

Optical Amplifiers Selection Guide

Finisar offers a wide selection of optical amplifiers, ranging in optical and electrical specification parameters, and in a variety of form factors and communications interfaces.

This selection guide seeks to help end-users to identify the amplifier(s) that best suit their application needs by providing an “at a glance” comparison of the specification parameters.

The part numbers referenced in the following tables represent a small portion of the full capabilities and offerings of our optical amplifier families. These tables include only the products that are available for purchase by any customer. Customized solutions for special applications are available upon

II. Ultraspan® EDFAs

Finisar's UltraSpan® family of optical amplifiers offers the power of optical amplification in a user-friendly, network-deployment and integration in new or existing network elements. Ultraspan amplifiers can provide stand-alone and complementing or enhancing their performance capabilities.

Parameter	P/N➔	FOA-M2200PB-EFG1C-AA015		FOA-R2100PB-EPB2C-AA010		FOA-M2000PB-EFG2C-AA066		FOA-M2000PB-EFG2C-AA067		FOA-M2000PB-EFG2C-AA068	
	Unit	Specification		Specification		Specification		Specification		Specification	
		Min	Max	Min	Max	Min	Max	Min	Max	Min	Max
Form Factor	mm	1RU Rack Mount		1RU Rack Mount		1RU Rack Mount		1RU Rack Mount		1RU Rack Mount	
		442x240x43.6		442x240x43.6		442x240x43.6		442x240x43.6		442x240x43.6	
Amplifier Type	-	WDM FGA		WDM FGA PowerBooster with OSC EDFA		Dual WDM FGA EDFAs		WDM FGA EDFA		WDM FGA EDFA	
Operating Wavelength Range	nm	1529.1	1564.2	1529.1	1530	1528.77	1564	1528.77	1564	1529.1	1564
Input Power Range	dBm	-15	12	-5	-35	-35	-3	-35	3	-15	12
Output Power Range	dBm	-2	18	5	-8	-8	20	-8	20	-2	18
Saturated Output Power	dBm	17		25.5		20		20		17	
Settable Gain Range	dB	5	18	5.5	6.5	11	24	11	24	5	18
Optimal Flat Gain	dB	17		6		23		23		17	
Gain/Power Setting Accuracy	dB	-0.5	0.5			-0.25	0.25	-0.25	0.25	-0.5	0.5
Gain Flatness vs. Wavelength	dB		±0.6				±0.6		±0.6		
Dynamic gain tilt	dB/dB		0.85	N/A			0.9		0.9		
Gain / Power Stability	dB		±0.1		±0.1		±0.1		±0.1		
Noise Figure (at OFG or equivalent)	dB		6.5				6		6		
Return loss	dB	40		40		40		40		40	
PDG	dB		0.3		0.3		0.3		0.3		
PMD	ps		0.3		0.3		0.3		0.3		
Multi-Path Interference	dB		-40		-40		-40		-40		
Laser Safety Classification	-	Class 1M		Class 1M with APR		Class 1M		Class 1M		Class 1M	
Optical Connectors	-	2: In, Out		3: In, Out, Monitor Out		4: In1, Out1, In2, Out2		2: In, Out		2: In, Out	
Operating Modes	-	AGC, APC, Manual		APC, Manual		AGC, APC, Manual		AGC, APC, Manual		AGC, APC, Manual	
Power Supply Voltage	V	110 (AC)	240 (AC)	-76 (DC)	-36 (DC)	-76 (DC)	-36 (DC)	110(AC)	240(AC)	-76 (DC)	-36 (DC)
Power Consumption	W		40						40		
Operating Case Temperature	°C	-5	55	-5	55	-5	55	-5	55	-5	55
Interface	-	Ethernet and RS-2132		Ethernet and RS-2132		Ethernet and RS-2132		Ethernet and RS-2132		Ethernet and RS-2132	
		SNMP v2 or web-based GUI		SNMP v2 or web-based GUI		SNMP v2 or web-based GUI		SNMP v2 or web-based GUI		SNMP v2 or web-based GUI	
Ethernet cable P/N	-	18-10-0138R		18-10-0138R		18-10-0138R		18-10-0138R		18-10-0138R	
Power Cable P/N	-	1133098 (US AC)		18-10-0089R		18-10-0089R		18-10-0089R		18-10-0089R	
		1133099 (EU AC)									
19" Brackets Kit P/N	-	50-60-0102-01R		50-60-0102-01R		50-60-0102-01R		50-60-0102-01R		50-60-0102-01R	
21" Brackets Kit P/N	-	50-60-0103-01R		50-60-0103-01R		50-60-0103-01R		50-60-0103-01R		50-60-0103-01R	
23" Brackets Kit P/N	-	50-60-0104-01R		50-60-0104-01R		50-60-0104-01R		50-60-0104-01R		50-60-0104-01R	
ETSI Brackets Kit P/N	-	50-60-0105-01R		50-60-0105-01R		50-60-0105-01R		50-60-0105-01R		50-60-0105-01R	

