

# **TR260™ LEDs** CxxxTR260-Sxx00

Cree's TR™ LEDs are the newest generation of solid-state LED emitters that combine highly efficient InGaN materials with Cree's proprietary device technology and silicon carbide substrates to deliver superior value for the LCD sideview market. The TR LEDs are among the brightest in the sideview market while delivering a low forward voltage resulting in a very bright and highly efficient solution for the 0.6-mm and 0.8-mm sideview market. The design is optimally suited for industry standard sideview packages as it is die attachable with clear epoxy and has two top contacts, consistent with industry standard packaging.

### **FEATURES**

- Rectangular LED RF Performance
  - 450 & 460 nm 33+ mW
  - 470 nm 30+ mW
  - 527 nm 12+ mW
- Epoxy Die Attach
- Low Forward Voltage 3.1 V typ at 20 mA
- 1000-V ESD Threshold Rating
- InGaN Junction on Thermally Conductive SiC Substrate

### **APPLICATIONS**

- Small LCD Backlighting 0.8 mm & 0.6 mm sideview packages
  - Mobile Appliances
  - Digital Cameras
  - Car Navigation Systems
- Medium LCD Backlighting 0.8 mm & 0.6 mm sideview packages
  - Portable PCs
  - Monitors
- LED Video Displays
- General Lighting

### CxxxTR260-Sxx00 Chip Diagram

# Top View Anode (+) 90 μm Diameter TR260 LED 260 x 480 μm Junction 440 x 220 μm Cathode (-) 98 x 98 μm Die Cross Section Bottom View Bottom Surface 160 x 380 μm t = 115 μm



Maximum Ratings at T <sub>A</sub> = 25°C Notes 183	CxxxTR260-Sxx00
DC Forward Current	50 mA
Peak Forward Current (1/10 duty cycle @ 1 kHz)	100 mA
LED Junction Temperature	125°C
Reverse Voltage	5 V
Operating Temperature Range	-40°C to +100°C
LED Chip Storage Temperature Range	-40°C to +120°C
Die Sheet Storage Conditions	≤30°C / ≤85% RH
Electrostatic Discharge Threshold (HBM) Note 2	1000 V
Electrostatic Discharge Classification (MIL-STD-883E) Note 2	Class 2

Typical Electrical/Optical Characteristics at $T_A = 25$ °C, If = 20 mA Note 3								
Part Number	Forward Voltage (V <sub>i</sub> , V)		(V <sub>f</sub> , V)	Reverse Current [I(Vr=5V), μA]	Full Width Half Max $(\lambda_{ m p},{ m nm})$			
	Min.	Тур.	Max.	Max.	Тур.			
C450TR260-Sxx00	2.7	3.1	3.4	2	20			
C460TR260-Sxx00	2.7	3.1	3.4	2	21			
C470TR260-Sxx00	2.7	3.1	3.4	2	21			
C527TR260-Sxx00	2.9	3.2	3.6	2	35			

Mechanical Specifications	CxxxTR260-Sxx00		
Description	Dimension	Tolerance	
P-N Junction Area (μm)	220 x 440	±35	
Chip Area (µm)	260 x 480	±35	
Chip Thickness (µm)	115	±15	
Au Bond Pad Diameter Anode (µm)	90	-5, +15	
Au Bond Pad Thicknesses (µm)	1.0	±0.5	
Au Bond Pad Area Cathode (μm)	98 x 98	-5, +15	
Bottom Area (µm)	160 x 380	±35	

### Notes:

- 1. Maximum ratings are package dependent. The above ratings were determined using a T-1 3/4 package (with Hysol OS4000 epoxy encapsulation and clear epoxy die attach) for characterization. Ratings for other packages may differ. The forward currents (DC and Peak) are not limited by the die but by the effect of the LED junction temperature on the package. The junction temperature limit of 125°C is a limit of the T-1 3/4 package; junction temperature should be characterized in a specific package to determine limitations. Assembly processing temperature must not exceed 325°C (< 5 seconds).
- Product resistance to electrostatic discharge (ESD) according to the HBM is measured by simulating ESD using a rapid avalanche energy test (RAET). The RAET procedures are designed to approximate the maximum ESD ratings shown. The RAET procedure is performed on each die. The ESD classification of Class 2 is based on sample testing according to MIL-STD-883E.
- 3. All products conform to the listed minimum and maximum specifications for electrical and optical characteristics when assembled and operated at 20 mA within the maximum ratings shown above. Efficiency decreases at higher currents. Typical values given are within the range of average values expected by the manufacturer in large quantities and are provided for information only. All measurements were made using lamps in T-1 3/4 packages (with Hysol OS4000 epoxy encapsulant and clear epoxy die attach). Optical characteristics are measured in an integrating sphere using Illuminance E.
- 4. Specifications are subject to change without notice.



