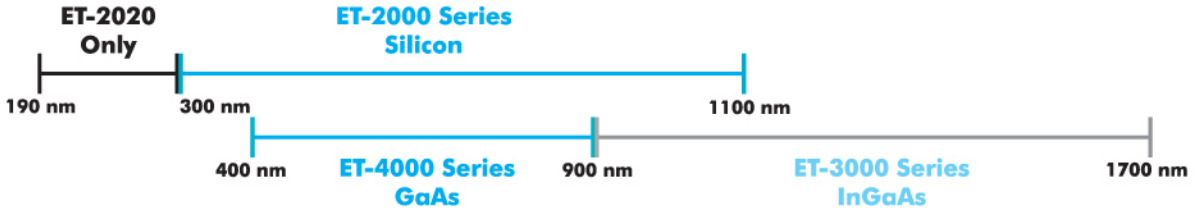
High Speed Photo Detector

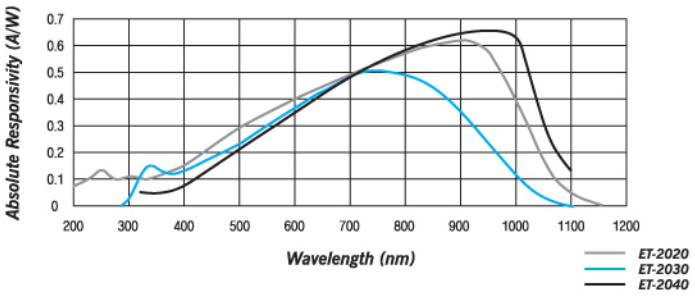
Features

- Suitable for a variety of pulsewidth measurement and pulse profiling applications
- Use PIN photodiodes and a reverse bias
- Utilize the photoelectric effect to convert light energy into a electrical current
- BNC or SMA output connector
- Fitted with FC fiber optic connectors
- Connecting the photodetector to an oscilloscope and terminating into 50Ω

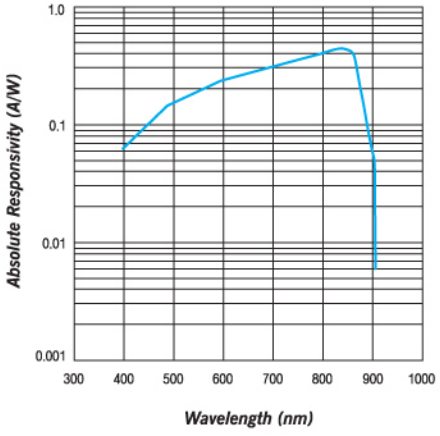


	nm Range
TTL & Analog Detectors	●
>10GHz GaAs & InGaAs Detectors	●
>9GHz Amplified Photodetectors	●
2GHz Amplified Photodetectors	●
Biased Silicon Detectors	●
Biased InGaAs Detectors	●

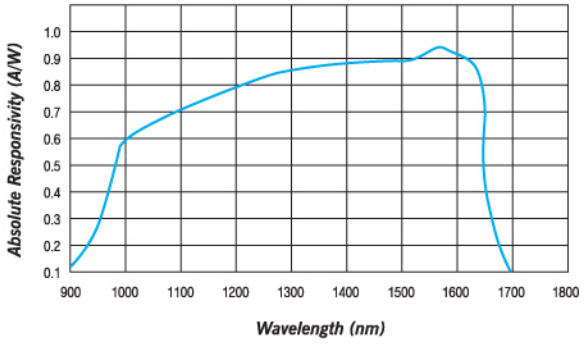
ET-2000 Series Spectral Responsivity



ET-4000 Series Spectral Responsivity



ET-3000TTL Spectral Responsivity



High Speed Photo Detectors

Biased Silicon Detectors

Model No.	ET-2000	ET-2020	ET-2030	ET-2040
Detector Type	PIN	PIN	PIN	PIN
Risetime	<200ps	<1.5ns	<300ps	<30ns
Falltime	<350ps	<1.5ns	<300ps	<30ns
Responsivity @830nm	0.4mA/W	0.5A/W	0.4A/W	0.5A/W
Bias Voltage	3V	24V[a]	9V	24V[a]
Cut Off Frequency	>1.5GHz	>200MHz	>1.2GHz	>25MHz
Active Area	0.006mm^2	2.55mm dia.	0.4mm dia.	4.57mm dia.
Dark Current	<1nA	<10nA	<0.1nA	<20nA
Junction Capacitance	<4pF	<10pF	<1.5pF	<45pF
Reverse Breakdown Voltage	40V	150V	20V	50V
Acceptance Angle (1/2 Angle)	20°	50°	30°	60°
Noise Equivalent Power (pW/√Hz)	<0.1	<1.0	<0.0015	<10.16
Connector	BNC	BNC	BNC	BNC
Mounting (Tapped Hole)	8-32 and M4	8-32 and M4	8-32 and M4	8-32 and M4

