T-41-91

BT&D TECHNOLOGIES

RCV5201
FIBER OPTIC *"LIGHT TO LOGIC"* ™ RECEIVER

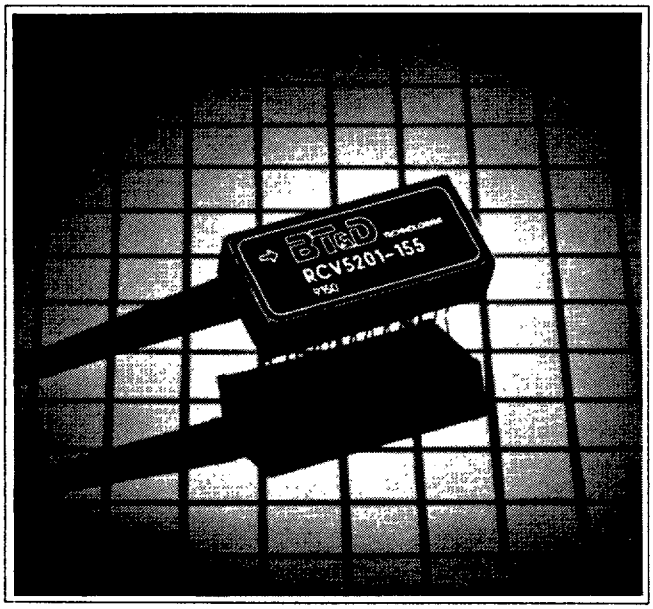
Features:

- Light to Logic 20-pin DIP receiver offers ECL compatibility
- -36 dBm AT 155 Mbits/s
  -40 dBm at 52 Mbits/s
- Plastic package
- GaAs IC preamplifier for high performance
- Maximum optical input power >-7 dBm
- SONET/SDH Compliant

Applications:

- Telecommunications networks
- SONET and SDH compatible
- Local area and metropolitan area networks
- Military communications and control systems
- Digital cable TV networks

RCV5201



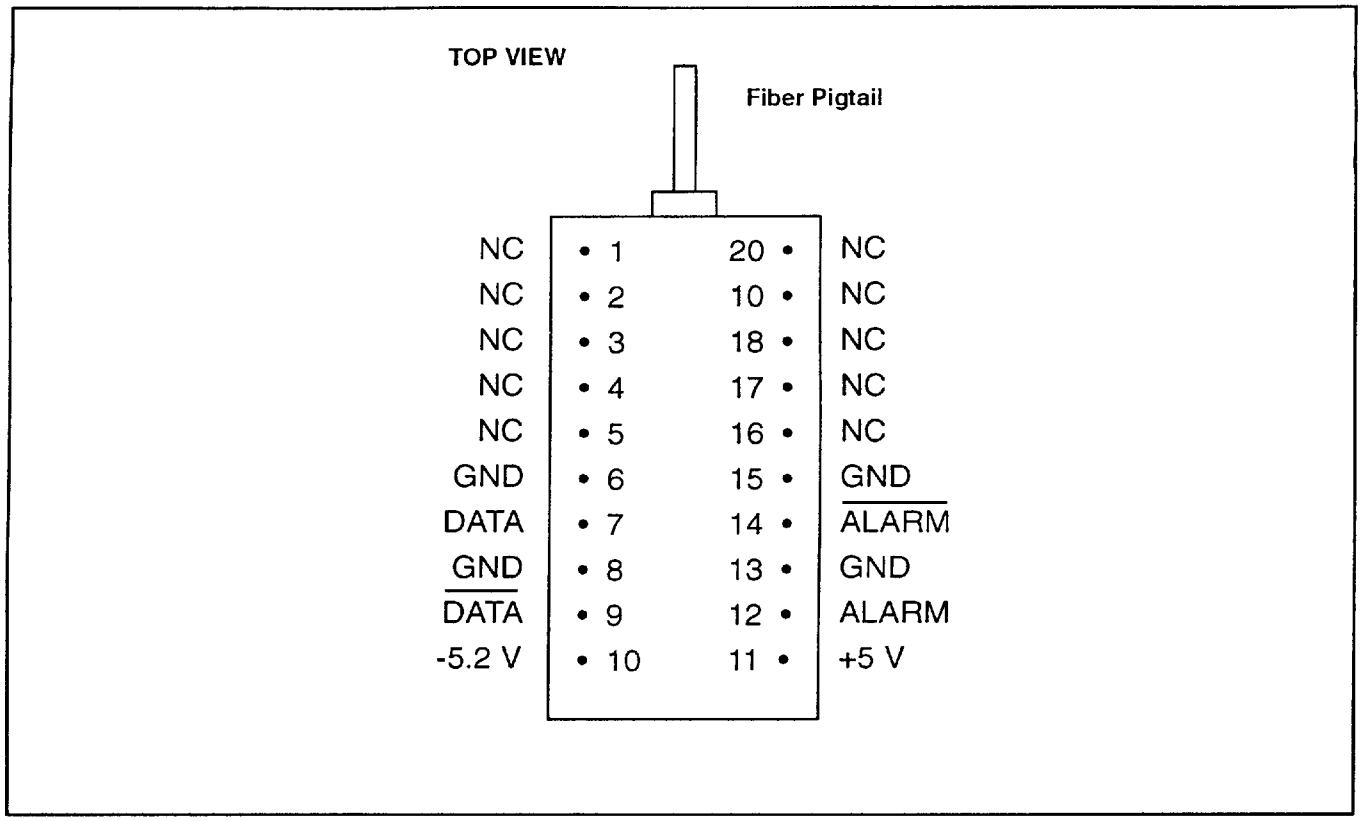
The RCV5201 receivers provide optical signal conversion and processing. Each receiver contains an InGaAs PIN photodiode and high sensitivity, wide dynamic range, transimpedance amplifier, capacitively coupled to limiting amplifier stages with PECL output drivers. Also provided is a loss of signal alarm.

