

# PH5503A2NA1

## Data Sheet

R08DS0055EJ0100

Rev.1.00

Dec 13, 2011

Ambient Illuminance Sensor

### DESCRIPTION

The PH5503A2NA1 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

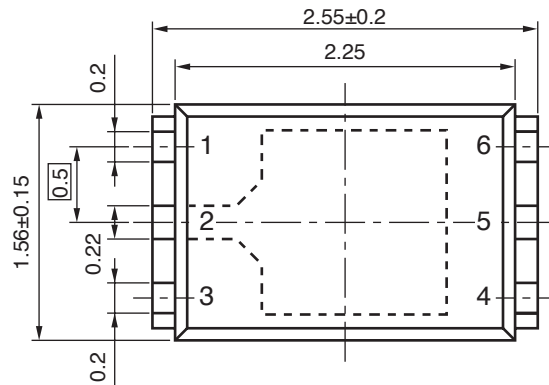
- Small and thin SON package                      2.55 x 1.56 x 0.55 mm
- Spectral characteristics close to human eye sensitivity  
Peak sensitivity wavelength                      555 nm TYP.
- Output characteristics proportional to illuminance
- Output light current                                      60  $\mu$ A TYP.@100 lx (Fluorescent light)
- Reduced variation of output current among light sources
- 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.

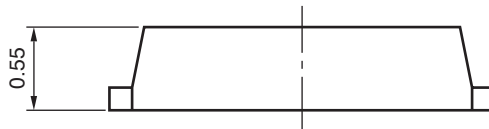
## PACKAGE DIMENSIONS (UNIT: mm)

### TOP VIEW

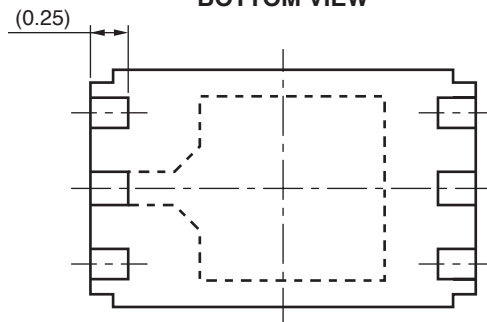


**Remark** Pin 1 is distinguishable by the shape of the lead frame.

### SIDE VIEW



### BOTTOM VIEW



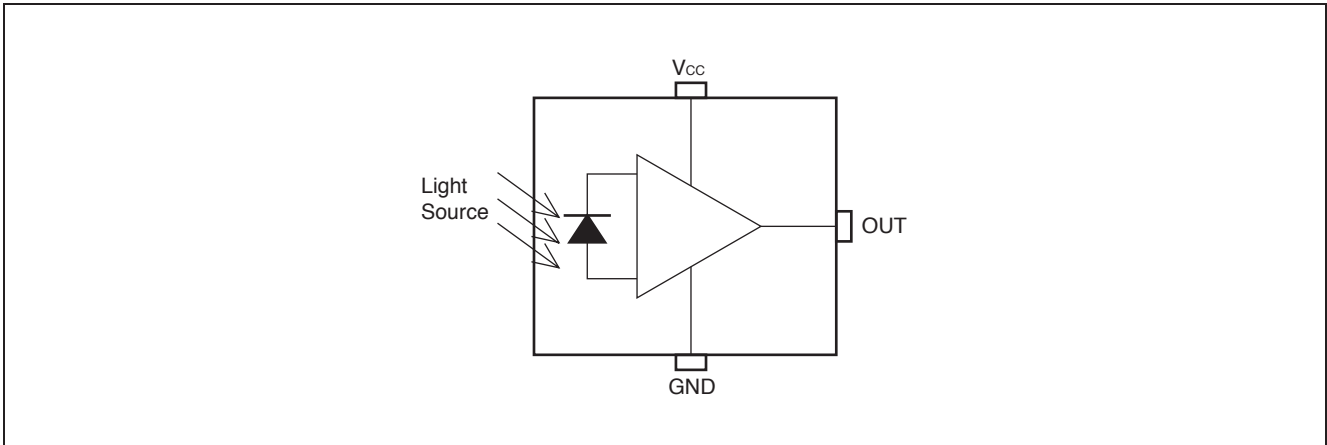
**Remark** ( ) indicates nominal dimensions.

