

## Features

- Infrared LED and phototransistor assure long life and high reliability
- Wide variety of slot configurations available from 2 mm (.079 in.) to 8 mm (.315 in.) slot width
- High resolution sensing with 0.5 mm (.02 in.) aperture
- Non-contact noiseless sensing ideal for office automation and computer peripheral equipment

## Ordering Information

Part number	Absolute maximum ratings				Electrical characteristics					
	Slot width/ sensing dist.	$I_f$	$P_c$	$T_{OPR}$	$V_f$ (typ.)	$I_s$ (min.)	$V_{CE(SAT)}$ (max.)	$t_r^1$ (typ.)	$t_f^1$ (typ.)	Dim. Drawing
<b>Transmissive (snap-in with connector)</b>										
EE-SX1235A-P2 <sup>2</sup>	5 (.197)	50	100	-25 ~ +95	1.2	0.6	0.4	8	8	p. 59
<b>Transmissive (solder terminals)</b>										
EE-SG3	3.6 (.142)	50	100	-25 ~ +85	1.2	2.0	0.4	4	4	p. 60
EE-SH3	3.4 (.134)	50	100	-25 ~ +85	1.2	0.5	0.4	4	4	p. 60
EE-SH3-DS	3.4 (.134)	50	100	-25 ~ +85	1.2	0.1	—	4	4	p. 60
EE-SH3-GS	3.4 (.134)	50	100	-25 ~ +85	1.2	0.5	0.4	4	4	p. 60
EE-SV3	3.4 (.134)	50	100	-25 ~ +85	1.2	0.5	0.4	4	4	p. 60
EE-SV3-GS	3.4 (.134)	50	100	-25 ~ +85	1.2	0.5	0.4	4	4	p. 60
<b>Transmissive (PCB mount)</b>										
EE-SG3-B	3.6 (.142)	50	100	-25 ~ +85	1.2	2	0.4	4	4	p. 67
EE-SH3-D	3.4 (.134)	50	100	-25 ~ +85	1.2	0.1	—	4	4	p. 67
EE-SJ3-D	3.4 (.134)	50	100	-25 ~ +85	1.2	0.1	—	4	4	p. 67
EE-SV3-B	3.4 (.134)	50	100	-25 ~ +85	1.2	0.5	0.4	4	4	p. 68
EE-SV3-D	3.4 (.134)	50	100	-25 ~ +85	1.2	0.1	—	4	4	p. 68
EE-SX198	3 (.118)	50	100	-25 ~ +85	1.2	0.5	0.4	4	4	p. 67
EE-SX1018	2 (.079)	50	100	-25 ~ +85	1.2	0.5	0.4	4	4	p. 64
EE-SX1025	2.8 (.110)	50	100	-25 ~ +85	1.2	0.5	0.4	4	4	p. 64
EE-SX1035	5.2 (.205)	50	100	-25 ~ +85	1.2	0.5	0.4	4	4	p. 64
EE-SX1041	5 (.197)	50	100	-25 ~ +95	1.2	0.5	0.4	4	4	p. 65
EE-SX1042	5 (.197)	50	100	-25 ~ +85	1.2	0.5	0.4	4	4	p. 65
EE-SX1046	3 (.118)	50	100	-25 ~ +85	1.2	1.2	0.4	4	4	p. 65
EE-SX1061	4.6 (.181)	50	100	-40 ~ +60	1.2	1.3	0.8	1000 max.	1000 max.	p. 66
EE-SX1070	8 (.315)	50	100	-25 ~ +95	1.2	0.5	0.4	4	4	p. 62
EE-SX1071	3.4 (.134)	50	100	-25 ~ +85	1.2	0.5	0.4	4	4	p. 66
EE-SX1081	5 (.197)	50	100	-25 ~ +85	1.2	0.5	0.4	4	4	p. 62
EE-SX1088	3.4 (.134)	50	100	-25 ~ +85	1.2	0.5	0.4	4	4	p. 63
EE-SX1096	3.4 (.134)	50	100	-25 ~ +85	1.2	0.5	0.4	4	4	p. 63
EE-SX1101	2 (.079)	50	75	-40 ~ +85	1.2	0.4	0.4	30	30	p. 62
<b>Transmissive (dual channel, PCB mount)</b>										
EE-SX1031	3.4 (.134)	50	100	-25 ~ +85	1.2	0.5	0.4	4	4	p. 69
<b>Transmissive (surface-mount)</b>										
EE-SX1102	2 (.079)	50	75	-40 ~ +85	1.2	0.4	0.4	30	30	p. 69
<b>Reflective (surface-mount)</b>										
EE-SY125	1 (.039)	50	75	-25 ~ +85	1.2	50 $\mu$ A	—	35	25	p. 70
<b>Actuator (PCB mount)</b>										
EE-SA105 <sup>3</sup>	—	50	100	-25 ~ +70	1.2	0.5	0.4	—	—	p. 70
<b>Unit</b>	<b>mm (in.)</b>	<b>mA</b>	<b>mW</b>	<b>°C</b>	<b>V</b>	<b>mA</b>	<b>V</b>	<b><math>\mu</math>S</b>	<b><math>\mu</math>S</b>	<b>—</b>

Notes: <sup>1</sup> See the appropriate illustrations (preceeding dimensional drawings) for the rising time,  $t_r$ , and the falling time,  $t_f$ , for each product.

<sup>2</sup> Applicable mating connectors: AMP 175778-3 and AMP 173977-3.

<sup>3</sup> Actuator operation:

Free position (FP): 14.2 ± 0.3 mm (.559 ± .012 in.)

Operating position (OP): 13.0 mm (.512 in.) min.

Total travel position (TTP): 12.1 mm (.476 in.) max.

Operating force: 15 gf (0.15 N) max.

Life expectancy: 500,000 operations min.

## Ordering Information (continued)

Part number	Absolute maximum ratings				Electrical characteristics					
	Slot width/ sensing dist.	$I_F$	$P_C$	$T_{OPR}$	$V_F$ (typ.)	$I_F$ (min.)	$V_{CE(SAT)}$ (max.)	$t_{ON}$ (typ.)	$t_{OFF}$ (typ.)	Dim. Drawing
<b>Actuator adaptable (PCB mount)</b>										
EE-SA102	3 (.118)	50	100	-25 ~ +85	1.2	0.5	0.4	4	4	p. 71
EE-SA103	3 (.118)	50	100	-25 ~ +85	1.2	0.5	0.4	4	4	p. 71
EE-SA104	3 (.118)	50	100	-25 ~ +85	1.2	0.5	0.4	4	4	p. 71
EE-SA107-P2	3.6 (.142)	50	100	-25 ~ +85	1.2	0.5	0.4	8	8	p. 71
<b>Reflective (PCB mount)</b>										
EE-SB5-B	5 (.197)	50	100	-25 ~ +80	1.2	0.2	—	30	30	p. 74
EE-SF5-B	5 (.197)	50	100	-25 ~ +80	1.2	0.2	—	30	30	p. 75
EE-SMR1-1	1 (.039)	40	150	0 ~ +60	1.2	80 $\mu$ A	—	4	4	p. 75
EE-SY110	5 (.197)	50	100	-40 ~ +85	1.2	0.2	—	30	30	p. 73
EE-SY113	4.4 (.173)	50	100	-40 ~ +85	1.2	0.16	—	30	30	p. 73
EE-SY124	1 (.039)	50	75	-25 ~ +85	1.2	50 $\mu$ A	—	35	25	p. 75
EE-SY169	4 (.157)	40	100	0 ~ +70	1.9	0.16	—	30	30	p. 74
EE-SY169A	4 (.157)	50	100	0 ~ +70	1.5 Max.	0.16	—	30	30	p. 74
EE-SY170	3.5 (.138)	50	100	-40 ~ +85	1.2	50 $\mu$ A	—	30	30	p. 74
EE-SY171	3.5 (.138)	50	100	-25 ~ +80	1.2	50 $\mu$ A	—	30	30	p. 74
<b>Reflective (solder terminals)</b>										
EE-SB5	5 (.197)	50	100	-25 ~ +80	1.2	0.2	—	30	30	p. 76
EE-SF5	5 (.197)	50	100	-25 ~ +80	1.2	0.2	—	30	30	p. 76
<b>Unit</b>	<b>mm (in.)</b>	<b>mA</b>	<b>mW</b>	<b>°C</b>	<b>V</b>	<b>mA</b>	<b>V</b>	<b><math>\mu</math>S</b>	<b><math>\mu</math>S</b>	<b>—</b>

Notes: <sup>1</sup> See the appropriate illustrations (preceeding dimensional drawings) for the rising time,  $t_r$ , and the falling time,  $t_f$ , for each product.

