5021TR-C 13 GHz
1310 / 1550 nm DFB Transceiver

DATASHEET | FEBRUARY 2017 MICROWAVE

Applications

- Radar Testing
- Signal Processing
- Phased Array Antenna
- Phase Noise Processing
- Antenna Remoting
- Military Communications
- Telemetry, Tracking & Control (TT&C)

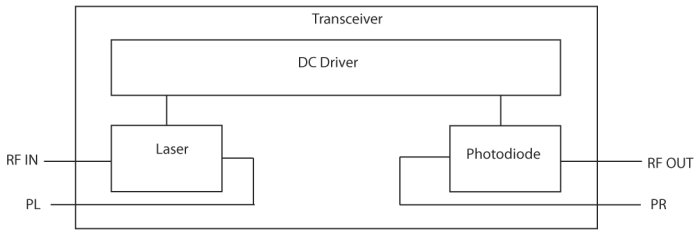
Features

- Bandwidth to 13 GHz
- Cooled, Isolated Direct-Mod DFB Laser
- High-Dynamic-Range
- -40 to +65°C
- 1310 / 1550 nm
- Flat Frequency Response
- Low Phase Noise
- CE Certified

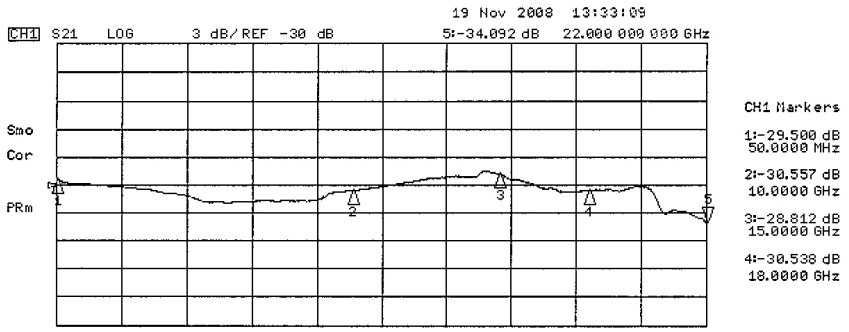
The 5021TR-C, 13 GHz transceiver delivers unmatched performance for radar testing, signal processing, phased array antenna, and phase noise testing. This rugged device eliminates many of the problems that are inherent in alternative transceiver technologies. When used in conjunction with the 355A fiber optic delay spools it offers performance that is superior to acoustic wave and coaxial delay lines.

EMCORE's fiber optic transmitters 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 transmitter provides several mechanical advantages. EMCORE'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.

Block Diagram



Typical S21 Graph



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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	Symbol	Condition	Min	Max	Unit
Operating Temperature Range of Baseplate	T_{OP}	continuous	-40	+65	°C
Storage Temperature	T_{STG}	-	-55	+85	°C
RF Input Power	P_{IN}	60 seconds	-	20	dBm

Electrical Characteristics

Parameter	5021TR-C	Unit
Upper Band Edge Frequency, min	13	GHz
Lower Band Edge Frequency, max	0.05	GHz
Amplitude Flatness, max[3]	5.0	dB p-p
Transmitter Gain (TG), 1 GHz[2]	-17	dB (W/A)
Receiver Gain (RG), 1 GHz[2]	-11	dB (A/W)
Input RF Return Loss, max[3] 0.05 GHz - 13.0 GHz	-7.0	dB
Output RF Return Loss , max 0.05 GHz - 13.0 GHz	-9.0	dB
Impedance, typ	50	Ohm
Input 1 dB Compression, min[3]	+20	dBm
Input Third Order Intercept, min[3] 0.05 GHz -7.0 GHz 7.0 GHz - 13.0 GHz	 +30 +25	 dBm dBm
Noise Figure, max[3] 0.05 GHz - 3.0 GHz 3.0 GHz - 7.0 GHz 7.0 GHz - 13.0 GHz	 44 50 54	 dB dB dB

1. Tested at 25°C unless noted otherwise.
2. Link RF $Gain_{dB}$ = TG + RG-2* $FiberLoss_{dB}$(assumes $R_{IN} = R_{OUT}$)
3. Performance applies only within frequency band specified by the model number.

