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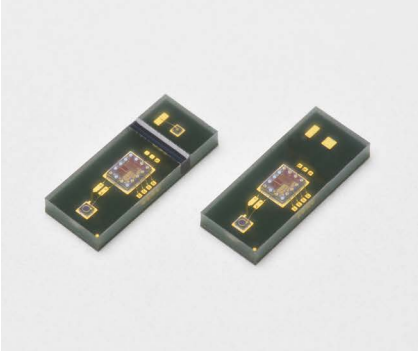
Near infrared/proximity type sensor



P13567-02CT G13568-02CT

I²C interface-compatible near IR sensor

These are compact optical devices that integrate an InGaAs photodiode and IC. Signal from a photodiode that receives near infrared light is output digitally through an I²C interface. A type with a built-in LED (P13567-02CT) and a type that includes a built-in LED driver and supports external LEDs (G13568-02CT) are available.

Features

- **I²C interface**
- **Low supply voltage: Vdd=2.25 V to 3.63 V**
- **I²C bus voltage: 1.65 V**
- **Low current consumption**
- **Small package (7.7 × 3.1 × 1.0 mm)**
- **Supports lead-free reflow soldering**
- **Built-in 16-bit A/D converter**
- **Built-in LED type (P13567-02CT)**
  External LED type (G13568-02CT)

Applications

- **Moisture level detection**
- **NIR (near infrared) photometry**

Structure

Parameter	P13567-02CT	NEW G13568-02CT	Unit
Detector	InGaAs PIN photodiode		-
Photosensitive area	ϕ0.3		mm
Emitter	Infrared LED	-	-
Emitter area	0.31 × 0.31	-	mm
Package	Plastic		-

Absolute maximum ratings (Ta=25 °C)

Parameter		Symbol	Condition	P13567-02CT	NEW G13568-02CT	Unit
Supply voltage		Vdd		-0.3 to +4		V
Load current		Io		±10		mA
Power dissipation		P		100		mW
Operating temperature		Topr	No dew condensation*1	-30 to +80		°C
Storage temperature		Tstg	No dew condensation*1	-40 to +85		°C
LED drive current	DC mode	IF		80	64 (total value of 3 terminals)	mA
	Pulse mode	IFP	Duty ratio=10%, pulse width=0.16 ms	80	50	
Reverse voltage*2		VR		1	5	V
Soldering temperature*3		Tsol		260 (3 times)		°C

*1: When there is a temperature difference between a product and the surrounding area in high humidity environment, dew condensation may occur on the product surface. Dew condensation on the product may cause deterioration in characteristics and reliability.
*2: When driven externally
*3: Reflow soldering, IPC/JEDEC J-STD-020 MSL3, see P.19
Note: Exceeding the absolute maximum ratings even momentarily may cause a drop in product quality. Always be sure to use the product within the absolute maximum ratings.

Recommended operating conditions

Parameter	Symbol	Condition	Min.	Typ.	Max.	Unit
Supply voltage	Vdd		2.25	3.3	3.63	V
I²C bus pull-up voltage*4	Vbus	Rp=2.2 kΩ	1.65	3.3	Vdd + 0.5	V
High level input voltage	Vih	SDA, SCL	1.55	-	Vdd + 0.5	V
Low level input voltage	Vil	SDA, SCL	-0.5	-	0.3 × Vbus	V
Bus capacitance	Cbus	SDA, SCL	-	-	400	pF
Maximum incident light level	-	Light source A	-	-	100	*lx*

*4: The pull-up resistance is determined by the Cbus capacitance and Vbus voltage. Satisfy the following condition: Vdd - Vbus < 1.2 V.

Electrical and optical characteristics

P13567-02CT

■ Sensor section (Ta=25 °C, Vdd=Vbus=Vanode=3.3 V, LED: λp=1.45 µm, initial setting: high gain, integration time: 100 ms, unless otherwise noted)

Parameter		Symbol	Condition	Min.	Typ.	Max.	Unit
Spectral response range		λ		-	0.9 to 1.7	-	µm
Peak sensitivity wavelength		λp		-	1.55	-	µm
Current consumption	Operation mode	Iddc	E=0 *lx* (dark state), excluding output current	30	75	150	µA
	Standby mode	Idds		0.1	1.0	3.0	
Dark count (when LED is in standby)		Sd	Dark state, initial setting	-	-	10	counts
Dark count (when LED is being driven)		Sdl	Dark state *5	0	3000	7500	counts
Sensitivity	High gain	Sh	Material of object: aluminum (reflectivity: 90%), distance to object: 1 mm *6	22500	50000	80000	counts/mW
Sensitivity gain ratio	High/Low	-		4.8	-	7.9	times

*5: LED driver (DC mode, IF=8 mA), integration time=100 ms
*6: LED driver (DC mode, IF=0.8 mA), integration time=100 ms

■ I²C section (Ta=25 °C, Vdd=Vbus=3.3 V, unless otherwise noted)

Parameter		Symbol	Condition	Min.	Typ.	Max.	Unit
I²C address		ADDR	7-bit		0 × 2A		
I²C clock frequency		fclk		1	-	400	kHz
SDA output voltage	High level	Voh	Rp=2.2 kΩ	0.8Vbus	-	-	V
	Low level	Vol	Rp=2.2 kΩ	0	-	0.4	V
I/O terminal capacitance		Ci		-	-	20	pF
SDA output fall time*7		tf	Rp=2.2 kΩ, Cp=400 pF	-	-	250	ns

*7: The SDA output rise time is determined by the time constant defined by Cbus × Rp.
Note: I²C interface (SDA, SCL) timing complies with "The I²C-bus specification version 2.1".

■ LED section (Ta=25 °C, Vanode=Vdd=3.3 V, unless otherwise noted)

Parameter	Symbol	Condition	Min.	Typ.	Max.	Unit
Peak emission wavelength	λp	IF=50 mA	1.4	1.45	1.5	µm
Spectral half width	Δλ	IF=50 mA	-	120	170	nm
Radiant flux	ϕe	IF=50 mA	1.8	2.4	-	mW
Forward voltage	VF	IF=50 mA	-	1.0	1.5	V
Reverse current	IR	VR=1 V	-	-	10	µA
Cutoff frequency*8	fc	IF=50 mA ± 10 mAp-p	-	15	-	MHz
Rise time	tr	20% to 80%*9	-	22	-	µs
Fall time	tf	80% to 20%*9	-	27	-	µs

*8: Frequency at which the light output drops by 3 dB relative to the output at 100 kHz
*9: When IF=8 mA in LED pulse mode

G13568-02CT

■ Sensor area (Ta=25 °C, Vdd=Vbus=3.3 V, unless otherwise noted)

Parameter		Symbol	Condition	Min.	Typ.	Max.	Unit
Spectral response range		λ		-	0.9 to 1.7	-	μm
Peak sensitivity wavelength		λp		-	1.55	-	μm
Current consumption	Operation mode	Iddc	E=0 *lx* (dark state), excluding output current	25	75	150	μA
	Standby mode	Idds		0.1	1.0	3.0	
Dark count		Sd	E=0 *lx* (dark state), initial setting	-	-	10	counts
Sensitivity	High gain	Sh	Light source A 100 *lx*	500	-	2500	counts/*lx*
Sensitivity gain ratio	High gain	-		4.8	-	7.9	times

■ I^2C area (Ta=25 °C, Vdd=Vbus=3.3 V, unless otherwise noted)

Parameter		Symbol	Condition	Min.	Typ.	Max.	Unit
I^2C address		ADDR	7-bit		0 × 2A		
I^2C clock frequency		fclk		1	-	400	kHz
SDA, SCL output voltage	High level	Voh	Rp=2.2 kΩ	0.8Vbus	-	-	V
	Low level	Vol	Rp=2.2 kΩ	0	-	0.4	V
I/O terminal capacitance		Ci		-	-	20	pF
SDA/SCL output fall time*10		tf	Rp=2.2 kΩ, Cp=400 pF	-	-	250	ns

*10: The SCL/SDA output rise time is determined by the time constant defined by Cbus × Rp.
Note: I^2C interface (SDA, SCL) timing complies with "The I^2C-bus specification version 2.1".

