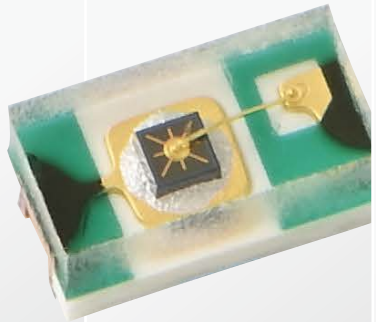
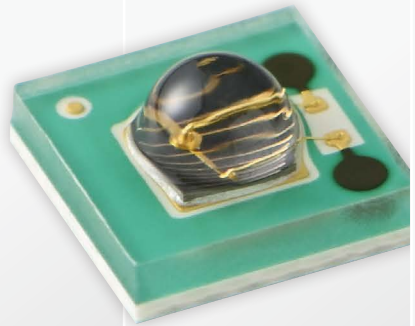
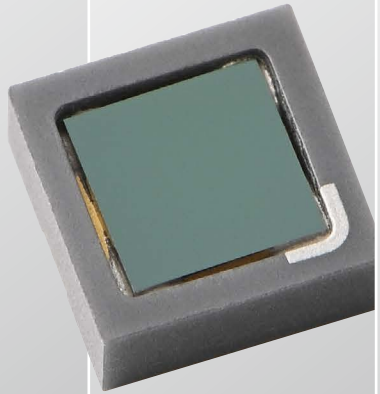
Rich variety of light emitters
for wide range of applications

