

PH5502B2NA1-E4

Data Sheet

R08DS0038EJ0100

Rev.1.00

Oct 05, 2011

Ambient Illuminance Sensor

DESCRIPTION

The PH5502B2NA1-E4 is an ambient illuminance sensor with a photo diode and current amplifier. This product has spectral characteristics close to human eye sensitivity and outputs light current proportional to the ambient brightness.

The PH5502B2NA1-E4 can be used to improve the performance and reduce the power consumption of digital equipment such as FPD-TV sets and mobile phones, by enabling automatic brightness control and automatic switching on and off of lighting systems.

FEATURES

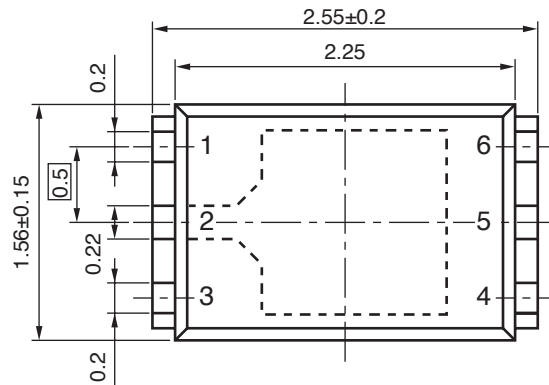
- Small and thin SON package 2.55 x 1.56 x 0.55 mm
- Spectral characteristics close to human eye sensitivity
Peak sensitivity wavelength 555 nm TYP.
- Output characteristics proportional to illuminance
- Large output light current 230 μ A TYP.@100 lx (Fluorescent light)
- Low voltage operation $V_{CC} = 1.8$ to 5.5 V
- Pb-free

APPLICATIONS

- FPD TV sets, displays
- Mobile phones, smartphones
- Notebook PCs, tablet PCs
- DSCs, DVCs
- FA equipment
- Lighting systems, etc.

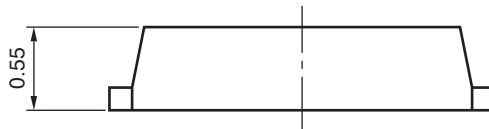
PACKAGE DIMENSIONS (UNIT: mm)

TOP VIEW

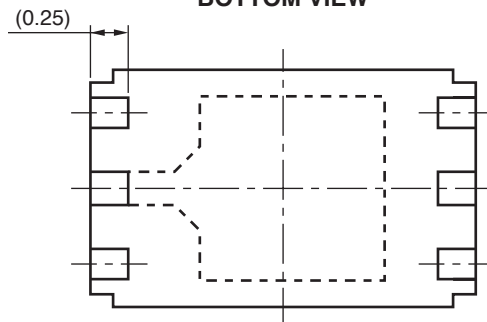


Remark Pin 1 is distinguishable by the shape of the lead frame.

SIDE VIEW



BOTTOM VIEW



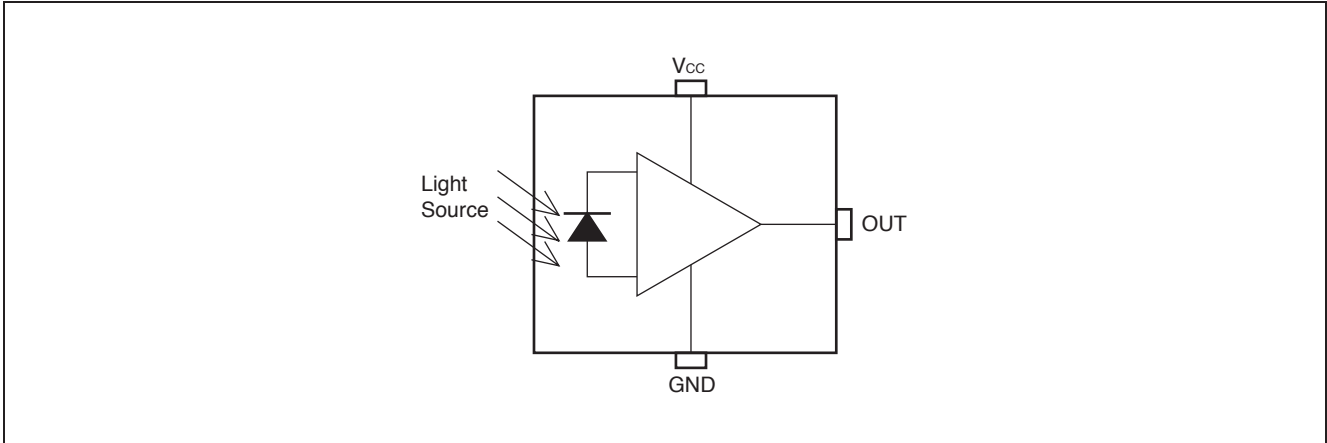
Remark () indicates nominal dimensions.

