

Description

The ACE432 series ICs are low voltage three-terminal adjustable regulators with guaranteed thermal stability over a full operation range. These ICs feature sharp turn-on characteristics, low temperature coefficient and low output impedance, which make them ideal substitutes for Zener diodes in applications such as switching power supply, charger, motherboard and other adjustable regulators.

The output voltage can be set to any value between 1.24V and 18V with two external resistors.

The ACE432 precision reference is offered in two voltage tolerance: 0.5% and 1.0%.

These ICs are available SOT-23-3.

Features

- Wide Programmable Precise Output Voltage from 1.24V to 18V
- High Stability under Capacitive Load
- Low Temperature Deviation: 3mV Typical
- Low Equivalent Full-range Temperature Coefficient: 20PPM/°C Typical
- Low Dynamic Output Resistance: 0.05Ω Typical
- High Sink Current Capacity from 0.1mA to 100mA
- Low Output Noise
- Wide Operating Range of -40 to 125°C

Application

- Graphic Card
- PC Motherboard
- Voltage Adapter
- Switching Power Supply
- Charger

Absolute Maximum Ratings

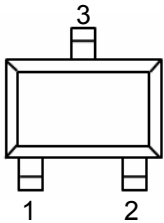
Parameter	Symbol	Max	Unit
Cathode to Anode Voltage ^(Note 2)	V _{KA}	20	V
Cathode Current Range (Continuous)	I _{KA}	-100 to 100	mA
Reference Input Current Range	I _{REF}	10	mA
Power Dissipation	P _D	370	mW
Junction Temperature	T _J	150	°C
Storage temperature range	T _{STG}	- 65 to 150	°C

Note 1: Stresses greater than those listed under “Absolute Maximum Ratings” may cause permanent damage to the device.

These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated under “Recommended Operating Conditions” is not implied. Exposure to “Absolute Maximum Ratings” for extended periods may affect device reliability.

Packaging Type

SOT-23-3

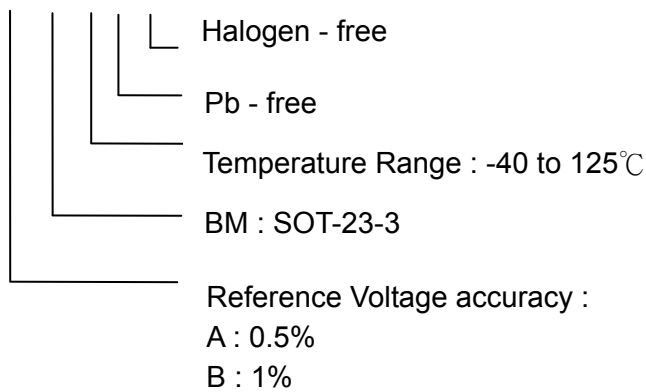


Pin	SOT-23
Cathode	2
Anode	3
Ref	1

Ordering information

Selection Guide

ACE432 X XX E + H



Functional Block Diagram

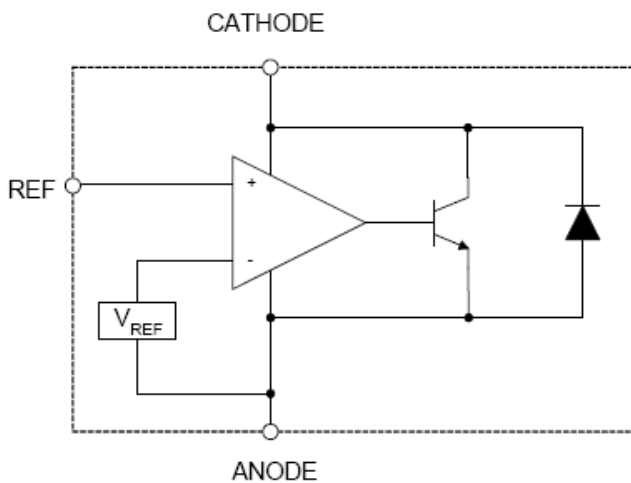


Figure 1. Functional Block Diagram of ACE432

Recommended Operating Conditions

Parameter	Symbol	Min	Max	Unit
Cathode Voltage	V_{KA}	V_{REF}	18	V
Cathode Current	I_{KA}	0.1	100	mA
Operating Ambient Temperature Range		-40	125	°C

