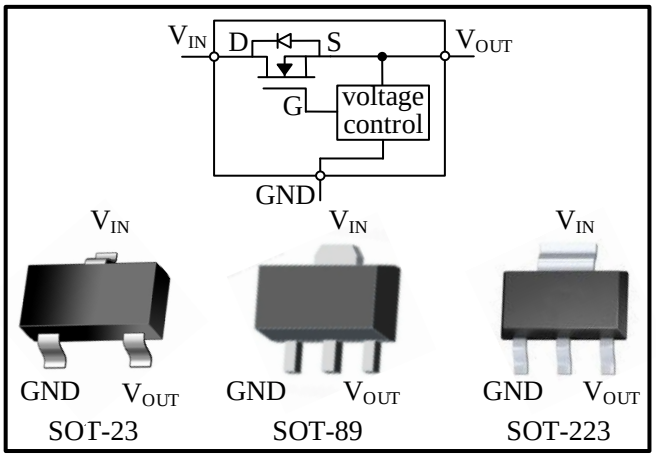
# 600V MOSovp™ Voltage Regulator / Overvoltage Protector

## General Features

- Typical Output Voltage: 16.6V @ $I_{OUT}$=1mA
- Maximum Input Voltage: 600V
- Very High-speed Transient Response
- Excellent Temperature Characteristics
- Overvoltage Protection
- Very High Reliability
- RoHS Compliant
- Halogen-free Available

| $V_{IN}$ | $R_{DS(ON)}$ (Typ.) | $I_{OUT}$ |
|---|---|---|
| 600V | 60Ω | 30mA |




## Applications

- Industrial Control
- Automotive
- Photovoltaic
- Overvoltage Protection
- Voltage Source
- Current Source

## Ordering Information

| Part Number | Package | Marking | Remark |
|---|---|---|---|
| AKZ17V60R | SOT-23 | 17V60 | Halogen Free |
| AKX17V60R | SOT-89 | 17V60 | Halogen Free |
| AKS17V60R | SOT-223 | 17V60 | Halogen Free |

## Typical Application Circuits

The AKZ17V60R series is an industry-first integrated voltage regulator developed by ARK using MOSovp™ technology. It is ideal for applications such as wide-range input voltage power supply, circuit overvoltage protection, and circuit overcurrent protection.

The typical circuit for the AKZ17V60R series of products for regulated power supply is as follows：

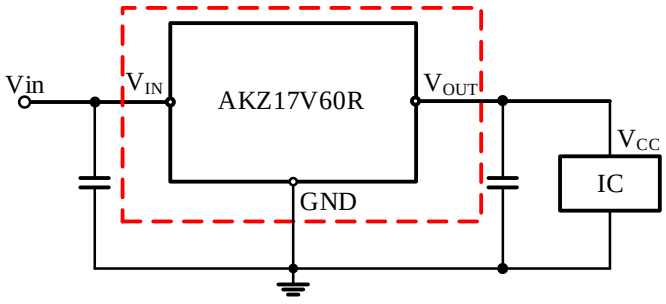



**Figure 1. Supplies power to the load circuit**

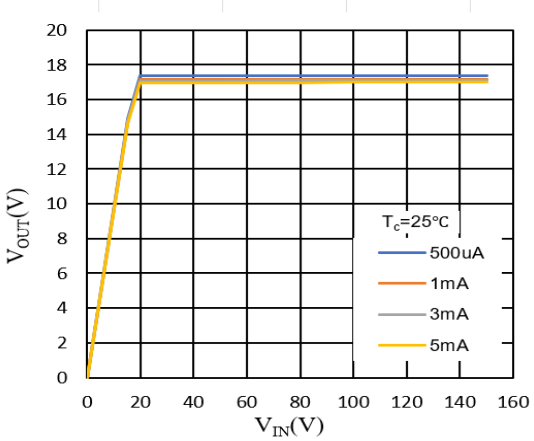



**Figure 2. Circuit test results**

As shown in Figure 1, AKZ17V60R can be used as a voltage regulator to provide a stable voltage to the load or IC, allowing input voltage up to 600V with low output ripple, with extremely high stability and reliability. The AKZ17V60R series also features automatic temperature compensation, and its output voltage has excellent temperature characteristics. This series of products has very low static current and very fast response speed, which can effectively suppress circuit surges.

