SWDC Series

SWDC series are deep ultraviolet LED modules with high-power ultraviolet ray emission with a wavelength of 265-285 nm. Regardless of significant innovations in wafers, packaging, etc., the highest radiance of a single LED has reached 25mW/cm^2, which has achieved international approval. The combination of high-power LED, dust-proof housing and base, are the core our sterilization module.

Sterilization Principle

Ultraviolet (UV) sterilization technology is a technology that inactivates bacterial virus microorganisms by using ultraviolet radiation energy. Instant high-energy ultraviolet rays are irradiated on the surface of bacterial microorganisms, and nucleic acid DNA and RNA containing genetic information in bacterial cells absorb a large amount of specific The ultraviolet light of the wavelength radiates energy, thereby forming the isomer of m-diazabenzene (mainly composed of protease) and meta-diazabenzene in the body, which causes obstacles to the metabolism of the bacteria itself and cause problems with the genetics of the bacteria, which will eventually lead to the death of the bacterial(see as figure 1). Ultraviolet radiation sterilization has the characteristics of high efficiency sterilization, without any resurrection and side effects.

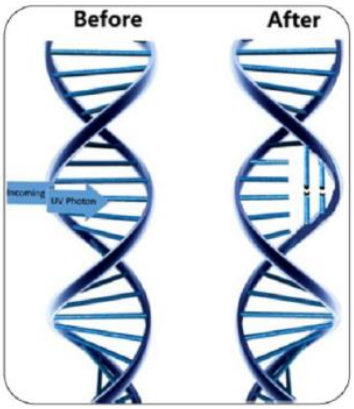


Figure 1 Comparison of changes in microbial DNA and RNA of bacterial viruses before and after UVC ultraviolet irradiation

Ultraviolet (UV) can be applied to varies of applications depending on its wavelength ranges. Research indicates that the most efficient UV light (UV) for sterilization applications are in the range of 230-285 nm, that is, in the UVC range. Ultraviolet rays in this wavelength range can be largely absorbed by DNA and RNA of bacterial microorganisms, especially in the vicinity of 264 nm, and the ultraviolet absorption is at its peak, rapidly decreases to near zero after the ultraviolet wavelength is greater than 285 nm, meaning that the wavelength above 285 nm can hardly be absorbed. In other words, for ultraviolet rays having a wavelength exceeding 285 nm, the bactericidal effect is very limited. In addition, it can be known from the ultraviolet absorption line of the bacterial microorganism that the closer the emission wavelength of the light source is to 264 nm, the higher the sterilization efficiency is, and the shorter the sterilization time required at the same light emission intensity.

SWDC-T202

The SWDC series uses a deep sterilizing module with a deep ultraviolet LED as an ultraviolet light source to cooperate with a water storage type water tank to sterilize and inactivate the water stored in water tanks. The LED operating current uses 25 mA, the power consumption is 0.2 W, the transmitting ultraviolet power is 2 mW, and the irradiation intensity per unit can reach 0.8 mW/cm^2. For any 4L water tank (typical size: 170mmx300mm), after 30min irradiation, the measured sterilization rate in the water tank can reach over 99%. The basic electrical and optical characteristics are shown in Table 1.

Table 1 Electro-Optical Characteristics

Items	Symbol	Condition	Target Spec.			Unit
			Min.	Typ.	Max.	
Forward Voltage	Vf	If = 20 mA	5.7	-	7.3	V
Radiant Flux	Φe		1.5	2.0	-	mW
Peak Wavelength	λp		265	278	285	nm
Spectrum Half Width	△λ		-	11.5	-	nm
Viewing Anlge	2Θ1/2		-	125	-	deg

Product Features:

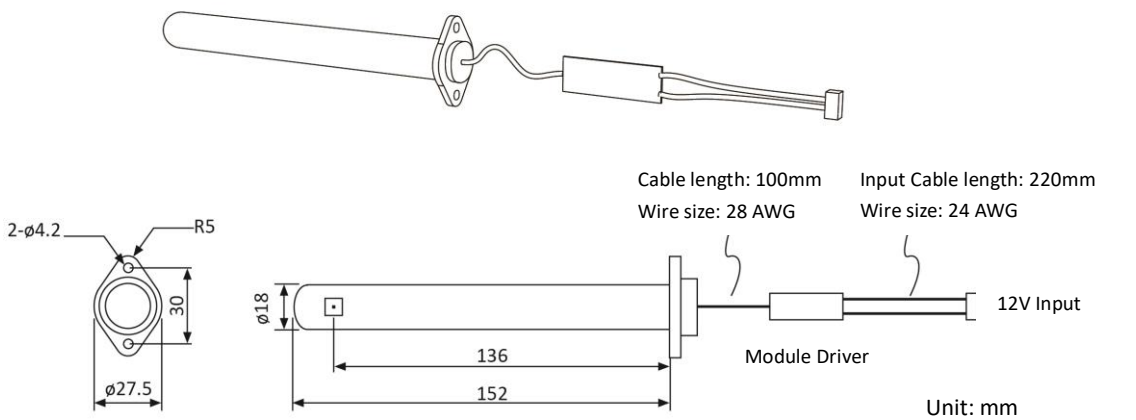
1. Sterilization efficiency is over 99%①
2. Working life of 10,000 hours or more②
3. Working voltage 24V typical value (If you need different voltage drives, please contact us)
4. Low standby operating current: < 0.1 uA
5. Lead-free environmentally friendly RHOS compatible
6. Waterproof level up to IP68③

