

Fiber Optic LAN Components MTRJ SFF 1.25 Gbps OFE

Preliminary
HFT248x-521

FEATURES

- Prealigned Fixed MTRJ connector
- VCSEL packaged with a back monitor photodiode
- Common anode and common cathode polarities available
- TO-46 hermetic package for VCSEL and Pin + Preamp
- 5V and 3.3 V operation
- GaAs PIN detector and BiCMOS preamplifier
- Differential output for low noise
- Data rates > 1GHz
- Laser is attenuated.
Unattenuated versions available (HFT2483-522 and HFT2484-522)



The HFT248x-521 is a single package transmitter and receiver designed to interface with the MT-RJ style optical connectors.

The transmitter is a high performance 850nm VCSEL (Vertical Cavity Surface Emitting Laser) packaged for high speed data communications. This product combines all the performance advantages of VCSEL with a custom designed power monitor diode. The power monitor diode can be used with an appropriate feedback control circuitry to set a maximum power level for each VCSEL. Attenuating coatings are available on the Laser transmitter to simplify design and assist in meeting eye safety requirements.

The PIN + preamp converts optical power into a differential output electrical signal. As the light increases, the differential output voltage increases, limiting at input powers above -10dBm. The differential output is designed to be AC coupled into a data amplifier.

The Honeywell HFT248x-521 is designed to interface with 50/125 and 62.5/125µm multimode fiber within an MT-RJ style interface.

ELECTRO-OPTICAL CHARACTERISTICS ($T_A=25^{\circ}\text{C}$ unless otherwise stated, 50/125 µm fiber)

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VCSEL Parameters	Test Condition	Symbol	Min.	Typ.	Max.	Units	Notes
Peak Fiber Coupled Optical Power (See Threshold current and slope efficiency which control power output)	$I_F=12\text{mA}$ Peak 50/125 μm fiber NA = 0.20	P_{oc}		0.350		mW	1
Threshold Current		I_{TH}	1.5	3.5	6	mA	
Threshold Current Temperature Variation	$T_A = 0^\circ\text{C}$ to 70°C	ΔI_{TH}	-1.5		1.5	mA	2
Slope Efficiency	$P_{oc} = 0.35\text{mW}$	η	0.02		0.1	mW/mA	3
Slope Efficiency Temperature variation	$T_A = 0^\circ\text{C}$ to 70°C	$\Delta\eta / \Delta T$		-0.5		%/°C	
Peak Wavelength	$I_F=9\text{mA}$	λ_P	830	850	860	nm	
λ_P Temperature Variation	$I_F=9\text{mA}$	$\Delta\lambda_P/\Delta T$		0.06		nm/°C	
Spectral Bandwidth, RMS	$I_F=9\text{mA}$	$\Delta\lambda$			1.0	nm	
Laser Forward Voltage	$I_F=9\text{mA}$	V_F		1.8	2.2	V	
Laser Reverse Voltage	$I_R=10\text{ }\mu\text{A}$	BVR_{LD}		-10		V	
Rise and Fall Times	Prebias Above Threshold, 20%-80%	t_r t_f		150 200	300 300	ps	4
Relative Intensity Noise	1 GHz BW, $I_F=9\text{mA}$	RIN		-128	-122	dB/Hz	
Series Resistance	$I_F=9\text{mA}$	R_S	15	25	50	Ohms	
Back Monitor Photodiode Parameters	Test Conditions	Symbol	Min.	Typ.	Max.	Units	Notes
Monitor Current	$P_{oc} = .35\text{mW}$	I_{PD}	0.09		0.58	mA	
Monitor current Temperature Variation	$P_{oc} = .35\text{mW}$	$\Delta I_{PD}/\Delta T$		0.0		%/°C	
Dark Current	$P_o = 0\text{mW}$, $V_R=3\text{V}$	I_D			20	nA	
PD Reverse Voltage	$P_o = 0\text{mW}$, $I_R=10\text{ }\mu\text{A}$	BVR_{PD}	30	115		V	5
PD Capacitance	$V_R=0\text{V}$, Freq=1MHz $V_R=3\text{V}$, Freq=1MHz	C		75 40	100 55	pF	
PIN + Preamp Parameters	Test Condition	Symbol	Min.	Typ.	Max.	Units	Notes
Supply Voltage	$P_{in} = 0\text{ }\mu\text{W}$, $R_{load}=50\Omega$	V_{cc}		5	5.5	Volts	6
Supply Current	$P_{in} = 0\text{ }\mu\text{W}$, $R_{load}=50\Omega$	I_{cc}		35	50	mA	6
Output Voltage	$P_{in} = 100\text{ }\mu\text{W}$, $R_{load}=50\Omega$	V_{out}		200	500	mV	6
Responsivity		R	2500	3500	5000	$\mu\text{V}/\mu\text{W}$	7,8
Overload (Surge Power)			0	3		dB	
Upper 3dB Bandwidth		BW_{upper}	850	1200	1500	MHz	9
RMS Input Referred Noise	$P_{in}=0\text{ }\mu\text{W}$, $R_{load}=50\Omega$ 937.5MHz (1.875 GHz) BT Filter			300		nW	10
Sensitivity	BER= 10^{-12} , SNR=7	S	-20	-24		dBm	
Power Supply Rejection Ratio	$P_{in}=0\text{ }\mu\text{W}$, $R_{load}=50\Omega$	PSRR	10	30		dB	11
Pulse Width Distortion	$P_{in}=20\text{ }\mu\text{W}$ peak, $R_{load}=50\Omega$	PWD		35	60	ps	12
Rise/Fall Time	$P_{in}=20\text{ }\mu\text{W}$ peak, $R_{load}=50\Omega$	T_R/T_F			400	ps	13
Wavelength Responsivity	$P_{in}=20\text{ }\mu\text{W}$ peak, $R_{load}=50\Omega$	λ	760	850	860	nm	

