

10GBase SR/SW SFP+ Multi Rate Optical Transceivers WST-SFP+SRDR-x



Applications:

- 10GBASE-SR/SW 10Gigabit Ethernet
- 2,4 and 8G Fiber Channel Storage

Features:

- 2-wire interface with integrated Digital Diagnostic monitoring
- 850nm VSCEL and PIN receiver
- Industry-standard, protocol-independent XFI interface
- Transmission distance up to 300M
- LC-Duplex Optical Receptacle
- Hot Pluggable
- Compliant to SFP+ MSA Operating case
- Compliant to IEEE 802.3ae 10GBASE-SR Application
- Temperature range: 0°C~70°C, -40~85°C
- Support Multi-Rate(1.25G~10.3125G) Transmission
- RoHS
- Power dissipation < 1W

Absolute Maximum Ratings

Parameter	Symbol	Unit	Min	Max
Storage Temperature Range	T _s	°C	-40	+85
Operating Case Temperature	T _C	°C	0	+70
	T _C	°C	-40	+85

Recommended Operating Conditions

Parameter	Symbol	Unit	Min	Typ	Max
Case Operating Temperature Range	T _c	°C	0		+70
	T _c	°C	-40		+85
Data rate		Gbps		10.3125	
Power Supply Voltage	V _{CC}	V	3.14	3.3	3.47
Power Supply Current	I _{CC}	mA			300

Specifications (tested under recommended operating conditions, unless otherwise noted)

Parameter	Symbol	Min	Typ	Max	Unit	NOTE
Transmitter						
Output Opt. Power	P _{OUT}	-6		-1	dBm	1
Optical Wavelength	λ	840	850	860	nm	
Spectral Width (-20dB)	σ			1	nm	
Optical Extinction Ratio	ER	3.0			dB	
Output Eye Mask	Compliant with IEEE 802.3ae					
Receiver						
Rx Sensitivity	R _{SENS}			-10	dBm	2
Input Saturation Power (Overload)	Psat	0.5			dBm	
Wavelength Range	λ_C	770	850	860	nm	
LOS De -Assert	LOS _D			-14	dBm	
LOS Assert	LOS _A	-30			dBm	
LOS Hysteresis		0.5	1.0		dB	

Note1. Class 1 Laser Safety per FDA/CDRH and IEC-825-1 regulations.

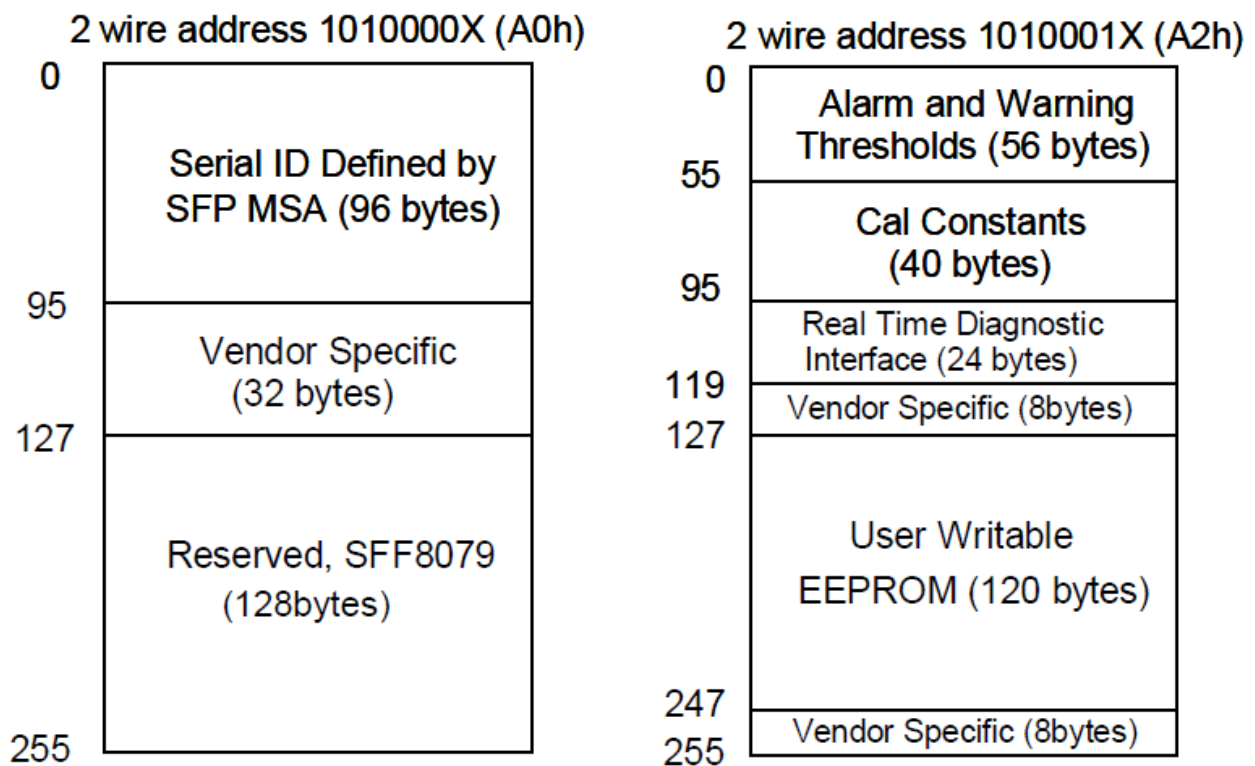
Note2. Measured with a PRBS 2³¹-1 test pattern, @10.3125Gb/s, BER<10⁻¹².

