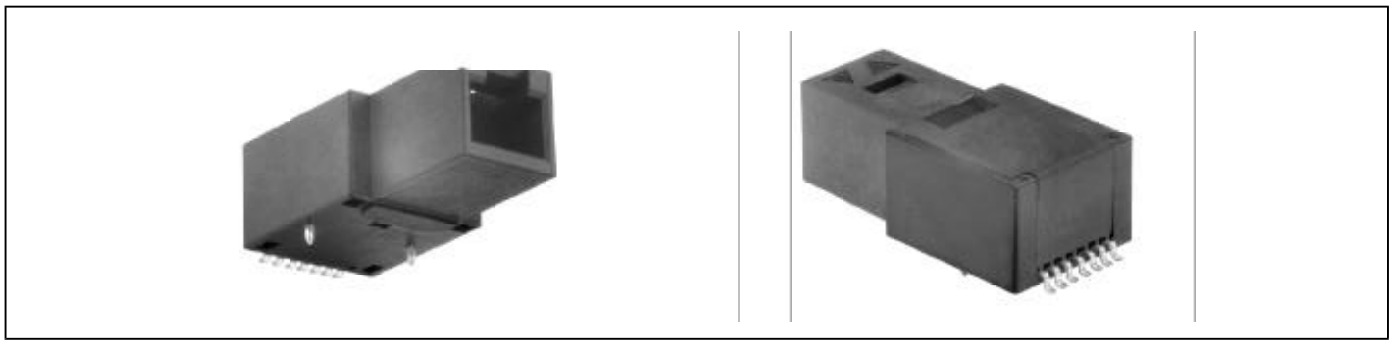
OPF5020 10 Mb/s, 100 Mb/s Short Wavelength MT-RJ Transceiver



Features

- Small Form Factor allows dense backplanes
- Allows same port density as copper based RJ-45 modular jacks
- Low cost 850 nm LED design
- Supports 10 BASE-FL and 100 BASE-SX data rates
- Surface mountable

Description

Optek's OPF5020 is based on the industry standard MT-RJ format for fiber optic transceivers. Its small size and intuitive connector latching design allows for higher density implementations and easier end user installation.

The transmitter is an 850 nm GaAlAs LED, configured for optimum transceiver performance when used in conjunction with a low-side driver. The high coupling efficiency of the LED and optical system allows the device to be used at low current drive levels reducing power consumption and increasing system reliability.

The receiver is comprised of a high speed photodiode coupled to a low noise transimpedance amplifier. The receiver output is a low impedance analog source. The analog representation of the received optical input is externally translated to ECL/TTL levels for use in digital modes up to 125 MBaud, NRZ.

Combining the OPF5020 with commercially available LED driver and postamp/data-quantizer circuits can provide a physical layer medium dependent sublayer (PMD) for communication between nodes of a fiber network. Application Bulletin 217 presents an example PMD design with typical receiver sensitivity of -30 dBm at a bit-error-rate of 2.5×10^{-10}, operating full duplex 100BASE-SX with either a 2^{23}-1 or worst case FDDI data pattern.

Absolute Maximum Ratings ($T_A = 25^o$ C unless otherwise noted)

Storage	-40° C to +85° C
Operating Temperature	0° C to +70° C
Solder Temperature (Soldering Iron, 10 sec.)	260° C
Solder Temperature (Vapor Phase Reflow, 30 sec.)	235° C

Transmitter

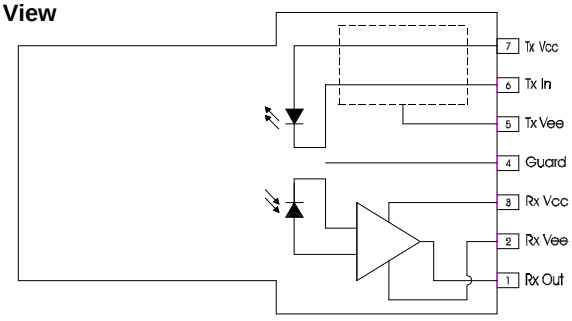
Forward Input Current (DC)	100 mA
Reverse Input Voltage	3.5 V

Receiver

Supply Voltage (Rx Vcc - Rx Vee)	-.5 to 6 V
Output Current	25 mA

All transmitters are subject to 100% burn in testing. Test conditions are 96 hours at 60 mA continuous current in 85° C ambient.

