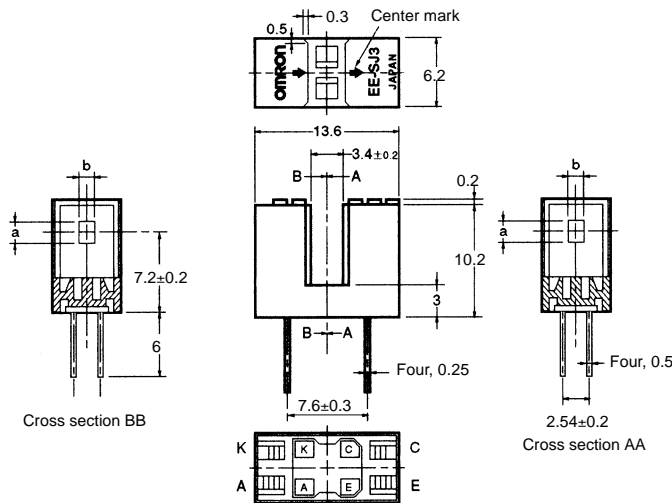


# EE-SJ3 Series

# Photomicrosensor (Through-beam)

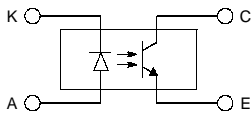
## ■ Dimensions

Note: All units are in millimeters unless otherwise indicated.



Model	Slit (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

### 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

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

## ■ Absolute Maximum Ratings (Ta = 25°C)

Item	Symbol	Rated value
Emitter	Forward current	I <sub>F</sub> 50 mA (see note 1)
	Pulse forward current	I <sub>FP</sub> 1 A (see note 2)
	Reverse voltage	V <sub>R</sub> 4 V
Receiver	Collector-Emitter voltage	V <sub>CEO</sub> 30 V
	Emitter-Collector voltage	V <sub>ECO</sub> ---
	Collector current	I <sub>C</sub> 20 mA
	Collector dissipation	P <sub>C</sub> 100 mW (see note 1)
Ambient temperature	Operating	T <sub>opr</sub> -25°C to 85°C
	Storage	T <sub>stg</sub> -30°C to 100°C
Soldering temperature	T <sub>sol</sub>	260°C (see note 3)

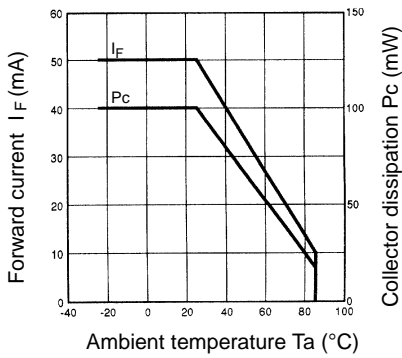
- Note:
- Refer to the temperature rating chart if the ambient temperature exceeds 25°C.
  - The pulse width is 10 μs maximum with a frequency of 100 Hz.
  - Complete soldering within 10 seconds.