Pin No.	Terminal
1	OUT
2	GND
3	V <sub>CC</sub>
4	NC
5	NC
6	NC

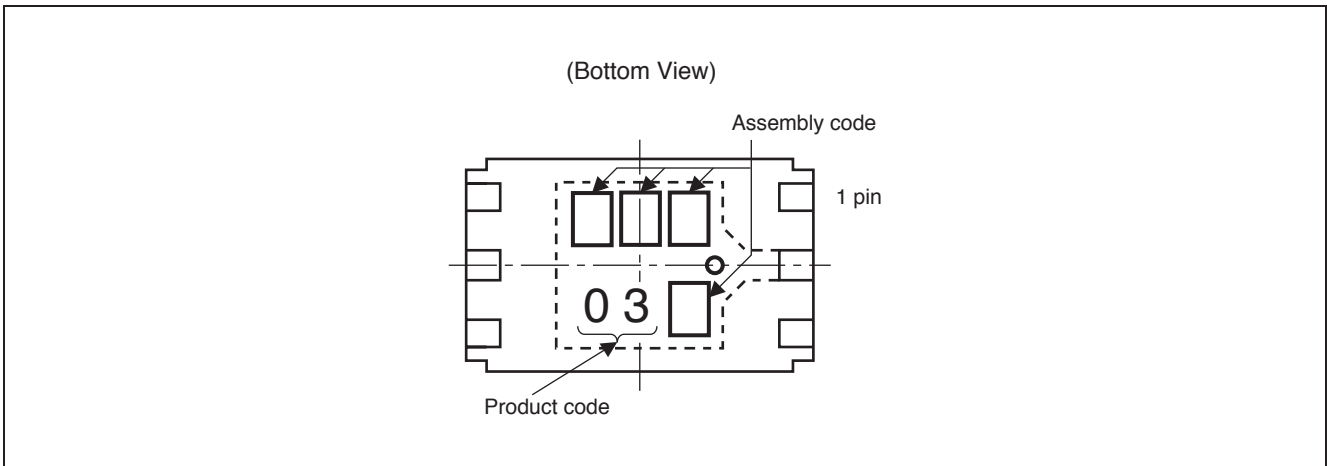
**Remark**

1. Connect all the NC terminals to GND or V<sub>CC</sub>.
2. The bypass capacitor between V<sub>CC</sub> and GND is to be mounted within 20 mm of the package body.

**BLOCK DIAGRAM**



**MARKING EXAMPLE**



**ORDERING INFORMATION**

Part Number	Order Number	Packing Style
PH5503A2NA1	PH5503A2NA1-E4	Embossed Tape 3 000 pcs/reel

## 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

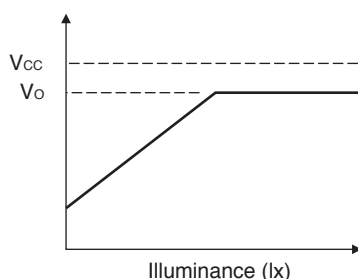
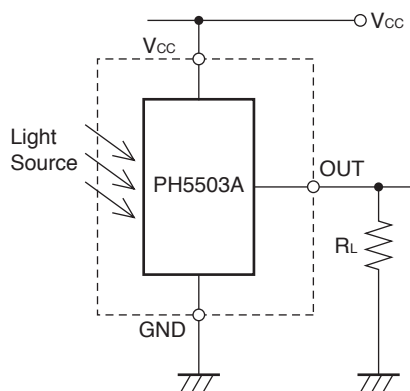
## ELECTRO-OPTICAL CHARACTERISTICS ( $T_A = 25^\circ\text{C}$ , $V_{CC} = 3.0\text{ V}$ , unless otherwise specified)

