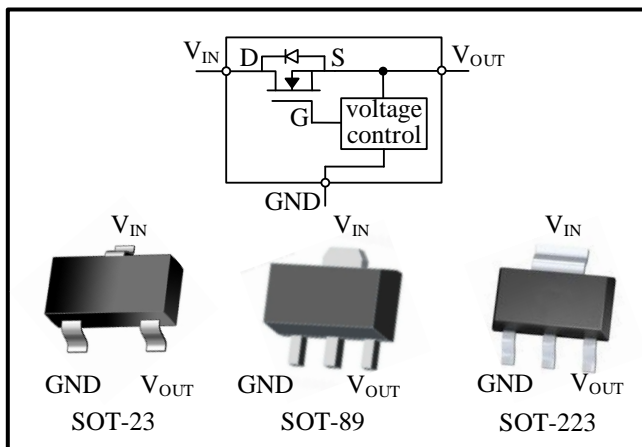


### 210V MOSvp™ Voltage Regulator / Overvoltage Protector

#### General Features

- Typical Output Voltage: 31V @  $I_{OUT}=1mA$
- Maximum Input Voltage: 210V
- Maximum Output Current: 30 mA
- Blocks Surges up to 180V
- Very High-speed Transient Response
- Excellent Temperature Characteristics
- Overvoltage Protection
- Very High Reliability
- RoHS Compliant
- Halogen-free Available

$V_{IN}$	$R_{DS(ON)}$ (Typ.)	$I_{OUT}$
210V	7 $\Omega$	30mA



#### Applications

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

#### Ordering Information

Part Number	Package	Marking	Remark
AKZ35V15R	SOT-23	35V15R	Halogen Free
AKX35V15R	SOT-89	35V15R	Halogen Free
AKS35V15R	SOT-223	35V15R	Halogen Free

#### Absolute Maximum Ratings

$T_A = 25^\circ\text{C}$  unless otherwise specified

Symbol	Parameter	AKZ35V15R	AKX35V15R	AKS35V15R	Unit
V <sub>IN</sub>	Input Voltage to GND <sup>[1]</sup>	210			V
V <sub>SGND</sub>	Source to GND Voltage	±40			V
I <sub>OUT</sub>	Continuous V <sub>OUT</sub> Current <sup>[1]</sup>	30	50	70	mA
P <sub>D</sub>	Power Dissipation	0.5	1.0	1.5	W
T <sub>L</sub>	Soldering Temperature Distance of 1.6mm from case for 10 seconds	300			°C
T <sub>J</sub>	Operating Temperature Range	-55 to 125			
T <sub>STG</sub>	Storage Temperature Range	-55 to 150			

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

#### Thermal Characteristics

Symbol	Parameter	AKZ35V15R	AKX35V15R	AKS35V15R	Unit
$R_{\theta JC}$	Thermal Resistance, Junction-to-Case	250	125	83	K/W



# AKZ35V15R/AKX35V15R/AKS35V15R

## Provisional datasheet

### Electrical Characteristics

T<sub>A</sub> = 25°C unless otherwise specified

Symbol	Parameter	Min.	Typ.	Max.	Unit	Test Conditions
V <sub>IN</sub>	Input Voltage to GND	--	--	210	V	T <sub>J</sub> = -40°C to +125°C
V <sub>OUT</sub>	Output Voltage	--	--	35	V	V <sub>IN</sub> = 25 to 210 V, I <sub>OUT</sub> = 0 μA
		--	32	--	V	V <sub>IN</sub> = 25 to 210 V, I <sub>OUT</sub> = 10 to 100 μA
		--	31	--	V	V <sub>IN</sub> = 25 to 210 V, I <sub>OUT</sub> = 0.1 to 1 mA
		28	30.5	--	V	V <sub>IN</sub> = 25 to 70 V, I <sub>OUT</sub> = 3 to 10 mA
BV <sub>DSV</sub>	Drain-to-Source Breakdown Voltage	180	--	--	V	V <sub>GND</sub> S = -36V I <sub>DS</sub> = 250 μA
R <sub>DS(ON)</sub>	Static On-state Resistance <sup>[1]</sup>	--	7	--	Ω	V <sub>SGND</sub> = 0V I <sub>DS</sub> = 100mA

