

# Distinctive Characteristics

## DSA

- 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.



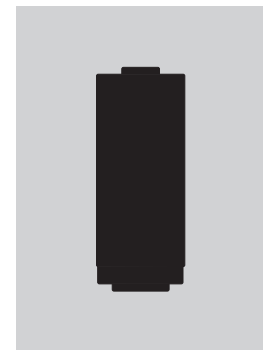
## DSB

- Photo interrupter, rather than contacts, ensures high reliability. 1 million operations minimum.
- 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.

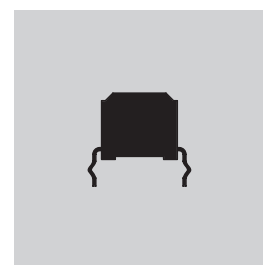


Actual Sizes

DSA



DSB



Toggles

Rockers

Pushbuttons

Illuminated PB

Programmable

Keylocks

Rotaries

Slides

Tactiles

**K** Tilt

Touch

Indicators

Accessories

Supplement

## DSA SWITCH PART NUMBER & DESCRIPTION



**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>	Silicone 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>	1. Do not install switch near vibration source. 2. Terminals should not be exposed to liquid.

### 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.

Toggles

Rockers

Pushbuttons

Illuminated PB

Programmable

Keylocks

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Slides

Tactiles

Tilt **K**

Touch

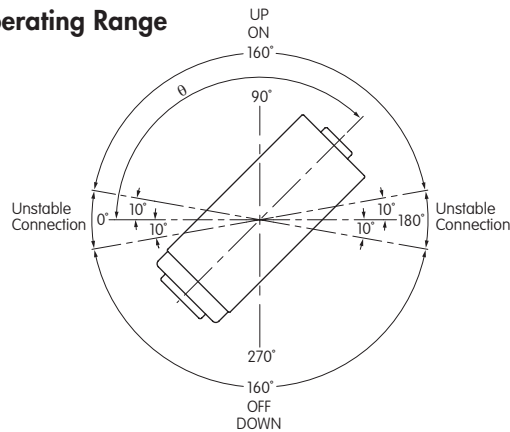
Indicators

Accessories

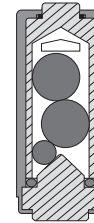
Supplement

DSA SWITCH SPECIFICATIONS (CONTINUED)

Operating Range

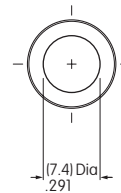
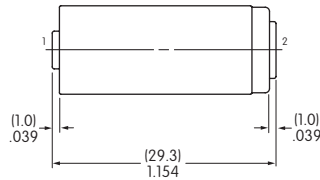
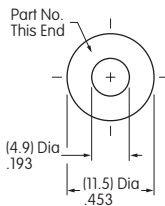


Cross Section



Allow 500ms settling time between states.

TYPICAL SWITCH DIMENSIONS



DSA01

Terminal numbers are not on the switch.

OPTIONAL ADAPTOR

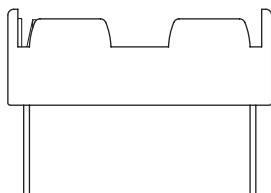
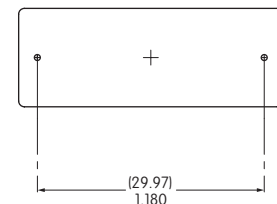
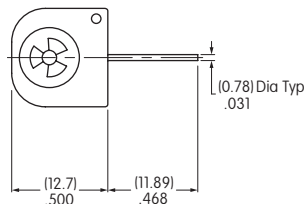
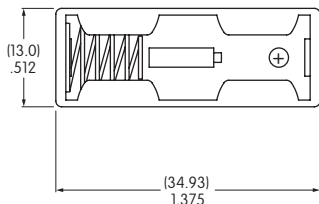


AT094  
PCB Adaptor for DSA01

**Materials:**  
Holder: Polypropylene  
Spring: Spring Steel with Nickel Plating  
PC Pins: Brass with Nickel Plating



Assembled DSA Switch & Adaptor

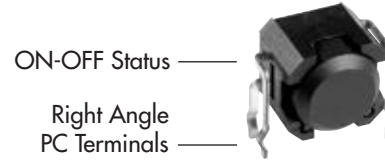


PCB Footprint

## 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

<b>Mechanical Life:</b>	1,000,000 operations minimum
<b>Electrical Life:</b>	1,000,000 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)
<b>Notes:</b>	<ol style="list-style-type: none"> <li>1. Prevent exposure to magnetic fields.</li> <li>2. Do not install switch near vibration source.</li> </ol>

