

DLT1000 Transmitter
DLR1000 Receiver

BT&D
TECHNOLOGIES

British
Telecom
&
DuPont

T-41-91

DLT1000 Transmitter and DLR1000 Receiver

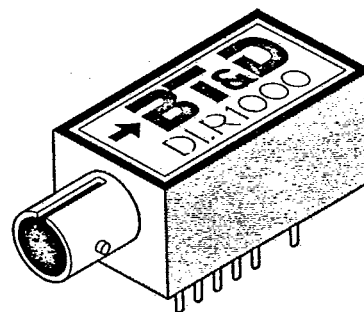
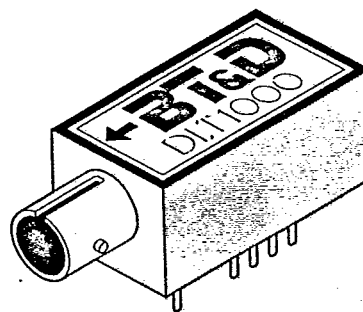
FIBER OPTIC DATA LINKS

Features:

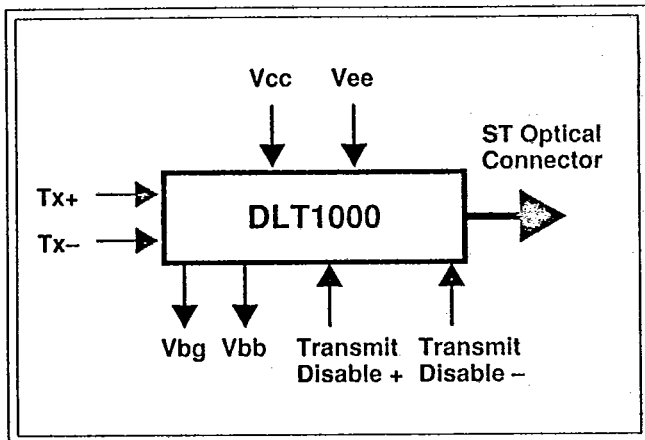
- Full FDDI compliance
- Reliable 1300 nanometer MOVPE ELED
- Reliable InGaAs/InP Planar MOVPE PIN detector
- Single 5-volt power supply
- Compact ST® connectorized 14-pin DIP package
- High speed to >170 Mbits/second
- Low power consumption
DLT1000: 600 mW typical
DLR1000: 400 mW typical
- Transmission distances up to 5 kilometers
- 18 dB typical loss budget for DLT1000/
DLR1000 system through 62.5 μ m fiber
- 17dB typical loss budget when used with
50 μ m fiber.

Applications:

- FDDI systems
- Local area networks
- Point-to-point data communications
- Digital television
- Military communications and control systems
- Switching systems



DLT1000

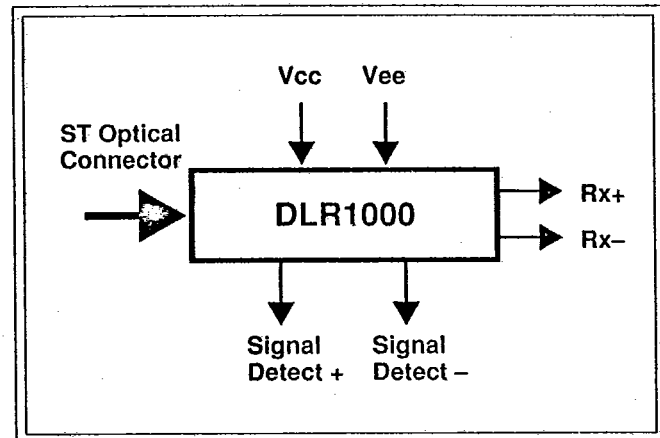


The **DLT1000 Data Link Transmitter** converts serial ECL signals to lightwaves in the 1300 nanometer band. It is capable of data rates from DC to **220 Mbits/second**. A single nominal 5-volt power supply is required. The DLT1000 will operate with either Vcc or Vee grounded for direct interface with ECL (Vcc = 0V), pseudo-ECL (Vcc = +5V), TTL (Vcc = +5V), or CMOS (Vcc = +5V). Data and Transmit_Disable signals are received through complementary differential inputs to comparators. Logical 1 to transmit data (Tx+, Tx-) results in high optical output. Logical 1 to Transmit_Disable disables the transmitter.

Output biases Vbb and Vbg are available for user voltage referencing applications or for setting Data or Transmit_Disable comparator switching level. For example, to control Transmit_Disable with a TTL signal when the DLT1000 is powered to pseudo-ECL levels, connect Transmit_Disable- to Vbg and input the TTL transmit disable signal to Transmit_Disable+. To hardwire enable the DLT1000 regardless of power configuration, connect Transmit_Disable+ to Vbg and Transmit_Disable- to Vbb.

The InGaAsP/InP **high-speed ELED** is fabricated by the Metal-Organic Vapor Phase Epitaxy (MOVPE) process for high reliability, performance, and consistency.

DLR1000



The **DLR1000 Data Link Receiver** converts lightwaves in the 1300 nanometer band to serial ECL signals. Data rates from 1 to 170 Mbits/second can be used. A single nominal 5-volt power supply is required (Vcc = +5V and Vee = 0V).

Data and Signal_Detect signals come from complementary, ECL-compatible differential outputs. In the logic 1 state, the positive output is high and the negative output low; in the logic 0 state, the positive output is low and the negative output high.

Signal_Detect is an optical power alarm. The optical signal intensity is sufficient for conversion when Signal_Detect is logic 1; when it is too weak for conversion, Signal_Detect is logic 0. The assert/de-assert parameters are compliant with the **FDDI PMD** Standard. Assert is typically -34 dBm; de-assert is typically -36 dBm. If not used, the Signal_Detect output(s) can be left unconnected.

The InGaAs/InP high-performance **Planar PIN photodiode** is manufactured by the MOVPE process for high reliability and product consistency.

BT&D

T-41-91

DLT1000 Transmitter**ABSOLUTE LIMITING RATINGS**

PARAMETER	MIN	MAX	UNITS
Power Supply Voltage (Vcc or Vee)	0	6	V
Input Voltage	Vee	Vcc	V
Output Current (Vbb and Vbg)	-1	1	mA
Operating Temperature in Free Air	0	+70	°C
Storage Temperature	-20	+85	°C
Relative Humidity	—	non-condensing	%RH
Soldering Temperature	—	240/10	°C/secs

PERFORMANCE SPECIFICATIONS¹

PARAMETER	MIN	TYP	MAX	UNITS
Center Wavelength	1270	1300	1380	nm
Spectral Width (FWHM)	—	80	120	nm
Optical Output Power (average 50% duty cycle into 62.5 μ m core; 0.275 NA fiber)	-19.0 (12.5)	-15.5 (28)	-14.0 (40)	dBm (μ W)
Optical Rise and Fall Time (10%-90%/90%-10%)	0.6	2	3	ns
Duty Cycle Distortion (peak) ²	—	—	0.6	ns
Extinguished Optical Output Power ³	—	0	30	nW
Differential Input to Switch Optical Output	—	100	—	mV
High Level Input Current	—	50	—	μ A
Transmit_Disable Response Time	—	100	1000	ns
Output Voltage at Vbb with Respect to Vcc	-1.5	-1.3	-1.1	V
Output Voltage at Vbg with Respect to Vee	1.1	1.3	1.5	V
Operating Power Supply Voltage	4.5	5.0	5.7	V
Current Consumption ⁴	—	120	160	mA
Transmission Distance ⁵	—	—	5	km

1. Through specified operating conditions.

2. With 62.5 MHz square wave input.

3. With Logical 0 data input or Logical 1 Transmit_Disable input.

4. Typical consumption figure is at 25°C, 5.0 V supply. Maximum consumption is at 70°C, 5.7 V supply.

5. With fiber of appropriate intermodal bandwidth.

DLR1000 Receiver

ABSOLUTE LIMITING RATINGS

PARAMETER	MIN	MAX	UNITS
Power Supply Voltage (Vcc or Vee)	0	6	V
Optical Input Power	—	1	mW
Output Current (any output)	0	30	mA
Operating Temperature in Free Air	0	+70	°C
Storage Temperature	-20	+85	°C
Relative Humidity	—	non-condensing	%RH
Soldering Temperature	—	240/10	°C/secs

PERFORMANCE SPECIFICATIONS¹

PARAMETER	MIN	TYP	MAX	UNITS
Optical Input Center Wavelength	1270	1300	1380	nm
Sensitivity for 2.5E-10 BER at 125 Mbaud ^{2,7}	—	-34 (0.4)	-31 (0.8)	dBm (μW)
Maximum Operating Optical Input Power ^{2,7}	-14 (40)	-12 (63)	—	dBm (μW)
Input Pulse Duration ('0' or '1')	5	—	1000	ns
Input Duty Cycle	40	50	60	%
Total Pulse Width Distortion (peak) ^{2,3}	—	—	0.7	ns
Signal Detect must Assert Input Power	—	—	-31	dBm
BER at which Signal Detect must De-assert	—	—	0.01	—
Signal_Detect Hysteresis	1.5	—	—	dB
Signal_Detect Assertion Time	—	—	100	μs
Signal_Detect De-assertion Time	—	—	350	μs
Rx+ and Rx- Output Rise and Fall Times	0.5	1	1.5	ns
Output High Voltage with Respect to Vcc ⁴	-1.0	—	-0.7	V
Output Low Voltage with Respect to Vcc ⁴	-2.0	—	-1.6	V
Operating Power Supply Voltage	4.5	5.0	5.7	V
Current Consumption ^{5,6}	—	80	120	mA
Operating Distance ⁸	—	—	5	km

