Photomicrosensor (Reflective)

EE-SY1201

Built-in lens achieves 3 mm focal length

Small surface mounting type reflection sensor

• PCB surface mounting type.

Be sure to read *Safety Precautions* on page 3.

RoHS Compliant

Model Number Structure

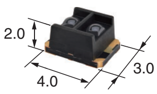
EE-S Y 1 201

(1) (2) (3) (4)

(1)	(2)	(3)	(4)
Photomicrosensor	Reflective	Phototransistor output	Serial number

Ordering Information

Photomicrosensor

Appearance	Sensing method	Connecting method	Sensing distance	Output type	Model	Minimum packing unit (Unit: pcs)
	Reflective	SMT	3.0 mm	Phototransistor	**EE-SY1201**	1,000

Note: Order in multiples of minimum packing unit.

Ratings, Characteristics and Exterior Specifications

Absolute Maximum Ratings (Ta = 25°C)

Item		Symbol	Rated value	Unit
Emitter				
	Forward current	I_F	50 *1	mA
	Reverse voltage	V_R	6	V
Detector				
	Collector-emitter voltage	V_{CEO}	35	V
	Emitter-collector voltage	V_{ECO}	6	V
	Collector current	I_C	20	mA
	Collector dissipation	P_C	75 *1	mW
Total allowable loss		P_{tot}	100 *1	mW
Operating temperature		T_{opr}	-25 to 85	°C
Storage temperature		T_{stg}	-40 to 100	°C
Reflow soldering temperature		T_{sol}	260 *2	°C

*1. Refer to the temperature rating chart if the ambient temperature exceeds 25°C.
*2. Complete soldering within 5 seconds.
For reflow soldering, use the conditions given on page 5.

Exterior Specifications

Connecting method	Weight (g)	Material
SMT	0.025	Case: Epoxy resin Sealing resin: Epoxy resin

Electrical and Optical Characteristics (Ta = 25°C)

Item		Symbol	Value MIN.	Value TYP.	Value MAX.	Unit	Condition
Emitter							
	Forward current	V_F	---	1.2	1.4	V	I_F = 20 mA
	Reverse voltage	I_R	---	---	10	μA	V_R = 6 V
	Peak emission wavelength	λ_P	---	950	---	nm	---
Detector							
	Light current	I_L	60	---	410	μA	I_F = 4 mA, V_{CE} = 2 V, Aluminum-deposited
	Dark current	I_D	---	1	100	nA	V_{CE} = 20 V, 0 lx
	Leakage current	I_{LEAK}	---	---	700	nA	I_F = 4 mA, V_{CE} = 2 V, with no reflection
	Collector-emitter saturated voltage	V_{CE} (sat)	---	---	---	V	---
	Peak spectral sensitivity wavelength	λ_P	---	930	---	nm	---
Rising time		tr	---	20	100	μs	V_{CC} = 2 V, R_L = 1 kΩ, I_L = 100 μA, d = 4 mm *
Falling time		tf	---	20	100	μs	V_{CC} = 2 V, R_L = 1 kΩ, I_L = 100 μA, d = 4 mm *

* Refer to *Fig 12. Light Current Measurement Setup Diagram* on page 2.

Engineering Data (Reference values)

Fig 1. Forward Current vs. Allowable Power Dissipation Temperature Rating

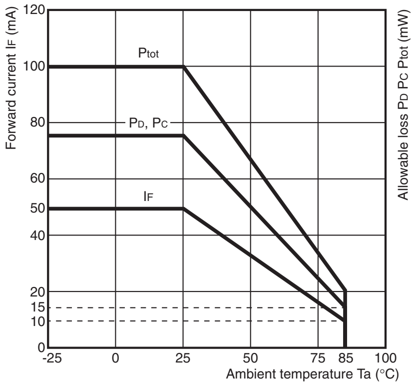


Fig 2. Forward Current vs. Forward Voltage Characteristics (Typical)

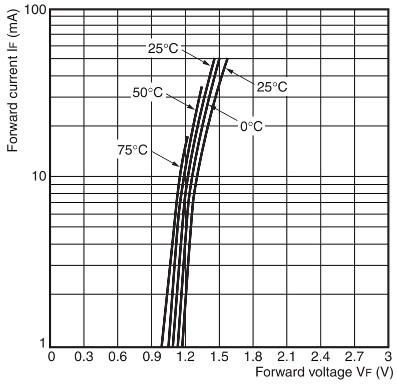


Fig 3. Light Current vs. Forward Current Characteristics (Typical)

