

Toggles

Rockers

Pushbuttons

Programmable Illuminated PB

Keylocks

Rotaries

Slides **H**

Tactiles

Tilt

Touch

Indicators

Accessories

Supplement



## ASS eries ..... H4

0.4VA Logic Level  
Straight, Right Angle & Vertical PC



## CS Series ..... H10

3A Power Level  
Straight PC  
Panel or PCB Mount



## FS Series ..... H14

High Frequency  
90MHz to 1GHz  
Straight PC



## JS01, JS03 Series ..... H18

Extended & Piano Actuated DIP Slides  
25mA @ 24V DC  
Straight PC



## JS02, JS04 SMT Series ..... H24

Ultra-miniature 25mA DIP Slide  
Gull Wing Terminals  
4- & 8-position



MS Series ..... H30

6A Power Level & 0.4VA Logic Level  
 Solder Lug, Straight PC, Right Angle & Vertical PC  
 Panel Mount, PCB Mount, & Bracket Mount



MS Illuminated Series ..... H38

6A Power Level  
 LED Illumination  
 Solder Lug & Straight PC  
 PCB Mount & Flat Frame Mount



SM Series ..... H42

Ultra-miniature  
 500mA or 1.0mA  
 Straight PC



SS Series ..... H44

0.1A Power Level & 0.4VA Logic Level  
 Top & Side Actuated  
 PCB Mount



SS Illuminated Series ..... H49

0.1A Power Level  
 LED Illumination  
 Top & Side Actuation  
 PCB Mount



SS3 SMT Series ..... H53

Ultra-miniature 0.4VA Logic Level  
 Side Actuated

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Illuminated PB

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# General Specifications

## Electrical Capacity (Resistive Load)

**Logic Level:** 0.4VA maximum @ 28V AC/DC maximum  
(Applicable Range 0.1mA ~ 0.1A @ 20mV ~ 28V)  
Note: Find additional explanation of operating range in Supplement section.

## Other Ratings

**Contact Resistance:** 50 milliohms maximum  
**Insulation Resistance:** 500 megohms minimum @ 500V DC  
**Dielectric Strength:** 500V AC minimum for 1 minute minimum  
**Mechanical Life:** 50,000 operations minimum  
**Electrical Life:** 50,000 operations minimum  
**Nominal Operating Force:** 2.55N  
**Contact Timing:** Nonshorting (break-before-make)  
**Travel:** Pretravel: .082" (2.1mm); Overtravel: .016" (0.4mm); Total Travel: .098" (2.5mm)

## Materials & Finishes

**Actuator:** Glass fiber reinforced polyamide  
**Upper Case Housing:** Carbon blended polyacetal (antistatic)  
**Lower Case Housing:** Glass fiber reinforced polyamide  
**Support Bracket:** Tin plated phosphor bronze  
**Movable Contact:** Phosphor bronze with gold plating  
**Stationary Contacts:** Brass with gold plating  
**Terminals:** Brass with gold plating

## Environmental Data

**Operating Temperature Range:** -30°C through +85°C (-22°F through +185°F)  
**Humidity:** 90 ~ 95% humidity for 192 hours @ 40°C (104°F)  
**Vibration:** 10 ~ 60Hz with peak-to-peak amplitude of 1.5mm traversing the frequency range & returning in 5 minutes; 3 right angled directions for 30 minutes  
**Shock:** 50G (490m/s<sup>2</sup>) acceleration (tested in 6 right angled directions, with 5 shocks in each direction)

## PCB Processing

**Soldering:** Wave Soldering Recommended. See Profile A in Supplement section.  
Manual Soldering: for single pole see Profile B in Supplement section; for double pole see Profile A.  
**Cleaning:** These devices are not process sealed. Hand clean locally using alcohol based solution.

## Standards & Certifications

The A Series slides have not been tested for UL recognition or CSA certification. These switches are designed for use in a low-voltage, low-current, logic-level circuit. When used as intended in a logic-level circuit, the results do not produce hazardous energy.

# Distinctive Characteristics

Subminiature size (1/3 size of Series M switches) saves space on PC boards.

Specifically developed for logic-level applications.

Award-winning STC contact mechanism with benefits unavailable in conventional mechanisms: smoother, positive detent actuation, increased contact stability and unparalleled logic-level reliability. (Additional STC details in Terms & Acronyms; see Supplement section.)

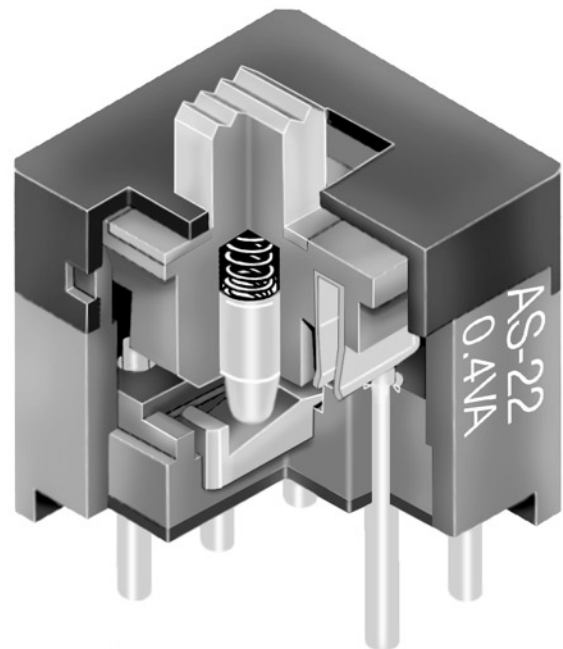
Available in various actuator lengths.

Antistatic superstructure of carbon blended polyacetal prevents static discharge to the contacts.

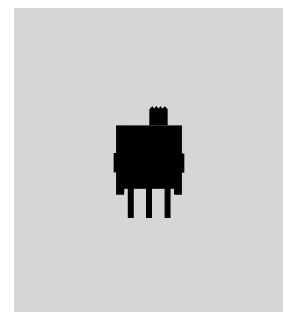
Molded-in, epoxy sealed or ultrasonically welded terminals lock out flux, solvents, and other contaminants.

.100" x .100" (2.54mm x 2.54mm) terminal spacing conforms to standard PC board grid spacing.

Matching indicators available.



Actual Size



## TYPICAL SWITCH ORDERING EXAMPLE

**AS**      **2**      **2**      **A**      **H**

Poles		Circuits				Actuators		PC Terminals	
1	SPST SPDT	1	ON	NONE	OFF	A	.098" (2.5mm) Long	P	Straight
2	DPDT SP3T	2	ON	NONE	ON	B	Flush	*B	Straight with Bracket
		3	ON	OFF	ON	C	.150" (3.8mm) Long	*H	Right Angle with Bracket
		4	ON	ON	ON			*V	Vertical with Bracket

\*Bracketed models are ESD protected

### DESCRIPTION FOR TYPICAL ORDERING EXAMPLE

**AS22AH**

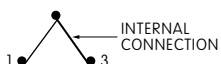

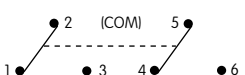
DPDT  
ON-NONE-ON Circuit

.098" (2.5mm) Long  
Actuator



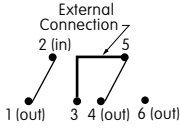
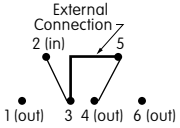
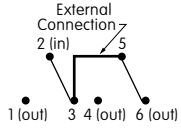
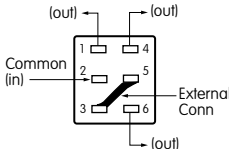
Right Angle PC Terminals

## POLES & CIRCUITS

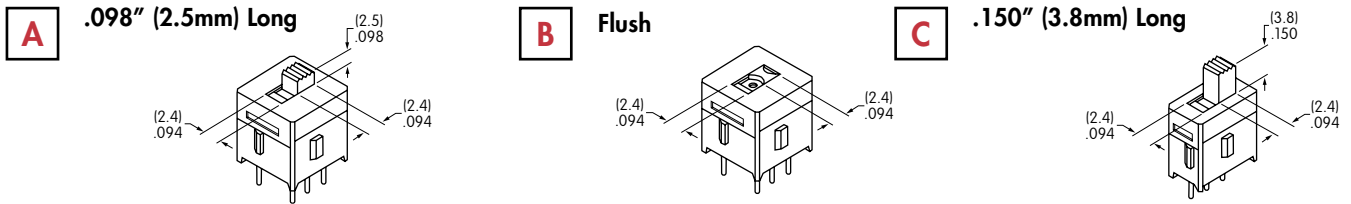
Pole	Model	Slide Position			Connected Terminals			Throw & Schematics
		Left	Center	Right	Left	Center	Right	
SP	AS11	ON	NONE	OFF	3-1	OPEN	OPEN	SPST 
SP	AS12 AS13	ON ON	NONE OFF	ON ON	2-1 2-1	OPEN OPEN	2-3 2-3	SPDT 
DP	AS22 AS23	ON ON	NONE OFF	ON ON	2-1 5-4 2-1 5-4	OPEN OPEN	2-3 5-6 2-3 5-6	DPDT 

Note: Terminal numbers are not actually on the switch.

### For 3 Throw (3-On)

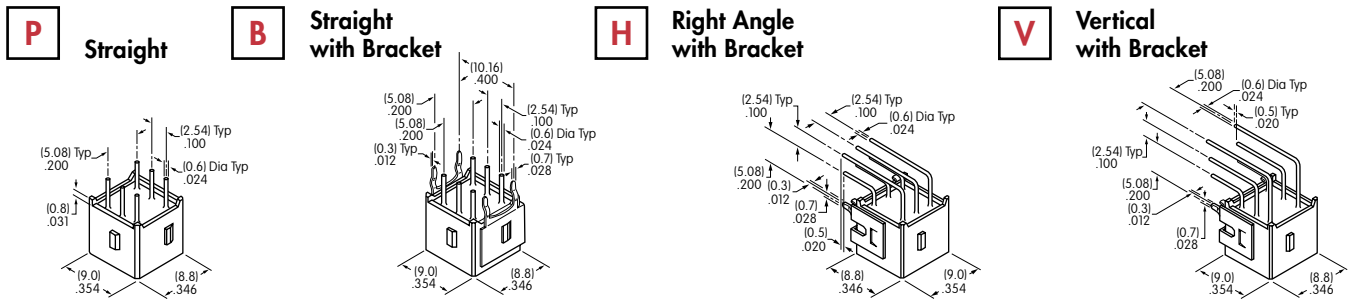
Pole	Model	Connected Terminals & Schematics			External Connection
		Left	Center	Right	
SP	AS24	ON  2-1 5-4	ON  2-3 5-4	ON  2-3 5-6	The SP3T model utilizes a double pole base.  External connections must be made during field installation. 

## ACTUATORS



Actuator Color: Gray standard; contact factory for other colors.

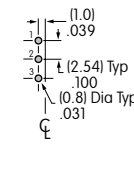
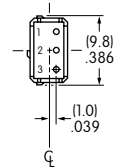
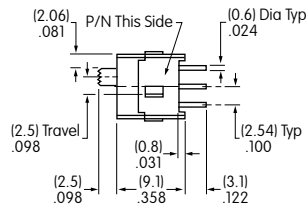
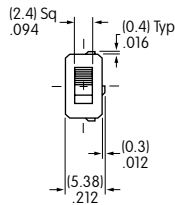
## PC TERMINALS



Use of a support bracket is recommended to increase PCB mounting strength and stability.

## TYPICAL SWITCH DIMENSIONS

### Single Pole



Actuator shown in LEFT position

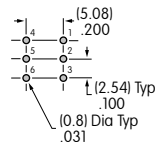
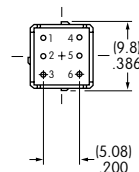
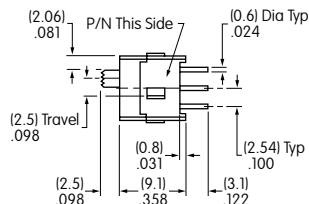
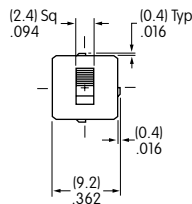
Single throw models do not have terminal 2.