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Notes:

1. Operating power is set by the peak operating current $I_{PEAK}=I_{BIAS}+I_{MODULATION}$.
2. Operation at temperatures outside the specified range may result in the threshold current exceeding the maximums defined in the electro-optical characteristics table.
3. Slope efficiency is defined as $\Delta P_o/\Delta I_F$ at a total power output of 0.35 mW.
4. Rise and fall times are sensitive to drive electronics, 200ps rise and fall times are achievable with Honeywell VCSELs.
5. To safeguard the VCSEL from current spike damage, short the VCSEL anode and cathode to each other during photodiode BVR verification testing. Additionally to safeguard the backmonitor PIN photodiode, limit the photodiode reverse voltage in accordance with the absolute maximum rating.
6. Pin refers to the total optical power at the face of the fiber optic cable input to the PIN + Preamp Detector.
7. Responsivity measured with source wavelength of 850nm, 125MHz square wave, $P_{in}=20\mu W$ peak, $R_{load}=50\Omega$.
8. The output voltage increases as received light power increases, up to approximately -15dBm. The preamplifier is designed to limit the electrical output signal above this optical input level, and does not introduce signal distortion until the average input power exceeds 0dBm.
Bandwidth is measured with a small signal sinusoidal light source with 50 μW average power, $R_{load}=50\Omega$.
10. RMS input referred optical noise is obtained by measuring the RMS output referred noise, then dividing by the responsivity.
11. PSRR is measured from 300KHz to 1GHz by injecting a -20dB electrical signal on the V_{cc} pin. The nominal value at 100MHz is recorded. No external bypass components are assumed. An external V_{cc} filter network will greatly increase the PSRR.
12. Measured at the 50% level of output pulses using 0.5 GHz square wave with <200 ps rise time.
13. Rise and fall times are measured with source wavelength of 850nm, 125MHz square wave, with optical rise and fall times < 200ps, $P_{in}=20\mu W$ peak, $R_{load}=50\Omega$.

ABSOLUTE MAXIMUM RATINGS

Parameter	Rating
Storage Temperature	-40 to +85°C
Case Operating Temperature	0 to +70°C
Lead Solder Temperature	260°C, 10 sec.
Laser Continuous Forward current, Heat Sunked	15 mA
Laser Reverse Breakdown Voltage ($I_R = 10\mu A$)	5V @ 10 μA
Back Monitor Reverse Voltage	30 V
Incident Optical Power on the Detector	0 dBm average, +4 dBm peak
Power Supply Voltage (PIN + Preamp)	5.5V

NOTICE

Stresses greater than those listed under “Absolute Maximum Ratings” may cause permanent damage to the device. This is a stress rating only and functional operation of the device at these or any other conditions above those indicated in the operations section for extended periods of time may affect reliability.

