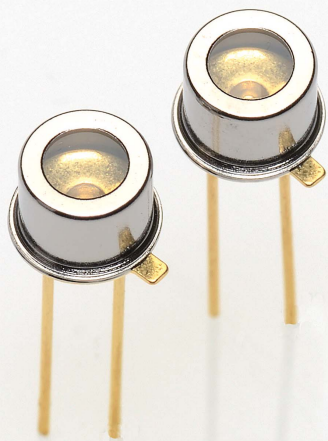
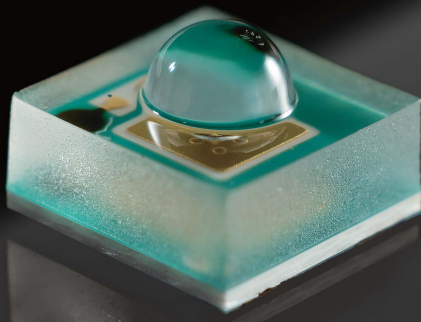


# LED

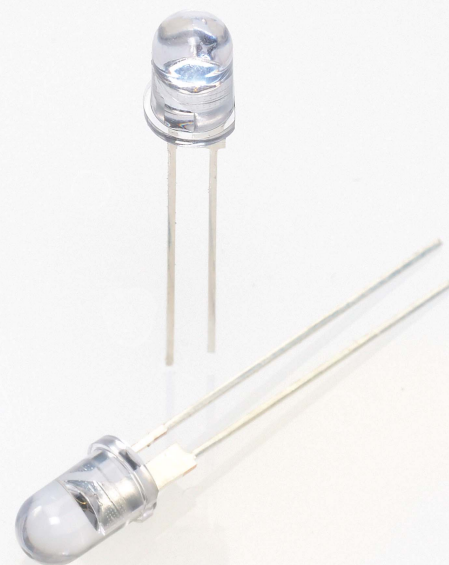
Rich variety of light emitters for wide range of applications



■ Metal package type LED  
L9337-02



■ Surface mount type LED with lens  
L14096-0085GL



■ Bullet-shaped LED  
L12170

Архангельск (8182)63-90-72  
Астана (7172)727-132  
Астрахань (8512)99-46-04  
Барнаул (3852)73-04-60  
Белгород (4722)40-23-64  
Брянск (4832)59-03-52  
Владивосток (423)249-28-31  
Волгоград (844)278-03-48  
Вологда (8172)26-41-59  
Воронеж (473)204-51-73  
Екатеринбург (343)384-55-89  
Иваново (4932)77-34-06

Ижевск (3412)26-03-58  
Иркутск (395)279-98-46  
Казань (843)206-01-48  
Калининград (4012)72-03-81  
Калуга (4842)92-23-67  
Кемерово (3842)65-04-62  
Киров (8332)68-02-04  
Краснодар (861)203-40-90  
Красноярск (391)204-63-61  
Курск (4712)77-13-04  
Липецк (4742)52-20-81  
Киргизия (996)312-96-26-47

Магнитогорск (3519)55-03-13  
Москва (495)268-04-70  
Мурманск (8152)59-64-93  
Набережные Челны (8552)20-53-41  
Нижний Новгород (831)429-08-12  
Новокузнецк (3843)20-46-81  
Новосибирск (383)227-86-73  
Омск (3812)21-46-40  
Орел (4862)44-53-42  
Оренбург (3532)37-68-04  
Пенза (8412)22-31-16  
Казахстан (772)734-952-31

Пермь (342)205-81-47  
Ростов-на-Дону (863)308-18-15  
Рязань (4912)46-61-64  
Самара (846)206-03-16  
Санкт-Петербург (812)309-46-40  
Саратов (845)249-38-78  
Севастополь (8692)22-31-93  
Симферополь (3652)67-13-56  
Смоленск (4812)29-41-54  
Сочи (862)225-72-31  
Ставрополь (8652)20-65-13  
Таджикистан (992)427-82-92-69

Сургут (3462)77-98-35  
Тверь (4822)63-31-35  
Томск (3822)98-41-53  
Тула (4872)74-02-29  
Тюмень (3452)66-21-18  
Ульяновск (8422)24-23-59  
Уфа (347)229-48-12  
Хабаровск (4212)92-98-04  
Челябинск (351)202-03-61  
Череповец (8202)49-02-64  
Ярославль (4852)69-52-93