Register map

Adrs	Function	bit							
		7	6	5	4	3	2	1	0
00	RGB sensor control	Reset	Standby function	Standby function monitor	Register reset	Gain selection	Integration mode	Integration time setting	
01	Manual timing (high byte)	Manual timing (low byte)							
02	Manual timing (low byte)								
03	Output data (high byte)	Anode channel data (16 bits)							
04	Output data (low byte)								
05	-	Not used							
06	-								
07	-								
08	-								
09	-								
0A	-								
0B	-								
0C	-								
0D	-								
0E	LED drive control 1	LED reset	LED standby function	DC mode	1/10 mode	*11			
0F	LED drive control 2	LED1 drive current selection				*12			

*11: LED2 drive current selection (G13568-02CT)
*12: LED3 drive current selection (G13568-02CT)
Note: We recommend that the LEDs be used in DC mode.

■ Details of 00, 0E, 0F

P13567-02CT

Adrs		bit							
		7	6	5	4	3	2	1	0
00	Initial setting	Reset	Standby	Standby function monitor	Register reset	Gain	Integration mode	Integration time	
		1	1	-	1	0	1	0	0
	Function	0: Operation 1: reset	0: Operation 1: Standby	Readout only	0: Reset release 1: Address 03-0A Data reset	0: High gain 1: Low gain	0: Fixed time mode 1: Manual setting mode	(00) 32 µs (01) 0.5 ms (10) 8.2 ms (11) 65.5 ms	
0E	Initial setting	LED reset	LED standby	DC mode	1/10 mode				
		1	1	0	0				
	Function	0: Operation 1: reset	0: Operation 1: Standby	0: Pulse mode 1: DC mode	0: Normal mode 1: 1/10 mode				
0F	Initial setting	LED drive current							
		0	0	0	0				
	Function	0: 0 mA 1: 64 mA	0: 0 mA 1: 32 mA	0: 0 mA 1: 16 mA	0: 0 mA 1: 8 mA				

G13568-02CT

Adrs		bit							
		7	6	5	4	3	2	1	0
0	Initial setting	Reset	Standby	Standby function monitor	Register reset	Gain	Integration mode	Integration time	
		1	1	-	1	0	1	0	0
	Function	0: Operation 1: reset	0: Operation 1: Standby	Readout only	0: Reset release 1: Address 03-0A Data reset	0: High gain 1: Low gain	0: Fixed time mode 1: Manual setting mode	(00) 32 µs (01) 0.5 ms (10) 8.2 ms (11) 65.5 ms	
0E	Initial setting	LED reset	LED standby	DC mode	1/10 mode	LED2 drive current (0 mA)*13			
		1	1	0	0	0	0	0	0
	Function	0: Operation 1: reset	0: Operation 1: Standby	0: Pulse mode 1: DC mode	0: Normal mode 1: 1/10 mode	0: 0 mA 1: 64 mA	0: 0 mA 1: 32 mA	0: 0 mA 1: 16 mA	0: 0 mA 1: 8 mA
0F	Initial setting	LED1 drive current (0 mA)*13				LED3 drive current (0 mA)*13			
		0	0	0	0	0	0	0	0
	Function	0: 0 mA 1: 64 mA	0: 0 mA 1: 32 mA	0: 0 mA 1: 16 mA	0: 0 mA 1: 8 mA	0: 0 mA 1: 64 mA	0: 0 mA 1: 32 mA	0: 0 mA 1: 16 mA	0: 0 mA 8 mA

*13: Set to the total of the currents selected with the four bit parameters.

Program example (P13567-02CT, G13568-02CT)

Condition 1: Initial settings [manual setting mode, Tint=00 (32 µs), integration time=100 ms/ch (manual timing register set to 0x0C30)]

■ command

Action		Data body								Ack	Remark
Address call (0x2A)	S	0	1	0	1	0	1	0	W	A	7-bit address
Register call (0x00)		0	0	0	0	0	0	0	0	A	Specifies the control byte
Register write (0x84)		1	0	0	0	0	1	0	0	A	ADC reset, standby release
Address call (0x2A)	Sr	0	1	0	1	0	1	0	W	A	Restart, address
Register call (0x00)		0	0	0	0	0	0	0	0	A	Specifies the control byte
Register write (0x04)		0	0	0	0	0	1	0	0	A	P ADC reset release, bus release
Stands by for longer than the integration time (standby time > 400 ms)											
Address call (0x2A)	S	0	1	0	1	0	1	0	W	A	7-bit address
Register call (0x03)		0	0	0	0	0	1	0	1	A	Specifies the sensor data byte
Address call (0x2A)	Sr	0	1	0	1	0	1	0	R	A	Changes to read mode
Data read out (MSB)		X	X	X	X	X	X	X	X	*A*	Data output
Data read out (LSB)		X	X	X	X	X	X	X	X	$\bar{A}$	P

S=Start condition, Sr=Restart condition, A=Acknowledge, *A*=Acknowledge by host, P=Stop condition, R=Read mode (1), W=Write mode (0), $\bar{A}$=not acknowledge

■ Format

The rest is the same as the above command list.

S	0x2A (7 bits)	W	A	0x00	A	0x84	A

Sr	0x2A (7 bits)	W	A	0x00	A	0x04	A	P

When the SCL clock is 400 kHz, the write time is 135 µs.

Standby

S	0x2A (7 bits)	W	A	0x03	A	Sr	0x2A (7 bits)	R	A

Sensor data	A	Sensor data	$\bar{A}$	P

The readout time is 112.5 µs.

from master to slave from slave to master

Condition 2: [Fixed time mode, Tint=01 (0.5 ms), integration time=1.0 ms/ch]

■ Command

Action		Data body								Ack	Remark
Address call (0x2A)	S	0	1	0	1	0	1	0	W	A	7-bit address
Register call (0x00)		0	0	0	0	0	0	0	0	A	Specifies the control byte
Register write (0x81)		1	0	0	0	0	0	0	1	A	ADC reset, standby release
Address call (0x2A)	Sr	0	1	0	1	0	1	0	W	A	Restart, bit address
Register call (0x00)		0	0	0	0	0	0	0	0	A	Specifies the control byte
Register write (0x01)		0	0	0	0	0	0	0	1	A	P ADC reset release, bus release
Stands by for longer than the integration time. Measurement takes place during standby (standby time > 4 ms). Measurements are repeated continuously.											
Address call (0x2A)	S	0	1	0	1	0	1	0	W	A	7-bit address
Register call (0x03)		0	0	0	0	0	1	0	1	A	Specifies the sensor data byte
Address call (0x2A)	Sr	0	1	0	1	0	1	0	R	A	Changes to read mode
Data read out (infrared: MSB)		X	X	X	X	X	X	X	X	*A*	Data output
Data read out (infrared: LSB)		X	X	X	X	X	X	X	X	$\bar{A}$	P

S=Start condition, Sr=Restart condition, A=Acknowledge, *A*=Acknowledge by host, P=Stop condition, R=Read mode (1), W=Write mode (0), $\bar{A}$=not acknowledge

■ Format

The rest is the same as the above command list.

