

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.

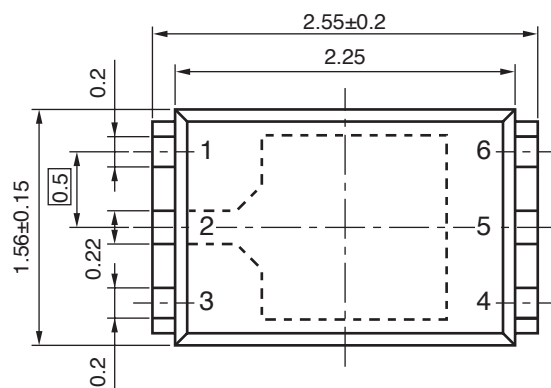
The PH5502B2NA1-E4 can be used to improve the performance and reduce the power consumption of digital equipment such as FPD-TV sets and mobile phones, by enabling automatic brightness control and automatic switching on and off of lighting systems.

FEATURES

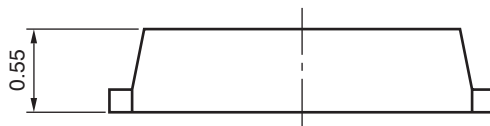
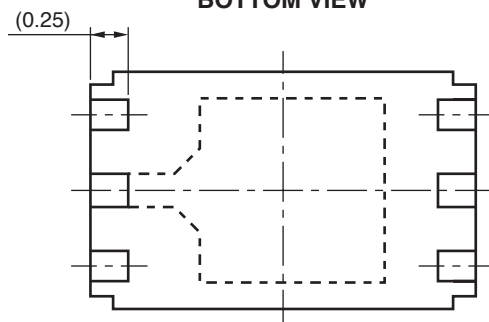
- Small and thin SON package 2.55 x 1.56 x 0.55 mm
- Spectral characteristics close to human eye sensitivity
Peak sensitivity wavelength 555 nm TYP.
- Output characteristics proportional to illuminance
- Output light current 60 μ A TYP.@100 lx (Fluorescent light)
- Reduced variation of output current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

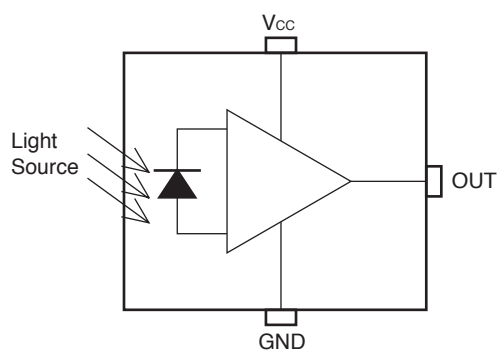
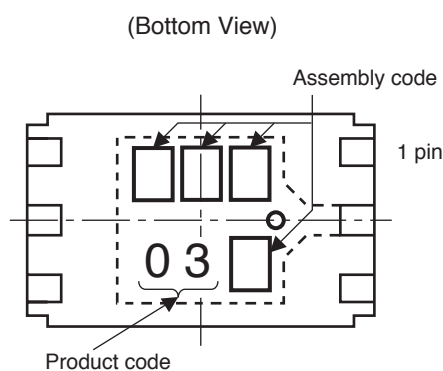
Remark Pin 1 is distinguishable by the shape of the lead frame.

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****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 × 1.0 mm)

RECOMMENDED OPERATING CONDITIONS

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

ELECTRO-OPTICAL CHARACTERISTICS

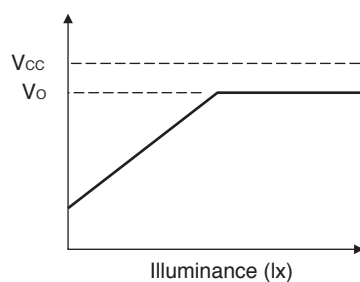
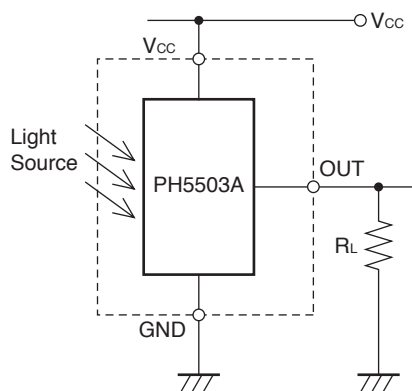
($T_A = 25^\circ\text{C}$, $V_{CC} = 3.0\text{ V}$, unless otherwise specified)

