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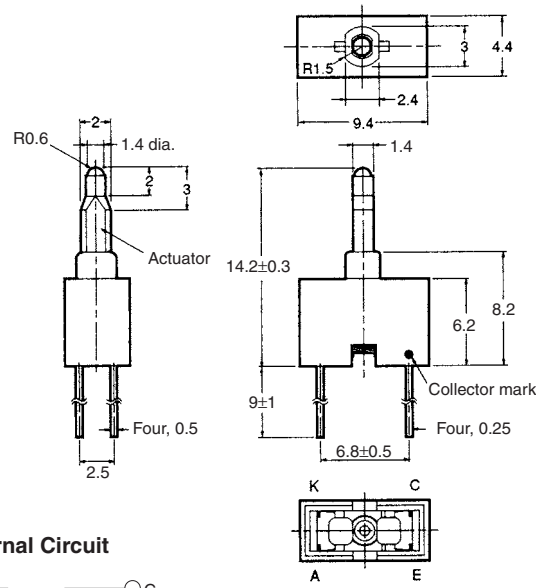
Photomicrosensor (Actuator)
EE-SA105

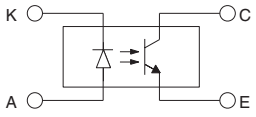
⚠ **Be sure to read *Precautions* on page 25.**

■ Dimensions

Note: All units are in millimeters unless otherwise indicated.



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

■ 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**	Topr	–25°C to 70°C
	Storage	Tstg	–40°C to 100°C
Soldering temperature		Tsol	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		tr	---	---
Falling time		tf	---	---

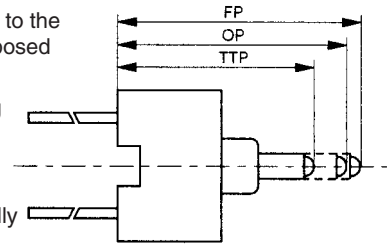
■ Mechanical Characteristics

Actuator operation (I_F = 20 mA, V_{CE} = 5 V) (see note 1)	Free position (FP): 14.2±0.3 mm Operating position (OP): 13.0 mm min. Total travel position (TTP): 12.1 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.

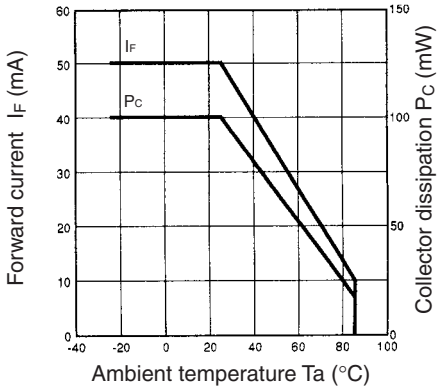
Total travel position (TTP): The distance between the bottom of the housing to the top of the actuator when the actuator is fully pressed.



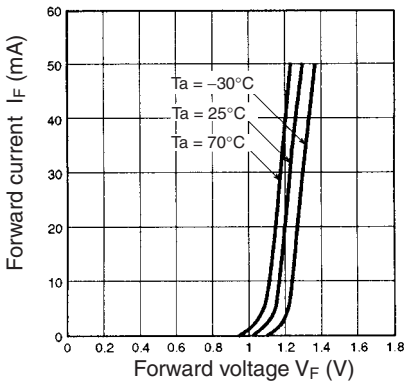
2. Operating force: The force required to press the actuator from its FP to OP.

■ Engineering Data

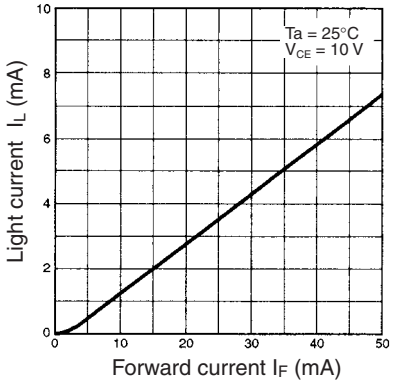
Forward Current vs. Collector Dissipation Temperature Rating



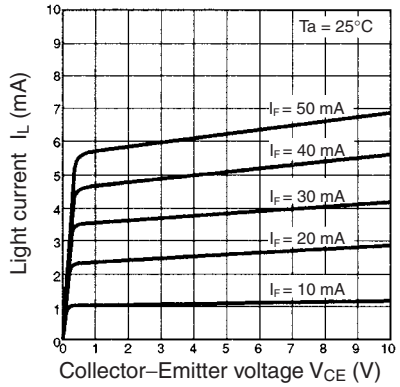
Forward Current vs. Forward Voltage Characteristics (Typical)



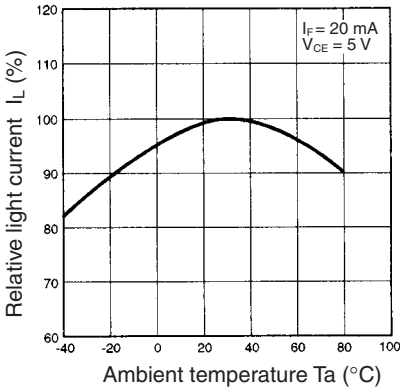
Light Current vs. Forward Current Characteristics (Typical)



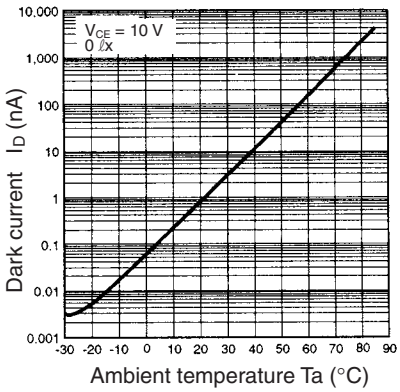
Light Current vs. Collector–Emitter Voltage Characteristics (Typical)



Relative Light Current vs. Ambient Temperature Characteristics (Typical)



Dark Current vs. Ambient Temperature Characteristics (Typical)



Sensing Position Characteristics (Typical)