

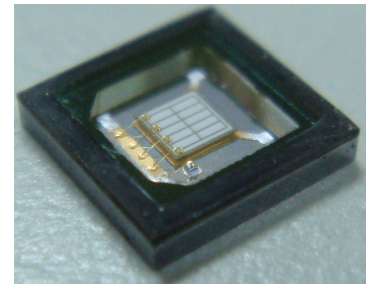
P5-40

High Power 365nm UV LED

High Power 365nm UV LED

Introduction

Market applications using UV LEDs are diverse and represent a significant opportunity for any LED packager or integrator. Traditional mercury lamps have many disadvantages that limit UV applications, and mercury is a notorious pollutant. Features of the LED including form factor, wavelength and lifetime, add flexibility to UV applications. SemiLEDs' portfolio of mercury free UV products will enhance and in some cases revolutionize the way applications are built in UV market segments such as Curing, Currency/Document Verification, Tanning, Medical, and Sterilization.



All SemiLEDs UV P5LEDs are made using the patented vertical MvpLED™ chips which is a Copper-Alloy device, featuring a silicon substrate and hard glass. The Copper-Alloy device and silicon substrate allow for maximum heat transfer from the junction to the board or heat sink. These features along with the optical advantages facilitate designs using higher drive currents to maximize light density. The package is reflow-able under standard SMT process.

Features

- ▮ Long Operating Life
- ▮ High Efficacy
- ▮ Low Thermal Resistance
- ▮ Low Profile Design
- ▮ SMT Device
- ▮ Instant Light
- ▮ Fully Dimmable
- ▮ RoHS Compliant

Applications

- ▮ UV air purifier
- ▮ Medical applications
- ▮ UV activated applications
- ▮ Counterfeit detection
- ▮ Special chemical detection
- ▮ High resolution optics
- ▮ Curing

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1- Product Nomenclature

The part number is explained as follows:

P5 – 40 – X Y Z

Where P5 – designates P5 high power UV LED

40 – designates chip size

X – designates peak wavelength (B : 365~370nm ; C : 370~375 nm)

Y – designates radiation power of P5 LED (please see optical power bin, page 5)

Z – Reserved code

2- Absolute Maximum Ratings, Ta at 25°C

Characteristics	Maximum Rating	Unit
DC Forward Current	700	mA
Pulse Forward Current [1]	1000	mA
Power Dissipation	3	W
Allowable Reverse Current [2]	85	mA
Operating Temperature [3]	-20~85	°C
Storage Temperature	-40~100	°C
Junction Temperature	125	°C
Soldering Temperature	260°C 10sec.	
ESD Classification (HBM)	Class 2	

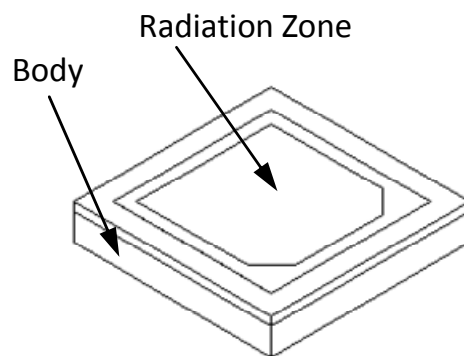
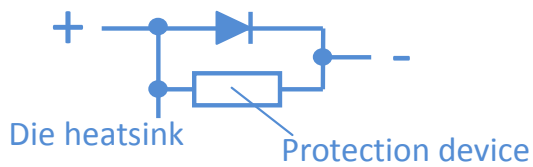
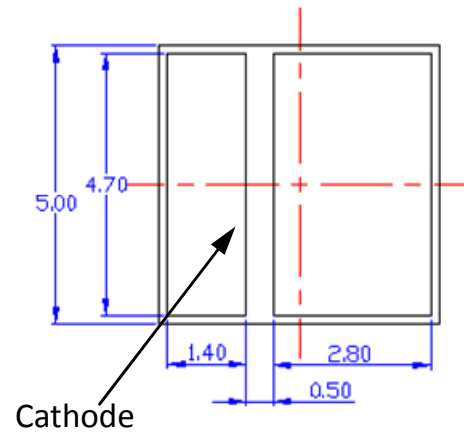
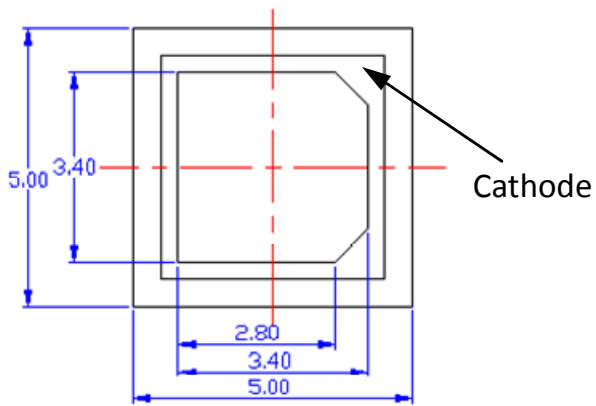
Reminding:

