Games
- Reference Voltage Source
- Hand-Hold Equipment

Absolute Maximum Rating

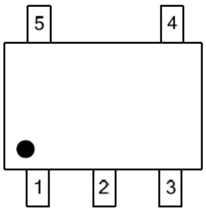
Parameter		Symbol	Value	Unit
V_{IN}		Max Input Voltage	20	V
Power dissipation	SOT-23-5	P_D	400	mW
	SOT-89-5	P_D	250	mW
Operating Junction Temperature		T_J	125	°C
Ambient Temperature		T_A	-40 to 85	°C
Storage Temperature Range		T_{STG}	-40 to 150	°C
Lead Temperature for Soldering 10 Seconds		T_L	260	°C

Recommended Work Condition

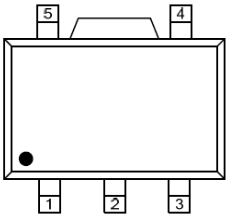
Symbol	Parameter	Value	Unit
V_{IN}	Max Input Voltage	16	V

Packaging Type

SOT-23-5



SOT-89-5



SOT-23-5	SOT-89-5	Description	Function
2	3	GND	Ground
4	1	VOUT	Voltage Regulated Output
1	4	EN	Enable Control Input: High=Activate LDO, Low=Shutdown LDO
3	2	VDD	Supply Voltage Input
5	5	FB/NC	Output Voltage Feedback/ No Connection

Ordering information

ACE557U XX XX + H

- Halogen - free
- Pb - free
- BN: SOT-23-5
  AN: SOT-89-5
- Output Voltage：2.5V/ 2.6V …../5.0V / Default： Adjustable Version

Typical Application Circuit

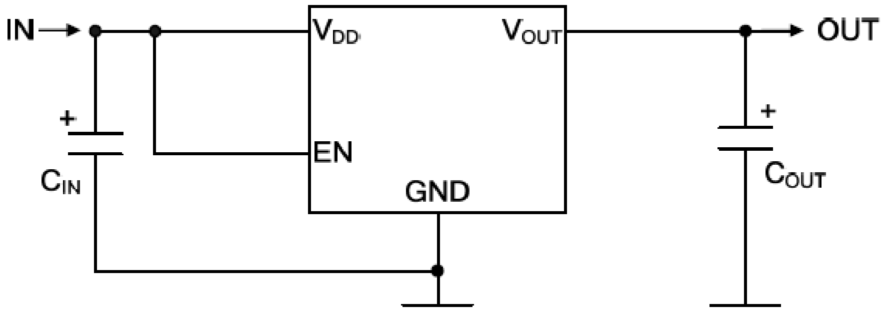


Figure 1

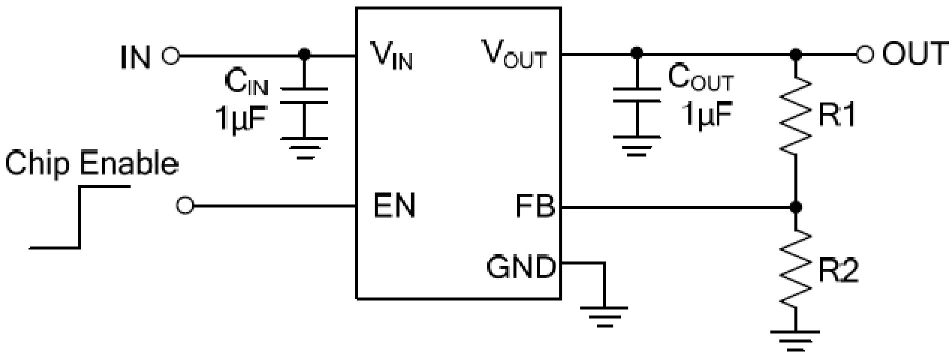


Figure 2

Note 1: Input Capacitor (C_{IN}=1μF) is recommended in all applications.

Note 2: Output Capacitor (C_{OUT}=4.7μF/6.8μF) is recommended in all applications to assure the stability of circuit.

ACE557U Output Voltage Setting

The output voltage of the ACE557U adjustable regulator is programmed using an external resistor divider as shown in Figure 2. The output voltage is calculated using:

$$V_{OUT} = V_{FB}\left(1 + \frac{R1}{R2}\right)$$

Where: V_{FB}=1.2V (Typ) (the internal reference voltage)

Resistors R1 and R2 should be chosen for approximately 3-5μA divider current. Lower value resistors can be used but offer no inherent advantage and waste more power. Higher values should be avoided, as leakage currents at FB increase the output voltage error. The recommended design procedure is to choose R2=200kΩ to set the divider current at 5μA and then calculate R1 using:

$$R1 = \left(\frac{V_{OUT}}{V_{FB}} - 1\right) \times R2$$

Where: V_{FB}=1.2V (Typ).