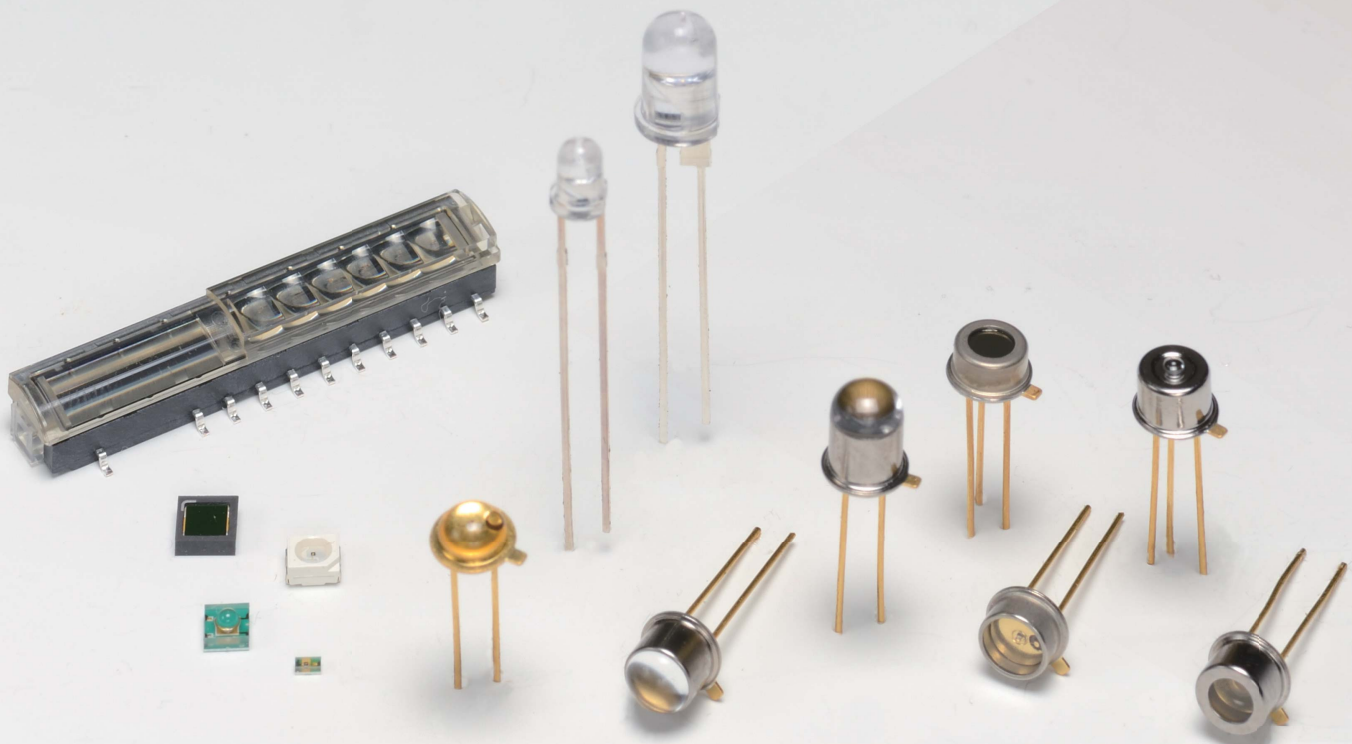
# LED

LEDs are opto-semiconductors that convert electrical energy into light energy. LEDs offer the advantages of low cost and a long service life compared to laser diodes (LDs).

LEDs are grouped into visible LEDs and invisible LEDs. Visible LEDs are mainly used for display or illumination, where LEDs are used individually. Invisible LEDs, however, are mainly used with photosensors such as photodiodes or CMOS image sensors.

Hamamatsu provides various LEDs from red to mid infrared range, which are mainly used in combination with photosensors.

Based on crystal growth technology and process technology supporting numerous compound semiconductor materials, we provide a product lineup that covers various wavelengths. The products feature high quality and high reliability backed by strictly controlled assembly process and inspection process.



# Contents

- Product lineup ..... 3
- Application examples ..... 4
- Selection guide ..... 5
- Directivity (typical examples) ..... 9

## Features of Hamamatsu LEDs

### ● Product lineup that covers a wide variety of wavelengths

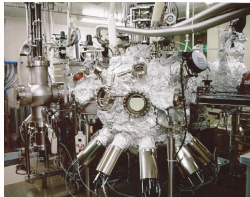
| Product           | Peak emission wavelength | Main applications                                                                         |
|-------------------|--------------------------|-------------------------------------------------------------------------------------------|
| Red LED           | 660 to 700 nm            | Optical switch, POF data communication, barcode reader                                    |
| Near infrared LED | 850 to 945 nm            | Optical encoder, optical communication (optical fiber communication, FSO), optical switch |
|                   | 1.2 to 1.55 μm           | Moisture measurement, analysis, near infrared lighting                                    |
| Mid infrared LED  | 3.3 to 4.3 μm            | Gas detection                                                                             |

### ● Wide variety of packages

| Package type       | Characteristics     |
|--------------------|---------------------|
| Metal              | High reliability    |
| Plastic            | Low cost            |
| Surface mount type | Compact, thin case  |
| With lens          | Narrow directivity  |
| For high output    | High heat radiation |

### ● Custom devices available

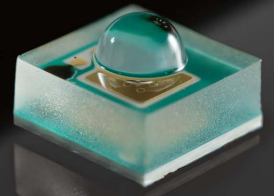
In addition to changes in specifications of catalog products, fully customized products that entail new epitaxial wafer crystal growth can be provided.



