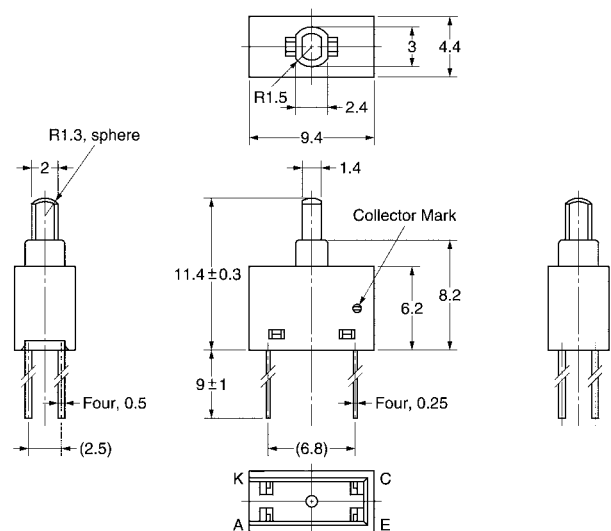


Photomicrosensor (Actuator) EE-SA113

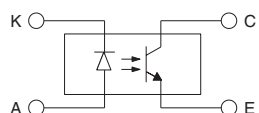
⚠ Be sure to read *Precautions* on page 25.

■ Dimensions

Note: All units are in millimeters unless otherwise indicated.



Internal Circuit



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

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

■ Features

- Model has an actuator.
- Low operating force (0.15 N (15 gf)).
- Connects to circuits with ease.

■ Absolute Maximum Ratings (Ta = 25°C)

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
	Collector–Emitter voltage	V _{CEO} 30 V
Detector	Emitter–Collector voltage	V _{ECO} 5 V
	Collector current	I _C 20 mA
	Collector dissipation	P _C 100 mW (see note 1)
Ambient temperature	Operating	T _{opr} –25°C to 70°C
	Storage	T _{stg} –40°C to 85°C
Soldering temperature	T _{sol}	260°C (see note 3)

- Note:** 1. Refer to the temperature rating chart if the ambient temperature exceeds 25°C.
2. The pulse width is 10 μs maximum with a frequency of 100 Hz.
3. Complete soldering within 10 seconds.

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

Item	Symbol	Value	Condition
Emitter	Forward voltage	V _F 1.2 V typ., 1.5 V max.	I _F = 30 mA
	Reverse current	I _R 0.01 μA typ., 10 μA max.	V _R = 4 V
	Peak emission wavelength	λ _P 940 nm typ.	I _F = 20 mA
Detector	Light current	I _L 0.5 mA min.	I _F = 20 mA, V _{CE} = 5 V at free position (FP)
	Dark current	I _D 2 nA typ., 200 nA max.	V _{CE} = 10 V, 0 lx
	Leakage current	I _{LEAK} 10 μA max.	I _F = 20 mA, V _{CE} = 5 V at operating position (OP)
	Collector–Emitter saturated voltage	V _{CE} (sat) 0.15 V typ., 0.4 V max.	I _F = 20 mA, I _L = 0.1 mA
	Peak spectral sensitivity wavelength	λ _P 850 nm typ.	V _{CE} = 10 V
Rising time	t _r	---	---
Falling time	t _f	---	---

■ Mechanical Characteristics

Actuator operation (I _F = 20 mA, V _{CE} = 5 V) (see note 1)	Free position (FP): 11.4 ± 0.3 mm Operating position (OP): 10.2 mm min. Total travel position (TTP): 9.3 mm max.
Operating force (see note 2)	0.15 N (15 gf) max.
Mechanical life expectancy	500,000 operations min. (The actuator traveling from its FP to FP via TTP is regarded as one operation.)

Note: 1. Free position (FP):

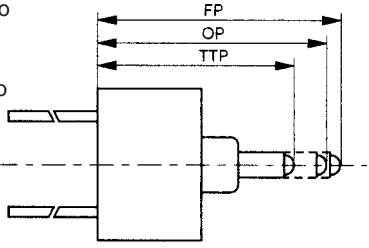
The distance between the bottom of the housing to the top of the actuator without any external force imposed on the actuator.