Electrical Characteristics

Operating Conditions: $T_A=25^{\circ}\text{C}$, unless otherwise note

Parameter	Symbol	Test Conditions	Min.	Typ.	Max.	Unit	
Reference Voltage	V_{REF}	$V_{KA}=V_{REF}, I_{KA}=10\text{mA}$	1.234	1.240	1.246	V	
			1.228	1.240	1.252		
Deviation of reference voltage over full temperature range	ΔV_{REF}	$V_{KA}=V_{REF}, I_{KA}=10\text{mA}$		0 to 70°C	2	10	mV
				-40 to 85°C	3	10	
				-40 to 125°C	4	15	
Ratio of change in V_{REF} to the change in cathode voltage	$\Delta V_{REF}/\Delta V_{KA}$	$I_{KA}=10\text{mA}$ $\Delta V_{KA}: V_{REF}$ to 16V		-0.5	-1.5	mV/V	
Reference Input current	I_{REF}	$I_{KA}=10\text{mA}, R1=10\text{K}\Omega, R2=\infty$		0.15	0.40	μA	
Deviation of Reference current over full temperature range	ΔI_{REF}	$I_{KA}=10\text{mA}, R1=10\text{K}\Omega, R2=\infty, T_A=-40^{\circ}\text{C}$ to 125°C		0.10	0.40	μA	
Minimum cathode current for regulation	$I_{KA}(\text{Min})$	$V_{KA}=V_{REF}$		55	80	μA	
Off-state cathode current	$I_{KA}(\text{Off})$	$V_{REF}=0, V_{KA}=18\text{V}$		0.04	0.10	μA	
		$V_{KA}=6, V_{REF}=0$		0.01	0.05		
Dynamic impedance	Z_{KA}	$I_{KA}=1$ to 100mA $V_{KA}=V_{REF}, f \leq 1\text{kHz}$		0.05	0.15	Ω	
Thermal Resistance	θ_{JC}	SOT-23		84.84		$^{\circ}\text{C}/\text{W}$	

