

# PH5504A2NA1

R08DS0067EJ0100

Rev.1.00

Nov 05, 2012

Ambient Light Sensor

## DESCRIPTION

The PH5504A2NA1 is an ambient light 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 PH5504A2NA1 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

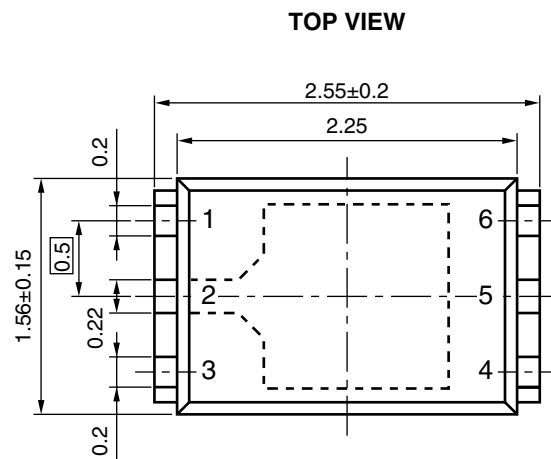
- Small and thin SON package                      2.55 x 1.56 x 0.55 mm
- Spectral characteristics close to human eye sensitivity  
Peak sensitivity wavelength                      530 nm TYP.
- The impact of infrared light can be reduced by incorporating infrared light correction circuits.
- Output characteristics proportional to illuminance
- Output light current                                      55  $\mu$ 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

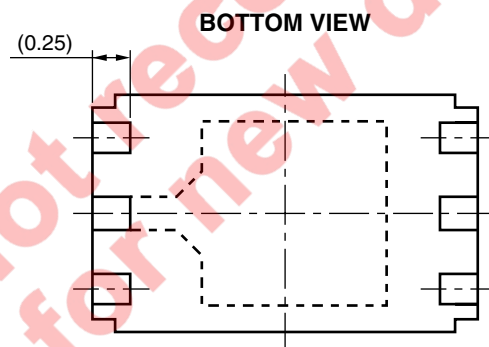
- FPD TV sets, displays
- Mobile phones, smartphones
- Notebook PCs, tablet PCs
- DSCs, DVCs
- FA equipment
- Lighting systems, etc.

Not recommended for new design

## PACKAGE DIMENSIONS (UNIT: mm)



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



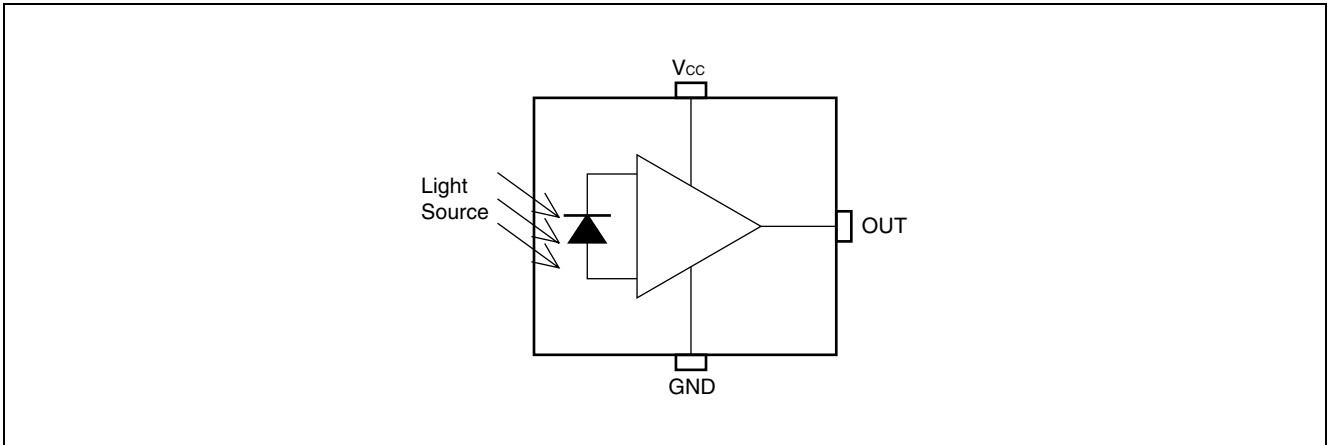
**Remark** ( ) indicates nominal dimensions.

