SHARP

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2. When using this Sharp product, please observe the absolute maximum ratings, other conditions and instructions for use described in the specification sheets, as well as the precautions mentioned below.
   Sharp assumes no responsibility for any damages resulting from use of the product which does not comply with absolute maximum ratings, other conditions and instructions for use included in the specification sheets, and   the precautions mentioned below.

(Precautions)
 (1) In making catalogue or instruction manual based on the specification sheets, please verify the validity of the catalogue or instruction manuals after assembling Sharp products in customer's products at the responsibility of customer.

 (2) This Sharp product is designed for use in the following application areas ;
   • Computers   • OA equipment   • Telecommunication equipment (Terminal)   • Measuring equipment
   • Tooling machines   • Audio visual equipment   • Home appliances
   If the use of the Sharp product in the above application areas is for equipment listed in paragraphs (3) or (4), please be sure to observe the precautions given in those respective paragraphs.

 (3) Appropriate measures, such as fail-safe design and redundant design considering the safety design of the overall system and equipment, should be taken to ensure reliability and safety when Sharp product is used for equipment in responsibility of customer which demands high reliability and safety in function and precision, such as ;
   • Transportation control and safety equipment (aircraft, train, automobile etc.)
   • Traffic signals   • Gas leakage sensor breakers   • Rescue and security equipment
   • Other safety equipment

 (4)Sharp product is designed for consumer goods and controlled as consumer goods in production and quality.
   Please do not use this product for equipment which require extremely high reliability and safety in function and precision, such as ;
   • Space equipment   • Telecommunication equipment (for trunk lines)
   • Nuclear power control equipment   • Medical equipment

 (5) Please contact and consult with a Sharp sales representative if there are any question regarding interpretation of the above four paragraphs.

3. Disclaimer
   The warranty period for Sharp product is one (1) year after shipment.
   During the period, if there are any products problem, Sharp will repair (if applicable), replace or refund.
   Except the above, both parties will discuss to cope with the problems.

   The failed Sharp product after the above one (1) year period will be coped with by Sharp, provided that both parties shall discuss and determine on sharing responsibility based on the analysis results thereof subject to the above scope of warranty.

   The warranty described herein is only for Sharp product itself which are purchased by or delivered to customer.
   Damages arising from Sharp product malfunction or failure shall be excepted.

   Sharp will not be responsible for the Sharp product due to the malfunction or failures thereof which are caused by:
   (1) storage keep trouble during the inventory in the marketing channel.
   (2) intentional act, negligence or wrong/poor handling.
   (3) equipment which Sharp products are connected to or mounted in.
   (4) disassembling, reforming or changing Sharp products.
   (5) installation problem.
   (6) act of God or other disaster (natural disaster, fire, flood, etc.)
   (7) external factors (abnormal voltage, abnormal electromagnetic wave, fire, etc.)
   (8) special environment (factory, coastal areas, hotspring area, etc.)
   (9) phenomenon which cannot be foreseen based on the practical technologies at the time of shipment.
   (10) the factors not included in the product specification sheet.

4. Please contact and consult with a Sharp sales representative for any questions about Sharp product.

1. Application

   This technical sheets applies to the outline and characteristics of reflective type proximity /RGB color sensor
   ; Model No. GP2AP080C00F

2. Outline   Refer to the drawing page 5.
3. Ratings and characteristics   Refer to Page 6 to 7.
4. Supplement

   1) This product is built-in photodiode.

   2) Brominated flame retardants

   Specific brominated flame retardants such as the PBB and PBDE are not used in this device at all.

   3) This product shall not contain the following materials.

   Also, the following materials shall not be used in the production process for this product.

   Materials for ODS : CFCs, Halon, Carbon tetrachloride, 1,1,1-Trichloroethane (Methylchloroform)

   4) Compliance with each regulation

   4.4.1   The RoHS directive(2011/65/EU)

   This product complies with the RoHS directive(2011/65/EU) .

   Object substances: mercury, lead, cadmium, hexavalent chromium, polybrominated biphenyls（PBB）

   and polybrominated diphenyl ethers （PBDE）

   4.4.2   Content of six substances specified in Management Methods for Control of Pollution Caused by Electronic

   Information Products Regulation (Chinese : 电子信息产品污染控制管理办法).

   Marking Styles for the Names and Contents of the Hazardous Substances

Category	Hazardous Substances					
	Lead (Pb)	Mercury (Hg)	Cadmium (Cd)	Hexavalent chromium (Cr^{6+})	Polybrominated biphenyls (PBB)	Polybrominated diphenyl ethers (PBDE)
Proximity	○	○	○	○	○	○

   This table is prepared in accordance with the provisions of SJ/T 11364.

