

# Distinctive Characteristics

Photo interrupter, rather than contacts, ensures high reliability.

Sealed construction for protection from environmental elements, including hydrogen sulfide, sulfur dioxide, and nitrogen hydroxide. Terminals are made of ammonia-resistant materials.

Totally sealed body allows process compatibility for time- and money-saving automatic soldering and cleaning.

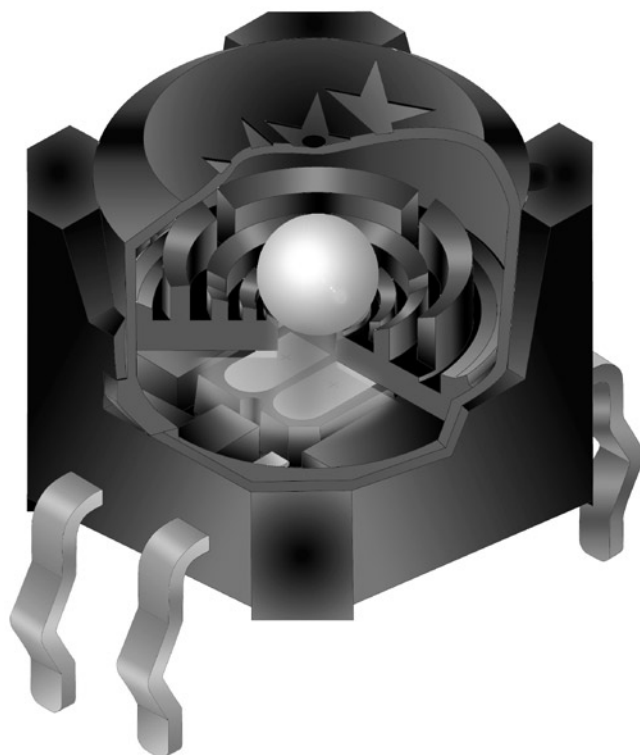
Space-saving compact dimensions allow high density mounting.

Internal steel ball movement allows functionality of 360° circumference rotation.

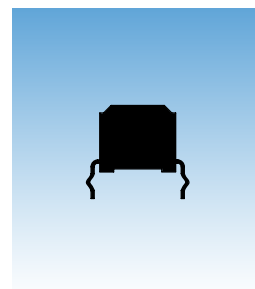
The DS series switch is well-suited to meet product safety concerns due to normally closed (on) status.

Crimped terminals ensure secure mounting and prevent dislodging during wave soldering.

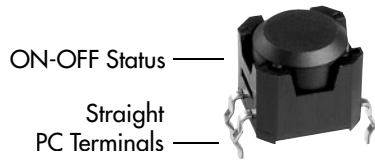
The switch is triggered when tilted beyond 30° in any direction.



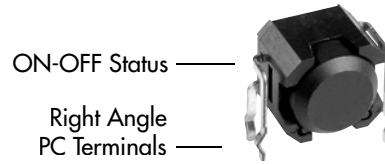
Actual Size



## SWITCH PART NUMBERS & DESCRIPTION



**DSBA1P**



**DSBA1H**

## SPECIFICATIONS

### Absolute Maximum Ratings Temperature at 25°C

		Symbol	Rating	Unit
Input	Forward Current	$I_F$	50	mA
	Reverse Voltage	$V_R$	5	V
	Power Dissipation	$P_D$	75	mW
Output	Collector-Emitter Voltage	$V_{CEO}$	30	V
	Emitter-Collector Voltage	$V_{ECO}$	3	V
	Collector Current	$I_C$	20	mA
	Collector Power Dissipation	$P_C$	50	mW
	Total Power Dissipation	$P_{tot}$	100	mW

### Mechanical Specifications

<b>Mechanical Life:</b>	150,000 operations minimum
<b>Electrical Life:</b>	150,000 operations minimum using applicable circuit

### Materials & Finishes

<b>Housing:</b>	Glass fiber reinforced polyamide (UL94V-0 flammability rating)
<b>Base:</b>	Glass fiber reinforced polyamide (UL94V-0 flammability rating)
<b>Terminals:</b>	Phosphor bronze with tin plating

### Environmental Specifications

<b>Operating Temperature Range:</b>	-25°C ~ +80°C (-13°F ~ +176°F)
<b>Storage Temperature Range:</b>	-30°C ~ +85°C (-22°F ~ +185°F)
<b>Humidity:</b>	85% humidity for 500 hours @ +85°C (+185°F)
<b>Vibration:</b>	10Hz with peak-to-peak amplitude of 10mm traversing the frequency range & returning in 1 minute; 3 right angled directions for 500,000 cycles
<b>Shock:</b>	100G (981m/s <sup>2</sup> ) acceleration (tested in 6 right angled directions, with 5 shocks in each direction)

