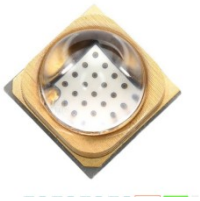
HK415S35CL-S45



Specification Datasheet

CFCL Optoelectronics (Shenzhen) Co., Ltd.

Model No.: HK415S35CL-S45

Product: 3535 Round Lens Package UVA LED (45*45mil Chip)

Revision: V1.0

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1. General Description

This is a high-power violet-blue UVA solid-state light source designed for 500 mA continuous operation, with a typical peak wavelength of 415 nm. The device integrates a 45 mil × 45 mil GaN LED chip into a 3535 surface-mount AlN ceramic package and delivers a radiant output power of 940 – 1180 mW at 500 mA, with a 60° half-intensity beam formed by a high-purity fused silica spherical lens. Its narrow spectral half-width of 18 nm ensures stable, repeatable process results in the target wavelength band.

The AlN substrate provides ultra-low thermal resistance (12 °C/W typical, junction to board) together with a low-profile ceramic package, enabling stable high-current operation and a long service life under continuous duty. Operating in the 415 nm region of the violet-blue band, close to the visible spectrum, this band combines moderate photon energy with minimal photodegradation to most materials making it a reliable choice for specialty curing, horticultural lighting and photoelectric detection.

2. Key Features

- Peak wavelength: typical 415.0 nm, full binning range 410.0 – 420.0 nm (violet-blue band, adjacent to the visible spectrum)
- 3535 surface-mount AlN ceramic package with thermal conductivity ≥ 170 W/m·K and thermal resistance of 12 °C/W (typical)
- 60° half-intensity beam angle realized by a high-purity fused silica spherical lens
- Radiant output power 940 – 1180 mW at 500 mA continuous operating current
- Moderate photon energy with minimal photodegradation to most substrate materials
- Low luminous degradation under continuous high-current driving
- 100% electrical and optical inspection before shipment
- RoHS, CE and REACH compliant

3. Application Fields

- Specialty UV coatings and low-energy ink curing
- Horticultural lighting for anthocyanin accumulation and secondary metabolite regulation
- Agricultural and forestry pest trapping (insect attraction lamps)
- Special fluorescence detection and long-wave fluorescent excitation
- Commercial ambient UV lighting and decorative illumination

- Aquarium lighting and ornamental plant colour enhancement
- Auxiliary surface treatment of low-sensitivity materials

4. Absolute Maximum Ratings

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

Parameter	Symbol	Rating	Unit
Forward Current	I_F	700	mA
Peak Forward Current (10% duty cycle, 1ms pulse)	$I_{F(peak)}$	⩽1500	mA
Reverse Voltage	V_R	5.0	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 = 500 mA)

Parameter	Symbol	Min.	Typ.	Max.	Unit
Peak Wavelength	λ_p	410.0	415.0	420.0	nm
Spectral Half-Width	Δλ	-	18	-	nm
Forward Voltage	V_F	2.9	-	3.8	V
Radiant Output Power	P_e	940.0	1060.0	1180.0	mW
Viewing Angle (Half Intensity)	$2\theta_{1/2}$	-	60	-	deg
Reverse Leakage Current	I_R	-	-	1.0	μA

Thermal Resistance (Junction to Board)	R $_{th(j-b)}$	-	12	15	°C/W

6. Binning Specifications

(Test condition: Ta = 25°C, I $_F$ = 500 mA)

6.1 Forward Voltage Binning

Level	A01	A02	A03	A04	A05
Min. (V)	2.9	3.1	3.3	3.5	3.7
Max. (V)	3.1	3.3	3.5	3.7	3.8

6.2 Radiometric Power Binning

Level	S45-94	S45-98	S45-102	S45-106	S45-110	S45-114
Min.(mW)	940.0	980.0	1020.0	1060.0	1100.0	1140.0
Max.(mW)	980.0	1020.0	1060.0	1100.0	1140.0	1180.0

6.3 Dominant Wavelength Binning

Level	410A	415B
Min.	410.0 nm	415.0 nm
Max.	415.0 nm	420.0 nm

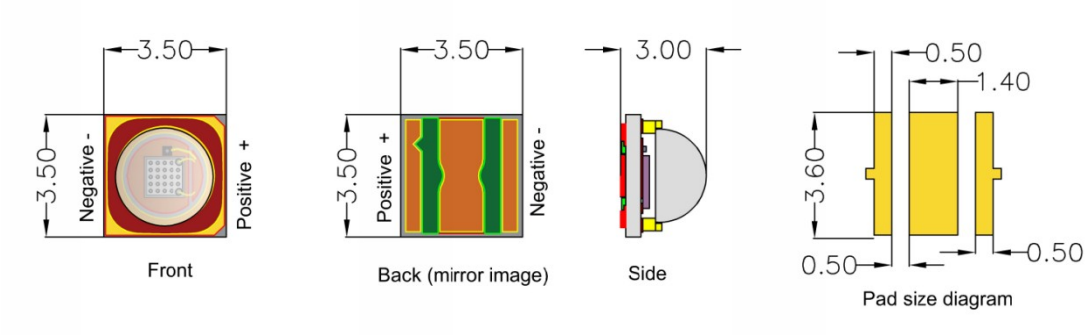
Default supply: 415B bin; 410A bin available upon custom request.

