

PRELIMINARY DATA SHEET



NEC's EA MODULATOR INTEGRATED InGaAsP MQW DFB LASER DIODE IN BUTTERFLY PACKAGE WITH GPO CONNECTOR FOR 10 Gb/s DWDM APPLICATIONS

NX8560LJ SERIES

FEATURES

- **INTEGRATED ELECTROABSORPTION MODULATOR**
- **UP TO 40 km TRANSMISSION CAPABILITY WITH STANDARD SINGLE MODE FIBER** (dispersion 800 ps/nm)
- **LOW MODULATION VOLTAGE**
- **7-PIN BUTTERFLY PACKAGE WITH GPO™ CONNECTOR**
- **AVAILABLE FOR DWDM WAVELENGTH BASED ON ITU-T RECOMMENDATION**

DESCRIPTION

NEC's NX8560LJ Series are an Electro-Absorption (EA) Modulator integrated, 1550 nm Multiple Quantum Well (MQW) structured Distributed Feed-Back (DFB) laser diodes. It is capable of transmitting up to 40 km for 10 Gb/s applications by using standard fiber dispersion 800 ps/nm and is available for Dense Wavelength Multiplexing (DWDM) wavelength based on ITU-T recommendations.

ELECTRO-OPTICAL CHARACTERISTICS ($T_{LD} = T_{set}$, $T_c = 25^\circ\text{C}$, BOL unless otherwise specified)

PART NUMBER			NX8560LJ Series		
SYMBOLS	PARAMETERS AND CONDITIONS	UNITS	MIN	TYP	MAX
TSET	Laser Set Temperature ¹	°C	20		35
I _{op}	Operating Current	mA	50	60	80
V _{CENTER}	Modulation Center Voltage	V	-2.0		-0.5
V _{MOD}	Modulation Voltage	V		2.0	3.0
V _{FLD}	Forward Voltage of LD, I _{FLD} = I _{op}	V			2.0
I _{TH}	Threshold Current, T _{LD} = T _{set}	mA		7	20
P _r	Optical Output from Fiber, Under modulation ²	dBm	-3	-2	
λ _p	Peak Emission Wavelength, I _{FLD} = I _{op} , V _{EA} = 0 V	nm	1528	ITU-T ³	1563
SMSR	Side Mode Suppression Ratio, I _{FLD} = I _{op} , V _{EA} = 0 V	dB	30	>37	
ER	Extinction Ratio, Under modulation ²	dB	10	>11	
t _r	Rise Time, 20-80%, Under modulation ²	ps			40
t _f	Fall Time, 80-20%, Under modulation ²	ps			40
DP	Dispersion Penalty, 40 km SMF under modulation ^{2, 4}	dB			2.0
ISOL	Optical Isolation	dB	23		
S ₁₁	RF Return Loss, I _{FLD} = I _{op} , V _{EA} = -1 V, f = 130 MHz to 5 GHz	dB		-10	-8
	I _{FLD} = I _{op} , V _{EA} = -1 V, f = 5 GHz to 10 GHz	dB		-8	-5

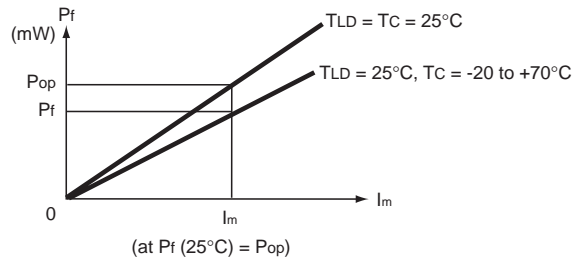
Note:

1. NX8560LJ Series: T_{SET} is a certain point between 20°C and 35°C.
 NX8560LJXXX Series: T_{SET} is set at a certain point between 20°C and 35°C for ITU-T grid wavelength
2. 40 km SMF under modulation, 9.95328 Gb/s, PRBS 2²³-1, V_{EA} = V_{CENTER} ± 1/2V_{MOD}, I_{FLD} = I_{op}, NEC test system
 V_{center} : a certain point between -2.0 V and -0.5 V.
 V_{mod} : a certain point 3 V or below.
 I_{op} : a certain point between 50 mA and 80 mA.
3. Available for DWDM wavelength based on ITU-T recommendations (100 GHz grid).
 Please refer to ordering information.
4. BER = 10⁻¹⁰.

