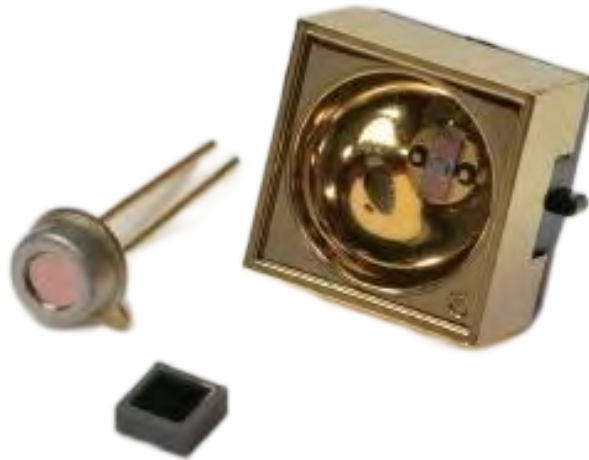


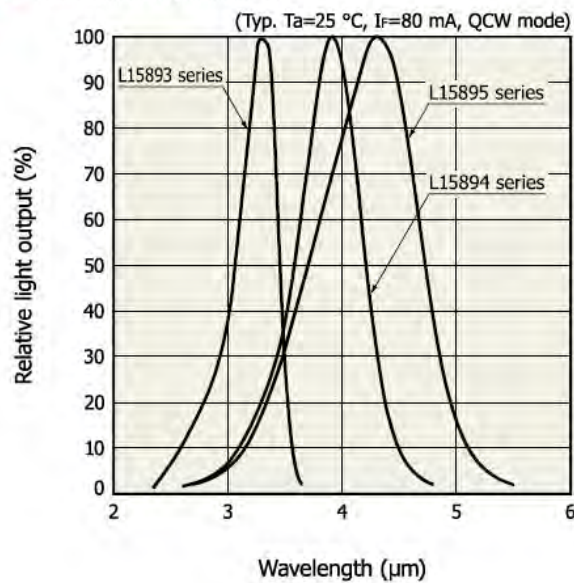
# Mid-Infrared LEDs

3.3 to 4.3  $\mu\text{m}$



 **Emission spectrum**

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 boselec@boselec.com www.boselec.com

## Hamamatsu IR LED summary sheet

at room temp

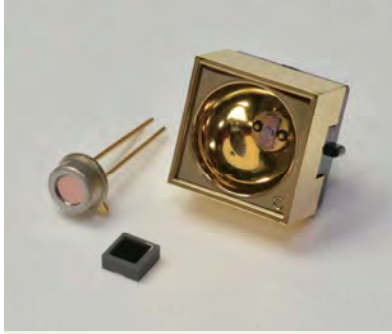
wavelength, microns	part number (series-)	package (-suffix)	package type	window	IR Power out, quasi CW, min	Compared to loffe LED...	\$ each, 1 to __
3.3 $\mu\text{m}$	L15893-	-0330C	ceramic surface mt	AR-Si	0.8 mW	power is 4X to 8X higher	
		-0330M	TO-46		1.1 mW		
		-0330ML	TO-46 w/reflector	none	1.6 mW		
3.9 $\mu\text{m}$	L15894-	-0390C	ceramic surface mt	AR-Si	0.8 mW	power is 10X to 20X higher	
		-0390M	TO-46		1.0 mW		
		-0390ML	TO-46 w/reflector	none	1.4 mW		
4.3 $\mu\text{m}$	L15895-	-0430C	ceramic surface mt	AR-Si	0.45 mW	power is 10X to 20X higher	
		-0430M	TO-46		0.6 mW		
		-0430ML	TO-46 w/reflector	none	0.8 mW		

Technical details of the above products follow this page

**Please also see our catalog of MINIATURE THERMAL INFRARED SOURCES for instrument grade blackbody radiators and our separate catalog of CALIBRATION GRADE CAVITY AND EXTENDED AREA BLACKBODY SOURCES**

# Mid infrared LED

L15893/L15894/L15895 series



**Peak emission wavelength: 3.3 μm, 3.9 μm, 4.3 μm**

The L15893 series, L15894 series, L15895 series are mid infrared LEDs with the peak wavelength of 3.3 μm, 3.9 μm, and 4.3 μm respectively, manufactured using Hamamatsu unique crystal growth and process technologies. Output is significantly increased compared to the previous products. These are suitable as light sources mounted in gas detectors.