7. Outline Dimensions

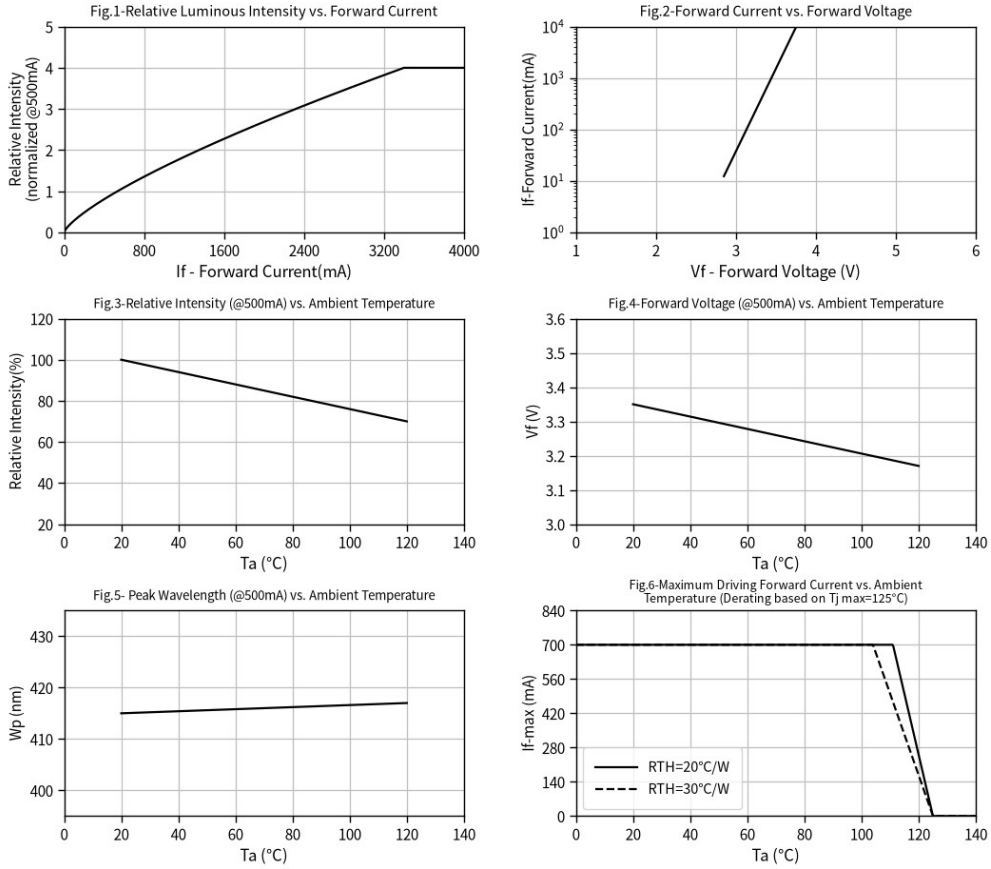
- **Package Type:** 3535 SMD Round Lens
- **Overall Dimensions:** 3.50 ± 0.10 mm (Length) × 3.50 ± 0.10 mm (Width) × 3.00

± 0.10 mm (Height)

- **Lens Diameter:** φ2.8mm (High-purity quartz glass)
- **Pad Layout:** Standard 3535 SMD footprint
- **Polarity Marking:** Anode (+) and Cathode (-) marked on the back of the package (mirror view)
- **Pad Size:** Symmetrical pad design compatible with standard 3535 SMD reflow soldering processes



8. Characteristic Curve



9. Packaging & Storage

9.1 Packaging

- Packaging form: Tape and reel
- Quantity per reel: 600 pieces
- Reel diameter: 178 mm (7 inch)
- Moisture Sensitivity Level: MSL 3

9.2 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 moisture barrier bag properly after opening
- For MSL 3 devices, complete soldering within 168 hours after opening the bag under factory environment (≤ 30°C / 60% RH); bake before use if expired.

10. Notes & Precautions

- Peak wavelength measurement tolerance: ± 2.0 nm
- Radiant power measurement tolerance: ± 10%
- Forward voltage measurement tolerance: ± 10%
- All parameters are tested on finished devices under standard conditions (Ta = 25 °C, IF = 500 mA) via integrating sphere system.
- UVA LEDs emit high-energy ultraviolet radiation. Avoid direct exposure to eyes or skin during operation.
- This device is sensitive to electrostatic discharge (ESD). ESD withstand voltage: HBM ± 2000 V. Proper ESD protection is required during handling and assembly.
- Operating beyond absolute maximum ratings may cause permanent damage to the device.
- Proper thermal design is required to ensure junction temperature does not exceed 105°C under continuous operation.
- Chip-level maximum ratings (S-45EUPUT-A): DC forward current ≤ 1500 mA, junction temperature ≤ 125 °C. The package-level limits stated in Section 4 govern continuous operation of this device.