

## Quick Detection of Flame from Distance, Compact UV Sensor with High Sensitivity and Wide Directivity, Suitable for Flame Detectors and Fire Alarms.

The UV TRON R9533 and R9454 are UV sensors that utilize the photoelectric effect from metal and gas multiplication. These devices are sensitive only to UV light in a spectral range of 185 nm to 260 nm. This makes them easy to use since they do not require optical visible-cut filters. Their electrodes are optimized for ruggedness to resist mechanical shocks up to 10 times (10000 m/s<sup>2</sup>) greater than the conventional UV TRONs. The R9533 is a head-on type (UV light enters through the top of the bulb) that easily installs into equipment. The R9454 is a side-on type (UV light enters through the side of the bulb) whose outer appearance resembles the conventional flame sensor R2868. Both these types utilize a plate cathode and feature high sensitivity and a wide field of view (directivity).

### APPLICATIONS

- Flame detectors for gas/oil lighters and matches
- Fire alarms
- Arson watch monitors
- Combustion monitors for burners
- Inspection of ultraviolet leakage
- Detection of discharge
- Ultraviolet switching

### SPECIFICATIONS

#### GENERAL

Parameter	R9454	R9533	Unit
Spectral Response	185 to 260		nm
Window Material	UV glass		—
Weight	Approx. 1.5	Approx. 2.5	g

#### MAXIMUM RATINGS

Parameter	R9454	R9533	Unit
Supply Voltage (DC)	500	400	V
Peak Current <sup>①</sup>	30		mA
Average Discharge Current <sup>②</sup>	1		mA
Operating Ambient Temperature	-20 to +60	-20 to +125	°C

#### CHARACTERISTICS (at 25 °C)

Parameter	R9454	R9533	Unit
Discharge Starting Voltage (with UV radiation) (DC) Max.	360	280	V
Recommended Operating Voltage (DC)	400 ± 25	350 ± 25	V
Background <sup>③</sup> Max.	10		min <sup>-1</sup>
Sensitivity <sup>④</sup> Typ.	4000	10000	min <sup>-1</sup>

**NOTE:** ① This is the maximum momentary current that can be handled if its full width at half maximum is less than 10 μs.

② If the tube is operated near this or higher, the service life is noticeably reduced. Use the tube within the recommended current values.

③ Measured under room illuminations (approximately 500 lux) and recommended operating conditions. Note that these values may increase if the following environmental factors are present.

1. Mercury lamps, sterilization lamps, or halogen lamps are located nearby. 2. Direct or reflected sunlight is incident on the tube.

3. Electrical sparks such as welding sparks are present. 4. Radiation sources are present. 5. High electric field (including static field) generates across the tube.

④ These are representative values for a wavelength of 200 nm and a light input of 10 pW/cm<sup>2</sup>. In actual use, the sensitivity will vary with the wavelength of the ultraviolet radiation and the drive circuitry employed.