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

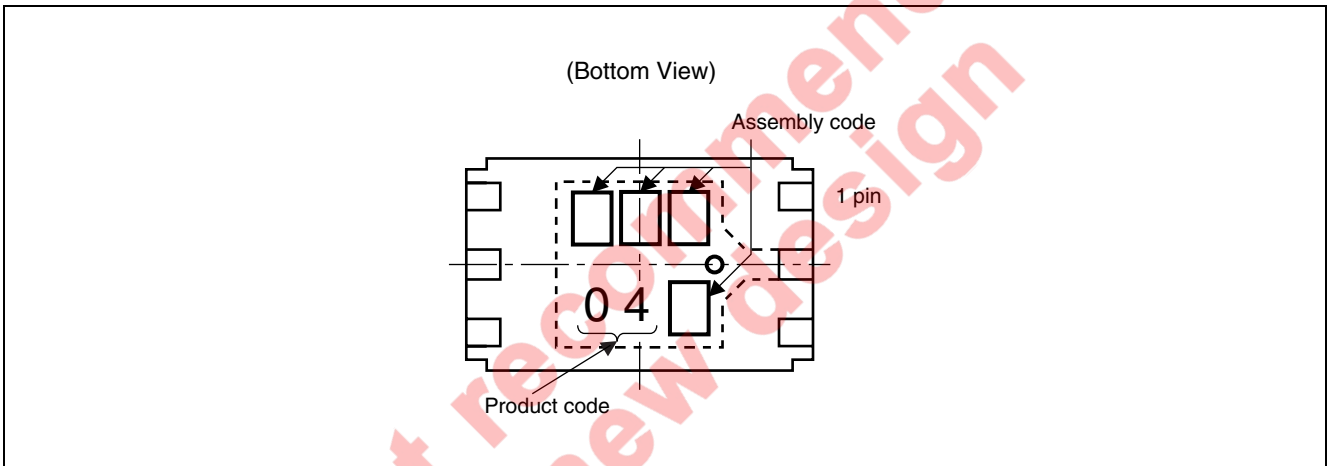
**Remark**

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	Solder Plating Specification	Packing Style
PH5504A2NA1-E4	PH5504A2NA1-E4-Y-A	Pb-Free	Embossed Tape 5 000 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

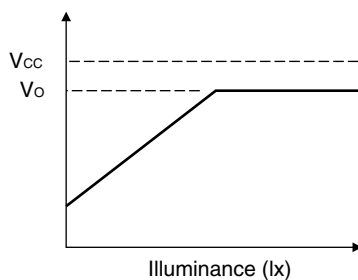
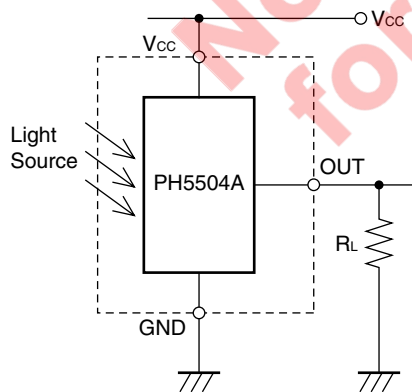
**ELECTRO-OPTICAL CHARACTERISTICS ( $T_A = 25^\circ\text{C}$ ,  $V_{CC} = 3.0\text{ V}$ , unless otherwise specified)**

Parameter	Symbol	Conditions	MIN.	TYP.	MAX.	Unit
Supply Current *1	$I_{CC}$	$E_V = 100\text{ lx}$ *2	–	63	–	$\mu\text{A}$
Peak Sensitivity Wavelength	$\lambda_p$	–	–	530	–	nm
Light Current *1	$I_{O0}$	$E_V = 0\text{ lx}$	–	–	0.2	$\mu\text{A}$
	$I_{O1}$	$E_V = 100\text{ lx}$ *2	44	55	66	$\mu\text{A}$
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	$t_r$	–	80	–	$\mu\text{s}$
	Fall Time	$t_f$	–	140	–	$\mu\text{s}$
	Delay Time	$t_d$	–	250	–	$\mu\text{s}$
	Storage Time	$t_s$	–	5	–	$\mu\text{s}$

