HK-TO39-255NM-Z2S



Specification Datasheet

CFCL Optoelectronics (Shenzhen) Co., Ltd.

Model No.:HK-TO39-255nm-Z2S

Product: TO39 package Quartz lens 7° vertical beam (20*20mil Chip)

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1. General Description

The HK-TO39 (250–260 nm) is a high-performance deep-ultraviolet LED in a hermetic TO39 metal-can package with a hemispherical sapphire lens. Built on high-efficiency AlGaN chip technology, it emits in the 250–260 nm UVC band with a typical peak at 255 nm, featuring a narrow stable spectrum and a sharply focused 7° beam.

This wavelength band overlaps with the absorption maxima of nucleic acids, proteins and many organic and inorganic compounds, making it highly versatile for bio-analytical, environmental and chemical sensing. The hermetically sealed TO39 package delivers outstanding environmental stability and long service life, ideal for laboratory instruments, environmental monitoring systems and medical diagnostic equipment.

2. Key Features

- Peak wavelength range: 250.0 – 260.0 nm (typical 255 nm)
- Hermetic TO39 metal can with hemispherical sapphire lens
- Ultra-narrow viewing angle: ~7° typical for targeted irradiation
- Stable radiant output at 20 mA forward current
- Mercury-free, ozone-free, RoHS/REACH compliant
- Fast response, instant on/off and pulse operation capable
- Standard 3-pin through-hole TO39 form factor
- Excellent environmental stability via hermetic sealing
- Long lifetime and reliable thermal performance

3. Application Fields

- Biomedical & Life-Science Instruments — nucleic acid detection, DNA / RNA quantification, fluorescence excitation, PCR-based detection systems
- Water Quality Analysis — nitrate / nitrite absorbance sensing, organic pollutant monitoring, UV-absorption water quality sensors
- Environmental Gas Monitoring — SO_2, NO_x and ozone detection, atmospheric pollutant analysis, industrial emission monitoring
- Analytical Chemistry — HPLC-UV detectors, capillary electrophoresis detectors, bench-top and portable spectrophotometers
- Medical Diagnostics — in-vitro diagnostic devices, biosensor excitation sources, clinical laboratory equipment
- Scientific Research & OEM Integration — optical sensing modules, photochemical reaction sources, aerospace charge management systems

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4. Absolute Maximum Ratings

(Test condition: Ambient temperature Ta = 25°C)

Parameter	Symbol	Rating	Unit
Forward Current	I_F	100	mA
Peak Forward Current (10% duty cycle, 1ms pulse)	$I_{F(peak)}$	120	mA
Reverse Voltage	V_R	5	V
Operating Temperature Range	T_{opr}	-40 ~ +85	°C
Storage Temperature Range	T_{stg}	-40 ~ +100	°C
Maximum Junction Temperature	T_j	105	°C

5. Electro-Optical Characteristics

(Test condition: Ta = 25°C, Forward current I_F = 100 mA)

Parameter	Symbol	Min.	Typ.	Max.	Unit
Peak Wavelength	λ_p	250.0	255.0	260.0	nm
Spectral Half-Width	Δλ	-	12	-	nm
Forward Voltage	V_F	5.0	6.8	6.2	V
Radiant Output Power	P_e	1.0	2.4	3.5	mW
Viewing Angle (Half Intensity)	$2\theta_{1/2}$	-	7	-	deg
Reverse Leakage Current	I_R	-	-	10	μA
Thermal Resistance (Junction to Board)	$R_{th(j-b)}$	-	18	-	°C/W

6. Binning Specifications

(Test condition: Ta = 25°C, I_F = 100 mA)

6.1 Forward Voltage Binning

Level	A01	A02	A03	A04	A05	A06
Min. (V)	5.0	5.2	5.4	5.6	5.8	6.0
Max. (V)	5.2	5.4	5.6	5.8	6.0	6.2

6.2 Radiometric Power Binning

Level	-				
Min.	1.0 mW	1.5 mW	2.0 mW	2.5 mW	3.0 mW
Max.	1.5 mW	2.0mW	2.5 mW	3.0 mW	3.5 mW

6.3 Dominant Wavelength Binning

Level	255A	255B
Min.	250.0 nm	255.0 nm
Max.	255.0 nm	260.0 nm

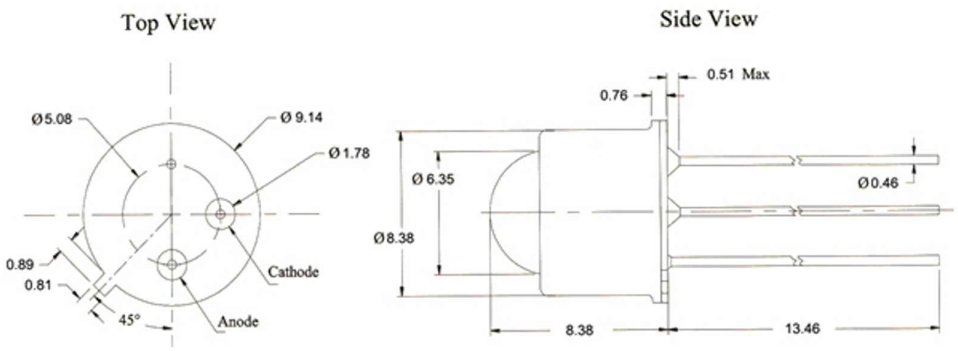
7. Outline Dimensions

- **Package Type:** TO39 package Quartz lens 7° vertical beam
- **Overall Dimensions:** 9.14 ± 0.10 mm (φ) × 8.38 ± 0.10 mm (Shell Height) ×

13.46 ± 0.10 mm (PIN Height)

- **Pad Layout:** Quartz lens 7° vertical beam

8. Packaging & Storage



8.1 Packaging

- Packaging type: Anti-static bag
- Quantity per roll: Up to 50 pieces
- Bag size: 145mm * 100mm
- Moisture sensitivity level: MSL 3

8.2 Storage Conditions

- Store in a dry environment at room temperature
- Recommended storage: 5°C ~ 30°C, 30% ~ 70% RH
- Avoid direct sunlight, corrosive gases and high humidity
- Reseal the bag properly after opening to prevent moisture absorption

9. Notes & Precautions

1. Peak wavelength tolerance: ± 3.5 nm
2. Radiant flux measurement tolerance: ± 10%
3. Forward voltage tolerance: ± 10%
4. All parameters are measured at chip level by UV-CHIPS
5. UVC LEDs emit high-energy ultraviolet radiation. Avoid direct exposure to eyes or skin during operation.
6. The device is sensitive to electrostatic discharge (ESD). Proper ESD protection is required during handling and assembly.
7. Operating beyond absolute maximum ratings may cause permanent damage to the device.