## Features

- High output
- High-speed response
- High reliability
- Low power consumption
- Small surface mount type ceramic package (L15893-0330C, L15894-0390C, L15895-0430C)
- TO-46 with reflector (for light condensing) (L15893-0330ML, L15894-0390ML, L15895-0430ML)

## Applications

- Gas detection (CH<sub>4</sub>, CO<sub>2</sub>)

## Structure

Type no.	Package	Window material
L15893-0330C	Surface mount type ceramic*1	Si with AR coating
L15893-0330M	TO-46	
L15893-0330ML	TO-46 with reflector	None*2
L15894-0390C	Surface mount type ceramic*1	Si with AR coating
L15894-0390M	TO-46	
L15894-0390ML	TO-46 with reflector	None*2
L15895-0430C	Surface mount type ceramic*1	Si with AR coating
L15895-0430M	TO-46	
L15895-0430ML	TO-46 with reflector	None*2

\*1: These products are not hermetically sealed.

\*2: To protect the emission section, protective tape is applied to the surface of the product. Remove the tape after assembly.

### ▣ Absolute maximum ratings (Ta=25 °C, unless otherwise noted)

Type no.	Reverse voltage V <sub>R</sub> (V)	Forward current I <sub>F</sub> (mA)	Pulse forward current I <sub>FP</sub> *3 (A)	Power dissipation P (mW)	Operating temperature T <sub>opr</sub> *4 (°C)	Storage temperature T <sub>stg</sub> *4 (°C)	Soldering temperature T <sub>sol</sub> (°C)
L15893-0330C	1	100	0.5	340	-40 to +85	-40 to +100	240 (twice)*5
L15893-0330M					-20 to +60	-20 to +60	-
L15893-0330ML				280	-40 to +85	-40 to +100	240 (twice)*5
L15894-0390C					-20 to +60	-20 to +60	-
L15894-0390M				260	-40 to +85	-40 to +100	240 (twice)*5
L15894-0390ML					-20 to +60	-20 to +60	-
L15895-0430C					-40 to +85	-40 to +100	-
L15895-0430M					-20 to +60	-20 to +60	-
L15895-0430ML							

\*3: Pulse width=10 μs, duty ratio=1%

\*4: No dew condensation

When there is a temperature difference between a product and the surrounding area in high humidity environments, dew condensation may occur on the product surface. Dew condensation on the product may cause deterioration in characteristics and reliability.

\*5: Reflow soldering, JEDEC J-STD-020 MSL 3, see P.10

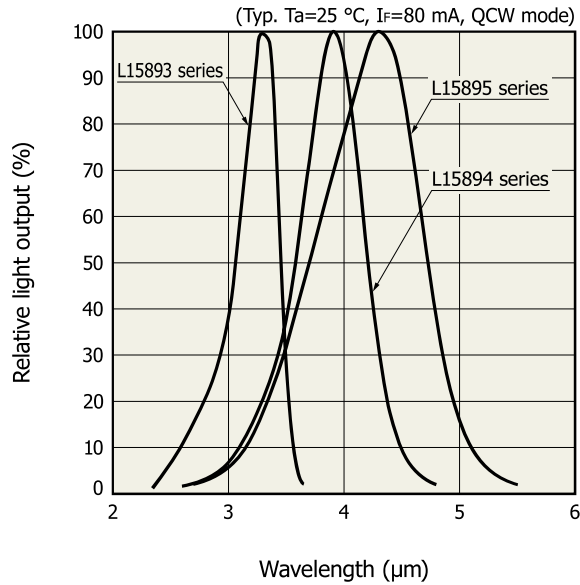
Note: Exceeding the absolute maximum ratings even momentarily may cause a drop in product quality. Always be sure to use the product within the absolute maximum ratings.