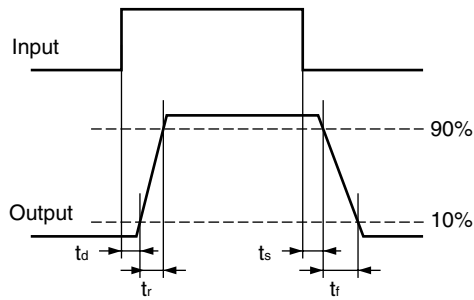
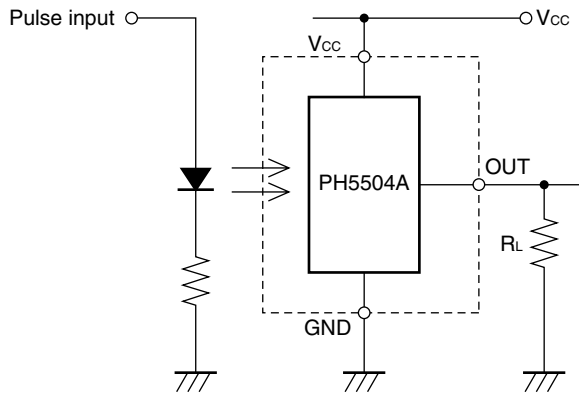
Note: \*1 Measured under load resistance conditions of an output current unsaturated

\*2 Fluorescent light

\*3 Saturation output voltage measurement method:



\*4 Switching Time

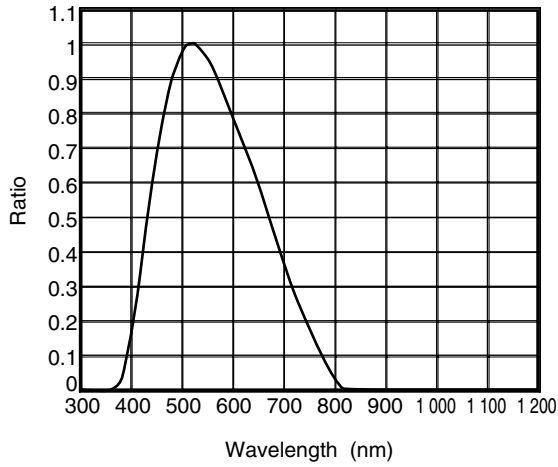


\*5 White LED

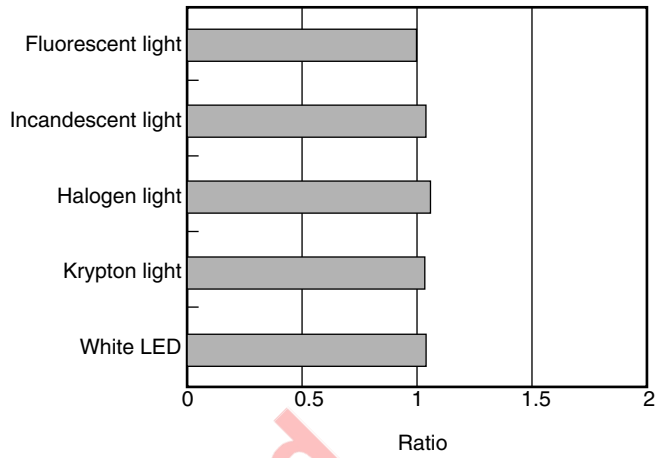
Not recommend  
for new design

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

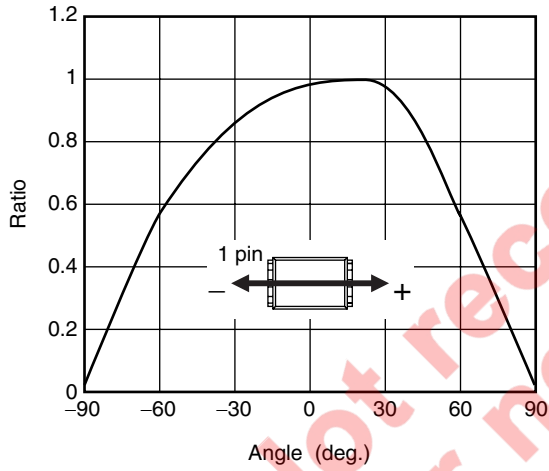
**SPECTRAL SENSITIVITY CHARACTERISTICS**



