

# 5021TR

## 22 GHz DFB Transceiver



The 5021TR 22 GHz transceiver delivers unmatched performance for radar testing, signal processing, phased antenna array, and phase noise testing. This rugged device eliminates many of the problems that are inherent in alternative transceiver technologies. When used in conjunction with the 355A fiber-optic delay spools it offers performance that is superior to acoustic wave and coaxial delay lines.

Ortel's fiber-optic transceivers provide bandwidth that is essentially independent of fiber length, loss or delay, and triple transit signals that are immeasurable. In addition to enhanced electrical performance, the delay lines provide several mechanical advantages. Ortel's technology takes advantage of the rigid yet flexible properties of fiber-optic cable to provide repeatable, enhanced phase and group delay characteristics. The small size of these components allows for a long delay in a compact package with superior temperature stability of fiber.

### Features

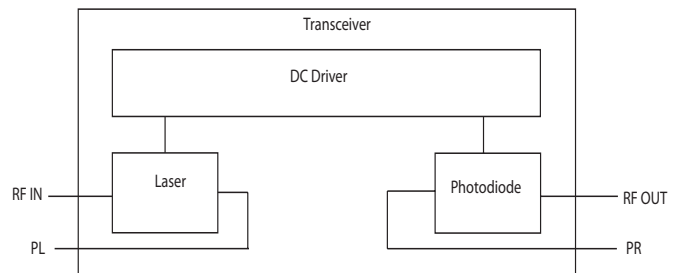
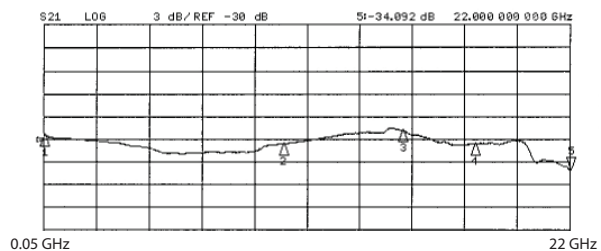
- Bandwidth to 22 GHz
- Cooled, isolated direct-mod DFB laser
- High dynamic range
- -40 to +65 C
- 1310 nm
- Flat frequency response
- Low phase noise
- CE Certified

### Applications

- Radar testing
- Signal processing
- Phased antenna array
- Phase noise processing
- Antenna remoting
- Military communications
- Telemetry, Tracking & Control (TT&C)

### Ordering Options

Model Number	Description
5021TR-E-1309-SA	Transceiver, 22 GHz, SMA, 1310 nm, 9 dBm, SC/APC
5021TR-E-1309-FA	Transceiver, 22 GHz, SMA, 1310 nm, 9 dBm, FC/APC



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MICROWAVE

### Absolute Maximum Ratings

Stresses in excess of the absolute maximum ratings can cause permanent damage to the device. These are absolute stress ratings only. Functional operation of the device is not implied at these or any other conditions in excess of those given in the operational sections of the data sheet. Exposure to absolute maximum ratings for extended periods can adversely affect device reliability.

Parameter	Min	Max	Unit
Operating Temperature Range of Baseplate	-40	+65	°C
Storage Temperature	-55	+85	°C
RF Input Power	-	20	dBm

### DC Interface Characteristics

Pin Number	Min	Typ	Max	Max Ripple	Current
1	11V	-	16V	100 mV p-p	0.3 A max
2	4.5V	-	5.5V	200 mV p-p	1.6 A max

### Front Panel LEDs

- Power on
- Laser Temperature Stable
- Laser Optical Power Stable
- Photodiode Optical Input Power

### Pin/Package Information

Nine-Pin, Male D-sub Connector

Pin Number	Function
1	+15 Vdc
2	+5 Vdc
3	Not Used
4	Ground
5	Ground
6	Photodiode Current Monitor
7	Alarm Common
8	Laser Current Monitor
9	Alarm

### Laser Safety

This product meets the appropriate standard in Title 21 of the Code of Federal Regulations (CFR). FDA/CDRH Class IIIb laser product. This device has been classified with the FDA/CDRH under accession number 0220191. All Versions of this laser are Class 3B laser product, tested according to IEC 60825-1:1993 + A1:1997 + A2:2001 / EN 60825-1:1994 + A2:2001 + A1:2002

Single-mode fiber pigtail with SC/APC connectors (standard).

Wavelength = 1.3 μm.

Maximum power = 30 mW.

Caution: Use of controls, adjustments and procedures other than those specified herein may result in hazardous laser radiation exposure.

### dc Monitor Voltages

- Photodiode current, pin 6:  
1V/1mA (into 1 MOhm load). Proportional to photodiode optical input power.
- Laser dc current, pin 8:  
1V/100mA (into 1 MOhm load)

### Alarm Circuits

- Summary Alarm, pins 7 & 9.