[1] I_{FP} condition : Pulse width \leq 10msec. and duty \leq 1/10.

[2] This device isn't designed to be driven in reverse bias.

[3] Please confirm the junction temperature is under maximum rating.

3- Mechanical Dimensions



Notes:

- Drawings are not to scale
- All dimensions are in millimeter
- General tolerance is $\pm 0.2\text{mm}$.

Materials

Chip : MvpLED UV LED

Submount : Silicon

Glass protection : UV resistant Hard Glass

Electrodes : Au Plating

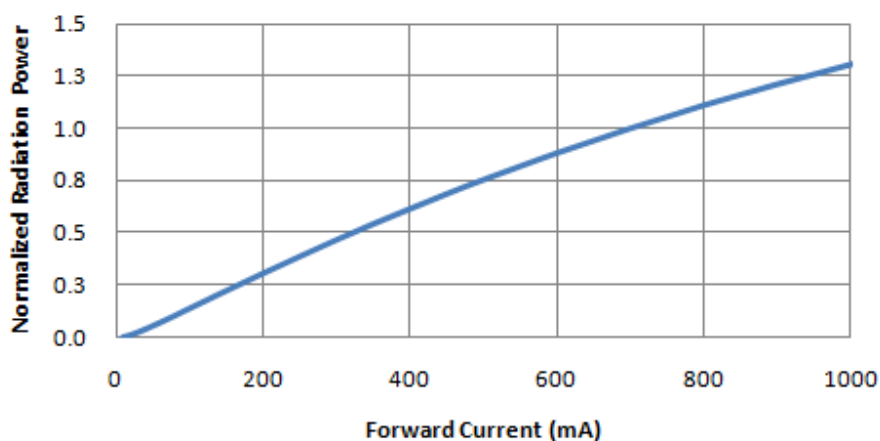
4- Typical Optical Characteristics at 700mA

Characteristics	Symbol	Typical	Unit
Radiation Power	P_o	150	mW
Peak Wavelength	λ_p	368	nm
Full Width at Half Maximum	$\Delta\lambda$	10	nm
Viewing Angle	$2\theta_{1/2}$	110	Degree

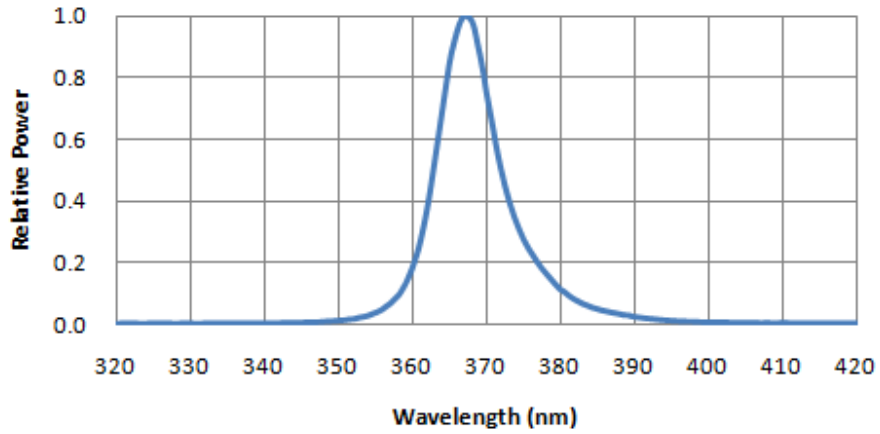
Optical Power Bin

$\lambda_p \setminus P_o$	75~90 mW	90~110 mW	110~130 mW	130~160 mW	160~200 mW	200~240 mW
365~370 nm (Bin B)	BC3	BD1	BD2	BE1	BF1	BF2
370~375 nm (Bin C)	CC3	CD1	CD2	CE1	CF1	CF2

