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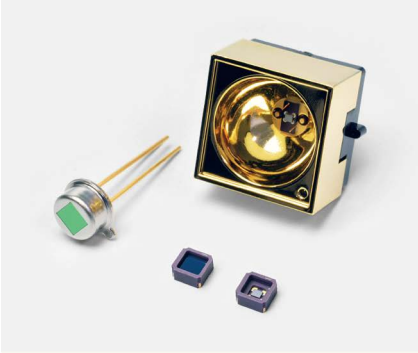
Mid-infrared LED



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 (L15893-0330CA/CN, L15894-0390CA/CN, L15895-0430CA/CN)**
- **TO-46 with reflector (for light condensing) (L15893-0330ML, L15894-0390ML, L15895-0430ML)**

Applications

- **Gas detection (CH_4, CO_2)**

Structure

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

*1: These products are not hermetically sealed.
*2: To protect the emission section, a 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_R (V)	Forward current I_F (mA)	Pulse forward current I_{FP}*3 (A)	Power dissipation P (mW)	Operating temperature Topr*4 (°C)	Storage temperature Tstg*4 (°C)	Soldering temperature Tsol (°C)
L15893-0330CA NEW	1	100	0.5	340	-40 to +85	-40 to +100	240 (twice)*5
L15893-0330CN							-
L15893-0330MA					-20 to +60	-20 to +60	-
L15893-0330ML							
L15894-0390CA NEW				280	-40 to +85	-40 to +100	240 (twice)*5
L15894-0390CN							-
L15894-0390MA					-20 to +60	-20 to +60	-
L15894-0390ML							
L15895-0430CA NEW				260	-40 to +85	-40 to +100	240 (twice)*5
L15895-0430CN							-
L15895-0430MA					-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

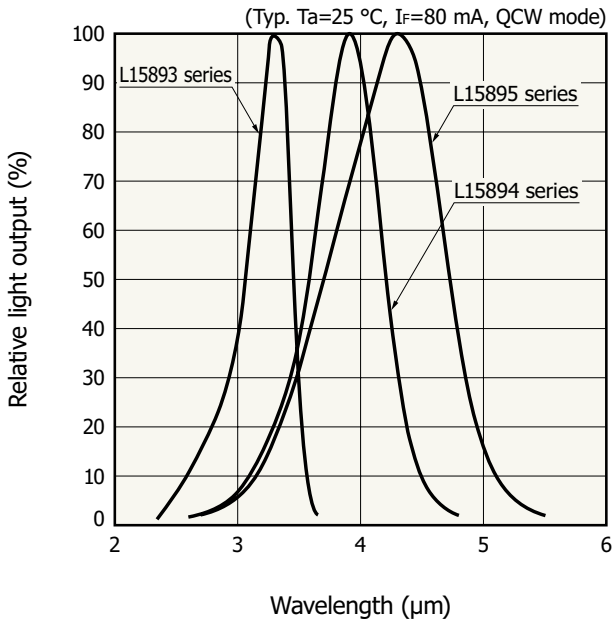
Note: Exceeding the absolute maximum ratings even momentarily may cause a drop in product quality. Always be sure to use the product within the absolute maximum ratings.

Electrical and optical characteristics (Ta=25 °C)

Type no.	Peak emission wavelength λp*6			Spectral half width Δλ*6		Radiant flux ϕe*6		Forward voltage V_F*6		Rise time tr 10 to 90%
	Min. (µm)	Typ. (µm)	Max. (µm)	Typ. (µm)	Max. (µm)	Min. (mW)	Typ. (mW)	Typ. (V)	Max. (V)	Max. (µs)
L15893-0330CA NEW	3.1	3.3	3.4	0.4	0.6	0.8	1.3	2.7	3.2	1
L15893-0330CN										
L15893-0330MA						0.9	1.5			
L15893-0330ML						1.6	2.6			
L15894-0390CA NEW	3.8	3.9	4.1	0.6	0.9	0.8	1.4	2.2	2.7	
L15894-0390CN										
L15894-0390MA						0.8	1.4			
L15894-0390ML						1.4	2.4			
L15895-0430CA NEW	4.1	4.3	4.4	1.0	1.3	0.45	0.75	2.0	2.5	
L15895-0430CN										
L15895-0430MA						0.5	0.8			
L15895-0430ML						0.8	1.4			

