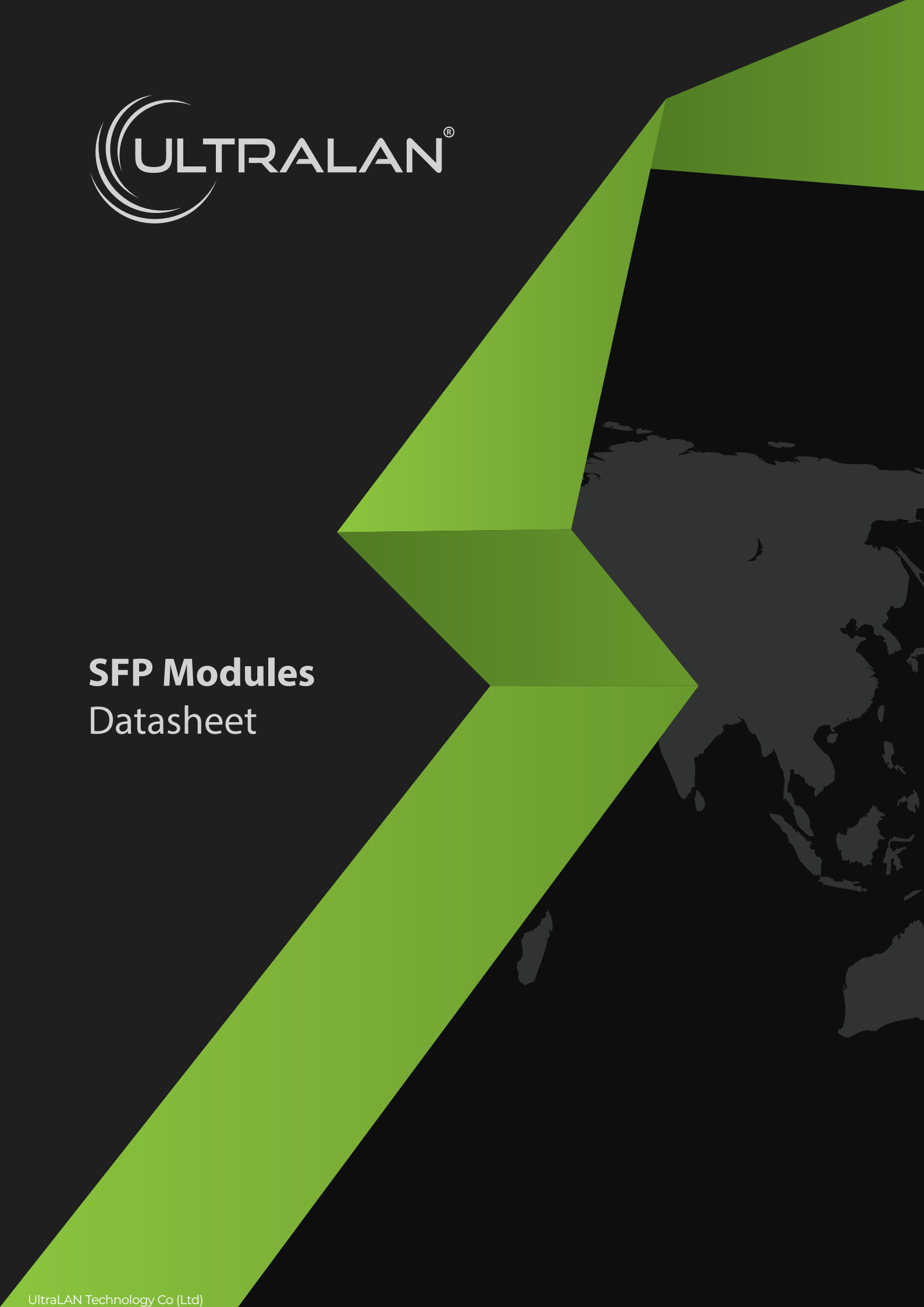
ULTRALAN®

SFP Modules
Datasheet



RoHS Compliant **1000M&10/100/1000M** Copper SFP Transceiver

ULST12R-CDS1

All UltraLAN SFP products carry a **3 year warranty** against defects.

Product Description

The Copper Small Form Pluggable (SFP) transceivers is high performance, cost effective module compliant with the Gigabit Ethernet and 1000BASE-T standards as specified in IEEE 802. 3-2002 and IEEE 802.3ab, which supporting 1000Mbps data- rate up to 100 meters reach over unshielded twisted-pair CAT 5 cable. The module supports1000 Mbps (or 10/100/1000Mbps) full duplex data-links with 5-level Pulse Amplitude Modulation (PAM) signals. All four pairs in the cable are used with symbol rate at 250Mbps on each pair. The module provides standard serial ID information compliant with SFP MSA, which can be accessed with address of A0h via the 2wire serial CMOS EEPROM protocol. The physical IC can also be accessed via 2wire serial bus at address ACh.