S	0x2A (7 bits)	W	A	0x00	A	0x81	A

Sr	0x2A (7 bits)	W	A	0x00	A	0x01	A	P

When the SCL clock is 400 kHz, the write time is 135 µs.

Standby

S	0x2A (7 bits)	W	A	0x03	A	Sr	0x2A (7 bits)	R	A

Sensor data	A	Sensor data	$\bar{A}$	P

The readout time is 112.5 µs.

from master to slave from slave to master

Condition 3: [Manual setting mode, Tint=01 (0.5 ms), manual timing=357 (0x165), integration time=357 ms/ch, low gain]

■ Command

Action		Data body								Ack	Remark
Address call (0x2A)	S	0	1	0	1	0	1	0	W	A	7-bit address
Register call (0x00)		0	0	0	0	0	0	0	0	A	Specifies the control byte
Register write (0x8D)		1	0	0	0	1	1	0	1	A	ADC reset, standby release
Register write (0x01)		0	0	0	0	0	0	0	1	A	Manual timing high byte
Register write (0x65)		0	1	1	0	0	1	0	1	A	Manual timing low byte
Address call (0x2A)	Sr	0	1	0	1	0	1	0	W	A	Restart, 7-bit address
Register call (0x00)		0	0	0	0	0	0	0	0	A	Specifies the control byte
Register write (0x0D)		0	0	0	0	1	1	0	1	A	P ADC reset release, bus release
Stands by for longer than the integration time. Measurement takes place during standby (standby time > 1428 ms).											
Address call (0x2A)	S	0	1	0	1	0	1	0	W	A	7-bit address
Register call (0x03)		0	0	0	0	0	1	0	1	A	Specifies the sensor data byte
Address call (0x2A)	Sr	0	1	0	1	0	1	0	R	A	Changes to read mode
Data read out (MSB)		X	X	X	X	X	X	X	X	*A*	Data output
Data read out (LSB)		X	X	X	X	X	X	X	X	$\bar{A}$	P

S=Start condition, Sr=Restart condition, A=Acknowledge, *A*=Acknowledge by host, P=Stop condition, R=Read mode (1), W=Write mode (0), $\bar{A}$=not acknowledge

■ Format

The rest is the same as the above command list.

S	0x2A (7 bits)	W	A	0x00	A	0x85	A

0x01	A	0x65	A

Sr	0x2A (7 bits)	W	A	0x00	A	0x0D	A	P

When the SCL clock is 400 kHz, the write time is 180 µs.

Standby

S	0x2A (7 bits)	W	A	0x03	A	Sr	0x2A (7 bits)	R	A

Sensor data	A	Sensor data	$\bar{A}$	P

The readout time is 112.5 µs.

from master to slave from slave to master

Condition 4: (LED drive DC mode, LED drive current=48 mA)

■ Command

· When starting operation

Action		Data body								Ack	Remark	
Address call (0x2A)	S	0	1	0	1	0	1	0	W	A	7-bit address	
Register call (0x0E)		0	0	0	0	1	1	1	0	A	Specifies the control byte	
Register write (0xA0)		1	0	1	0	0	0	0	0	A	Standby release, DC mode	
Register write (0x60)		0	1	1	0	0	0	0	0	A	Drive current	
Address call (0x2A)	Sr	0	1	0	1	0	1	0	W	A	Restart, 7-bit address	
Register call (0x0E)		0	0	0	0	1	1	1	0	A	Specifies the control byte	
Register write (0x20)		0	0	1	0	0	0	0	0	A	P	LED driver reset release, bus release

· When ending operation

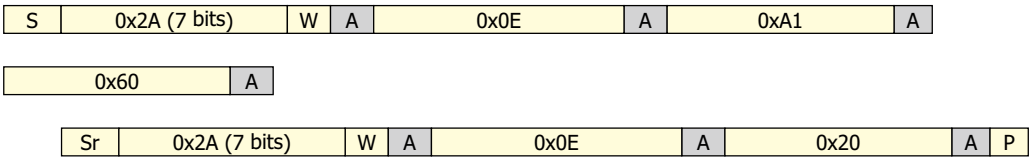
Action		Data body								Ack	Remark	
Address call (0x2A)	S	0	1	0	1	0	1	0	W	A	7-bit address	
Register call (0x0E)		0	0	0	0	1	1	1	0	A	Specifies the control byte	
Register write (0xC0)		1	1	0	0	0	0	0	0	A	P	Standby

S=Start condition, Sr=Restart condition, A=Acknowledge, $\bar{A}$=Acknowledge by host, P=Stop condition, R=Read mode (1), W=Write mode (0), $\bar{A}$=not acknowledge

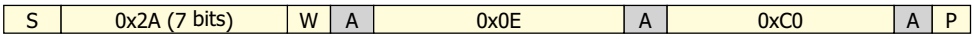
■ Format

The rest is the same as the above command list.

· When starting operation



· When ending operation

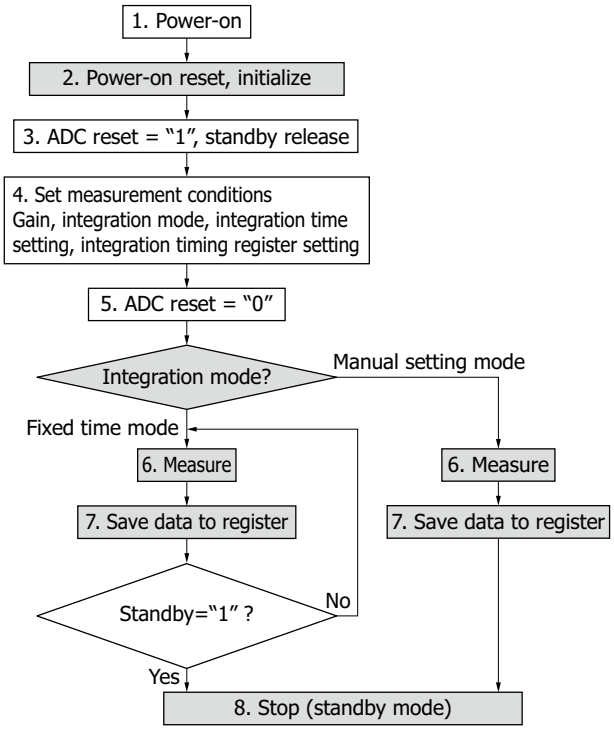


from master to slave from slave to master

Note: G13568-02CT does not have a built in LED, so it can not use this condition.