   ○ : Indicates that said hazardous substance contained in all of the homogeneous materials for this part is

   below the limit requirement of GB/T 26572

   5) Country of origin :   China

   6) Product mass :   Approx . 0.017 g

   7) The moisture absorption level of this product is MSL.3.

5. Notes

   1) Notes concerning receiver surface

   Please note enough that it is likely to malfunction when a receiver surface is dirty with garbage and dust, etc.

   Moreover, please do not touch a receiver surface.

   2) For cleaning

   Cleaning shall carry out as the below items to avoid keeping solvent, solder and flux on the device.

   ・Solvent cleaning :   Solvent temperature 45℃ or less, Immersion for 3 min or less

   ・Ultrasonic cleaning :   Please don't carry out ultrasonic cleaning.

   ・The cleaning shall be carried out with solvent below.

       Solvent : Ethyl alcohol, Methyl alcohol, Isopropyl alcohol

   3) Please take proper methods to prevent ESD. The IC built in GP2AP080C00F is ESD-sensitive because it is fabricated by sub-micron CMOS process. For example, in handling GP2AP080C00F, human body and soldering iron etc. should be grounded.

   4) Before the circuit design

   In circuit designing, make allowance for the degradation of the light emitting diode output that results from long continuous

   operation. (50% degradation/5 years)

   5) Notes ambient light

   Proximity mode when set to avoid malfunctions due to a strong disturbance light, such an arrangement to receive ambient light Directly on the detector, please be avoided. Also by placing this product in close proximity to other components, it may be a malfunction with the light reflected from their product, structural arrangement to reduce the amount of light receiving surface of the outer, please consider.

   6) After being mounted and soldered, if GP2AP080C00F is deformed by external force or impact, e.g. something falls onto the device, it may result in defective implementation such as lift-off of the terminals. Careful handling should be taken.

7) For soldering

Refer to Page 4.

8) Recommended external circuit

Components	Recommended values
CX1	1µF
CX2	2.2µF
R_p	22Ω
R_{SDA}	10kΩ
R_{SCL}	10kΩ
R_{INT}	10kΩ

(Top View)
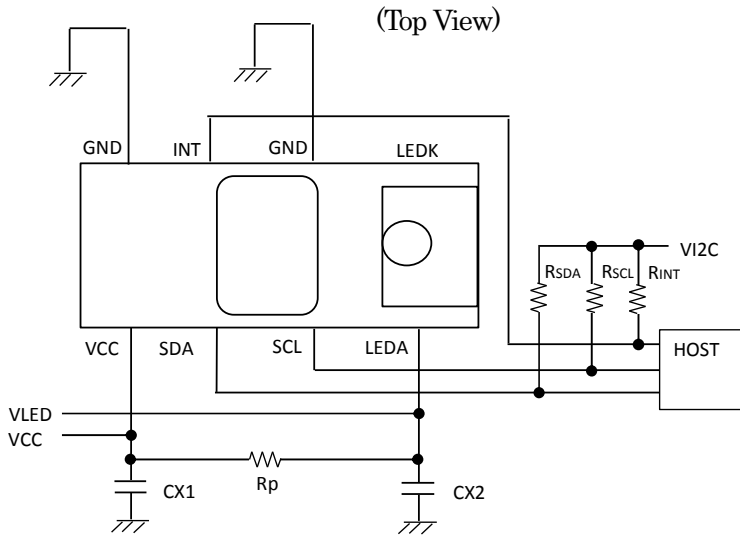
There are cases to generate a noise because LED driving current flows LEDA terminal, and to distort a waveform of LED driving current.

To reduce these influences, please arrange CX2within 5mm from LEDA terminal, and wire between LEDA terminal, CX2 and GND terminal as close as possible. Also, the wiring of VLED is separated from VCC and VI2C terminals, and the power source of VLED is separated from VCC is recommended.

And in order to reduce the influence of the power supply noise, please arrange CX1 and Rp within 5mm from VCC terminal.

