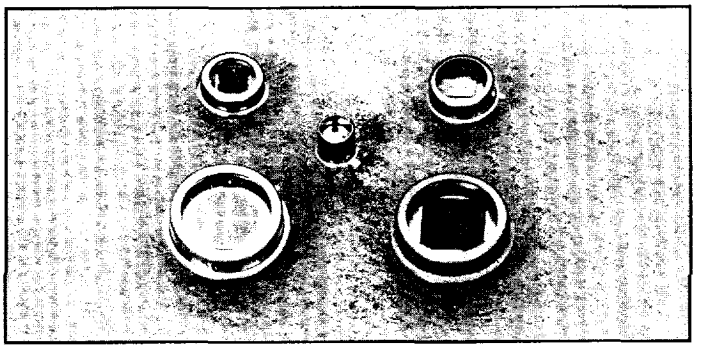
Series 3T

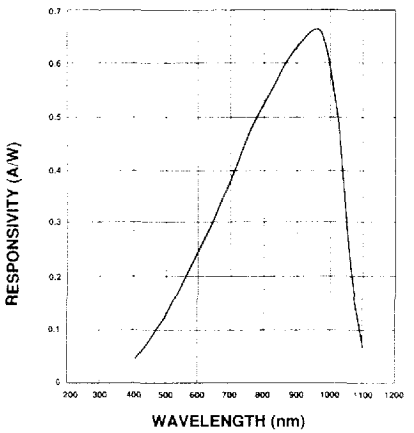
High Speed Detection of Infrared Wavelengths

Series 3T devices are specifically processed to maximize responsivity in the 800 to 1000nm range. Typical responsivity at 900nm is .61 A/W for single junction devices and .58 A/W for quadrants. These photodiodes are fabricated on ultra high resistivity silicon to achieve full depletion and very low capacitance at a reverse bias of 60V.

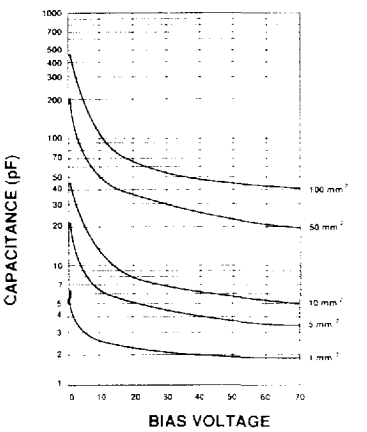
ABSOLUTE MAXIMUM RATINGS

	Max. Rating	Unit
DC Reverse Voltage	70	V
Storage Temperature Range	-45 to +100	°C
Operating Temperature Range	-25 to +75	°C





SERIES 3T - TYPICAL SPECTRAL RESPONSE



SERIES 3T - TYPICAL CAPACITANCE VERSUS BIAS VOLTAGE FOR A GIVEN ACTIVE AREA

Electrical / Optical Specifications

Characteristics measured at 22° C (±2) ambient, and a reverse bias of 60 volts, unless otherwise stated.

Series 3T responsivity tested at 900nm is .54 A/W min., typical .61A/W

Single Elements

Type No.	Active Area		Dark Current nA		NEP WHz$^{-1/2}$ λ = 900 nm	Capacitance pF		Risetime ns λ = 900 nm R_L = 50 Ω	Package
	mm²	mm	Max.	Typ.	Typ.	Vr=0V Typ.	Vr=60V Max.	Typ.	
OSD1-3T	1	1.13 dia	10	3	1.0×10^{-13}	7	2.5	12	4
OSD5-3T	5	2.52 dia	30	7	1.6×10^{-13}	30	5	12	9
OSD15-3T	15	3.8 x 3.8	40	10	1.9×10^{-13}	90	10	12	9
OSD35-3T	35	5.9 x 5.9	150	70	4.8×10^{-13}	205	22	12	15
OSD50-3T	50	7.98 dia	200	100	5.9×10^{-13}	290	27	12	17
OSD60-3T	62	7.9 X 7.9	300	100	5.9×10^{-13}	350	32	12	17
OSD100-3T	100	11.3 dia	600	200	8.3×10^{-13}	580	52	13	20

Quadrants

(Values given are per element unless otherwise stated)

Type No.	Active Area (Total)		Sep.	Dark Current µA		NEP WHz$^{-1/2}$ λ = 900 nm	Capacitance pF		Risetime ns λ = 900 nm R_L = 50 Ω	Crosstalk % at 900 nm		Package
	mm²	mm	mm	Max.	Typ.	Typ.	Vr=0V Typ.	Vr=60V Max.	Typ.	Max.	Typ.	
QD50-3T	50	7.98 dia	0.2	1.0	0.07	4.9×10^{-13}	75	8	12	5	1	18
QD100-3T	100	11.3 dia	0.2	2.0	0.15	7.2×10^{-13}	147	14	12	5	1	19

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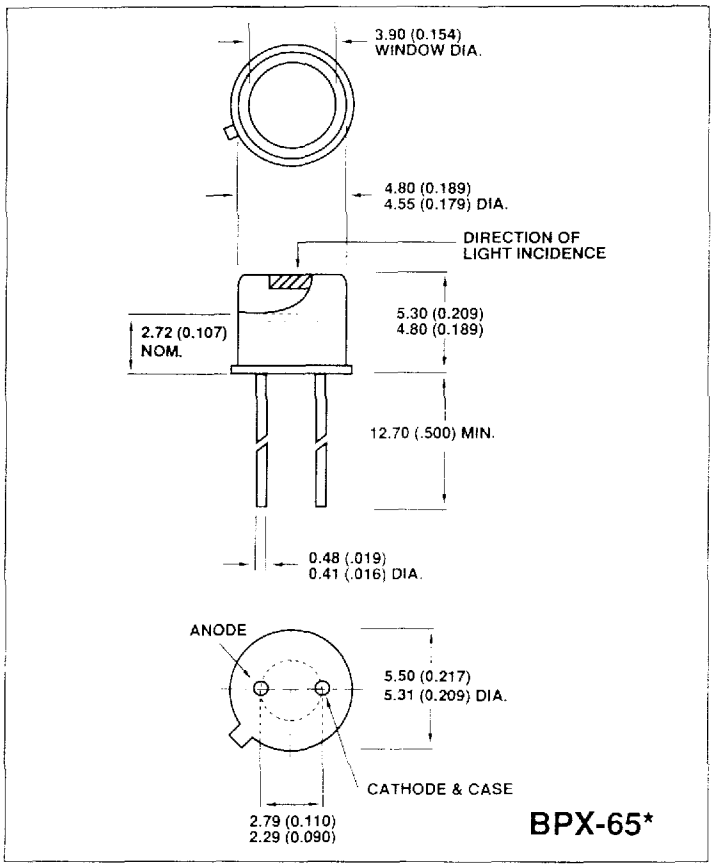
Ultra High Speed Photodiodes BPX-65, AX65-R2F

The BPX65 is a high speed, high quality silicon photodetector which is manufactured in large quantity and offers an excellent price-to-performance ratio. Its high frequency response, sensitivity and low cost make the BPX65 suitable for applications including fiber optic communications, shaft encoders, computer light pens, and laser instrumentation.

The photodetector consists of a 1mm² active element mounted in a hermetically sealed TO-18 equivalent package. The cathode is connected to the case, although a special isolated version, the BPX65R, is available upon request. This device however utilizes a three-lead TO-18 package, unlike the two-lead version shown in the diagram.

This device is available in a special package for fiber optic applications (the AX65-R2F), with an epoxy covering (the X65-EB), or even in die form. Centronic can also supply the die in a special custom-designed package and manufacture the device to MIL SPEC.



*For AX65-R2F see Package No.6

ABSOLUTE MAXIMUM RATINGS

	Max. Rating	Unit
Storage Temperature	-55 to +100	°C
Operating Temperature	-40 to +80	°C
Active Element Dimensions	1 x 1	mm
Recommended Wavelength Range	400 to 1000	nm
High Frequency Response	up to 100	MHz
Field of View (BPX-65)	74	°

ELECTRO-OPTICAL SPECIFICATIONS*		MIN.	TYPICAL	MAX.	UNITS
Peak Sensitivity				850	nm
Operating Voltage				30	V
Power Dissipation (at 25°C)				250	mW
Response Linearity (to better than 1%)			up to 7.5		mW/cm²
Responsivity at	450nm		0.20		A/W
	at 900nm	0.52	0.55		A/W
	at 1064nm		0.15		A/W
Risetime (measured at 900nm) (Vr-20V)			3.5		ns
Capacitance (Vr = 0V)			15		pF
Capacitance (Vr = 20V)			3.5	4.0	pF
Dark Current (Vr = 20V)			1.0	5.0	nA
NEP at 900nm (Vr = 20V)			3.3×10^{-14}		$WHz^{-1/2}$
Photosensitivity (at color temp of 2856°K) (Vr = 20V)			6		nA/LUX

*All the parameters are characteristic of a photodiode operating at 23°C, and connected to a load resistance of 50 ohms (where appropriate).

