
High Power 1480 nm MQW Lasers

Technical Data

FPL2600, FPL4600

Features

- **1480 nm Wavelength**
- **Output Power Options of 30 mW to 70 mW**
- **14 pin DIL or Butterfly Package**
- **Back-facet Monitor Photodiode**
- **Integral Thermoelectric Cooler**

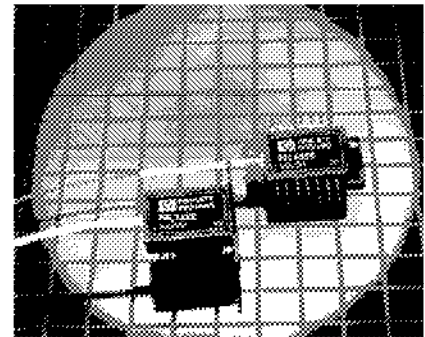
Applications

- **Erbium-doped Fiber Amplifier Pump Laser**
- **Laser Spectroscopy**
- **Fibre Gyroscopes**

Description

The FPL2600 and FPL4600 series of semiconductor lasers are designed for high output powers in the 1480 nm wavelength region. The devices consist of a multiple quantum well (MQW) laser chip bonded in our unique, high-stability, 6 pin sub-module package. The sub-module is, in turn, mounted in an industry-standard 14 pin package which contain a thermoelectric cooler and back-facet monitor photodiode.

High fiber-coupled powers are obtained by using high and low-reflectivity coatings on the appropriate laser facets to maximize front facet output power, together with high-efficiency fiber lenses. The result is that these devices provide the high fiber-coupled output power required for optically pumping Erbium-doped fiber to achieve amplification of optical signals in the 1550 nm wavelength region.



The devices are also useful as sources for high power laser spectroscopy studies and as high power sources for fiber gyroscopes.

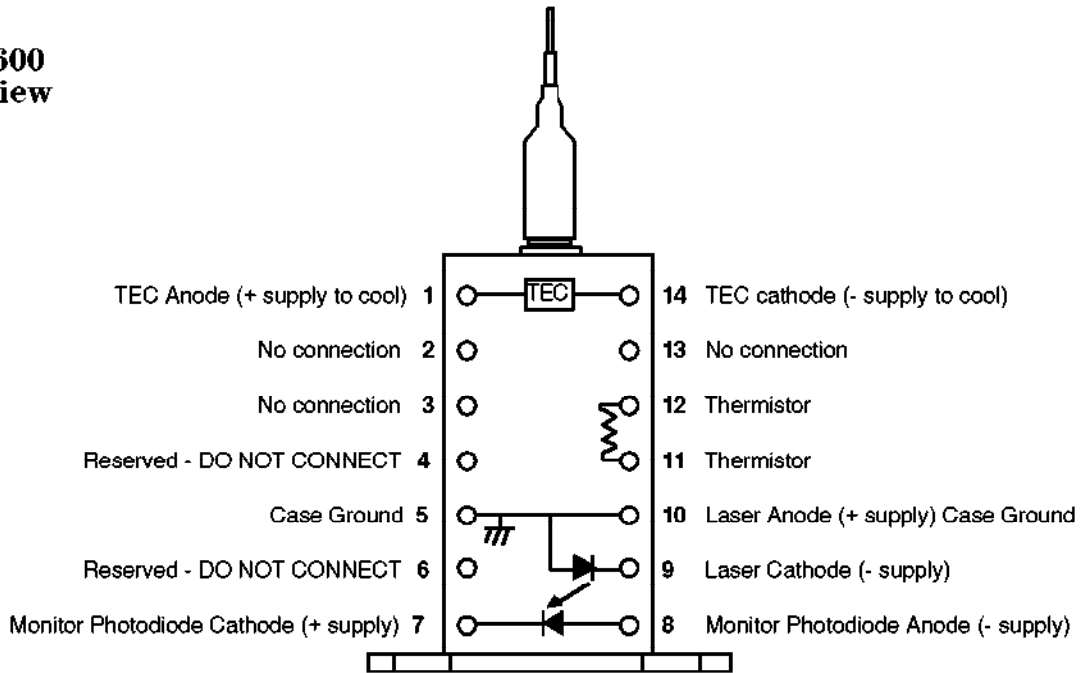
Laser Safety Warning

This device is a Class IIIb (3b) Laser Product. It can emit invisible laser radiation if operated with the fiber pigtail disconnected.