<sup>2</sup> Applicable mating connectors: AMP 175778-3 and AMP 173977-3.

<sup>3</sup> Actuator operation:

Free position (FP): 14.2  $\pm$  0.3 mm (.559  $\pm$  .012 in.)

Operating position (OP): 13.0 mm (.512 in.) min.

Total travel position (TTP): 12.1 mm (.476 in.) max.

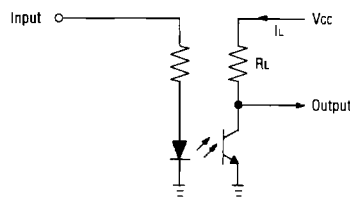
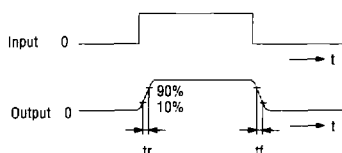
Operating force: 15 gf (0.15 N) max.

Life expectancy: 500,000 operations min.

## Transmissive Snap-in with Connector

## Timing Charts

### EE-SX1235A-P2

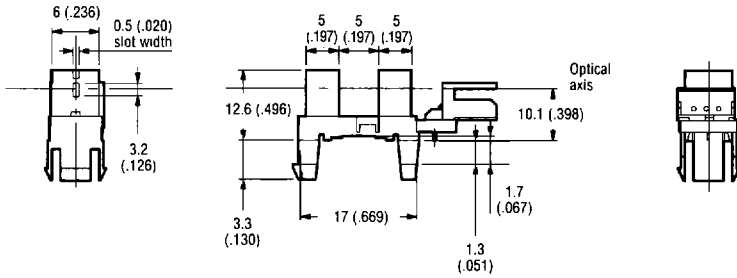
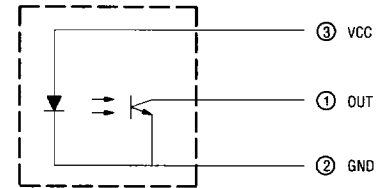
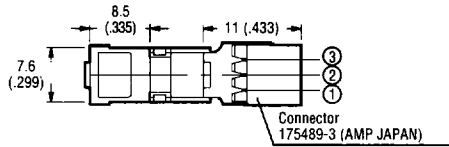


**Dimensions** [Unit: mm (inch)]

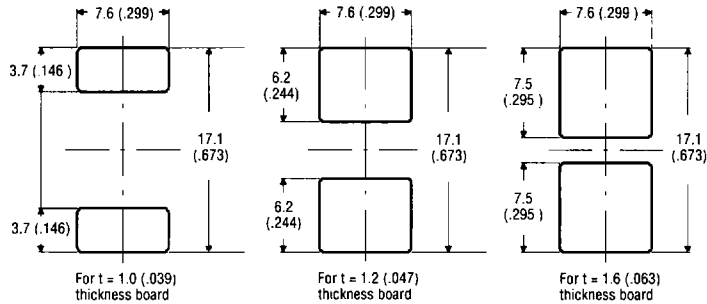
[ ] = Reference dimensions only.

**EE-SX1235A-P2**

**Internal connections**



**Recommended mounting holes**

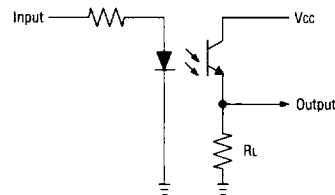
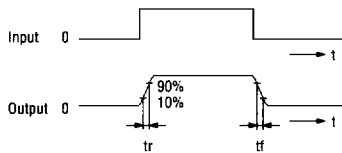


\* Each corner must be R0.5 (.02) max.

**Transmissive Solder Terminals**

**Timing Charts**

**EE-SG3 / SH3(-DS, -GS) / SV3(-GS)**



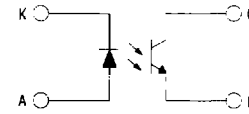
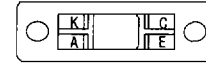
# Phototransistor

## Dimensions [Unit: mm (inch)]

[ ] = Reference dimensions only.

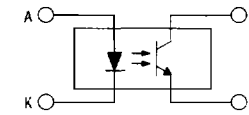
### EE-SG3

#### Terminal arrangement (bottom view)



Terminal number	Name
A	Anode
K	Cathode
C	Collector
E	Emitter

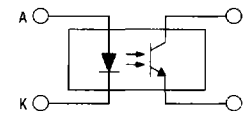
#### Internal circuit (all models)



Terminal number	Name
A	Anode
K	Cathode
C	Collector
E	Emitter

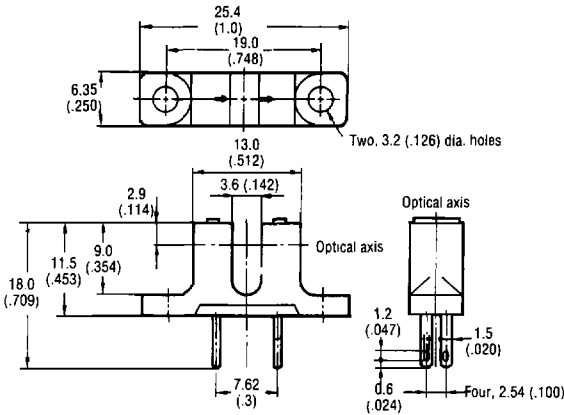
Model	Aperture (a x b)
EE-SH3	0.5 x 2.1 (.020 x .083)
EE-SH3-DS	0.2 x 2.1 (.008 x .083)
EE-SH3-GS	2.1 x 0.5 (.083 x .020)

#### Internal circuit (all models)

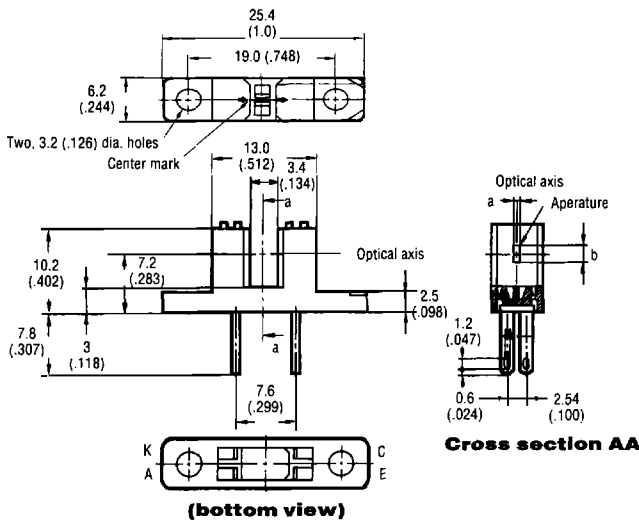


Terminal number	Name
A	Anode
K	Cathode
C	Collector
E	Emitter

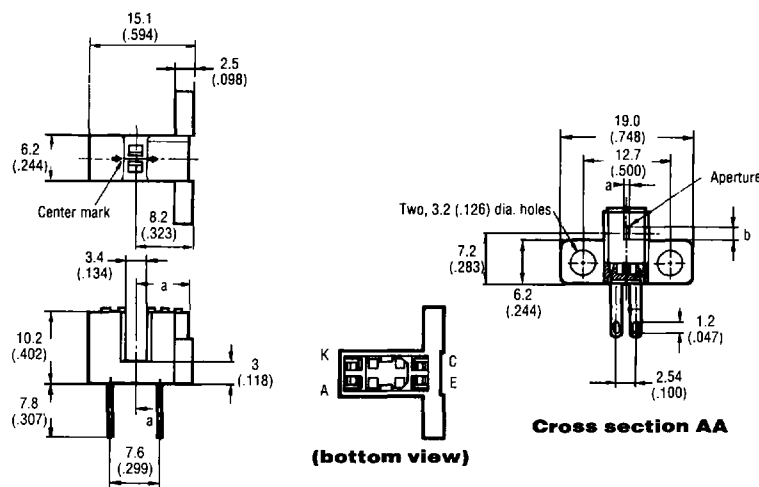
Model	Aperture (a x b)
EE-SV3	0.5 x 2.1 (.020 x .083)
EE-SV3-GS	2.1 x 0.5 (.083 x .020)



### EE-SH3 (-DS, -GS)



### EE-SV3 (-GS)



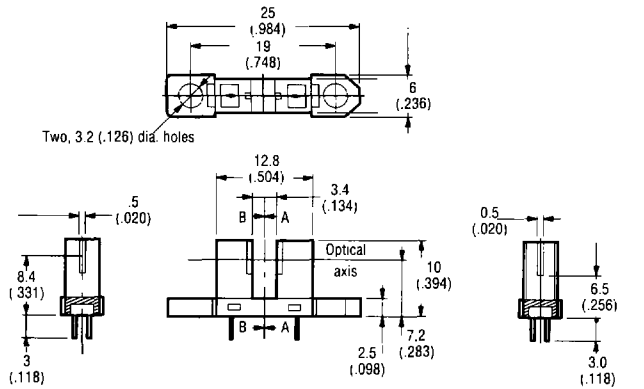
Note: The width of the aperture on the emitter and that on the receiver are the same size.