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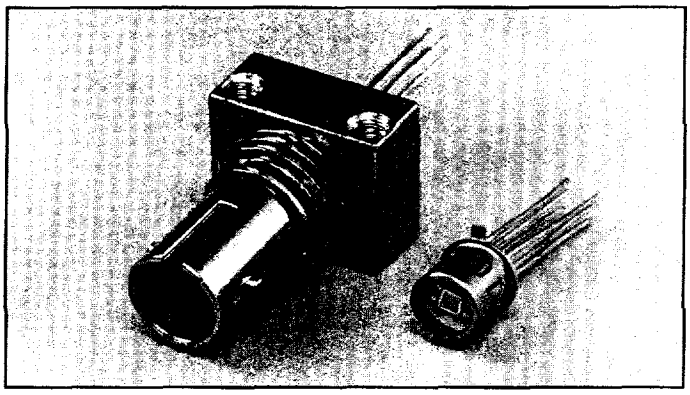
Fiberoptic Receiver BPX65-100

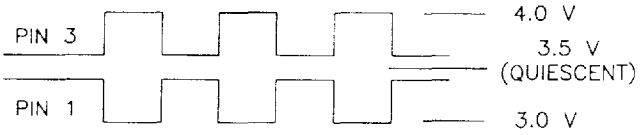
The BPX65-100 receiver contains a BPX-65 ultra high speed photodiode coupled to an NE5212 (Signetics) transimpedance amplifier. Standard products include ST and SMA connector versions.

ABSOLUTE MAXIMUM RATINGS

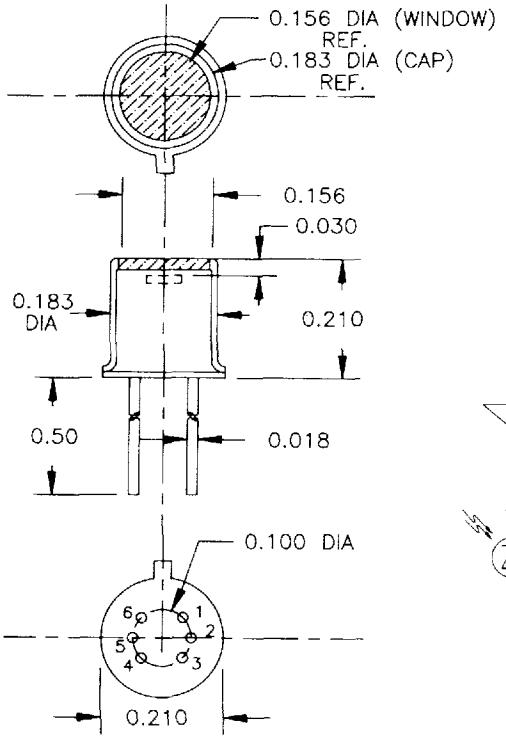
	Max. Rating	Unit
Maximum Voltage	6	V
Operating Temperature Range	-20 to +70	°C



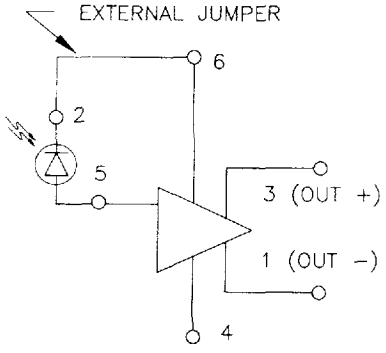
BPX65-100ST AND BPX65-100



OUTPUT WAVEFORMS (NOMINAL VALUES)



BPX65-100
OUTLINE DIMENSIONS



BPX65-100
SCHEMATIC

PIN DESIGNATIONS

1 – OUTPUT (–)
2 – CELL CATHODE
3 – OUTPUT (+)
4 – GROUND & CASE
5 – CELL ANODE
6 – Vcc (5V)

Receiver Data at 25°C

Type No.	Fiber Connector	Power Supply	Detector Responsivity λ = 850 nm	Amplifier Gain	Max. Data Rate
BPX65-100	NONE	5 V	0.5 A/W	14 kohms	100 Mb/s
BPX65-100ST	ST	5 V	0.5 A/W	14 kohms	100 Mb/s
BPX65-100SMA	SMA	5 V	0.5 A/W	14 kohms	100 Mb/s

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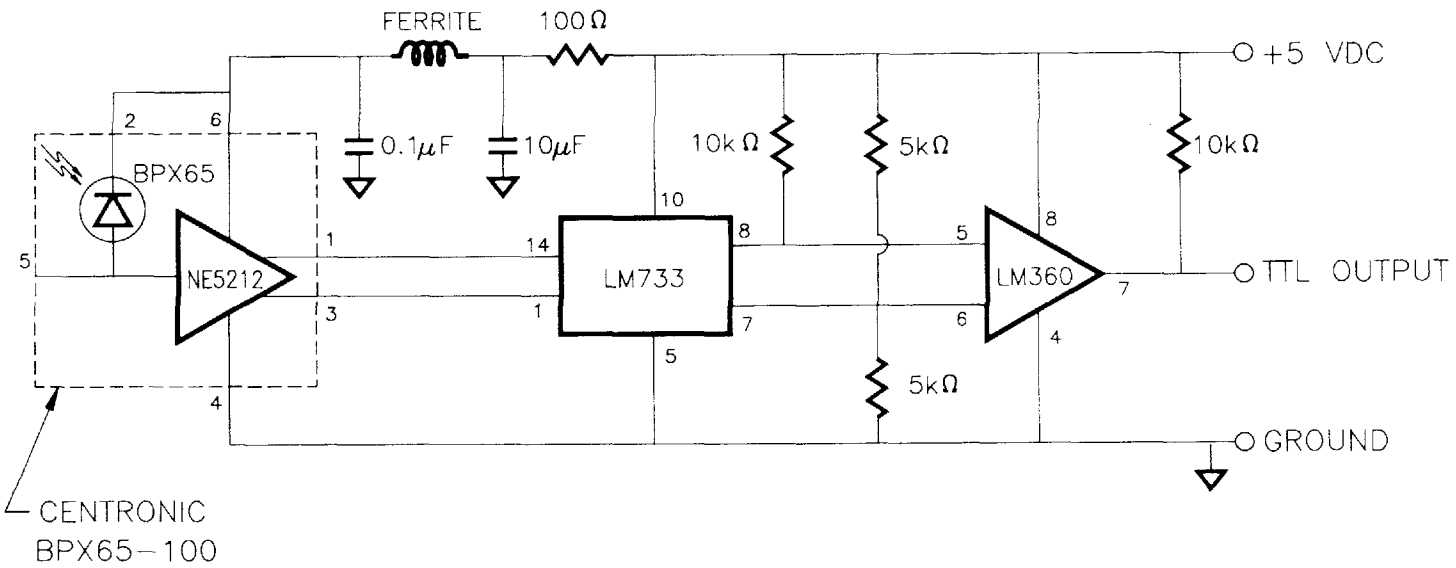
Application Note: 50 Megahertz datalink receiver constructed with the BPX65-100. Please note that the 0.1pF capacitors decoupling the +5 volt line should be located as close as possible to pin 6 to avoid oscillation.

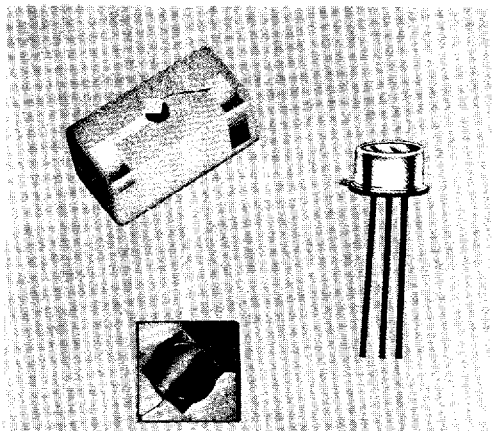


50 MHz DATALINK RECEIVER BUILT WITH THE CENTRONIC BPX65-100

EPITAXX inc.

