

REV	DESCRIPTION	BY	DATE	APPROVED

Description

The 660 nm Far Red Hex (NHX) product is a high flux density solid-state light module. It takes advantage of chip-on-board (COB) technology to maximize chip density and a metal core substrate for high thermal conductivity. The special surface coating significantly increases light extraction and does not degrade due to environmental extremes. Intended uses include machine vision, plant growth, and spectroscopy.



Flux Characteristics at Maximum Rated Forward Current

T_A = 25 °C

TYPE	PRODUCT CODE	RADIANT FLUX (Φ _E , mW)	FORWARD CURRENT (I _F , mA)
660 nm	NHX660040S00S00	400	480


Electro-Optical

T_A = 25 °C, I_F = 160 mA

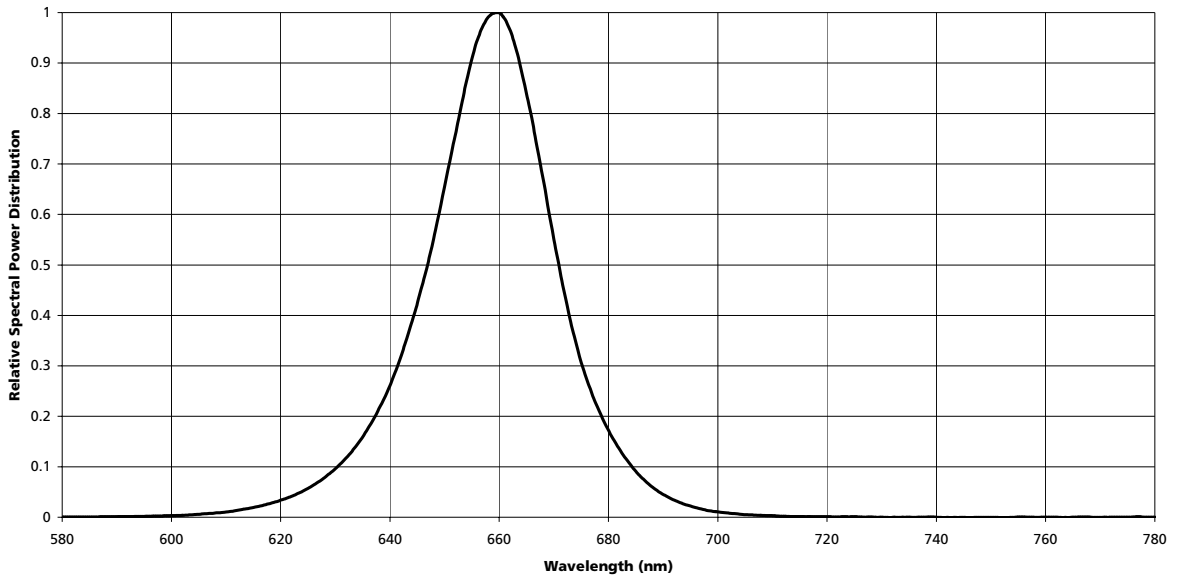
TYPE	RADIANT FLUX (Φ _E , mW)		FORWARD VOLTAGE (V _F , V)		PEAK WAVELENGTH (λ _P , nm)			FULL WIDTH HALF MAXIMUM (Δλ, nm)
	MIN	TYP	TYP	MAX	MIN	TYP	MAX	TYP
660 nm	90	150	8.75	11.0	650	660	670	20

Estimated Irradiance Values (T_A = 25 °C, I_F = 160 mA)