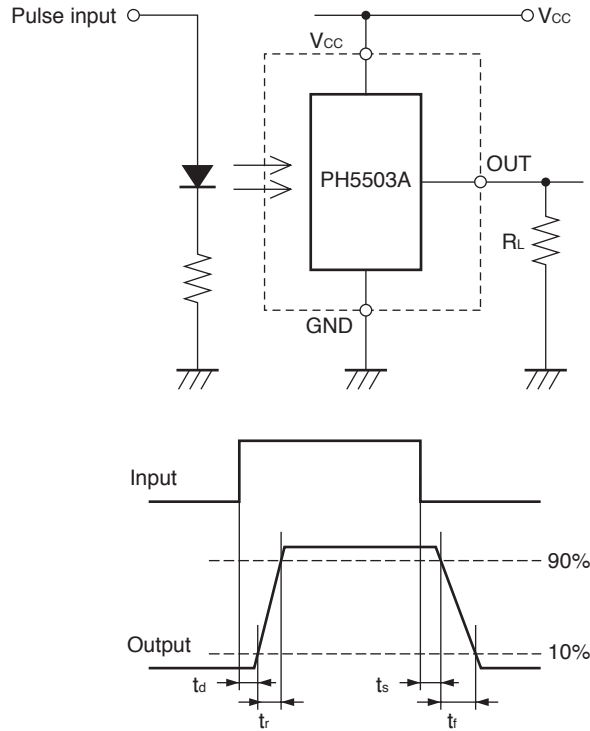
Parameter	Symbol	Conditions	MIN.	TYP.	MAX.	Unit
Supply Current ^{*1}	I_{CC}	$E_V = 100\text{ lx}$ ^{*2}	–	68	–	μA
Peak Sensitivity Wavelength	λ_p	–	–	555	–	nm
Light Current ^{*1}	I_{O0}	$E_V = 0\text{ lx}$	–	–	0.1	μA
	I_{O1}	$E_V = 100\text{ lx}$ ^{*2}	48	60	72	μA
Sensitivity Ratio of Fluorescent/Incandescent	–	$E_V = 100\text{ lx}$	–	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