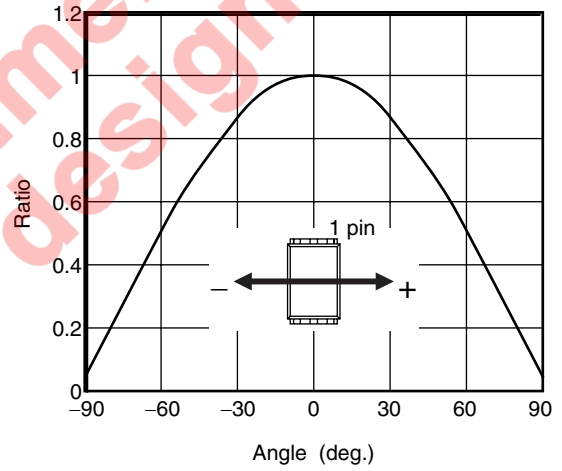
**LIGHT SOURCE SENSITIVITY VARIATION**



**DIRECTIONAL CHARACTERISTICS 1**

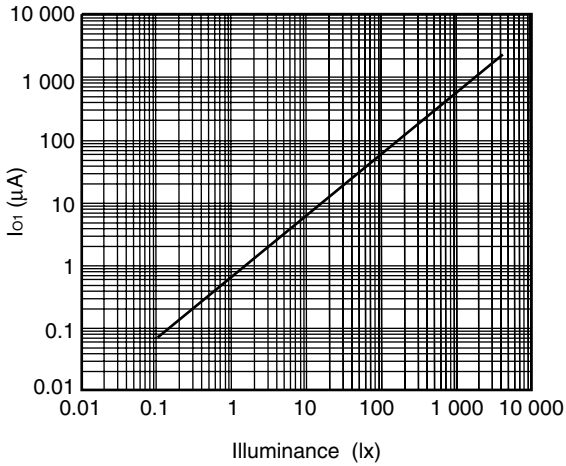


**DIRECTIONAL CHARACTERISTICS 2**

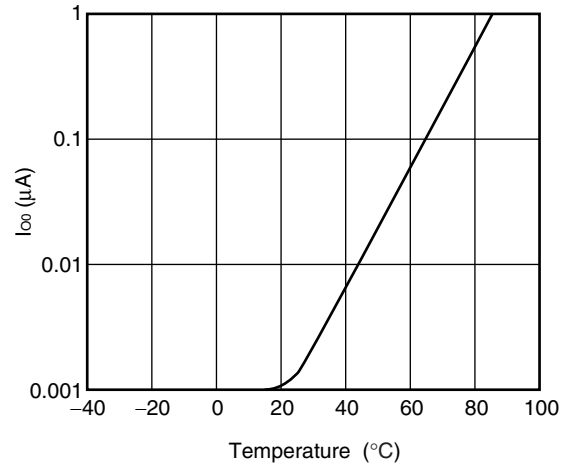


**Remark** The graphs indicate nominal characteristics.

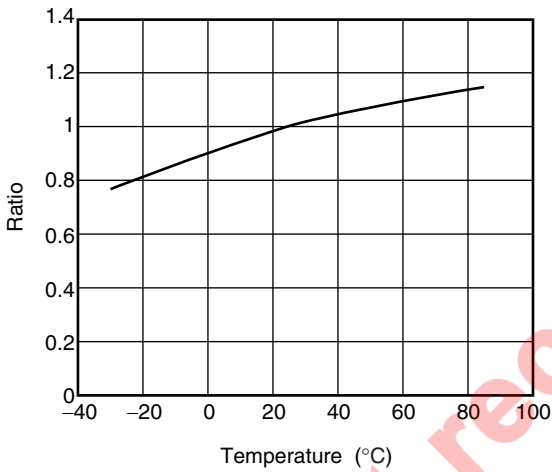
LIGHT CURRENT vs. ILLUMINANCE



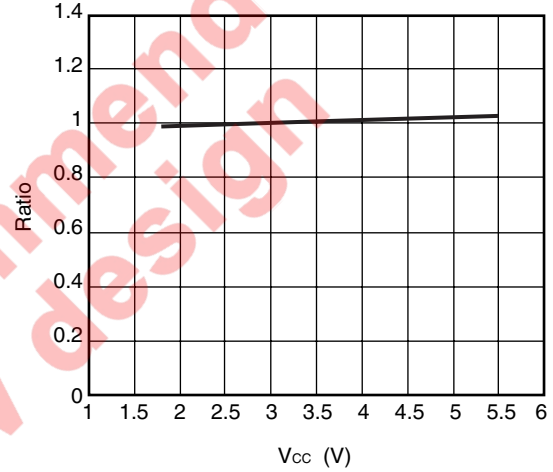
TEMPERATURE DEPENDENCY OF LIGHT CURRENT AT 0 lx