The BT&D planar pin photodiode operates throughout the 1200 nm to 1600 nm wavelength band. A GaAs IC wide dynamic range transimpedance amplifier optimized for either 52 or 155 Mbaud operation provides the low noise front end gain.

A low pass filter maximizes the signal to noise ratio while minimizing intersymbol interference. The interface amplifier provides signal conversion and buffering for the PECL complementary data outputs. A complementary PECL alarm output is also provided.

The receivers operate from +5 and -5.2 V power supplies. A 50/125 micron multimode fiber pigtail is included, assuring compatibility with multimode and single-mode fiber optic systems.

RCV5201 CONNECTION DIAGRAM



NC

These pins are not connected and should be left open circuit on the application PCB.

GROUND

These pins should be connected to the circuit ground.

DATA, $\overline{\text{DATA}}$

These pins provide complimentary differential PECL DATA and $\overline{\text{DATA}}$ outputs. The RCV5201 DATA output is non inverting, an optical pulse causes the DATA output to go to the PECL logic high state (+4V nominal).

ALARM,$\overline{\text{ALARM}}$

These pins provide complimentary differential ALARM and $\overline{\text{ALARM}}$ outputs. This is the low light alarm. ALARM goes to a logic low (3.3V nominal) state when the optical power drops below the threshold level (insufficient optical power).

The optical power must increase to a higher level than the level where the alarm went low before ALARM will return high. This difference is the alarm hysteresis.

FUNCTIONAL DESCRIPTION RCV5201

Design

The RCV5201 receiver contains a InGaAsP photodetector, transimpedance amplifier and interface amplifier circuit. It is designed with a multimode fiber pigtail to allow maximum flexibility in connector options.

The interface amplifier is capacitively coupled to the preamplifier circuit with a time constant of approximately 0.1 ms.

Terminating the Outputs

The data outputs of the RCV5201 are PECL compatible. Care should be taken to match termination impedances to the interconnect to minimize reflection effects. Both serial data outputs (DATA and $\overline{\text{DATA}}$) should be terminated identically, even if only one output is used, in order to balance the drive currents drawn from the RCV5201. This will lower the power supply noise generated by the RCV5201 and improve performance at low optical input power levels.

