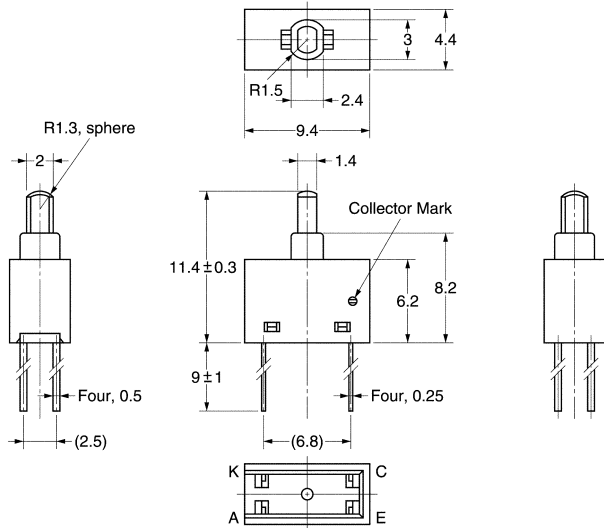


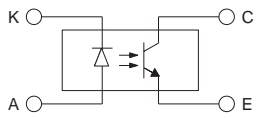
## Photomicrosensor (Actuator) EE-SA113

### ■ 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
Detector	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 mW (see note 1)
	Operating	$T_{opr}$ –25°C to 70°C
Ambient temperature	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  $\mu$ s maximum with a frequency of 100 Hz.
  3. Complete soldering within 10 seconds.

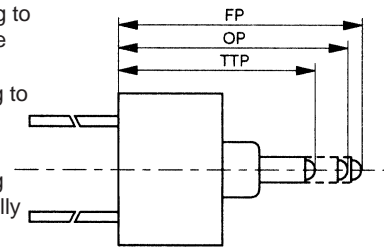
### ■ Electrical and Optical Characteristics (Ta = 25°C)

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 $\mu$ A typ., 10 $\mu$ A max.	$V_R = 4$ V
	Peak emission wavelength	$\lambda_P$ 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 $\mu$ A 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	$\lambda_P$ 850 nm typ.	$V_{CE} = 10$ V
Rising time	$t_r$	---	---
Falling time	$t_f$	---	---

### ■ Mechanical Characteristics

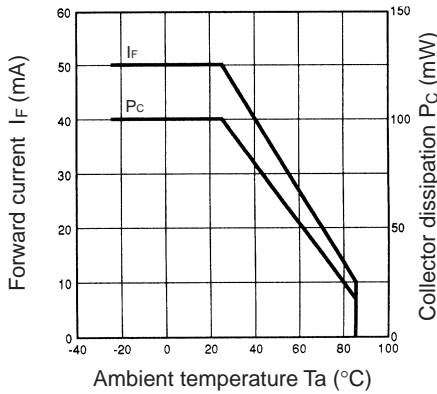
<b>Actuator operation</b> ( $I_F = 20$ mA, $V_{CE} = 5$ V) (see note 1)	Free position (FP): 11.4 ± 0.3 mm Operating position (OP): 10.2 mm min. Total travel position (TTP): 9.3 mm max.
<b>Operating force</b> (see note 2)	0.15 N (15 gf) max.
<b>Mechanical life expectancy</b>	500,000 operations min. (The 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.

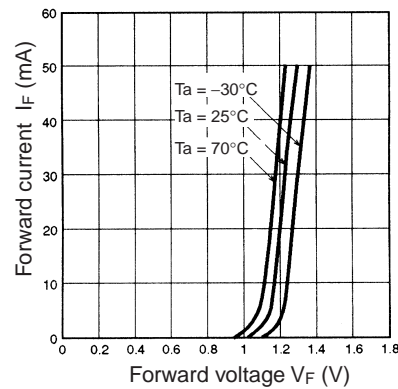


**Engineering Data**

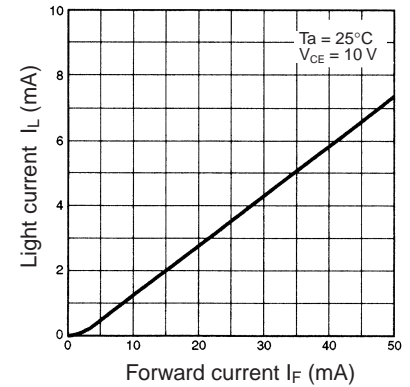
**Forward Current vs. Collector Dissipation Temperature Rating**



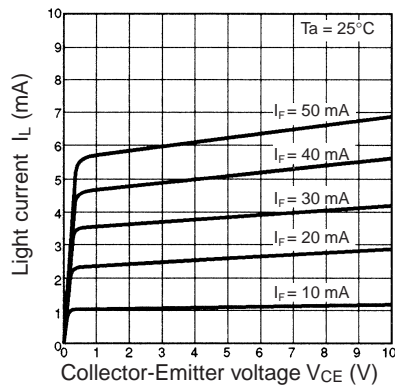
**Forward Current vs. Forward Voltage Characteristics (Typical)**



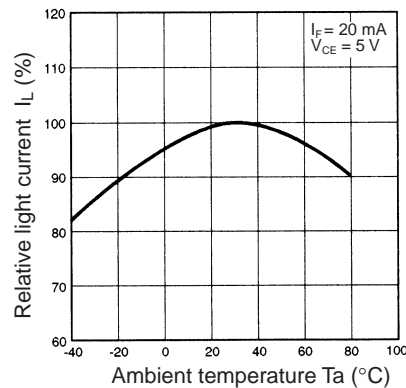
**Light Current vs. Forward Current Characteristics (Typical)**



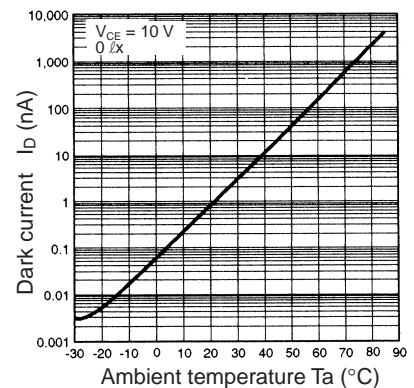
**Light Current vs. Collector-Emitter Voltage Characteristics (Typical)**



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



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



**Sensing Position Characteristics (Typical)**

