Cree® TR1823™ LEDs

Data Sheet

C*xxx*TR1823-S*xx*00-2

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 0.4-mm, 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.

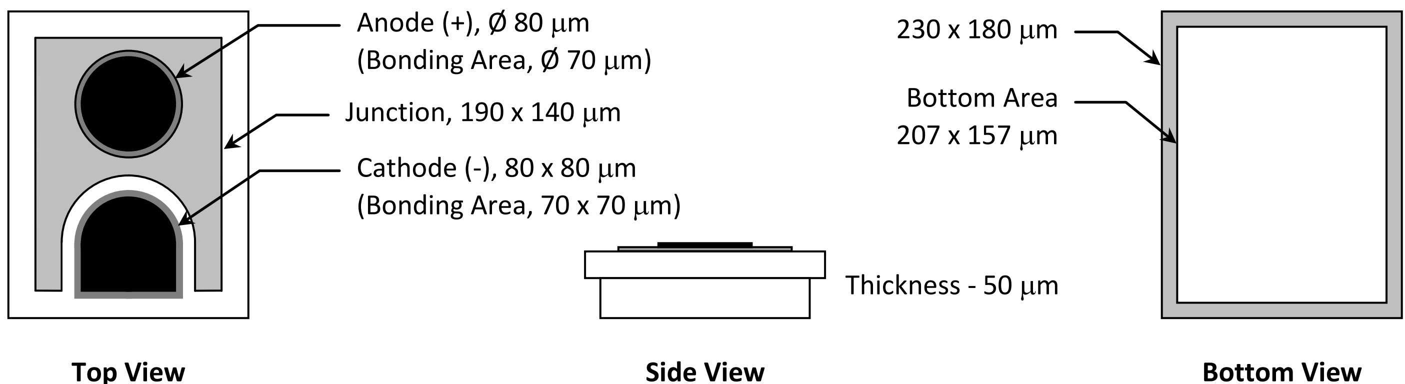
FEATURES

- Rectangular LED RF Performance
  - 450 nm – 16+ mW
  - 460 nm – 16+ mW
  - 470 nm – 14+ mW
- Epoxy Die Attach
- Low Forward Voltage - 3.3 V typ @ 20 mA
- 1 kV ESD Rating, 2 kV optional
- InGaN Junction on Thermally Conductive SiC Substrate
- Also avaliable with DW & V_f binned @ 5 mA

APPLICATIONS

- Mobile Backlighting – 0.8 mm, 0.6 mm & 0.4 mm sideview packages
  - Mobile Appliances
  - Digital Cameras
  - Car Navigation Systems
- LCD Backlighting – 0.8 mm, 0.6 mm & 0.4 mm sideview packages
  - Portable PCs
  - Monitors
- LED Video Displays

C*xxx*TR1823-S*xx*00-2 Chip Diagram



Data Sheet: CPR3EN Rev A

CREE

Maximum Ratings at T_A = 25°C Notes 1&3	C*xxx*TR1823-S*xx*00-2
DC Forward Current	30 mA
Peak Forward Current (1/10 duty cycle @ 1 kHz)	70 mA
LED Junction Temperature	125°C
Reverse Voltage	5 V
Operating Temperature Range	-40°C to +100°C
LED Chip Storage Temperature	-40°C to +120°C
Recommended Die Sheet Storage Conditions	≤30°C / ≤85% RH
Electrostatic Discharge Threshold (HBM) Note 2	1000 V (optional 2000 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_f, V)			Reverse Current [I(Vr=5V), µA]	Full Width Half Max (λ_D,)
	Min.	Typ.	Max.	Max.	Typ.
C450TR1823-S*xx*00-2	2.9	3.3	3.6	2	20
C460TR1823-S*xx*00-2	2.9	3.3	3.6	2	21
C470TR1823-S*xx*00-2	2.9	3.3	3.6	2	21