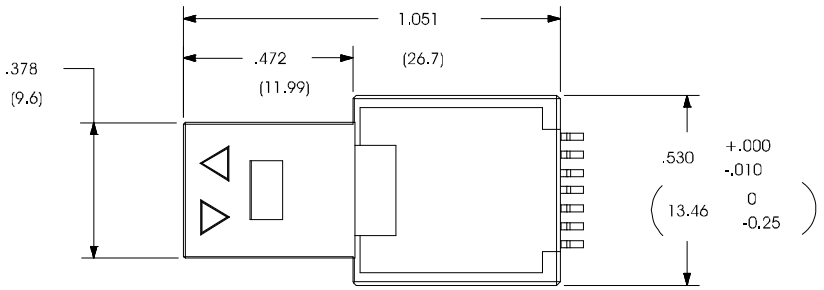
Top View

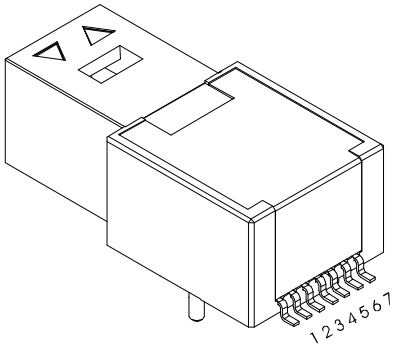


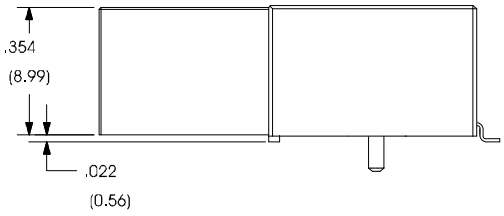
This component is susceptible to damage from electrostatic discharge (ESD). Normal static precautions should be taken in handling and assembly of this component to prevent ESD damage or degradation.

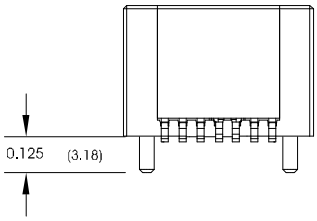
Visit our website at www.optekinc.com or email us at mt-rj@optekinc.com

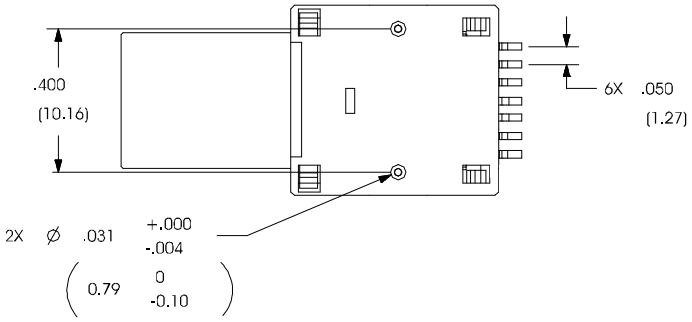
Type OPF5020







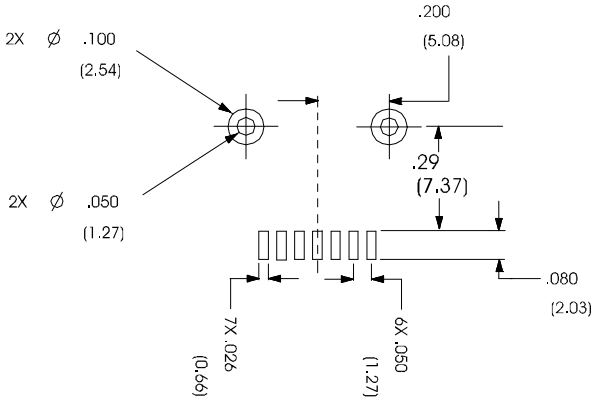




PIN	FUNCTION
7	Tx Vcc
6	Tx In
5	Tx Vee
4	Guard
3	Rx Vcc
2	Rx Vee
1	Rx Out

DIMENSIONS ARE IN INCHES (mm).

