

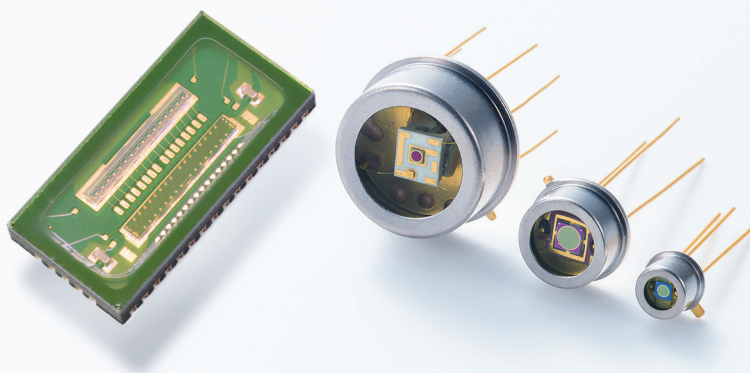


QUALITY MATTERS IN AUTONOMOUS VEHICLES

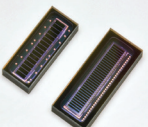

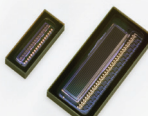
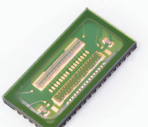

Hamamatsu devices for LiDAR - From design to manufacturing

Photodetector

Hamamatsu can provide unbiased selection choices because we offer all types of photodetectors that meet your TOF (Time-Of-Flight) & FMCW (Frequency-Modulated-Continuous-Wave) LiDAR requirements.



Hamamatsu standard products*

Parameter	Si PIN Photodiode	InGaAs PIN Photodiode	Si APD	Hybrid (Si APD+TIA)	SiPM/MPPC	InGaAs APD
LiDAR Detection Range	Short	Short to Medium	Medium	Medium	Medium to Long	Long
Gain	1	1	50-150	50-100	10^6	10-30
Detection Sensitivity Si = 905nm InGaAs = 1550nm	>92%	>76%	>70%	>70%	>7%	>72%
Operating Voltage	<10V	<20V	<160V	<160V	<80V	<55V
Readout Circuit	Complex	Complex	Complex	Simple	Simple	Complex
Array	Suitable	Suitable	Suitable	Suitable	Suitable	Suitable
Product Series	S13773 S14362 S14363	G8370 G13176 G12180	S12426 S12508 S14645	S13282 S13645 S14137	S13720	G8931 G14858
						

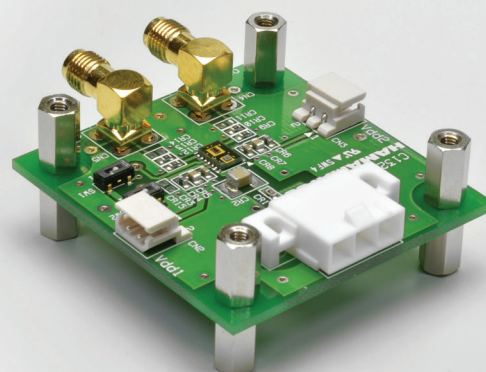
* Customization of photodetectors is possible, please contact Hamamatsu for more information.

* For detailed information and product type number, please refer to individual datasheet.

Evaluation Kit & Module

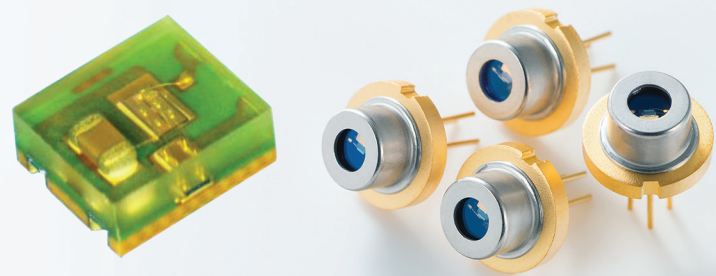
For quick evaluation, Hamamatsu provides evaluation kits and modules to help you save on costs and make your job easier.

