

P8212

## Integrated light emitting/receiving elements for automobile VICS

P8212 is a light emitting/receiving module consisting of an LED array and a photodiode in the same small package. The width of this module is minimized so that automobile antennas can be designed thin. A lens is also fitted onto the photodiode to increase the amount of input light. Although the lens makes the photodiode directivity narrow, this problem was solved by separating the photodiode optical axis from the LED axis to match the light emitting and receiving areas required for VICS.

### Features

- Small package
- Lens design optimized for light emitting/receiving timings
- Cylindrical lens with less pickup error during component mounting

### Applications

- Automobile VICS

### Absolute maximum ratings (Ta=25 °C)

Parameter	Symbol	Value	Unit
Photodiode reverse voltage	V <sub>R</sub> Max.	20	V
LED reverse voltage	V <sub>R</sub> Max.	4	V
LED pulse forward current *1	I <sub>FP</sub>	1300	mA
Operating temperature	T <sub>opr</sub>	-30 to +95	°C
Storage temperature	T <sub>stg</sub>	-40 to +115	°C

\*1: 64 kHz, duty ratio=50 %, 4 ms ON, average duty ratio=2.5 %

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

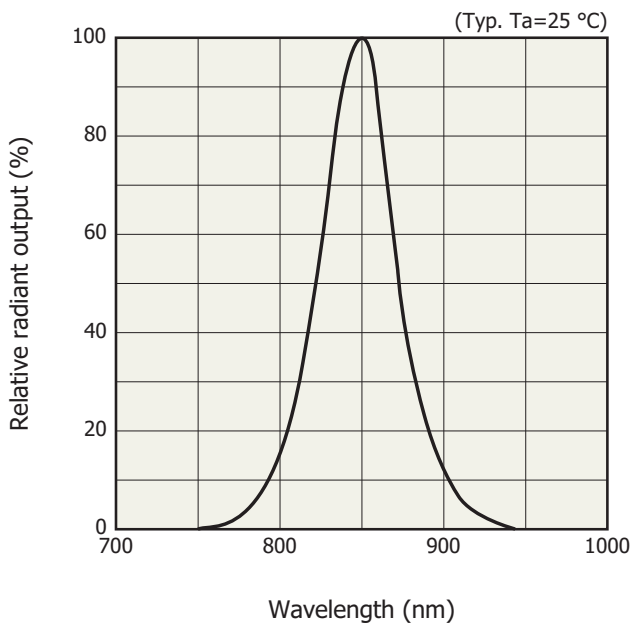
parameter	Symbol	Condition	Min.	Typ.	Max.	Unit
Spectral response range	$\lambda$		-	480 to 1100	-	nm
Peak sensitivity wavelength	$\lambda_p$		-	960	-	nm
Photo sensitivity	S	$\lambda = \lambda_p$	520	620	-	mA/W
		$\lambda = 850$ nm	460	540	-	mA/W
Short circuit current	I <sub>SC</sub>	100 lx, 2856 K	27	33	-	$\mu$ A
Dark current	I <sub>D</sub>	V <sub>R</sub> =12 V	-	1	10	nA
Cutoff frequency	f <sub>c</sub>	V <sub>R</sub> =12 V, R <sub>L</sub> =1 k $\Omega$ $\lambda$ =850 nm, -3dB	-	4	-	MHz
Terminal capacitance	C <sub>t</sub>	V <sub>R</sub> =12 V, f=1 MHz	-	40	-	pF
Directivity at half width	-	Direction in long side	-	$\pm$ 55	-	degree
		Direction in short side	-	+35, -18	-	

