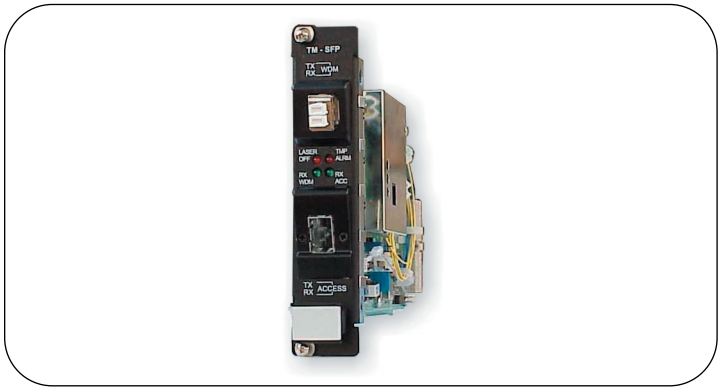
MRV Communications, Inc.

FIBER ACCESS SOLUTIONS

Datasheet

TM-xSFP - Fiber Driver-LD transponder



TM-xSFP

TM-xSFP - Fiber Driver-LD transponder

The TM-xSFP transponder is part of the Fiber Driver-LD (LambdaDriver®) product line and can be hosted by the LD400, LD800 and LD1600 chassis.

The transponders are single slot modules that interface between the CWDM or DWDM multiplexers and the terminal equipment. These modules provide transparent light paths at ITU-T grid CWDM/DWDM wavelength, which can carry any data centric protocols at any rate from 2 Mbps to 2.7 Gbps, enabling carriers to mix different protocols such as SONET/SDH, Fast Ethernet, Gigabit Ethernet, Fibre Channel, ESCON, etc. in a same chassis

The terminal equipment interface possesses an SFP (Small Form Factor Pluggable) receptacle, thus providing the highest flexibility in terminal equipment interface selection.
Using SFP transceivers enables the customer to easily change the type of optical interface according to the different needs of terminal equipment. By means of the SFP receptacle, the same transponder supports any possible protocol and the only difference between GE and OC48 service support is the type of SFP used with the rtansponder. SFP transceivers are pluggable, and can easily be reused at different locations for different applications, thus maximizing the return on investment in optics and equipment, and reducing the need for on-hand parts inventory.

Using CWDM SFP create interesting single module applications, all 3R based (Re-shape, Re-amplify and Re-time):

1. CWDM 3R repeater for specific wavelength – can be used in intermediate node locations for boosting the signal to distances over 100 Km.

2. CWDM 3R wavelengths converter – can be used in "inter-ring nodes" for transparent connection of specific services between two rings, i.e by transferring the service from one CWDM wavelength to another.

3. CWDM to DWDM 3R converter – can be used at DWDM-CWDM demarcation points for transparent connection of CWDM links into DWDM backbone.

Transponders are operated completely independently of the other parts of the system and can be hot swapped without having to interrupt other services running through the same system.
Transponders possess the "data rate selection" functionality, allowing carriers the ability for remote rate provisioning. In "data selection" modes the modules perform 3R functionality in order to maintain the signal's best quality. In cases when there is no possibility to define a specific data rate for selection, transparent 2R (reshape, re-amplify) mode can be operated.
For laser safety requirements, all transponders are equipped with the Automatic Laser Shutdown (ALS) functionality, which reduces the optical power of the

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Features

- ITU-T grid (G.694.2) wavelengths with 20 nm spacing for CWDM
- ITU-T grid (G.694.1) wavelengths for 100 GHz or 200 GHz spacing for DWDM
- Works on standard G.652 / G.655 fiber
- 2R/3R options selection
- Data rate from 2 Mbps to 2.7 Gbps
- SFP access interface for highest flexibility
- SFP digital diagnostics as per SFF-8472 Support
- Compatibility with any SFP vendor according to MSA SFF-8074i
- Link Integrity Notification (LIN)
- Power Monitoring
- Y Cable protection support
- Loop-back
- Automatic Laser Shutdown (ALS)
- Hot swappable module
- SNMP manageable by LambdaDriver Management module