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

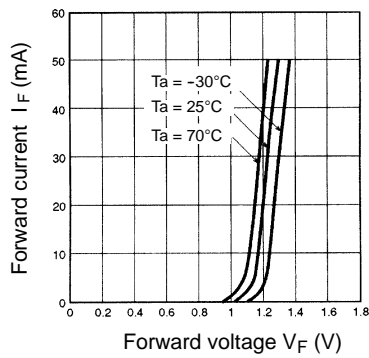
Item	Symbol	Value			Condition	
		EE-SJ3-C	EE-SJ3-D	EE-SJ3-G		
Emitter	Forward voltage	V <sub>F</sub>	1.2 V typ., 1.5 V max.		I <sub>F</sub> = 30 mA	
	Reverse current	I <sub>R</sub>	0.01 μA typ., 10 μA max.		V <sub>R</sub> = 4 V	
	Peak emission wavelength	λ <sub>P</sub>	940 nm typ.		I <sub>F</sub> = 20 mA	
Receiver	Light current	I <sub>L</sub>	1 to 28 mA typ.	0.1 mA min.	0.5 to 14 mA	I <sub>F</sub> = 20 mA, V <sub>CE</sub> = 10 V
	Dark current	I <sub>D</sub>	2 nA typ., 200 nA max.		V <sub>CE</sub> = 10 V, 0 lx	
	Leakage current	I <sub>LEAK</sub>	---		---	
	Collector-Emitter saturated voltage	V <sub>CE (sat)</sub>	0.1 V typ., 0.4 V max.	---	0.1 V typ., 0.4 V max.	I <sub>F</sub> = 20 mA, I <sub>L</sub> = 0.1 mA
	Peak spectral sensitivity wavelength	λ <sub>P</sub>	850 nm typ.		V <sub>CE</sub> = 10 V	
Rising time	t <sub>r</sub>	4 μs typ.			V <sub>CC</sub> = 5 V, R <sub>L</sub> = 100 Ω, I <sub>L</sub> = 5 mA	
Falling time	t <sub>f</sub>	4 μs typ.				

■ Engineering Data

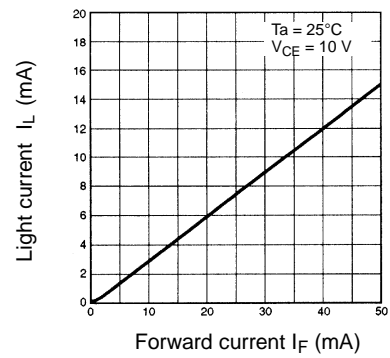
Forward Current vs. Collector Dissipation Temperature Rating



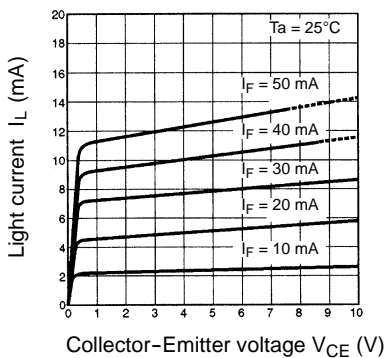
Forward Current vs. Forward Voltage Characteristics (Typical)



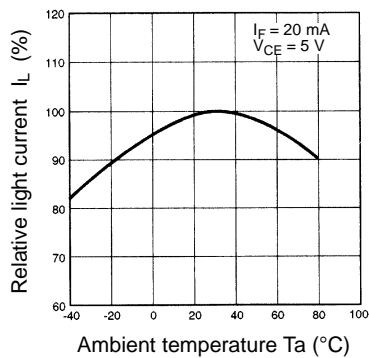
Light Current vs. Forward Current Characteristics (Typical)



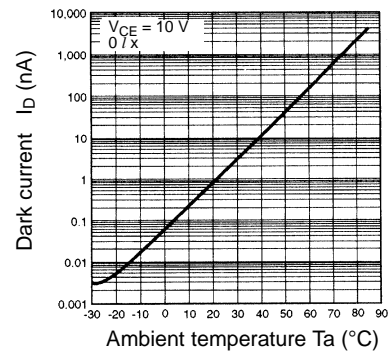
Light Current vs. Collector-Emitter Voltage Characteristics (EE-SJ3-G)



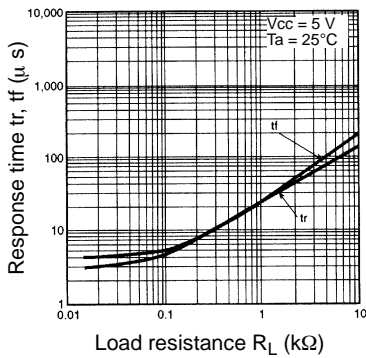
Relative Light Current vs. Ambient Temperature Characteristics (Typical)