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

Emission spectrum



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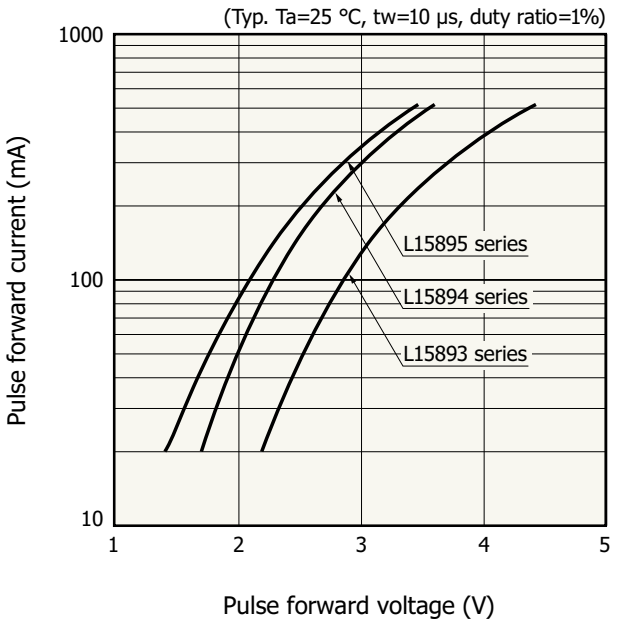
Pulse forward current vs. pulse forward voltage



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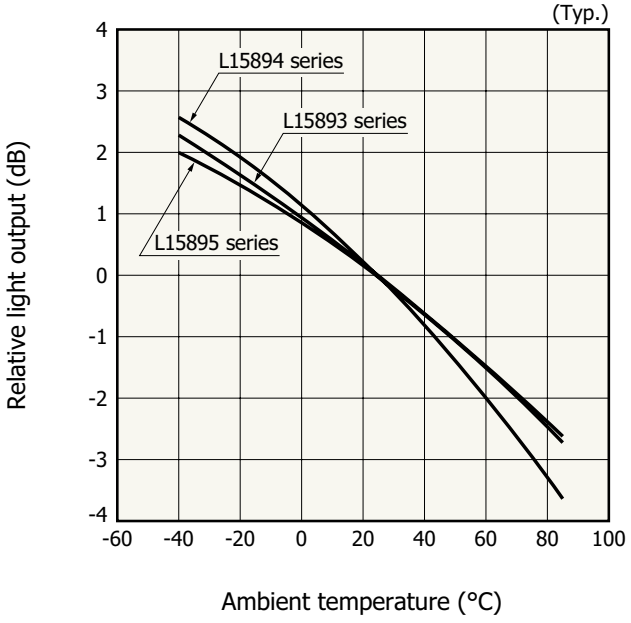
Light output vs. ambient temperature

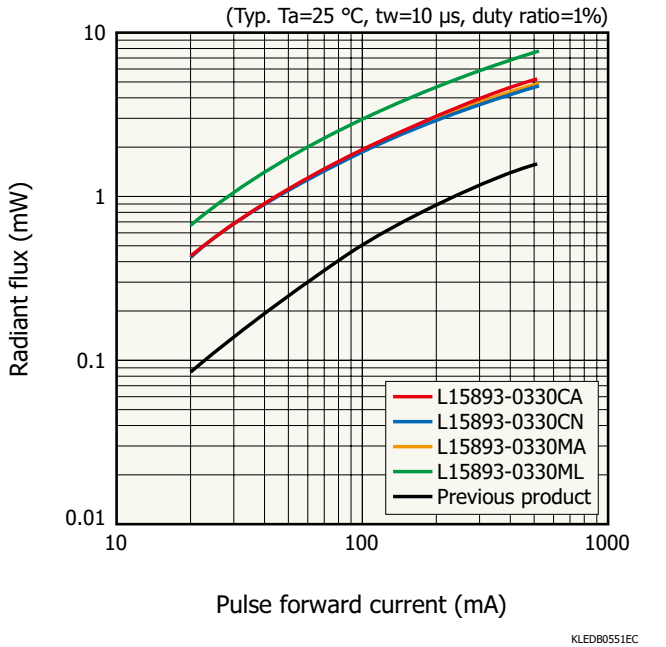


L15893-0330ML, L15894-0390ML, L15895-0430ML:
operating temperature = -20 to +60 °C