# Phototransistor

## Dimensions [Unit: mm (inch)]

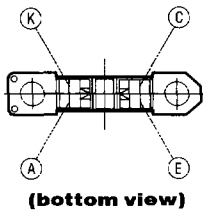
[ ] = Reference dimensions only.

### EE-SX1088

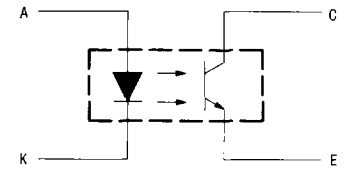


Cross section BB

Cross section AA

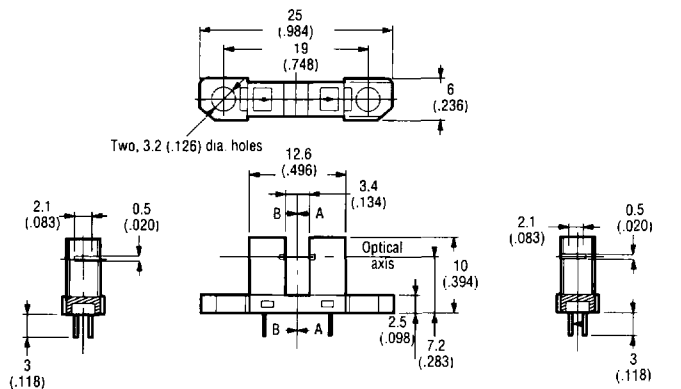


### Internal circuit



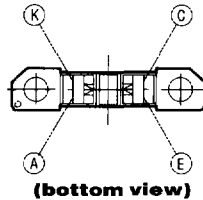
Terminal number	Name
A	Anode
K	Cathode
E	Emitter
C	Collector

### EE-SX1096

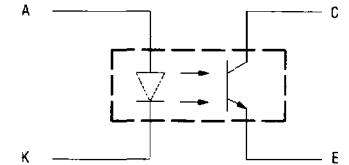


Cross section BB

Cross section AA



### Internal circuit



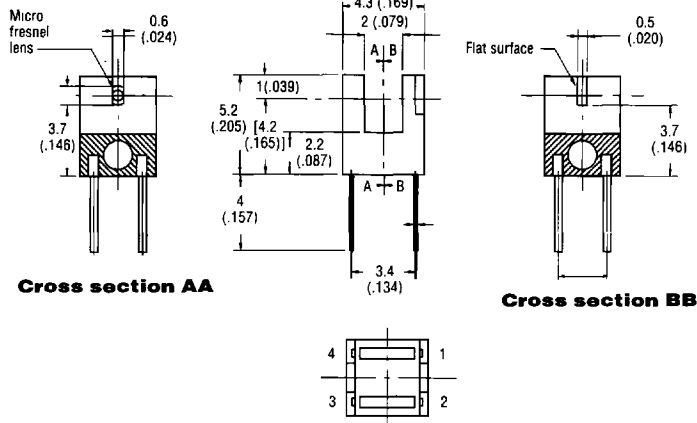
Terminal number	Name
A	Anode
K	Cathode
E	Emitter
C	Collector

# Phototransistor

## Dimensions [Unit: mm (inch)]

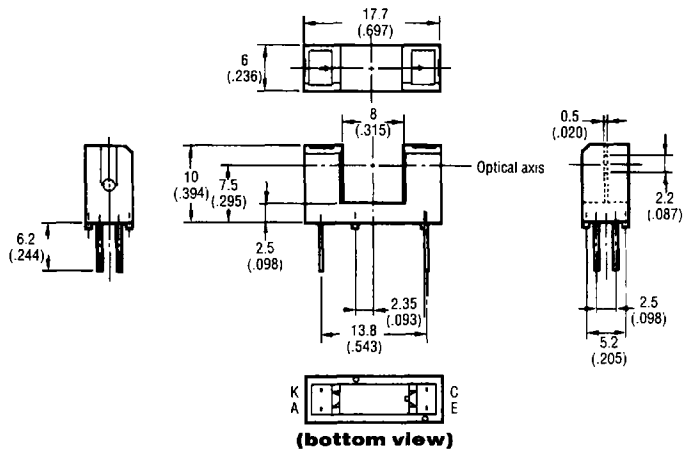
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### EE-SX1101

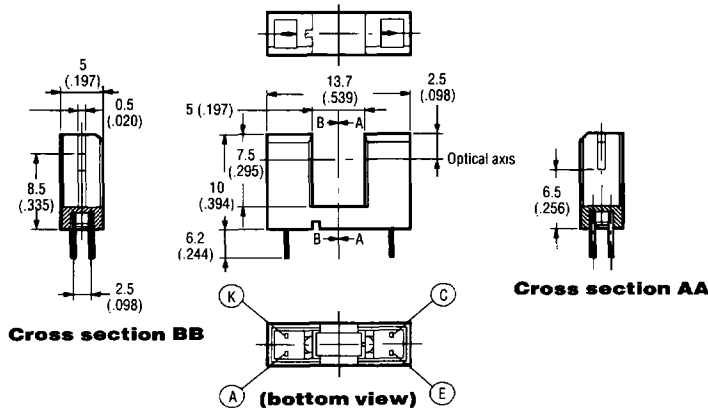


Terminal number	Name
1	Anode
2	Cathode
3	Emitter
4	Collector

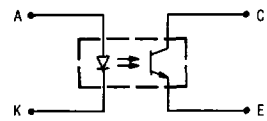
### EE-SX1070



### EE-SX1081



### Internal circuit

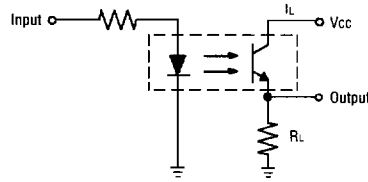
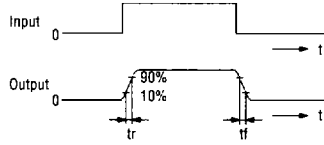


Terminal number	Name
A	Anode
K	Cathode
C	Collector
E	Emitter

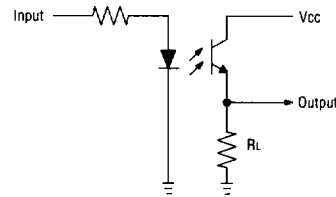
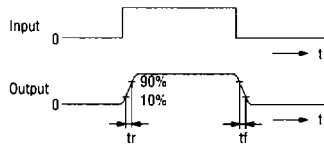
**Transmissive PCB Mount**

## Timing Charts

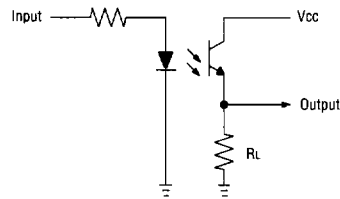
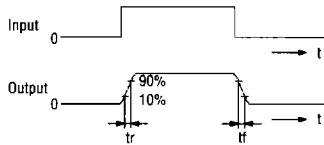
### EE-SX1101



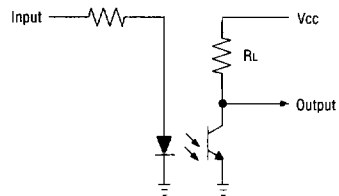
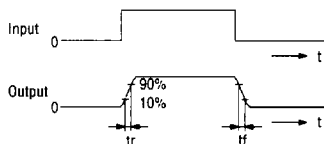
### EE-SX198 / 1018 / 1025 / 1041 / 1042 / 1046 / 1070 / 1071