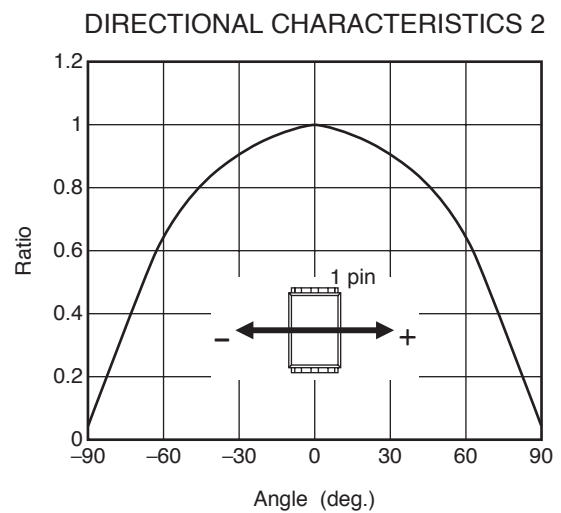
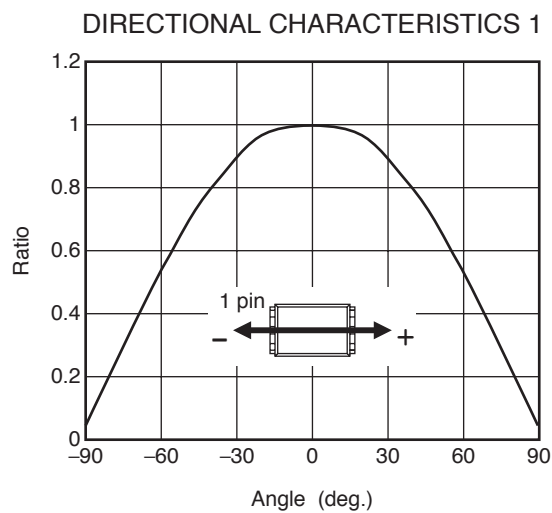
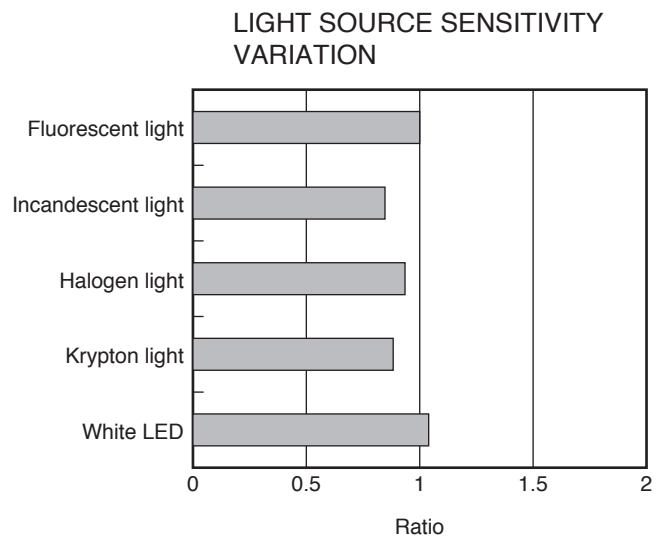
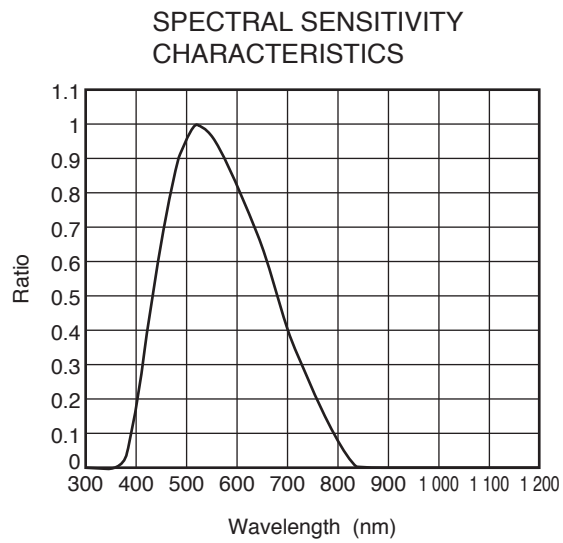
Note: ^{*1} Measured under load resistance conditions of an output current unsaturated

^{*2} Fluorescent light

^{*3} Saturation output voltage measurement method:

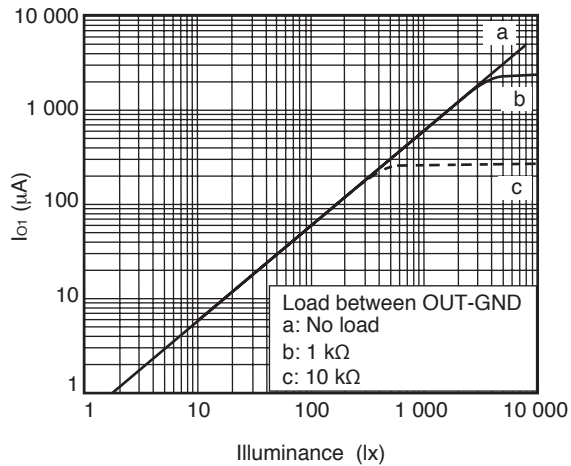
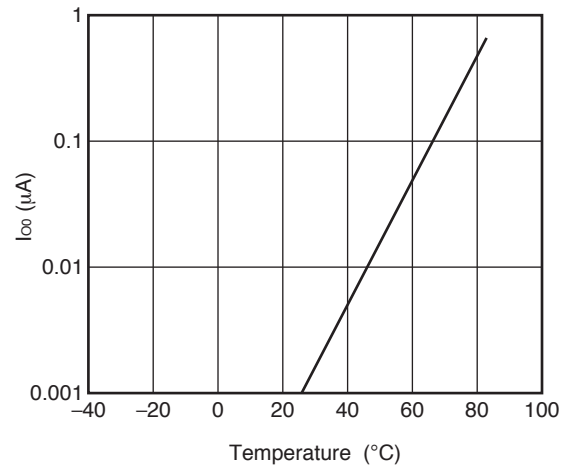
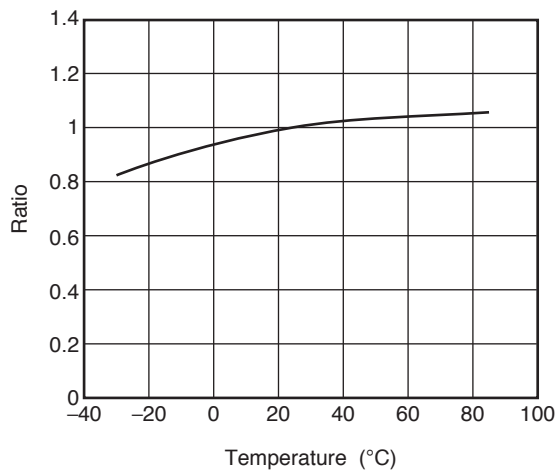
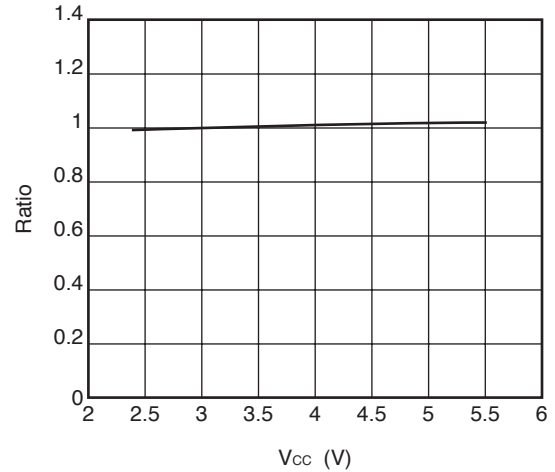


PH5503A2NA1***4 Switching Time*****5 White LED**

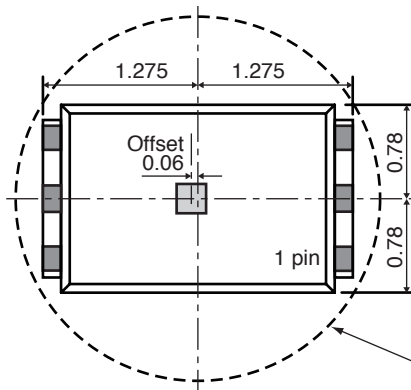
TYPICAL CHARACTERISTICS ($T_A = 25^\circ\text{C}$, $V_{CC} = 3.0\text{ V}$, unless otherwise specified)

Remark The graphs indicate nominal characteristics.

LIGHT CURRENT VS. ILLUMINANCE

TEMPERATURE DEPENDENCY
OF LIGHT CURRENT AT 0 lxTEMPERATURE DEPENDENCY OF LIGHT
CURRENT AT 100 lx (NORMALIZED AT 25°C) V_{CC} DEPENDENCY OF LIGHT CURRENT
AT 100 lx (NORMALIZED AT $V_{CC} = 3$ V)

Remark The graphs indicate nominal characteristics.

RECOMMENDED OPTICAL LAYOUT (UNIT: mm)