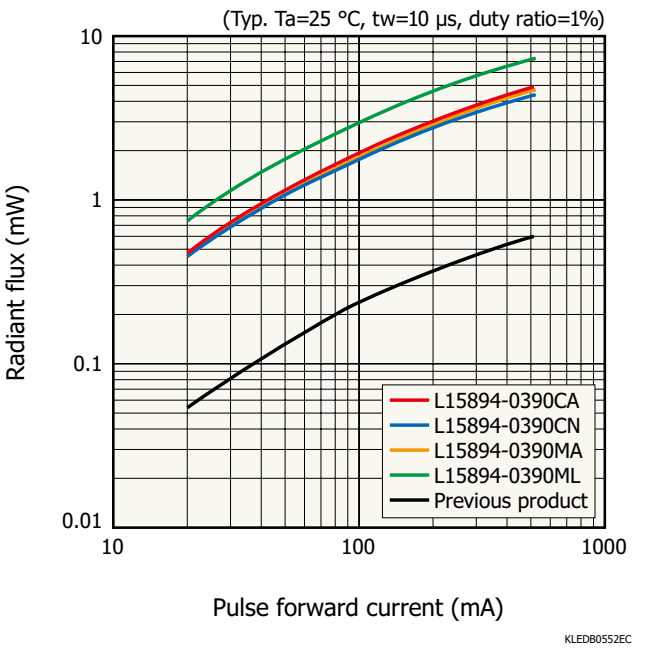
KLEDB0543EC

Radiant flux vs. pulse forward current

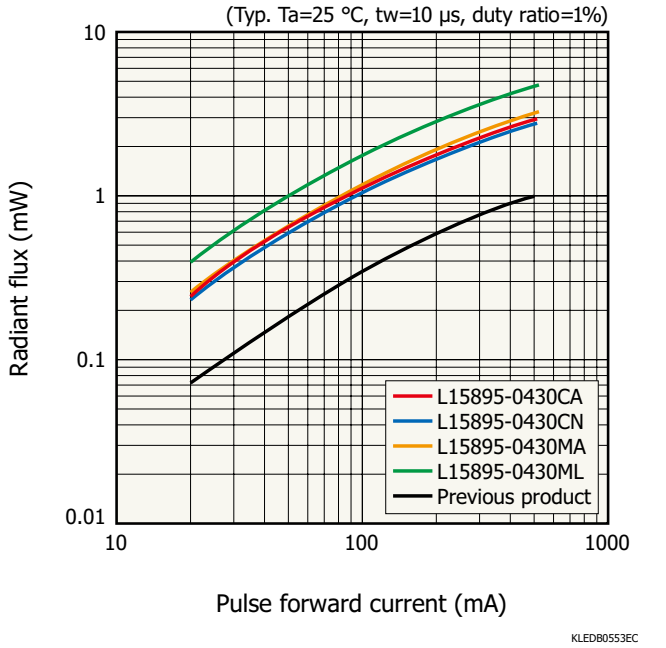
L15893 series



L15894 series

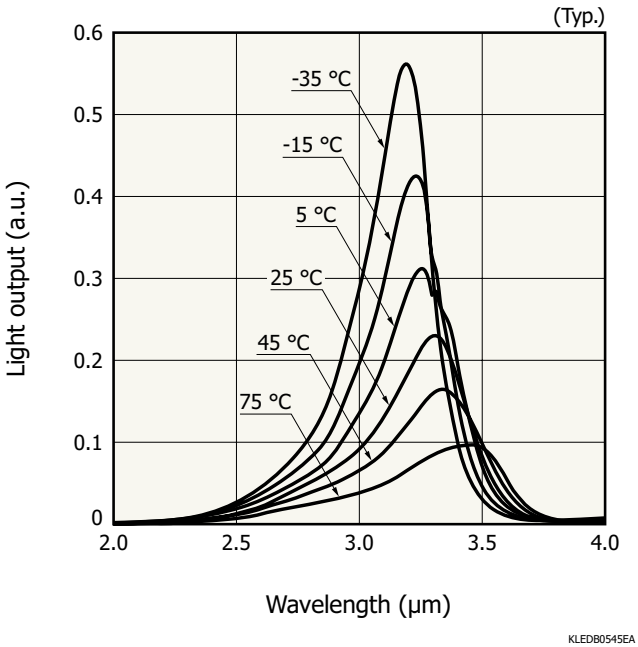


L15895 series



Temperature characteristics of emission spectrum

L15893 series



