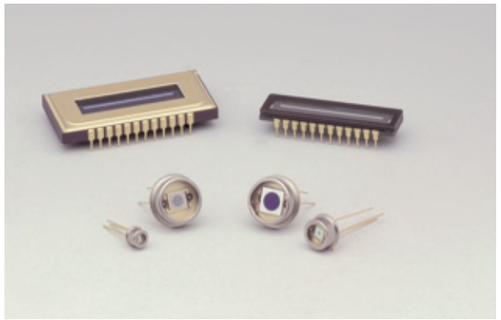
IR-enhanced Si devices

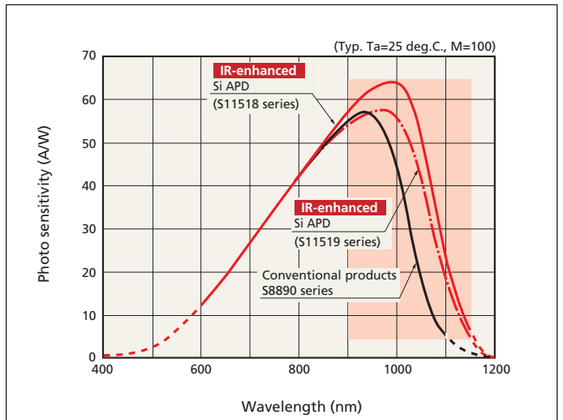
Next-generation Si devices with enhanced near IR sensitivity, using a MEMS structure

Introducing the next-generation of ultra high sensitivity semiconductor sensors that exceed the performance of existing Si photodiodes, Si APDs, and CCD image sensors. These sensors have MEMS (Micro-Electro-Mechanical-Systems) structures fabricated using our own unique laser processing technology and achieve very high sensitivity in the near infrared region. They are the ideal solution for a wide variety of applications such as optical communications, thermal measurement and fluorescence photometry.

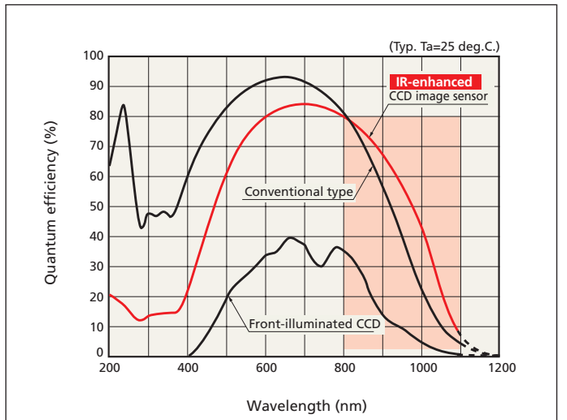


IR-enhanced Si line-up

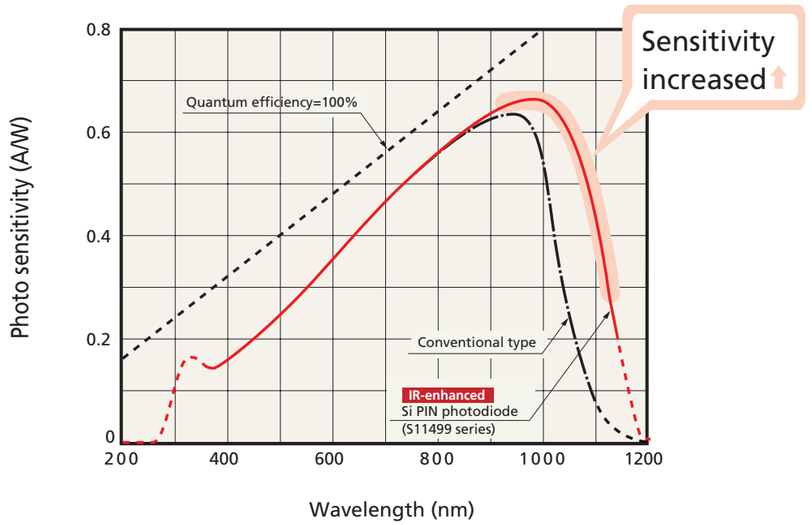
Spectral response (IR-enhanced Si APD)



Spectral response (IR-enhanced CCD image sensor)



Spectral response (IR-enhanced Si PIN photodiode) (Typ. Ta=25 deg.C)



Line-up (Typ. Ta=25 deg.C., unless otherwise noted)