ELECTRO-OPTICAL CHARACTERISTICS (Applicable to Monitor PD: $T_{LD} = T_{set}$, $T_c = -20$ to $+70^\circ\text{C}$)

PART NUMBER			NX8560LJ SERIES		
SYMBOLS	PARAMETERS AND CONDITIONS	UNITS	MIN	TYP	MAX
I_m	Monitor Current, $V_{RPD} = 5\text{V}$, $I_{FLD} = I_{OP}$, $V_{EA} = 0\text{V}$	μA	30		1100
I_D	Dark Current, $V_{RPD} = 5\text{V}$, $V_{EA} = 0\text{V}$	nA			10
C_t	Terminal Capacitance, $V_{RPD} = 5\text{V}$, $f = 1\text{Mhz}$	pF			15
γ^1	Tracking Error, $I_m = \text{const.}$	dB			0.5

Note:
 1. $\gamma = \left| 10 \log \frac{P_f}{P_{op}} \right|$



ELECTRO-OPTICAL CHARACTERISTICS (Applicable to Thermistor and TEC: $T_c = -20$ to $+70^\circ\text{C}$)

PART NUMBER			NX8560LJ SERIES		
SYMBOLS	PARAMETERS AND CONDITIONS	UNITS	MIN	TYP	MAX
R	Thermistor Resistance, $T_{LD} = 25^\circ\text{C}$	k Ω	9.5	10.0	10.5
B	B Constant	K	3350	3450	3550
I_c	Cooler Current, $T_{LD} = T_{set}$	A			1.2
Vc	Cooler Voltage, $T_{LD} = T_{set}$	V			2.4

ABSOLUTE MAXIMUM RATINGS¹

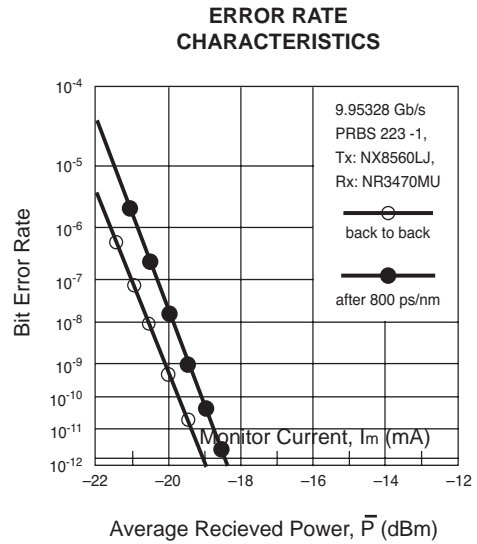
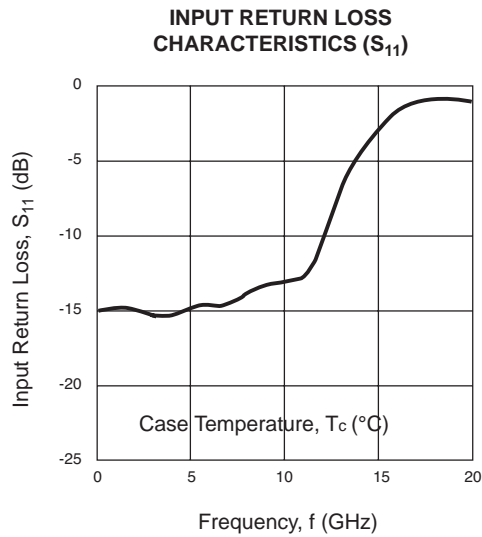
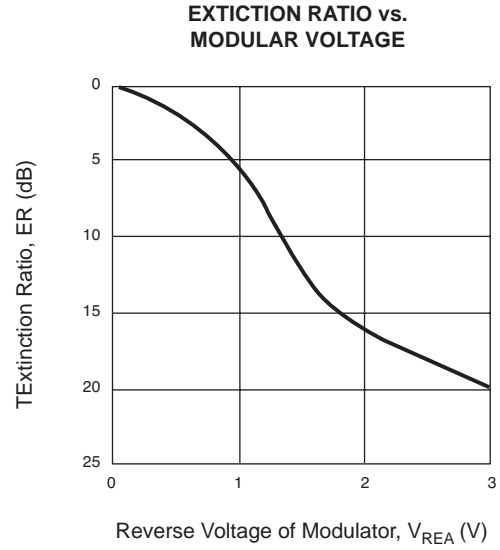
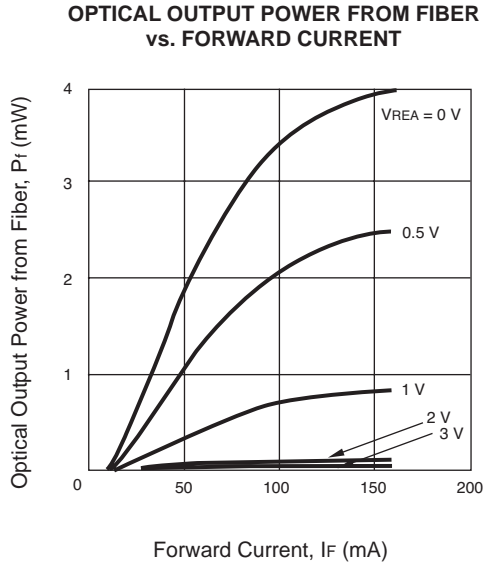
($T_c = 25^\circ\text{C}$, unless otherwise specified)

