NV4V41SF

Data Sheet

Blue-Violet Laser Diode

405 nm Blue-Violet Laser Light Source

R08DS0064EJ0200
Rev.2.00
Jun 20, 2013

DESCRIPTION

The NV4V41SF is a high output blue-violet laser diode with a wavelength of 405 nm. A newly developed LD chip structure achieves a high optical power output of 600 mW (CW).

FEATURES

- High optical output power P_o = 600 mW @CW
- Peak wavelength λ_p = 400 to 405 nm
- Multi transverse mode (lateral)
- Operating temperature range T_C = 0 to +30°C
- ϕ5.6 mm CAN package

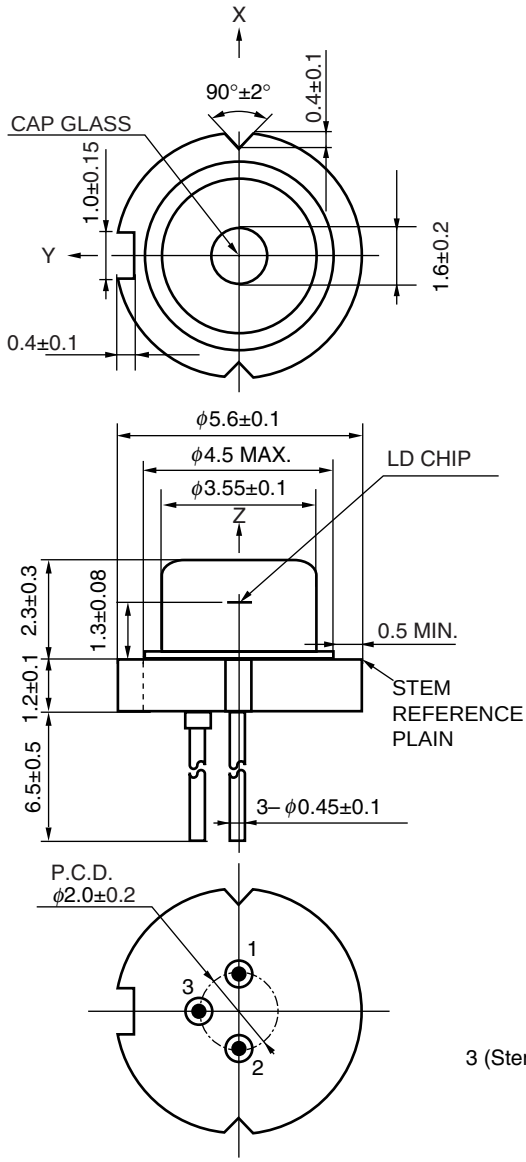


APPLICATIONS

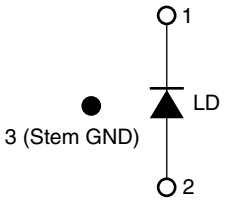
- Blue-violet laser light source
- Light source for Laser Direct Imaging system
- Light source for industrial manufacturing equipment

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

Remark Cap glass thickness : 0.25±0.03 mm
Cap glass refractive index : 1.53 (λ = 405 nm)

<R> ORDERING INFORMATION

Part Number	Order Number	Rank	Packing Style
NV4V41SF	NV4V41SF-A	HV	Tray Packing (100 p/Tray), With data
		XV	Individual Packing (for samples), With data

ABSOLUTE MAXIMUM RATINGS (T_C = 25°C, unless otherwise specified)

Parameter	Symbol	Ratings	Unit
Optical Output Power (CW)	P_o	700	mW
Reverse Voltage of LD	V_R	2	V
Operating Case Temperature	T_C	0 to +30	°C
Storage Temperature	T_{stg}	–40 to +85	°C

RECOMMENDED OPERATING CONDITIONS (T_C = 25°C, unless otherwise specified)

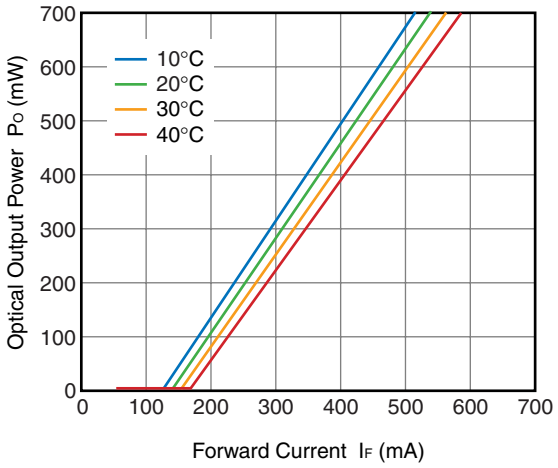
Parameter	Symbol	MAX.	Unit
Optical Output Power (CW)	P_o	600	mW