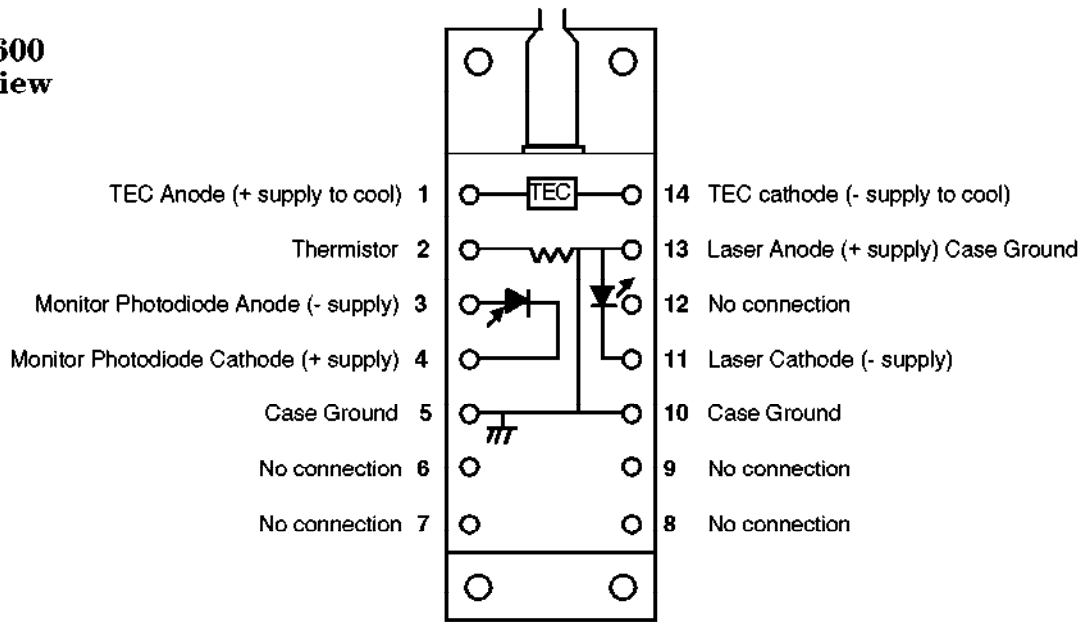
To avoid possible eye damage do not look into an unconnected fiber pigtail during laser operation. Do not exceed specified operating limits.

Connection Diagrams

FPL2600 Top View



FPL4600 Top View



Absolute Maximum Ratings

Absolute maximum limits mean that no catastrophic damage will occur if the product is subjected to these ratings for short periods, provided each limiting parameter is in isolation and all other parameters have values within the performance specification. It should not be assumed that limiting values of more than one parameter can be applied to the product at the same time.

Parameter	Minimum	Typical	Maximum	Units
Laser Forward Current (Imax)	-	-	500	mA
Laser Reverse Current @ 2 V	-	10	250	μ A
Laser Reverse Voltage	-	-	2.0	V
Photodiode Forward Current	-	-	1.0	mA
Photodiode Reverse Voltage (Vr)	-	-	-10	V
Fiber Pull Strength	-	-	10	N
Operating Temperature	-20	-	+55	$^{\circ}$ C
Storage Temperature	-40	-	+85	$^{\circ}$ C
Mechanical Shock Vibration	To Be Defined			

Laser Specification [1]

Parameter	Minimum	Typical	Maximum	Units
Peak Wavelength	1465	1480	1490	nm
Temperature Dependence of Peak Wavelength	-	-	0.5	nm/ $^{\circ}$ C
Spectral Width (FWHM)	-	14	20	nm
Fiber Output Optical Power @ 350 mA (Pf) [2]				
FPLX630	30	-	-	mW
FPLX635	35	-	-	mW
FPLX640	40	-	-	mW
FPLX645	45	-	-	mW
FPLX650	50	-	-	mW
FPLX655	55	-	-	mW
FPLX660	60	-	-	mW
FPLX670	70	-	-	mW
Threshold Current (I _{th})	-	30	-	mA
Temp. Coeff. of Threshold Current	-	2	-	%/ $^{\circ}$ C
Differential Resistance	-	10	-	Ohms
Forward Voltage	-	1.5	2	V

Notes:

1. Bias 350 mA unless otherwise stated.
2. Operation of the device at 450 mA will typically give an additional fiber output optical power of 12 mW.

