

# NV4V31SF

Blue-Violet Laser Diode

405 nm Blue-Violet Laser Light Source

R08DS0070EJ0100

Rev.1.00

Jun 20, 2013

## DESCRIPTION

The NV4V31SF is a blue-violet laser diode with a wavelength of 405 nm. A newly developed LD chip structure achieves a high optical power output of 175 mW (CW). The NV4V31SF can provide excellent linearity from low to high output at high temperatures, and reduces the unevenness of beam divergence.

## FEATURES

- High optical output power  $P_o = 175 \text{ mW @CW}$
- Peak wavelength  $\lambda_p = 405 \text{ nm TYP.}$
- Single transverse mode (lateral)
- Wide operating temperature range  $T_C = -5 \text{ to } +85^\circ\text{C}$
- $\phi 5.6 \text{ mm CAN package}$

## APPLICATIONS

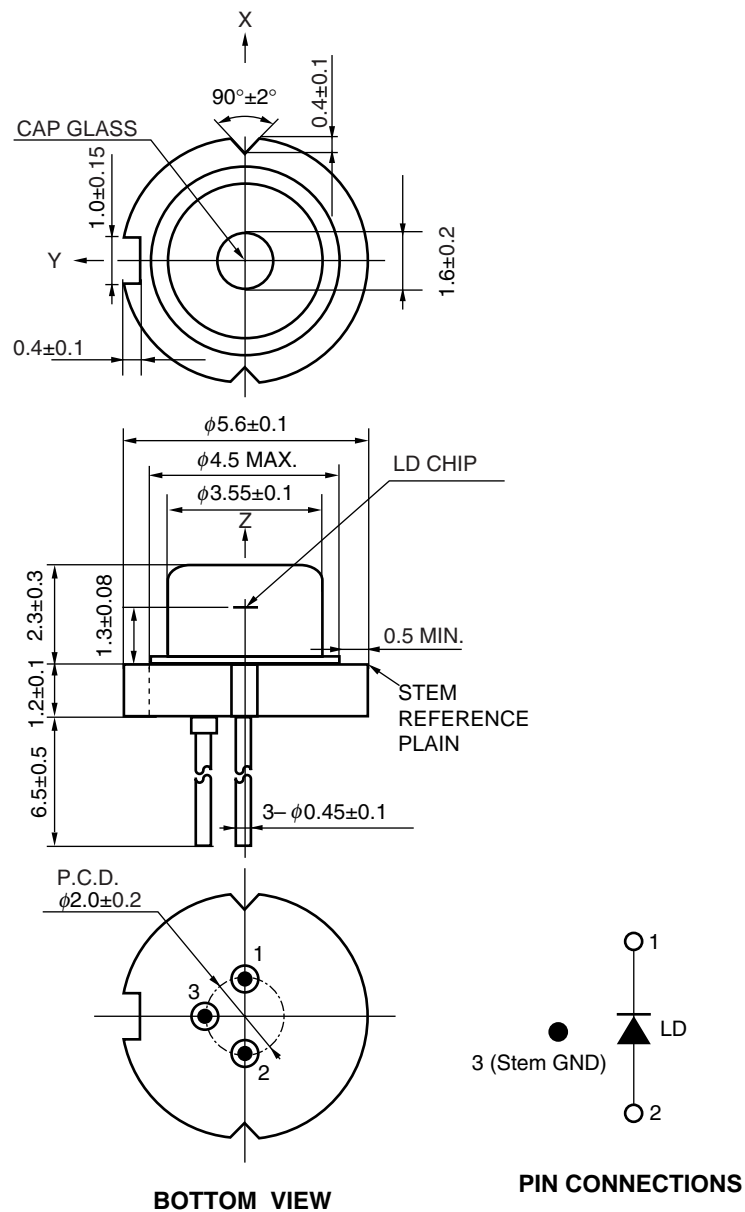
- Blue-violet laser light source



The mark <R> shows major revised points.

The revised points can be easily searched by copying an "<R>" in the PDF file and specifying it in the "Find what:" field.

