

Fiber Optic SFF 2x5 850 nm VCSEL 1.25G Lightwave Transceiver with VF-45™

Data Sheet

OVF2300



Features

- Single +3.3V power supply
- IEEE 802.3z Gigabit Ethernet 1000BASE-SX compliant
- Fiber Channel (100-M5-SN-I, 100-M6-SN-I) compliant
- Industry standard Small Form Factor (SFF) package
- Multisource 2x5 footprint
- RJ-45 style VF-45™ (SG) connector
- 850 nm Vertical cavity surface emitting laser (VCSEL)
- PECL differential inputs and outputs
- Internally terminated and AC coupled data IO
- Signal detect (SD) TTL compatible
- ESD Class 2 per MIL-STD 883D Method 3015.7
- FCC (Class B) and EN 55022 compliant
- 550 m link distance with 50/125 μm multimode fiber

Applications

- Telecommunications and Data Communications system networks
- Fiber-to-the-desktop
- Switches/bridges/routers/server
- Local Area Networks (LAN)
- Storage Area Networks (SAN)
- High speed computer links
- Switching system

Description

The Optocom Small Form Factor (SFF) 2x5 OVF2300 transceiver provides signal conversion and processing for high performance integrated duplex data links. It operates over multimode fiber by converting lightwave information into an electrical signal and vice versa for distances of up to 550 m. The SFF transceiver module is a single unit comprised of a transmitter, receiver, and VF-45™ receptacle.

This transceiver module is based on the Physical-Medium-Dependent (PMD) sublayer and baseband medium, type 1000BASE-SX (short wavelength). The appropriate fiber optic cable is 62.5 μm or 50 μm multimode fiber with VF-45™ (Volition™) connector.

The module is designed for low cost LAN, SAN, WAN, and Gigabit Ethernet applications. It can be used as the network and device interface in mainframes, workstations, servers, storage devices, and in a broad range of network devices such as bridges, routers, hubs, and local and wide area switches.

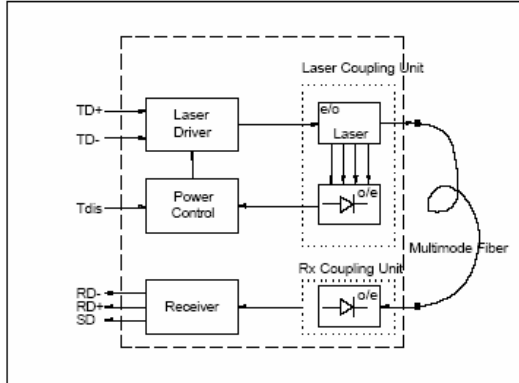
*VF-45™ is a trademark of 3M.

*Volition™ is a trademark of 3M.

Description - continued

The OVF2300 transceiver operates at 1.25 Gb/s from a signal power supply (+3.3V). The differential data inputs and outputs are internally terminated and AC coupled.

Function Diagram



Operating Range for 1000BASE-SX

Fiber Type	Minimum Range (meters)
62.5 micron MMF	2 to 260
50 micron MMF	2 to 550
10 micron SMF	Not Supported

Performance Specifications

Absolute Maximum Ratings

Stresses in excess of the absolute maximum ratings can cause damage to the optical device. Operations of the optical device are suggested to remain within the recommended operating conditions. Exposure to the absolute maximum ratings for extended periods can adversely affect device reliability.

Parameter	Symbol	Minimum	Maximum	Unit
Supply Voltage	$V_{CC}-V_{EE}$	-0.5	4.5	V
Data Input Levels(PECL)	V_{IN}		$V_{EE}-V_{CC}$	V

Safety

Laser Compliance Statement

The OVF2300 is classified as a Class I Laser Product. It complies with IEC 60825-1 and FDA 21 CFR 1040.10 and 1040.11. The transceiver must be operated under recommended operating conditions. Because the transceiver is designed to be inherently eye safe, it does not require open fiber control thus eliminating complex electronics or mechanics.

Caution - use of device other than those specified herein may result in hazardous laser radiation exposure or other damage. Please embrace all customary precautions and discretion while handling this device.

Usage Restrictions

The optical ports of the modules shall be terminated with an optical connector or with a dust plug.

Usage Restrictions

Failure to adhere to the specified temperature and voltage limits could result in a modification that is considered an act of “manufacturing,” and will require under law recertification of the modified product with the U.S. Food and Drug Administration (ref. 21 CFR 1040.10 (i)).