Electrical Characteristics

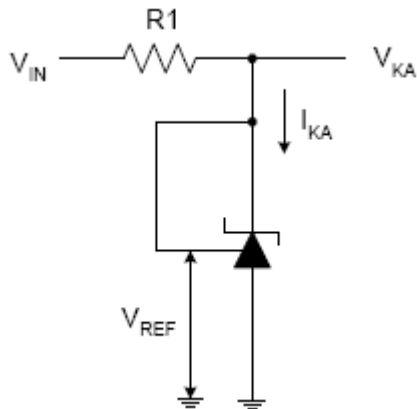


Figure 2. Test Circuit 4 for $V_{KA}=V_{REF}$

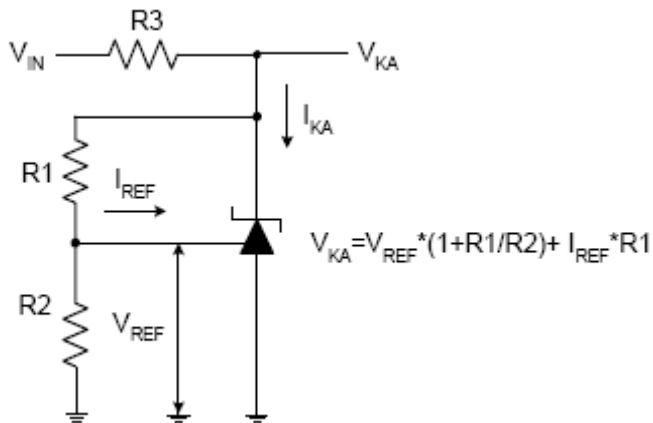


Figure 3. Test Circuit 5 for $V_{KA}>V_{REF}$

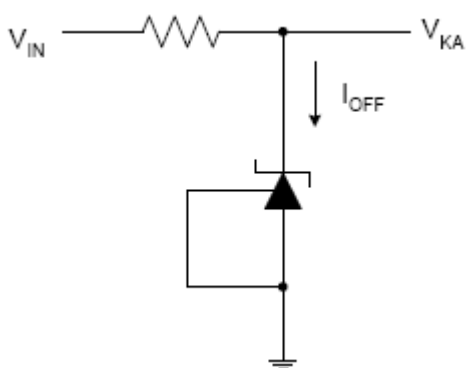


Figure 4. Test Circuit 6 for I_{OFF}

Typical Performance Characteristics

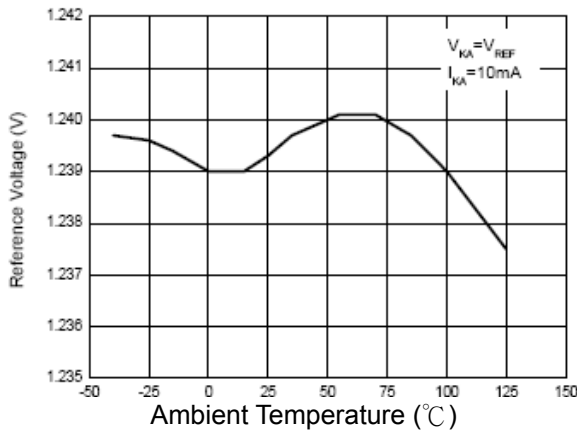


Figure 5. Reference Voltage vs. Ambient Temperature

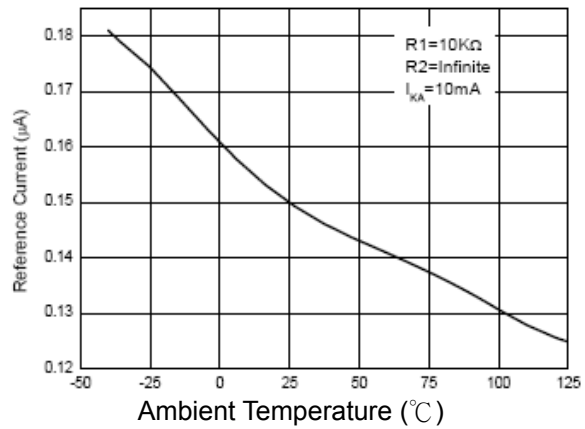