Parameter	Symbol	Conditions	MIN.	TYP.	MAX.	Unit
Supply Current *1	$I_{CC}$	$E_V = 100\text{ lx}$ *2	-	68	-	$\mu\text{A}$
Peak Sensitivity Wavelength	$\lambda_p$	-	-	555	-	nm
Light Current *1	$I_{O0}$	$E_V = 0\text{ lx}$	-	-	0.1	$\mu\text{A}$
	$I_{O1}$	$E_V = 100\text{ lx}$ *2	48	60	72	$\mu\text{A}$
Sensitivity Ratio of Fluorescent/Incandescent	-	$E_V = 100\text{ lx}$	-	1	-	Multiple
Saturation Output Voltage *3	$V_O$	$E_V = 100\text{ lx}$ , $R_L = 150\text{ k}\Omega$ *2	2.6	2.9	-	V
Switching Time *4	Rise Time	$R_L = 5\text{ k}\Omega$ *5	-	50	-	$\mu\text{s}$
	Fall Time		-	80	-	$\mu\text{s}$
	Delay Time		-	160	-	$\mu\text{s}$
	Storage Time		-	4	-	$\mu\text{s}$

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

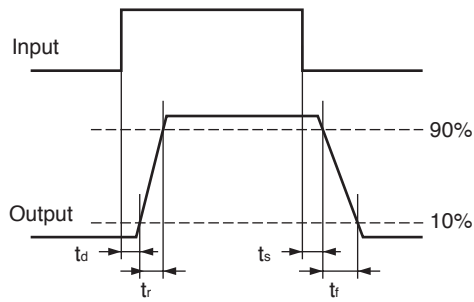
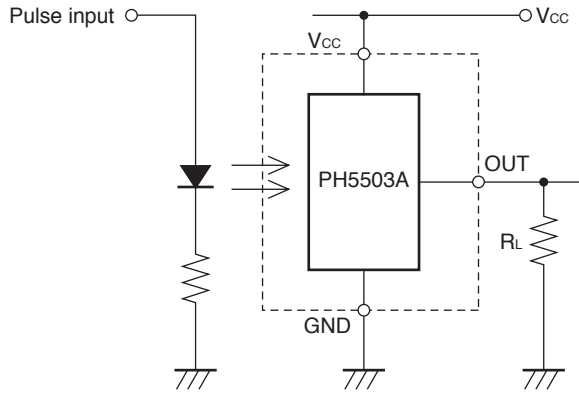
\*2 Fluorescent light

\*3 Saturation output voltage measurement method:



**PH5503A2NA1**

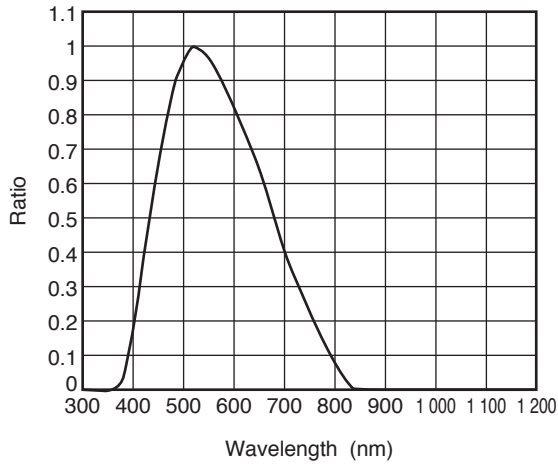
\*4 Switching Time



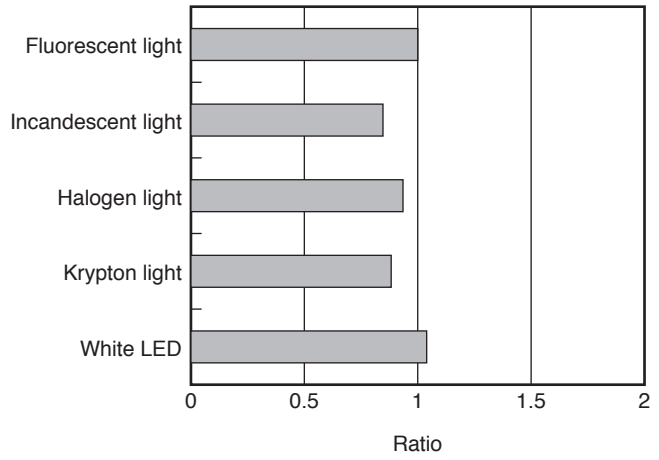
\*5 White LED

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

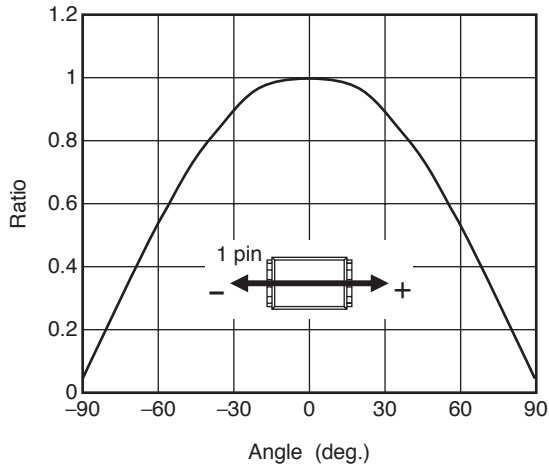
**SPECTRAL SENSITIVITY CHARACTERISTICS**



