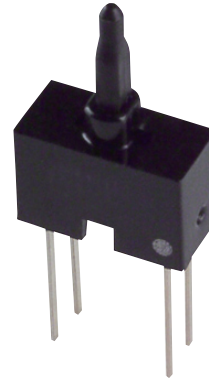


# Photomicrosensor (Actuator)

# EE-SA105

## Actuator

- Low operating force (0.15 N)



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

RoHS Compliant

## Ordering Information

### Photomicrosensor

Appearance	Sensing method	Connecting method	Sensing distance	Output type	Model	Minimum packing unit (Unit: pcs)
	Transmissive	Terminal for PCB mounting	Refer to Mechanical Characteristics	Phototransistor	EE-SA105	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
<b>Emitter</b>			
Forward current	$I_F$	50*1	mA
Pulse forward current	$I_{FP}$	1*2	A
Reverse voltage	$V_R$	4	V
<b>Detector</b>			
Collector-Emitter voltage	$V_{CEO}$	30	V
Emitter-Collector voltage	$V_{ECO}$	5	V
Collector current	$I_C$	20	mA
Collector dissipation	$P_C$	100*1	mW
Operating temperature	$T_{opr}$	-25 to 70	°C
Storage temperature	$T_{stg}$	-40 to 100	°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	Actuator
Terminal for PCB mounting	0.3	Polycarbonate	POM

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

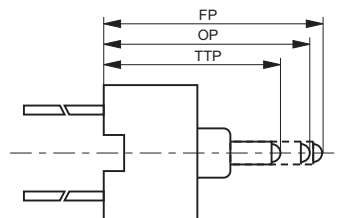
Item	Symbol	Value			Unit	Condition
		MIN.	TYP.	MAX.		
<b>Emitter</b>						
Forward voltage	$V_F$	—	1.2	1.5	V	$I_F = 30$ mA
Reverse current	$I_R$	—	0.01	10	μA	$V_R = 4$ V
Peak emission wavelength	$\lambda_P$	—	940	—	nm	$I_F = 20$ mA
<b>Detector</b>						
Light current	$I_L$	0.5	—	—	mA	$I_F = 20$ mA, $V_{CE} = 5$ V at free position (FP)
Dark current	$I_D$	—	2	200	nA	$V_{CE} = 10$ V, 0 lx
Leakage current	$I_{LEAK}$	—	—	10	μA	$I_F = 20$ mA, $V_{CE} = 5$ V at operating position (OP)
Collector-Emitter saturated voltage	$V_{CE(sat)}$	—	0.15	0.4	V	$I_F = 20$ mA, $I_L = 0.1$ mA
Peak spectral sensitivity wavelength	$\lambda_P$	—	850	—	nm	$V_{CE} = 10$ V
Rising time	$t_r$	—	—	—	μs	—
Falling time	$t_f$	—	—	—	μs	—

## Mechanical Characteristics

Item	Value		
Operating specifications	Free position (FP)	14.2±0.3 mm	$I_F = 20 \text{ mA}, V_{CE} = 5 \text{ V}^{*1}$
	Operating position (OP)	13 mm min.	
	Total travel position (TTP)	12.1 mm max.	
Operating force	0.15 N max. <sup>*2</sup>		
Mechanical life expectancy	500,000 operations min. (The actuator traveling from its FP to FP via TTP is regarded as one operation.)		

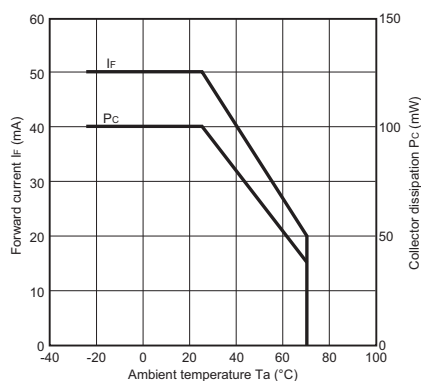
\*1. Free position (FP): The distance between the bottom of the housing to the top of the actuator without any external force imposed on the actuator.  
 Operating position (OP): The distance between the bottom of the housing to the top of the actuator when the actuator is pressed and the  $I_L$  becomes  $I_{LEAK}$  or less.  
 Total travel position (TTP): The distance between the bottom of the housing to the top of the actuator when the actuator is fully pressed.

\*2. Operating force: The force required to press the actuator from its FP to OP.