### Source-Drain Diode Characteristics

T<sub>A</sub> = 25°C unless otherwise specified

Symbol	Parameter	Min	Typ.	Max.	Unit	Test Conditions
V <sub>SD</sub>	Diode Forward Voltage	--	--	1.2	V	I <sub>SD</sub> = 100mA V <sub>GND</sub> S = -36 V

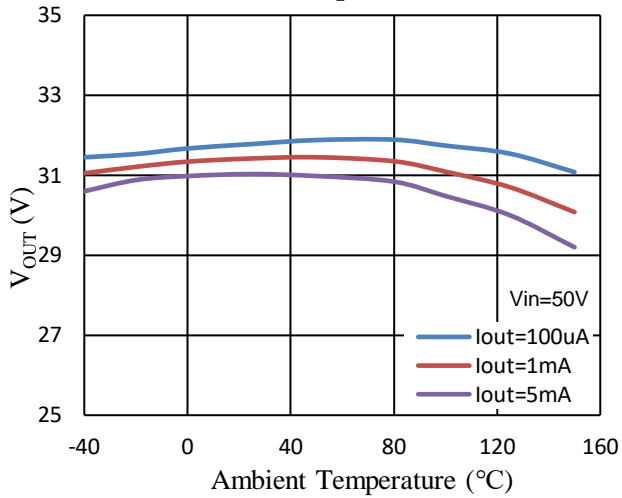
NOTE:

[1] Cannot exceed the power dissipation of the device.

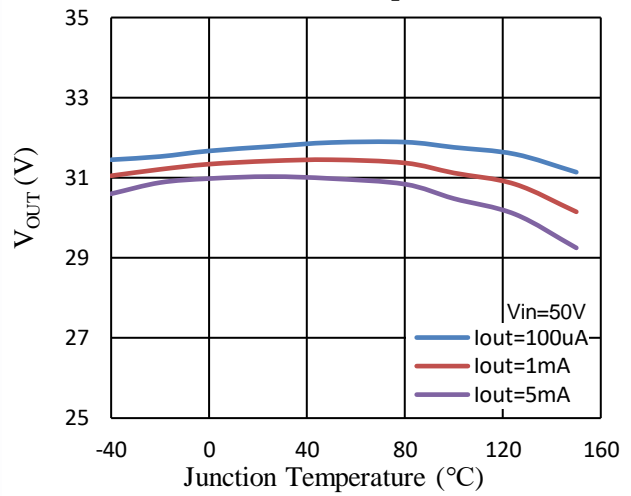
[2] Pulse width ≤ 380 μs, duty cycle ≤ 2%.

### Typical Characteristics

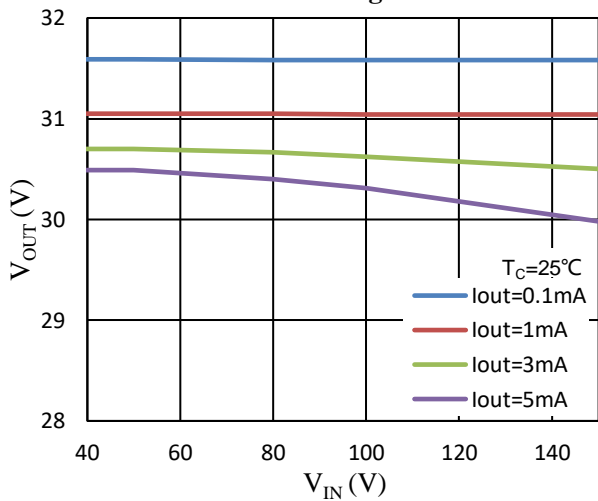
**Figure 1. Output Voltage vs. Ambient Temperature**



