



APPROVAL SHEET

CUSTOMER : _____
 DEVICE NAME : Ambient Light Sensor
 CODE No. : _____
 ITEM No. : RAL-C302
 ISSUED DATE : 2009. 06. 25

[CUSTOMER APPROVAL]

ACCEPT No.				
ACCEPT DATE				
ACCEPT	INSPECTER	CHECK	APPROVAL	COMMENT

	ISSUE	REVIEW	REVIEW	APPR'D
ISSUED DEPT.				

레이트론 (주)	Tel : 82-42-863-2840 Fax : 82-42-861-0843 http://www.raytron.co.kr
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PART NAME	Ambient Light Sensor	MODEL NAME	
PART No.		TYPE No.	RAL-C302

1. Application

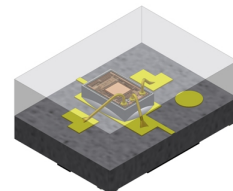
- Detection of ambient light to control display back lighting mobile devices—mobile phones PDAs computing devices, TFT LCD TV, plasma TV, video camera, digital still camera
- Automatic residential and commercial lighting management
- Automatic contrast enhancement for electronic signboard
- Ambient light monitoring device for daylight and artificial light

2. Description

The **RAL-C302** Photo IC, consisting of photodiode and a current amp circuit in a single chip.
 This photoIC is a cost effective solution to the power saving of display back lighting of mobile application such as the mobile phones and PDAs.
 The photodiode peaks in human luminosity curve at 600nm.
 Hence, it provides an excellent responsivity

3. Features

- Close to the human eye's response
- Good output linearity across wide illumination range
- Low sensitivity variation across various light sources
- Guaranteed temperature performance, -30°C to 85°C
- Wide supply voltage range, 1.8V to 5.5V
- Compact and light surface-mount COB-package



4. Absolute Maximum Rating

- Supply Voltage : -0.5 ~ +7 V
- Output Voltage : ≤ Vcc
- Operating Temperature : -25°C ~ +80°C
- Storage Temperature : -40°C ~ +85°C
- Soldering Temperature : 260°C

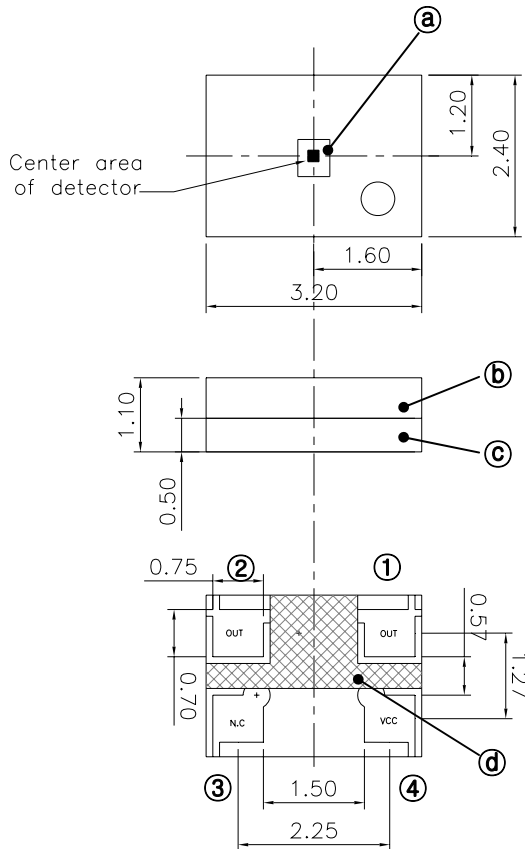
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5. Appearance & Dimensions

1) Package Dimension (Unit : mm)

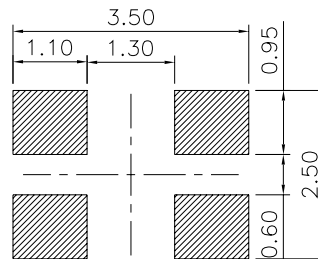


1. Pin Config.

- ① Out
- ② Out
- ③ N.C
- ④ Vcc

2. G.T : ±0.2

View from soldering face



2) Material List

Symbol	Description	Material
①	Detector	Silicon
②	Epoxy	Epoxy Resin
③	FR-4	Epoxy Resin + Glass Fiber
④	PSR	Photo resister ink



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6. Electro-Optical Characteristics

1) Absolute Maximum Rating

(at 25°C Unless otherwise note)

