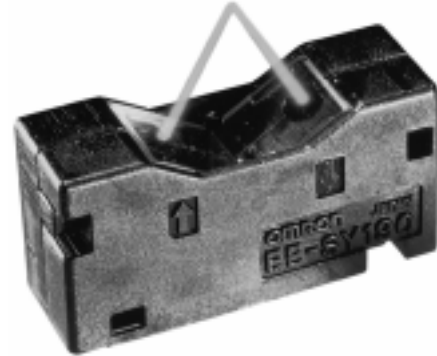


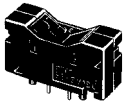
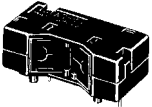
EE-SY190/191

Reflective Photomicrosensor uses
Fresnel Lenses to Enhance Sensing
Characteristics

- High-precision optical technology ensures excellent limited sensing range and sensing position characteristics
- Ideal for paper/OHP detection in OA/CP markets
- Available in top-view model (EE-SY190) and side-view model (EE-SY191)
- Compact package (Length 18mm x Width 6mm x Height 9 mm)



Ordering Information

Appearance	Sensing method	Sensing distance	Output configuration	Weight	Part number
	Reflective	4.0 mm (min) 4.5 mm (typ) 5.0 mm (max)	Phototransistor	Approx. 0.95 g	EE-SY190
	Reflective	4.0 mm (min) 4.5 mm (typ) 5.0 mm (max)	Phototransistor	Approx. 0.88 g	EE-SY191

Specifications

■ ABSOLUTE MAXIMUM RATINGS ($T_A = 25^\circ\text{C}$ (77°F))

Item		Symbol	Rated value
Emitter	Forward current	I_F	50 mA (See Note 1.)
	Pulse forward current	I_{FP}	1 A (See Note 2.)
	Reverse voltage	V_R	4 V
Receiver	Collector-emitter voltage	V_{CEO}	30 V
	Emitter-collector voltage	V_{ECO}	---
	Collector current	I_C	20 mA
	Collector dissipation	P_C	100 mW (See Note 1.)
Ambient temperature	Operating	T_{opr}	-25°C to 85°C (-13°F to 185°F) (See Note 3.)
	Storage	T_{stg}	-40°C to 100°C (-40°F to 212°F)
	Soldering	T_{sol}	260°C (500°F) (10 seconds max.)

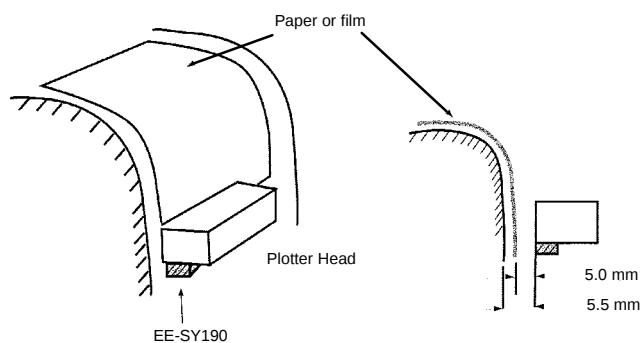
Note: 1. Refer to Engineering Data if the ambient temperature is not within the normal room temperature. I_F , P_C and P_{OUT} must be derated according to the Temperature Characteristics curves contained within the Engineering Data section.

2. The pulse width is 10 μs maximum with a frequency of 100 Hz.

3. To be used on in applications where no freezing or condensation occurs.

■ TYPICAL APPLICATION

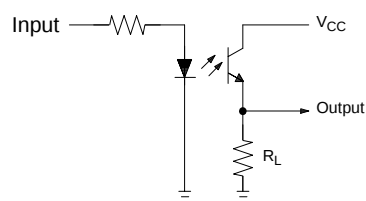
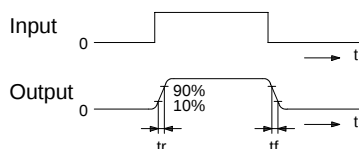
The EE-SY190 microsensor detects the size and edge of overhead transparency film or white paper without detecting the background surface.