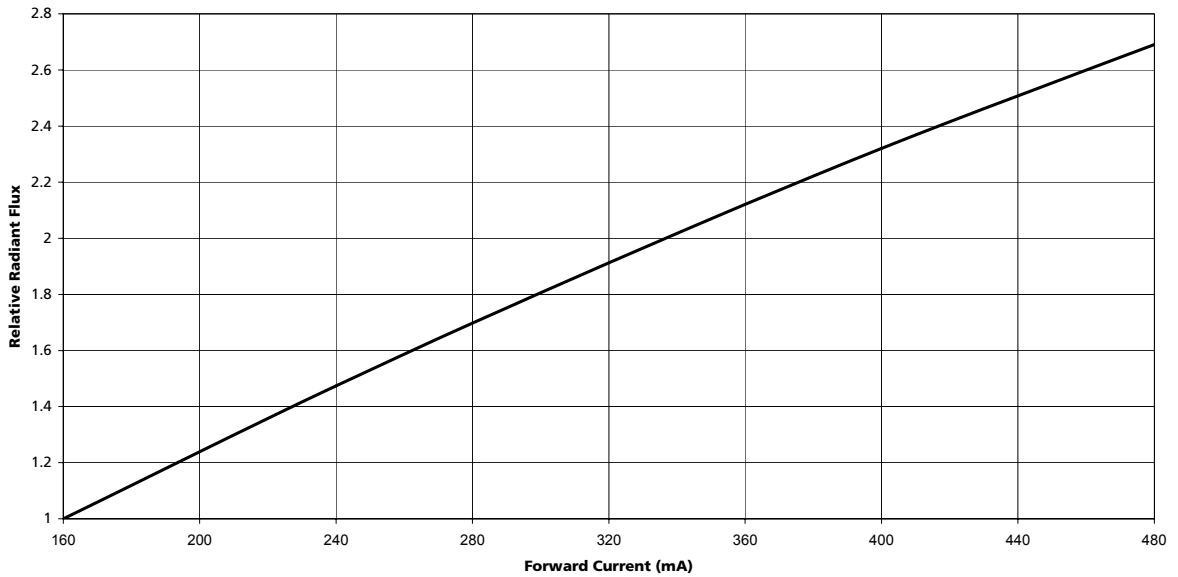
Distance (cm)	Hex without Optic (mW/cm ²)	Hex with NHXOPTIC040A Optic (mW/cm ²)
2	3	45
4	1.1	25
6	0.5	10
8	0.3	6
10	0.2	4


	NORLUX CORPORATION 575 RANDY ROAD CAROL STREAM, IL 60188-2121	CREATED BY: DMH	SAP #: 129900	
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Spectral Characteristics

