

PH5503A2NA1

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.

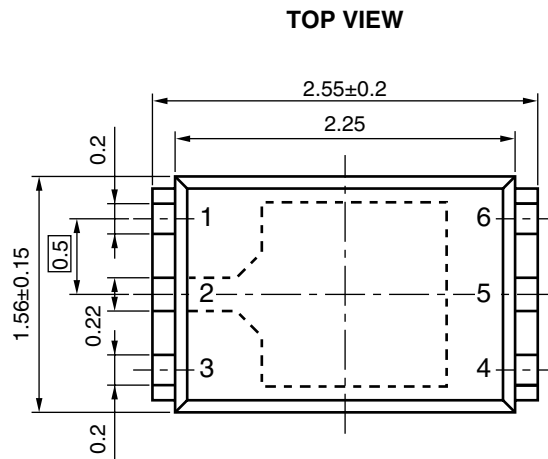
FEATURES

- 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 μ 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

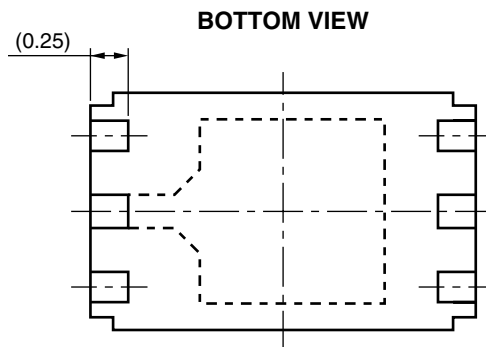
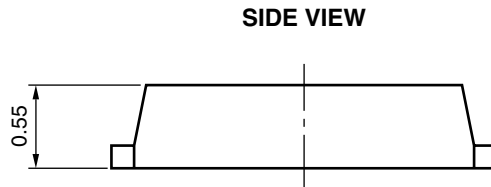
APPLICATIONS

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

PACKAGE DIMENSIONS (UNIT: mm)



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

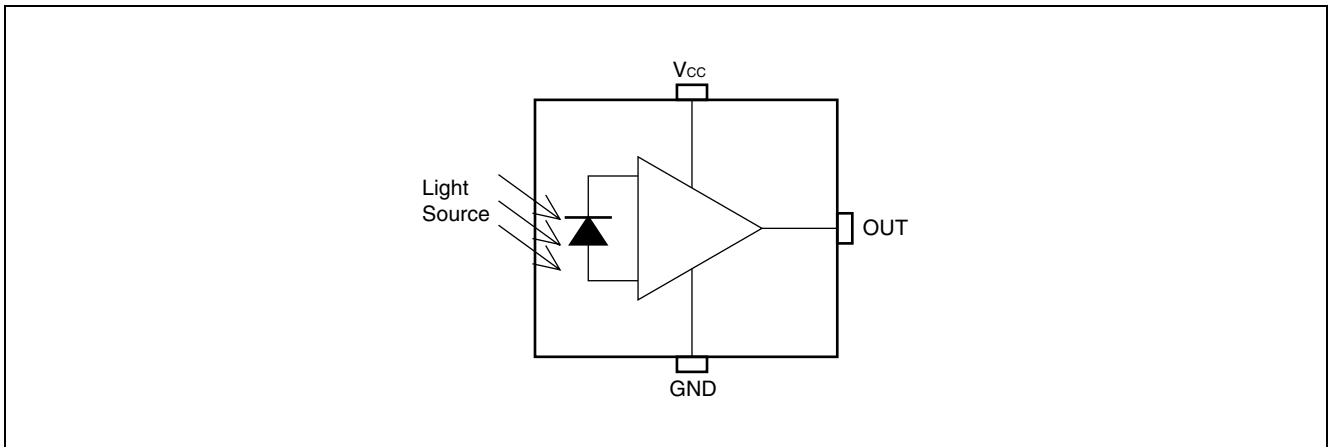


Remark () indicates nominal dimensions.