### Straight PC



AS12AP

### Double Pole



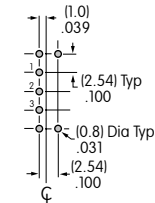
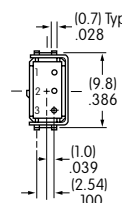
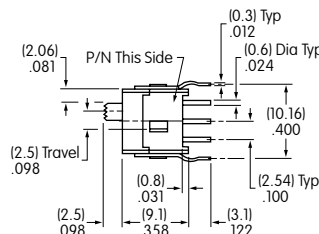
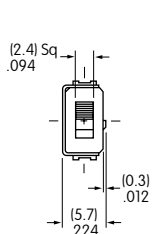
Actuator shown in LEFT position

### Straight PC



AS22AP

### Single Pole



Actuator shown in LEFT position

### Straight PC • Bracket



AS12AB

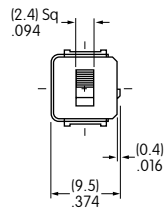
Toggles  
Rockers  
Pushbuttons  
Illuminated PB  
Programmable  
Keylocks  
Rotaries  
Slides  
Tactiles  
Tilt  
Touch  
Indicators  
Accessories  
Supplement

## TYPICAL SWITCH DIMENSIONS

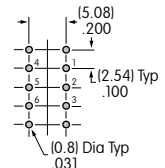
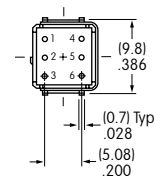
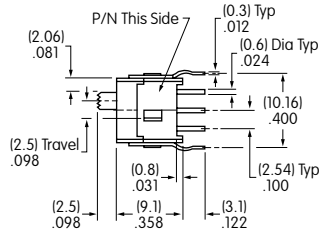
### Straight PC • Bracket



**AS22AB**



### Double Pole

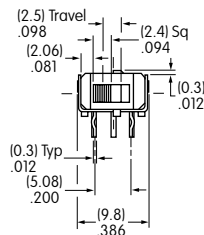


Actuator shown in LEFT position

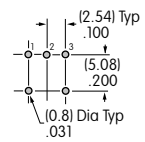
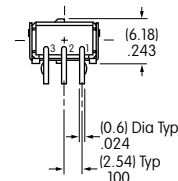
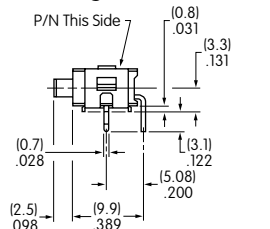
### Right Angle PC



**AS12AH**



### Single Pole

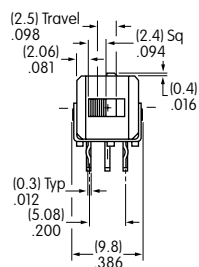


Actuator shown in LEFT position

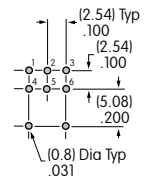
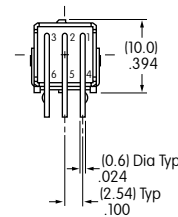
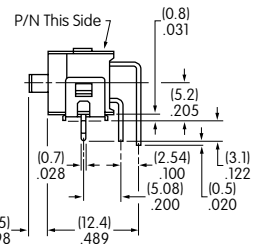
### Right Angle PC



**AS22AH**



### Double Pole

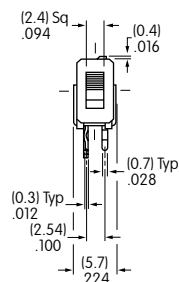


Actuator shown in LEFT position

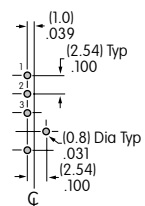
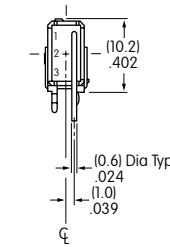
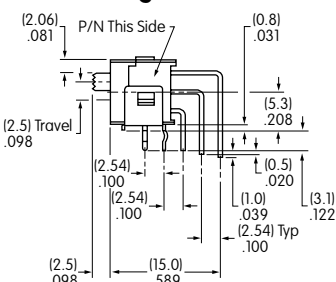
### Vertical PC



**AS12AV**



### Single Pole

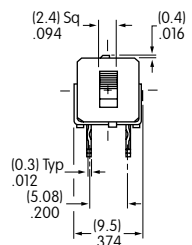


Actuator shown in LEFT position

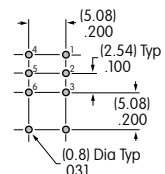
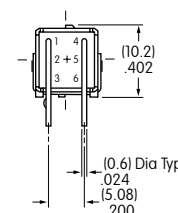
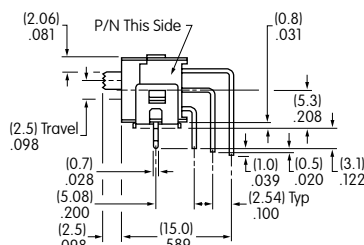
### Vertical PC



**AS22AV**



### Double Pole



Actuator shown in LEFT position

# General Specifications

## Electrical Capacity (Resistive Load)

**Power Level:** 3A @ 125V AC or 2A @ 250V AC

## Other Ratings

<b>Contact Resistance:</b>	10 milliohms maximum
<b>Insulation Resistance:</b>	1,000 megohms minimum @ 500V DC
<b>Dielectric Strength:</b>	1,000V AC minimum between contacts for 1 minute minimum; 1,500V AC minimum between contacts & case for 1 minute minimum
<b>Mechanical Life:</b>	50,000 operations minimum
<b>Electrical Life:</b>	20,000 operations minimum
<b>Static Capability:</b>	Withstands 12 kilovolts ESD
<b>Contact Timing:</b>	Nonshorting (break-before-make)
<b>Total Travel:</b>	.087" (2.2mm)

## Materials & Finishes

<b>Actuator:</b>	Glass fiber reinforced polyamide
<b>Cover &amp; Case:</b>	Glass fiber reinforced polyamide (UL94V-0)
<b>Movable Contacts:</b>	Copper with silver plating
<b>Stationary Contacts:</b>	Silver capped copper with silver plating
<b>Terminals:</b>	Copper with silver plating

## Environmental Data

<b>Operating Temp Range:</b>	-30°C through +85°C (-22°F through +185°F)
<b>Humidity:</b>	90 ~ 95% humidity for 240 hours @ 40°C (104°F)
<b>Vibration:</b>	10 ~ 55Hz with peak-to-peak amplitude of 1.5mm traversing the frequency range & returning in 1 minute; 3 right angled directions for 2 hours
<b>Shock:</b>	50G (490m/s <sup>2</sup> ) acceleration (tested in 6 right angled directions, with 5 shocks in each direction)

## Installation

<b>Soldering Time &amp; Temp:</b>	Wave Soldering: See Profile A in Supplement section. Manual Soldering: See Profile B in Supplement section.
<b>Cleaning:</b>	These devices are not process sealed. Hand clean locally using alcohol based solution.

## Standards & Certifications

<b>Flammability Standard:</b>	UL94V-0 cover & case
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Toggles

Rockers

Pushbuttons

Illuminated PB

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# Distinctive Characteristics

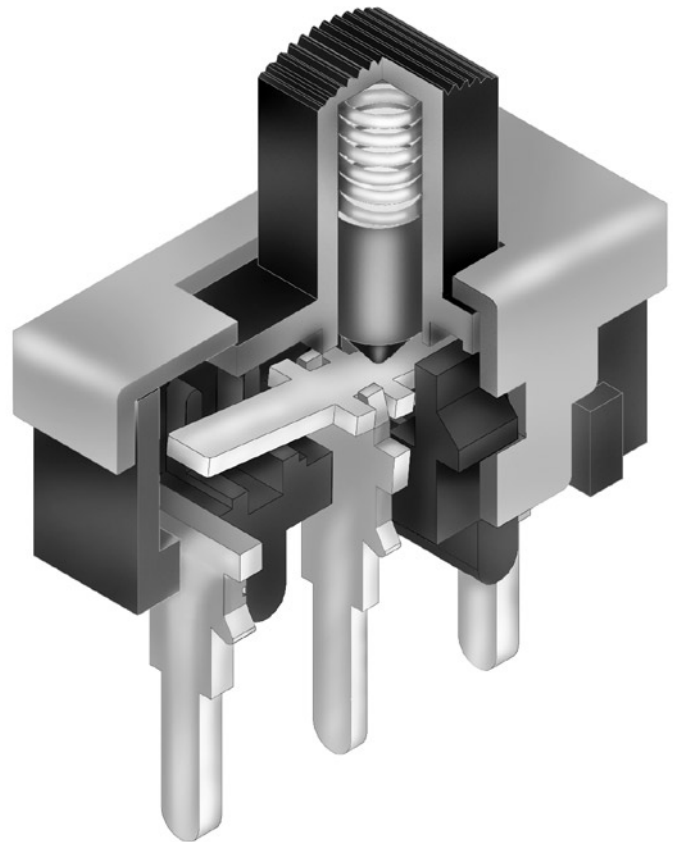
High performance and high quality at a low price.

Molded cover and case of high insulating material withstand 12 kilovolts of electrostatic discharge (ESD), providing antistatic feature.

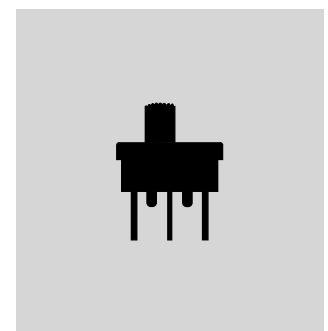
Cover and case UL 94V-0 flammability rated.

Epoxy sealed terminals to lock out flux, dust, and other contaminants.

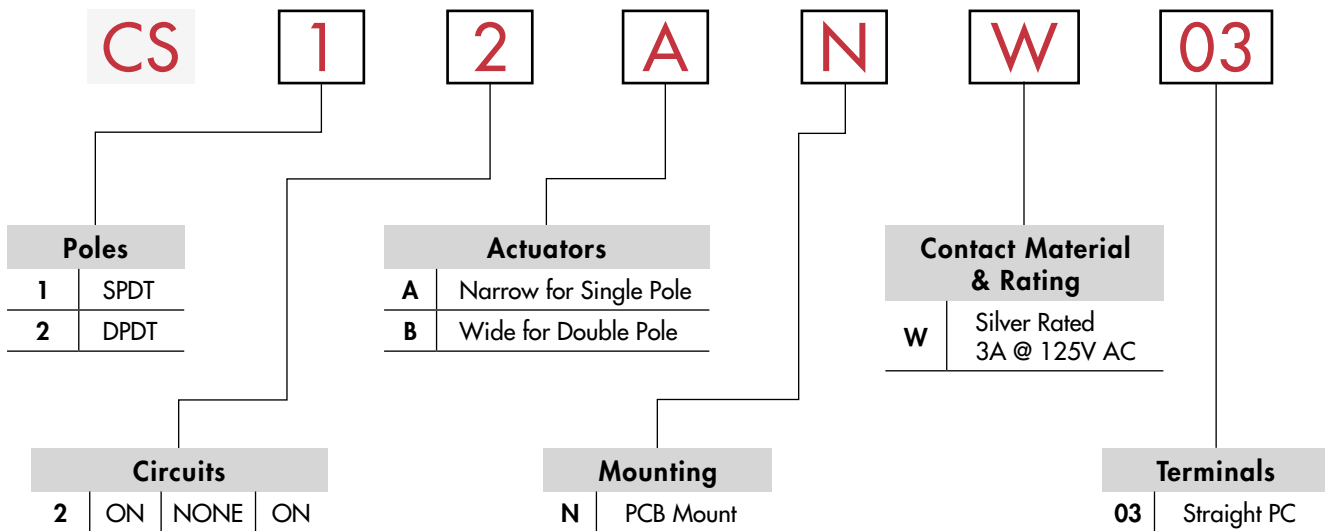
Suited for a wide variety of applications including telecommunications, electronic controls, audio devices, and household appliances.



Actual Size

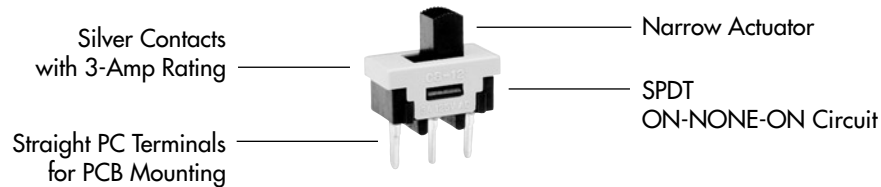


### TYPICAL SWITCH ORDERING EXAMPLE



### DESCRIPTION FOR TYPICAL ORDERING EXAMPLE

#### CS12ANW03



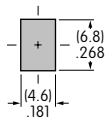
### POLES & CIRCUITS

		Slide Position			Connected Terminals			Throw & Schematics
Pole	Model	Left	Center	Right	Left	Center	Right	
SP	CS12	ON	NONE	ON	2-1	OPEN	2-3	SPDT 
DP	CS22	ON	NONE	ON	2-1 5-4	OPEN	2-3 5-6	DPDT 

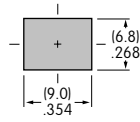
Note: Terminal numbers are not actually on switch.