OPTOELECTRONIC DEVICES

ETX 75
ETX 100
ETX 300



LONG WAVELENGTH INDIUM GALLIUM ARSENIDE P-I-N PHOTODETECTORS

FEATURES

- 900 to 1700nm spectral range
- High responsivity
- Passivated, burned-in elements
- Ceramic submount, TO-46 package

DESCRIPTION

EPITAXX high speed Indium Gallium Arsenide p-i-n photodetectors are manufactured using state-of-the-art Vapor Phase Epitaxy growth techniques to insure reproducible high performance. The detector elements are anti-reflection coated and passivated for environmental protection.

A high temperature, high voltage burn-in procedure eliminates early failures and insures high reliability. The devices can have 75, 100 and 300 micron active diameter and are available on ceramic submounts (CER) or in hermetically sealed TO-46 cans (T).

APPLICATIONS

- high speed lightwave receivers
- long wavelength laser monitors
- power and attenuation test sets
- optical data links

ABSOLUTE MAXIMUM RATINGS

Reverse Voltage:	V_R = 25V for ETX 75 and ETX 100
	V_R = 15V for ETX 300
Storage Temperature:	T = –60 to +100C
Operating Temperature:	T = –40 to +85C
Forward/Reverse Current:	I_F/I_R = 1mA
Soldering:	200C for 5 seconds

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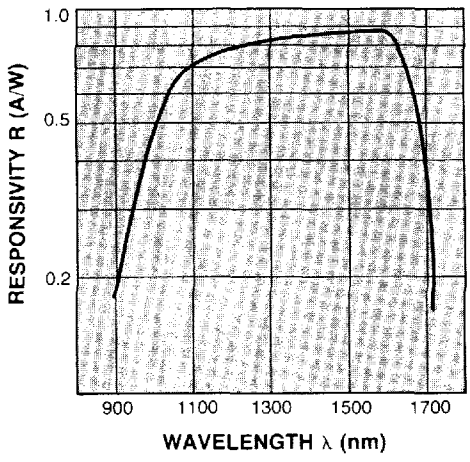
CHARACTERISTICS
(V_R = 5V, T = 25C)

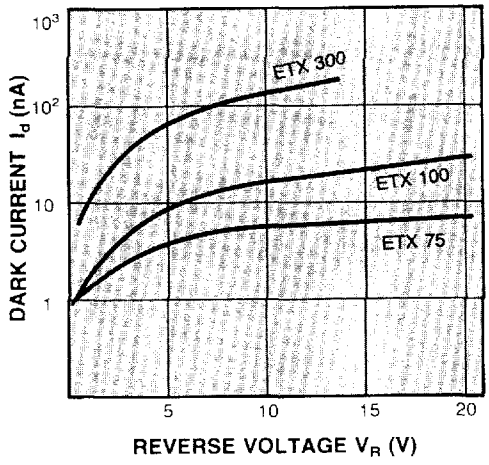
	SYMBOL	MIN	TYP	MAX	UNIT
Photosensitive Diameter	d				
ETX 75			75		µm
ETX 100			100		µm
ETX 300			300		µm
Spectral Range		900		1700	nm
Responsivity	R				
@ 1300nm					
●CER		0.72	0.87		A/W
●T		0.65	0.80		A/W
@ 1550nm					
●CER		0.82	0.97		A/W
●T		0.75	0.90		A/W
Dark Current	I_d				
ETX 75			3	10	nA
ETX 100			10	30	nA
ETX 300			75	200	nA
Capacitance	C				
ETX 75CER			0.4	1.0	pF
T			0.6	1.0	pF
ETX 100CER			0.8	2.0	pF
T			1.0	2.0	pF
ETX 300CER			5.0	15	pF
T			5.0	15	pF
Rise/Fall Time	t_r,t_f				
(10-90%, 50 Ω)					
ETX 75				0.5	ns
ETX 100				1	ns
ETX 300				5	ns

TYPICAL CURVES

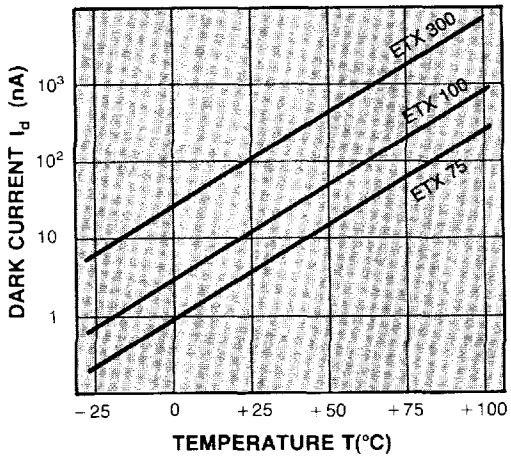
SPECTRAL RESPONSE



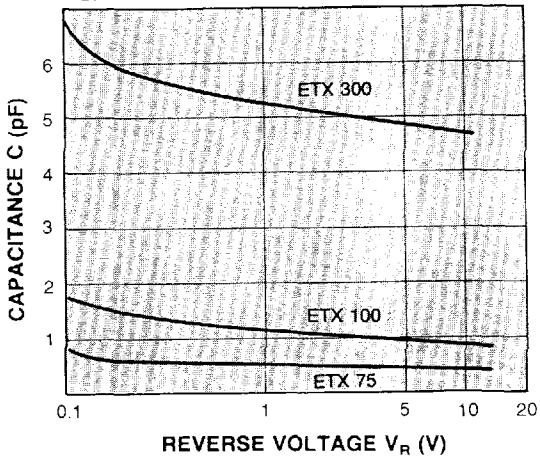
DARK CURRENT vs. REVERSE VOLTAGE



DARK CURRENT vs. TEMPERATURE



CAPACITANCE vs. REVERSE VOLTAGE



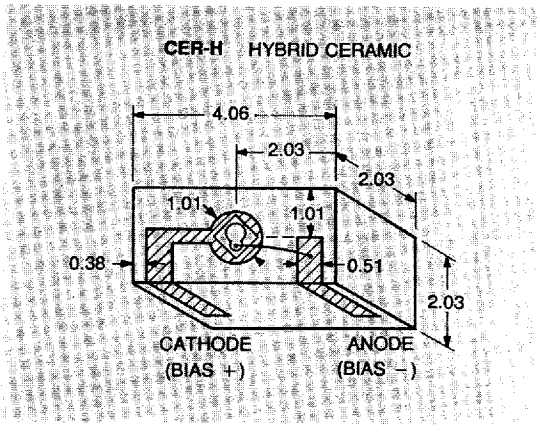
TESTING AND HANDLING

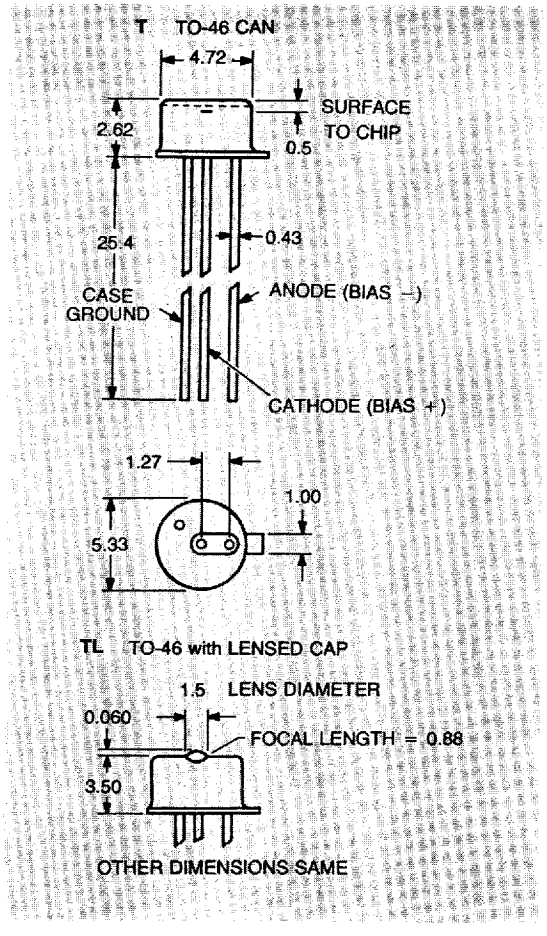
- The following tests are performed before shipment:
  - Visual inspection, I_d, C, V_R on all devices.
  - R on a sample basis.
- Precautions:
  - Electrostatic discharge protection must be used when handling the devices.
  - Recommended reverse voltage is 5 volts.
  - For chips on a ceramic carrier, a baking procedure is recommended before sealing: 100C for 2 hours in dry N_2 or Vacuum.
- Burn-in:
  - During processing, all devices are heated to 150C for 14 hours.

