

# NV4V31MF

## Data Sheet

Blue-Violet Laser Diode

R08DS0045EJ0200

405 nm Blue-Violet Laser Light Source

Rev.2.00

Jun 20, 2013

### DESCRIPTION

The NV4V31MF 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) at up to 85°C. The NV4V31MF 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 emission wavelength  $\lambda_p = 405 \text{ nm TYP.}$
- <R> • Single transverse mode (lateral)
- Wide operating temperature range  $T_C = -5 \text{ to } +85^\circ\text{C}$
- $\phi 3.8 \text{ mm}$  small CAN package

### APPLICATIONS

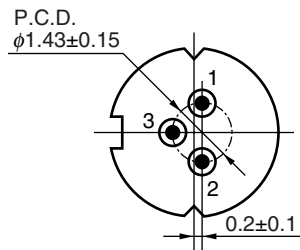
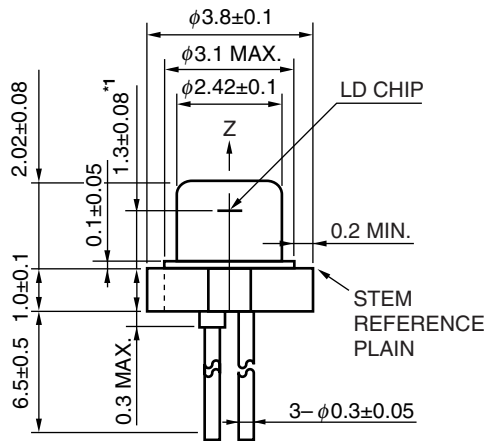
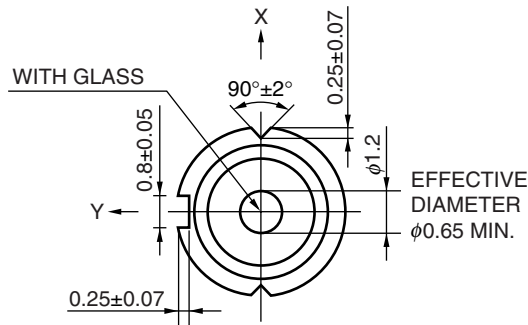
- Blue-violet laser light source



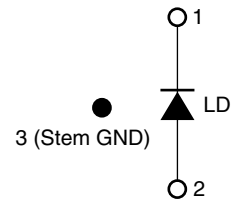
The mark <R> shows major revised points.

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

<R> **PACKAGE DIMENSIONS (UNIT: mm)**



**BOTTOM VIEW**



**PIN CONNECTIONS**

- Remarks**
1. Cap glass thickness: 0.25±0.03 mm  
Cap glass refractive index: 1.53 ( $\lambda = 405 \text{ nm}$ )
  2. Position accuracy of the LD chip based on the center of stem  
 $\Delta x = \pm 80 \mu\text{m}$   
 $\Delta y = \pm 80 \mu\text{m}$   
 $\Delta z = \pm 80 \mu\text{m}$  (\*1)

**NV4V31MF**<R> **ORDERING INFORMATION**

Part Number	Order Number	Rank	Packing Style
NV4V31MF	NV4V31MF-A	GV	Tray Packing (250 p/Tray), Without data
		KV	Individual Packing (for samples), Without data

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

Parameter	Symbol	Ratings	Unit
Optical Output Power (CW)	$P_o$	180	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)**

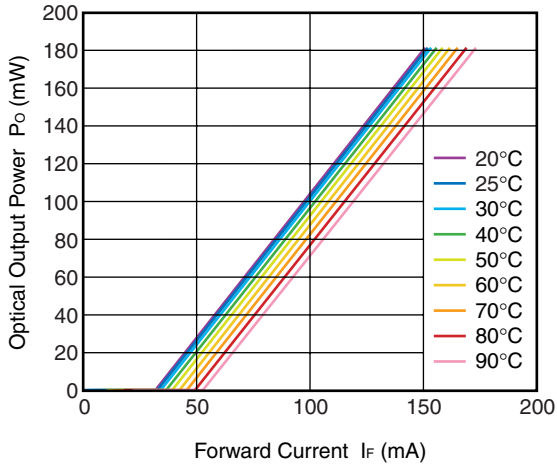
Parameter	Symbol	MAX.	Unit
Optical Output Power (CW)	$P_o$	175	mW