Laser Data

Wavelength	850 nm
Total output power (as defined by IEC: 50 mm aperture at 10 cm distance)	<400 μ W
Total output power (as defined by FDA: 7 mm aperture at 20 cm distance)	<70 μ W
Beam divergence	12°

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Differential Data Input Voltage			3	V
Operating Ambient Temperature	T_{AMB}	0	70	°C
Storage Ambient Temperature	T_{STG}	-40	+85	°C
Humidity/Temperature Test Condition	RH	5	85/85	%/°C
Soldering Conditions, Temp/Time MIL STD 883C, Method 2003	T_{SOLD}/t_{SOLD}		270/10	°C/sec
ESD Resistance (all pins to V_{EE} , human body)			1.5	kV
Output Current	I_o		50	mA

Recommended Operating Conditions

Parameter	Symbol	Minimum	Typical	Maximum	Unit
Ambient Temperature	T_A	0		70	°C
Power Supply Voltage	$V_{CC}-V_{EE}$	3.1	3.3	3.5	V
Transmitter					
Data Input Differential Voltage ¹	V_{DIFF}	0.4		1.6	V
TTL Transmit Disable Input Voltage - HIGH, LOW	V_{DSH} V_{DSL}	$V_{CC}-1.3$ 0		V_{CC} 0.8	V
Input Data Rise/ Fall, Time 10%-90%		100		370	Ps
Receiver					
Input Center Wavelength		770		860	nm

Notes:

1. Data inputs are AC coupled with 100 differential termination built into the transceiver.

Transmitter Electro-Optical Interface ($T_A=25^\circ\text{C}$)

Parameter	Symbol	Minimum	Typical	Maximum	Unit
Launched Power (Average) ¹	P_o	-9.5		-4	dBm
Center Wavelength	λ_c	830	850	860	nm
Spectral Width (RMS)	$\Delta\lambda$			0.85	nm
Relative Intensity Noise	RIN			-117	dB/Hz
Extinction Ratio ² (Dynamic)	E_r	9			dB
Rise Time ³ , 20%-80%	T_R			260	ps
Fall Time ³ , 20%-80%	T_F			260	ps
Total Contributed Jitter	TJ			225	ps
Supply Current	I_T		60		mA

Notes:

1. Measured at the end of 5 meters of 50/125 graded index fiber using calibrated power meter and a precision test ferrule.
2. Extinction Ratio is defined as $P_o(H)/P_o(L) \times 100\%$.
3. Rise/Fall time measurement is based on unfiltered waveform. The input data pattern is a 125 MHz square pattern.

Receiver Electro-Optical Specifications ($T_A=25^\circ\text{C}$)

Parameter	Symbol	Minimum	Typical	Maximum	Unit
Sensitivity (Average Power) ¹	P_{IN}		-19	-17	dBm
Saturation (Average Power)	P_{SAT}	0			dBm
Signal Detect Assert Level ²	P_{SA}			-17	dBm
Signal Detect Deassert Level ³	P_{SD}	-30			dBm
Signal Detect Hysteresis	$P_{SA} - P_{SD}$		3		dB
Signal Detect Assert Time	t_{AS}			100	μs

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Signal Detect Deassert Time	t_{DA}		350	μs
Data Output Differential Voltage	V_{OUT}	0.4	1.3	V
Output Data Rise/Fall Time, 20%-80%	t_r, t_f		375	Ps
Return Loss of Receiver	RL	12		dB
Supply Current ⁴	I_R		80	mA

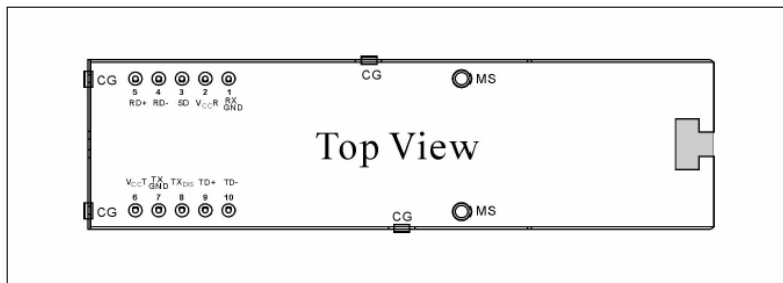
Notes:

1. Average optical power at which the BER is 1×10^{-12} . Measured in the center of the eye opening with a 2⁷-1 NRZ PRBS and ER=9 dB.
2. An increase in optical power above the specified level will cause the SIGNAL DETECT output to switch from a Low state to a High state.
3. A decrease in optical power below the specified level will cause the SIGNAL DETECT to change from a High state to a Low state.
4. Supply current excluding Rx output load.