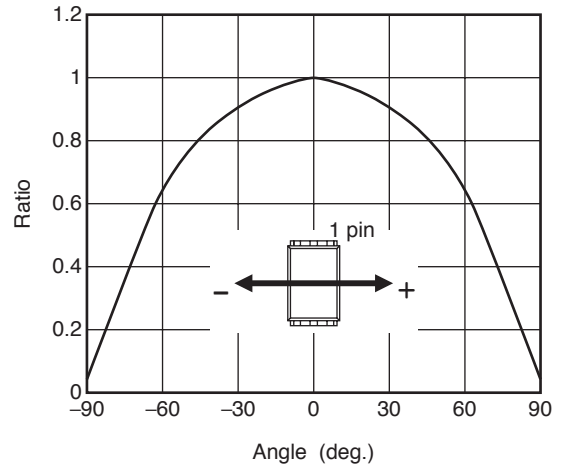
**LIGHT SOURCE SENSITIVITY VARIATION**



**DIRECTIONAL CHARACTERISTICS 1**

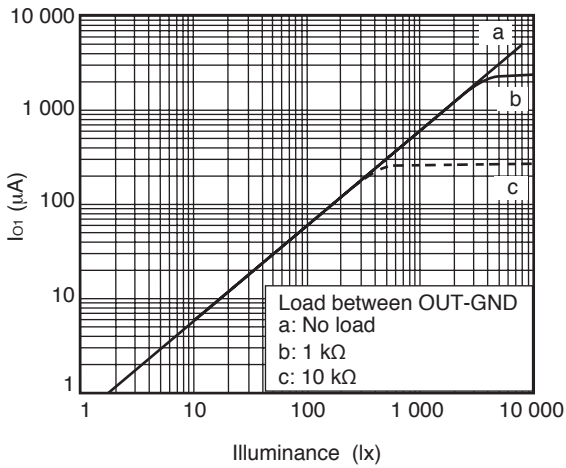


**DIRECTIONAL CHARACTERISTICS 2**

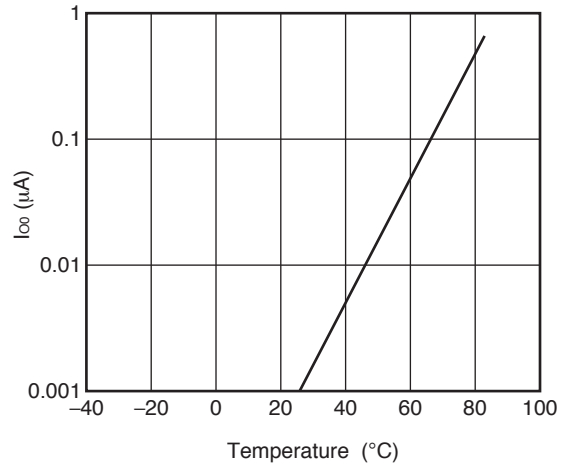


**Remark** The graphs indicate nominal characteristics.

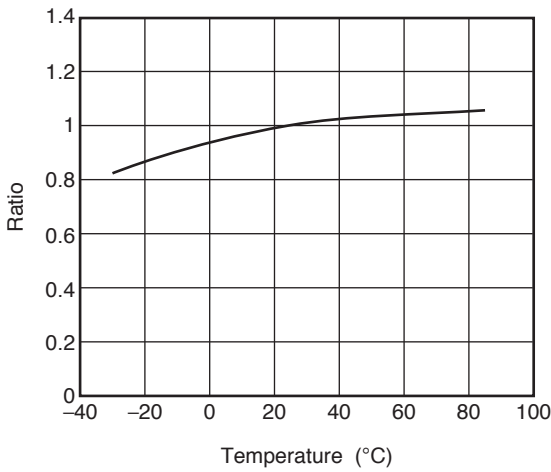
LIGHT CURRENT VS. ILLUMINANCE



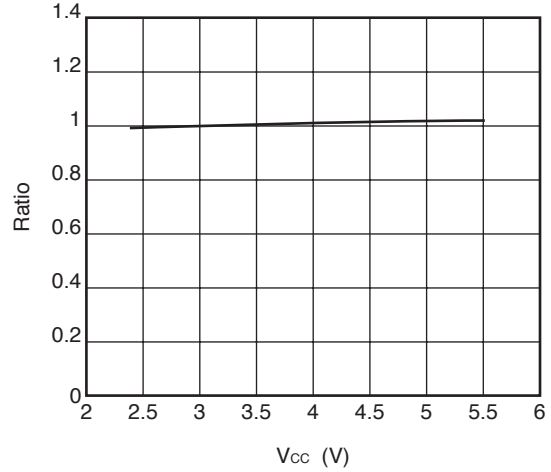
TEMPERATURE DEPENDENCY OF LIGHT CURRENT AT 0 lx



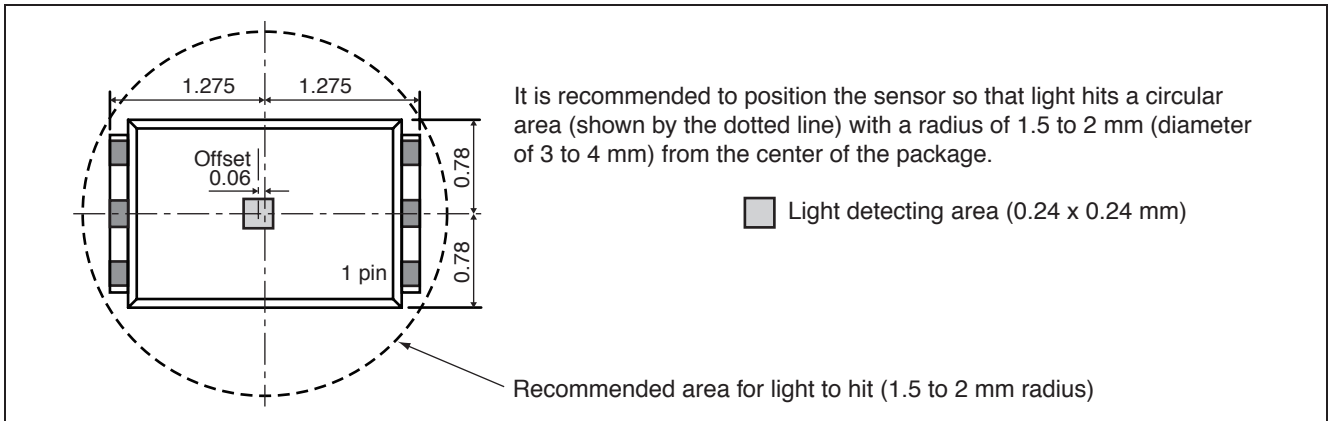
TEMPERATURE DEPENDENCY OF LIGHT CURRENT AT 100 lx (NORMALIZED AT 25°C)