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

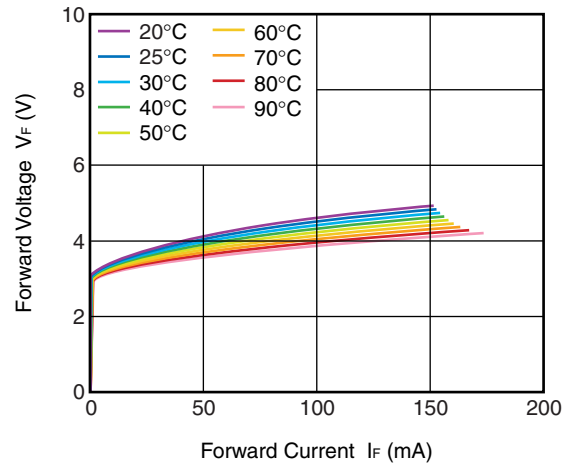
Parameter	Symbol	Conditions	MIN.	TYP.	MAX.	Unit
Threshold Current	$I_{th}$	CW		35	55	mA
Operating Current	$I_{op}$	CW, $P_o = 175$ mW		150	200	mA
Optical Voltage	$V_{op}$	CW, $P_o = 175$ mW		5.0	6.5	V
Slope Efficiency	$\eta_d$	CW, $P_o = 20$ mW, 175 mW	1.1	1.55		W/A
Peak Wavelength	$\lambda_p$	CW, $P_o = 175$ mW	400	405	415	nm
Beam Divergence (lateral)	$\theta_l$	CW, $P_o = 175$ mW	6	9	12	deg.
Beam Divergence (vertical)	$\theta_\perp$		15	20	25	
Position Accuracy Angle (lateral)	$\Delta\theta_l$	CW, $P_o = 175$ mW	-3	0	3	deg.
Position Accuracy Angle (vertical)	$\Delta\theta_\perp$		-3	0	3	

<R> **TYPICAL CHARACTERISTICS (T<sub>C</sub> = 25°C, unless otherwise specified)**

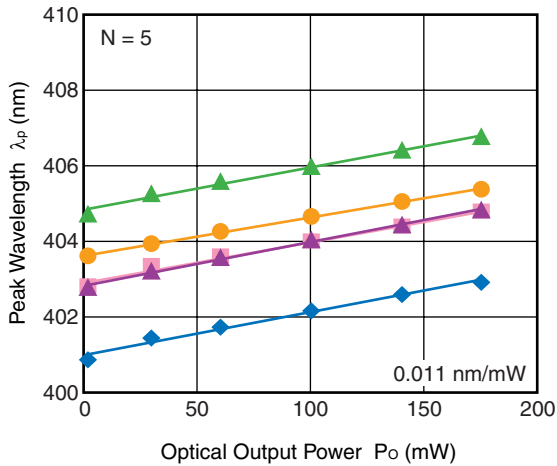
**OPTICAL OUTPUT POWER vs. FORWARD CURRENT**



