NV4V31MF

Blue-Violet Laser Diode

405 nm Blue-Violet Laser Light Source

R08DS0045EJ0100
Rev.1.00
Mar 05, 2012

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 mW @CW
- Peak emission wavelength λ_p = 405 nm TYP.
- Wide operating temperature range T_C = –5 to +85°C
- ϕ3.8 mm small CAN package



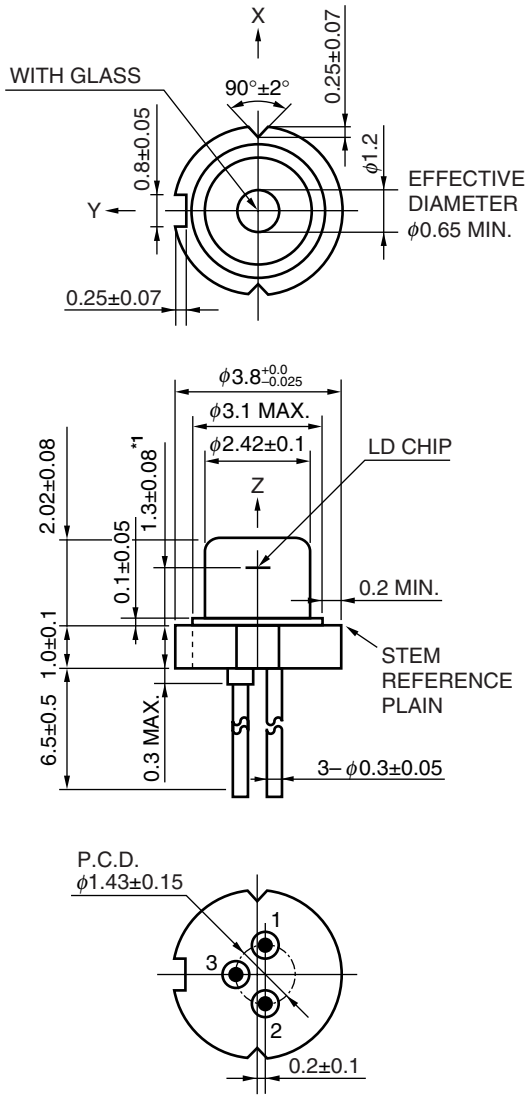
APPLICATIONS

- 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.

PACKAGE DIMENSIONS (UNIT: mm)



BOTTOM VIEW

PIN CONNECTIONS

Remarks 1. Cap glass thickness: 0.25±0.03 mm
Cap glass refractive index:1.53 (λ = 405 nm)

2. Position accuracy of the LD chip based on the center of stem
$\Delta x = \pm 80\ \mu m$
$\Delta y = \pm 80\ \mu m$
$\Delta z = \pm 80\ \mu m$ (***1**)

<R> ## ORDERING INFORMATION

Part Number	Order Number	Rank	Package
NV4V31MF	NV4V31MF-A	GV	Tray Packaging (250 p/Tray)
		KV	Individual Packaging (for small samples)

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

Parameter	Symbol	Ratings	Unit
Optical Output Power (CW)	P_o	180	mW
Optical Output Power (pulse) *1	P_p	360	mW
Reverse Voltage of LD	V_R	2	V
Operating Case Temperature	T_C	–5 to +85	°C
Storage Temperature	T_{stg}	–40 to +85	°C

Note: *1. Pulse condition: PW ≤ 50 ns, Duty ≤ 50%

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

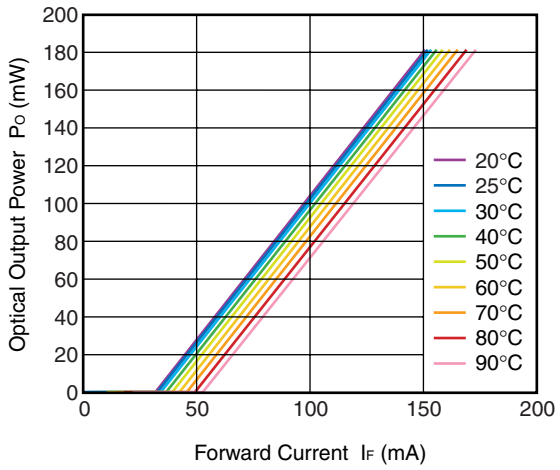
Parameter	Symbol	MAX.	Unit
Optical Output Power (CW)	P_o	175	mW

