SFP-3011 4.25 Gbps Fibre Channel Multimode Transceiver

SFP, Duplex LC Connector, 850nm VCSEL for Multimode Fiber, RoHS Compliant

Digital Diagnostics Functions

Features

- 850nm VCSEL
- Multi Data Rate: from 1.062 to 4.25Gbps, NRZ
- Single +3.3V Power Supply
- RoHS Compliant and Lead-free
- AC/AC Differential Electrical Interface
- Compliant with Multi-Source Agreement (MSA) Small Form Factor Pluggable (SFP)
- Compliant with SFF-8472 Digital Diagnostic Monitoring Interface
- Duplex LC Connector
- Compliance with ANSI specifications for Fibre Channel applications
- Eye Safety
  Designed to meet Laser Class 1 comply with EN60825-1

Applications

- Fibre Channel Links

Description

The SFP-3011 from LevelOne is a high performance and cost-effective module for serial optical data communication applications specified for multimode of multi-rate from 1.062 to 4.25 Gb/s. It operates with +3.3V power supply. The module is intended for multimode fiber, operates at a nominal wavelength of 850nm and complies with Multi-Source Agreement (MSA) Small Form Factor Pluggable (SFP). Each module is integrated digital diagnostics functions via an I^2C serial interface.

The module is a duplex LC connector transceiver designed to provide Fibre Channel compliant link at 1.062 , 2.125 and 4.25 Gb/s short reach applications. The characteristics are performed in accordance with ANSI Fibre Channel Physical Interface (FC-PI-2) Rev 7.0

EMC

Most equipment utilizing high-speed transceivers will be required to meet the following requirements:

1) FCC in the United States
2) CENELEC EN55022 (CISPR 22) in Europe

To assist the customer in managing the overall equipment EMC performance, the transceivers have been designed to satisfy FCC class B limits and provide good immunity to radio-frequency electromagnetic fields.

Eye Safety

The transceivers have been designed to meet Class 1 eye safety and comply with EN 60825-1.

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Product Information

Model Number	Operating Voltage & SD Output	Wavelength	Output Power	Sensitivity	Distance
SFP-3011	*3.3V TTL*	*850 nm*	*-8 ~ -1.1 dBm*	*≦-16 dBm*	*150 m for 50/125μm* *70 m for 62.5/125μm*

ABSOLUTE MAX RATINGS

PARAMETER	SYMBOL	MIN	MAX	UNIT	NOTE
Storage Temperature	T_S	-40	85	℃	
Supply Voltage	V_{CC}	-0.5	4.0	V	
Data Input Voltage	---	0	Vcc	V	
Supply Current	I_S		240	mA	

OPERATING CONDITIONS

PARAMETER	SYMBOL	MIN.	TYP.	MAX.	UNIT	NOTE
Case Operating Temperature	T_A	0		70	℃	
Supply Voltage	V_{CC}	3.0	3.3	3.6	V	
Data Input Voltage Swing	V_{ID}	250		2200	mV	

ELECTRICAL CHARACTERISTICS

PARAMETER	SYMBOL	MIN	MAX	UNIT	NOTE
Input					
MOD_DEF (1), MOD_DEF (2), Tx_ Disable, Rate Select - Low	V_{IL}	0	0.8	V	
MOD_DEF (1), MOD_DEF (2), Tx_ Disable, Rate Select - High	V_{IH}	2.0	Vcc	V	
Output					
TX_Fault, LOS , MOD_DEF (2) - Low	V_{OL}	0	0.8	V	
TX_Fault, LOS , MOD_DEF (2) -High	V_{OH}	2.0	Vcc	V	

TRANSMITTER ELECTRO-OPTICAL CHARACTERISTICS

PARAMETER	SYMBOL	MIN	TYP.	MAX	UNIT	NOTE
Optical Output Power	Po	-8		-1.1	dBm	1
Optical Modulation Amplitude	OMA	247			μW	2
Center Wavelength	λ_c	830	850	860	nm	
Spectral Width (RMS)	Δλ			0.85	nm	
RIN	RIN			-118	dB/Hz	
Coupled Power Ratio	CPR	9			dB	2
Optical Rise time (20%-80%)	t_r			90	psec	3
Optical Fall time (20%-80%)	t_f			90	psec	3
Jitter Generation (peak to peak)	TJ			0.44	UI	
Deterministic Jitter	DJ			0.26	UI	

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RECEIVER ELECTRO-OPTICAL CHARACTERISTICS

PARAMETER		SYMBOL	MIN	TYP.	MAX	UNIT	NOTE
Maximum Input Optical Power		P_{max}	0			dBm	4
Minimum Input Optical Power	4.25Gb/s	P_{min}			-16	dBm	4
	2.125Gb/s				-18		
	1.063Gb/s				-18		
Operating Wavelength		λ	770		860	nm	
Optical Return Loss		ORL	12			dB	
Loss of Signal – Asserted		P_A	-29			dBm	5
Loss of Signal – Deasserted		P_D			-17	dBm	6
Loss of Signal –Hysterisis		P_A -P_D	1		5	dB	

