

# Enhanced Vertical™ EV-B40A 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

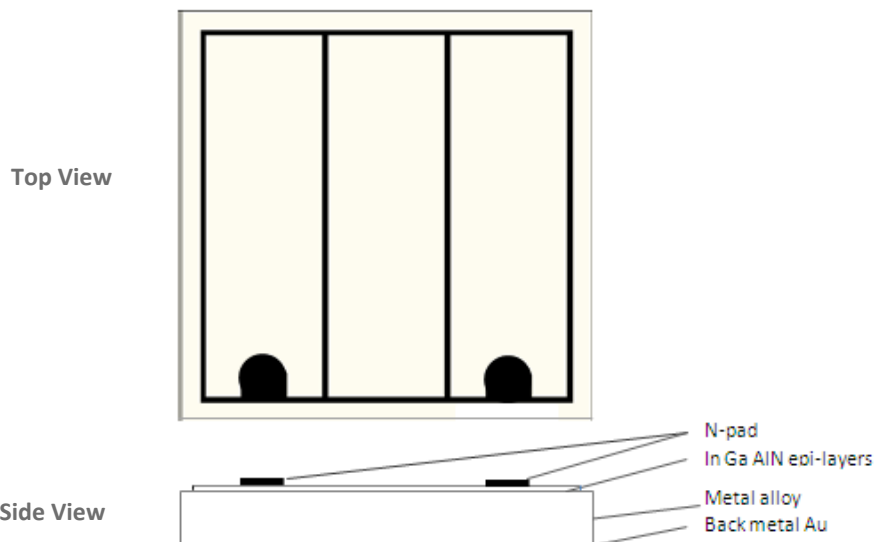
## Feature

- 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 white light design
- Patterned Surface . . . . . Maximum light extraction
- Enhanced Vertical Structure . . . . . Eutectic die attach compatible**

## Applications

- General Lighting
- LCD backlight
- Digital Camera Flash light
- High Power LED
- Automotive lighting
- Signalling
- Signage
- Miniature Light Engine

## Chip Mechanical Diagram



## Mechanical Specifications

P-N junction area	970 μm X 970 μm	± 20 μm
Base area	1070 μm X 1070 μm	± 50 μm
Chip thickness	145 μm	± 15 μm
Bond pad size	120 μm X 120 μm	± 15 μm
Bond pad thickness	7.7 μm	± 0.5 μm
Junction height	140 μm	± 15 μm

Note: The bond pad size is designed for single wire bonding per pad. We recommend using gold ball bonding as an electrical connection.

The gold ball must not extend outside of the pad area.

## Optical and Electrical Characteristics at 350mA, Ta at 25°C

Parameter	Symbol	Min	Typ	Max	Remark
Forward voltage:	Vf		3.1	3.4	Volt
Spectra half width	$\Delta\lambda$		20	40	nm
Reverse current	Ir			2 $\mu$ A	Vr= 5 Volt

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

## Absolute Maximum Ratings, Ta at 25°C

Forward Current (DC)	700 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)

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.

## BIN Table (Output Power at 350mA, Ta 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	460-462.5	462.5-465
300-320	BCC0	BDC0	BEC0	BFC0	BGC0	BHC0	BJC0	BKC0
320-340	BCC2	BDC2	BEC2	BFC2	BGC2	BHC2	BJC2	BKC2
340-360	BCC4	BDC4	BEC4	BFC4	BGC4	BHC4	BJC4	BKC4
360-380	BCC6	BDC6	BEC6	BFC6	BGC6	BHC6	BJC4	BKC6
380-400	BCC8	BDC8	BEC8	BFC8	BGC8	BHC8	BJC8	BKC8
400-420	BCD0	BDD0	BED0	BFD0	BGD0	BHD0	BJD0	BKD0
420-440	BCD2	BDD2	BED2	BFD2	BGD2	BHD2	BJD2	BKD2
440-460	BCD4	BDD4	BED4	BFD4	BGD4	BHD4	BJD4	BKD4
460-480	BCD6	BDD6	BED6	BFD6	BGD6	BHD6	BJD6	BKD6
480-500	BCD8	BDD8	BED8	BFD8	BGD8	BHD8	BJD8	BKD8
500-525	BCE0	BDE0	BEE0					
525-550	BCEA	BDEA						