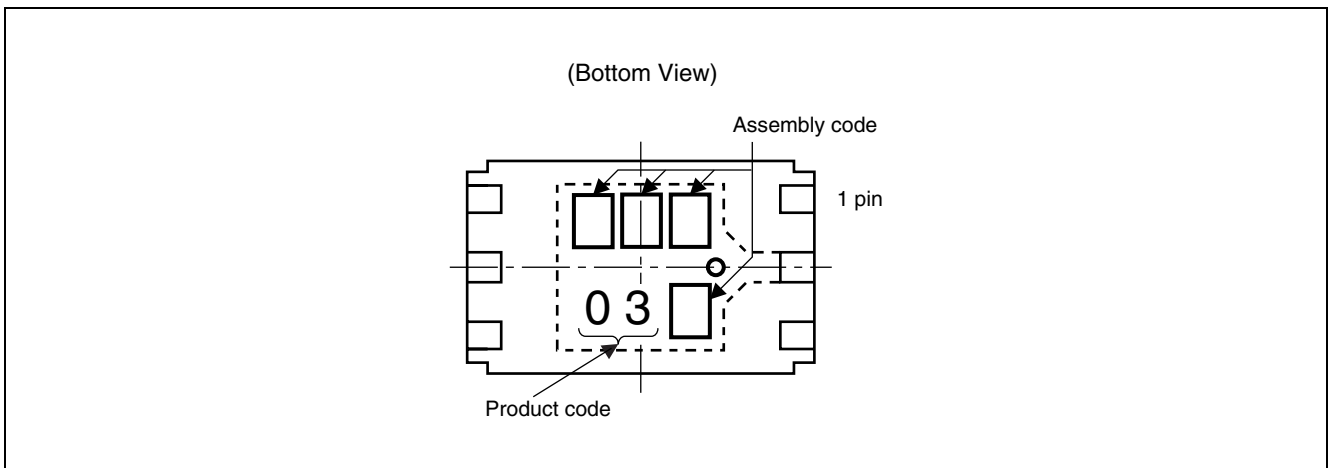
Pin No.	Terminal
1	OUT
2	GND
3	V _{CC}
4	NC
5	NC
6	NC

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



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

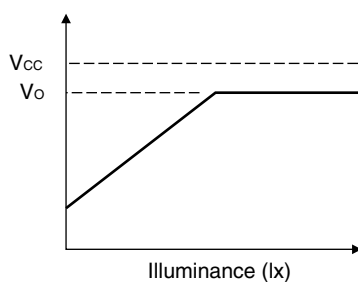
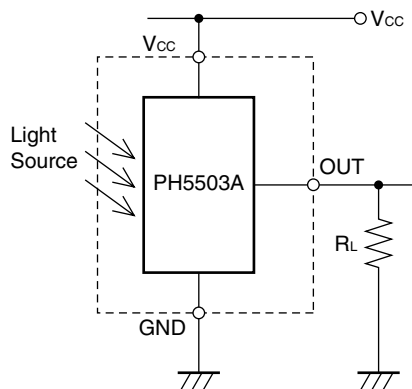
ELECTRO-OPTICAL CHARACTERISTICS ($T_A = 25^\circ\text{C}$, $V_{CC} = 3.0\text{ V}$, unless otherwise specified)

Parameter	Symbol	Conditions	MIN.	TYP.	MAX.	Unit
Supply Current *1	I_{CC}	$E_V = 100\text{ lx}$ *2	–	68	–	μA
Peak Sensitivity Wavelength	λ_p	–	–	555	–	nm
Light Current *1	I_{O0}	$E_V = 0\text{ lx}$	–	–	0.1	μA
	I_{O1}	$E_V = 100\text{ lx}$ *2	48	60	72	μA
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	–	μs
	Fall Time		–	80	–	μs
	Delay Time		–	160	–	μs
	Storage Time		–	4	–	μs

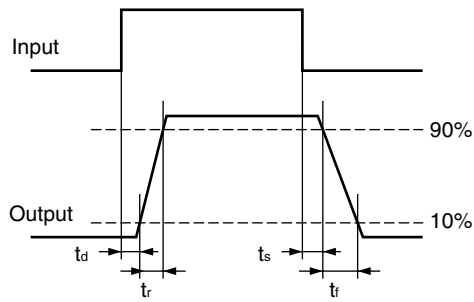
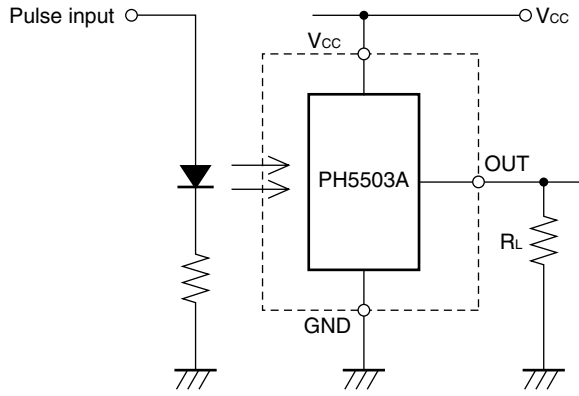
Note: *1 Measured under load resistance conditions of an output current unsaturated