Pin No.	Terminal
1	OUT
2	GND
3	V _{CC}
4	NC
5	NC
6	NC

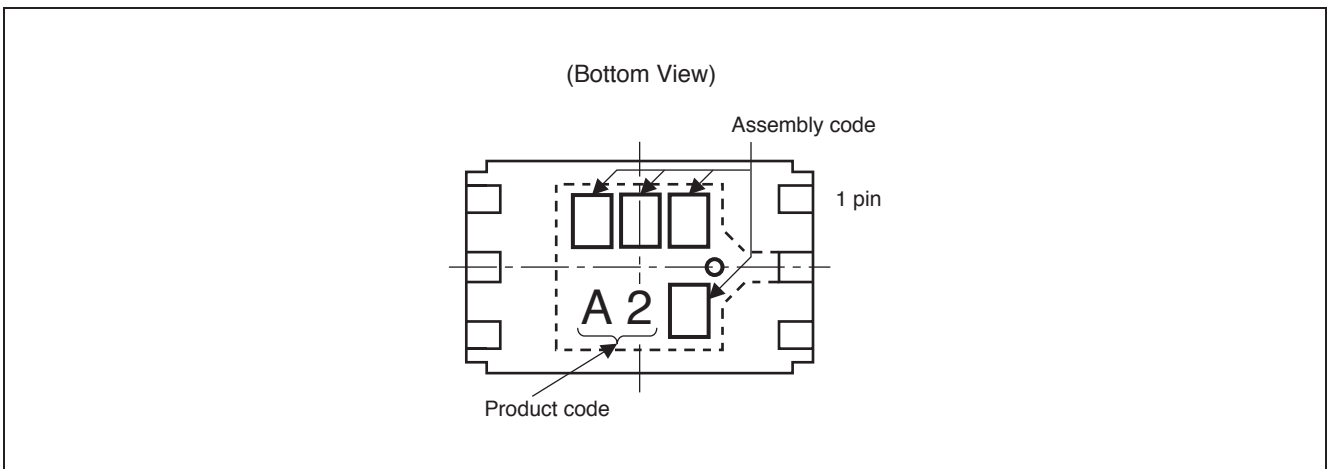
Remark

1. Connect all the NC terminals to GND or V_{CC}.
2. The bypass capacitor between V_{CC} and GND is to be mounted within 20 mm of the package body.

BLOCK DIAGRAM



MARKING EXAMPLE



ABSOLUTE MAXIMUM RATINGS ($T_A = 25^\circ\text{C}$, unless otherwise specified)

Parameter	Symbol	Ratings	Unit
Supply Voltage	V_{CC}	6	V
Light Current	I_O	5	mA
Power Dissipation *1	P_D	135	mW
Operating Temperature	T_{opt}	-30 to +85	$^\circ\text{C}$
Storage Temperature	T_{stg}	-40 to +100	$^\circ\text{C}$

Note: *1. Mounted on glass epoxy board (18 mm × 13 mm × t0.8 mm)

RECOMMENDED OPERATING CONDITIONS

Parameter	Symbol	MIN.	TYP.	MAX.	Unit
Supply Voltage	V_{CC}	1.8	3.0	5.5	V

ELECTRO-OPTICAL CHARACTERISTICS ($T_A = 25^\circ\text{C}$, $V_{CC} = 3.0\text{ V}$, unless otherwise specified)