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

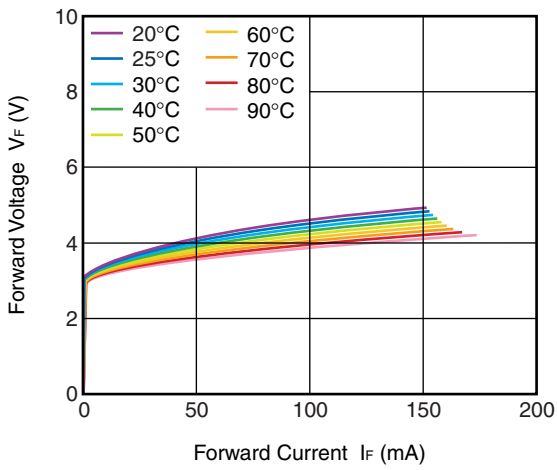
Parameter	Symbol	Conditions	MIN.	TYP.	MAX.	Unit
Threshold Current	I_{th}	CW		35	55	mA
Operating Current	I_{op}	CW, P_o = 175 mW		150	200	mA
Optical Voltage	V_{op}	CW, P_o = 175 mW		5.0	6.5	V
Slope Efficiency	η_d	CW, P_o = 20 mW, 175 mW	1.1	1.55		W/A
Peak Wavelength	λ_p	CW, P_o = 175 mW	400	405	415	nm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

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

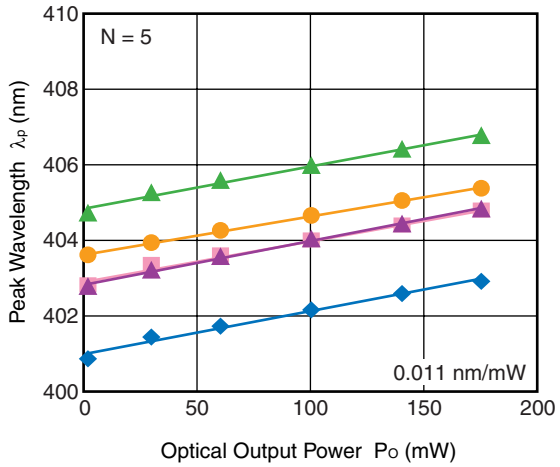
OPTICAL OUTPUT POWER vs. FORWARD CURRENT



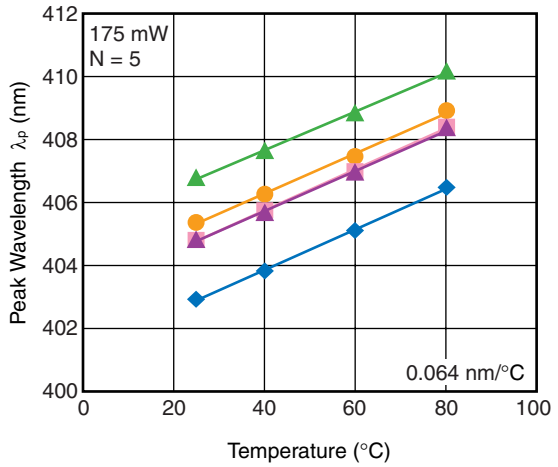
FORWARD VOLTAGE vs. FORWARD CURRENT



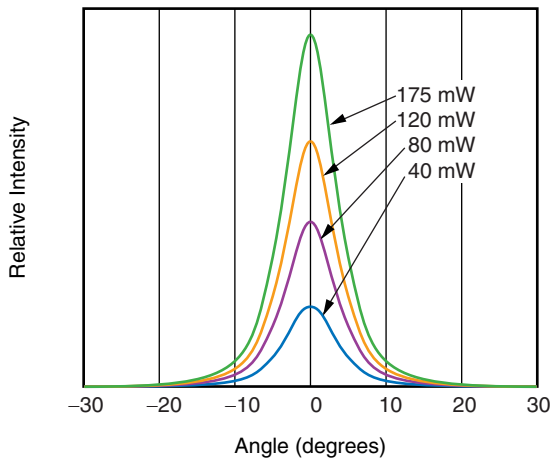
POWER DEPENDENCE OF DIFFERENTIAL EFFICIENCY