MOUNTING

Panel Cutouts

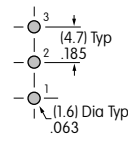


Single Pole

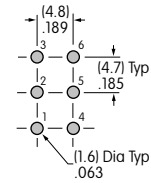


Double Pole

PCB Footprints

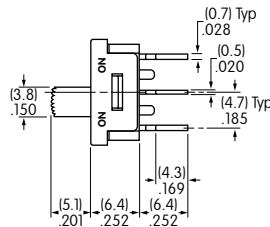
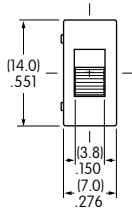


Single Pole

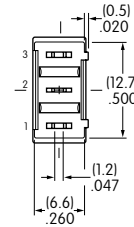


Double Pole

TYPICAL SWITCH DIMENSIONS



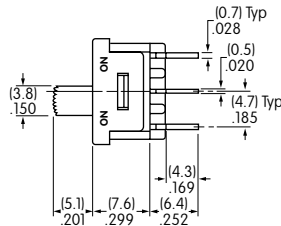
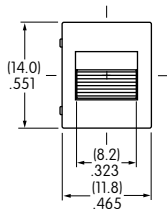
Actuator shown in LEFT position



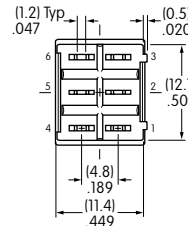
Single Pole



CS12ANW03



Actuator shown in LEFT position



Double Pole



CS22BNW03

# General Specifications

For high frequency (DC through 1GHz): Isolation 40dB minimum at 1GHz.  
Insertion loss 0.5dB maximum at 1GHz.

Impedance 75 ohms

Innovative alternative to relay products

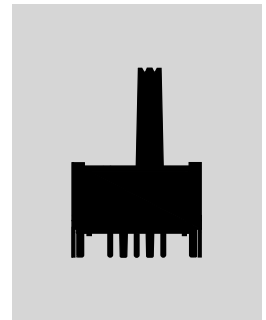
Highly reliable, self-cleaning twin contact mechanism with gold plating

Long total travel of .138" (3.5mm) for highly visible actuator position

Distinct audible and tactile feedback during actuation

Suited to high frequency applications (90MHz to 1GHz) such as CATV and communication equipment

Actual Size  
with Tall Actuator



# Distinctive Characteristics

## Electrical Capacity (Resistive Load)

**Logic Level:** 0.4VA maximum @ 28V AC/DC maximum  
(Applicable Range 0.1mA ~ 0.1A @ 20mV ~ 28V)  
Note: Find additional explanation of operating range in Supplement section.

## RF Ratings

**Impedance:** 75 ohms  
**Insertion Loss:** 0.5dB maximum @ 1GHz  
**Isolation:** 40dB minimum @ 1GHz

## Other Ratings

**Contact Resistance:** 200 milliohms maximum  
**Insulation Resistance:** 250 megohms minimum @ 500V DC  
**Dielectric Strength:** 500V AC minimum for 1 minute minimum  
**Mechanical Life:** 1,000 operations minimum  
**Electrical Life:** 1,000 operations minimum  
**Contact Timing:** Nonshorting (break-before-make)  
**Total Travel:** .138" (3.5mm)

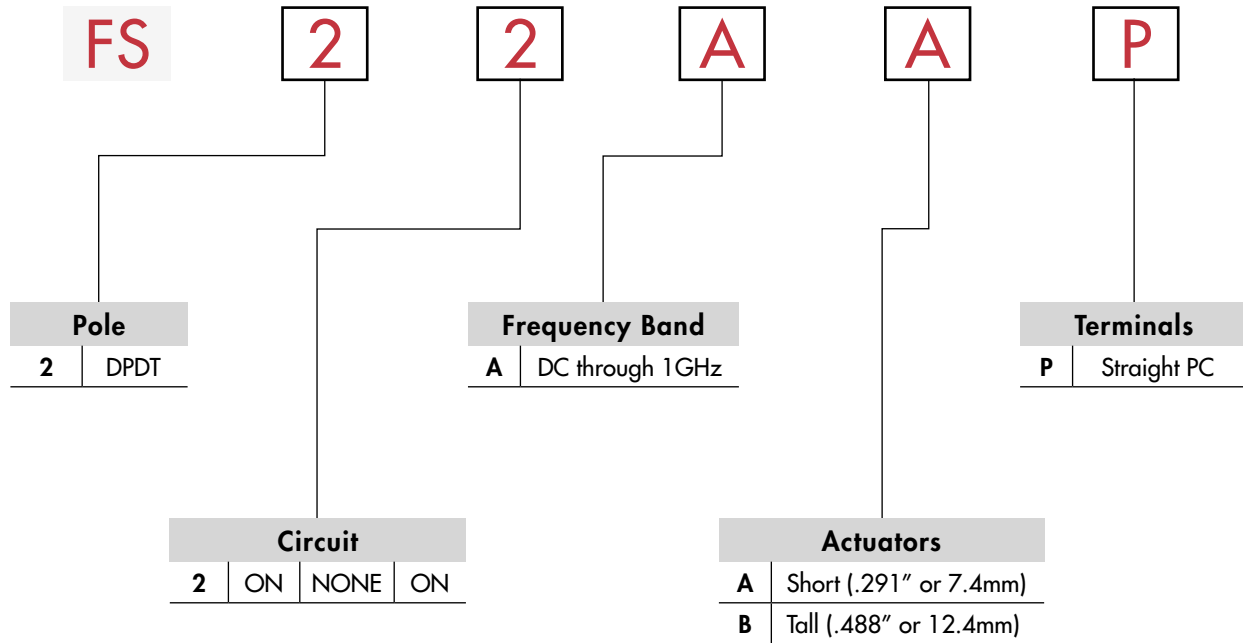
## Environmental Data

**Operating Temp Range:** -30°C through +85°C (-22°F through +185°F)  
**Humidity:** 90 ~ 95% humidity for 240 hours @ 40°C (104°F)  
**Vibration:** 10 ~ 55Hz with peak-to-peak amplitude of 1.5mm traversing the frequency range & returning in 5 minutes; 3 right angled directions for 2 hours  
**Shock:** 50G (490m/s<sup>2</sup>) acceleration (tested in 6 right angled directions, with 5 shocks in each direction)

## Installation

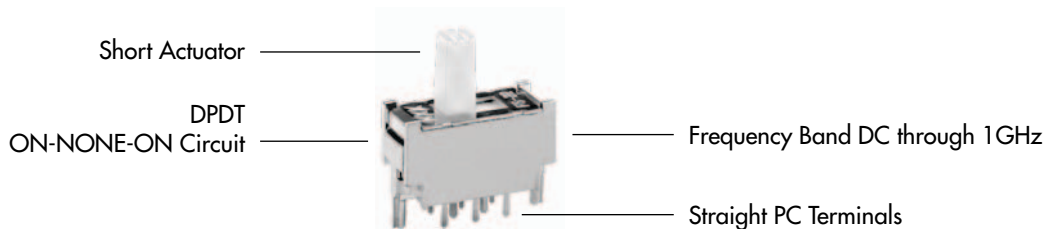
**Soldering Time & Temp:** Wave Soldering: See Profile A in Supplement section.  
Manual Soldering: See Profile A in Supplement section.  
**Cleaning:** These devices are not process sealed. Hand clean locally using alcohol based solution.

TYPICAL SWITCH ORDERING EXAMPLE



DESCRIPTION FOR TYPICAL ORDERING EXAMPLE

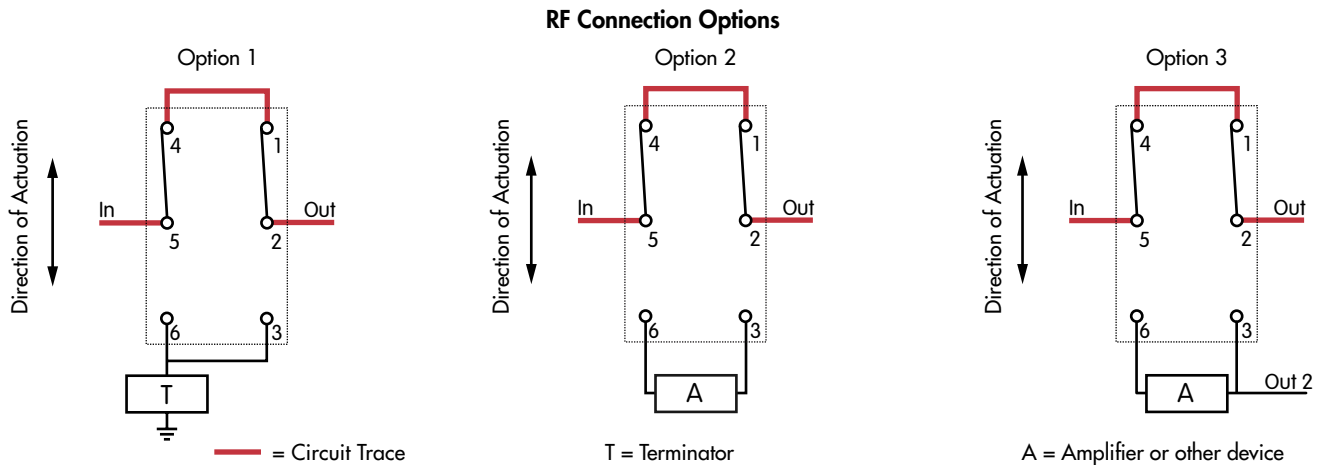
FS22AAP



POLE & CIRCUIT

		Slide Position			Connected Terminals			Throw & Schematics
Pole	Model	Left	Center	Right	Left	Center	Right	
DP	FS22	ON	NONE	ON	2-1 5-4	NA	2-3 5-6	Note: Terminal numbers are not actually on the switch. DPDT

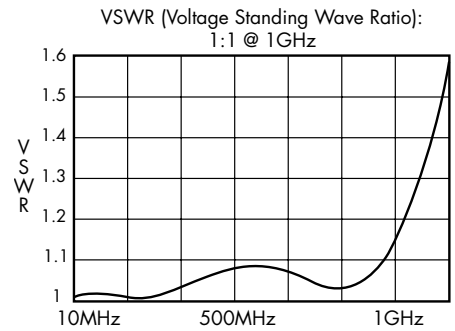
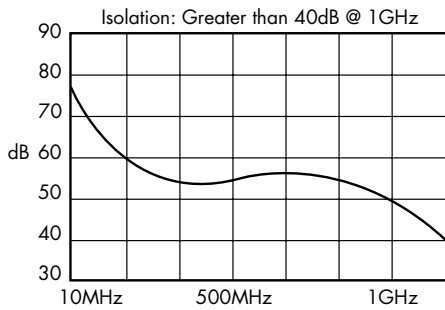
## HIGH FREQUENCY PERFORMANCE



**Isolation**  
 >40dB @ 1GHz  
 (higher value is better)

**Insertion Loss**  
 <0.5dB @ 1GHz  
 (lower value is better)

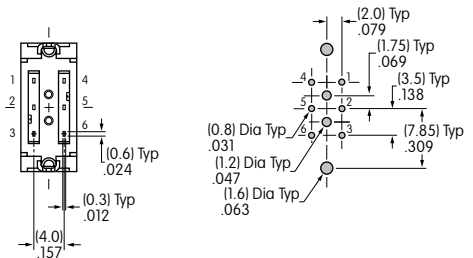
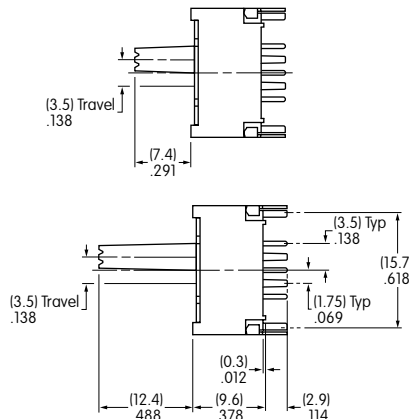
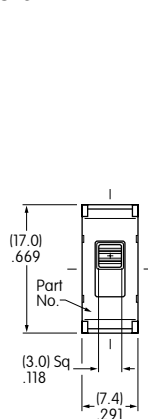
**Standing Wave Ratio or Impedance Matching**  
 Standing Wave = ratio between highest voltage & lowest voltage  
 (must always be more than 1)



Note: The data above reflects the conditions using the FS switch on a test PCB with two coaxial connectors. High frequency applications require external connection on the PCB. Contact factory for details.

## TYPICAL SWITCH DIMENSIONS

### Short & Tall Actuators



FS22ABP

Actuator in LEFT position.

Toggles  
Rockers  
Pushbuttons  
Illuminated PB  
Programmable  
Keylocks  
Rotaries  
Slides  
Tactiles  
Tilt  
Touch  
Indicators  
Accessories  
Supplement

## General Specifications

### Electrical Capacity (Resistive Load)

**Switching Rating:** 25mA @ 24V DC  
**Nonswitching Rating:** 0.1A @ 50V DC

### Other Ratings

**Contact Resistance:** 50 milliohms maximum  
**Insulation Resistance:** 100 megohms minimum @ 500V DC  
**Dielectric Strength:** 500V AC minimum for 1 minute minimum  
**Mechanical Life:** 2,000 operations minimum  
**Electrical Life:** 2,000 operations minimum  
**Total Travel:** For slide actuator: .031" (0.8mm); for piano actuator: .114" (2.9mm)

### Materials & Finishes

	JS01 Slide DIP	JS03 Piano DIP
<b>Actuator:</b>	Glass fiber reinforced polyamide	Glass fiber reinforced PBT
<b>Cover:</b>	Glass fiber reinforced polyamide (UL94V-0)	Glass fiber reinforced PBT (UL94V-0)
<b>Base:</b>	Glass fiber reinforced polyamide (UL94V-0)	Glass fiber reinforced PBT (UL94V-0)
<b>Contacts:</b>	Beryllium copper with gold plating	Phosphor bronze with gold plating
<b>Terminals:</b>	Brass with gold plating	Phosphor bronze with gold plating

### Environmental Data

**Operating Temp Range:** -25°C through +70°C (-13°F through +158°F)  
**Humidity:** 90 ~ 95% humidity for 96 hours @ 40°C (104°F)  
**Vibration:** 10 ~ 55Hz with peak-to-peak amplitude of 1.5mm traversing the frequency range & returning in 1 minute; 3 right angled directions for 2 hours  
**Shock:** 50G (490m/s<sup>2</sup>) acceleration (tested in 6 right angled directions, with 5 shocks in each direction)

### PCB Processing

**Soldering:** Wave Soldering Recommended. See Profile A in Supplement section.  
 Manual Soldering: See Profile A in Supplement section.  
 Note: Switches are packaged in OFF position and should be soldered in OFF position.  
**Cleaning:** These devices are not process sealed. Hand clean locally using alcohol based solution.