Parameter	Symbol	Min	Typ	Max	Unit	NOTE
Supply Voltage	V _{cc}	3.14	3.3	3.46	V	
Supply Current	I _{cc}			300	mA	
Transmitter						
Input differential impedance	R _{in}		100		Ω	1
Single ended data input swing	V _{in,pp}	100		700	mV	
Transmit Disable Voltage	VD	V _{cc} -1.3		V _{cc}	V	
Transmit Enable Voltage	VEN	V _{ee}		V _{ee} + 0.8	V	2
Transmit Disable Assert Time				10	us	
Receiver						
Differential data output swing	V _{out,pp}	300		850	mV	3
Data output rise time	t _r	28			ps	4
Data output fall time	t _f	28			ps	4
LOS Fault	V _{LOS fault}	V _{cc} -1.3		V _{cc} HOST	V	5
LOS Normal	V _{LOS norm}	V _{ee}		V _{ee} +0.8	V	5
Power Supply Rejection	PSR	100			mVpp	6

Notes:

1. Connected directly to TX data input pins. AC coupled thereafter.
2. Or open circuit.
3. Into 100 ohms differential termination.
4. 20 – 80 %.
5. Loss Of Signal is LVTTTL. Logic 0 indicates normal operation; logic 1 indicates no signal detected.
6. Receiver sensitivity is compliant with power supply sinusoidal modulation of 20 Hz to 1.5 MHz up to specified value applied through the recommended power supply filtering network.

Digital Diagnostic Memory Map



EEPROM Serial ID Memory Contents

Accessing Serial ID Memory uses the 2 wire address 1010000X (A0H). Memory Contents of Serial ID are shown in Table as below.

