Preliminary

COBP PHOTO SENSOR with Red & IR & two Green LED

■ GENERAL DISCRIPTION

NJL5511R is the compact surface mount type photo sensor, which is built in high brightness RED LED, Infrared LED, two green LED and a high sensitive photo diode. This product is suit for the application for Bio monitor as pulse rate, SpO_2.

■ FEATURES

- Peak wavelength : λ_P 660nm ±4nm(RED) , 940nm ±10nm(Infrared) , 525nm ±5nm(Green)
- Output current : 20μA typ (RED), 10μA typ (Infrared), 11μA typ (Green)
- Miniature, thin package: 3.2x5.0x0.8mm
- Pb free solder reflowing permitted: 260°C, 2times
- Halogen free, Pb free
- Compliant with RoHS directive

■ APPLICATION

- Bio monitor as pulse rate, SpO_2

■ ABSOLUTE MAXIMUM RATINGS (Ta=25˚C)

PARAMETER	SYMBOL	RATINGS	UNIT
Emitter			
Forward Current (Continuous)	$I_{F\ RED}$	50	mA
	$I_{F\ IR}$	50	mA
	$I_{F\ GREEN}$	15 *1	mA
Reverse Voltage (Continuous)	$V_{R\ RED}$	5	V
	$V_{R\ IR}$	5	V
	$V_{R\ GREEN}$	5	V
Power Dissipation *2	P_D	65	mW
Detector			
Reverse Voltage	V_R	35	V
Power Dissipation	P_D	20	mW
Coupled			
Total Power Dissipation	P_{tot}	85	mW
Operating Temperature	T_{opr}	-20 to +70	˚C
Storage Temperature	T_{stg}	-30 to +85	˚C
Reflow Soldering Temperature	T_{sol}	260	˚C

*1 This is current value of each 1pcs LED.

*2 Prohibits that "RED LED", "IR LED" and “GREEN LED” turn on at the same time.

■ ELECTRO-OPTICAL CHARACTERISTICS (Ta=25˚C)

PARAMETER	SYMBOL	TEST CONDITION	MIN	TYP	MAX	UNIT
Emitter						
DC Forward Voltage	$V_{F\ RED}$	I_F=10mA	—	2	2.5	V
	$V_{F\ IR}$	I_F=10mA	—	1.3	1.8	V
	$V_{F\ GREEN}$	I_F=10mA	—	3	3.5	V
Pulse Forward Voltage *1	$V_{FP\ RED}$	I_{FP}=100mA	—	3.2	—	V
	$V_{FP\ IR}$	I_{FP}=100mA	—	1.4	—	V
	$V_{FP\ GREEN}$	I_{FP}=100mA	—	4	—	V
Reverse Current	$I_{R\ RED}$	V_R=5V	—	—	10	μA
	$I_{R\ IR}$	V_R=5V	—	—	10	μA
	$I_{R\ GREEN}$	V_R=5V	—	—	10	μA
Peak Wavelength *2	$\lambda_{P\ RED}$	I_F=10mA	656	660	664	nm
	$\lambda_{P\ IR}$	I_F=10mA	930	940	950	nm
	$\lambda_{P\ GREEN}$	I_F=10mA	520	525	530	nm
Detector						
Dark Current	I_D	V_R=10V, Without incident light	—	0.1	2	nA
Forward Voltage	V_F	I_F=1mA, Without incident light	—	—	1.2	V
Terminal Capacitance	Ct	V_R=0V, f=1MHz	—	30	—	pF
		V_R=2.5V, f=1MHz	—	13	—	pF
Peak Wavelength	λ_P		—	800	—	nm
Coupled						
Output Current *3	$I_{O\ RED}$	I_F=4mA,V_R=2.5V,d=2.0mm (*6)	12	—	36	μA
	$I_{O\ IR}$	I_F=4mA,V_R=2.5V,d=2.0mm (*6)	4	—	17	μA
	$I_{O\ GREEN}$	I_F=4mA (*5),V_R=2.5V,d=2.0mm (*6)	7	—	20	μA
Operating Dark Current *4	$I_{D\ RED}$	I_F=4mA,V_R=2.5V	—	30	200	nA
	$I_{D\ IR}$	I_F=4mA,V_R=2.5V	—	10	100	nA
	$I_{D\ GREEN}$	I_F=4mA (*5),V_R=2.5V	—	10	100	nA
Response Time(Rise/Fall)	tr,tf RED	V_R=0V,RL=1kΩ	—	400	—	ns
		V_R=2.5V,RL=1kΩ	—	250	—	ns
	tr,tf IR	V_R=0V,RL=1kΩ	—	550	—	ns
		V_R=2.5V,RL=1kΩ	—	300	—	ns
	tr,tf GREEN	V_R=0V,RL=1kΩ	—	400	—	ns
		V_R=2.5V,RL=1kΩ	—	250	—	ns

