Fiber Optic LAN Components

HFM2614-021

VF45 Quad Transceiver for 10Mb/s and 100Mb/s Ethernet

FEATURES

- Key component for making a fiber optic Ethernet truly scalable and switchable from 10 to 100Mb/s Ethernet.
- Innovative *NEW* interconnect is cost competitive with copper solutions, thus enabling Fiber-To-The-Desktop.
- Backwards compatible with 10Mbit Ethernet (10BaseFL) and 16Mbit Token Ring.
- Small footprint allows high density port spacing.
- Can be used for a broad range of datarates all the way up to 125Mbaud.

The VF45 transceiver is intended to provide a low cost, fiber optic solution to the requirements of 10/100 Mbit Ethernet and 4/16 Mbit Token Ring LAN applications. The HFM2610 combines a fiber optic transmitter and receiver with an innovative new connection scheme, and lends itself to high density applications by significantly reducing the board space required for a fiber optic transceiver. The inexpensive VF45 connection scheme also allows cost effective fiber-to-the-desktop in the horizontal LAN cabling environment, while maintaining high standards of performance. The HFM2610 is completely interoperable with existing short wavelength fiber optic solutions for Ethernet and Token Ring.

The HFM2610 utilizes existing Honeywell optoelectronic components and IC's with proven capabilities in the Ethernet and Token Ring LAN environment. The new style interconnect allows the HFM2610 to look and feel similar to existing UTP copper interconnects. In addition, users enjoy the benefits of fiber optic performance and the security of knowing they have a built-in migration path to higher datarates in the future.

The transmitter consists of a high reliability GaAlAs 850nm LED which couples to a multimode fiber through the VF45 style connector. The LED uses a glass microlens over the Caprock junction to collimate the light, increasing the intensity, which provides for consistent power launch into fiber optic cables.

The hybrid bipolar fiber optic receiver consists of a silicon PIN photodiode for high speed operation and a transimpedance preamplifier IC for excellent noise immunity. The receiver has V_{cc} and V_{EE} power connection pins and can be powered with either +5V and Ground (V_{cc} and V_{EE} respectively) or with Ground and - 5.2V (V_{cc} and V_{EE} respectively).

Under Development

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ABSOLUTE MAXIMUM TRANSMITTER RATINGS

PARAMETER	RATING
Storage Temperature	-40 to +85°C
Operating Temperature	0 to +70°C
Lead Solder Temperature	260°C for 10 sec.
Reverse Input Voltage	1.8 Volts
Continuous Forward Current (Heat Sinked)	100mA

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.

TRANSMITTER ELECTRO-OPTICAL CHARACTERISTICS(T_A=25°C unless otherwise stated)

Parameters	Test Condition	Symbol	Min.	Typ.	Max.	Units	Notes
Fiber Coupled Optical Power	I_f =32mA Peak; 50% duty cycle; 50µm fiber NA=0.20 (Over Temp)	P_{OC} Avg.	-21.3	-17.8	-16.3	dBm	1,2,3
		P_{OC} Avg.	-21.8		-15.8	dBm	
Fiber Coupled Optical Power	I_f =32mA Peak; 50% duty cycle; 62.5µm fiber NA=0.275 (Over Temp)	P_{OC} Avg.	-17.5	-14.0	-12.5	dBm	1,2,3
		P_{OC} Avg.	-18.0		-12.0	dBm	
Forward Voltage	I_f =32mA dc	V_F		1.84		Volts	
	I_f =60mA dc	V_F	1.48	1.70	2.09	Volts	
Forward Voltage Temp. Coefficient	I_f =32mA dc	$\Delta V_F/\Delta T$		-.18		mV/°C	
	I_f = 60mA dc	$\Delta V_F/\Delta T$		-.22		mV/°C	
Reverse Voltage	I_R=10µA	B_{VR}	1.8	3.8		Volts	
Peak Wavelength	I_F=32mA dc	λp	810	856	895	nm	
	I_F= 60mA dc	λp	810	850	885	nm	
Response Time	I_F=32mA Peak, No Prebias	t_R/t_F		4.0	4.5	ns	
P_O Temp Coefficient	I_F=100mA	$\Delta P_O/\Delta T$		-0.034		dB/°C	
	I_F= 60mA	$\Delta P_O/\Delta T$		-0.024		dB/°C	
Series Resistance	DC	r_s		4.0		ohms	
Device Capacitance	V_R=0V f=1MHz	C		55		pF	
Thermal Resistance	Heat Sinked			260		°C/W	

Notes

1. Maximum degradation at end of life = 2dB.
2. POC is measured using a 10 meter mode stripped cable which is intended to accurately represent a working system.
3. Tested with a 50% duty cycle signal.