### Performance Diagrams

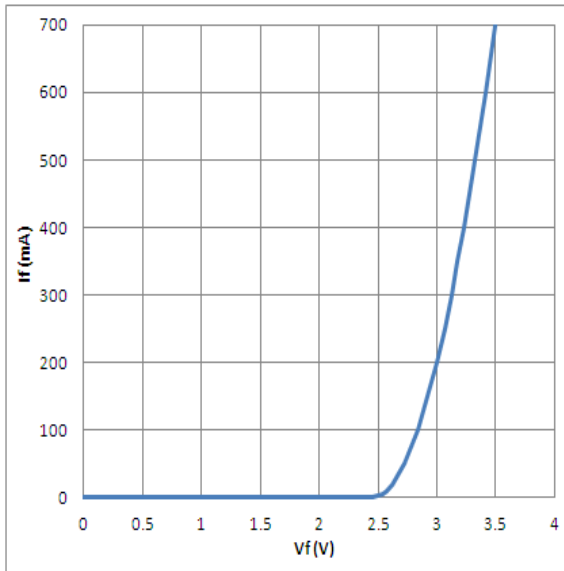


Fig-1 Forward Current vs. Forward Voltage.

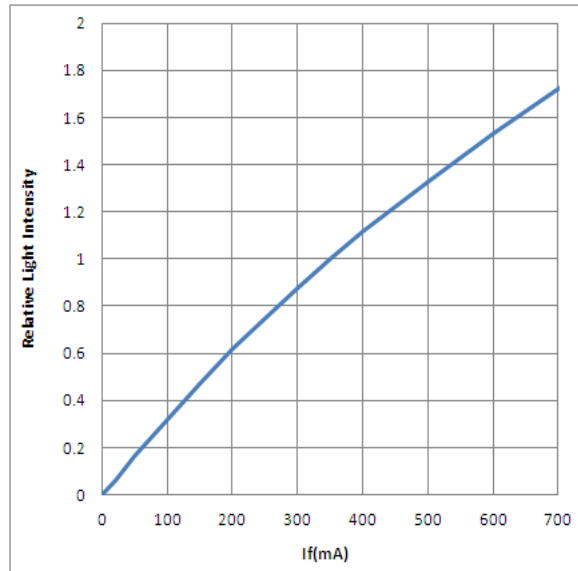


Fig-2 Relative Intensity vs. Forward Current.

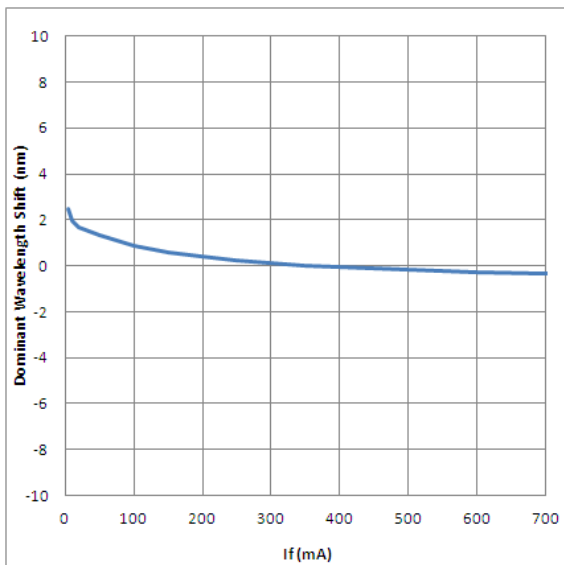


Fig-3 Dominant Wavelength Shift vs. Forward Current.

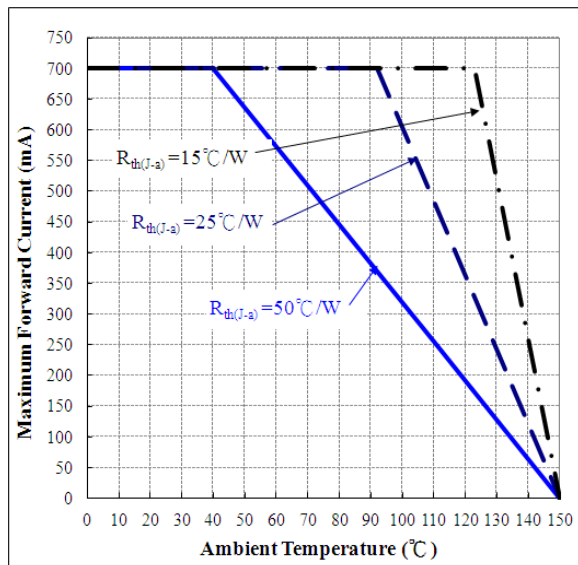


Fig-4 Maximum Forward Current vs. Ambient Temperature.

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.

## 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 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).



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