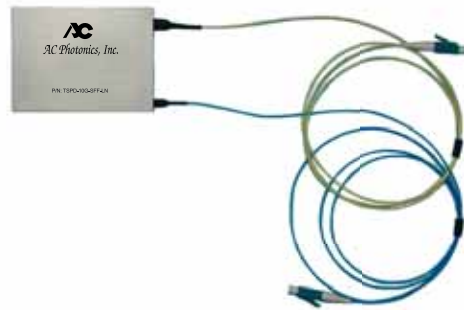




TSPD-10G-SFF-LN



Features

- Small Form Factor 2.2"x3"x0.53"
- Tunable CW with Full C-band Coverage
- Negative Chirp MZ Lithium Niobate Modulator
- Integrated 10 Gbps Tunable Transmitter and Receiver with 16 Channels 6x Mbps Mux and Demux
- Up to 1600ps/nm Tolerance.
- 50 GHz ITU Grid Wavelength Spacing
- High Sensitivity APD Receiver (-26 dBm Typical)
- Multi Bit Rate From 9.95Gbps to 11.3Gbps
- +5.5dBm Output Power
- Compliant with 300-pin Multi Source Agreement (MSA)
- Compliant with I²C 300-pin MSA interface Rev4.2
- Compliant with OIF SFI-4
- Conforms to Telcordia GR 468
- Internal SBS Support
- External TxTRACE Support
- Special Thermal Solution

General Description

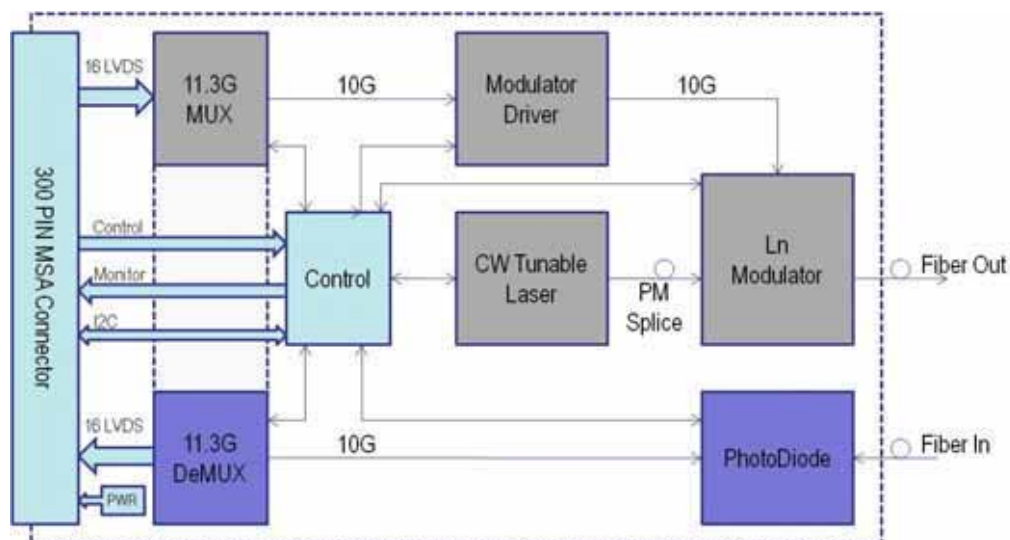


Figure 1: Transponder Block Diagram

The TSPD- 10G-SFF-LN is a Small Form Factor long reach widely tunable transponder designed for DWDM applications. The transponder contains both a 10 Gbps widely tunable transmitter and a wide band high sensitivity receiver. The 10G-SFF interface is compatible with the 300-pin MSA and I²C interface. The 10G-SFF uses a widely tunable laser to tune and cover the entire C-Band.

The 10G-SFF uses a Negative chirp Mach Zehnder Lithium Niobate modulator to enable high performance under OSNR load across the entire C-Band and over long distances.

Integrated SERDES are used to convert parallel electrical signals into serial signals and serial signals into parallel electrical signals respectively. The electrical interface of both transmit and receive is based on 16 differential LVDS data lines and 6xx Mbps. The module complies with OIF SFI-4 standard.