Please evaluate with the actual electrical implementation, and carefully make sure that there is no problem.
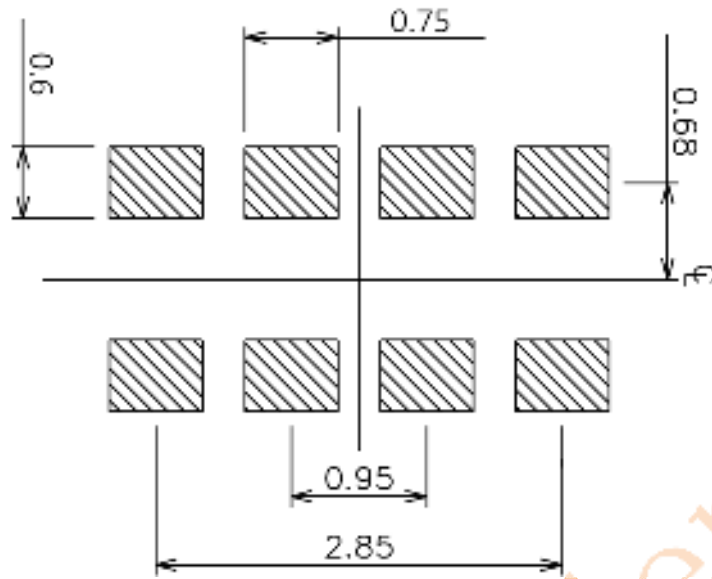
SDA terminal (as output) and INT terminal are NMOS open-drain output.

9) Block diagram
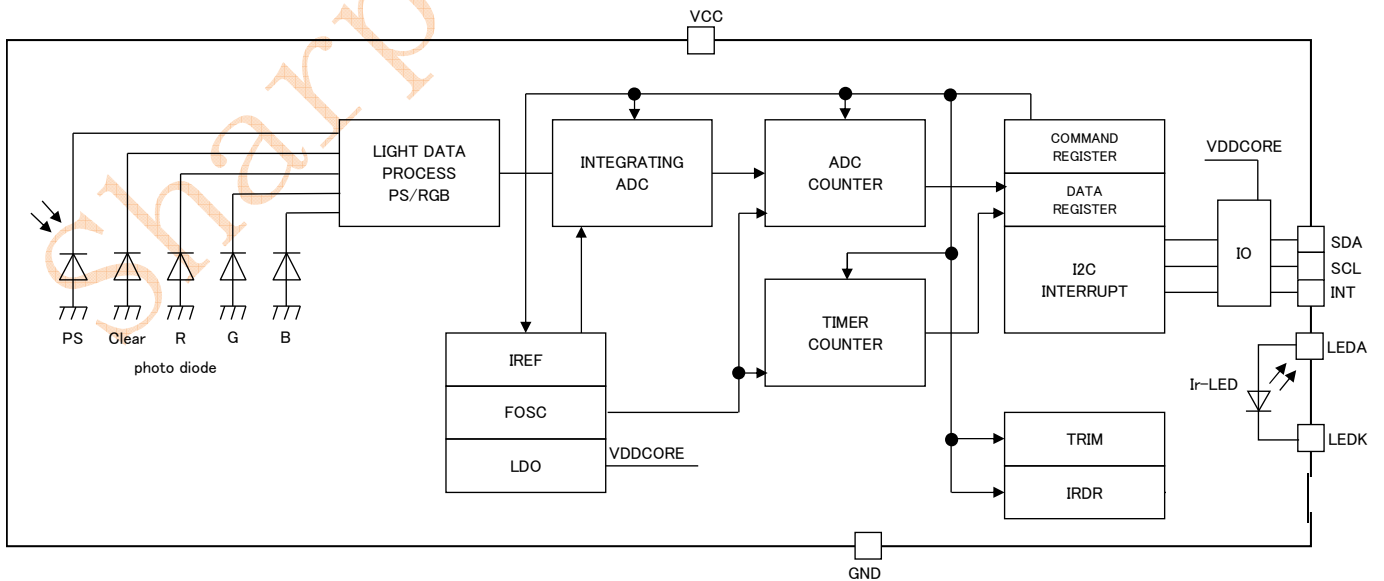
10)   Foot pattern of PCB