III. Ultraspan Raman and ROPA

Finisar's Ultraspan® family of Raman and ROPA optical amplifiers offer the power of optical amplification in a user-deployable and integration in new or existing network elements. Ultraspan amplifiers can provide stand-alone amplification or enhancing their performance capabilities.



1RU Raman / ROPA Pl

Parameter	P/N➔	FOA-R9100PR-RBW2C-AA003		FOA-R9100PR-RBW3C-AA004		FOA-R9200PR-RFW3C-AA037	
	Unit	Specification		Specification		Specification	
		Min	Max	Min	Max	Min	Max
Form Factor	mm	1RU Rack Mount		1RU Rack Mount		1RU Rack Mount	
		442x240x43.6		442x240x43.6		442x240x43.6	
Amplifier Type	-	Counter-Propagating Raman Amplifier		Counter-Propagating Raman Amplifier		Co-Propagating Raman Amplifier	
Operating Wavelength Range	nm	1528	1567	1529	1564	1529.2	1564.2
Total Pump Power	mW	450	490	680	710	680	710
Input Signal Power Range (pumps off)	dBm	-45	-10	-44	5	-10	26
Signal Insertion Loss	dB		1.6		1.8		1.8
Nominal Gain for G.652	dB		10		14.5		9
Nominal Gain for Leaf	dB		13		17.5		10
Nominal Gain for TrueWave	dB		15		20		11.5
Nominal Gain for TeraLight	dB		14		19		N/A
Spectral Gain Flatness	dB		1		1.2		1.2
Effective Noise Figure	dB		-1		-0.5		N/A
OSC Wavelength Range	nm	1500	1520	1500	1520	1500	1520
Raman Gain at OSC Wavelength	dB	5		10		6	
OSC Insertion Loss	dB		2.5		1.8		1.8
Return loss	dB	40		40		40	
PDL	dB		0.15		0.15		0.15
PDG	dB		0.6		0.2		0.2
PMD	ps		0.2		0.2		0.2
RIN (any pump)	dB/Hz		-110		-110		-115
Laser Safety Classification	-	Class 1M		Class 1M with APR		Class 1M with APR	
Optical Connectors	-	4: In, Out, Monitor in, Monitor Out		3: In, Out, Monitor Out		3: In, Out, Input Monitor	
Operating Modes	-	AGC, Manual		AGC, Manual		AGC, Manual	
Power Supply Voltage	V	-76 (DC)	-36 (DC)	-76 (DC)	-36 (DC)	-76 (DC)	-36 (DC)
Power Consumption	W		55		55		55
Operating Case Temperature	°C	-5	55	-5	55	-5	55
Interface	-	Ethernet and		Ethernet and		Ethernet and	
		RS-2132		RS-2132		RS-2132	
Communications Protocol	-	SNMP v2 or web-based GUI		SNMP v2 or web-based GUI		SNMP v2 or web-based GUI	
Ethernet cable P/N	-	18-10-0138R		18-10-0138R		18-10-0138R	
Power Cable P/N	-	18-10-0048R		18-10-0048R		18-10-0089R	
19" Brackets Kit P/N	-	50-60-0102-01R		50-60-0102-01R		50-60-0102-01R	
21" Brackets Kit P/N	-	50-60-0103-01R		50-60-0103-01R		50-60-0103-01R	
23" Brackets Kit P/N	-	50-60-0104-01R		50-60-0104-01R		50-60-0104-01R	
ETSI Brackets Kit P/N	-	50-60-0105-01R		50-60-0105-01R		50-60-0105-01R	

IV. Ultraspan for the lab

Finisar's Ultraspan® family optical amplifiers for laboratory and production environments offer the power of optical amplification in a rack-mountable platform ideal for laboratory or production line use. Ultraspan amplifiers can be integrated via LAN into your measurement set-up.

