

**Ha-VIS FE SFP Transceiver MM L2**  
 Fast Ethernet  
 for Duplex LC connector Multimode Cable, 2 km

## Features

- 1310 nm LED
- Data Rate: 155 Mbit/s, NRZ
- Single +3.3 V Power Supply
- RoHS Compliant and Lead-free
- AC/AC Differential Electrical Interface
- Compliant with Multi-Source Agreement (MSA) Small Form Factor Pluggable (SFP)
- Duplex LC Connector
- Compliance with 100Base-FX of IEEE 802.3u Standard
- Compliance with FDDI PMD Standard
- Compliance with ATM Standard

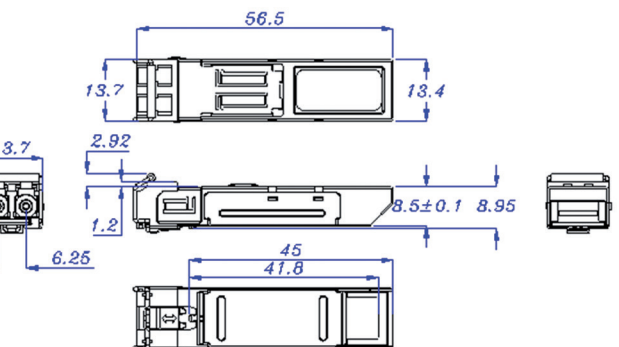
## General description

The Ha-VIS FE SFP Transceiver MM L2 is the high performance and cost-effective module for serial optical data communication applications specified for multimode of 155 Mbit/s. It operates with +3.3 V power supply. The module is intended for multimode fiber, operates at a nominal wavelength of 1310 nm and complies with Multi-Source Agreement (MSA) Small Form Factor Pluggable (SFP). Each module consists of a transmitter optical subassembly, a receiver optical subassembly and an electrical subassembly. All of them are housed in a plastic package and the combination produces a reliable component.

The module is a duplex LC connector transceiver designed to provide an ATM/SONET OC-3/SDH STM-1 compliant link for 155 Mbit/s short reach applications. The characteristics are performed in accordance with Telcordia Specification GR-468-CORE.

Identification	Part-Number	Drawing	Dimensions in mm
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Ha-VIS FE SFP Transceiver MM L2	20 76 000 0300		
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## Technical characteristics

### Applications

- Fast Ethernet
- FDDI
- ATM/SONET OC-3/SDH STM-1
- Multimode fibre links
- Optical-Electrical Interface Conversion

### Ethernet Interface - Fibre Optic

Cable types acc. to IEEE 802.3  
125 µm Multimode fibre, 1310 nm; 50 / 125 µm or 62.5 /

Data rate 155 Mbit/s

Maximum cable length 2 km

Sensitivity ≤ -32 dBm

Wave length 1310 nm

### Transmitter

Output power -19 ... -14 dBm

Output power (typ.) -17 dBm

Extinction Ratio (min) 8.2 dB

Center wave length 1270 ... 1360 nm

Spectral width (FWHM) (max) 200 nm

Optical rise time (10 % ... 90 %) (max) 3.0 ns p-p

Optical fall time (10 % ... 90 %) (max) 3.0 ns p-p

Output eye compliant with ITU recommendation G.957

### Receiver

Maximum input optical power (min) -14 dBm

Receiver sensitivity -34 ... -32 dBm

Operating wave length 1100 ... 1600 nm

Loss of Signal - asserted ( $P_A$ ) (min) -45 dBm

Loss of Signal - deasserted (max) -31 dBm

Loss of Signal - hysteresis (min) 0.5 dB

### Timing characteristics

TX\_DISABLE Assert Time (max) 10 µs

TX\_DISABLE Negate Time (max) 1 ms

Time to initialize, include reset of TX\_FAULT (max) 300 ms

TX\_FAULT from fault to assertion (max) 100 µs

TX\_DISABLE time to start reset (min) 10 µs

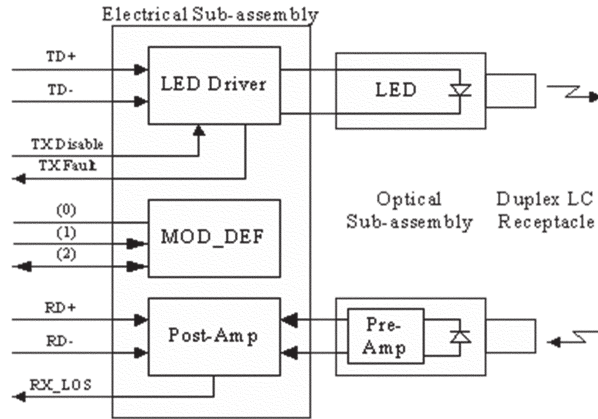
Receiver Loss of Signal Assert Time (max)

off to on 100 µs

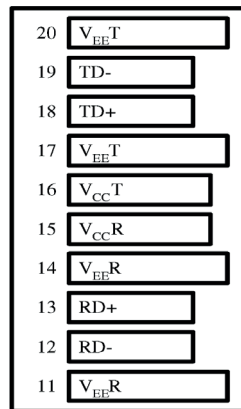
on to off 100 µs

## Technical characteristics

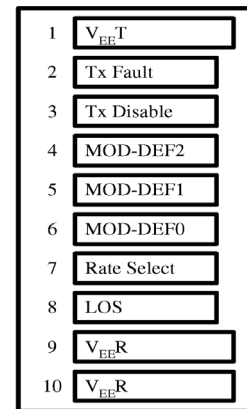
### Block diagram of transceiver



### Pin assignment diagram of transceiver



Top of board



Bottom of board  
(as viewed through top of board)

Pin	Symbol	Functional description
1	VeeT	Transmitter ground
2	TX Fault	Transmitter Fault Indication (not connected)
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

Pin	Symbol	Functional description
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

## Technical characteristics

### Power Supply

Power supply (Vcc)	0...6 V DC
Operating voltage and SD output	3.3 V TTLAC/AC
Permissible range	3.1 V to 3.5 V
Data input voltage swing	400 ... 1600 mV

### Transmitter

Transmitter supply current (max)	140 mA
Tx Transmitter Disable Input voltage - low	0 ... 0.8 V
Tx Transmitter Disable Input voltage - high	2.0 V ... Vcc
Tx Transmitter Fault Output voltage - low	0 ... 0.8 V
Tx Transmitter Fault Output voltage - high	2.0 V ... Vcc

### Receiver

Receiver supply current (max)	100 mA
Receiver Data Output differential voltage	0.4 ... 1.3 V
Rx LOS Output voltage - low	0 ... 0.8 V
Rx LOS Output voltage - high	2.0 V ... Vcc
MOD_DEF (1), MOD_DEF (2) - low	-0.6 V ... Vcc x 0.3
MOD_DEF (1), MOD_DEF (2) - high	Vcc x 0.7 ... Vcc + 0.5

### Design features

Housing type	metal housing
Dimensions (W x H x D)	13.7 mm x 8.95 mm x 56.5 mm

### Environmental conditions

Operating temperature	-40 °C to +85 °C
Storage temperature	-40 °C to +85 °C

### EMC

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

- 1) FCC in the United States
- 2) CENELEC EN 55 022 (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 60 825-1.