



ACE507A

Precise Low Dropout Voltage Regulator

Description

The ACE507A series are precise, low power consumption, positive voltage regulators manufactured using CMOS and laser trimming technologies. The series provides large currents with a significantly small dropout voltage. The ACE507A consists of a current limit circuit, a driver transistor a precision reference voltage and an error correction circuit. The series is compatible with low ESR ceramic capacitors. The current limiter's foldback circuit also operates as a short protect for the output current limiter and the output pin. Output voltage can be set internally by laser trimming technologies. It is selectable in 100mV Increments with a range of 1.2V to 5.0V.

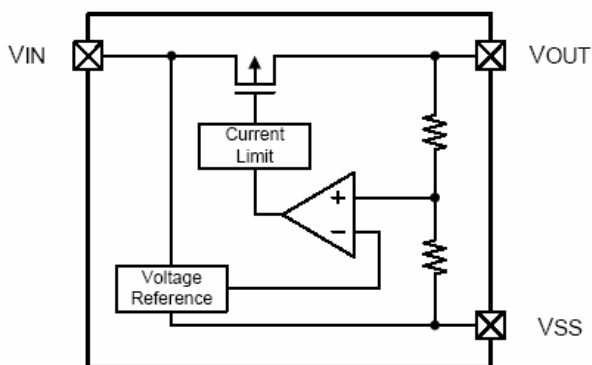
Features

- Output Voltage selectable in 100mV steps (1.2V to 5.0V)
- Highly Accurate
- Low Dropout Voltage
- Low Power Consumption
- Internal current limiting and short protecting
- Small packages

Application

- Battery Powered equipment
- Cameras, Video cameras
- Reference Voltage Source
- Mobile phones
- Communication tools

Functional Block Diagram





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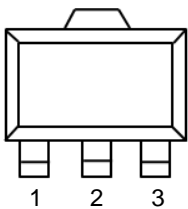
Absolute Maximum Ratings

Operating temperature range applies unless otherwise specified.

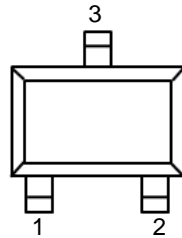
| Parameter | Symbol | Max | Unit |
|--|-----------|----------------------------------|------------------|
| Input voltage | V_{IN} | -0.3 ~ 6 | V |
| Output Voltage | V_{OUT} | $V_{SS} - 0.3$ to $V_{IN} + 0.3$ | V |
| Power Dissipation ($T_A=25^\circ\text{C}$) SOT-89-3 SOT-23-3 | P_D | 500 150 | mW |
| Operating Temperature Rang | T_{OPR} | -25 ~ 80 | $^\circ\text{C}$ |
| Storage Temperature Rang | T_{STG} | - 40 ~125 | $^\circ\text{C}$ |

Packaging Type

SOT-89-3



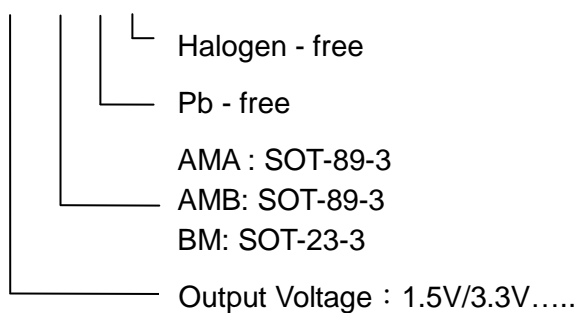
SOT-23-3



| Description | SOT-89-3(A) | SOT-89-3(B) | SOT-23-3 |
|-------------|-------------|-------------|----------|
| V_{SS} | 2 | 1 | 1 |
| V_{IN} | 3 | 2 | 3 |
| V_{OUT} | 1 | 3 | 2 |

Ordering information

ACE507A XX XX + H





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Electrical Characteristics

($T_A=25^{\circ}\text{C}$, unless otherwise specified.)

