

Description

The SFG-X16 is small form factor pluggable module for bi-directional serial optical data communications such as Gigabit Ethernet 1000BASE-ZX and FC. It is with the SFP 20-pin connector to allow hot plug capability. Digital diagnostic functions are available via an I2C. This module is designed for single mode fiber and operates at a nominal wavelength of 1550 nm. A guaranteed minimum optical link budget of 37 dB is offered which can correspond to a link distance of over 160 km (assuming worst case fiber loss of 0.22 dB/km). The transmitter section uses a multiple quantum well 1550 nm DFB laser and is a class 1 laser compliant according to International Safety Standard IEC-60825. The receiver section uses an integrated InGaAs Avalanche photodetector preamplifier mounted in an optical header and a limiting post-amplifier IC.

Laser Safety

This single mode transceiver is a Class 1 laser product. It complies with IEC-60825 and FDA 21 CFR 1040.10 and 1040.11. The transceiver must be operated within the specified temperature and voltage limits. The optical ports of the module shall be terminated with an optical connector or with a dust plug.



Features

- Small Form Factor Pluggable MSA Compliant
- Compliant with IEEE 802.3z Gigabit Ethernet
- Compliant with Fibre Channel
- 37 dB Power Budget (up to 160 km)
- 1550 nm DFB LD Transmitter
- APD High Sensitivity Receiver
- EEPROM with serial ID functionality
- LC Duplex Connector
- Class 1 Laser Safety Standard IEC 825 Compliant
- Single + 3.3 V power Supply
- Temperature Ranges: 0 to +70°C
- RoHS Compliant

Applications

- Gigabit Ethernet, Fibre Channel, Metro Edge
- Bridges/Routers/intelligent hub and concentrators

Absolute Maximum Ratings					
Parameter	Symbol	Min	Typ	Max	Unit
Storage Temperature	T _s	-40	-	85	°C
Operating Temperature	T _{OP}	0	-	70	°C
Power Supply Voltage	V _{CC}	-0.5	-	3.6	V
Power Supply Current	I _{CC}	-	230	280	mA
General Specifications					
Parameter	Symbol	Min	Typ	Max	Units
Data Rate	B	-	1250	-	Mbps
Supported Link Length on 9/125µm SMF	L	-	160	-	Km

Order Information

Models	Bit Rate (Mbps)	GE/FC	Distance (km)	Wavelength (nm)	Fiber Single/Dual	Package	Temp. (°C)	TX Power (dBm)	RX Sens. (dBm)
SFG-X16	1250	Yes	160	1550 DFB	Dual	LC SFP	0 to 70	5 to 1	-36

Transmitter Specifications (0°C < Topr < 70°C, 3.13V < Vcc < 3.47V)						
Parameter	Symbol	Min	Typ	Max	Units	Notes
Optical						
Optical Transmit Power	P _o	1	---	5	dBm	1
Output Center Wavelength	λ	1520	1550	1580	nm	
Output Spectrum Width	Δλ	---	0.2	1	nm	-20 dB Width
Side Mode Suppression Ratio	SMSR	30			dB	
Extinction Ratio	E _R	9	---	---	dB	
Optical Rise Time	t _r			260	ps	20 % to 80% Values.
Optical Fall Time	t _f			260	ps	20 % to 80% Values.
Relative Intensity Noise	RIN			-120	dB/Hz	
Electrical						
Data Input Current – Low	I _{IL}	-350			μA	
Data Input Current – High	I _{IH}			350	μA	
Differential Input Voltage	V _{IH} - V _{IL}	0.5		2.4	V	Peak-to-Peak
TX Disable Input Voltage – Low	T _{DIS, L}	0		0.5	V	2
TX Disable Input Voltage – High	T _{DIS, H}	2.0		V _{cc}	V	2
TX Disable Assert Time	T _{ASSERT}			10	μs	
TX Disable Deassert Time	T _{DEASSERT}			1	ms	
TX Fault Output Voltage -- Low	T _{FaultL}	0		0.5	V	3
TX Fault Output Voltage -- High	T _{FaultH}	2.0		V _{cc} +0.3	V	3

1. Output power is power coupled into a 9/125 μm single mode fiber.
2. There is an internal 4.7K to 10K ohm pull-up resistor to VccTX.
3. Open collector compatible, 4.7K to 10K ohm pull-up to Vcc (Host Supply Voltage).

Receiver Specifications (0°C < Topr < 70°C, 3.13V < Vcc < 3.47V)						
Parameter	Symbol	Min	Typ	Max	Units	Notes
Optical						
Sensitivity	Sens			-36	dBm	4
Maximum Input Power	Pin	-10			dBm	4
Signal Detect -- Asserted	Pa	---		-36	dBm	Transition: low to high
Signal Detect -- Deasserted	Pd	-50	---	---	dBm	Transition: high to low
Signal detect -- Hysteresis		1.0	---		dB	
Wavelength of Operation		1100	---	1600	nm	
Electrical						
Differential Output Voltage	V _{OH} - V _{OL}	0.6		2.0	V	
Output LOS Voltage -- Low	V _{OL}	0		0.5	V	5
Output LOS Voltage -- High	V _{OH}	2.0		V _{cc} +0.3	V	5

4. Measured at 2⁷-1 PRBS at BER 1E-12.