Regulatory Compliance

Feature	Standard	Comments
Electrostatic Discharge (ESD) to the Electrical Pins	MIL-STD 883D Method 3015.7	Class 1 (>1000V)
Immunity: Electrostatic Discharge (ESD) to the Duplex SG Receptacle	EN 61000-4-2 IEC 1000-4-2	Discharges of $\pm 1.5kV$ with an air discharge probe on the receptacle cause no damage.
Immunity: Radio Frequency Electromagnetic Field	EN 61000-4-3 IEC 1000-4-3	With a field strength of 10 V/m rms, noise frequency ranges from 10 MHz to 1 GHz. No effect on transceiver performance between the specification limits.
Emission: Electromagnetic Interference (EMI)	FCC Class B EN 55022 Class B CISPR 22	Noise frequency range: 30 MHz or 5 GHz

Connection Diagram



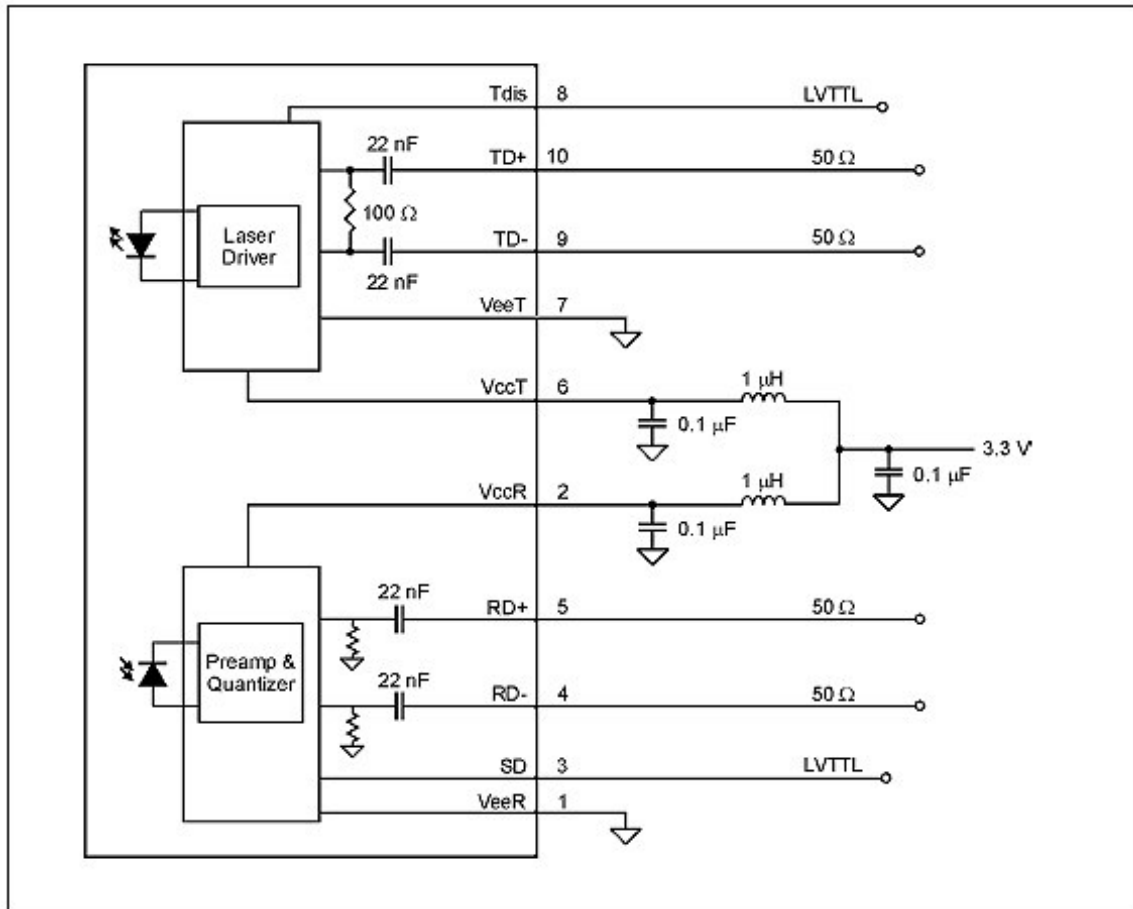
Pin Description

Pin Name		Level/Logic	Pin	Description
VeeR	Receiver Signal Ground	N/A	1	
VccR	Receiver Power Supply	N/A	2	
SD	Signal Detect	TTL/CMOS compatible	3	Normal Operation: Logic "1" Output, represents that light is present at receiver input. Fault Condition: Logic "0" Output.
RD-	Received Data Out Not	PECL, DC Coupled	4	Receiver Data Out Not
RD+	Received Data Out	PECL, DC Coupled	5	Receiver Data Out