Left: R9533 Right: R9454

# FLAME SENSOR UV TRON<sup>®</sup> R9454, R9533

Figure 1: UV TRON's Spectral Response and Various Light Sources

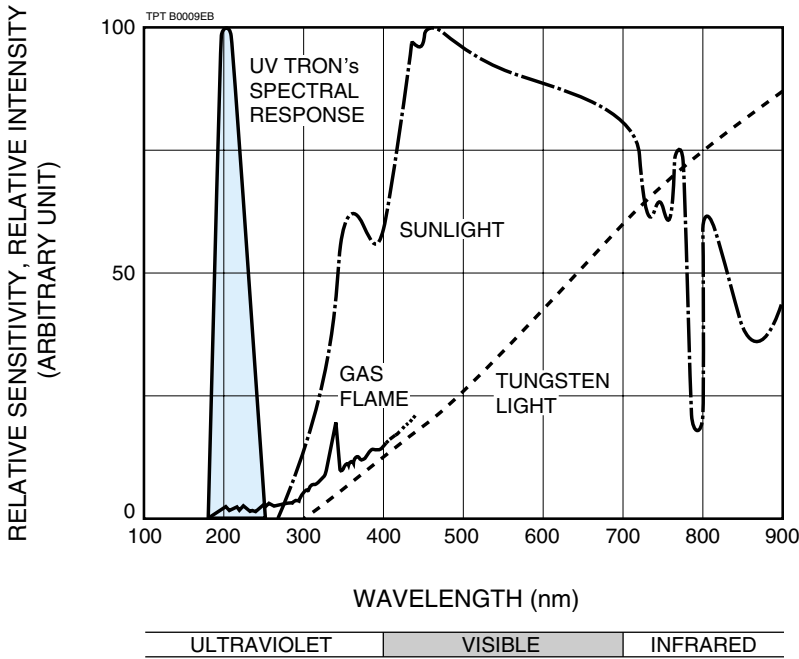
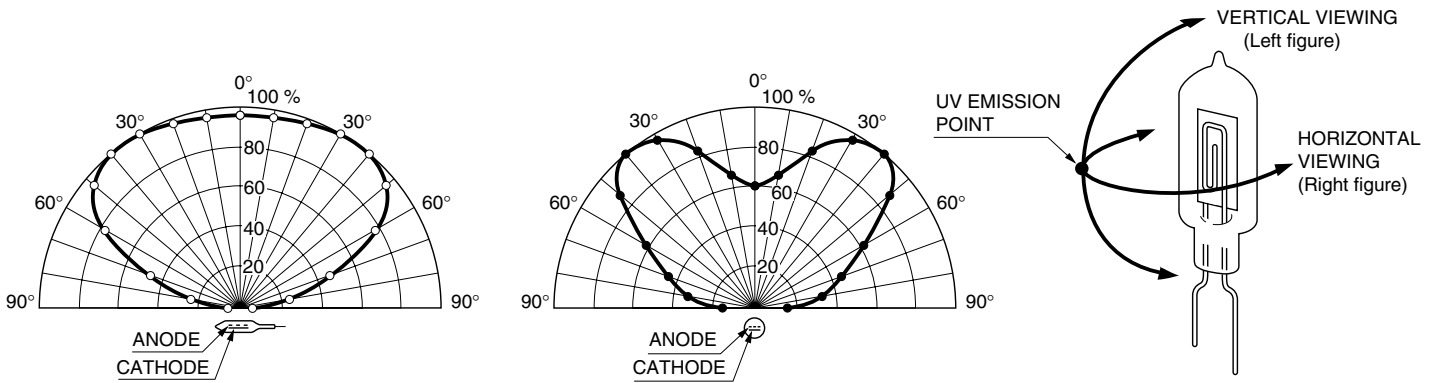


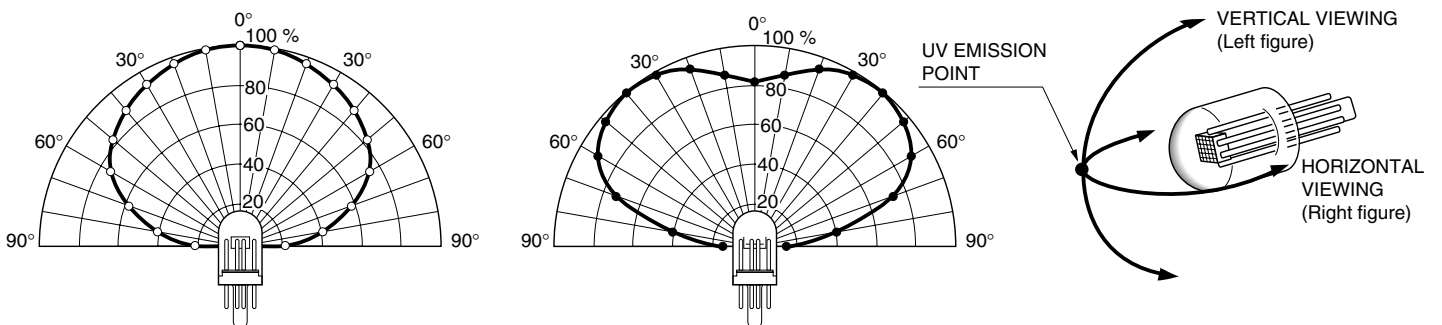
Figure 2: Angular Sensitivity (Directivity)

