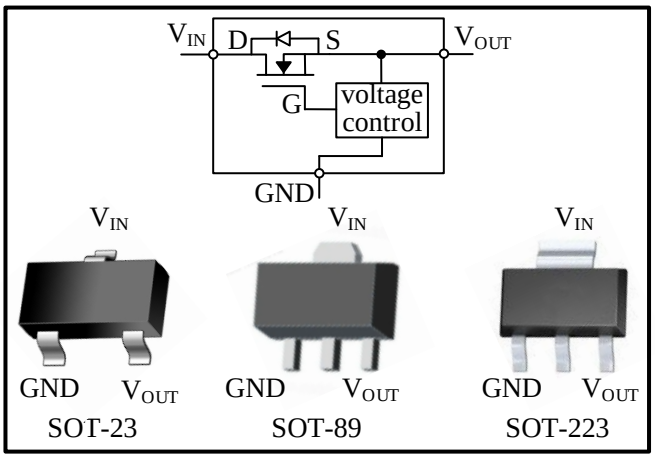
200V MOSovp™ Voltage Regulator / Overvoltage Protector

General Features

- Typical Output Voltage: 24V @ I_{OUT}=1mA
- Maximum Input Voltage: 200V
- 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}
200V	7Ω	30mA



Applications

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

Ordering Information

Part Number	Package	Marking	Remark
AKZ25V15R	SOT-23	25V15R	Halogen Free
AKX25V15R	SOT-89	25V15R	Halogen Free
AKS25V15R	SOT-223	25V15R	Halogen Free

Absolute Maximum Ratings

T_A =25℃ unless otherwise specified

Symbol	Parameter	AKZ25V15R	AKX25V15R	AKS25V15R	Unit
V_{IN}	Input Voltage to GND [1]	200			V
V_{SGND}	Source to GND Voltage	±30			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	Operating Temperature Range	-55 to 125			
T_{STG}	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	AKZ25V15R	AKX25V15R	AKS25V15R	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	--	--	200	V	T_J = −40°C to +125°C
V_{OUT}	Output Voltage	--	--	28	V	V_{IN} = 25 to 200 V, I_{OUT} = 0 μA
		--	24.5	--	V	V_{IN} = 25 to 200 V, I_{OUT} = 10 to 100 μA
		--	24	--	V	V_{IN} = 25 to 200 V, I_{OUT} = 0.1 to 1 mA
		20	23.5	--	V	V_{IN} = 25 to 60 V, I_{OUT} = 3 to 10 mA
BV_{DSV}	Drain-to-Source Breakdown Voltage	180	--	--	V	V_{GNDS}=-28V I_{DS}=250μA
$R_{DS(ON)}$	Static On-state Resistance [1]	--	7	--	Ω	V_{SGND}=0V I_{DS}=100mA

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_{SD} =100mA V_{GNDS} = -28 V

NOTE:

[1] Cannot exceed the power dissipation of the device.
[2] Pulse width≤380μs, duty cycle≤2%.