*2 Fluorescent light

*3 Saturation output voltage measurement method:



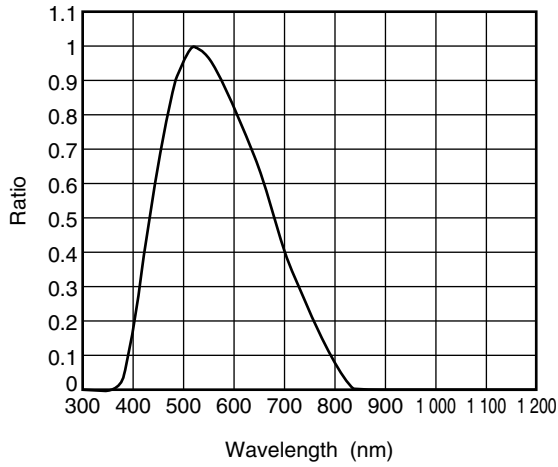
*4 Switching Time



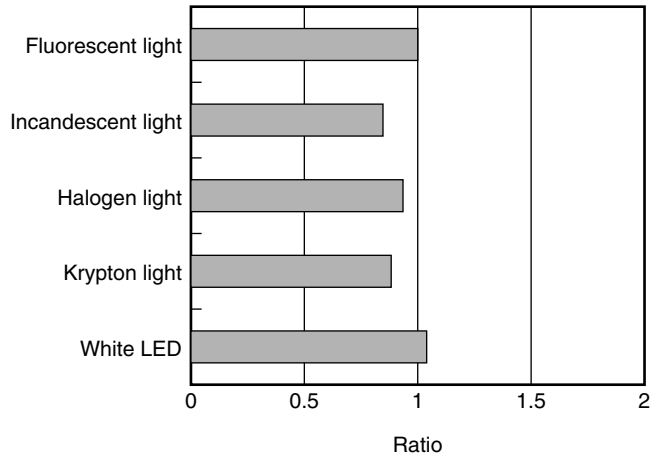
*5 White LED

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

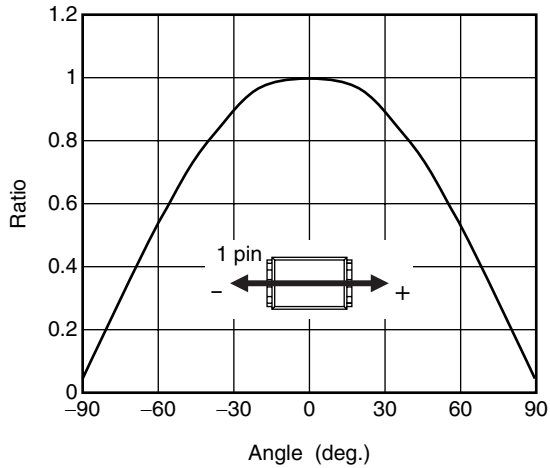
SPECTRAL SENSITIVITY CHARACTERISTICS



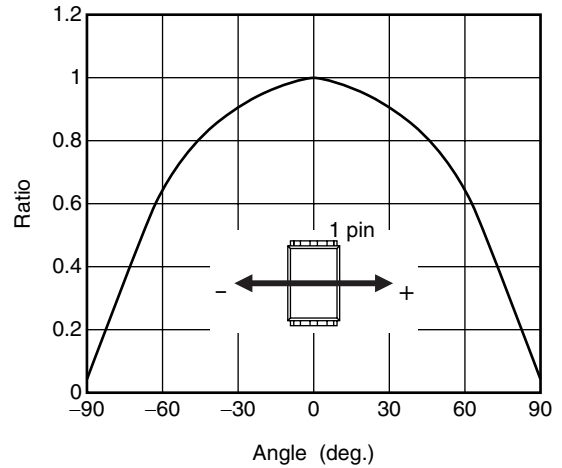
