

Compact Reflective Type (Standard Sensing Distance = 5 mm)

- Photo IC output (Two types available: Dark-ON (EE-SY310)/ Light-ON (EE-SY410))
- For use with power supply voltage of 4.5 to 16 VDC
- Directly connectable to C-MOS

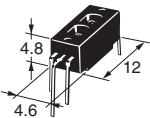


⚠ Be sure to read *Safety Precautions* on Page 3.

RoHS Compliant

Ordering Information

Photomicrosensor

Appearance	Sensing method	Connecting method	Standard sensing distance	Output type	Model	Minimum packing unit (Unit: pcs)
	Reflective	Terminal for PCB mounting	5 mm	Photo IC	EE-SY310 (Dark-ON) EE-SY410 (Light-ON)	1

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	4	V
Pulse forward current	I _{FP}	1*2	A
Detector			
Power supply voltage	V _{CC}	16	V
Output voltage	V _{OUT}	28	V
Output current	I _{OUT}	16	mA
Permissible output dissipation	P _{OUT}	250*1	mW
Operating temperature	T _{opr}	-40 to 75	°C
Storage temperature	T _{stg}	-40 to 85	°C
Soldering temperature	T _{sol}	260*3	°C

*1. Refer to the temperature rating chart if the ambient temperature exceeds 25°C.

*2. Pulse width ≤ 10 μs, Repeated 100 Hz

*3. Complete soldering within 10 seconds.

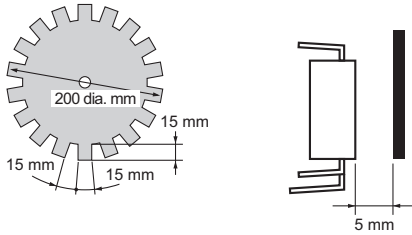
Exterior Specifications

Connecting method	Weight (g)	Material	
		Case	Cover
Terminal for PCB mounting	0.4	LCP	Polycarbonate

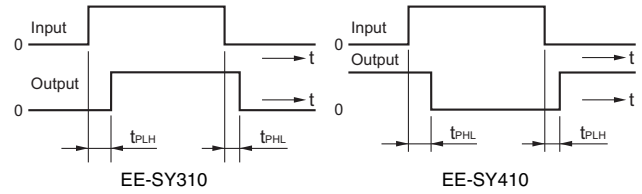
Electrical and Optical Characteristics (Ta = 25°C)

Item	Symbol	Value			Unit	Condition
		MIN.	TYP.	MAX.		
Emitter						
Forward voltage	V _F	—	1.2	1.5	V	I _F = 20 mA
Reverse current	I _R	—	0.01	10	μA	V _R = 4 V
Peak emission wavelength	λ _P	—	920	—	nm	I _F = 20 mA
Detector						
Low-level output voltage	V _{OL}	—	0.12	0.4	V	V _{CC} = 4.5 to 16 V, I _{OL} = 16 mA without incident (EE-SY310) with incident (EE-SY410) *1*2
High-level output voltage	V _{OH}	15	—	—	V	V _{CC} = 16 V, R _L = 1 kΩ with incident (EE-SY310) without incident (EE-SY410) *1*2
Current consumption	I _{CC}	—	3.2	10	mA	V _{CC} = 16 V
Peak spectral sensitivity wavelength	λ _P	—	870	—	nm	V _{CC} = 4.5 to 16 V
LED current when output OFF (EE-SY310)	I _{FT}	—	6	15	mA	V _{CC} = 4.5 to 16 V
LED current when output ON (EE-SY410)	I _{FT}	—	6	15	mA	V _{CC} = 4.5 to 16 V
Hysteresis	ΔH	—	17	—	%	V _{CC} = 4.5 to 16 V *3
Response frequency	f	50	—	—	P.P.S	V _{CC} = 4.5 to 16 V I _F = 15 mA, I _{OL} = 16 mA *4
Response delay time	t _{PLH} (t _{PHL})	—	3	—	μs	V _{CC} = 4.5 to 16 V I _F = 15 mA, I _{OL} = 16 mA *5
Response delay time	t _{PHL} (t _{PLH})	—	20	—	μs	V _{CC} = 4.5 to 16 V I _F = 15 mA, I _{OL} = 16 mA *5

- *1. "With incident" is a condition when $I_F = 20\text{ mA}$ with reflectance 90% white paper and a standard sensing distance " d " = 5 mm (" d " is the distance from the top of the sensor to the reflective surface).
- *2. Sensing object: Reflectance 90% white paper, standard sensing distance " d " = 5 mm
- *3. Hysteresis is the difference in LED current between two states when the output state is inverted and expressed as a percentage.
- *4. The value of the response frequency is measured by rotating the disk as shown below.