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

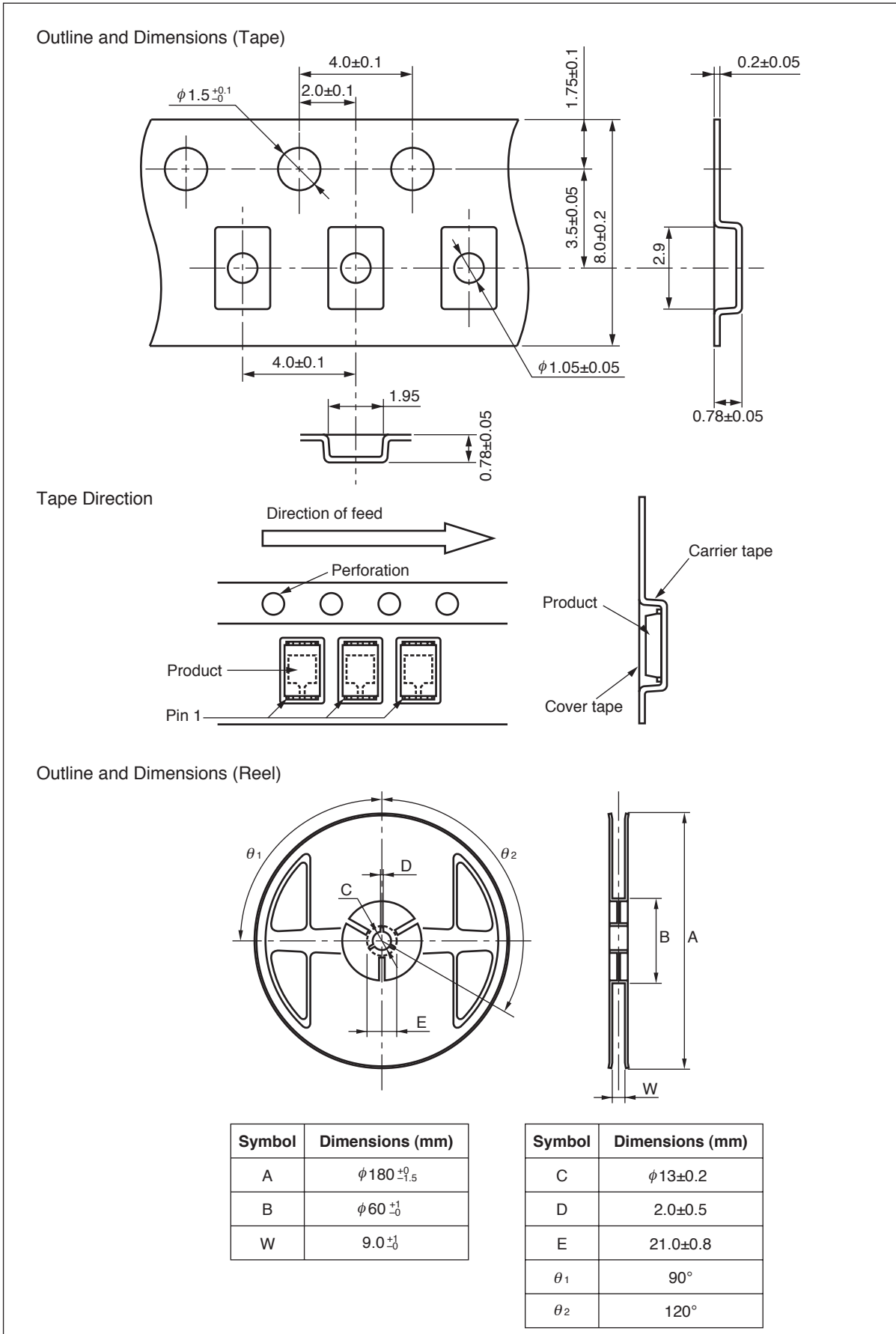


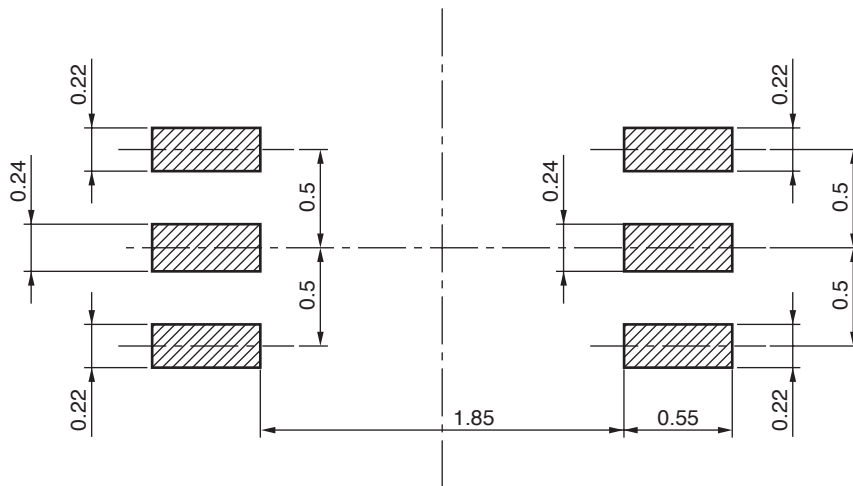
**Remark** The graphs indicate nominal characteristics.

