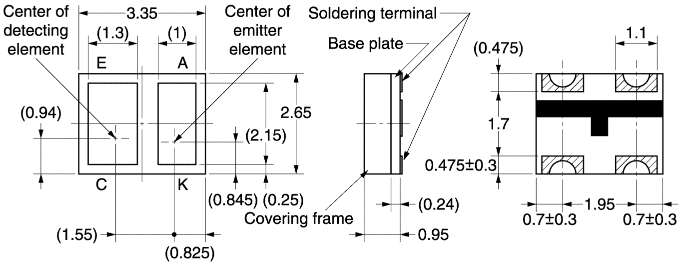
EE-SY193

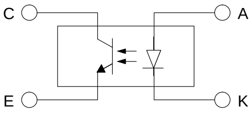
Photomicrosensor
(Reflective)

■ Dimensions

Note: All units are in millimeters unless otherwise indicated.

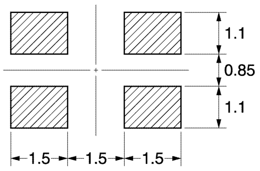


Internal Circuit



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

Recommended soldering patterns



Unless otherwise specified, the tolerances are ±0.2 mm.

■ Features

- Ultra-compact model.
- PCB surface mounting type.

■ Absolute Maximum Ratings (Ta = 25°C)

Item		Symbol	Rated value
Emitter	**Forward current**	I_F	25 mA (see note 1)
	Pulse forward current	I_{FP}	100 mA (see note 2)
	Reverse voltage	V_R	6 V
Detector	**Collector–Emitter voltage**	V_{CEO}	18 V
	Emitter–Collector voltage	V_{ECO}	4 V
	Collector current	I_C	20 mA
	Collector dissipation	P_C	75 mW (see note 1)
Ambient temperature	**Operating**	Topr	–30°C to 80°C
	Storage	Tstg	–40°C to 85°C
	Reflow soldering	Tsol	220°C (see note 3)
	Manual soldering	Tsol	300°C (see note 3)

Note:
1. Refer to the temperature rating chart if the ambient temperature exceeds 25°C.
2. Duty: 1/100; Pulse width: 0.1 ms
3. Complete soldering within 10 seconds for reflow soldering and within 3 seconds for manual soldering.

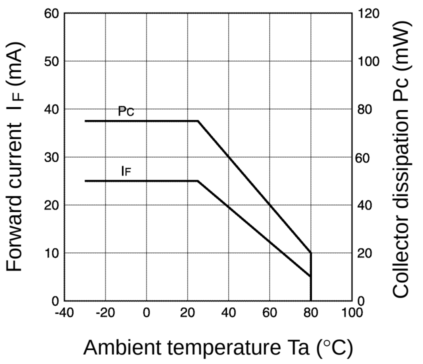
■ Electrical and Optical Characteristics (Ta = 25°C)

Item		Symbol	Value	Condition
Emitter	**Forward voltage**	V_F	1.1 V typ., 1.3 V max.	I_F = 4 mA
	Reverse current	I_R	10 µA max.	V_R = 6 V
	Peak emission wavelength	λ_P	940 nm typ.	I_F = 20 mA
Detector	**Light current**	I_L	100 µA min., 150 µA typ., 360 µA max.	Aluminum-deposited surface, I_F = 4 mA, V_{CE} = 2 V, d = 1 mm (see note)
	Dark current	I_D	100 nA max.	V_{CE} = 10 V, 0 ℓx
	Leakage current	I_{LEAK}	1 µA max.	I_F = 4 mA, V_{CE} = 2 V
	Collector–Emitter saturated voltage	V_{CE} (sat)	---	---
	Peak spectral sensitivity wavelength	λ_P	900 nm typ.	---
Rising time		tr	25 µs typ.	V_{CC} = 2 V, R_L = 1 kΩ,
Falling time		tf	30 µs typ.	V_{CC} = 2 V, R_L = 1 kΩ,

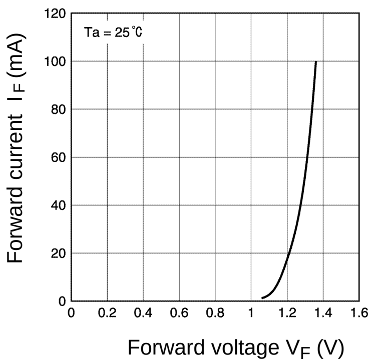
Note: The letter "d" indicates the distance between the top surface of the sensor and the sensing object.

