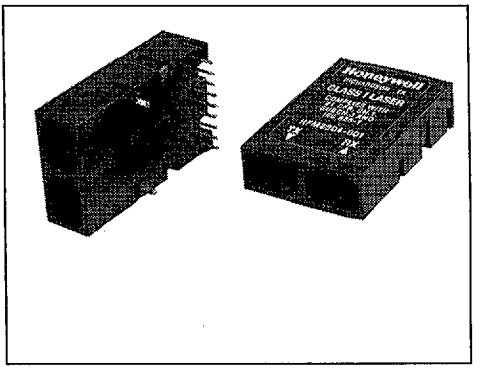
HFM2504-001

1.0625 Gb/s Fiber Channel Short WavelengthTransceiver

FEATURES

- Class I eye safe. Does not require any external circuitry on PCB to ensure eye safety compliance
- Single power supply V_{CC} = +5V
- Received Signal Detect function
- Low cost, high reliability, fiber optic-to-electronic solution
- Complies with Fiber Channel (1.0625 Gb/s) Standard
- Industry Standard 1x9 pin package footprint
- Industry Standard duplex SC Optical Connector
- Transmitter and Receiver functions built into a single package



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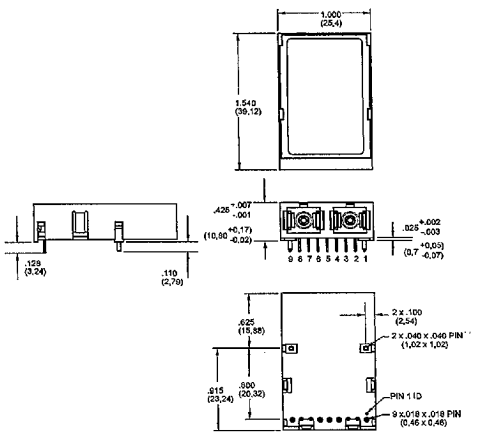
DESCRIPTION

The HFM2504-001 fiber optic transceiver module provides a low cost solution to the requirements of high speed, intra-building interconnects over multimode fiber optic cable. The module is intended for the short wavelength 1.0625 Gb/s Fiber Channel format although it will operate with other protocols. Typical uses include LAN (Local Area Network) interconnect, clustered workstation links, and connections to mass storage devices.

The module is designed and tested to meet or exceed ANSI X3T11 Fiber Channel link distance requirements (we specify 300 m in 62.5/125 micron fiber and 500 m in 50/125 micron fiber). The emitted optical power levels are within Class I operating limits as defined by both CDRH (Center for Disease and Radiological Health) and IEC825-1 for a center wavelength from 830 nm to 860 nm. Because the transceiver is designed to be inherently eye safe, it does not require open fiber control, thus eliminating complex electronics or mechanics.

The HFM2504-001 consists of independent transmitter (TX) and Receiver (RX) functions combined in a single module housing. The transmitter consists of a high reliability 850 nm VCSEL (Vertical Cavity Surface Emitting Laser) which couples to a fiber optic cable through an SC connector. The transmitter is driven with a differential PECL (Positive Emitter Coupled Logic) signal applied to TX In+ and TX In-. This signal is converted to an appropriate modulation current by a Silicon Bipolar Laser Driver Integrated Circuit (IC).

OUTLINE DIMENSIONS in inches (mm)



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Pinout

1. RX V_{EE}
2. RX Out +
3. RX Out-
4. RX Signal Detect
5. RX V_{CC}
6. TX V_{CC}
7. TX In -
8. TX In +
9. TX V_{EE}

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DESCRIPTION (continued)

The optical receiver consists of a PIN (P-type intrinsic N-type) photodiode and preamp assembly and a Silicon Bipolar Postamp IC. Optical input is coupled to the receiver with either a 50/125 or a 62.5/125 micron fiber through an SC connector. Output from the module consists of differential PECL data signals on RX Out+ and RX Out- and a single PECL signal detect function RX Signal Detect.

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ELECTRICAL CHARACTERISTICS

PARAMETER	SYMBOL	MIN	TYP	MAX	UNITS	TEST CONDITIONS
Supply Current - TX	I_{CC}		65		mA	
Supply Current - RX	I_{CC}		130		mA	
Power Dissipation - TX	P_{DISS}		0.325		W	
Power Dissipation - RX	P_{DISS}		0.650		W	
Differential Output Voltage Swing	V_{OD}		1.00		V	peak-to-peak
Data Output Rise Time	t_R			0.25	ns	20%-80%
Data Output Fall Time	t_F			0.25	ns	80%-20%
Data Input Voltage - Low	V_{IH}-V_{CC}			-1.475	V	
Data Input Voltage - High	V_{IL}-V_{CC}	-1.165			V	
Data Output Load	R_L		50		Ω	

RECEIVER ELECTRO-OPTICAL CHARACTERISTICS

PARAMETER	SYMBOL	MIN	TYP	MAX	UNITS	TEST CONDITIONS
Receiver Overload Condition	P_{IN} (max.)			0	dBm	
Sensitivity at "eye" center	P_{IN} (min.)	-17			dBm avg.	(1)
Operating Wavelength	λ	770		860	nm	
Signal Detect - Asserted	P_A			-20	dBm avg.	
Signal Detect - Hysteresis	P_A-P_D	1.5	2.0		dBm	
Singal Detect Assert Time (Off to On)	AS			0.75	µs	(2)
Signal Detect DeAssert Time (On to Off	ANS			15.0	µs	(3)

Notes

1. For a BER of 10^{-12} and static clock offset of +/- 15% and an extinction ratio of the Source ≥ 9 dBm.
2. Transition from P_{IN} (Max) to dark.
3. Transition from dark to P_{IN} (Min).

