T-41-91

BT&D TECHNOLOGIES

British Telecom & DuPont

PDC1211-52/155

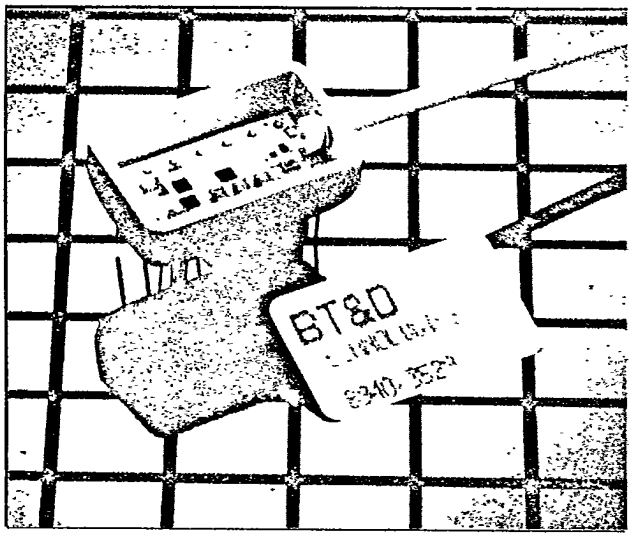
WIDE DYNAMIC RANGE GaAs IC PINFET RECEIVER

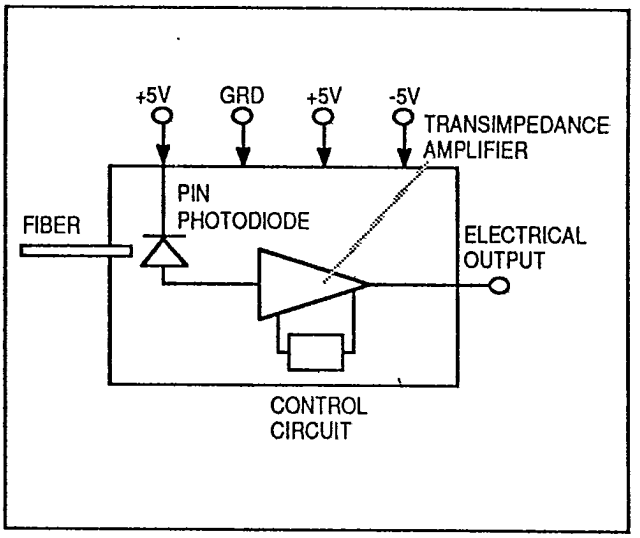
Features

- Ultra high reliability planar InGaAs PIN photodiode
- Custom GaAs IC for high performance and stability
- High sensitivity and dynamic range
- Transimpedance amplifier design
- 14 PIN dual in line package
- 1300 and 1550 nanometer operation

Applications

- Optical communication systems operating up to 155 Mbits/s
- Subscriber loop
- Interoffice
- SONET and SDH





Description

The PDC1211 family of receivers offer wide dynamic range performance optimised for operation at 52 and 155 Mbit/s, without compromising receiver sensitivity. The planar PIN InGaAs photodiode is produced by MOVPE, providing very high electro-optic performance and state of the art reliability. The FET transimpedance amplifiers are based on 0.5µm GaAs circuits and are linked to a silicon control circuit used to enhance the dynamic range. The receiver is hermetically packaged in a 14 pin dual in line package.