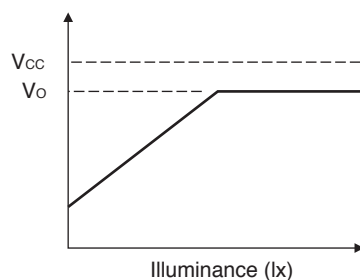
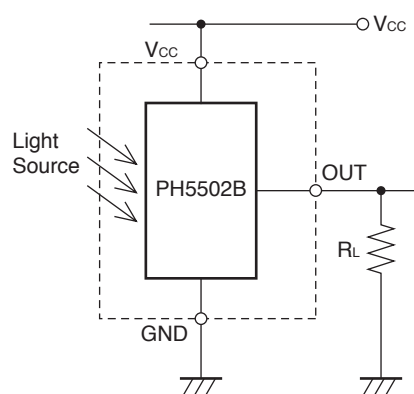
Parameter	Symbol	Conditions	MIN.	TYP.	MAX.	Unit
Supply Current *1	I_{CC}	$E_V = 100\text{ lx}$ *2	–	260	–	μA
Peak Sensitivity Wavelength	λ_p	–	–	555	–	nm
Light Current *1	I_{O0}	$E_V = 0\text{ lx}$	–	–	0.1	μA
	I_{O1}	$E_V = 10\text{ lx}$ *2	–	23	–	μA
	I_{O2}	$E_V = 100\text{ lx}$ *3	–	330	–	μA
	I_{O3}	$E_V = 100\text{ lx}$ *2	195	230	265	μA
Saturation Output Voltage *4	V_O	$E_V = 100\text{ lx}$, $R_L = 150\text{ k}\Omega$ *2	2.6	2.9	–	V
Switching Time *5	Rise Time	$R_L = 5\text{ k}\Omega$ *6	–	200	–	μs
	Fall Time		–	250	–	μs
	Delay Time		–	400	–	μs
	Storage Time		–	10	–	μs

Note: *1 Measured under load resistance conditions of an output current unsaturated

*2 Fluorescent light

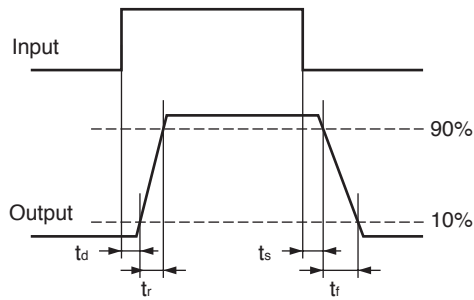
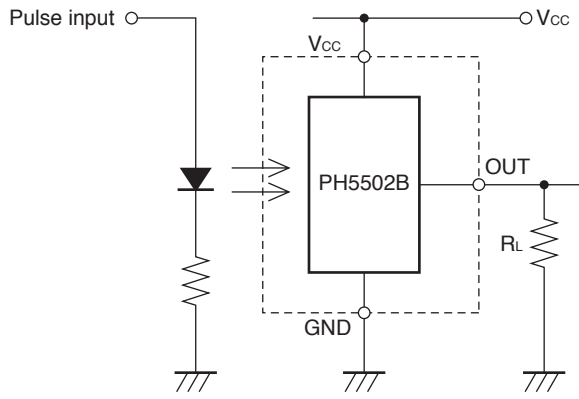
*3 Incandescent light

*4 Saturation output voltage measurement method:



PH5502B2NA1-E4

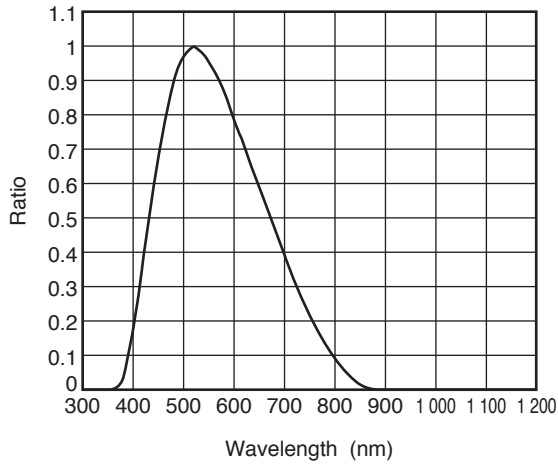
*5 Switching Time



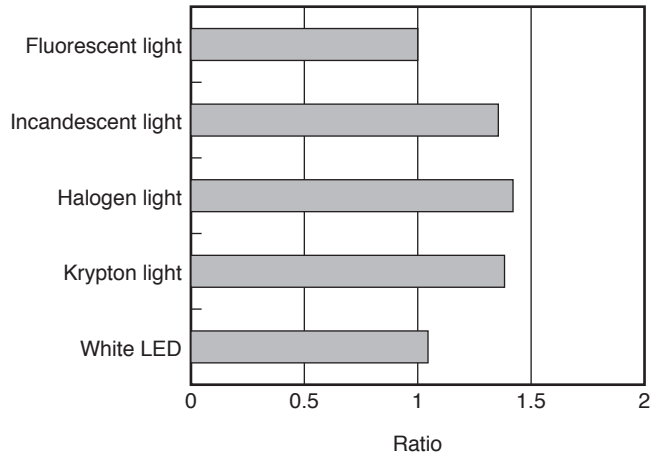
*6 White LED

TYPICAL CHARACTERISTICS ($T_A = 25^\circ\text{C}$, $V_{CC} = 3.0\text{ V}$, unless otherwise specified)