Mechanical Specifications	C*xxx*TR1823-S*xx*00-2	
Description	Dimension	Tolerance
P-N Junction Area (µm)	140 x 190	±35
Bond Pad Center-to-Center (µm) - reference only	100	-
Chip Top Area (µm)	180 x 230	±35
Chip Thickness (µm)	50	±15
Chip Bottom Area (µm)	157 x 207	±35
Au Bond Pad Diameter - Anode (µm)	80	-5, +15
Anode Bonding Area (µm) Note 4	70	-5, +15
Au Bond Pad Area - Cathode (µm)	80 x 80	-5, +15
Cathode Bonding Area (µm) Note 4	70	-5, +15
Au Bond Pad Thicknesses (µm)	1.0	±0.5
Chip Bottom Area (µm)	157 x 207	±35

Notes:

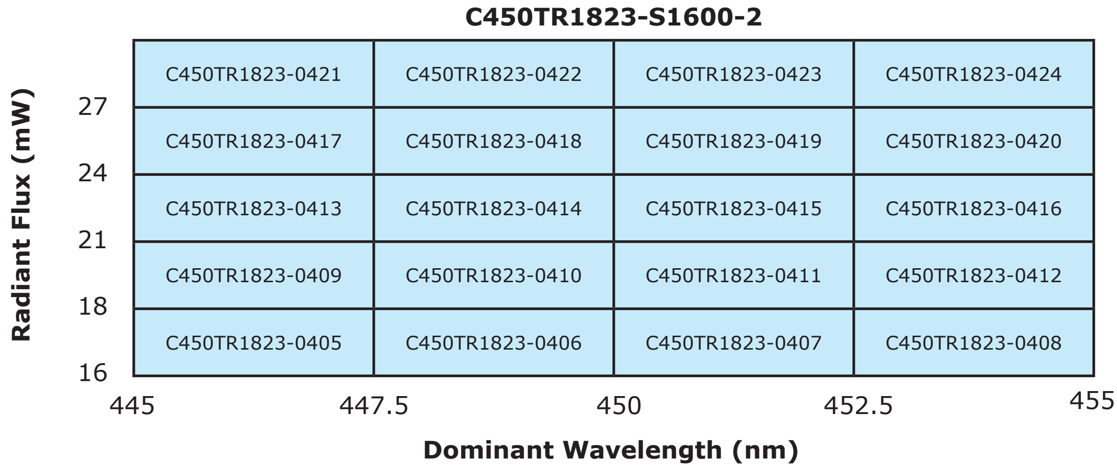
1. Maximum ratings are package-dependent. The above ratings were determined using a thru-hole package (with Hysol® OS4000 epoxy encapsulation and clear epoxy die attach) for characterization. Ratings for other packages may differ. The forward currents (DC and Peak) are not limited by the die but by the effect of the LED junction temperature on the package. The junction temperature limit of 125°C is a limit of the thru-hole package; junction temperature should be characterized in a specific package to determine limitations. Assembly processing temperature must not exceed 325°C (< 5 seconds).
2. 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 manufacturer in large quantities and are provided for information only. All measurements were made using lamps in thru-hole packages (with Hysol OS4000 epoxy encapsulation and clear epoxy die attach). Optical characteristics measured in an integrating sphere using Illuminance E.
4. Bonding Area is defined as the bond pad area exposed through the opening in the passivation layer.
5. Specifications are subject to change without notice.