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VccT	Transmitter Power Supply	N/A	6	
VeeT	Transmitter Signal Ground	N/A	7	
T _{DIS}	Transmitter Disable	TTL/CMOS compatible	8	Transmitter Laser Control
TD+	Transmit Data	PECL, DC Coupled	9	Transmitter Data In
TD-	Transmit Data Not	PECL, DC Coupled	10	Transmitter Data Not In
CG	Case Ground	N/A		An optional connection of the transceiver to the equipment chassis ground. Holes in circuit board must be tied to chassis ground.
MS	Mounting Stud	N/A		The mounting studs are provided for transceiver mechanical attachment to the circuit board.

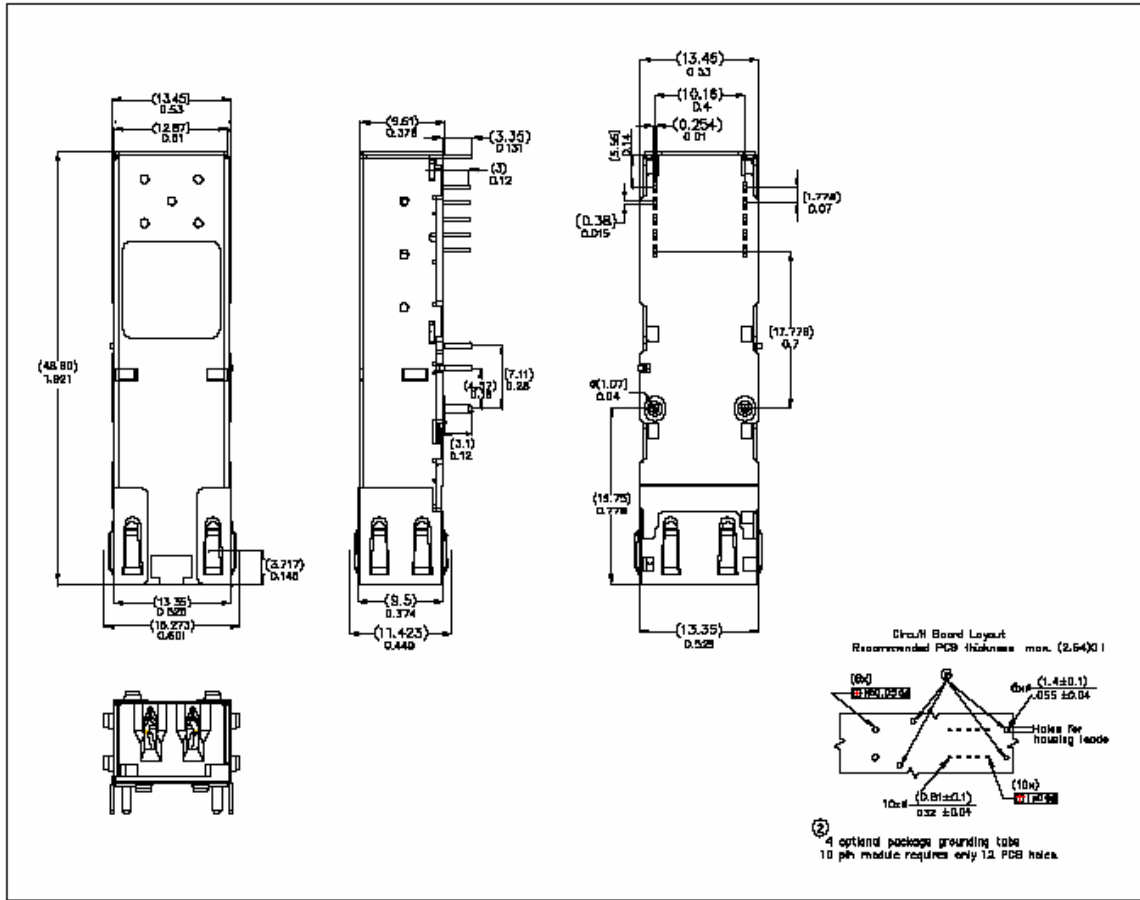
Recommended Interface Diagram



Physical Characteristics

Outline Diagram

Dimensions for the device package are given in millimeters.



Additional Information

Contact

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