| Symbol | Parameter | Test Conditions | Test Circuit | Min | Typ | Max | Units |
|--|--|---|--------------|---------------------|--------------|---------------------|-------------------------|
| V_{IN} | Input Voltage | | | 1.8 | | 6 | V |
| I_{SS} | Supply Current | $V_{IN}=V_{OUT}+1.0\text{V}$ | 2 | | 8 | | μA |
| | | | | | 20 | 50 | |
| V_{OUT} | Output Voltage | $V_{IN}=V_{OUT}+1.0\text{V}$, $I_{OUT}=40\text{mA}$ | 1 | $V_{OUT(T)} * 0.98$ | $V_{OUT(T)}$ | $V_{OUT(T)} * 1.02$ | V |
| I_{OUT} | Output Current | $V_{IN} \geq V_{OUT} + 1.0\text{V}$ | 1 | 300 | | | mA |
| V_{DROP} | Dropout Voltage | $I_{OUT}=100\text{mA}$ | 1 | | 0.51 | 0.75 | V |
| | | | | | 0.16 | 0.24 | |
| | | | | | 0.12 | 0.20 | |
| $\frac{\Delta V_{OUT}}{\Delta V_{IN} \cdot V_{OUT}}$ | Lin Regulations | $V_{OUT}+0.5\text{V} \leq V_{IN} \leq 5.5\text{V}$, $I_{OUT}=80\text{mA}$ | 1 | | 0.05 | 0.3 | %/V |
| ΔV_{OUT} | Load Regulations | $V_{IN}=V_{OUT}+1.0\text{V}$ $1.0\text{mA} \leq I_{OUT} \leq 80\text{mA}$ | | | 20 | 40 | mV |
| $\frac{\Delta V_{OUT}}{\Delta T_A \cdot V_{OUT}}$ | Output Voltage Temperature Characteristics | $V_{IN}=V_{OUT}+1.0\text{V}$, $I_{OUT}=10\text{mA}$ | | | ± 100 | | ppm/ $^{\circ}\text{C}$ |
| IRRI | Ripple Rejection | $V_{IN}=V_{OUT}+1.0\text{V}$, $F=120\text{Hz}$ $V_{RIP}=1V_{RMS}$, $I_{OUT}=30\text{mA}$ | 1 | 62 | | | dB |
| I_{SHORT} | Short current | $V_{IN}=V_{OUT}+1.0\text{V}$ | 1 | | 30 | | mA |
| I_{OUT} | Maximum Output Current | $V_{IN}=V_{OUT}+1.0\text{V}$, $V_{OUT}>2.5\text{V}$ | 1 | 350 | | | mA |

Note 1. $V_{OUT(T)}$ =Specified output Voltage

Note 2. $V_{OUT(E)}$ =Effective output Voltage (i.e. the output voltage when " $V_{OUT(T)}+0\text{V}$ " is provided at the V_{IN} pin while maintaining a certain I_{OUT} value)

Note 3. $V_{DROP}=\{V_{IN1}(\text{note5})-V_{OUT1}(\text{note4})\}$

Note 4. V_{OUT1} =A voltage equal to 98% of the output voltage whenever an amply stabilized $I_{OUT}(V_{OUT(T)}+1.0\text{V})$ is input.

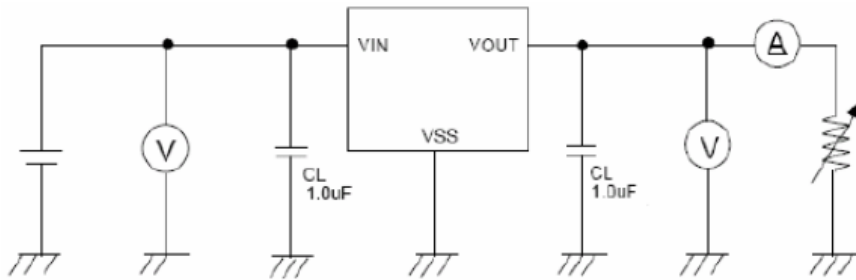
Note 5. V_{IN1} =The voltage when $V_{OUT}=V_{OUT1}$



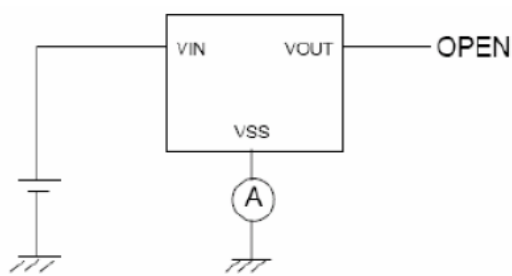
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Test Circuit