### EE-SG3 / SG3-B, EE-SH3 / SJ3 / SV3, EE-SX1035 / 1081 / 1088 / 1096



### EE-SX1061



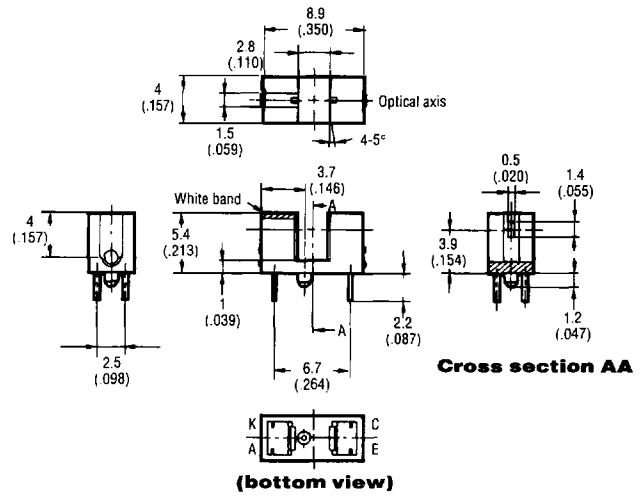
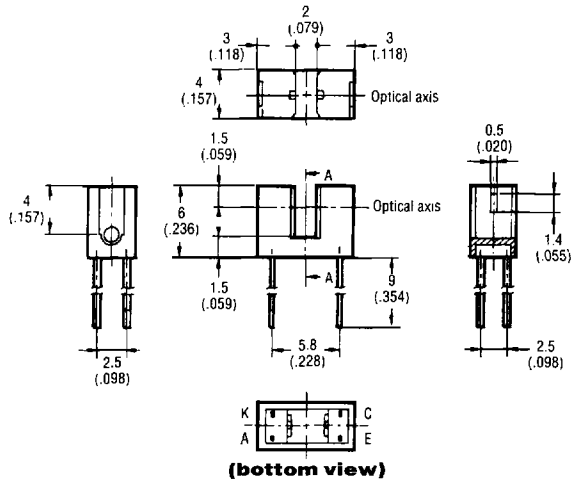
# Phototransistor

## Dimensions [Unit: mm (inch)]

[ ] = Reference dimensions only.

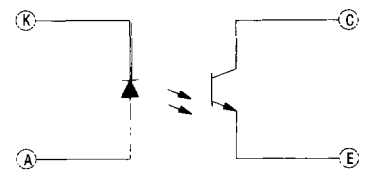
### EE-SX1018

### EE-SX1025

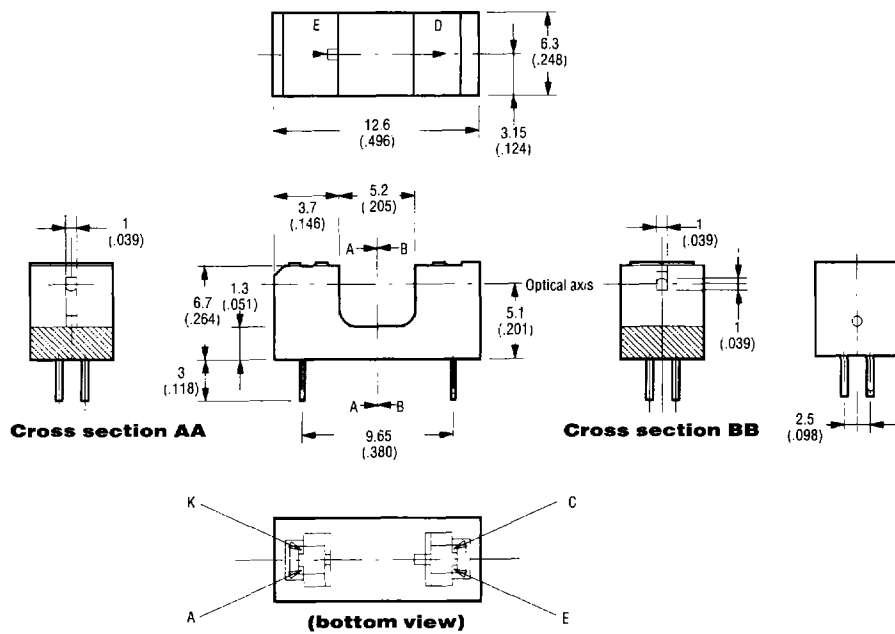


### EE-SX1035

### Internal circuit



Terminal number	Name
A	Anode
K	Cathode
E	Emitter
C	Collector



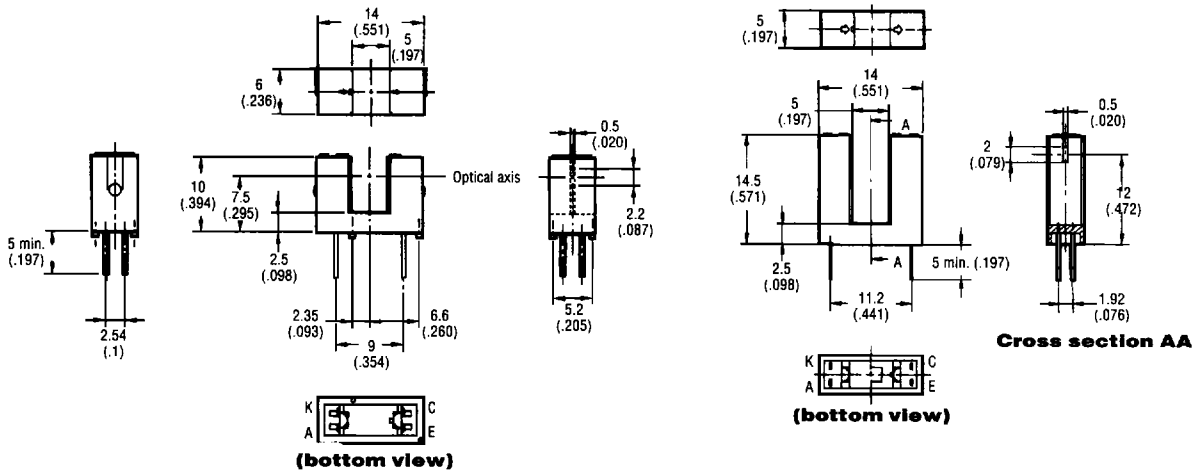
# Phototransistor

## Dimensions [Unit: mm (inch)]

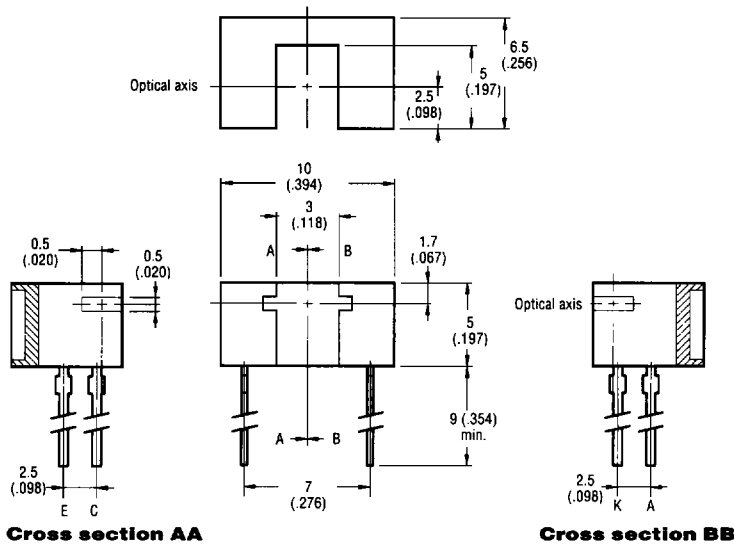
[ ] = Reference dimensions only.

EE-SX1041

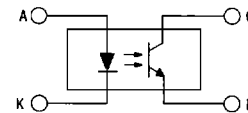
EE-SX1042



EE-SX1046



### Internal circuit (all models)

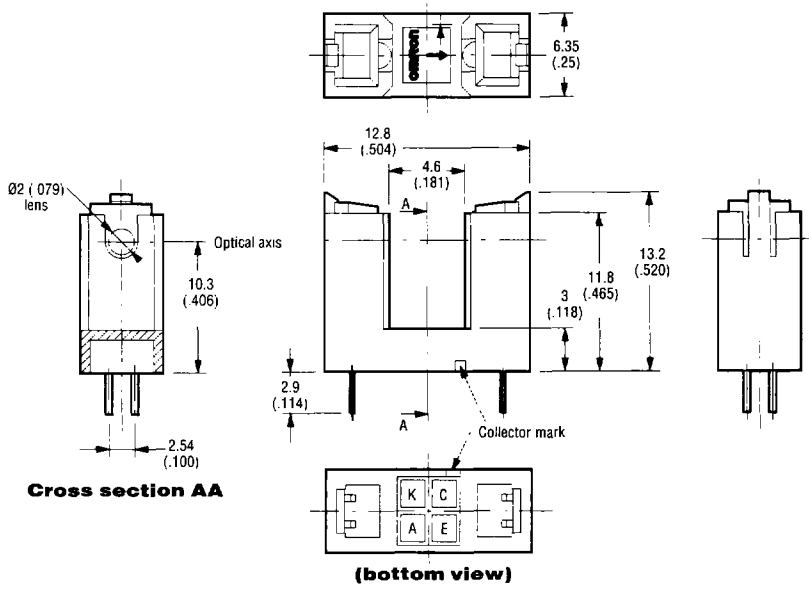


Terminal number	Name
A	Anode
K	Cathode
C	Collector
E	Emitter

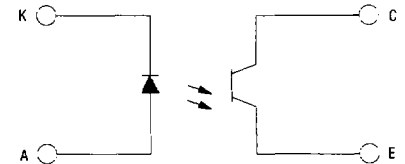
## Dimensions [Unit: mm (inch)]

[ ] = Reference dimensions only.