*1 Pulse duty 0.5% (Pulse width 100μs, Period 20ms)

*2 This is represented as emission wavelength range of LED. The emission wavelength verification test has not confirmed in the manufacturing process.

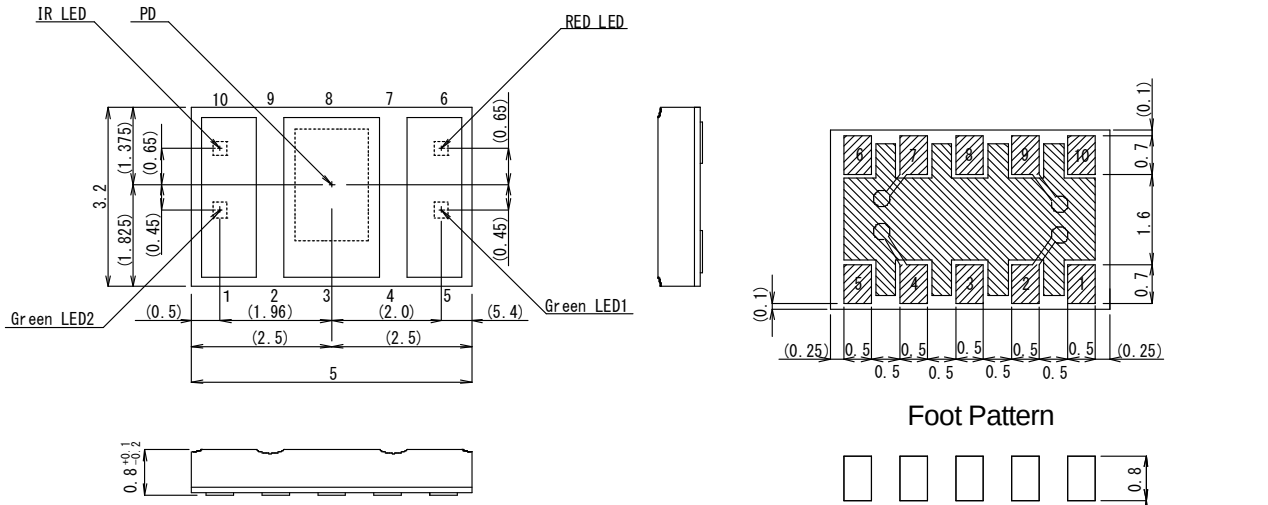
*3 Please refer to “Output Current Test Condition”.

*4 I_D may increase according to the periphery situation of the surface mounted condition.

*5 Total current of each LED (IF=2mA/pcs).

*6 Distance from the package undersurface to the aluminum evaporation surface.