Figure 6. Reference Current vs. Ambient Temperature

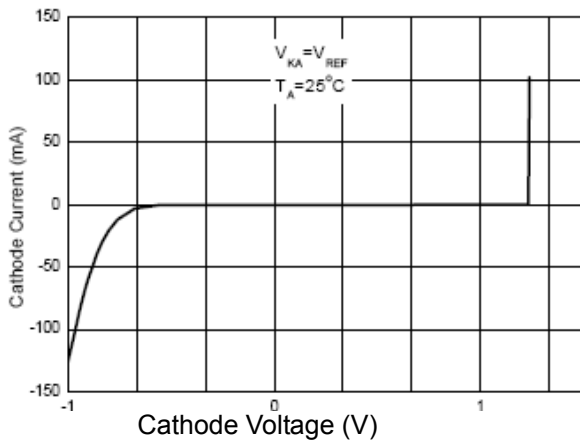


Figure 7. Cathode Current vs. Cathode Voltage

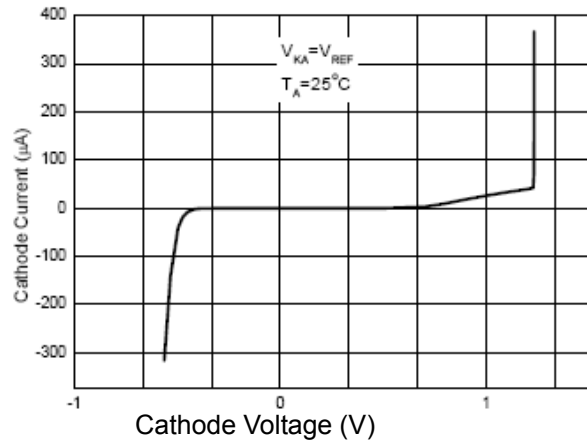


Figure 8. Cathode Current vs. Cathode Voltage

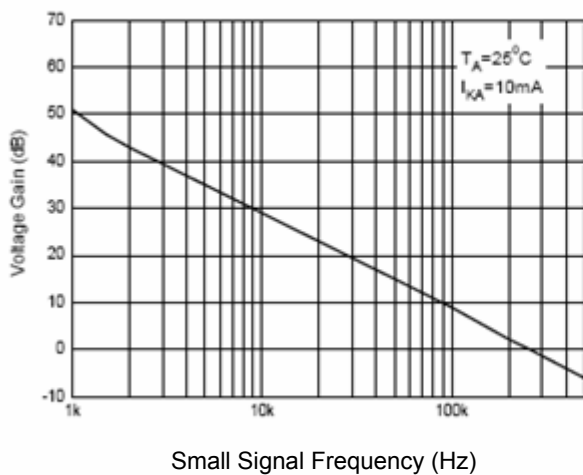
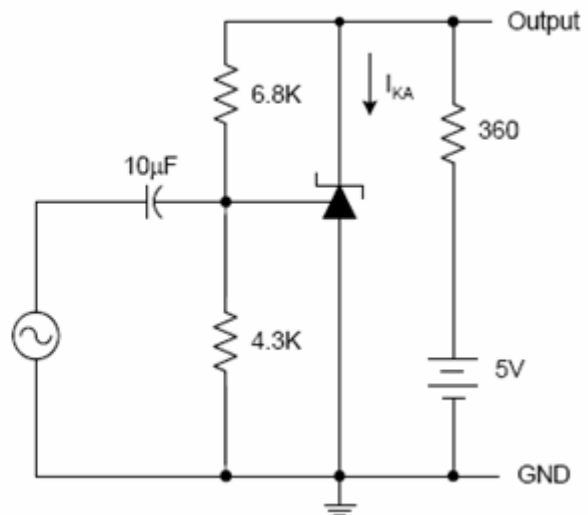


Figure 9. Small Signal Voltage Gain vs. Frequency



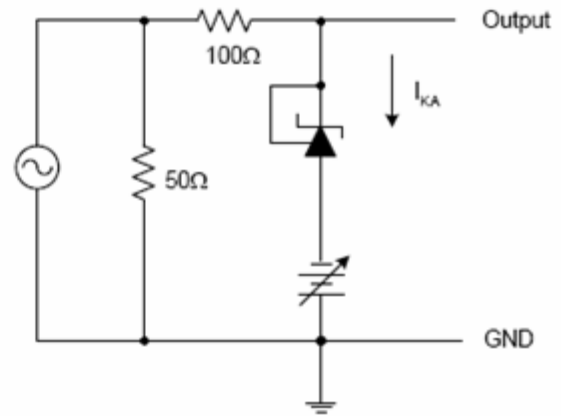
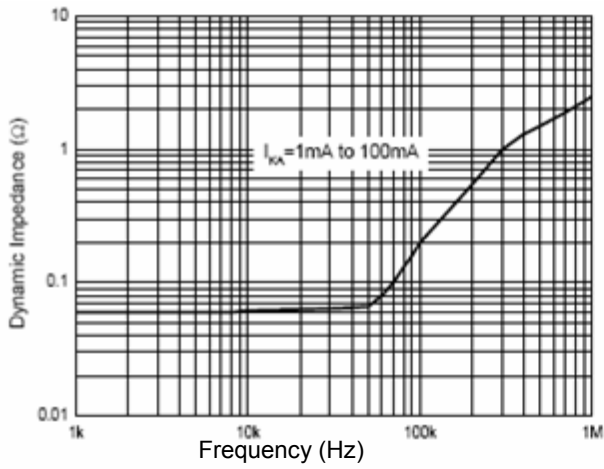


