Trans Max™ 4100 Hub

Specifications

Optical Amplifiers (EDFAs)

Characteristics	17-1-S-N	21-1-S-N	OM4-EDFA- 19-2-S-N	20-1-S-H	23-1-S-H
Optical Input Power					
Constant Gain Mode, dBm[1,2]	–10 to 12	–10 to 12	NA	0 to 14.5	2 to 15
Constant Power Mode, dBm[3,4]	–3 to 12	–3 to 12	–3 to 12	NA	NA
Wavelength Range, nm	1530 – 1562	1530 – 1562	1530 – 1562	1527 – 1562	1527 – 1562
Optical Input Connector			SC/APC		
Optical Output Power					
Minimum Output Power per Port, dBm	17.0	21.0	19.0	20.5	23.5
Number of Output Ports	1	1	2	1	1
Power per Port Tolerance, dB	NA	NA	+0.5 / –0.0	NA	NA
Maximum Output Power Variation, dB[5]			± 0.5		
Maximum Gain Variation, dB[6]			± 0.5		
Residual Pump Power, dBm			–35		
Optical Output Connector(s)			SC/APC		
ASE Noise Figure					
–10dBm to 0dBm in 1550 ± 5 nm, dB (Typ/Max)	4.5/4.8	4.5/4.8	4.5/4.8[5]	NA	NA
–10dBm to 0dBm in 1530-1562 nm, dB (Max)	5.5	5.5	5.5[5]	NA	NA
> 6 dBm in 1550 ± 5 nm, dB (Typ/Max)	5.5/6	5.5/6	5.5/6	NA	NA
> 6 dBm in 1530-1562 nm, dB (Max)	8.0	8.0	8.0	NA	NA
2dBm to 13.5 dBm in 1540-1562nm, dB (Typ/Max)	NA	NA	NA	5/5.5	5/5.5
2dBm to 13.5 dBm in 1528-1562nm, dB (Typ/Max)	NA	NA	NA	6/6.5	6/6.5
Gain Flatness					
Optimum Gain, dB	11.0	14.0	NA	8.0	10.0
Minimum Settable Gain, dB	7.0	10.0	NA	6.0	8.5
Maximum Settable Gain, dB	15.0	18.0	NA	10.0	11.5
1535-1560nm, dB	± 1.5	± 1.5	NA	NA	NA
1525-1562nm, dB	± 3.0	± 3.0	NA	1.5 (pk-pk)	3.5 (pk-pk)
1540-1562nm, dB	NA	NA	NA	1.2 (pk-pk)	1.1 (pk-pk)
Dynamic Gain Tilt from 1540-1562 nm, dB	NA	NA	NA	0.5	0.3
Dynamic Gain Tilt from 1525-1562 nm, dB	NA	NA	NA	0.9	1.0
EDFA Environmental					
EDFA Operating Temperature Range, °C[7]	–30 to 75 (–22 to 167° F)				
EDFA Storage Temperature Range, °C	–40 to 85 (–40 to 185° F)				

Technical Specification

Trans Max™ 4100 Hub Technical Specifications

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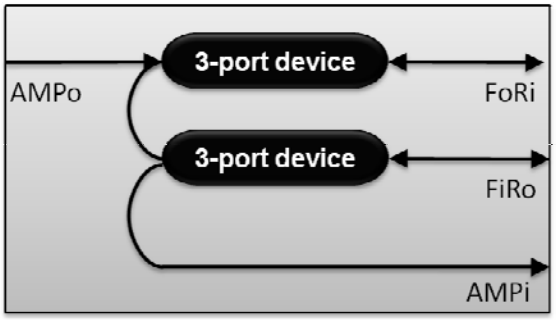
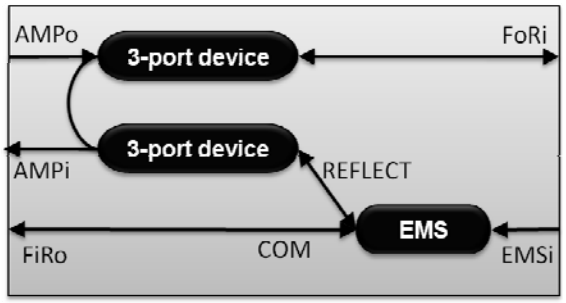
General EDFA	
Input/ Output Isolation, dB	2
Input / Output Return Loss, dB	–55
Polarization Mode Dispersion, dB	0.5
Polarization Dependant Loss, ps	0.3
Transient Response, ms	10
EDFA Powering Requirement	
DC Current, mA @ 24 VDC	425
DC Current, mA @ 12 VDC	150
DC Current, mA @ 5 VDC	30
General Trans Max Specifications	
Number of AC Powering Ports	2
Number of Optical Ports	4
Operating Temperature Range, °C	–40 to 60 (–40 to 140° F)
Weight, Crated/Uncrated	42 lbs (19.1 kg)/40 lbs (18.1 kg)
Dimensions, Crated, W x H x D	23.25 x 15.3 x 13.63 inches (59.1 x 38.9 x 34.6 cm)
Dimensions, Uncrated	20.0 x 11.7 x 10.2 inches (50.8 x 29.7 x 25.9 cm)
4 Port Bi-directional Optical Passive Module (P/N OCRD04H0000PB)	
Channel Optical Performance	
Central Wavelength, nm	1550
Bandwidth, nm	1550 ± 30
Insertion Loss[8]	
AMPo to FoRi or FiRo to AMPi, dB max.	0.9
FoRi to FiRo, dB max.	1.8
Isolation @ 23° C	
FoRi – AMPo or AMPi – FiRo, dB min.	40
FiRo to FoRi, dB min.	60
General Optical Performance	
Directivity	
AMPo to FiRo or FoRi to AMPi, dB min.	50
AMPo to AMPi, dB min	70
Return Loss, dB min.	50
Polarization Dependent Loss, dB max.	0.2
Polarization Mode Dispersion, ps max.	0.1
Power Handling, mW max.	500
Operating and Storage Temperature	–40 to 85° C (–40 to 185° F)