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):

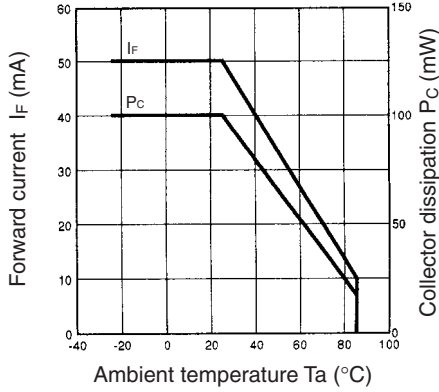
The distance between the bottom of the housing to the top of the actuator when the actuator is fully pressed.



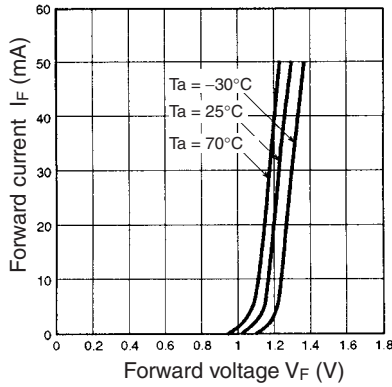
2. Operating force: The force required to press the actuator from its FP to OP.

■ Engineering Data

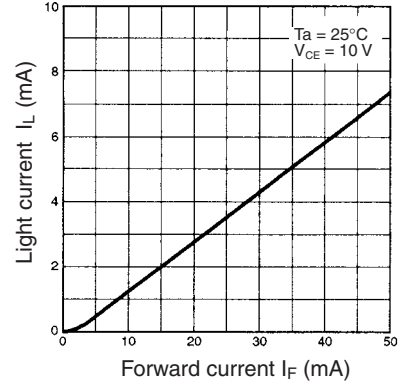
Forward Current vs. Collector Dissipation Temperature Rating



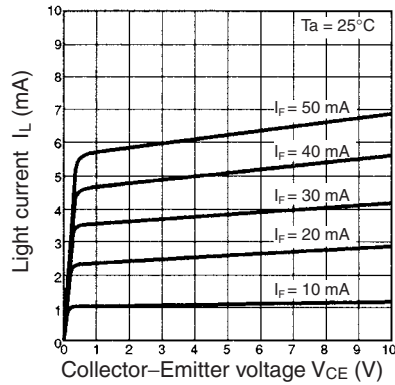
Forward Current vs. Forward Voltage Characteristics (Typical)



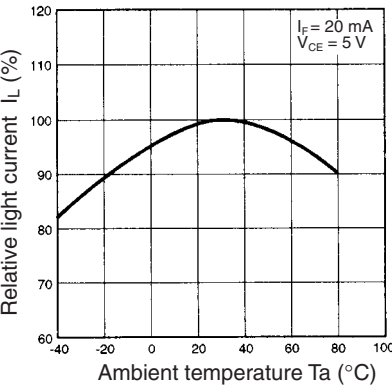
Light Current vs. Forward Current Characteristics (Typical)



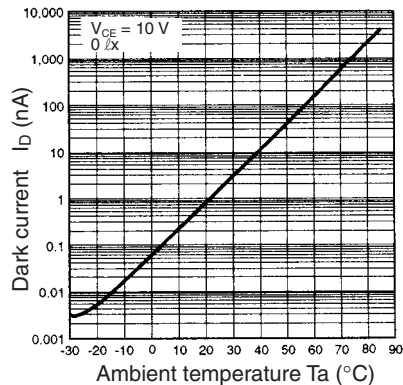
Light Current vs. Collector-Emitter Voltage Characteristics (Typical)



Relative Light Current vs. Ambient Temperature Characteristics (Typical)



Dark Current vs. Ambient Temperature Characteristics (Typical)



Sensing Position Characteristics (Typical)