Circuit Layout

The RCV5201 uses very high bandwidth circuitry to achieve its high level of performance. Care must be taken to ensure stable operation. The use of ground planes and transmission line interconnects is required. The use of a standard evaluation board is highly recommended for those users who are not familiar with these techniques.

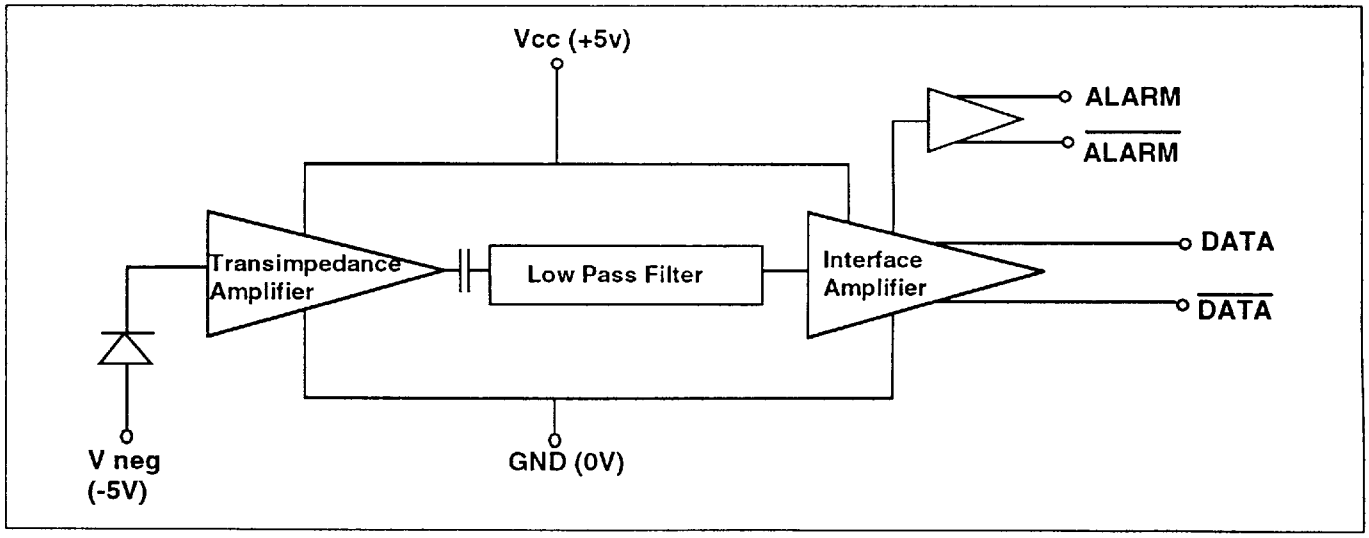
Signal traces should conform to ECL design rules to prevent reflections and ringing from degrading performance. Useful guidelines are contained in ECL manufacturer design manuals.

Manufacturing

The fiber pigtail on the device requires normal fiber handling considerations. Care should be taken to avoid tight bends as well as excessive tension on the fiber pigtail.

The allowable temperature range for the RCV5201 is limited by the material used in the pigtail. Exposure to temperatures over 85°C is not recommended. Low profile sockets or hand soldering is recommended for this part.

Figure 1 - Block diagram of the RCV5201



RCV5201 ABSOLUTE LIMITING RATINGS

Parameter	Symbol	Min	Max	Units
Supply Voltage [1]	Vcc	- 0.5	5.5	V
Supply Voltage	V neg	- 10	0.5	V

ENVIRONMENTAL PARAMETERS

Parameter	Symbol	Min	Max	Units
Operating Temperature	_	- 40	+ 85	°C
Storage Temperature	_	- 40	+ 85	°C
Humidity	--	--	85	%RH

ELECTRICAL PARAMETERS [-40 TO +85°C]

Parameter	Symbol	Min	Max	Units
Supply Voltage	Vcc	4.75	5.3	V
Supply Voltage	V neg	- 4.0	-6.0	V
Vcc Supply Current [4]	_	_	100	mA
V neg Supply Current	_	_	1.0	mA
DATA Output Level [high] [2,3]	--	3.9	4.15	V
DATA Output Level [low] [2,3]	--	3.1	3.5	V
ALARM Output Level [high] [2,3]	V off	3.9	4.15	V
ALARM Output Level [low] [2,3]	V on	3.1	3.5	V

Notes

1. Vcc of -0.5 V and V neg of +0.5 V may not be applied simultaneously.
2. Output terminated to (Vcc -2) with 50 Ω load or equivalent.
3. Output voltages are for Vcc = 5.0 volts.
4. Outputs not loaded.

