# Distinctive Characteristics

## DSA

Environmentally friendly, contains no mercury.

High contact reliability due to sealed body.

The switch is triggered when tilted beyond ±10° of the horizontal.

PCB adaptor available as an accessory.

## DSB

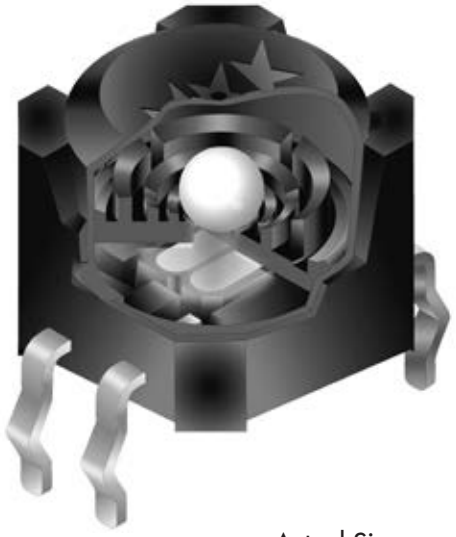


Photo interrupter, rather than contacts, ensures high reliability. 1 million operations minimum.

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° circumference rotation.

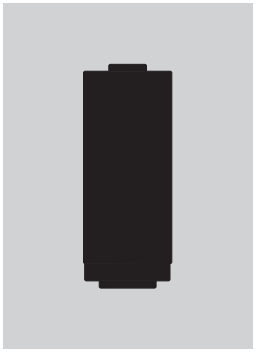
The DSB series switch is well-suited to meet product safety concerns due to normally closed (on) status.

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

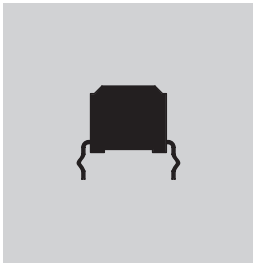
The switch is triggered when tilted beyond ±30° of the horizontal.

Actual Sizes

DSA



DSB



## DSA SWITCH PART NUMBER & DESCRIPTION

SPST ON – OFF

Sealed Body

DSA01

## DSA SWITCH SPECIFICATIONS

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

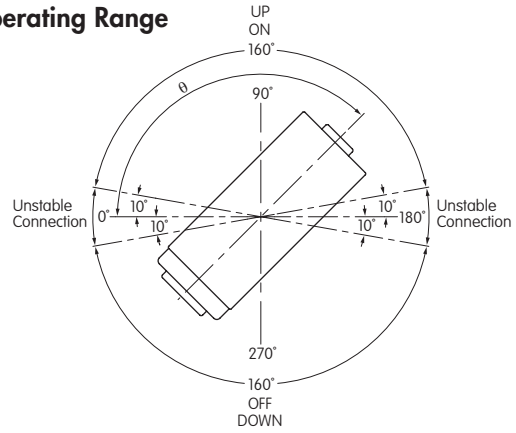
| Materials & Finishes | |
|---|---|
| **Housing:** | PBT |
| **Rubber Rings:** | Silicone Rubber |
| **Contact Balls:** | Brass with Silver Plating |
| **Terminals:** | Brass with Silver Plating |

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

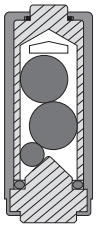
| Processing for AT094 PCB Adaptor | |
|---|---|
| **Soldering (with PCB Mount Holder):** | Wave Soldering: See Profile A in Supplement section.<br>Manual Soldering: See Profile B in Supplement section. |
| **Automated Cleaning:** | Hand clean locally using alcohol based solution. |

## DSA SWITCH SPECIFICATIONS (CONTINUED)

### Operating Range

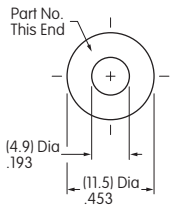


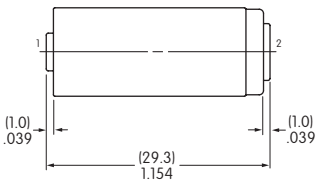

### Cross Section

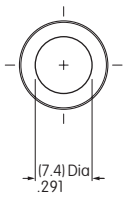


Allow 500ms settling time between states.

## TYPICAL SWITCH DIMENSIONS




Terminal numbers are not on the switch.

DSA01

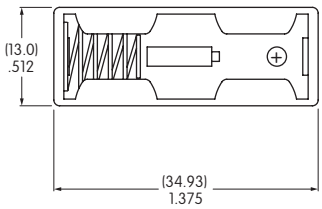
## OPTIONAL ADAPTOR

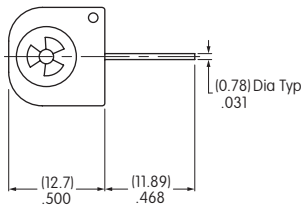
**AT094**
**PCB Adaptor for DSA01**

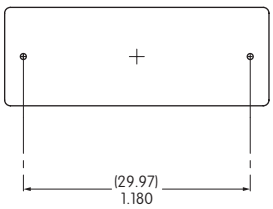
**Materials:**

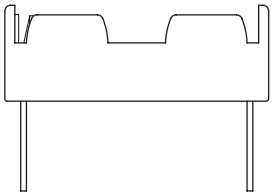
| | |
|---|---|
| Holder: | Polypropylene |
| Spring: | Spring Steel with Nickel Plating |
| PC Pins: | Brass with Nickel Plating |