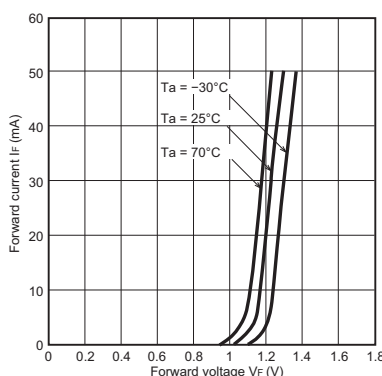


## Engineering Data (Reference Value)

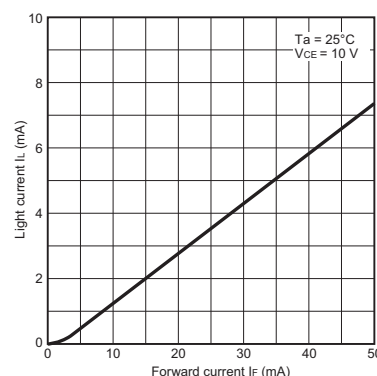
**Fig 1. Forward Current vs. Collector Dissipation Temperature Rating**



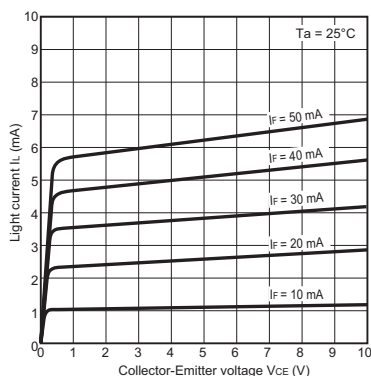
**Fig 2. Forward Current vs. Forward Voltage Characteristics (Typical)**



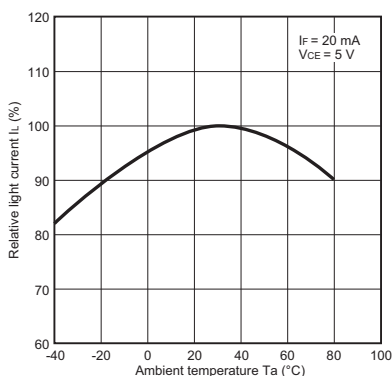
**Fig 3. Light Current vs. Forward Current Characteristics (Typical)**



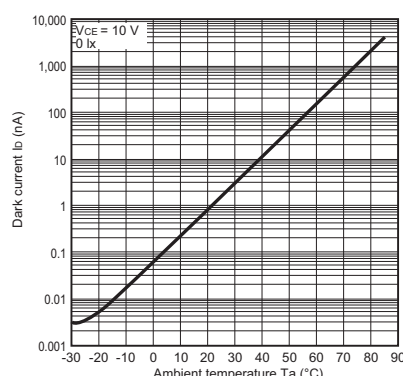
**Fig 4. Light Current vs. Collector-Emitter Voltage Characteristics (Typical)**



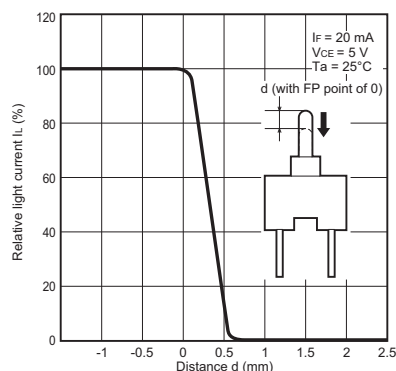
**Fig 5. Relative Light Current vs. Ambient Temperature Characteristics (Typical)**



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



**Fig 7. 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.

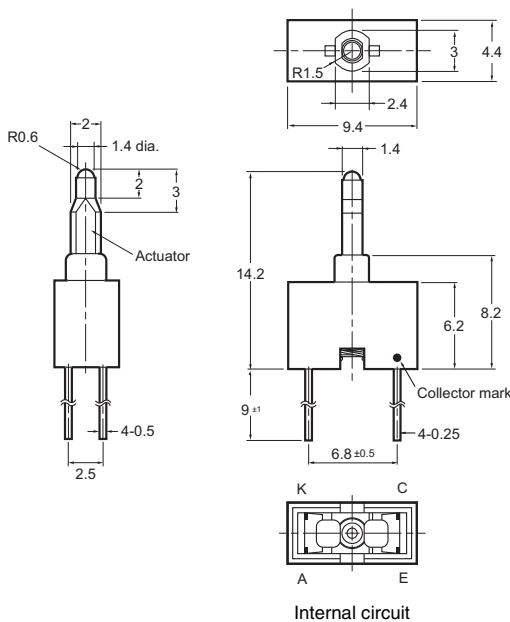
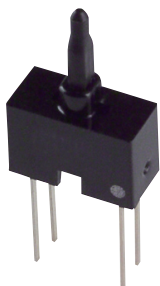
This product does not resist water. Do not use the product in places where water or oil may be sprayed onto the product.

## Dimensions and Internal Circuit

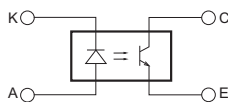
(Unit: mm)

### Photomicrosensor

EE-SA105



Internal circuit



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

Unless otherwise specified, the tolerances are as shown below.

Dimensions	Tolerance
3 mm max.	±0.3
3 < mm ≤ 6	±0.375
6 < mm ≤ 10	±0.45
10 < mm ≤ 18	±0.55
18 < mm ≤ 30	±0.65

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