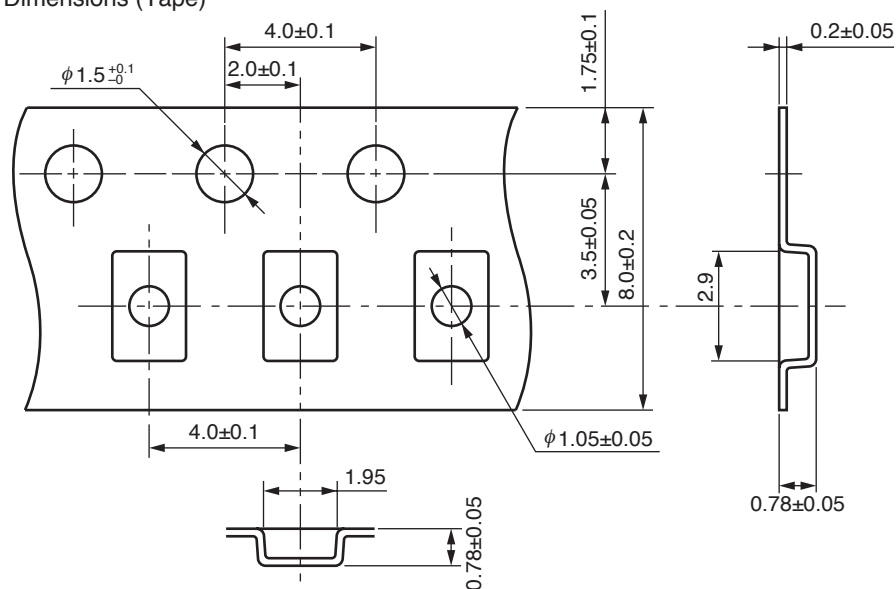
It is recommended to position the sensor so that light hits a circular area (shown by the dotted line) with a radius of 1.5 to 2 mm (diameter of 3 to 4 mm) from the center of the package.

■ Light detecting area (0.24 x 0.24 mm)

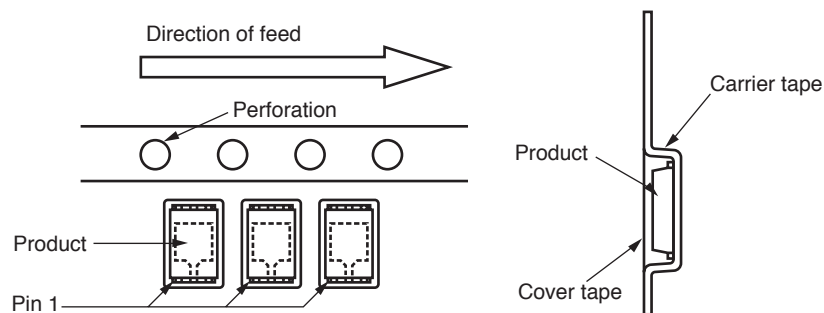
Recommended area for light to hit (1.5 to 2 mm radius)

TAPING SPECIFICATIONS (UNIT: mm)

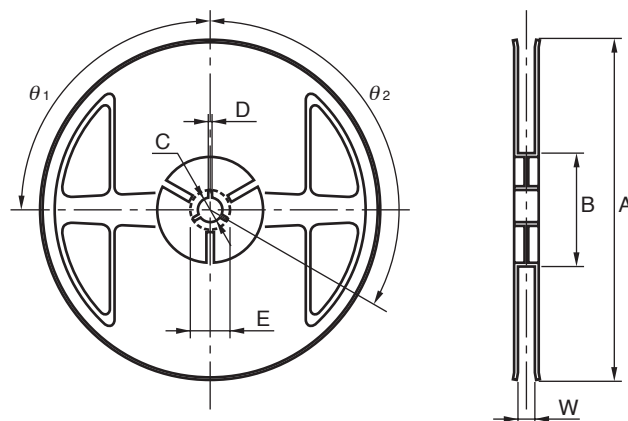
Outline and Dimensions (Tape)



Tape Direction

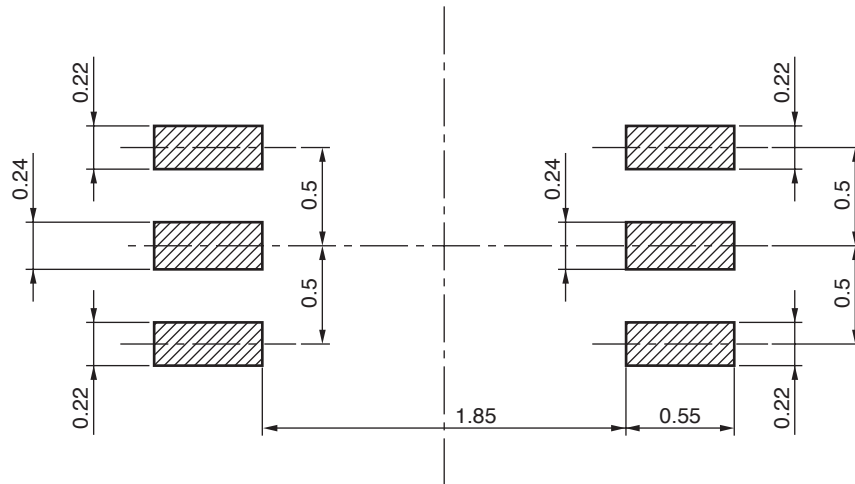


Outline and Dimensions (Reel)