## &lt;R&gt; PACKAGE DIMENSIONS (UNIT: mm)



**Remark** Cap glass thickness :  $0.25 \pm 0.03$  mm  
 Cap glass refractive index : 1.53 ( $\lambda = 405$  nm)

## &lt;R&gt; ORDERING INFORMATION

Part Number	Order Number	Rank	Packing Style
NV4V31SF	NV4V31SF-A	HV	Tray Packing (100 p/Tray), With data
		XV	Individual Packing (for samples), With data

**ABSOLUTE MAXIMUM RATINGS ( $T_C = 25^\circ\text{C}$ , unless otherwise specified)**

Parameter	Symbol	Ratings	Unit
Optical Output Power (CW)	$P_o$	210	mW
Reverse Voltage of LD	$V_R$	2	V
Operating Case Temperature	$T_C$	-5 to +85	$^\circ\text{C}$
Storage Temperature	$T_{stg}$	-40 to +85	$^\circ\text{C}$

**RECOMMENDED OPERATING CONDITIONS  
( $T_C = 25^\circ\text{C}$ , unless otherwise specified)**

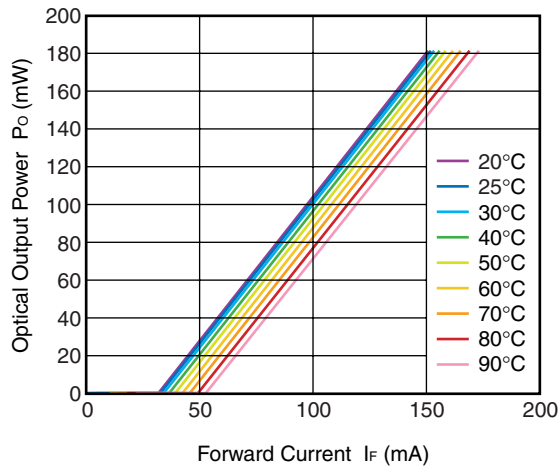
Parameter	Symbol	MAX.	Unit
Optical Output Power (CW)	$P_o$	175	mW

**ELECTRO-OPTICAL CHARACTERISTICS  
( $T_C = 25^\circ\text{C}$ , unless otherwise specified)**

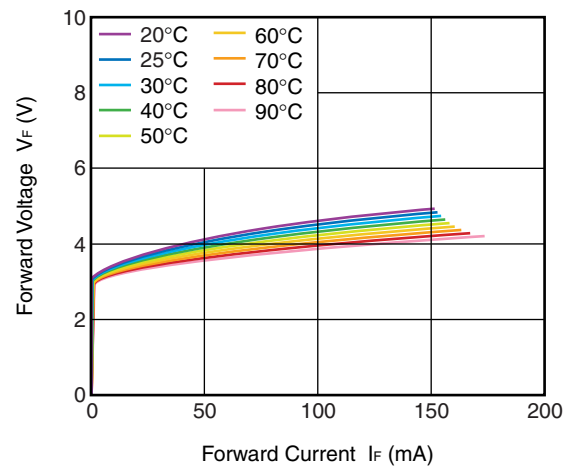
Parameter	Symbol	Conditions	MIN.	TYP.	MAX.	Unit
Threshold Current	$I_{th}$	CW		35	55	mA
Operating Current	$I_{op}$	CW, $P_o = 175\text{ mW}$		150	200	mA
Operating Voltage	$V_{op}$	CW, $P_o = 175\text{ mW}$		5.0	6.5	V
Slope Efficiency	$\eta_d$	CW, $P_o = 20\text{ mW}$ , 175 mW	1.1	1.55		W/A
Peak Wavelength	$\lambda_p$	CW, $P_o = 175\text{ mW}$	400	405	410	nm
Beam Divergence (lateral)	$\theta_l$	CW, $P_o = 175\text{ mW}$	6	9	12	deg.
Beam Divergence (vertical)	$\theta_\perp$		15	20	25	
Position Accuracy Angle (lateral)	$\Delta\theta_l$	CW, $P_o = 175\text{ mW}$	-3	0	3	deg.
Position Accuracy Angle (vertical)	$\Delta\theta_\perp$		-3	0	3	