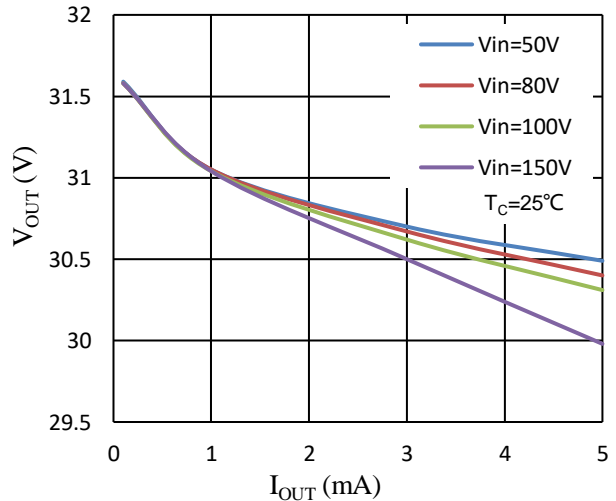
**Figure 2. Output Voltage(V<sub>out</sub>) vs. Junction Temperature**



**Figure 3. Output Voltage vs. Input Voltage**



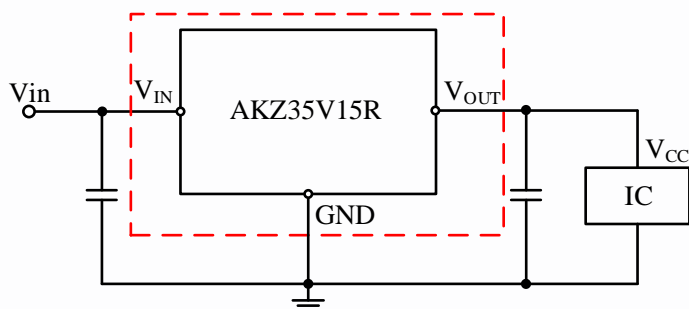
**Figure 4. Output Voltage vs. Load Current**



### Typical Application Circuits

The AKZ35V15R 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.

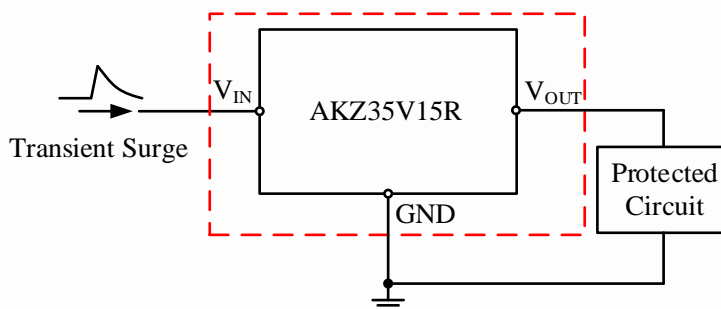
The typical circuit for the AKZ35V15R series of products for regulated power supply is as follows:



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

As shown in Figure 1, AKZ35V15R can be used as a voltage regulator to provide a stable voltage to the load or IC, allowing input voltage up to 210V with low output ripple, with extremely high stability and reliability. The AKZ35V15R 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.

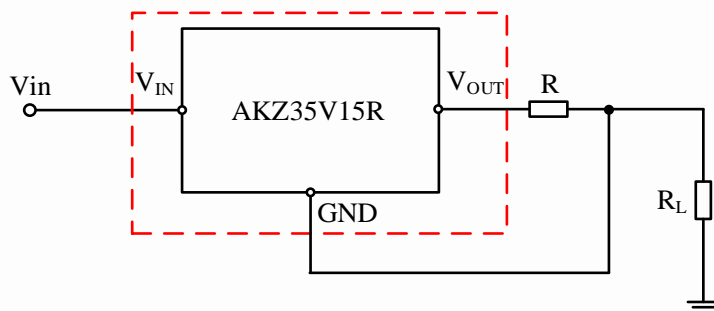
The typical circuit for the AKZ35V15R series of products for overvoltage protection is as follows:



**Figure 2. Overvoltage protection for the load circuit**

As shown in Figure 2, the AKZ35V15R 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,  $V_{OUT} = V_{IN}$ . AKZ35V15R presents a low resistance characteristic and does not affect the circuit signal. When there is a surge signal in the input circuit, the AKZ35V15R responds quickly and immediately changes to a high resistance state, clamping the output voltage to provide overvoltage protection for the load circuit.