Parameter	Symbol	Rated	Unit
Supply Voltage	Vcc	-0.7 ~ +6.5	V
Output Voltage	Vout	max Vcc	V
Output Current	I _{PH}	Max 3	mA
Permissible power dissipation	P	35	mW
Operating Temperature	T _{opr.}	-30 ~ +85	°C
Storage Temperature	T _{stg.}	-40 ~ +100	°C
Soldering Temperature (*1)	T _{sol}	260	°C

(*1) 6s or less / time up to 2times

2) Electro - Optical Characteristics

(T_a=25°C) (V_{cc}=5.0V)

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
Supply Voltage	Vcc	1.8	-	5.5	V	
Light Current 1 (*2)	IPH1	-	7.0	-	μA	Vcc=3v, EV=10 lx
Light Current 2 (*2)	IPH2	-	70	-	μA	Vcc=3v, EV=100 lx
Light Current 3 (*1)	IPH3	-	70	-	μA	Vcc=3v, EV=100 lx
Dark Current	IDARK	-	0.05	0.1	μA	Vcc=3v, EV=0 lx
Light Current Ratio	I _{PH3} /I _{PH2}	-	1.0	-	-	
Gain Linearity	-	-5	-	5	%	EV=100lx ~ 1,000lx
Peak sensitivity wavelength	λ _p	-	550	-	nm	
Temperature Coefficient (*2)	TC	-	-0.19	-	%/°C	EV=100 lx

(*1) CIE standard A light source is used (color Temp. = 2856K)

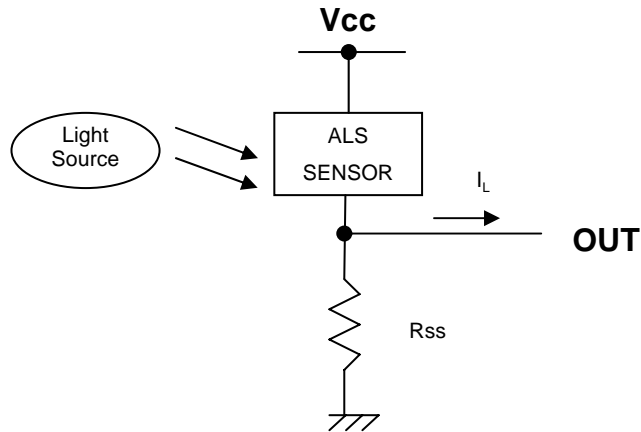
(*2) Fluorescence light is used as light source. However, White LED is substituted in a mass production process.

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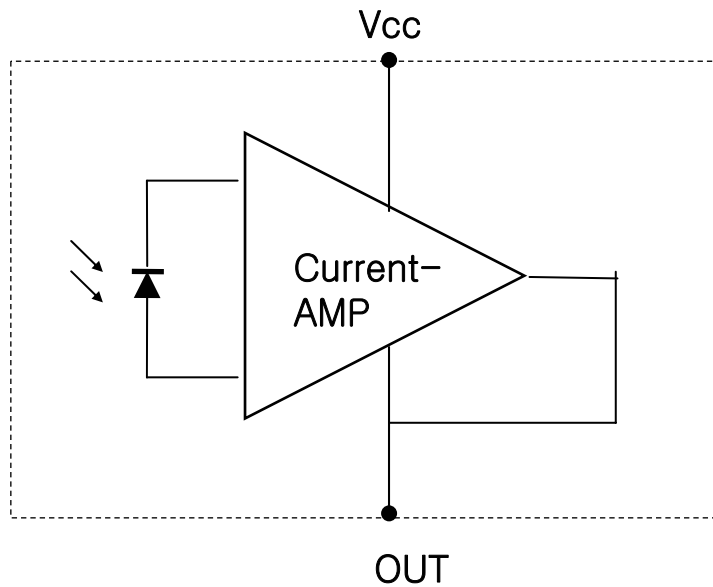
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3) Measurement Conditions



4) Schematic Block Diagram



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5) Graph of Electrical / Optical Characteristics

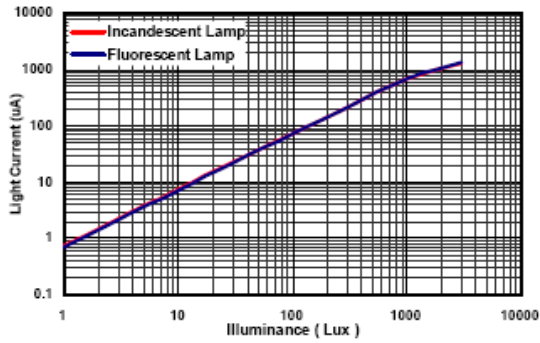


Fig.1 IPH vs. Ev (VDD=3.0V, Rss=0)