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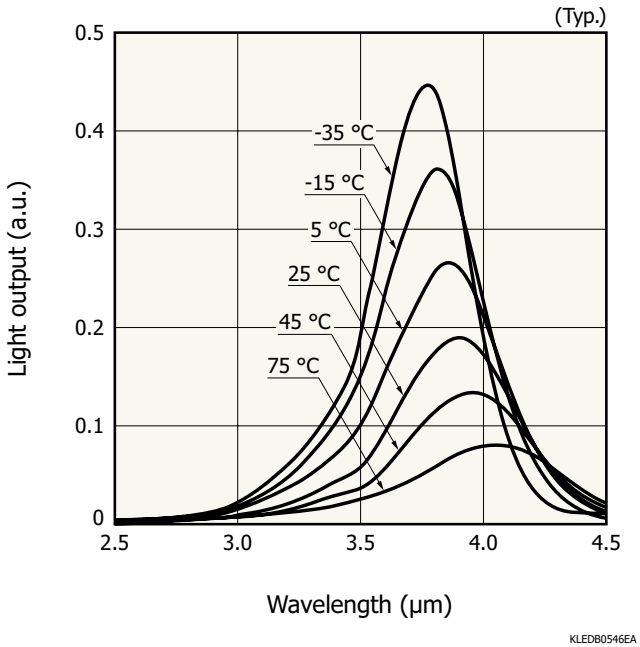
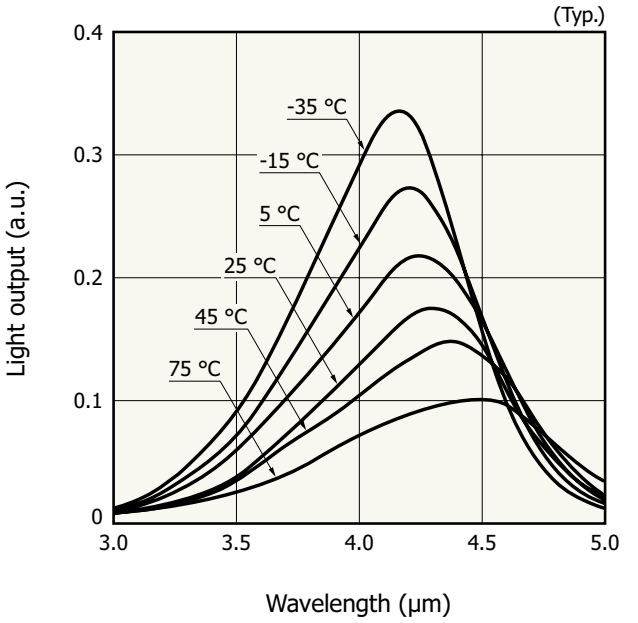
L15894 series



KLEDB0546EA

L15895 series



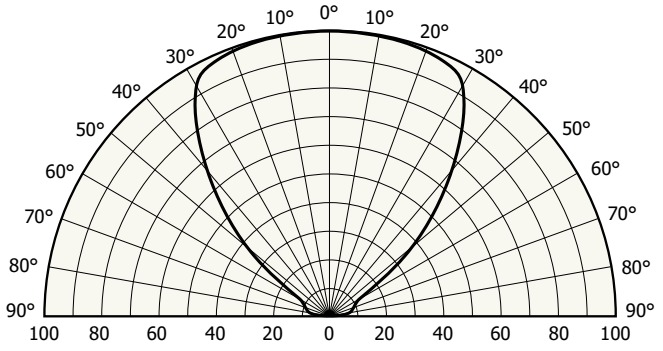
L15893-0330ML, L15894-0390ML, L15895-0430ML:
operating temperature = -20 to +60 °C