Notes : a. The ET-2020 and ET-2040 utilize wall plug-in power supplies. All other biased silicon photodetectors utilize long life 3V lithium cell(s).

1. The ET-2000 and ET-2030 can be purchased with an optional wall plug in power supply.
2. Standard photodetectors have a positive bias. Photodetectors with a negative bias are available as a special option.
3. These photodetectors are not intenally terminated. A 50Ω
4. Termination is optimal.
5. The ET-2030 can be ordered with a FC fiber input receptacle.

Biased InGaAs Detectors

Model No.	ET-3000	ET-3010	ET-3020	ET-3040
Detector Type	PIN	PIN	PIN	PIN
Risetime	<175ps	<225ps	<6ns	<1.25ns
Falltime	<175ps	<225ps	<250ns	<3.70ns
Responsivity @1.3㎛	0.8A/W	0.8A/W	0.8A/W	0.9A/W
Bias Voltage	6V	6V	0V	6V
Cut off Frequency	>2GHz	>1.5GHz	>2.5MHz	>50MHz
Active Area (dia)	100㎛	100㎛	3.0mm	1.0mm
Dark Current	<1nA	<1nA	≈2000nA	<20nA
Junction Capacitance	<0.75pF	<1.25pF	<1300pF	<32pF
Reverse Breakdown Voltage	25V	25V	2V	20V
Acceptance Angle (1/2 Angle)	20°	N/A	50°	50°
Noise Equivalent Power (pW/√Hz)	<0.1	<0.1	<1.0	<0.1
Connector	BNC	BNC	BNC	BNC
Mounting (Tapped Hole)	8-32 and M4	8-32 and M4	8-32 and M4	8-32 and M4
Fiber Optic Connector	N/A	FC	N/A	N/A

Notes :

1. The ET-3000, ET-3010 and ET-3040 can be ordered with an optional 5V wall plug in power supply.
2. Standard photodetectors have a positive bias. Photodetectors with a negative bias are available as a special option.
3. These photodetectors are not internally terminated. A 50Ω termination is optimal.

TTL and Analog Detectors

Model No.	ET-2030TTL	ET-3000TTL
Detector Type	PIN	PIN
Detector Material	Silicon	InGaAs
Active Area (diameter)	0.4mm	100μm
Acceptance Angle (half angle)	10°	20°
Power Supply	12V DC external	12V DC external
Mounting (reversible tapped holes)	8-32 or M4 x 0.7	8-32 or M4 x 0.7
Analog Output		
Risetime	<300psec	<175psec
Falltime	<300psec	<175psec
Sensitivity	0.4A/W@830nm	0.8A/W@1.3μm
Frequency Response	DC-1.2GHz	DC-2GHz
Termination	50Ω external	50Ω external
Maximum Continuous Current	10mA	10mA
Connector	BNC	BNC
TTL Output		
Risetime	<8nsec	<8nsec
Falltime	<9nsec	<9nsec
Adjustable Trigger Threshold	40-500mV	40-500mV
Threshold Monitor	External	External
Minimum Detectable Pulsewidth	8nsec	8nsec
Frequency Response	DC-60MHz	DC-60MHz
Logic High	>3.0V	>3.0V
Logic Low	<0.5V	<0.5V
Pulse Stretch (when enabled)	100nsec typical	100nsec typical
Termination	500Ω typical	500Ω typical
Connector	BNC	BNC