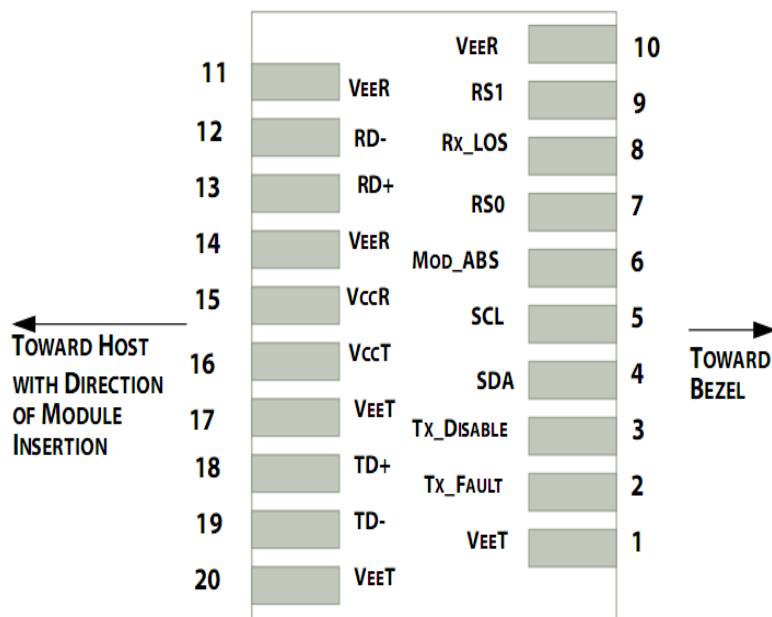
Serial ID Memory Contents

Data Address	Size (Bytes)	Name of Field	Contents(Hex)	Description
BASE ID FIELDS				
0	1	Identifier	03	SFP
1	1	Ext. Identifier	04	GBIC/SFP function is

				defined by two-wire interface ID only
2	1	Connector	07	LC Connector
3-10	8	Transceiver	10 00 00 00 40 40 0C 5C	10GBASE-SR, 2,4,8G FC
11	1	Encoding	06	64B/66B
12	1	BR-Normal	67	10.3Gbps
13	1	Rate Identifier	00	unspecified
14	1	Length (9um)-km	00	not support SMF
15	1	Length (9um)	00	not support SMF
16	1	Length(50um)	08	82 for OM2
17	1	Length(62.5um)	02	26 for OM1
18	1	Length (Copper)	1E	not support copper
19	1	Length(OM3)	00	300M for OM3
20-35	16	Vendor name	57 41 56 45 53 50 4C 49 54 54 45 52 20 20 20 20	WAVESPLITTER
36	1	Channel Spacing	00	
37-39	3	Vendor OUI	00 00 00	
40-55	16	Vendor PN	57 53 54 2D 53 46 50 2B 53 52 44 52 2D 43 20 20	WST-SFP+SRDR-x
56-59	4	Vendor rev	xx xx xx xx	
60-61	2	Wavelength	03 52	850nm
62	1	DWDM Wavelength	00	
63	1	CC Base	xx	Check add. 0 to 62
64-65	2	Options	00 1A	TxDisable, TxFault, LOS implemented
66	1	BR,max	00	
67	1	BR,min	00	
68-83	16	Vendor SN	xxxxxxxxxxxxxxxxxx xxxxxxxxxxxxxxxxxx	
84-91	8	Data code	xxxxxxxxxxxxxxxxxx	
92	1	Diagnostic Monitoring Type	68	Internal cal., Average power
93	1	Enhanced Options	F0	Alarm/Warning flags, Soft TxDisable, Soft TxFault, Soft RxLOS

				implemented
94	1	SFF-8472 Compliance	03	Rev. 10.0
95	1	CC_EXT	xx	Check add. 64 to 94
96-127	32	Vendor Specific		Vendor Specific EEPROM
128-255	128	Reserved	00	