The typical circuit for the AKZ17V60R series of products for overvoltage protection is as follows：

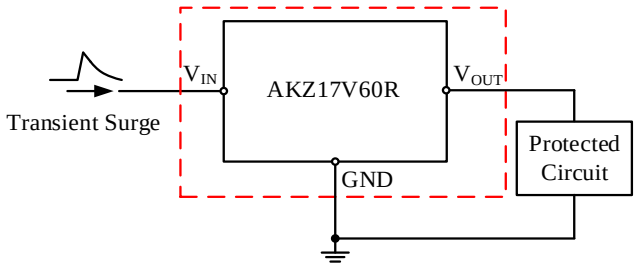



**Figure 3. Overvoltage protection for the load circuit**

As shown in Figure 3, the AKZ17V60R can be used as an overvoltage protector to provide overvoltage protection for the load circuit. The product has a very fast response speed and can effectively suppress circuit surges. When the circuit is not triggered clamping protection, $V_{OUT}$=$V_{IN}$. AKZ17V60R presents a low resistance characteristic and does not affect the circuit signal. When there is a surge signal in the input circuit, the AKZ17V60R responds quickly and immediately changes to a high resistance state, clamping the output voltage to provide overvoltage protection for the load circuit.

## Absolute Maximum Ratings

$T_A$ =25℃ unless otherwise specified

| Symbol | Parameter | AKZ17V60R | AKX17V60R | AKS17V60R | Unit |
|---|---|---|---|---|---|
| $V_{IN}$ | Input Voltage to GND [1] | 600 | | | V |
| $V_{SGND}$ | Output Voltage to GND Voltage | ±20 | | | V |
| $I_{OUT}$ | Continuous $V_{OUT}$ Current [1] | 30 | 50 | 70 | mA |
| $P_D$ | Power Dissipation | 0.5 | 1.0 | 1.5 | W |
| $T_L$ | Soldering Temperature Distance of 1.6mm from case for 10 seconds | 300 | | | ℃ |
| $T_J$ & $T_{STG}$ | Operating and Storage Temperature Range | -55 to 150 | | | |

*Caution: Stresses beyond those listed in the "Absolute Maximum Ratings" may cause permanent damage to the device.*

## Thermal Characteristics

| Symbol | Parameter | AKZ17V60R | AKX17V60R | AKS17V60R | Unit |
|---|---|---|---|---|---|
| $R_{\theta JC}$ | Thermal Resistance, Junction-to-Case | 250 | 125 | 83 | K/W |

## Electrical Characteristics

$T_A$ =25°C unless otherwise specified

| Symbol | Parameter | Min. | Typ. | Max. | Unit | Test Conditions |
|---|---|---|---|---|---|---|
| $V_{IN}$ | Input Voltage to GND | -- | -- | 600 | V | $T_J$ = −40°C to +125°C |
| $V_{OUT}$ | Output Voltage ($V_{IN}$＜$V_{CLAMP}$) [2] | -- | $V_{IN}$ | -- | V | $T_J$ = −40°C to +150°C |
| | Output Voltage ($V_{IN}$＞$V_{OUT}$) | -- | 17.0 | -- | V | $V_{IN}$ = 10 to 150 V, $I_{OUT}$ = 50 μA |
| | | -- | 16.6 | -- | V | $V_{IN}$ = 10 to 150 V, $I_{OUT}$ = 1 mA |
| | | -- | 16.3 | -- | V | $V_{IN}$ = 10 to 150 V, $I_{OUT}$ = 5 mA |
| | | -- | 16.0 | -- | V | $V_{IN}$ = 10 to 50 V, $I_{OUT}$ = 10 mA |
| $R_{DS(ON)}$ | Static On-state Resistance [3] | -- | 60 | 80 | Ω | $V_{GND}$=$V_{OUT}$ $I_{OUT}$ =50mA |
| $I_{GND}$ | Quiescent Current | -- | -- | 20 | uA | $V_{IN}$ = 10 to 600 V, $I_{OUT}$ = 0 mA |

*Caution: The Maximum steady state usable output current and input voltage are very dependent on the heating sinking and/or lead temperature length of the package.*