■ CHARACTERISTICS ($T_A = 25^\circ\text{C}$ (77°F))

Item		Symbol	Value	Condition
Emitter	Forward voltage	V_F	1.2 V typ., 1.5 V max.	$I_F = 30\text{ mA}$
	Reverse current	I_R	10 μA max.	$V_R = 4\text{ V}$
	Peak emission wavelength	$\lambda_{P(L)}$	940 nm typ.	$I_F = 30\text{ mA}$
Receiver	Light current (See Note 1.)	I_L	50 μA min., 180 μA typ., 600 μA max.	$I_F = 20\text{ mA}$, $V_{CE} = 5\text{ V}$ White paper with a reflection factor of 90%, $d = 4.5\text{ mm}$ (See Note 1.)
	Dark current	I_D	2 nA typ., 100 nA max.	$V_{CE} = 5\text{ V}$, 0 lx
	Leakage current	I_{LEAK}	1 μA max.	$I_F = 20\text{ mA}$, $V_{CE} = 5\text{ V}$ without object
	Peak spectral sensitivity wavelength	$\lambda_{P(P)}$	850 nm typ.	$V_{CE} = 5\text{ V}$
Rising time (See Note 2.)		t_r	30 μs typ.	$V_{CC} = 5\text{ V}$, $R_L = 1\text{ k}\Omega$, $I_L = 200\text{ }\mu\text{A}$
Falling time (See Note 2.)		t_f	30 μs typ.	$V_{CC} = 5\text{ V}$, $R_L = 1\text{ k}\Omega$, $I_L = 200\text{ }\mu\text{A}$

- Note: 1. The letter "d" indicates the distance between the top surface of the sensor and the sensing object.
 2. The illustration below shows the rising time, t_r , and the falling time, t_f .



■ SENSING CHARACTERISTICS (T_A = 25°C (77°F))

Item	Symbol	Value	Condition
Light-convergent characteristics	ΔL	+4.0/-3.0 mm typ., +5.5/-3.5 mm max.	ΔL defined as $I_L = 20\%$ assuming $I_L = 100\%$ at $d = 4.5$ mm (see Fig. 1).
Sensing position characteristics	Δd	± 0.6 mm typ., ± 1.6 mm max.	Δd defined as distance for I_L to change from 20% (80%) to 50% of the peak I_L . Center: $I_L = 50\%$ in X and Y directions (see Fig. 2).
Recommended sensing distance	d	4.0 mm min., 4.5 mm typ., 5.0 mm max.	Sensing object can be either of the two: Diffuse reflective object (paper). Regular reflective object (mirror).