Pin Definition



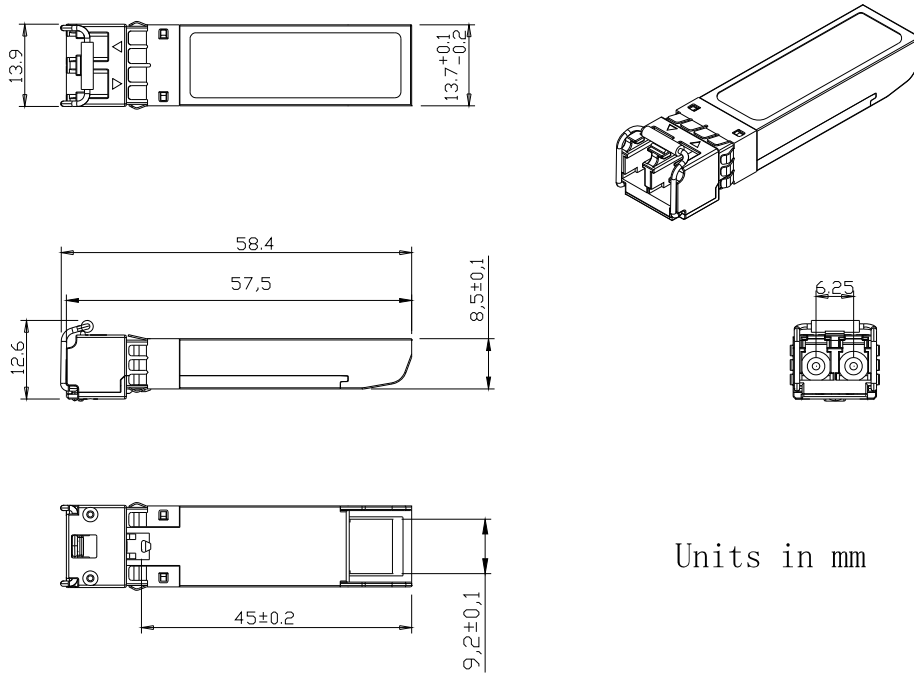
Pin	Symbol	Name/Description	NOTE
1	V _{EET}	Transmitter Ground (Common with Receiver Ground)	1
2	T _{FAULT}	Transmitter Fault.	2
3	T _{DIS}	Transmitter Disable. Laser output disabled on high or open.	3
4	SDA	2-wire Serial Interface Data Line	4
5	SCL	2-wire Serial Interface Clock Line	4
6	MOD_ABS	Module Absent. Grounded within the module	4
7	RS0	Rate Select 0	5
8	LOS	Loss of Signal indication. Logic 0 indicates normal operation.	6
9	RS1	No connection required	1
10	V _{EER}	Receiver Ground (Common with Transmitter Ground)	1
11	V _{EER}	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	V _{EER}	Receiver Ground (Common with Transmitter Ground)	1
15	V _{CCR}	Receiver Power Supply	
16	V _{CCT}	Transmitter Power Supply	
17	V _{EET}	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	V _{EET}	Transmitter Ground (Common with Receiver Ground)	1

Notes:

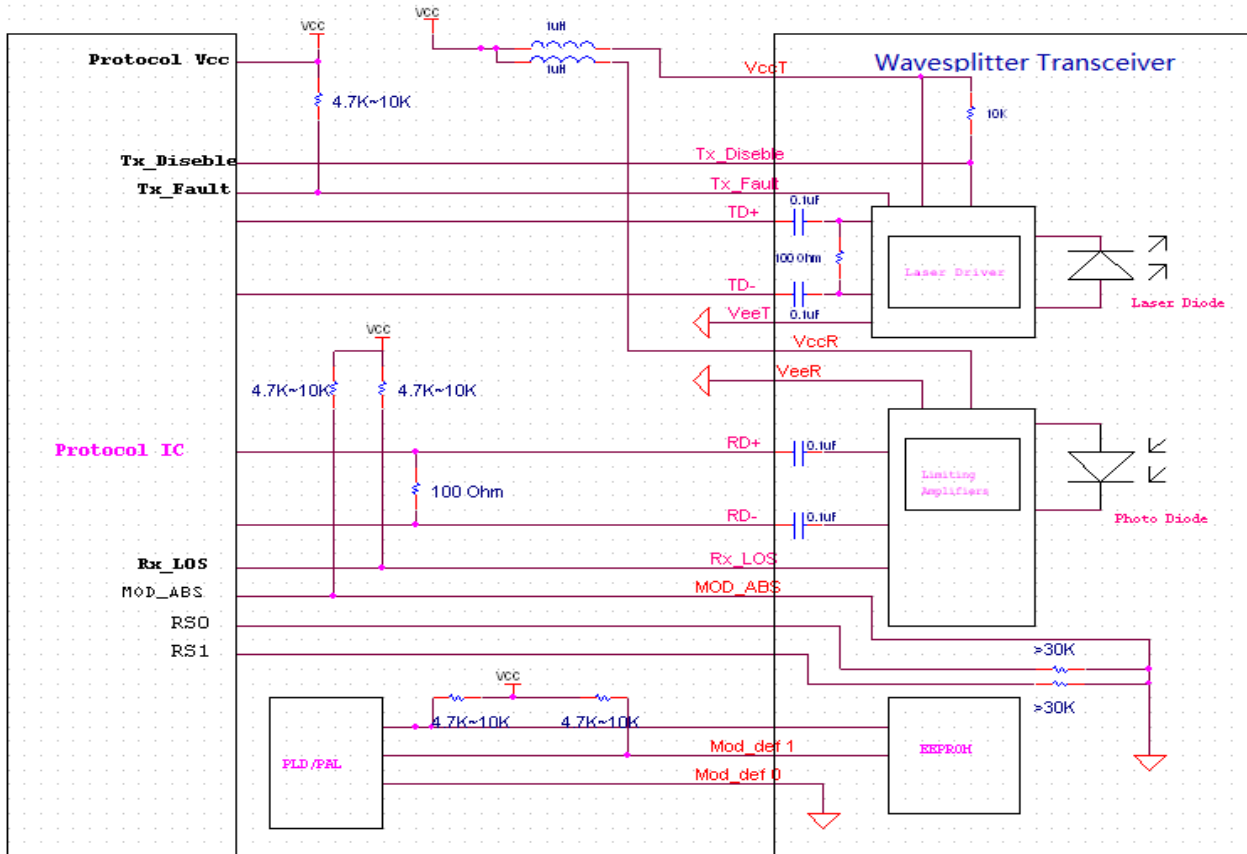
1. Circuit ground is internally isolated from chassis ground.
2. T_{FAULT} is an open collector/drain output, which should be pulled up with a 4.7k – 10k Ohms resistor on the host board if intended for use. Pull up voltage should be between 2.0V to Vcc + 0.3V. A high output indicates a transmitter fault caused by either the TX bias current or the TX output power exceeding the preset alarm threshold. A low output indicates normal operation. In the low state, the output is pulled to <0.8V.
3. Laser output disabled on T_{DIS} >2.0V or open, enabled on T_{DIS} <0.8V.
4. Should be pulled up with 4.7kΩ- 10kΩ host board to a voltage between 2.0V and 3.6V. MOD_ABS pulls line low to indicate module is plugged in.
5. Internally pulled down per SFF-8431 Rev 4.1.
6. LOS is open collector output. It 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.