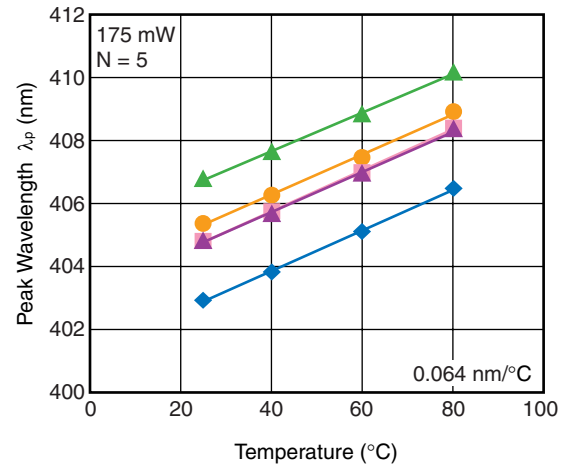
**FORWARD VOLTAGE vs. FORWARD CURRENT**



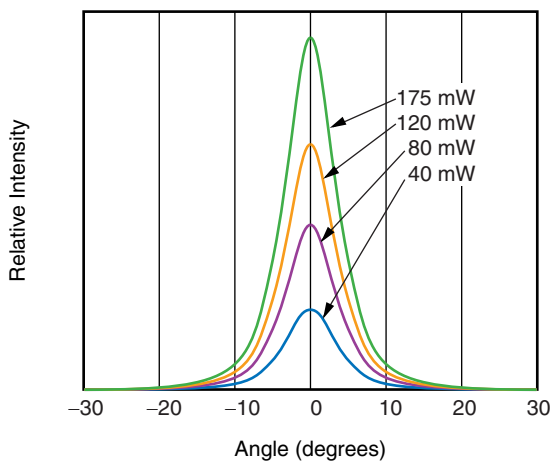
**POWER DEPENDENCE OF PEAK WAVELENGTH**



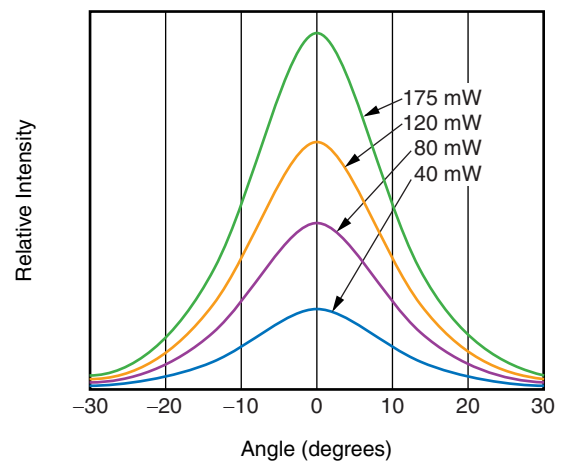
**TEMPERATURE DEPENDENCE OF PEAK WAVELENGTH**



**FFP (LATERAL)**

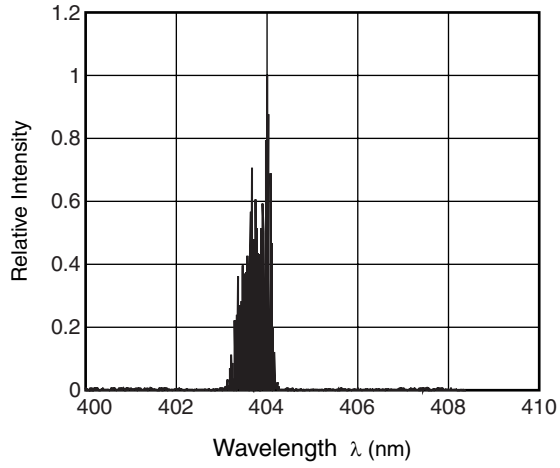


**FFP (VERTICAL)**

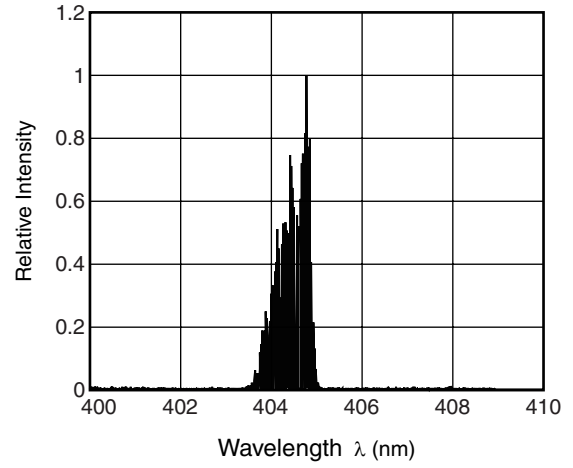


**Remark** The graphs indicate nominal characteristics.

**Wavelength Spectrum (100 mW)**



**Wavelength Spectrum (175 mW)**



**Remark** The graphs indicate nominal characteristics.

**<R> 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**

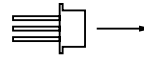
<R>



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

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

**SEMICONDUCTOR LASER**



**AVOID EXPOSURE-Invisible**  
 Laser Radiation is emitted from  
 this aperture

<b>Warning</b>	Laser Beam	<p>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.)</p> <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>
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## Revision History