R9454



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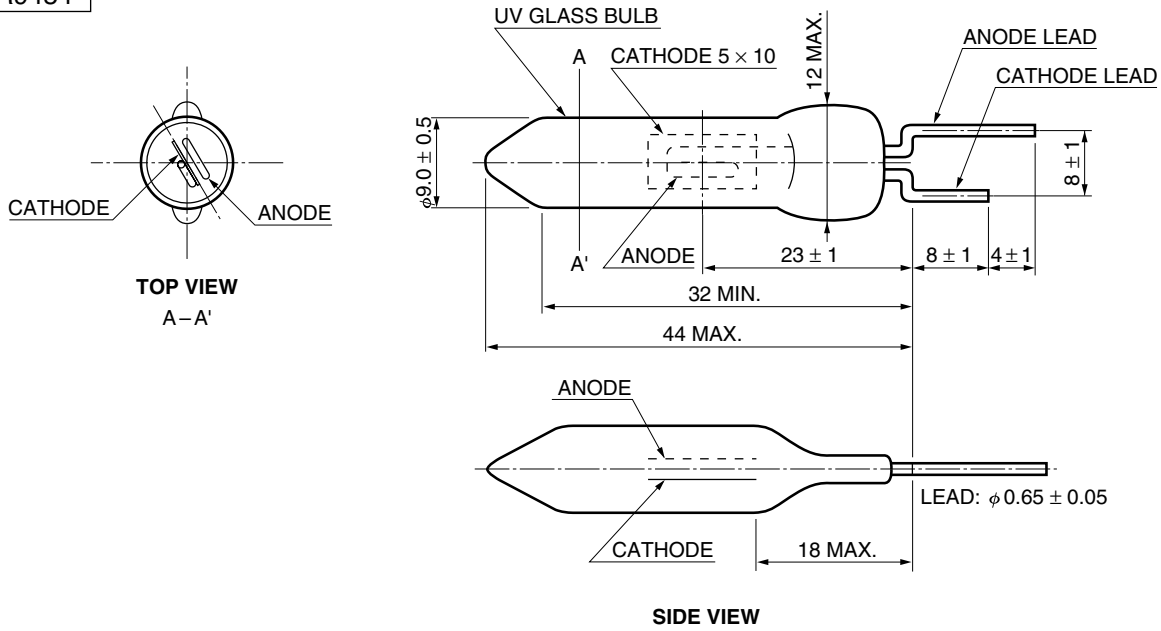
R9533



TPT B0032EA

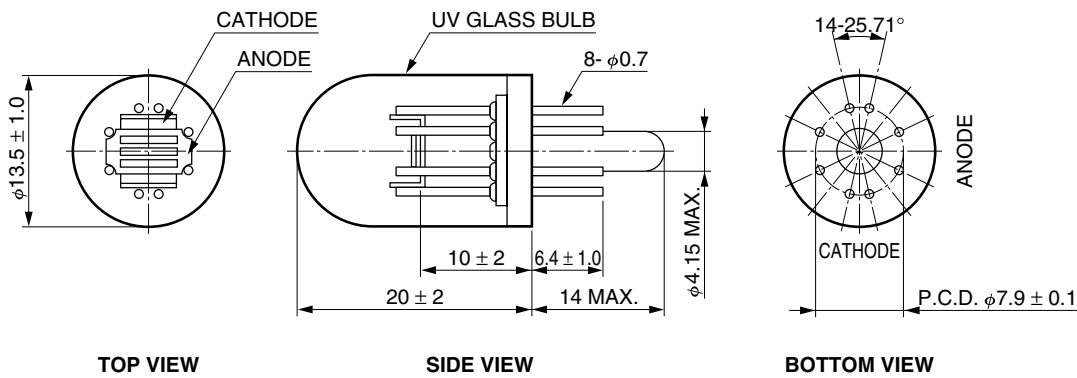
Figure 3: Dimensional Outline (Unit: mm)