SYMBOLS	PARAMETERS	UNITS	RATINGS
P_f	Optical Output from Fiber	mW	10
I_{FLD}	Forward Current of LD	mA	150
V_{RLD}	Reverse Voltage of LD	V	2.0
V_{Fm}	Forward Voltage of Modulator	V	1
V_{Rm}	Reverse Voltage of Modulator	V	4
I_{FPD}	Forward Current of PD	mA	1
V_{RPD}	Reverse Voltage of PD	V	10
I_c	Cooler Current	A	1.5
Vc	Cooler Voltage	V	2.5
T_c	Operating Case Temperature	$^\circ\text{C}$	-20 to +70
T_{STG}	Storage Temperature	$^\circ\text{C}$	-40 to +85
T_{SLD}	Lead Soldering Temperature (3 s)	$^\circ\text{C}$	350

Note:

1. Operation in excess of any one of these parameters may result in permanent damage.

TYPICAL PERFORMANCE CURVES ($T_c = 25^\circ\text{C}$ unless otherwise specified)



Remark:

1. The graphs indicate nominal characteristics.

NX8560LJ SERIES

ORDERING INFORMATION

NX8560LJ□□□ - □□

CC : SC-UPC connector (standard)
BC : FC-UPC connector (option)

Without wavelength code: Wavelength is a certain point between
1528.77 to 1563.04 nm
With Wavelength code :Refer to Table A

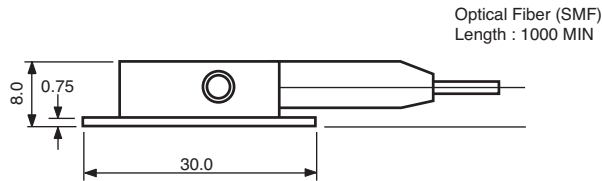
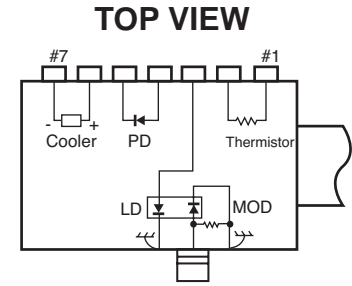
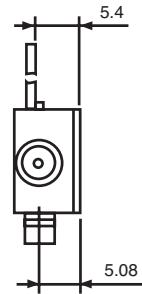
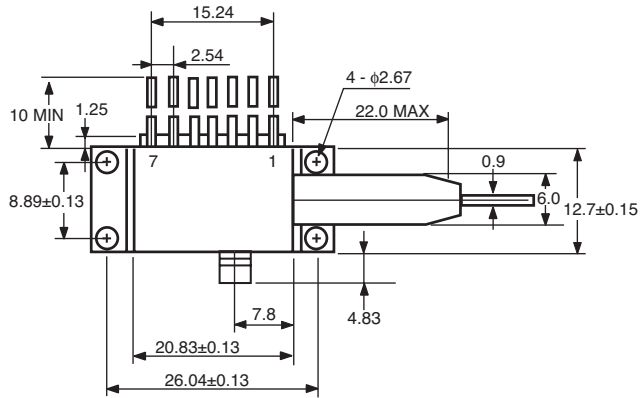
Table A: DWDM wavelength base on ITU-T recommendations (@ $T_{LD} = T_{set}$)