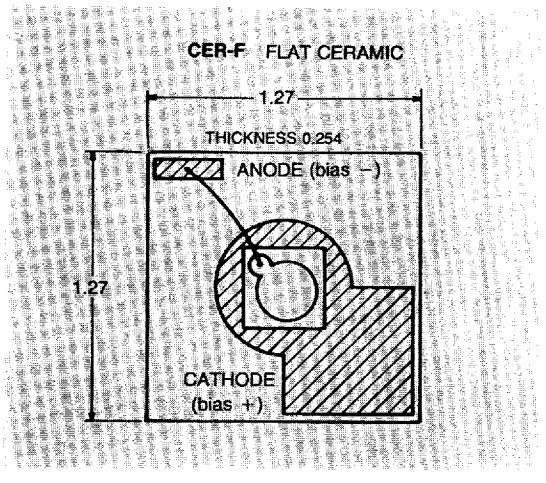
  Additionally:
  - ETX 75 and ETX 100 are burned-in for 48 hours at 120C and 18V reverse bias.
  - ETX 300 are burned-in for 48 hours at 120C and 12V reverse bias.

DIMENSIONS

All dimensions in mm.







ORDERING INFORMATION

When ordering, please indicate chip size (75,100,300) and package style. (CER-H, CER-F, etc.)

Examples: ETX 75 CER-H
ETX 100 T
ETX 300 CER-F

OPTIONS

- V : enhanced responsivity at 850nm (R = 0.2 A/W).
- TL : TO-46-030 lensed cap.

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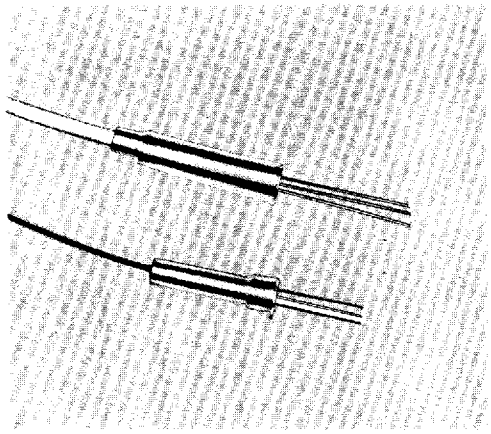
OPTOELECTRONIC DEVICES

ETX 75F
ETX 100F



LONG WAVELENGTH INDIUM GALLIUM ARSENIDE FIBERED PHOTODETECTORS

FEATURES

- High responsivity at 1300nm and 1550nm.
- Low dark current and capacitance.
- Hermetically sealed package.
- Multimode or singlemode fiber pigtail.

DESCRIPTION

EPITAXX Indium Gallium Arsenide fibered photodetectors combine state-of-the-art material growth, packaging and optical coupling techniques. The p-i-n diodes, manufactured by Vapor Phase Epitaxy, are passivated and hermetically sealed.

The fiber coupling, using proprietary techniques, allows full coupling from a 50 micron core fiber to the 75 or 100 micron active diameter devices. High temperature and high reverse voltage burn-in procedures eliminate early failures and insure the reliability of the device.

APPLICATIONS

- Lightwave receiver for telecommunications and data communications.
- Fiber optic instrumentation.

OPTIONS

- Connectorized fiber
- Customer fiber

ABSOLUTE MAXIMUM RATINGS

Reverse Voltage:	V_R = 25 Volts
Storage temperature:	T = –60 to + 100C
Operating temperature:	T = –40 to + 85C
Forward/Reverse Current:	I_F/I_R = 1mA
Soldering:	200C for 5 seconds

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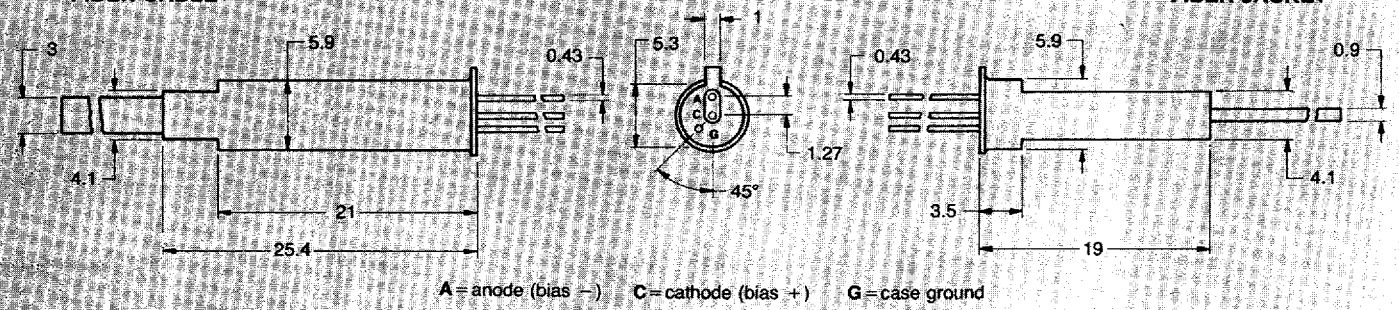
CHARACTERISTICS

(V_R = 5V, T = 25C)

	SYMBOL	MIN	TYP	MAX	UNITS
Spectral Range		900		1700	nm
Responsivity	R				
@ 1300nm		0.65	0.80		A/W
@ 1500nm		0.75	0.90		A/W
Capacitance	C				
ETX 75F			0.6	1.0	pF
ETX 100F			1.0	2.0	pF
Rise/Fall Time (10-90%, 50Ω)	t_r,t_f				
ETX 75F				0.5	ns
ETX 100F				1.0	ns
Dark Current	I_d				
ETX 75F			3	10	nA
ETX 100F			10	30	nA
Optical Fiber					
● core diameter		47	50	53	μm
● cladding diameter		122	125	128	μm
● numerical aperture			0.2		
● length		1			m

DIMENSIONS

All dimensions in mm.



TESTING AND HANDLING

- The following tests are performed before shipment: I_d, C, R at 1300nm, V_R.
- Precautions:
  - -Electrostatic discharge protection must be used when handling the devices.
  - -Recommended reverse voltage is 5 volts.
- See data sheet 7-86-01 on ETX 75, ETX 100 and ETX 300 for typical curves (Spectral Response, Dark Current, Capacitance) and burn-in procedures.

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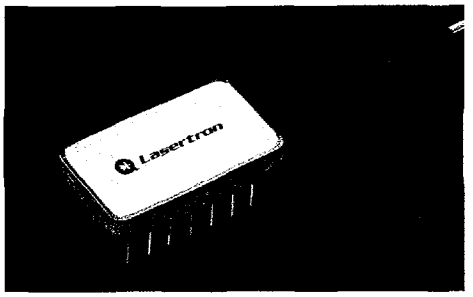
QDEP

Single Element PIN Detector



- *Telecom access and junction applications*
- *Components for instruments*
- *AR-coated, high-responsivity InGaAs detector*
- *Low capacitance*
- *Industry-standard 14-pin DIL package, multimode fiber*

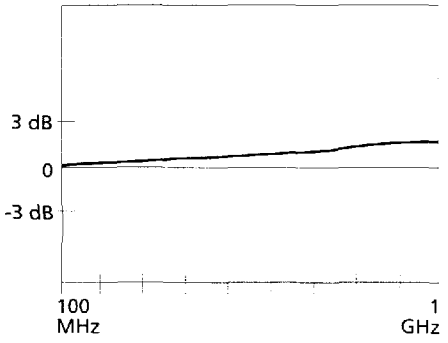
Description

The Lasertron QDEP075-001 and -002 PIN detector modules incorporate a low-noise, high-responsivity AR-coated InGaAs detector housed in a 14-pin DIL package. The QDEP075-001 and -002 are coupled to a multimode fiber pigtail for telecom access and junction applications.

Applications

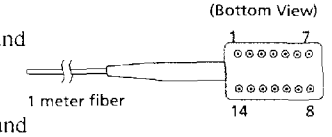
The QDEP075-001 and -002 are designed for telecom junction and access networks where there is a need for economical, stable, high-speed detector modules. The low-capacitance detector is specially configured to allow high-frequency signal detection up to 1 GHz.