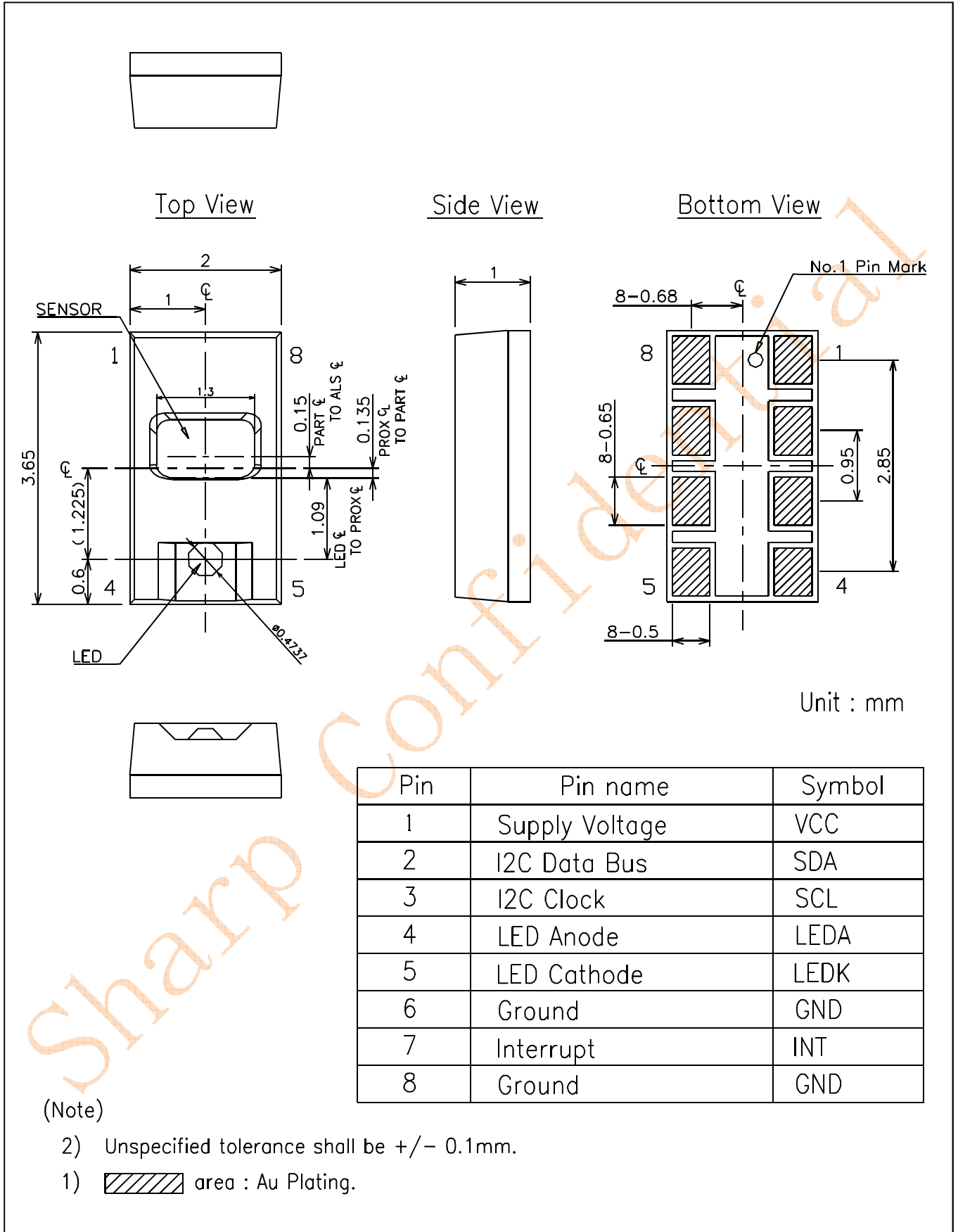Recommendable size of solder creamed paste (Reference)

◪ : Soldering paste area

* Dimensions in parenthesis are shown for reference.
 Unit : mm

2. Outline Dimensions

Top View

Side View

Bottom View

No.1 Pin Mark

Unit : mm

Pin	Pin name	Symbol
1	Supply Voltage	VCC
2	I2C Data Bus	SDA
3	I2C Clock	SCL
4	LED Anode	LEDA
5	LED Cathode	LEDK
6	Ground	GND
7	Interrupt	INT
8	Ground	GND

(Note)

2) Unspecified tolerance shall be +/− 0.1mm.

1) ▨ area : Au Plating.