### Standards & Certifications

**Flammability Standards:** UL 94V-0 rated cover & base  
 The JS series devices have not been tested for UL recognition and CSA certification. These switches are designed for use in a low-voltage, low-current circuit. When used as intended in a low-voltage, low-current circuit, the results do not produce hazardous energy.

Toggles

Rockers

Pushbuttons

Illuminated PB

Programmable

Keylocks

Rotaries

Slides

Tactiles

Tilt

Touch

Indicators

Accessories

Supplement

# Distinctive Characteristics

Slide type and piano type actuators available.

Twin sliding contact mechanism with self-cleaning action (JS01) provides smooth actuation and produces high contact reliability.

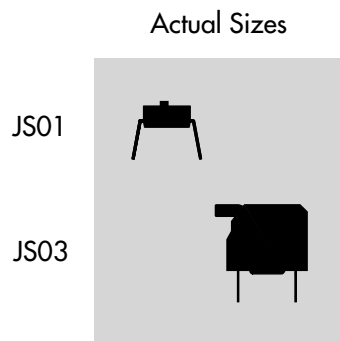
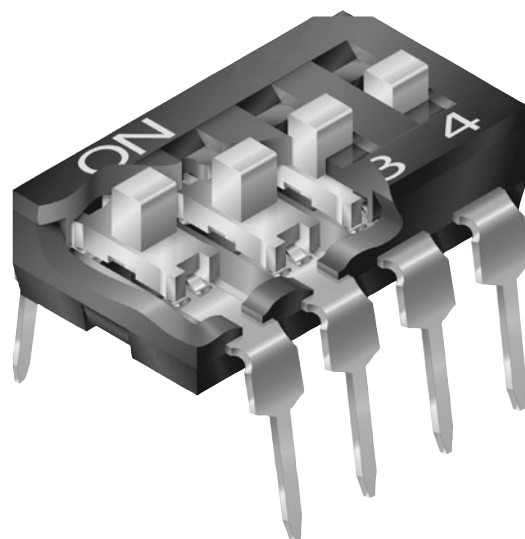
Gold plated contacts prevent oxidation and sulfide effect and provide stable contact resistance.

Use of self-extinguishing UL94V-0 certified material in cover and base provides high arc resistance and high insulation resistance.

Slanted terminals ensure secure PCB mounting and prevent dislodging during wave soldering.

Terminal spacing conforms to standard .100" (2.54mm) PCB grid.

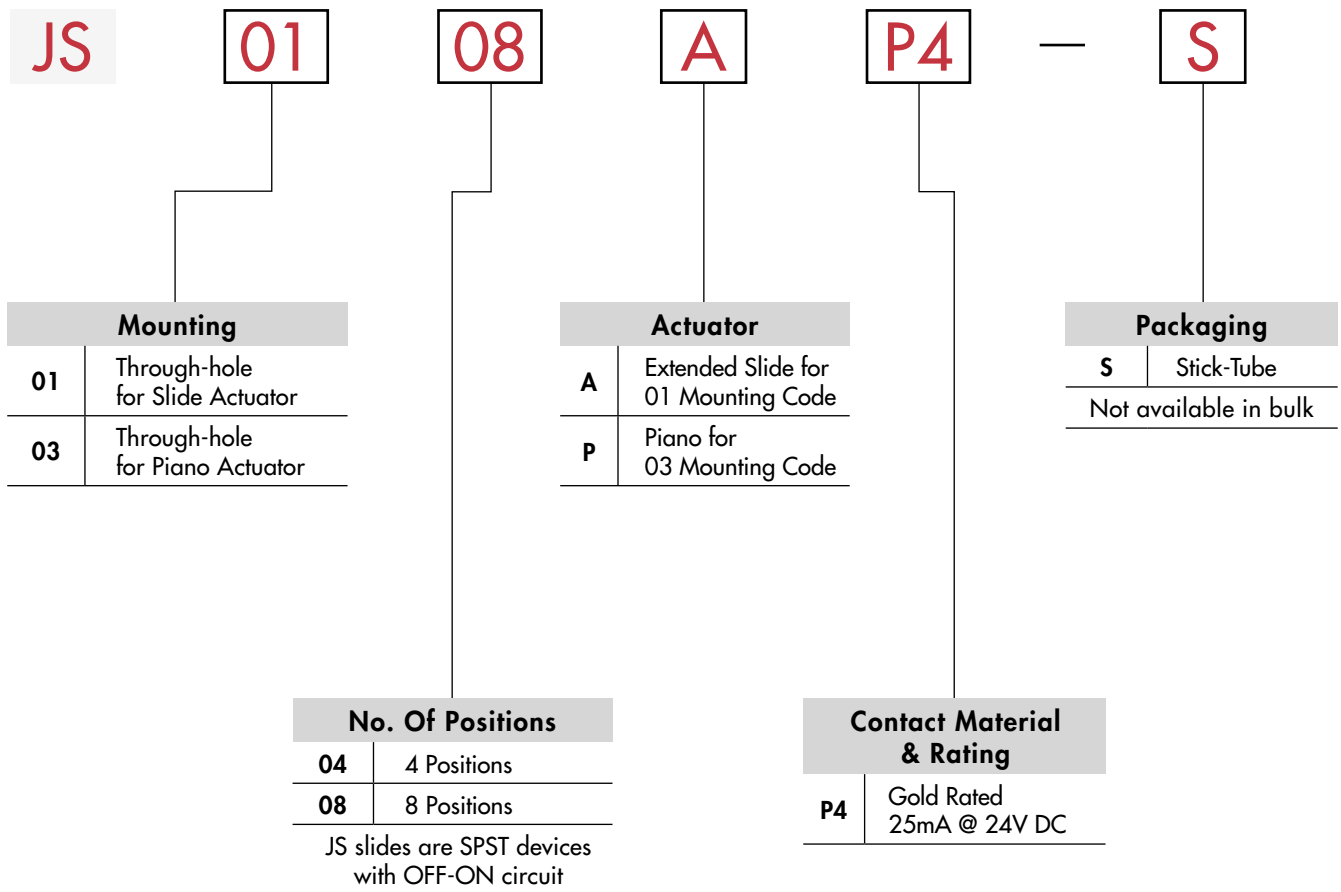
End-to-end stackable.



- Toggles
- Rockers
- Pushbuttons
- Illuminated PB
- Programmable
- Keylocks
- Rotaries
- H Slides**
- Tactiles
- Tilt
- Touch
- Indicators
- Accessories
- Supplement

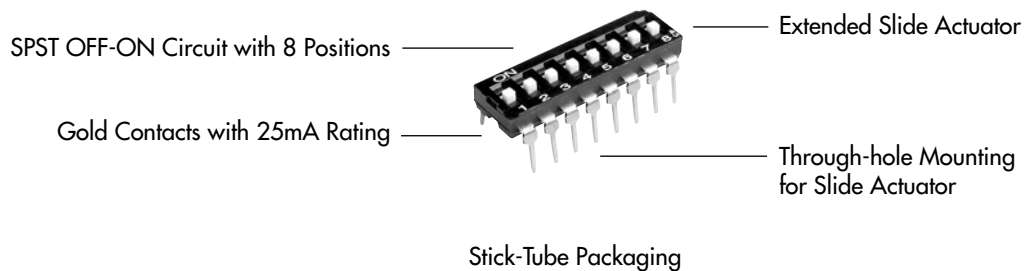


### TYPICAL SWITCH ORDERING EXAMPLE

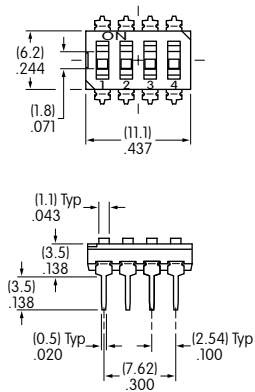


### DESCRIPTION FOR TYPICAL ORDERING EXAMPLE

#### JS0108AP4-S

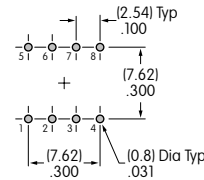
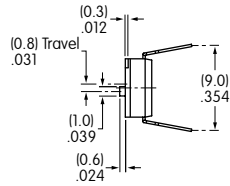


TYPICAL SWITCH DIMENSIONS



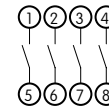
End View

Slide Actuator

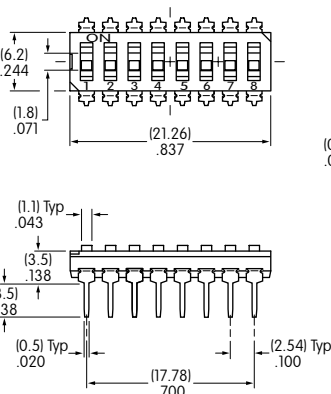


Schematic

4 Positions

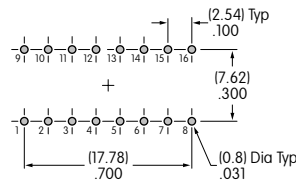
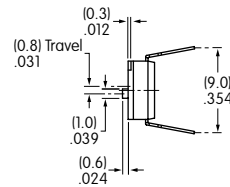


JS0104AP4



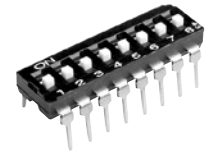
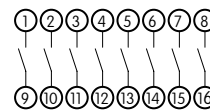
End View

Slide Actuator

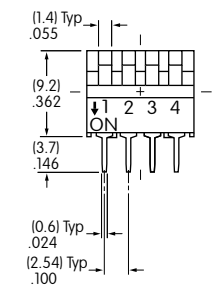


Schematic

8 Positions

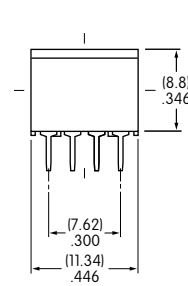
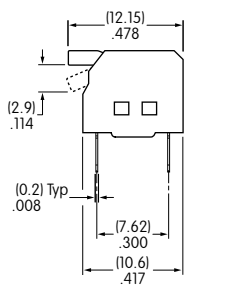


JS0108AP4

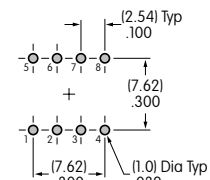


End View

Piano Actuator

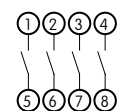


Schematic

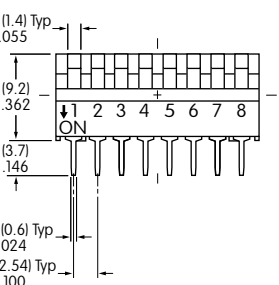


Schematic

4 Positions

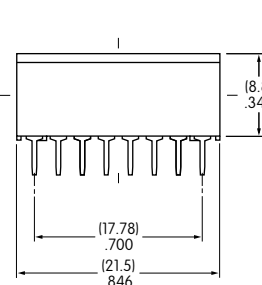
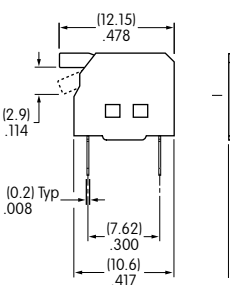


JS0304PP4

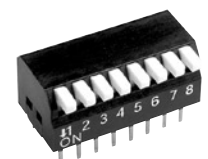
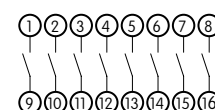
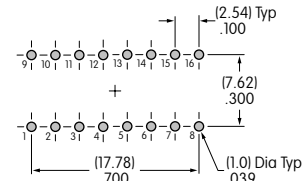


End View

Piano Actuator



Schematic



JS0308PP4

### PACKAGING

**S**

#### Stick-Tube Packaging

Switches are not available in bulk and must be ordered in increments of:

##### Slide Actuator

JS0104AP4-S: 46 pieces per stick-tube

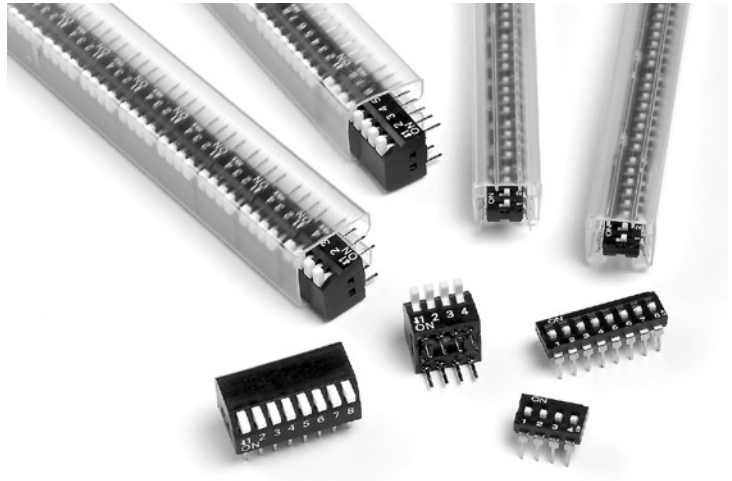
JS0108AP4-S: 24 pieces per stick-tube

##### Piano Actuator

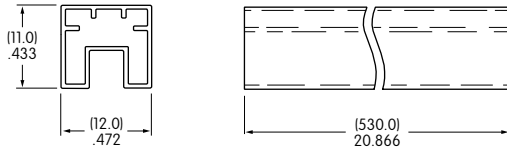
JS0304PP4-S: 44 pieces per stick-tube

JS0308PP4-S: 23 pieces per stick-tube

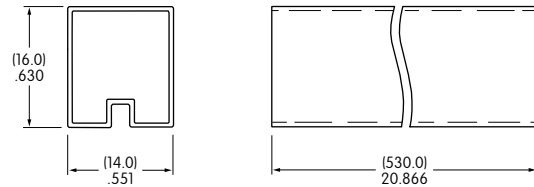
Switches are packaged in OFF position.