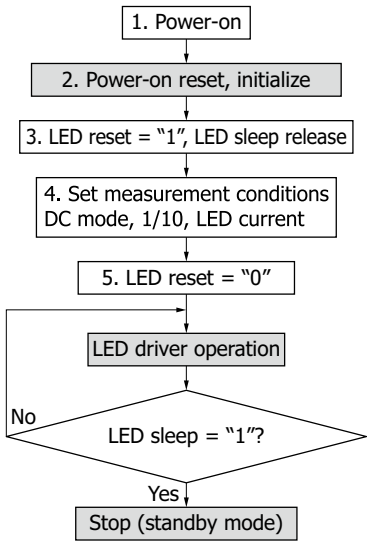
Flowcharts

Sensor section (P13567-02CT, G13568-02CT)



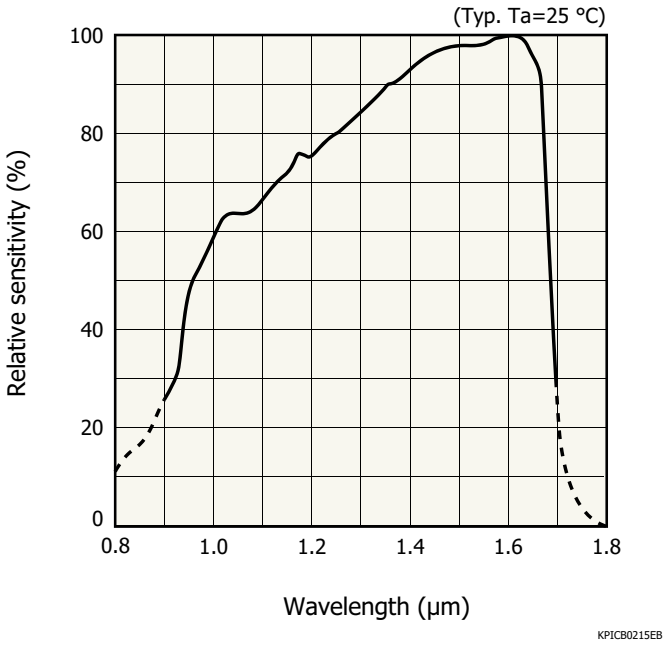
After power-on, the built-in power-on reset circuit operates to set all registers to their initial conditions (2.).
With the initial settings, the product is in standby mode, waiting for commands.
To set measurement conditions, enter commands via the I^2C bus. This product starts measuring when ADC reset changes from 1 to 0. Therefore, to write to registers, ADC reset must be set to 1 (3.). After setting measurement conditions (4.), release ADC reset to start measuring (5.). There are two operation modes: fixed time mode and manual setting mode. In manual setting mode, the product automatically enters standby mode after completing a single measurement. In fixed time mode, the product repeats measurement and data storage. During this repetition, if ADC reset or standby is set to 1 with an I^2C command, the product stops its operation.

LED driver (P13567-02CT)

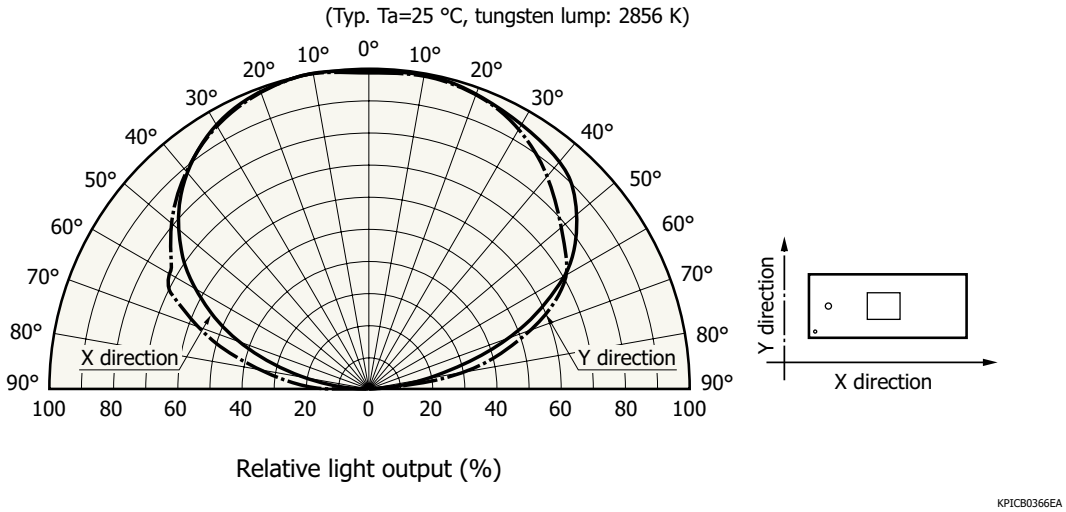


With the initial settings, the LED drivers are also in standby mode. Therefore, first disable the standby mode (3.). Next, set the LED current, 1/10 mode, DC mode, and the like. Then, release the reset to start operating (4. 5.). LED drivers continue to operate until they are set to standby mode. To end operation, enable standby mode.

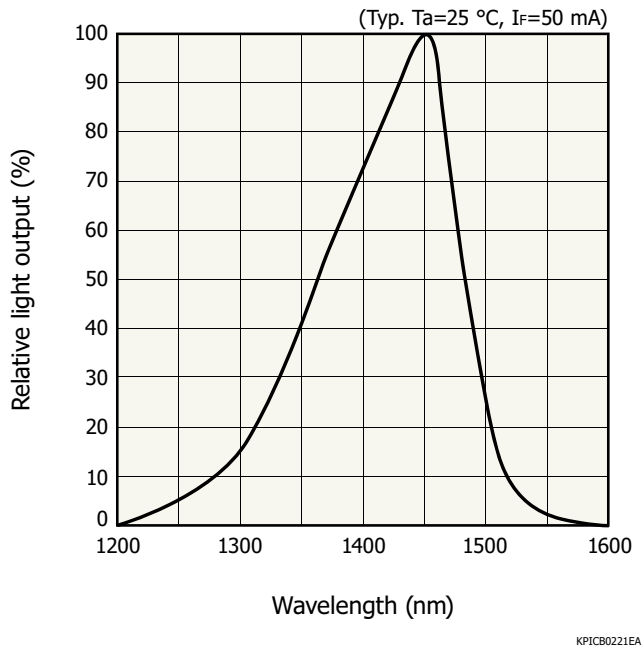
Spectral response (P13567-02CT, G13568-02CT)



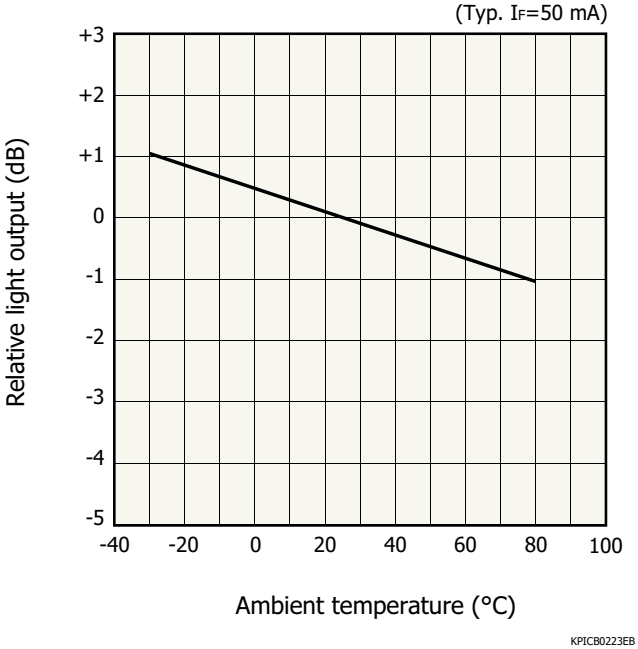
Directivity (P13567-02CT, G13568-02CT)



