

# Enhanced Vertical™ EV-B80T High Power Blue LED

## Introduction

The Enhanced Vertical (EV™) LED series is the latest innovation in high brightness LED chips, an ideal light source for general lighting applications, including street lighting, commercial and residential lighting. Featuring SemiLEDs' vertical chip structure on a patented metal alloy substrate and manufactured with our proprietary process, the EV LEDs offer advantages in excellent optical output and high thermal conductivity, thereby achieving greater light quality, color consistency, reliability and overall efficiency of the luminaire. Further design advances of the EV LED structure, offer higher thermal endurance for process temperatures up to 325° Celsius and maximum suggested junction temperature of 150° Celsius.

Among pure metals at room temperature, copper has the second highest electrical and thermal conductivity after silver. Furthermore, due to the high thermal conductivity of the copper alloy layer, the heat generated in our device is effectively removed. This is a major advantage for any lamp or luminaire manufacturer when using SemiLEDs EV LED chip.

SemiLEDs' patented and unique process uses a limited quantity of Sapphire, which can be recycled and reused multiple times, significantly reducing the Carbon footprint. The reduced dependence on Sapphire also removes a thermal management bottleneck while providing the most environmentally friendly LED on the market.

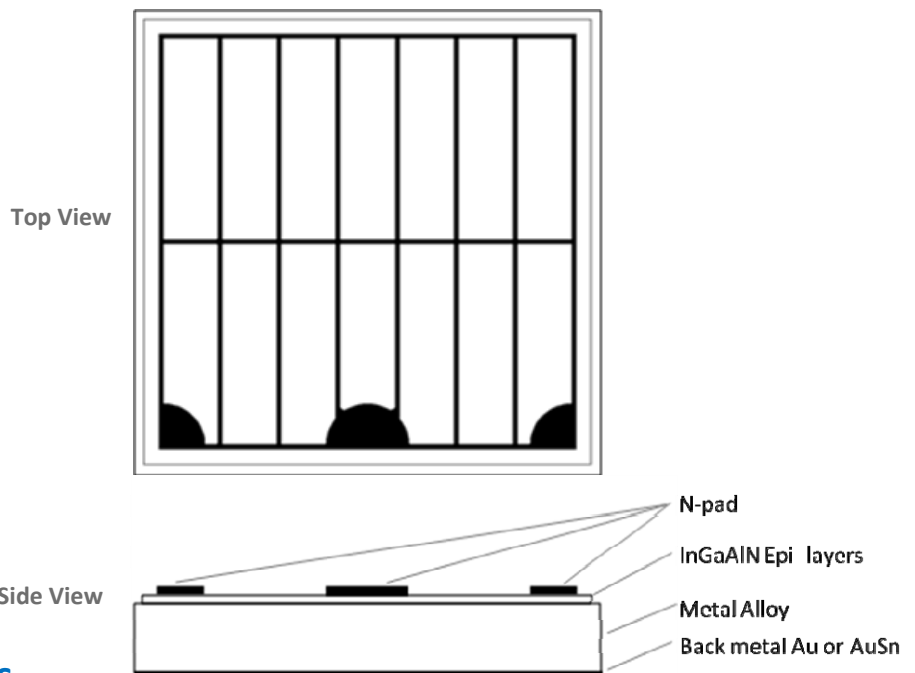
**RoHS and REACH Compliant**

## Features

- Metal alloy device . . . . . High thermal conductivity
- Thickness 145 μm . . . . . Consolidated metal alloy
- P-N junction high at 140 μm . . . . . Silver epoxy die attachment compatible
- Optimized N-pad design . . . . . Better current spreading
- Nearly Perfect Lambertian emission pattern . . . . . Ideal for high output density
- Patterned Surface . . . . . Maximum light extraction
- High Thermal Endurance . . . . . Eutectic die attach compatible

## Applications

- General lighting
- LCD Backlight
- Digital Camera Flash Light
- High Power LED
- Automotive Lighting
- Signalling
- Signage
- Heavy Duty Torch



## Mechanical Specifications

P-N junction area	1930 μm X 1930 μm	± 20 μm
Base area	2090 μm X 2090 μm	± 50 μm
Chip thickness	145 μm	± 15 μm
Corner bond pad size	220 μm X 215 μm	± 15 μm
Center bond pad size	220 μm X 390 μm	± 15 μm
Bond pad thickness	7.7 μm	± 0.5 μm
Junction height	140 μm	± 15 μm
AuSn metallization thickness <sup>*Note 2</sup>	3 μm	± 0.5 μm

Note: The corner bond pad size is designed for single wire bonding per pad. The center bond pad size is designed for single wire or two wire bonding. We recommend using gold ball bonding as an electrical connection. The gold ball must not extend outside of the pad area.