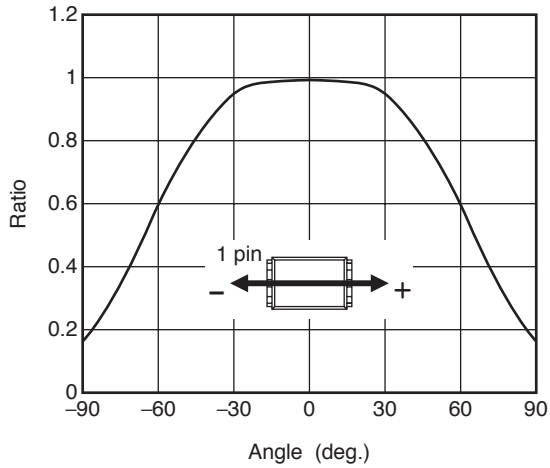
SPECTRAL SENSITIVITY CHARACTERISTICS



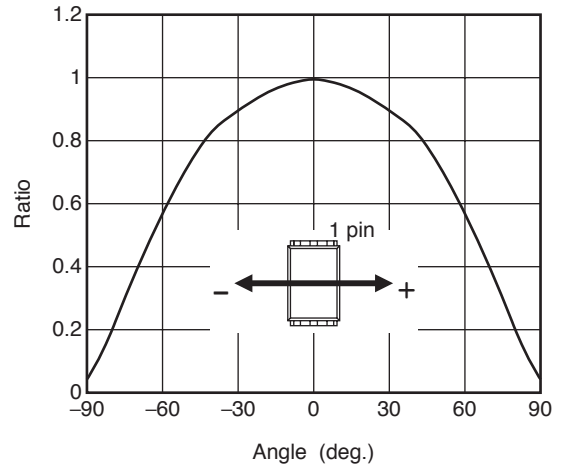
LIGHT SOURCE SENSITIVITY VARIATION



DIRECTIONAL CHARACTERISTICS 1

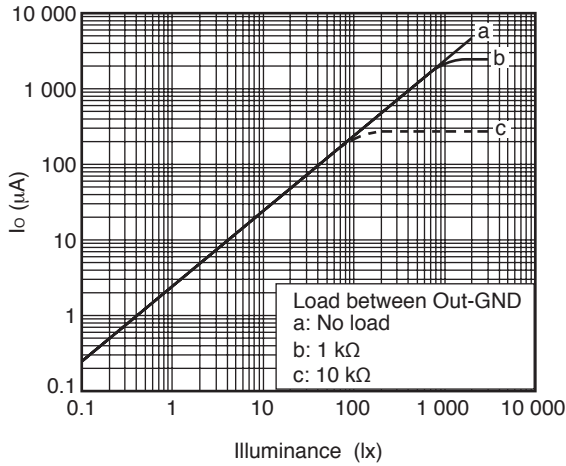


DIRECTIONAL CHARACTERISTICS 2

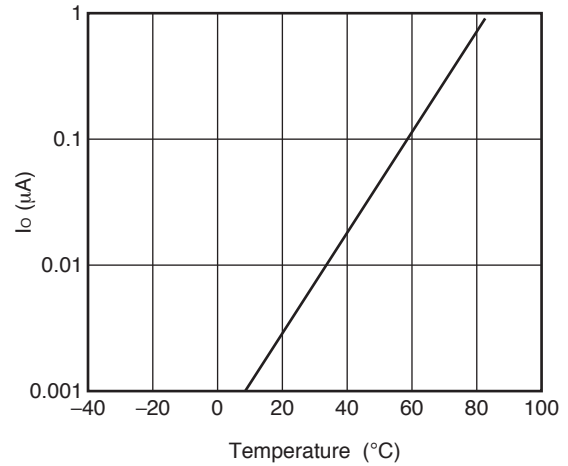


Remark The graphs indicate nominal characteristics.

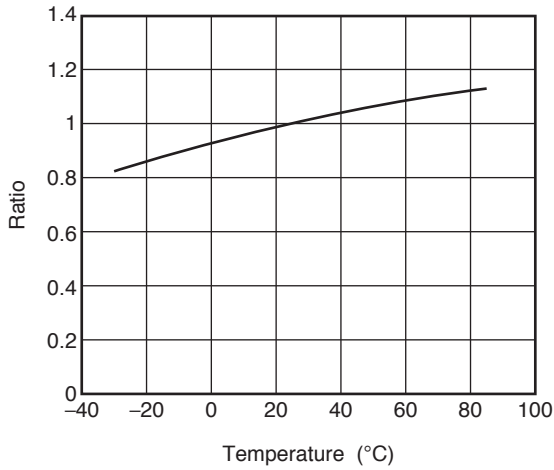
LIGHT CURRENT VS. ILLUMINANCE



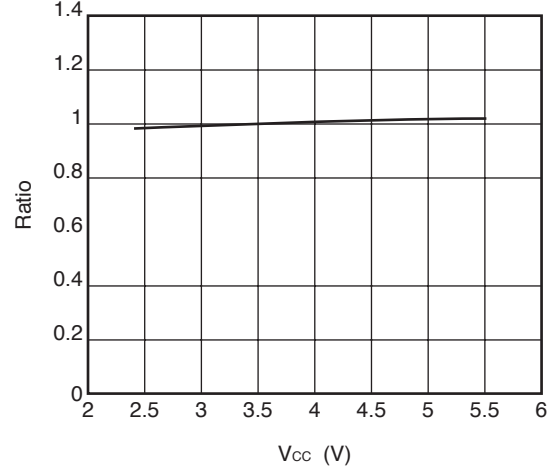
TEMPERATURE DEPENDENCY OF LIGHT CURRENT AT 0 lx



TEMPERATURE DEPENDENCY OF LIGHT CURRENT AT 100 lx (NORMALIZED AT 25°C)