KLEDB0547EA

Directivity

L15893-0330CA/CN, L15894-0390CA/CN, L15895-0430CA/CN

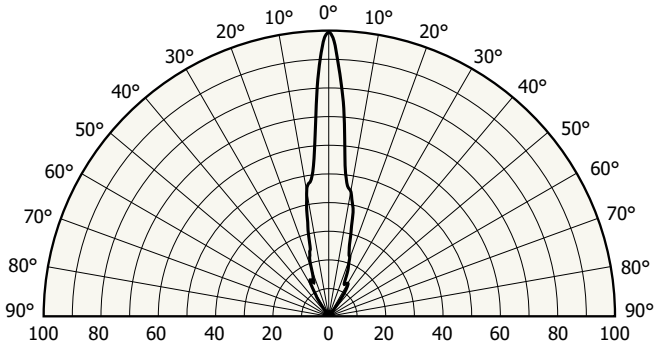
(Typ. Ta=25 °C, distance between LED and photodiode: 5 cm)



KLEDB0554EB

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

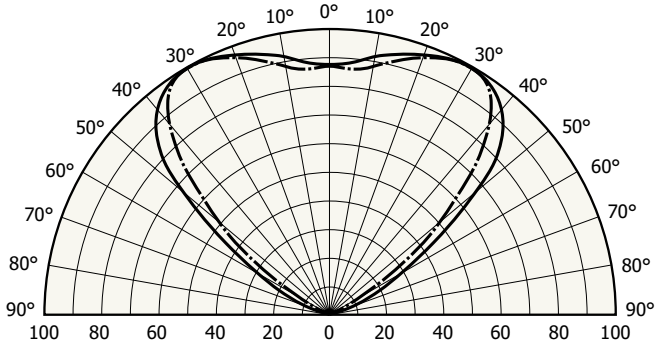
(Typ. Ta=25 °C, distance between LED and photodiode: 3 cm)



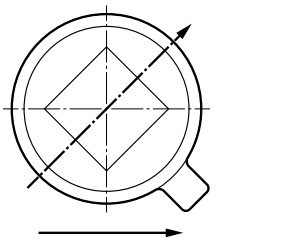
KLEDB0549EA

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

(Typ. Ta=25 °C, distance between LED and photodiode: 5 cm)

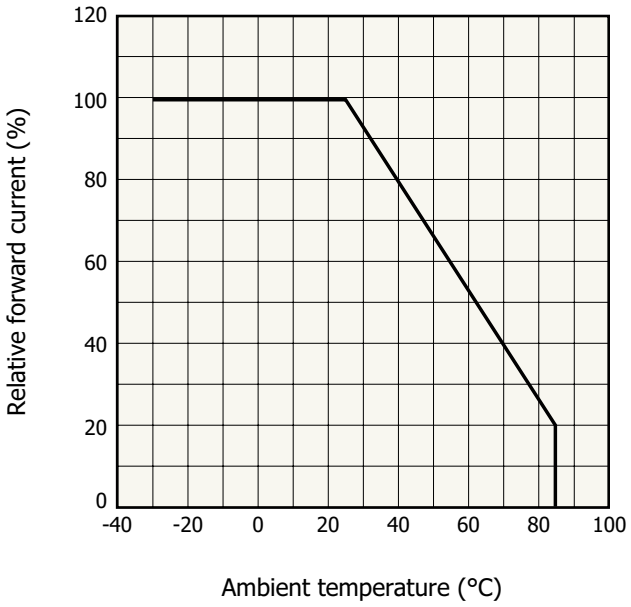


KLEDB0550EA



KLEDC0065EA

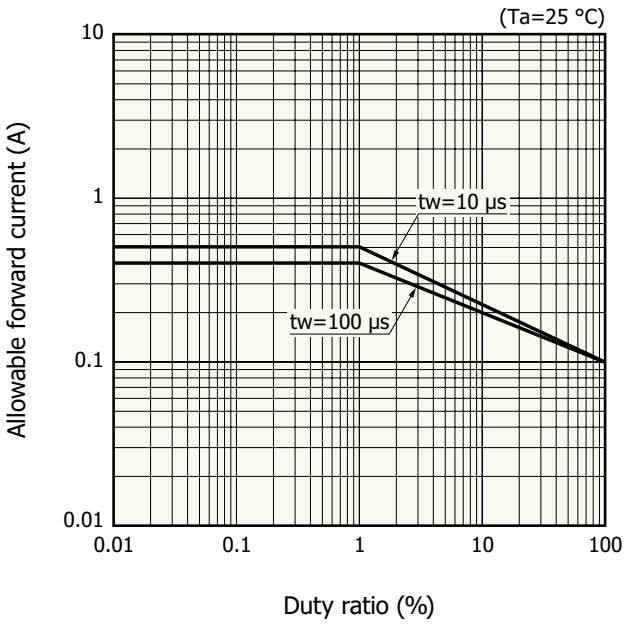
Allowable forward current vs. ambient temperature