### ▣ Electrical and optical characteristics (Ta=25 °C)

Type no.	Peak emission wavelength λ <sub>p</sub> *6			Spectral half width Δλ*6		Radiant flux φ <sub>e</sub> *6		Forward voltage V <sub>F</sub> *6		Rise time t <sub>r</sub> 10 to 90%
	Min. (μm)	Typ. (μm)	Max. (μm)	Typ. (μm)	Max. (μm)	Min. (mW)	Typ. (mW)	Typ. (V)	Max. (V)	Max. (μs)
L15893-0330C	3.1	3.3	3.4	0.4	0.6	0.8	1.3	2.7	3.2	1
L15893-0330M						1.1	1.9			
L15893-0330ML						1.6	2.6			
L15894-0390C	3.8	3.9	4.1	0.6	0.9	0.8	1.4	2.2	2.7	
L15894-0390M						1.0	1.7			
L15894-0390ML						1.4	2.4			
L15895-0430C	4.1	4.3	4.4	1.0	1.3	0.45	0.75	2.0	2.5	
L15895-0430M						0.6	1.0			
L15895-0430ML						0.8	1.4			

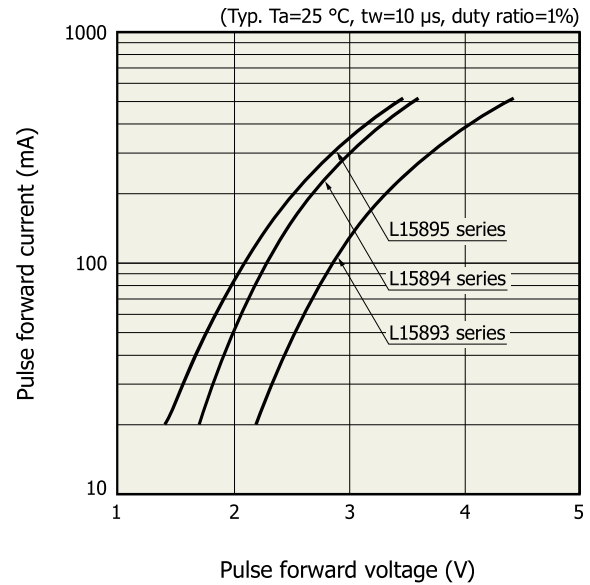
\*6: I<sub>F</sub>=80 mA, QCW (quasi continuous wave) mode (pulse width=100 μs, duty ratio=50%)