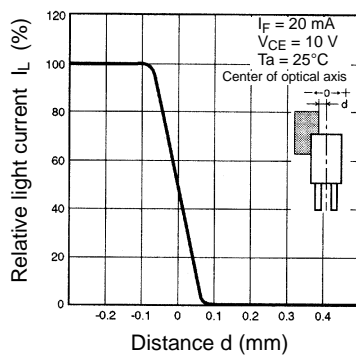
Dark Current vs. Ambient Temperature Characteristics (Typical)



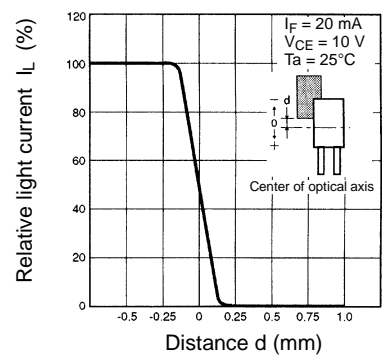
Response Time vs. Load Resistance Characteristics (Typical)



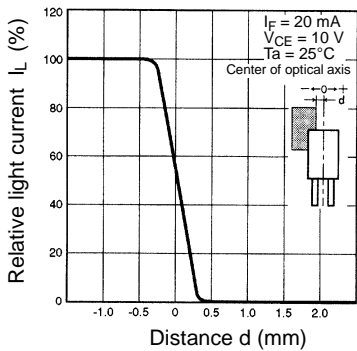
Sensing Position Characteristics (EE-SJ3-D)



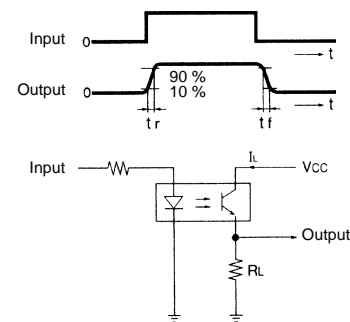
Sensing Position Characteristics (EE-SJ3-G)



Sensing Position Characteristics (EE-SJ3-C)

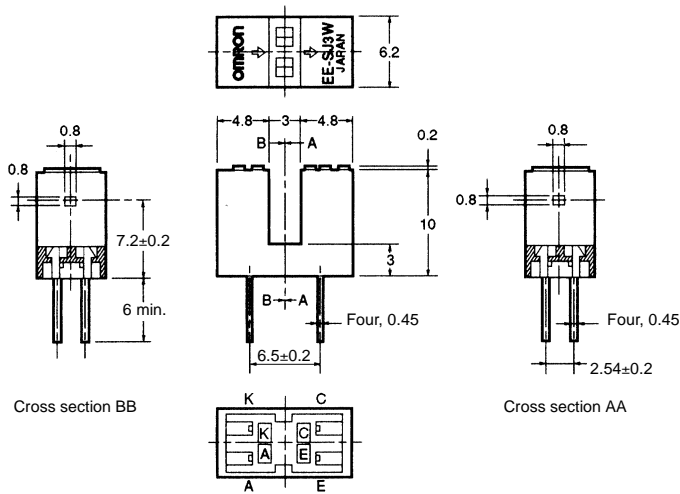


Response Time Measurement Circuit

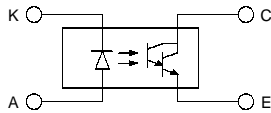


### ■ Dimensions

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

- General-purpose model with a 3-mm-wide slot.
- PCB mounting type.
- With a red LED as an emitter element and a Photo-Darlington transistor as a detector element.

### ■ Absolute Maximum Ratings (Ta = 25°C)

Item	Symbol	Rated value
Emitter	Forward current	I <sub>F</sub> 15 mA (see note 1)
	Pulse forward current	I <sub>FP</sub> ---
	Reverse voltage	V <sub>R</sub> 4 V
Receiver	Collector-Emitter voltage	V <sub>CEO</sub> 24 V
	Emitter-Collector voltage	V <sub>ECO</sub> ---
	Collector current	I <sub>C</sub> 20 mA
	Collector dissipation	P <sub>C</sub> 75 mW (see note 1)
Ambient temperature	Operating	T <sub>opr</sub> -20°C to 60°C
	Storage	T <sub>stg</sub> -20°C to 80°C
Soldering temperature	T <sub>sol</sub>	260°C (see note 3)