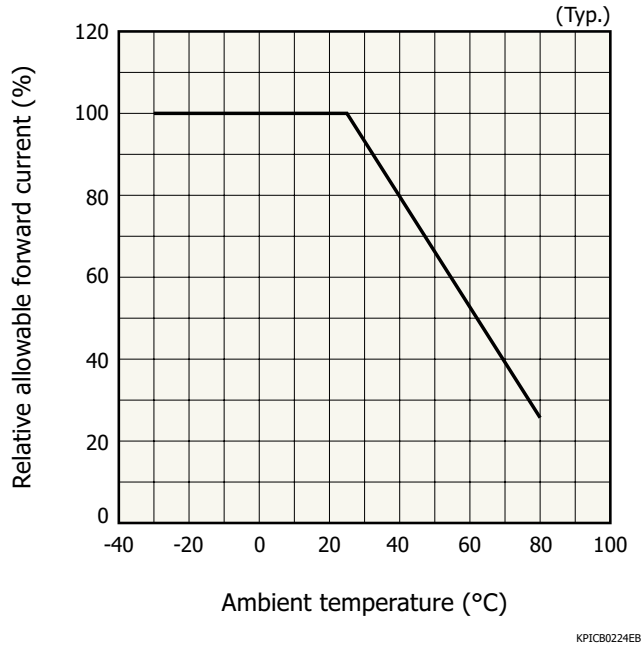
Emission spectrum (P13567-02CT)



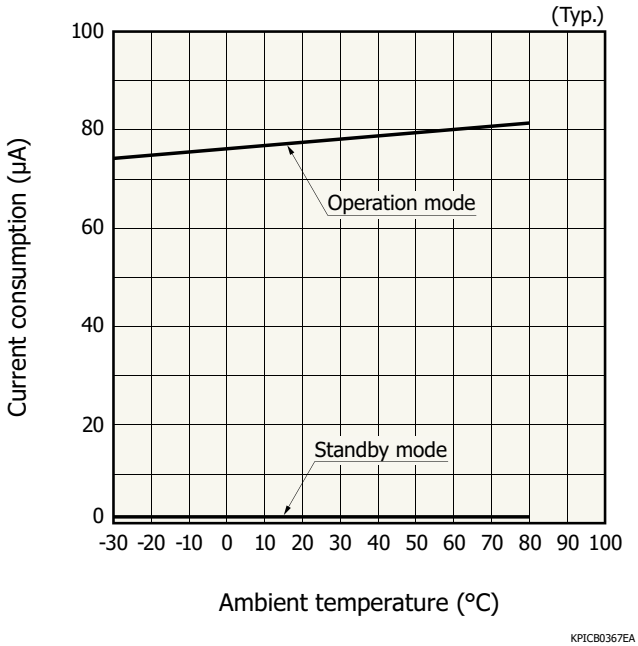
Light output vs. ambient temperature (P13567-02CT)



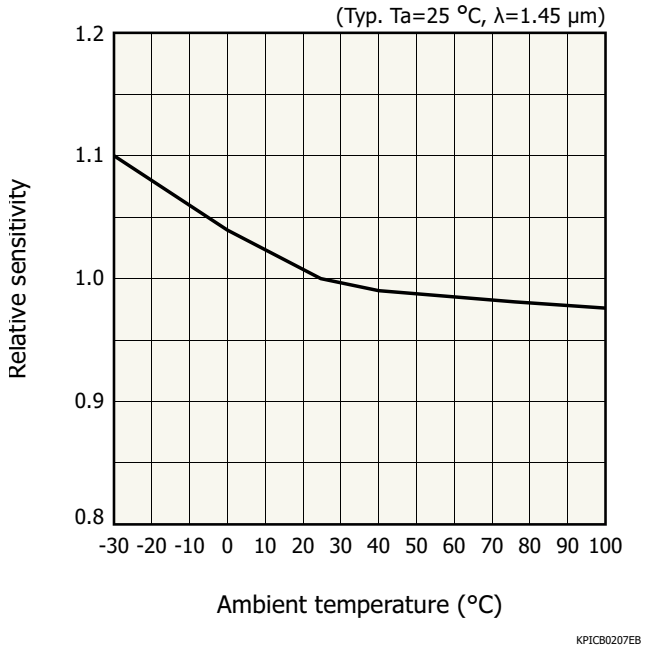
Allowable forward current vs. ambient temperature (P13567-02CT)



Current consumption vs. ambient temperature (P13567-02CT, G13568-02CT)



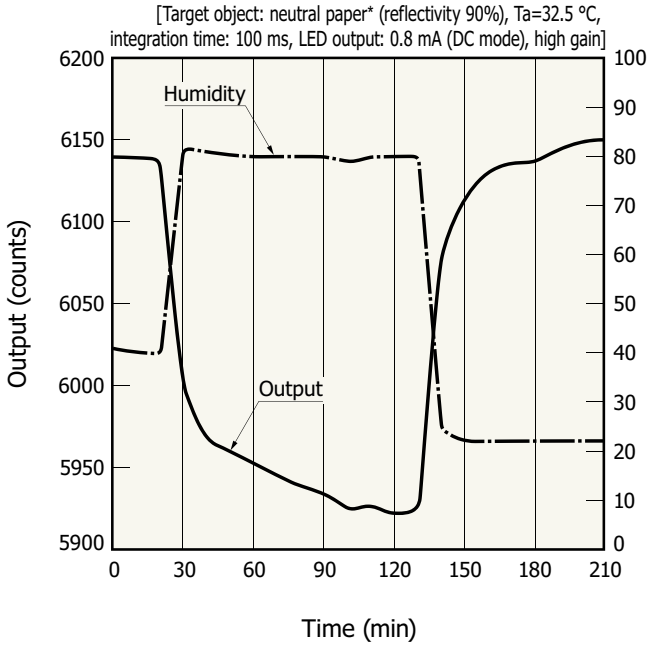
Sensitivity vs. ambient temperature (P13567-02CT, G13568-02CT)



KPICB0207EB

Measurement example of moisture level (P13567-02CT)

The moisture level of the neutral paper is detected when the humidity is changed (40% to 80% to 20%).