① In the laboratory working environment, using the standard E. coli method to count the difference before and after sterilization;

② IESNA (North American Lighting Industry Association) LM80 experimental method, 70% light failure evaluation standard

③ Please refer to the test standard of IEC60529/GB4208

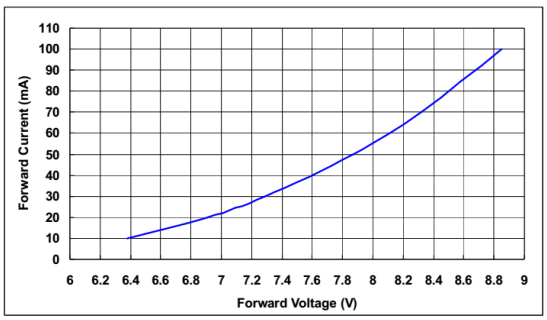
Specification

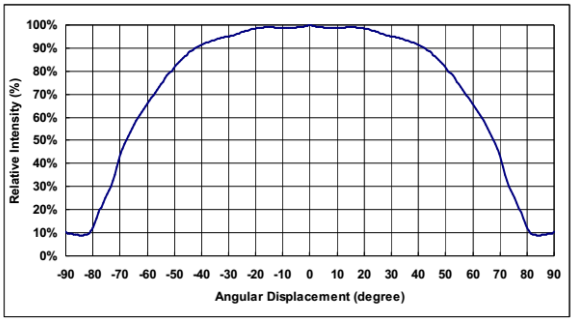


Unit: mm

Tolerance: +/- 0.2mm

Specification





① Measured 1cm from the LED, using the instrument for the remote photoelectric U-20 ultraviolet irradiance meter.

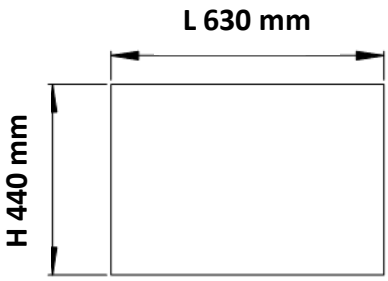
Recommended Method

Our sterilization module is placed against the water tank wall, and the UVC LED is located in the center of the upper water tank, which will diverge light along the cross section of the water tank. Our LED has a viewing angle of 125°, allowing the light to reach the upper and lower of the water tank with a conical area of 35mm (10 mm axial distance) of its irradiated. Reaching the sterilization national standard requirement of 30mJ/cm^2 in around 10 minutes.

The penetration depth of 265-285nm ultraviolet radiation within water is about 50mm, which can effectively inactivate the bacterial microorganisms inside of the water tank. The LED module is controlled by an external control circuit. This solution

is specially designed for high-power UV LEDs. Not only can it ensure the long and stable operation of the LED, its performance will also not be affected by overheating.

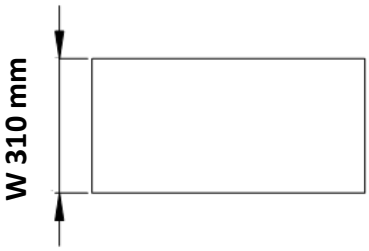
Packaging



Outer Carrier:

Carton Dimension：630mm X 310mm X 440mm

Quantity：300 pieces/carton

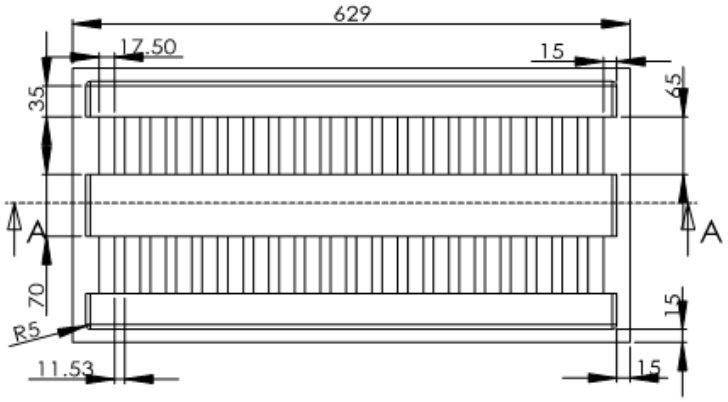


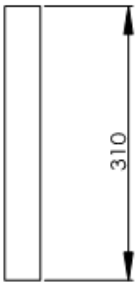
Carton Drawing：

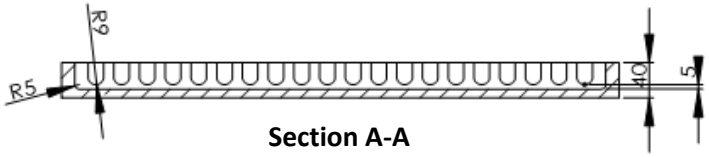
Inner Box:

Protective Foam Dimension：629mm X 310mm X 40mm

Quantity：20 pieces/ layer







Section A-A
Scale 1:5