**Emission spectrum**



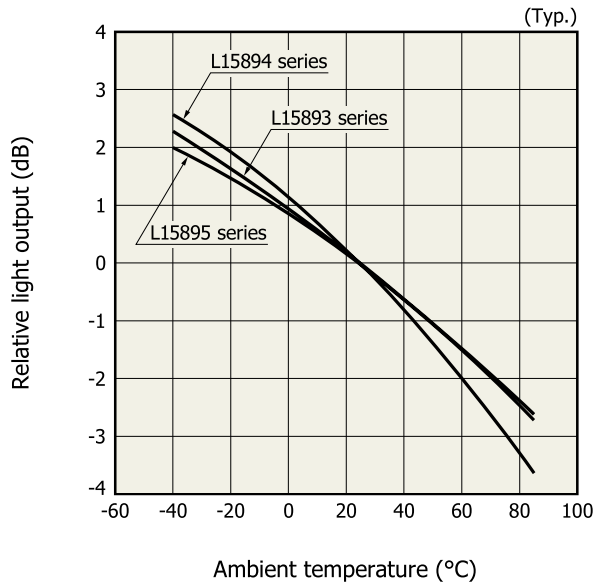
KLEDB0538EB

**Pulse forward current vs. pulse forward voltage**



KLEDB0542EB

**Light output vs. ambient temperature**

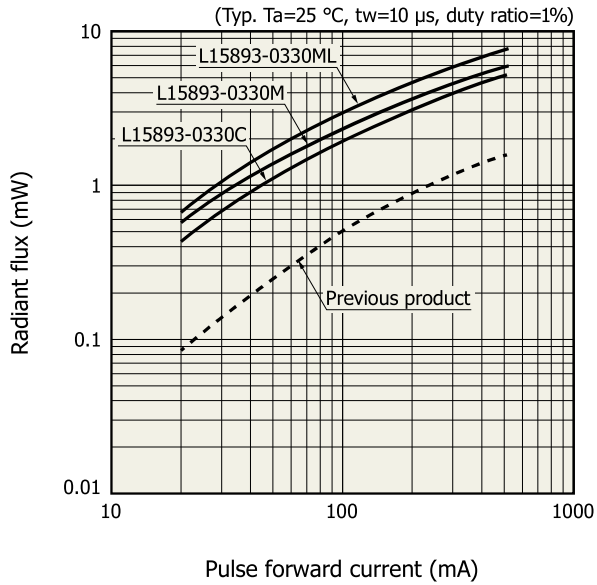


KLEDB0543EC

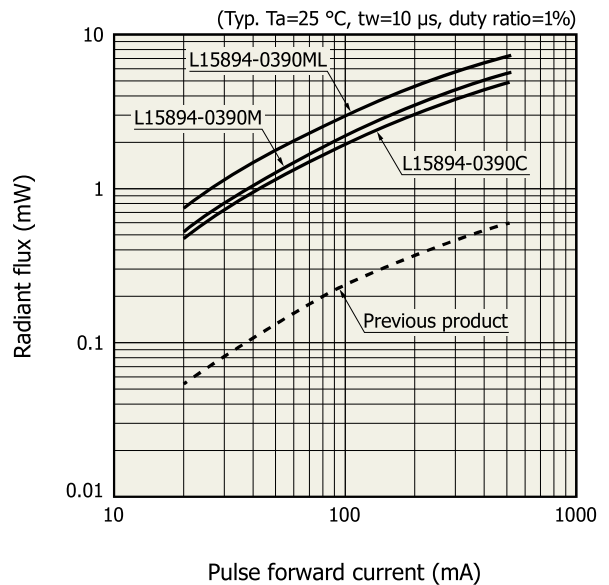
L15893-0330ML, L15894-0390ML, L15895-0430ML:  
operating temperature = -20 to +60  $^\circ\text{C}$