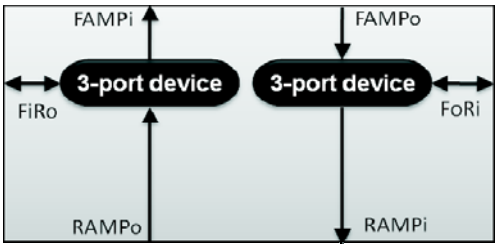
5 Port Bi-directional Optical Passive Module (P/N OCRD05H0650PB)	
Channel Optical Performance	
Central Wavelength, nm	1550
Bandwidth, nm	1550 ± 30
Insertion Loss[8]	
AMPo to FoRi or FiRo to AMPi, dB max.	0.9
FiRo to AMPi, dB max.	1.50
FoRi to FiRo, dB max.	2.4
EMSi to FiRo, dB max.	0.8
Isolation @ 23° C	
FoRi to AMPo or AMPi – FiRo, dB min.	40
FiRo to FoRi, dB min.	60
General Optical Performance	
Directivity	
AMPo to FiRo or FoRi to AMPi, dB min.	50
AMPo to AMPi, dB min	70
Return Loss, dB min.	50
Polarization Dependent Loss, dB max.	0.2
Polarization Mode Dispersion, ps max.	0.1
Power Handling, mW max.	500
Operating and Storage Temperature	–40 to 85° C (–40 to 185° F)



Specifications

6 Port Bi-directional Optical Passive Module (P/N OCRD06H0000PB)

Channel Optical Performance



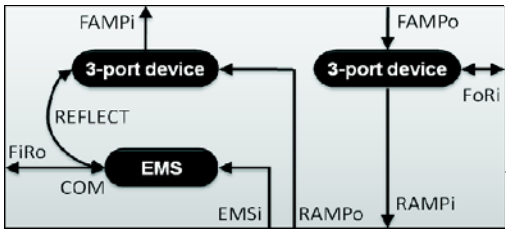
Central Wavelength, nm	1550
Bandwidth, nm	1550 ± 30
Insertion Loss[8], RAMPo to FiRo, FiRo to FAMPi, FAMPo to FoRi, or FoRi to RAMPi, dB max.	0.9
Isolation @ 23° C, FiRo to RAMPo, FAMPi to FiRo, FoRi to FAMPo, or RAMPi to FoRi, dB min.	40

General Optical Performance

Directivity, FiRi to RoFo, dB min.	50
Return Loss, dB min.	50
Polarization Dependent Loss, dB max.	0.2
Polarization Mode Dispersion, ps max.	0.1
Power Handling, mW max.	500
Operating and Storage Temperature, ° C	–40 to 85° C (–40 to 185° F)

7 Port Bi-directional Optical Passive Module (P/N OCRD07H0650PB)

Channel Optical Performance



Central Wavelength, nm	1550
Bandwidth, nm	1550 ± 30
Insertion Loss[8]	
EMSi to FiRo, dB max.	0.8
FAMPo to FoRi or FoRi to RAMPi, dB max.	0.90
FiRo to FAMPi or RAMPo to FiRo, dB max.	1.50
Isolation @ 23° C, FAMPi to FiRo, FoRi to FAMPo, RAMPi to FoRi, or FiRo to RAMPo, dB min.	40