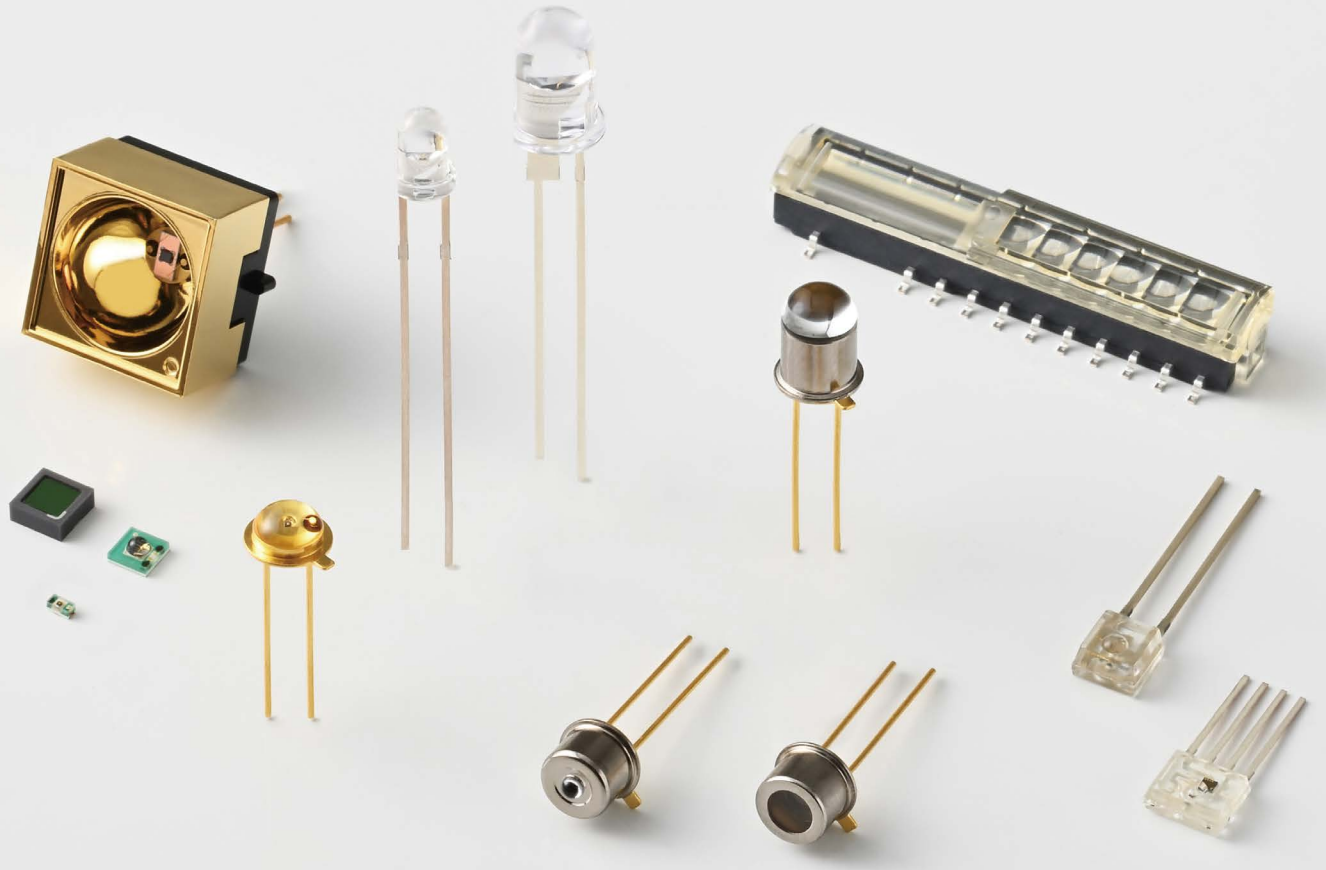
L E D







LED



Rich variety of light emitters for wide range of applications

Hamamatsu provides various LEDs from red to mid infrared range, which are mainly used in combination with a photosensor.
By using crystal growth technology and process technology for a variety of compound semiconductor materials, we have a product lineup for a variety of wavelengths. We also achieve high quality and high reliability through strictly controlled assembly and inspection processes.

Hamamatsu LEDs

Product lineup that covers a wide variety of wavelengths

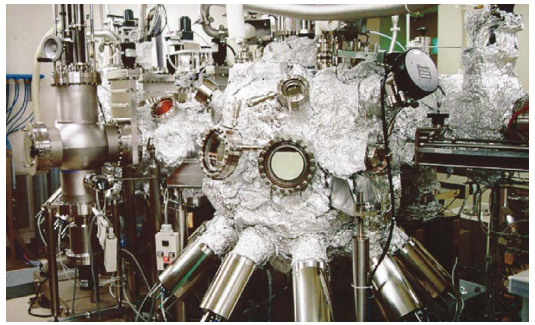
Product name	Peak emission wavelength	Main applications
Red LED	650 to 700 nm	Optical switches, POF data communication, barcode readers
Near infrared LED	830 to 945 nm	Optical encoders, optical fiber communication, FSO, optical switches
	1.2 to 1.55 µm	Moisture measurement, analysis, near infrared lighting
Mid infrared LED	3.3 to 4.3 µm	Gas detection
Light emitting/receiving module	870 nm	VICS in-vehicle unit
SIP type LED	650 to 940 nm	Optical links, optical switches, encoders

Variety of package types

Package	Features
Metal	High reliability
Plastic	Low price
Surface mount type	Compact, thin type
With lens	Narrow directivity
High output	High heat radiation

Custom devices available

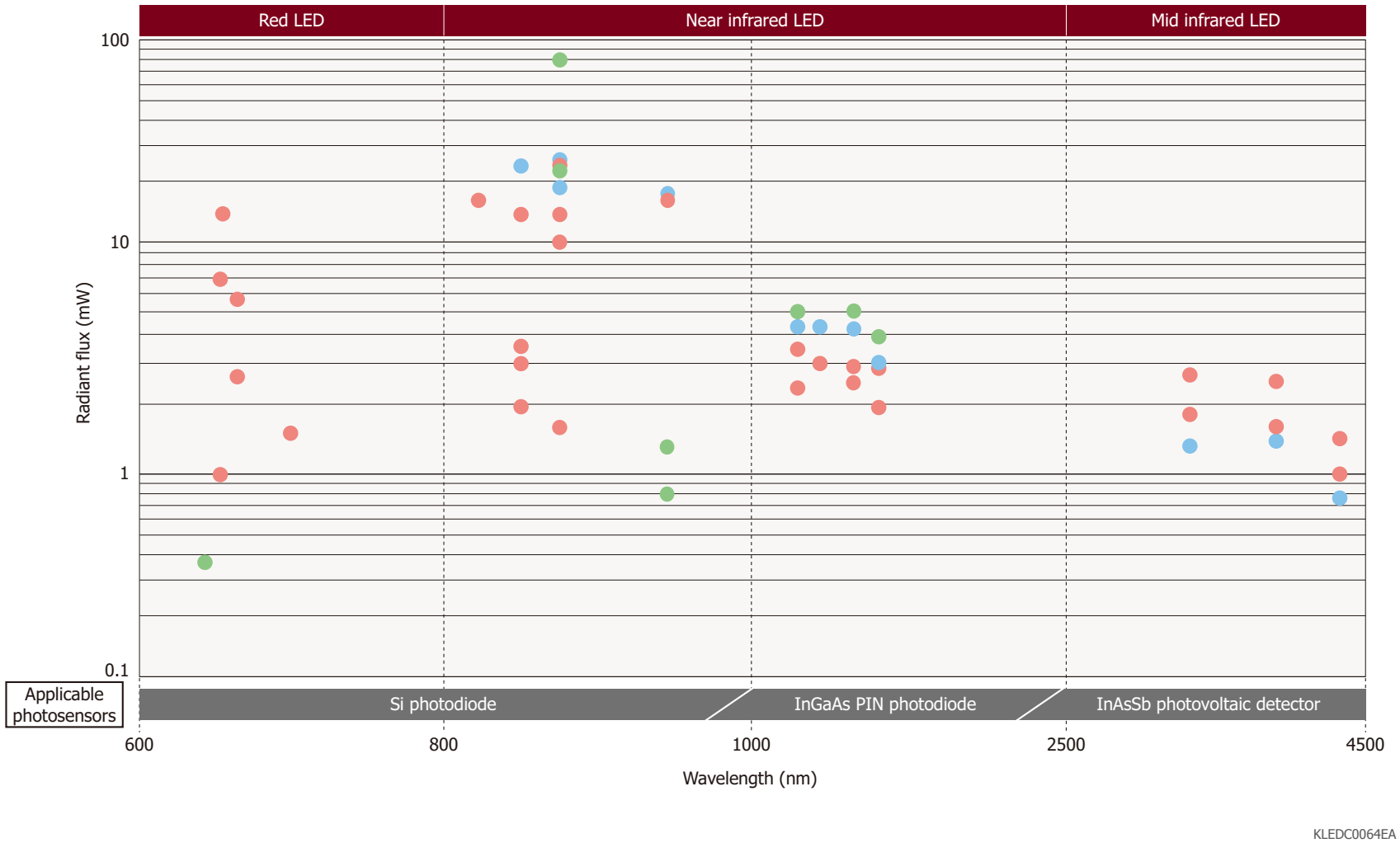
In addition to package and lens design, and multi-element array, we can also support custom specifications, such as wavelength changes that require new epitaxial wafer crystal growth.