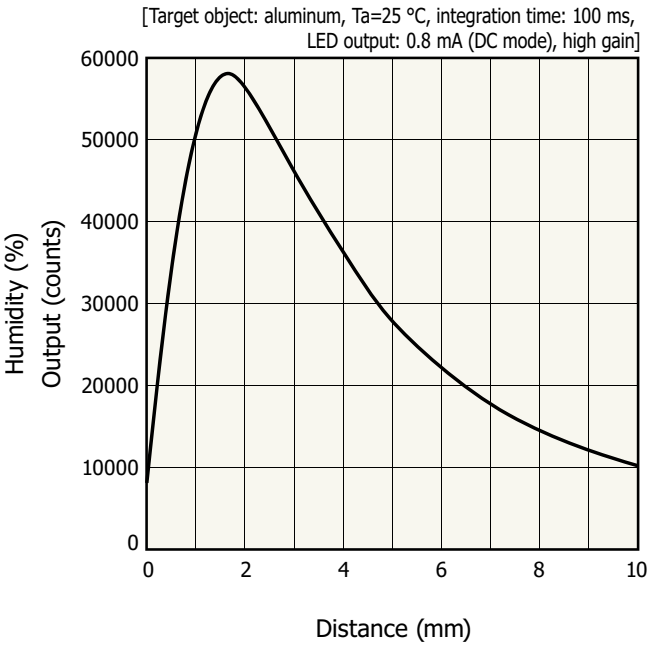


* through 1.2 mm thick glass

KPICB0236EB

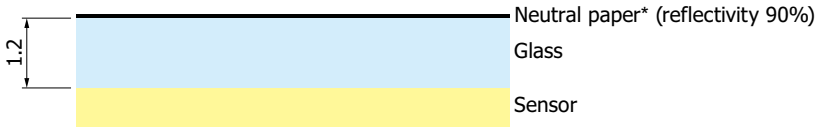
Output vs. distance between sensor and target object (P13567-02CT)

The sensor output is maximum when the distance between the sensor and target object is about 1.5 mm.



KPICB0344EA

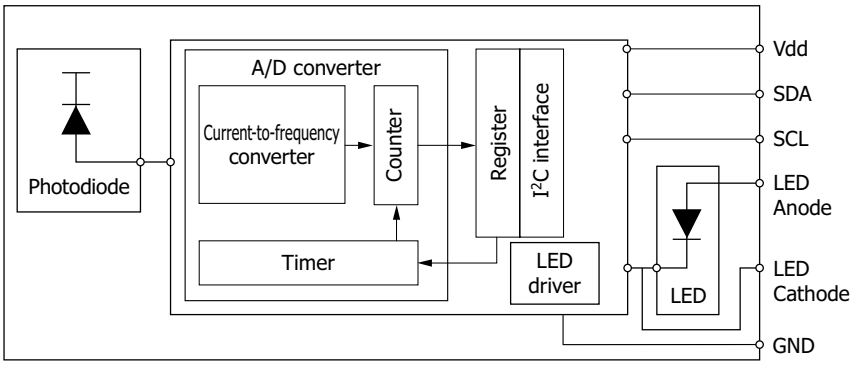
Cross section (unit: mm)



KPICC0313EB

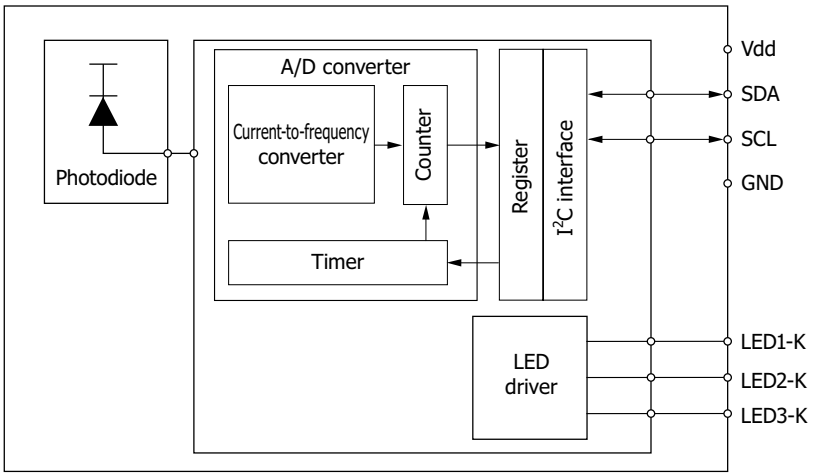
Block diagram

P13567-02CT



KPICC0299EB

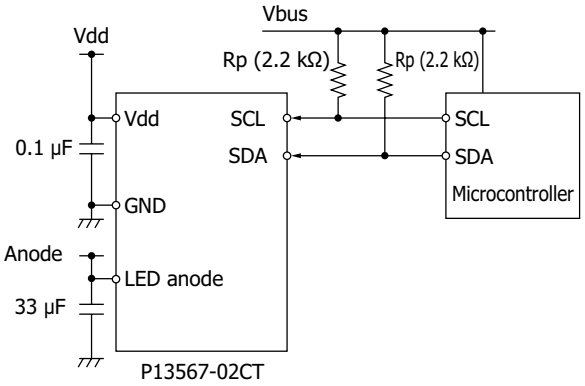
G13568-02CT



KPICC0292EB

Connection example

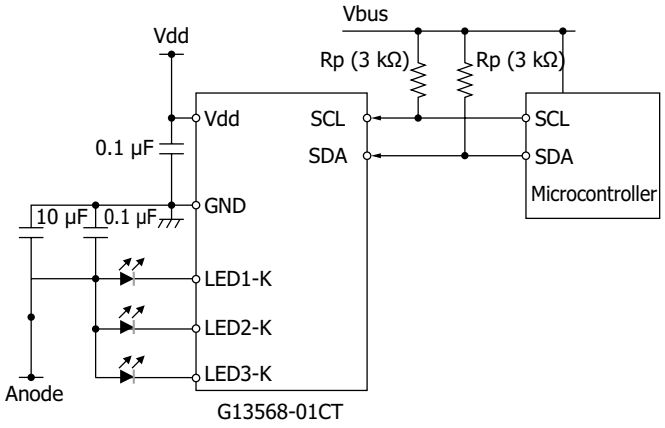
P13567-02CT



Note: When the LED is emitting light, do not externally control the LED.
If you are using Vdd and Vbus at different voltages, use them in the range that satisfies Vdd - Vbus<1.2 V.
Set the LED's anode voltage to V_F + 0.5 V or higher of the LED in use.
Leave the LED cathode open.

KPICC0374EC

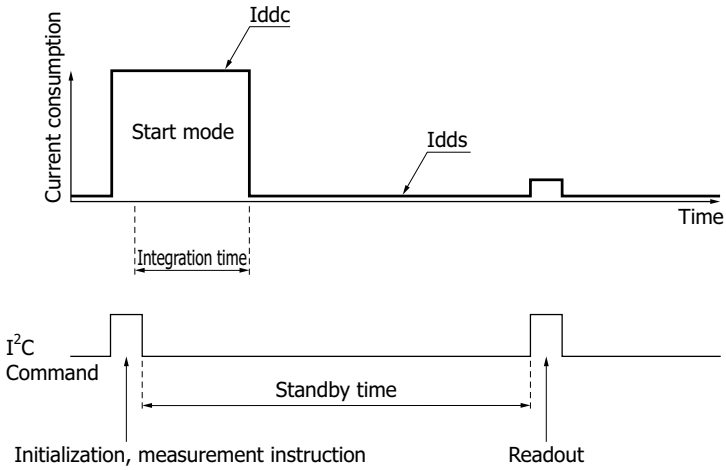
G13568-02CT



KPICC0296EB

Timing chart

Sensor section (manual mode)