Electrical Characteristics

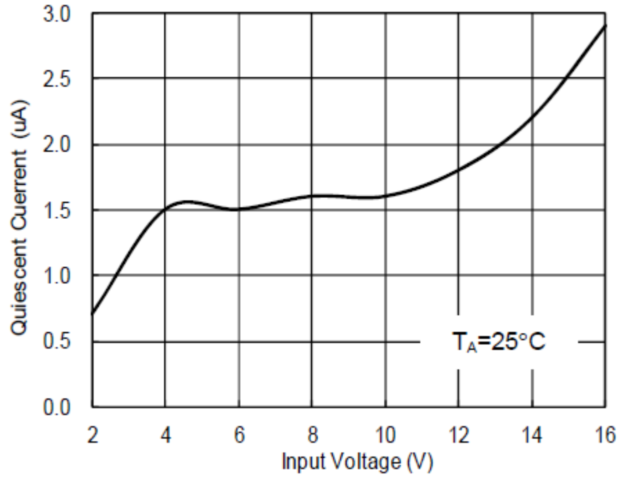
(Test conditions: C_{IN}=1.0μF, C_{OUT}=1.0μF, T_A=25°C, unless otherwise noted)

Symbol	Parameter	Test Conditions	Min	Typ	Max	Unit
V_{IN}	Input Voltage				16	V
V_{OUT}	Output Voltage	V_{IN}=Set V_{OUT}+1V 1mA≤I_{OUT}≤10mA	V_{OUT}× 0.98	V_{OUT}× 1.0	V_{OUT}× 1.02	V
V_{FB}	Feedback Reference Voltage	V_{IN}=2.5V to16V	1.176	1.2	1.224	V
I_{FB}	Feedback Reference Current	V_{FB}=1.2V			10	nA
I_{OUT} (Max) (Note)	Maximum Output Current	V_{IN} -V_{OUT}=1V	250			mA
V_{DROP}	Dropout Voltage	I_{OUT}=150mA		300		mV
	Output Voltage Accuracy	I_{OUT}=250mA	-3		3	%
$\frac{\Delta V_{OUT}}{\Delta V_{IN} \cdot V_{OUT}}$	Line Regulation	I_{OUT}=10mA 4V≤V_{DD}≤6V		0.05	0.2	%/V
ΔV_{OUT}	Load Regulation	V_{IN}=Set V_{OUT}+1V 1mA≤I_{OUT}≤250mA		20		mV
I_S	Supply Current	V_{IN}=Set V_{OUT}+1V V_{OUT} Floating		2	5	μA
	Shut Down Quiescent Current	V_{IN}=8V, EN= GND			1	μA
I_{EN}	EN Input Current	EN=V_{IN} or GND			1	μA
$\frac{\Delta V_{OUT}}{\Delta T \cdot V_{OUT}}$	Output Voltage Temperature Coefficient	I_{OUT}=10mA		±150		ppm/°C
V_{IL}	EN Input Low Voltage	V_{IN}=3.6V to 16V			0.8	V
V_{IH}	EN Input High Voltage	V_{IN}=3.6V to 16V	1.8			V
PSRR	Power Supply Ripple Rejection	f=100Hz, Ripple=0.5Vp-p V_{IN}=Set V_{OUT}+1V		40		dB
	Output Noise	BW=10Hz~100kHz		240		μVRMS

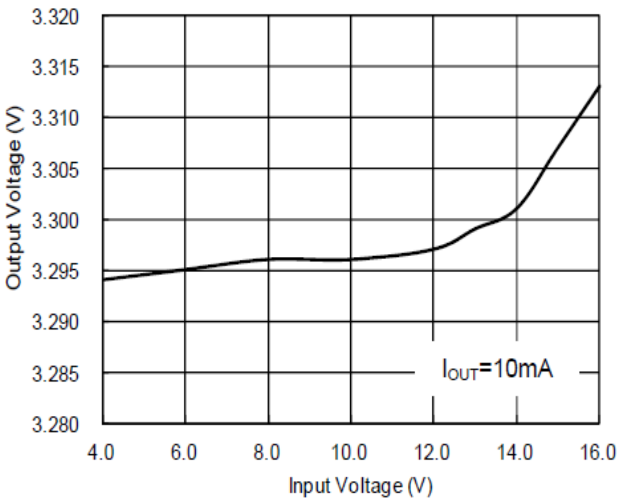
Note: The maximum power rating of each package is constant, so along with the change of $_{ILOAD}$, the V_{IN}-V_{OUT} should be controlled to a certain range to ensure the normal operation.