**Stick-Tube Dimensions for Slide Actuator  
JS0104AP4-S & JS0108AP4-S**



**Stick-Tube Dimensions for Piano Actuator  
JS0304PP4-S & JS0308PP4-S**



# General Specifications

Toggle

Rockers

Pushbuttons

Illuminated PB

Programmable

Keylocks

Rotaries

Slides

Tactiles

Tilt

Touch

Indicators

Accessories

Supplement

### Electrical Capacity (Resistive Load)

**Switching Rating:** 25mA @ 24V DC  
**Nonswitching Rating:** 0.1A @ 50V DC

### Other Ratings

	JS02 Extended Actuator	JS04 Flush Actuator
<b>Contact Resistance:</b>	50 milliohms maximum	50 milliohms maximum
<b>Insulation Resistance:</b>	100 megohms minimum @ 500V DC	100 megohms minimum @ 100V DC
<b>Dielectric Strength:</b>	500V AC minimum for 1 minute minimum	300V AC minimum for 1 minute minimum
<b>Mechanical Life:</b>	2,000 operations minimum	2,000 operations minimum
<b>Electrical Life:</b>	2,000 operations minimum	2,000 operations minimum
<b>Total Travel:</b>	.031" (0.8mm)	.026" (0.65mm)

### Materials & Finishes

	JS02 Extended Actuator	JS04 Flush Actuator
<b>Actuator:</b>	Glass fiber reinforced polyamide	Glass fiber reinforced polyamide
<b>Cover:</b>	Glass fiber reinforced polyamide (UL94V-0)	Glass fiber reinforced polyamide (UL94V-0)
<b>Base:</b>	Glass fiber reinforced polyamide (UL94V-0)	Glass fiber reinforced polyamide (UL94V-0)
<b>Contacts:</b>	Beryllium copper with gold plating	Copper alloy with gold plating
<b>Terminals:</b>	Brass with gold plating	Brass with gold plating

### Environmental Data

<b>Operating Temp Range:</b>	<b>JS02 Extended Actuator:</b> -20°C through +70°C (-4°F through +158°F) <b>JS04 Flush Actuator:</b> -30°C through +85°C (-22°F through +185°F)
<b>Humidity:</b>	90 ~ 95% humidity for 96 hours @ 40°C (104°F)
<b>Vibration:</b>	10 ~ 55Hz with peak-to-peak amplitude of 1.5mm traversing the frequency range & returning in 1 minute; 3 right angled directions for 2 hours
<b>Shock:</b>	50G (490m/s <sup>2</sup> ) acceleration (tested in 6 right angled directions, with 5 shocks in each direction)

### PCB Processing

<b>Soldering:</b>	Reflow Soldering Recommended. See Profile A in Supplement section. Manual Soldering: See Profile A in Supplement section. Note: Switches are packaged in OFF position and should be soldered in OFF position.
<b>Cleaning:</b>	These devices are not process sealed. Hand clean locally using alcohol based solution.

### Standards & Certifications

<b>Flammability Standards:</b>	UL 94V-0 rated cover & base The JS Series slides have not been tested for UL recognition or CSA certification. These switches are designed for use in a low-voltage, low-current circuit. When used as intended in a low-voltage, low-current circuit, the results do not produce hazardous energy.
--------------------------------	--

# Distinctive Characteristics

Extended and flush slide actuators available.

Twin sliding contact mechanism with self-cleaning action (JS02) provides smooth actuation and produces high contact reliability.

Gold plated contacts prevent oxidation and sulfide effect and provide stable contact resistance.

Use of self-extinguishing UL94V-0 certified material in cover and base provides high arc resistance and high insulation resistance.

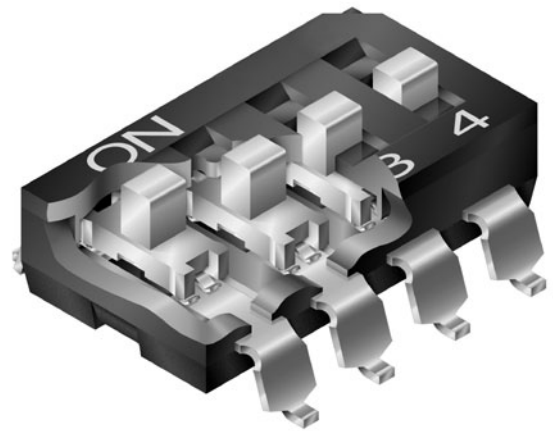
Gull-wing terminals ensure secure PCB mounting and prevent dislodging during vapor phase and infrared convection reflow soldering.

Terminal spacing conforms to standard PCB grid.  
 For JS02: .100" (2.54mm)  
 For JS04: .050" (1.27mm)

End-to-end stackable.

Packaged in tape-reel or stick-tube. Tape-reel packaging meets EIA-481-D Standard.

Coplanarity: all considered surfaces must lie between two parallel planes that are a maximum distance apart of .0059" (0.15mm). (Additional coplanarity details in Terms and Acronyms in the Supplement section.)



Actual Sizes

JS02

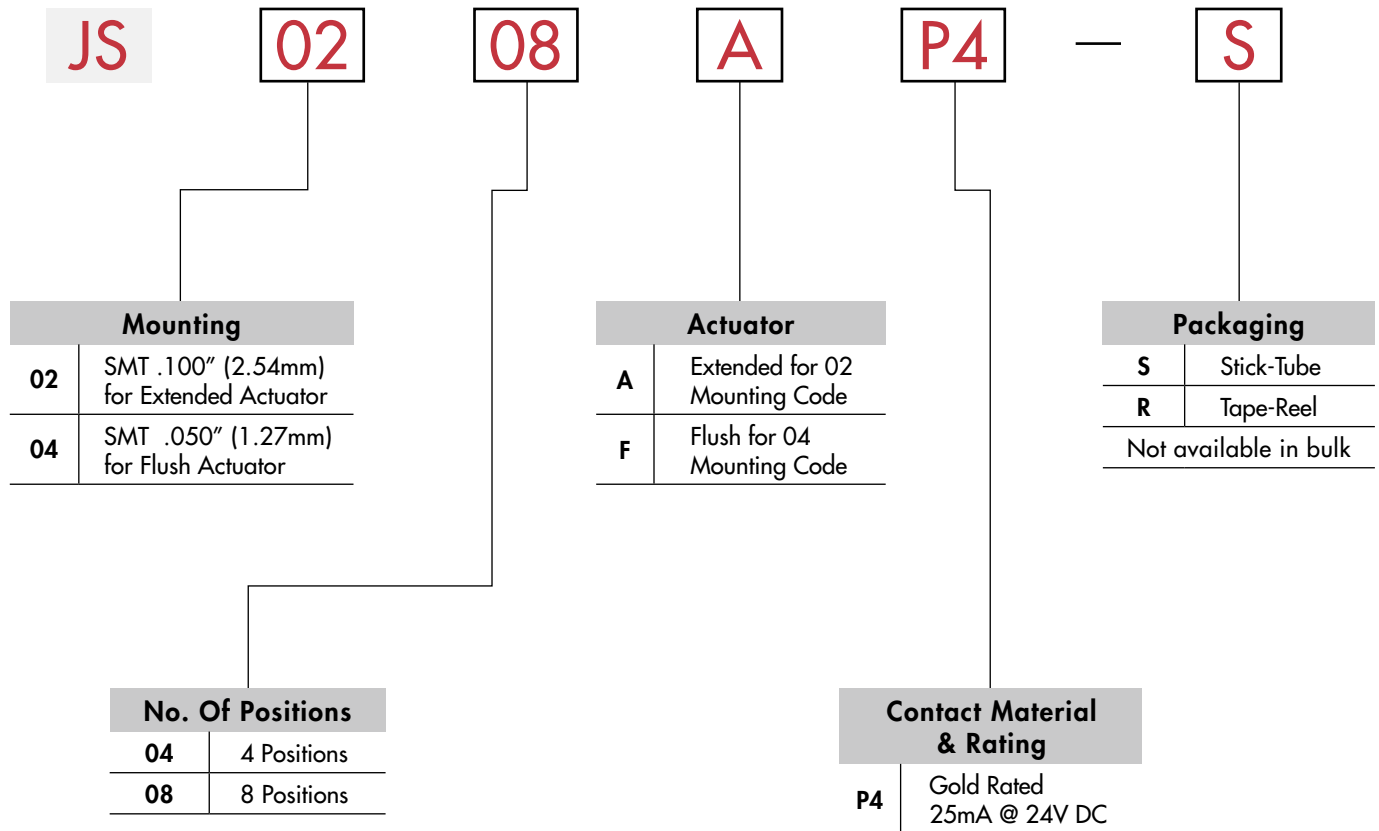


JS04



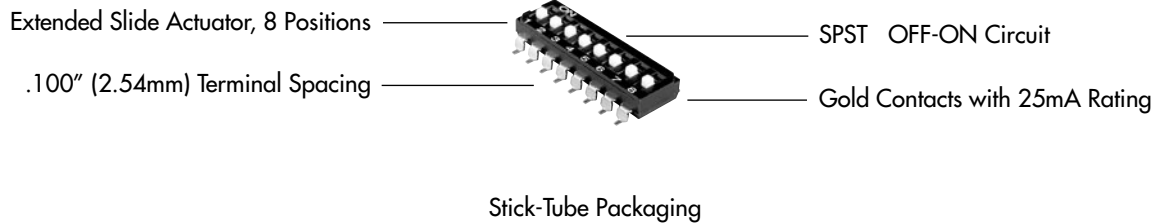
- Toggles
- Rockers
- Pushbuttons
- Illuminated PB
- Programmable
- Keylocks
- Rotaries
- H Slides**
- Tactiles
- Tilt
- Touch
- Indicators
- Accessories
- Supplement

### TYPICAL SWITCH ORDERING EXAMPLE



### DESCRIPTION FOR TYPICAL ORDERING EXAMPLE

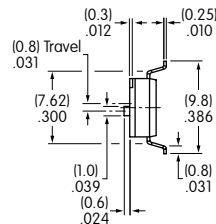
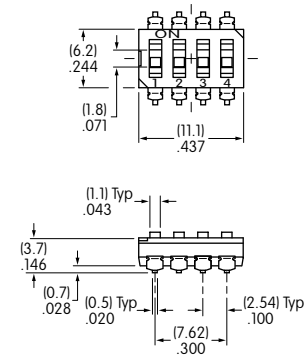
#### JS0208AP4-S



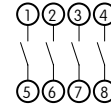
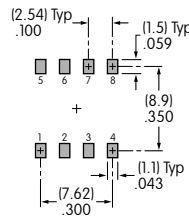
TYPICAL SWITCH DIMENSIONS

Single Pole

4 Positions • Extended Actuator



End View

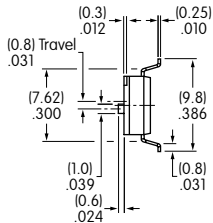
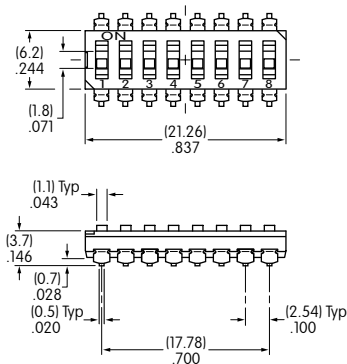