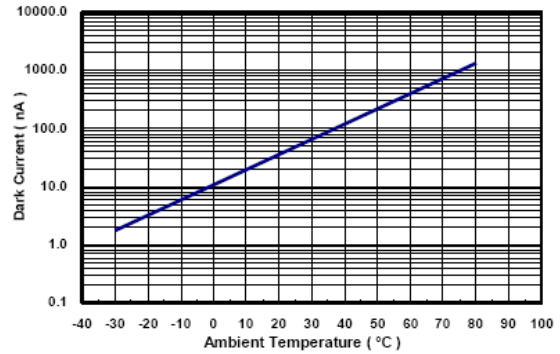


Fig.2 Dark current vs. Ambient Temperature

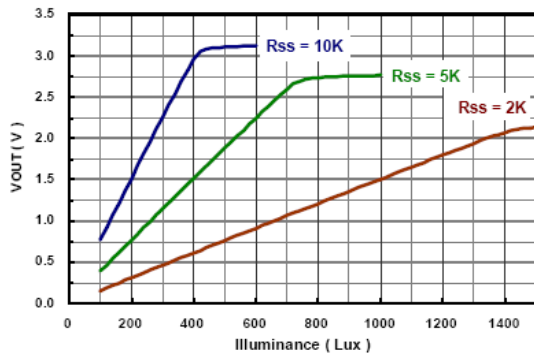


Fig.3 OUT vs. Ev (VDD=5.0V)

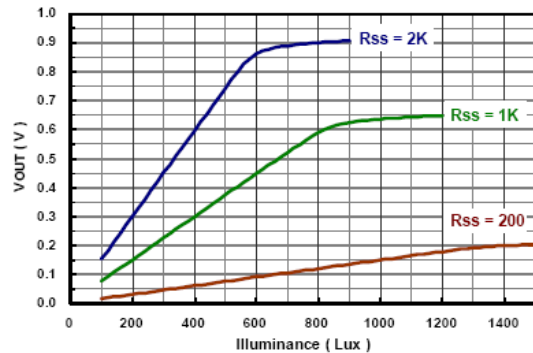


Fig.4 OUT vs. Ev (VDD=3.0V)

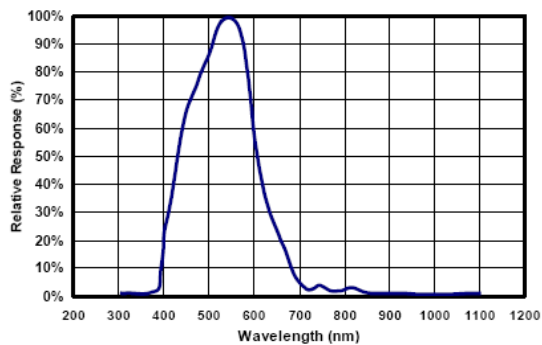


Fig.5 Spectral Response



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7. Reliability Test Item and Standard.

- 1) All output products shall satisfy below Reliability test items.
- 2) Related sampling quantity and acceptance/failure judgment standard accordance with MIL standard MIL-STD-883 is as listed below.

- ① Confidence level : 90%
- ② LTPD : 10% / 20%

No	Test Items	Test Conditions	Failure Judgement	Samples(n)
				Defective(c)
1	High temp. and High humidity Operating (※1)	Ta= +60℃ 85% RH /500h Vcc=5 V applying	Failure judgment criteria Of each characteristics Given in 1 to6 Must be With The Following range. 1) I _{CC} Current attenuate Difference : 20% less 2) I _{PH} Current attenuate Difference : 20% less	n=22, C=0
2	High temp. Operating (※1)	Ta= +60℃/500h Vcc=5V applying		n=22, C=0
3	Low temp. Operating (※1)	Ta= -30℃/500h Vcc=5V applying		n=22, C=0
4	Temperature Cycling (※1) (※2)	Ta= -20℃ to +75℃ (30min/30min) 20 Cycle test		n=22, C=0
5	Solderability (Reflow Solder)	Soldering Temp.:+260±5℃,10s Pb free solder : Sn/3.0Ag/0.5Cu	Leads shall be covered By solder more than 95%	n=11, C=0

- ※1. Electro-optical characteristics shall be satisfied after leaving 2 hours in the normal condition.
- ※2. Temperature cycle test shall repeat above condition 20 times under no load.

