# OMRON

Photomicrosensor (Transmissive)
# EE-SJ3 Series

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

■ Dimensions

Note: All units are in millimeters unless otherwise indicated.

Cross section BB

Cross section AA

Internal Circuit
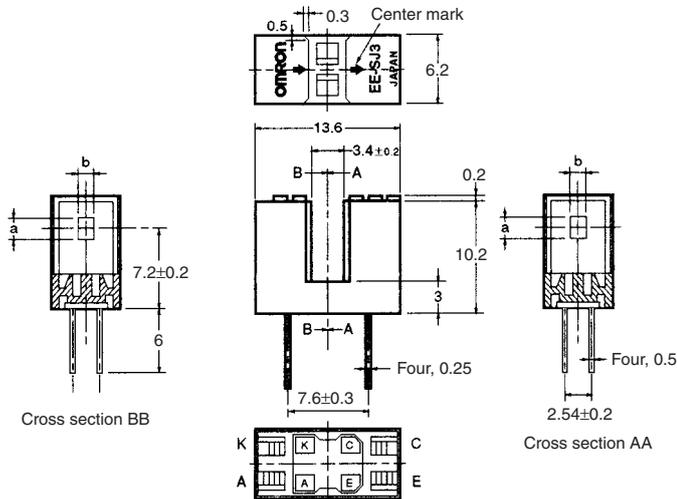
Model	Aperture (a x b)
EE-SJ3-C	2.1 x 1.0
EE-SJ3-D	2.1 x 0.2
EE-SJ3-G	0.5 x 2.1
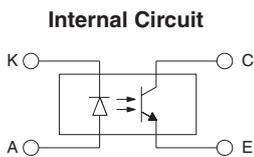
Unless otherwise specified, the tolerances are as shown below.

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

• High-resolution model with a 0.2-mm-wide sensing aperture, high-sensitivity model with a 1-mm-wide sensing aperture, and model with a horizontal sensing aperture are available.

■ 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}	---
	Collector current	I_C	20 mA
	Collector dissipation	P_C	100 mW (see note 1)
Ambient temperature	Operating	Topr	−25°C to 85°C
	Storage	Tstg	−30°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
			EE-SJ3-C	EE-SJ3-D	EE-SJ3-G	
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	1 to 28 mA typ.	0.1 mA min.	0.5 to 14 mA	I_F = 20 mA, V_{CE} = 10 V
	Dark current	I_D	2 nA typ., 200 nA max.			V_{CE} = 10 V, 0 ℓx
	Leakage current	I_{LEAK}	---			---
	Collector–Emitter saturated voltage	V_{CE} (sat)	0.1 V typ., 0.4 V max.	---	0.1 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	4 μs typ.			V_{CC} = 5 V, R_L = 100 Ω, I_L = 5 mA
Falling time		tf	4 μs typ.			

■ Engineering Data

Forward Current vs. Collector Dissipation Temperature Rating

Forward current I_F (mA)
Collector dissipation P_C (mW)
I_F
P_C
Ambient temperature Ta (°C)
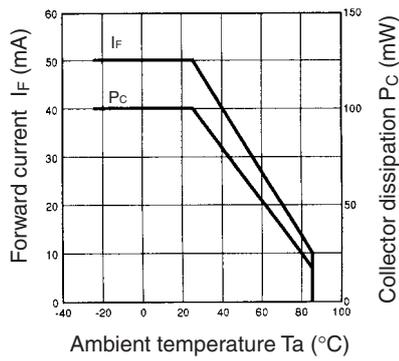
Forward Current vs. Forward Voltage Characteristics (Typical)

Forward current I_F (mA)
Ta = −30°C
Ta = 25°C
Ta = 70°C
Forward voltage V_F (V)
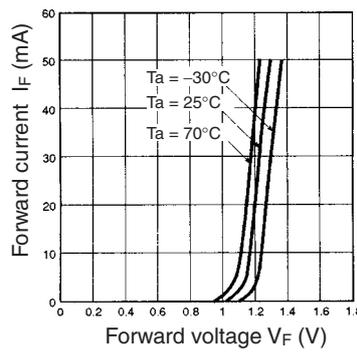
Light Current vs. Forward Current Characteristics (Typical)

Light current I_L (mA)
Ta = 25°C
V_CE = 10 V
Forward current I_F (mA)
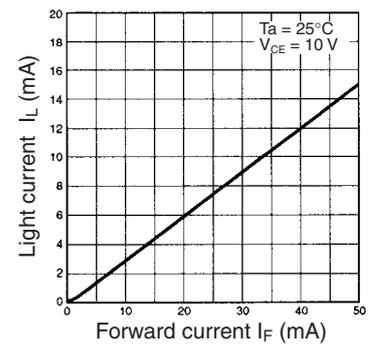
Light Current vs. Collector−Emitter Voltage Characteristics (EE-SJ3-G)

