CEL

LASER DIODE
NX6311EH

1 310 nm AlGaInAs MQW-DFB LASER DIODE FOR 4 Gb/s FIBER CHANNEL APPLICATION

DESCRIPTION

The NX6311EH is a 1 310 nm Multiple Quantum Well (MQW) structured Distributed Feed-Back (DFB) laser diode with InGaAs monitor PIN-PD.

APPLICATION

- 4 G fiber channel

FEATURES

- Optical output power P_o = 7.0 mW
- Low threshold current I_{th} = 8 mA
- Differential efficiency η_d = 0.40 W/A
- Wide operating temperature range T_C = –30 to +85°C
- InGaAs monitor PIN-PD
- CAN package ϕ5.6 mm
- Focal point 5.8 mm

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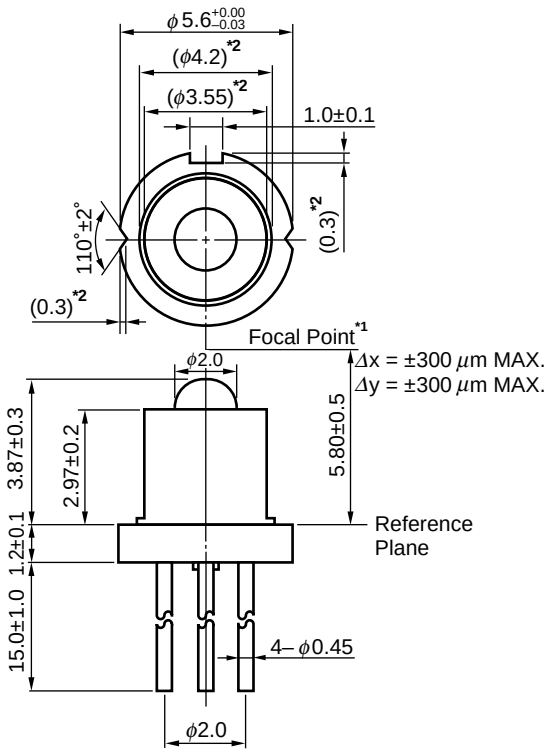
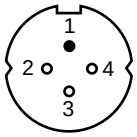
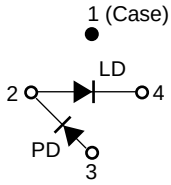
PACKAGE DIMENSIONS (UNIT: mm)



BOTTOM VIEW

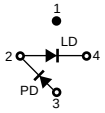


PIN CONNECTIONS



***1** Focal Point: A point to get maximum optical output power from fiber.
***2** ( ) indicates nominal dimension.

ORDERING INFORMATION

Part Number	Package	Pin Connections
NX6311EH-AZ	4-pin CAN with ball lens cap	

Remarks 1. The color of ball lens cap might be observed differently.

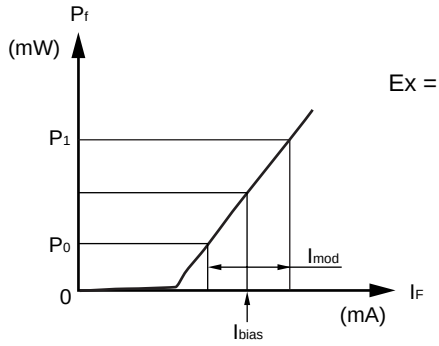
2. The hermetic test will be performed as AQL 1.0%.

ABSOLUTE MAXIMUM RATINGS

Parameter	Symbol	Ratings	Unit
Optical Output Power	P_o	15	mW
Forward Current of LD	I_F	120	mA
Reverse Voltage of LD	V_R	2.0	V
Forward Current of PD	I_F	10	mA
Reverse Voltage of PD	V_R	20	V
Operating Case Temperature	T_C	−30 to +85	°C
Storage Temperature	T_{stg}	−40 to +85	°C
Lead Soldering Temperature	T_{sld}	350 (3 sec.)	°C
Relative Humidity (noncondensing)	RH	85	%

RECOMMENDED OPERATING CONDITION

Parameter	Symbol	Conditions	MIN.	TYP.	MAX.	Unit
Bias Current	I_{bias}	T_C = 25°C, refer to below		I_{th} +20		mA



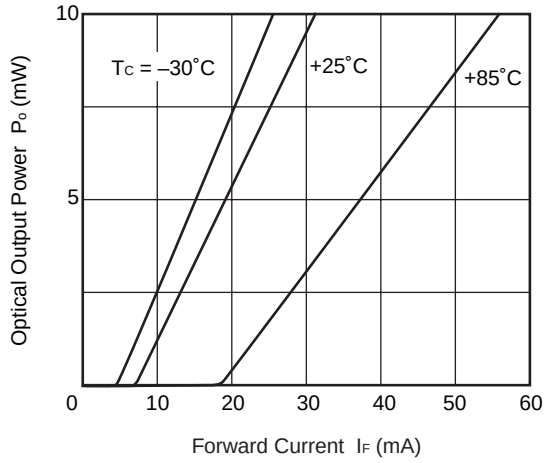
$$Ex = 10 \log \frac{P_1}{P_0} \text{ [dB]}$$