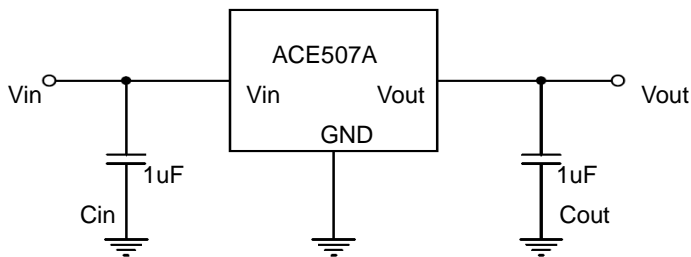


Test Circuit 1



Test Circuit 2

Typical Application Circuit





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Typical Performance Characteristics

3.0V Out unless otherwise specified

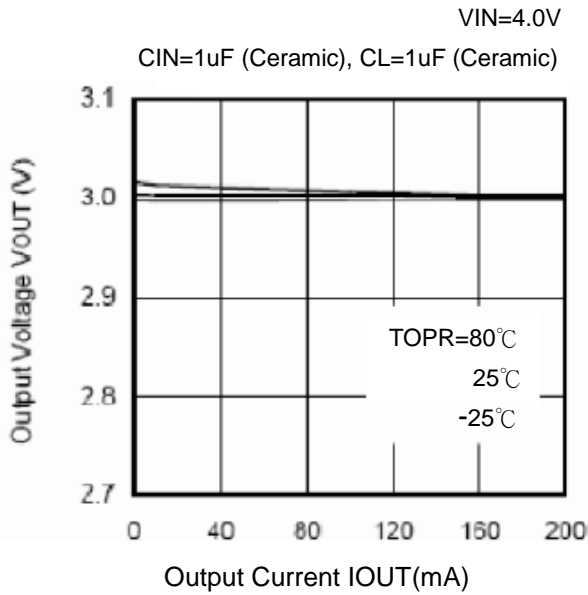


Figure1. Output Voltage vs. Output Current

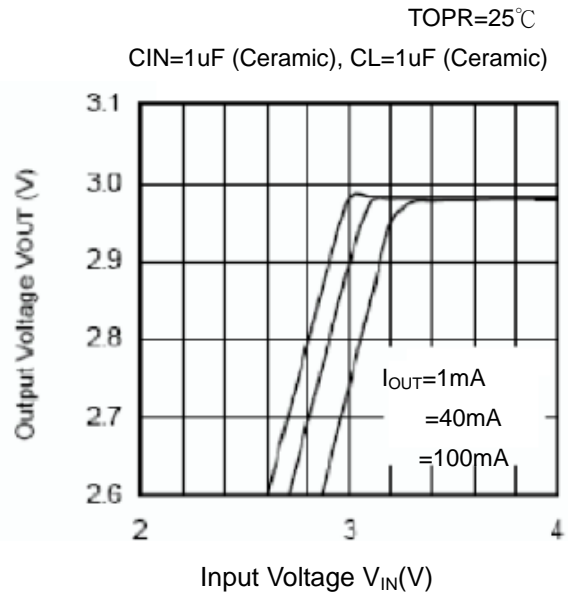


Figure 2. Output Voltage vs. Input Voltage

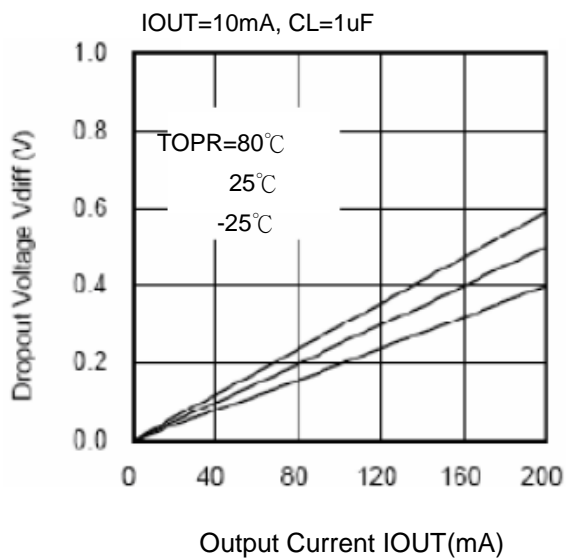


Figure 3. Dropout Voltage vs. Output Current

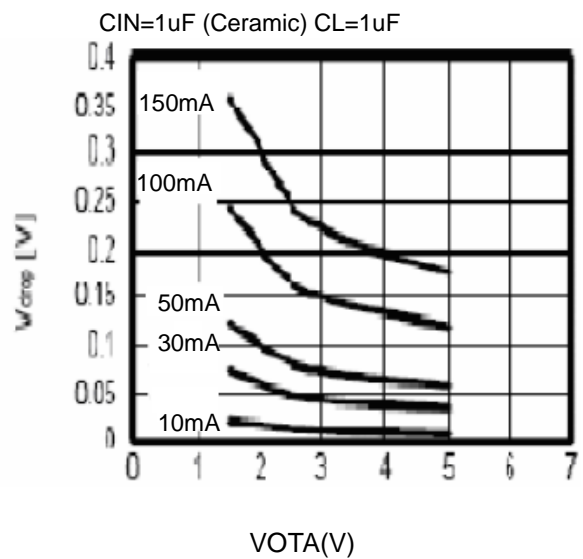


Figure4. Dropout Voltage vs. Output Voltage



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Typical Performance Characteristics