TYPICAL FREQUENCY RESPONSE



Pin Connections

1 NC
2 Anode (QDEP075-002, Cathode)
3 Case Ground
4 NC
5 Case Ground
6 NC
7 NC
8 Case Ground
9 NC
10 NC
11 NC
12 NC
13 Cathode (QDEP075-002, Anode)
14 NC



Specifications

QDEP075			-001, -002
Characteristics at 25°C	**Min**	**Typ**	**Max**
Detector diameter (µm)		60 or 75*	
Responsivity (A/W, at 1300 nm)	0.75		
Capacitance (pF at -5 V)		0.4	0.5
Dark current (nA at -5 V)		3	10
Spectral range (nm)	1100		1650
Bandwidth (GHz)	1		
Operating temperature range (°C)	-20		70
Storage temperature range (°C)	-40		85

**Detector used will be either a 60 µm planar or 75 µm mesa detector*

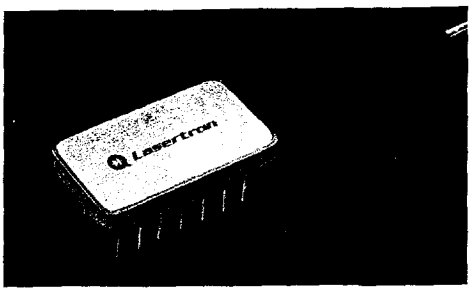
Ordering Information

	Suffix			
Base Model	**No Connector**	**FC/PC**	**Biconic**	**ST**
QDEP075	-001**	-050	-051	-052
QDEP075	-002**	-053	-054	-055

*** The QDEP075-001 and -002 differ only in their pin connections.*

QDFB

Wide Dynamic Range pinFET Receiver

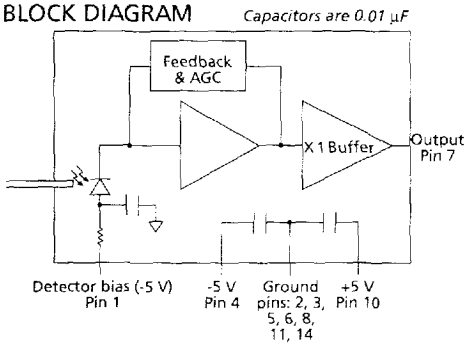


- *Telecom access and junction applications*
- *Transimpedance amplifier with AGC*
- *High sensitivity*
- *Wide dynamic range >32 dB*
- *1300 and 1550 nm operation*

Description

The QDFB is a fiber-optic transimpedance receiver used in long-wavelength applications. Excellent sensitivity and a wide dynamic range is achieved by the use of an automatic gain control circuit (AGC). The QDFB features a buffered output stage which increases the drive capabilities. Packaged in the industry-standard, low-profile 14-pin DIL package, the hermetic package is pigtailed with multimode fiber. Connector selection is optional.

BLOCK DIAGRAM *Capacitors are 0.01 µF*



Applications

The QDFB pinFET is designed to operate in digital fiber-optic systems running at data rates up to 155 Mb/s. The pinFET reduces system engineering time by eliminating performance matching between the detector, amplifier, and an automatic gain control loop while maintaining stability.

Power Supply Internal 0.01 µf power supply decoupling capacitors are used to improve performance in noisy conditions. Additionally, external bypass capacitors with short leads should be used at the supply pins. Capacitor values depend on system conditions. The QDFB requires a single +5 and two -5 volt supplies, one for the detector and the other for the amplifier. Pin 1 is dedicated to the detector and allows the photodiode current to be monitored.

Output Loading Considerations An output buffer enables the QDFB to drive capacitive loads. Nevertheless, output loading should still be kept to a minimum; excessive reactive loads can cause ringing and overshoot. Also, the output is generally AC-coupled to the next stage to isolate post-amplification circuitry from shifts in pinFET dc output voltage.

Maximum Overload Power The maximum overload is defined as the input power needed to cause a 1 volt peak-to-peak output voltage. Operation above this level is possible because the QDFB does not start clipping until about 2.5 volts peak-to-peak, or at approximately 0 dBm optical input power.

Sensitivity The sensitivity of every module is determined before shipment. The sensitivity calculated is the input power needed to maintain better than 10^{-9} Bit Error Rate. The calculation is based on an RMS noise measurement under "no light" conditions.

Manufacturing Information The QDFB is subjected to a battery of processes including active burn-in, temperature cycling, fine and gross leak test, and visual inspections. Refer to the *Manufacturing Processes* section for detailed information on processing procedures.

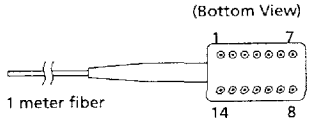
All devices are tested before shipment; test results are included with each unit.

Ordering Information

	Suffix			
Base Model	**No Connector**	**FC/PC**	**Biconic**	**ST**
QDFB-010	-001	-050	-051	-052
QDFB-040	-001	-050	-051	-052
QDFB-100	*Preliminary, please call for ordering information.*			-052

Pin Connections

1	Detector Bias (-5 V)	8	Case Ground
2	NC	9	NC
3	Case Ground	10	+5 V
4	-5 V	11	NC
5	Case Ground	12	NC
6	NC	13	NC
7	Output	14	NC



Specifications

(at 25°C, ±5 V, unless otherwise noted)

	QDFB-010		QDFB-040		QDFB-100*	
	Min	Max	Min	Max	Min	Max
Electrical Characteristics						
Sensitivity (dBm)**		-52		-45		-39
Sensitivity over operating temperature (dBm)		-50		-43.5		-37.5
Maximum overload (dBm)	-5		-5		-5	
Peak-to-peak voltage at max overload (V_{pp})		1		1		1
Bandwidth at -3 dB (MHz)	10		40		100	
Gain flatness (dB)		±1		±1		±1
Output impedance (Ohms)		50		50		50
Transimpedance (K Ohms)	400		85		30	

**Preliminary*

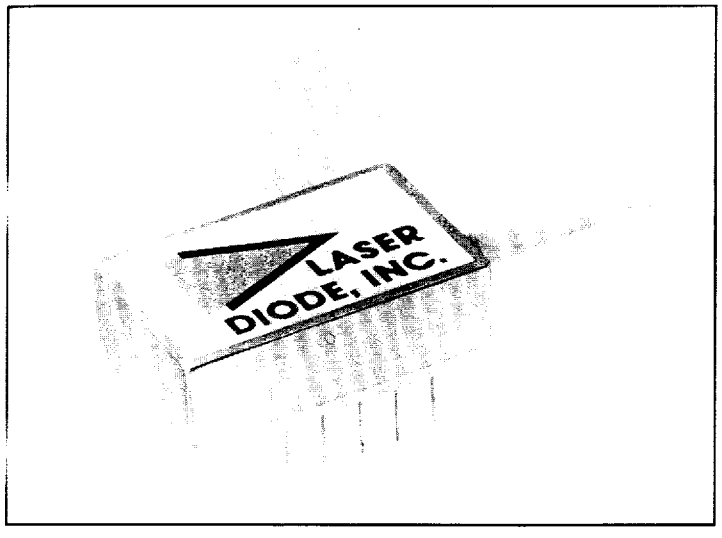
***Noise filter used to test sensitivity for the QDFB-010 is a 8.5 MHz, 3-pole filter. Noise filter used to test sensitivity for the QDFB-040 is a 40 MHz, 3-pole filter; QDFB-100 is a 110 MHz, 3-pole filter.*

Common Specifications	Min	Max
Detector responsivity (A/W)	0.75	
Photodiode dark current (nA)		5
Wavelength range (nm)	1200	1600
Storage temperature (°C)	-40	85
Operating temperature (°C)	-20	70
Positive supply voltage (V)	4.75	5.25
Negative supply voltage (V)	-5.25	-4.75
Power consumption (mW)		250

Absolute Maximum Ratings

Fiber coupled power (mW)	5
Reverse photocurrent (mA)	5
Reverse detector bias voltage (V)	-15
Forward current (mA)	2
Lead soldering temperature (°C)	260
Lead soldering duration (sec)	10
Fiber yield strength (N, min)	10
Fiber bend radius (mm, min)	30
Positive power supply (V)	7
Negative power supply (V)	-7

PINFET OPTICAL RECEIVER



FEATURES:

- InGaAs PIN Detector
- Low Capacitance 0.5pf
- Low Dark Current 5nA
- High Spectral Responsivity
- Low Noise GaAs FET
- 1300 & 1550nm Operation
- Transimpedance Circuit Design
- Wide Dynamic Range >25dB
- Military Qualified Packages Available

DESCRIPTION:

The LDPF pinfet is a fiber optic receiver module for use in long wavelength systems. The receiver utilizes a trans-impedance circuit configuration for wide dynamic range and low noise. The LDPF incorporates a high performance InGaAs PIN photo diode having an optical response from 1100nm to 1600nm. The detector is coupled to a low noise GaAs MESFET front end hybrid preamplifier for excellent sensitivity and wide dynamic range. Other versions of the pinfet include a 1000MHz unit for high speed applications, a silicon version for avionics data bus work and a wide dynamic range design (>40dB) for local loop applications. Application notes are available upon request.