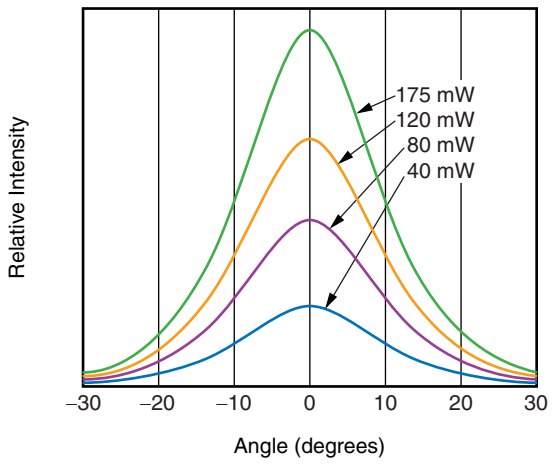
TEMPERATURE DEPENDENCE OF DIFFERENTIAL EFFICIENCY



FFP (LATERAL)

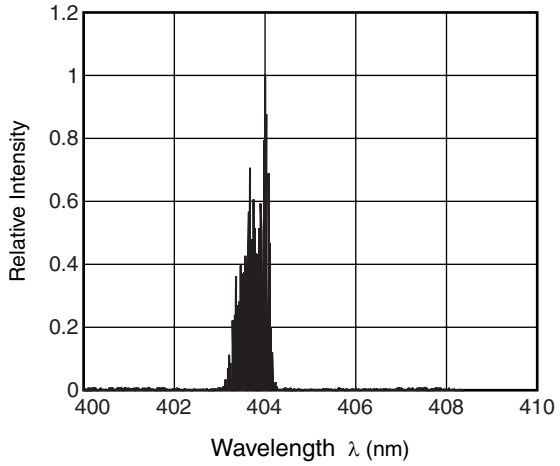


FFP (VERTICAL)

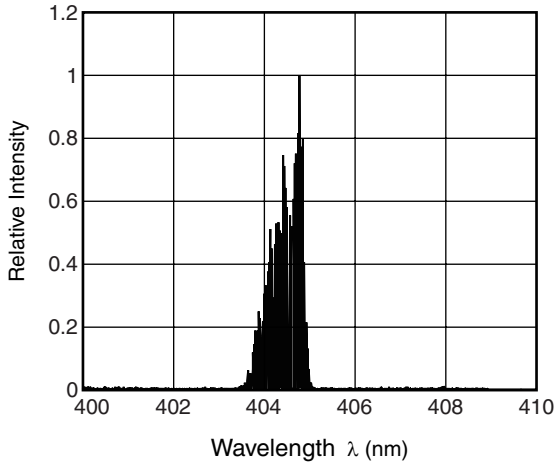


Remark The graphs indicate nominal characteristics.

Wavelength Spectrum (100 mW)



Wavelength Spectrum (175 mW)



Remark The graphs indicate nominal characteristics.

NOTES ON HANDLING (UNIT: mm)

1. Recommended soldering conditions
   - Peak Temperature 350°C or below
   - Time 3 seconds or less
   - 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.

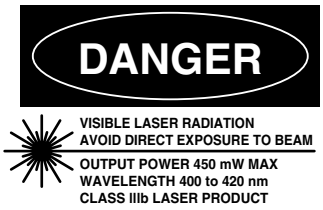
   (2) Do not subject the package to undue stress.
   The package has a tensile strength of 1N.
   Do not exceed this rating. Also, avoid bending the leads as much as possible.
   If the leads must be bent, bend them only once, making sure to anchor the base of the lead.

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

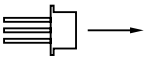
   (4) Be sure to attach a heat sink to sufficiently dissipate heat.

   (5) Use the device as soon as possible after opening the aluminum moisture barrier bag.

SAFETY INFORMATION ON THIS PRODUCT



SEMICONDUCTOR LASER



AVOID EXPOSURE-Visible Laser Radiation is emitted from this aperture

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	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 **ORDERING INFORMATION**
		p.4, 5	Addition of **TYPICAL CHARACTERISTICS**

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