Fiber Optic LAN 1x5 Transceiver
For 1310 nm 100 Mb/s with VF-45™ Connector

Data Sheet

OVF2021-1

Features

- 1310 nm LED
- Multimode fiber with VF-45™ connector
- Operating Temperature: 0 ~ +70°C
- 2 km link distance
- Data Rate of 100 Mb/s
- Compatible with Ethernet and Token Ring protocols
- Small footprint allows high density port spacing

Applications

- Telecommunications and Data Communications System Networking
- Fiber-to the-desktop
- 100 Mb/s Ethernet
- 4/16 Mb/s Token Ring LAN

Description

The OVF2021-1 is a 1x5 transceiver module that combines a fiber optic transmitter and receiver with the VF-45™ connector, an innovative connection scheme that lends itself to high density applications by significantly reducing the board space required for a fiber optic transceiver. It operates at a data rate of 100 Mb/s over a link distance of 2 km.

The transmitter consists of a high reliability InGaAsP 1310 nm LED (Light Emitting Diode) coupled to a multimode fiber through the VF-45™ connector.

The hybrid bipolar fiber optic receiver consists of an InGaAs PIN (P-type/ Intrinsic/ N-type detector) photodiode for high-speed operation and a transimpedance preamplifier IC for excellent noise immunity. The device is designed to operate on the ECL (Emitter Coupled Logic) standard of -5.2 V and has excellent PSRR (Power Supply Rejection Ratio) (20 dB at 10 MHz typical). It can also be operated with a +5 V supply with a slight loss of PSRR performance at data rates below 1 MHz.

*VF-45™ is a trademark of 3M.
*Volition™ is a trademark of 3M.

Safety

Laser Compliance Statement

The OVF2021-1 is classified as a Class I LED Product and 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 LED radiation exposure or other damage. Please embrace all customary precautions and discretion while handling this device.

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	Value	Unit
Storage Temperature	T_{stg}	-40 to +85	°C
Operating Temperature	T_{op}	0 to +70	°C
Soldering Temperature	S_{temp}	260	°C
Soldering Time	S_{time}	10	sec
Reverse Input Voltage		1.8	V
Continuous Forward Current (Heat Sinked)		75	mA
Supply Voltage (Vcc-Vee)		-0.5 to -6.0	V

Recommended Operating Conditions

Parameter	Symbol	Value	Unit
Supply Voltage	Vcc-Vee	5.0 to 5.5	V
Optical Signal Input		1.0 to 70	µW

Transmitter Electro-Optical Characteristics (T_A=25°C unless otherwise noted)

Parameter	Condition	Symbol	Min	Typ	Max	Unit
Fiber Coupled Optical Power:	I_F=25 mA rms (50% duty cycle)	Poc(Avg.)	-23.5	-21.5	-19.5	dBm
50 µm fiber[1,2]	NA=0.20 (over temp.)	Poc(Avg.)	-24		-20	dBm
Fiber Coupled Optical Power:	I_F=25 mA rms (50% duty cycle)	Poc(Avg.)	-20	-18	-16	dBm
62.5 µm fiber[1,2]	NA=0.275 (over temp.)	Poc(Avg.)	-20.5		-15.5	dBm
Forward Voltage	I_F=25 mA DC	V_F		1.1	1.7	V
Forward Voltage Temperature Coefficient	I_F=25 mA DC	$\Delta V_F/\Delta T$		-0.12		mV/°C
Peak Wavelength	I_F=25 mA DC	λp	1280	1310	1350	nm
Response Time	I_F=25 mA Peak (50% duty cycle) No prebias	t_R/t_F	2	2.7	3.5	ns

Po Temp Coefficient	I_F=25 mA DC	ΔPo/ΔT		-0.004	dB/°C
	I_F=50 mA DC	ΔPo/ΔT		-0.006	dB/°C
Series Resistance	DC	Rs	6.0		Ω
Thermal Resistance	Heat Sinked		260		°C/W

Notes:
1. **Maximum degradation at end of life = 2 dB.**
2. **Poc is measured using a 10 meter mode stripped cable which is intended to accurately represent a working system.**

