

ErFA 2906: Coolerless small form factor EDFA **(980nm Pump Version – *Preliminary*)**



Applications

- Single or small number of channel booster or pre-amplification
- For Ultra high speed system (40Gbps)
- Loss compensation

Description

- ErFA2906 has been designed for a wide variety of single channel or small number of channel applications of EDFA.
- Miniature Small (120mm x 80mm x14mm) board mountable package.
- Simple cooler-less coaxial 980nm pumped configuration.
- Input and output monitor is implemented.
- Integrated temperature sensor

Features

- Saturated output power $> +5\text{dBm}$
- Noise figure $< 5.7\text{dB}$ at -15dBm in and $+5\text{dBm}$ out
- Cooler free operation up to $+60\text{ }^{\circ}\text{C}$ ambient temperature
- Low power consumption owing to the cooler less pumping

Block Diagram

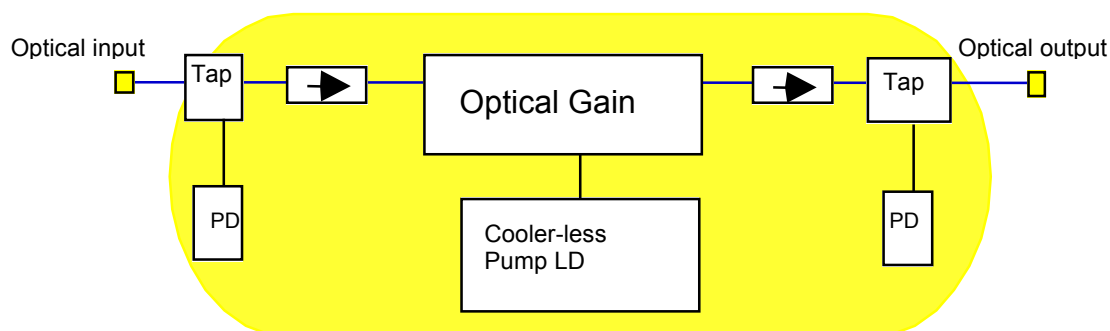


Figure 1: ErFA2903 EDFA optical configuration

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120
106

23.65 9.75 45°

23.53

11.09

15.85 6.48

IN OUT

National Semiconductor
LM35DM

4-Ø2.5

6.7

80

60

44.94

23

27.14

25.72

4-R22

MOLEX:79109-0208

4.11

12.7

Figure 2: ErFA2906 outline drawing

Pin #	Description		
1	Laser cathode -	9	N.C.
2	Laser Anode +	10	Input PD Gnd
3	TEC +	11	Input PD Cathode +
4	TEC -	12	Input PD Anode -
5	LM35DM Vs +	13	Output PD Cathode +
6	LM35DM Gnd	14	Output PD Anode -
7	LM35DM Vout	15	N.C.
8	Laser PD Anode -	16	Output PD Gnd

Parameter	Unit	Min	Typ	Max	Remarks
Storage Temperature	°C	-40		70	
Operating Humidity	%RH	10		80	No dew condensation
Storage Humidity	%RH	10		90	No dew condensation
Operating Temperature	°C	0		60	

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Absolute Maximum Ratings

Item	Symbol	Condition	Value limit	Unit
980nm Laser forward current	I_P		250	mA
Laser reverse voltage	$V_{F,P}$		2	V
Monitor photodiode forward current	$I_{F,M}$		5	mA
Monitor photodiode reverse voltage	$V_{R,M}$		20	V
Forward voltage of input signal monitor diode	$V_{F,M,IN}$		0	V
Forward voltage of output signal monitor diode	$V_{F,M,OUT}$		0	V
Reverse voltage of input signal monitor diode	$V_{R,M,IN}$		15	V
Reverse voltage of output signal monitor diode	$V_{R,M,OUT}$		15	V