Symbol	Dimensions (mm)
A	$\phi 180^{+0}_{-1.5}$
B	$\phi 60^{+1}_{-0}$
W	9.0^{+1}_{-0}

Symbol	Dimensions (mm)
C	$\phi 13 \pm 0.2$
D	2.0 ± 0.5
E	21.0 ± 0.8
θ_1	90°
θ_2	120°

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.

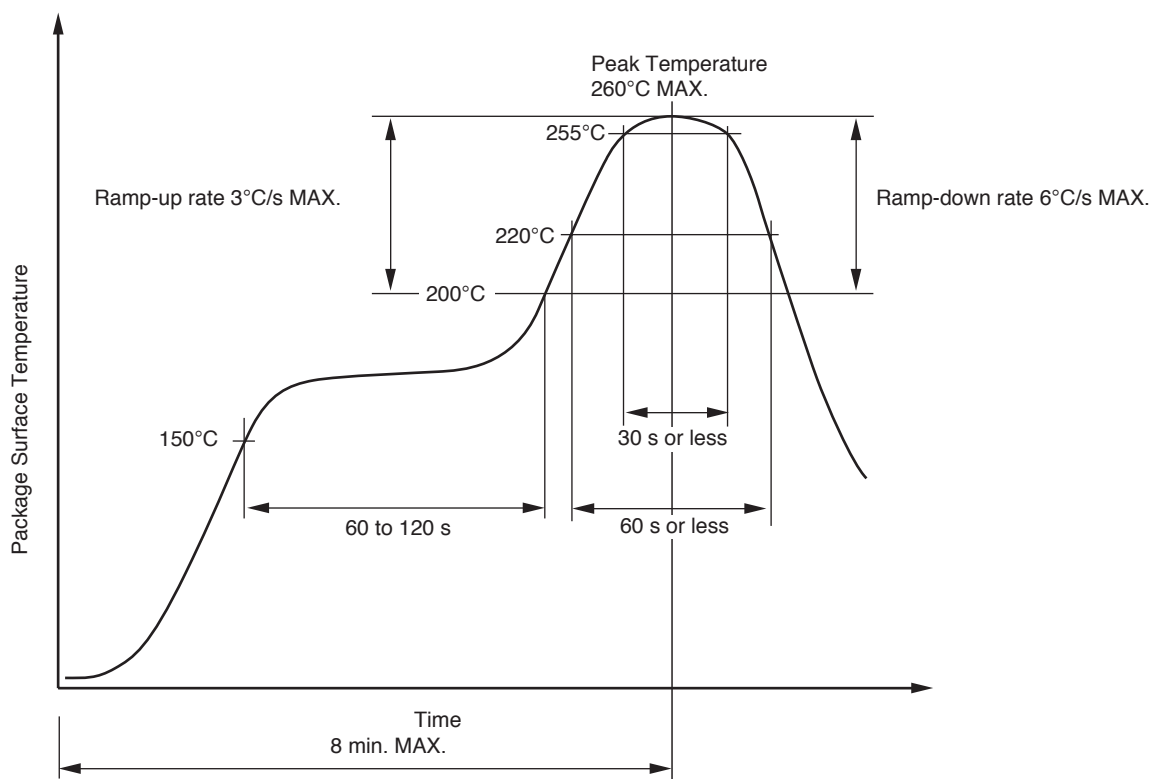
Baking conditions: Once, with tape and reel, $60\pm 5^{\circ}\text{C}$, 10 to 24 hoursAfter the baking process, this product must be stored under conditions of 30°C or below, 70% RH or below, and reflow soldering must be done within 168 hours.

< 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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