Schematic

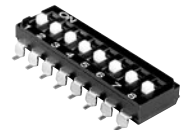
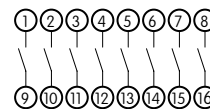
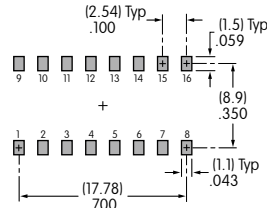
JS0204AP4

Single Pole

8 Positions • Extended Actuator



End View

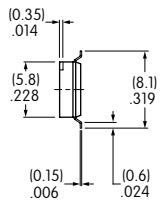
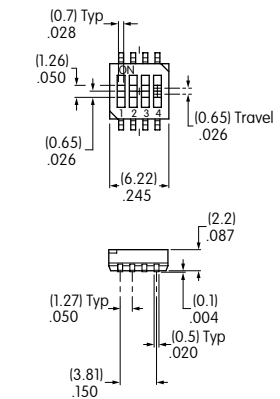


Schematic

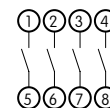
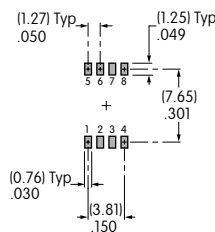
JS0208AP4

Single Pole

4 Positions • Flush Actuator



End View

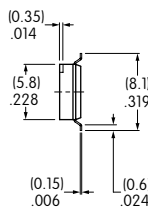
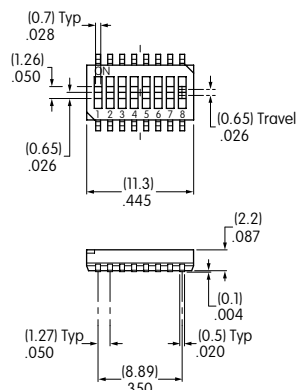


Schematic

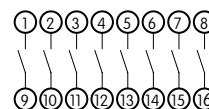
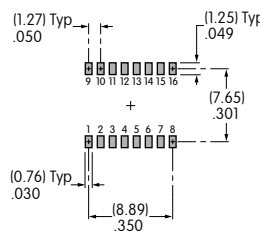
JS0404FP4

Single Pole

8 Positions • Flush Actuator



End View



Schematic

JS0408FP4

## PACKAGING

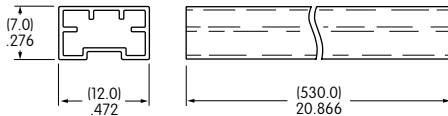
**S**

### Stick-Tube Packaging

Switches are packaged in OFF position.  
Switches are not available in bulk and must be ordered in the following increments:

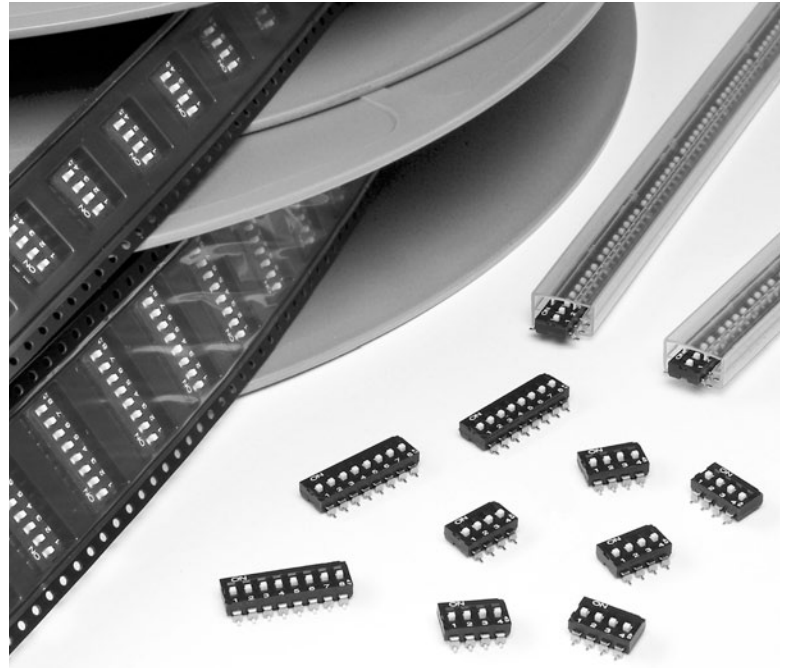
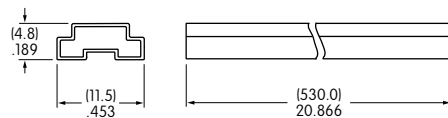
#### Extended Actuator

JS0204AP4-S: 46 pieces per stick-tube  
JS0208AP4-S: 24 pieces per stick-tube



#### Flush Actuator

JS0404FP4-S: 80 pieces per stick-tube  
JS0408FP4-S: 45 pieces per stick-tube



**R**

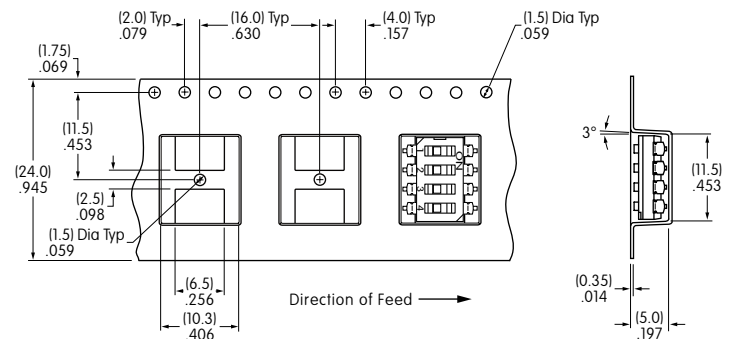
### Tape-Reel Packaging for Extended Actuator

Switches are packaged in OFF position.  
Switches are not available in bulk and must be ordered in the following increments:

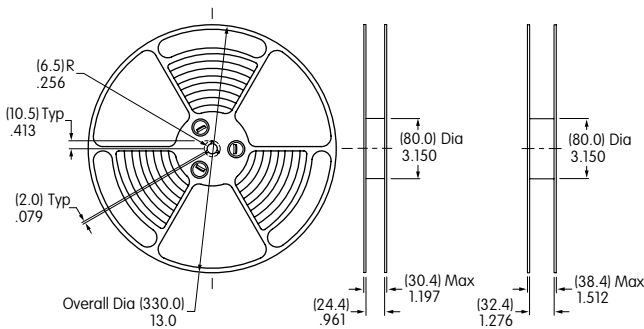
JS0204AP4-R: 500 pieces per tape-reel  
JS0208AP4-R: 500 pieces per tape-reel

Minimum Leader Length: 15.75" (400mm)  
Minimum Trailer Length: 6.3" (160mm)

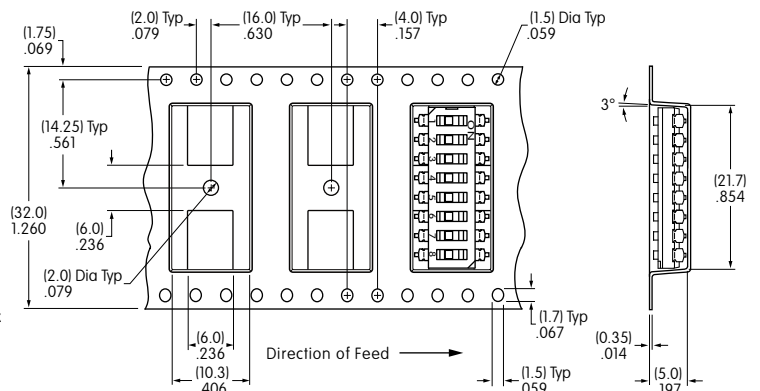
Tape-reel packaging meets EIA-481-D Standard.



Tape Dimensions for JS0204AP4-R



Reel Dimensions JS0204AP4-R JS0208AP4-R



Tape Dimensions for JS0208AP4-R

Toggles

Rockers

Pushbuttons

Programmable Illuminated PB

Keylocks

Rotaries

Slides **H**

Tactiles

Tilt

Touch

Indicators

Accessories

Supplement



PACKAGING (CONTINUED)

**R**

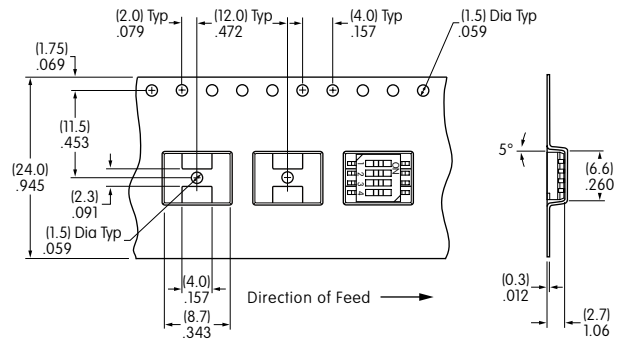
**Tape-Reel Packaging for Flush Actuator**

Switches are packaged in OFF position.  
Switches are not available in bulk and must be ordered in the following increments:

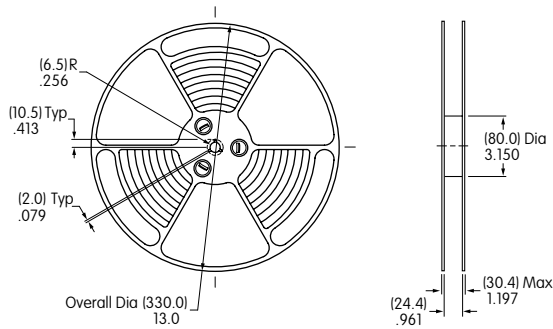
- JS0404FP4-R: 2,000 pieces per tape-reel
- JS0408FP4-R: 2,000 pieces per tape-reel

Minimum Leader Length: 15.75" (400mm)  
Minimum Trailer Length: 6.3" (160mm)

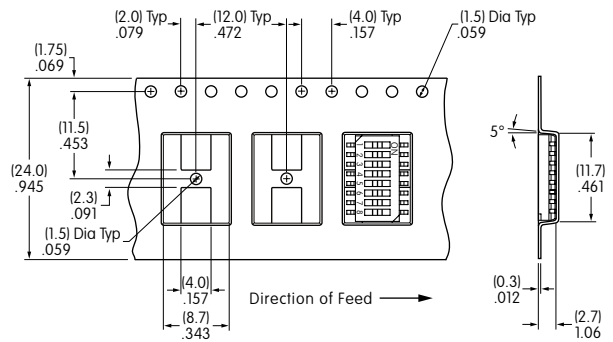
Tape-reel packaging meets EIA-481-D Standard.



Tape Dimensions for JS0404FP4-R



Reel Dimensions for JS0404FP4-R & JS0408FP4-R



Tape Dimensions for JS0408FP4-R

Toggles

Rockers

Pushbuttons

Illuminated PB

Programmable

Keylocks

Rotaries

**H** Slides

Tactiles

Tilt

Touch

Indicators

Accessories

Supplement

# General Specifications

Toggles

Rockers

Pushbuttons

Illuminated PB

Programmable

Keylocks

Rotaries

Slides

Tactiles

Tilt

Touch

Indicators

Accessories

Supplement

## Electrical Capacity (Resistive Load)

<b>Power Level (silver):</b>	6A @ 125V AC or 3A @ 250V AC
<b>Logic Level (gold):</b>	0.4VA maximum @ 28V AC/DC maximum (Applicable Range 0.1mA ~ 0.1A @ 20mV ~ 28V)
<b>Logic/Power Level: (gold over silver)</b>	Combines silver & gold ratings

Note: Find additional explanation of dual rating & operating range in Supplement section.

## Other Ratings

<b>Contact Resistance:</b>	10 milliohms maximum for silver; 20 milliohms maximum for gold
<b>Insulation Resistance:</b>	1,000 megohms minimum @ 500V DC
<b>Dielectric Strength:</b>	1,000V AC minimum between contacts for 1 minute minimum; 1,500V AC minimum between contacts & case for 1 minute minimum
<b>Mechanical Life:</b>	100,000 operations minimum
<b>Electrical Life:</b>	25,000 operations minimum for silver; 50,000 operations minimum for gold
<b>Contact Timing:</b>	Nonshorting (break-before-make)
<b>Total Travel:</b>	On-None-On circuit .087" (2.2mm); all other circuits .138" (3.5mm)

## Materials & Finishes

<b>Actuator:</b>	Glass fiber reinforced PBT resin (UL94V-0)
<b>Frame:</b>	Stainless steel for panel & PCB mount; phosphor bronze with tin plating for bracket mount
<b>Dust Cover:</b>	Phosphor bronze with nickel plating
<b>Case:</b>	Glass fiber reinforced diallyl phthalate resin (UL94V-0)
<b>Movable Contacts:</b>	Silver alloy (code W); copper with gold plating (code G); or silver alloy with gold plating (code A)
<b>Stationary Contacts:</b>	Silver capped copper with silver plating (code W); copper with gold plating (code G); or silver alloy with gold plating (code A)
<b>Terminals:</b>	Copper or brass with silver or gold plating

## Environmental Data

<b>Operating Temp Range:</b>	-30°C through +85°C (-22°F through +185°F)
<b>Humidity:</b>	90 ~ 95% humidity for 96 hours @ 40°C (104°F)
<b>Vibration:</b>	10 ~ 55Hz with peak-to-peak amplitude of 1.5mm traversing the frequency range & returning in 1 minute; 3 right angled directions for 2 hours
<b>Shock:</b>	50G (490m/s <sup>2</sup> ) acceleration (tested in 6 right angled directions, with 5 shocks in each direction)

## Processing

<b>Soldering:</b>	Wave Soldering recommended (PC Mount). See Profile A in Supplement section. Manual Soldering: See Profile A in Supplement section.
<b>Cleaning:</b>	These devices are not process sealed. Hand clean locally using alcohol based solution.