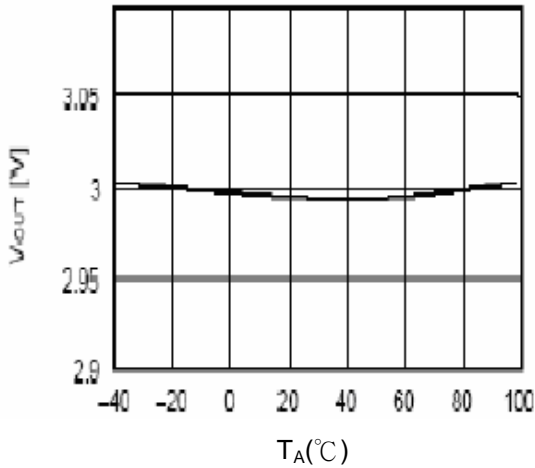


Figure 5. Output Voltage vs. Temperature

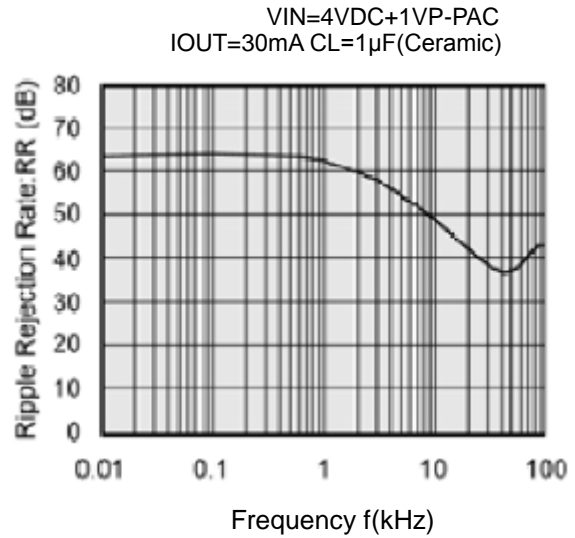


Figure 6. Ripple rejection rate

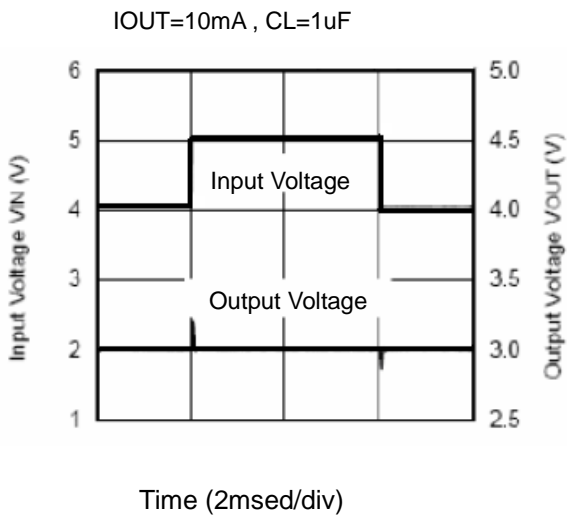


Figure 7. Input Transient Response