LIGHT SOURCE SENSITIVITY VARIATION



DIRECTIONAL CHARACTERISTICS 1

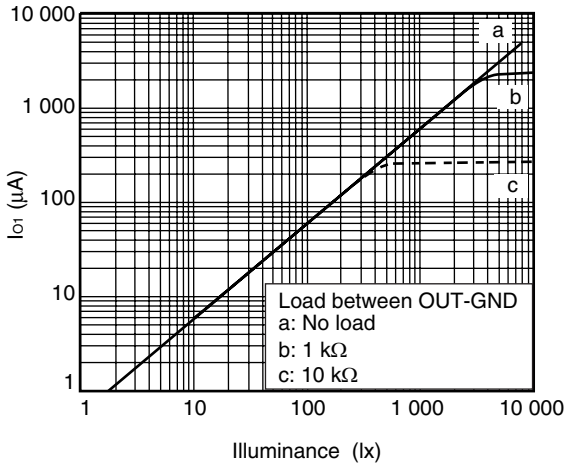


DIRECTIONAL CHARACTERISTICS 2

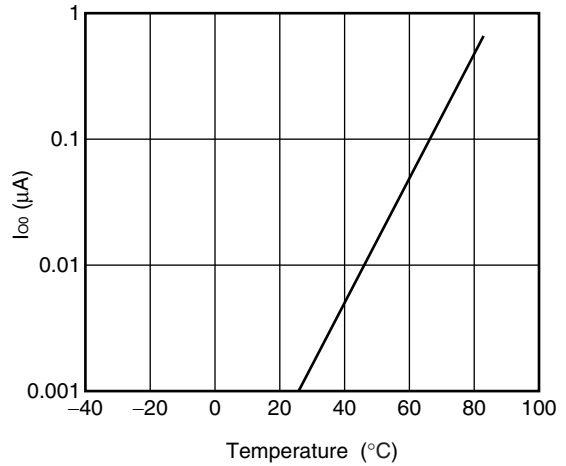


Remark The graphs indicate nominal characteristics.

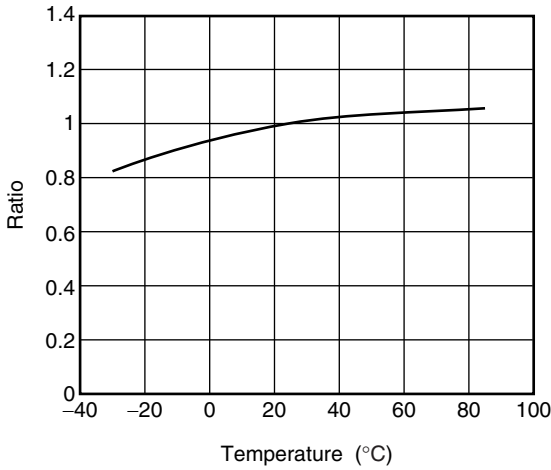
LIGHT CURRENT VS. ILLUMINANCE



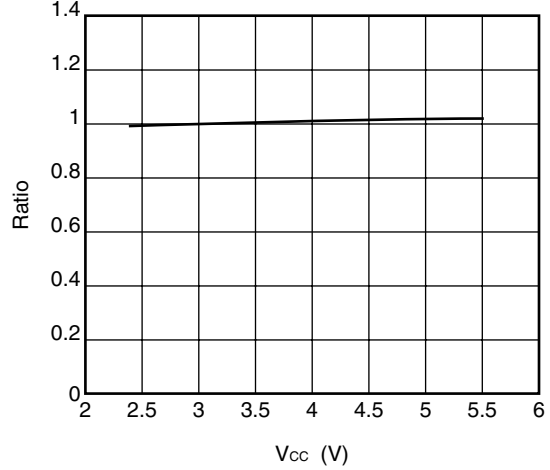
TEMPERATURE DEPENDENCY OF LIGHT CURRENT AT 0 lx