## TYPICAL CHARACTERISTICS ( $T_c = 25^\circ\text{C}$ , unless otherwise specified)

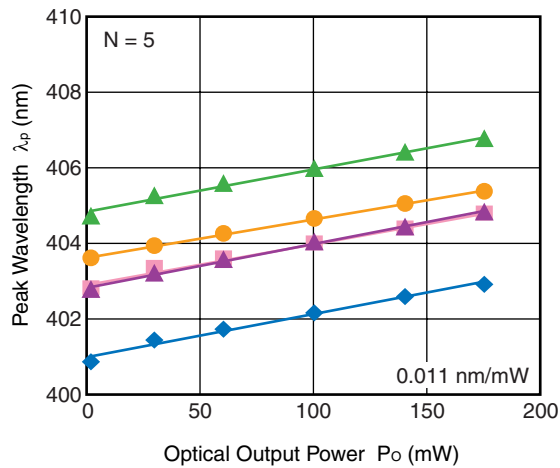
OPTICAL OUTPUT POWER  
vs. FORWARD CURRENT



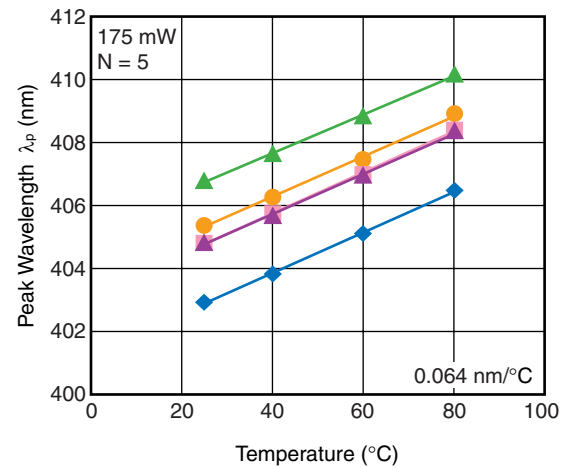
FORWARD VOLTAGE vs.  
FORWARD CURRENT



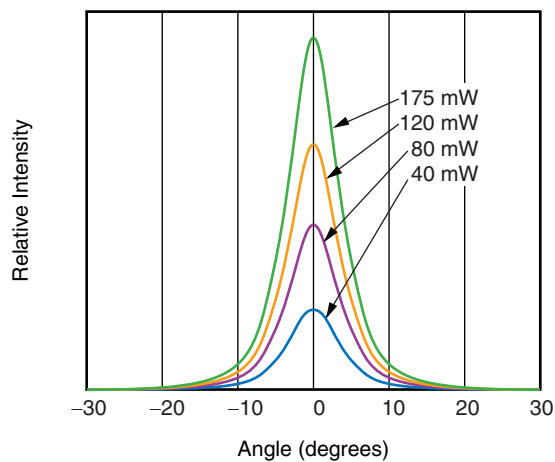
POWER DEPENDENCE OF  
PEAK WAVELENGTH



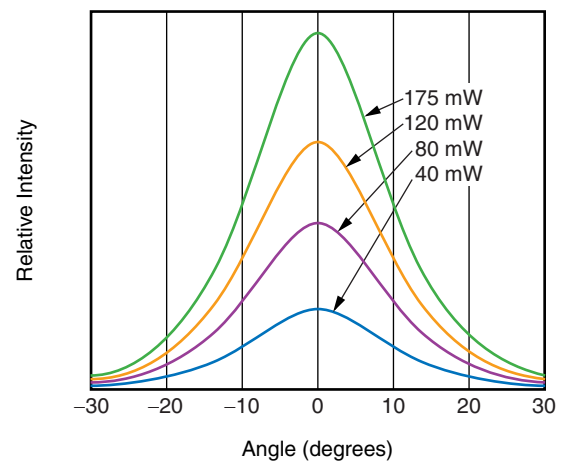
TEMPERATURE DEPENDENCE OF  
PEAK WAVELENGTH