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



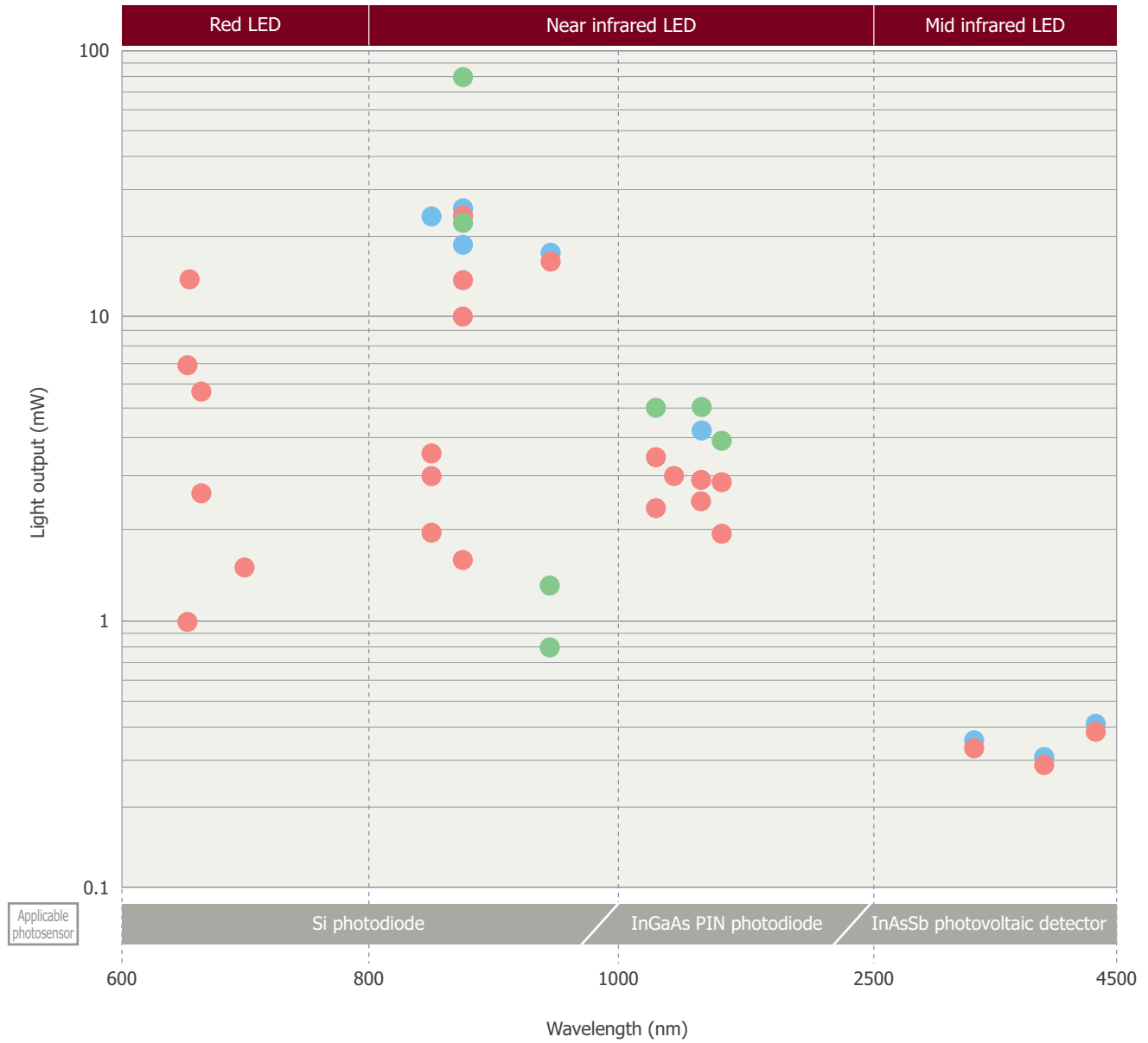
Thin-film crystal growth with MOCVD equipment



# Product lineup

Hamamatsu Photonics offers various packages of LEDs that support different wavelengths and light outputs.

## Wide-ranging product lineup



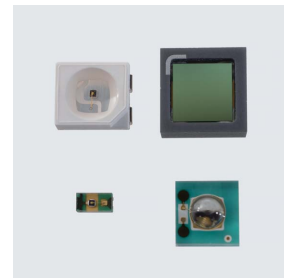
● Metal packages



● Plastic packages



● Surface mount types

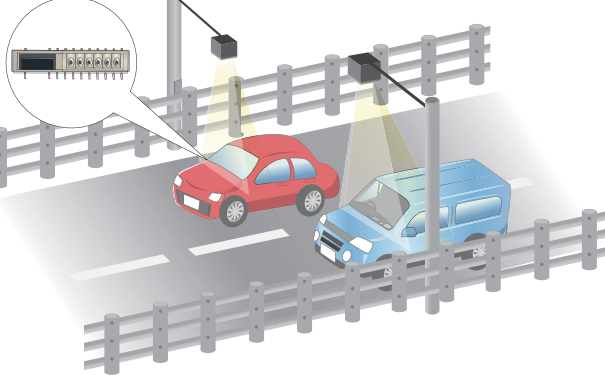


Note: For details on directivity, see pages 9 and 10.

# Application examples

## VICS

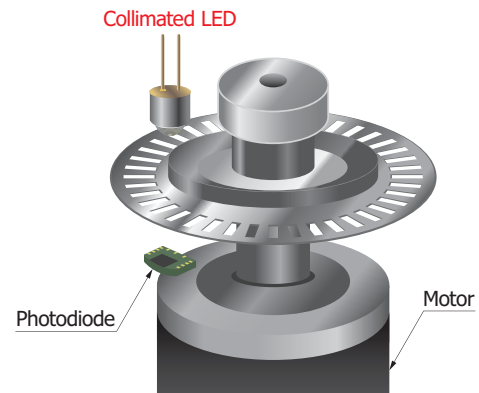
Light emitting/  
receiving module



KLEDC0029EB

Light emitting/receiving modules with built-in LEDs and a photosensor are embedded in VICS (Vehicle Information and Communication System) in-vehicle devices.

