

ESP85X6-01D

14.025Gbps SFP+ Transceiver, Multi Mode, 100m Reach

PRODUCT FEATURES

- Supports up to 14.025Gbps bit rate
- Hot-pluggable SFP+ footprint
- 850nm VCSEL laser and PIN photodiode, Up to 100m for OM3-MMF transmission
- Compliant with SFP+ MSA and SFF-8472 with duplex LC receptacle
- Compatible with RoHS
- Single +3.3V power supply
- Real Time Digital Diagnostic Monitoring
- Operating case temperature:
 - Standard: 0 to +70°C

APPLICATIONS

- 4.25/8.5/14.025G Fiber Channel

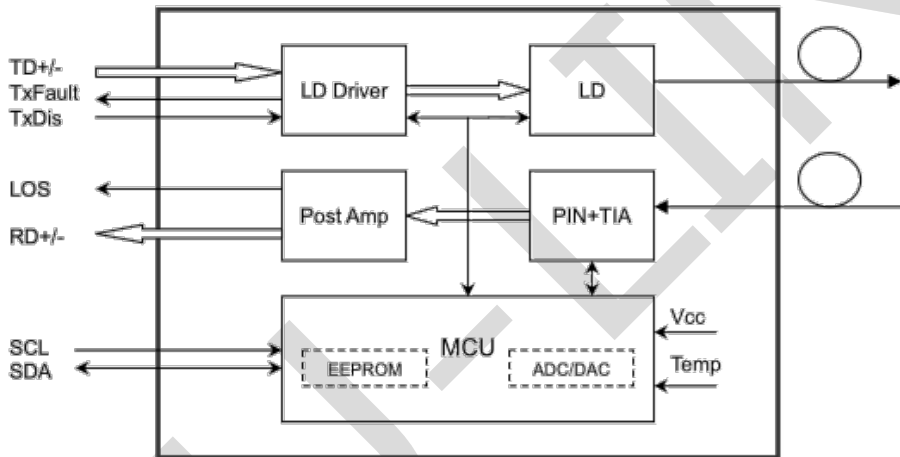
DESCRIPTIONS

The SFP+ transceivers are high performance, cost effective modules supporting data rate of 14.025 Gbps.

Fiber type	Data rate (Gbps)	Operating range (meters)
OM2	4.25	0.5~150
	8.5	0.5~50
	14.025	0.5~35
OM3	4.25	0.5~380
	8.5	0.5~150
	14.025	0.5~100

The transceiver consists of three sections: a VCSEL laser transmitter, a PIN photodiode integrated with a trans-impedance preamplifier (TIA) and MCU control unit. All modules satisfy class I laser safety requirements.

Module Block Diagram



Ordering Information

Part No.	Data Rate(optical)	Laser	Fiber Type	Distance	Optical Interface	Temp	DDMI	Latch Color
ESP85X6-01D	14.025Gbps	VCSEL	MMF	100m	LC	0~70°C	Yes	Black

Absolute Maximum Ratings

Parameter	Symbol	Min	Max	Unit
Supply Voltage	Vcc	-0.5	4.5	V
Storage Temperature	Ts	-40	+85	°C
Operating Humidity	-	5	85	%

Recommended Operating Conditions

Parameter	Symbol	Min	Typical	Max	Unit
Operating Case Temperature	T _c	0		+70	°C
Power Supply Voltage	V _{cc}	3.135	3.30	3.465	V
Power Supply Current	I _{cc}			300	mA
Data Rate			14.025		Gbps

Electrical Characteristics

Parameter	Symbol	Min	Typical	Max	Unit	Notes
Transmitter						
Centre Wavelength	λ_c	840	850	860	nm	
Data Input Swing Differential	V _{IN}	180		950	mV	2
Input Differential Impedance	Z _{IN}	90	100	110	Ω	
TX Disable	Disable	2.0		V _{cc}	V	
	Enable	0		0.8	V	
TX Fault	Fault	2.0		V _{cc}	V	
	Normal	0		0.8	V	
Receiver						
Receiver Overload		0			dBm	3
LOS De-Assert	LOS _D			-12	dBm	
Data Output Swing Differential	V _{out}	500	700	900	mV	4
LOS	High	2.0		V _{cc}	V	
	Low			0.8	V	