- Evaluation board for photodetectors (APD+TIA, MPPC and others)
- Photodetector modules



Light Source

High-power laser diodes with sharp near field pattern (NFP) and far field pattern (FFP) that are close to Gaussian shape.



Hamamatsu standard pulsed laser diodes*

Product Series	Type/Package	Output Power	Peak Emission Wavelength	Emitting Size
L11384	Metal Can	>21W	870nm	70x10um
L11649		>20W	870nm	200x1um
L11854		>21W	905nm	70x10um
		>75W	905nm	230x10um
		>100W	905nm	360x10um
L14829	Surface Mount (SMD)	>90W	905nm	230x10um
L14774		>100W	905nm	360x10um
L14828	SMD with FET and Capacitor	>90W	905nm	230x10um
L14075		>100W	905nm	360x10um

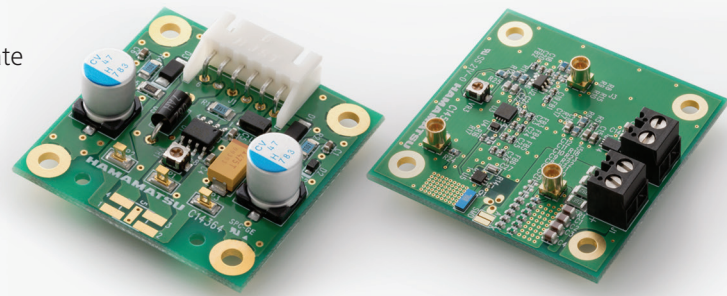
* Customization of laser diodes is possible, please contact Hamamatsu for more information.

* For detailed information and product type number, please refer to individual datasheet.

Laser Diode Driver Board

Off-the-shelf driver boards allow you to quickly operate and evaluate the laser diode of your choice for your LiDAR design.

- Driver board for laser diode with FET and capacitor (C14364)
- Driver board for laser diode only (C14518)



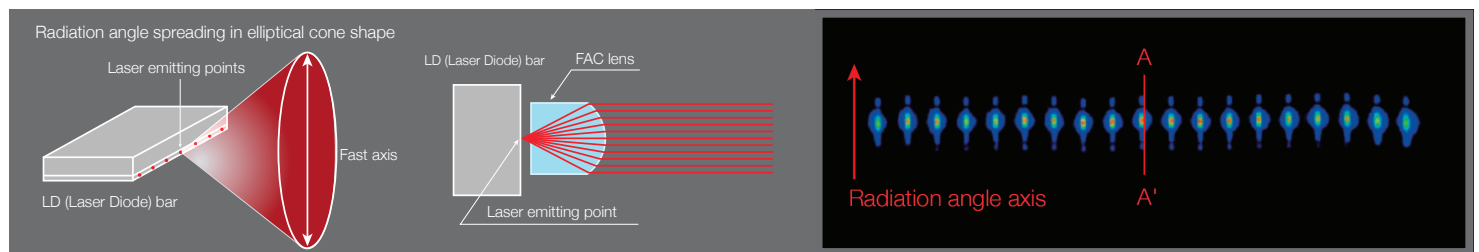
Hamamatsu

Other Components for LiDAR Design

Light Collimator

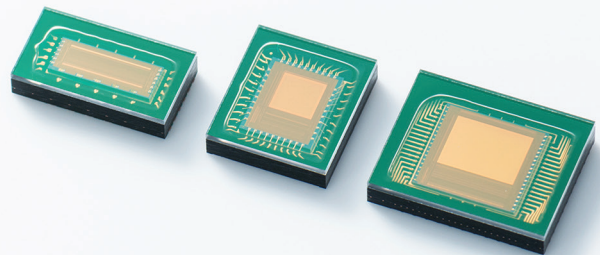
Attach a FAC lens to your laser diode to minimize the smile and side lobes of your output pattern.

