



# 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.

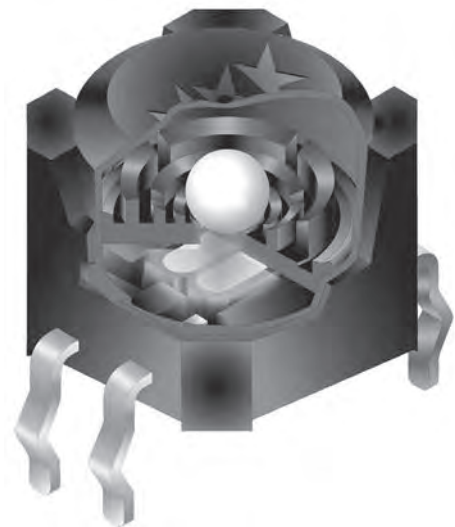
Space-saving compact dimensions allow high density mounting.

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.

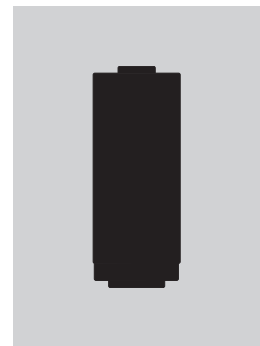
Crimped terminals ensure secure mounting and prevent dislodging during wave soldering.

The switch is triggered when tilted beyond  $\pm 30^\circ$  of the horizontal.

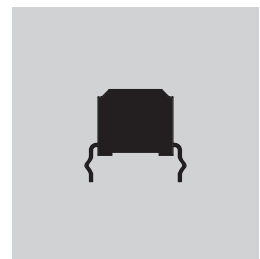


Actual Sizes

DSA



DSB



## DSA SWITCH PART NUMBER &amp; DESCRIPTION

DSA01



SPST ON – OFF

Sealed Body

## DSA SWITCH SPECIFICATIONS

## Mechanical &amp; 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 &amp; 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

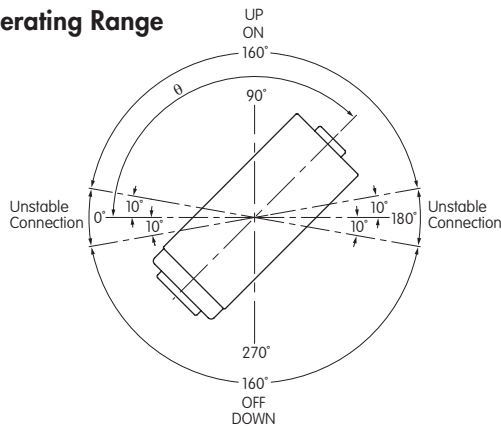
<b>Operating Temperature Range:</b>	-10°C ~ +70°C (+14°F ~ +158°F)
<b>Storage Temperature Range:</b>	-25°C ~ +85°C (-13°F ~ +185°F)
<b>Contact Bounce (for reference):</b>	500ms maximum
<b>Humidity:</b>	90% humidity for 96 hours @ 40°C (104°F)
<b>Vibration (for reference):</b>	Frequency range 10Hz ~ 500Hz for 2 hours; 2 directions; Acceleration: 0.2G
<b>Notes:</b>	1. Do not install switch near vibration source. 2. Terminals should not be exposed to liquid.

## Processing for AT094 PCB Adaptor

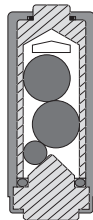
<b>Soldering (with PCB Mount Holder):</b>	Wave Soldering: See Profile A in Supplement section. Manual Soldering: See Profile B in Supplement section.
<b>Automated Cleaning:</b>	Hand clean locally using alcohol based solution.

DSA SWITCH SPECIFICATIONS (CONTINUED)

Operating Range

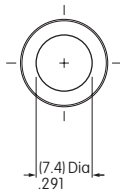
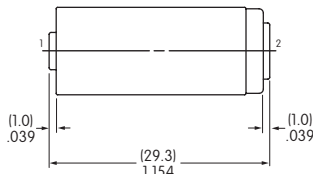
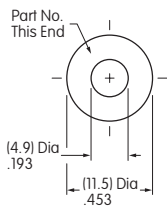


Cross Section



Allow 500ms settling time between states.

TYPICAL SWITCH DIMENSIONS



DSA01

Terminal numbers are not on the switch.

OPTIONAL ADAPTOR

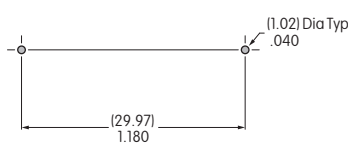
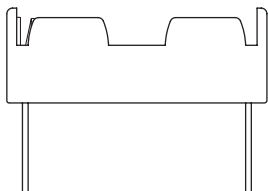
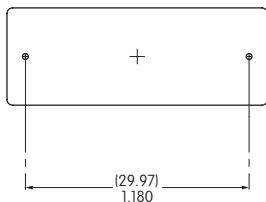
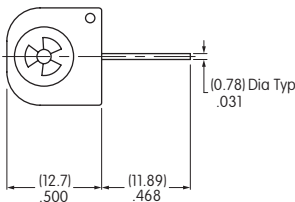
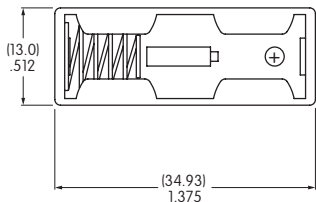