Optical and Characteristics

Parameter	Symbol	Min.	Typical	Max.	Unit	Notes
Transmitter						
Optical Modulation Amplitude(OMA)	POMA	-4.8			dBm	
Average Output Power	POUT	-7.8		0	dBm	1
Average Output Power(Laser Off)	POFF			-30	dBm	
Wavelength	λ	840		860	nm	
Spectral Width (RMS)	$\Delta\lambda$			0.59	nm	
Extinction ratio	ER	3.5			dB	
Transmitter waveform and dispersion				4.7	dB	

penalty (TWDP)						
RIN20OMA	RIN			-128	dB/Hz	
Optical return loss tolerance	ORLT	20			dB	
Receiver						
Wavelength	λ	840		860	nm	
Received Sensitivity (OMA)	P_{IN}			-10.5	dBm	BER<1x10 ⁻¹²
Optical Power Overload	P_{IN} (SAT)	0			dBm	
Receiver Reflectance	RFL			-12	dB	
Rx_LOS of Signal Assert	P_A	-30			dBm	
Rx_LOS of Signal De-assert	P_D			-12	dBm	
Rx_LOS of Signal Hysteresis	PHy	0.5		5	dB	

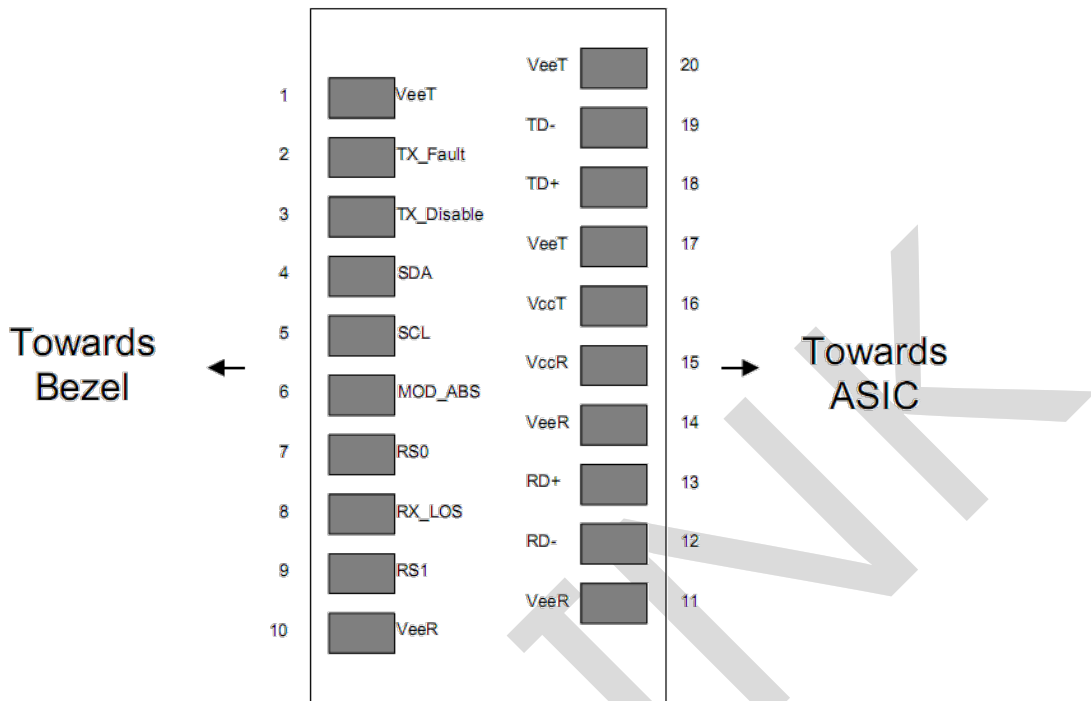
Notes:

1. The optical power is launched into MMF.
2. PECL input, internally AC-coupled and terminated.
3. Measured with a PRBS 2³¹-1 test pattern @14.025Mbps, BER ≤1×10⁻¹².
4. Internally AC-coupled.

