

# Light emitting/receiving module 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)

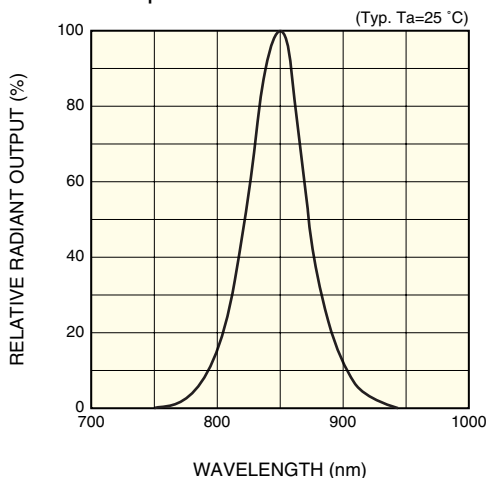
parameter	Symbol	Condition	Min.	Typ.	Max.	Unit
Spectral response range	$\lambda$		-	480 to 1100	-	nm
Peak sensitivity wavelength	$\lambda_p$		-	960	-	nm
Photo sensitivity	S	$\lambda=\lambda_p$	520	620	-	mA/W
		$\lambda=850$ nm	460	540	-	mA/W
Short circuit current	I <sub>sc</sub>	100 lx, 2856 K	27	33	-	$\mu$ A
Dark current	I <sub>d</sub>	V <sub>R</sub> =12 V	-	1	10	nA
Cut-off 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 <sub>F</sub> =100 mA	830	850	900	nm
Spectral half width	$\Delta\lambda$	I <sub>F</sub> =100 mA	-	40	-	nm
Pulse forward voltage	V <sub>FP</sub>	I <sub>F</sub> =900 mA *2	5.5	6.3	7.4	V
Reverse current	I <sub>R</sub>	V <sub>R</sub> =4 V	-	-	10	$\mu$ A
Pulse radiant intensity	I <sub>ep</sub>	I <sub>F</sub> =900 mA *2	1400	1800	-	mW/sr
Cut-off frequency	f <sub>c</sub>	I <sub>F</sub> =100 mA $\pm$ 10 mA <sub>p-p</sub>	-	20	-	MHz
Directivity at half width	-	Direction in long side	-	$\pm 30$	-	degree
		Direction in short side	-	$\pm 13$	-	

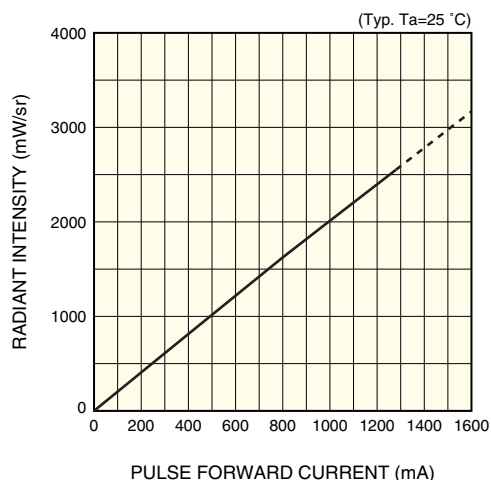
\*2: Average peak value in pulse operation at 64 kHz, 50 % duty ratio, 4 ms ON

## ■ Emission spectrum



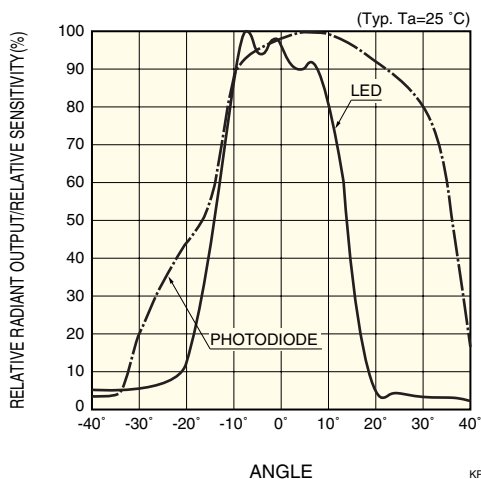
KLEDB0114EA

## ■ Radiant intensity vs. pulse forward current (LED)



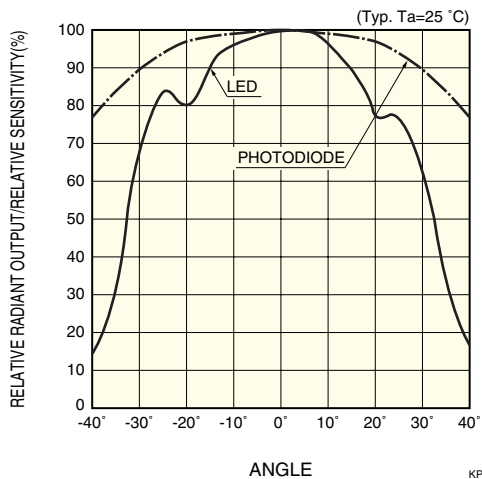
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## ■ Directivity: direction in short side



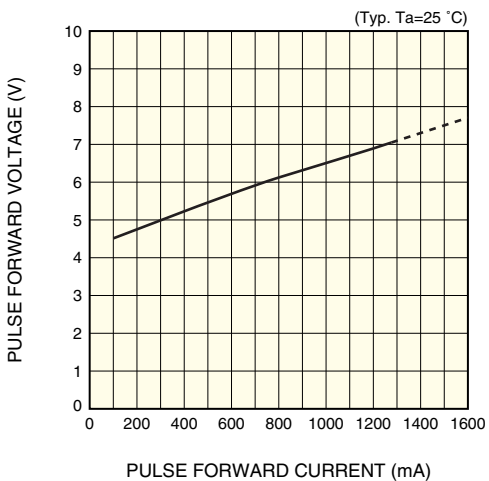
KPCB0021EA

## ■ Directivity: direction in long side



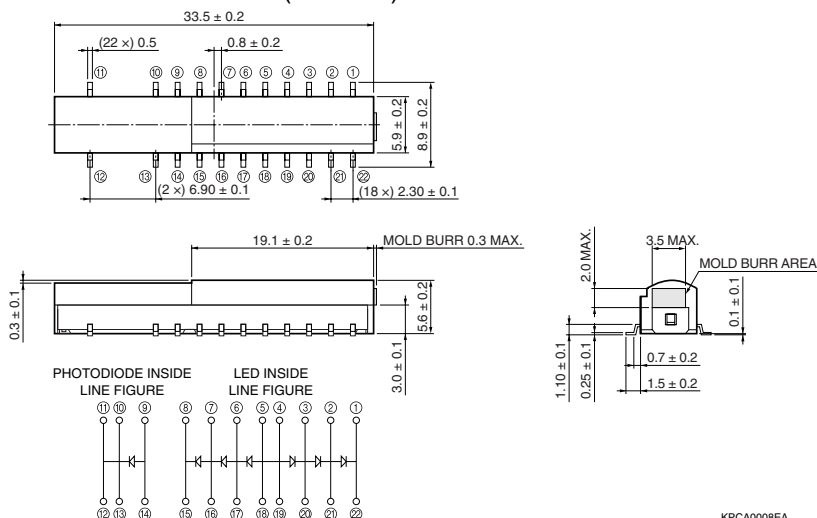
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## ■ Pulse forward voltage vs. pulse forward current (LED)



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## ■ Dimensional outline (unit: mm)



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