### EE-SX1061

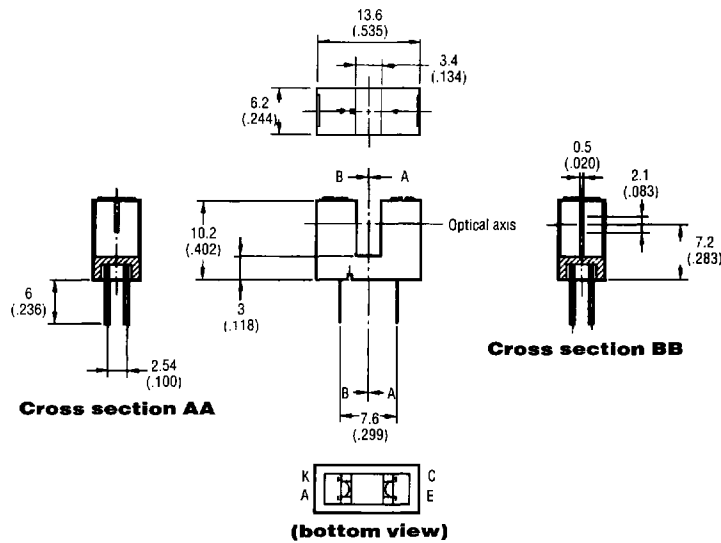


### Internal circuit



Terminal number	Name
A	Anode
K	Cathode
E	Emitter
C	Collector

### EE-SX1071



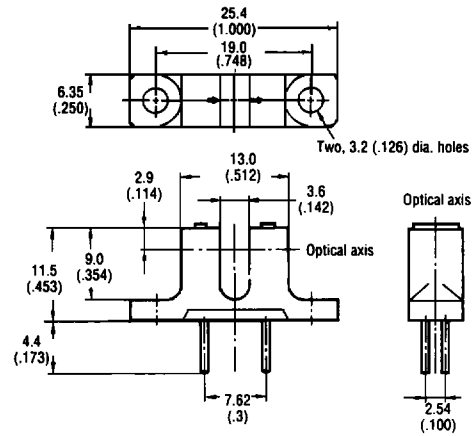
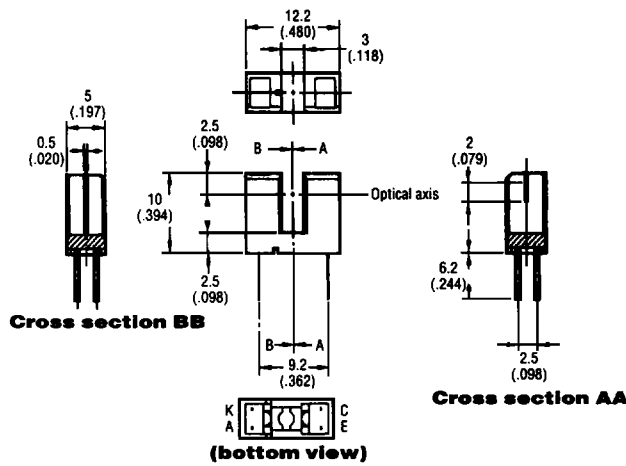
# Phototransistor

## Dimensions [Unit: mm (inch)]

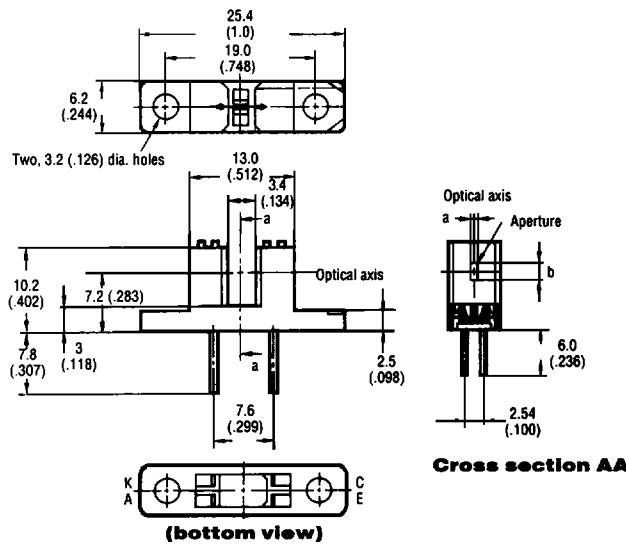
[ ] = Reference dimensions only.

### EE-SX198

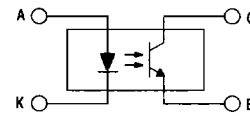
### EE-SQ3-B



### EE-SH3-D

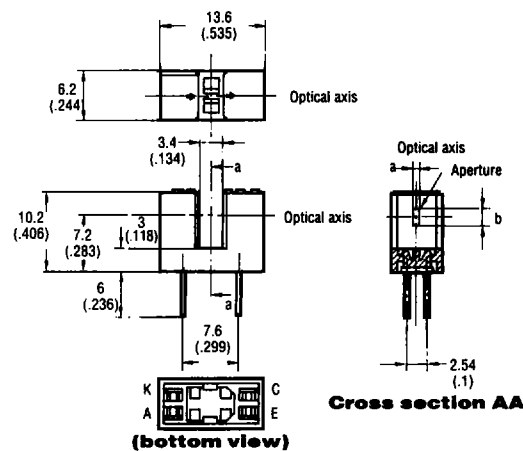


### Internal circuit (all models)



Terminal number	Name	Model	Aperture (a x b)
A	Anode	EE-SH3-D	0.2 x 2.1 (.008 x .083)
K	Cathode		
E	Emitter		
C	Collector		

### EE-SJ3-D



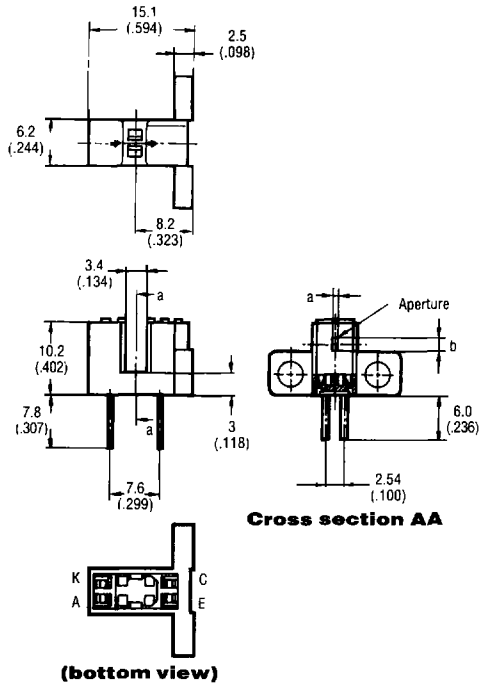
Model	Aperture (a x b)
EE-SJ3-D	0.2 x 2.1 (.008 x .083)

CAN'T FIND THE PRODUCT SOLUTION YOU NEED? MANY OTHER STYLES AND VARIATIONS ARE AVAILABLE. CALL YOUR OMRON REPRESENTATIVE FOR MORE INFORMATION.

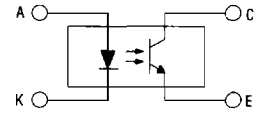
## Dimensions [Unit: mm (inch)]

[ ] = Reference dimensions only.