Typical Operating Characteristics

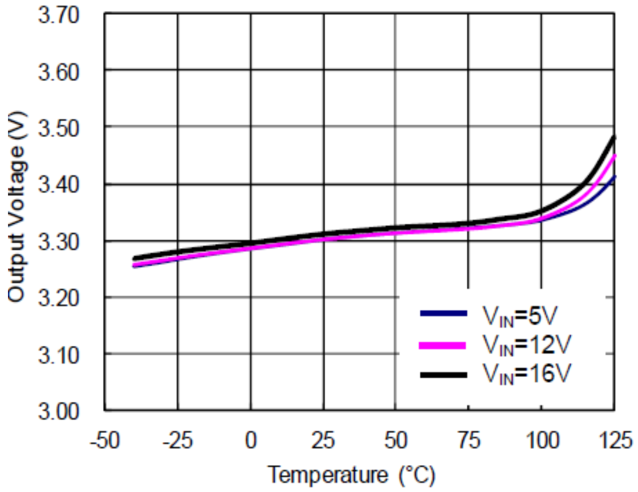
Quiescent Current vs. Input Voltage
I_{OUT}=0mA



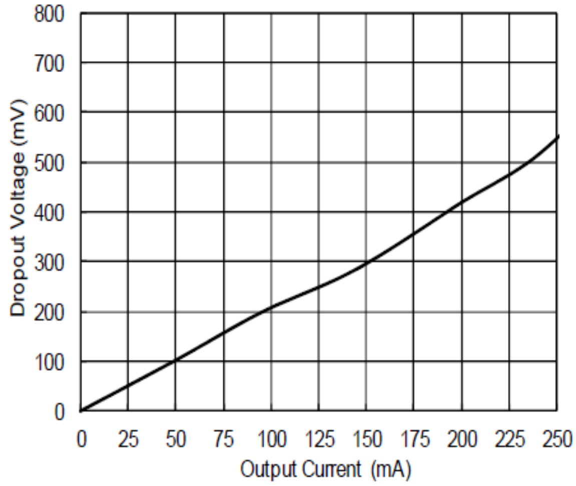
Output Voltage vs. Input Voltage



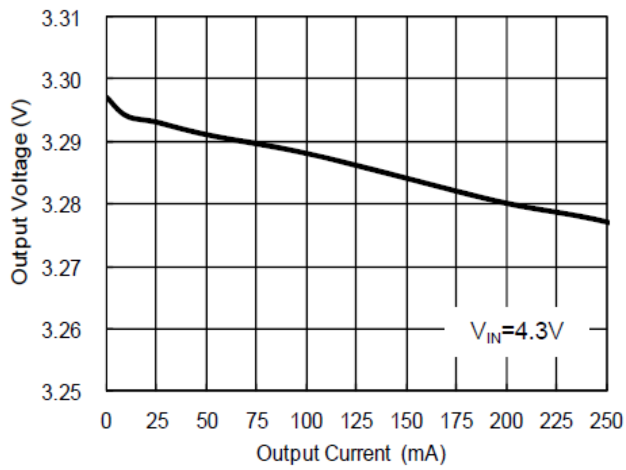
Output Voltage vs. Temperature
I_{OUT}=5mA



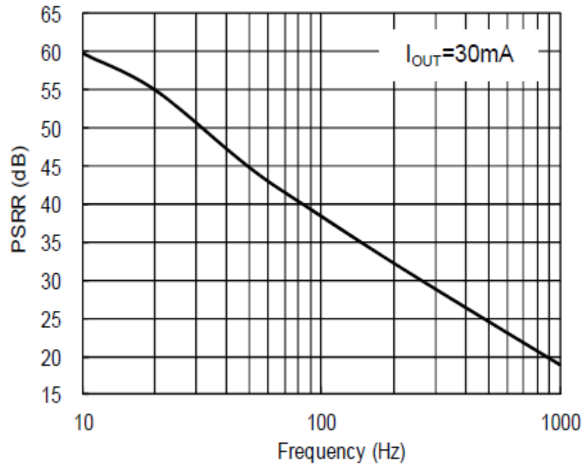
Dropout Voltage vs. Output Current
V_{OUT}=3.3V