Fig. 1

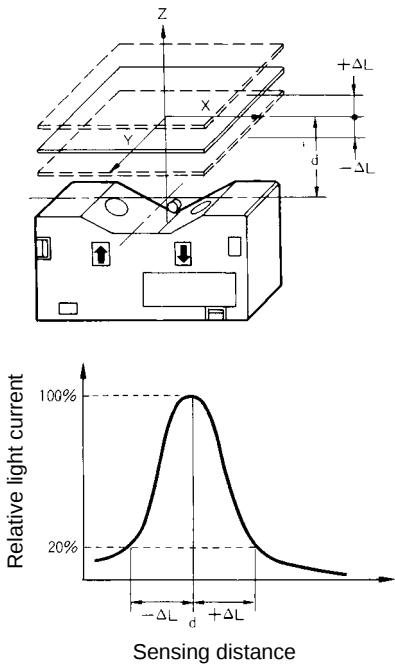
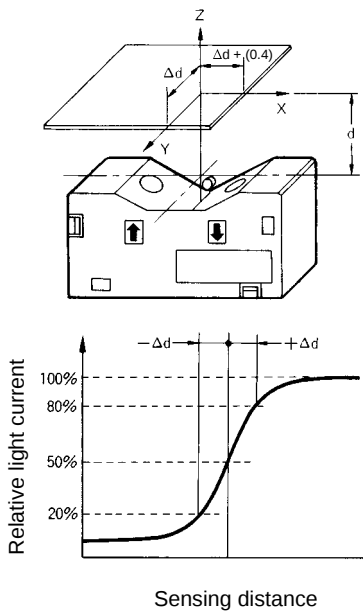
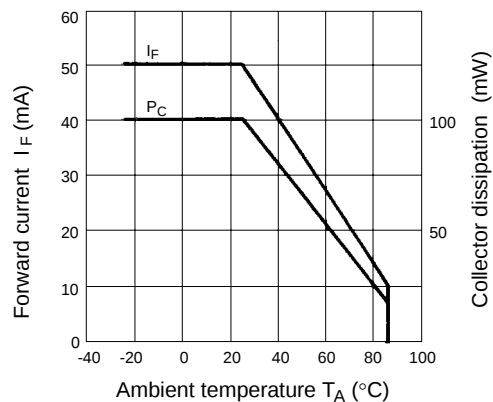


Fig. 2

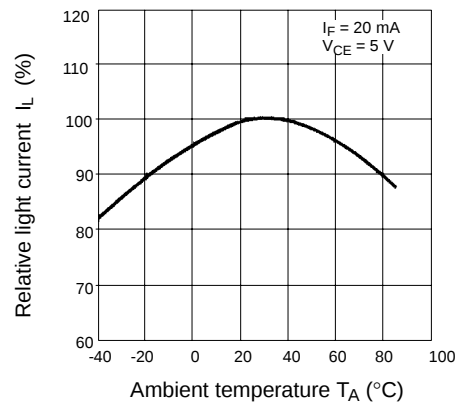


Engineering Data

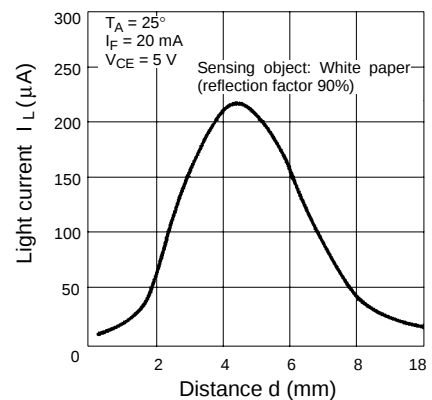
■ TEMPERATURE RATING



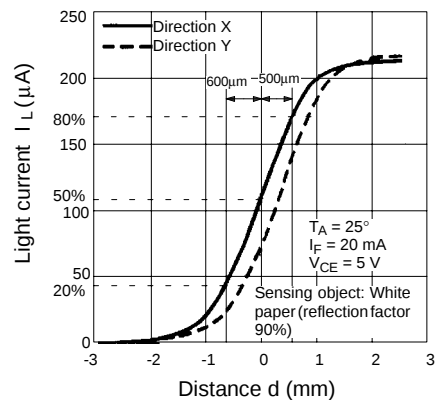
■ RELATIVE LIGHT CURRENT VS. AMBIENT TEMPERATURE CHARACTERISTICS (TYPICAL)



■ SENSING DISTANCE CHARACTERISTICS (TYPICAL)



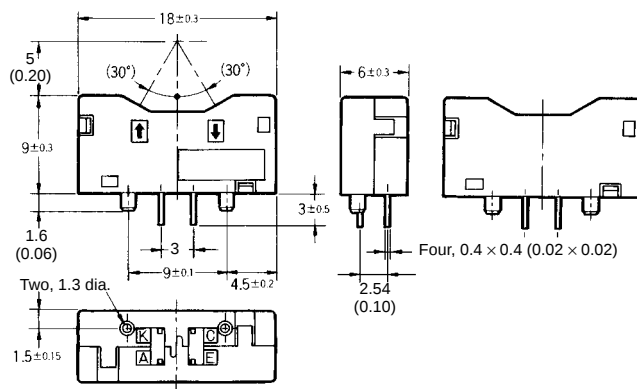
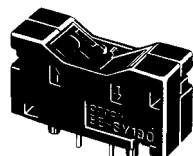
■ SENSING POSITION CHARACTERISTICS (TYPICAL)