**Radiant flux vs. pulse forward current**

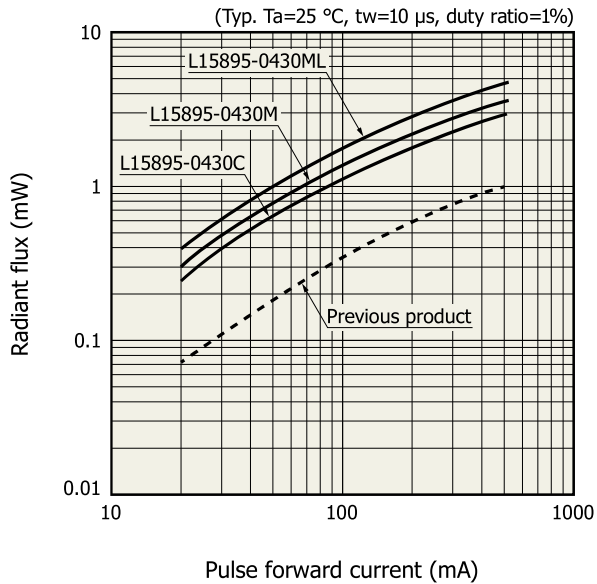
L15893 series



L15894 series

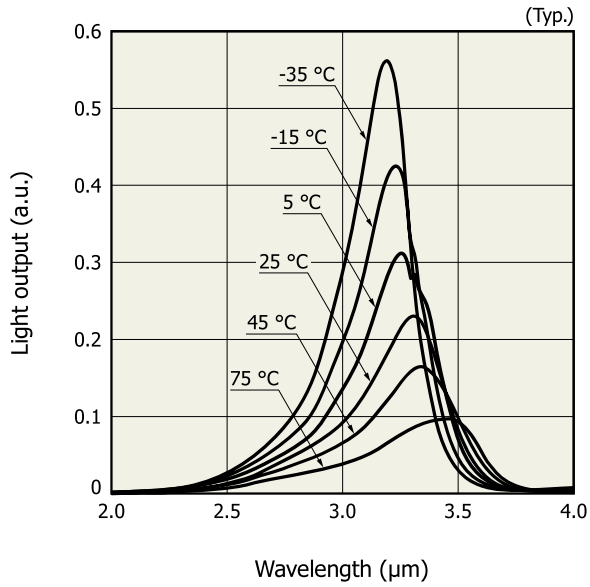


L15895 series

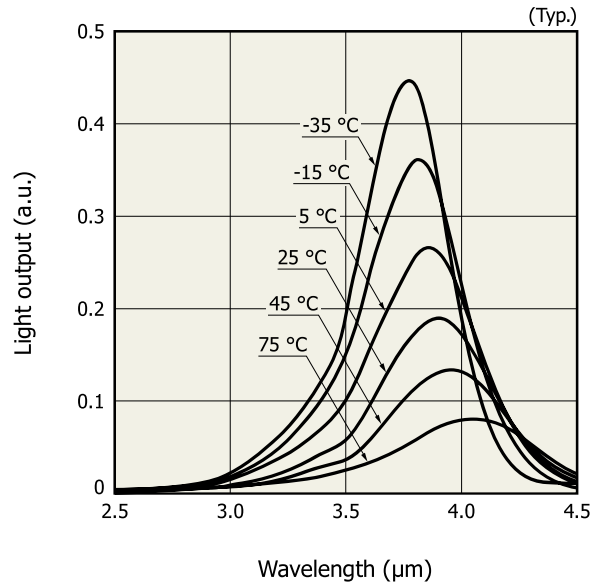


Temperature characteristics of emission spectrum

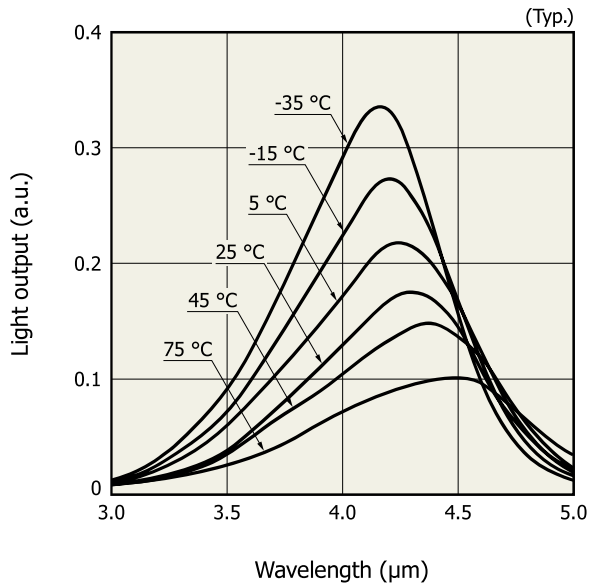
L15893 series



L15894 series



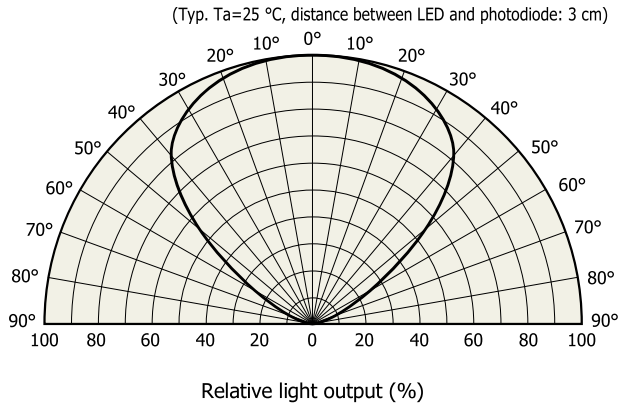
L15895 series



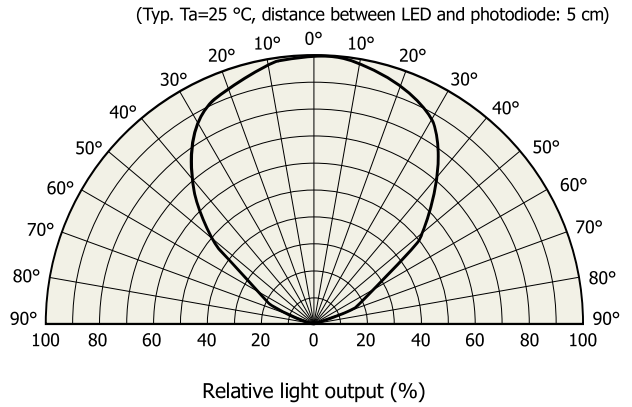
L15893-0330ML, L15894-0390ML, L15895-0430ML:  
operating temperature = -20 to +60 °C

