

# Distinctive Characteristics

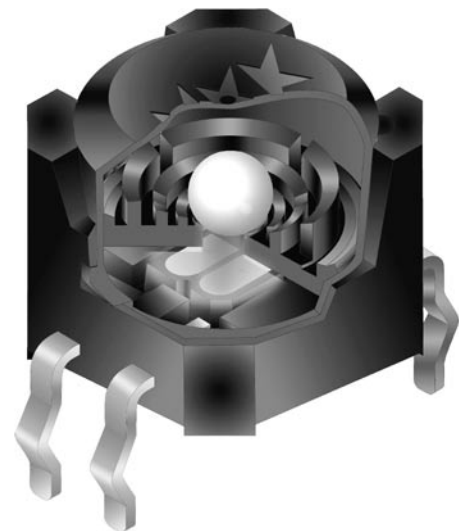
## DSA *NEW*

- Environmentally friendly, contains no mercury.
- High contact reliability due to sealed body.
- The switch is triggered when tilted beyond  $\pm 10^\circ$  of the horizontal.
- PCB adaptor available as an accessory.



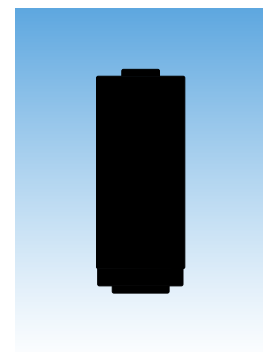
## DSB

- 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  $360^\circ$  circumference rotation.
- The DSB 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  $\pm 30^\circ$  of the horizontal.

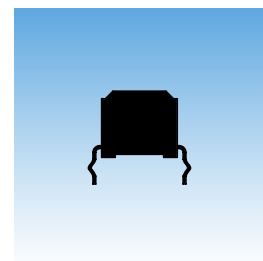


Actual Sizes

DSA



DSB



## DSA SWITCH PART NUMBER & DESCRIPTION

NEW →

DSA01



SPST ON – OFF

Sealed Body

## DSA SWITCH SPECIFICATIONS

### Mechanical & Electrical Specifications

<b>Poles and Circuits:</b>	Single Pole Single Throw ON – OFF
<b>Operating Range:</b>	ON Angle = 10° ~ 170°; OFF Angle = 190° ~ 350°
<b>Resistive Load:</b>	0.1A @ 12V DC
<b>Contact Resistance:</b>	100 milliohms maximum
<b>Insulation Resistance:</b>	50 megohms minimum @ 250V DC
<b>Dielectric Strength:</b>	250V AC for 1 minute minimum between terminals
<b>Mechanical Life:</b>	100,000 operations minimum
<b>Electrical Life:</b>	100,000 operations minimum

### Materials & Finishes

<b>Housing:</b>	PBT
<b>Rubber Rings:</b>	Nitrile Butadiene Rubber
<b>Contact Balls:</b>	Brass with Silver Plating
<b>Terminals:</b>	Brass with Silver Plating

### Environmental Specifications

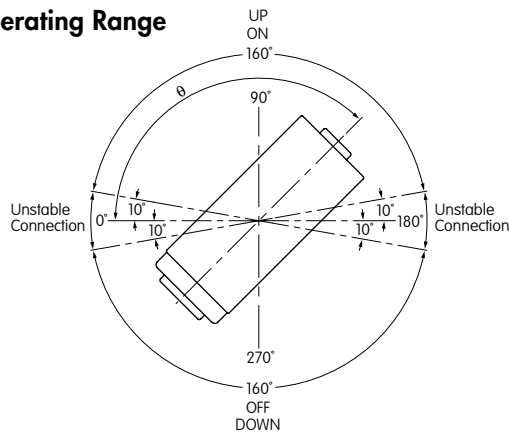
<b>Operating Temperature Range:</b>	-10°C ~ +70°C (+14°F ~ +158°F)
<b>Storage Temperature Range:</b>	-25°C ~ +85°C (-13°F ~ +185°F)
<b>Contact Bounce (for reference):</b>	500ms maximum
<b>Humidity:</b>	90% humidity for 96 hours @ 40°C (104°F)
<b>Vibration (for reference):</b>	Frequency range 10Hz ~ 500Hz for 2 hours; 2 directions; Acceleration: 0.2G
<b>Notes:</b>	<ol style="list-style-type: none"> <li>Do not install switch near vibration source.</li> <li>Terminals should not be exposed to liquid.</li> </ol>

### Processing for AT094 PCB Adaptor

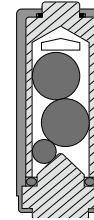
<b>Soldering (with PCB Mount Holder):</b>	Wave Soldering: See Profile A in Supplement section. Manual Soldering: See Profile B in Supplement section.
<b>Automated Cleaning:</b>	Hand clean locally using alcohol based solution.