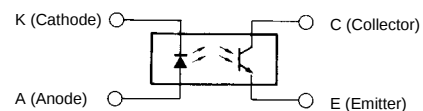
Dimensions

Unit: mm (inch)

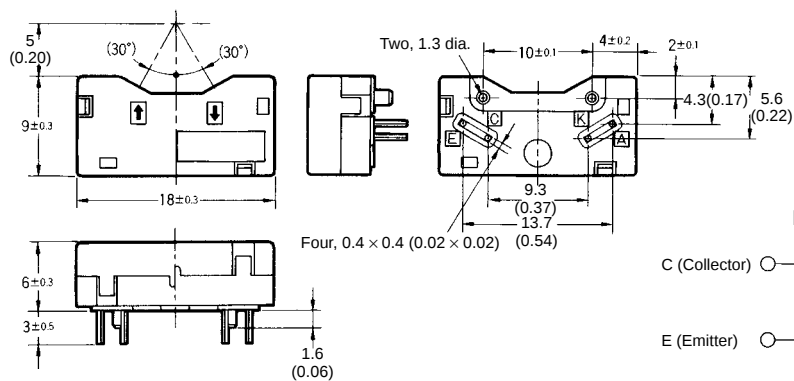
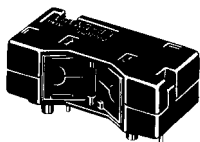
EE-SY190



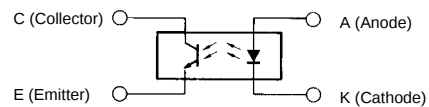
Internal Circuit



EE-SY191



Internal Circuit



Precautions

■ RATINGS

Using the photomicrosensor beyond its absolute maximum ratings can result in diminished life expectancy, reliability, or failure. OMRON does not assume responsibility for any change in the characteristics and/or performance of the device due to use beyond the absolute maximum ratings.

■ SURGE

Electrical surges, incorrect wiring or voltage could result in damage to the photomicrosensor.

■ INSTALLATION

Photomicrosensors with non-modulated light sources are not protected against incandescent lights or sunlight and should not be located in areas where such external light sources exist. Photomicrosensors equipped with an internal modulated light source are not affected by external light sources.

When installing the photomicrosensor, always mount it on a flat surface. If mounted on a curved or irregular surface, the electrical characteristics of the sensor can be altered due to a change in the sensor's orientation.

For proper connection of the photomicrosensor, refer to the terminal diagram on the data sheet. Incorrect wiring or connections can result in damage to the photomicrosensor.

■ RELIABILITY

For maximum reliability and life expectancy, use the photomicrosensor at temperatures within the rated operating temperature range. If the ambient temperature abruptly changes from a low (0°C or lower) to a high temperature, condensation may occur on the surface of the light source and/or receiver, thus causing a malfunction.

Mount the photomicrosensor in a dust-free environment. Check that the light-receiving window is clean. If necessary, clean off the window using a dry cloth.

Keep the photomicrosensor in a dry storage location to prevent the terminals from corroding.

The sensing window and case of most photomicrosensor models are made of a polycarbonate resin which withstands alcohol and chloride solvents, but is soluble in strong alkali, aromatic hydrocarbons, and aliphatic hydrocarbonate chloride solvents.

NOTE: DIMENSIONS SHOWN ARE IN MILLIMETERS. To convert millimeters to inches divide by 25.4.

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