**Directivity**

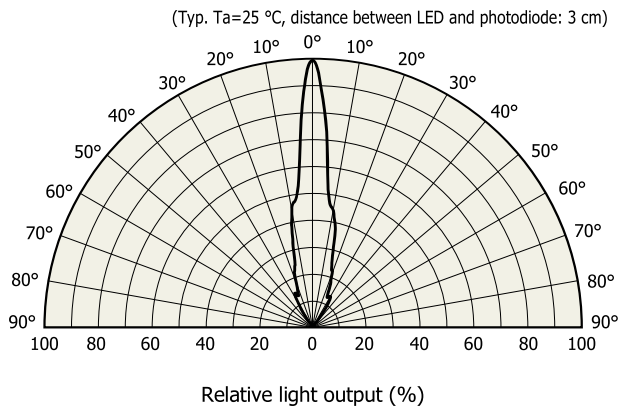
L15893-0330C, L15894-0390C, L15895-0430C



L15893-0330M, L15894-0390M, L15895-0430M

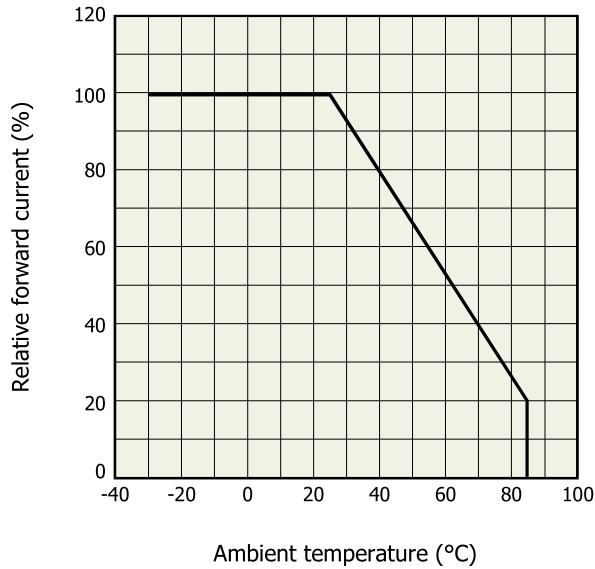


L15893-0330ML, L15894-0390ML, L15895-0430ML

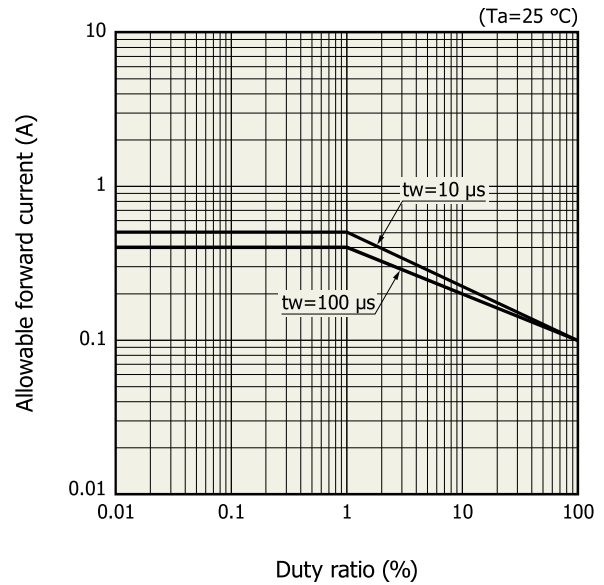




Allowable forward current vs. ambient temperature



Allowable forward current vs. duty ratio



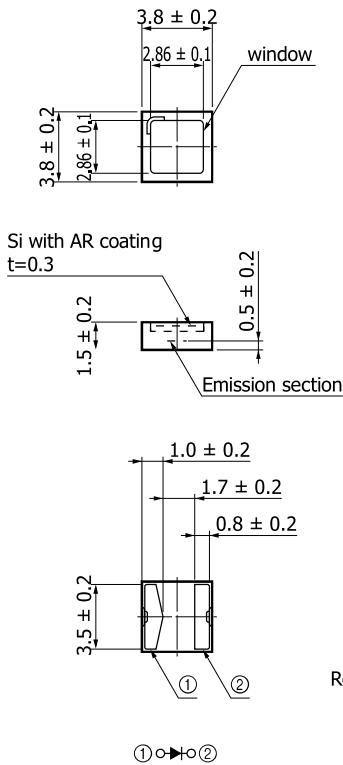
L15893-0330ML, L15894-0390ML, L15895-0430ML:  
operating temperature = -20 to +60 °C

KLEDB0417EB

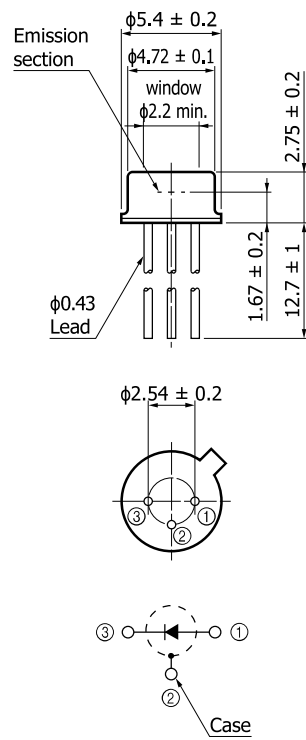
KLEDB0418EA