Typical Characteristics

Figure 1. Output Voltage vs. Ambient Temperature

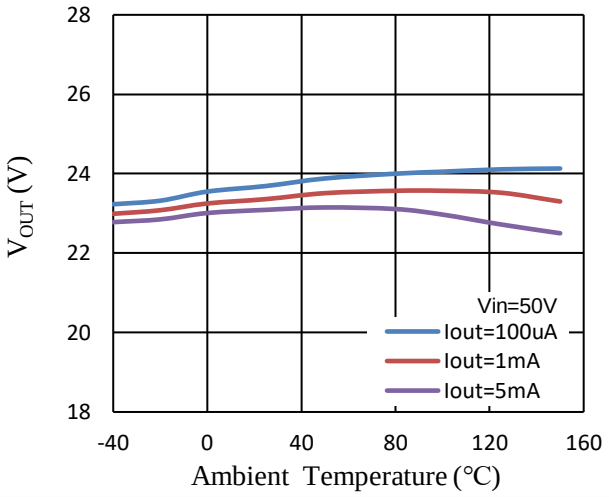


Figure 2. Output Voltage vs. Junction Temperature

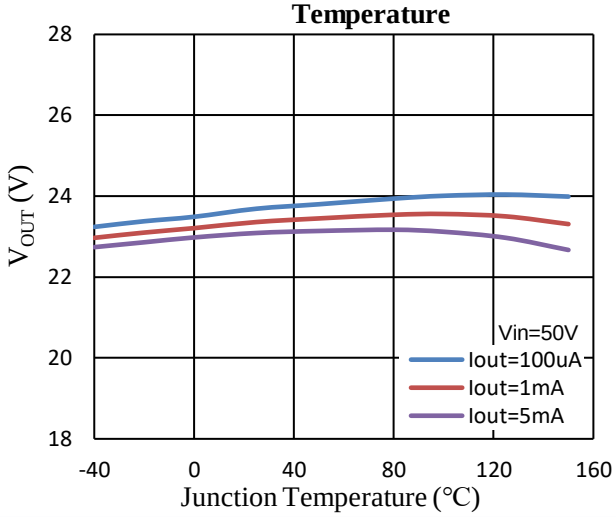


Figure 3. Output Voltage vs. Input Voltage

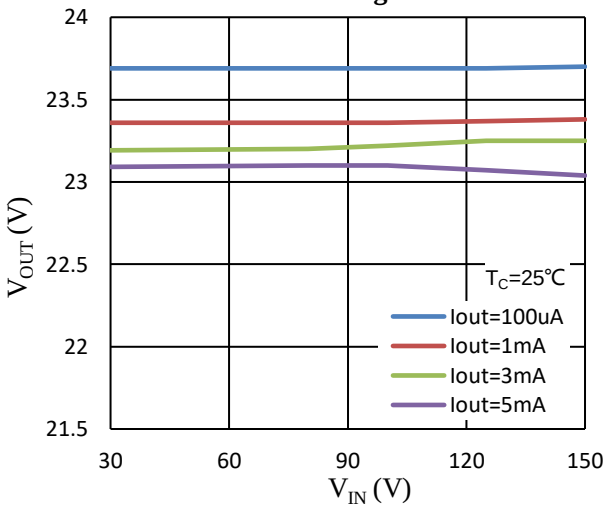
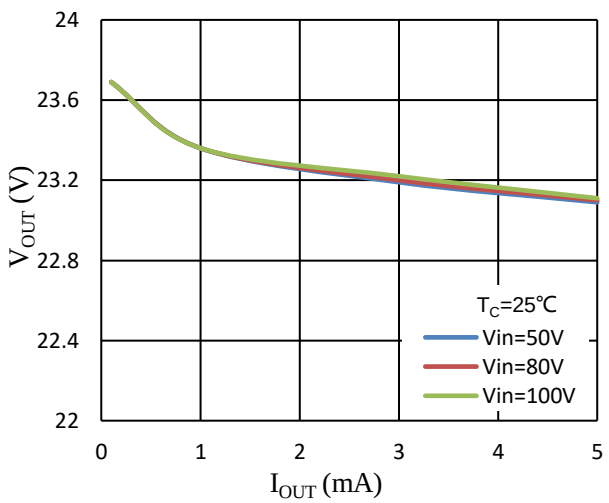


Figure 4. Output Voltage vs. Load Current



Typical Application Circuits

The AKZ25V15R 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 AKZ25V15R series of products for regulated power supply is as follows：

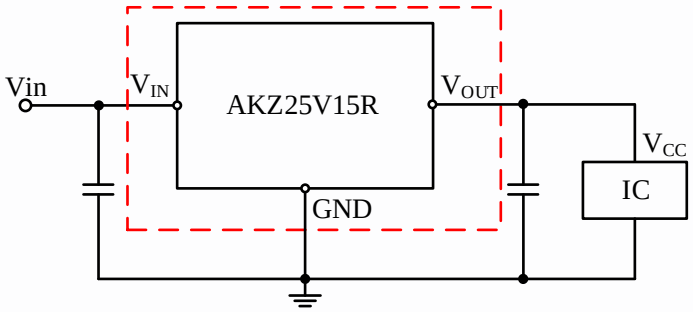


Figure 1. Supplies power to the load circuit

As shown in Figure 1, AKZ25V15R can be used as a voltage regulator to provide a stable voltage to the load or IC, allowing input voltage up to 200V with low output ripple, with extremely high stability and reliability. The AKZ25V15R 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 AKZ25V15R series of products for overvoltage protection is as follows：