NOTICE

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

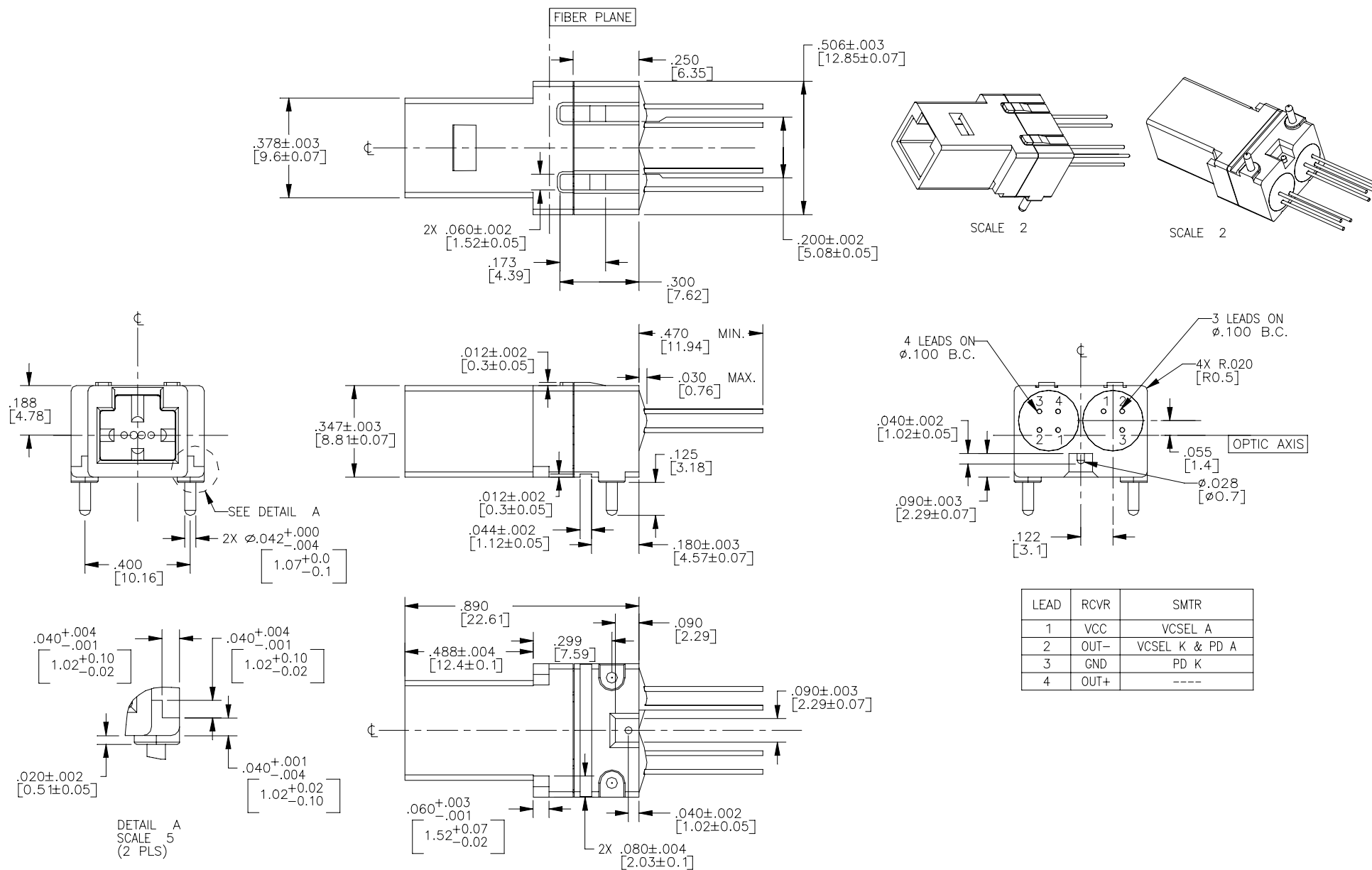
ORDER GUIDE

Catalog Listing	Description
HFT2480-521	Attenuated, Common Anode
HFT2481-521	Attenuated, Common Cathode

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For application help: call 1-800-537-6945
www.honeywell.com/sensing/VCSEL

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Honeywell warrants goods of its manufacture as being free of defective materials and faulty workmanship. Commencing with the date of shipment, Honeywell's warranty runs for 18 months. If warranted goods are returned to Honeywell during that period of coverage, Honeywell will repair or replace without charge those items it finds defective. The foregoing is Buyer's sole remedy and is **in lieu of all other warranties, expressed or implied, including those of merchantability and fitness for a particular purpose.**

While we provide application assistance, personally and through our literature, it is up to the customer to determine the suitability of the product in the application.

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