

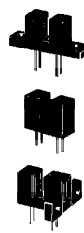
EE-SH3/SV3/SJ3

A Series of Phototransistor Output Sensors with Excellent Sensing Position Characteristics and High Resolution

- High-resolution model detecting 0.2-mm-dia. objects and high-sensitivity model detecting 1.0-mm-dia. objects
- Incorporating a center mark for optical axis adjustment with ease
- Incorporating soldering terminals (EE-SH3) and PCB terminals (EE-SH3-B)
- Compact models with no mounting tab ideal to be built into various equipment (EE-SJ3-C/EE-SJ3-D/EE-SJ3-G)



Ordering Information

Appearance	Sensing method	Slot width	Sensing object	Output configuration	Weight	Part Number
Soldering terminals 	Transmissive	3.4 mm	Opaque, 0.5 x 2.1 mm min.	Phototransistor	Approx. 0.8 g	EE-SH3
					Approx. 0.7 g	EE-SV3
			Opaque, 1.0 x 2.1 mm min.		Approx. 0.8 g	EE-SH3-CS
					Approx. 0.7 g	EE-SV3-CS
			Opaque, 0.2 x 2.1 mm min.		Approx. 0.8 g	EE-SH3-DS
					Approx. 0.7 g	EE-SV3-DS
Opaque, 2.1 x 0.5 mm min.			Approx. 0.8 g		EE-SH3-GS	
			Approx. 0.7 g		EE-SV3-GS	
PCB terminals 			Opaque, 0.5 x 2.1 mm min.		Approx. 0.8 g	EE-SH3-B
					Approx. 0.7 g	EE-SV3-B
			Opaque, 1.0 x 2.1 mm min.		Approx. 0.8 g	EE-SH3-C
					Approx. 0.7 g	EE-SV3-C
					Approx. 0.6 g	EE-SJ3-C
			Opaque, 0.2 x 2.1 mm min.		Approx. 0.8 g	EE-SH3-D
					Approx. 0.7 g	EE-SV3-D
					Approx. 0.6 g	EE-SJ3-D
			Opaque, 2.1 x 0.5 mm min.		Approx. 0.8 g	EE-SH3-G
					Approx. 0.7 g	EE-SV3-G
		Approx. 0.6 g	EE-SJ3-G			

Specifications

■ ABSOLUTE MAXIMUM RATINGS ($T_A = 25^\circ\text{C}$)

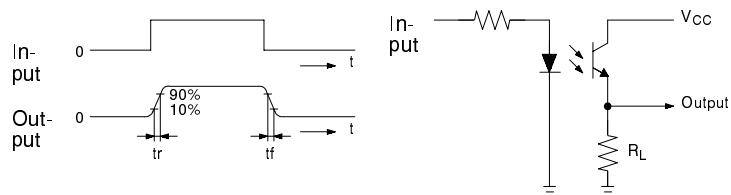
Item		Symbol	Rated value
Input	Forward current	I_F	50 mA*
	Reverse voltage	V_R	4 V
Output	Collector-emitter voltage	V_{CEO}	30 V
	Collector current	I_C	20 mA
	Collector dissipation	P_C	100 mW*
Ambient temperature	Operating	T_{opr}	-25° to 85°C
	Storage	T_{stg}	-30° to 100°C

*Refer to Engineering Data if the ambient temperature is not within the normal room temperature range.

■ CHARACTERISTICS ($T_A = 25^\circ\text{C}$)

Item		Symbol	EE-SH3(-B)/SV3(-B)		EE-SH3-C/CS EE-SV3-C/CS EE-SJ3-C		EE-SH3-D/DS EE-SV3-D/DS EE-SJ3-D		EE-SH3-G/GS EE-SV3-G/GS EE-SJ3-G	
			Value	Condition	Value	Condition	Value	Condition	Value	Condition
Input	Forward voltage	V_F	1.2 V typ. 1.5 V max.	$I_F = 30\text{ mA}$	1.2 V typ. 1.5 V max.	$I_F = 30\text{ mA}$	1.2 V typ. 1.5 V max.	$I_F = 30\text{ mA}$	1.2 V typ. 1.5 V max.	$I_F = 30\text{ mA}$
	Reverse current	I_R	10 μA max.	$V_R = 4\text{ V}$	10 μA max.	$V_R = 4\text{ V}$	10 μA max.	$V_R = 4\text{ V}$	10 μA max.	$V_R = 4\text{ V}$
	Peak emission wavelength	$\lambda_{p(L)}$	940 nm typ.	$I_F = 20\text{ mA}$	940 nm typ.	$I_F = 20\text{ mA}$	940 nm typ.	$I_F = 20\text{ mA}$	940 nm typ.	$I_F = 20\text{ mA}$
Output	Dark current	I_D	2 nA typ. 200 nA max.	$V_{CE} = 10\text{ V}$ 0/x	2 nA typ. 200 nA max.	$V_{CE} = 10\text{ V}$ 0/x	2 nA typ. 200 nA max.	$V_{CE} = 10\text{ V}$ 0/x	2 nA typ. 200 nA max.	$V_{CE} = 10\text{ V}$ 0/x
	Peak spectral sensitivity wavelength	$\lambda_{p(P)}$	850 nm typ.	$V_{CE} = 10\text{ V}$	850 nm typ.	$V_{CE} = 10\text{ V}$	850 nm typ.	$V_{CE} = 10\text{ V}$	850 nm typ.	$V_{CE} = 10\text{ V}$
Combina tion	Light current (collector current)	I_L	0.5 to 14 mA min.	$I_F = 20\text{ mA}$ $V_{CE} = 10\text{ V}$	1 to 28 mA min.	$I_F = 20\text{ mA}$ $V_{CE} = 10\text{ V}$	0.1 mA min.	$I_F = 20\text{ mA}$ $V_{CE} = 10\text{ V}$	0.5 to 14 mA min.	$I_F = 20\text{ mA}$ $V_{CE} = 10\text{ V}$
	Collector-emitt er saturated voltage	$V_{CE(sat)}$	0.4 V max.	$I_F = 20\text{ mA}$ $I_L = 0.1\text{ mA}$	0.4 V max.	$I_F = 20\text{ mA}$ $I_L = 0.1\text{ mA}$	---		0.4 V max.	$I_F = 20\text{ mA}$ $I_L = 0.1\text{ mA}$
	Rising time*	t_r	4 μs typ.	$V_{CC} = 5\text{ V}$ $R_L = 0.1\text{ k}\Omega$ $I_L = 5\text{ mA}$	4 μs typ.	$V_{CC} = 5\text{ V}$ $R_L = 0.1\text{ k}\Omega$ $I_L = 5\text{ mA}$	4 μs typ.	$V_{CC} = 5\text{ V}$ $R_L = 0.1\text{ k}\Omega$ $I_L = 5\text{ mA}$	4 μs typ.	$V_{CC} = 5\text{ V}$ $R_L = 0.1\text{ k}\Omega$ $I_L = 5\text{ mA}$
	Falling time*	t_f	4 μs typ.		4 μs typ.		4 μs typ.		4 μs typ.	

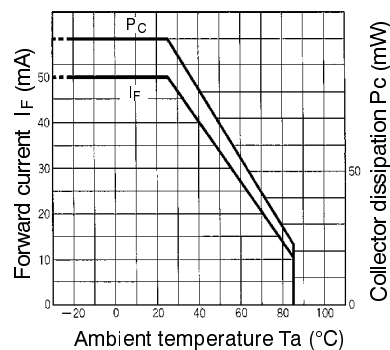
*The following illustrations show the rising time, t_r , and the falling time, t_f .



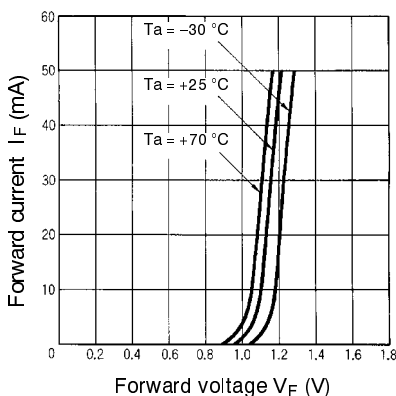
Engineering Data

Note: The operating conditions of the photomicrosensor must be within the absolute maximum rating ranges.

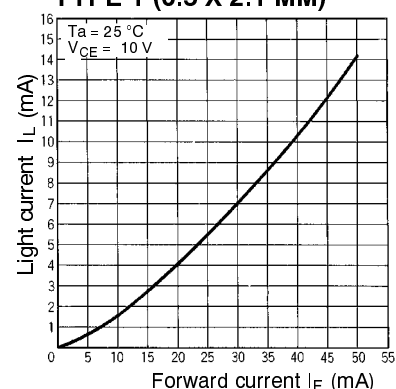
TEMPERATURE CHARACTERISTICS



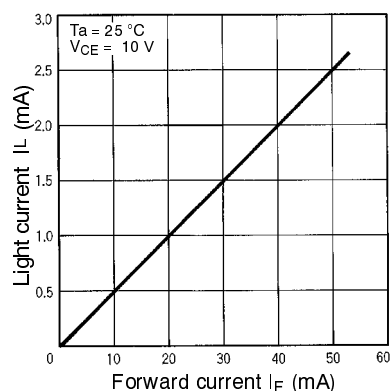
INPUT CHARACTERISTICS (TYPICAL)



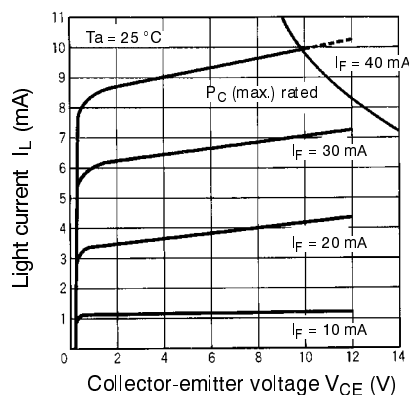
INPUT/OUTPUT CHARACTERISTICS (TYPICAL) APERTURE TYPE 1 (0.5 X 2.1 MM)



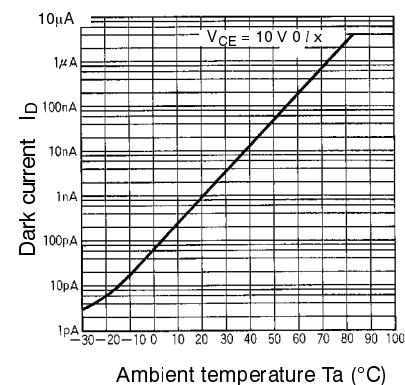
INPUT/OUTPUT CHARACTERISTICS (TYPICAL) APERTURE TYPE 2 (0.2 X 2.1 MM)



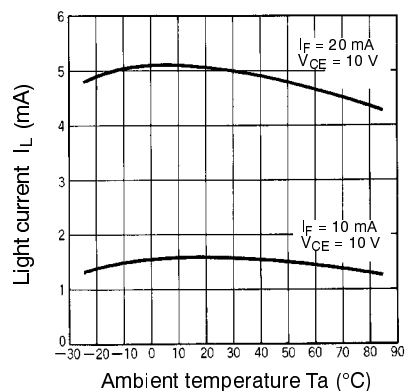
OUTPUT CHARACTERISTICS (TYPICAL) APERTURE (0.5 X 2.1 MM)



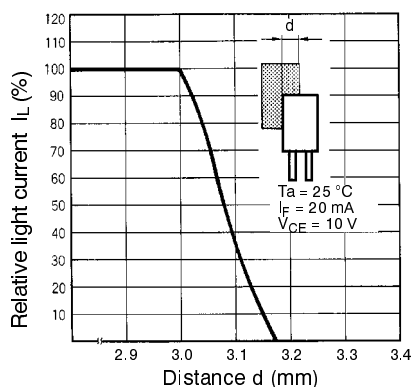
DARK CURRENT TEMPERATURE DEPENDENCY (TYPICAL)



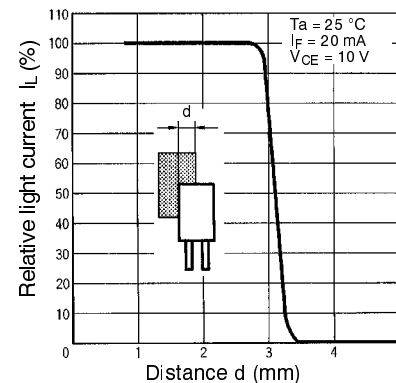
LIGHT CURRENT TEMPERATURE DEPENDENCY (TYPICAL) APERTURE (0.5 X 2.1 MM)



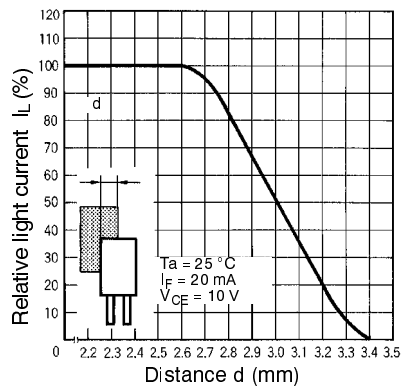
SENSING POSITION CHARACTERISTICS 1 (TYPICAL) APERTURE (0.5 X 2.1 MM)



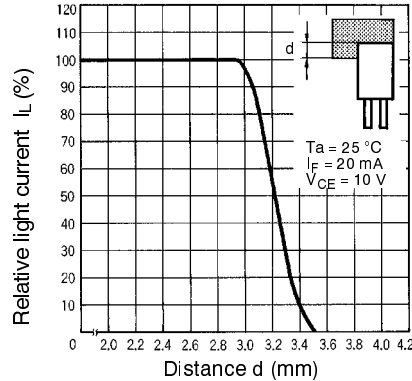
SENSING POSITION CHARACTERISTICS 2 (TYPICAL) APERTURE (0.5 X 2.1 MM)



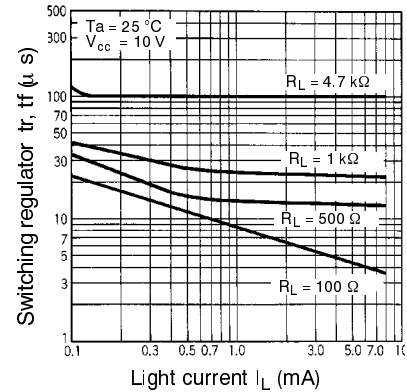
■ SENSING POSITION CHARACTERISTICS 3 (TYPICAL) APERTURE (1.0 X 2.1 MM)



■ SENSING POSITION CHARACTERISTICS 4 (TYPICAL) APERTURE (2.1 X 0.5 MM)



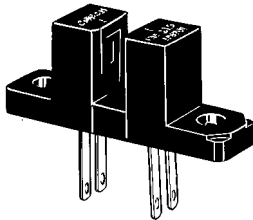
■ SWITCHING CHARACTERISTICS (TYPICAL)



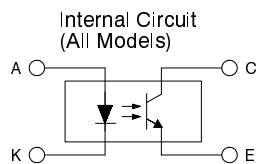
Dimensions

Unit: mm

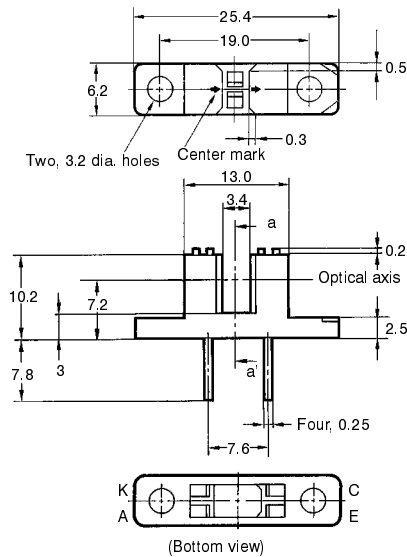
■ EE-SH3 (-CS, -DS, GS)/SH3-B (-C, -D, -G)