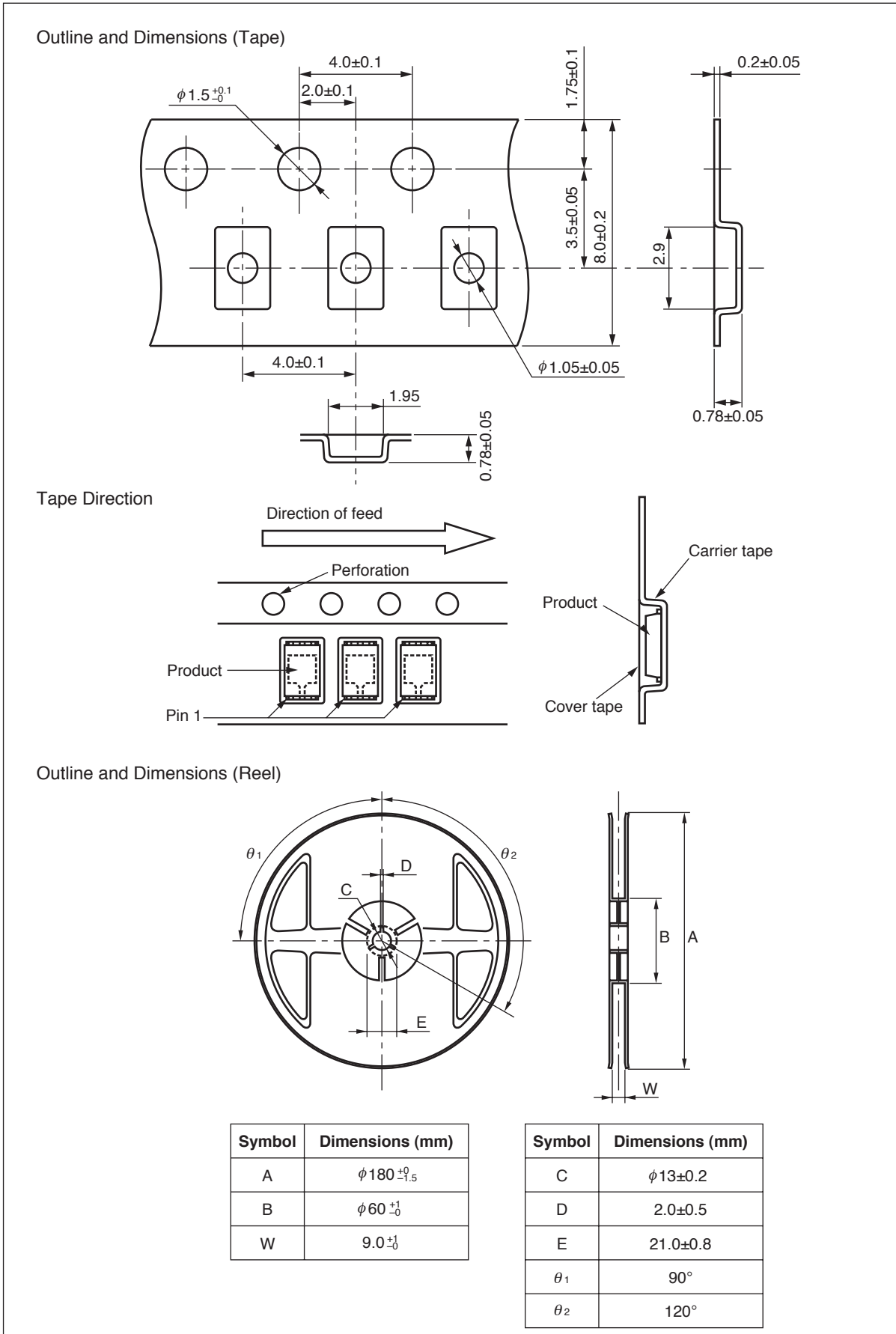


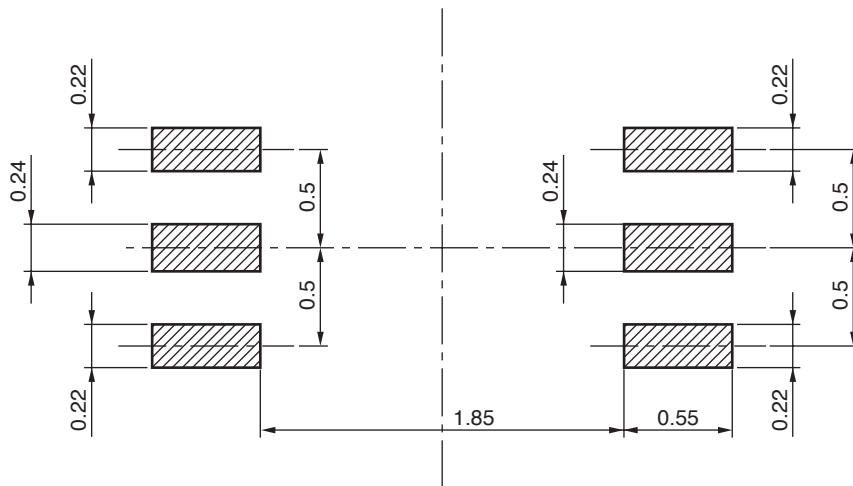
VCC DEPENDENCY OF LIGHT CURRENT AT 100 lx (NORMALIZED AT VCC = 3 V)



Remark The graphs indicate nominal characteristics.

TAPING SPECIFICATIONS (UNIT: mm)



RECOMMENDED MOUNT PAD DIMENSIONS (Unit: mm)

Remark All dimensions in this figure must be evaluated before use.