transmitters automatically in case of a broken link. The ALS functionality is implemented on both ports of the transponders (WDM side and Terminal equipment side).
The Loop-back as well as the Remote Laser Shutdown functions assist in troubleshooting the network and provide a cost effective way of pinpointing a problem.
The Link Integrity Notification function allows the terminal equipments to detect the link failure in the path between the two terminal equipments regardless of the location of the failure. The link failure is propagated throughout the network until it reaches the terminal equipment, by disabling the transmission immediately upon failure detection at the opposite port of the transponder.
The TM-xSFP transponders provide Power monitoring on the CWDM/DWDM port in addition to Digital Diagnostics supplied from the SFP port. This function provides a dB value of transmitting and receiving optical signal at each transponder, giving the network manager an additional tool in analyzing the quality of his fiber optic network.
The TM-xSFP transponders support Y-Cable protection protocol, which is used in cases of full hardware protection of the transport equipment with only one terminal port for every service. In this protection mode each two adjacent transponders in LambdaDriver® chassis run proprietary protocol in order to maintain "operational" and "standby" transponders operation.

3 types of transponders are available:

TM-CSFP/xx – CWDM laser wavelength
TM-DSFP/xx – DWDM laser wavelength
TM-DL4SFP/xx – Low dispersion DWDM laser wavelength

The CWDM transponders achieve distances of up to 85 Km without regeneration with 2.5 Gbps protocols and 8 channels Mux/DeMux.
The DWDM transponders achieve distances of up to 95 Km without regeneration with 2.5 Gbps protocols and 8 channels Mux/DeMux.
Lower speed protocols (such as Gigabit Ethernet) can reach longer distances (more than 100 Km) depending on fiber parameters.
The Low dispersion DWDM transponders achieve distances of up to 400 Km (using EDFA Optical Amplifiers) with 2.5Gbps protocols without the need for dispersion compensation units.

Technical Specifications

Physical Dimensions	W: 26.93mm (1.06 In); H:130.7 (5.145 In); D:227.5mm (8.956 In)
Weight	0.55kg (1.21 lb)
Optical connector	MiniSC (MU) - WDM port; SFP -Terminal equipment port
Data Rate	2 Mbps - 2.7 Gbps
WDM grid	DWDM: ITU-T - G.694.1 CWDM: ITU-T - G.694.2
Minimum Laser Power	DWDM +3.5 dbm CWDM +1.5 dbm
Minimum Receiver Sensitivity	1.25Gbps -32dbm 2.5Gbps -27dbm
Minimum Receiver Power	3dbm +/- 1dbm
Note: For additional information on SFP transceiver types, please refer to MRV Plug-ins documentation	

Ordering Information

OADM modules	
TM-CSFP/xx*	SFP Access port, any rate (2Mbps - 2.5Gbps) CWDM ch #xx transponder
TM-DSFP/xx*	SFP Access port, any rate (2Mbps - 2.5Gbps) DWDM ch #xx transponder
TM-DL4SFP/xx*	SFP Access port, any rate (2Mbps - 2.5Gbps) DWDM ch #xx transponder with low dispersion
SFP - Small Form Factor Pluggable (LC Connectors) transcievers	
SFP-F-SX	SFP, up to 200Mbps, MM, 1310nm, 0-2km
SFP-F-LX	SFP up to 200Mbps, SM, 1310nm, 15km
Gigabit Ethernet/Fibre Channel	
SFP-G-SX	SFP 1000Base-SX, MM, 850nm, 0-550m
SFP-G-LX	SFP 1000Base-LX, SM, 1310nm, 10km
ESFP-GD-LX	SFP 1000Base-LX, SM, 1310nm. 10km, with Digital Diagnostics.
SFP-GD-XD	SFP 1000Base-XD, SM, 1550nm, 50km, with Digital Diagnostics.
CWDM Gigabit Ethernet/Fibre Channel	
SFP-GDCWZX-xx*	SFP 1000Base-ZX, SM CWDM (XX=Wavelength 1470-1610nm), 80km, CWDM with Digital Diagnostics.
FC 1Gbps/2.1Gbps	
SFP-21DRD-SX	SFP 1/2.1 Gbps Dual Rate SX, MM, 850nm, 0-550m, with Digital Diagnostics.
OC48	
SFP-OC48D-SR1	SFP OC48 IR1, SM,1310nm, 2km, with Digital Diagnostics.
SFP-OC48D-SR2,	SFP OC48 IR2, SM,1550nm, 50km with Digital Diagnostics.
Multi Rate SFP	
SFP-27MRD-SR	SFP 2500 Multi Rate SR, SM,1310nm, 2km with Digital Diagnostics.
SFP-27MRD-IR2	SFP 2500 Multi Rate SR, SM,1550nm, 50km with Digital Diagnostics. *Please inquire for longer distances.

* xx - Represents the wavelength (47-61 for CWDM; 21-59 for DWDMß