

APS2012SP1C  
Ambient Light Photo Sensor

DESCRIPTION

- The APS2012SP1C is a NPN silicon phototransistor, It is a good effective solution to the power saving of display backlighting appliances and the device is sensitive to the visible spectrum

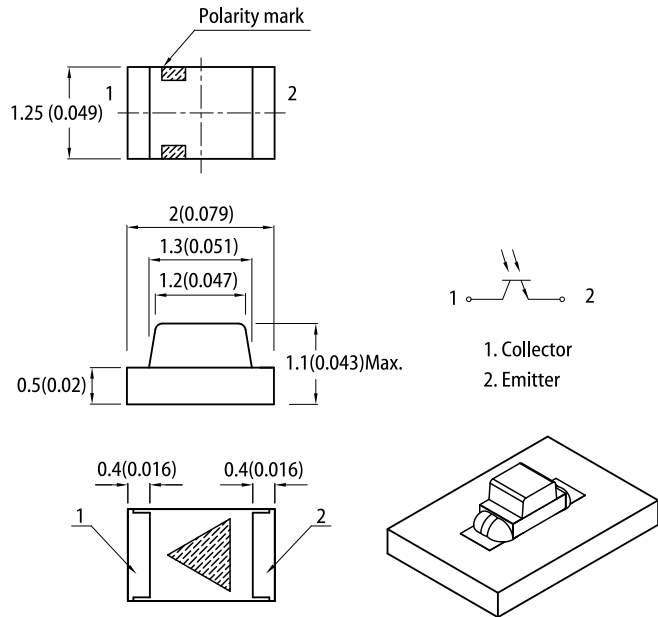
FEATURES

- 2.0mm x1.25mm SMD LED,1.1mm thickness
- Adapted to human eye responsive
- Wide angle of half sensitivity
- Moisture sensitivity level: 3
- Package: 2000 pcs / reel
- Water clear lens
- Halogen-free
- RoHS compliant

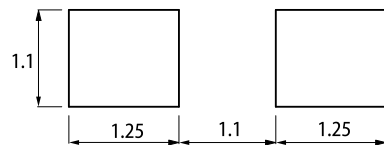
APPLICATIONS

- Detection of ambient light to control display backlighting in:
- Mobile phones
  - PDAs
  - Note books
  - Video cameras

PACKAGE DIMENSIONS



RECOMMENDED SOLDERING PATTERN  
(units : mm; tolerance : ± 0.1)



- Notes:
1. All dimensions are in millimeters (inches).
  2. Tolerance is ±0.1(0.004") unless otherwise noted.
  3. The specifications, characteristics and technical data described in the datasheet are subject to change without prior notice.
  4. The device has a single mounting surface. The device must be mounted according to the specifications.

ABSOLUTE MAXIMUM RATINGS at T<sub>A</sub>=25°C

Parameter	Symbol	Value	Unit	Notice
Collector Emitter Voltage	V <sub>ceo</sub>	60	V	I <sub>ceo</sub> = 100μA
Emitter-Collector Voltage	V <sub>eco</sub>	4	V	I <sub>eco</sub> = 100μA
Operating Temperature	T <sub>opr</sub>	-40 to +85	°C	-
Storage Temperature	T <sub>stg</sub>	-40 to +85	°C	-

Note:  
1. Relative humidity levels maintained between 40% and 60% in production area are recommended to avoid the build-up of static electricity – Ref JEDEC/JESD625-A and JEDEC/J-STD-033.

ELECTRICAL / OPTICAL CHARACTERISTICS at  $T_A=25^{\circ}\text{C}$ 

Parameter	Symbol	Value			Unit	Conditions
		Min.	Typ.	Max.		
Collector Emitter Breakdown Voltage	$B_{V_{CE0}}$	60	-	-	V	$I_{CE0} = 100\mu\text{A}$
Emitter Collector Breakdown Voltage	$B_{V_{ECO}}$	4	-	-	V	$I_{ECO} = 100\mu\text{A}$
Collector dark current	$I_D$	-	10	100	nA	$V_{CE} = 5\text{V}$ , $E_V = 0\text{Lx}$
Light Current (1)	$I_{PH1}$	-	6	-	$\mu\text{A}$	$V_{CE} = 5\text{V}$ , $E_V = 100\text{Lx}$ <sup>[1]</sup>
Light Current (2)	$I_{PH2}$	-	130	-	$\mu\text{A}$	$V_{CE} = 5\text{V}$ , $E_V = 1000\text{Lx}$ <sup>[1]</sup>
Light Current (3)	$I_{PH3}$	-	950	-	$\mu\text{A}$	$V_{CE} = 5\text{V}$ , $E_V = 1000\text{Lx}$ <sup>[2]</sup>
Light Current (4)	$I_{PH4}$	-	420	-	$\mu\text{A}$	$V_{CE} = 5\text{V}$ , $E_V = 1000\text{Lx}$ <sup>[3]</sup>
Light Test Current	$I_{TPH}$	10	-	300	$\mu\text{A}$	$V_{CE} = 5\text{V}$ , $E_V = 100\text{Lx}$ , at 630nm LED <sup>[4]</sup>
Rise Time(10% to 90%)	$t_r$	-	3.24	-	$\mu\text{s}$	$R_L = 50\Omega$ , $V_R = 5\text{V}$ , $F = 1\text{KHz}$ , $\text{CCT/K} = 11195$ , 1000Lux
Fall Time(90% to 10%)	$t_f$	-	1	-	$\mu\text{s}$	
Saturation Output Voltage	$V_o$	4.5	4.7	-	V	$V_{CC} = 5\text{V}$ , $E_V = 1000\text{Lx}$ <sup>[1]</sup> , $R_L = 75\text{K}\Omega$
Response Wavelength	$\lambda$	390	-	700	nm	>10% Response
Collector Emitter Saturation Voltage	$V_{CE(sat)}$	-	-	0.4	V	$I_C = 10\text{mA}$
Range of Spectral Bandwidth	$\lambda_{0.1}$	390	-	950	nm	-
Wavelength of Peak Sensitivity	$\lambda_p$	-	580	-	nm	-