**Electrical and optical characteristics for LED (Ta=25 °C)**

parameter	Symbol	Condition	Min.	Typ.	Max.	Unit
Peak emission wavelength	$\lambda_p$	$I_F=100\text{ mA}$	830	850	900	nm
Spectral half width	$\Delta\lambda$	$I_F=100\text{ mA}$	-	40	-	nm
Pulse forward voltage	$V_{FP}$	$I_{FP}=900\text{ mA}^{\ast 2}$	5.5	6.3	7.4	V
Reverse current	$I_R$	$V_R=4\text{ V}$	-	-	10	$\mu\text{A}$
Pulse radiant intensity	$I_{ep}$	$I_{FP}=900\text{ mA}^{\ast 2}$	1400	1800	-	mW/sr
Cutoff frequency	$f_c$	$I_F=100\text{ mA}\pm 10\text{ mAp-p}$	-	20	-	MHz
Directivity at half width	-	Direction in long side	-	$\pm 30$	-	degree
		Direction in short side	-	$\pm 13$	-	

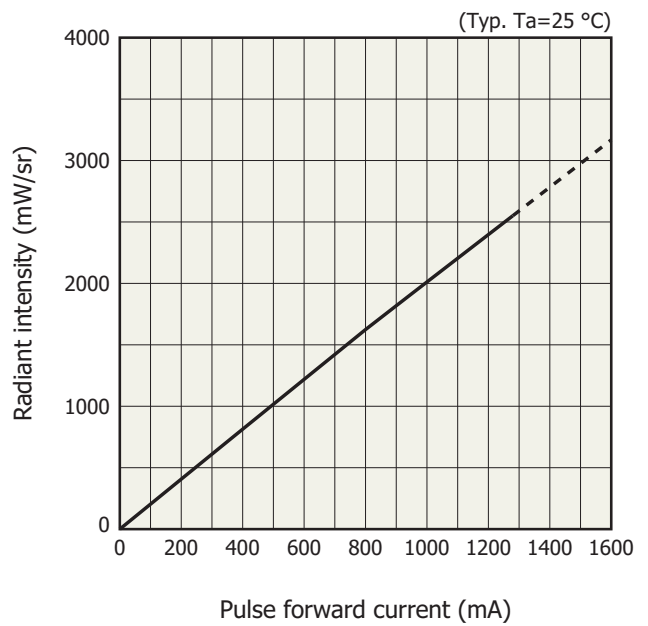
$\ast 2$ : Average peak value in pulse operation at 64 kHz, 50 % duty ratio, 4 ms ON