PERFORMANCE SPECIFICATIONS (T=25°C)

Model No.	Bandwidth (MHz)	Suggested NRZ Data Rate (Mbps)	Sensitivity [1] (dBm)		Transimpedance (kohms)	N.E.P. (dbm/$\sqrt{Hz}$)
			Min.	Typ.		
LDPF 0012	12	16	-50	-52	600	-95
LDPF 0024	24	34	-47	-49	330	-94
LDPF 0032	32	45	-45	-47	200	-92
LDPF 0065	65	90	-42	-44	75	-90
LDPF 0120	120	168	-38	-40	32	-88
LDPF 0250	250 [2]	350	-33	-35	5	-84

NOTES:

[1] Receiver sensitivity is quoted as the average optical power in dBm at 1300nm and Ta=25°C for 10^{-9} BER and is calculated from measured noise power at the pinfet output. Noise filter bandwidth equals pinfet bandwidth.

[2] Pinfets utilizing a GaAs IC to achieve bandwidths up to 1000MHZ are available.

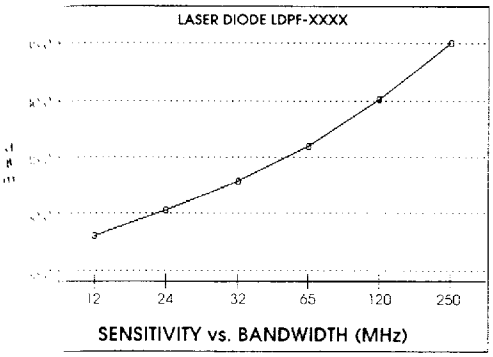
PERFORMANCE SPECIFICATIONS (T=25°C) *(Continued)*

	Min.	Typ.	Max.	Units
Dark Current		5	20	nA
Detector Capacitance		0.5		pF
Dynamic Range	25	30		dB
Spectral Responsivity λ=1300nm λ=1550nm	.75 .85	.85 .95		A/W
Load Impedance	1			kohm
Power Supply Current +5 Volts -5 Volts			35 10	mA mA
Fiber [1]	Core: 50	Cladding: 125	Buffer: 900	µm

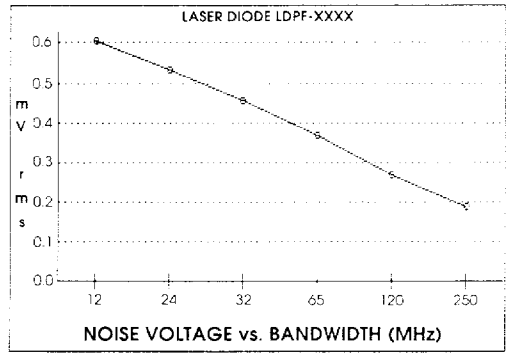
Notes: [1] Other fiber pigtails are available as an option.

Absolute Maximum Ratings:

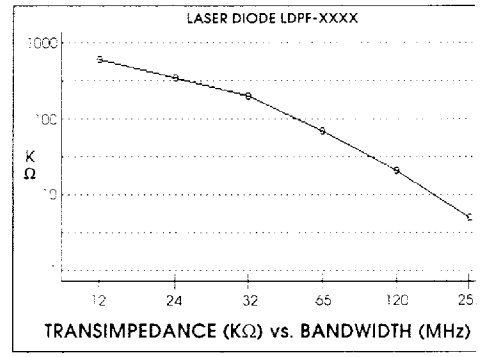
Operating Temperature	-40		+65	°C
Storage Temperature	-40		+85	°C
Lead Soldering Time (at 260°C)			10	secs.
Positive Supply			+7	volts
Negative Supply			-7	volts
Photodiode Bias			-20	volts



SENSITIVITY vs. BANDWIDTH (MHz)

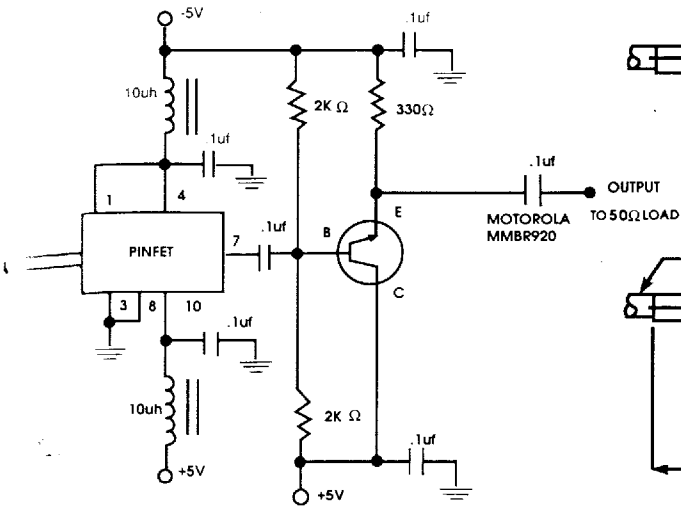


NOISE VOLTAGE vs. BANDWIDTH (MHz)

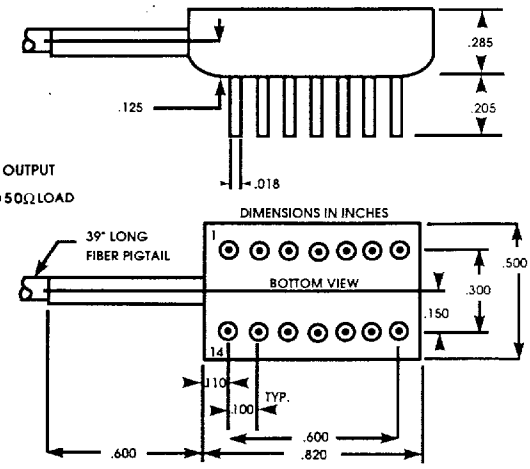


TRANSIMPEDANCE (KΩ) vs. BANDWIDTH (MHz)

RECOMMENDED PINFET OUTPUT INTERFACE CIRCUIT



MECHANICAL DIMENSIONS



PIN ASSIGNMENT

PIN	FUNCTION
1	-5V DET. BIAS
2	NC
3	GND
4	-5V V_{EE}
5	NC
6	NC
7	OUTPUT
8	GND
9	NC
10	+5V V_{CC}
11	NC
12	NC
13	NC
14	NC

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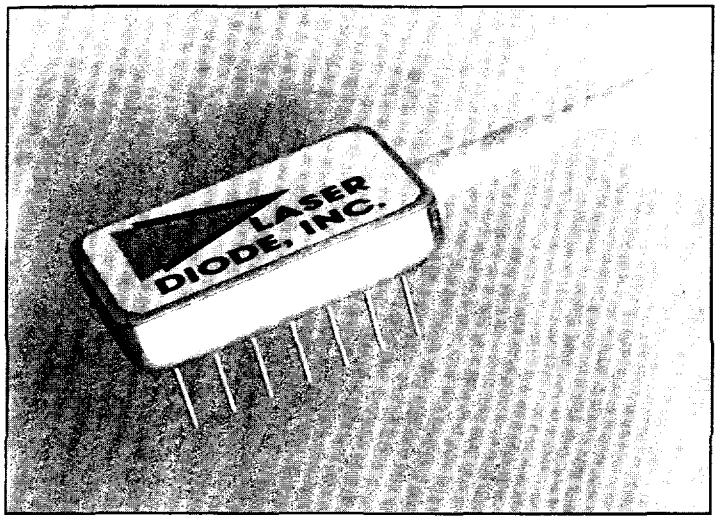
LASER DIODE, INC.
MORGAN ELECTRONICS DIVISION
1130 SOMERSET ST., NEW BRUNSWICK, NJ 08901
(201) 249-7000 (FAX) 201-249-9165 (TWX) 710-998-0597

WIDE DYNAMIC RANGE PINFET



FEATURES:

- Wide Dynamic Range >40dB
- InGaAs PIN Detector
- 1300 & 1550nm Operation
- Transimpedance Circuit Design
- Low Noise GaAs FET
- Mil-Qualified Units Available

DESCRIPTION:

The Laser Diode, Inc. LDPF pinfet is a fiber optic receiver module for use in long wavelength systems. The-040 option provides dynamic range up to 44dB. A novel "fast clamp" circuit limits the output signal to 2.5 V_{pp} at high optical input levels. At low power levels the fast clamp is deactivated automatically for minimum impact on sensitivity. An InGaAs PIN diode is utilized with a GaAs MESFET transimpedance preamplifier for low noise and excellent sensitivity. Short wavelength operation and units screened for military applications are also available.