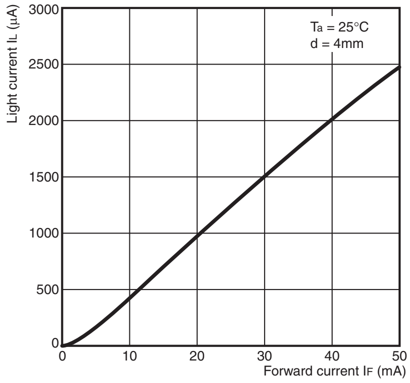


Fig 4. Light Current vs. Collector-Emitter Voltage Characteristics (Typical)

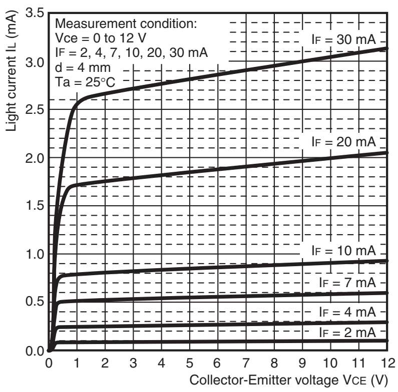


Fig 5. Relative Light Current vs. Ambient Temperature Characteristics (Typical)

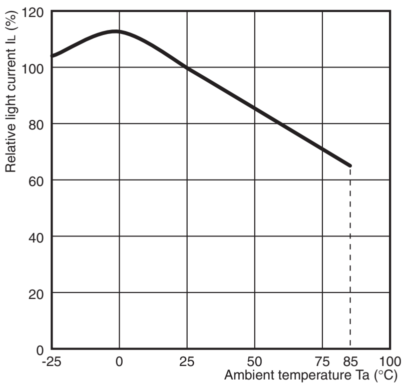


Fig 6. Dark Current vs. Ambient Temperature Characteristics (Typical)

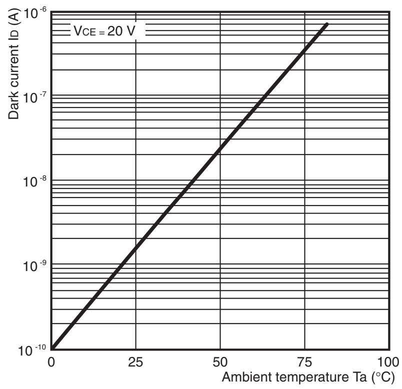


Fig 7. Response Time vs. Load Resistance Characteristics (Typical)

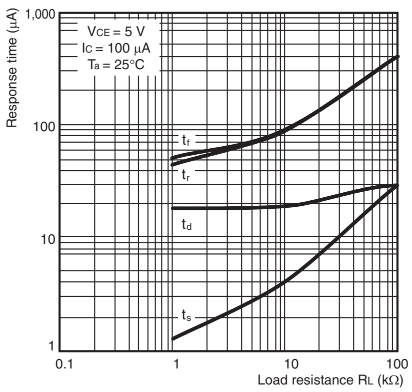


Fig 8. Relative Light Current vs. Distance Characteristics (Typical)

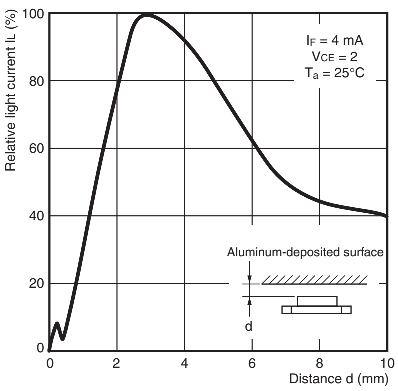


Fig 9. Relative Light Current vs. Card Moving Distance Characteristics (Typical)

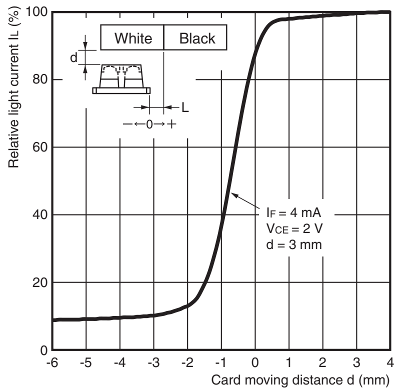


Fig 10. Relative Light Current vs. Card Moving Distance Characteristics (Typical)