TRANSMITTER ELECTRO-OPTICAL CHARACTERISTICS

PARAMETER	SYMBOL	MIN	TYP	MAX	UNITS	TEST CONDITIONS
Output Optical Power	P_O	-10		-4	dBm avg.	(1)
Optical Extinction Ratio		9	13		dB	10 Log (P_H/P_L) (2)
Center Wavelength	λ_C	830		860	nm	
Spectral Width	Δλ			4	nm	RMS
Optical Rise Time	t_R			0.26	ns	20%-80% (3)
Optical Fall Time	t_F			0.26	ns	80%-20% (4)
RIN			-130	-122	dB/Hz	
Optical Transmit Pulse - Undershoot				20	%	(3)
Optical Transmit Pulse - Overshoot				30	%	(3)

Notes

1. Class I maximum eye safety limits are specified according to wavelength at the limits shown in figure "Laser safety standards".
2. Optical Extinction Ratio is measured with an idle line state equal to 1/5 the data rate (156.25 MHz).
3. The required transmitter pulse shape characteristics are specified in the form of a mask of the transmitter "eye" diagram (Figure 2). This "eye" characterizes jitter, optical rise and fall times, undershoot, overshoot, and ringing. The "eye" should be measured with 4 pole 937.5 MHz Bessel-Thomson filter as specified in ITU G.957 to represent the effective receiver bandwidth
4. The required transmitter pulse shape characteristics are specified in the form of a mask of the transmitter "eye" diagram (Figure 2). The "eye" should be measured with 4 pole 937.5 MHz Bessel-Thomson filter as specified in ITU G.957 to represent the effective receiver bandwidth. Actual transmitter t_R/t_F must be corrected for bandwidth limitations introduced by test equipment.

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ABSOLUTE MAXIMUM RATINGS

PARAMETER	SYMBOL	MIN	TYP	MAX	UNITS	TEST CONDITIONS
Storage temperature	T_A	-40		100	°C	
Lead Soldering Limits				240/10	°C/s	
Supply voltage	V_{CC}-V_{EE}	-0.2		7.00	V	

RECOMMENDED OPERATING CONDITIONS

PARAMETER	SYMBOL	MIN	TYP	MAX	UNITS	TEST CONDITIONS
Case Operating Temperature	T_A	0		70	°C	(1)
Supply Voltage	V_{CC}	4.75		5.25	V	

Notes

1. Thermal performance is closely coupled to the thermal characteristics of the board on which the module is used. The stated range of operation is assured for all applications where the temperature of the board into which the module is inserted is maintained at 70°C or less.

ORDER GUIDE

Description	Catalog Listing
1.0625 Gb/s Fiber Channel Short Wavelength Transceiver	HFM2504-001

CAUTION

The inherent design of this component causes it to be sensitive to electrostatic discharge (ESD). To prevent ESD-induced damage and/or degradation to equipment, take normal ESD precautions when handling this product.

FUNCTIONAL BLOCK DIAGRAM

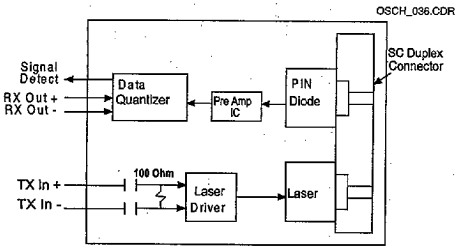

Fig. 1 Laser safety standards

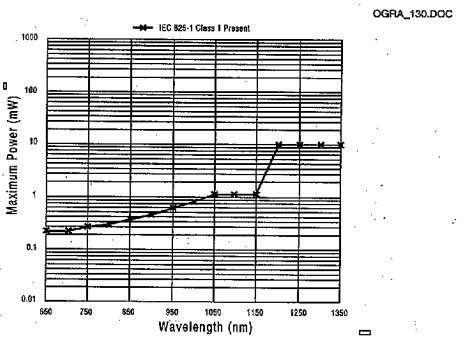

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Fig. 2

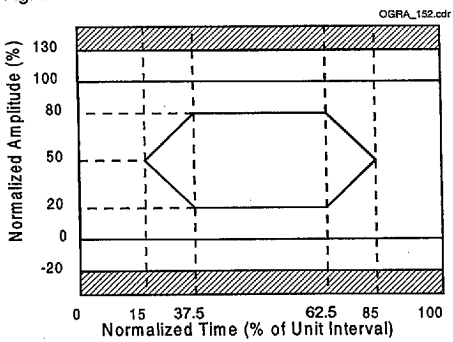
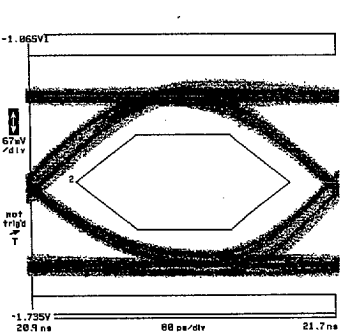


Fig. 3 Typical transmitter "eye" diagram at 1.25 GB/S, pseudo random N^7 data pattern



Honeywell reserves the right to make changes in order to improve design and supply the best products possible.

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