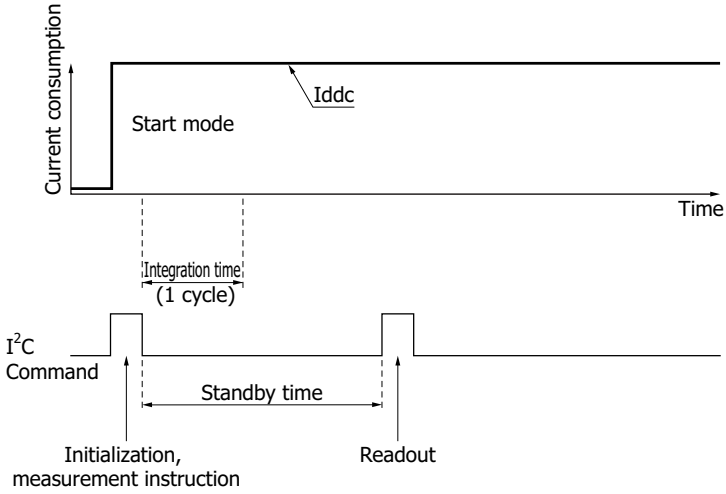


KPICC0293EA

The photodiode data is stored temporarily in a buffer register (not the I^2C register). After the completion of the measurement, the entire set of data is stored in the I^2C register. If this product is set to manual mode, after the integration time elapses, it will automatically switch to sleep mode. I^2C register values are not initialized with ADC reset or in standby mode. They are initialized only during a power-on reset when the power is turned on. The integration time per cycle is the sum of the three detection times indicated in the timing chart on the left.

· Initialization, measurement instruction
· Standby time (> integration time)
· Readout time

Sensor section (fixed time mode)



KPICC0294EA

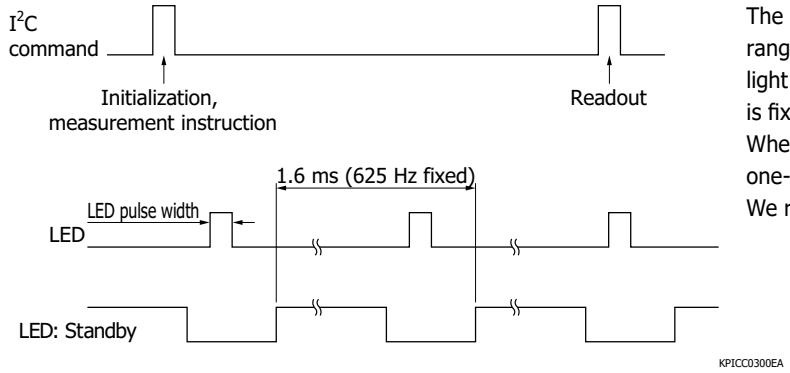
The measurement time is the shortest under the following conditions.

<Conditions>
· Fixed time mode, Tint=00 (32 µs)
· Integration time: 32 µs/ch
· SCL frequency: 400 kHz
· Initialization, measurement instruction: 135 µs
· Standby time (> integration time): 128 µs
· Readout time: 112.5 µs

Measurement time: 375.5 µs

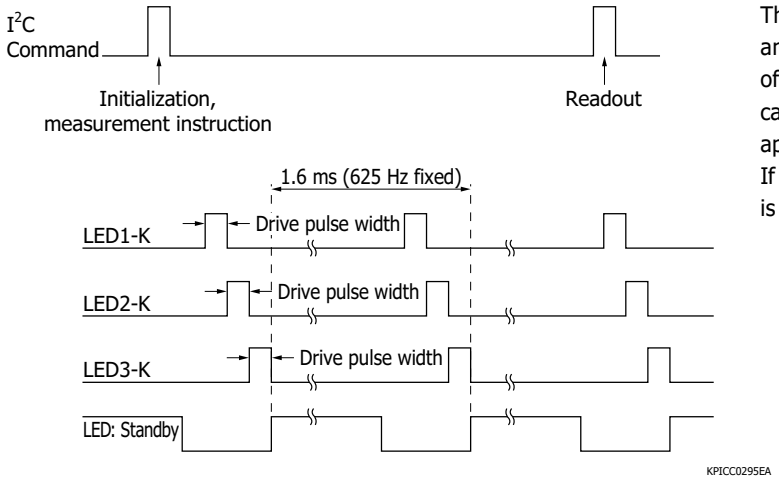
■ LED driver (pulse drive)

P13567-02CT



The LED driver can set the light emission pulse width in the range of 0 µs to 240 µs in 16 µs steps (16 levels total). The light emission cycle is approximately 1.6 ms. The drive current is fixed at 8 mA.
When set to low current mode, the drive current is reduced to one-tenth (0.8 mA).
We recommend that you use the LED driver in DC mode.

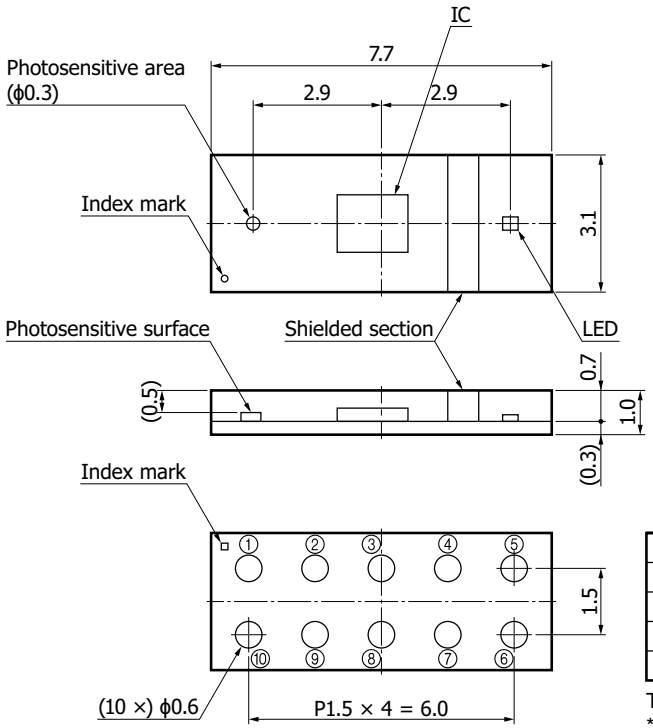
G13568-02CT



The 3-channel drivers operate in the order LED1-K, LED2-K, and LED3-K. The drive pulse width can be set in the range of 0 µs to 240 µs in 16-µs steps (16 levels total). Drive pulse can be set separately for each LED. The drive cycle is fixed at approximately 1.6 ms, and the drive current is fixed at 8 mA.
If set to low current mode, the current is set to 0.8 mA, which is 1/10 the initial setting.