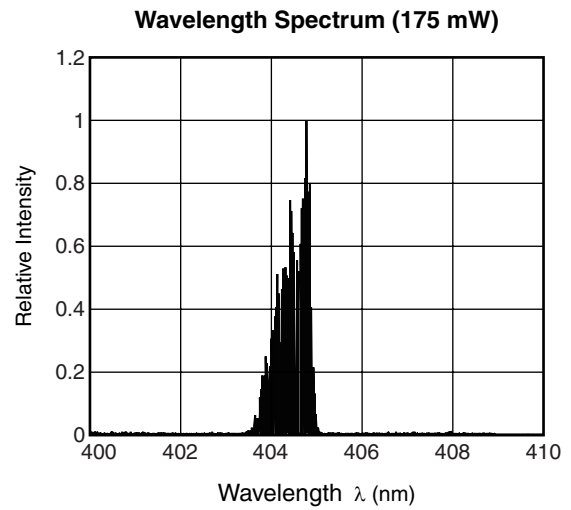
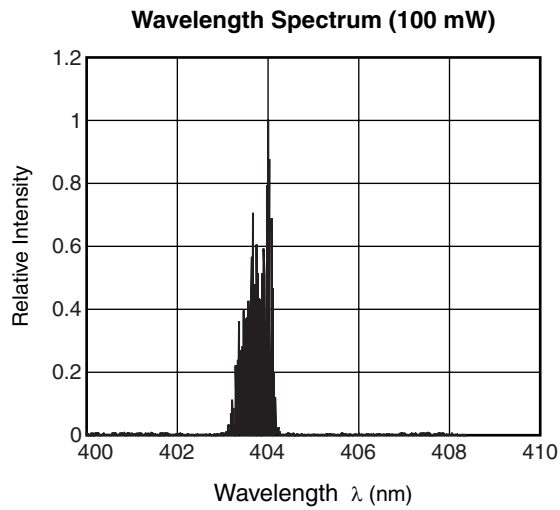
FFP (LATERAL)



FFP (VERTICAL)



**Remark** The graphs indicate nominal characteristics.



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## NOTES ON HANDLING

### 1. Recommended soldering conditions

- Peak Temperature  $\leq 350^{\circ}\text{C}$
- Time  $\leq 3$  seconds
- Soldering of leads should be made at the point 2.0 mm from the root of the lead
- This device cannot be mounted using reflow soldering.

### 2. Usage cautions

#### (1) Take the following steps to ensure that the device is not damaged by static electricity.

- Wear an antistatic wrist strap when soldering the device.  
We recommend a strap with a 1 M $\Omega$  resistor.
- Make sure that the work table and soldering iron are grounded.
- Make sure that the soldering iron does not leak.

#### (2) Do not subject the package to undue stress.

The package has a tensile strength of 1N or less.

Do not exceed this rating. Also, avoid bending the leads as much as possible.

If the leads must be bent, bend them only once, making sure to anchor the stem base of the lead.


#### (3) Do not allow the cap glass of the package to become scratched or dirty.

Also, do not subject the cap glass to external force.


#### (4) Be sure to attach a heat sink to sufficiently dissipate heat.

#### (5) Use the device as soon as possible after opening the bag.

SAFETY INFORMATION ON THIS PRODUCT



**DANGER**



VISIBLE LASER RADIATION  
AVOID EYE OR SKIN EXPOSURE TO  
DIRECT OR SCATTERED RADIATION

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OUTPUT POWER 3W MAX  
WAVELENGTH 400 to 680nm  
CLASS IIIb LASER PRODUCT

SEMICONDUCTOR LASER



AVOID EXPOSURE-Invisible  
Laser Radiation is emitted from  
this aperture

<div>Warning</div>	<div>Laser Beam</div> <div>A laser beam is emitted from this diode during operation. If the laser beam or its reflection enters your eye, it may cause injury to the eye or loss of eyesight. (Note that, depending on the wavelength of the beam, the laser beam might not be visible.)</div> <div><ul style="list-style-type: none"><li>Do not look directly into the laser beam.</li><li>Avoid exposure to the laser beam, any reflected or collimated beam.</li></ul></div>
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<b>Revision History</b>	<b>NV4V31SF Data Sheet</b>
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<b>Rev.</b>	<b>Date</b>	<b>Description</b>	
		<b>Page</b>	<b>Summary</b>
0.01	Jan 23, 2013	–	First edition issued
1.00	Jun 20, 2013	p.2	Modification of <b>PACKAGE DIMENSIONS</b>
		p.3	Modification of <b>ORDERING INFORMATION</b>

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