### EE-SV3 (-B, -D)



### Internal circuit (all models)

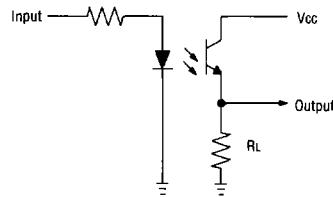
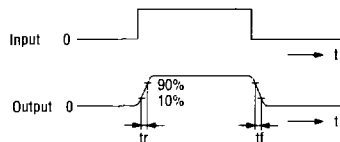


Terminal number	Name	Model	Aperture (a x b)
A	Anode	EE-SV3-B	0.5 x 2.1 (.020 x .083)
K	Cathode	EE-SV3-D	0.2 x 2.1 (.008 x .083)
E	Emitter		
C	Collector		

## Transmissive Dual Channel, PCB Mount

## Timing Charts

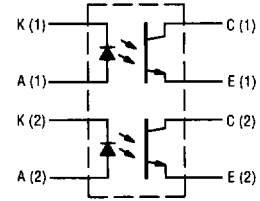
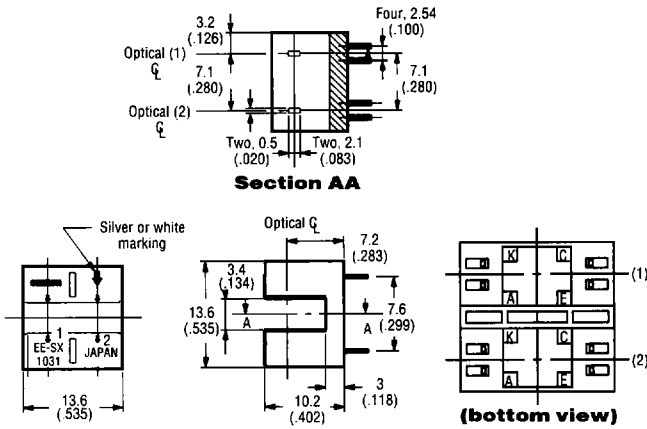
### EE-SX1031



## Dimensions [Unit: mm (inch)]

[ ] = Reference dimensions only.

### EE-SX1031

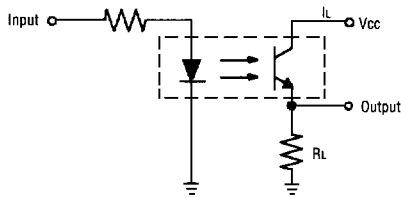


Terminal number	Name
A	Anode
K	Cathode
C	Collector
E	Emitter

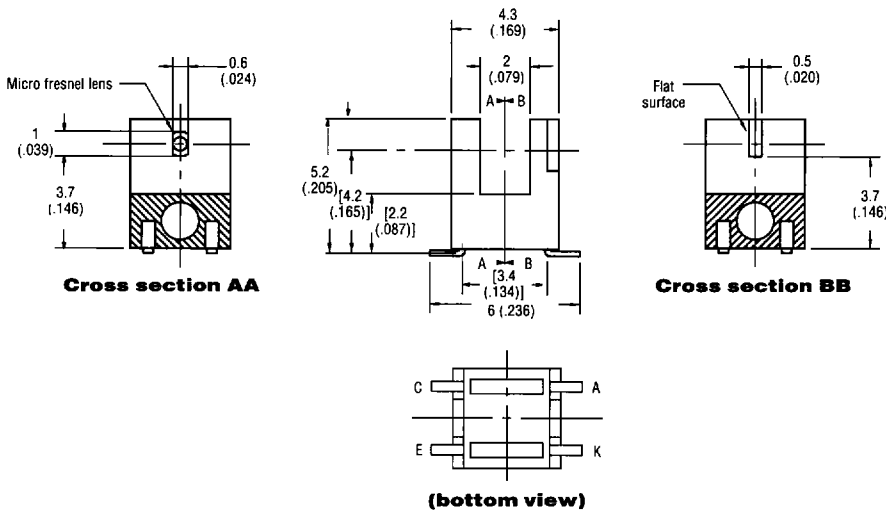
## Transmissive Surface Mount

## Timing Charts

### EE-SX1102



### EE-SX1102

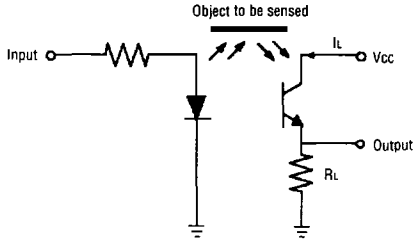


Terminal number	Name
A	Anode
K	Cathode
C	Collector
E	Emitter

**Reflective Surface Mount**

## Timing Charts

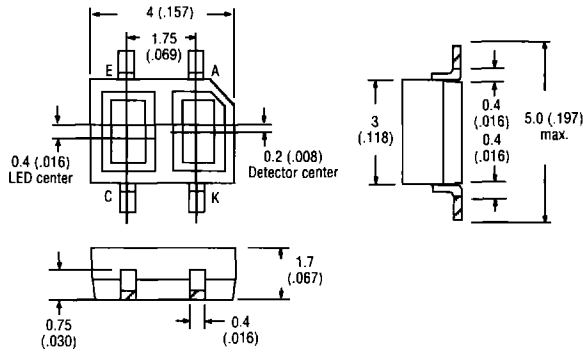
EE-SY125



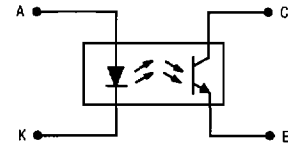
## Dimensions [Unit: mm (inch)]

[ ] = Reference dimensions only.

EE-SY125



### Internal circuit

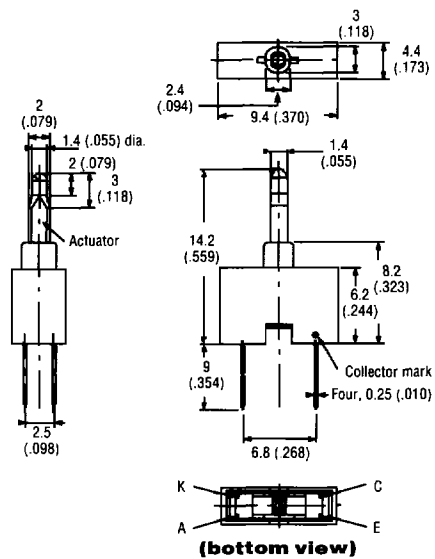


Terminal number	Name
A	Anode
K	Cathode
C	Collector
E	Emitter

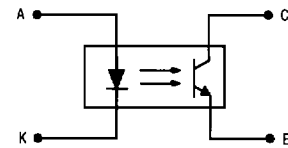
**Actuator PCB Mount**

## Dimensions [Unit: mm (inch)]

EE-SA105



### Internal circuit

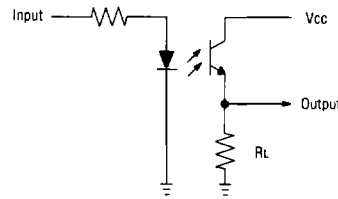
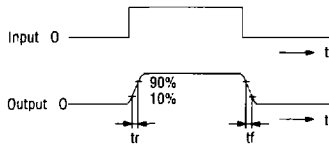


Terminal number	Name
A	Anode
K	Cathode
C	Collector
E	Emitter

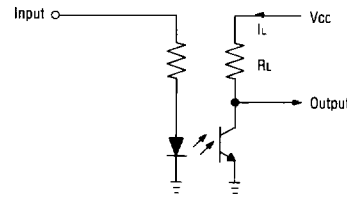
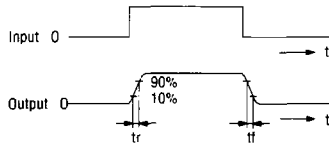
**Actuator Adaptable PCB Mount**

## Timing Charts

**EE-SA102 / SA103 / SA104**



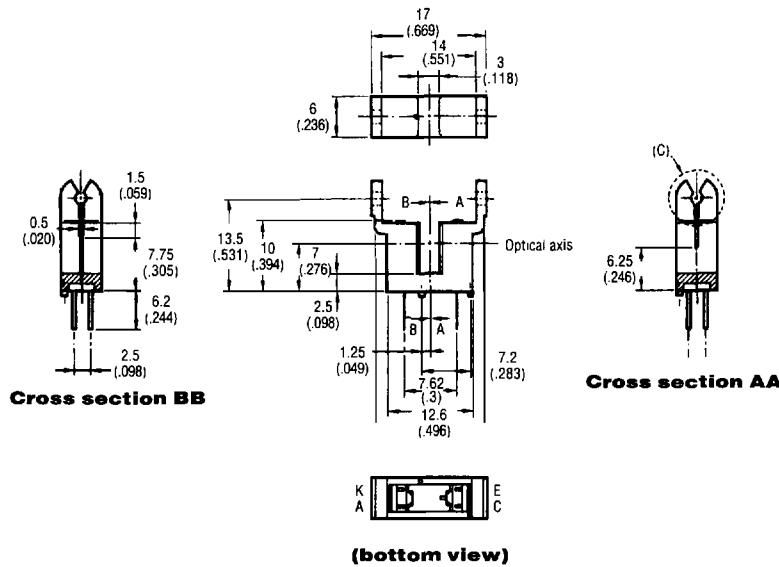
**EE-SA107-P2**



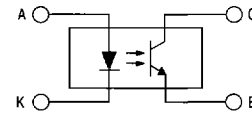
## Dimensions [Unit: mm (inch)]

[ ] = Reference dimensions only.