NOTES ON HANDLING

1. Recommended reflow soldering conditions

(including infrared reflow, convection reflow, and infrared + convection reflow)

- (1) This product is dry-packed with desiccant in order to avoid moisture absorption.
- (2) After breaking the seal, reflow soldering must be done within 168 hours under the recommended temperature profile shown below.
- (3) If more than 168 hours have passed after breaking the seal, the baking process must be done by using a tape and reel.

Baking conditions: Once, with tape and reel, $60\pm 5^{\circ}\text{C}$, 10 to 24 hours

After the baking process, this product must be stored under conditions of 30°C or below, 70% RH or below, and reflow soldering must be done within 168 hours.

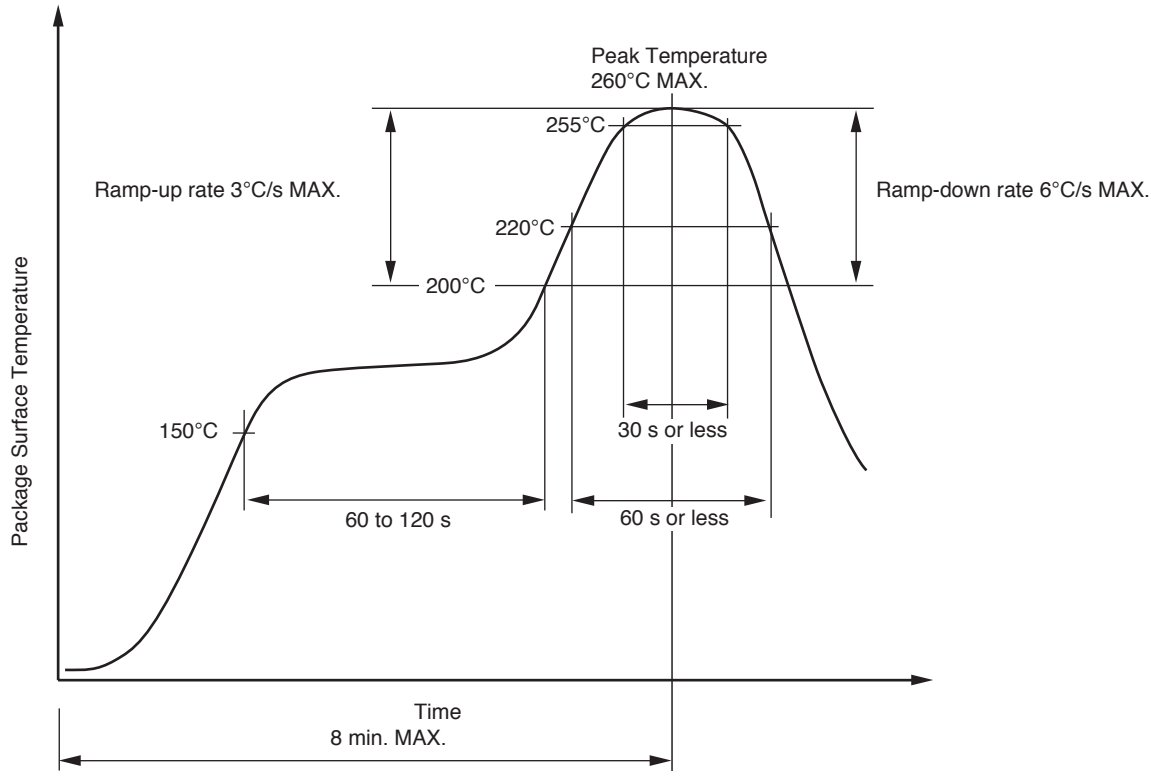
<Storage conditions after breaking seal>

- Storage conditions : 30°C or below, 70% RH or below
- Maximum storage period after breaking seal : 168 hours (Second reflow soldering must be completed within 168 hours.)

<Reflow soldering conditions>

- Peak reflow temperature : 260°C or below (Package surface temperature)
- Maximum number of reflows : 2
- No repair by hand soldering
- Maximum chlorine content of rosin flux (percentage mass) : 0.2% or less

Recommended Temperature Profile of Reflow



Revision History	PH5502B2NA1-E4 Data Sheet
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Rev.	Date	Description	
		Page	Summary
1.00	Oct 05, 2011	-	First edition issued

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