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

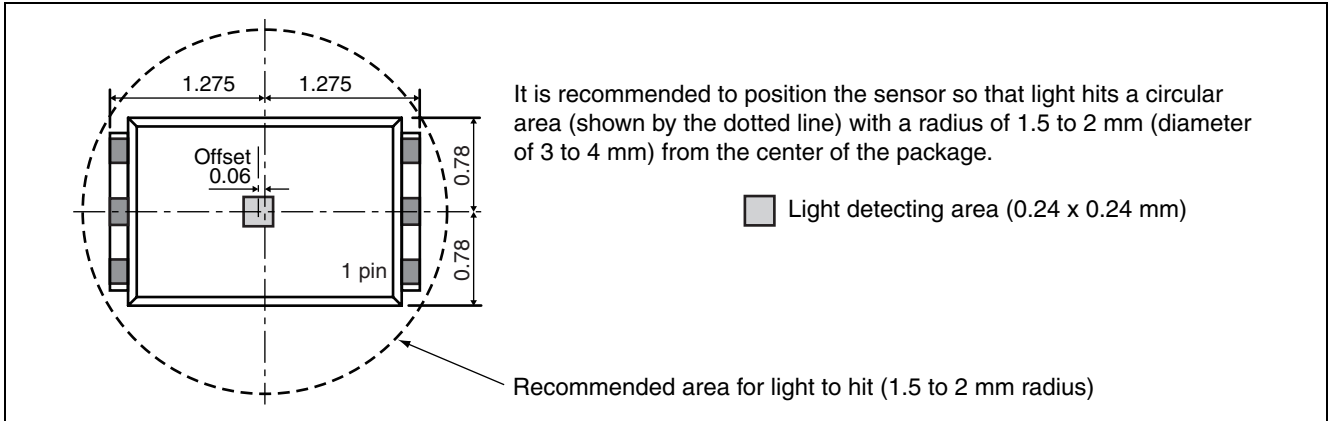


VCC DEPENDENCY OF LIGHT CURRENT AT 100 lx (NORMALIZED AT VCC = 3 V)