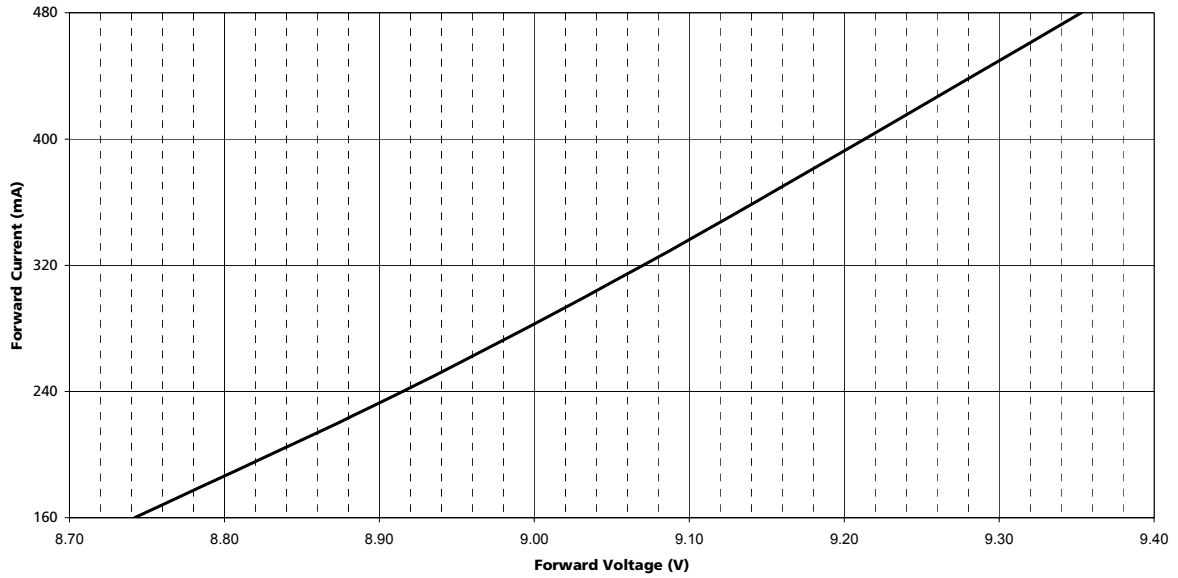


Relative Radiant Flux vs. Forward Current

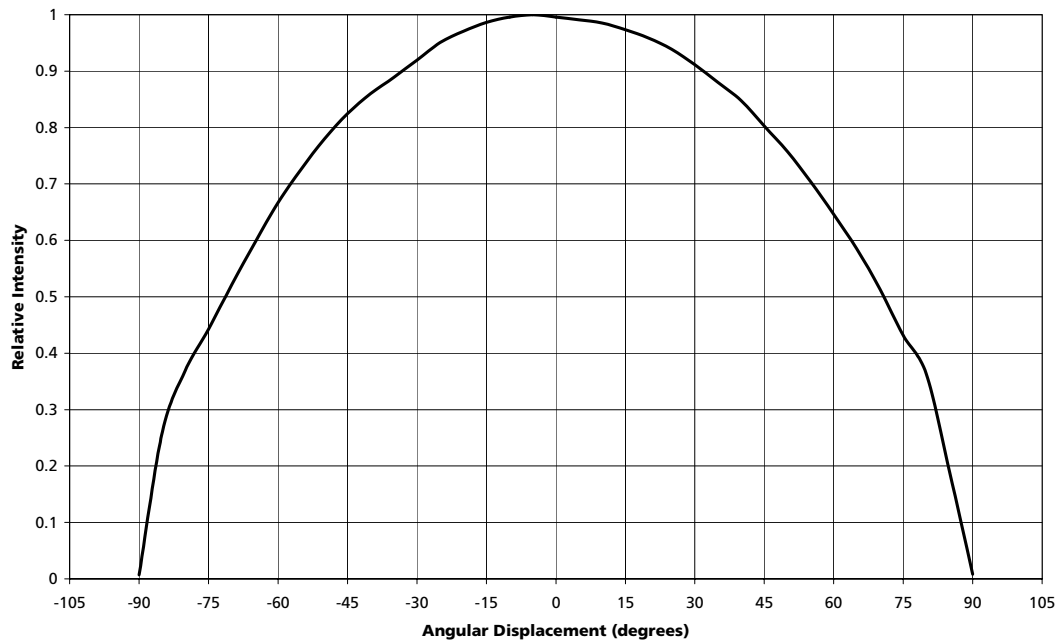



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Nominal Forward Voltage vs. Forward Current



Monochromatic Hex Radiation Pattern



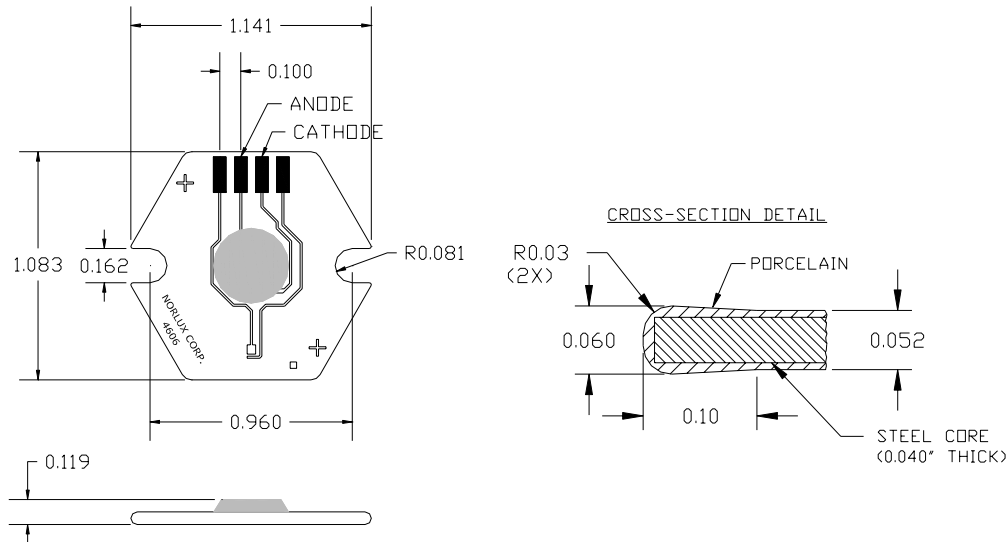
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Absolute Maximum Ratings