■ Engineering Data

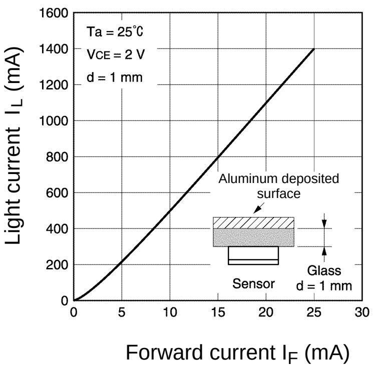
Forward Current vs. Collector Dissipation Temperature Rating



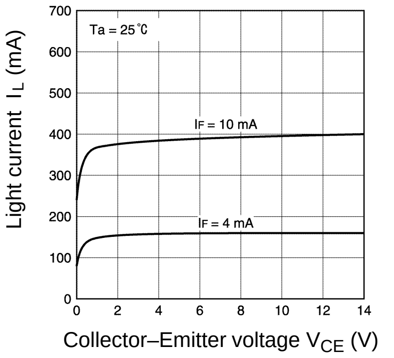
Forward Current vs. Forward Voltage Characteristics (Typical)



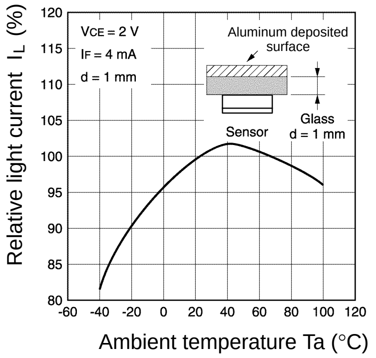
Light Current vs. Forward Current Characteristics (Typical)



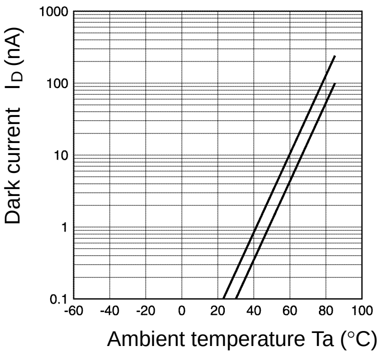
Light Current vs. Collector–Emitter Voltage Characteristics (Typical)



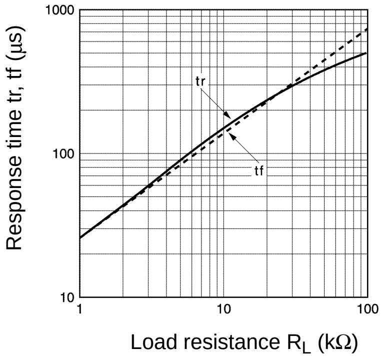
Relative Light Current vs. Ambient Temperature Characteristics (Typical)



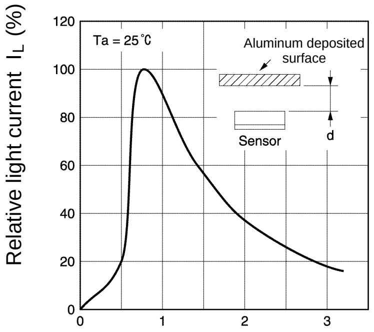
Dark Current vs. Ambient Temperature Characteristics (Typical)



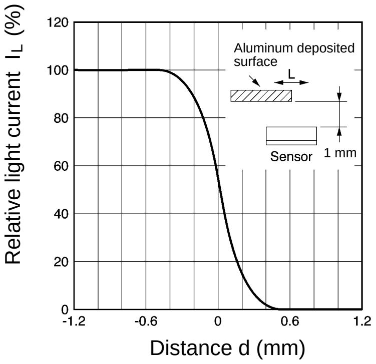
Response Time vs. Load Resistance Characteristics (Typical)



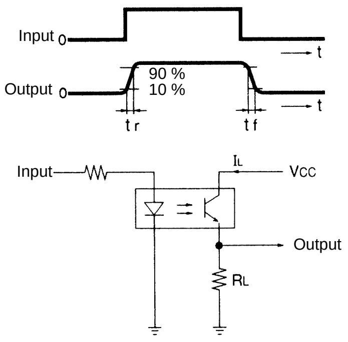
Sensing Distance Characteristics (Typical)



Sensing Position Characteristics (Typical)



