

SFP-16G-ER

16GBase-ER SFP+ Transceiver

Hot Pluggable, +3.3V, LC Duplex, 1550nm, SMF, up to 40km, Commercial Temperature

FEATURES

- Up to 16Gbps data links
- Distance up to 40km
- EML laser 1550nm
- Duplex LC Connector
- Hot-pluggable SFP+ footprint
- Single 3.3V power supply
- Digital Diagnostic Monitor (DDM)
- Power Consumption: 1.5W
- Commercial Operating Temperature Range: 0 to 70°C
- RoHS compliant

APPLICATIONS

- 16G FC 10km - 40km

DESCRIPTION

ATGBICS SFP-16G-ER is a 16Gbps enhanced small form factor pluggable SFP+ transceiver compatible with 16G FC.

ABSOLUTE MAXIMUM RATINGS

Parameter	Symbol	Min.	Typical	Max.	Unit
Supply Voltage	V _{CC}	-0.5		4	V
Storage Temperature	T _s	-40		85	°C
Operating Case Temperature	T _c	0		70	°C

RECOMMENDED OPERATING ENVIRONMENT

Parameter	Symbol	Min.	Typical	Max.	Unit
Operating Case Temperature	T _c	0		70	°C
Power Supply Voltage	V _{cc}	3.15	3.3	3.45	V
Power Supply Current	I _{cc}			450	mA
Data Rate				16	Gbps
Max Link Length on 9/125µm SMF	L _{max}			40	km

ELECTRICAL CHARACTERISTICS

Parameter	Symbol	Min.	Typical	Max.	Unit	Notes
TRANSMITTER						
Input Differential Impedance	Z _{in}	90	100	110	Ω	
Data Input Swing Differential	V _{in}	250		1200	mV	
Tx-Dis Disable	V _d	2.0		V _{cc}	V	
Tx-Dis Enable	V _{en}	0		0.8	V	
RECEIVER						
Data Output Swing Differential	V _{out}	250		800	mV	
Rx-Los Fault	V _{lf}	2.0		V _{cc} HOST	V	
Rx-Los Normal	V _{ln}	0		0+0.8	V	
Output rise and fall time	Tr, Tf	30			ps	

OPTICAL PARAMETERS

Parameter	Symbol	Min.	Typical	Max.	Unit	Notes
TRANSMITTER						
Centre Wavelength	λ _c	1510	1550	1570	nm	
Centre Wavelength Spacing			20		nm	
Spectral Width (-20dB)	σ			1	nm	
Average Output Power	P _{out}	0		5	dBm	
Extinction Ratio	ER	6			dB	
Average Launch Power of Off Transmitter	P _{off}			-30	dBm	
Relative Intensity Noise	RIN			-130	dB/Hz	
RECEIVER						
Centre Wavelength	λ _c	1260		1620	nm	
Receiver Overload/Overload	PIN			-14	dBm	
	P _{max}	0			dBm	
LOS De-Assert	LOSD			-21	dBm	
LOS Assert	LOSA	-24			dBm	
LOS Hysteresis		0.5		4.5	dB	