DIMINSIONS FOR PCB LAYOUT



FIBER OPTIC COMPONENTS

Type OPF5020

Electrical Characteristics (T_A = 0 to 70° C, Rx Vee = 0.00 V, 4.75 ≤ Rx Vcc ≤ 5.25)

SYMBOL	PARAMETER	MIN	TYP	MAX	UNITS	TEST CONDITIONS
Transmitter						
V_F	Forward Voltage	1.3	1.7	2.1	V	I_F = 60 mA
V_{BR}	Reverse Input Breakdown Voltage	3.5	9.0	--	V	I_R = 100 µA
λp	Peak Emission Wavelength	820	840	865	nm	I_F = 60 mA
λ_{BW}	Spectral Bandwidth (full width; half max.)	--	--	60	nm	I_F = 60 mA
C_T	Diode Capacitance	--	55	--	pF	V = 0, f = 1 MHz
$\Delta P_T/\Delta T$	Optical Power Temperature Coefficient	--	-0.008	--	dBm/°C	I_F = 60 mA
P_T	Peak Output Optical Power(1)	-16.0	-12.0	-9.0	dBm	IF = 60 mAdc
t_r, t_f	Rise Time, Fall Time(2) (10% to 90%)	--	3.5	6.5	ns	IF = 60 mA, No pre-bias
Receiver						
R_P	Responsivity(3)(4)	5.3	7.0	11.4	mV/µW	λp = 840 nm, P_R = 63 µW
V_{NO}	RMS Output Noise Voltage	--	530	--	µV	Noise Bandwidth = 100 MHz, P_R = 0 µW
P_N	Equivalent Optical Noise Input Power (RMS)	--	-41.0	--	dBm	Noise Bandwidth = 100 MHz
$P_{R(MAX)}$	Maximum Input Optical Power(3)(4)(5)	75	--	--	µW	
Z_O	Output Impedance	--	30	--	Ω	f = 50 MHz
V_{Odc}	DC Output Voltage	1.25	1.70	2.45	V	P_R = 0 µW, R_{LOAD} = 500 Ω to Rx Vee
I_{CC}	Power Supply Current	--	9	15	mA	R_{LOAD} = Open
t_r, t_f	Rise Time, Fall Time(3)(4) (10% to 90%)	--	3.5	6.5	ns	P_R = 63 µW, C_{LOAD} = ≤ 15 pF
DCD	Duty Cycle Distortion(3)(6)	--	0.4	1.2	ns	P_R = 75 µW
BW	Bandwidth	100	125	--	MHz	-3 dB Electrical

*Typical values are at T_A = 25° C with Rx Vcc - Rx Vee = 5.00 V.

NOTES:
(1) Coupled optical power using a 2 to 5 meter length of 62.5/125 µm fiber cable, N.A. = 0.275.
(2) Rise and fall times shown here are valid for a 50 Ω driver impedance. Rise and fall times obtained using commercial LED driver circuits can be significantly lower. Refer to Application Bulletin 217.
(3) P_R is defined as average coupled optical power at the receiver input.
(4) Square wave light input: 12.5 MHz; (tr and tf) ≤ 2.0 ns; extinction ratio ≤ 10%; AC coupled, 500 Ω load to Rx Vee.
(5) Defined with DCD ≤ 1.2 ns.
(6) Square wave light inpupt: 50 MHz; (tr and tf) ≤ 2.0 ns; extinction ratio ≤ 10%; AC coupled, 500 Ω load to Rx Vee.

REEL
Material: Antistatic, Type 'A', 56mm LOKREEL
Diameter: 13 inches (325mm)
Hub Diameter: 4 inches (100mm)
Hub Width: 56.5mm
Surface: 10^{11} ohm/sq (maximum rating)

POCKET TAPE
Material: Antistatic, HMS-10-13-A
Width (W): 56mm
Pitch (P): 24mm (pocket to pocket)
Sprocket Pitch: 4mm
Pocket Depth(K_0): 0.43 inches (10.92mm)

COVER
Material: Conductive, pressure-sensitive
Width: 49.5mm

OTHER PROPERTIES
Parts Per Reel: 200
Leader: 17 pockets

FIBER OPTIC COMPONENTS