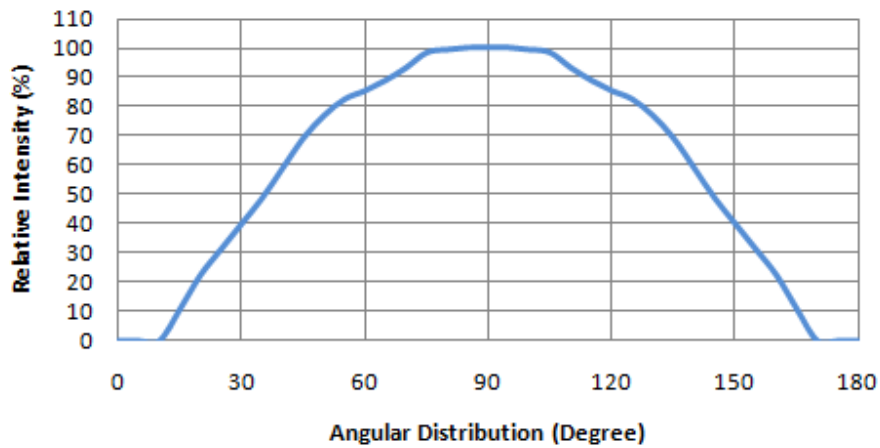
Typical Relative Power vs. Forward Current



Typical Wavelength Spectrum Distribution



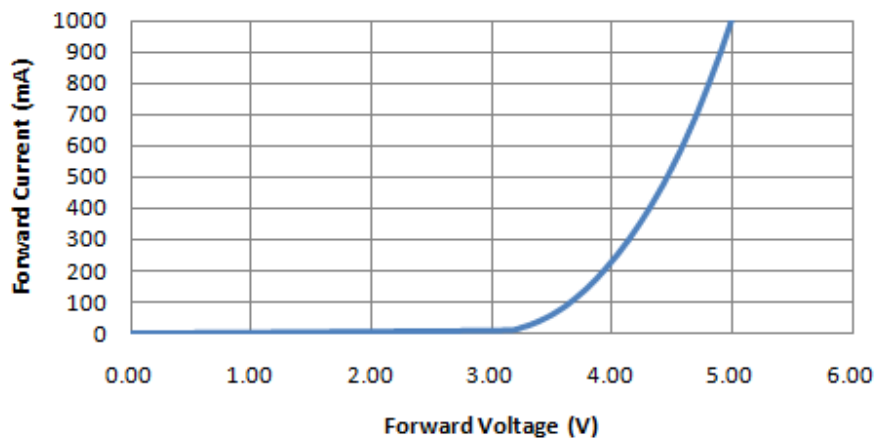
Typical Spatial Radiation Pattern



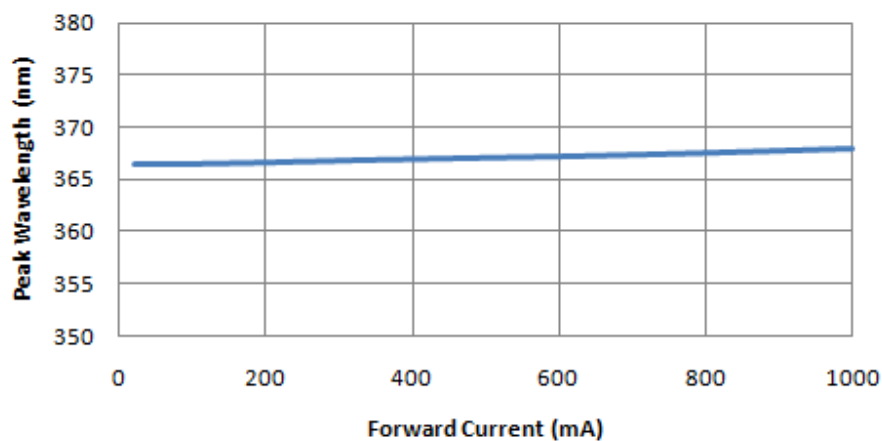
5- Typical Electrical / Thermal Characteristics, $T_a=25^\circ\text{C}$, $I_f=700\text{mA}$