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

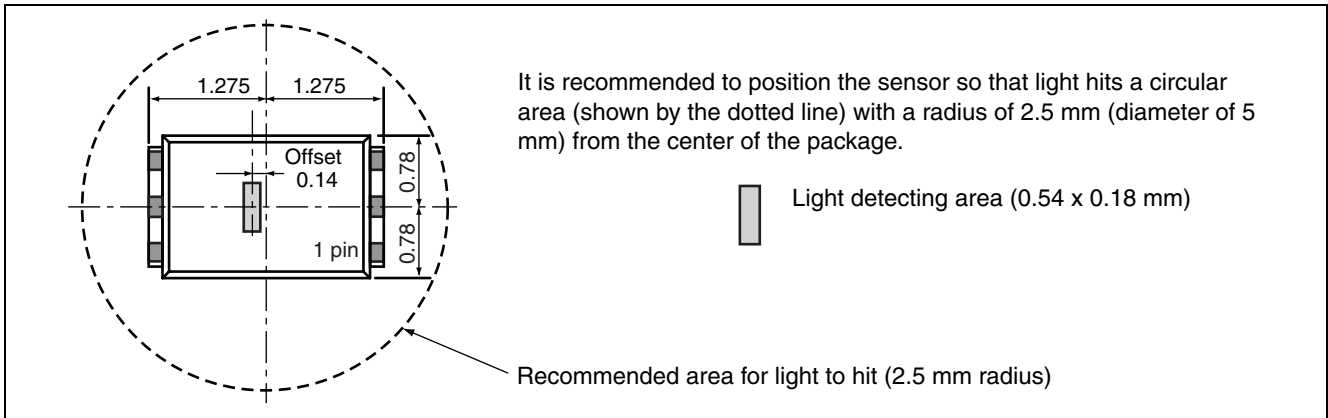


VCC DEPENDENCY OF LIGHT CURRENT AT 100 lx (NORMALIZED AT VCC = 3 V)