**Emission spectrum**



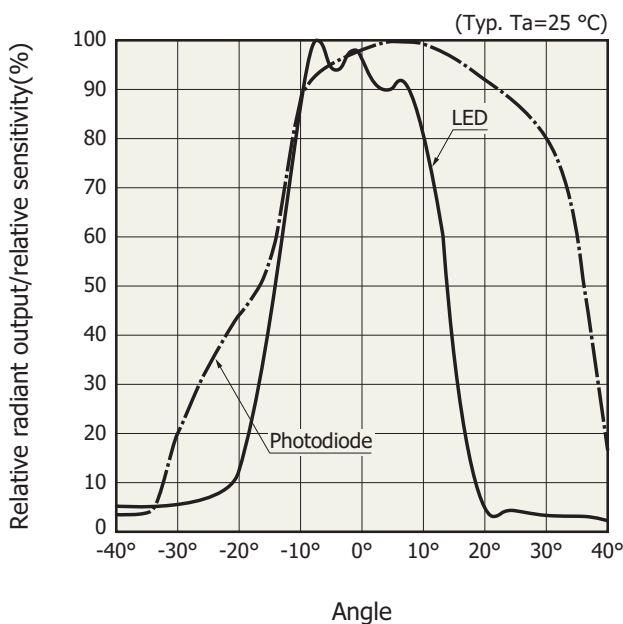
KLEDB0114EB

**Radiant intensity vs. pulse forward current (LED)**



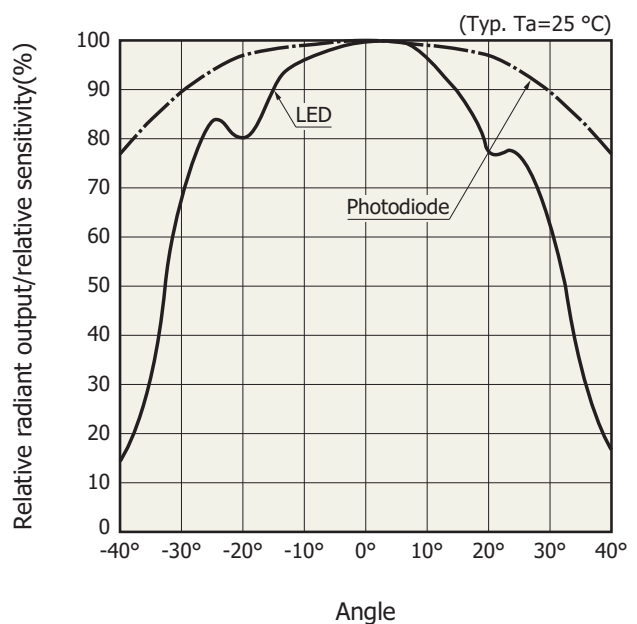
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**Directivity: direction in short side**



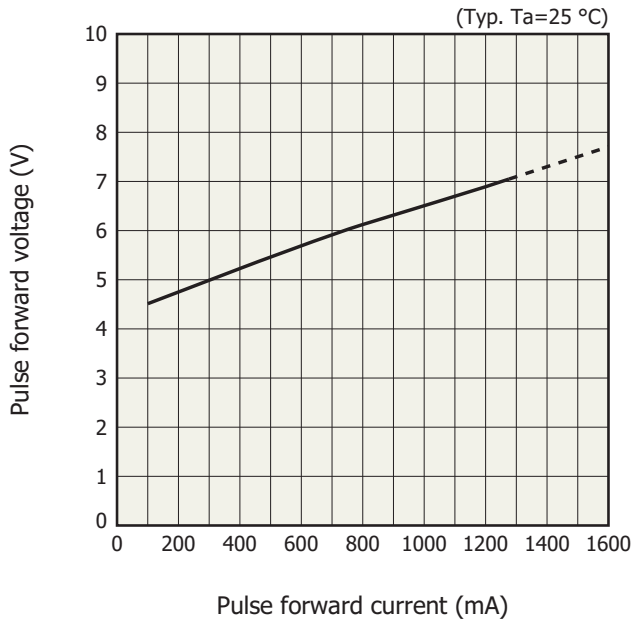
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**Directivity: direction in long side**



