WWW.OPTIPATCH.COM.AR
INFO@OPTIPATCH.COM.AR

SFP 10GLR - 3J

10GBASE-LR SFP+ 1310NM 10KM DOM TRANSCEIVER

FEATURES

- Hot-pluggable SFP+ footprint
- Supports 9.95 to 10.5Gb/s bit rates
- Power dissipation < 1W RoHS-6
- compliant (lead-free)
- Industrial temperature range : -40 C to 85 C
- Single 3.3V power supply
- Maximum link length of 10km
- Uncooled 1310nm DFB laser
- Receiver limiting electrical interface
- Duplex LC connector Built-in digital
- diagnostic functions

APPLICATIONS

- 10GBASE-LR/LW 10G Ethernet
- 1200-SM-LL-L 10G Fibre Channel

DESCRIPTION

10Gb/s Enhanced Small Form Factor Pluggable SFP+ transceivers are designed for use in 10-Gigabit Ethernet links up to 10km over Single Mode fiber. They are compliant with SFF-8431, SFF-8432 and IEEE 802.3ae 10GBASE-LR/LW, and 10G Fibre Channel 1200-SM-LL-L Digital diagnostics functions are available via a 2-wire serial interface. The transceiver is a “limiting module”, i.e., it employs a limiting receiver. Host board designers using an EDC PHY IC should follow the IC manufacturer’s recommended settings for interoperating the host- board EDC PHY with a limiting receiver SFP+ module. The optical transceiver is compliant per the RoHS Directive 2011/65/EU.

PRODUCT SPECIFICATIONS

I. General Specifications

Data Rate Specifications	Symbol	Min	Typ.	Max	Units	Ref.
Bit Rate	BR	3.144		11.3168	Gb/s	1
Bit Error Ratio	BER			10^{-12}		2

Notes:

1.10GBASE-LR, 10GBASE-LW, 1200-SM-LL-L 10GFC.

2.Tested with a 231 – 1 PRBS.

II. Absolute Maximum Ratings

Parameter	Symbol	Min	Typ.	Max	Unit	Ref.
Maximum Supply Voltage	Vcc	-0.5		4.0	V	
Storage Temperature	Ts	-40		85	℃	
Case Operating Temperature	Top	-40		85	℃	
Relative Humidity	RH	0		85	%	1
Receiver Optical Damage Threshold	RxDamage	5			dBm	

Note: Non-condensing.

III. Electrical Characteristics (TOP = 0 to 70 ℃ , VCC = 3.14 to 3.46 V)

Parameter	Symbol	Min	Typ.	Max	Unit	Ref.
Supply Voltage	Vcc	3.14	3.30	3.46	V	
Supply Current	ICC		200	285	mA	
Transmitter						
Input differential impedance	R_{in}		100	120	Ω	1
Differential data input swing	Vin,pp	180		850	mVpp	
Transmit Disable Voltage	VD	2	50	Vcc	V	
Transmit Enable Voltage	V_{EN}	V_{ee}		0.8	V	

Receiver						
Differential data output swing	Vout,pp	300		850	mV	2,5
Output rise time and fall time	Tr, Tf	28			ps	3
LOS Fault	$V_{LOS\ fault}$	2		Vcc	V	4
LOS Normal	$V_{LOS\ norm}$	Vee		0.8	V	4
Power Supply Noise Tolerance	VccT/VccR		Per SFF-8431 Rev 3.0		mVpp	

Notes:

1.Connected directly to TX data input pins. AC coupling from pins into laser driver IC.

2.Into 100 differential termination.

3.20 – 80%. Measured with Module Compliance Test Board and OMA test pattern. Use of four 1's and four 0's sequence in the PRBS 9 is an acceptable alternative.

4.LOS is an open collector output. Should be pulled up with 4.7k – 10k on the host board. Normal operation is logic 0; loss of signal is logic 1.

5.The transceiver is a " limiting module", i.e., it employs a limiting receiver. Host board designers using an EDC PHY IC should follow the IC manufacturer' s recommended settings for interoperating the host-board EDC PHY with a limiting receiver SFP+ module.

IV. Optical Characteristics (TOP = -40 to 85 °C, VCC = 3.14 to 3.46 V))

Parameter	Symbol	Min	Typ.	Max	Unit	Note
Transmitter						
Optical Modulation Amplitude (OMA)	POMA	-5.2			dBm	
Average Launch Power	P_{AVE}	-8.2		+0.5	dBm	1
Optical Wavelength	λ	1260		1355	nm	
Side-Mode Suppression Ratio	SMSR	30			dB	
Optical Extinction Ratio	ER	3.5			dB	
Transmitter and Dispersion Penalty	TDP			3.2	dB	
Average Launch power when Tx is OFF	POFF			-30	dBm	
Tx Jitter	Txj		Per 802.3ae requirements			
Relative Intensity Noise	RIN			-128	dB/Hz	
Receiver						
Receiver Sensitivity (OMA) @ 10.3Gb/S	R_{SENS1}			-12.6	dBm	2
Receiver Sensitivity (OMA) @ 10.3Gb/s	R_{SENS2}			-10.3	dBm	3
Average Receiver Power	PAVE	-14.4		+0.5	dBm	
Optical Center Wavelength	λ_C	1260		1600	nm	
Receiver Reflectance	Rrx			-12	dB	

LOS De-AssertLOS De-Assert	LOSD			-17	dBm	
LOS Assert	LOSA	-30			dBm	
LOS Hysteresis		0.5			dB	

Notes:

1.Average power figures are informative only, per IEEE 802.3ae.

2.Valid between 1260 and 1355 nm. Measured with worst ER; BER<10-12; 231– 1 PRBS.

3.Valid between 1260 and 1355 nm. Per IEEE 802.3ae.

V. Digital Diagnostic Specifications

10GBASE-LR SFP+ transceivers can be used in host systems that require either internally or externally calibrated digital diagnostics.

Parameter	Symbol	Min	Typ.	Max	Units	Ref.
Accuracy						
Internally measured transceiver temperature	$\Delta DD_{Temperature}$			3	ºC	
Internally measured transceiver supply voltage	$\Delta DD_{Voltage}$			3	%	
Measured TX bias current	ΔDD_{Bias}			10	%	1
Measured TX output power	$\Delta DD_{Tx\text{-}Power}$			2	dB	
Measured RX received average optical power	$\Delta DD_{Rx\text{-}Powe}$			2	dB	

Notes:

1.Circuit ground is internally isolated from chassis ground.

2.TFAULT is an open collector/drain output, which should be pulled up with a 4.7k -10k Ohms resistor on the host board if intended for use. Pull up voltage should be between 2.0V to Vcc + 0.3V. A high output indicates a transmitter fault caused by either the TX bias current or the TX output power exceeding the preset alarm thresholds. A low output indicates normal operation. In the low state, the output is pulled to <0.8V.

3.Laser output disabled on TDIS >2.0V or open, enabled on TDIS <0.8V.

4.Internally pulled down per SFF-8431 Rev 2.0. See Sec. X for the logic table to use for the internal CDRs locking modes.

5.LOS is open collector output. Should be pulled up with 4.7kΩ -10kΩ on host board to a voltage between 2.0V and 3.6V. Logic 0 indicates normal operation; logic 1 indicates loss of signal.

VII. Mechanical Specifications