A sensitive APD receiver converts optical to electric al signal and feeds the clock and data recovery (CDR) circuit.

50GHz ITU grid wavelength spacing is available as well as multi bit rates as 9.95Gbps, 10.3Gbps, 10.5Gbps, 10.7Gbps, 11.1Gbps and 11.3Gbps. Tuning the transponder's laser is made possible through standard I²C commands.

The 10G-SFF allows the user to adjust the decision threshold of the receiver circuitry. The decision threshold can be set using I²C commands in the range of 0% to 100%.



Absolute Maximum Ratings

Parameter	Symbol	Min	Max	Units
Operating Case Temperature	T _c	-5	75	°C
Storage Case Temperature	T _s	-40	85	°C
-5.2V Supply Voltage	V _{EE}	-6	0.5	V
3.3V Supply Voltage	V _{DD}	-0.5	4	V
5.0V Supply Voltage	V _{CC}	-0.5	5.5	V
1.8V Supply Voltage	V _{DD2}			V
Voltage on LVDS pin		0	V _{cc}	V
Static Discharge Voltage	ESD		500	V
Relative Humidity	RH		85	%
Receiver Maximum Input Power	Pin		0	dBm

Operating Conditions

Parameter	Symbol	Min	Typ	Max	Units
Operating Temperature	T _{case}	-5		70	°C
Power Consumption	P _{max}			7	W
-5.2V Supply Voltage	V _{ee}	-4.94	-5.2	-5.45	V
VEE Current	I _{ee}		0.26		A
Transient VEE Current	I _{ee}			0.8	A
3.3V Supply Voltage	V _{dd}	3.13	3.3	3.47	V
VDD Current	I _{dd}		0.7		A
Transient VDD Current	I _{dd}			1	A
5.0V Supply Voltage	V _{cc}	4.75	5.0	5.25	V
VCC Current	I _{cc}		0.55		A
Transient VCC Current	I _{cc}			0.8	A
1.8V Supply Voltage	V _{dd2}		Not used		V
VDD2 Current	I _{dd2}		Not used		A





Optical Parameters

Tx and Rx optical parameters

Parameter	Symbol	Min	Typ	Max	Conditions	Units	
Output Power	P _o	+5	+5.5	+6	BOL	dBm	
	P _o	+4.5			EOL		
TxVOA	P _{ovar}	-3*			For nominal output power of +7dBm	dB	
TxVOA step			0.1			dB	
Modulator Extinction Ratio	ER	10*			With Bessel Filter	dB	
Shutter – output power during tuning	SHER		-45	-40		dBm	
Optical Signal to Noise Ratio	OSNR	50				dB@0.1nm	
Side Mode Suppression Ratio	SMSR	40	50			dB@0.1nm	
Tx	Tuning Range	T _λ	1528		1563		nm
	Channel spacing			50			GHz
	Wavelength Switching Time	t _s			125		ms
	Laser Wake-Up Timing	L _{SON}			100		ms
	Laser Shutdown Timing	L _{SOFF}			300*	-30dBm	ms
	Wavelength Accuracy	Δf _i	-1.25		+ 1.25		GHz
			-10		+10		pm
	Power Variation Between Channels	Δ P _t	-0.5		+0.5		dBm
	Jitter Generation					Compliant with GR-253 issue 3	
	Back to back Sensitivity						
		APD	Si	-26*	-24*	40°C Case; BER < 10 ⁻¹² , OSNR > 35dB, ER=10dB, PRBS=2 ³¹ -1; Fixed RxDTV	dBm
	Max Receiver Overload						
		APD	PinMax	-5*		BER < 10 ⁻¹² , OSNR > 35dB, ER=10dB, PRBS=2 ³¹ -1, Fixed RxDTV	dBm
	Rx Spectral Range	λ _{in}	1520		1608		nm
	Optical Return Loss	RL	27				dB
	Jitter Transfer & Tolerance					Compliant with GR-253 issue 3	
Dispersion Penalty	DP			2*	-400ps/nm to +1600ps/nm @ 35dB OSNR	dB	

All parameters are at 10.7Gbps data rate