PERFORMANCE SPECIFICATIONS (Ta=25°C)

Model No.	Bandwidth[1] (MHz)	Maximum [2] Optical Input (dBm)	Sensitivity [2,3] (dBm)		Optical Dynamic Range (dB)	Transfer[4] Gain kV/W
			Min.	Typ.		
LDPF 0012-040	12	-6	-48	-50	44	155
LDPF 0025-040	25	-6	-46	-48	42	50
LDPF 0050-040	50	-6	-41	-43	37	36

NOTES:

[1] Other bandwidth values are available.

[2] Maximum optical input and sensitivity are average power values.

[3] Receiver sensitivity is quoted as the average optical power in dBm at 1300nm and Ta=25°C for 10^{-9} BER and is calculated from measured noise power at the pinfet output. Noise filter bandwidth equals pinfet bandwidth.

[4] Transfer Gain = transimpedance x detector responsivity.

PERFORMANCE SPECIFICATIONS (T=25°C) *(Continued)*

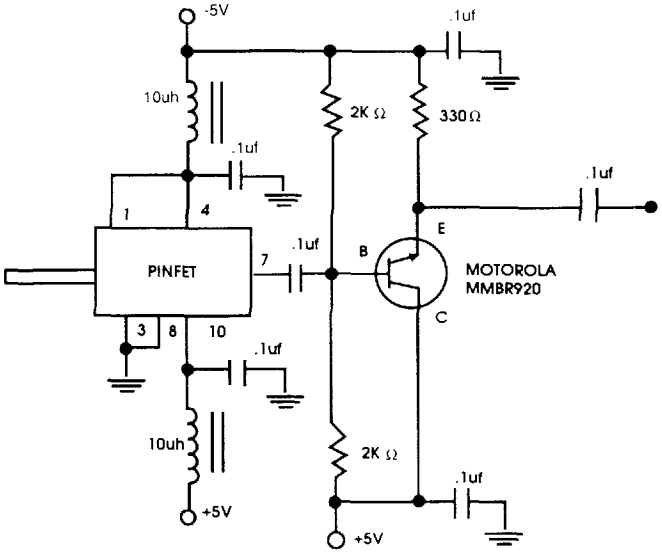
	Min.	Typ.	Max.	Units
Dark Current		5	20	nA
Detector Capacitance		0.5		pF
Dynamic Range		see front cover		dB
Spectral Responsivity λ=1300nm λ=1550nm	.75 .85	.85 .95		A/W
Load Impedance	1			kohm
Power Supply Current +5 Volts -5 Volts			35 10	mA mA
Fiber [1]	Core: 50	Cladding: 125	Buffer: 900	µm

Notes: [1] Other fiber pigtails are available as an option.

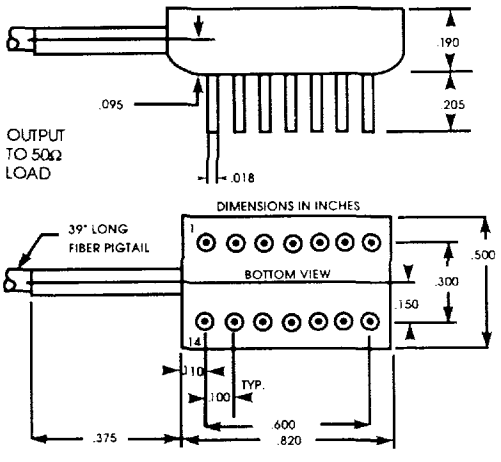
Absolute Maximum Ratings:

Operating Temperature	-40		+70	°C
Storage Temperature	-40		+85	°C
Lead Soldering Time (at 260°C)			10	secs.
Positive Supply			+7	volts
Negative Supply			-7	volts
Photodiode Bias			-20	volts

RECOMMENDED PINFET OUTPUT INTERFACE CIRCUIT



MECHANICAL DIMENSIONS



PIN ASSIGNMENT

PIN	FUNCTION
1	-5V DET. BIAS
2	NC
3	GND
4	-5V V_{EE}
5	NC
6	NC
7	OUTPUT
8	GND
9	NC
10	+5V V_{CC}
11	NC
12	NC
13	NC
14	NC

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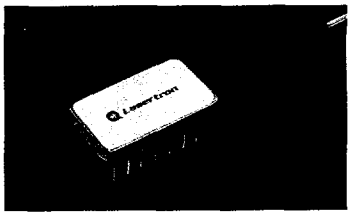
pinFET Receivers

LASERTRON

14-pin DIL Package
(all pinFET receivers)



	Application		Specification							Configuration				Model Suffix				
Base Model	Telecom/Digital	Analog/Video	pinFET Bandwidth (MHz)	Noise Filter Bandwidth (MHz)	Data Rate (Mb/s, typ)	Dynamic Range (dB)	Sensitivity (dBm, max)	Feedback Resistor (K Ohm)	Maximum Input (dBm, avg)	Variable Transimpedance	Fixed Transimpedance	High-Impedance Integrating	Single-Mode Fiber / Multimode Fiber	No Connector	FC/PC Connector	Biconic Connector	ST Connector	Description
QDFB-010-	■		10	8.5	16	47	-52	475	-5	■			■	-001	-050	-051	-052	Wide dynamic range
QDFB-040-	■		40	40	55	40	-45	100	-5	■			■	-001	-050	-051	-052	Wide dynamic range
QDFB-100-*	■		100	110	155	34	-39	35	-5	■			■	-001	-050	-051	-052	Wide dynamic range
QDFM-100-	■		100	95	140	33	-36	5	-3	■			■	-201	-250	-251	-252	Wide dynamic range
QDFM-125-	■		125	95	155	32	-35	5	-3	■			■	-201	-250	-251	-252	*Wide dynamic range*
QDFT-005-	■	■	5	4	4	25	-53	900	-27.9		■		■	-001	-050	-051	-052	Fixed transimpedance
QDFT-010-	■	■	10	9	16	25	-50.5	500	-25.4		■		■	-001	-050	-051	-052	Fixed transimpedance
QDFT-015-	■	■	15	9	16	25	-50.5	500	-25.4		■		■	-001	-050	-051	-052	Fixed transimpedance
QDFT-020-	■	■	20	9	16	25	-49	250	-22.4		■		■	-001	-050	-051	-052	Fixed transimpedance
QDFT-025-	■	■	25	25	34	25	-46.5	250	-22.4		■		■	-001	-050	-051	-052	*Fixed transimpedance*
QDFT-025-	■	■	25	25	34	25	-48.5	360	-25.5		■		■	-004	-053	-054	-055	Fixed transimpedance
QDFT-040-	■	■	40	25	50	25	-45	120	-19.2		■		■	-001	-050	-051	-052	Fixed transimpedance
QDFT-045-	■	■	45	25	50	25	-45	120	-19.2		■		■	-001	-050	-051	-052	Fixed transimpedance
QDFT-050-	■	■	50	34	50	25	-42.5	72	-17		■		■	-001	-050	-051	-052	Fixed transimpedance
QDFT-060-	■	■	60	50	90	25	-42	72	-17		■		■	-001	-050	-051	-052	*Fixed transimpedance*
QDFT-065-	■	■	65	50	90	25	-43.5	90	-19		■		■	-001	-050	-051	-052	Fixed transimpedance
QDFT-070-	■	■	70	50	90	26	-42	54	-15.8		■		■	-001	-050	-051	-052	Fixed transimpedance
QDFT-090-	■	■	90	90	90	27	-41	42	-14.6		■		■	-001	-050	-051	-052	Fixed transimpedance
QDFT-100-	■	■	100	90	140	27	-41	42	-14.6		■		■	-001	-050	-051	-052	Fixed transimpedance
QDFT-125-	■	■	125	100	168	27	-38.5	20	-11.5		■		■	-301	-350	-351	-352	Fixed transimpedance
QDFT-170-	■	■	170	150	168	28	-36.5	11	-12		■		■	-301	-350	-351	-352	Fixed transimpedance
QDFT-200-	■	■	200	150	280	28	-36.5	11	-12		■		■	-301	-350	-351	-352	Fixed transimpedance
QDFT-250-	■	■	250	200	280	28	-34.5	6.5	-7.2		■		■	-301	-350	-351	-352	Fixed transimpedance
QDFT-275-	■	■	275	200	280	28	-34.5	6.5	-7.2		■		■	-301	-350	-351	-352	Fixed transimpedance
QDFT-300-	■	■	300	200	417	28	-34.5	6.5	-7.2		■		■	-301	-350	-351	-352	Fixed transimpedance
QDFF-120-	■		1200	475	622	—	—	0.5	-2	■			■	-201	-250	-251	-252	High-speed GaAs monolithic
QDFF-200-	■		1800	—	2500	—	—	0.25	-2	■			■	-201	-250	-251	-252	High-speed GaAs monolithic
QDFX-120-	■	■	1200	475	1500	21	-30	4	-9		■		■	-001	-050	-051	-052	High-speed GaAs monolithic
QDFH-9003-	■		650**	475	678	20	-36	—	-12			■	■	-002	-050	-051	-052	High impedance