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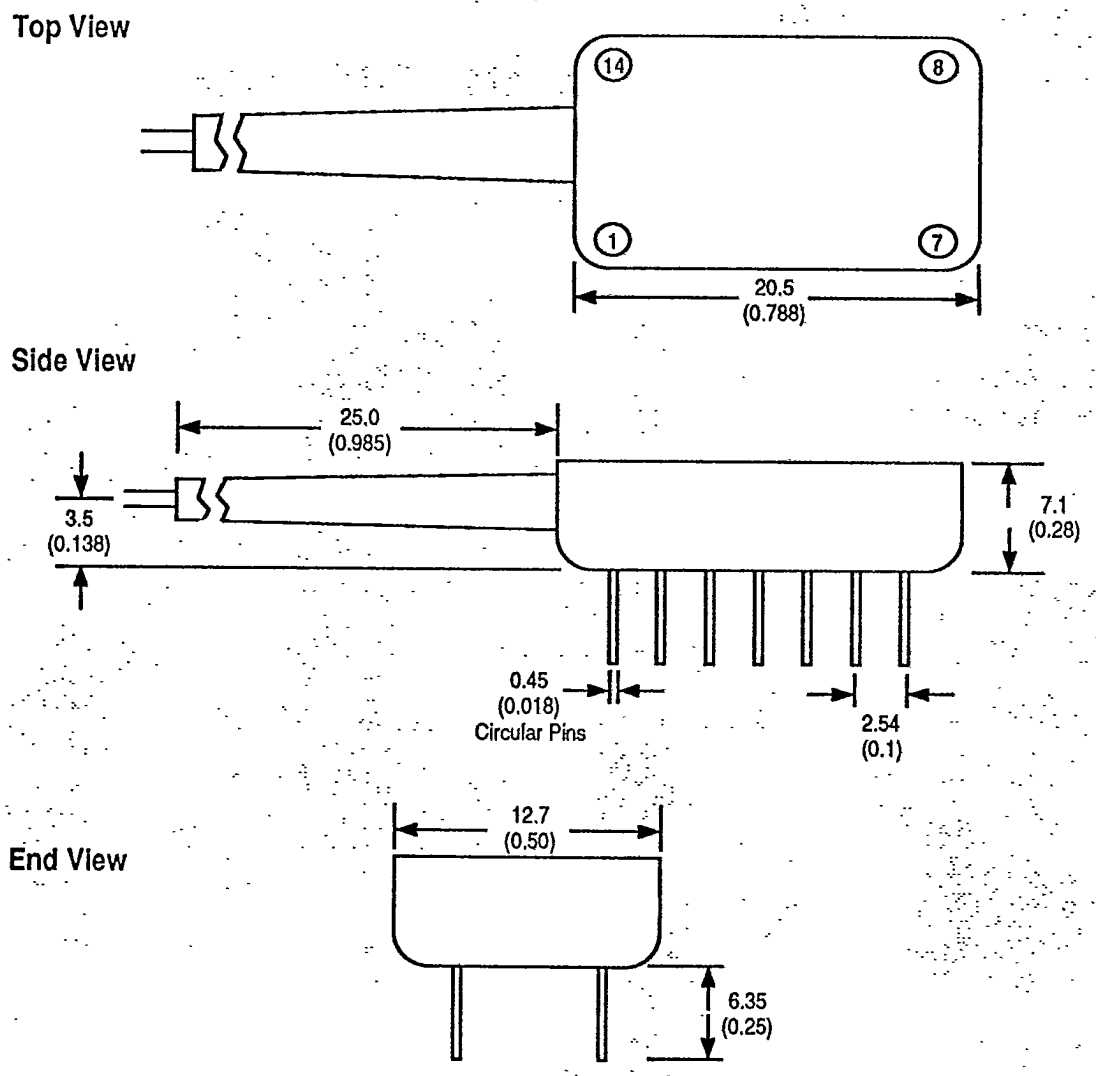
PACKAGE DIMENSIONS

dimensions in millimeters (inches)



PIN NO.	FUNCTION	PIN NO.	FUNCTION
1	+Vbias	8	Not connected
2	GND	9	Not connected
3	GND	10	+V
4	-V	11	GND
5	GND	12	Output
6	GND	13	GND
7	Not connected	14	GND

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SPECIFICATIONS

ABSOLUTE MAXIMUM RATINGS

PARAMETER		MIN	MAX	UNITS
Case Operating Temperature		-40	+85	°C
Storage Temperature		-40	+85	°C
Humidity	Operating	—	Non-condensing	
	Storage	—	Non-condensing	
Supply Voltage	+V	0.0	+6.0	V
	-V	-6.0	0.0	V

PERFORMANCE SPECIFICATIONS — OPTICAL [1, 2, 3, 4]