AT094  
PCB Adaptor for DSA01

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

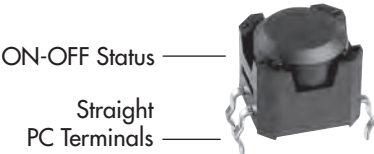


Assembled DSA Switch & Adaptor

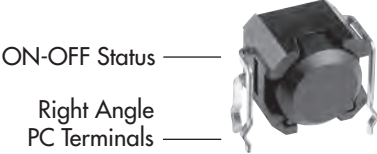


PCB Footprint

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

Mechanical Life:	1,000,000 operations minimum
Electrical Life:	1,000,000 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

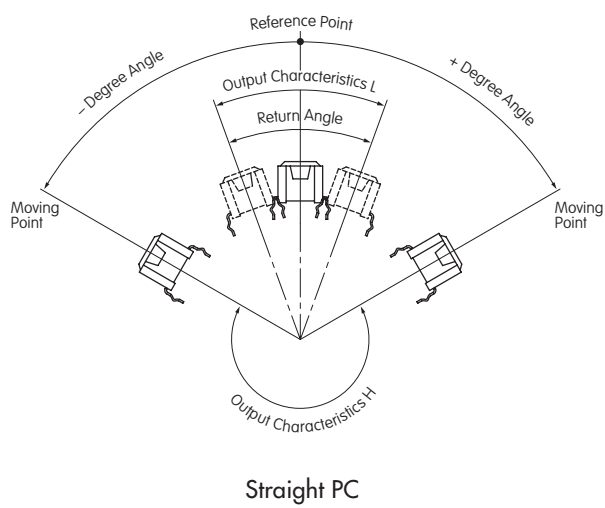
Operating Temperature Range:	-25°C ~ +80°C (-13°F ~ +176°F)
Storage Temperature Range:	-30°C ~ +85°C (-22°F ~ +185°F)
Humidity:	85% humidity for 500 hours @ +85°C (+185°F)
Vibration:	10Hz with peak-to-peak amplitude of 10mm traversing the frequency range & returning in 1 minute; 3 right angled directions 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)

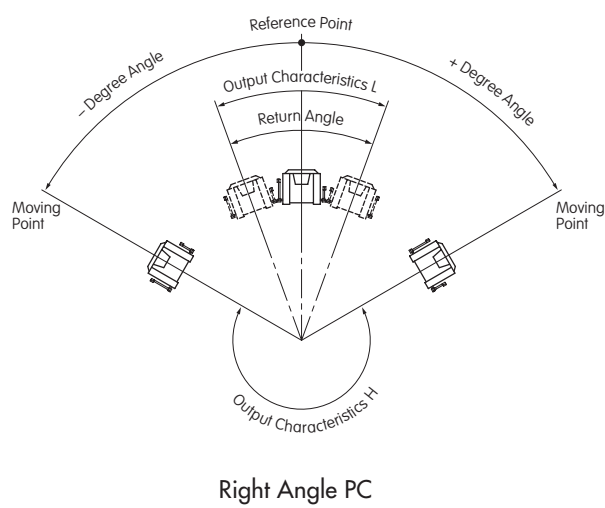
Operating Characteristics		
Circuit Characteristics (ON-OFF)	Operating Angle	Return Angle
	$\pm 30^{\circ}$ to $\pm 60^{\circ}$	Minimum $10^{\circ}$
	Output $V_{OL} \rightarrow V_{OH}$	Output $V_{OH} \rightarrow V_{OL}$

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



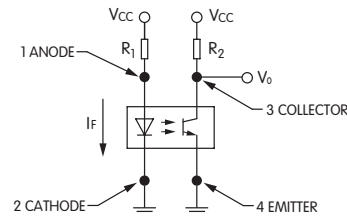
Straight PC



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

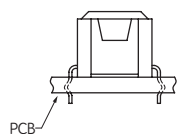


PCB Processing

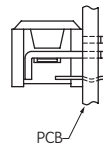
**Soldering :** Wave Soldering: See Profile A in Supplement section.  
Manual Soldering: See Profile A in Supplement section.

**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

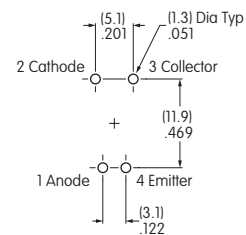
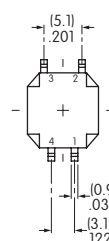
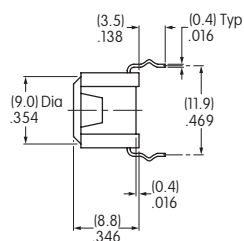
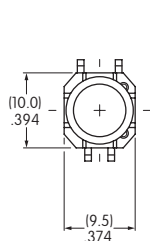


PCB mounting option for Right Angle PC

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

## TYPICAL SWITCH DIMENSIONS

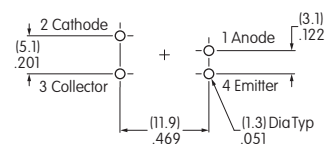
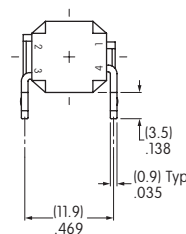
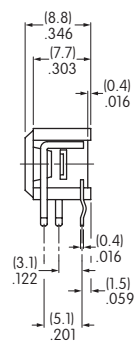
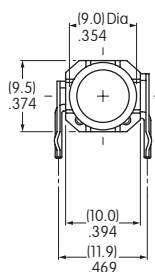
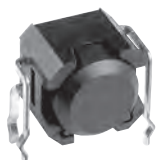
### Straight PC



**DSBA1P**

Terminal numbers are on bottom of switch.

### Right Angle PC



**DSBA1H**

Terminal numbers are on bottom of switch.





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