PIN ASSIGNMENT

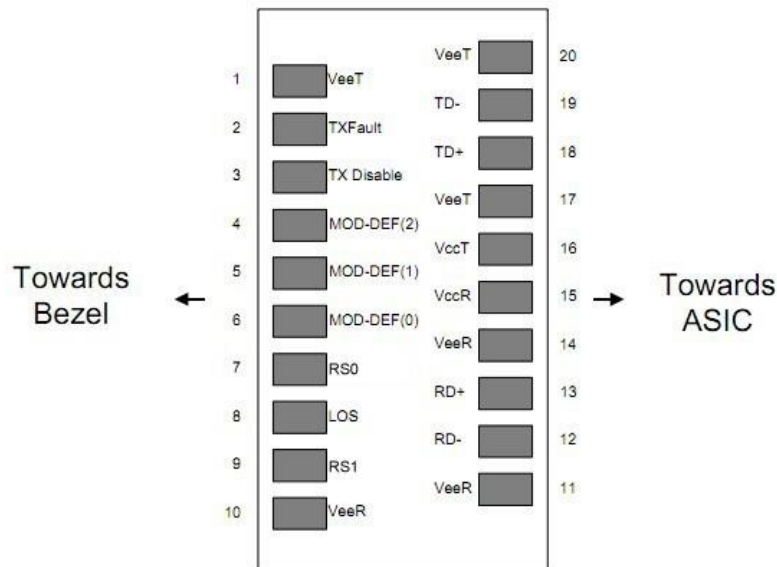


Diagram of Host Board Connector Block Pin Numbers and Names

PIN FUNCTION DEFINITIONS

PIN	Symbol	Function	Notes
1	VEET	Transmitter Ground (Common with Receiver Ground)	1
2	TFAULT	Transmitter Fault.	
3	TDIS	Transmitter Disable. Laser output disabled on high or open.	2
4	MOD_DEF(2)	Module Definition 2. Data line for Serial ID.	3
5	MOD_DEF(1)	Module Definition 1. Clock line for Serial ID.	3
6	MOD_DEF(0)	Module Definition 0. Grounded within the module.	3
7	RS0	Rate Select0, optionally controls SFP+ module receiver. When high input signaling rate>4.25 GBd and when low input signaling rate<4.25 GBd	
8	LOS	Loss of Signal indication. Logic 0 indicates normal operation.	4
9	RS1	Rate Select1, optionally controls SFP+ module receiver. When high input signaling rate>4.25 GBd and when low input signaling rate<4.25 GBd	
10	VEER	Receiver Ground (Common with Transmitter Ground)	1
11	VEER	Receiver Ground (Common with Transmitter Ground)	1
12	RD-	Receiver Inverted DATA out. AC Coupled.	
13	RD+	Receiver Non-inverted DATA out. AC Coupled.	
14	VEER	Receiver Ground (Common with Transmitter Ground)	1
15	VCCR	Receiver Power Supply	
16	VCCT	Transmitter Power Supply	
17	VEET	Transmitter Ground (Common with Receiver Ground)	1
18	TD+	Transmitter Non-Inverted DATA in. AC Coupled.	
19	TD-	Transmitter Inverted DATA in. AC Coupled.	
20	VEET	Transmitter Ground (Common with Receiver Ground)	1

Notes:

1. Circuit ground is internally isolated from chassis ground.
2. Laser output disabled on TDIS >2.0V or open, enabled on TDIS <0.8V.
3. Should be pulled up with 4.7k - 10k Ohms on host board to a voltage between 2.0V and 3.6V. MOD_DEF(0) pulls line low to indicate module is plugged in.
4. LOS is open collector output. Should be pulled up with 4.7k -10k Ohms on host board to a voltage between 2.0V and 3.6V. Logic 0 indicates normal operation; logic 1 indicates loss of signal.

EEPROM

2 wire address 1010000X (A0h)

0~95 Serial ID Defined by SFP MSA (96 bytes)
96~127 Vendor Specific (32 bytes)
128~255 Reserved (128 bytes)

DDM THRESHOLD

	Low Alarm	Low Warn	High Warn	High Alarm	Unit
Temperature	-5	0	70	75	°C
Voltage	3	3.1	3.6	3.7	V
Tx Bias	15	20	90	100	mA
Tx Power	-8.7	-4.7	4	7	dBm
Rx Power	-19.8	-15.8	-1	1.9	dBm

REGULATORY COMPLIANCE

ATGBICS transceivers are Class 1 Laser Products comply with FDA regulations. They meet Class 1 eye safety requirements of EN 60825 and the electrical safety requirements of EN 60950.

MECHANICAL DIMENSIONS (UNIT: mm)