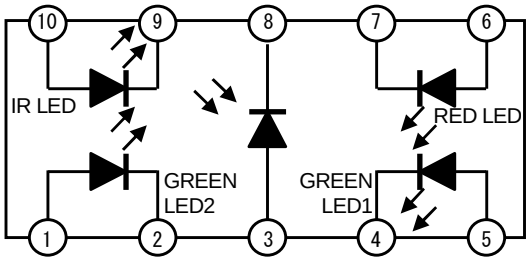
■ OUTLINE unit:mm



1. Anode for GREEN LED2
2. Cathode for GREEN LED2
3. Anode for PD
4. Cathode for GREEN LED1
5. Anode for GREEN LED1
6. Anode for RED LED
7. Cathode for RED LED
8. Cathode for PD
9. Cathode for IR LED
10. Anode for IR LED

Unspecified tolerance: ±0.1mm
Dimensions in parenthesis are shown for reference.

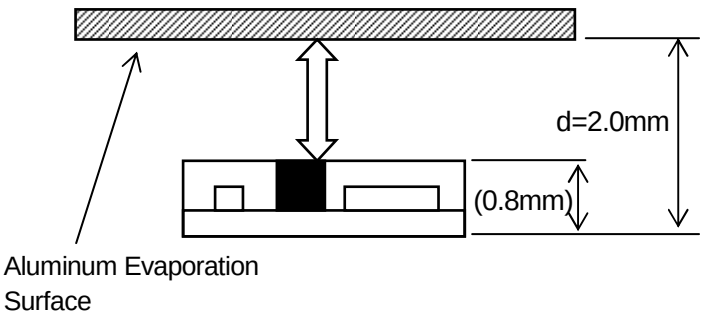
■ BLOCK DIAGRAM



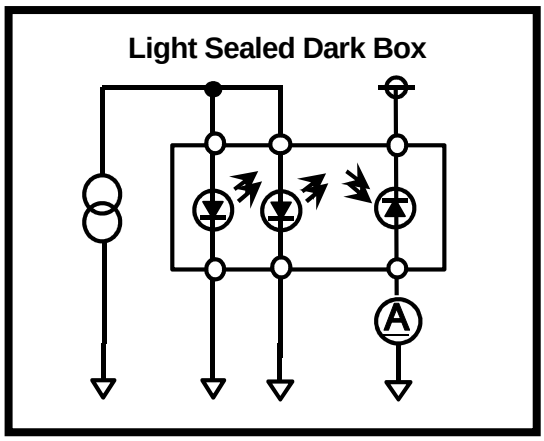
1. Anode for GREEN LED2
2. Cathode for GREEN LED2
3. Anode for PD
4. Cathode for GREEN LED1
5. Anode for GREEN LED1
6. Anode for RED LED
7. Cathode for RED LED
8. Cathode for PD
9. Cathode for IR LED
10. Anode for IR LED

■ OUTPUT CURRENT TEST CONDITION

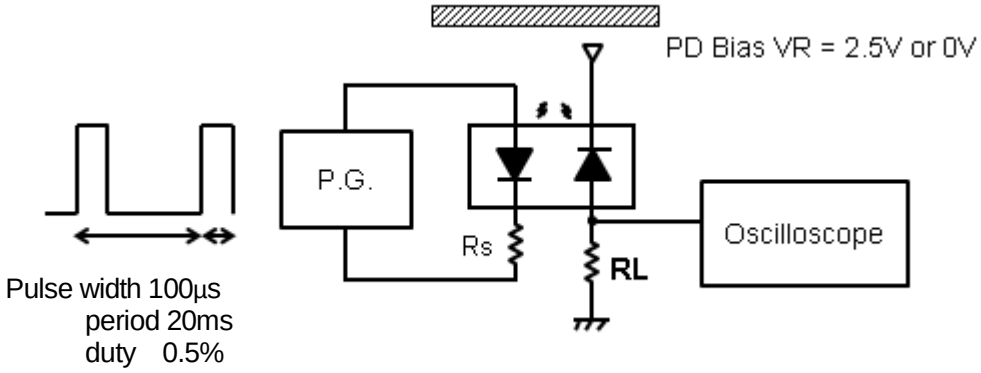
The signal from LED is reflected at the aluminum surface.



■ DARK CURRENT TEST CONDITION



■ RESPONSE TIME TEST CONDITION



■ OUTPUT CURRENT vs. DISTANCE TEST CONDITION