## Source-Drain Diode Characteristics

$T_A$=25°C unless otherwise specified

| Symbol | Parameter | Min | Typ. | Max. | Unit | Test Conditions |
|---|---|---|---|---|---|---|
| $V_{SD}$ | Diode Forward Voltage | -- | -- | 1.2 | V | $I_{OUT}$ =-50mA $V_{SGND}$ = 20 V |

NOTE：

[1] Cannot exceed the Power Dissipation of the device.
[2] The input voltage is lower than the clamp voltage value, the internal depletion MOSFET operate in a linear resistance region, and the output voltage is approximately equal to the input voltage value.
[3] Pulse width≤380μs, duty cycle≤2%.

## Typical Characteristics

**Figure 4. Output Voltage(Vout)vs. Ambient Temperature**

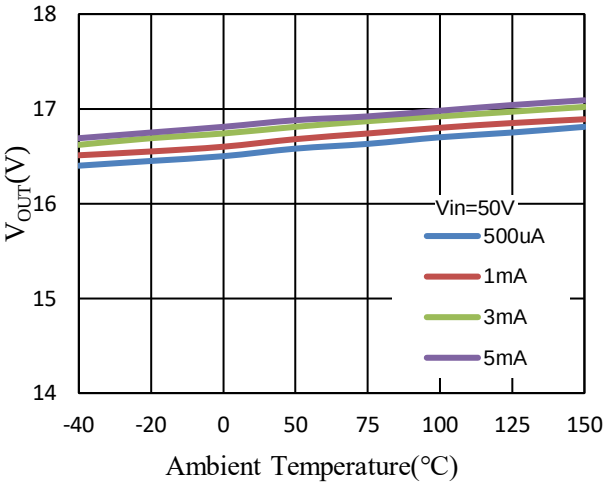



**Figure 5. Output Voltage(Vout)vs. Junction Temperature(℃)**

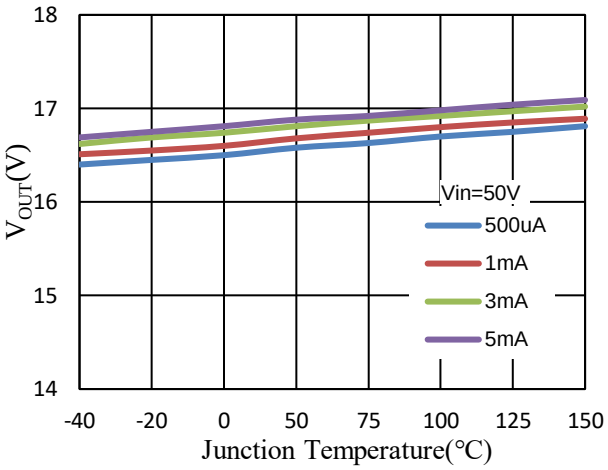



**Figure 6. Output Voltage vs. Input Voltage**

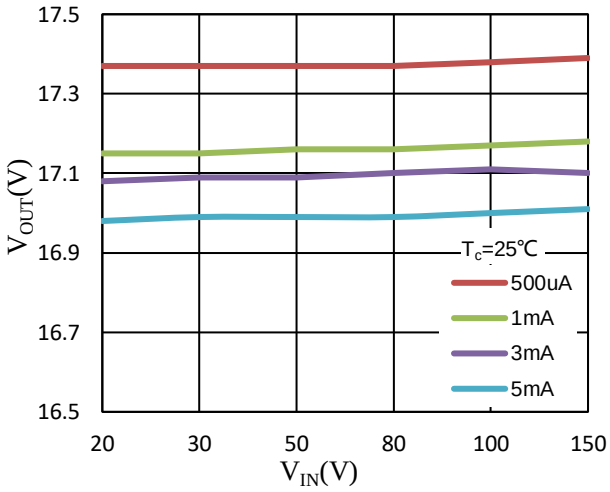
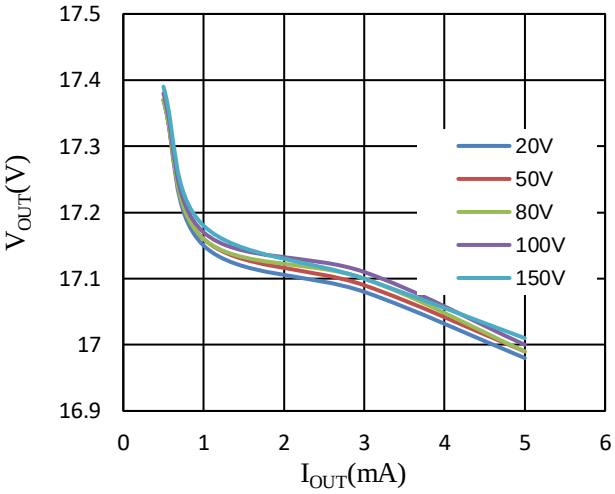
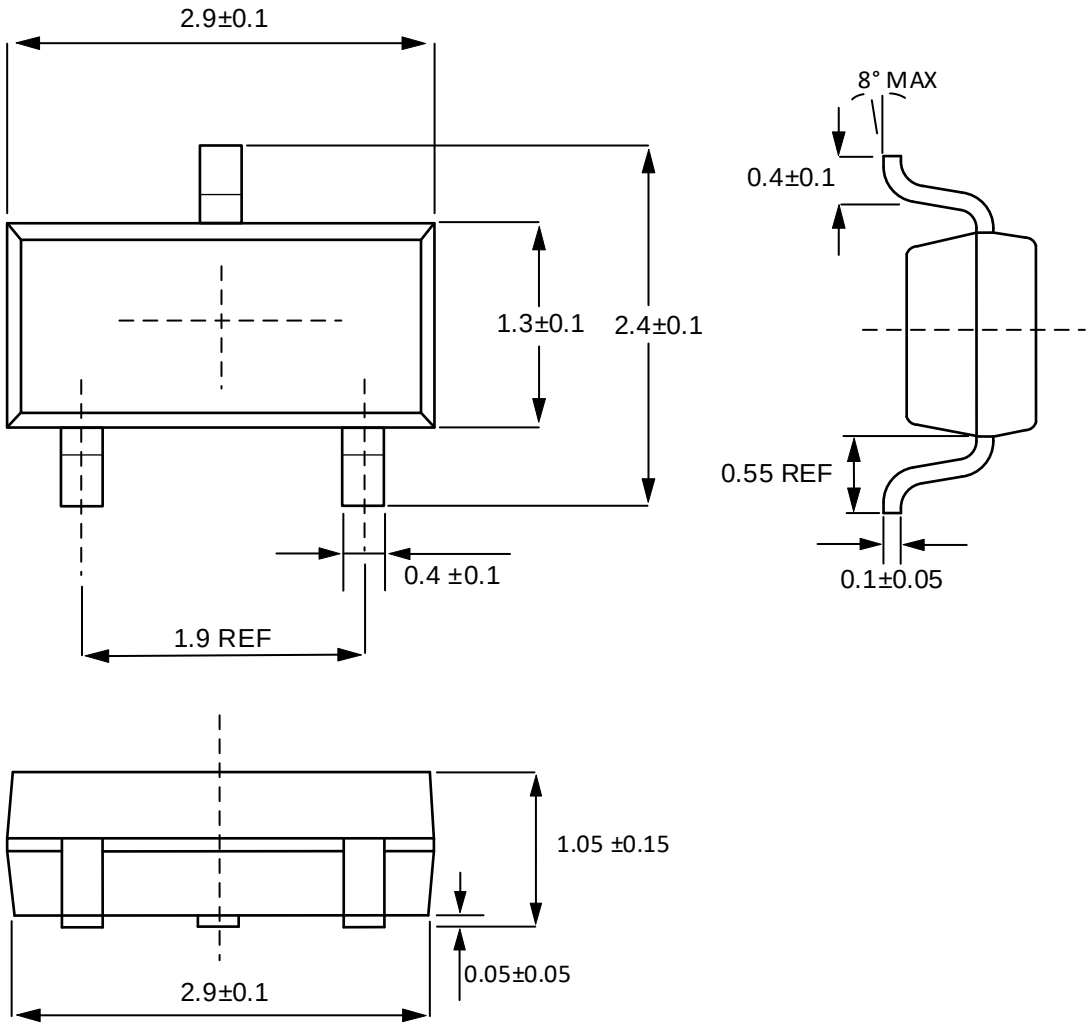