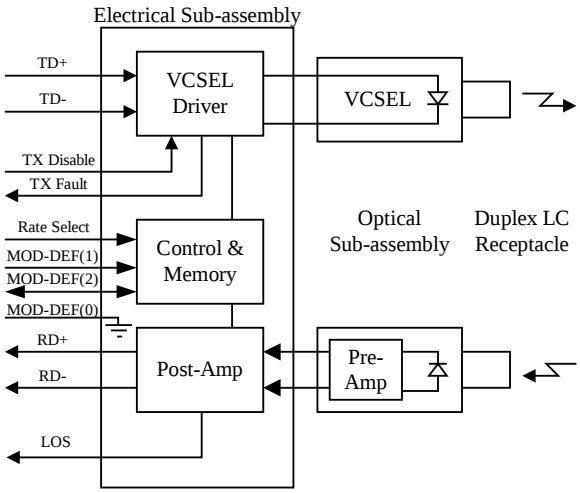
Notes:

1. Measured average power coupled into 50/125μm or 62.5/125 multi-mode fiber.
2. Equivalent extinction ratio specification for Fibre Channel. Allows smaller ER at higher average power.
3. These are 20-80% values.
4. Measured with 2^7-1 PRBS at BER<10^{-12}
5. Measured on transition – low to high.
6. Measured on transition – high to low.

TIMING CHARACTERISTICS

PARAMETER	SYMBOL	MIN	TYP.	MAX	UNIT	NOTE
TX_DISABLE Assert Time	t_off			10	μs	
TX_DISABLE Negate Time	t_on			1	ms	
Time to initialize, include reset of TX_FAULT	t_init			300	ms	
TX_FAULT from fault to assertion	t_fault			100	μs	
TX_DISABLE time to start reset	t_reset	10			μs	
Receiver Loss of Signal Assert Time (off to on)	t_{A,RX_LOS}			100	μs	
Receiver Loss of Signal Assert Time (on to off)	t_{D,RX_LOS}			100	μs	

BLOCK DIAGRAM OF TRANSCEIVER



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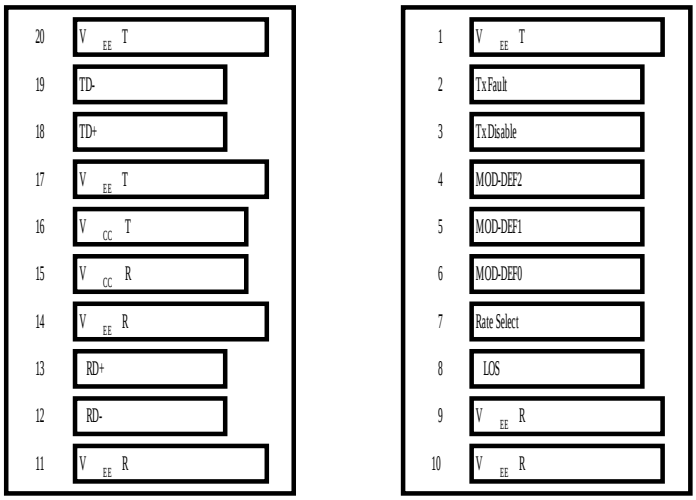
PIN OUT DIAGRAM OF TRANSCEIVER



Top of Board

Buttom of Board (As Viewed through Top of Board

PIN OUT TABLE

Pin	Symbol	Functional Description
1	VeeT	Transmitter Ground
2	TX Fault	Transmitter Fault Indication
3	TX Disable	Transmitter Disable – Module disables on high or open
4	MOD-DEF(2)	Module Definition 2 – Two wire serial ID interface
5	MOD-DEF(1)	Module Definition 1 – Two wire serial ID interface
6	MOD-DEF(0)	Module Definition 0 – Grounded in module
7	Rate Select	Not Connected
8	LOS	Loss of Signal
9	VeeR	Receiver Ground
10	VeeR	Receiver Ground
11	VeeR	Receiver Ground
12	RD-	Inverse Received Data Out
13	RD+	Received Data Out
14	VeeR	Receiver Ground
15	VccR	Receiver Power
16	VccT	Transmitter Power
17	VeeT	Transmitter Ground
18	TD+	Transmitter Data In
19	TD-	Inverse Transmitter Data In
20	VeeT	Transmitter Ground

Claim:

Digital Data Communications reserves the right to make changes in the specification described hereinafter without prior notice.