**EE-SA102**

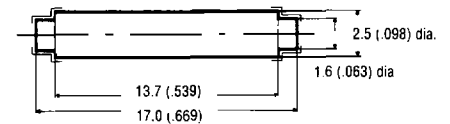


### Internal circuit (all models)



Terminal number	Name
A	Anode
K	Cathode
C	Collector
E	Emitter

### Recommended actuator design for EE-SA102



- Note: 1. No flash is located at the sections indicated by dotted lines.  
2. Material must be opaque in infrared light range (900 to 950 nm).

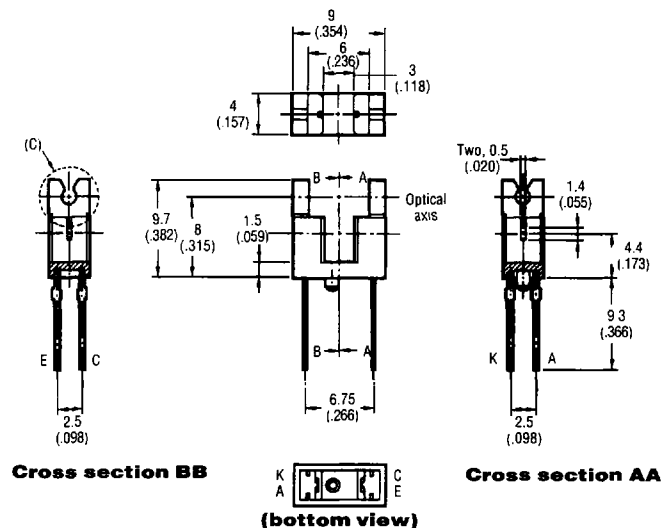
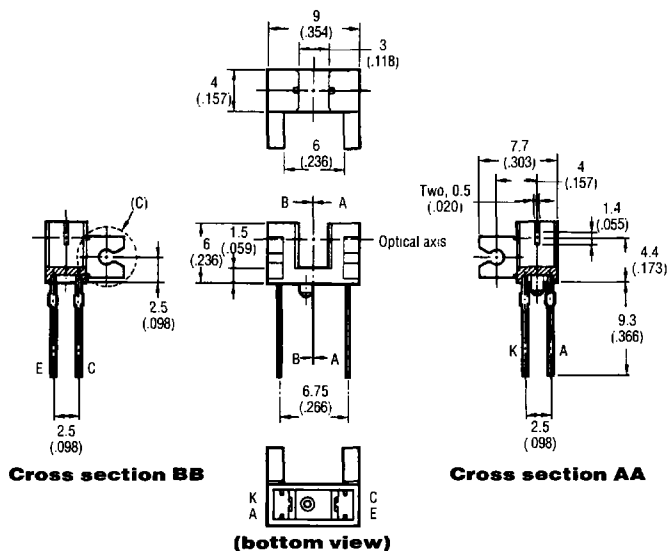
# Phototransistor

## Dimensions [Unit: mm (inch)]

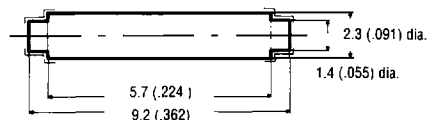
[ ] = Reference dimensions only.

### EE-SA103

### EE-SA104

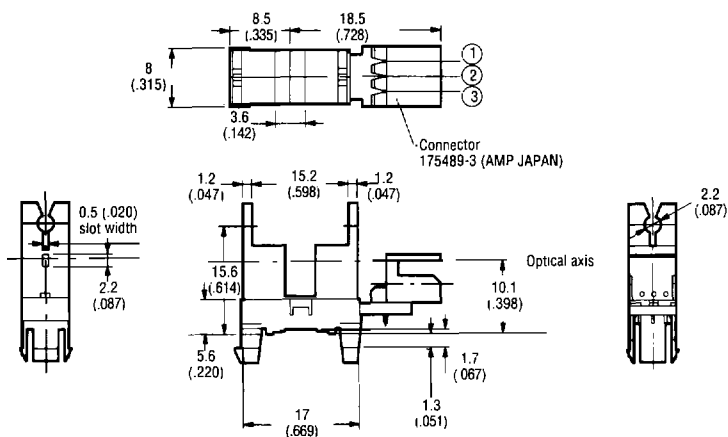


### Recommended actuator design for EE-SA103, EE-SA104

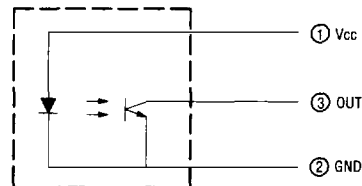


- Note: 1. No flash is located at the sections indicated by dotted lines.
- 2. Material must be opaque in infrared light range (900 to 950 nm).

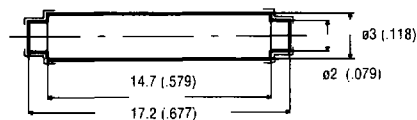
### EE-SA107-P2



### Internal connections



### Recommended actuator design



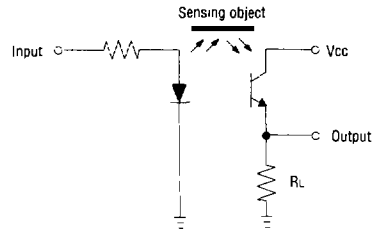
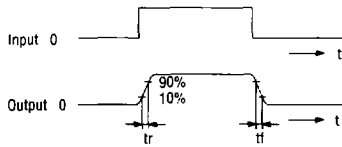
- Note: 1. No flash is located at the sections indicated by dotted lines.
- 2. Material must be opaque in infrared light range (900 to 950 nm).

# Phototransistor

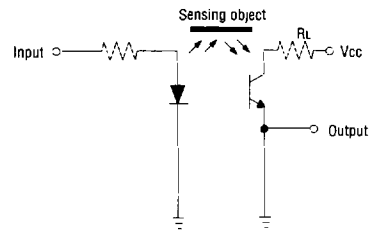
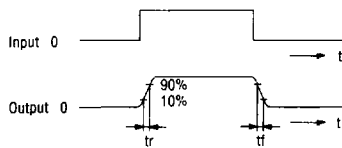
Reflective PCB Mount

## Timing Charts

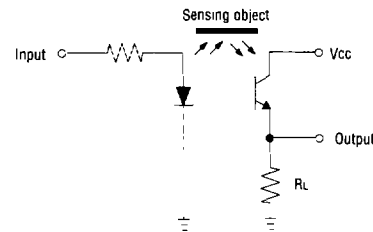
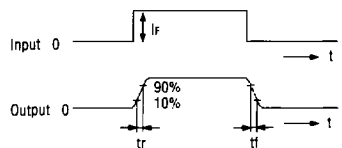
EE-SB5-B, EE-SMR1-1, EE-SY110 / SY113 / SY124 / SY170 / SY171



EE-SY169 / SY169A



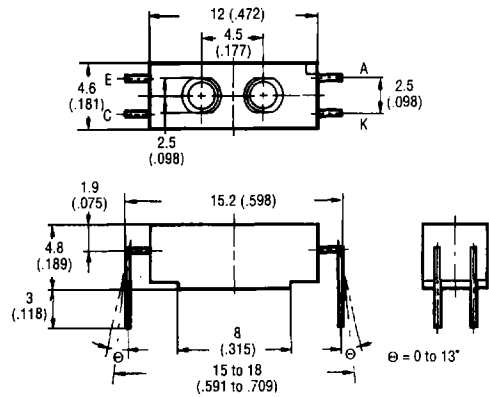
EE-SF5-B



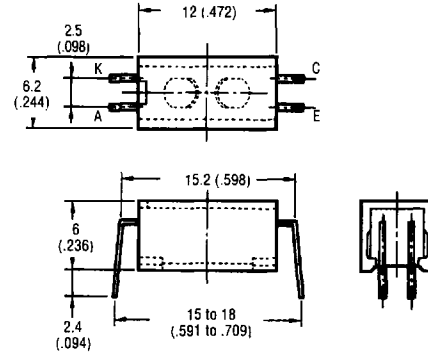
## Dimensions [Unit: mm (inch)]

[ ] = Reference dimensions only.