ELECTRO-OPTICAL CHARACTERISTICS (T_C = 25°C, unless otherwise specified)

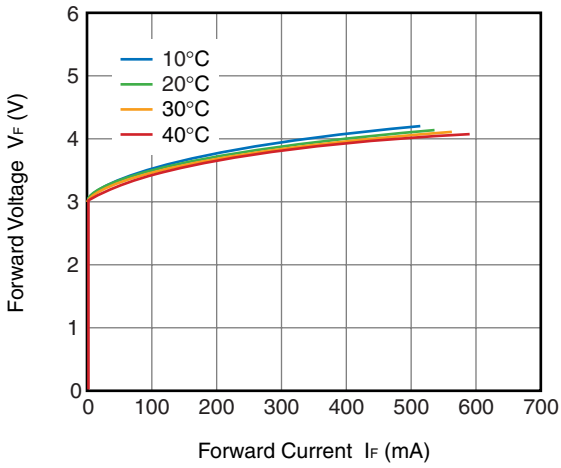
Parameter	Symbol	Conditions	MIN.	TYP.	MAX.	Unit
Threshold Current	I_{th}	CW		140	180	mA
Operating Current	I_{op}	CW, P_o = 600 mW		500	600	mA
Operating Voltage	V_{op}	CW, P_o = 600 mW		4.1	4.6	V
Slope Efficiency	η_d	CW, P_o = 100 mW, 600 mW	1.0	1.7		W/A
Peak Wavelength	λ_p	CW, P_o = 600 mW	400	–	405	nm
Beam Divergence (lateral)	$\theta_{//}$	CW, P_o = 600 mW ($1/e^2$)	10	16	22	deg.
Beam Divergence (vertical)	$\theta_{\perp}$		35	40	50	
Position Accuracy Angle (vertical)	$\Delta\theta_{\perp}$	CW, P_o = 600 mW	–5	–	5	deg.

TYPICAL CHARACTERISTICS (T_C = 25°C, unless otherwise specified)

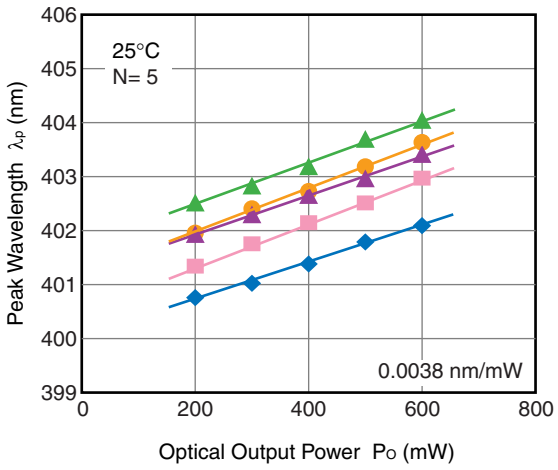
OPTICAL OUTPUT POWER vs. FORWARD CURRENT