R9454



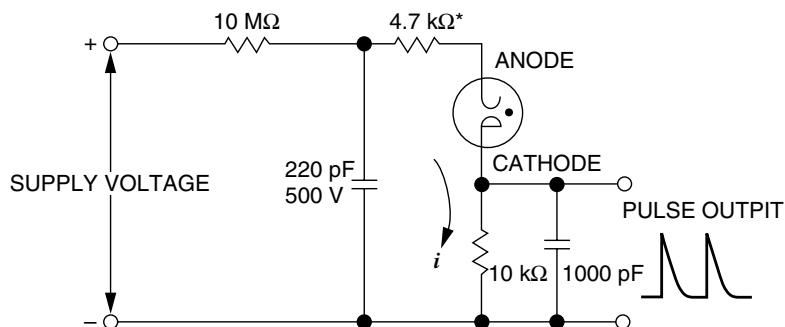
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R9533



TPT A0035EA

Figure 4: Recommended Operating Circuit



\* This 4.7 kΩ resistor must be connected within 2.5 cm from the tip of the UVtron anode lead.

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# FLAME SENSOR UV TRON<sup>®</sup> R9454, R9533

## ■ PRECAUTIONS FOR USE

### ● Ultraviolet Radiation

The UV TRON itself emits ultraviolet radiation in operation. When using two or more UV TRONs at the same time in close position, care should be taken so that they do not optically interfere with each other.

### ● Vibration and Shock

These UV TRONs passed JIS C 60068-2-6 (vibration test 3.0 mm peak to peak, 200 m/s<sup>2</sup>, 10 Hz to 2000 Hz) and JIS C 60068-2-27 (impact test 10000 m/s<sup>2</sup>, 1 ms). However, if subjected to strong mechanical shocks such as drop impacts in excess of the guaranteed values, the bulb may crack or internal electrodes may deform resulting in poor electrical characteristics. So use extreme care when handling the UV TRON.

### ● Polarity

Connect the UV TRON at the correct polarity. Reverse polarity connection will cause malfunction or breakdown.

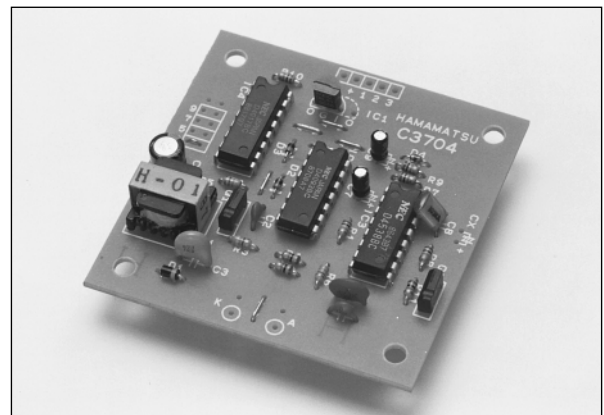
## ■ WARRANTY

The UV TRON is covered by a warranty for a period of one year after delivery. The warranty is limited to replacement of any defective tube due to defects traceable to the manufacturer.

## RELATED PRODUCTS

### UV TRON DRIVING CIRCUIT C3704 SERIES (Sold Separately)

The C3704 series are flame sensor driver circuits. The C3704 has a high-voltage power supply and signal processor mounted on the same PC board. It works as a flame sensor unit just by hooking up a 5 V to 30 V DC supply and connecting to the R9533. Please note that the R9533 lead pins cannot be soldered directly to the C3704. A dedicated socket (E678-8F) must be used to make the connection. See the C3704 series data sheet for detailed information.



# HAMAMATSU

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