Product Features

- Up to 1.25Gb/s bi-directional data links
- Compact RJ-45 connector
- Hot pluggable SFP footprint
- 1Gigabit Ethernet over Cat 5 cable
- Applicable for 100m distance transmission
- Low power consumption, < 1.2W
- Access to physical layer IC via 2-wire serial bus
- 1000 BASE-T operation in host systems with SERDES interface
- 10/100/1000Mbps compliant in host systems with SGMII interface
- Operating case temperature:

Commerical:	0 to 70 °C
Industrial:	-40 to 85 °C

Applications:

- Gigabit Ethernet 1000BASE-T
- Switch to Switch interface
- Switched backplane applications
- Router/Server interface
- Other optical transmission systems

Absolute Maximum Ratings

Parameter	Symbol	Min.	Max.	Unit	Note
Supply Voltage	Vcc	-0.5	4.0	V	
Storage Temperature	Ts	-40	85	℃	
Relative Humidity	RH	0	85	%	

Note: Stress in excess of the maximum absolute ratings can cause permanent damage to the transceiver.

General Operating Characteristics

Parameter	Symbol	Min.	Typ	Max.	Unit	Note
Data Rate		9.953	10.3125	1000	Mb/s	
Supply Voltage	Vcc	3.13	3.3	3.47	V	
Supply Current	I_{CCS}			375	mA	
Opperating Case Temp.	Tc	0		70	℃	

Low-Speed Signals Electrical Interface (TOP(C) = 0 to 70â„ƒ, VCC = 3.13 to 3.47 V)

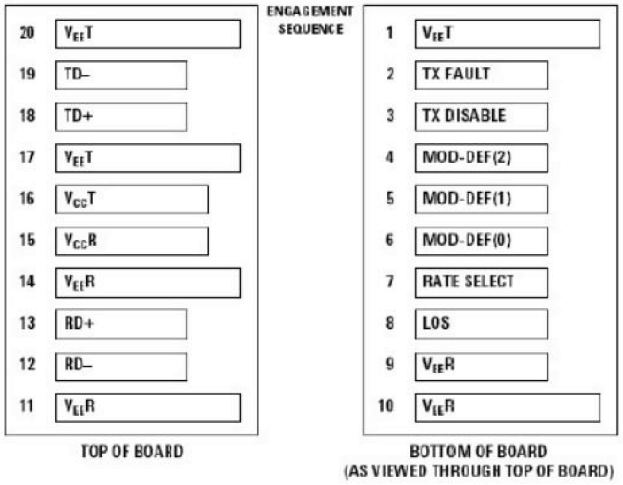
Parameter	Symbol	Min.	Max.	Unit	Note
SFPOutput_Low	V_{OL}	0	0.5	V	1
SFPOutput_High	V_{OH}	Vcc-0.5	Vcc+0.3	V	1
SFPInput_Low	V_{IL}	0	0.8	V	1
SFPInput_High	V_{IH}	2.0	Vcc+0.3	V	1

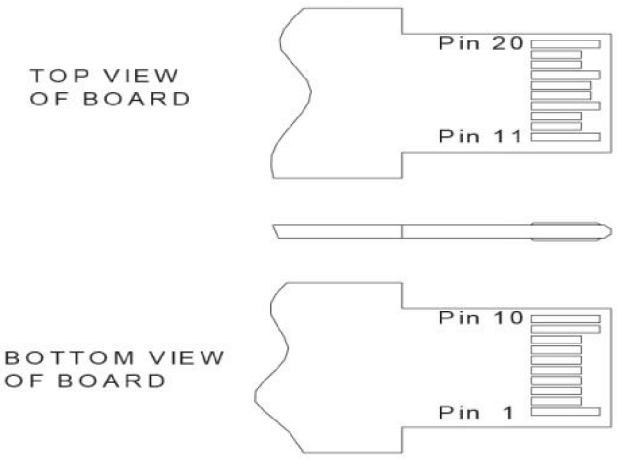
Notes:
1. 4.7k to 10k pull-up to host_Vcc, measured at host side of connector
2. MOD_DEF(1) (SCL) and MOD_DEF(2) (SDA), are open drain CMOS signals. Both MOD_DEF(1) and MOD_DEF(2) must be pulled up to host_Vcc.