ELECTRO-OPTICAL CHARACTERISTICS (T_C = –30 to +85°C, unless otherwise specified)

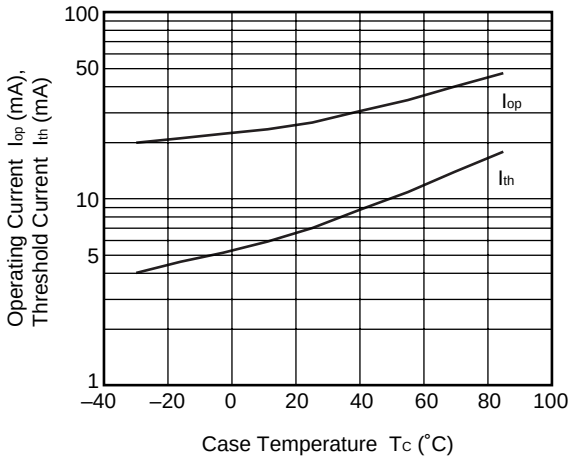
Parameter	Symbol	Conditions	MIN.	TYP.	MAX.	Unit
Operating Voltage	V_{op}	CW, P_o = 7.0 mW, T_C = +25°C		1.3	1.6	V
		CW, P_o = 7.0 mW			2.0	
Threshold Current	I_{th}	CW, T_C = +25°C		8	20	mA
		CW	2		40	
Differential Efficiency	η_d	CW, T_C = +25°C	0.25	0.40	0.50	W/A
		CW	0.12		0.65	
Peak Emission Wavelength	λ_p	P_o = 7.0 mW, RMS (–20 dB)	1 290		1 330	nm
Temperature Dependence of Slope Efficiency	$\Delta\eta$	$\Delta\eta = 10 \log \frac{\eta_d \text{ (@ 85°C)}}{\eta_d \text{ (@ 25°C)}}$	–3.0		1.5	dB
Spectral Width	σ	P_o = 7.0 mW, RMS (–20 dB)			1	nm
Rise Time	t_r	20-80%			90	ps
Fall Time	t_f	80-20%			90	ps
Side Mode Suppression Ratio	SMSR	CW, P_o = 7.0 mW	35			dB
Relative Intensity Noise	RIN	CW, P_o = 7.0 mW			–120	dB/Hz
Monitor Current	I_m	V_R = 1.5 V, P_o = 7.0 mW	200		2 000	μA
Monitor Dark Current	I_D	V_R = 5 V			500	nA
Monitor PD Terminal Capacitance	C_t	V_R = 5 V, f = 1 MHz		6	20	pF

TYPICAL CHARACTERISTICS (T_C = –30 to +85°C, unless otherwise specified)

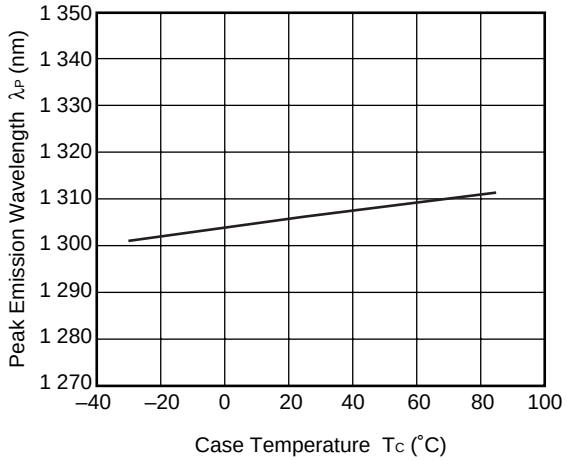
OPTICAL OUTPUT POWER vs. FORWARD CURRENT



OPERATING CURRENT AND THRESHOLD CURRENT vs. CASE TEMPERATURE



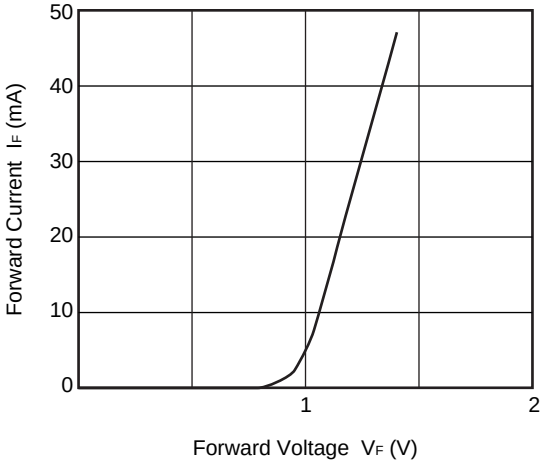
TEMPERATURE DEPENDENCE OF PEAK EMISSION WAVELENGTH