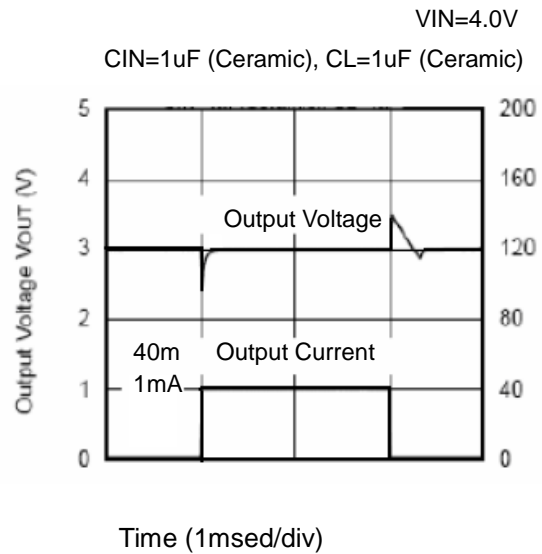


Figure 8. Load Transient Response

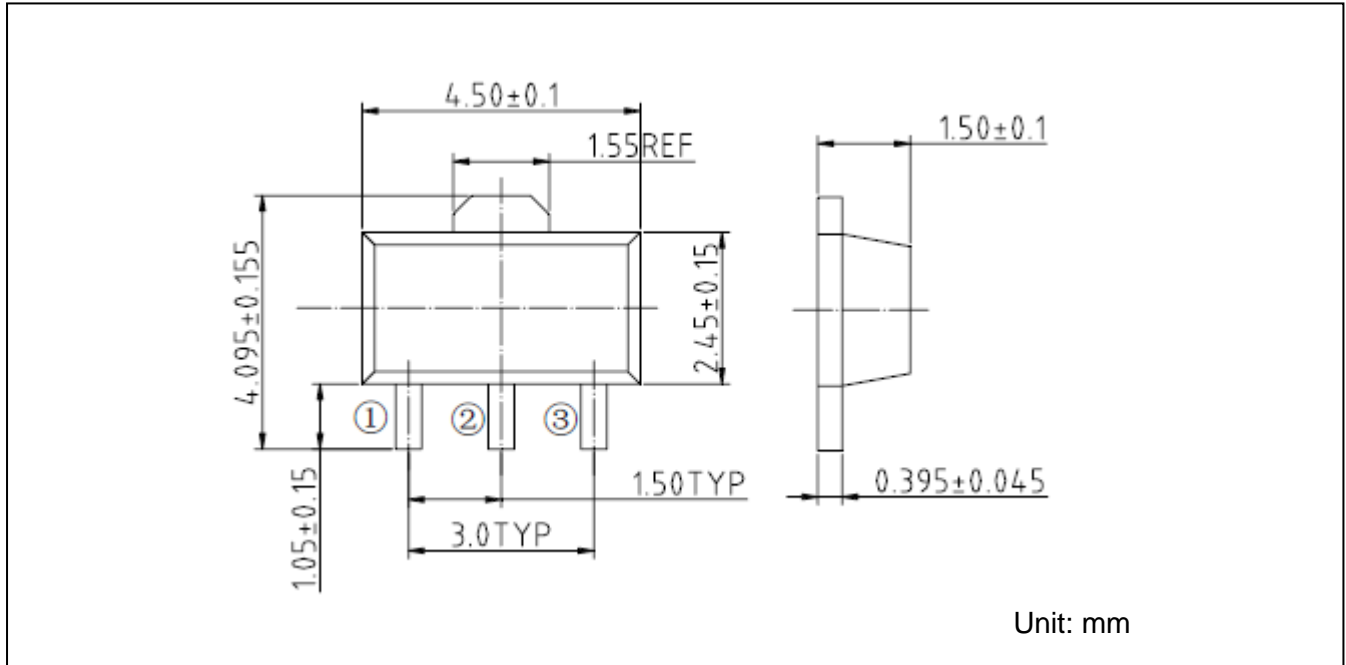


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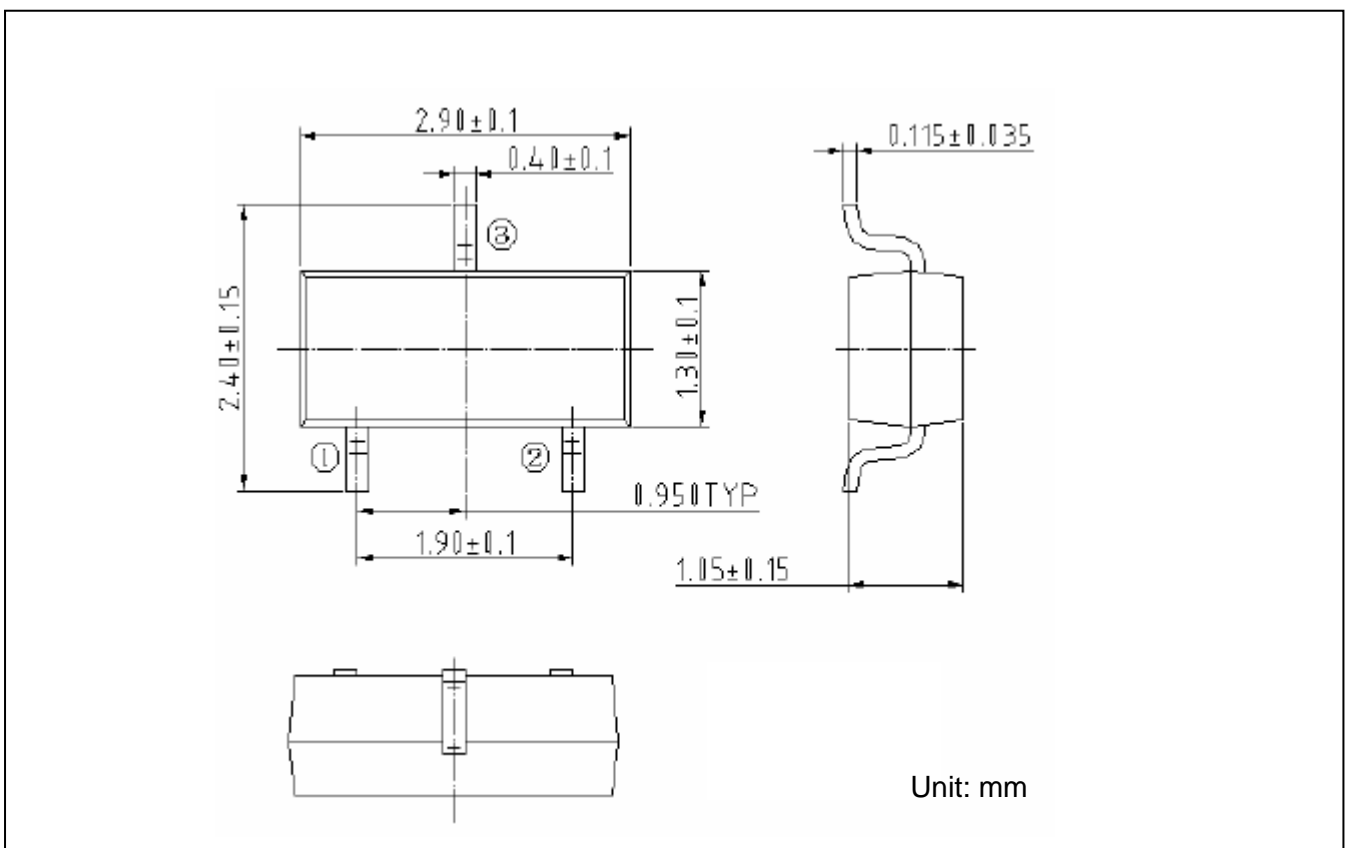
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Packing Information

SOT-89-3



SOT-23-3





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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 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.

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