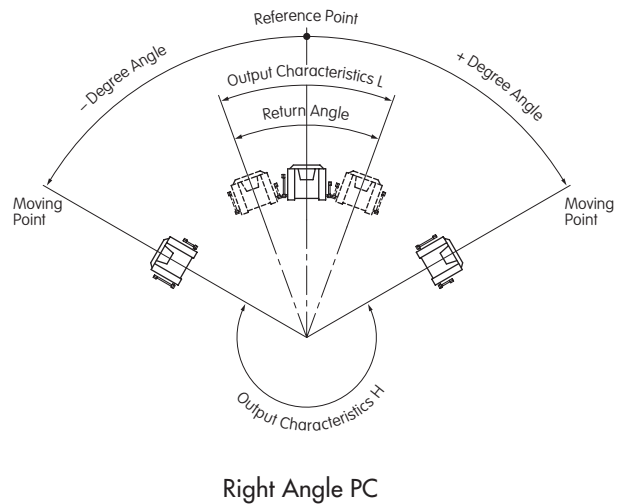
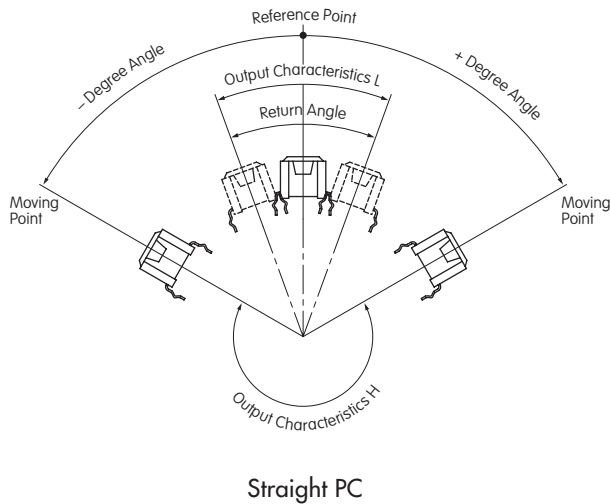
DSB SWITCH SPECIFICATIONS (CONTINUED)

Operating Characteristics

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

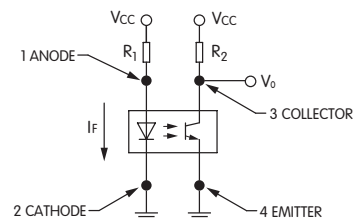
Output Characteristics  $V_{OL}$  with Photo transistor ON: 1.0V maximum (horizontal)  
 Output Characteristics  $V_{OH}$  with Photo transistor OFF: 4.0V minimum (inclined at an angle of  $-60^\circ$  minimum)

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

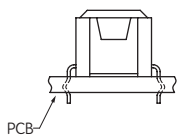


PCB Processing

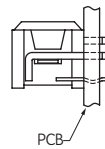
**Soldering :** Wave Soldering: See Profile A in Supplement section.  
 Manual Soldering: See Profile A in Supplement section.

**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

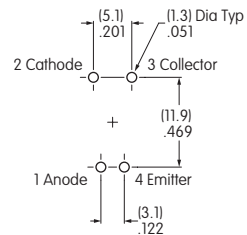
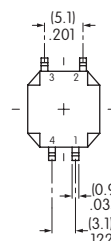
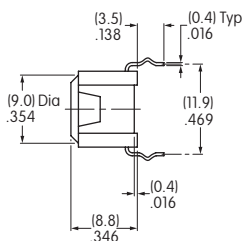
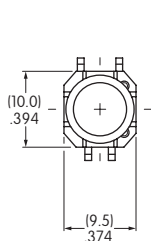


PCB mounting option for Right Angle PC

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

## TYPICAL SWITCH DIMENSIONS

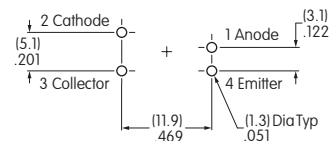
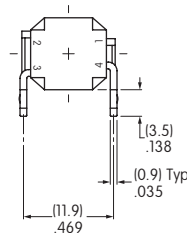
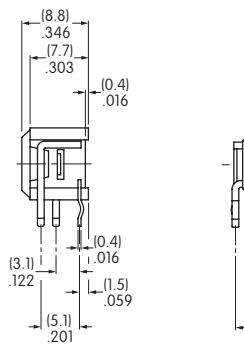
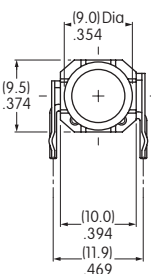
### Straight PC



**DSBA1P**

Terminal numbers are on bottom of switch.

### Right Angle PC



**DSBA1H**

Terminal numbers are on bottom of switch.