Typical Optical Power Output vs Forward Current

Typical Spectral Output vs Wavelength

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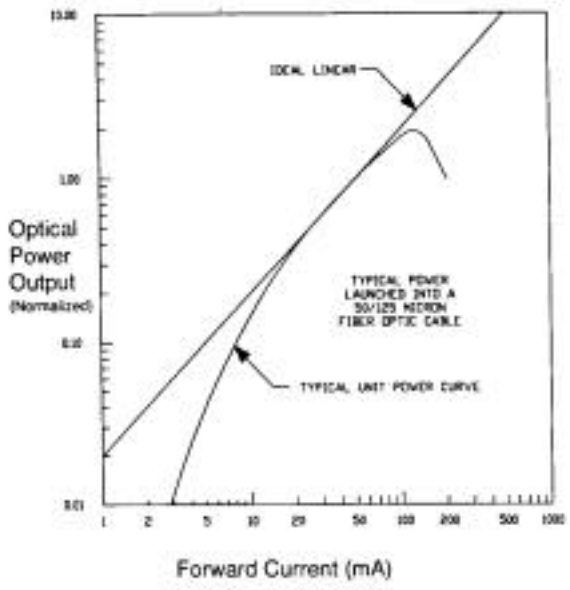
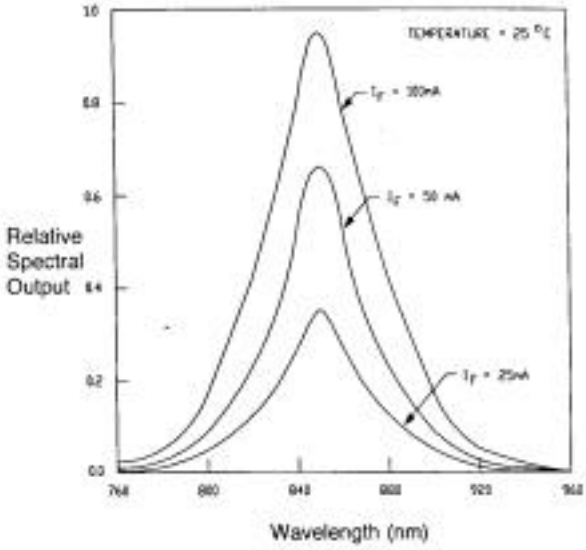
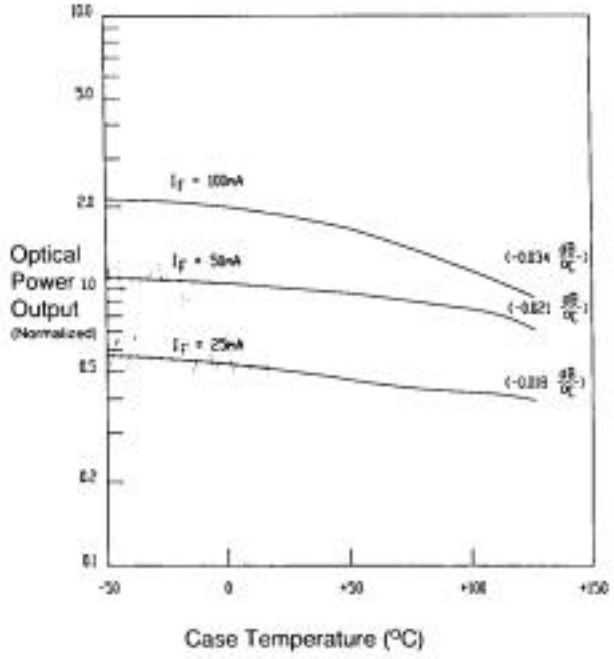




Typical Optical Power Output vs Case Temperature



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.

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ABSOLUTE MAXIMUM RECEIVER RATINGS

PARAMETER	RATING
Storage Temperature	-40 to +85ºC
Operating Temperature	0 to +70ºC
Lead Solder Temperature	260ºC for 10 sec.
Supply Voltage (V_{CC} - V_{EE})	-0.5 to -6.0 Volts

RECOMMENDED OPERATING CONDITIONS

Supply Voltage (V_{CC} - V_{EE})	5.0 to 5.5 Volts
Optical Signal Input	1.0 to 100µW

NOTICE

1. 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 of this specification is not implied. Exposure to absolute maximum rating conditions for extended periods of time may affect reliability.