Characteristics	Symbol	Typical	Unit
Typical Forward Voltage (@350mA)	V_F	4.1	V
Typical Forward Voltage (@700mA)	V_F	4.6	V
Temperature Coefficient of Forward Voltage	$\Delta V_F / \Delta T_j$	-3~-5	mV/ $^\circ\text{C}$
Thermal Resistance (R_{j-b})	$R\Theta_{j-b}$	5	$^\circ\text{C}/\text{W}$

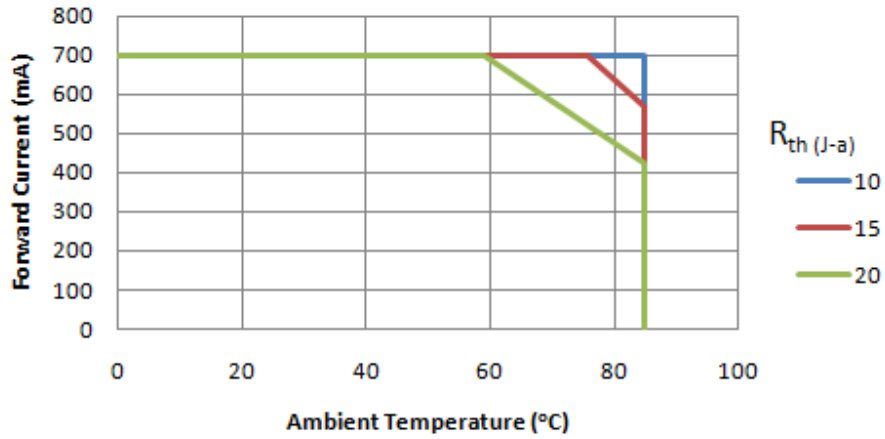
Typical Forward Current vs. Forward Voltage