#### Notes:

1. Prevent exposure to magnetic fields.
2. Do not install switch near vibration source.

## SPECIFICATIONS (Continued)

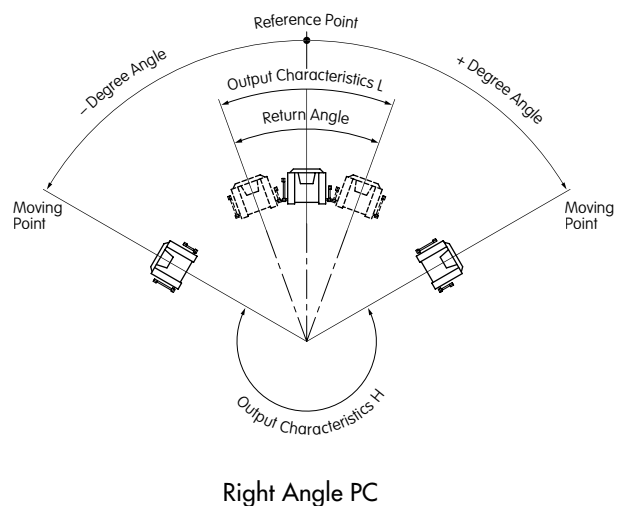
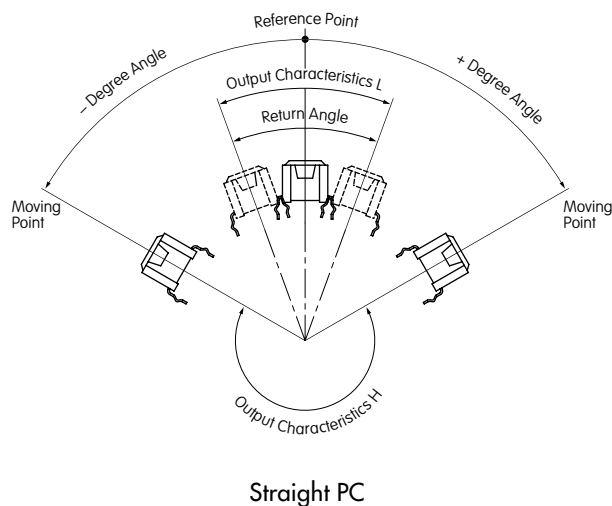
### Operating Characteristics

	Operating Angle	Return Angle
<b>Circuit Characteristics (ON-OFF)</b>	$\pm 30^\circ$ to $\pm 60^\circ$	Minimum $10^\circ$
	Output $V_{OL} \rightarrow V_{OH}$	Output $V_{OH} \rightarrow V_{OL}$

Output Characteristics  $V_{OL}$  with Photo transistor ON: 1.0V maximum (horizontal)

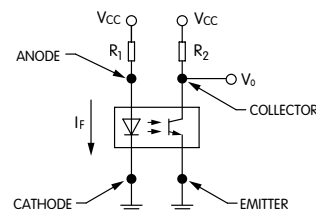
Output Characteristics  $V_{OH}$  with Photo transistor OFF: 4.0V minimum (inclined at an angle of  $-60^\circ$  minimum)

### Output Characteristics



### Circuit Design Considerations

$V_{CC} = 5V$   
 $R_2 = 100k\Omega$   
 $I_F = 19mA$  ( $V_{CC} = 5V$ ,  $R_1 = 200\Omega$ )  
 $V_F$  of the LED Maximum = 1.3V

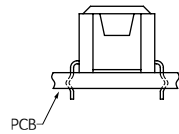


### PCB Processing

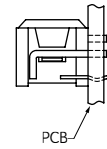
**Soldering:** Wave Soldering: 10 seconds maximum @  $260^\circ C$  maximum  
 Manual Soldering: 3 seconds maximum @  $350^\circ C$  maximum

**Automated Cleaning:** Use alcohol based solution at  $50^\circ C$  maximum. Do not submerge over 2 inches (5cm) for 1 minute maximum. Do not use organic solvents.

## MOUNTING OPTIONS



PCB mounting option for Straight PC

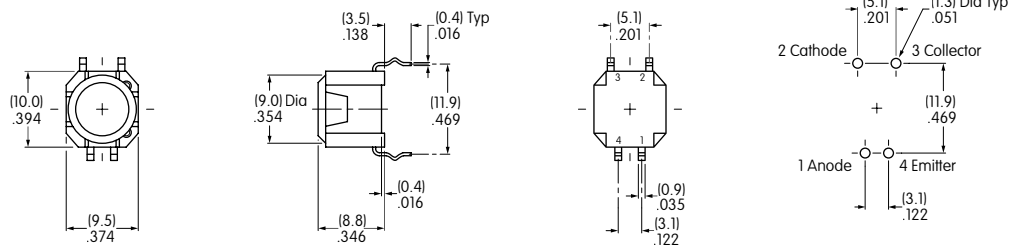


PCB mounting option for Right Angle PC

Install switch at an angle less than  $\pm 3^\circ$

## TYPICAL SWITCH DIMENSIONS

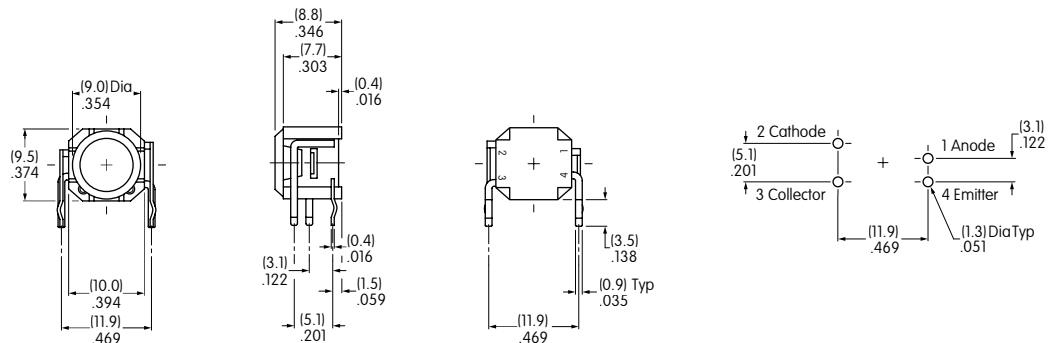
### Straight PC



DSBA1P

Terminal numbers are on bottom of switch.

### Right Angle PC



DSBA1H

Terminal numbers are on bottom of switch.