The typical circuit for the AKZ35V15R series of products for overcurrent protection is as follows:



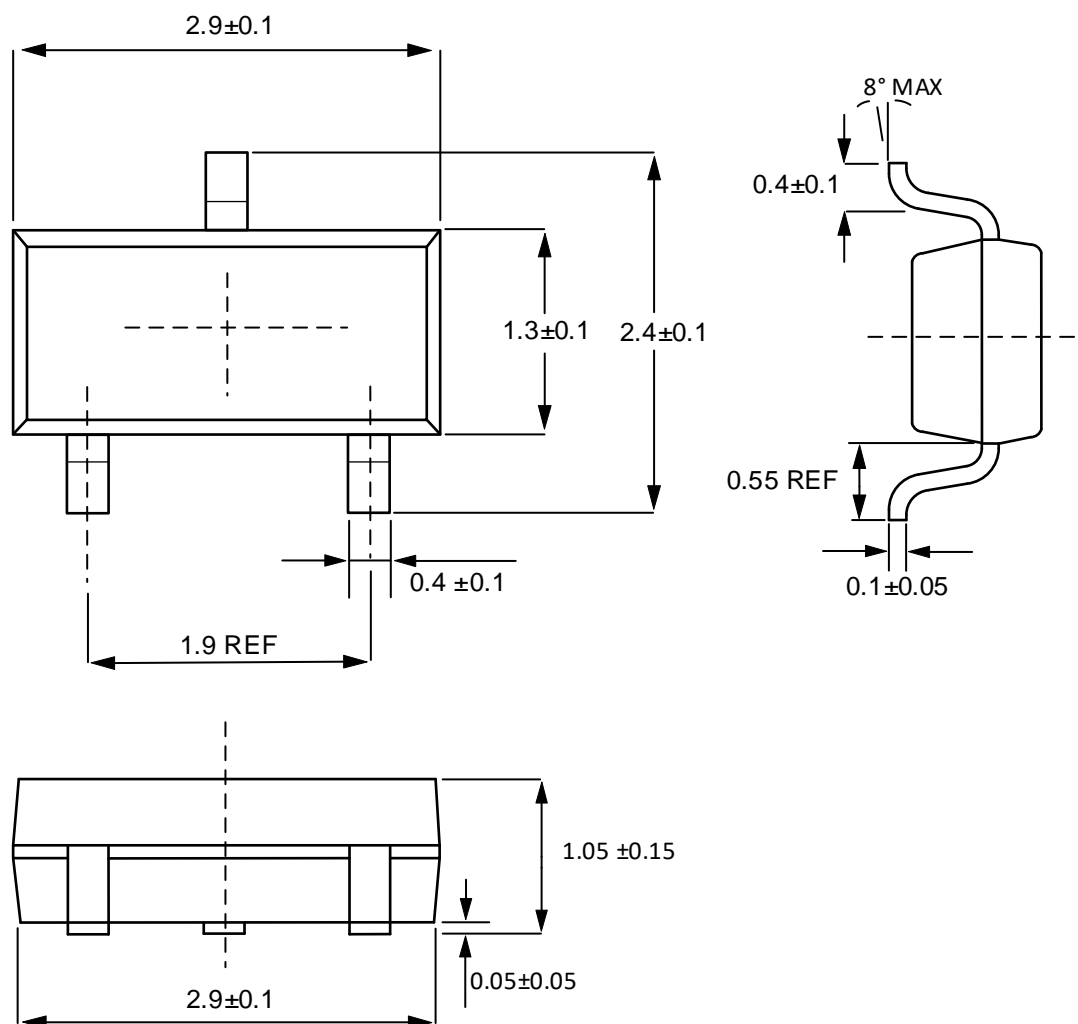
**Figure 3. Overcurrent protection for the load circuit**

As shown in Figure 3, AKZ35V15R can be used with a current limiting resistor to form a simple constant current source/overcurrent protector to provide constant current power supply or overcurrent protection for load circuits. The maximum voltage across the resistor R1 in the circuit is  $V_{MAX} = V_{OUT(MAX)}$ , so the maximum current flowing through R1 is  $I_{MAX} = V_{OUT(MAX)} / R_1$ , which means the current flowing through the circuit will be limited to a certain range, thus providing overcurrent protection for the load circuit.