## Notes:

1. White Fluorescent light (Color Temperature = 6200K) is used as light source.
2. Illuminance by CIE standard illuminant-A/2856K incandescent lamp.
3. Sunlight (Color Temperature = 4600K) is used as light source.
4. 630nm LED is substituted in mass production.
5. Excess driving current and / or operating temperature higher than recommended conditions may result in severe light degradation or premature failure.

Fig.1 Illuminance vs. Output Photocurrent

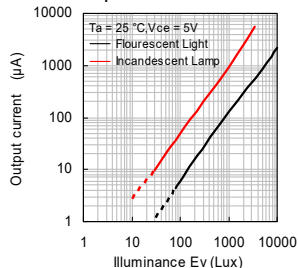
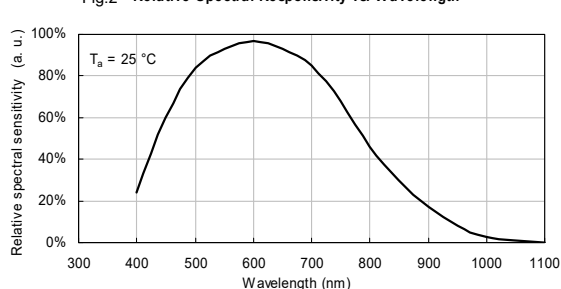
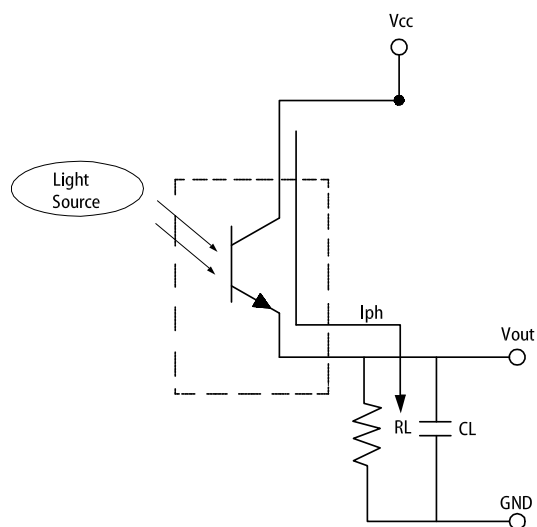


Fig.2 Relative Spectral Responsivity vs. Wavelength



## CONVERTING PHOTOCURRENT TO VOLTAGE

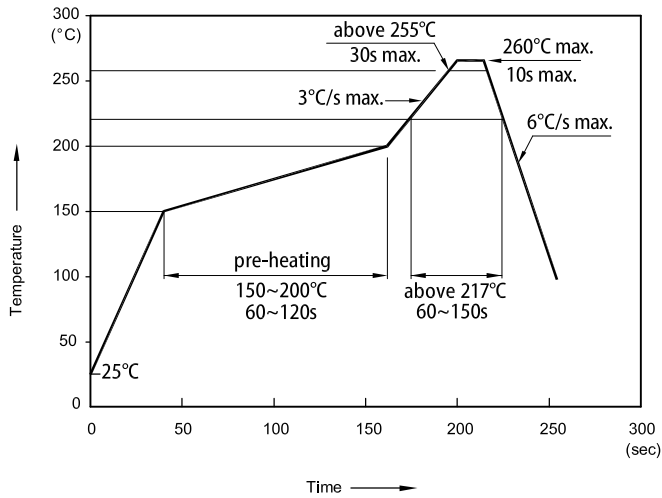


## Notes:

1. The output voltage ( $V_{out}$ ) is the product of photocurrent ( $I_{PH}$ ) and loading resistor ( $R_L$ ).
2. A right loading resistor shall be chosen to meet the requirement of maximum ambient light, and Output saturation voltage:

$$V_{out(max)} = I_{out(max)} \times R_L \leq V_{out(saturation)} = V_{CC} - 0.3V$$