## NV4V31MF Data Sheet

Rev.	Date	Description	
		Page	Summary
0.01	Sep 08, 2011	–	First edition issued
1.00	Mar 05, 2012	Throughout	Preliminary Data Sheet -> Data Sheet
		p.3	Modification of <b>ORDERING INFORMATION</b>
		p.4, 5	Addition of <b>TYPICAL CHARACTERISTICS</b>
2.00	Jun 20, 2013	p.1	Modification of <b>FEATURES</b>
		p.2	Modification of <b>PACKAGE DIMENSIONS</b>
		p.3	Modification of <b>ORDERING INFORMATION</b>
			Modification of <b>ABSOLUTE MAXIMUM RATINGS</b>
		p.4	Modification of <b>TYPICAL CHARACTERISTICS</b>
		p.6	Modification of <b>NOTES ON HANDLING</b>
		p.7	Modification of <b>SAFETY INFORMATION ON THIS PRODUCT</b>

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**California Eastern Laboratories, Inc.**  
4590 Patrick Henry Drive, Santa Clara, California 95054, U.S.A.  
Tel: +1-408-919-2500, Fax: +1-408-988-0279

**Renesas Electronics Europe Limited**  
Dukes Meadow, Millboard Road, Bourne End, Buckinghamshire, SL8 5FH, U.K  
Tel: +44-1628-651-700, Fax: +44-1628-651-804

**Renesas Electronics Europe GmbH**  
Arcadiastrasse 10, 40472 Düsseldorf, Germany  
Tel: +49-211-65030, Fax: +49-211-6503-1327

**Renesas Electronics (China) Co., Ltd.**  
7th Floor, Quantum Plaza, No.27 ZhiChunLu Haidian District, Beijing 100083, P.R.China  
Tel: +86-10-8235-1155, Fax: +86-10-8235-7679

**Renesas Electronics (Shanghai) Co., Ltd.**  
Unit 204, 205, AZIA Center, No.1233 Lujiazui Ring Rd., Pudong District, Shanghai 200120, China  
Tel: +86-21-5877-1818, Fax: +86-21-6887-7858 / -7898

**Renesas Electronics Hong Kong Limited**  
Unit 1601-1613, 16/F., Tower 2, Grand Century Place, 193 Prince Edward Road West, Mongkok, Kowloon, Hong Kong  
Tel: +852-2886-9318, Fax: +852 2886-9022/9044

**Renesas Electronics Taiwan Co., Ltd.**  
13F, No. 363, Fu Shing North Road, Taipei, Taiwan  
Tel: +886-2-8175-9600, Fax: +886 2-8175-9670

**Renesas Electronics Singapore Pte. Ltd.**  
80 Bendemeer Road, Unit #06-02 Hyflux Innovation Centre Singapore 339949  
Tel: +65-6213-0200, Fax: +65-6213-0300

**Renesas Electronics Malaysia Sdn.Bhd.**  
Unit 906, Block B, Menara Amcorp, Amcorp Trade Centre, No. 18, Jln Persiaran Barat, 46050 Petaling Jaya, Selangor Darul Ehsan, Malaysia  
Tel: +60-3-7955-9390, Fax: +60-3-7955-9510

**Renesas Electronics Korea Co., Ltd.**  
11F., Samik Lavied' or Bldg., 720-2 Yeoksam-Dong, Kangnam-Ku, Seoul 135-080, Korea  
Tel: +82-2-558-3737, Fax: +82-2-558-5141