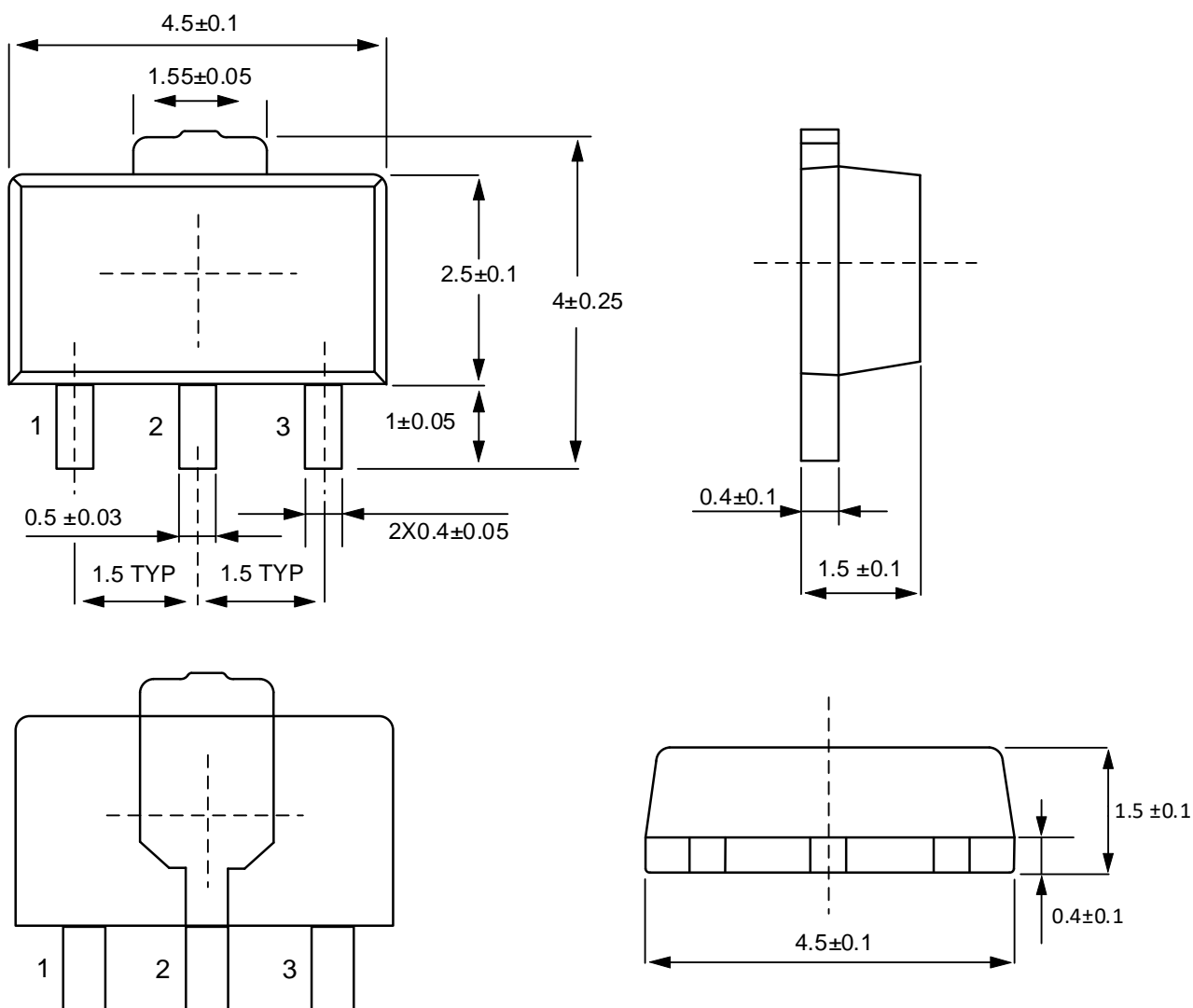
This circuit can also be used as a constant current source to power a load in applications with a wide range of voltage inputs, with a constant current of  $I = V_{OUT(MAX)} / R_1$ .