High-Speed Electrical Interface (TOP(C) = -0 to 70 , VCC = 3.13 to 3.47 V

Parameter	Symbol	Min.	Typ	Max.	Unit	Note
LineFrequecy	FL		125		MHz	2
TxOutputImpedance	Zout,tx		100		Ω	3
RxInputImpedance	Zin.rx		100		Ω	3
Singleendeddatainputswing	Vin	250		1200	mV	
Singleendeddataoutputswing	Vout	350		800	mV	
Rise/FallTime	Tr/Tf		175		ps	4
TxInputImpedance	Zin,tx		50		Ω	
RxOutputImpedance	Zout,rx		50		Ω	

Note:
1. All high-speed signals are AC-coupled internally.
2. 5-level encoding, per IEEE 802.3
3. Differential, for all Frequencies between 1MHz and 125MHz Differential.
4. 20%-80%

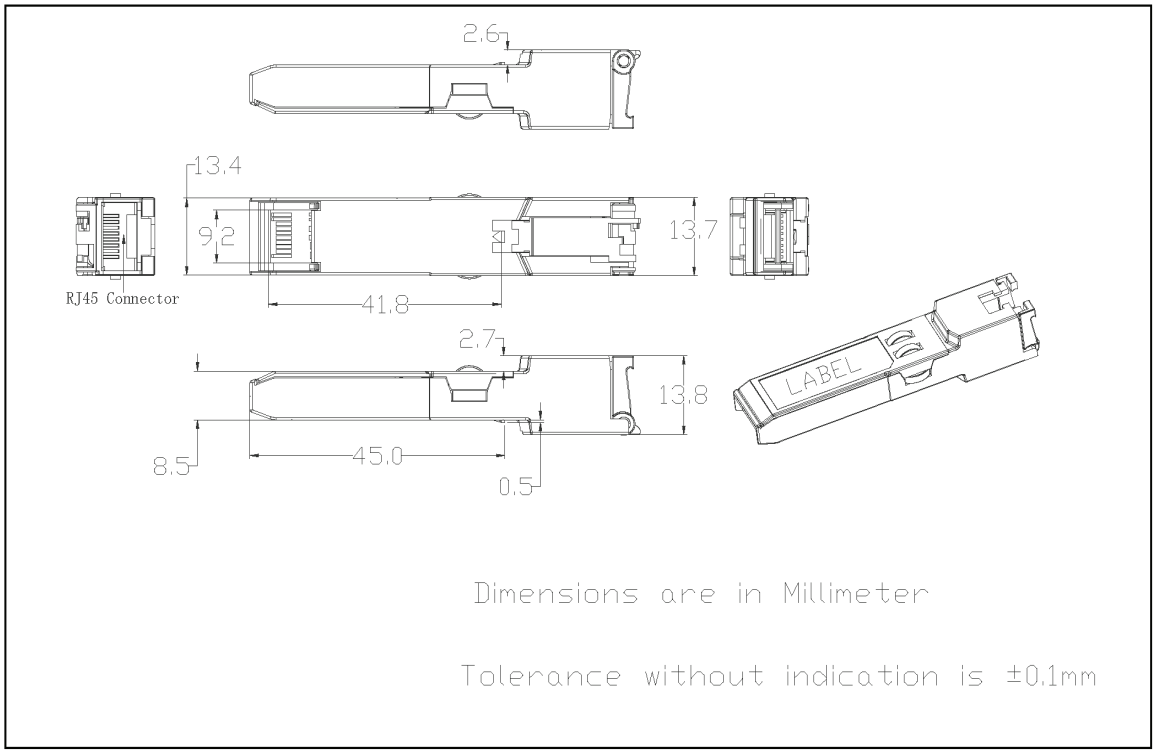




Pin	Symbol		Notes
1	VeeT	Tx ground	1
2	TxFault	Transmitter Fault. Not supported	
3	TxDisable	Transmitter Disable. PHY disabled on high or open	2
4	MOD-DEF2	Module Definition 2. Data line for serial ID	3
5	MOD-DEF1	Module Definition 1. Clock line for serial ID	3
6	MOD-DEF0	Module Definition 0. Grounded within the module	3
7	Rateselect	No connection	
8	LOS	Loss of Signal indication.	4
9	VeeR	Rx ground	1
10	VeeR	Rx ground	1
11	VeeR	Rx ground	1
12	RD-	Receiver Inverted DATA out.AC coupled	
13	RD+	Receiver Non-inverted DATA out. AC coupled	
14	VeeR	Rx ground	1
15	VccR	Rx power supply	
16	VccT	Tx power supply	1
17	VeeT	Tx ground	
18	TD+	Transmitter Non-Inverted DATA in. AC coupled	
19	TD-	Transmitter Inverted DATA in. AC coupled	
20	VeeT	Tx ground	1

Notes :

1. Circuit ground is connected to chassis ground
2. PHY 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 2.0 V and 3.6 V.MOD_DEF(0) pulls line low to indicate module is plugged in.
4. LVTTL compatible with a maximum voltage of 2.5V. Not supported on GE-GB-P.


2.6
13.4
9.2
13.7
RJ45 Connector
41.8
2.7
13.8
LABEL
8.5
45.0
0.5
Dimensions are in Millimeter
Tolerance without indication is ±0.1mm

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