Output Voltage vs. Output Current

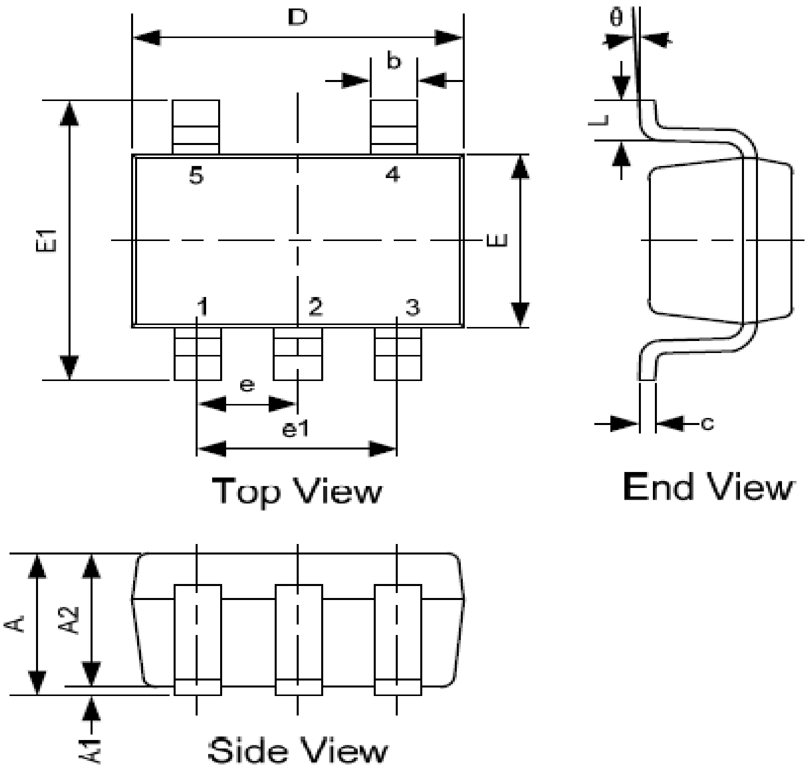


PSRR vs. Frequency



Packing Information

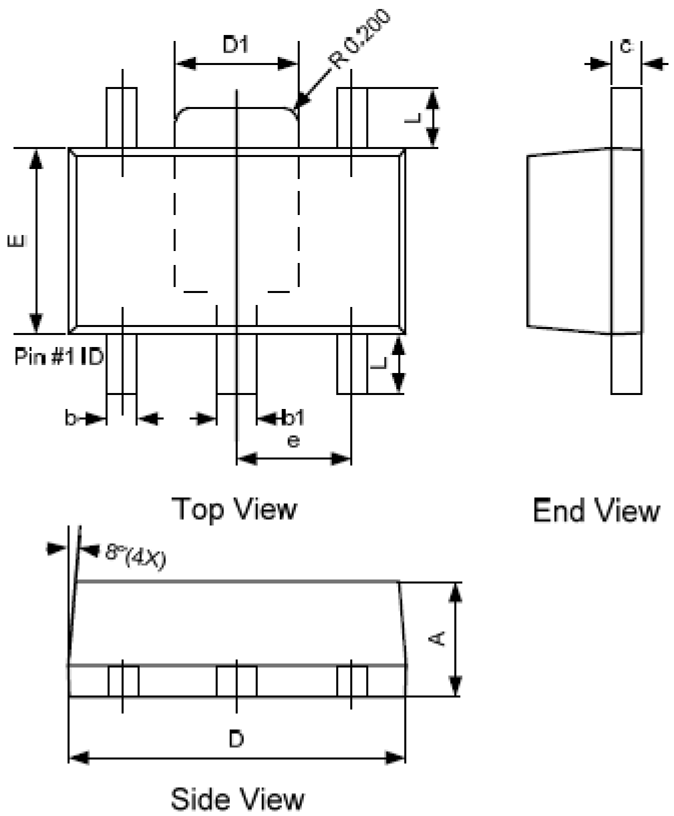
SOT-23-5



DIMENSIONS						
Symbol	MILLIMETERS			INCHES		
	Min	Typ	Max	Min	Typ	Max
A	1.013	1.15	1.40	0.040	0.045	0.055
A1	0.00	0.05	0.10	0.000	0.002	0.004
A2	1.00	1.10	1.30	0.039	0.043	0.051
b	0.30		0.50	0.012		0.020
c	0.10	0.15	0.20	0.004	0.006	0.008
D	2.82		3.10	0.111		0.122
E	1.50	1.60	1.70	0.059	0.063	0.067
E1	2.60	2.80	3.00	0.102	0.110	0.118
e	0.95REF			0.037REF		
e1	1.90REF			0.075REF		
L	0.30		0.60	0.012		0.024
θ	0°		8°	0°		8°

Packing Information

SOT-89-5



DIMENSIONS						
Symbol	MILLIMETERS			INCHES		
	Min	Typ	Max	Min	Typ	Max
A	1.40	1.50	1.60	0.055	0.059	0.063
b	0.32		0.54	0.013		0.021
b1	0.38		0.62	0.015		0.024
c	0.35		0.44	0.014		0.017
D	4.40	4.50	4.60	0.173	0.177	0.181
D1	1.40		1.83	0.055		0.072
E	2.30	2.50	2.60	0.091	0.098	0.102
e	1.50TYP			0.059TYP		
L	0.65		1.20	0.026		0.047

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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