## Standards & Certifications

<b>Flammability Standards:</b>	UL94V-0 rated actuator & case
<b>UL:</b>	<b>File No. E44145 - Recognized only when ordered with marking on switch.</b> Add "/U" or "/CUL" to end of part number to order UL recognized switch. All Single & Double Pole Double Throw models recognized at 6A @ 125V AC & 3A @ 250V AC.
<b>CSA:</b>	<b>File No. 023535_0_000 - Certified only when ordered with marking on switch.</b> Add "/C" to end of part number to order CSA certified switch. All Double Throw & 3 Throw models certified at 6A @ 125V AC, 3A @ 250V AC, & 0.4VA maximum @ 28V DC.

# Distinctive Characteristics

Available in flat frame and bracketed PC mounting types.

Over-center actuator block and plunger design gives crisp actuation with clear indication of circuit status; this design also diminishes sparking and increases operating life.

Guide interlocked with actuator block prevents window locking and maintains correct plunger alignment to assure contact stability.

Antijamming design protects contacts from damage due to excessive downward force on the actuator.

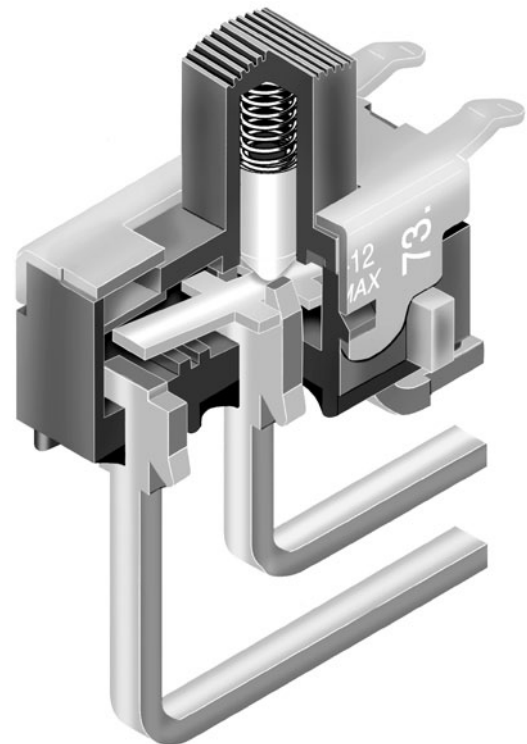
High internal barriers between poles and insulating sheet between case and actuator block give added protection to contacts.

Specially composed silver alloy contacts for power applications or gold contacts for logic level applications give high contact reliability.

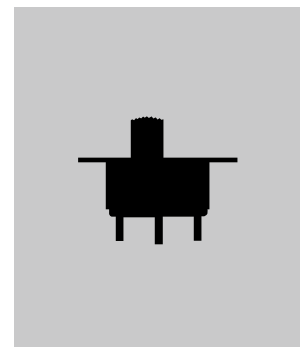
Prominent external insulating barriers increase insulation resistance and dielectric strength.

Epoxy sealed terminals prevent entry of flux, solvents, and other contaminants.

Clinching of frame to case well above base and terminals provides 1,500V dielectric strength.



Actual Size



Toggles

Rockers

Pushbuttons

Illuminated PB

Programmable

Keylocks

Rotaries

**H** Slides

Tactiles

Tilt

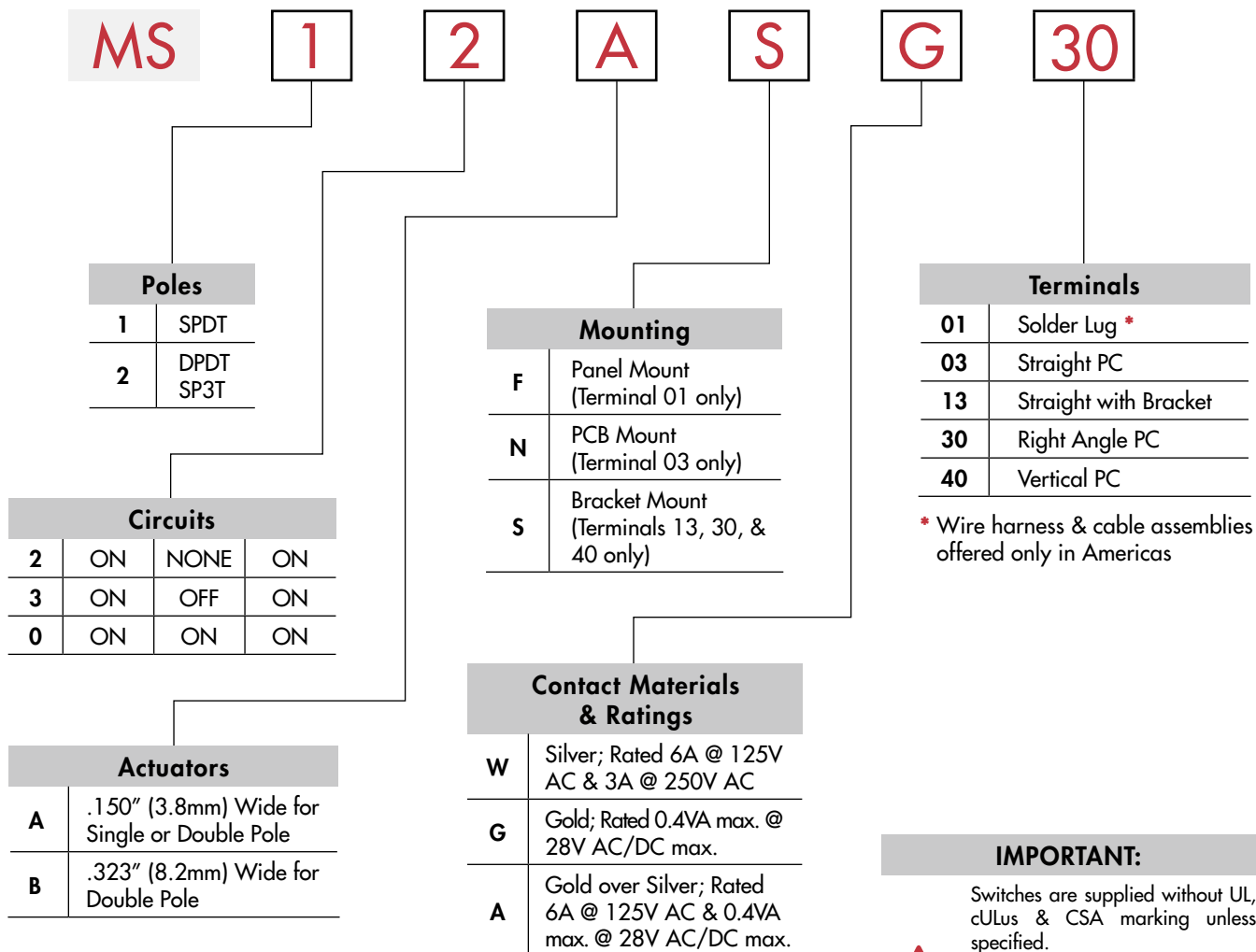
Touch

Indicators

Accessories

Supplement

## TYPICAL SWITCH ORDERING EXAMPLE



**IMPORTANT:**

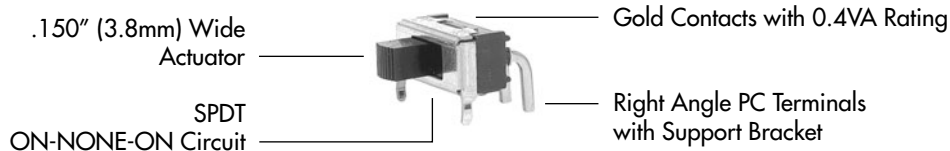
Switches are supplied without UL, cULus & CSA marking unless specified.

**UL, cULus & CSA recognized only when ordered with marking on the switch.**

Specific models, ratings, & ordering instructions are noted on General Specifications page.

## DESCRIPTION FOR TYPICAL ORDERING EXAMPLE

### MS12ASG30



Toggles  
 Rockers  
 Pushbuttons  
 Illuminated PB  
 Programmable  
 Keylocks  
 Rotaries  
 Slides  
 Tactiles  
 Tilt  
 Touch  
 Indicators  
 Accessories  
 Supplement

## POLES & CIRCUITS

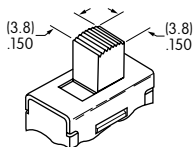
Pole	Model	Slide Position			Connected Terminals			Throw & Schematics
		Left	Center	Right	Left	Center	Right	
								Note: Terminal numbers are not actually on the switch.
SP	MS12 MS13	ON ON	NONE OFF	ON ON	2-1	OPEN	2-3	
DP	MS22 MS23	ON ON	NONE OFF	ON ON	2-1 5-4	OPEN	2-3 5-6	 

### For 3 Throw (3-On)

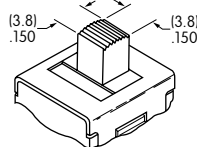
Pole	Model	Connected Terminals & Schematics			External Connection
		Left	Center	Right	
SP	MS20	ON  2-1 5-4	ON  2-3 5-4	ON  2-3 5-6	<p>The SP3T model utilizes a double pole base.</p> <p>External connections must be made during field installation.</p>

## ACTUATORS

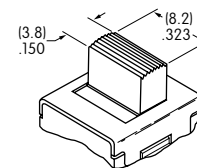
**A** .150" (3.8mm) Wide for Single Pole



.150" (3.8mm) Wide for Double Pole



**B** .323" (8.2mm) Wide for Double Pole Only



## CONTACT MATERIALS & RATINGS

**W** Silver over Silver Power Level 6A @ 125V AC & 3A @ 250V AC

**G** Gold over Brass or Copper Logic Level 0.4VA maximum @ 28V AC/DC maximum  
 Note: Complete explanation of operating range in Supplement section.

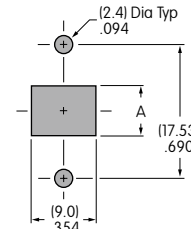
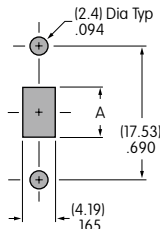
**A** Gold over Silver Power Level or Logic Level 6A @ 125V AC or 0.4VA maximum @ 28V AC/DC maximum

Note: This dual rated option is suitable when two or more identical switches are used in logic and in power circuits within the same application. See Supplement section for complete explanation of dual rating and operating range.