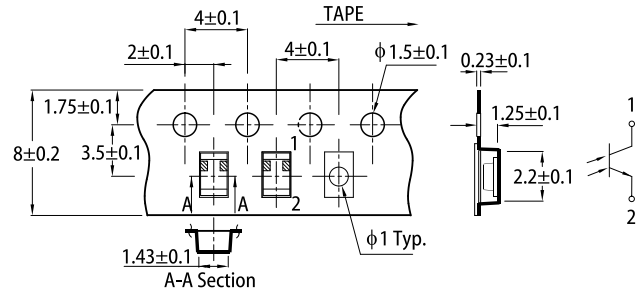
## REFLOW SOLDERING PROFILE for LEAD-FREE SMD PROCESS



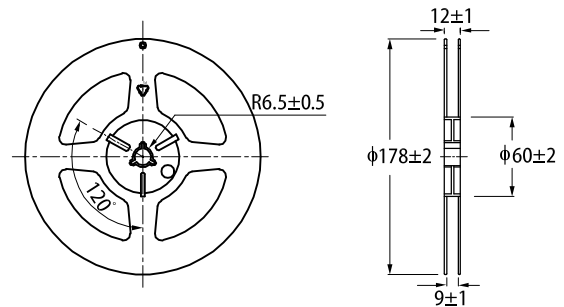
Notes:

1. Don't cause stress to the LEDs while it is exposed to high temperature.
2. The maximum number of reflow soldering passes is 2 times.
3. Reflow soldering is recommended. Other soldering methods are not recommended as they might cause damage to the product.

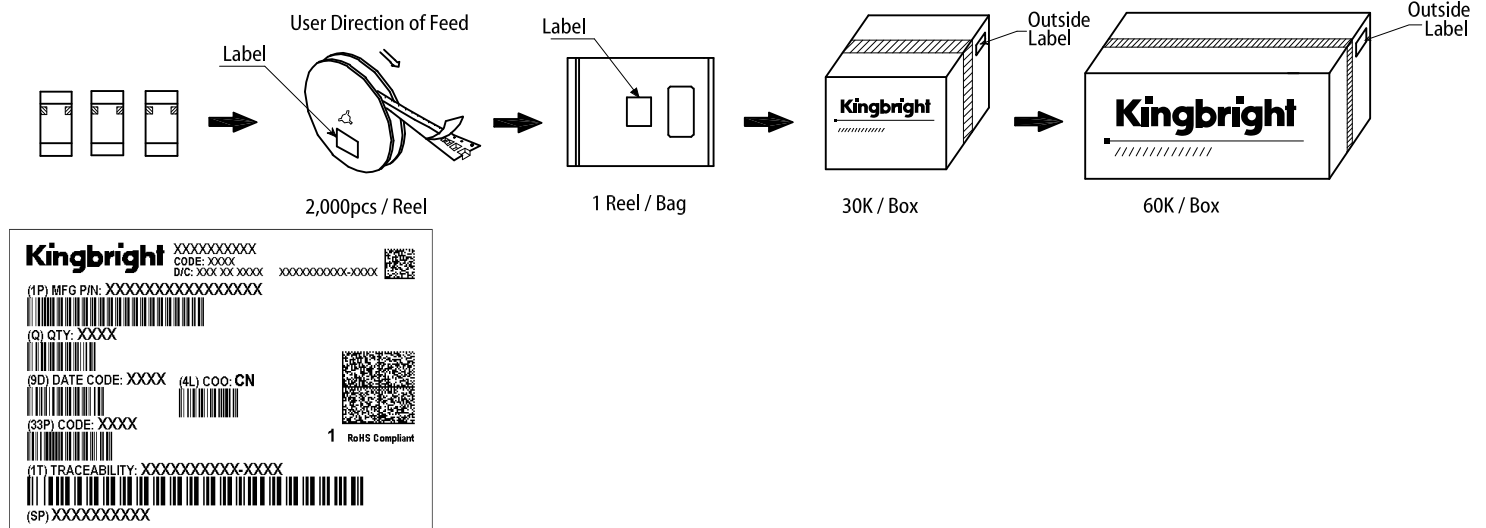
## TAPE SPECIFICATIONS (units : mm)



## REEL DIMENSION (units : mm)



## PACKING & LABEL SPECIFICATIONS



## PRECAUTIONARY NOTES

1. The information included in this document reflects representative usage scenarios and is intended for technical reference only.
2. The part number, type, and specifications mentioned in this document are subject to future change and improvement without notice. Before production usage customer should refer to the latest datasheet for the updated specifications.
3. When using the products referenced in this document, please make sure the product is being operated within the environmental and electrical limits specified in the datasheet. If customer usage exceeds the specified limits, Kingbright will not be responsible for any subsequent issues.
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