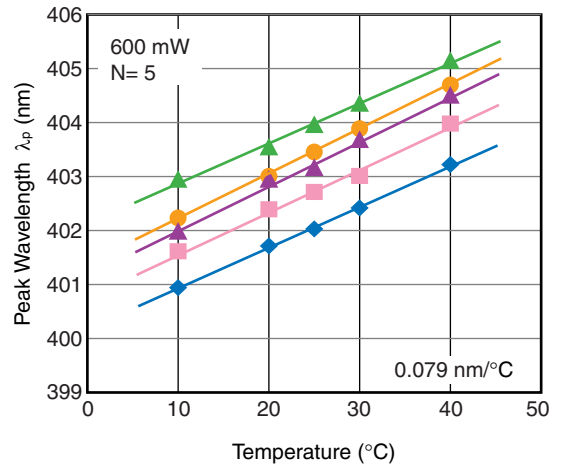
FORWARD VOLTAGE vs. FORWARD CURRENT



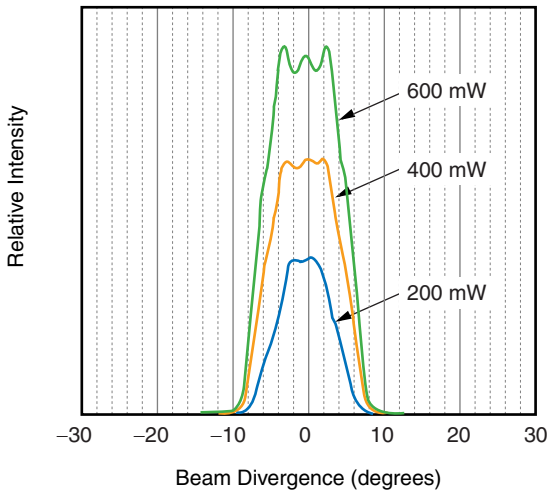
POWER DEPENDENCE OF PEAK WAVELENGTH



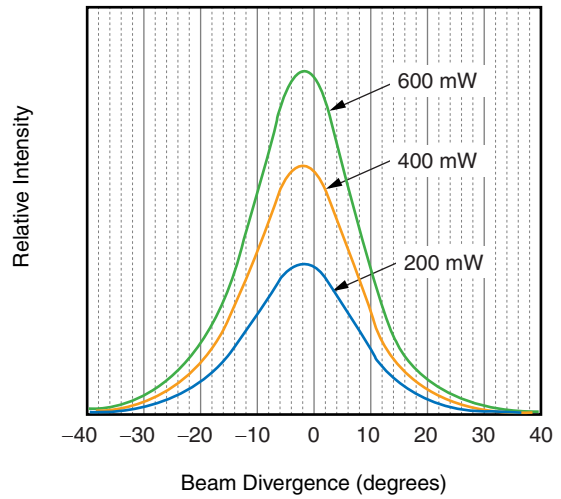
TEMPERATURE DEPENDENCE OF PEAK WAVELENGTH



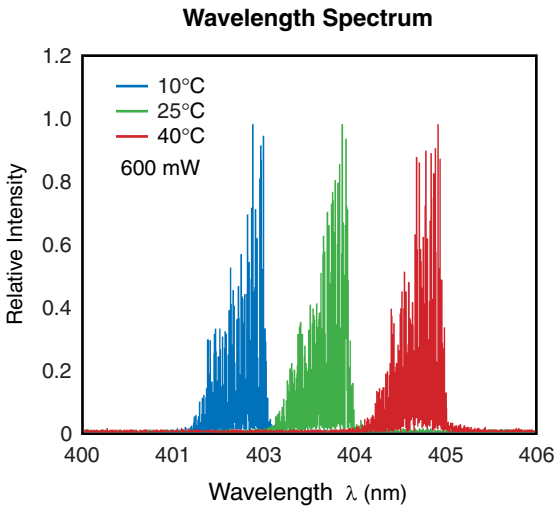
FFP (LATERAL)



FFP (VERTICAL)



Remark The graphs indicate nominal characteristics.



Remark The graphs indicate nominal characteristics.

NOTES ON HANDLING (UNIT: mm)

1. Recommended soldering conditions
   - Peak Temperature ≤ 350°C
   - Time ≤ 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 MΩ resistor.
   - Make sure that the work table and soldering iron are grounded.
   - Make sure that the soldering iron does not leak.

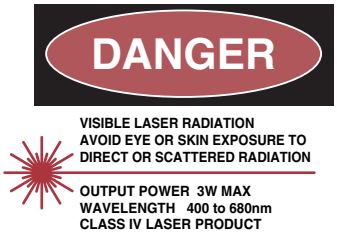
   (2) Do not subject the package to undue stress.
   The package has a tensile strength of 1N or less.
   Do not exceed this rating. Also, avoid bending the leads as much as possible.
   If the leads must be bent, bend them only once, making sure to anchor the stem base of the lead.

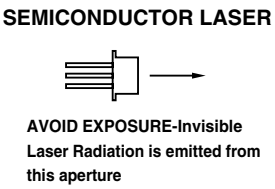
   (3) Do not allow the cap glass of the package to become scratched or dirty.
   Also, do not subject the cap glass to external force.

   (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





Warning Laser Beam	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.) • Do not look directly into the laser beam. • Avoid exposure to the laser beam, any reflected or collimated beam.

Revision History	NV4V41SF Data Sheet

Rev.	Date	Description	
		Page	Summary
0.01	Jul 11, 2012	–	First edition issued
1.00	Jan 09, 2013	Throughout	This data sheet is officially released (Preliminary Data Sheet becomes Data Sheet).
		p.3	The typical values of Threshold Current and Operating Voltage are changed in ELECTRO-OPTICAL CHARACTERISTICS.
			The unit, "$(1/e^2)$", is deleted from the value of P_O.
		pp.4,5	TYPICAL CHARACTERISTICS is added.
2.00	Jun 20, 2013	p.2	Modification of **PACKAGE DIMENSIONS**
		p.3	Modification of **ORDERING INFORMATION**

All trademarks and registered trademarks are the property of their respective owners.