SCALE	APPLICATABLE MODELS		SHARP
15/1		Name	GP2AP080C00F
UNIT			Outline dimension
1 = 1/1 mm			

3. Ratings and Characteristics

3.1 Absolute Maximum Ratings

Ta=25℃(unless otherwise specified)

Parameter	Symbol	Rating	Unit	Remarks
Power supply voltage	VCC	-0.3 to 3.8	V	
LED voltage	VLED	-0.3 to 3.8	V	
I2C voltage	VI2C	-0.3 to 3.8	V	
Operating temperature	Topr	-30 to 85	℃	
Storage temperature	Tstg	-40 to 85	℃	
Soldering temperature	Tsol	250	℃	peak temperature duration:10s

3.2 Recommended Operating Conditions

Ta=25℃(unless otherwise specified)

Parameter	Symbol	Operating condition	Unit	Remarks
Power supply voltage	VCC	1.7 to 3.6	V	
LED voltage	VLED	3.0 to 3.6	V	
I2C voltage	VI2C	1.7 to Vcc	V	
Operating temperature	Topr	-30 to 85	℃	
SCL, SDA input low level	VIL	-0.3 to 0.54	V	
SCL, SDA input high level	VIH	1.26 to Vcc+0.2	V	

3.3 Electrical and Optical Characteristics

Ta=25℃, VCC=VLED=VI2C=3.0V
(unless otherwise specified. The external circuit constants follow the recommended external circuit of page 3.)

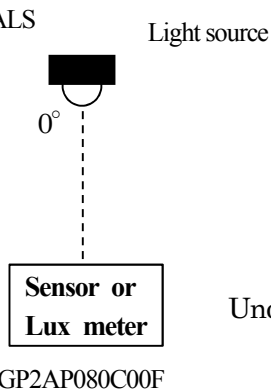| Parameter	Symbol	Min.	Typ.	Max.	Unit	Remarks
Current consumption (PS)	I_{CC_PS}		190	270	μA	OP[1:0]=10
Current consumption (ALS)	I_{CC_ALS}		150	200	μA	OP[1:0]=01,RANGE_A=0000
Current consumption (Power Down)	I_{CC-S}	—	—	5	μA	OP[3]=0
Internal Oscillator Frequency	fosc1	1.6	2.0	2.4	MHz	
I2C clock frequency	f	1	—	400	kHz	
SDA output low level voltage	V_{OL_SDA}	0	—	0.4	V	I_{OL_SDA}=3mA
INT output low level voltage	V_{OL_INT}	0	—	0.4	V	I_{OL_INT}=3mA
ADC Conversion Time1 (PS)	Tint_P	—	2	—	ms	12bit ADC
ADC Conversion Time1 (ALS)	Tint_A	—	32.8	—	ms	16bit ADC
Full scale ADC code1	Data_F$_{PS}$	—	—	16383	counts	
Full scale ADC code2	Data_F$_{ALS}$	—	—	65535	counts	
ADCCODE_ALS1	Data_A1	800	1000	1200	Lux	RES_A[1:0]=01, RANGE_A[3:0]=0110, at 1000 lx, White color LED 5200K *1
ADCCODE_ALS2	Data_A2	800	1000	1200	Lux	RES_A[1:0]=01, RANGE_A[3:0]=0110, at 1000 lx, Fluorescent lamp 6600K *1
ADCCODE_ALS3	Data_A3	800	1000	1200	Lux	RES_A[1:0]=01, RANGE_A[3:0]=0110, at 1000 lx, Halogen lamp 2770K *1
ADCCODE_ALS4	Data_A4	400	500	600	Lux	RES_A[1:0]=01, RANGE_A[3:0]=0110, at 500 lx, Incandescence lamp 2700K *1
Correlated Color Temperature	Data_CCT1	—	5200	—	K	RES_A[1:0]=01, RANGE_A[3:0]=0110, LED 5200K
	Data_CCT2	—	2770	—	K	RES_A[1:0]=01, RANGE_A[3:0]=0110, LED 2770K
ADCCODE_RGB	Data_RGB	-20	0	+20	%	RES_A[1:0]=01, RANGE_A[3:0]=0110

GP2AP080C00F(ED-17G002T)

Ta=25℃, VCC=VLED=VI2C=3.0V

(unless otherwise specified. The external circuit constants follow the recommended external circuit of page 3.)

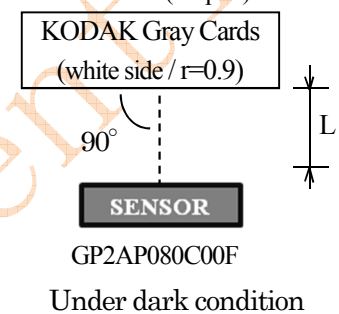| Parameter	Symbol	Min.	Typ.	Max.	Unit	Remarks
Detection distance	L	85	100	115	mm	Detection Object : KODAK Gray Card (white side / r=0.9) *2
LED peak wavelength	λ_{P_PS}	—	950	—	nm	
LED peak current	I_{LED4}	—	24	—	mA	IS[2:0]=001
	I_{LED5}	—	89	—	mA	IS[2:0]=010
	I_{LED6}	—	164	—	mA	IS[2:0]=011
	I_{LED7}	—	230	—	mA	IS[2:0]=111