Parameter	P/N➔	FOA-M2200TM-EFG1C-AA060		FOA-M2200TM-EFG2C-AA061		FOA-M7100TM-EFG2C-AA027		FOA-S2000TM-ASE3C-AA062	
	Unit	Specification		Specification		Specification		Specification	
		Min	Max	Min	Max	Min	Max	Min	Max
Form Factor	mm	1RU Rack Mount 442x240x43.6		1RU Rack Mount 442x240x43.6		1RU Rack Mount 442x240x43.6		1RU Rack Mount 442x240x43.6	
Amplifier Type	-	WDM FGA		Dual WDM FGA EDFAs		WDM VGA EDFA		High-Power ASE Source	
Operating Wavelength Range	nm	1529.1	1564.2	1528.77	1564	1527.6	1565.5	1528.7	1567.1
Input Power Range	dBm	-15	12	-35	-3	-25	8	N/A	
Output Power Range	dBm	-2	18	-8	20	0	19.5	15	26.5
Saturated Output Power	dBm	17		20		13	21	26.5	
Settable Gain Range	dB	5	18	11	24	-0.25	0.25	N/A	
Optimal Flat Gain	dB	17		23		N/A		N/A	
Gain/Power Setting Accuracy	dB	-0.5	0.5	-0.25	0.25	-0.25	0.25	N/A	
Gain Flatness vs. Wavelength	dB		±0.6		±0.6		1		±0.9
Dynamic gain tilt	dB		0.85		0.9	N/A		N/A	
Gain / Power Stability	dB		±0.1		±0.1		±0.1		±0.2
Noise Figure (at OFG or equivalent)	dB		6.5		6		5.5 (at max gain)	N/A	
Return loss	dB	40		40		40		40	
PDG	dB		0.3		0.3		0.3	N/A	
PMD	ps		0.3		0.3		0.3	N/A	
Multi-Path Interference	dB		-40		-40		-40	N/A	
Laser Safety Classification	-	Class 1M		Class 1M		Class 1M		Class 3B	
Optical Connectors	-	2: In, Out		4: In1, Out1, In2, Out2		2: In, Out		1: Out	
Operating Modes	-	AGC, APC, Manual		AGC, APC, Manual		AGC, APC, Manual		ON / OFF	
Power Supply Voltage	V	110V(AC)	240(AC)	110V(AC)	240(AC)	110V(AC)	240(AC)	110V(AC)	240(AC)
Power Consumption	W		40		40		40		50
Operating Case Temperature	C	15	35	15	35	15	35	15	35
Interface	-	Ethernet		Ethernet		Ethernet		Ethernet	
Communications Protocol	-	Web-based GUI		Web-based GUI		Web-based GUI		Web-based GUI	
Ethernet cable P/N	-	18-10-0138R		18-10-0138R		18-10-0138R		18-10-0138R	
US AC Power Cable P/N	-	1133098		1133098		1133098		1133098	
EU AC Power Cable P/N	-	1133099		1133099		1133099		1133099	
19" Brackets Kit P/N	-	50-60-0102-01R		50-60-0102-01R		50-60-0102-01R		50-60-0102-01R	
21" Brackets Kit P/N	-	50-60-0103-01R		50-60-0103-01R		50-60-0103-01R		50-60-0103-01R	
23" Brackets Kit P/N	-	50-60-0104-01R		50-60-0104-01R		50-60-0104-01R		50-60-0104-01R	
ETSI Brackets Kit P/N	-	50-60-0105-01R		50-60-0105-01R		50-60-0105-01R		50-60-0105-01R	

V. Fixed Gain Amplifiers (FGAs)

Finisar's Fixed Gain Amplifiers (FGAs) are typically single-stage EDFAs whose gain spectrum is either non-flat or flat. They are used as boosters at the transmission side of a link, preamplifiers at the receive side, or inline amplifiers at the mid-span. Our set gain differs from the OFG. In the following table "Single Channel" refers to non-gain flattened amplifiers, WDM