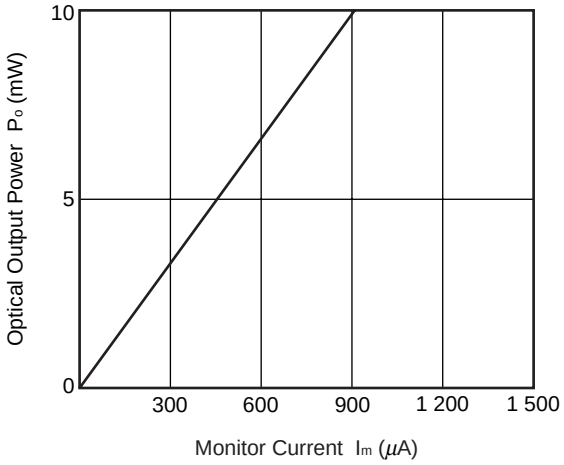
Remark The graphs indicate nominal characteristics.

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

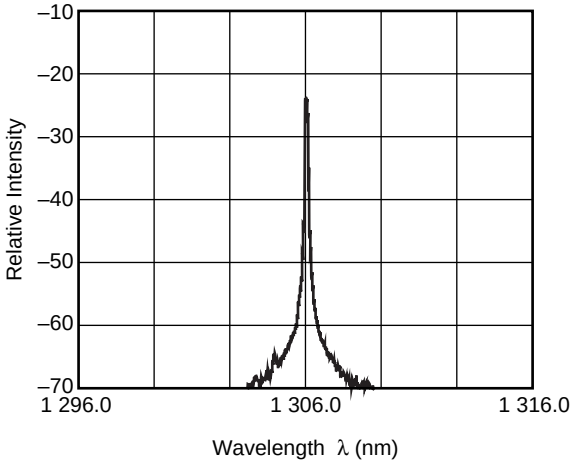
FORWARD CURRENT vs.
FORWARD VOLTAGE



OPTICAL OUTPUT POWER
vs. MONITOR CURRENT



SPECTRUM



Remark The graphs indicate nominal characteristics.

REFERENCE

Document Name	Document No.
Opto-Electronics Devices Pamphlet[*1]	PX10160E

***1** Published by the former NEC Compound Semiconductor Devices, Ltd.

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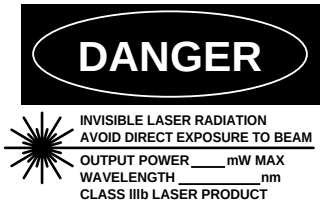
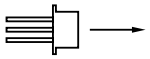
SAFETY INFORMATION ON THIS PRODUCT



SEMICONDUCTOR LASER



AVOID EXPOSURE-Invisible Laser Radiation is emitted from this aperture

Warning Laser Beam	A laser beam is emitted from this diode during operation. The laser beam, visible or invisible, directly or indirectly, may cause injury to the eye or loss of eyesight. • Do not look directly into the laser beam. • Avoid exposure to the laser beam, any reflected or collimated beam.
Caution GaAs Products	This product uses gallium arsenide (GaAs). GaAs vapor and powder are hazardous to human health if inhaled or ingested, so please observe the following points. • Follow related laws and ordinances when disposing of the product. If there are no applicable laws and/or ordinances, dispose of the product as recommended below. 1. Commission a disposal company able to (with a license to) collect, transport and dispose of materials that contain arsenic and other such industrial waste materials. 2. Exclude the product from general industrial waste and household garbage, and ensure that the product is controlled (as industrial waste subject to special control) up until final disposal. • Do not burn, destroy, cut, crush, or chemically dissolve the product. • Do not lick the product or in any way allow it to enter the mouth.

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Subject: Compliance with EU Directives

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CEL Pb-free products have the same base part number with a suffix added. The suffix –A indicates that the device is Pb-free. The –AZ suffix is used to designate devices containing Pb which are exempted from the requirement of RoHS directive (*). In all cases the devices have Pb-free terminals. All devices with these suffixes meet the requirements of the RoHS directive.

This status is based on CEL's understanding of the EU Directives and knowledge of the materials that go into its products as of the date of disclosure of this information.

Restricted Substance per RoHS	Concentration Limit per RoHS (values are not yet fixed)	Concentration contained in CEL devices	
Lead (Pb)	< 1000 PPM	-A	-AZ
		Not Detected	(*)
Mercury	< 1000 PPM	Not Detected	
Cadmium	< 100 PPM	Not Detected	
Hexavalent Chromium	< 1000 PPM	Not Detected	
PBB	< 1000 PPM	Not Detected	
PBDE	< 1000 PPM	Not Detected	

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