Note 2: AuSn is available upon request. (Part Number : EV-B80T-U)

## Optical and Electrical Characteristics at 1,000 mA, T<sub>a</sub> at 25°C

Parameter	Symbol	Min	Typ	Max	Remark
Forward voltage:	V <sub>f</sub>		3.0	3.2	Volt
Spectra half width	Δλ		20	40	nm
Reverse current	I <sub>r</sub>			2 μA	V <sub>r</sub> = 5 Volt

Measured by SemiLEDs on bare chip and is only given for information.

## Absolute Maximum Ratings, T<sub>a</sub> at 25°C

Forward Current (DC)	3,000 mA
LED Junction Temperature	150°C
Reverse Voltage	5 V
Operating Temperature	-40°C to +110°C
Storage Temperature (Chip)	-40°C to +110°C
Storage Temperature (Chip on tape)	-20°C to + 65 °C
Temperature during packaging (reflow)	325°C (<5sec)

Note:

1. Maximum ratings are strongly package dependent and may differ between different packaged devices. The values given were collected by SemiLEDs' in-house package and are only given for information.

## Radiant Power Characteristic, T<sub>a</sub> at 25°C

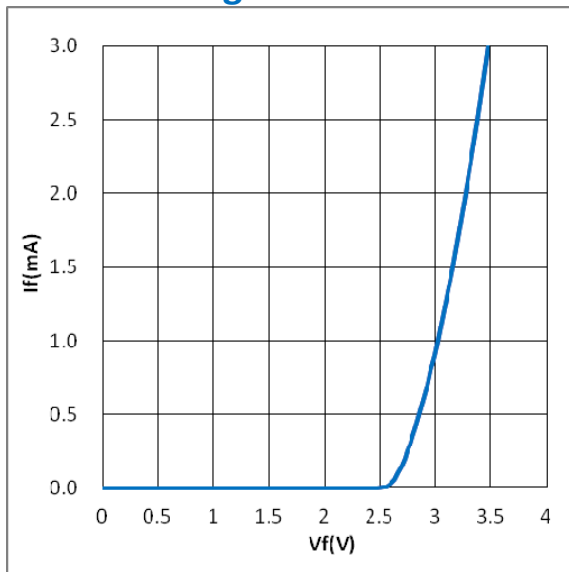
Wd	*Radiometric Power (mW) Factor			
	1000mA	1500mA	2000mA	3000mA
445~460nm	1.00	1.45	1.84	2.50

\*Power factors are typical value and are for reference only.

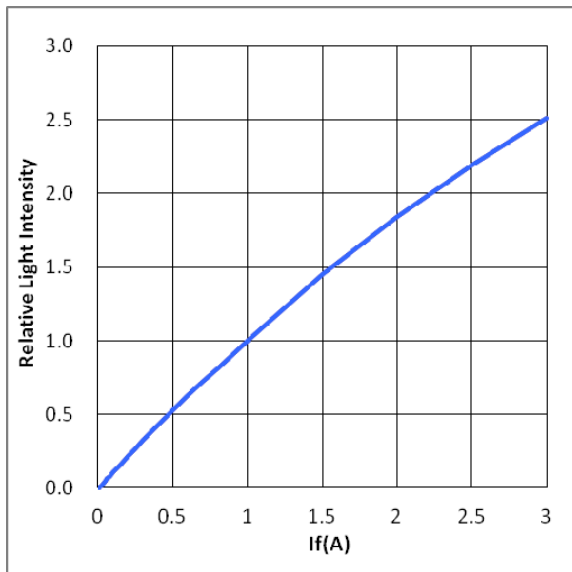
## BIN Table (Output Power at 1000mA, T<sub>a</sub> at 25°C)

IS(mW)/Wd(nm)	445-447.5	447.5-450	450-452.5	452.5-455	455-457.5	457.5-460
1000-1100	BCK0	BDK0	BEK0	BFK0	BGK0	BHK0
1100-1200	BCL0	BDL0	BEL0	BFLO	BGL0	BHL0
1200-1300	BCM0	BDM0	BEM0	BFM0	BGM0	BHM0
1300-1400	BCN0	BDN0	BEN0	BFNO	BGN0	BHN0
1400-1500	BCP0	BDP0	BEPO	BFPO	BGP0	BHP0
1500-1600	BCQ0	BDQ0	BEQ0	BFQ0	BGQ0	BHQ0