Dimensional outlines (unit: mm)

L15893-0330C, L15894-0390C, L15895-0430C



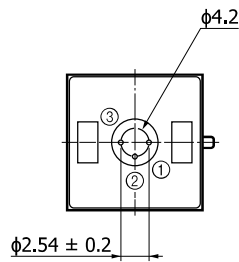
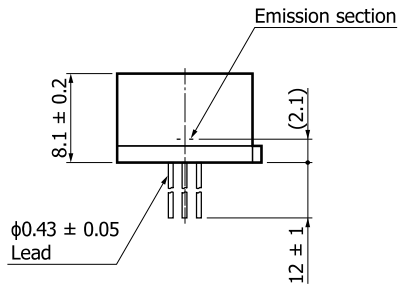
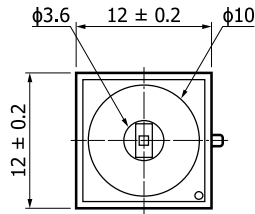
L15893-0330M, L15894-0390M, L15895-0430M



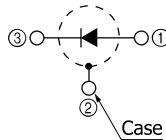
KLEDA0105EC

KLEDA0101ED

L15893-0330ML, L15894-0390ML, L15895-0430ML



Values in parentheses indicate reference.



KLEDA0112EA

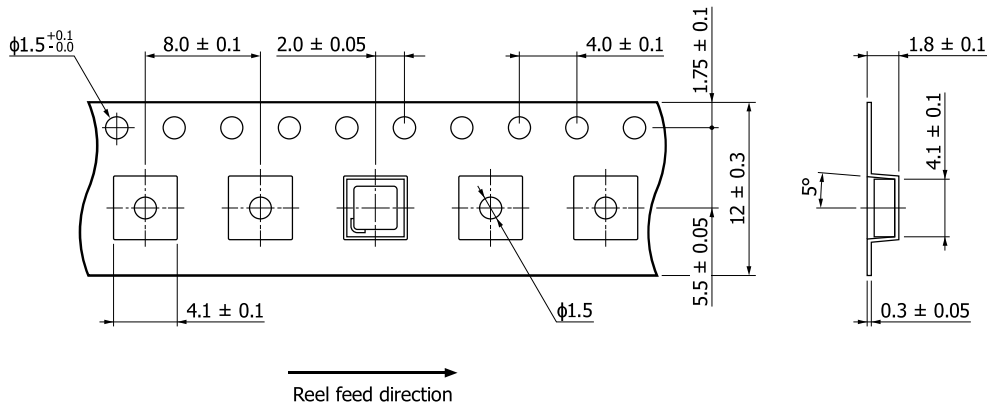
Standard packing specifications

L15893-0330C, L15894-0390C, L15895-0430C

Reel (conforms to JEITA ET-7200)