T_A = 25°C

Forward Current	480 mA (Follow Derating Chart)
Reverse Voltage (I _R = 100 μA)	> 15 V
Power (Heat Sink Required)	5 W
Thermal Resistance Junction-to-Ambient R _{THJA}	20° C/W Forced Air Calculation
Thermal Resistance Junction-to-Substrate	15 °C/W
Junction Temperature	125 °C
Operating Ambient Temperature	-30 °C to 85 °C
Relative Humidity	90% Non Condensing
Storage Temperature	-40 °C to 100 °C
Soldering Temperature	≤ 245 °C for 5 seconds

Mechanical / Electrical (Typical Dimensions)



Use #6 screws or #4 screws with shoulder washers to properly mount device

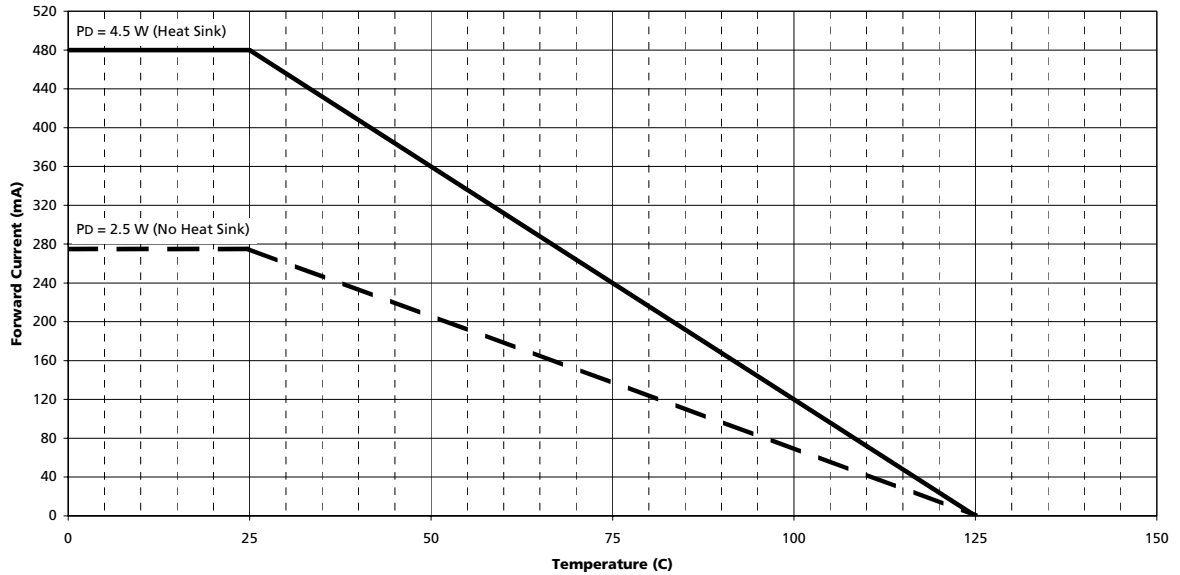
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Thermal Considerations

Most applications will require the Hex substrate to be attached to a heat-sinking surface. Care should be taken to ensure that the maximum junction temperature is not exceeded in the given application. Use the following (typical) information to design a thermal system using the Hex.

Maximum Junction Temperature	125 °C
Thermal Resistance Junction-to-Substrate, R_{THJS}	10 °C/W
Thermal Resistance Junction-to-Ambient, R_{THJA} No Heat Sink / Still Air	40 °C/W

Derating Forward Current vs. Temperature



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Reliability

The Hex product family is qualified to the tests in the table below.

Test	Reference	Test Conditions	Results
Temperature Cycle	Mil-Std-883 Method 1010.7	-40C to 100C 15 min. dwell, 1 min transfer, 500 cycles	No Failures
High Temperature Storage	Mil-Std-883 Method 1008	120C for 1000 Hrs.	No Failures
Low Temperature Storage	N/A	-40C for 1000 Hrs.	No Failures
High Temperature Operating Life Test	Mil-Std-883 Method 1005	55C for 2000 Hrs. Devices powered at 160 mA.	Negligible LOP change 1000 Hrs.
Humidity / Moisture Resistance	Mil-Std -202	Per Method 106	No Failures
Mechanical Shock	Mil-Std-883 Method 2002	Condition B: 1500 G's, 5 Shocks in Each Axis	No Failures
Vibration	Mil-Std-883 Method 2007	Condition A: Sweep 4 times each axis 20-2000 Hz. , 20G	No Failures

Notes:

- Test sample size (n) greater than 30 devices for each test

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