**Remark** The graphs indicate nominal characteristics.

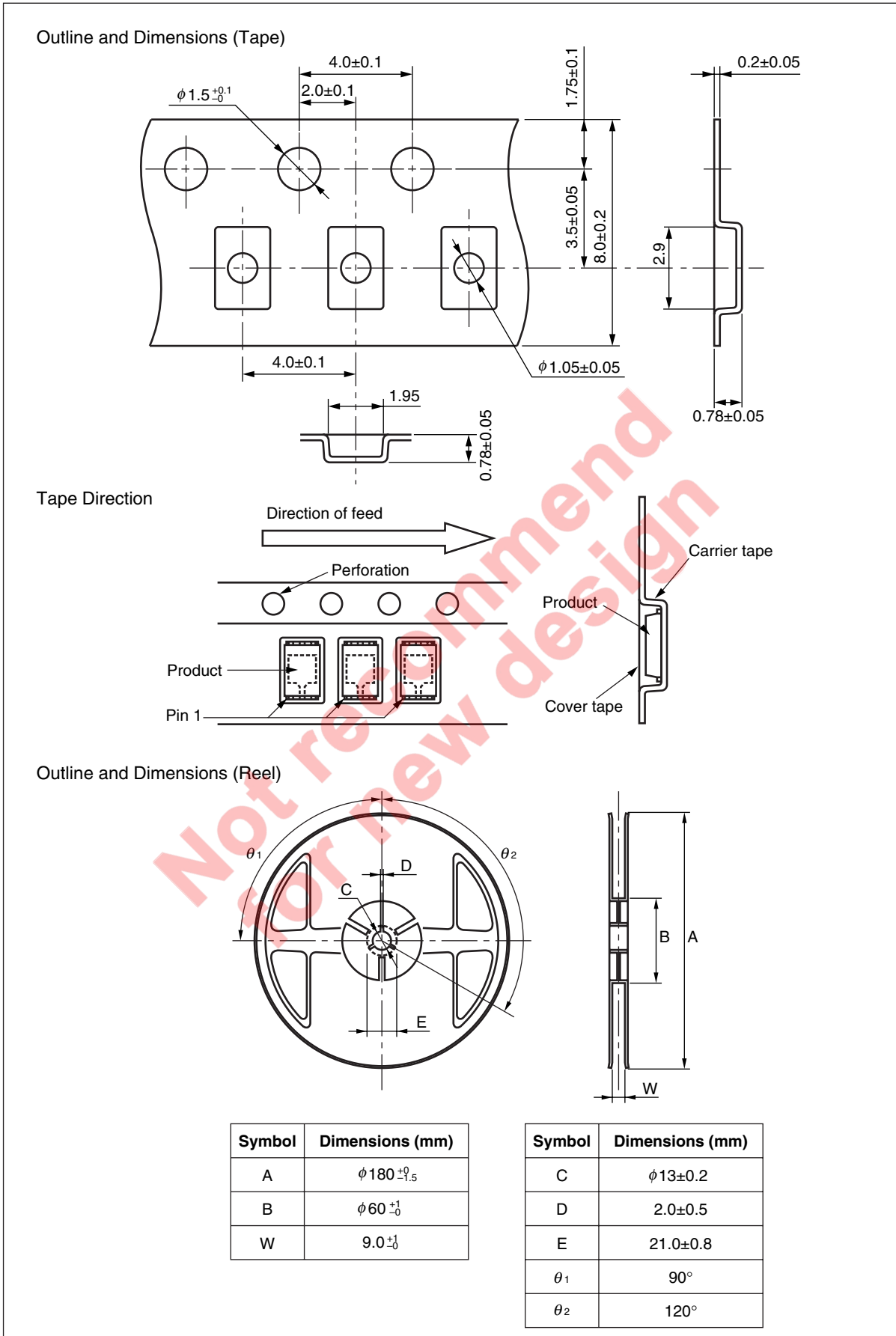
RECOMMENDED OPTICAL LAYOUT (UNIT: mm)