Digital Diagnostics

Parameter	Range	Unit	Accuracy	Calibration
Temperature	0 to +70	°C	±3°C	Internal
Voltage	3.0 to 3.6	V	±3%	Internal
Bias Current	0 to 15	mA	±10%	Internal
TX Power	-7.8 to 0	dBm	±3dB	Internal
RX Power	-16 to 1	dBm	±3dB	Internal

Pin Diagram



Pin Definitions

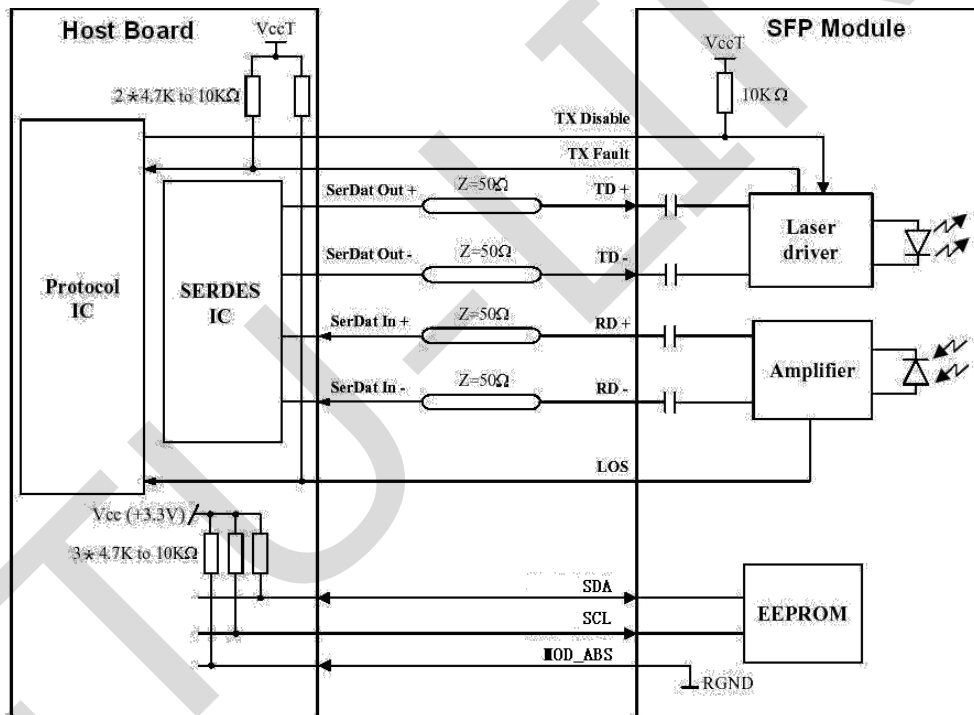
Pin	Signal Name	Description	Plug Seq.	Notes
1	V _{EET}	Transmitter Ground	1	
2	TX_FAULT	Transmitter Fault Indication	3	Note1
3	TXDISABLE	Transmitter Disable	3	Note2
4	SDA	SDA Serial Data Signal	3	
5	SCL	SCL Serial Clock Signal	3	
6	MOD_ABS	Module Absent. Grounded within the module	3	
7	RS0	Not Connected	3	
8	LOS	Loss of Signal	3	Note 3
9	RS1	Not Connected	3	
10	V _{EER}	Receiver ground	1	
11	V _{EER}	Receiver ground	1	
12	RD-	Inv. Received Data Out	3	Note 4
13	RD+	Received Data Out	3	Note 4
14	V _{EER}	Receiver ground	1	
15	V _{CCR}	Receiver Power Supply	2	
16	V _{CCT}	Transmitter Power Supply	2	
17	V _{EET}	Transmitter Ground	1	
18	TD+	Transmit Data In	3	Note 5
19	TD-	Inv. Transmit Data In	3	Note 5
20	V _{EET}	Transmitter Ground	1	