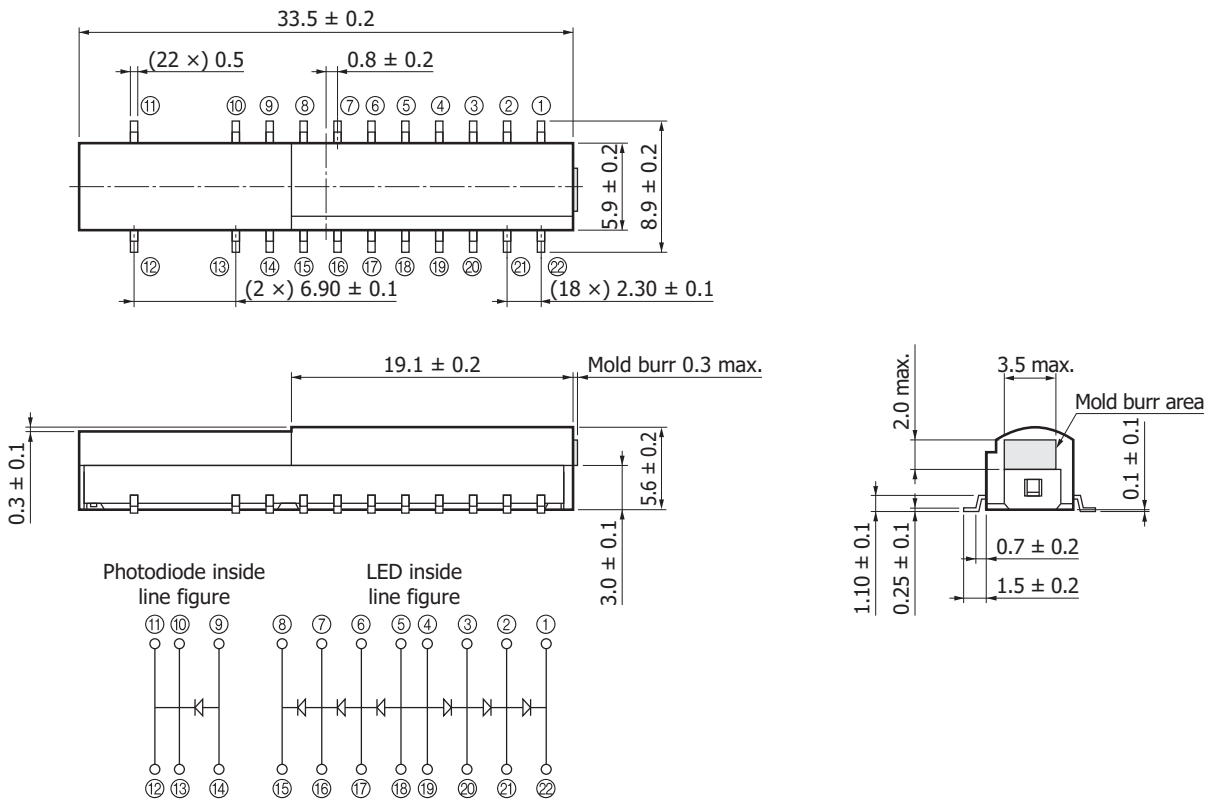
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❑ Pulse forward voltage vs. pulse forward current (LED)



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❑ Dimensional outline (unit: mm)



KPCA0008EB

Information described in this material is current as of September 2017.

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**HAMAMATSU**[www.hamamatsu.com](http://www.hamamatsu.com)

HAMAMATSU PHOTONICS K.K., Solid State Division

1126-1 Ichino-cho, Higashi-ku, Hamamatsu City, 435-8558 Japan, Telephone: (81) 53-434-3311, Fax: (81) 53-434-5184

U.S.A.: Hamamatsu Corporation: 360 Foothill Road, Bridgewater, N.J. 08807, U.S.A., Telephone: (1) 908-231-0960, Fax: (1) 908-231-1218

Germany: Hamamatsu Photonics Deutschland GmbH: Arzbergerstr. 10, D-82211 Herrsching am Ammersee, Germany, Telephone: (49) 8152-375-0, Fax: (49) 8152-265-8

France: Hamamatsu Photonics France S.A.R.L.: 19, Rue du Saule Trapu, Parc du Moulin de Massy, 91882 Massy Cedex, France, Telephone: 33-(1) 69 53 71 00, Fax: 33-(1) 69 53 71 10

United Kingdom: Hamamatsu Photonics UK Limited: 2 Howard Court, 10 Tewin Road, Welwyn Garden City, Hertfordshire AL7 1BW, United Kingdom, Telephone: (44) 1707-294888, Fax: (44) 1707-325777

North Europe: Hamamatsu Photonics Norden AB: Torshamnsgatan 35 16440 Kista, Sweden, Telephone: (46) 8-509-031-00, Fax: (46) 8-509-031-01

Italy: Hamamatsu Photonics Italia S.r.l.: Strada della Moia, 1 int. 6, 20020 Arese (Milano), Italy, Telephone: (39) 02-93581733, Fax: (39) 02-93581741

China: Hamamatsu Photonics (China) Co., Ltd.: B1201, Jiaming Center, No.27 Dongsanhuan Beilu, Chaoyang District, Beijing 100020, China, Telephone: (86) 10-6586-6006, Fax: (86) 10-6586-2866