Thin-film crystal growth under ultra-high vacuum in MBE equipment

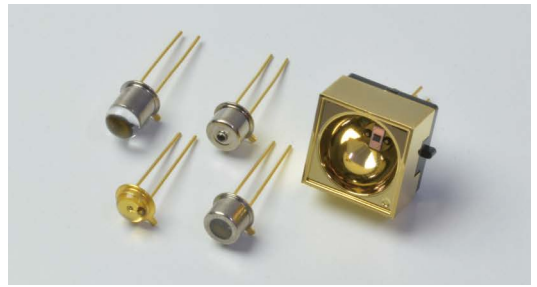
Thin-film crystal growth with MOCVD equipment

Light output vs. wavelength



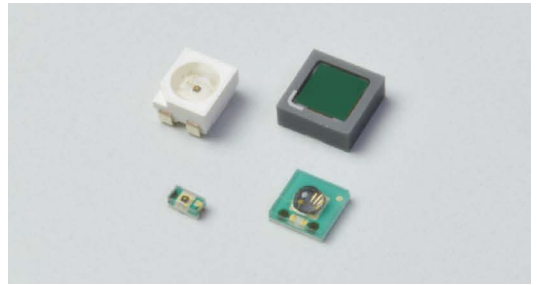
KLEDC0064EA

Metal packages



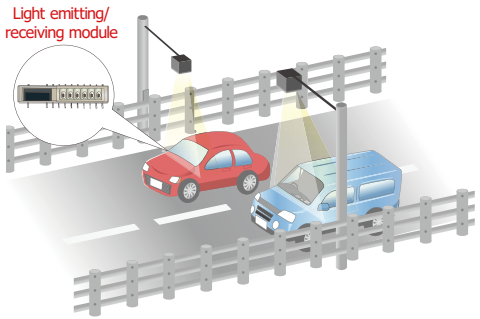
Plastic packages

Surface mount types



Application examples

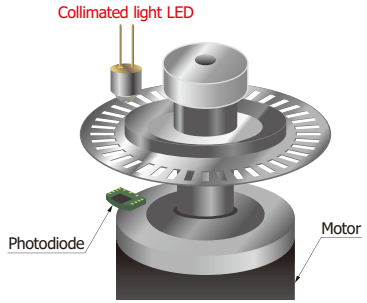
VICS



KLEDC0029EB

Light emitting/receiving modules with built-in LEDs and a photosensor are embedded in VICS in-vehicle devices.

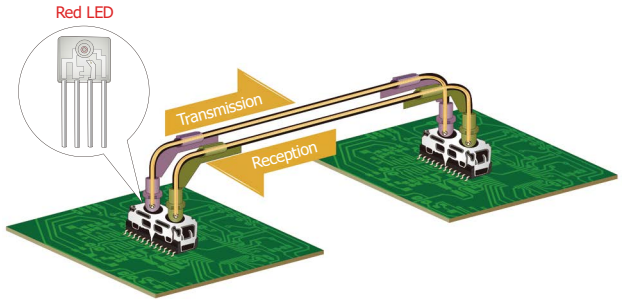
Encoders



KLEDC0054EA

Optical transmission encoders require a collimated LED to achieve high accuracy.

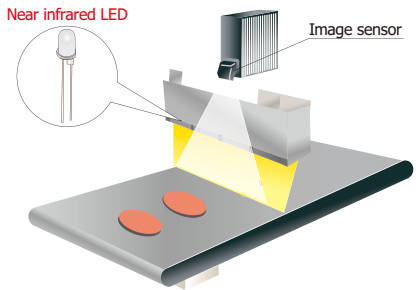
Optical communication



KLEDC0055EA

Red LEDs are used for POF (plastic optical fiber) communications and FSO (free space optics).