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

KLEDB0417EB

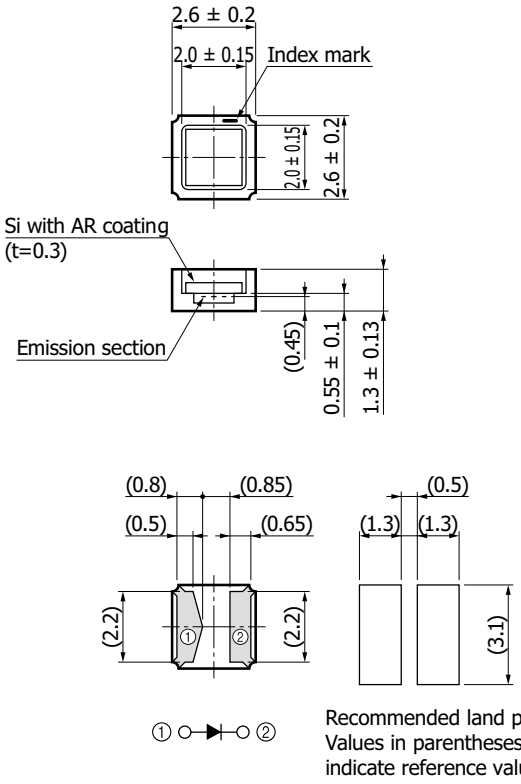
Allowable forward current vs. duty ratio



KLEDB0418EA

Dimensional outlines (unit: mm)

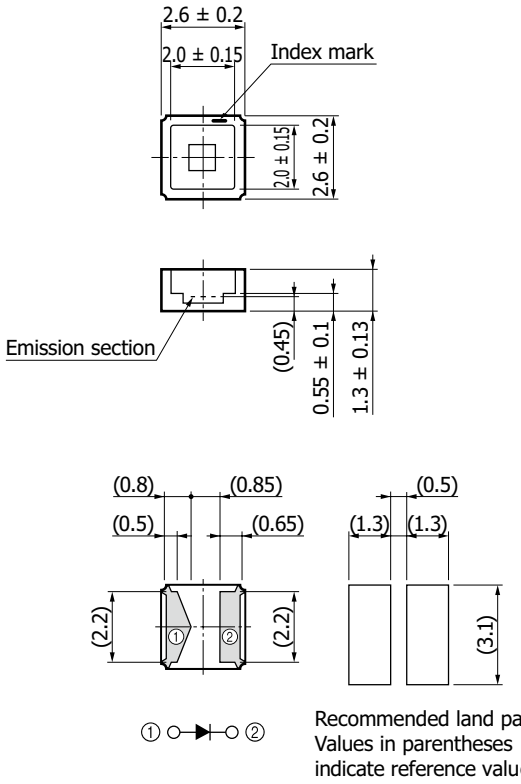
L15893-0330CA, L15894-0390CA, L15895-0430CA



Recommended land pattern
Values in parentheses
indicate reference values.

KLEDA0117EA

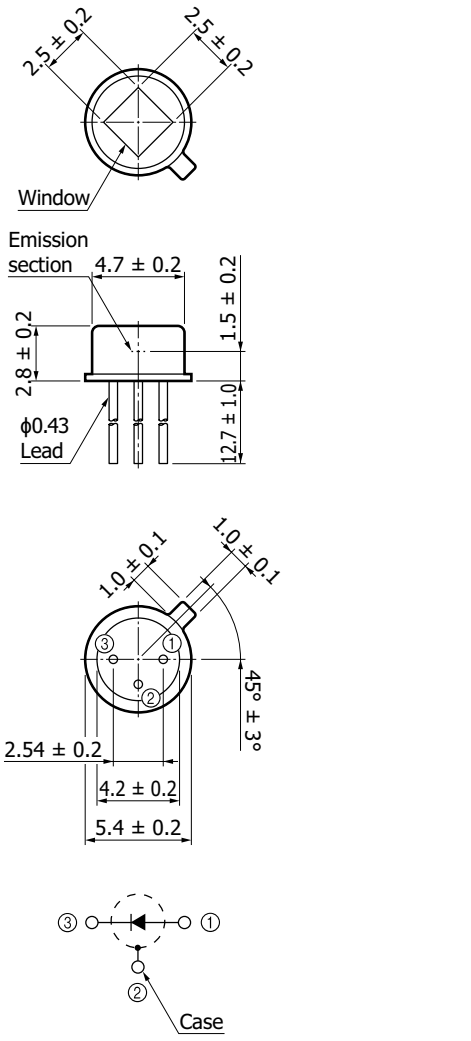
L15893-0330CN, L15894-0390CN, L15895-0430CN



Recommended land pattern
Values in parentheses
indicate reference values.