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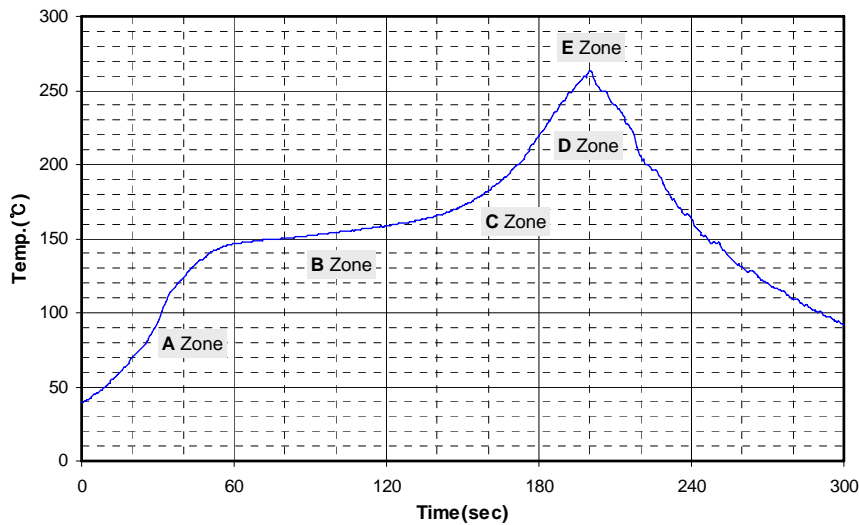
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8. Precautions to be taken on mounting

1) Reflow Soldering

- ① Following soldering paste recommended.
 - Melting temperature : 245 ~ 260°C
 - Composition : Pb-Free
- ② Recommended thickness of metal mask is between 0.2mm and 0.25mm for screen printing.
- ③ The below illustrated temperature profile at the top surface of the product is requested for soldering.



Zone	Time	Temperature
A	70 ~ 100sec	4°C/s max.
B	60 ~ 120sec	140 ~ 160°C
C	50 ~ 70sec	4°C/s max.
D	40sec max.	210 ~ 230°C
E	10sec max.	260°C max.

☞ Reflow System : Japan pulse Laboratories Inc.(RF-430)
 Temp. Profile : SEF Eltronic GmbH (Mesh 3.0)

2) Manual Soldering

- ① Use the Pb-Free solder or the solder containing silver.
- ② Use a soldering iron of 25W or smaller.
Adjust the temperature of the soldering iron below 270°C
- ③ Finish soldering within 3 seconds.
- ④ Handle products only after the temperature is cooled off.

3) Storage Method

Dry Box storage is recommended as soon as the aluminum Shielding bag has been opened prevent moisture absorption. The following storage conditions as recommended

- ① Temperature : 10 to 30°C
- ② Humidity : 60% RH or less

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4) Moisture-Proof Packing

- ① To avoid moisture absorption by the resin, the product the product is packed in an aluminum envelope with silica gel.
- ② Since the optical characteristics of the device may be affected by exposure to moisture in the air before soldering and they should therefore be stored after opening the moisture proof bag under the following conditions.
 - . Temperature : 10 to 30℃
 - . Humidity : 60% RH or less
 - . Time : 72h

5) Baking

product that has been in a condition of moisture resistant packaging for 6 months or longer. or for which 72 hours or longer have elapsed since the moisture resistant packaging was opened. should be baked according to the following conditions prior to use.

- ① Baking conditions
 - . 60℃, 48 hours or longer (Reels)
 - . 100℃, 4 hours or longer (Bulk)
 - . 125℃, 2 hours or longer (Bulk)
 - . 150℃, 1 hours or longer (Bulk)

6) Mounting Precautions

- ① Do not apply stress to the resin at high temperature.
- ② The resin part is easily scratched, so avoid friction with hard materials.
- ③ When installing the assembly board in equipment, ensure that this product does not come into contact with other components.