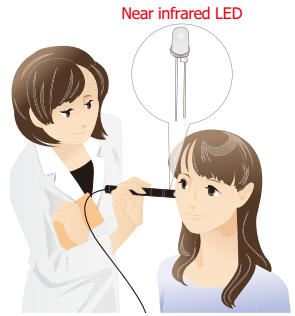
Lighting for infrared cameras



KLEDC0056EA

Infrared LEDs with large output are used as light sources for infrared camera imaging. These LEDs are arranged around the camera.

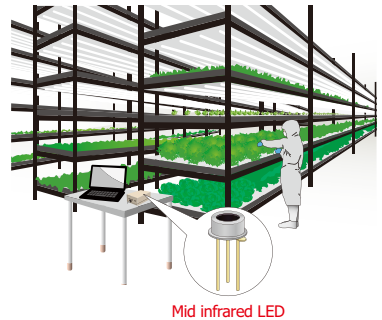
Skin moisture measurement



KLEDC0057EA

Compact near infrared LEDs are used for measuring skin moisture levels.

Gas detection

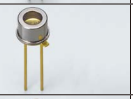
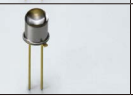


KLEDC0058EA

Mid infrared LEDs are used for CO_2 density measurements in plant factories.

Red LEDs

Red LEDs have a peak emission wavelength in the 660 to 700 nm range. They are used in a wide range of applications including optical switches, POF data communication, and barcode readers.

Type no.	Peak emission wavelength (nm)	Spectral half width (nm)	Emitter area (mm)	Radiant flux (mW)	Forward voltage (V)	Cutoff frequency (MHz)	Measurement condition: Forward current (mA)	Photo	Directivity	Features	Application examples
L10762	660	15	ϕ0.4	1.0*	1.9	70	20		⑧	High fiber end output	POF data communication
L11767		18	□0.31	13	2.1	6			①	High output, wide directivity	Optical switches
L11767-0066L			ϕ4.65	7					⑤	High reliability, narrow directivity	
L6108	670	25	□0.25	5.5	1.8	5	20		①	High output, wide directivity	Optical switches
L6112			ϕ1.15						②	High output	
L6112-01			ϕ4.65	2.5					⑤	High reliability, narrow directivity	
L6112-02			ϕ1.15						③	High reliability, wide directivity	
L10363	700	20	ϕ4.65	1.4	1.7	5	20		⑤	High reliability, narrow directivity	Optical switches

* POF core diameter=ϕ1 mm, length=1 m, Z (distance between the top surface of the cap and the fiber end)=0.3 mm

830 to 945 nm

These near infrared LEDs have a peak emission wavelength in the 830 to 945 nm range. They are used in a wide range of applications including optical switches and encoders.

Type no.	Peak emission wavelength (nm)	Spectral half width (nm)	Emitter area (mm)	Radiant flux (mW)	Forward voltage (V)	Cutoff frequency (MHz)	Measurement condition: Forward current (mA)	Photo	Directivity	Features	Application examples
L14336-0083R	830	40	ϕ0.75	16	1.5	20	50		②	High output	Optical switches
L11913	850	25	ϕ4.65	3.4*	1.45	20	20		⑥	High reliability, superior collimation	Encoders
L13141-0085K		30	ϕ0.11	2.8	1.7	25	50		⑦	Wide directivity, current confinement type	Optical switches
L13142-0085K		35	ϕ0.4	3					⑧	Narrow directivity, current confinement type	
L13142-0085L		30	ϕ4.65						⑥		
L14096-0085GL		25	ϕ1.4	23	1.9	20			⑬	High output, narrow directivity	
L14337-0085R		45	ϕ0.75	13	1.5	50			②	High output, high-speed response	

* Light output

830 to 945 nm

These near infrared LEDs have a peak emission wavelength in the 830 to 945 nm range. They are used in a wide range of applications including optical switches, optical fiber communication, near infrared lighting, and encoders.

Type no.	Peak emission wavelength (nm)	Spectral half width (nm)	Emitter area (mm)	Radiant flux (mW)	Forward voltage (V)	Cutoff frequency (MHz)	Measurement condition: Forward current (mA)	Photo	Directivity	Features	Application examples
L8013	870	45	ϕ1.15	45 μW*1	1.45	50	30		⑦	Easy fiber alignment	POF data communication
L9337			ϕ0.75	23	1.42	40	50		②	High output	Optical switches
L9337-01			ϕ4.65	13					⑤	High reliability, narrow directivity	
L9337-02			ϕ0.75	10					③	High reliability, wide directivity	
L9437			ϕ4.65	1.6*2	1.5		30		⑥	High reliability, superior collimation	Encoders
L10843			□0.39	23	1.45	50	50		①	High output, wide directivity	Optical switches
L11368-01		35	ϕ1.7	65 μW*3	2	50	50		④	Current confinement type	Optical communication
L12170		45	ϕ5.0	80	1.45	40	200		⑩	Large current, high output, narrow directivity	Near infrared lighting
				1200	2.4		3000*4				
L12171-0087G			□0.24	18	1.55		50		⑫	Surface mount type, compact	Optical switches
L12756			ϕ3.0	23	1.5				⑪	High output, narrow directivity	Near infrared lighting

*1: PCF200 fiber end output *2: Light output *3: GI50 fiber end output *4: Pulse value=10 μs, duty ratio=1%

830 to 945 nm

These near infrared LEDs have a peak emission wavelength in the 830 to 945 nm range. They are used in a wide range of applications including optical switches and near infrared lighting.