General Optical Performance

Directivity, RAMPo to FAMPi or FAMPo to RAMPi, dB min.	50
Return Loss, dB min.	50
Polarization Dependent Loss, dB max.	0.2
Polarization Mode Dispersion, ps max.	0.1
Power Handling, mW max.	500
Operating and Storage Temperature, ° C	–40 to 85° C (–40 to 185° F)

Optical Switch

Optical Characteristics

Operating Wavelength Range, nm	1260 to 1620
Input Optical Power Range, dBm	–10 to +23
Insertion Loss, dB	< 2
Optical Crosstalk, dB	> 50
Optical Return Loss, dB	> 45
Optical Isolation, dB Typ.[9]	30
Optical Connector Type	SC/APC

Specifications

Switching Characteristics	
Switching Time, ms[10]	< 20
Switch Type	Latching
Optical Switching Threshold Ranges, dBm	+15 to –10 (3 dB Steps)
Optical Power Test Point, V/mW[11]	1.0 (1 mW/V) Low Scale or 0.1 (10 mW/V) High Scale with automatic scaling
Optical Power Test Point Accuracy	10%
Wait Time Before Restoration, Seconds Typ. [12]	30

Operational Switching Table

Operating Mode	Path A Input	Path B Input	Path Selected
Automatic	Above Threshold	Above Threshold	Path A
Automatic	Above Threshold	Below Threshold	Path A
Automatic	Below Threshold	Above Threshold	Path B[13]
Automatic	Below Threshold	Below Threshold	Path A
Force B	Independent of Input Level	Independent of Input Level	Path B
Force A	Doesn't Matter	Doesn't Matter	Path A

Visual Indicators	
Status LEDs	
Green	Optical input power of associated path above threshold.
Red	Optical input power of associated path below threshold.
Amber[14]	Optical input power of associated path less than 10% above threshold.
Path LEDs	
Green	Indicates active path and operating in automatic mode.
Flashing Green	Indicates active path and operating in Forced mode. Must press **AUTO/A/B** path control switch to change operating mode.
Flashing Red	Optical switch error — path not switching.

Notes:

1. When operating in Constant Gain Mode, the sum of the input power and the gain set-point should not exceed the nominal output power or the high output power shutdown may be triggered.
2. Laser emissions shall turn off when the input power is < –2 dBm for OM4-EDFA-23-1-S-H, < –4 dBm for OM4-EDFA-20-1-S-H, and < –10 dBm for OM4-EDFA-17-1-S-N and OM4-EDFA-21-1-S-N. Laser emissions shall turn on when the input power is > 1 dBm for OM4-EDFA-23-1-S-H, > –1 dBm for OM4-EDFA-20-1-S-H, and > –7 dBm for OM4-EDFA-17-1-S-N and OM4-EDFA-21-1-S-N.
3. EDFA's operating in Constant Power Mode will meet output power specifications with input power levels >–3 dBm. At input power levels between –10 and –3 dBm, the EDFA will attempt to maintain the set point output power but it may be less than specifications.
4. Laser emissions shall turn off when the input power is < –10 dBm for OM4-EDFA-17-1-S-N, OM4-EDFA-21-1-S-N, and OM4-EDFA-19-2-S-N. Laser emissions shall turn on when the input power is > –7 dBm for OM4-EDFA-17-1-S-N, OM4-EDFA-21-1-S-N, and OM4-EDFA-19-2-S-N.
5. Variation of optical power over specified temperature, wavelength, and all polarization states.
6. Gain will not vary more than ± 0.5 dB when adding or subtracting wavelengths in AGC mode.
7. Representative of the Trans Max4100 internal temperature range when the node is operating in an external temperature range of –40° C to 60° C.
8. Insertion loss excluding connectors. A pair of connectors have a loss of 0.5 dB maximum and 0.3 dB typical.
9. Isolation specification for the downstream optical power monitored from the upstream transmitter.
10. Optical threshold settings lower than 10 dB below the optical input may delay switching by 15 ms typical.
11. Testpoints use two ranges as listed. The correct range is automatically set and indicated on the device.
12. Automatic return to path A, after a switch to path B, has a 30 second delay that will self-reset each time in that 30 second period that path A's input level drops below the threshold.
13. If the input to path B remains above threshold and the input to path A goes above threshold and remains there for 30 seconds, the optical switch will switch back to path A.
14. Optical threshold is set within the hysteresis window for path B to switch back to path A. To avoid unintended switching, set the threshold lower.

Specifications are subject to change without notice.

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