Typical value is a reference value, there is no guarantee

＊1. ALS

Light source

0°

Sensor or Lux meter

GP2AP080C00F

Under dark condition

＊2. Detection distance (PS part)

KODAK Gray Cards (white side / r=0.9)

90°

L

SENSOR

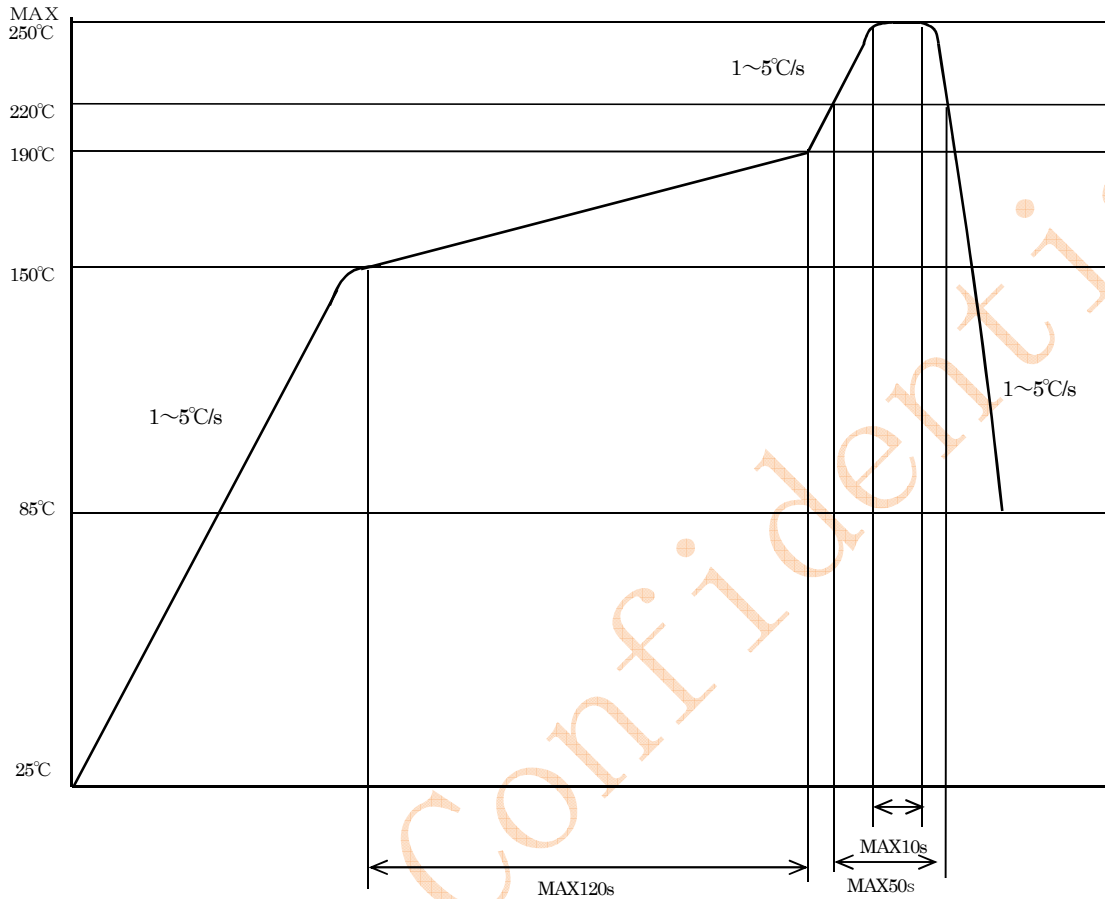GP2AP080C00F

Under dark condition

Precautions for Soldering

1. In case of solder reflow

    Reflow is allowed only three at the temperature and the time
    within the temperature profile as shown in the figure below.
    This Profile temperature is the sensor surface package temperature.
    Reflow interval shall be within 7days under conditions, 10 to 30℃, 70%RH or less.

2. Other precautions

    An infrared lamp used to heat up for soldering may cause a localized temperature rise in the resin.
    Also avoid immersing the resin part in the soldering.
    Even if within the temperature profile above, there is the possibility that the gold wire in package is broken
    in case that the deformation of PCB gives the affection to lead pins.
    Please use after confirmation the conditions fully actual solder reflow machine.