Figure 10. Dynamic Impedance vs. Frequency

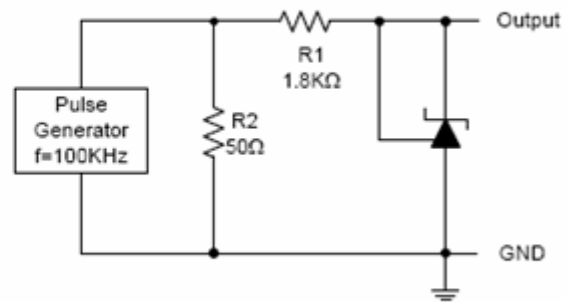
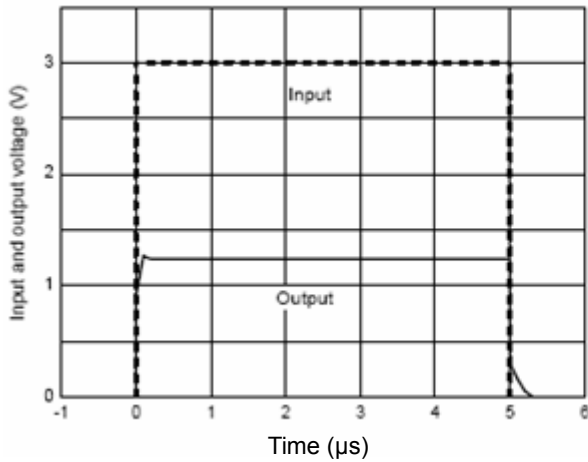


Figure 11. Pulse Response of Input and Output Voltage

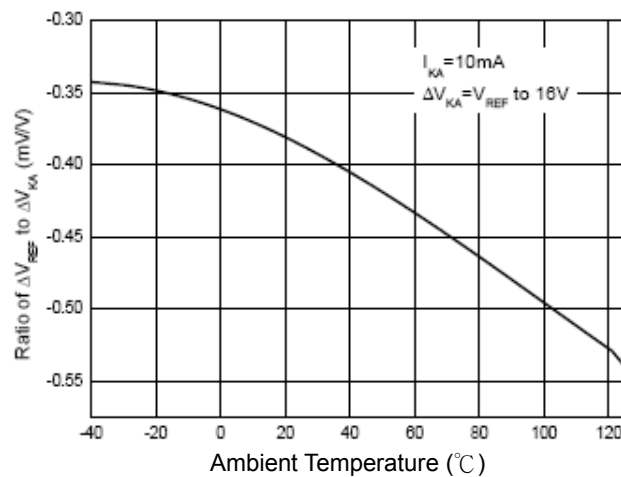


Figure 12. Ratio of Delta Reference Voltage to the Ratio of Cathode Voltage vs. Ambient Temperature