Type no.	Peak emission wavelength (nm)	Spectral half width (nm)	Emitter area (mm)	Radiant flux (mW)	Forward voltage (V)	Cutoff frequency (MHz)	Measurement condition: Forward current (mA)	Photo	Directivity	Features	Application examples
L14097-0094GL	940	40	ϕ1.4	60 1200	2.5 3.0	10	50 1000*		⑭	Large current, high output	Near infrared lighting
L9338	945	60	ϕ0.75	15	1.34	0.3	50		②	High output	Optical switches

* Pulse value=10 μs, duty ratio=1%

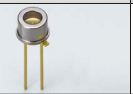
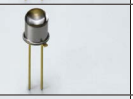
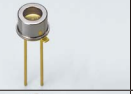
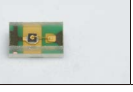
1.2 to 1.55 µm

These high output near infrared LEDs have a peak emission wavelength at 1 µm or higher. 1.2 µm, 1.3 µm, 1.45 µm, and 1.55 µm peak emission wavelength types are available. They are used for analysis, near infrared lighting, etc.

Type no.	Peak emission wavelength (nm)	Spectral half width (nm)	Emitter area (mm)	Radiant flux (mW)	Forward voltage (V)	Cutoff frequency (MHz)	Measurement condition: Forward current (mA)	Photo	Directivity	Features	Application examples
L13072-0120K	1200	80	ϕ1.15	2.2	1.1	15	50		③	High reliability, high output	Analysis, near infrared lighting
L13072-0120L			ϕ4.65	3.2					⑤		
L13072-0120P			ϕ3.0	5					⑪	High output, narrow directivity	
NEW L13072-0120G			□0.31	4.4					⑫	Surface mount type, compact	
L12771	1300	90	ϕ1.15	2.8	1	15	50		③	High reliability, high output	Analysis, near infrared lighting
L12771-01			ϕ4.65	3.1					⑤		
NEW L12771-0130G			□0.31	4.4					⑫	Surface mount type, compact	

1.2 to 1.55 µm

These high output near infrared LEDs have a peak emission wavelength at 1 µm or higher. 1.2 µm, 1.3 µm, 1.45 µm, and 1.55 µm peak emission wavelength types are available. They are used for moisture measurements, analysis, near infrared lighting, etc.

Type no.	Peak emission wavelength (nm)	Spectral half width (nm)	Emitter area (mm)	Radiant flux (mW)	Forward voltage (V)	Cutoff frequency (MHz)	Measurement condition: Forward current (mA)	Photo	Directivity	Features	Application examples
L10660	1450	120	ϕ1.15	2.4	1	15	50		③	High reliability	Moisture measurement, near infrared lighting
L10660-01			ϕ4.65	2.8					⑤		
L13895-0145P			ϕ3.0	5	0.9	10			⑪	High output	
L13895-0145G			□0.31	4					⑫	Surface mount type, compact	
L12509-0155K	1550	120	ϕ1.15	1.9	0.8	15	50		③	High reliability, high output	Analysis, near infrared lighting
L12509-0155L			ϕ4.65	2.7					⑤		
L12509-0155P			ϕ3.0	3.8					⑪	High output	
L12509-0155G			□0.31	3					⑫	Surface mount type, compact	

Mid infrared LEDs

Mid infrared LEDs with peak emission wavelengths in the mid infrared region (3.3 µm, 3.9 µm, 4.3 µm) feature high output and are used for gas detection.
They are used in combination with quantum type detectors such as InAsSb photovoltaic detectors.