Product		Type No.	Conventional products	Active area size	Package	Application	Page No.
IR-enhanced Si PIN photodiode	High speed	S11498	S9055	Ø 0.2 mm	TO-18	Optical fibre communications	P.12
		S11498-01	S9055-01	Ø 0.1 mm	TO-18		
	Large active area	S11499	-	Ø 3 mm	TO-5	YAG laser monitor	P.12
		S11499-01	S3759	Ø 5 mm	TO-8		
IR-enhanced APD	High sensitivity	S11518-10	S8890-10	Ø 1 mm	TO-5	YAG laser monitor	P.13
		S11518-30	S8890-30	Ø 3 mm	TO-8		
	Low voltage	S11519-10	S8890-10	Ø 1 mm	TO-5		
		S11519-30	S8890-30	Ø 3 mm	TO-8		
IR-enhanced CCD image sensor		S11500-1007	S7030-1007	24 x 24 µm/1024 x 128 ch	Ceramic Non-cooled	Raman spectrometers	P.14
		S11510-1006	S10420-1006	14 x 14 µm/1024 x 64 ch			
		S11510-1106	S10420-1106	14 x 14 µm/2048 x 64 ch			

IR-enhanced Si PIN photodiodes S11498 series, S11499 series

IR-enhanced Si PIN photodiodes

The S11498 series and S11499 series are a family of Si PIN photodiodes which use Hamamatsu's new MEMS structure to offer a drastic improvement in sensitivity in the near infrared region at longer wavelengths.

Si PIN Photodiodes S11498 series

Features

- High sensitivity: 0.4 A/W (850 nm)
- High speed
  1.5 GHz (S11498)
  2.0 GHz (S11498-01)
- Low capacitance

Applications

- Optical fibre communications
- High speed measurement

Si PIN Photodiodes S11499 series

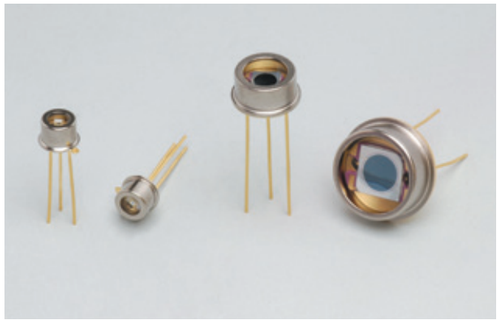
Features

- High sensitivity: 0.6 A/W (1060 nm)
- Large active area
  ϕ 3.0 mm (S11499)
  ϕ 5.0 mm (S11499-01)

Applications

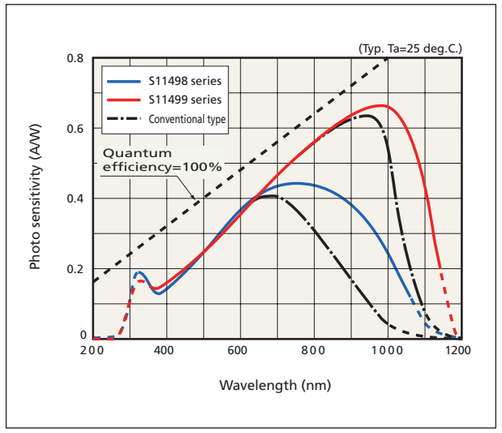
- YAG laser monitor

Author: Robin Smith, Hamamatsu Photonics UK



S11498/S11498-01 (left), S11499/S11499-01 (right)

Spectral response



IR-enhanced Si APDs S11518 series, S11519 series

IR-enhanced Si APD

The S11518 series and S11519 series are a family of Si APDs which use Hamamatsu's new MEMS technology to offer 40% quantum efficiency at 1.06 µm.

The S11518 series can replace the S8890 series whilst offering almost double the quantum efficiency at 1.06 µm, making this series ideal for YAG laser monitoring.

The S11519 series is designed for operation at low bias and offers excellent characteristics and stable operation at just 350 V.

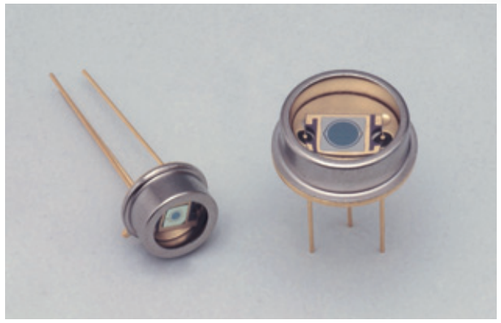
Features

- High sensitivity in the near infrared region
- High gain
- S11519 series: stable operation at low bias

Applications

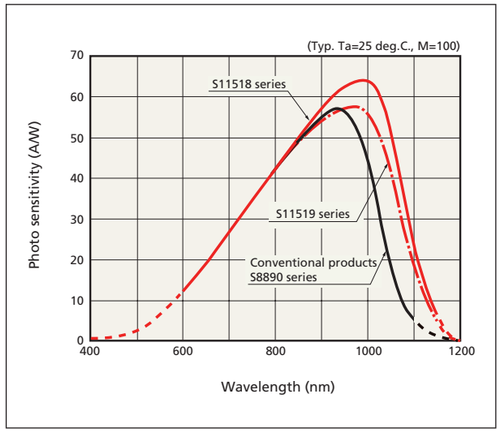
- YAG laser monitor

Author: Robin Smith, Hamamatsu Photonics UK



S11518-10/S11518-30 (left), S11519-10/S11519-30 (right)

Spectral response



IR-enhanced CCD image sensors S11500-1007, S11510 series

IR-enhanced CCD image sensors

The S11500-1007 and S11510 series are FFT (Full Frame Transfer) CCD image sensors which feature improved sensitivity in the near infrared region and a quantum efficiency of 40% at 1000 nm through the use of a MEMS structure on the back side of the CCD.