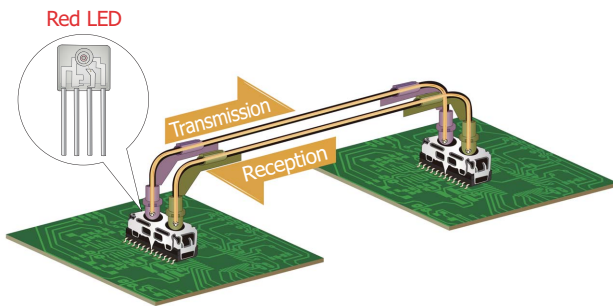
## Encoders



KLEDC0054EA

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

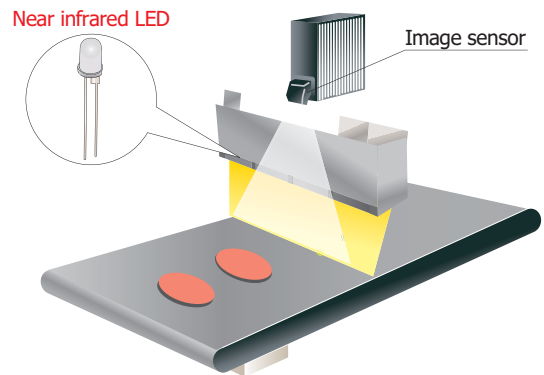
## Optical communication



KLEDC0055EA

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

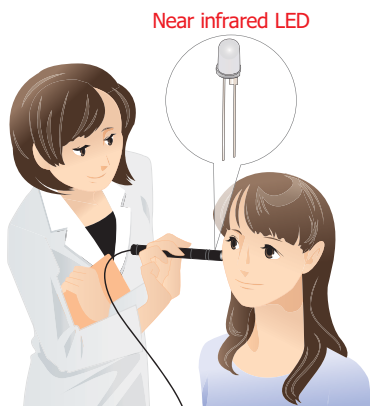
## Lighting for infrared cameras



KLEDC0056EA

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

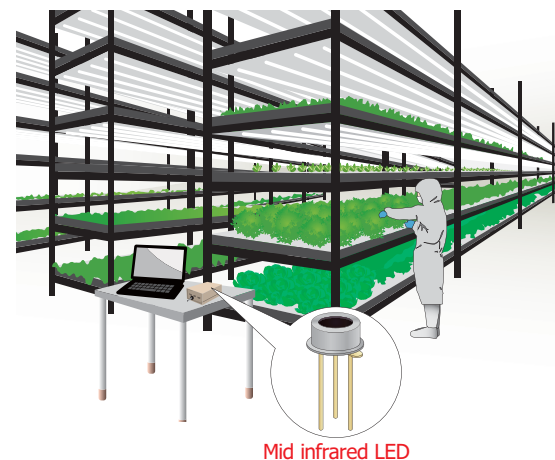
## Skin moisture measurement



KLEDC0057EA

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

## Gas detection











KLEDC0058EA

Mid infrared LEDs are used for CO<sub>2</sub> density measurements in plant factories.

# Selection guide

## Red LED

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. Various types are available including a type with a reflector (cavity) on the metal base to increase the irradiance, a type with lens featuring narrow directivity, and a type that can irradiate over a wide range without a reflector.

| Type no.     | Peak emission wavelength (nm) | Spectral half width (nm) | Emission area (mm) | Radiant flux (mW) | Forward voltage (V) | Cutoff frequency (MHz) | Measurement condition | Photo                                                                                 | Directivity (P.9, 10) | Features                             | Application examples   |
|--------------|-------------------------------|--------------------------|--------------------|-------------------|---------------------|------------------------|-----------------------|---------------------------------------------------------------------------------------|-----------------------|--------------------------------------|------------------------|
|              |                               |                          |                    |                   |                     |                        | Forward current (mA)  |                                                                                       |                       |                                      |                        |
| L10762       | 660                           | 15                       | $\phi$ 0.4         | 1.0*1             | 1.9                 | 70                     | 20                    |    | ⑧                     | High fiber end output                | POF data communication |
| L11767       |                               | 18                       | $\square$ 0.31     | 13                | 2.1                 | 6                      |                       |    | ①                     | High output, wide directivity        | Optical switches       |
| L11767-0066L |                               |                          | $\phi$ 4.65        | 7                 |                     |                        |                       |    | ⑤                     | High reliability, narrow directivity |                        |
| L6108        | 670                           | 25                       | $\square$ 0.25     | 5.5               | 1.8                 | 5                      | 20                    |    | ①                     | Wide directivity                     | Optical switches       |
| L6112        |                               |                          | $\phi$ 1.15        |                   |                     |                        |                       |   | ②                     | Wide directivity                     |                        |
| L6112-01     |                               |                          | $\phi$ 4.65        | 2.5               |                     |                        |                       |  | ⑤                     | High reliability, narrow directivity |                        |
| L6112-02     |                               |                          | $\phi$ 1.15        |                   |                     |                        |                       |  | ③                     | High reliability, wide directivity   |                        |
| L10363       | 700                           | 20                       | $\phi$ 4.65        | 1.4               | 1.7                 | 5                      | 20                    |  | ⑤                     | High reliability, narrow directivity | Optical switches       |