Type no.	Peak emission wavelength* (nm)	Spectral half width* (nm)	Emitter area (mm)	Radiant flux* (mW)	Forward voltage* (V)	Rise time max. (µs)	Measurement condition: Forward current QCW mode (mA)	Photo	Directivity	Features	Application examples
NEW L15893-0330C	3300	400	0.67 × 0.77	1.3	2.7	1	80		⑮	Surface mount type	Methane detection
L15893-0330M				1.9					③	High output, high reliability	
NEW L15893-0330ML				2.6					⑨	High output, narrow directivity	
NEW L15894-0390C	3900	600	0.67 × 0.77	1.4	2.2				⑮	Surface mount type	Reference light source for gas detection
L15894-0390M				1.7					③	High output, high reliability	
NEW L15894-0390ML				2.4					⑨	High output, narrow directivity	
NEW L15895-0430C	4300	1000	0.67 × 0.77	0.75	2				⑮	Surface mount type	CO_2 detection
L15895-0430M				1					③	High output, high reliability	
NEW L15895-0430ML				1.4					⑨	High output, narrow directivity	

* I_F=80 mA, QCW (quasi continuous wave) mode (pulse width=100 µs, duty ratio=50%)

Evaluation kit for mid infrared LED

This driver is for Hamamatsu mid infrared LED (L15893-0330M, L15894-0390M, L15895-0430M). The LED can be operated with a pulse drive simply by connecting a power supply (±15 V). Contact us for detailed information.

Note: LEDs are sold separately

(Typ. Ta=25 °C, Vs=+15 V)

Type no.	Output current (mA)	Output pulse (µs)	Output cycle (µs)
M16615	400	10	1000

Special LEDs

Light emitting/receiving module

This VICS in-vehicle module employs six 870 nm LED chips and one Si photodiode in a plastic package.

Type no.	Peak emission wavelength (nm)	Spectral half width (nm)	Pulse radiant intensity*1 (mW/sr)	Pulse forward voltage*1 (V)	Cutoff frequency (MHz)	Measurement conditions: Pulse forward current (mA)	Photo
P12793	870*2	45*2	1550	6.7	15	900	

*1: 64 kHz, duty ratio=50%, 4 ms ON, average peak value during pulse drive *2: IF=100 mA

SIP type LEDs

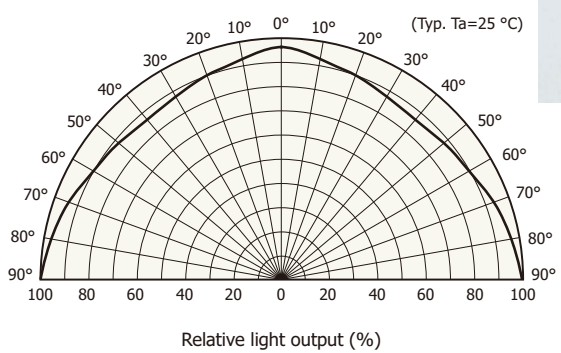
These are compact, plastic SIP (single inline package) LEDs with a lens in which the LED chip is molded in transparent resin.

Type no.	Peak emission wavelength (nm)	Spectral half width (nm)	Radiant flux (mW)	Forward voltage (V)	Measurement condition: Forward current (mA)	Features	Photo
L10881	650	25 max.	-4.5 dBm*3	1.9	20	High output for 156 Mbps optical link	
L5276	880	50	2.2	1.3	20	For optical switches	
L6286	940	45	0.8*4	1.25			
L6895-10	940	60	1.2*4	1.25	20	For encoders	

*3: Fiber coupling optical output *4: minimum value

Metal package

① Resin potted type (no reflector)



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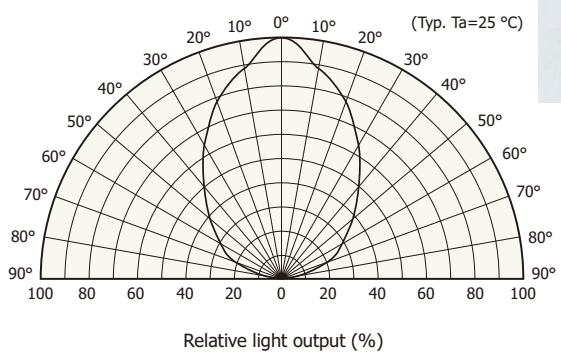
② Resin potted type (with reflector)



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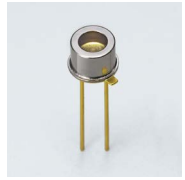
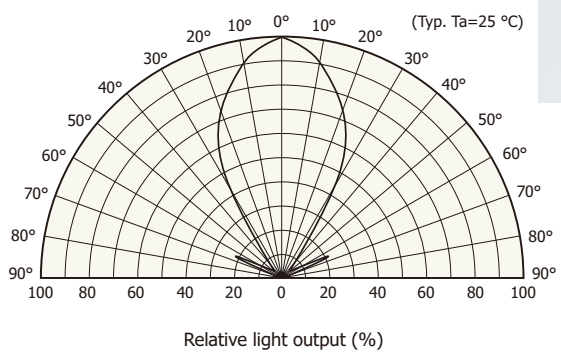
③ Flat cap





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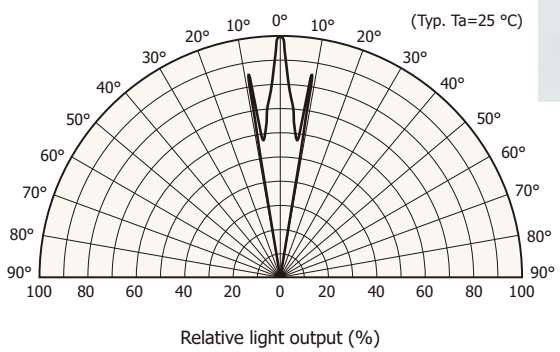
④ With mini lens