Monitor Photodiode Specification

Parameter	Minimum	Typical	Maximum	Units
Photocurrent at $I = I_{max}$	-	0.2	-	mA
Responsivity ($\Delta I_m / \Delta P_f$) at $V_r = 0$	-	5.0	-	$\mu A/mW$
Maximum Change in Responsivity [1] (from $-20^\circ C$ to $+55^\circ C$ meas. w.r.t. $20^\circ C$)	-	-	1.0	dB
Dark Current ($V_r = -5 V$)	-	-	0.1	μA
Photocurrent Linearity	-	± 0.5	-	dB

Reliability

The typical median life time is 500,000 hours at $25^\circ C$ chip temperature and 350 mA drive current.

Thermistor Specification

Parameter	Minimum	Typical	Maximum	Units
Resistance at $25^\circ C$ Case Temp.	9.0	10.0	11.0	k Ω
Temperature Coefficient	-	-4.4	-	%/ $^\circ C$

T.E.C. Specification

Parameter	Minimum	Typical	Maximum	Units
Current at $40^\circ C$ Case Temperature ($25^\circ C$ Laser Temp.)	-	-	1.0	A
Voltage	-	-	2.0	V

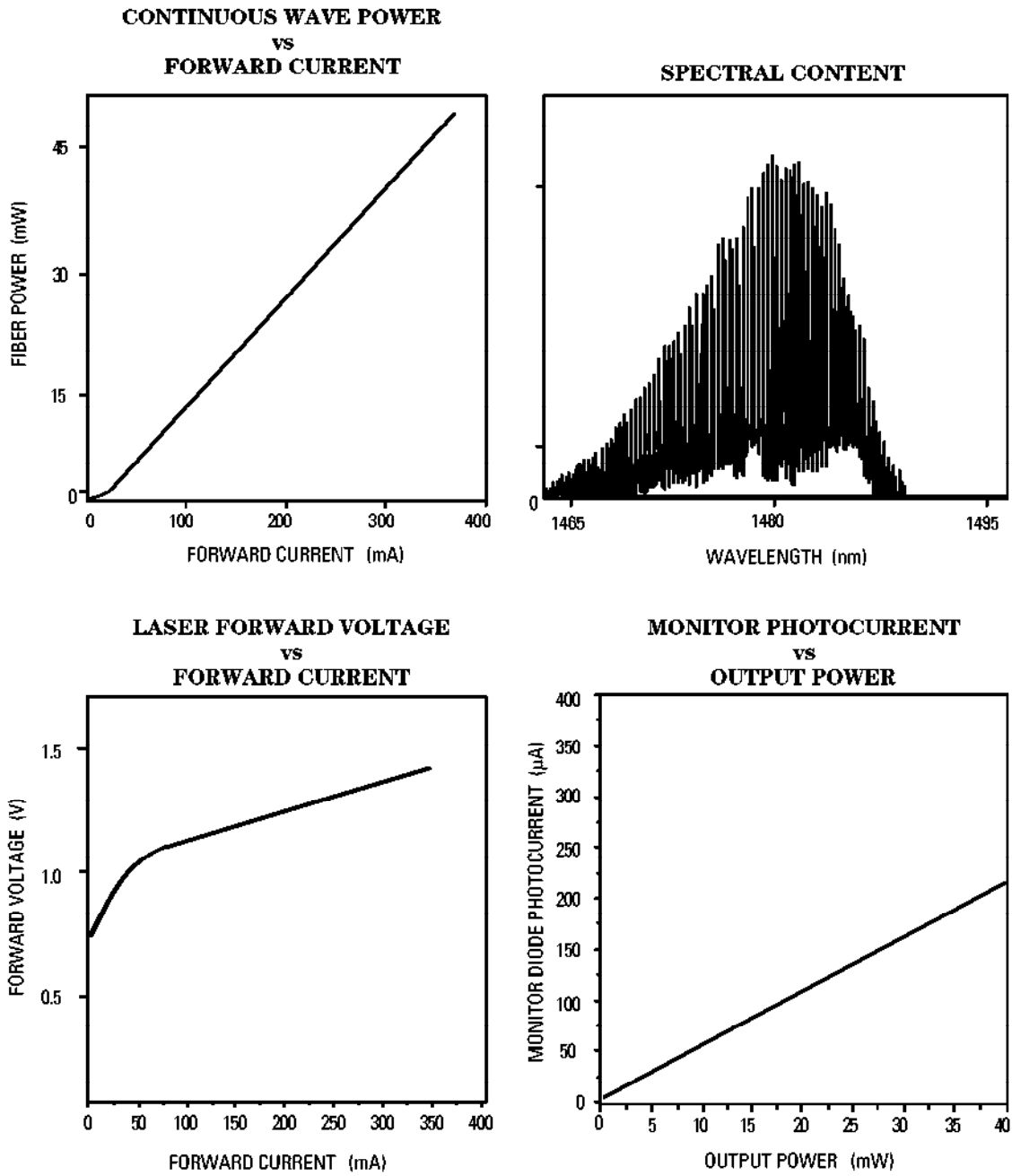
Fiber Pigtail Specification

Parameter	Minimum	Typical	Maximum	Units
Type	Tight jacketed, self-mode-stripping, single mode fiber			
Length [2]	-	1.5	-	m
Spot Size (Mode Radius)	4.5	-	5.5	μm
Cladding Diameter	122	-	128	μm
Core/Cladding Concentricity	-	-	1.0	μm
Secondary Jacket Diameter	0.8	0.9	1.0	mm
Effective Cutoff Wavelength (1 meter straight)	1150	-	1200	nm

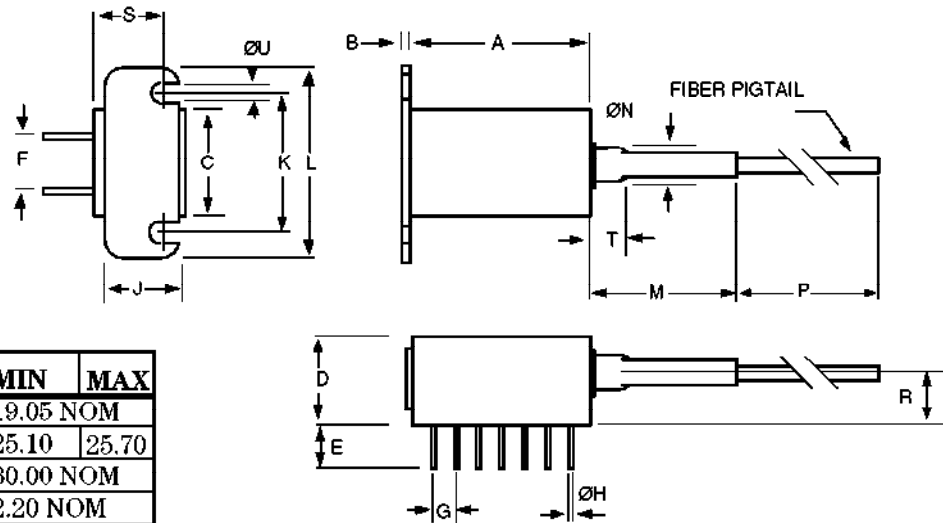
Notes:

1. Fiber output power change for constant monitor output current.
2. Fiber length of 1.5 meters is standard without connector. Length will be reduced during connectorization.