\*1: POF core diameter= $\phi$ 1 mm, length=1 m, Z (distance between the cap surface and the fiber end)=0.3 mm

## Near infrared LED (850 to 945 nm)













These near infrared LEDs have a peak emission wavelength in the 850 to 945 nm range. They are used in a wide range of applications including optical switches, optical fiber communication, FSO, optical rangefinders, near infrared lighting, and encoders. A wide product lineup (high output, high-speed response, superior collimation, current confinement type with mini light spot, high reliability type for in-vehicle applications, etc.) is available.

| Type no.                                                                                          | Peak emission wavelength (nm) | Spectral half width (nm) | Emission area (mm) | Radiant flux (mW)                                                                     | Forward voltage (V)                                                                   | Cutoff frequency (MHz)                                                                | Measurement condition                                                                 | Photo                                                                                 | Directivity (P.9, 10)                                                                 | Features                                     | Application examples                           |                                                                                       |
|---------------------------------------------------------------------------------------------------|-------------------------------|--------------------------|--------------------|---------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|----------------------------------------------|------------------------------------------------|---------------------------------------------------------------------------------------|
|                                                                                                   |                               |                          |                    |                                                                                       |                                                                                       |                                                                                       | Forward current (mA)                                                                  |                                                                                       |                                                                                       |                                              |                                                |                                                                                       |
| L11913                                                                                            | 850                           | 25                       | φ4.65              | 3.4*2                                                                                 | 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                                                                                     |                                                                                       | Narrow directivity, current confinement type                                          |                                                                                       |                                              |                                                |                                                                                       |
| L13814-0085K                                                                                      |                               | 30                       | φ0.05              | 2                                                                                     | 1.9                                                                                   | 25                                                                                    |                                                                                       |    | ⑦                                                                                     | Current confinement type, mini light spot    |                                                |                                                                                       |
| L14096-0085GL                                                                                     |                               | 25                       | φ1.4               | 23                                                                                    | 20                                                                                    |    |                                                                                       | ⑫                                                                                     | High output, narrow directivity                                                       |                                              |                                                |                                                                                       |
| L8013                                                                                             | 870                           | 45                       | φ1.15              | 45 μW*3                                                                               | 1.45                                                                                  | 50                                                                                    |                                                                                       | 30                                                                                    |    | ⑦                                            |                                                | Easy fiber alignment                                                                  |
| 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                                                                              |                                              |                                                |                                                                                       |
| L9725-01                                                                                          |                               | φ2.4                     | 23                 | 1.45                                                                                  | 40                                                                                    | 50                                                                                    |  | ⑭                                                                                     | High output, surface mount type                                                       | In-vehicle                                   |                                                |                                                                                       |
| L10843                                                                                            |                               | □0.39                    |                    |                                                                                       | 50                                                                                    |  | ①                                                                                     | High output, wide directivity                                                         | Optical switches                                                                      |                                              |                                                |                                                                                       |
| L11368-01                                                                                         |                               | 35                       | φ1.7               | 65 μW*4                                                                               | 2                                                                                     | 50                                                                                    | 50                                                                                    |  | ④                                                                                     | Current confinement type                     | Optical communication                          |                                                                                       |
| L12170                                                                                            |                               | 45                       | φ5.0               | 80                                                                                    | 1.45                                                                                  | 40                                                                                    | 200                                                                                   | 50                                                                                    |  | ⑨                                            | Large current, high output, narrow directivity | Near infrared lighting                                                                |
|                                                                                                   |                               |                          |                    | 1200                                                                                  | 2.4                                                                                   |                                                                                       | 3000*5                                                                                |                                                                                       |                                                                                       |                                              |                                                |                                                                                       |
| L12171-0087G                                                                                      | □0.24                         |                          | 18                 | 1.55                                                                                  | 50                                                                                    |  | ⑪                                                                                     | Surface mount type, compact                                                           | Optical switches                                                                      |                                              |                                                |                                                                                       |
| L12756                                                                                            | φ3.0                          |                          | 23                 | 1.5                                                                                   |  | ⑩                                                                                     | High output, narrow directivity                                                       | Near infrared lighting                                                                |                                                                                       |                                              |                                                |                                                                                       |
|  L14097-0094GL | 940                           | 40                       | φ1.4               | 60                                                                                    | 2.5                                                                                   | 10                                                                                    | 50                                                                                    |  | ⑬                                                                                     | Large current, High output                   | Near infrared lighting                         |                                                                                       |
|                                                                                                   |                               |                          | 1200               | 3.0                                                                                   | 1000*5                                                                                |                                                                                       |                                                                                       |                                                                                       |                                                                                       |                                              |                                                |                                                                                       |
| L9338                                                                                             | 945                           | 60                       | φ0.75              | 15                                                                                    | 1.34                                                                                  | 0.3                                                                                   | 50                                                                                    |  | ②                                                                                     | High output                                  | Optical switches                               |                                                                                       |
| L9726                                                                                             |                               |                          | φ2.4               |                                                                                       | 1.35                                                                                  |                                                                                       |                                                                                       |                                                                                       |                                                                                       |                                              |                                                |  |

\*2: light output \*3: PCF200 fiber end output \*4: GI50 fiber end output \*5: Pulse value=10 μs, duty ratio=1%