Notice

1. Descriptions of circuits, software and other related information in this document are provided only to illustrate the operation of semiconductor products and application examples. You are fully responsible for the incorporation of these circuits, software, and information in the design of your equipment. Renesas Electronics assumes no responsibility for any losses incurred by you or third parties arising from the use of these circuits, software, or information.
2. Renesas Electronics has used reasonable care in preparing the information included in this document, but Renesas Electronics does not warrant that such information is error free. Renesas Electronics assumes no liability whatsoever for any damages incurred by you resulting from errors in or omissions from the information included herein.
3. Renesas Electronics does not assume any liability for infringement of patents, copyrights, or other intellectual property rights of third parties by or arising from the use of Renesas Electronics products or technical information described in this document. No license, express, implied or otherwise, is granted hereby under any patents, copyrights or other intellectual property rights of Renesas Electronics or others.
4. You should not alter, modify, copy, or otherwise misappropriate any Renesas Electronics product, whether in whole or in part. Renesas Electronics assumes no responsibility for any losses incurred by you or third parties arising from such alteration, modification, copy or otherwise misappropriation of Renesas Electronics product.
5. Renesas Electronics products are classified according to the following two quality grades: "Standard" and "High Quality". The recommended applications for each Renesas Electronics product depends on the product's quality grade, as indicated below.
   "Standard": Computers; office equipment; communications equipment; test and measurement equipment; audio and visual equipment; home electronic appliances; machine tools; personal electronic equipment; and industrial robots etc.
   "High Quality": Transportation equipment (automobiles, trains, ships, etc.); traffic control systems; anti-disaster systems; anti-crime systems; and safety equipment etc.
   Renesas Electronics products are neither intended nor authorized for use in products or systems that may pose a direct threat to human life or bodily injury (artificial life support devices or systems, surgical implantations etc.), or may cause serious property damages (nuclear reactor control systems, military equipment etc.). You must check the quality grade of each Renesas Electronics product before using it in a particular application. You may not use any Renesas Electronics product for any application for which it is not intended. Renesas Electronics shall not be in any way liable for any damages or losses incurred by you or third parties arising from the use of any Renesas Electronics product for which the product is not intended by Renesas Electronics.
6. You should use the Renesas Electronics products described in this document within the range specified by Renesas Electronics, especially with respect to the maximum rating, operating supply voltage range, movement power voltage range, heat radiation characteristics, installation and other product characteristics. Renesas Electronics shall have no liability for malfunctions or damages arising out of the use of Renesas Electronics products beyond such specified ranges.
7. Although Renesas Electronics endeavors to improve the quality and reliability of its products, semiconductor products have specific characteristics such as the occurrence of failure at a certain rate and malfunctions under certain use conditions. Further, Renesas Electronics products are not subject to radiation resistance design. Please be sure to implement safety measures to guard them against the possibility of physical injury, and injury or damage caused by fire in the event of the failure of a Renesas Electronics product, such as safety design for hardware and software including but not limited to redundancy, fire control and malfunction prevention, appropriate treatment for aging degradation or any other appropriate measures. Because the evaluation of microcomputer software alone is very difficult, please evaluate the safety of the final products or systems manufactured by you.
8. Please contact a Renesas Electronics sales office for details as to environmental matters such as the environmental compatibility of each Renesas Electronics product. Please use Renesas Electronics products in compliance with all applicable laws and regulations that regulate the inclusion or use of controlled substances, including without limitation, the EU RoHS Directive. Renesas Electronics assumes no liability for damages or losses occurring as a result of your noncompliance with applicable laws and regulations.
9. Renesas Electronics products and technology may not be used for or incorporated into any products or systems whose manufacture, use, or sale is prohibited under any applicable domestic or foreign laws or regulations. You should not use Renesas Electronics products or technology described in this document for any purpose relating to military applications or use by the military, including but not limited to the development of weapons of mass destruction. When exporting the Renesas Electronics products or technology described in this document, you should comply with the applicable export control laws and regulations and follow the procedures required by such laws and regulations.
10. It is the responsibility of the buyer or distributor of Renesas Electronics products, who distributes, disposes of, or otherwise places the product with a third party, to notify such third party in advance of the contents and conditions set forth in this document, Renesas Electronics assumes no responsibility for any losses incurred by you or third parties as a result of unauthorized use of Renesas Electronics products.
11. This document may not be reproduced or duplicated in any form, in whole or in part, without prior written consent of Renesas Electronics.
12. Please contact a Renesas Electronics sales office if you have any questions regarding the information contained in this document or Renesas Electronics products, or if you have any other inquiries.

(Note 1) "Renesas Electronics" as used in this document means Renesas Electronics Corporation and also includes its majority-owned subsidiaries.

(Note 2) "Renesas Electronics product(s)" means any product developed or manufactured by or for Renesas Electronics.

RENESAS

SALES OFFICES Renesas Electronics Corporation http://www.renesas.com

Refer to "http://www.renesas.com/" for the latest and detailed information.

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

© 2013 Renesas Electronics Corporation. All rights reserved.

[Colophon 2.2]