2. Quiescent output voltage(V_{ODC})is -2.4 Volts typical. Dynamic output voltage swing is below the quiescent output voltage. ($V_O = V_{ODC} + R \times P_{IN}$)

3. Photodiode has 600mm (.024 in.) diameter microlens for optical coupling.

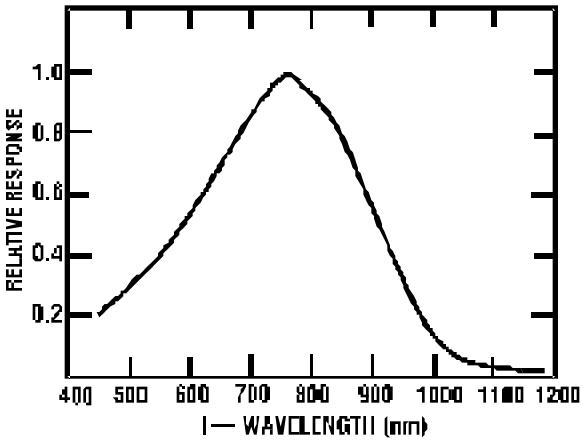
RECEIVER ELECTRO-OPTICAL CHARACTERISTICS (0°C<T<70° C unless otherwise specified)

Parameters	Test Condition	Symbol	Min.	Typ.	Max.	Units
Responsivity @ 25ºC	f = 10 MHz; 50% duty cycle P_{IN} = 100µW peak	R	5.3	7.0	9.6	mV/µW
Over temperature 0 to +70°C	λ = 850 nm 62.5µm core fiber	R	4.5		11.5	mV/µW
Input Power @ 25ºC	f = 10 MHz; 50% duty cycle λ = 850nm	P_{IN} (avg.)	-34 0.4		-10.6 87.5	dBm µW
Over temperature 0 to +70°C	PWD = 2.5 nS				-8.2 150	dBm µW
DC Output Voltage	$P_{IN} \leq 0.1\mu W$	V_{ODC}	-4.0	-3.65	-3.3	V
Power Supply Current	R_{LOAD} =0	I_{CC}		9	15	mA
Rise/Fall Time @ 25ºC	f = 10 MHz; 50% duty cycle P_{IN} = 63µW avg.	t_R / t_F		3.6	4.5	nS
Overtemperature 0 to +70°C	λ = 850 nm	t_R / t_F	.	3.6	6.3	nS
Pulse Width Distortion	f = 63 MHz; 50% duty cycle P_{IN} = 63µW avg. λ = 850 nm	PWD		0.2	1.5	nS
Bandwidth	λ = 850nm R = .707R Max.	BW		125		MHz
RMS Noise Output Voltage	P_{IN} = 0µW 75 MHz, 3 pole Bessel filter on output	V_{NO}		0.52	0.58	mV
	No filter on output				0.70	mV
Output PSRR	f = 10 MHz			20		db
Output Overshoot	P_{IN} = 10µW			10	13	%
Output Resistance	f = 50 Mhz			20		ohms
RMS Input Noise	P_{IN} = 0 µW	P_{IN}		-42.3	-41.0	dBm

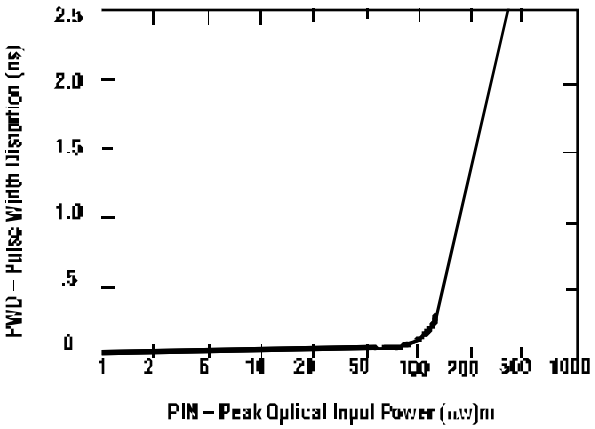
Power	75 Mhz, 3 pole Bessel filter on output			0.074	0.079	µW