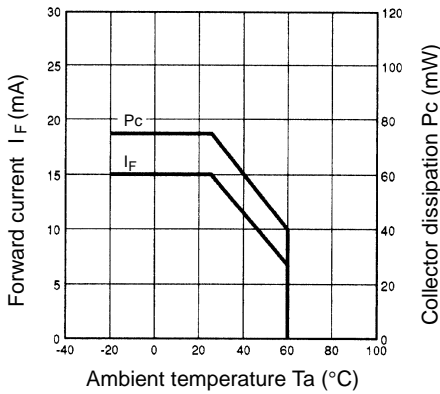
- Note:
1. Refer to the temperature rating chart if the ambient temperature exceeds 25°C.
  2. The pulse width is 10 μs maximum with a frequency of 100 Hz.
  3. Complete soldering within 10 seconds.

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

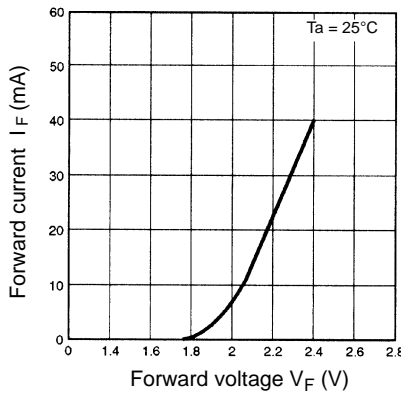
Item	Symbol	Value	Condition
Emitter	Forward voltage	V <sub>F</sub> 2.0 V typ., 2.6 V max.	I <sub>F</sub> = 15 mA
	Reverse current	I <sub>R</sub> 0.01 μA typ., 5 μA max.	V <sub>R</sub> = 4 V
	Peak emission wavelength	λ <sub>p</sub> 700 nm typ.	I <sub>F</sub> = 3 mA
Receiver	Light current	I <sub>L</sub> 1.5 mA min., 120 mA max.	I <sub>F</sub> = 3 mA, V <sub>CE</sub> = 10 V
	Dark current	I <sub>D</sub> 20 nA typ., 250 nA max.	V <sub>CE</sub> = 10 V, 0 lx
	Leakage current	I <sub>LEAK</sub> ---	---
	Collector-Emitter saturated voltage	V <sub>CE (sat)</sub> 0.9 V typ.	I <sub>F</sub> = 3 mA, I <sub>L</sub> = 0.5 mA
	Peak spectral sensitivity wavelength	λ <sub>p</sub> 800 nm typ.	V <sub>CE</sub> = 10 V
Rising time	t <sub>r</sub>	180 μs typ.	V <sub>CC</sub> = 5 V, R <sub>L</sub> = 100 Ω, I <sub>L</sub> = 10 mA
Falling time	t <sub>f</sub>	60 μs typ.	V <sub>CC</sub> = 5 V, R <sub>L</sub> = 100 Ω, I <sub>L</sub> = 10 mA

■ Engineering Data

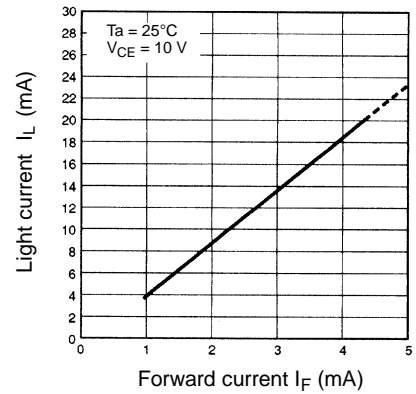
Forward Current vs. Collector Dissipation Temperature Rating



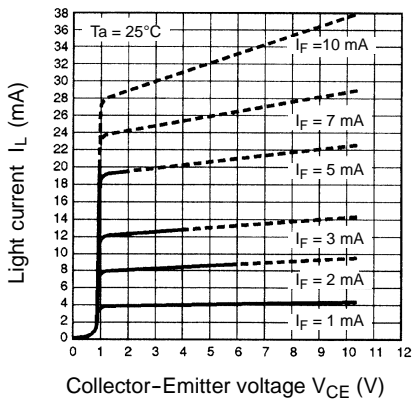
Forward Current vs. Forward Voltage Characteristics (Typical)



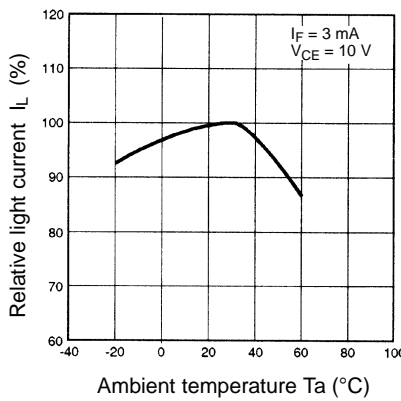
Light Current vs. Forward Current Characteristics (Typical)



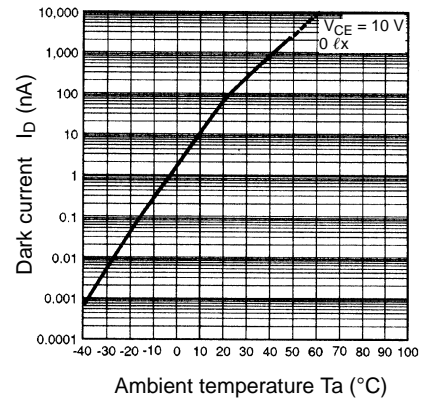
Light Current vs. Collector-Emitter Voltage Characteristics (Typical)



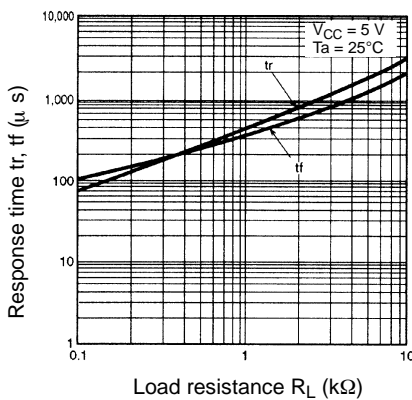
Relative Light Current vs. Ambient Temperature Characteristics (Typical)



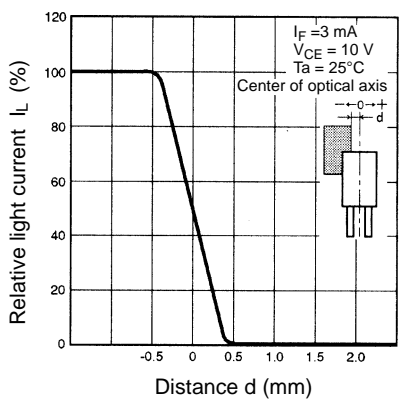
Dark Current vs. Ambient Temperature Characteristics (Typical)



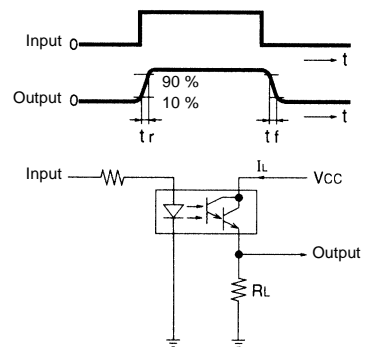
Response Time vs. Load Resistance Characteristics (Typical)



Sensing Position Characteristics (Typical)

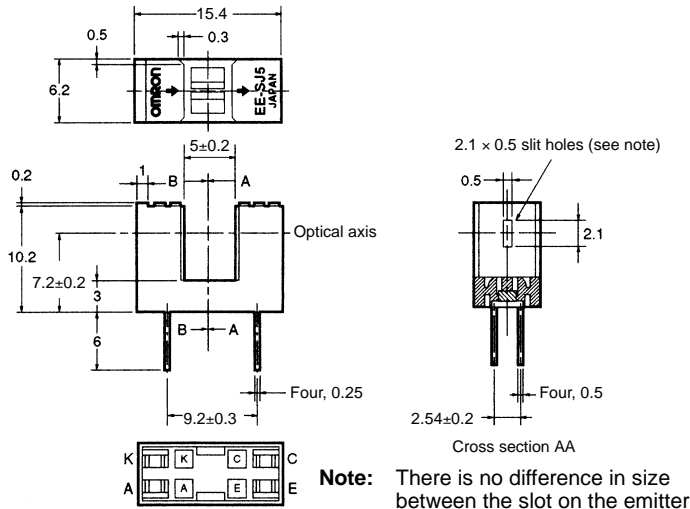


Response Time Measurement Circuit



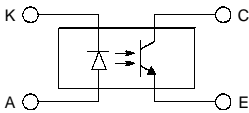
## ■ Dimensions

**Note:** All units are in millimeters unless otherwise indicated.



**Note:** There is no difference in size between the slot on the emitter and that on the detector.

### Internal Circuit



Unless otherwise specified, the tolerances are as shown below.

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

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

- General-purpose model with a 5-mm-wide slot.
- PCB mounting type.
- High resolution with a 0.5-mm-wide slit.

## ■ 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
Receiver	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	$T_{opr}$ -25°C to 85°C
	Storage	$T_{stg}$ -30°C to 100°C
Soldering temperature	$T_{sol}$	260°C (see note 3)

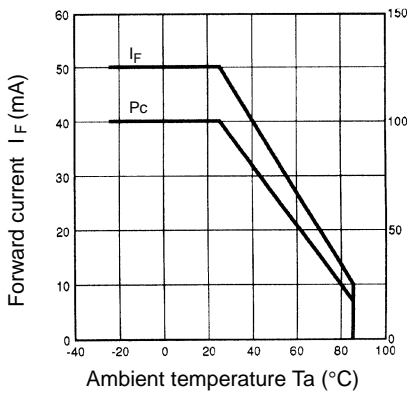
- Note:**
1. Refer to the temperature rating chart if the ambient temperature exceeds 25°C.
  2. The pulse width is 10 μs maximum with a frequency of 100 Hz.
  3. Complete soldering within 10 seconds.

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

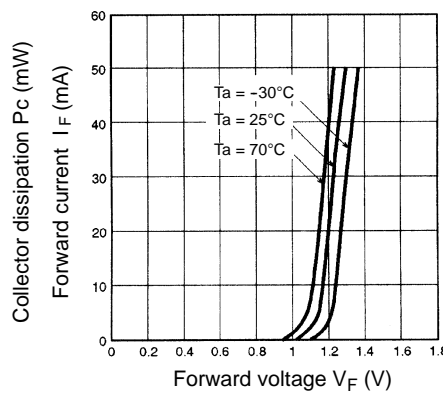
Item	Symbol	Value	Condition
Emitter	Forward voltage	$V_F$ 1.2 V typ., 1.5 V max.	$I_F = 30$ mA
	Reverse current	$I_R$ 0.01 μA typ., 10 μA max.	$V_R = 4$ V
	Peak emission wavelength	$\lambda_P$ 940 nm typ.	$I_F = 20$ mA
Receiver	Light current	$I_L$ 0.5 mA min., 14 mA max.	$I_F = 20$ mA, $V_{CE} = 10$ 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.	$I_F = 20$ mA, $I_L = 0.1$ mA
	Peak spectral sensitivity wavelength	$\lambda_P$ 850 nm typ.	$V_{CE} = 10$ V
Rising time	$t_r$	4 μs typ.	$V_{CC} = 5$ V, $R_L = 100$ Ω, $I_L = 5$ mA
Falling time	$t_f$	4 μs typ.	$V_{CC} = 5$ V, $R_L = 100$ Ω, $I_L = 5$ mA