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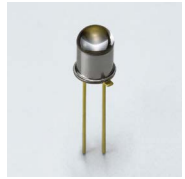
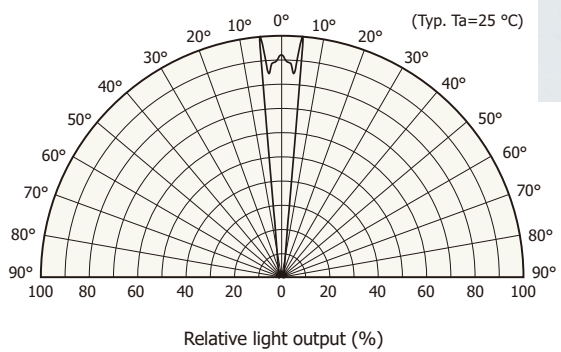
⑤ With lens





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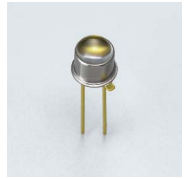
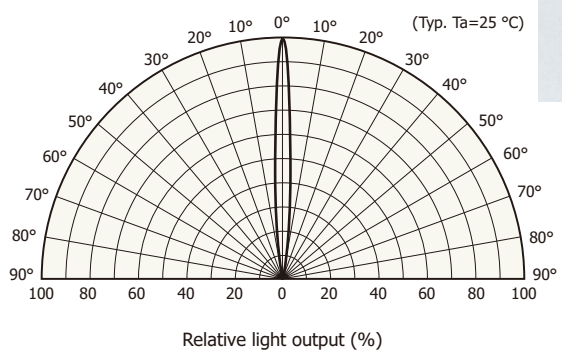
⑥ With lens (superior collimation)





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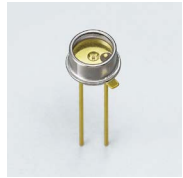
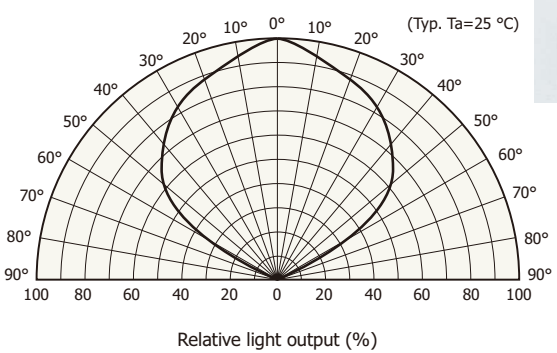
Metal package

⑦ Low-profile flat cap





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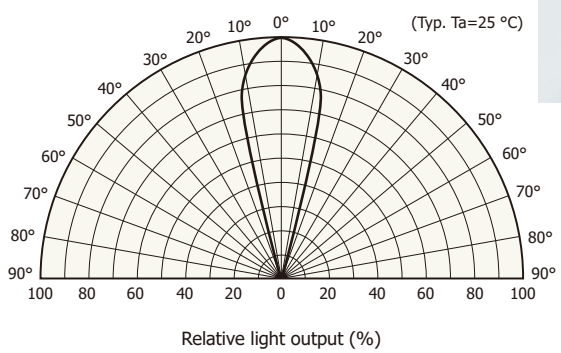
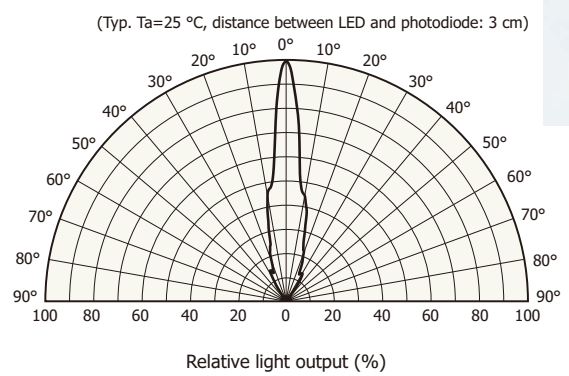
⑧ With ball lens