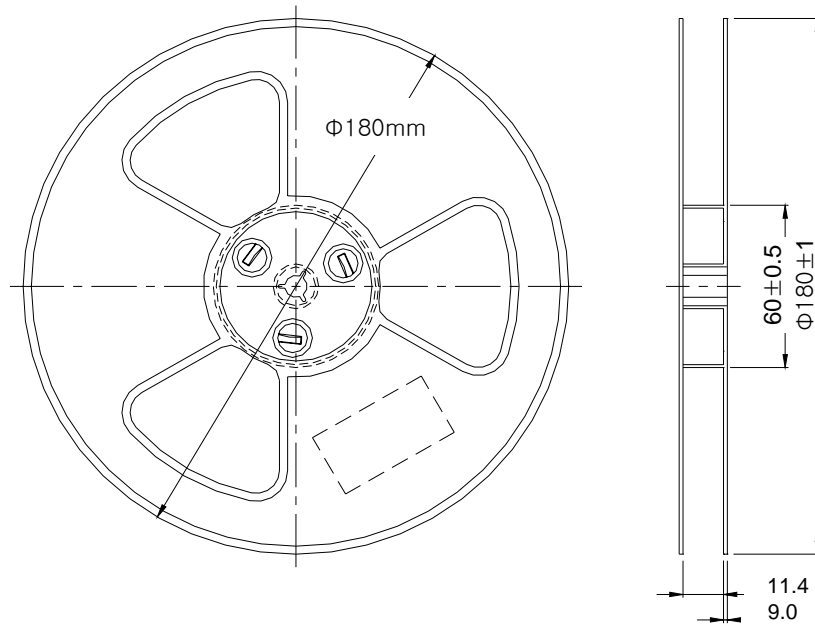
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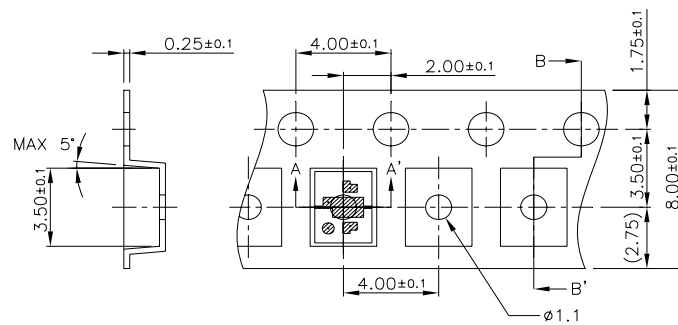
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9. Tape and Reel Packing Specification

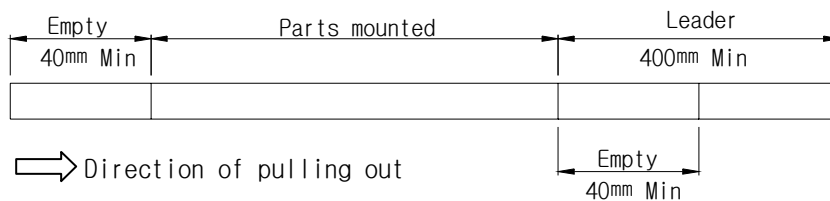
1) Shape and dimension of Reel



2) Dimension of Tapes



3) Configuration of Tapes



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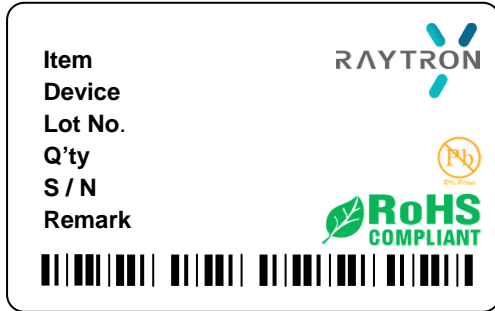
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10. Packing Specifications

1) Label Specification (Bar Code Sticker)



Label Dimensions (Unit : mm)

Label Type	L	W	Remark
Label #1	65	40	

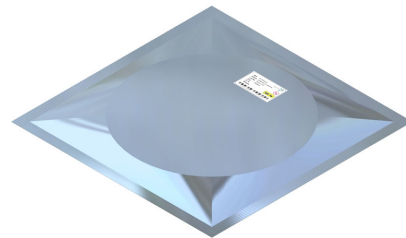
2) Box Specifications & Packing Method

(Unit : mm)

Packing Type	Materials	L x W x H	Quantity
Plastic Reel	Plastic	8"	3,000 pcs
Al Shielding Bag	Aluminum	250 x 250 x 0.1	3,000 pcs
RM-#0.5	Corrugated Cardboard	279 x 225 x 92	21,000 pcs
RM-#2	Corrugated Cardboard	395 x 300 x 240	84,000 pcs



1. Put 3,000pcs of products in a reel.



2. Put 1pcs of Al shielding bag.



4. Put 4pcs of #1 packing boxes in a #0.5 packing box.



3. Put them(7pcs of reel) in a #0.5 packing box.



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