## Near infrared LED (1.2 to 1.55 $\mu\text{m}$ )







These high output near infrared LEDs have a peak emission wavelength at 1  $\mu\text{m}$  or higher. 1.2  $\mu\text{m}$ , 1.3  $\mu\text{m}$ , 1.45  $\mu\text{m}$ , and 1.55  $\mu\text{m}$  peak emission wavelength types are available. They are used for moisture measurements, analysis, near infrared lighting, and so on. Various packages (metal package, with lens, bullet-shaped) are available.

| Type no.                | Peak emission wavelength (nm) | Spectral half width (nm) | Emission area (mm) | Radiant flux (mW) | Forward voltage (V) | Cutoff frequency (MHz) | Measurement condition<br>Forward current (mA) | Photo                                                                                 | Directivity (P.9, 10) | Features                        | Application examples                         |
|-------------------------|-------------------------------|--------------------------|--------------------|-------------------|---------------------|------------------------|-----------------------------------------------|---------------------------------------------------------------------------------------|-----------------------|---------------------------------|----------------------------------------------|
|                         |                               |                          |                    |                   |                     |                        |                                               |                                                                                       |                       |                                 |                                              |
| L13072-0120K            | 1200                          | 80                       | $\phi$ 1.15        | 2.2               | 1.1                 | 15                     | 50                                            |    | ③                     | High reliability, high output   | Analysis, near infrared lighting             |
| L13072-0120L            |                               |                          | $\phi$ 4.65        | 3.2               |                     |                        |                                               |    | ⑤                     |                                 |                                              |
| L13072-0120P            |                               |                          | $\phi$ 3.0         | 5                 |                     |                        |                                               |    | ⑩                     | High output, narrow directivity |                                              |
| L12771                  | 1300                          | 90                       | $\phi$ 1.15        | 2.8               | 1                   | 15                     | 50                                            |    | ③                     | High reliability, high output   | Analysis, near infrared lighting             |
| L12771-01               |                               |                          | $\phi$ 4.65        | 3.1               |                     |                        |                                               |    | ⑤                     |                                 |                                              |
| L10660                  | 1450                          | 120                      | $\phi$ 1.15        | 2.4               | 1                   | 15                     | 50                                            |   | ③                     | High reliability                | Moisture measurement, near infrared lighting |
| L10660-01               |                               |                          | $\phi$ 4.65        | 2.8               |                     |                        |                                               |  | ⑤                     |                                 |                                              |
| L13895-0145P            |                               |                          | $\phi$ 3.0         | 5                 | 0.9                 | 10                     |                                               |  | ⑩                     | High output                     |                                              |
| <b>NEW</b> L13895-0145G |                               |                          | $\square$ 0.31     | 4                 |                     |                        |                                               |  | ⑪                     | Surface mount type, compact     |                                              |
| L12509-0155K            | 1550                          | 120                      | $\phi$ 1.15        | 1.9               | 0.8                 | 15                     | 50                                            |  | ③                     | High reliability, high output   | Analysis, near infrared lighting             |
| L12509-0155L            |                               |                          | $\phi$ 4.65        | 2.7               |                     |                        |                                               |  | ⑤                     |                                 |                                              |
| L12509-0155P            |                               |                          | $\phi$ 3.0         | 3.8               |                     |                        |                                               |  | ⑩                     | High output                     |                                              |



## Mid infrared LED


Mid infrared LEDs with peak emission wavelengths in the middle infrared region (3.3  $\mu\text{m}$ , 3.9  $\mu\text{m}$ , 4.3  $\mu\text{m}$ ) 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) | Emission area (mm) | Radiant flux (mW) | Forward voltage (V) | Rise time max. ( $\mu\text{s}$ ) | Measurement condition         | Photo                                                                               | Directivity (P.9, 10) | Features           | Application examples                     |
|--------------|-------------------------------|--------------------------|--------------------|-------------------|---------------------|----------------------------------|-------------------------------|-------------------------------------------------------------------------------------|-----------------------|--------------------|------------------------------------------|
|              |                               |                          |                    |                   |                     |                                  | Forward current QCW mode (mA) |                                                                                     |                       |                    |                                          |
| L13771-0330M | 3300                          | 300                      |                    | 0.25              | 2.1                 |                                  | 50                            |  | ③                     | High reliability   | Methane detection                        |
| L13771-0330C |                               |                          |                    |                   |                     |                                  |                               |  | ⑮                     | Surface mount type |                                          |
| L13454-0390M | 3900                          | 500                      | □1.04              | 0.2               | 1.7                 | 1                                | 80                            |  | ③                     | High reliability   | Reference light source for gas detection |
| L13454-0390C |                               |                          |                    |                   |                     |                                  |                               |  | ⑮                     | Surface mount type |                                          |
| L13201-0430M | 4300                          | 700                      |                    | 0.3               | 1.6                 |                                  | 80                            |  | ③                     | High reliability   | CO <sub>2</sub> detection                |
| L13201-0430C |                               |                          |                    |                   |                     |                                  |                               |  | ⑮                     | Surface mount type |                                          |

## LED array (2-chip type)


This LED array incorporates a 670 nm red LED chip and an 870 nm near infrared LED chip.