Notes:

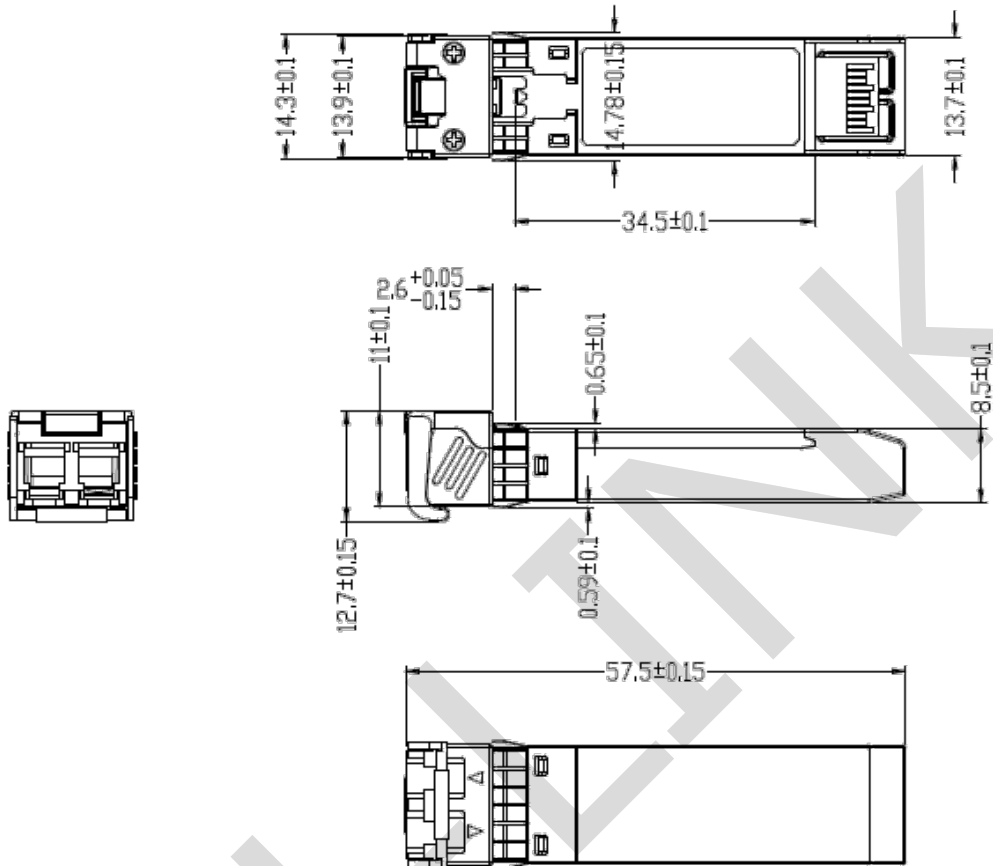
Plug Seq.: Pin engagement sequence during hot plugging.

- 1) TX Fault is an open collector output, which should be pulled up with a 4.7k~10kΩ resistor on the host board to a voltage between 2.0V and Vcc+0.3V. Logic 0 indicates normal operation; Logic 1 indicates a laser fault of some kind. In the low state, the output will be pulled to less than 0.8V.
- 2) Laser output disabled on TDIS >2.0V or open, enabled on TDIS <0.8V.
- 3) LOS is open collector output, should be pulled up with a 4.7k~10kΩ on host board to a voltage between 2.0V and 3.6V. Logic 0 indicates normal operation; logic 1 indicates loss of signal.
- 4) RD-/+ : These are the differential receiver outputs. They are internally AC-coupled, differential lines which should be terminated with 100Ω (differential) at the user SERDES.
- 5) TD-/+ : These are the differential transmitter inputs. They are internally AC-coupled, differential lines with 100Ω differential termination inside the module.

Recommended Interface Circuit



Mechanical Diagram



Revision History

Version No.	Date	Description
1.0	Sep 8, 2018	Preliminary datasheet
2.0	Aug 21, 2024	Format change

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