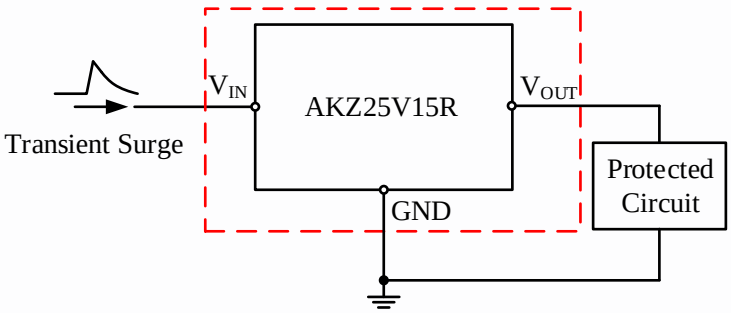


Figure 2. Overvoltage protection for the load circuit

As shown in Figure 2, the AKZ25V15R 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, $V_{OUT} = V_{IN}$. AKZ25V15R presents a low resistance characteristic and does not affect the circuit signal. When there is a surge signal in the input circuit, the AKZ25V15R 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 AKZ25V15R series of products for overcurrent protection is as follows：

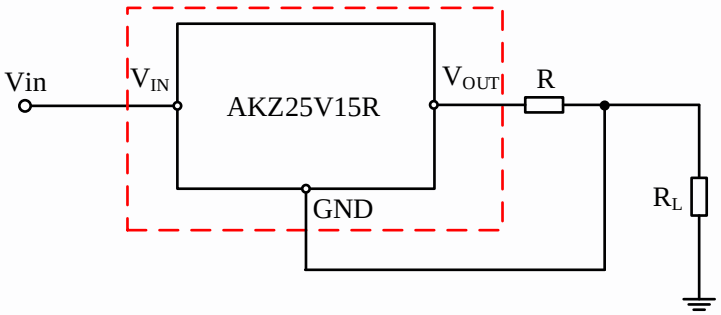


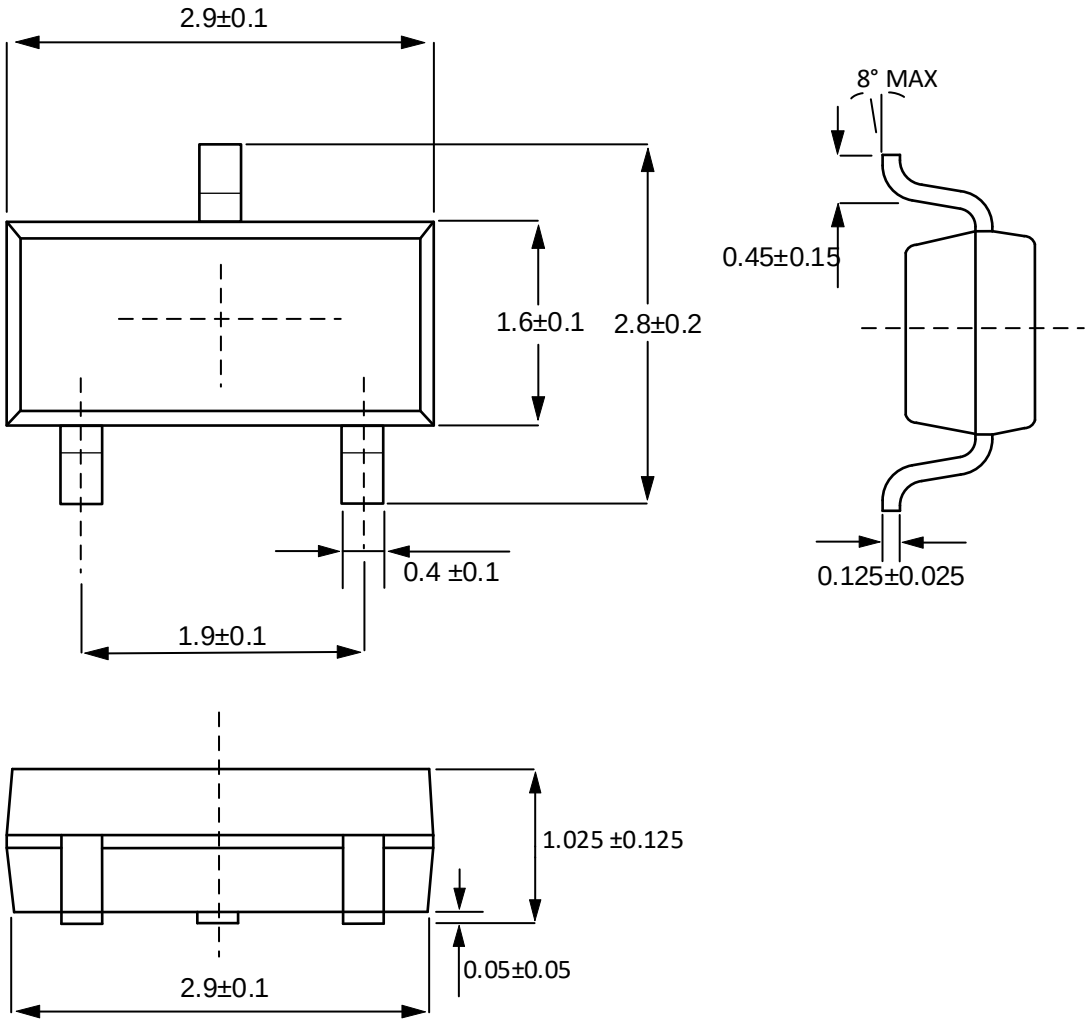
Figure 3. Overcurrent protection for the load circuit