**Figure 7. Output Voltage vs. Load current**

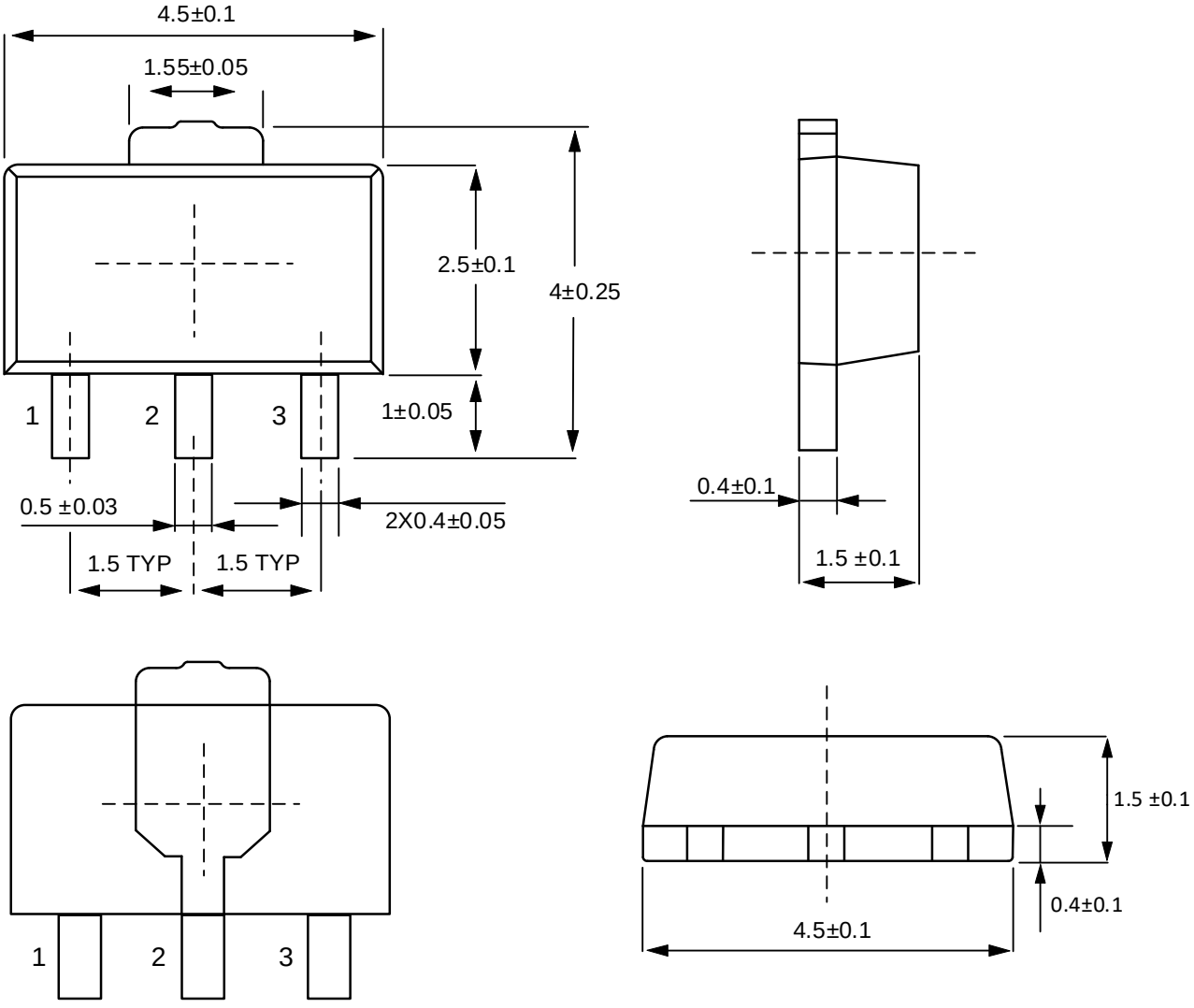


## Package Dimensions

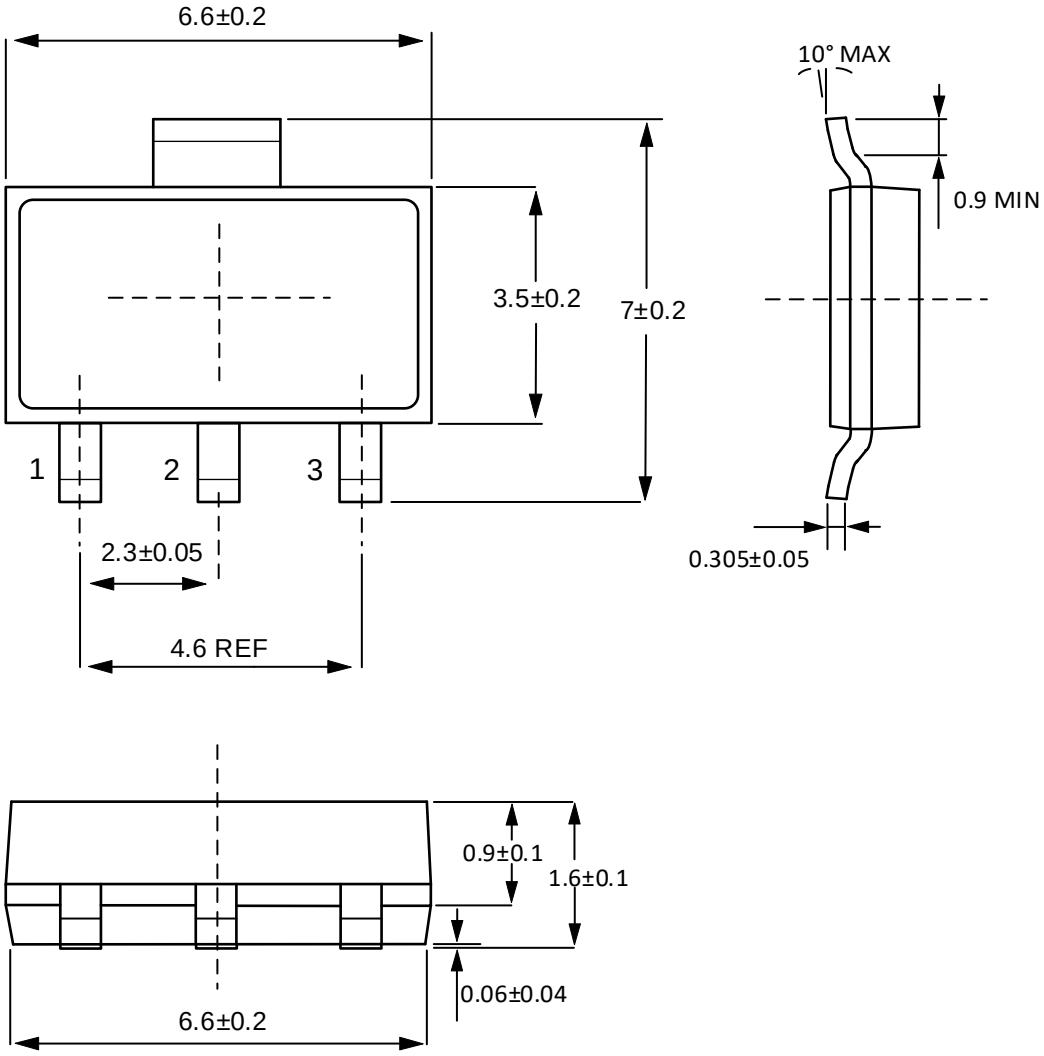
### SOT-23



## SOT-89


4.5±0.1
1.55±0.05
2.5±0.1
4±0.25
1±0.05
1
2
3
0.5 ±0.03
2X0.4±0.05
1.5 TYP
1.5 TYP
0.4±0.1
1.5 ±0.1
1.5 ±0.1
0.4±0.1
4.5±0.1

## SOT-223


6.6±0.2
10° MAX
0.9 MIN
3.5±0.2
7±0.2
1
2
3
2.3±0.05
4.6 REF
0.305±0.05
0.9±0.1
1.6±0.1
0.06±0.04
6.6±0.2

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   a. Cause the failure of the life support device or system, or
   b. Affect its safety or effectiveness.