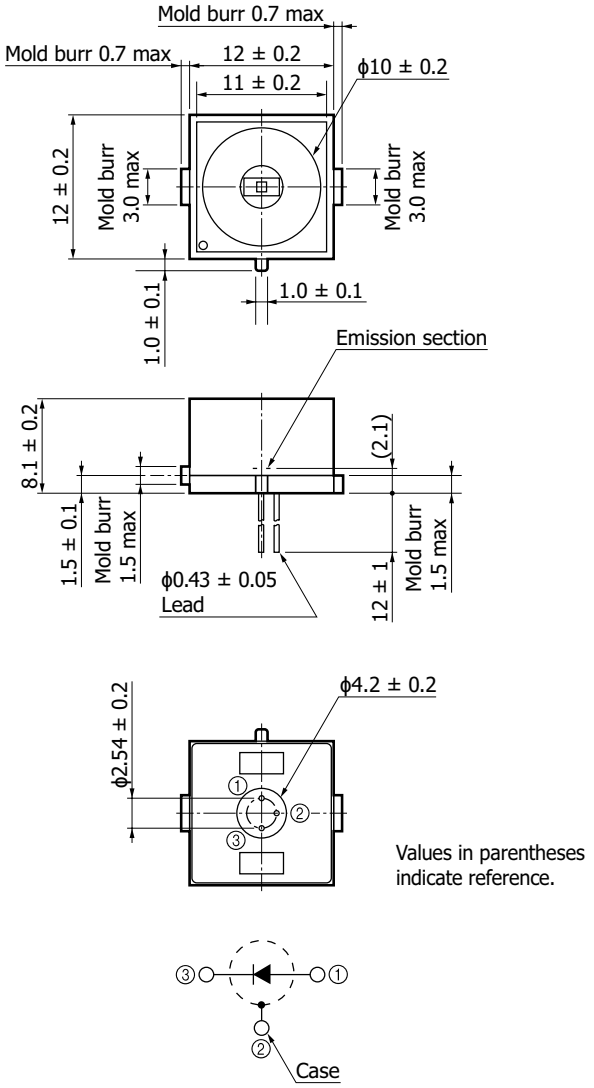
KLEDA0114EB

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



KLEDA0113EA

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



KLEDA0112EC

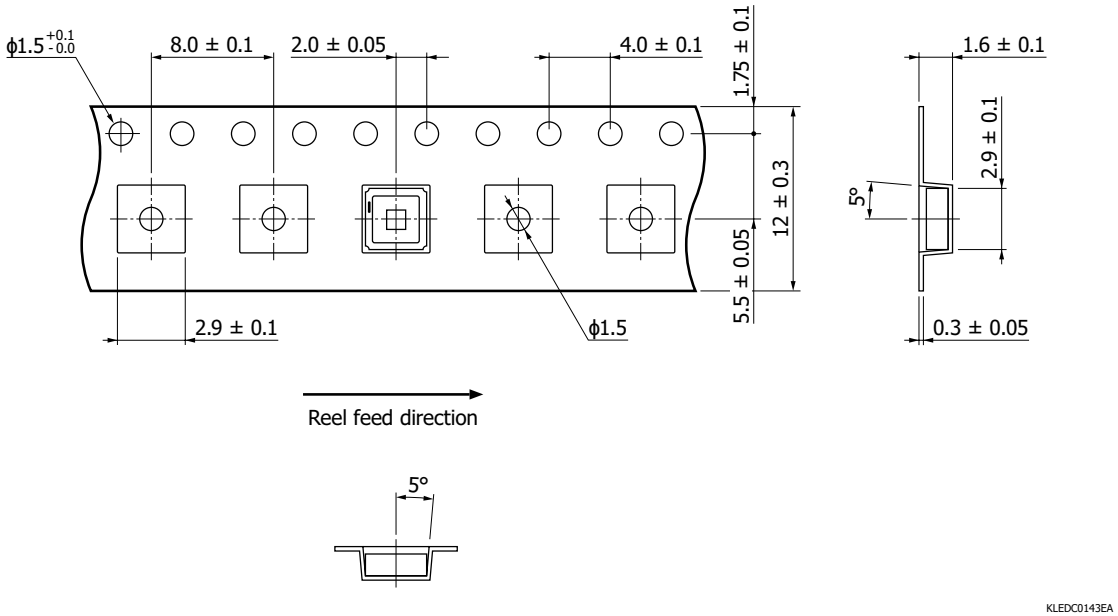
Standard packing specifications

L15893-0330CA/CN, L15894-0390CA/CN, L15895-0430CA/CN

■ 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)

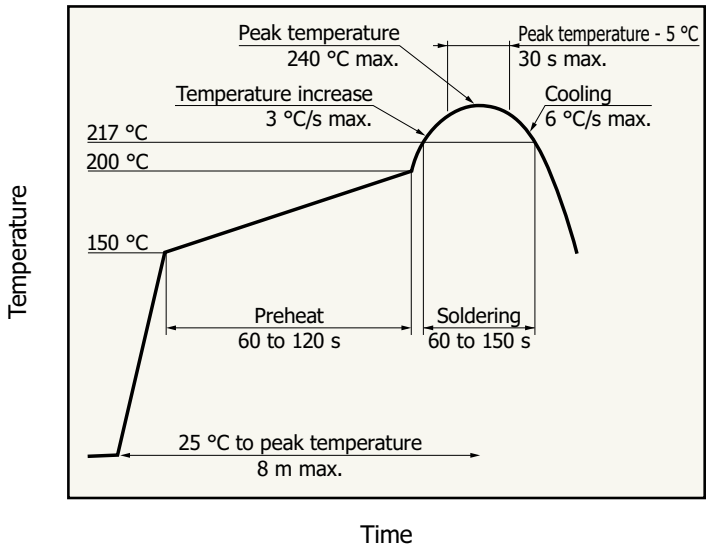


■ Packing quantity
500 pcs/reel

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

Recommended soldering conditions

L15893-0330CA/CN, L15894-0390CA/CN, L15895-0430CA/CN



KSPDB0418EA

- After unpacking, keep it in an environment at a temperature of 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.
- If 12 months have passed in an unpacked state or the above storage period has passed after opening, perform baking to dehumidify before reflow soldering. For the baking, refer to "Precautions / Surface mount type products" in the related information. When you set baking conditions, check that problems do not occur in the product by testing out the conditions in advance.

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

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

Evaluation kit M16953 for InAsSb photovoltaic detector