>10GHz GaAs & InGaAs Detectors

Model No.	ET-3500	ET-3500F	ET-4000	ET-4000F
Detector Type	PIN	PIN	PIN	PIN
Detector Material	InGaAs	InGaAs	GaAs	GaAs
Spectral Range	1000-1650nm	1000-1650nm	450-870nm	450-870nm
Risetime	<35ps	<35ps	<35ps	<35ps
Falltime	<35ps	<35ps	<35ps	<35ps
Responsivity	0.88A/W@1550nm	0.88A/W@1550nm	0.45A/W@850nm	0.45A/W@850nm
Bias Voltage	6V	6V	6V	6V
Cut Off Frequency	>10GHz	>10GHz	>10GHz	>10GHz
Active Area	32μm dia.	32μm dia.	40μm dia.	40μm dia.
Dark Current	<3nA	<3nA	<200pA	<200pA
Junction Capacitance	0.12pF	0.12pF	0.3pF	0.3pF
Noise Equivalent Power (pW/√Hz)[b]	<0.04	<0.04	<0.02	<0.02
Electrical Connector	SMA	SMA	SMA	SMA
Mounting (Tapped Hole)	8-32 and M4	8-32 and M4	8-32 and M4	8-32 and M4
Fiber Optic Connection	N/A	9/125μm SMF	N/A	9/125μm SMF[c]

Notes : a. All specifications apply for a 50Ω termination unless otherwise noted. b. Short circuit output
c. Multi-mode fiber available. May limit bandwidth to <10GHz. d. All >10GHz photodetectors have an internal 50Ω termination.

High Speed Amplified Photo Detectors

2GHz Amplified Detectors

Model No.	ET-2030A	ET-3000A
Detector Material	Silicon	InGaAs
Risetime	<500ps	<400ps
Falltime	<500ps	<400ps
Responsivity	450V/W @830nm	900V/W @1300nm
Power Supply	24V[1]	24V[1]
Frequency Response	75kHz-1.2GHz	75kHz-1.5GHz
Active Area (dia.)	400μm	100μm
Acceptance Angle (1/2 Angle)	10°	20°
Noise Equivalent Power (pW/√Hz)	<60	<30
Maximum Undistorted Output Voltage	500mVp-p	400mVp-p
Connector	BNC	BNC
Mounting (tapped hole)	8-32 and M4	8-32 and M4

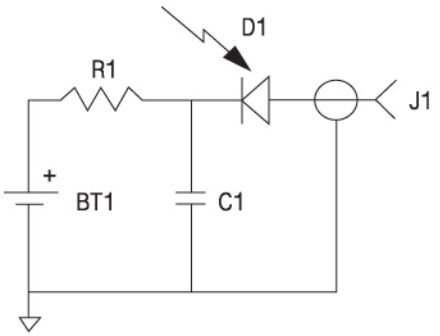
Notes :
1. The ET-2030A and ET-3000A utilize wall plug in power supplies.
2. Amplified photodetectors do not have an internal termination. Optimal termination is 50Ω.
3. The ET-2030A and ET-3000A can be ordered with a FC fiber optic receptacle.

>9GHz Amplified Detectors

Model No.	ET-3500A	ET-3500AF	ET-4000A	ET-4000AF
Spectral Range	1000-1650nm	1000-1650nm	400-900nm	400-900nm
Detector Material	InGaAs	InGaAs	GaAs	GaAs
Risetime	<40ps	<40ps	<40ps	<40ps
Falltime	<40ps	<40ps	<40ps	<40ps
Bandwidth	20kHz-9GHz	20kHz-9GHz	20kHz-9GHz	20kHz-9GHz
Conversion Gain	900V/W@1550nm	900V/W@1550nm	450V/W@850nm	450V/W@850nm
Current Monitor Output	2mV/μA	2mV/μA	2mV/μA	2mV/μA
Max. Nondistorted Output	450mV p-p	450mV p-p	450mV p-p	450mV p-p
Noise Equivalent Power[b]	<25pW/√Hz	<25pW/√Hz	<25pW/√Hz	<25pW/√Hz
Photodiode Active Area Dia.	32μm	32μm	40μm	40μm
Input Connector	Free Space	FC/PC	Free Space	FC/PC
Fiber Optic Connection	N/A	9/125μm SMF[b]	N/A	9/125μm SMF[b]
Output Connector	SMA	SMA	SMA	SMA
Power Supply	5 VDC	5 VDC	5 VDC	5 VDC
Mounting (Tapped Hole)	8-32 or M-4	8-32 or M-4	8-32 or M-4	8-32 or M-4

Notes :
a. All Specifications apply for 50Ω termination unless otherwise noted.
b. Multi-mode fiber available. May limit bandwidth to <9GHz

Schematic of Electrical Circuit for <2GHz Biased Silicon and InGaAs Photodetectors:



Schematic of Electrical Circuit for >10GHz Photodetectors: