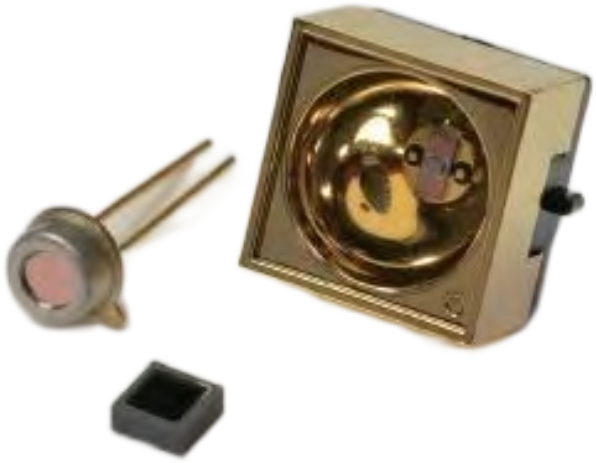
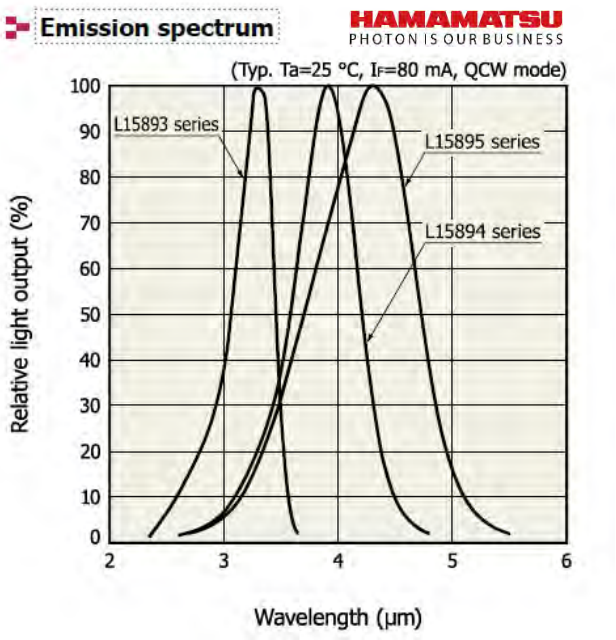
Boston Electronics

Mid-Infrared LEDs

3.3 to 4.3 μm





BostonElectronics
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Hamamatsu IR LED summary sheet

at room temp

valid 9/26/2023 subject to change without notice

wavelength, microns	part number (series-)	package (-suffix)	package type	window	IR Power out, quasi CW, min	Compared to Ioffe LED…	$ each, 1 to 25
3.3 μm	L15893-	-0330C	ceramic surface mt	AR-Si	0.8 mW	power is 4X to 8X higher	$36
		-0330CN	ceramic surface mt	none	0.8 mW		$36
		-0330M	TO-46		1.1 mW		$112
		-0330ML	12x12x8 mm reflector assy	none	1.6 mW		$125
3.9 μm	L15894-	-0390C	ceramic surface mt	AR-Si	0.8 mW	power is 10X to 20X higher	$36
		-0390CN	ceramic surface mt	none	0.8 mW		$36
		-0390M	TO-46		1.0 mW		$112
		-0390ML	12x12x8 mm reflector assy	none	1.4 mW		$125
4.3 μm	L15895-	-0430C	ceramic surface mt	AR-Si	0.45 mW	power is 10X to 20X higher	$36
		-0430CN	ceramic surface mt	none	0.45 mW		$36
		-0430M	TO-46	AR-Si	0.6 mW		$112
		-0430ML	12x12x8 mm reflector assy	none	0.8 mW		$125

Technical details of the above products follow this page

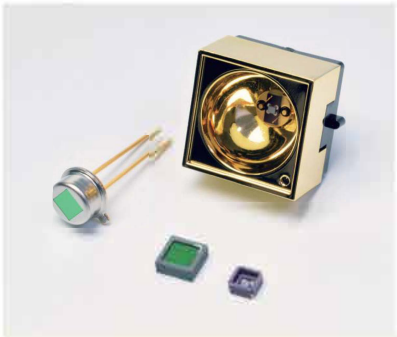
Please also see our catalog of

MINIATURE THERMAL INFRARED SOURCES

and our separate catalog of

CALIBRATION GRADE 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/CN, L15894-0390C/CN, L15895-0430C/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
L15893-0330C	Surface mount type ceramic	Si with AR coating
L15893-0330CN NEW		None
L15893-0330MA NEW	TO-46	Si with AR coating
L15893-0330ML	TO-46 with reflector	None*2
L15894-0390C	Surface mount type ceramic	Si with AR coating
L15894-0390CN NEW		None
L15894-0390MA NEW	TO-46	Si with AR coating
L15894-0390ML	TO-46 with reflector	None*2
L15895-0430C	Surface mount type ceramic	Si with AR coating
L15895-0430CN NEW		None
L15895-0430MA NEW	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)
L15893-0330C	1	100	0.5	340	-40 to +85	-40 to +100	240 (twice)*5
L15893-0330CN NEW							-
L15893-0330MA NEW							
L15893-0330ML					-20 to +60	-20 to +60	-
L15894-0390C				280	-40 to +85	-40 to +100	240 (twice)*5
L15894-0390CN NEW							-
L15894-0390MA NEW							
L15894-0390ML					-20 to +60	-20 to +60	-
L15895-0430C				260	-40 to +85	-40 to +100	240 (twice)*5
L15895-0430CN NEW							-
L15895-0430MA NEW							
L15895-0430ML					-20 to +60	-20 to +60	-

*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.12

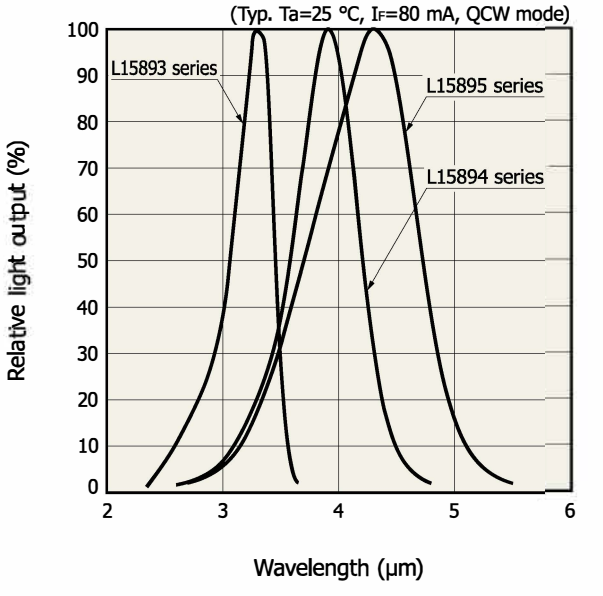
Note: Exceeding the absolute maximum ratings even momentarily may cause a drop in product quality. Always be sure to use the product within the absolute maximum ratings.

Electrical and optical characteristics (Ta=25 °C)

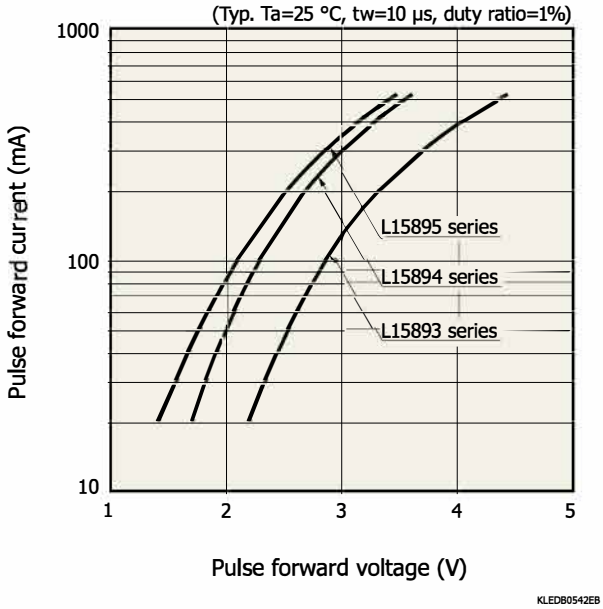
Type no.	Peak emission wavelength λp*6			Spectral half width Δλ*6		Radiant flux ϕc*6		Forward voltage V_F*6		Rise time tr 10 to 90%
	Min. (μm)	Typ. (μm)	Max. (μm)	Typ. (μm)	Max. (μm)	Min. (mW)	Typ. (mW)	Typ. (V)	Max. (V)	Max. (μs)
L15893-0330C	3.1	3.3	3.4	0.4	0.6	0.8	1.3	2.7	3.2	1
L15893-0330CN NEW	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

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

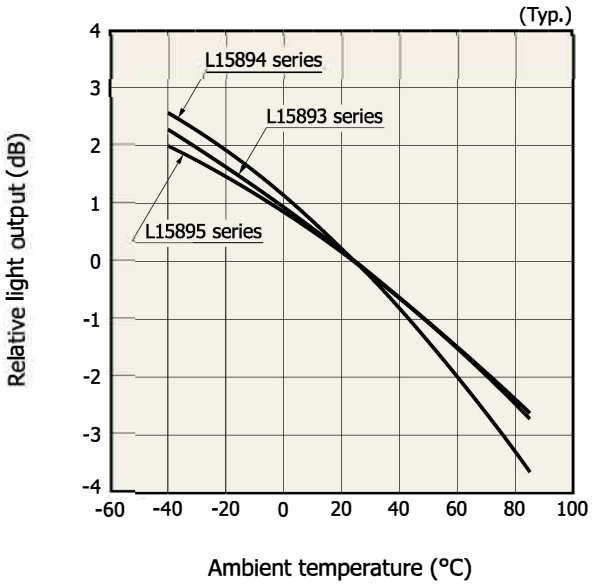
Emission spectrum



Pulse forward current vs. pulse forward voltage



Light output vs. ambient temperature

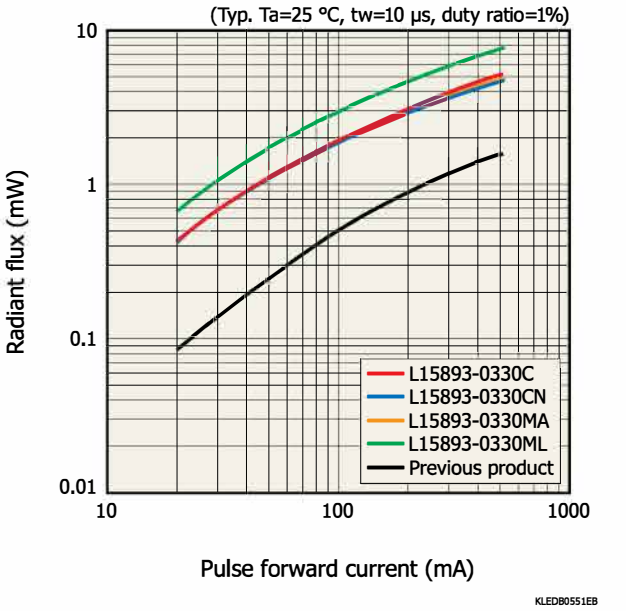


L15893-0330ML, L15894-0390ML, L15895-0430ML:
operating temperature = -20 to +60 °C

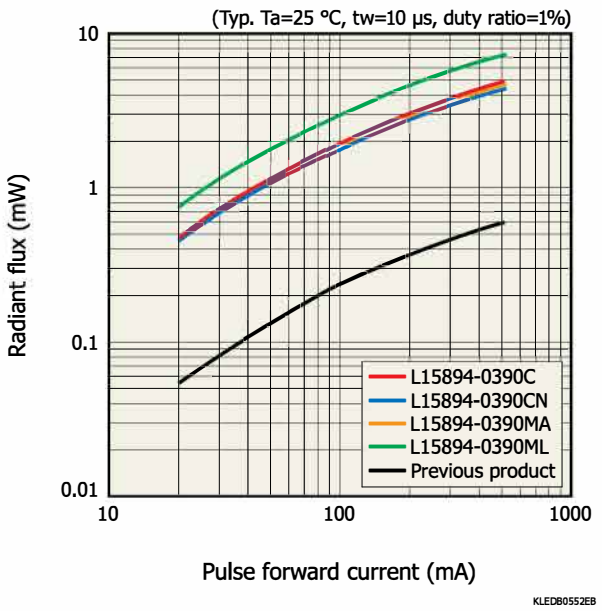
KLEDB0543EC

Radiant flux vs. pulse forward current

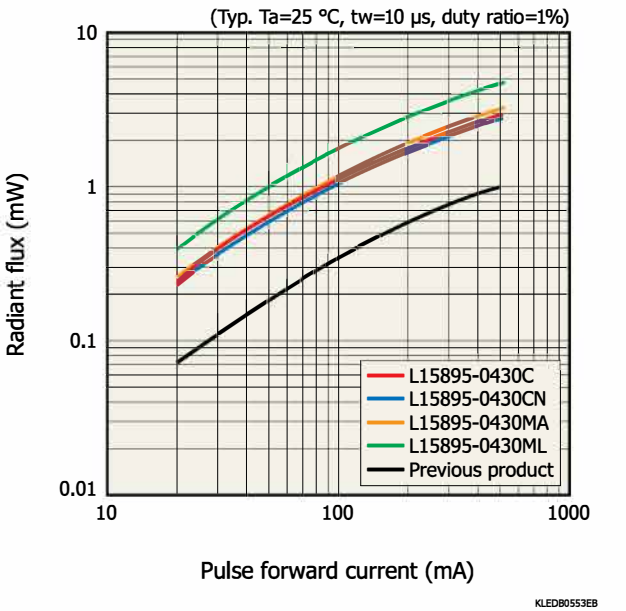
L15893 series



L15894 series

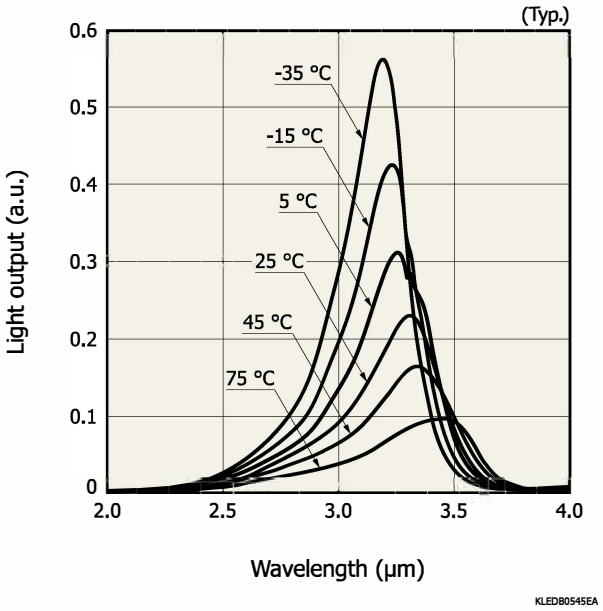


L15895 series

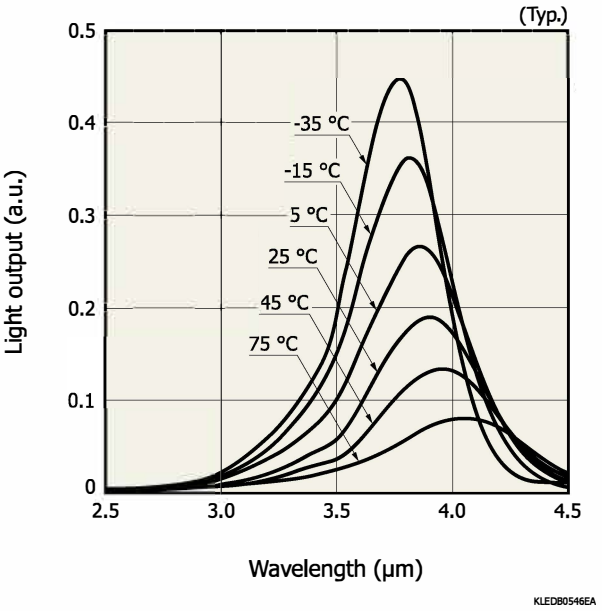


Temperature characteristics of emission spectrum

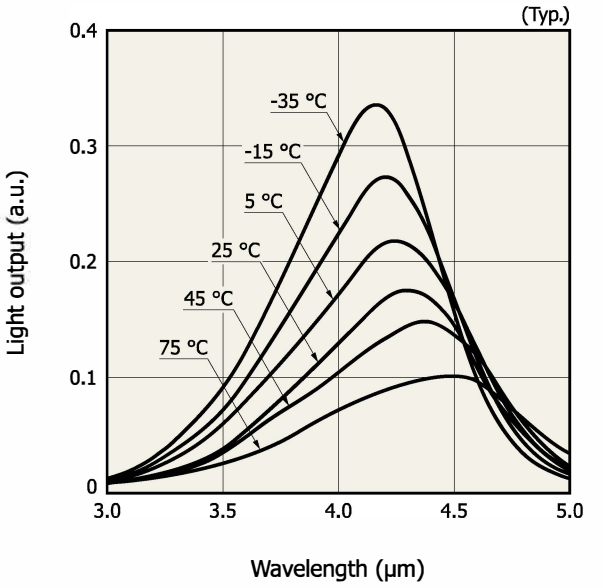
L15893 series



L15894 series



L15895 series



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

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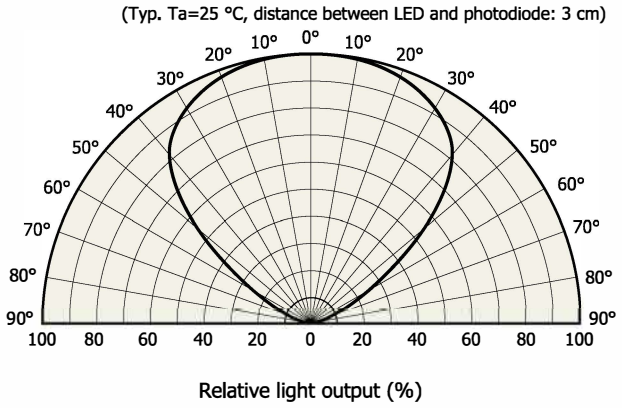
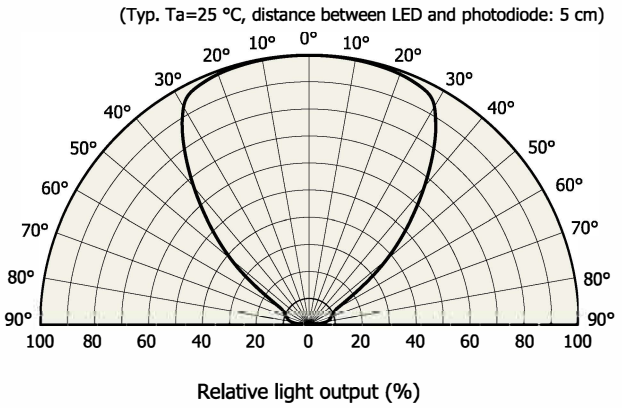
Directivity

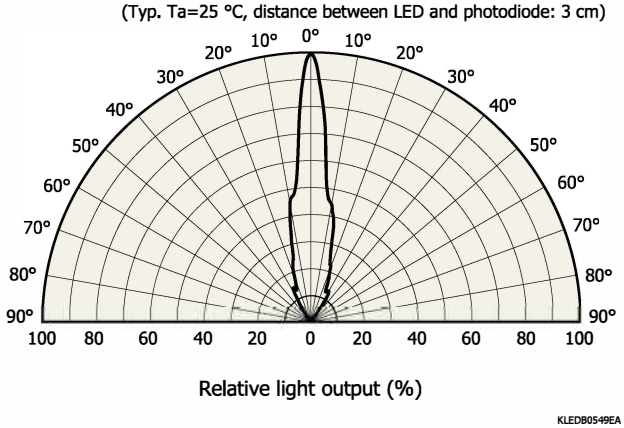
L15893-0330C, L15894-0390C, L15895-0430C



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

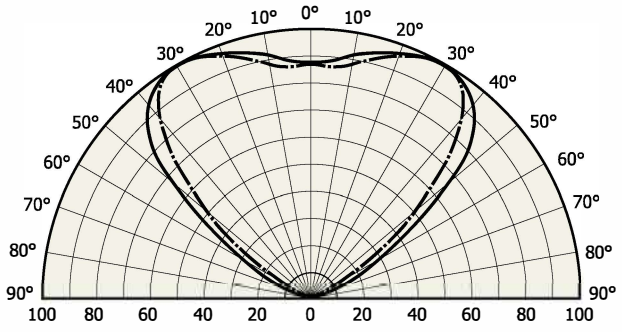


L15893-0330ML, L15894-0390ML, L15895-0430ML

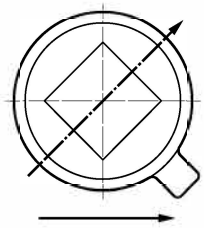


L15893-0330MA, L15894-0390MA, L15895-0430MA

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

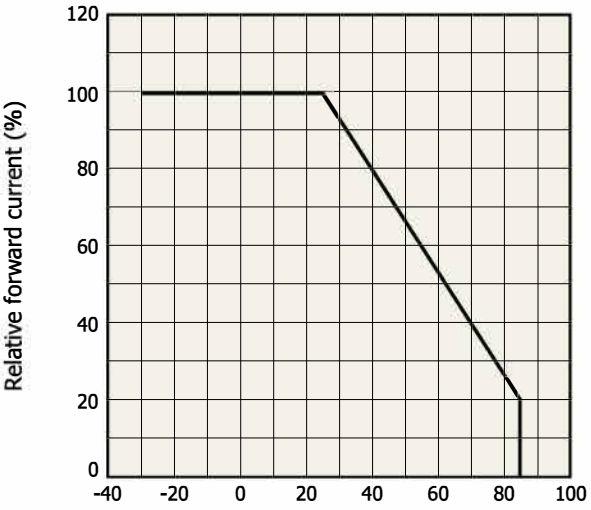


KLEDB0550EA



KLEDC0065EA

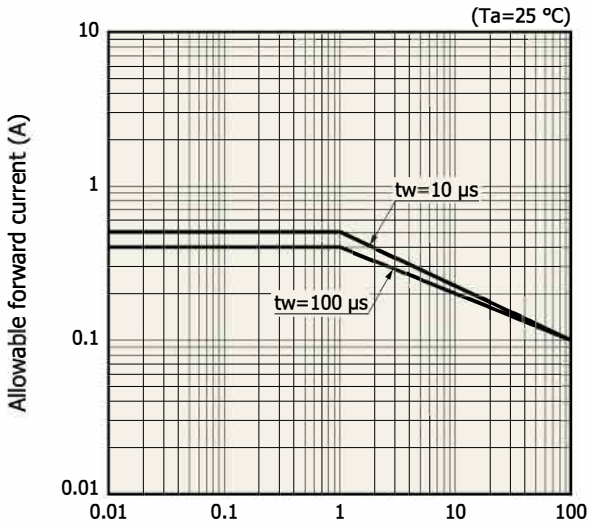
Allowable forward current vs. ambient temperature



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

KLEDB0417EB

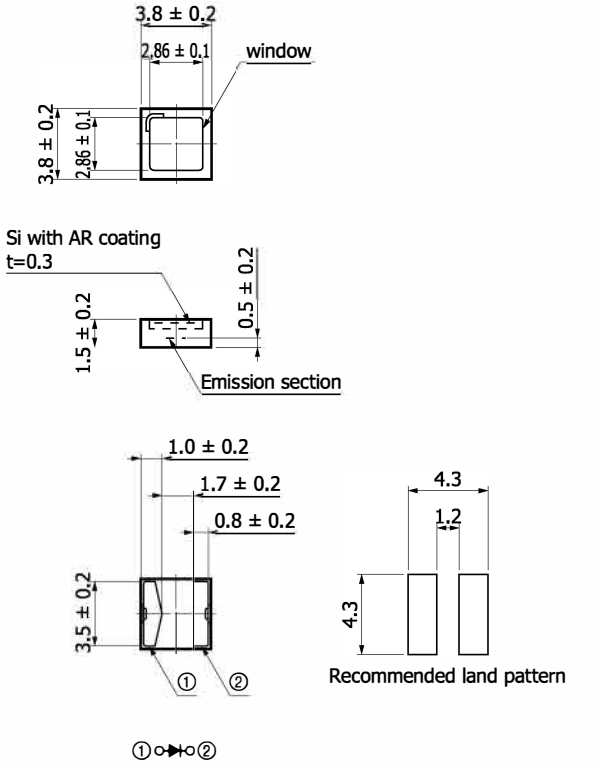
Allowable forward current vs. duty ratio



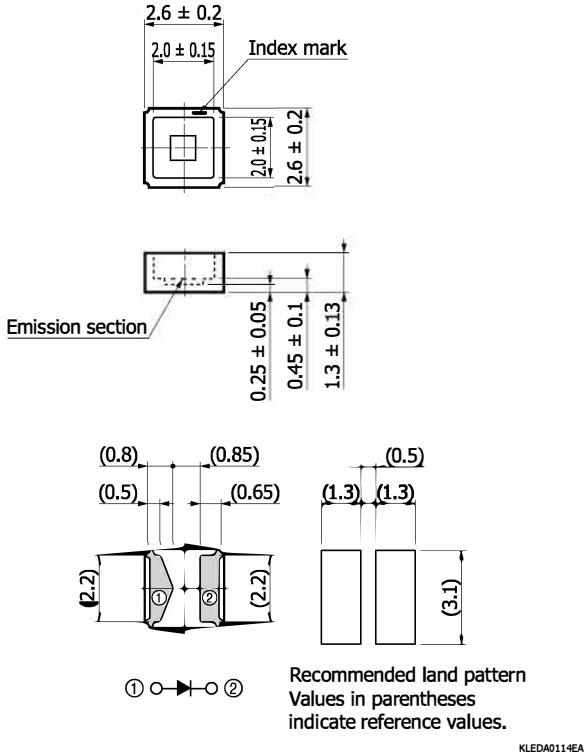
KLEDB0418EA

Dimensional outlines (unit: mm)

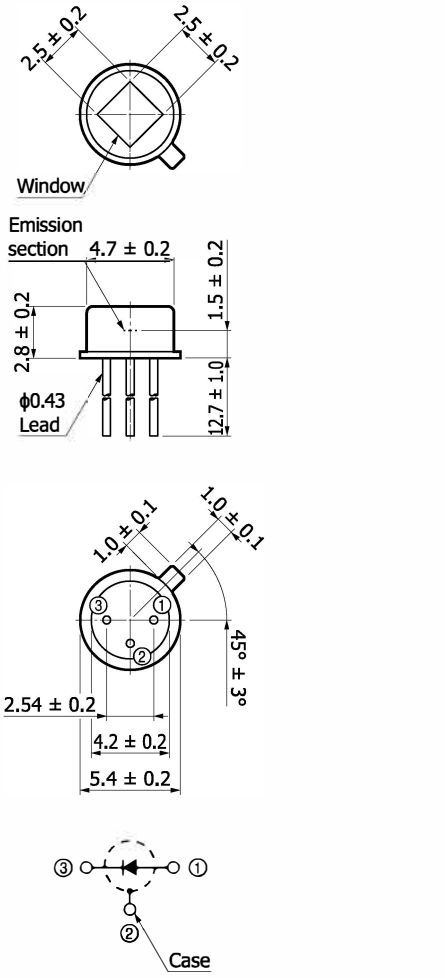
L15893-0330C, L15894-0390C, L15895-0430C



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



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



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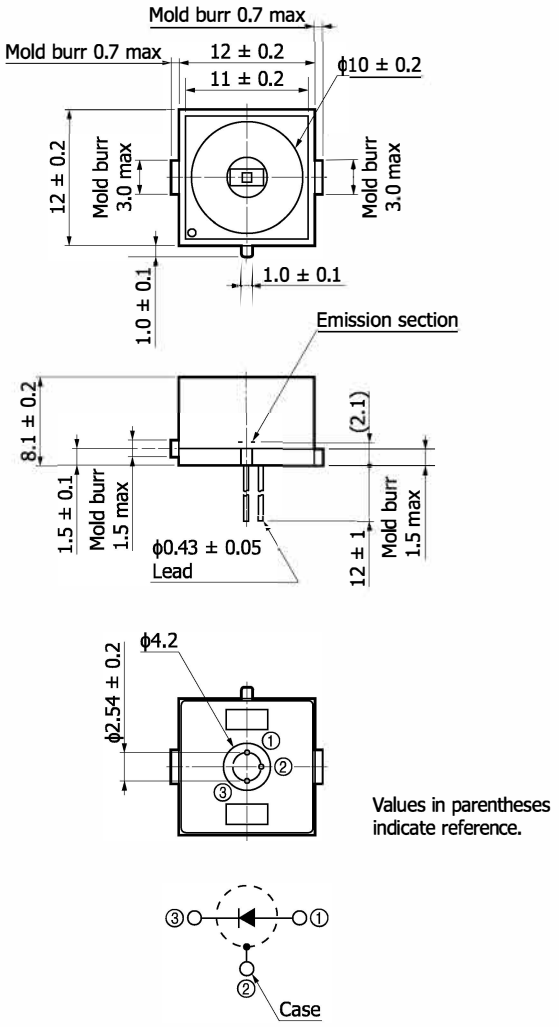
L15893-0330ML, L15894-0390ML, L15895-0430ML



KLEDA0112EB

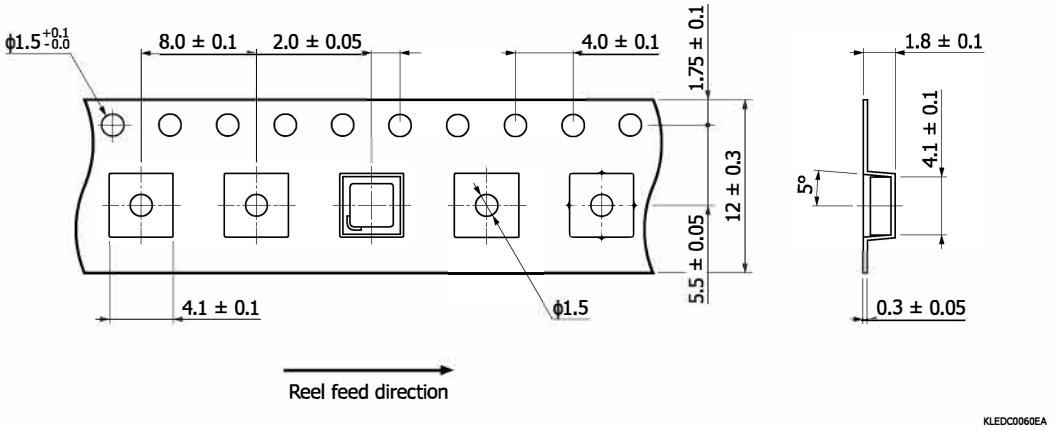
Standard packing specifications

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)



■ Packing quantity
500 pcs/reel

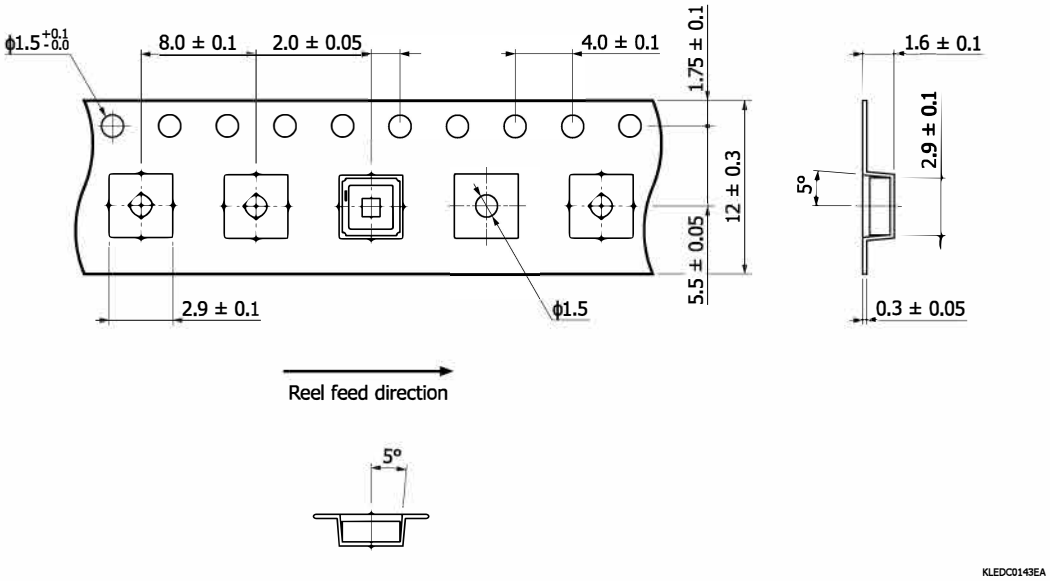
■ Packing state
Reel and desiccant in moisture-proof packaging (vacuum-sealed)

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

■ 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)

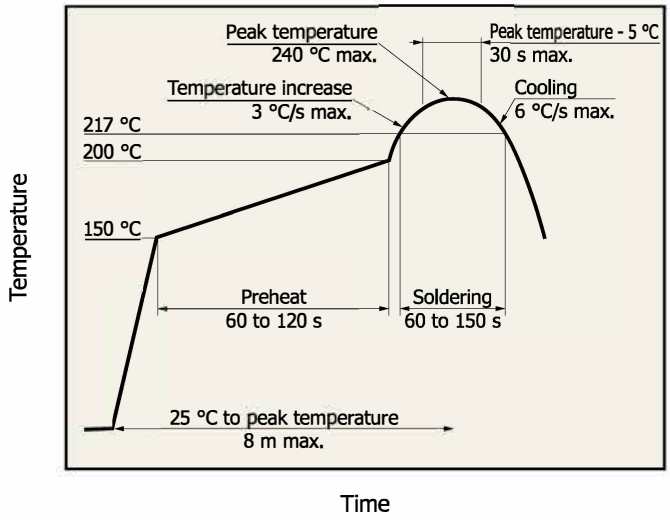


■ Packing quantity
500 pcs/reel

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

Recommended soldering conditions

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



- 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 three 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 the precautions "Surface mount type products." 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.

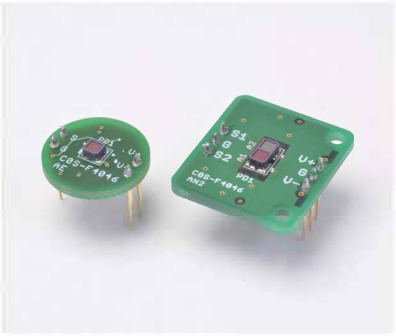
L15893-0330ML, L15894-0390ML, L15895-0430ML

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 kits M16607 series for InAsSb photovoltaic detector



The M16007 series are evaluation kits with an amplifier incorporating Hamamatsu InAsSb photovoltaic detector (ceramic package with band-pass filter). These can detect infrared light transmitted through a band-pass filter simply by connecting a power supply (±15 V). Two-element type that can detect two wavelengths is also available.

Specifications

- **Gain: 30 V/V**
- **Frequency characteristics: DC to 80 kHz**
- **Recommended drive voltage: ±15 V**
- **Built-in sensor: InAsSb photovoltaic detector (ceramic package with band-pass filter)**

Type no.	Built-in sensor	Center wavelength (µm)
M16607-033CF	P16612-033CF	3.3
M16607-039CF	P16612-039CF	3.9
M16607-043CF	P16612-043CF	4.26
M16607-015CF	P16849-011CF	3.3, 3.9
M16607-016CF	P16849-012CF	4.26, 3.9

Evaluation kit M16615 for mid infrared LED

Note: LED sold separately

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 M16607 series for InAsSb photovoltaic detector.

Specifications

- **Applicable LED: Mid infrared LED (TO-46 package)**
- **Output current: 400 mA**
- **Output pulse: 10 µs**
- **Output cycle: 1000 µs**
- **Recommended drive voltage: +15 V**

Related information

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

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

■ Technical note
· LED

HAMAMATSU www.hamamatsu.com

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Germany: HAMAMATSU PHOTONICS DEUTSCHLAND GMBH: Arzbergerstr. 10, 82211 Herrsching am Ammersee, Germany, Telephone: (49)8152-375-0, Fax: (49)8152-265-8 E-mail: info@hamamatsu.de
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Cat. No. KLED1085E09 Jul. 2023 DN