As shown in Figure 3, AKZ25V15R 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.

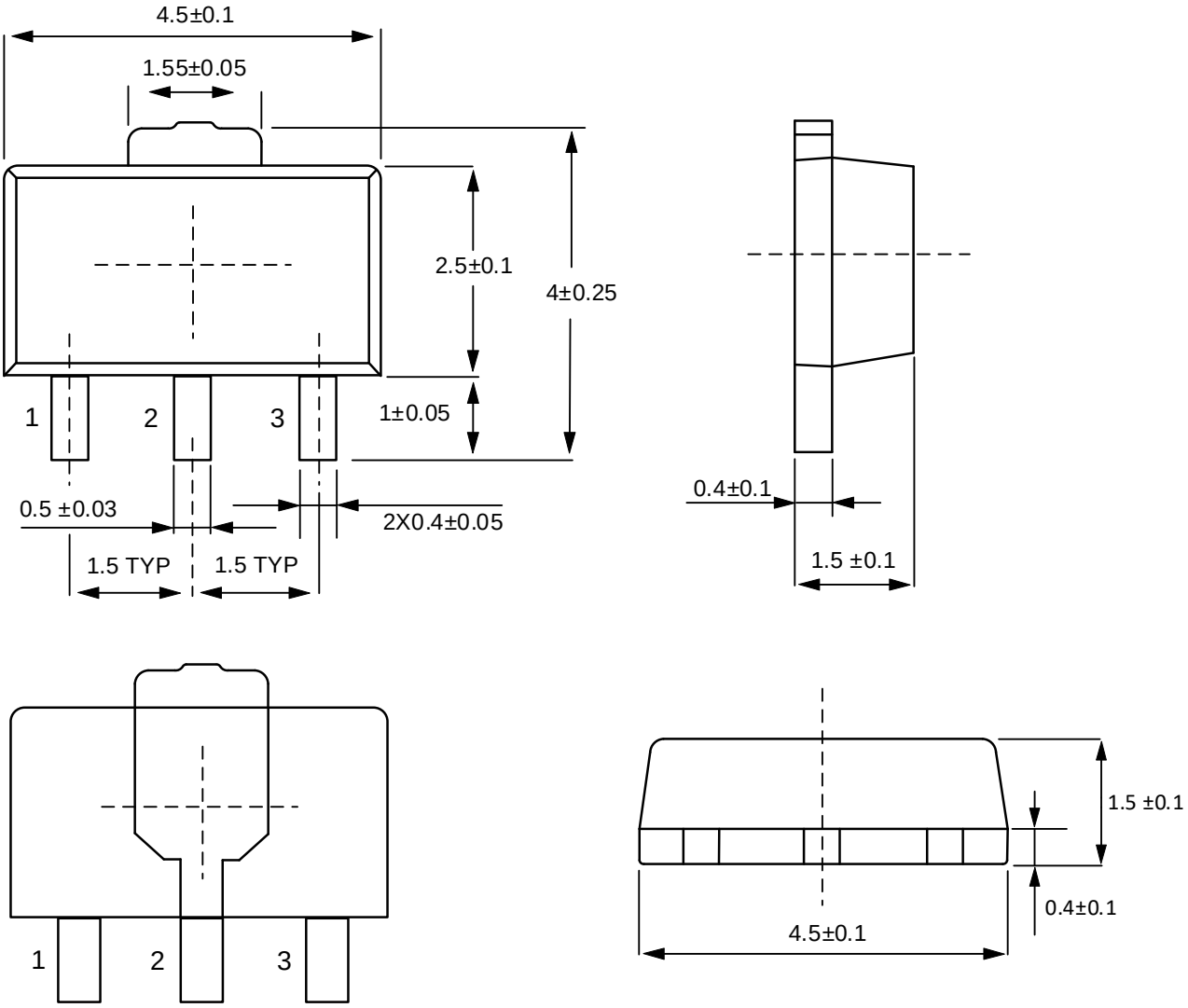
This circuit can also be used as a constant current source to power a load in applications with a wide range of voltage inputs, with a constant current of $I = V_{OUT(MAX)} / R_1$.