## Package Dimensions

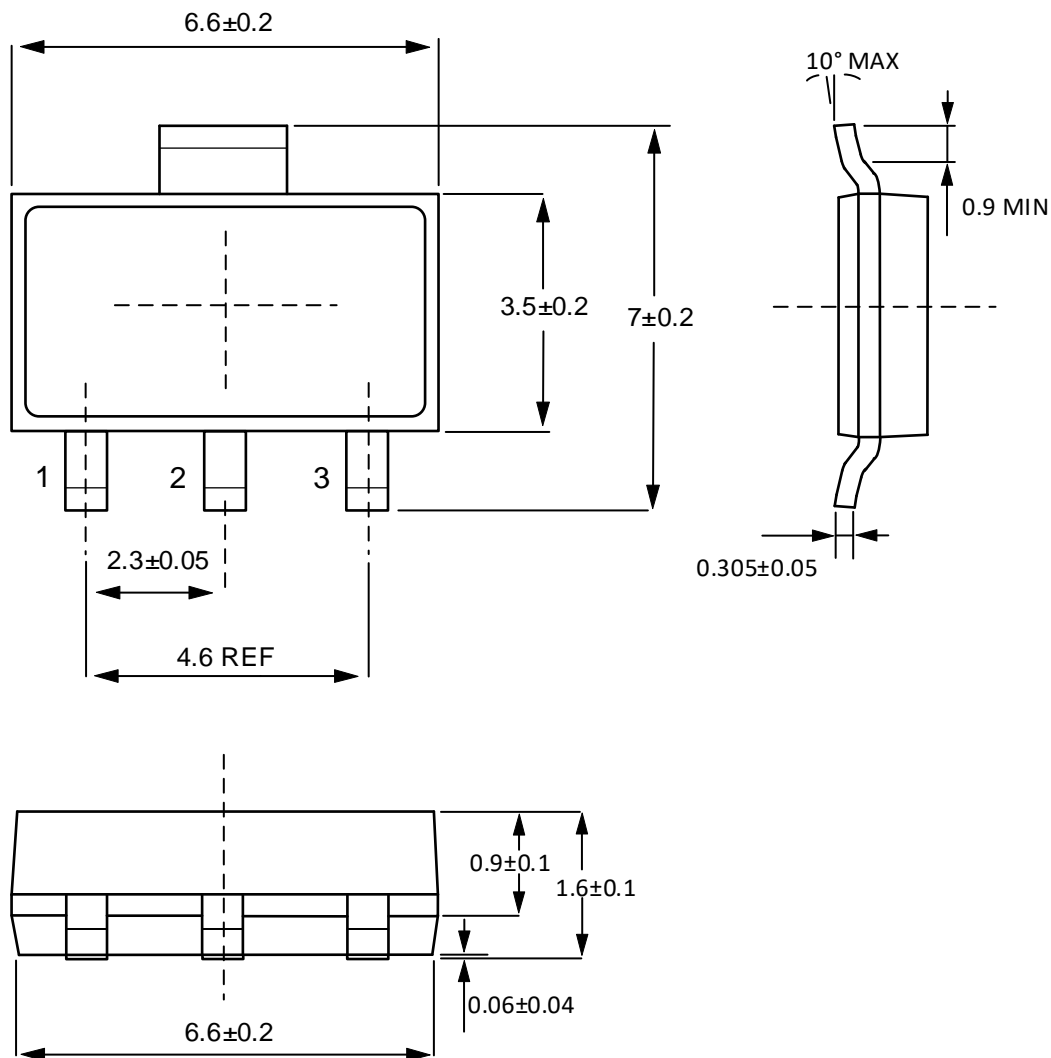
### SOT-23



**SOT-89**



**SOT-223**







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    - b. support or sustain life,
    - c. whose failure to perform when properly used in accordance with instructions for use provided in the labeling, can be reasonably expected to result in significant injury to the user.
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