Outer diameter	Hub diameter	Tape width	Material	Electrostatic characteristics
φ180 mm	φ60 mm	12 mm	PS	Conductive

Embossed tape (unit: mm, material: PS, conductive)



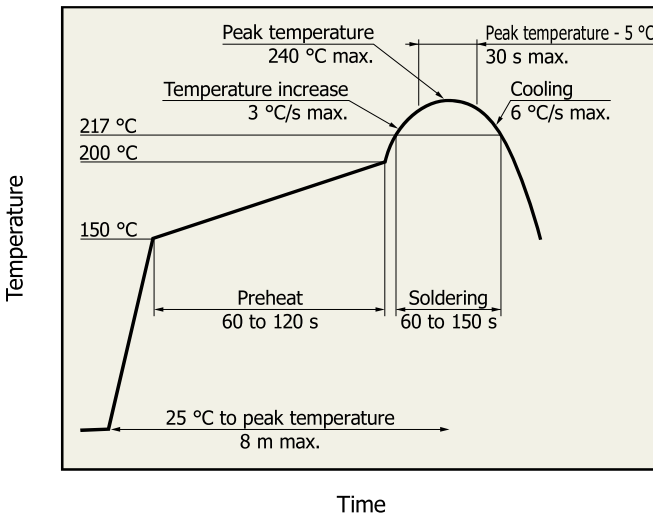
KLEDC0060EA

Packing quantity  
500 pcs/reel

Packing state  
Reel and desiccant in moisture-proof packaging (vacuum-sealed)

Recommended soldering conditions

L15893-0330C, L15894-0390C, L15895-0430C



- After unpacking, keep it in an environment at 5 to 30 °C and a humidity of 60% or less, and perform soldering within 168 hours.
- The effect that the product receives during reflow soldering varies depending on the circuit board and reflow oven that are used. When you set reflow soldering conditions, check that problems do not occur in the product by testing out the conditions in advance.

KSPDB0418EA

L15893-0330M, L15894-0390M, L15895-0430M

Solder temperature: 260 °C (5 s or less, once)  
Solder the leads at a point at least 2 mm away from the package body.

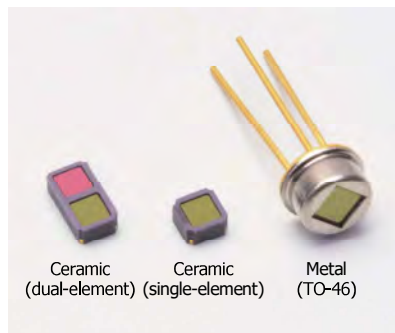
L15893-0330ML, L15894-0390ML, L15895-0430ML

Solder temperature: 230 °C (5 s or less, once)  
Solder the leads at a point at least 2 mm away from the package body.

Note: When you set soldering conditions, check that problems do not occur in the product by testing out the conditions in advance.

Related products

InAsSb photovoltaic detectors with band-pass filter P13243 series



Ceramic (dual-element) Ceramic (single-element) Metal (TO-46)

For detecting wavelengths of 3.3 μm, 3.9 μm, or 4.26 μm, we also offer the P13243 series InAsSb photovoltaic detectors with band-pass filter.

Type no.	Package
P13243-015CF/-016CF	Ceramic (dual-element)
P13243-033CF/-039CF/-043CF	Ceramic (single-element)
P13243-033MF/-039MF/-043MF	Metal (TO-46)



## Mid infrared LED evaluation kit M16615



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

Note: LED sold separately

### Related information

[www.hamamatsu.com/sp/ssd/doc\\_en.html](http://www.hamamatsu.com/sp/ssd/doc_en.html)

- Precautions
  - Disclaimer
  - Safety consideration
  - Metal, ceramic, plastic package products
  - Compound opto-semiconductors (photosensors, light emitters)
- Technical information
  - LED / Technical note



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Information described in this material is current as of March 2022.

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