■ Engineering Data

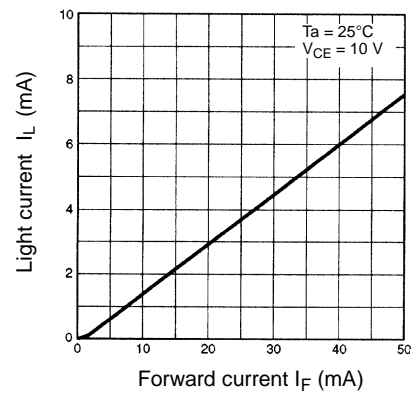
Forward Current vs. Collector Dissipation Temperature Rating



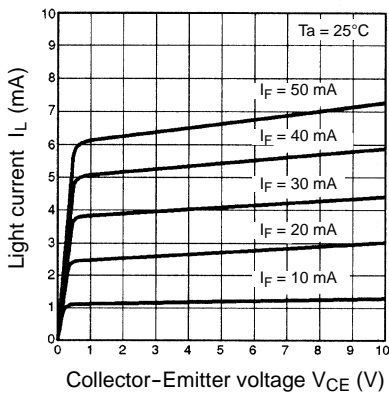
Forward Current vs. Forward Voltage Characteristics (Typical)



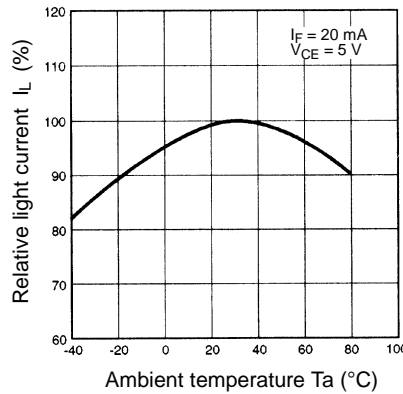
Light Current vs. Forward Current Characteristics (Typical)



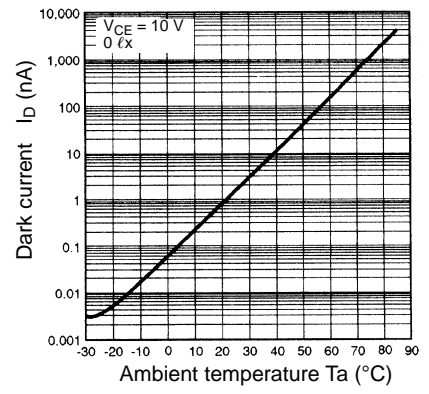
Light Current vs. Collector-Emitter Voltage Characteristics (Typical)



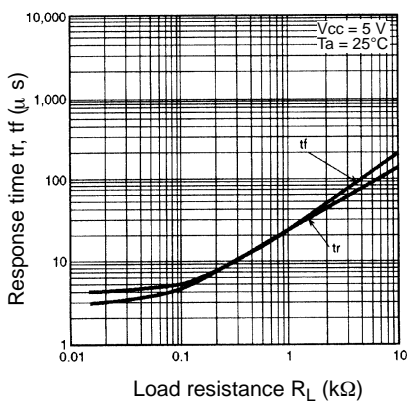
Relative Light Current vs. Ambient Temperature Characteristics (Typical)



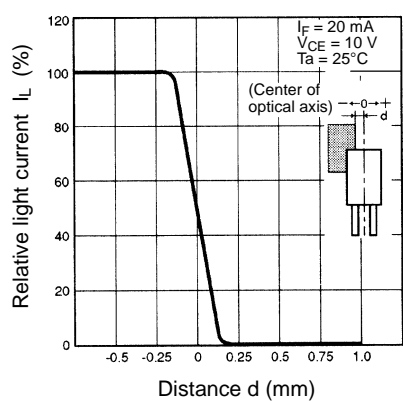
Dark Current vs. Ambient Temperature Characteristics (Typical)



Response Time vs. Load Resistance Characteristics (Typical)



Sensing Position Characteristics (Typical)



Response Time Measurement Circuit