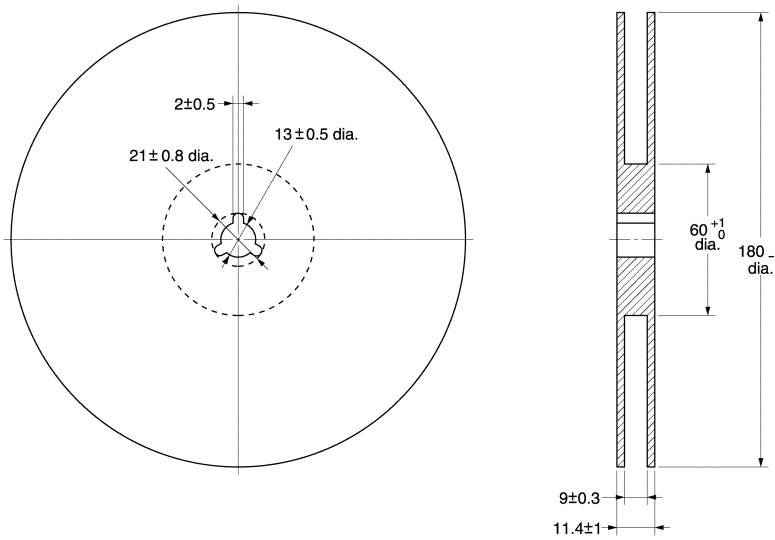
Response Time Measurement Circuit



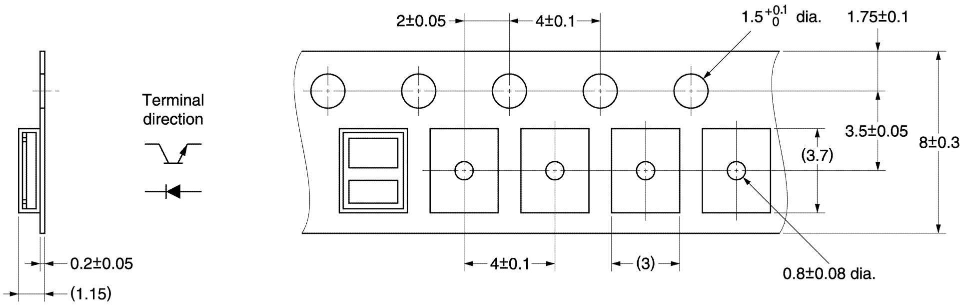
Unit: mm (inch)

■ Tape and Reel

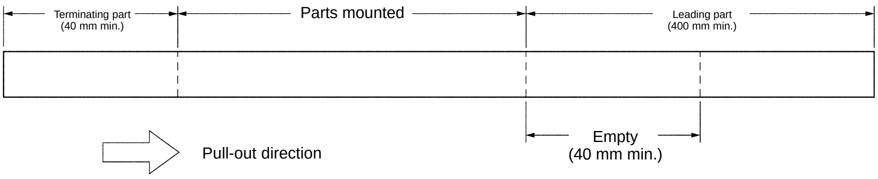
Reel



Tape



Tape configuration



Tape quantity

3,000 pcs./reel

Precautions

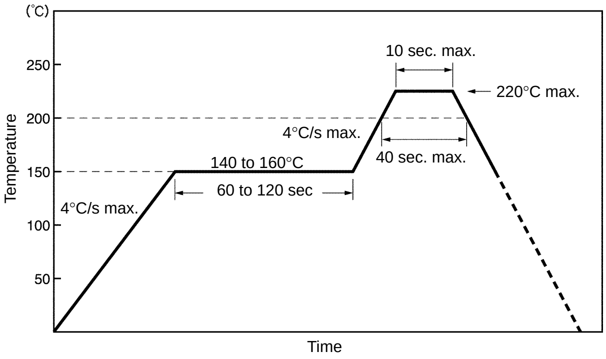
■ Soldering Information

Reflow soldering

- The following soldering paste is recommended:

  Melting temperature: 178 to 192°C

  Composition: Sn 63%, Pb 37%
- The recommended thickness of the metal mask for screen printing is between 0.2 and 0.25 mm.
- Set the reflow oven so that the temperature profile shown in the following chart is obtained for the upper surface of the product being soldered.



Manual soldering

- Use ”Sn 60” (60% tin and 40% lead) or solder with silver content.
- Use a soldering iron of less than 25 W, and keep the temperature of the iron tip at 300°C or below.
- Solder each point for a maximum of three seconds.
- After soldering, allow the product to return to room temperature before handling it.

Storage

To protect the product from the effects of humidity until the package is opened, dry-box storage is recommended. If this is not possible, store the product under the following conditions:

Temperature: 10 to 30°C

Humidity: 60% max.

The product is packed in a humidity-proof envelope. Reflow soldering must be done within 48 hours after opening the envelope, during which time the product must be stored under 30°C at 80% maximum humidity.

If it is necessary to store the product after opening the envelope, use dry-box storage or reseal the envelope.

Baking

If a product has remained packed in a humidity-proof envelope for six months or more, or if more than 48 hours have lapsed since the envelope was opened, bake the product under the following conditions before use:

Reel: 60°C for 24 hours or more
Bulk: 80°C for 24 hours or more