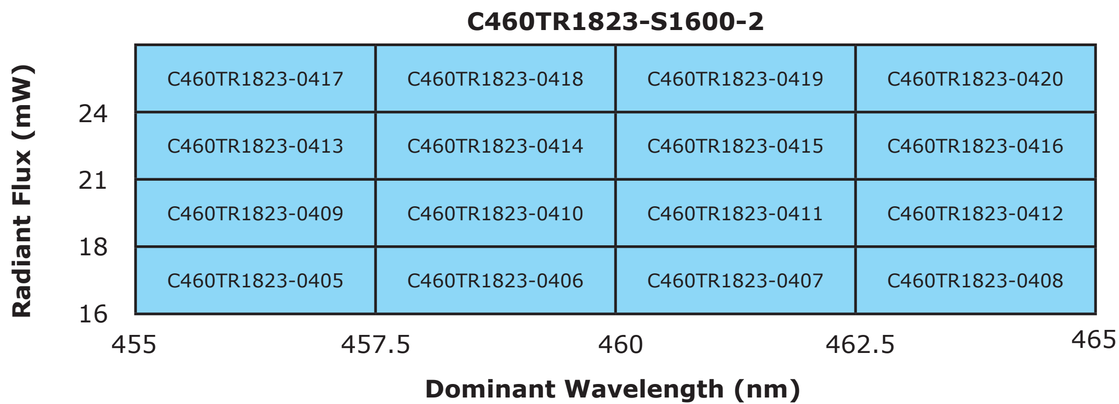
© 2014 Cree, Inc. All rights reserved. The information in this document is subject to change without notice. Cree® and the Cree logo are registered trademarks, and TR™ and TR1823™ are trademarks of Cree, Inc. Hysol® is a registered trademark of Henkel Corporation.

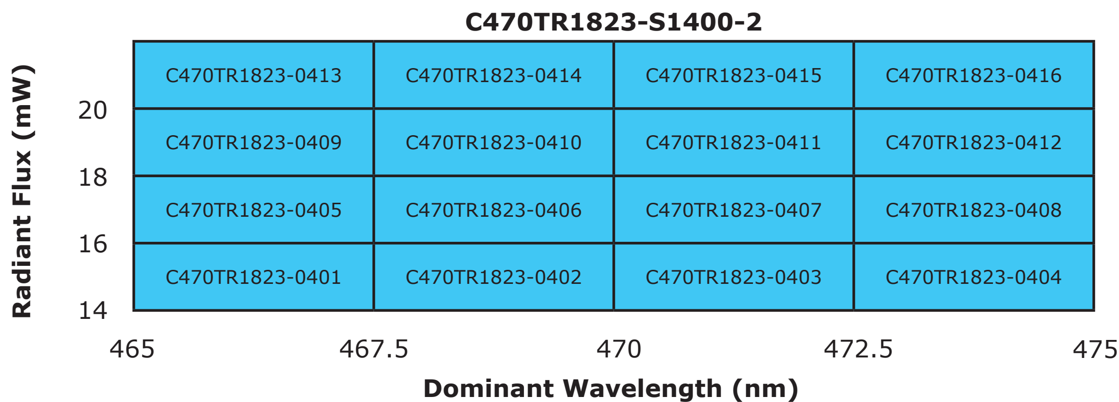
Cree, Inc.
4600 Silicon Drive
Durham, NC 27703-8475 USA
Tel: +1-919-313-5300
Fax: +1-919-313-5870
www.cree.com/chips

Standard Bins for C*xxx*TR1823-S*xx*00-2

LED chips are sorted to the Radiant Flux (RF) and Dominant Wavelength (DW) bins shown below. A sorted die sheet contains die from only one bin. Sorted die kit (CxxxTR1823-Sxx00-2) orders may be filled with any or all bins (Cxxx-TR1823-xxxx) contained in the kit. All RF and DW values are measured at If = 20 mA.