TYPICAL PERFORMANCE CURVES

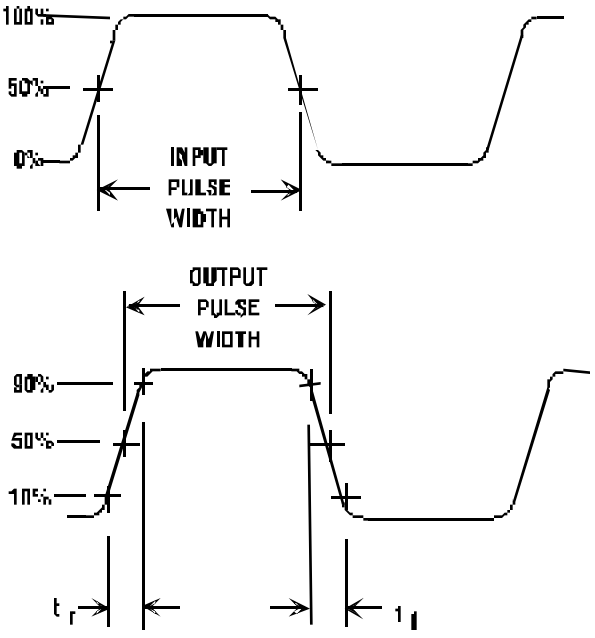
Spectral Response

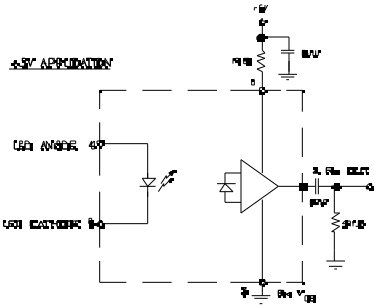


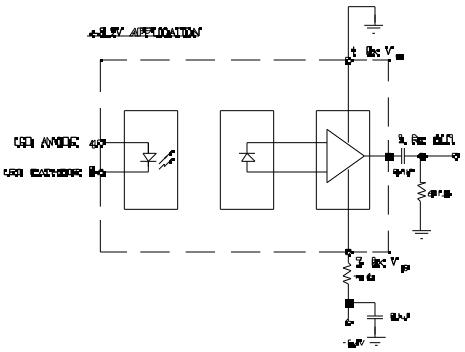
Pulse Width Distortion vs Optical Input Power



Switching Waveform

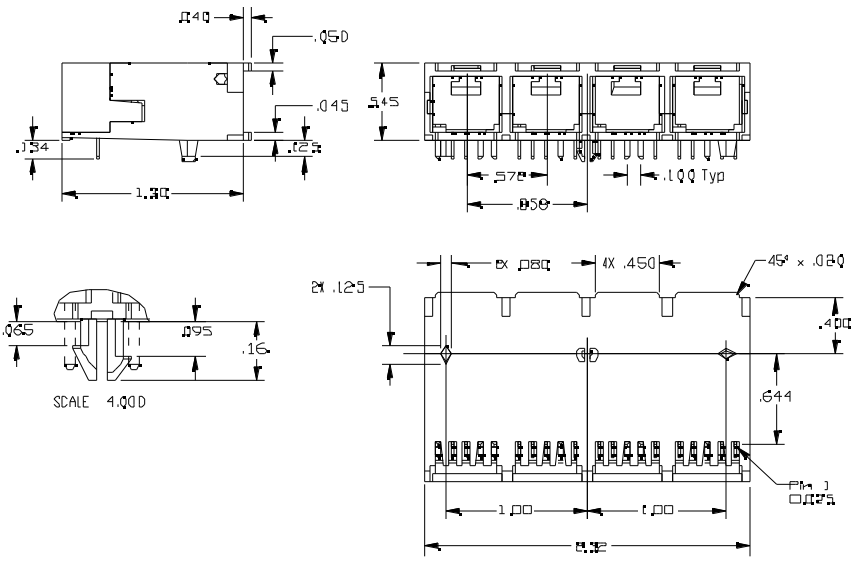






ORDER GUIDE

Catalog Listing	Description
HFM2610-021	Fiber Optic VF45 Transceiver



Pinout	Function
1.	Rx Vcc
2.	Rx Output
3.	Rx V_{EE}
4.	LED Anode
5.	LED Cathode

SALES AND SERVICE

Honeywell's MICRO SWITCH Division serves its customers through a world-wide network of sales offices and distributors. For application assistance, current specifications, pricing or name of the nearest Authorized Distributor, contact a nearby sales office or call:

1-800-367-6786 USA
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