It is provided in a surface mount type, compact package (3.5 × 2.8 × 1.9 mm) and is suitable for optical switch light sources.

| Type no. | Peak emission wavelength (nm) | Spectral half width (nm) | Radiant flux (mW) | Forward voltage (V) | Cutoff frequency (MHz) | Measurement condition<br>Forward current (mA) | Package                                                                               |
|----------|-------------------------------|--------------------------|-------------------|---------------------|------------------------|-----------------------------------------------|---------------------------------------------------------------------------------------|
| L10922   | 670                           | 25                       | 4                 | 1.8                 | 3                      | 20                                            |  |
|          | 870                           | 45                       | 18                | 1.47                | 40                     | 50                                            |                                                                                       |

## 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* <sup>1</sup> (mW/sr) | Pulse forward voltage* <sup>1</sup> (V) | Cutoff frequency (MHz) | Measurement condition<br>Pulse forward current (mA) | Package                                                                               |
|----------|-------------------------------|--------------------------|-----------------------------------------------|-----------------------------------------|------------------------|-----------------------------------------------------|---------------------------------------------------------------------------------------|
| P12793   | 870* <sup>2</sup>             | 45* <sup>2</sup>         | 1550                                          | 6.7                                     | 15                     | 900                                                 |  |

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

## SIP type LED

These LEDs are provided in a compact, plastic package with the LED chip molded in transparent resin and with a lens.

| Type no. | Peak emission wavelength (nm) | Spectral half width (nm) | Radiant flux (mW)      | Forward voltage (V) | Measurement condition<br>Forward current (mA) | Features                              | Package                                                                               |
|----------|-------------------------------|--------------------------|------------------------|---------------------|-----------------------------------------------|---------------------------------------|---------------------------------------------------------------------------------------|
| L10881   | 650                           | 25 max.                  | -4.5 dBm* <sup>3</sup> | 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* <sup>4</sup>      | 1.25                |                                               |                                       |                                                                                       |
| L6895-10 | 940                           | 60                       | 1.2* <sup>4</sup>      | 1.25                | 20                                            | For encoders                          |  |

\*3: fiber coupled optical power \*4: minimum value

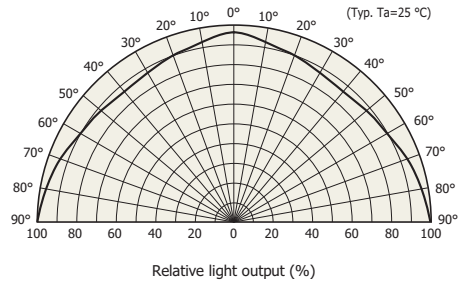
# Directivity (typical examples)

The directivities of the representative products for each type of package are provided below. The directivity may vary to some degree between individual products.

For the directivity of individual products, refer to the datasheet.

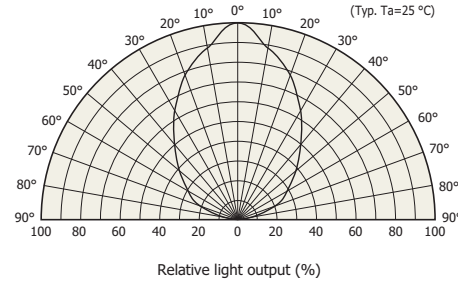
## ○ Metal package

### ① Resin potted type (no reflector)



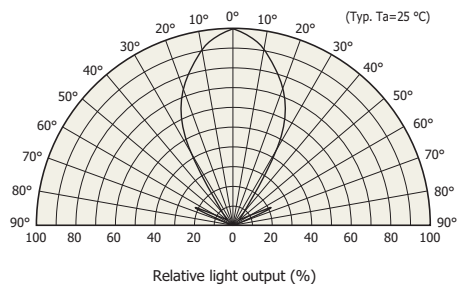
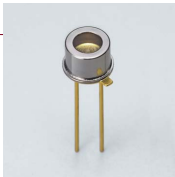
KLEDB0348EA

### ② Resin potted type (with reflector)



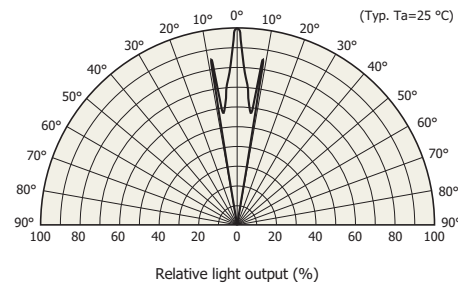
KLEDB0473EA

### ③ Flat cap



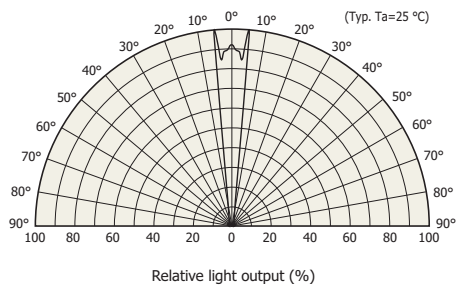
KLEDB0474EA

### ④ With mini lens



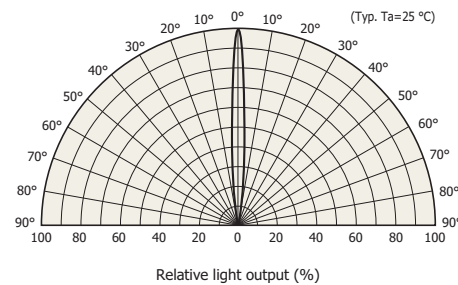
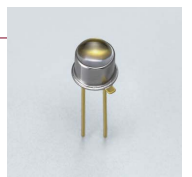
KLEDB0463EA