Parameter		P/N➔	FOA-M1100MB-ESC1C-AA001		FOA-M1500CB-ESC1C-AA011		FOA-M2200CB-EFG1C-AA002		FOA-M2200CB-EFG1C-AA003		FOA-M2200CB-EFG1C-AA004		
			Specification		Specification		Specification		Specification		Specification		
			Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	
Form Factor		mm	70x45x12		90x70x15		90x70x15		90x70x15		90x70x15		
Amplifier Type		-	Single Channel		OSC EDFA		WDM FGA		WDM FGA		WDM FGA		
Operating Wavelength Range		nm	1528.77	1567.13	1504.5	1517.5	1529	1563	1528.77	1564	1528.77	1565	
Input Power Range	Booster mode	dBm	-10	5	-2	7	-27	2	-25	8	-35	-5	
	Pre-amp mode						-35	-3	-40	-5			
Output Power Range	Booster mode	dBm	5	16	13		-7	17	-7	17.4	-7	17	
	Pre-amp mode						-10	13	-7	17.4			
Saturated Output Power		dBm	16		13		17			17.4	17		
Settable Gain Range	Booster mode	dB	5	26	N/A	N/A	10	20	4	28	15	30	
	Pre-amp mode	dB					13	25	13	33			
Optimal Flat Gain		dB	N/A		N/A		15		23		23		
Gain/Power Setting Accuracy	Booster mode	dB	-0.5	0.5	-0.5	1	-0.5	0.5	-0.5	0.5	-0.5	0.5	
	Pre-amp mode	dB					-0.5	0.5	-0.5	0.5			
Gain Flatness vs. Wavelength		dB	N/A		N/A			±0.6		±0.6		±0.5	
Dynamic gain tilt		dB/dB	N/A		N/A			±0.06		0.9		0.9	
Gain / Power Stability		dB	-0.2	0.2	-0.1	0.1	±0.1		±0.1		±0.1		
Noise Figure (at OFG or equivalent)		dB		6.5		8	6		5.5		5.5		
Return loss		dB	40		40		40		40		40		
PDG		dB		0.5		0.3	0.5		0.4		0.3		
PMD		ps		0.3		0.15	0.3		0.2		0.3		
Multi-Path Interference		dB		-40		-40	-40		-40		-40		
Laser Safety Classification		-	Class 1M		Class 1M		Class 1M		Class 1M		Class 1M		
Optical Connectors		-	2: In, Out		2: In, Out		2: In, Out		3: In, Out, Out Mon		3: In, Out, Out Mon		
Operating Modes		-	APC, Manual		APC, Manual		AGC, APC, Manual		AGC, APC, Manual		AGC, APC, Manual		
Power Supply Voltage		V	2.97	3.63	3.13	3.46	4.75	5.25	4.75	5.25	4.75	5.25	
Power Consumption		W		2.5		9.5		8		8		8	
Operating Case Temperature		°C	0	70	0	70	0	70	0	70	0	70	
Communications Protocol		-	RS-232		RS-232		RS-232		RS-232		RS-232 LVTTTL		
Default Baud Rate		Baud	9600		19200		19200		9600		19200		
Eval Board P/N		-	1178581		1185403		1185403		1185403		1185403		
Eval Board Cable P/N		-	18-10-0006R		18-10-0006R		18-10-0006R		18-10-0006R		18-10-0006R		

VI. Variable Gain Amplifiers (VGAs)

Finisar's compact Variable Gain Amplifiers (VGAs) are available in two form factors. Compact VGAs combine the u variable gain range; with up to 20dBm output power. Other VGAs with a larger form factor enable more complex f booster, pre, or inline amplifiers, and are all suitable for WDM applications, their gain spectrum being flat.