Package Dimensions

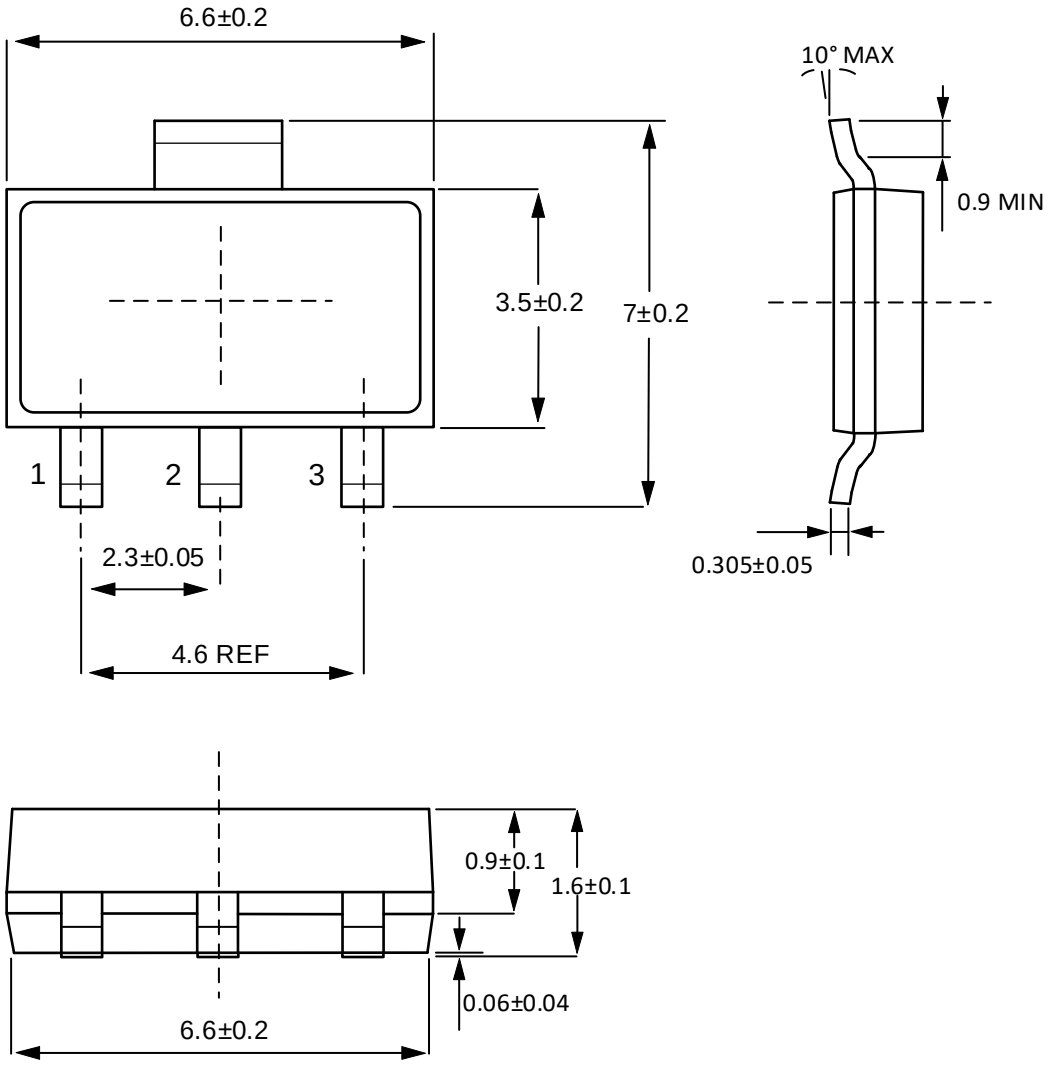
SOT-23



SOT-89


4.5±0.1
1.55±0.05
2.5±0.1
4±0.25
1
2
3
1±0.05
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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   b. support or sustain life,
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