

# QDFT Series

## High-Sensitivity Transimpedance pinFET Receiver



- Fixed transimpedance circuit configuration
- Hybrid construction
- Industry-standard 14-pin dual-in-line package
- Multimode fiber

### Description

The Corning Lasertron QDFT pinFET module is a high-sensitivity detector and hybrid preamplifier module designed for fiber-optic receivers operating at data rates up to and exceeding 420 Mb/s at 1300 and 1550 nm wavelengths. The transimpedance circuitry provides excellent sensitivity and superior dynamic range. The high sensitivity results from use of an advanced GaInAs detector element having  $<10$  nA leakage and a responsivity of  $>0.8$  A/W at 1300 and 1550 nm.

Sensitivities range from -53 dBm at 18 Mb/s, to -43 dBm at 140 Mb/s. Optical dynamic range exceeds 25 dB. Operation requires only  $\pm 5$  V power supplies at modest bias currents. The QDFT is packaged in a hermetically sealed, low-profile, 14-pin DIL package and is pigtailed with multimode fiber.

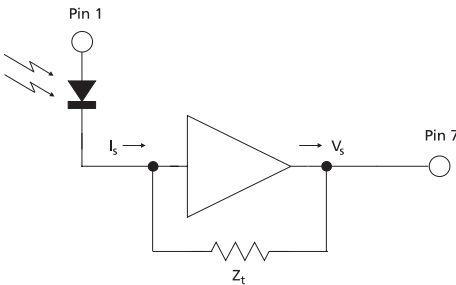
### Applications

The Corning Lasertron QDFT pinFET module consists of a low-capacitance, front-illuminated planar detector element followed by a hybrid transimpedance amplifier. Benefits of the transimpedance design of the QDFT pinFET module include excellent dynamic range and ease of implementation. The QDFT pinFET requires no equalization and is self-biasing. Simply by applying +5 V and -5 V supplies to the amplifier circuit, and a -5 V supply to the detector element, the device is ready to receive an optical input through a multimode fiber-optic pigtail.

The diagram to the left illustrates the fundamental operation of a QDFT pinFET. As incident light illuminates the detector, a small signal current is produced which is directly proportional to the amplitude of the incident light source ( $P_i$ ) and the responsivity ( $R$ ) of the detector.

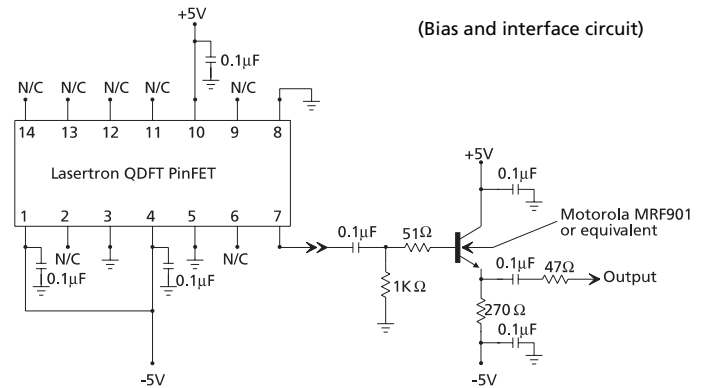
This simple relationship of  $R \cdot P_i$  yields the output signal current ( $I_s$ ). This current is then converted to a voltage with the transimpedance resistor ( $Z_t$ ) and a gain block amplifier. The resulting signal voltage ( $V_s$ ) is simply derived from the quantities  $I_s \cdot Z_t$ .

TRANSIMPEDANCE DESIGN CIRCUITRY



### Pin Connections

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



### Specifications and Ordering Information

QDFT Low-Bandwidth pinFET Receiver, page 39

QDFT Moderate-Bandwidth pinFET Receiver, page 40

QDFT High-Bandwidth pinFET Receiver, page 41

■ Telecom access and junction applications



### Description

See page 38 for a general description.

### Specifications *Contact Corning Lasertron regarding special requirements.*

QDFT -	005	010	015	020	025-001	025-004	040	045
Min. pinFET bandwidth (MHz)	5	10	15	20	25	25	40	45
Min. noise filter bandwidth (MHz)	4	9	9	9	25	25	25	25
Sensitivity (dBm, Avg.): Max.	-53	-50.5	-50.5	-49	-46.5	-48.5	-45	-45
Typ.	-55	-53	-53	-51.5	-49	-50.5	-48	-48
Typ. transimpedance (K Ohm)	900	500	500	250	250	360	120	120
Max. input (dBm, Avg.) Min.	-27.9	-25.4	-25.4	-22.4	-22.4	-25.5	-19.2	-19.2
					<b>Min</b>	<b>Typ</b>	<b>Max</b>	
<b>Common Specifications (all models listed above)</b>								
Sensitivity change 25 to 65°C (dB)							1.5	
Gain flatness 10 to 50% of nominal bandwidth (measured into a 1K Ohm load, dB)								±1
Detector dark current (nA)							1	10
Output voltage at P <sub>max</sub> (V, p-p)							2.3	
Measured output impedance (Ohms)							7	
Responsivity 1300 nm and -5 V bias (A/W)					0.75	0.85		
Responsivity change (dB, 25 to 65°C)							0.1	0.5
Power consumption: +5 V supply (mW)							90	
-5 V supply (mW)							40	
Operating temperature range (°C)							-20	70
Storage temperature range (°C)							-40	85