Typical Applications

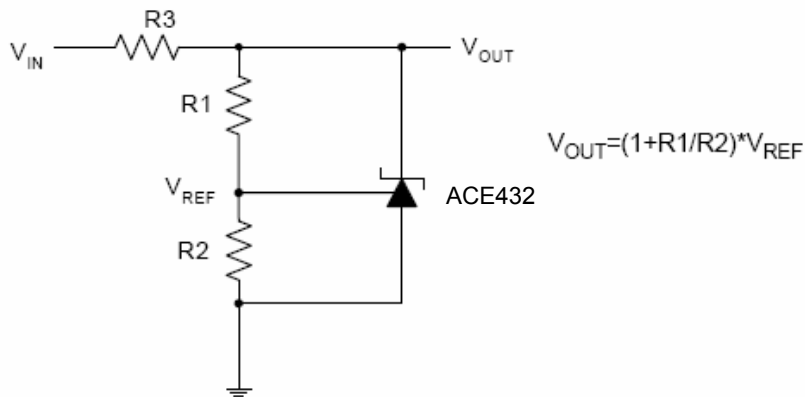


Figure 13. Shunt Regulator

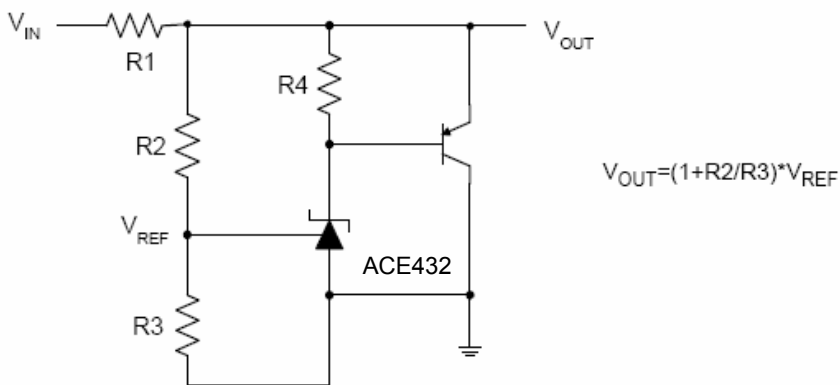


Figure 14. High Current Shunt Regulator

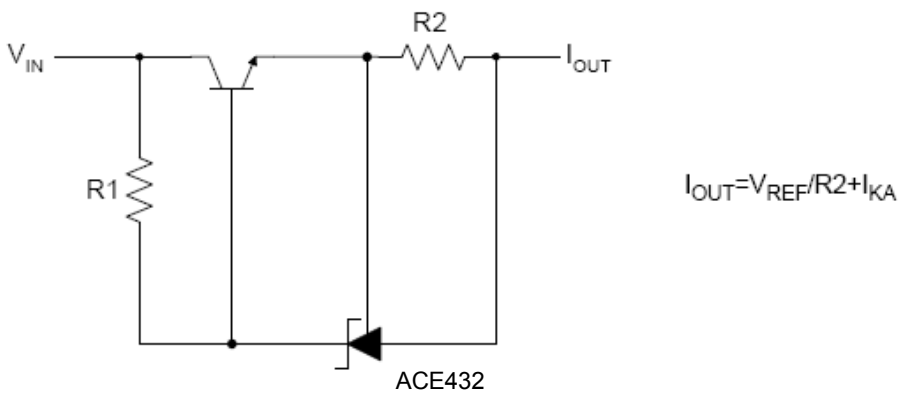


Figure 15. Current Source or Current Limit

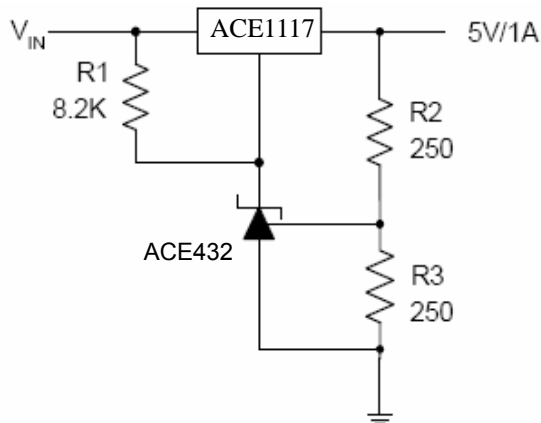