FIGURE 1: TYPICAL OPTICAL POWER OUTPUT VS FORWARD CURRENT

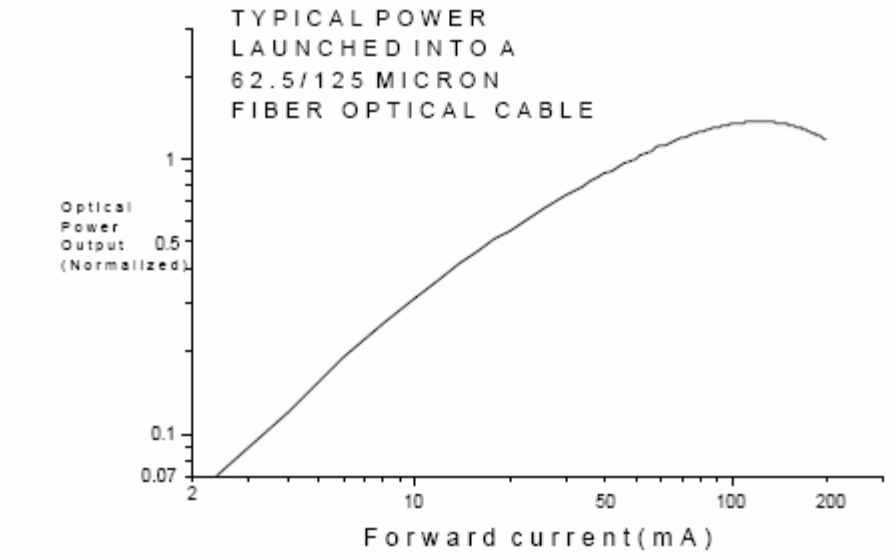
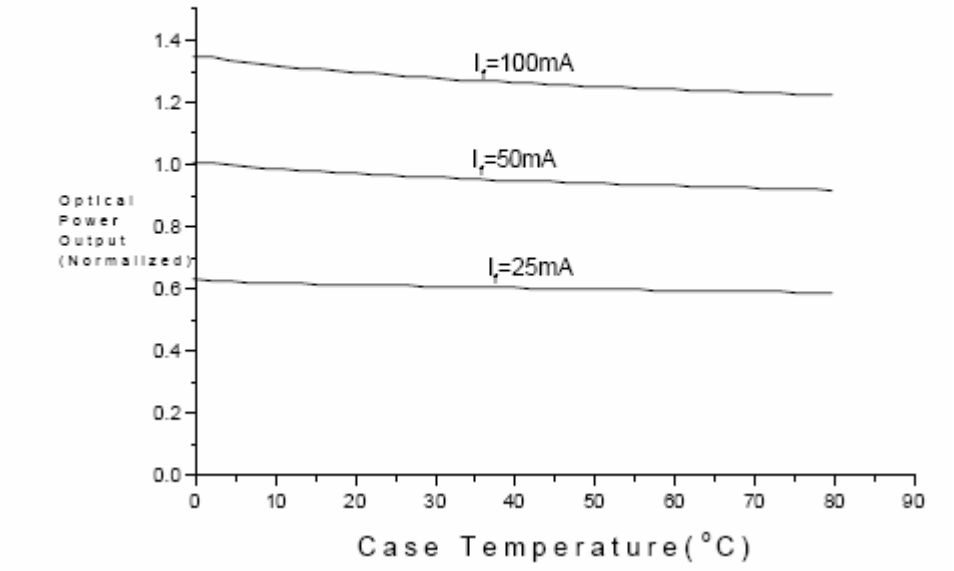


FIGURE 2: TYPICAL OPTICAL POWER OUTPUT VS CASE TEMPERATURE



Receiver Electro-Optical Characteristics (T_A=0<T<70°C, V_{EE}=-5.2V unless otherwise noted)

Parameter	Condition	Symbol	Min	Typ	Max	Unit
Responsivity @ 25°C	F=10 MHz; 50% duty cycle P_{IN}=10 µW avg.	R	12.5	17.5	23.5	mV/µW
over temp of 0°C~70°C	λ=1310 nm 62.5 mm core fiber	R	11		28.5	mV/µW
Input Power @ 25°C [1]	F=50 MHz; 50% duty cycle λ=1310 nm PWD=2.5 nS	P_{IN}(avg.)	-30 1			dBm µW
DC Output Voltage[2]	P_{IN} ≤ 0.1 µW	V_{ODC}	-4.0	-3.65	-3.3	V
Power Supply Current	R_{LOAD} =0	I_{CC}		9	15	mA
Rise/Fall Time @ 25°C	F=62.5 MHz; 50% duty cycle	t_R/t_F		3	4.5	nS
over temp of 0°C~70°C	P_{IN}=10 µW avg. λ=1310 nm			3	5.0	
Pulse Width Distortion[3]	F=62.5 MHz; 50% duty cycle P_{IN}=10 µW avg. λ=1310 nm	PWD		0.2	1.0	nS
Bandwidth	λ=1310 nm R=0.707R Max.	BW		125		MHz
RMS Noise Output Voltage	P_{IN}=0 µW avg. 75 MHz, 3 pole Bessel filter on output	V_{NO}		0.52	0.58	mV
	No filter on output	V_{NO}			0.7	mV
Output PSRR[4]	F=10 MHz			20		dB
Output Overshoot	P_{IN}=10 µW avg.			5	10	%
Output Resistance	F=50 MHz			20		Ω
RMS Input Noise Power @ 25°C[5]	P_{IN}=0 µW 75 MHz, 3 pole Bessel filter on output	P_{IN}		-41.3 0.074	-41.0 0.079	dBm µW

Notes:

*** Typical specifications are for operation at T_A = 25°C.**

**** Output pin should be AC coupled at a 511 Ohm load. Load capacitance <50 pF (see circuit diagram).**

***** Quiescent output voltage (V_{ODC}) = V_{CC} - 3.65 V typical. Dynamic output voltage swing is above the quiescent output voltage (V_O=V_{ODC}+R x P_{IN}).**