- *5. Refer to the following diagrams for definitions of response delay time. (t_{PHL} and t_{PLH}) are applicable to EE-SY410



Engineering Data (Reference Value) Note: Values in parentheses are for EE-SY410

Fig 1. Forward Current vs. Temperature Ratings for Output Allowable Dissipation

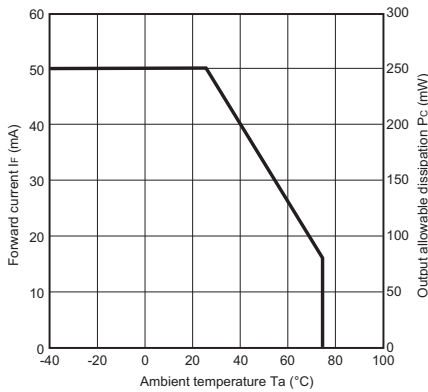


Fig 2. Forward Current vs. Forward Voltage Characteristics (Typical)

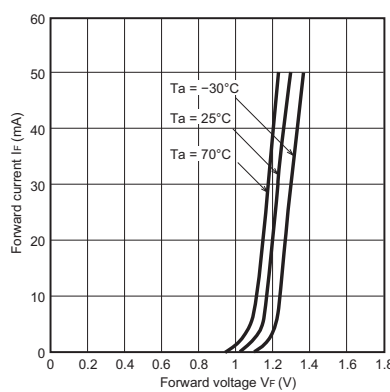


Fig 3. LED Current When Output ON (OFF) vs. Power Supply Voltage Characteristics (Typical)

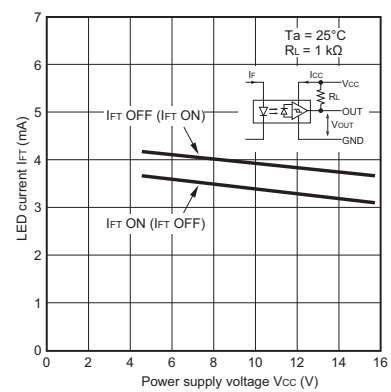


Fig 4. LED Current When Output ON (OFF) vs. Ambient Temperature Characteristics (Typical)

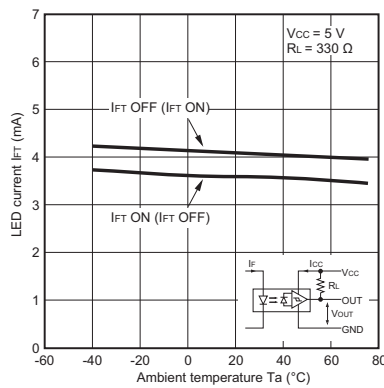


Fig 5. Low-level Output Voltage vs. Output Current Characteristics (Typical)

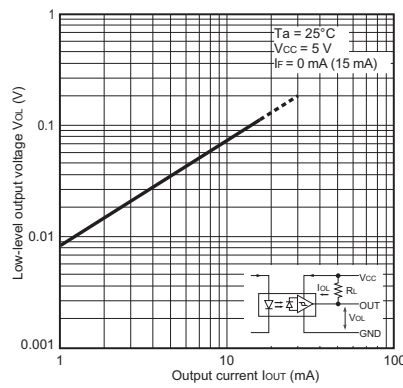


Fig 6. Low-level Output Voltage vs. Ambient Temperature Characteristics (Typical)