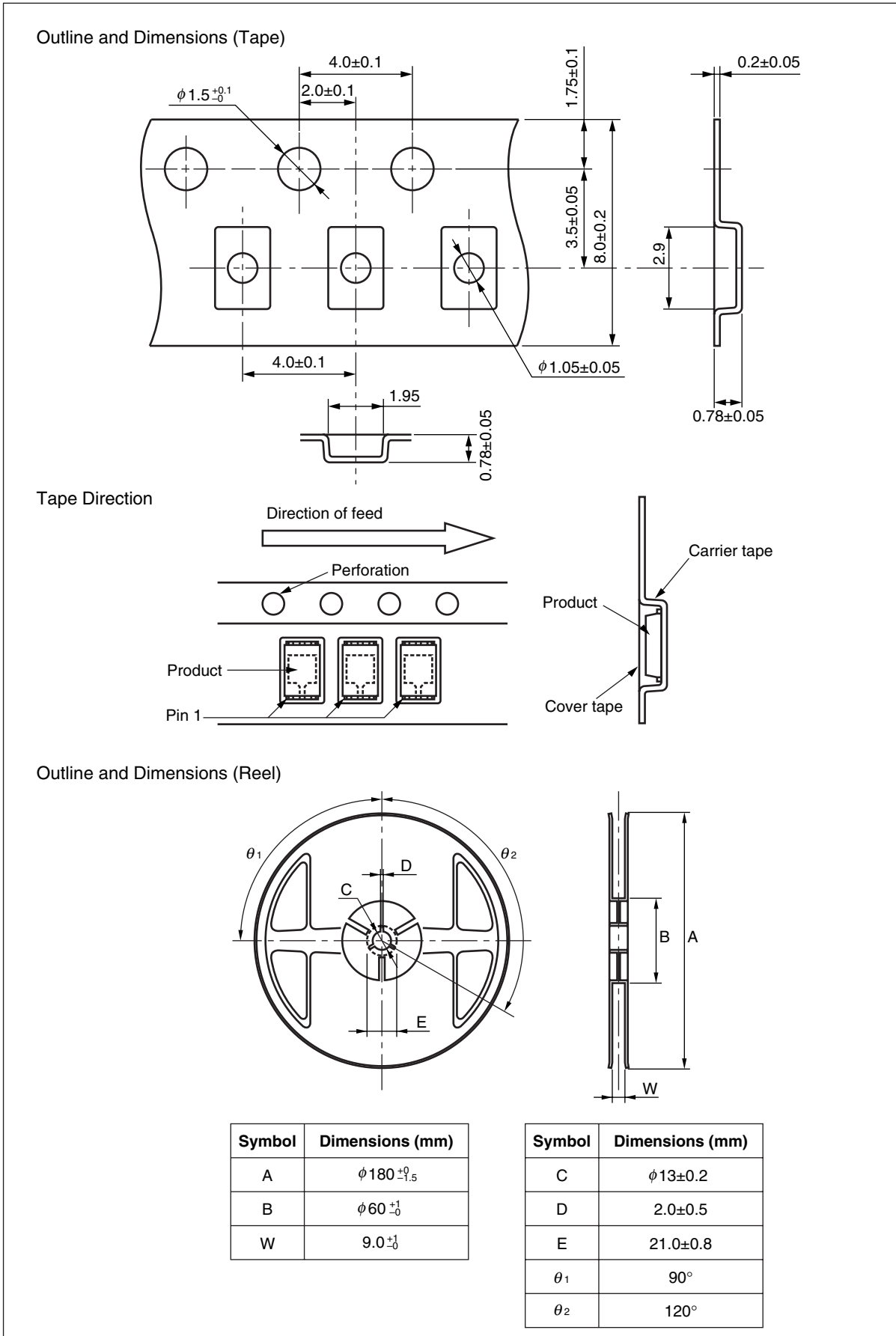


Remark The graphs indicate nominal characteristics.

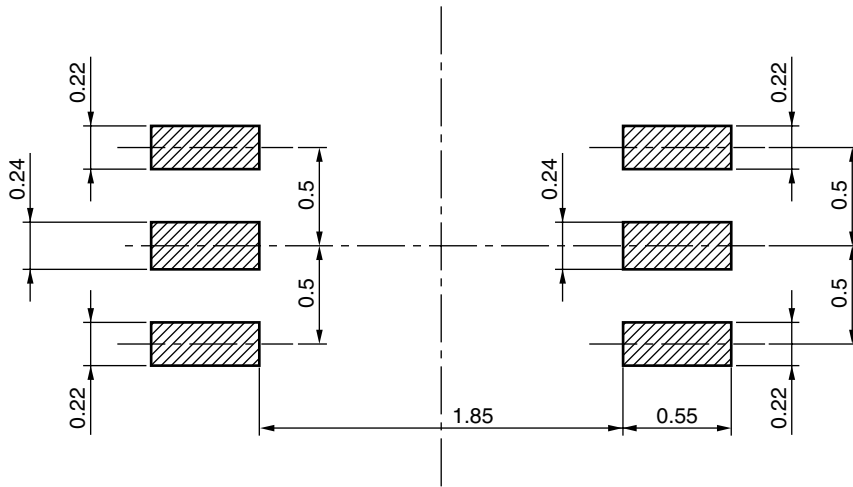
RECOMMENDED OPTICAL LAYOUT (UNIT: mm)



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°C or below, 70% RH or below, and reflow soldering must be done within 168 hours.