MSA NVG Platform

Dual-Pump Platform

Parameter	P/N→	FOA-M7300CD-EVG1C-AA002		FOA-M7300CD-EVG1C-AA003		FOA-M7300CD-EVG1C-AA004		FOA-M7100DA-EVG2C-AA013		FOA-M7100DA-EVG2C-AA014
	Unit	Specification		Specification		Specification		Specification		Specification
		Min	Max	Min	Max	Min	Max	Min	Max	Min
Form Factor	mm	90x70x16.5		90x70x16.5		90x70x16.5		100x150x18		100x150x18
Amplifier Type	-	WDM VGA		WDM VGA		WDM VGA with Mid-stage access		WDM VGA with Mid-stage access		WDM VGA with Mid-stage access
Operating Wavelength Range	nm	1529.5	1564	1529.5	1564	1529.5	1564	1529.5	1564	1529.5
Input Power Range	dBm	-38	5	-27	10	-27	8	-40	-3.5	-42
Output Power Range	dBm	-8	17	-8	19.5	-8	18	2	20.5	-5
Saturated Output Power	dBm	17		19.5		18		20.5		20.5
Gain Range	dB	15	30	10	25	10	25	25	40	17
Gain/Power Setting Accuracy	dB	-0.25	0.25	-0.25	0.25	-0.25	0.25	-0.5	0.5	-0.4
Gain Flatness vs. Wavelength	dB		±0.6		±0.6		±0.6		±0.6	
Gain / Power Stability	dB		±0.1		±0.1		±0.1		±0.1	
Settable Gain Tilt Range	dB	-2	2	-2	2	-2	2	-3.5	0	-2
Mid-Stage Loss	dB	N/A		N/A		0	4	4	9	4
Noise Figure ¹	dB	5.5	11.5	5.6	14.5	5.8	18.5	6.1	7.2	5.6
Return loss	dB	40		40		40		45		40
PDG	dB		0.3		0.3		0.3		0.3	
PMD	ps		0.3		0.3		0.3		0.2	
Multi-Path Interference	dB		-40		-40		-40		-40	
Laser Safety Classification	-	Class 1M		Class 1M		Class 1M		Class 1M		Class 1M
Optical Connectors	-	3: In, Out, Out Mon		2: In, Out, Out Mon		5: In, out, Out mon, MSA in, MSA Out		5: In, out, Out mon, MSA in, MSA Out		5: In, out, Out mon, MSA in, MSA Out
Operating Modes	-	AGC, APC, Manual		AGC, APC, Manual		AGC, APC, Manual		AGC, APC, Manual		AGC, APC, Manual
Power Supply Voltage	V	4.75	5.25	4.75	5.25	4.75	5.25	4.75	5.25	4.75
Power Consumption	W		10		13		11		17	
Operating Case Temperature	°C	0	70	0	70	0	70	0	70	0
Communications Protocol	-	RS-232		RS-232		RS-232 LVTTTL		RS-232 LVTTTL		RS-232 LVTTTL
Default Baud Rate	Baud	19200		19200		9600		19200		19200
Eval Board P/N	-	1185403		1185403		1185403		50-45-0069-01R		50-45-0069-01R
Eval Board Cable P/N	-	18-10-0006R		18-10-0006R		18-10-0006R		18-10-0006R		18-10-0006R

Notes

1. Max NF at minimum gain setting; min NF at maximum gain setting

VII. Raman And Hybrid Modules

Finisar’s Raman and Hybrid Raman Amplifiers enable accurate automatic gain control and deliver the sup

Parameter	P/N➔	FOA-R9100PR-RBW2C-AA003	
	Unit	Specification	
		Min	Max
Form Factor	mm	160x220x26	
Amplifier Type	-	Hybrid Raman / EDFA Amplifier	
Operating Wavelength Range	nm	1529	1567.2
Total Gain Range for G.652	dB	19	37
Gain Setting Accracy	dB		±0.5
Gain Flatness (G=27-40dB)	dB		1.3
Saturated Output Power	dBm		20.5
Input Power Range (Raman Pumps off)	dBm	-40	1.5
Output Power Range	dBm	-2	20.5
Tilt Range	dB	-2.5	0
Pre-Tilt	dB	-0.7	-1.3
Tilt Accuracy	dB		0.5
Total Gain Range for LEAF	dB	19	40
Total Raman Pump Power (ex-fiber)	mW		750
Input Signal Power Range (pumps off)	dBm	-40	1.5
Signal Insertion Loss	dB		1.7
Nominal Raman Gain for G.652 (after GFF)	dB	13.6	
Nominal Raman Gain for LEAF (after GFF)	dB	15	
Raman-Only effective NF for G.652	dB	-1.6	-0.8
Raman-Only effective NF for LEAF	dB	-2.4	-1.5
Total NF for G.652 (at Max Gain)	dB		-0.2
Total NF for LEAF (at Max Gain)	dB		-0.3
OSC Wavelength Range	nm	1527.9	1528.09
Raman Gain at OSC Wavelength	dB	-0.4	0.4
OSC Insertion Loss (IN to OSC drop port)	dB		3
Return loss	dB	40	
PDL+PDG	dB		0.35
PMD	ps		0.25



Parameter
Form Factor
Amplifier Type
Operating Wavelength Range
Total Raman Pump Power
Input Signal Power Range
Signal Insertion Loss
Nominal Gain for G.652
Nominal Gain for LEAF
Spectral Gain Flatness
Effective Noise Figure
OSC Wavelength Range
OSC Insertion Loss (to drop port)
Return loss
PDL
PDG
PMD
RIN (any pump)
Laser Safety Classification
Optical Connectors
Operating Modes
Power Supply Voltage
Power Consumption
Operating Case Temperature
Communications Protocols
Default Baud Rate
Eval Board P/N
Eval Board Cable P/N