The M16953 is an evaluation amplifier for gas measurement used in combination with Hamamatsu's InAsSb photovoltaic devices with band-pass filters (TO-46 package). These can detect infrared light transmitted through a band-pass filter simply by connecting a power supply ±2.5 V.

Specifications

- **Applicable devices: InAsSb photovoltaic detectors with band-pass filter*7**
- **Gain: 10^7 V/A**
- **Frequency characteristics: DC to 80 kHz**
- **Recommended drive voltage: ±2.5 V**

*7: InAsSb photovoltaic devices with band-pass filter sold separately

Evaluation kit M16615 for mid infrared LED

The M16615 is a driver for mid infrared LED (TO-46 package). The LED can be pulse-driven simply by connecting a power supply (+15 V). This is used in combination with the evaluation kit M16953 series for InAsSb photovoltaic detector.

Specifications

- **Applicable devices: Mid infrared LED*8**
- **Output current: 400 mA**
- **Output pulse: 10 µs**
- **Output cycle: 1000 µs**
- **Recommended drive voltage: +15 V**

*8: Mid infrared LED sold separately

Related information

www.hamamatsu.com/sp/ssd/doc_en.html

■ Precautions
· Disclaimer
· Safety consideration / Opto-semiconductors
· Precautions / Metal, ceramic, plastic package products
· Precautions / Surface mount type products
· Precautions / Compound opto-semiconductors (photosensors, light emitters)

■ Catalogs
· Selection guide / LED
· Technical note / LED

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