Closed when unit is OK. Open if fault or no DC power.

The alarm is a dry, form A contact. The alarm is a summary of:

- +5 VDC regulator
- Laser temperature
- Laser optical output power
- Photodiode optical input power.

### Optical Characteristics

Parameter	Specification	Unit
Fiber	Single mode (9/125 μm)	
Optical Connectors	SC/APC or FC/APC	-
5021 Optical Transmitter Output Power	9 to 11	dBm
Optical Receiver Input Power	10	dBm, max
Delay - Tx optical	7.5	ns, max
Delay - Rx optical	7.5	ns, max

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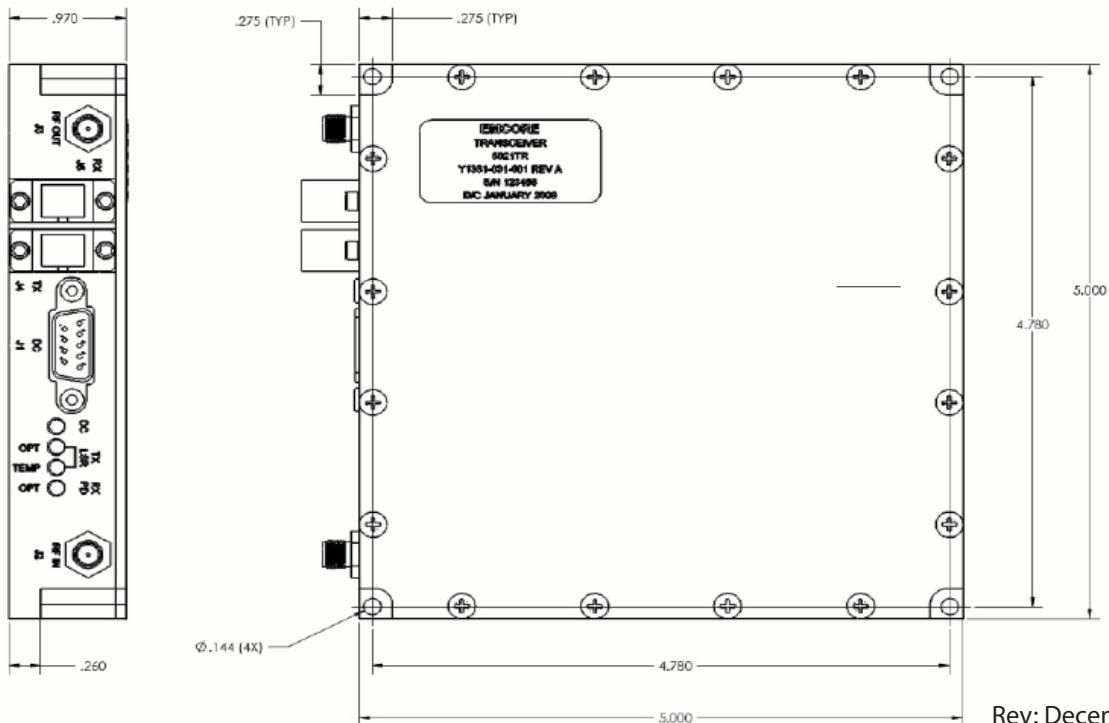
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### Electrical Characteristics<sup>1</sup>

Parameter	5021TR-D	Unit
Upper Band Edge Frequency, min	22	GHz
Lower Band Edge Frequency, max	0.05	GHz
Amplitude Flatness	6	dB p-p
Transmitter Gain (TG), 1 GHz <sup>2</sup>	-17	dB (W/A)
Receiver Gain (RG), 1 GHz <sup>2</sup>	-11	dB (A/W)
Input RF Return Loss, max <sup>3</sup> 0.05 - 13 GHz 13 - 22 GHz	-7.0 -4.0	dB
Output RF Return Loss, max 0.05 - 13 GHz 13 - 18 GHz 18 - 22 GHz	-9.0 -6.0 -4.0	dB
Impedance	50	Ohm
Input 1 dB Compression, min <sup>3</sup>	+20	dBm
Input Third Order Intercept, min <sup>3</sup> 0.05 GHz - 7 GHz 7 - 22 GHz	+30 +25	dBm
Noise Figure, max <sup>3</sup> 0.05 GHz - 3 GHz 3 - 7 GHz 7 - 13 GHz 13 - 18 GHz 18 - 22 GHz	44 50 54 59 61	dB

1. Tested at 25 °C unless noted otherwise.
2. Link RF Gain<sub>dB</sub> = TG + RG - 2\* FiberLoss<sub>dB</sub> (assumes R<sub>in</sub> = R<sub>out</sub>)
3. Performance applies only within the frequency range specified by the model number.

### Outline Drawing



Rev: December 14, 2010