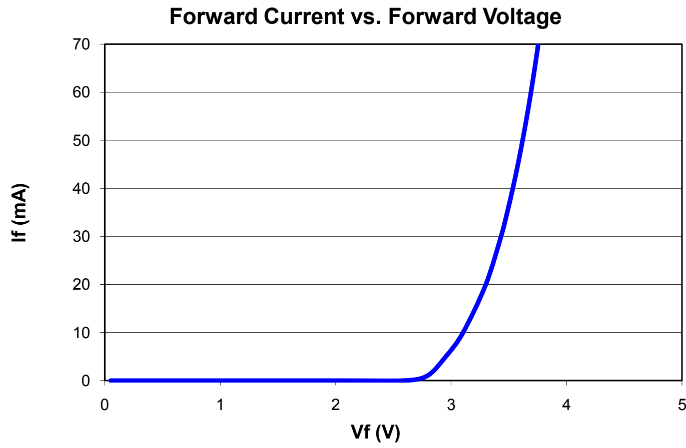


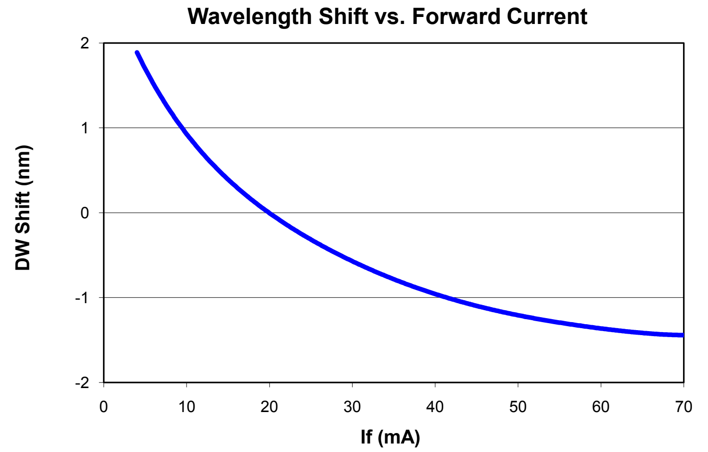
© 2014 Cree, Inc. All rights reserved. The information in this document is subject to change without notice. Cree® and the Cree logo are registered trademarks, and TR™ and TR1823™ are trademarks of Cree, Inc. Hysol® is a registered trademark of Henkel Corporation.

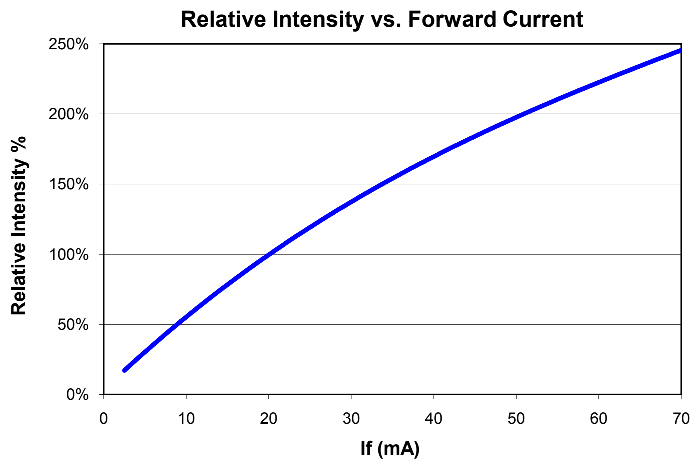
Cree, Inc.
4600 Silicon Drive
Durham, NC 27703-8475 USA
Tel: +1-919-313-5300
Fax: +1-919-313-5870
www.cree.com/chips

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.