FPL2600 Typical Laser Operating Characteristics



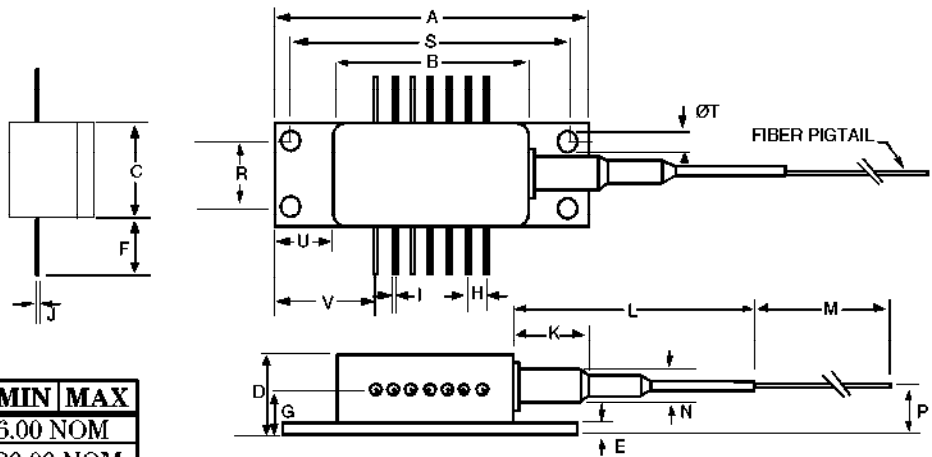
FPL2600 Package Drawing



DIM	MIN	MAX	DIM	MIN	MAX
A	20.68	20.98	K	19.05 NOM	
B	0.90	1.10	L	25.10	25.70
C	12.55	13.00	M	30.00 NOM	
D	8.51	9.60	ØN	2.20 NOM	
E	6.10	6.60	P	1000	-
F	7.62 NOM		R	5.80	6.20
G	2.54 NOM		S	6.00 NOM	
ØH	0.457 NOM		T	6.00 NOM	
J	7.01	7.21	ØU	3.17 NOM	

All dimensions in mm.

FPL4600 Package Drawing



DIM	MIN	MAX	DIM	MIN	MAX
A	29.85	30.15	K	6.00 NOM	
B	20.65	20.95	L	30.00 NOM	
C	12.45	12.75	M	1500	-
D	9.05	9.35	N	2.20 NOM	
E	1.40	1.60	P	5.25	5.55
F	4.90	6.10	R	8.85	9.15
G	5.45	5.75	S	25.85	26.15
H	2.54 NOM		ØT	2.10	1.90
I	0.38 NOM		U	4.45	4.75
J	0.25 NOM		V	7.38 NOM	

All dimensions in mm.

Ordering Information

FPLX6XX - XX

Connector Type:
 SF - Super FC/PC
 ST - ST® Connector
 FP - FC/PC
 AP - APC Connector
 DN - DIN 47256
 AD - Angled DIN 47256

Minimum Output Power @ 350mA:

30 mW = 30
 35 mW = 35
 40 mW = 40
 45 mW = 45
 50 mW = 50
 55 mW = 55
 60 mW = 60
 70 mW = 70

Package Style:
 2 = 14 DIL
 4 = Butterfly

CDRH Certification

Hewlett-Packard Ltd
 Whitehouse Road
 Ipswich, Suffolk IP1 5PB
 England

Manufactured: _____ Serial No. _____

Model No. _____

This product conforms to the applicable requirements of 21 CFR 1040 at the date of manufacture.

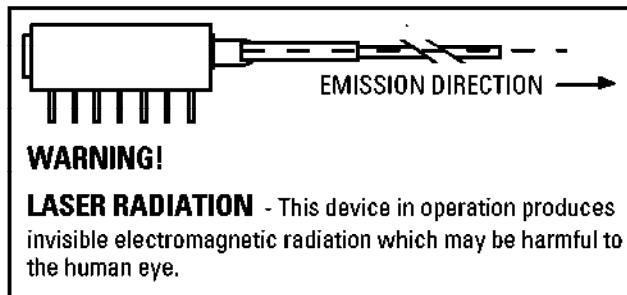
Laser Warning

DANGER



Invisible LASER Radiation -
 Avoid direct exposure to beam

Peak power	70 mW
Wavelength	1480 nm
Class III High Power Semiconductor Laser	



Handling Precautions

1. Normal handling precautions for electrostatic sensitive devices should be taken.
2. Semiconductor lasers can be damaged by overloading or by current surges. Appropriate transient protection should be taken.
3. CW operation of the laser requires attachment to heat sink (minimum 4°C/W).



For more information:

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