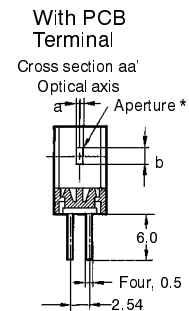
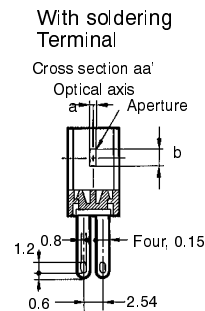
* With soldering terminal



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



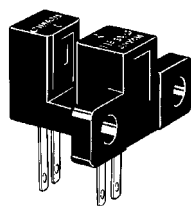
Model	Aperture (a x b)
EE-SH3	0.5 x 2.1
EE-SH3-CS	1.0 x 2.1
EE-SH3-DS	0.2 x 2.1
EE-SH3-GS	2.1 x 0.5



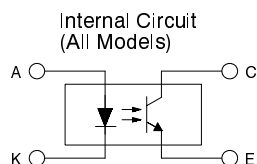
*The width of the aperture on the emitter and that on the receiver are the same in size.

Model	Aperture (a x b)
EE-SH3-B	0.5 x 2.1
EE-SH3-C	1.0 x 2.1
EE-SH3-D	0.2 x 2.1
EE-SH3-G	2.1 x 0.5

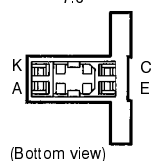
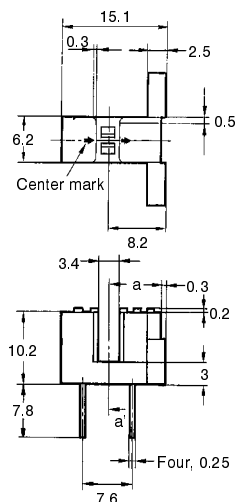
■ EE-SV3 (-CS, -DS, GS)/SV3-B (-C, -D, -G)



* With soldering terminal

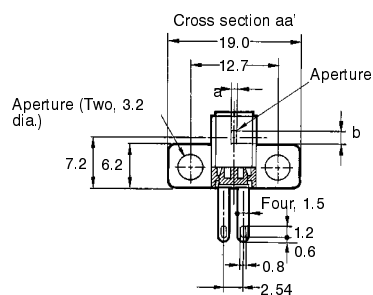


Terminal No.	Name
A	Anode
K	Cathode
C	Collector
E	Emitter

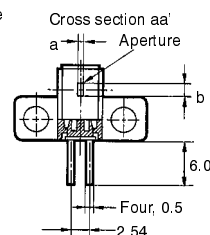


Model	Aperture (a x b)
EE-SV3	0.5 x 2.1
EE-SV3-CS	1.0 x 2.1
EE-SV3-DS	0.2 x 2.1
EE-SV3-GS	2.1 x 0.5

With soldering Terminal

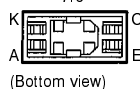
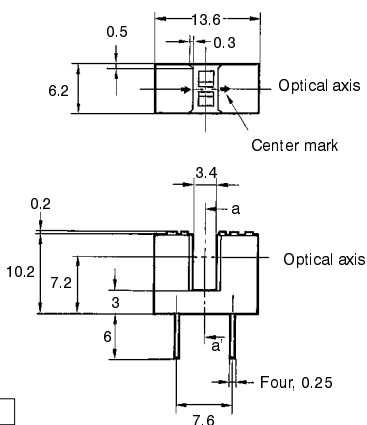
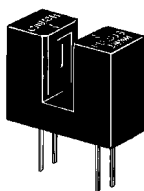


With PCB Terminal

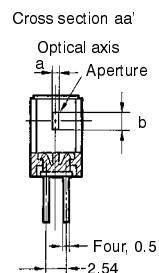


*The width of the aperture on the emitter and that on the receiver are the same in size.

■ EE-SJ3 (-C, -D, -G)



Model	Aperture (a x b)
EE-SJ3-C	1.0 x 2.1
EE-SJ3-D	0.2 x 2.1
EE-SJ3-G	2.1 x 0.5



* The width of the slit on the emitter and that on the receiver are the same in size.

Precautions

Refer to the Technical Information Section for general precautions.

NOTE: DIMENSIONS SHOWN ARE IN MILLIMETERS. To convert millimeters to inches divide by 25.4.

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