### Standard Bins for CxxxTR260-Sxx00

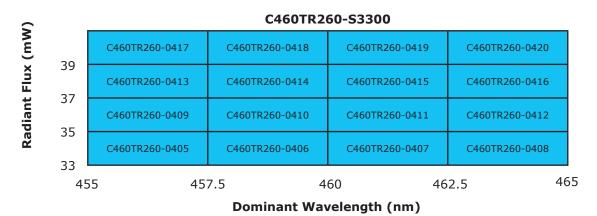
LED chips are sorted to the **radiant flux** and **dominant wavelength** bins shown. A sorted die sheet contains die from only one bin. Sorted die kit (CxxxTR260-Sxxxx) orders may be filled with any or all bins (CxxxTR260-xxxx) contained in the kit. All radiant flux and dominant wavelength values shown and specified are at If = 20 mA.

### 450-nm Kit

C450TR260-S3300 Radiant Flux (mW) C450TR260-0417 C450TR260-0418 C450TR260-0419 C450TR260-0420 39 C450TR260-0413 C450TR260-0414 C450TR260-0415 C450TR260-0416 37 C450TR260-0409 C450TR260-0410 C450TR260-0411 C450TR260-0412 35 C450TR260-0405 C450TR260-0406 C450TR260-0407 C450TR260-0408 33 455 445 447.5 450 452.5

### **Dominant Wavelength (nm)**

### 460-nm Kit



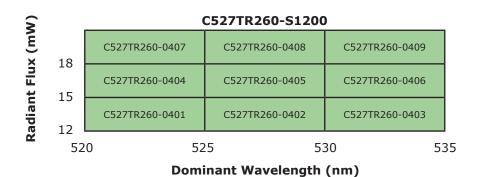


## Standard Bins for TR260 (continued)

### 470-nm Kit

C470TR260-S2700 Radiant Flux (mW) C470TR260-0413 C470TR260-0414 C470TR260-0415 C470TR260-0416 37 C470TR260-0409 C470TR260-0410 C470TR260-0411 C470TR260-0412 35 C470TR260-0405 C470TR260-0406 C470TR260-0407 C470TR260-0408 33 C470TR260-0401 C470TR260-0402 C470TR260-0403 C470TR260-0404 30 475 465 467.5 470 472.5 **Dominant Wavelength (nm)** 

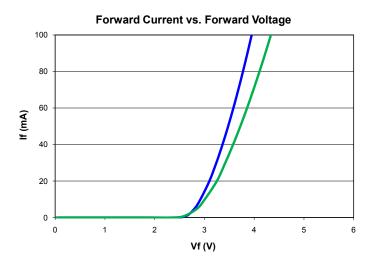
### **527-nm Kit**

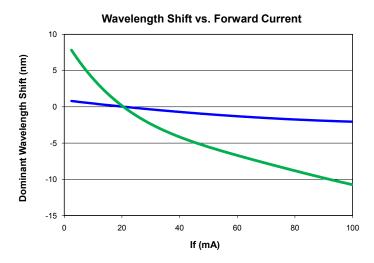


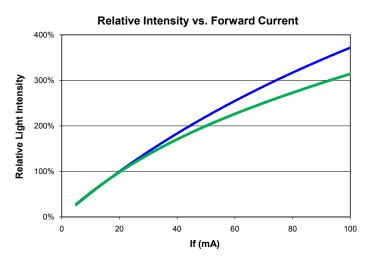


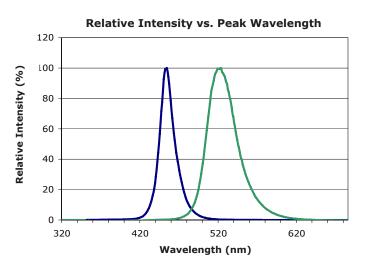
### **Characteristic Curves**

These are representative measurements for the TR LED product. Actual curves will vary slightly for the various radiant flux and dominant wavelength bins.











### **Radiation Pattern**

This is a representative radiation pattern for the TR LED product. Actual patterns will vary slightly for each chip.