Electrical Characteristics

Parameter	Symbol	Specification		Unit	Comments
		Min	Max		
Pump laser diode current (BOL)	I_{PO}		200	mA	Over whole operating condition 0°C to 60 °C
Relative change of pump laser diode current from BOL to EOL	$\Delta I_{PO} / I_{PO}$		20	%	
Pump laser diode forward voltage	V_P	-	2.2	V	
Pump monitor PD dark current	I_M	50	4000	μA	$I_P = I_{PO}$ Not applicable for EDFA power control
Pump monitor PD reverse voltage	U_{MR}	0	10	V	

TEMPERATURE SENSOR (LM35DM: Molded Small Outline Package)

Parameter	Symbol	Specification		Unit	Comments
		Min	Max		
Supply voltage	V_{S+}	4	30	V	
Temperature range		Typ. 0 to 100		°C	
Accuracy		Typ. ±0.9		°C	
Sensor gain		Typ. +10.0		mV/°C	
Quiescent current		91		uA	At $V_{S+} = +5V$

Optical Characteristics

Parameter	Symbol	Specification		Unit	Comments
		Min	Max		
Wavelength range		1530 to 1563		nm	
Temperature range	T_a	0 to 60		°C	
Input power	P_{in}	-15	-3	dBm	
Output power	P_{out}	5		dBm	
Polarization dependent gain			0.1	dB	
Polarization mode dispersion			0.1	ps	
Return loss		40		dB	
Noise figure			7.5 8.0 9.0	dB dB dB	30°C +/- 10 °C 30°C +/- 20 °C 30°C +/- 30 °C
Input PD minitor responsivity		Typ. 0.05		A/W	
Output PD minitor responsivity		Typ. 0.01		A/W	
Polarization dependance of monitors			0.2	dB	
Temperature dependance of monitors			0.4	dB	

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Typical Performance

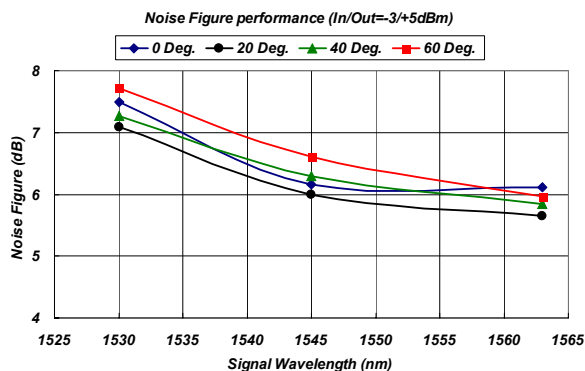


Figure 3: Noise Figure at -3dBm input

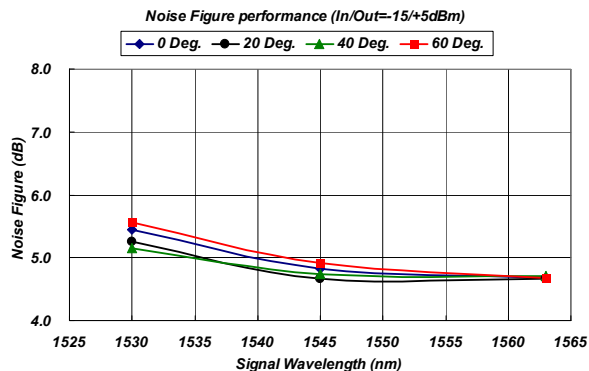


Figure 4; Noise Figure at -15dBm input

Ordering Information

ErFA2906 -X X -Y Y

Isolator and monitor indicator

FRNS Input / Output isolator, Input / Output monitor
RS Output isolator, Output monitor
R Output isolator
FRS Input / Output isolator, Output monitor

Optical connector indicator

FA FC Angled connector
FS FC super PC
SA SC Angled connector
SS SC super PC
LC LC connector
LA LC Angled connector

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FITEL
TECHNOLOGIES, INC.

Clinton, NJ 08809

T: 908-713-3525

F: 908-713-3515

www.fiteltech.com

sales@fiteltech.com