## DSA SWITCH SPECIFICATIONS (CONTINUED)

### Operating Range



### Cross Section

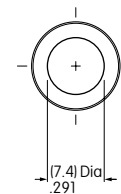
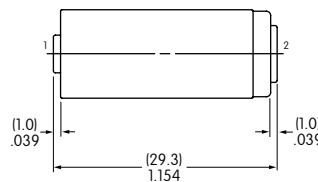
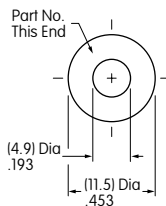


Allow 500ms settling time between states.

## TYPICAL SWITCH DIMENSIONS



DSA01



Terminal numbers are not on the switch.

## OPTIONAL ADAPTOR



**← NEW**

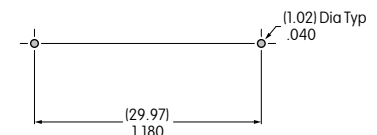
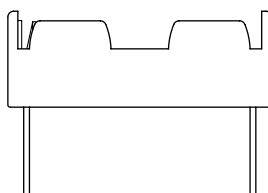
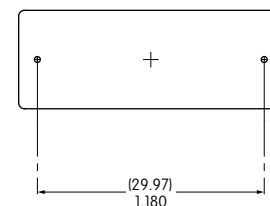
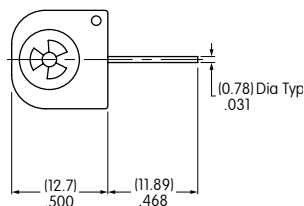
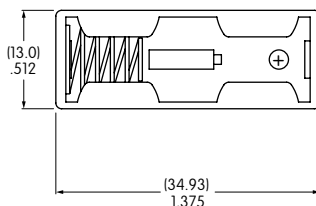
**AT094  
PCB Adaptor for DSA01**

### Materials:

- Holder: Polypropylene
- Spring: Spring Steel with Nickel Plating
- PC Pins: Brass with Nickel Plating

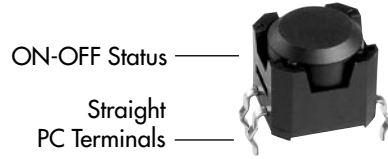


Assembled DSA Switch & Adaptor

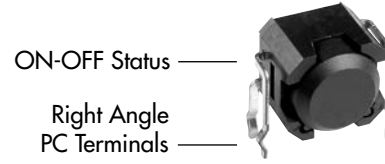


PCB Footprint

## DSB SWITCH PART NUMBERS & DESCRIPTION



**DSBA1P**



**DSBA1H**

## DSB SWITCH 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

**Mechanical Life:** 150,000 operations minimum

**Electrical Life:** 150,000 operations minimum using applicable circuit

### Materials & Finishes

**Housing:** Glass fiber reinforced polyamide (UL94V-0 flammability rating)

**Base:** Glass fiber reinforced polyamide (UL94V-0 flammability rating)

**Terminals:** Phosphor bronze with tin plating

### Environmental Specifications

**Operating Temperature Range:** -25°C ~ +80°C (-13°F ~ +176°F)

**Storage Temperature Range:** -30°C ~ +85°C (-22°F ~ +185°F)

**Humidity:** 85% humidity for 500 hours @ +85°C (+185°F)

**Vibration:** 10Hz with peak-to-peak amplitude of 10mm traversing the frequency range & returning in 1 minute; 3 right angled directions for 500,000 cycles

**Shock:** 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.

## DSB SWITCH SPECIFICATIONS (CONTINUED)

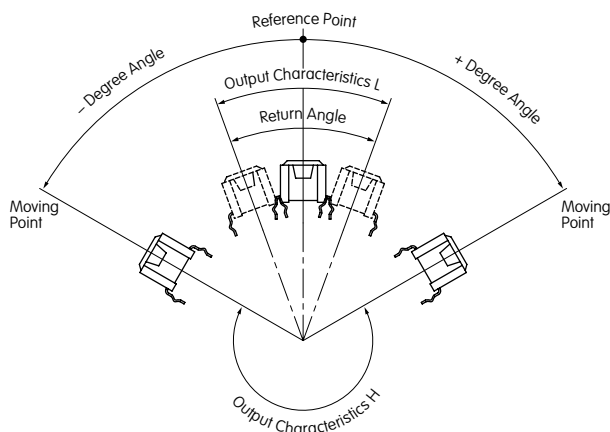
### Operating Characteristics

	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 $V_{OH} \rightarrow V_{OL}$