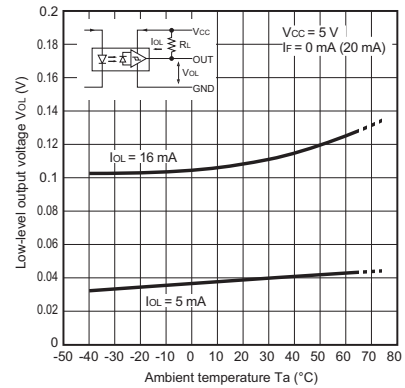


Fig 7. Current Consumption vs. Power Supply Voltage Characteristics (Typical)

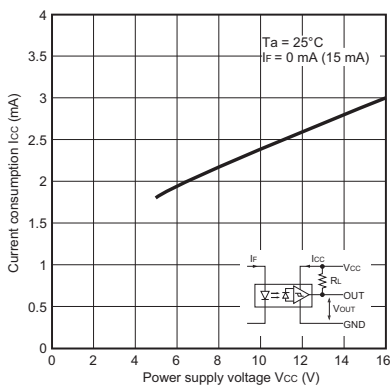


Fig 8. Response Delay Time vs. Forward Current Characteristics (Typical)

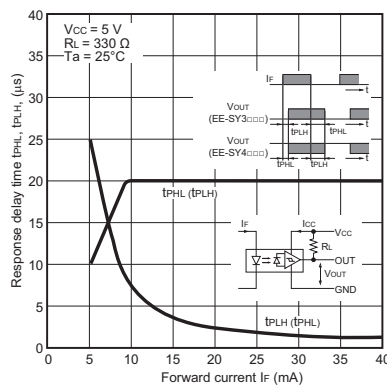
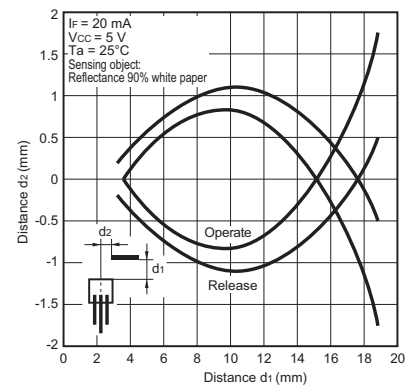


Fig 9. Sensing Position Characteristics (Typical)



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 Correct Use

Do not use the product in atmospheres or environments that exceed product ratings. Dispose of this product as industrial waste.

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.

Do not short-circuit the load.

Otherwise explosion or burning may occur.

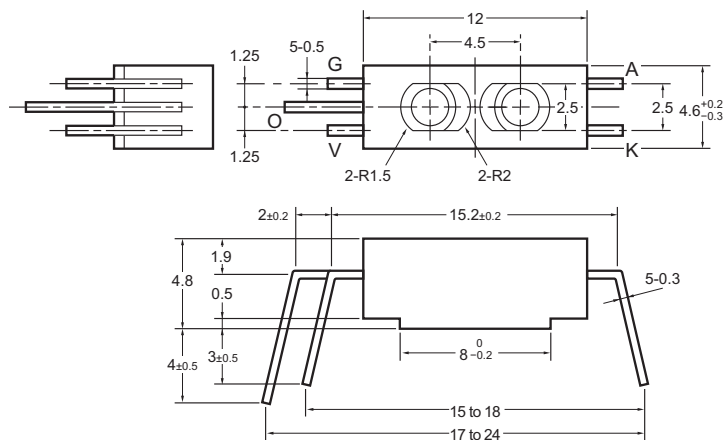
This product does not resist water. Do not use the product in places where water or oil may be sprayed onto the product.

Dimensions and Internal Circuit

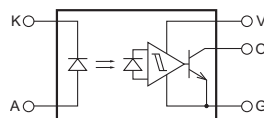
(Unit: mm)

Photomicrosensor

EE-SY310
EE-SY410



Internal circuit



Unless otherwise specified, the tolerances are as shown below.

Terminal No.	Name
A	Anode
K	Cathode
V	Power supply (V _{CC})
O	Output (OUT)
G	Ground (GND)

Dimensions	Tolerance
3 mm max.	±0.2
3 < mm ≤ 6	±0.24
6 < mm ≤ 10	±0.29
10 < mm ≤ 18	±0.35
18 < mm ≤ 30	±0.42

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