### ⑤ With lens



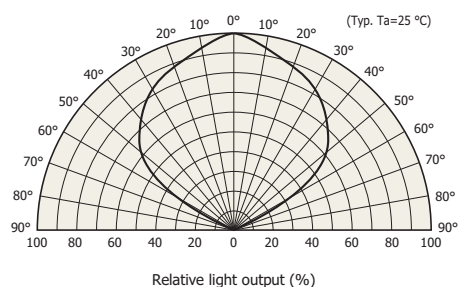
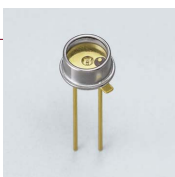
KLEDB0475EA

### ⑥ With lens (high collimation)



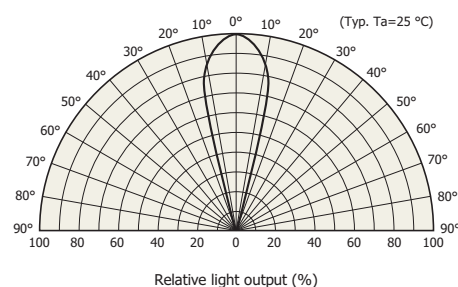
KLEDB0396EA

### ⑦ Low-profile flat cap



KLEDB0422EA

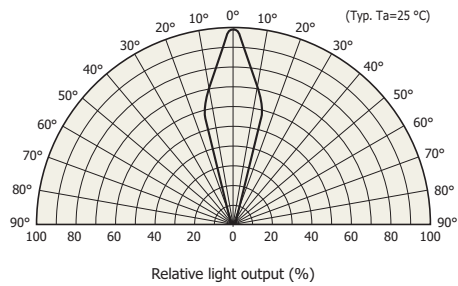
### ⑧ With ball lens



KLEDB0477EA

● Plastic package

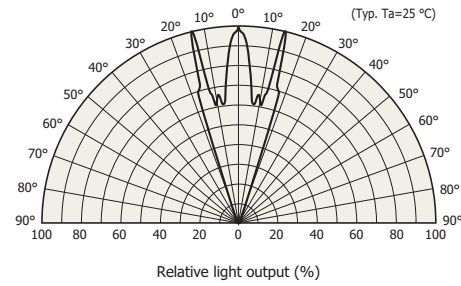
⑨ Bullet-shaped (φ5 mm)



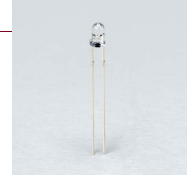
KLEDB0375EA



⑩ Bullet-shaped (φ3 mm)

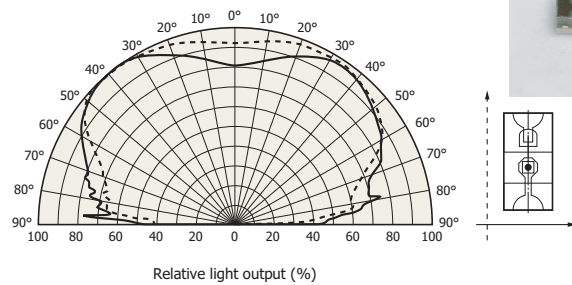


KLEDB0386EA

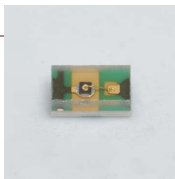


● Surface mount type

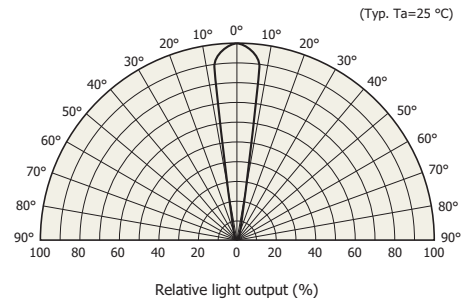
⑪ COB (chip-on-board)



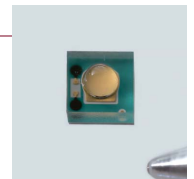
KLEDB0461EA



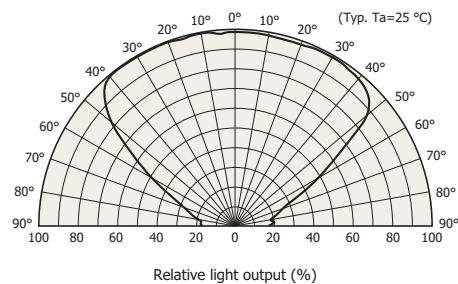
⑫ COB with lens



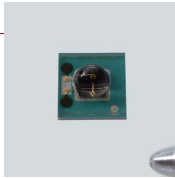
KLEDB0462EA



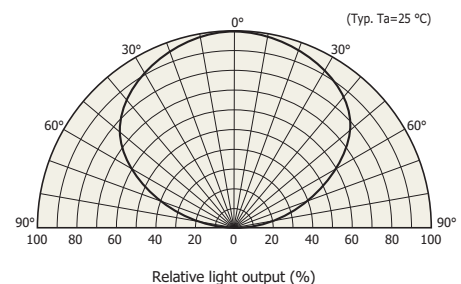
⑬ COB with lens (high output)



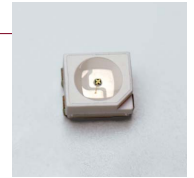
KLEDB0500EA



⑭ Premolded type



KLEDB0360EA



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