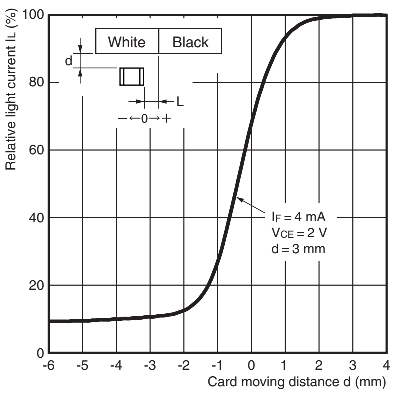


Fig 11. Response Time Measurement Circuit

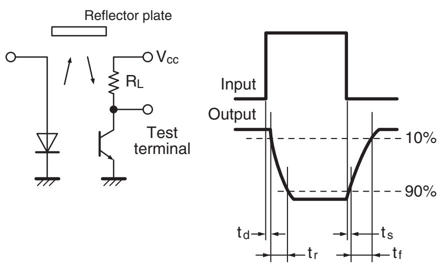
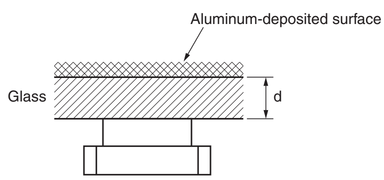


Fig 12. Light Current Measurement Setup Diagram



Safety Precautions

To ensure safe operation, be sure to read and follow the Instruction Manual provided with the Sensor.

⚠ CAUTION

This product is not designed or rated for ensuring safety of persons either directly or indirectly. Do not use it for such purposes.

Precautions for Safe Use

Do not use the product with a voltage or current that exceeds the rated range.

Applying a voltage or current that is higher than the rated range may result in explosion or fire.

Do not miswire such as the polarity of the power supply voltage.

Otherwise the product may be damaged or it may burn.

This product does not resist water. Do not use the product in places where water or oil may be sprayed onto the product.

Precautions for Correct Use

Do not use the product in atmospheres or environments that exceed product ratings.

This product is for surface mounting. Refer to "Soldering Information, Storage and Baking" for details.

Dispose of this product as industrial waste.

Dimensions and Internal Circuit

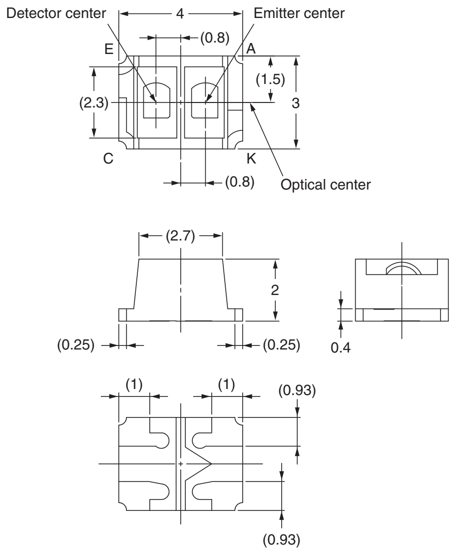
CAD Data marked products, 2D drawings and 3D CAD models are available.
For CAD information, please visit our website, which is noted on the last page.

(Unit: mm)

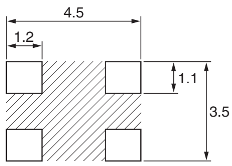
Photomicrosensor

EE-SY1201

CAD Data



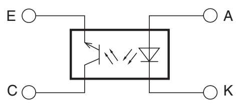
Recommended Soldering Pattern



Note: The shaded portion in the above figure may cause shorting.
Do not wire in this portion.