EE-SY110



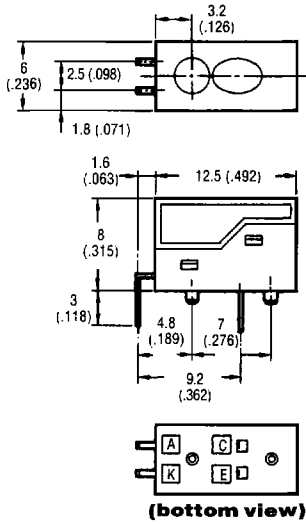
EE-SY113



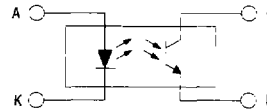
## Dimensions [Unit: mm (inch)]

[ ] = Reference dimensions only.

### EE-SY169 / SY169A

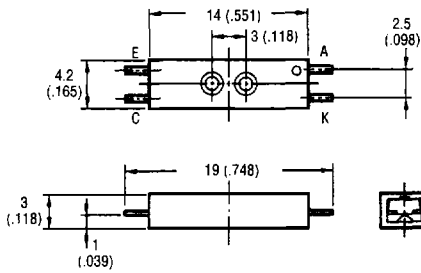


### Internal circuit (all models)

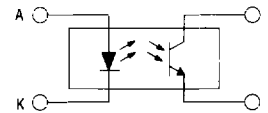


Terminal number	Name
A	Anode
K	Cathode
E	Emitter
C	Collector

### EE-SY170

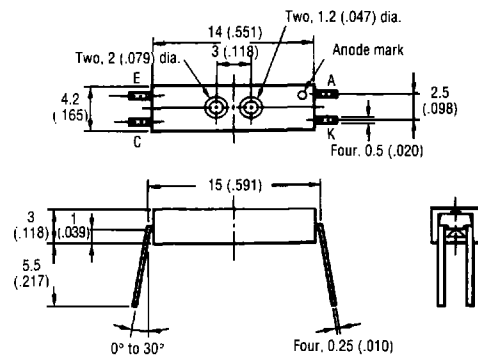


### Internal circuit (all models)

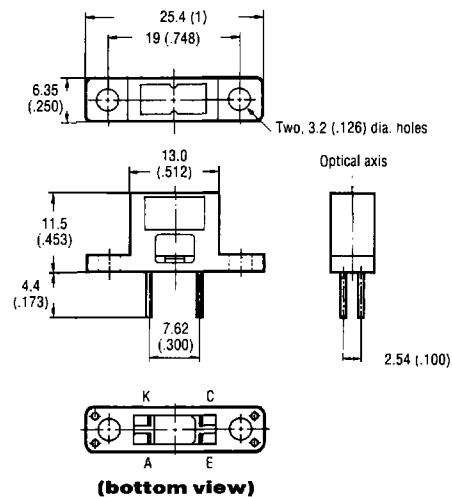


Terminal number	Name
A	Anode
K	Cathode
E	Emitter
C	Collector

### EE-SY171



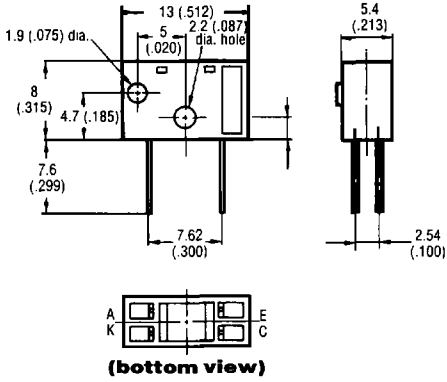
### EE-SB5-B



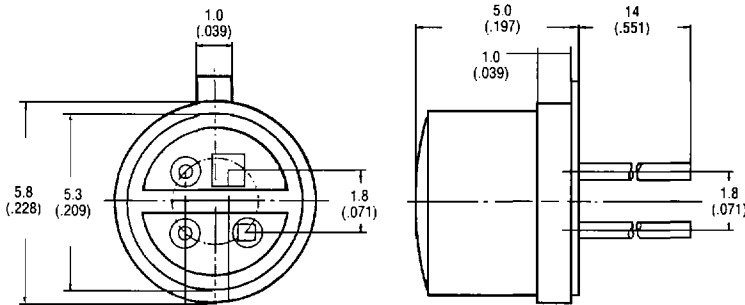
## Dimensions [Unit: mm (inch)]

[ ] = Reference dimensions only.

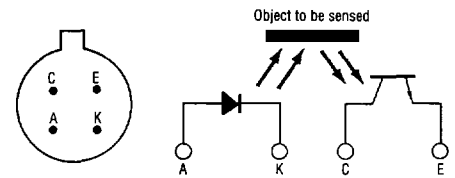
### EE-SF5-B



### EE-SMR1-1

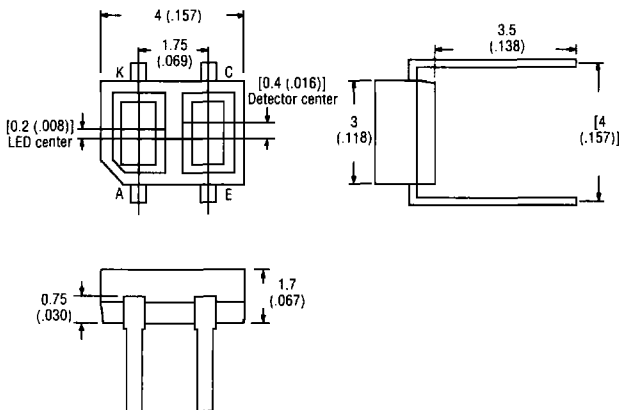


### Pin assignment (bottom view)

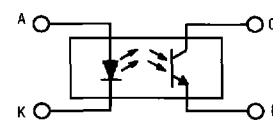


Terminal number	Name
A	Anode
K	Cathode
E	Emitter
C	Collector

### EE-SY124



### Pin assignment (bottom view)



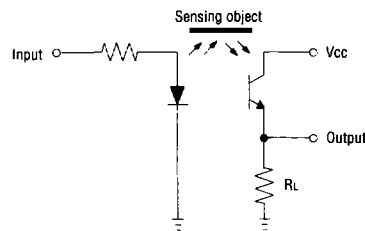
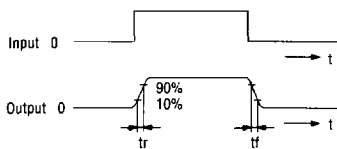
Terminal number	Name
A	Anode
K	Cathode
E	Emitter
C	Collector

Reflective

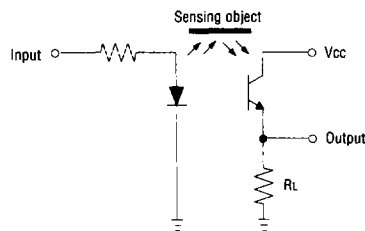
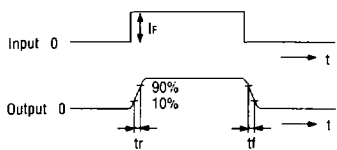
Solder terminals

## Timing Charts

EE-SB5



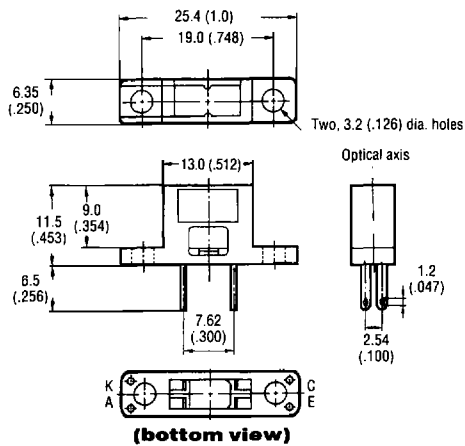
EE-SF5



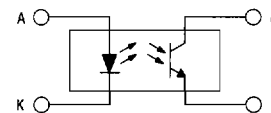
## Dimensions [Unit: mm (inch)]

[ ] = Reference dimensions only.

EE-SB5

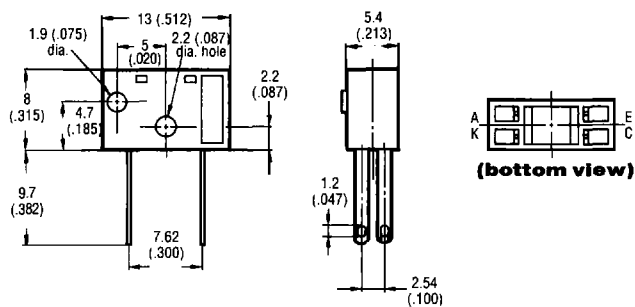


### Internal circuit (all models)

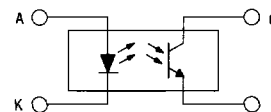


Terminal number	Name
A	Anode
K	Cathode
E	Emitter
C	Collector

EE-SF5



### Internal circuit (all models)



Terminal number	Name
A	Anode
K	Cathode
E	Emitter
C	Collector