### Absolute Maximum Ratings

Fiber-coupled power (mW)	5
Reverse photocurrent (mA)	5
Reverse 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

### Ordering Information

Base Model	Suffix		
	No Connector	FC/PC	ST
QDFT-005	-001	-050	-052
QDFT-010	-001	-050	-052
QDFT-015	-001	-050	-052
QDFT-020	-001	-050	-052
QDFT-025	-001	-050	-052
QDFT-025	-004	-053	-055
QDFT-040	-001	-050	-052
QDFT-045	-001	-050	-052



# QDFT

## Moderate-Bandwidth pinFET Receiver



■ Telecom trunk, access and junction applications

### Description

See page 38 for a general description.

### Specifications *Contact Corning Lasertron regarding special requirements.*

#### Absolute Maximum Ratings

Fiber-coupled power (mW)	5
Reverse photocurrent (mA)	5
Reverse 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

QDFT -	050	060	065	070	090	100
Min. pinFET bandwidth (MHz)	50	60	65	70	90	100
Min. noise filter bandwidth (MHz)	34	50	50	50	90	90
Sensitivity (dBm, Avg.): Max.	-42.5	-42	-43.5	-42	-41	-41
Typ.	-46.8	-45	-46	-44.5	-43	-43
Typ. transimpedance (K Ohms)	72	72	90	54	42	42
Max. input (dBm, Avg.) Min.	-17	-17	-19	-15.8	-14.6	-14.6

	Min	Typ	Max
<b>Common Specifications (all models listed above)</b>			
Sensitivity change 25 to 65°C (dB)		1.5	
Gain flatness 10 to 50% of nominal bandwidth (measured into a 1K Ohm load, dB)			+1
Detector dark current (nA)		1	10
Output voltage at P <sub>max</sub> (V)		2.3	
Measured output impedance (Ohms)		7	
Responsivity 1300 nm and -5 V bias (A/W)		0.75	0.85
Responsivity change (dB, 25 to 65°C)		0.1	0.5
Power consumption: +5 V supply (mW)		90	
-5 V supply (mW)		40	
Operating temperature range (°C)		-20	70
Storage temperature range (°C)		-40	85

### Ordering Information

Base Model	Suffix		
	No Connector	FC/PC	ST
QDFT-050	-001	-050	-052
QDFT-060	-001	-050	-052
QDFT-065	-001	-050	-052
QDFT-070	-001	-050	-052
QDFT-090	-001	-050	-052
QDFT-100	-001	-050	-052

■ Telecom access and junction applications

### Description

See page 38 for a general description.

### Specifications *Contact Corning Lasertron regarding special requirements.*

QDFT -	125	170	200	250	275	300
Min. pinFET bandwidth (MHz)	125	170	200	250	275	300
Min. noise filter bandwidth (MHz)	100	150	150	200	200	200
Sensitivity (dBm, Avg.):						
Max.	-38.5	-36.5	-36.5	-34.5	-34.5	-34.5
Typ.	-40.5	-38.5	-38.5	-36.5	-36.5	-36.5
Typ. transimpedance (K Ohms)	20	11	11	6.5	6.5	6.5
Max. input (dBm, Avg.)	-11.5	-12	-12	-7.2	-7.2	-7.2

#### Common Specifications

	Min	Typ	Max
Sensitivity change 25 to 65°C (dB)		1.5	
Gain flatness 10 to 50% of nominal bandwidth (measured into a 1K Ohm load, dB)			+1
Detector dark current (nA)		1	10
Output voltage at P <sub>max</sub> (V, p-p)		2.3	
Measured output impedance (Ohms)		7	
Responsivity 1300 nm and -5 V bias (A/W)	0.75	0.85	
Responsivity change (dB, 25 to 65°C)		0.1	0.5
Power consumption: +5 V supply (mW)		135	
-5 V supply (mW)		80	
Operating temperature range (°C)	-20		70
Storage temperature range (°C)	-40		85



#### Absolute Maximum Ratings

Fiber-coupled power (mW)	5
Reverse photocurrent (mA)	5
Reverse 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

### Ordering Information

Base Model	Suffix		
	No Connector	FC/PC	ST
QDFT-125	-301	-350	-352
QDFT-170	-301	-350	-352
QDFT-200	-301	-350	-352
QDFT-250	-301	-350	-352
QDFT-275	-301	-350	-352
QDFT-300	-301	-350	-352