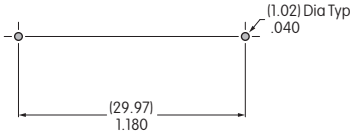
Assembled DSA Switch & Adaptor



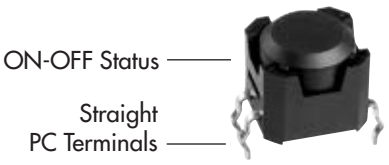



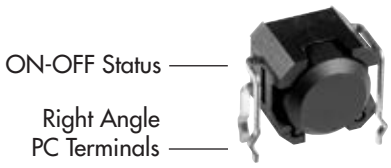



PCB Footprint

## 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/s²) acceleration (tested in 6 right angled directions, with 5 shocks in each direction) |
| **Notes:** | 1. Prevent exposure to magnetic fields.<br>2. Do not install switch near vibration source. |

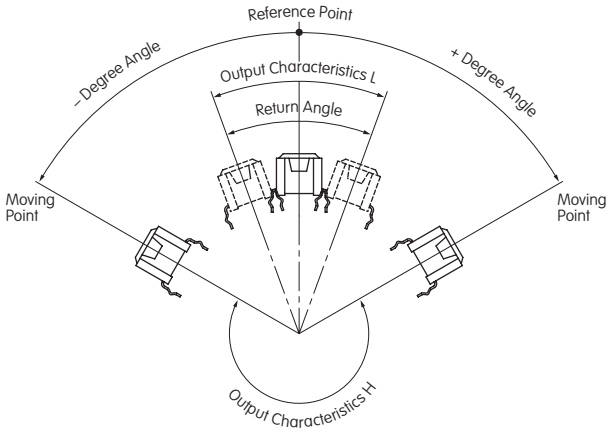
## DSB SWITCH SPECIFICATIONS (CONTINUED)

### Operating Characteristics

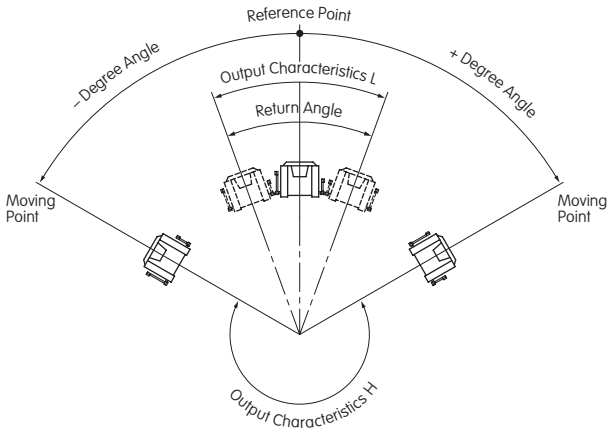
| | Operating Angle | Return Angle |
|---|---|---|
| **Circuit Characteristics (ON-OFF)** | ±30° to ±60° | Minimum 10° |
| | Output $V_{OL} \rightarrow V_{OH}$ | Output $V_{OH} \rightarrow V_{OL}$ |

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° minimum)

### Output Characteristics



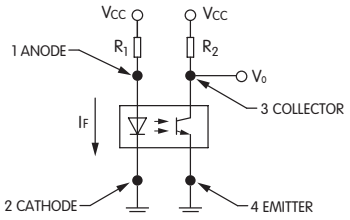

Straight PC




Right Angle PC

### Circuit Design Considerations

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

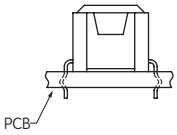



### PCB Processing

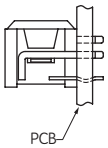
**Soldering :** Wave Soldering: See Profile A in Supplement section.
Manual Soldering: See Profile A in Supplement section.

**Automated Cleaning:** Use alcohol based solution at 50°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

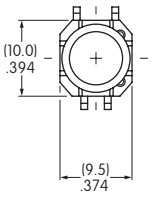


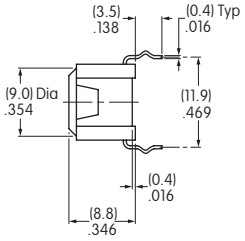

PCB mounting option for Right Angle PC

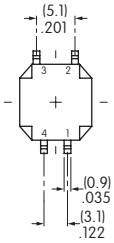
Install switch at an angle less than ±3° from the mounting surface.

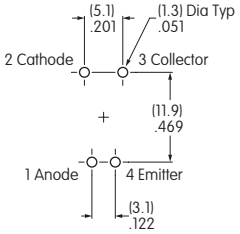
## TYPICAL SWITCH DIMENSIONS

### Straight PC



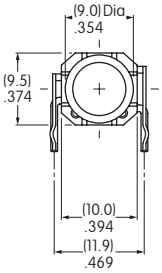



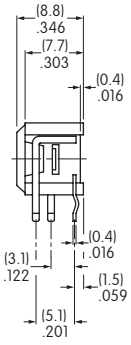



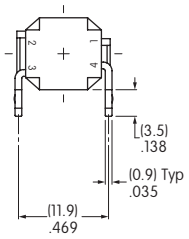

**DSBA1P**

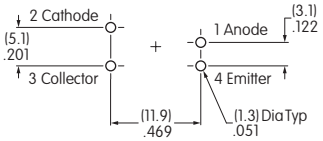
Terminal numbers are on bottom of switch.

### Right Angle PC




**DSBA1H**

Terminal numbers are on bottom of switch.