Wavelength Code	ITU-T Wavelength ¹ (nm)	Frequency (THz)	Wavelength Code	ITU-T Wavelength ¹ (nm)	Frequency (THz)
287	1528.77	196.10	501	1550.11	193.40
295	1529.55	196.00	509	1550.91	193.90
303	1530.33	195.90	517	1551.72	193.20
311	1531.11	195.80	525	1552.52	193.10
318	1531.89	195.70	533	1553.32	193.00
326	1532.68	195.60	541	1554.13	192.90
334	1533.46	195.50	549	1554.94	192.80
342	1534.25	195.40	557	1555.74	192.70
350	1535.03	195.30	565	1556.55	192.60
358	1535.82	195.20	573	1557.36	192.50
366	1536.60	195.10	581	1558.17	192.40
373	1537.39	195.00	589	1558.98	192.30
381	1538.18	194.90	597	1559.79	192.20
389	1538.97	194.80	606	160.60	192.10
397	1539.76	194.70	614	1561.41	192.00
405	1540.55	194.60	622	4562.23	191.90
413	1541.36	194.50	630	1563.04	191.80
421	1542.14	194.40			
429	1542.91	194.30			
437	1543.73	194.20			
445	1544.52	194.10			
453	1545.32	194.00			
461	1546.11	193.90			
469	1546.91	193.90			
477	1547.71	193.70			
485	1548.51	193.60			
493	1549.31	193.50			

Note:

1. The value which omitted and computed the 3rd place below the decimal point

OUTLINE DIMENSIONS (Units in mm, unless otherwise specified ±0.2 mm tolerance)

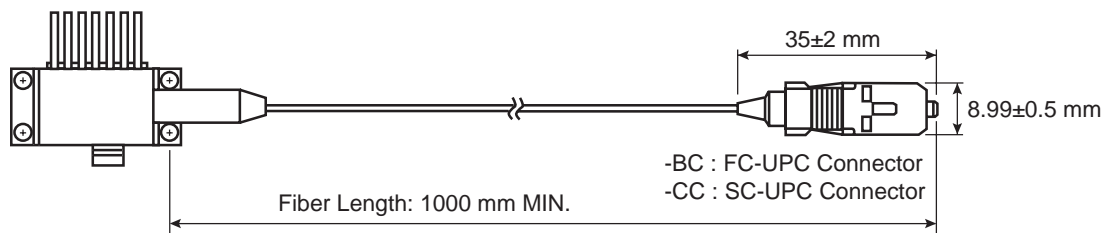


PIN CONNECTIONS

PIN No.	FUNCTION
1	THERMISTOR
2	THERMISTOR
3	LD DC Bias
4	PD ANODE
5	PD CATHODE,
6	COOLER ANODE
7	COOLER CATHODE

OPTICAL FIBER CHARACTERISTICS

PARAMETER	UNITS	SPECIFICATIONS
Mode Field Diameter	μm	9.3±0.5
Cladding Diameter	μm	125±1
Tight Buffer Diameter	μm	900±100
Cut-off Wavelength	nm	<1270
Attenuation 1525 to 1575	dB/km	<0.3
Minimum Fiber Bending Radius	mm	30
Fiber Length	mm	1000 MIN
Flammability		UL1581 VW-1



Life Support Applications

These NEC products are not intended for use in life support devices, appliances, or systems where the malfunction of these products can reasonably be expected to result in personal injury. The customers of CEL using or selling these products for use in such applications do so at their own risk and agree to fully indemnify CEL for all damages resulting from such improper use or sale.

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