

# Enhanced Vertical™ EV-G45A High Power GREEN LED

## Introduction

The Enhanced Vertical (EV™) LED series is the latest innovation in high brightness LED chips. 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, reliability and overall efficiency. 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

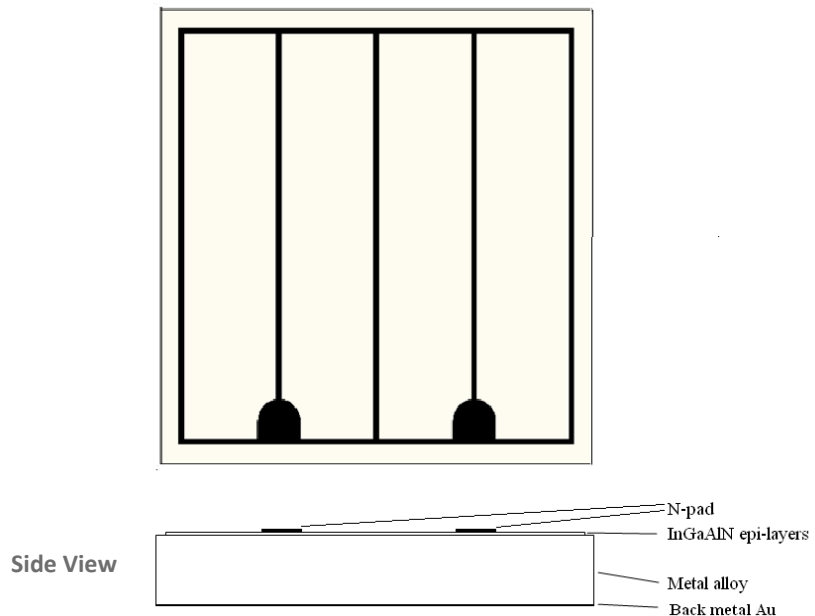
## Feature

- 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 light design
- Patterned Surface . . . . . Maximum light extraction
- High Thermal Endurance . . . . . Eutectic die attach compatible**

## Applications

- LCD backlight
- Architecture lighting
- High Power LED
- Entertainment lighting
- Signalling
- Signage
- Light Engine
- Landscape

## Chip Mechanical Diagram



## Mechanical Specifications

P-N junction area	1050 μm X 1050 μm	± 20 μm
Base area	1200 μm X 1200 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		3.2	3.6	Volt
Spectra half width	$\Delta\lambda$		35	50	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)

Wd Range (nm)	18-20cd	20-22cd	22-24cd	24-28cd	28-32cd
515-520	FE	FF	FJ	FK	FL
520-525	GE	GF	GJ	GK	GL
525-530	HE	HF	HJ	HK	HL
530-535	IE	IF	IJ		

### Performance Diagrams

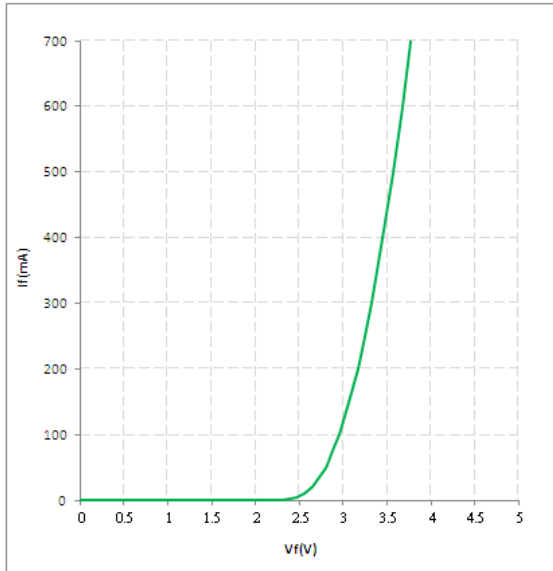


Fig-1 Forward Current vs. Forward Voltage.

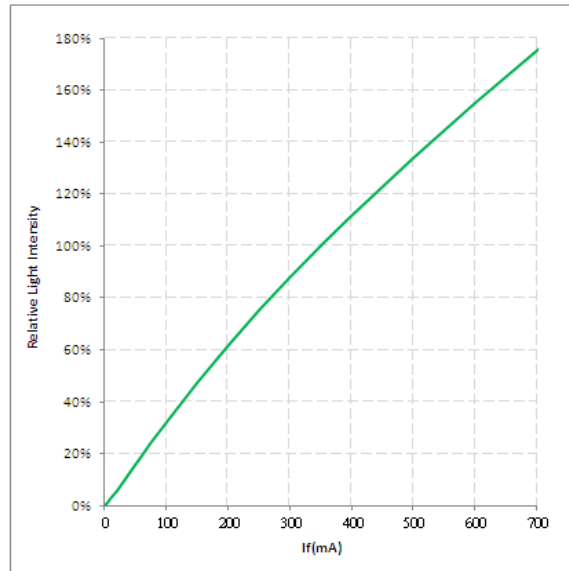


Fig-2 Relative Intensity vs. Forward Current.

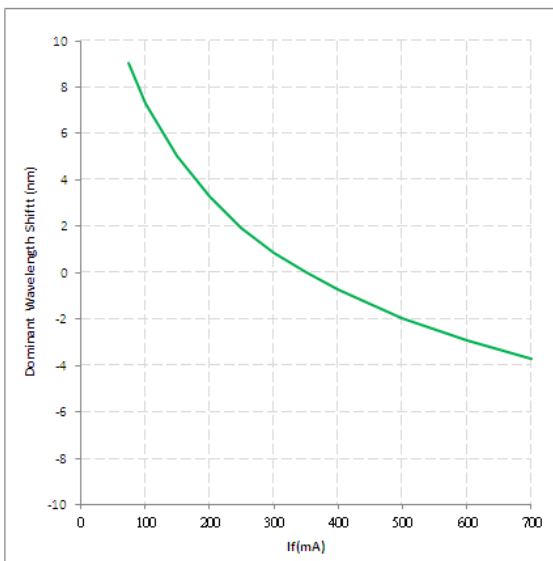


Fig-3 Dominant Wavelength Shift vs. Forward Current.

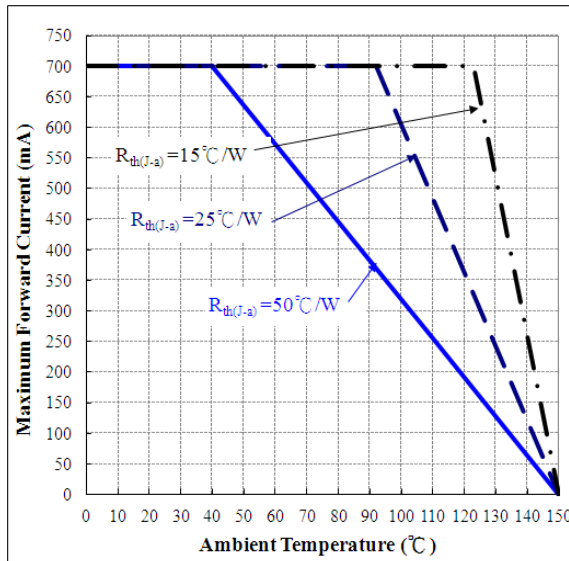


Fig-4 Maximum Forward Current vs. Ambient Temperature.

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).

The logo features a stylized blue fan icon 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.

[www.semileds.com](http://www.semileds.com)

[sales@semileds.com](mailto:sales@semileds.com)