OPTICAL PARAMETERS [-40 TO +85°C]

Parameter	Symbol	Min	Max	Units
Wavelength	_	1200	1600	nm
Receiver Sensitivity [1]				
52 Mb	_	_	-40	dBm
155 Mb	_	_	-36	dBm
Maximum I/P Power	_	-7.0	_	dBm
Alarm ON				
52 Mb	_	-48	-40	dBm
155 Mb	_	-44	-36	dBm
Hysteresis	--	0.5	4	dB
Alarm Response Time	_	_	600	µS
Reliability Target	_	_	2000	FIT

Notes

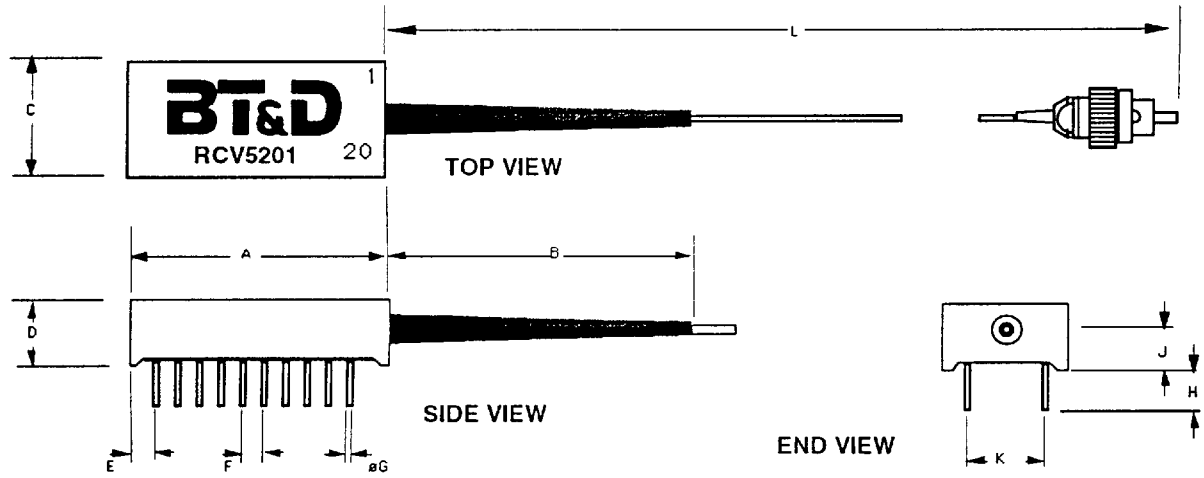
1. At a B.E.R. of $1X10^{-10}$, 2^{23}-1 PRBS pattern NRZ data at the line rate with 10:1 extinction ratio.

Fiber Pigtail	Typ	
Fiber Core	50	microns
Fiber Outer Diameter	125	microns
Fiber Plastic Diameter	900	microns

RCV5201 PACKAGE DRAWING

DIM	MIN	NOM	MAX
A		33.02	33.2
B			40.75
C	16.0	16.13	16.3
D			9.27
E	2.6	2.8	2.95
F		2.54	
ØG	0.46	0.5	0.53
H	3.1		3.5
J		4.57	
K	10	10.16	10.3
L	400		1000

All dimensions in mm



ORDERING INFORMATION

Please order part number - RCV5201 - 155 - FP

*Connector:
FP = FC/PC Polish
ST = ST™

Specified Data Rate:
052= 52 Mbits/s
155= 155 Mbits/s

Model Name:
RCV5201

Allowable part numbers
RCV5201 -155
RCV5201-052

HANDLING PRECAUTIONS

The RCV5201 can be damaged by current surges or overvoltage. Power supply transient precautions should be taken. Normal handling precautions for electrostatic sensitive devices should be taken.

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