KLEDB0477EA

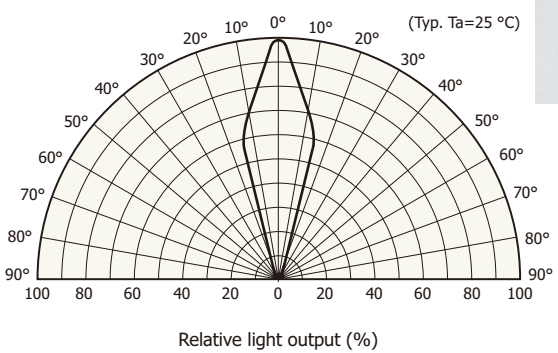
⑨ With reflector



KLEDB0549EA

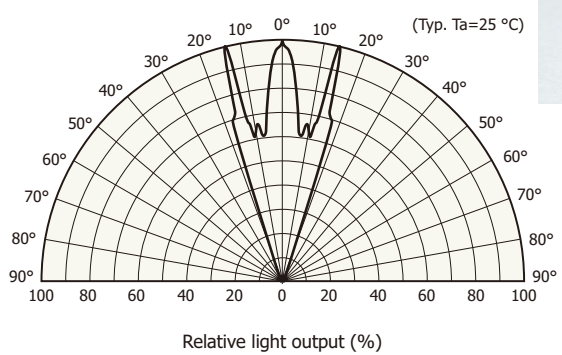
Plastic package

⑩ Bullet-shaped (ϕ5 mm)



KLEDB0375EA

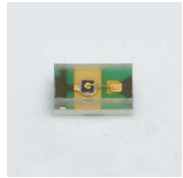
⑪ Bullet-shaped (ϕ3 mm)

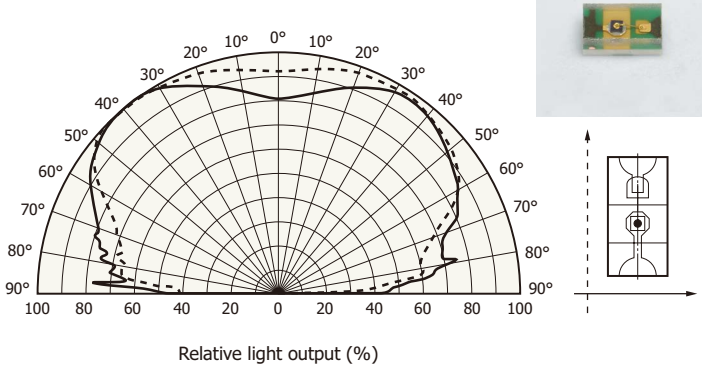


KLEDB0386EA

Surface mount type

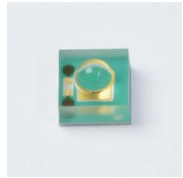
⑫ COB (chip-on-board)

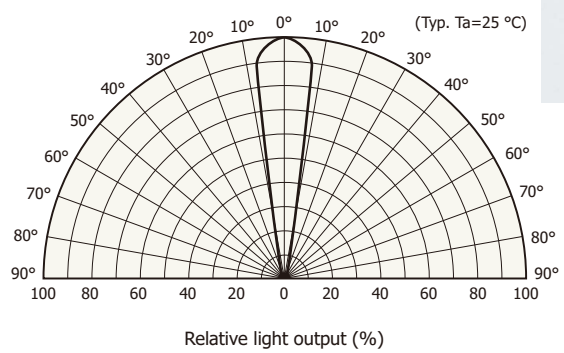




KLEDB0461EA

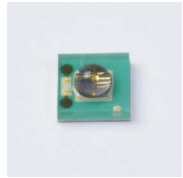
⑬ COB with lens (narrow directivity)

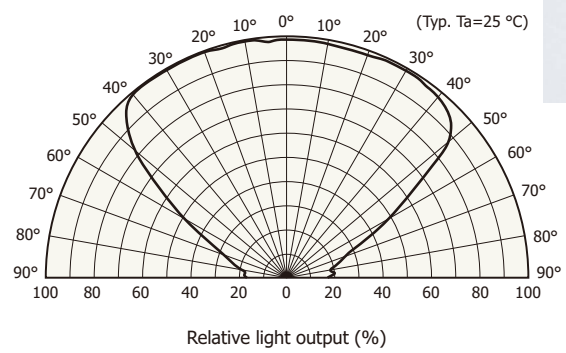




KLEDB0462EA

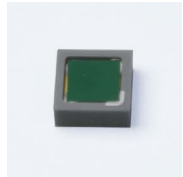
⑭ COB with lens (large output)

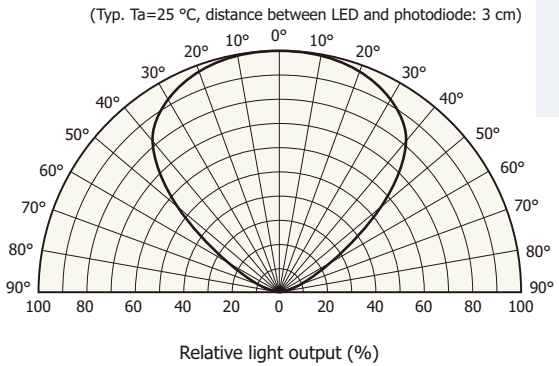




KLEDB0500EA

⑮ Ceramic type





KLEDB0464EA

Precautions

Disclaimer
Safety consideration
Metal, ceramic, plastic package products
Unsealed products
Surface mount type products
Compound opto-semiconductors (photosensors, light emitters)

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