1. Through specified operating conditions.

2. With FDDI Standard Test Pattern, both receiver data outputs PECL terminated.

3. At -20 dBm Average Optical Input Power.

4. All outputs at 25°C and are 10KH ECL, but with Vee grounded, and Vcc +5V nominal (so called Pseudo-ECL, PECL).

5. Typical consumption figure is at 25°C, 5.0 V supply. Maximum consumption is at 70°C, 5.7 V supply.

6. Excludes current drawn from output loads.

7. Average optical input power from 62.5 μm core; 0.275 NA fiber.

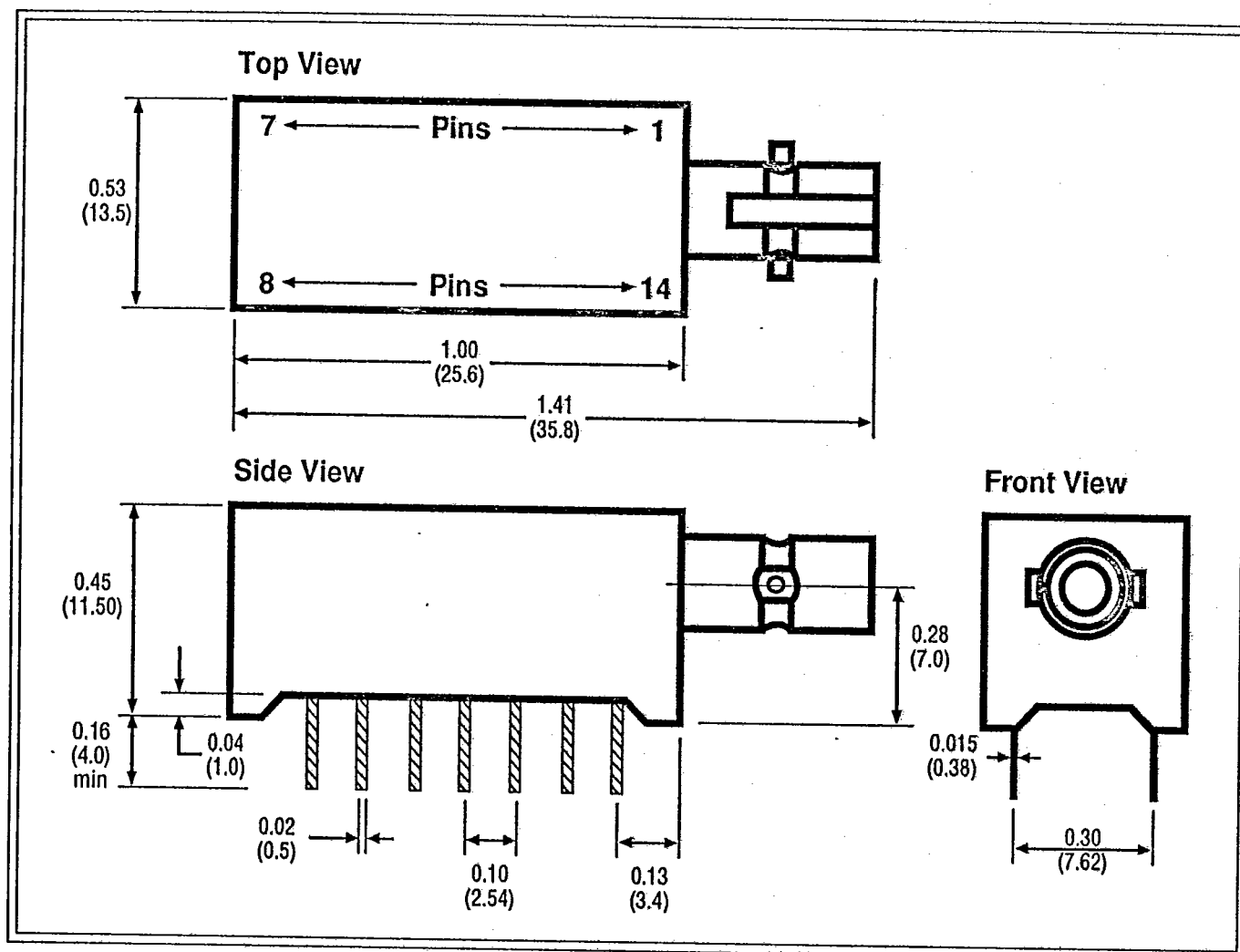
8. With fiber of appropriate intermodal bandwidth.

BER= Bit Error Rate in Errors per Bit.

Both Rx+ and Rx- outputs should be similarly terminated.

DL1000 PACKAGE DIMENSIONS

Dimensions in inches (millimeters)

**PINOUTS DLT1000**

PIN	DESIGNATION
1	Vbg
2	No Pin
3	No Pin
4	Tx+ (non-inverting data input)
5	Tx- (inverting data input)
6	Vcc
7	Vcc
8	No Pin
9	Transmit_Disable+ (high to disable output)
10	Transmit_Disable- (low to disable output)
11	Vbb
12	Vee
13	Vee
14	No-Connection

PINOUTS DLR1000

PIN	DESIGNATION
1	Vee
2	Vee
3	Vee
4	Signal Detect+
5	Signal Detect-
6	No Pin
7	Vee
8	Vee
9	No Pin
10	Vee
11	Vcc
12	Vcc
13	Rx-
14	Rx+