Light current I_L (mA)
Ta = 25°C
I_F = 50 mA
I_F = 40 mA
I_F = 30 mA
I_F = 20 mA
I_F = 10 mA
Collector−Emitter voltage V_CE (V)
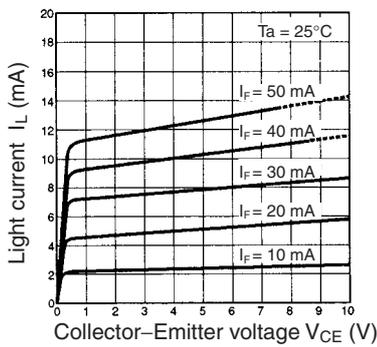
Relative Light Current vs. Ambient Temperature Characteristics (Typical)

Relative light current I_L (%)
I_F = 20 mA
V_CE = 5 V
Ambient temperature Ta (°C)

Dark Current vs. Ambient Temperature Characteristics (Typical)

Dark current I_D (nA)
V_CE = 10 V
0 ℓx
Ambient temperature Ta (°C)
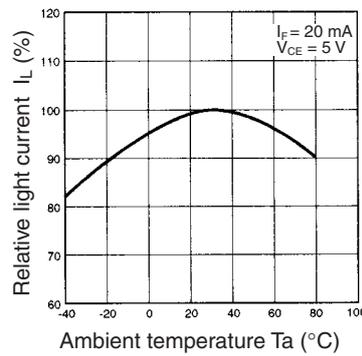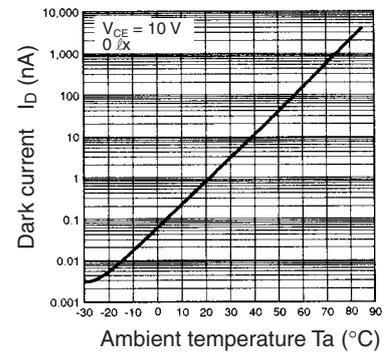
Response Time vs. Load Resistance Characteristics (Typical)
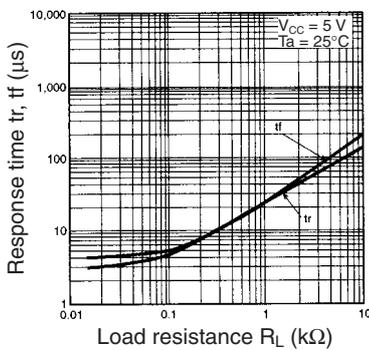
Response time tr, tf (μs)
V_CC = 5 V
Ta = 25°C
tf
tr
Load resistance R_L (kΩ)

Sensing Position Characteristics (EE-SJ3-D)
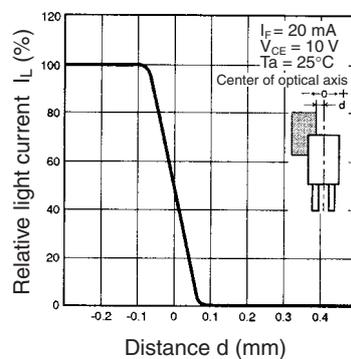
Relative light current I_L (%)
I_F = 20 mA
V_CE = 10 V
Ta = 25°C
Center of optical axis
Distance d (mm)

Sensing Position Characteristics (EE-SJ3-G)

Relative light current I_L (%)
I_F = 20 mA
V_CE = 10 V
Ta = 25°C
Center of optical axis
Distance d (mm)

Sensing Position Characteristics (EE-SJ3-C)

Relative light current I_L (%)
I_F = 20 mA
V_CE = 10 V
Ta = 25°C
Center of optical axis
Distance d (mm)
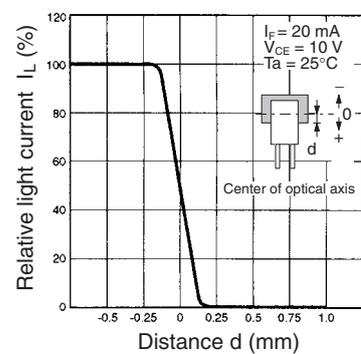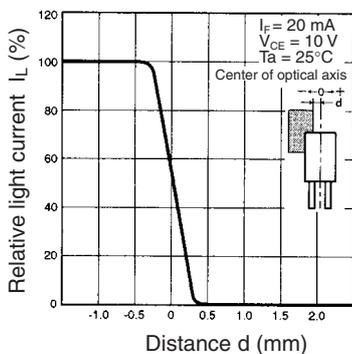
Response Time Measurement Circuit

Input
Output
90 %
10 %
t r
t f
Input
I_L
V_CC
Output
R_L
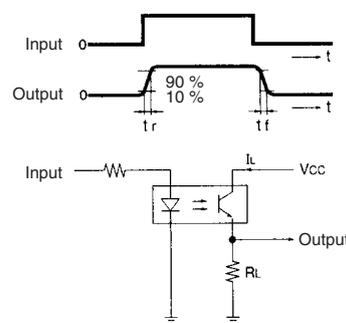
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