Preliminary
**Equalizer is 2.2pF, 50 Ohms*

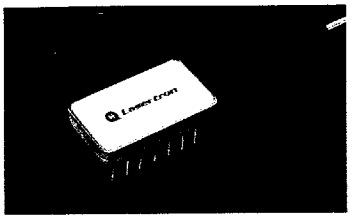
Models QDFB, QDFM & QDFT:
Operating Temperature Range: -20 to +70°C
Storage Temperature Range: -40 to +85°C

Models QDFF & QDFX:
Operating Temperature Range: 0 to +60°C
Storage Temperature Range: -40 to +85°C

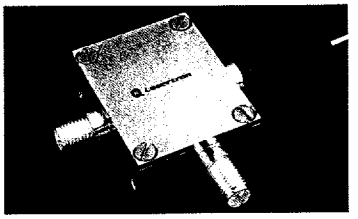
Models QDFH:
Operating Temperature Range: -20 to +70°C
Storage Temperature Range: -20 to +85°C

PIN Detectors & Receivers

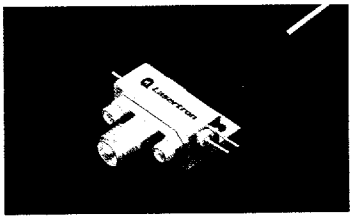
Single-Element PIN Detector (Model QDEP)



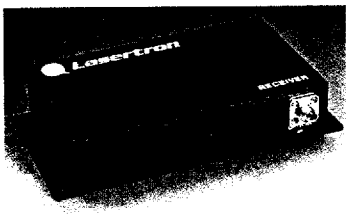
Ultrafast PIN Detector (Model QDEMW)



Small, Hermetic Microwave Detector (Model QDMH)



Mircrowave Receiver (Model QRXS)



	Application			Specification						Configuration						Model Suffix				
Base Model	Telecom/Digital	Microwave/RF	Analog/Video	Bandwidth (GHz)	Diameter (µm)	Responsivity (A/W, 1300 nm)	Resistance (Ohm)	Capacitance (pF @ -5 V, max)	Dark Current (nA @ -20 V)	Carrier	14-pin DIL Package	Microwave Detector Package	Small, Hermetic Microwave Pkg	Microwave Receiver in Housing	Single-Mode Fiber	Multimode Fiber	No Connector	FC/PC Connector	Biconic Connector	ST Connector	Description
QDE-060C	■			—	60	—	—	0.5	10*	■											Ceramic submount
QDEP075-	■			1	60	0.75	—	0.5	10*		■					■	-001	-050	-051	-052	Pin 2 anode, pin 13 cathode
QDEP075-	■			1	60	0.75	—	0.5	10*		■					■	-002	-053	-054	-055	Pin 2 cathode, pin 13 anode
QDEP075-			■	3	35	0.75	—	0.5	200		■				■		-101	-150			Analog detector
QDEMW1-		■		7	35	>0.7	100	0.3	200			■			■		-001	-051**			Ultrafast PIN, to 7 GHz
QDEMW1-		■		10	35	>0.7	100	0.3	200			■			■		-002	-052**			Ultrafast PIN, to 10 GHz
QDEMW1-		■		12	35	>0.7	100	0.3	200			■			■		-003	-053**			Ultrafast PIN,to 12 GHz
QDEMW1-		■		15	35	>0.7	100	0.3	200			■			■		-004	-054**			Ultrafast PIN, to 15 GHz
QDEMW1-		■		18	35	>0.7	100	0.3	200			■			■		-005	-055**			Ultrafast PIN, to 18 GHz
QDEMW3-		■		7	35	>0.7	1K	0.3	200			■			■		-001	-051**			Ultrafast PIN,to 7 GHz
QDEMW3-		■		10	35	>0.7	1K	0.3	200			■			■		-002	-052**			Ultrafast PIN, to 10 GHz
QDEMW3-		■		12	35	>0.7	1K	0.3	200			■			■		-003	-053**			Ultrafast PIN, to 12 GHz
QDMH1-		■		7	35	>0.7	50	0.3	200				■		■		-001	-051**			Small hermetic, to 7 GHz
QDMH1-		■		10	35	>0.7	50	0.3	200				■		■		-002	-052**			Small hermetic, to 10 GHz
QDMH1-		■		12	35	>0.7	50	0.3	200				■		■		-003	-053**			Small hermetic, to 12 GHz
QDMH1-		■		15	35	>0.7	50	0.3	200				■		■		-004	-054**			Small hermetic, to 15 GHz
QDMH1-		■		18	35	>0.7	50	0.3	200				■		■		-005	-055**			Small hermetic, to 18 GHz
QDMH2-		■		7	35	>0.7	100	0.3	200				■		■		-001	-051**			Small hermetic, to 7 GHz
QDMH2-		■		10	35	>0.7	100	0.3	200				■		■		-002	-052**			Small hermetic, to 10 GHz
QDMH2-		■		12	35	>0.7	100	0.3	200				■		■		-003	-053**			Small hermetic, to 12 GHz
QDMH2-		■		15	35	>0.7	100	0.3	200				■		■		-004	-054**			Small hermetic, to 15 GHz
QDMH2-		■		18	35	>0.7	100	0.3	200				■		■		-005	-055**			Small hermetic, to 18 GHz
QDMH3-		■		7	35	>0.7	1K	0.3	200				■		■		-001	-051**			Small hermetic, to 7 GHz
QDMH3-		■		10	35	>0.7	1K	0.3	200				■		■		-002	-052**			Small hermetic, to 10 GHz
QDMH3-		■		12	35	>0.7	1K	0.3	200				■		■		-003	-053**			Small hermetic, to 12 GHz
QRXS1-		■		7	35	>0.7	50	0.3	200					■	■			-051**			Microwave receiver, 7 GHz
QRXS1-		■		10	35	>0.7	50	0.3	200					■	■			-052**			Microwave receiver, 10 GHz
QRXS1-		■		12	35	>0.7	50	0.3	200					■	■			-053**			Microwave receiver, 12 GHz
QRXS1-		■		15	35	>0.7	50	0.3	200					■	■			-054**			Microwave receiver, 15 GHz
QRXS1-		■		18	35	>0.7	50	0.3	200					■	■			-055**			Microwave receiver, 18 GHz
QRXS2-		■		7	35	>0.7	100	0.3	200					■	■			-051**			Microwave receiver, 7 GHz
QRXS2-		■		10	35	>0.7	100	0.3	200					■	■			-052**			Microwave receiver, 10 GHz
QRXS2-		■		12	35	>0.7	100	0.3	200					■	■			-053**			Microwave receiver, 12 GHz
QRXS2-		■		15	35	>0.7	100	0.3	200					■	■			-054**			Microwave receiver, 15 GHz
QRXS2-		■		18	35	>0.7	100	0.3	200					■	■			-055**			Microwave receiver, 18 GHz
QRXS3-		■		7	35	>0.7	1K	0.3	200					■	■			-051**			Microwave receiver, 7 GHz
QRXS3-		■		10	35	>0.7	1K	0.3	200					■	■			-052**			Microwave receiver, 10 GHz
QRXS3-		■		12	35	>0.7	1K	0.3	200					■	■			-053**			Microwave receiver, 12 GHz

*At -5V.
**Super FC/PC connector.

Models QDE, QDEP, QDMH & QRXS:
Operating Temperature Range: -20 to +70°C
Storage Temperature Range: -40 to +85°C

Models QDEMW1 & QDEMW3:
Operating Temperature Range: 0 to +50°C
Storage Temperature Range: -20 to +70°C