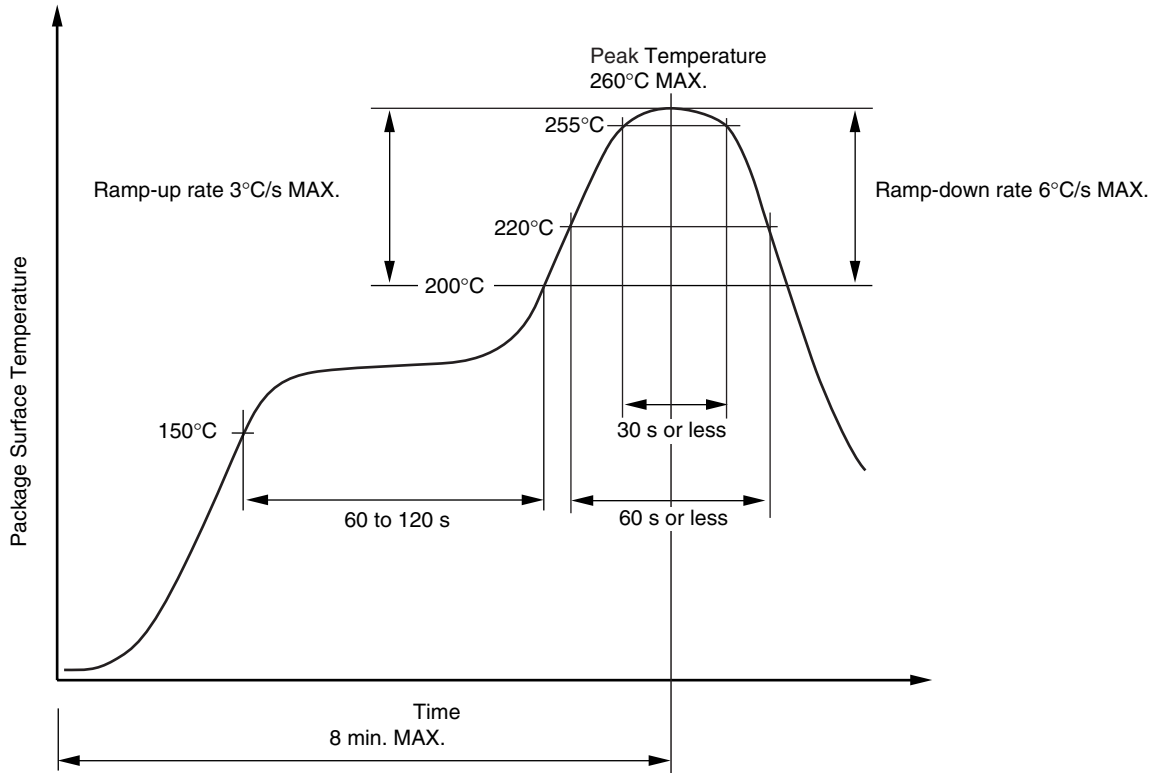
< Storage conditions after breaking seal >

- 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	PH5503A2NA1 Data Sheet
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Rev.	Date	Description	
		Page	Summary
1.00	Dec 13, 2011	-	First edition issued

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Renesas Electronics America Inc.
2880 Scott Boulevard Santa Clara, CA 95050-2554, U.S.A.
Tel: +1-408-586-6000, Fax: +1-408-586-6130

Renesas Electronics Canada Limited
1101 Nicholson Road, Newmarket, Ontario L3Y 9C3, Canada
Tel: +1-905-898-5441, Fax: +1-905-898-3220

Renesas Electronics Europe Limited
Dukes Meadow, Millboard Road, Bourne End, Buckinghamshire, SL8 5FH, U.K.
Tel: +44-1628-585-100, Fax: +44-1628-585-900

Renesas Electronics Europe GmbH
Arcadiastrasse 10, 40472 Düsseldorf, Germany
Tel: +49-211-65030, Fax: +49-211-6503-1327

Renesas Electronics (China) Co., Ltd.
7th Floor, Quantum Plaza, No.27 ZhiChunLu Haidian District, Beijing 100083, P.R.China
Tel: +86-10-8235-1155, Fax: +86-10-8235-7679

Renesas Electronics (Shanghai) Co., Ltd.
Unit 204, 205, AZIA Center, No.1233 Lujiazui Ring Rd., Pudong District, Shanghai 200120, China
Tel: +86-21-5877-1818, Fax: +86-21-6887-7858 / -7898

Renesas Electronics Hong Kong Limited
Unit 1601-1613, 16/F., Tower 2, Grand Century Place, 193 Prince Edward Road West, Mongkok, Kowloon, Hong Kong
Tel: +852-2886-9318, Fax: +852 2886-9022/9044

Renesas Electronics Taiwan Co., Ltd.
13F, No. 363, Fu Shing North Road, Taipei, Taiwan
Tel: +886-2-8175-9600, Fax: +886 2-8175-9670

Renesas Electronics Singapore Pte. Ltd.
1 HarbourFront Avenue, #06-10, Keppel Bay Tower, Singapore 098632
Tel: +65-6213-0200, Fax: +65-6276-8001

Renesas Electronics Malaysia Sdn.Bhd.
Unit 906, Block B, Menara Amcorp, Amcorp Trade Centre, No. 18, Jln Persiaran Barat, 46050 Petaling Jaya, Selangor Darul Ehsan, Malaysia
Tel: +60-3-7955-9390, Fax: +60-3-7955-9510

Renesas Electronics Korea Co., Ltd.
11F., Samik Lavied' or Bldg., 720-2 Yeoksam-Dong, Kangnam-Ku, Seoul 135-080, Korea
Tel: +82-2-558-3737, Fax: +82-2-558-5141