Optical Characteristics

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

DC Interface Characteristics

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

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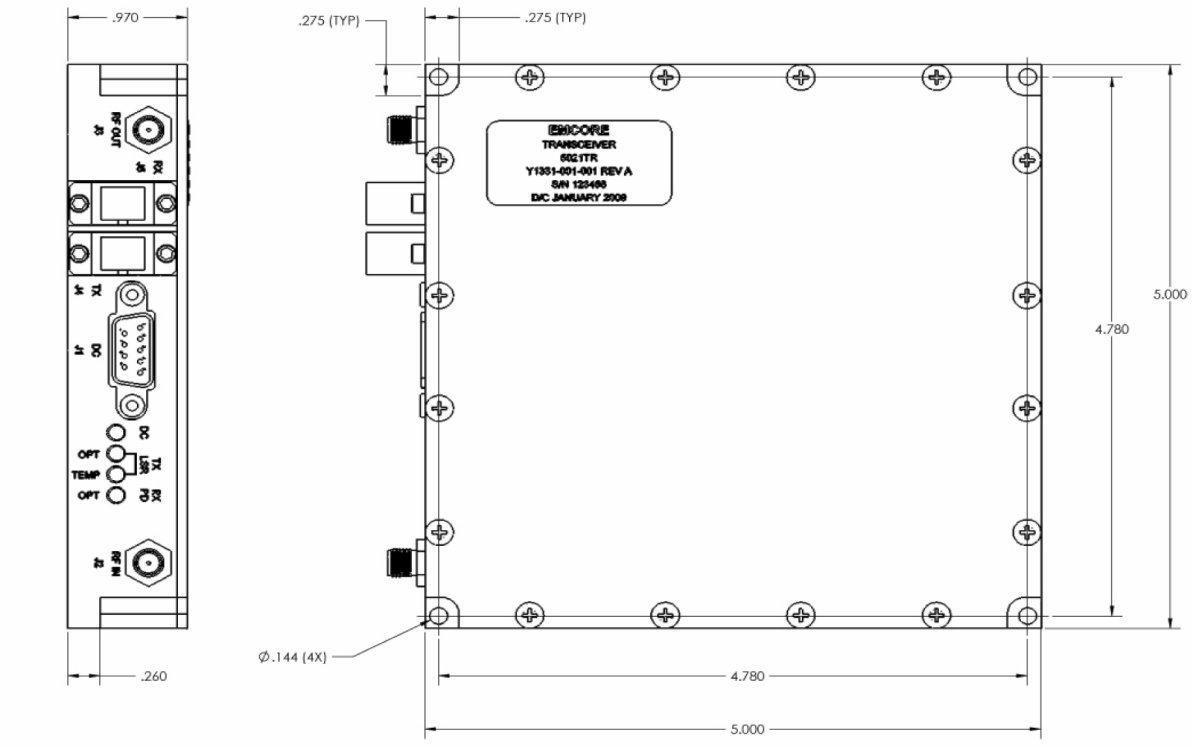
Pin/Package Information

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

Outline Drawing



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DC Monitor Voltages

- Photodiode Current, Pin 6:
  1 V/1 mA (into 1 MOhm load). Proportional to photodiode optical input power.
- Laser DC Current, Pin 8:
  1 V/100 mA (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 :
  1. +5 VDC Regulator
  2. Laser Temperature
  3. Laser Optical Power
  4. Photodiode Optical Input Power

Front Panel LEDs

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

Order Information

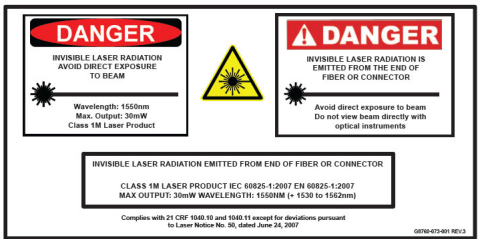
Model Number	Description
5021TR-C-1309-SA	Transceiver, 13 GHz, SMA, 1310 nm, 9 dBm, SC/APC
5021TR-C-1309-FA	Transceiver, 13 GHz, SMA, 1310 nm, 9 dBm, FC/APC

Laser Safety

This product meets the appropriate standard in Title 21 of the Code of Federal Regulations (CFR). FDA/CDRH Class 1M laser product. This device has been classified with the FDA/CDRH under accession number 0220191. All versions of this laser are Class 1M laser product, tested according to IEC 60825-1:2007 / EN 60825-1:2007. An additional warning for Class 1M laser products. For diverging beams, this warning shall state that viewing the laser output with certain optical instruments (for example: eye loupes, magnifiers, and microscopes) within a distance of 100 mm may pose an eye hazard. For collimated beams, this warning shall state that viewing the laser output with certain instruments designed for use at a distance (for example: telescopes and binoculars) may pose an eye hazard.

Wavelength = 1.3/1.5 µm.

Maximum power = 30 mW.



*Caution - Use of controls or adjustments or performance of procedures other than those specified herein may result in hazardous radiation exposure.
*IEC is a registered trademark of the International Electrotechnical Commision.

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