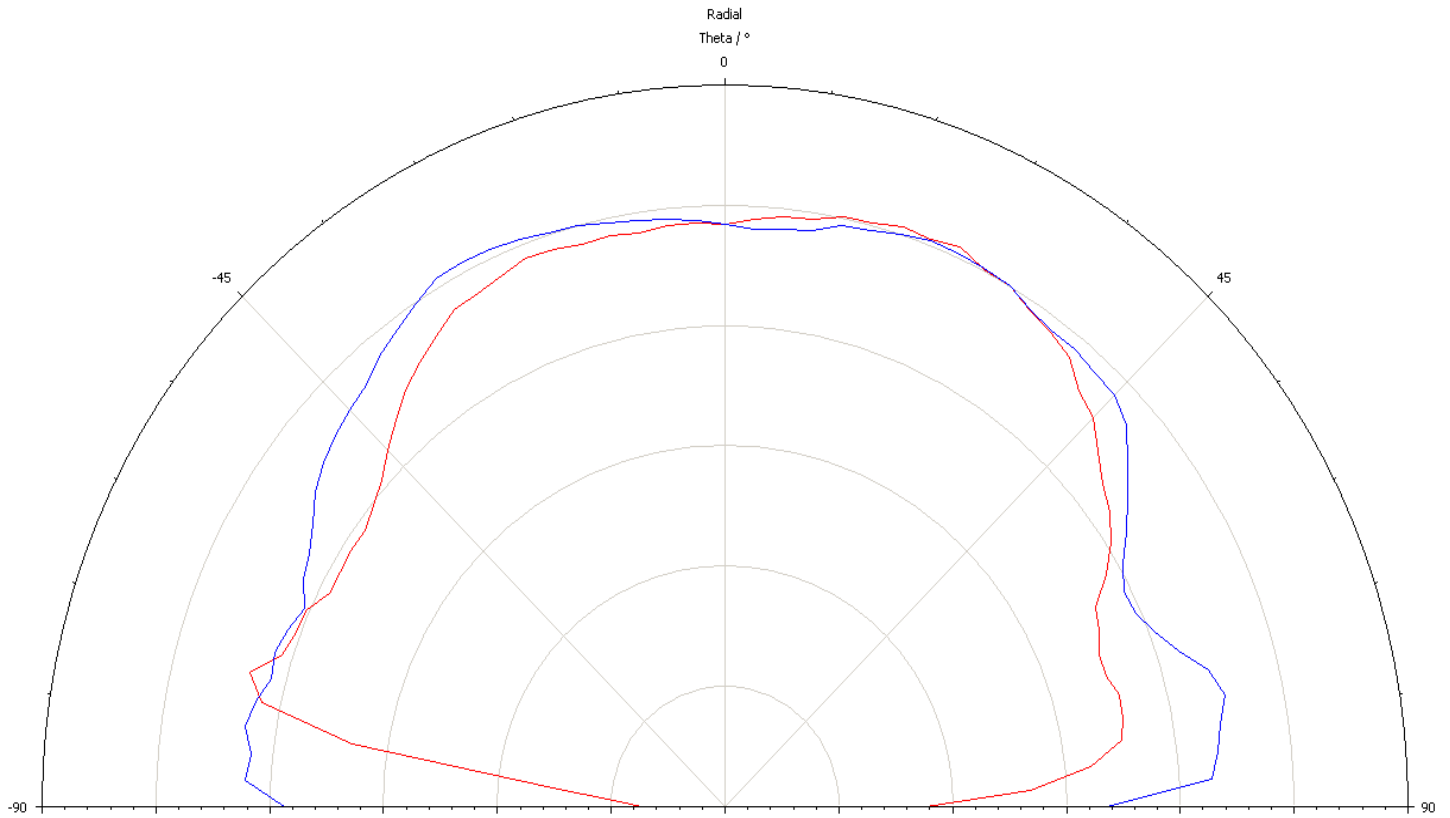


© 2014 Cree, Inc. All rights reserved. The information in this document is subject to change without notice. Cree® and the Cree logo are registered trademarks, and TR™ and TR1823™ are trademarks of Cree, Inc. Hysol® is a registered trademark of Henkel Corporation.

Cree, Inc.
4600 Silicon Drive
Durham, NC 27703-8475 USA
Tel: +1-919-313-5300
Fax: +1-919-313-5870
www.cree.com/chips

Radiation Pattern

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



© 2014 Cree, Inc. All rights reserved. The information in this document is subject to change without notice. Cree® and the Cree logo are registered trademarks, and TR™ and TR1823™ are trademarks of Cree, Inc. Hysol® is a registered trademark of Henkel Corporation.

Cree, Inc.
4600 Silicon Drive
Durham, NC 27703-8475 USA
Tel: +1-919-313-5300
Fax: +1-919-313-5870
www.cree.com/chips