Although these are area image sensors they can also be used as linear sensors through the implementation of binning, making these products ideal for spectroscopy applications.

CCD area image sensor S11500-1007

Features

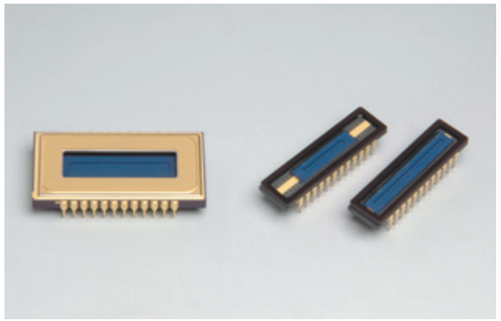
- Pixel size: 24 x 24 µm
- Line, pixel binning
- Wide spectral response range
- Low readout noise
- Wide dynamic range

CCD image sensors S11510 series

Features

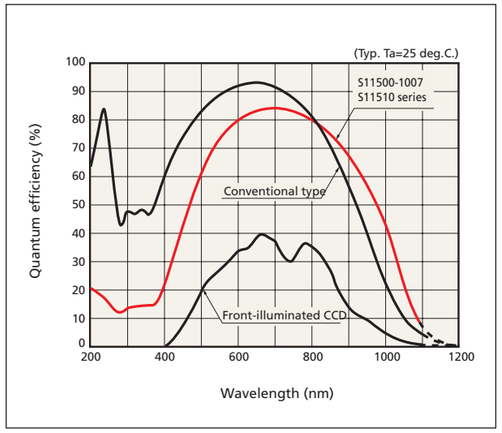
- Pixel size: 14 x 14 µm
- High CCD node sensitivity: 6.5 µV/e⁻
- Wide spectral response range
- Wide dynamic range

Author: Robin Smith, Hamamatsu Photonics UK



S11500-1007 (left), S11510-1006 (middle), S11510-1007 (right)

Spectral response



New InGaAs PIN photodiodes G11193 series

Small surface mount package PIN diodes

The new G11193 series of InGaAs PIN photodiodes feature a small, compact SMD (Surface Mount Device) package, measuring just 5 mm x 4 mm. Two types are available, with differing active areas of 0.2 mm and 0.3 mm diameter respectively.

The G11193 series feature low noise and low dark current characteristics and are ideal for optical power meter and general IR measurement applications.

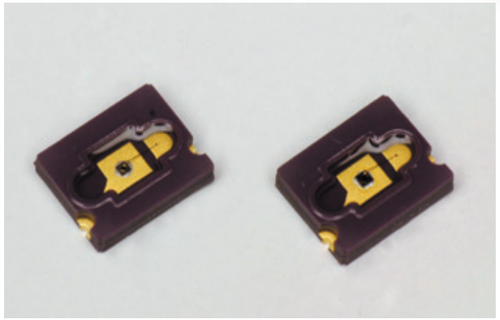
Features

- 0.9 µm - 1.7 µm spectral response range
- Small SMD package
- Low dark current

Applications

- Optical power meter
- General measurement
- Analytical instrumentation

Author: Richard Harvey, Hamamatsu Photonics UK



G11193 series

General ratings (Typ. Ta=25 deg.C.)

Parameter	G11193-02R	G11193-03R	Unit
Package	SMD		-
Active area	ϕ 0.2	ϕ 0.3	mm
Window	Resin		-

Spectral response

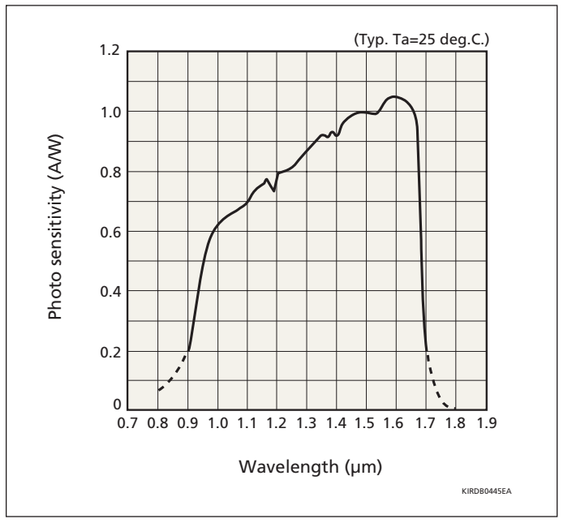


Photo sensitivity temperature characteristic