**RECOMMENDED OPTICAL LAYOUT (UNIT: mm)**



**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  $30^{\circ}\text{C}$  or below, 70% RH or below, and reflow soldering must be done within 168 hours.

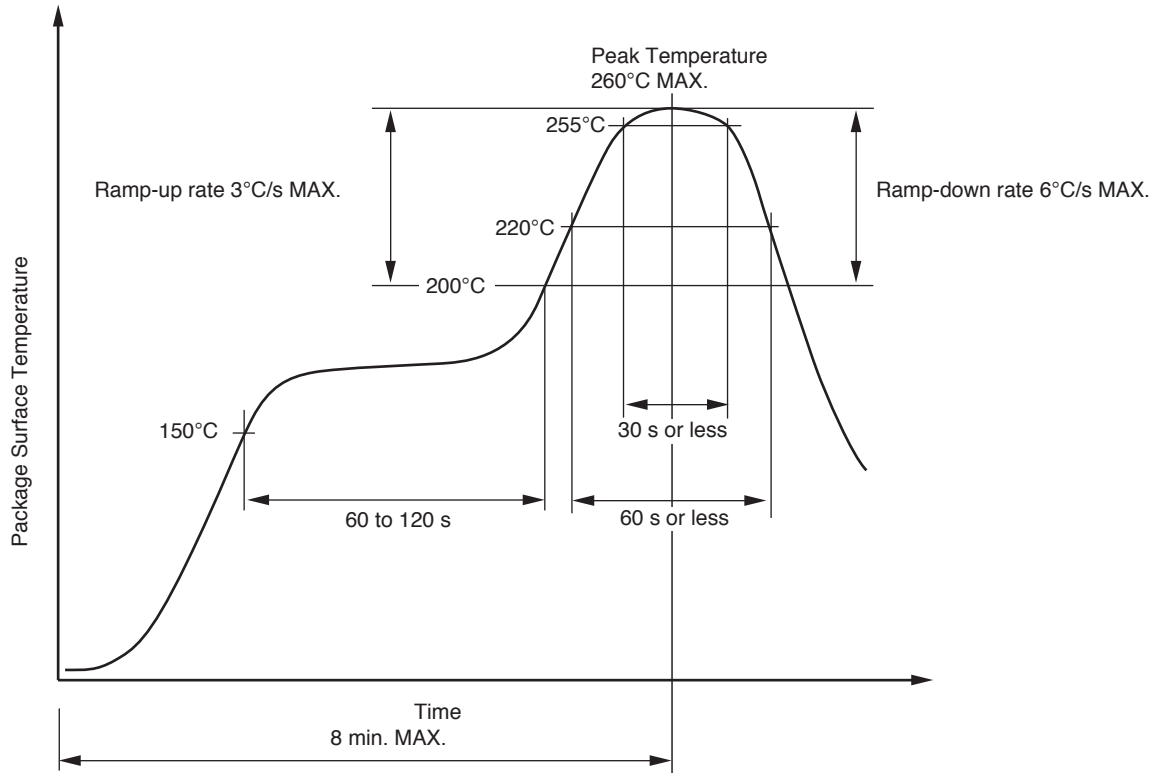
< Storage conditions after breaking seal >

- Storage conditions :  $30^{\circ}\text{C}$  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 :  $260^{\circ}\text{C}$  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



<b>Revision History</b>	<b>PH5503A2NA1 Data Sheet</b>
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<b>Rev.</b>	<b>Date</b>	<b>Description</b>	
		<b>Page</b>	<b>Summary</b>
1.00	Dec 13, 2011	–	First edition issued

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