- Custom coating possible to accommodate various wavelengths of laser
- Custom length of lens
- Custom focal length to meet distance requirement
- Product Series: J10919



Distance Image Sensor

- Fewer moving parts for a more reliable design
- Measures the distance of an object and provides image simultaneously using indirect time-of-flight method



Hamamatsu standard products*

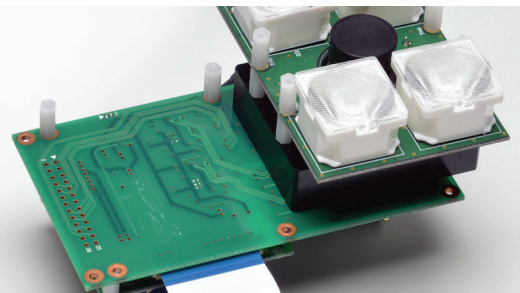
Product Series	Image Size	Number of Pixels	Pixel Pitch
S11961	5.12 x 0.05 mm	272	20um
S11962	2.56 x 2.56 mm	72 x 72	40um
S11963	4.8 x 3.6 mm	168 x 128	30um

* For detailed information and product type number, please refer to individual datasheet.

Driver Board/Evaluation Kit

Driver board and evaluation kit that save on cost and make your life easier while evaluating the best mirror and distance area image sensor to use in your system.

- Driver board for distance area image sensor (C12647 & C12648)



DEVICES for LiDAR

ASSEMBLY/MANUFACTURING/TESTING

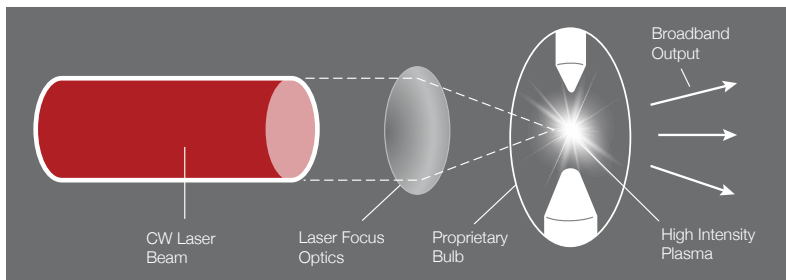
LED Light Source for UV Curing

- Shorten curing time with high intensity and custom wavelength UV LED source (365nm, 385nm, and 405nm)
- Simple design for ease of operation and shorter learning curve
- Custom head design for limited spacing
- Feedback control function permits stable irradiation
- Product Series: LC-L1V3 & LC-L1V5



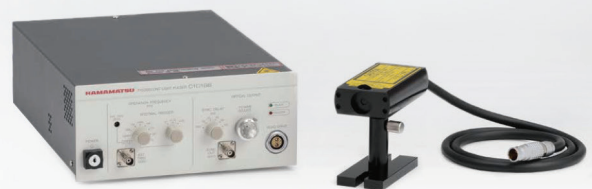
Laser-Driven Light Source for Calibration/Testing

- High brightness, broadband laser-driven light source
- Compact and durable
- Product Series: EQ-99X & EQ-99XFC



Picosecond Light Pulser for Testing

- Ultra-short, pulsed light source (picosecond) ideal for measuring detector response
- Stable output power and oscillating timing
- Interchangeable LD heads for 905 and 1550nm
- Product Series: PLP-10



High Resolution Silicon or InGaAs CMOS Camera for Inspection & Calibration

- High resolution CMOS cameras
- Custom frame rate & exposure time
- High sensitivity at 905nm to 1700nm



WHY HAMAMATSU ?

Unbiased Opinions Help You Select the Right Photonic Device

Not all technology is created equal! Hamamatsu's complete offering in photonics technology allow us to be honest and transparent in recommending the right photonic devices that are the best fit for your LiDAR design.

The Market Leader of the Past, Present and Future

We have been the technology leader in providing photonic solutions in different industries for more than 50 years, and we have years of experience in providing automotive grade components (AEC Q100/Q101/Q102 Qualification, IATF 16949, and ISO 9001).

Customized for Your Unique Needs

90% of our business is from customization. We understand that customization of your component in the system is necessary, especially in the automotive industry for ADAS/Autonomous Vehicles.

Simplify Your Supply Chain

Hamamatsu will meet your needs via our extensive selection of photodetectors, light sources, optical lenses, supporting electronics, light sources, PLP, and cameras used throughout design, assembly, manufacturing, and testing.

For product inquiry, email support@hamamatsu.com

HAMAMATSU
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