Terminal No.	Name
A	Anode
K	Cathode
C	Collector
E	Emitter

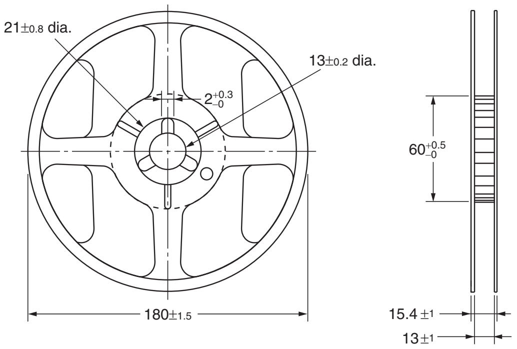
Internal circuit



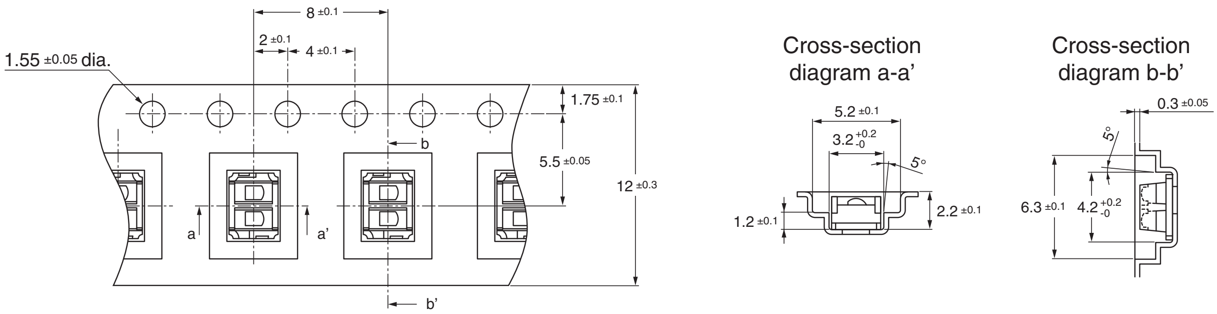
Unless otherwise specified, the dimensional tolerance is ±0.3 mm.

Tape and Reel

Reel (Unit: mm) *

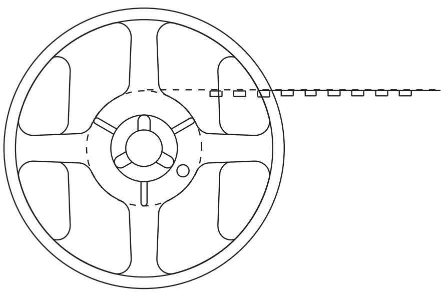


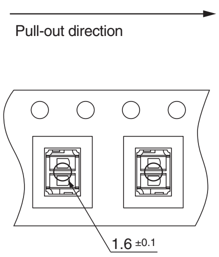
Tape (Unit: mm)



Part Mounting

The devices are oriented in the rectangular holes in the carrier tape so that the edge with the receiver faces the round feeding holes.





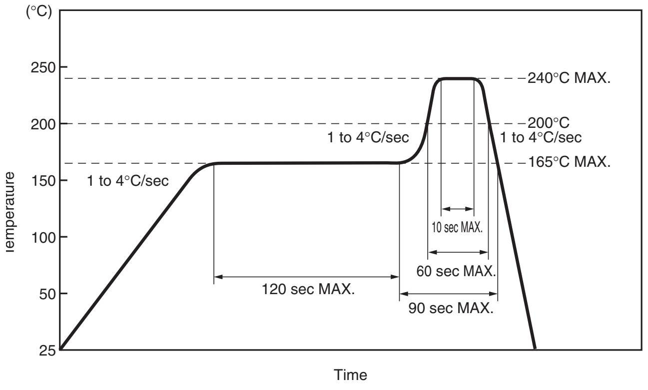
Packing Specifications

- One reel is sealed in an aluminum-laminated bag.
- The model number, lot number, and quantity are given on the label.

Soldering Information

Reflow soldering: Temperature profile

The reflow soldering must be completed at one time and must comply with the following diagram.



Solder Quantity

The pin's wiring pattern between the package and the board must not be soldered. Doing so would result in damage to the product's reliability. Make sure to adjust the solder quantity to the product sidewall of the terminal.

Other Notes

- The use of an infrared lamp causes the temperature of the resin to rise partially too high.
- Do not immerse the resin part into the solder.
- Test the soldering method under actual conditions and make sure the soldering works fine, since the impact on the junction between the device and PCB varies depending on the cooling and soldering conditions.

Storage

Storage conditions

Store the product under the following conditions:
Temperature: 5 to 30 °C
Humidity: 70% max.

Treatment after open

1. After opening the bag, store the products between 5 and 25°C at 60% humidity or lower and mount them within two days.
2. If storage for longer than two days after opening the bag is required, use a dry box or reseal the products in a moisture-proof bag with a commercially available desiccant. Store them between 5 and 30°C at 70% humidity or lower, and mount them within two weeks.

Cleaning Conditions

Cleaning in Solvent:
Solvent temperature: 45°C max.
Immersion time: 3 minutes max.
Ultrasonic Cleaning:
Do not use ultrasonic cleaning.
Recommended Solvents:
Ethyl alcohol, methyl alcohol, or isopropyl alcohol

Baking

If the above treatment could not be carried out, mounting is still possible after baking treatment.
However, baking treatment must be limited to only one time.
Recommended conditions: 125°C, 16 to 24 hours

Note: Do not bake the products while they are still in the bag.
Temporarily mount them to the PCB or place them in metal trays.

Please check each region's Terms & Conditions by region website.

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