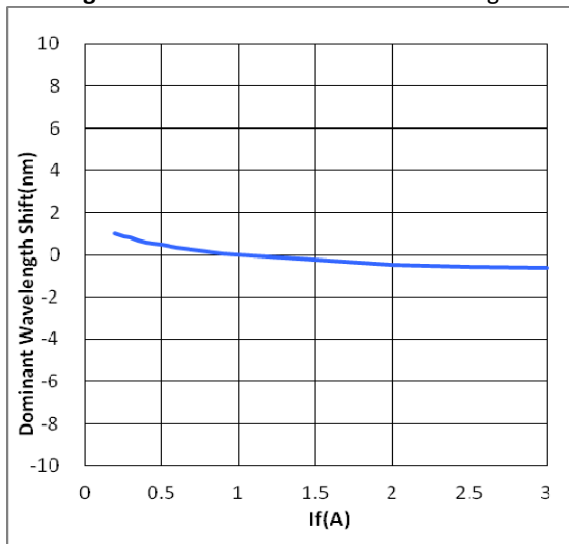
### Performance Diagrams



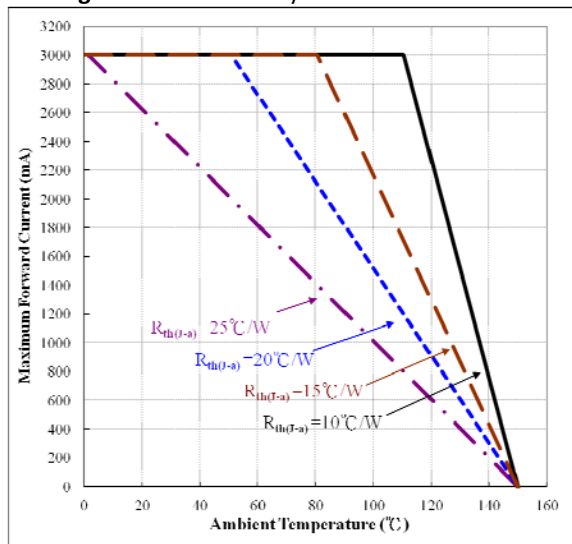
**Fig-1** Forward Current vs. Forward Voltage



**Fig-2** Relative Intensity vs. Forward Current



**Fig-3** Dominant Wavelength Shift vs. Forward Current



**Fig-4** Maximum Forward Current vs. Ambient Temperature

Note:

- a. Minimum and maximum value refers to the limits and set up of SemiLEDs’ testers. All other measurement data are defined as long-term production mean values and are only given for reference.
- b. A critical component is a component used in a life-support device or system whose failure can reasonably be expected to cause the failure of that life-support device or system, or to affect its safety or effectiveness of that device or system. Life support devices or systems are intended (i) to be implanted in the human body, or (ii) to support and/or maintain and sustain human life. If they fail, it is reasonable to assume that the health of the user may be endangered. Components used as a critical component must be approved in writing by SemiLEDs.

**Caution:** Users are requested to comply with the laws and public regulations concerning safety.

## About Us

**SemiLEDs Corporation** is a US company that develops and manufactures ultra-high brightness LED chips and components for general lighting, including street lights and commercial, industrial and residential lighting, along with specialty industrial applications such as UV curing, medical/cosmetic, counterfeit detection and horticulture. SemiLEDs specializes in the development and manufacturing of vertical LED chips in blue (white), green, and UV using a patented copper alloy base. This unique design allows for higher performance and longer lumen maintenance. The World Economic Forum recognized SemiLEDs innovations with the 2009 Technology Pioneer Award. SemiLEDs is fully ISO 9001:2008 and ISO 9001:2004 Certified.

SemiLEDs is a publicly traded company on NASDAQ Global Select Market (stock symbol "LEDS"). For investor information, please contact us at [investors@semileds.com](mailto:investors@semileds.com).

For further company or product information, please visit us at [www.semileds.com](http://www.semileds.com) or please contact [sales@semileds.com](mailto:sales@semileds.com).

The logo features a stylized blue icon of a fan or light rays above the word "SEMILEDs" in a bold, sans-serif font. The "i" in "LEDs" is lowercase and blue, while the rest of the letters are black.

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