1. **Sensitivity of minimum power @ ER=10.**
2. **See Figure 5(b)**
3. **Measured at 50% amplitude point on the output waveform.**
4. **Output PSSR is defined as 20 log (V supply ripple/V_{OUT} ripple).**
5. **Input referred noise is calculated as P_{HI}=V_{NO}/R.**

FIGURE 3: PULSE WIDTH DISTORTION VS OPTICAL INPUT

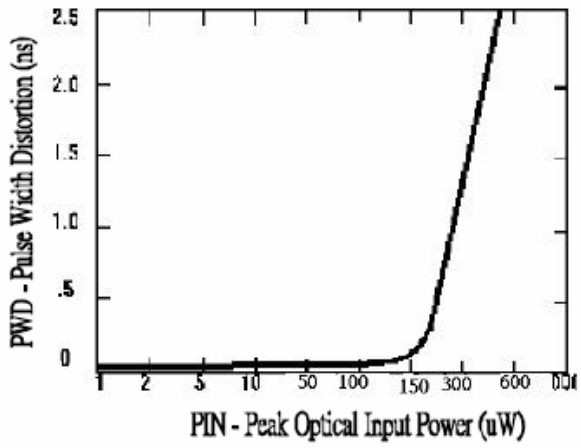


FIGURE 4: SWITCHING WAVEFORM

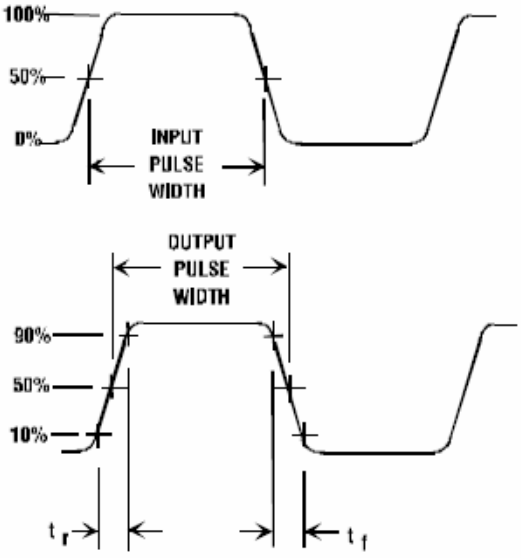
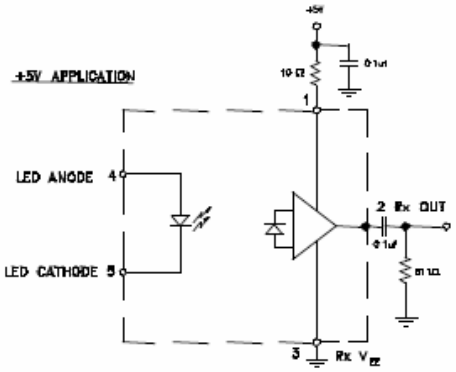
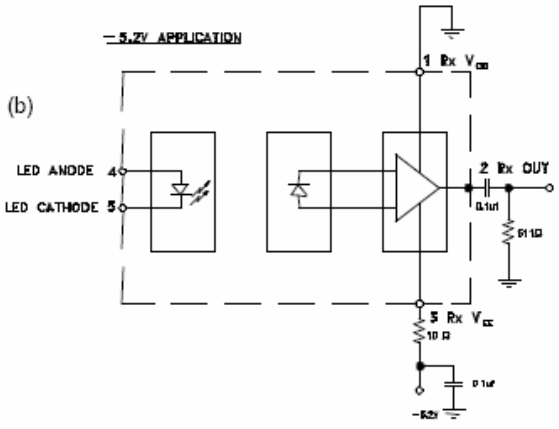


FIGURE 5: CIRCUIT DIAGRAM

(a)

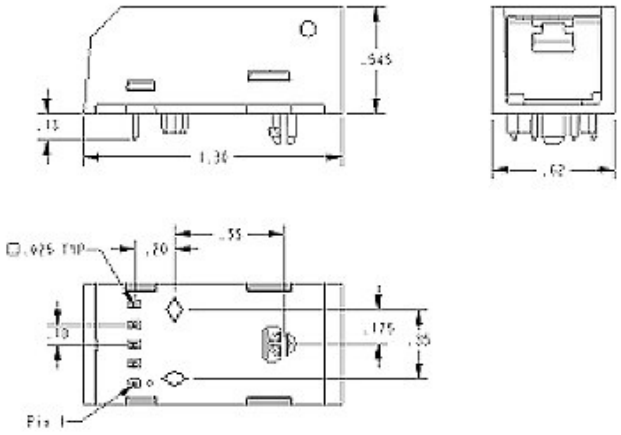


(b)



Package Outline Diagram

Dimensions for the device package are given in inches.



PINOUT

Number	Function
1	RX V_{CC}
2	RX Output
3	RX V_{EE} GND
4	LED Anode
5	LED Cathode

Additional Information

Contact

For additional information, product specifications, or information about Optocom:

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