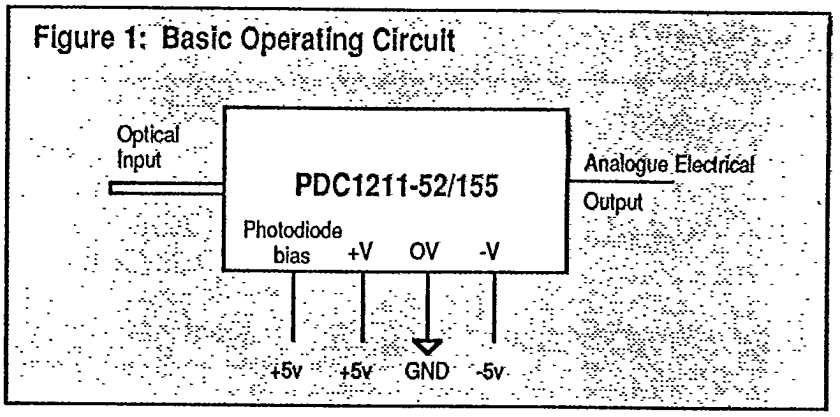
PARAMETER	MIN	TYP	MAX	MIN	TYP	MAX	UNITS
Bit Rate		52			155		Mbit/s
-3dB Frequency	—	>36	—	—	>110	—	MHz
Sensitivity	-42.0	-43.0	—	-38.0	-39.0	—	dBm
Output Signal Level at Sensitivity	5	10	—	5	10	—	pk-pk mV
Responsivity at Sensitivity	—	120	—	—	35	—	kV/W
Maximum Optical Power	>0	—	—	>0	—	—	dBm

PERFORMANCE SPECIFICATIONS — ELECTRICAL [1, 2, 3]

PARAMETER	MIN	TYP	MAX	UNITS
Wavelength	1200	—	1600	nm
Output Impedance	80	100	120	Ohms
Positive Supply Volts	—	5	—	V
Current	—	35	40	mA
Negative Supply Volts	—	-5		V
Current	—	25	30	mA
Total Power	—	300	350	mW
Fiber Specifications	50/125 core / cladding diameter 900µm outside diameter silicone / nylon tight jacket temperature rated at 125°C			
Fiber Length	—	1	—	Meter
MTTF (at 25°C case temp.)	500,000			Hours

Notes:

1. Conditions unless otherwise specified: Supply voltages ±5V. 25°C case temperature.
2. Measured at 1300nm wavelength. 10^{-11} BER, 100% modulation depth. 2^{15} -1 Pseudorandom pattern.
3. Output connected to 50Ω load (ac coupled).
4. If minimum bandwidth is required for analog applications, please specify at time of order.



Please refer to HANDLING PRECAUTIONS section before operating device

The PDC1211 is designed to be easy to use. Figure 1 illustrates the device connected in its standard operating configuration. Additional functionality is described in detail in the following applications guide.

1. Detailed Functional Description

The PDC1211 uses a GaAs integrated transimpedance preamplifier optimised for operation of the circuit at either 52 or 155Mbit/s. These are linked to a silicon control circuit which senses the incident optical input power and bleeds current from the transimpedance resistor in order to prevent circuit saturation and hence achieve the quoted dynamic range performance.

2. Electrical Performance

The circuit requires a positive supply of +5V. The photodiode is connected to a separate package pin to enable the user to monitor the circuit photocurrent if desired. The circuit also requires a negative supply of -5v and good electrical ground integrity. The analog electrical output gives a peak to peak output voltage signal which is proportional to the incident optical input power for input powers less than 15dB above the sensitivity level (the minimum output voltage at sensitivity is 5mV into 50ohm which is equivalent to an electrical responsivity of 120kV/W at 52Mbit/s, and 35kV/W at 155Mbit/s). Above this power level the output voltage is limited at approximately 800mV pk-pk by the operation of the control circuit.

The unit exhibits negligible pulse width distortion over the entire operating range of input powers from sensitivity to >0dBm.

Optimum sensitivity is achieved with good electrical grounding and short, well decoupled supply leads (recommend 0.1uF on all positive and negative supplies, close to the package).

3. Packaging

The complete circuit is hermetically mounted in an industry standard 14 pin dual in line style package. The package body is internally connected to ground. Adequate heatsinking should be provided to ensure that case temperature does not exceed 85°C.

4. Evaluation Board

An evaluation board is available for this product. Contact BT&D for more details.

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PDC1211-52/155

BT&D TECHNOLOGIES

ORDERING INFORMATION

Please order part number P D C 1 2 1 1 - X X X - X X

DATA RATE:
052 Mbit/s
155 Mbit/s

Style: FC/PC = FP
ST = ST
SMA = SA
Biconic = BI
None = NA

Products are available with custom connectors; call your account representative for details.

HANDLING PRECAUTIONS

1. High electrostatic fields can permanently damage PDC1211-52/155 devices. Normal precautions for handling electostatic sensitive devices should be taken.
2. InGaAs PIN Photodiodes can be damaged by over-loading or current surges. Appropriate transient protection precautions should be taken.

To place an order or to obtain more information, contact:

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