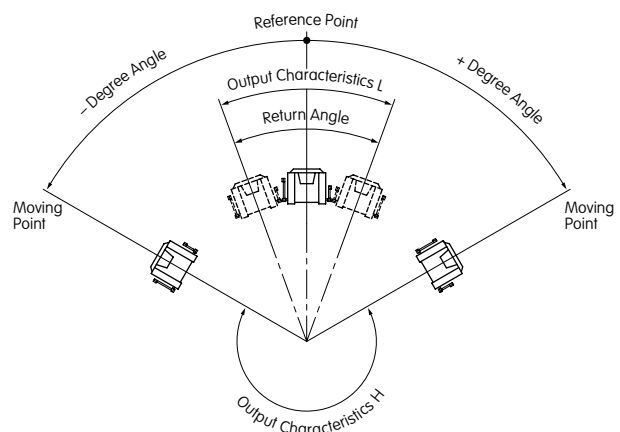
Output Characteristics  $V_{OL}$  with Photo transistor ON: 1.0V maximum (horizontal)

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

### Output Characteristics



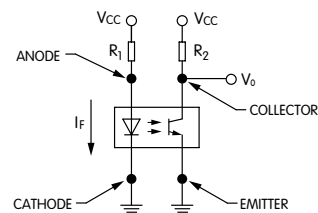
Straight PC



Right Angle PC

### 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

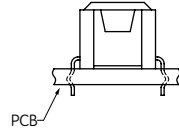


### PCB Processing

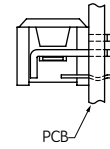
**Soldering :** Wave Soldering: See Profile A in Supplement section.  
Manual Soldering: See Profile A in Supplement section.

**Automated Cleaning:** Use alcohol based solution at  $50^\circ C$  maximum. Do not submerge over 2.0" (5.0cm) for 1 minute maximum. Do not use organic solvents.

## MOUNTING OPTIONS



PCB mounting option for Straight PC

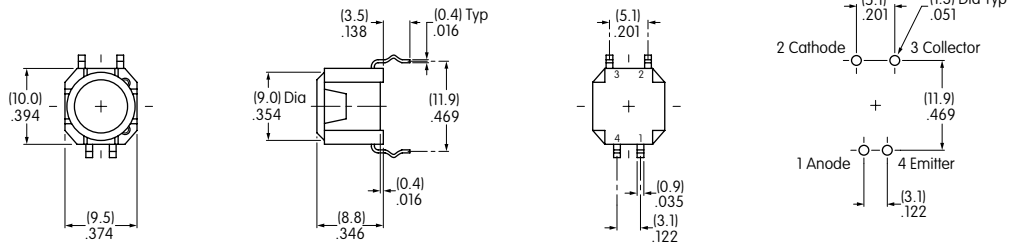


PCB mounting option for Right Angle PC

Install switch at an angle less than  $\pm 3^\circ$  from the mounting surface.

## TYPICAL SWITCH DIMENSIONS

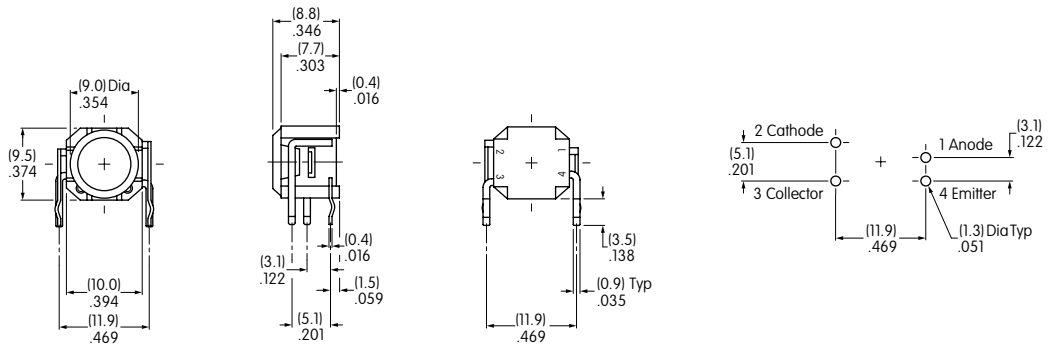
### Straight PC



DSBA1P

Terminal numbers are on bottom of switch.

### Right Angle PC



DSBA1H

Terminal numbers are on bottom of switch.