Figure 15. Current Source or Current Limit

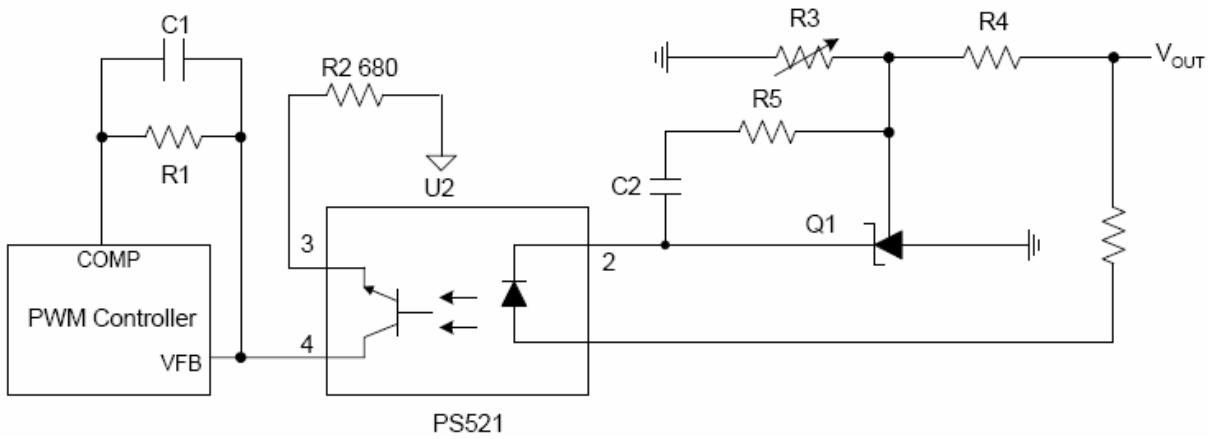
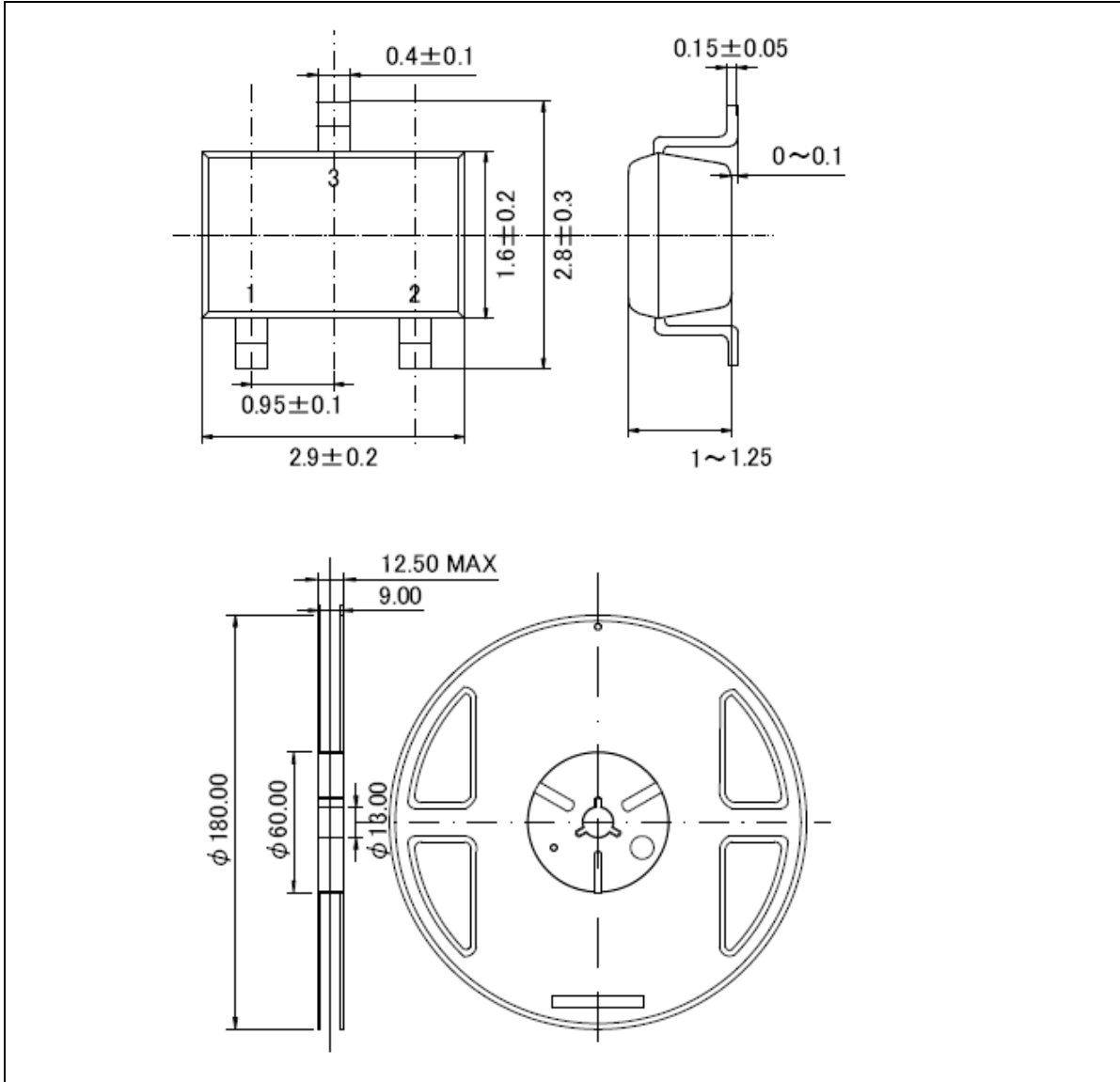


Figure 17. PWM Converter with Reference

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 used 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 whose 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.