Package Outline



Units in mm

Host - Transceiver Interface Block Diagram



Regulatory Compliance

Feature	Reference	Performance
Electrostatic discharge (ESD)	IEC/EN 61000-4-2	Compatible with standards
Electromagnetic Interference (EMI)	FCC Part 15 Class B EN 55022 Class B (CISPR 22A)	Compatible with standards
Laser Eye Safety	FDA 21CFR 1040.10, 1040.11 IEC/EN 60825-1, 2	Class 1 laser product
ROHS	2002/95/EC	Compatible with standards
EMC	EN61000-3	Compatible with standards

Ordering Information

Part No	Specification									
	Package	Data rate	Laser	Optical Power	Detector	Sensitivity	Temp	Reach	Other	Application code
WST-SFP+SRDR-C	SFP+	9.95~10.3 Gbps	850nm VSCSEL	-6~ -1dBm	PIN	-10dBm	0~70°C	300M	DDM RoHS	10GBASE-SR/SW Fiber Channel
WST-SFP+SRDR-I	SFP+	9.95~10.3 Gbps	850nm VSCSEL	-6~ -1dBm	PIN	-10dBm	-40~85°C	300KM	DDM RoHS	10GBASE-SR/SW Fiber Channel

Modification History

Revision	Date	Description	Originator	Review	Approved
V1	1-Sep-2011	New Issue	Min Liu	Wayne Liao	Wayne Liao
V2	4-Mar-2015	Add industrial Model	Min Liu	Wayne Liao	Wayne Liao



Taipei Headquarters
16F-5, No. 75, Sec. 1,
Xintai 5th Rd., Xizhi Dist.,
New Taipei City 22101,
Taiwan
Tel: +886-2-2698-7208
Fax: +886-2-2698-7210

U.S. Branch
2080 Rancho Higuera Ct.
Fremont, CA 94539,
USA
Tel: 510-651-7800
Fax: 510-651-7822

ShenZhen Branch
5F, 7th Building,
Tian'an Industrial Zone.,
NanShan Area, ShenZhen
China
Tel: +86-755-86265980 ;
Fax: +86-755-26642741

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