Typical Peak Wavelength vs. Forward Current



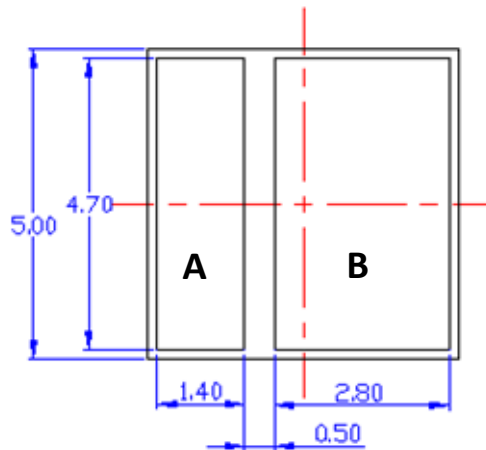
6- Current Derating Curves



Note: $R_{th(J-a)}$ is the thermal resistance from LED junction to ambient

7- Recommended Soldering Information

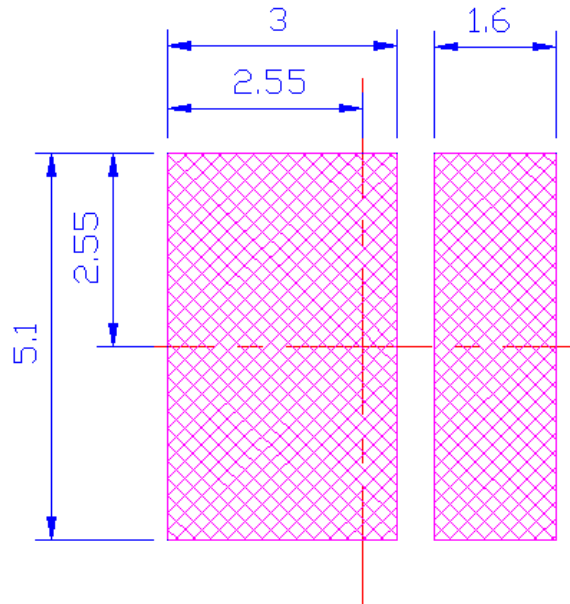
Emitter Pad Design



Unit: mm

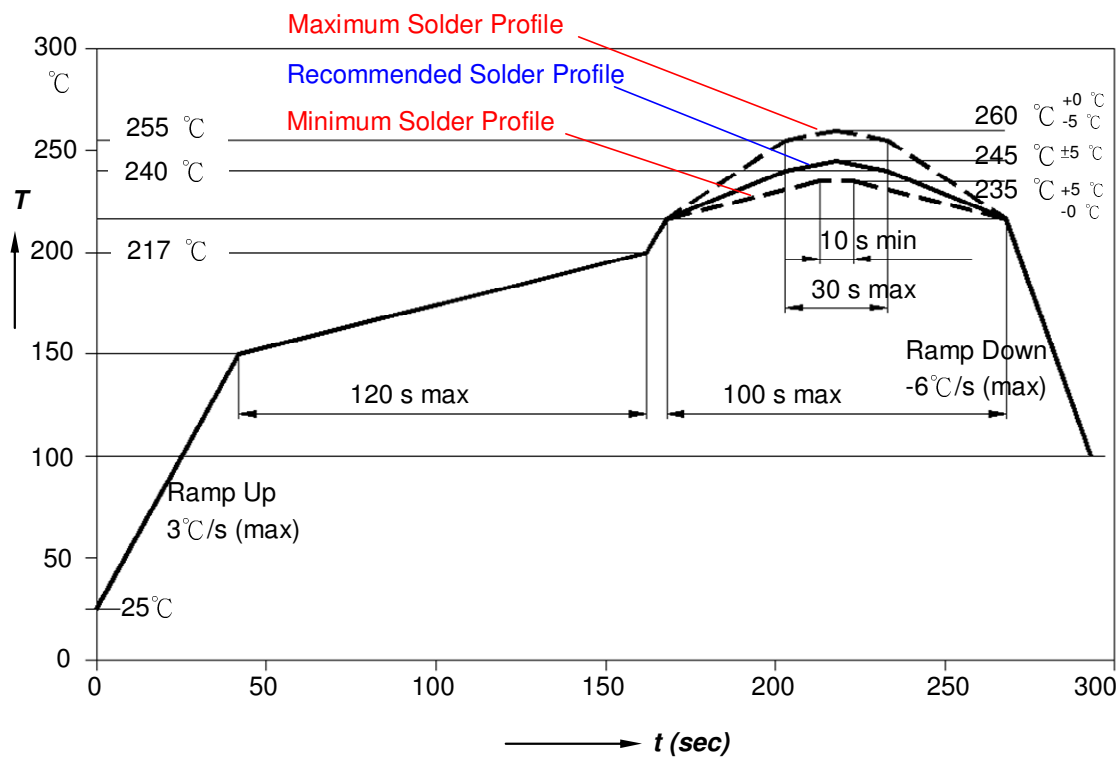
Pad	Function
A	Cathode
B	Anode and Thermal

Solder Pad Design



Unit : mm

Reflow Profile for Lead free Soldering



8- Cautions

The P5 LED is a UV device and emits a UV beam during operation. Don't look at the UV light directly or look through the optical system. The P5 LED radiates intense UV light; precautions must be taken with UV light, including wearing protective glasses to avoid the human eye directly catching the UV light. Users are requested to comply with the laws and public regulations concerning safety.

About Us

SemiLEDs is a US based manufacturer of ultra-high bright LED chips with state of the art fabrication facilities in Hsinchu Science Park, Taiwan. SemiLEDs specializes in the development and manufacturing of metal alloy vertical LED chips in blue (white), green and UV using our patented and proprietary MvpLED™ technology. This unique design allows for higher performance and longer lumen maintenance. SemiLEDs new high power I-core MvpLEDs™ can deliver over 120lm/W. In December 2008 The World Economic Forum recognized SemiLEDs innovations with the 2009 Technology Pioneer Award.



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