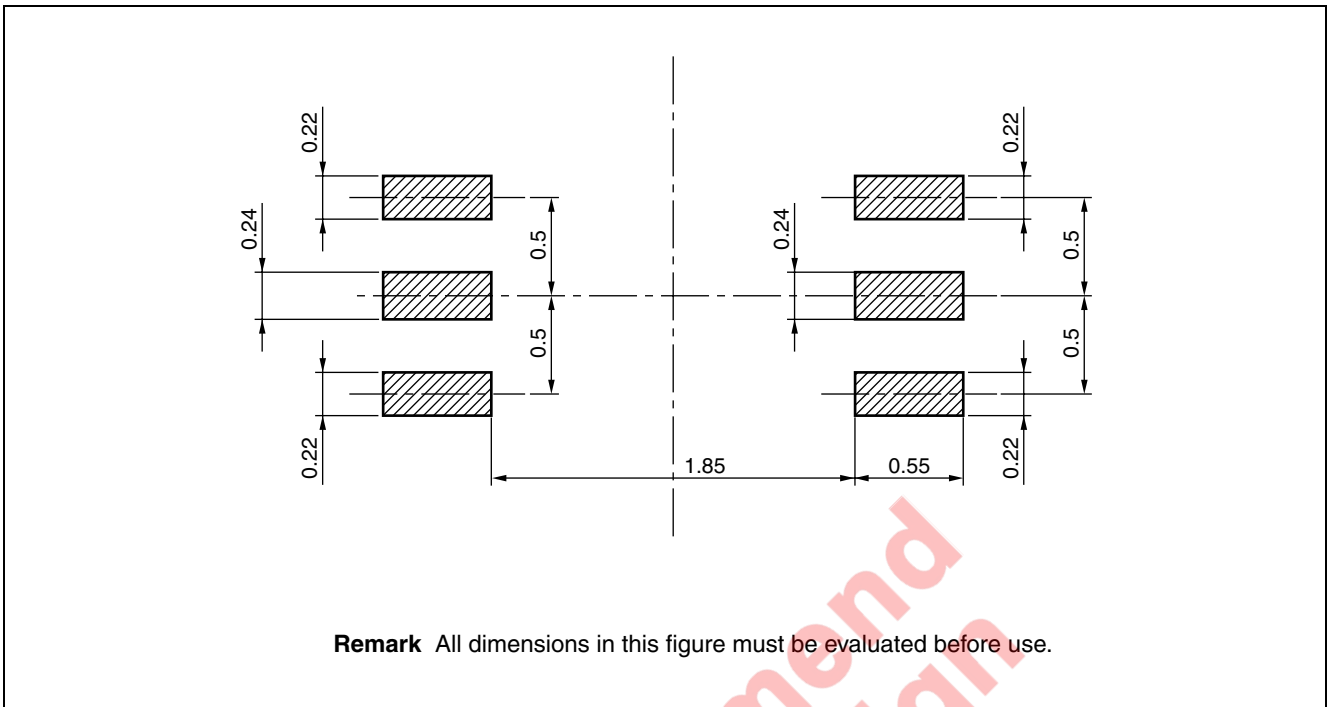
Not recommend  
for new design



TAPING SPECIFICATIONS (UNIT: mm)



RECOMMENDED MOUNT PAD DIMENSIONS (Unit: mm)



## 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.

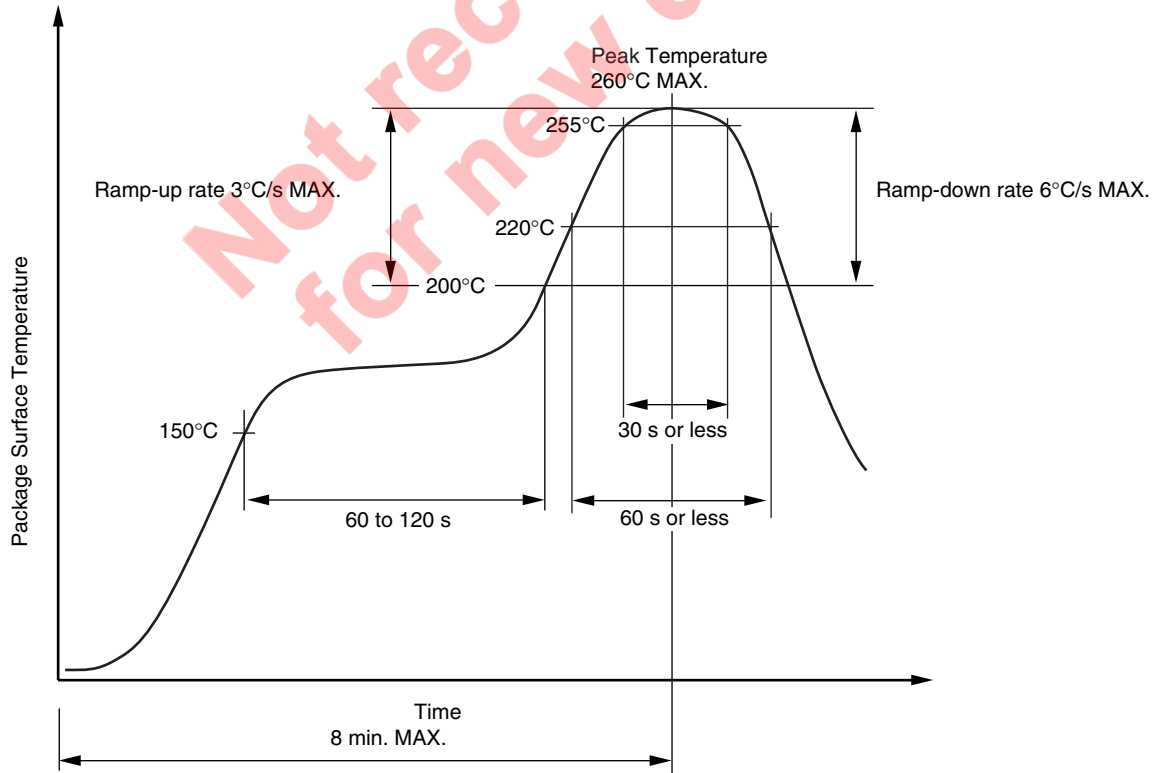
< Storage conditions after breaking seal >

- 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>PH5504A2NA1 Data Sheet</b>
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Rev.	Date	Description	
		Page	Summary
1.00	Nov 05, 2012	-	First edition issued

Not recommend  
for new design

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