Dimensional outline (unit: mm)

P13567-02CT

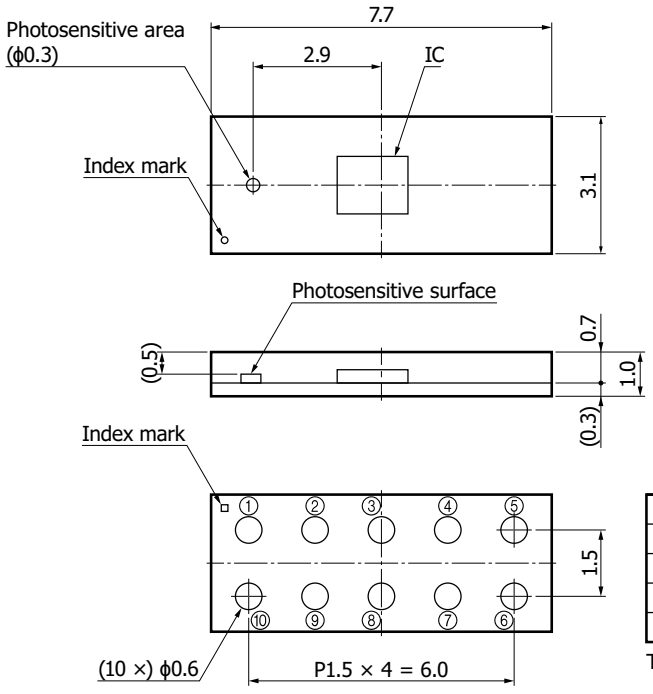


①	Vdd	⑥	LED anode
②	NC*	⑦	LED cathode
③	NC*	⑧	GND
④	NC*	⑨	SDA
⑤	NC*	⑩	SCL

Tolerance unless otherwise noted: ±0.2
* Please connected to open or GND.

KPICA0115EB

G13568-02CT



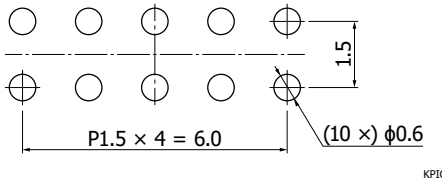
①	Vdd	⑥	NC
②	NC	⑦	LED2-K
③	NC	⑧	GND
④	LED3-K	⑨	SDA
⑤	LED1-K	⑩	SCL

Tolerance unless otherwise noted: ±0.2

KPICA0119EA

Note: When using this product, contact us for technical information. Please check the technical information first, and then create an appropriate device design.

Recommended land pattern (unit: mm)



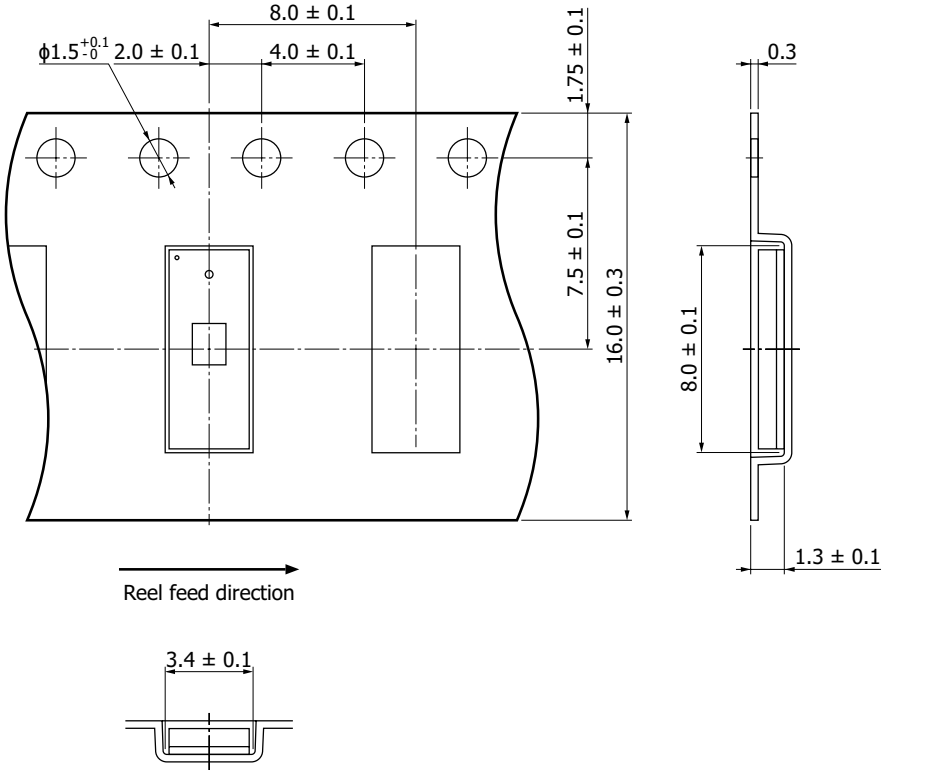
KPICC0372EB

Standard packing specifications

■ Reel

Dimensions	Hub diameter	Tape width	Material	Electrostatic characteristics
180 mm	60 mm	16 mm	PS	Conductive

■ Embossed tape (unit: mm, material: PS, conductive)

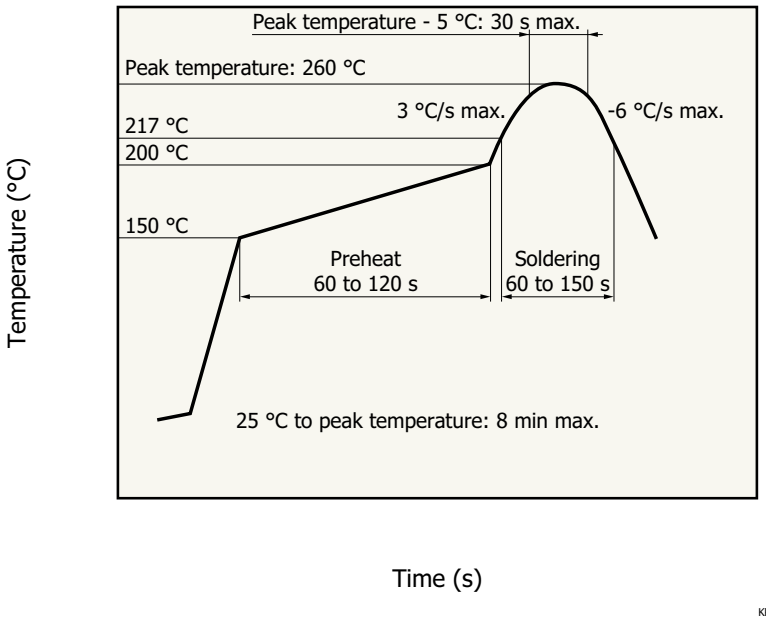


KPICC0392EA

■ Packing quantity
1000 pcs/reel

■ Packing type
Reel and desiccant in moisture-proof packaging (vacuum-sealed)

Measured example of temperature profile with our hot-air reflow oven for product testing



· This product supports lead-free soldering. After unpacking, store it in an environment at a temperature of 30 °C or less and a humidity of 60% or less, and perform soldering within 168 hours.
· If it is not stored in the above environment after unpacking or more than 12 months has passed without unpacking, perform baking. For the baking method, see the related information "Precautions of Surface mount type products."
· The effect that the product receives during reflow soldering varies depending on the circuit board and reflow oven that are used. When you set reflow soldering conditions, check that problems do not occur in the product by testing out the conditions in advance.

Related information

www.hamamatsu.com/sp/ssd/doc_en.html

■ Precautions
· Disclaimer
· Precautions / Surface mount type products

Evaluation kit C15285-01 for near infrared / proximity type sensor (built-in P13567-02CT)

An evaluation kit [60 mm (H) × 20 mm (V)] for understanding the operating principle of Hamamatsu's P13567-02CT and G13568-02CT near infrared / proximity type sensors is available. Contact us for detailed information.

Information described in this material is current as of January 2025.

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