Toggles  
Rockers  
Pushbuttons  
Illuminated PB  
Programmable  
Keylocks  
Rotaries  
Slides  
Tactiles  
Tilt  
Touch  
Indicators  
Accessories  
Supplement

## MOUNTING TYPES & TERMINALS

**F** Panel Mount  
(Combines with Solder  
Lug Terminal 01 only)



**N** Straight PC Mount  
(Combines with  
Straight PC Terminal  
03 only)



Dimension A =  
.268" (6.8mm) for on-none-on  
.319" (8.1mm) for on-off-on & on-on-on

Maximum Panel Thickness: .197" (5.0mm)

SP or DP with .150"  
(3.8mm) Actuator

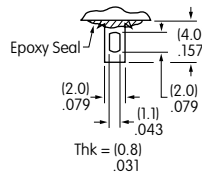
DP only with .323"  
(8.2mm) Actuator

**S** Support Bracket Mount  
(For Terminals 13, 30, & 40)

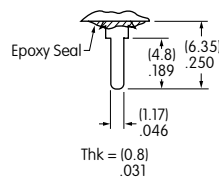


Maximum Panel Thickness:  
For Straight PC with Bracket Terminal 13: .197" (5.0mm)  
For Angle Mount Terminals 30 & 40: .177" (4.5mm)

**01** Solder Lug



**03** Straight PC



**13** Straight PC with Bracket

**30** Right Angle PC

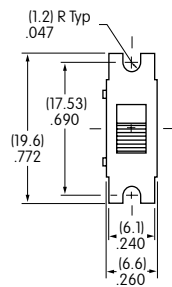
**40** Vertical PC

## TYPICAL SWITCH DIMENSIONS

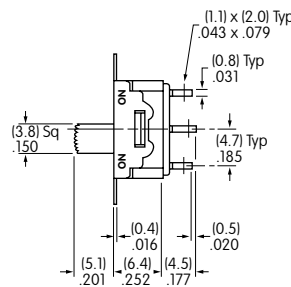
Solder Lug Terminals



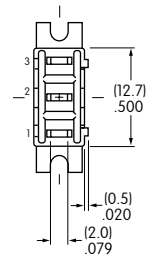
MS12AFW01



Single Pole



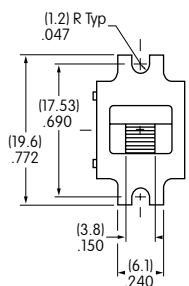
Actuator in LEFT Position



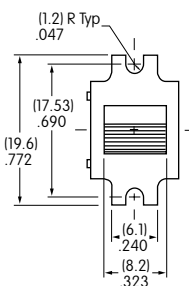
Solder Lug Terminals



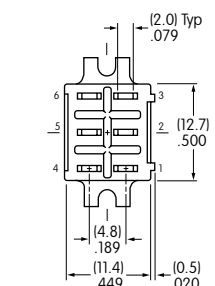
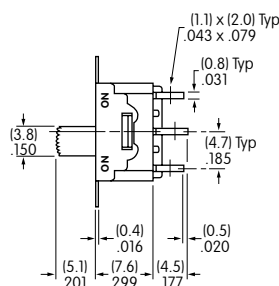
MS22BFW01



Double Pole



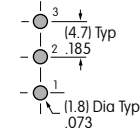
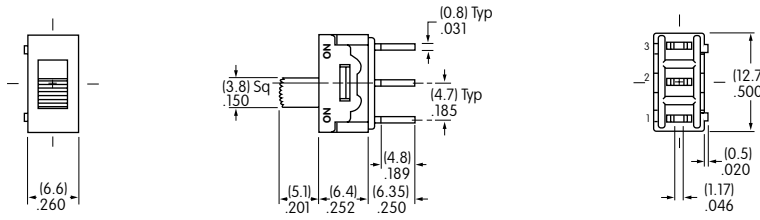
Actuator in LEFT Position



TYPICAL SWITCH DIMENSIONS

Single Pole

Straight PC Terminals

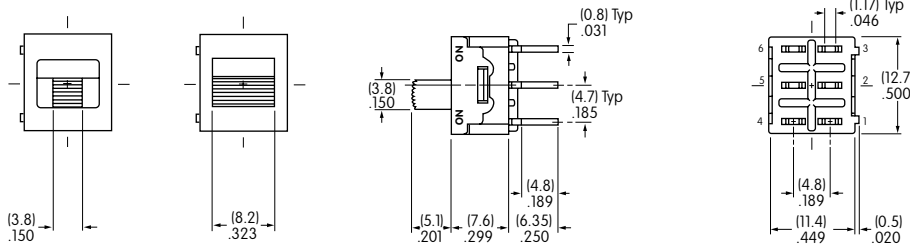


Actuator in LEFT Position

MS12ANG03

Double Pole

Straight PC Terminals

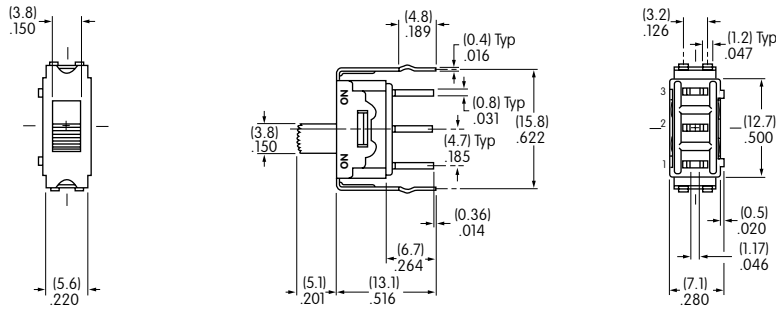


Actuator in LEFT Position

MS22BNG03

Single Pole

Straight PC Terminals with Bracket

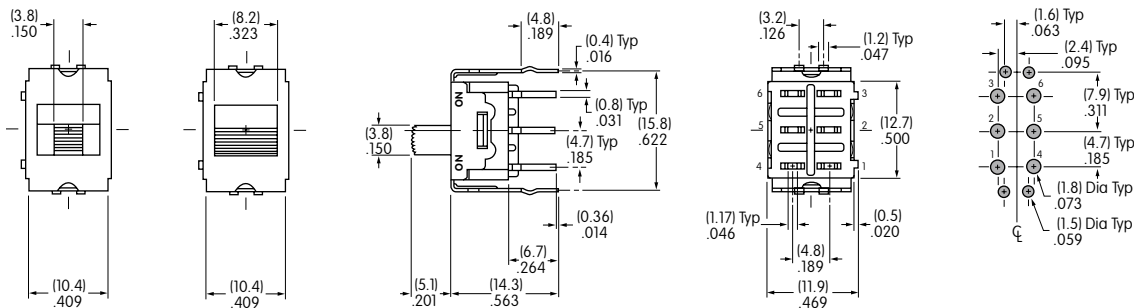


Actuator in LEFT Position

MS12ASG13

Double Pole

Straight PC Terminals with Bracket



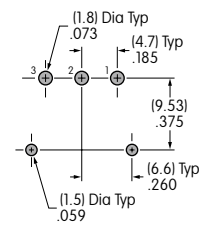
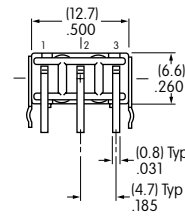
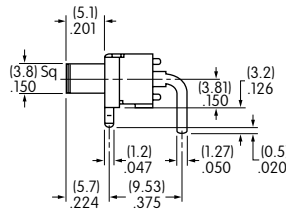
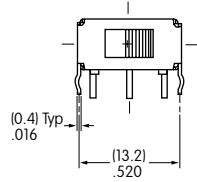
Actuator in LEFT Position

MS22BSG13

## TYPICAL SWITCH DIMENSIONS

### Right Angle PC Terminals

### Single Pole

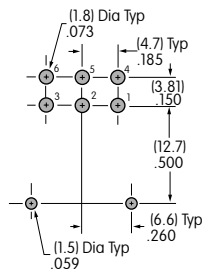
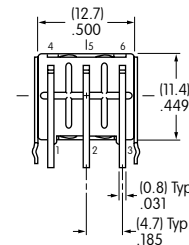
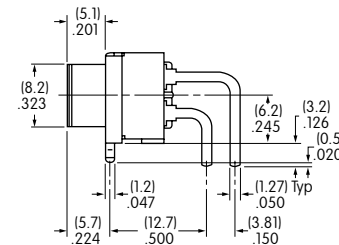
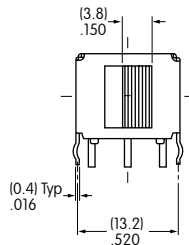
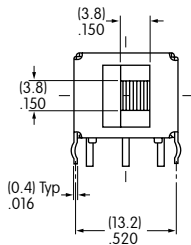


**MS12ASG30**

Actuator in LEFT Position

### Right Angle PC Terminals

### Double Pole

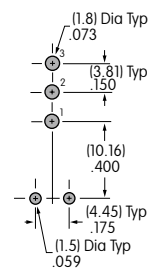
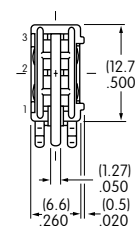
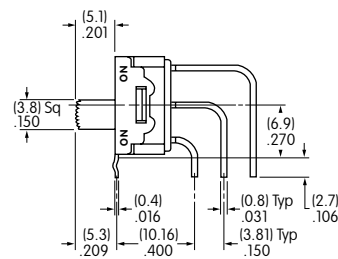
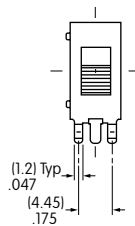


**MS22BSG30**

Actuator in LEFT Position

### Vertical PC Terminals

### Single Pole

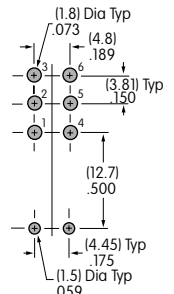
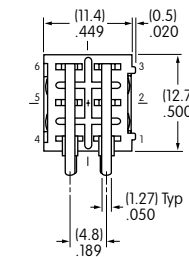
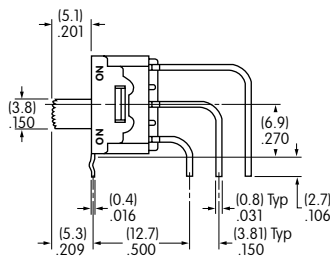
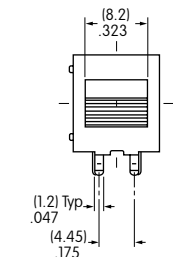
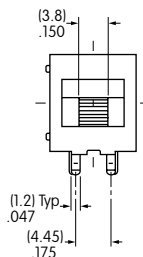


**MS12ASG40**

Actuator in LEFT Position

### Vertical PC Terminals

### Double Pole



**MS22BSG40**

Actuator in LEFT Position



# General Specifications

## Electrical Capacity (Resistive Load)

**Power Level:** 6A @ 125V AC or 3A @ 250V AC

## Other Ratings

**Contact Resistance:** 10 milliohms maximum

**Insulation Resistance:** 1,000 megohms minimum @ 500V DC

**Dielectric Strength:** 1,000V AC minimum between contacts for 1 minute minimum;  
1,500V AC minimum between contacts & case for 1 minute minimum

**Mechanical Life:** 50,000 operations minimum

**Electrical Life:** 25,000 operations minimum

**Contact Timing:** Nonshorting (break-before-make)

**Total Travel:** .087" (2.2mm)

## Materials & Finishes

**Actuator:** Polyamide (UL94V-0)

**Frame:** Stainless steel

**Case:** Glass fiber reinforced diallyl phthalate resin (UL94V-0)

**Movable Contacts:** Silver alloy

**Stationary Contacts:** Silver capped copper with silver plating

**Terminals:** Copper or brass with silver plating

## Environmental Data

**Operating Temp Range:** -10°C through +55°C (+14°F through +131°F)

**Humidity:** 90 ~ 95% humidity for 240 hours @ 40°C (104°F)

**Vibration:** 10 ~ 55Hz with peak-to-peak amplitude of 1.5mm traversing the frequency range  
& returning in 1 minute; 3 right angled directions for 2 hours

**Shock:** 50G (490m/s<sup>2</sup>) acceleration (tested in 6 right angled directions, with 5 shocks in each direction)

## Processing

**Soldering Time & Temp:** Wave Soldering Recommended (PC version): See Profile A in Supplement section.

Manual Soldering: See Profile A in Supplement section.

Note: Lever must be in center position while soldering.

**Cleaning:** These devices are not process sealed. Hand clean locally using alcohol based solution.

## Standards & Certifications

**Flammability Standards:** UL94V-0 rated actuator & case

Toggles

Rockers

Pushbuttons

Illuminated PB

Programmable

Keylocks

Rotaries

Slides

Tactiles

Tilt

Touch

Indicators

Accessories

Supplement

# Distinctive Characteristics

Bright, LED illumination at top of actuator.

Over-center actuator block and plunger design gives crisp actuation, diminishes sparking, and increases operating life.

Guide interlocked with actuator block prevents window locking and maintains correct plunger alignment to assure contact stability.

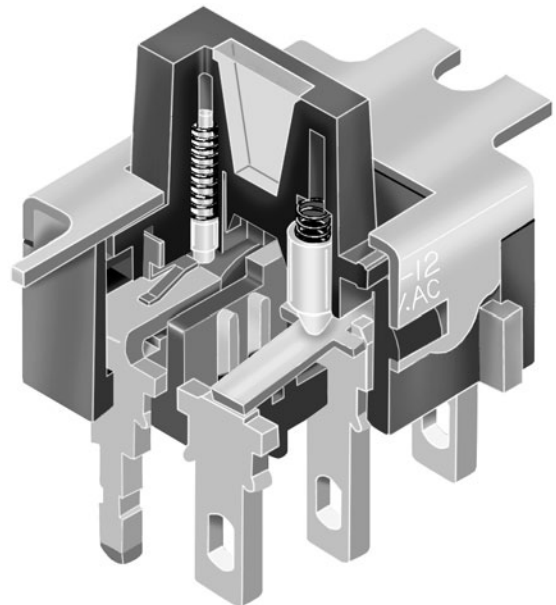
Antijamming design protects contacts from damage due to excessive downward force on the actuator.

High internal barriers between poles and insulating sheet between case and actuator block give added protection to contacts.

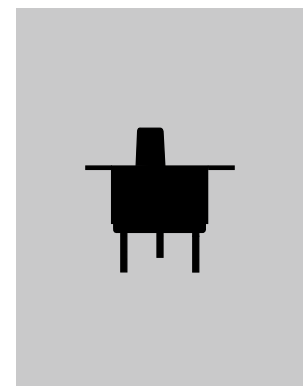
Prominent external insulating barriers increase insulation resistance and dielectric strength.

Epoxy sealed terminals prevent entry of flux, solvents, and other contaminants.

Clinching of frame to case well above base and terminals provides 1,500V dielectric strength.



Actual Size



Toggles

Rockers

Pushbuttons

Illuminated PB

Programmable

Keylocks

Rotaries

**H** Slides

Tactiles

Tilt

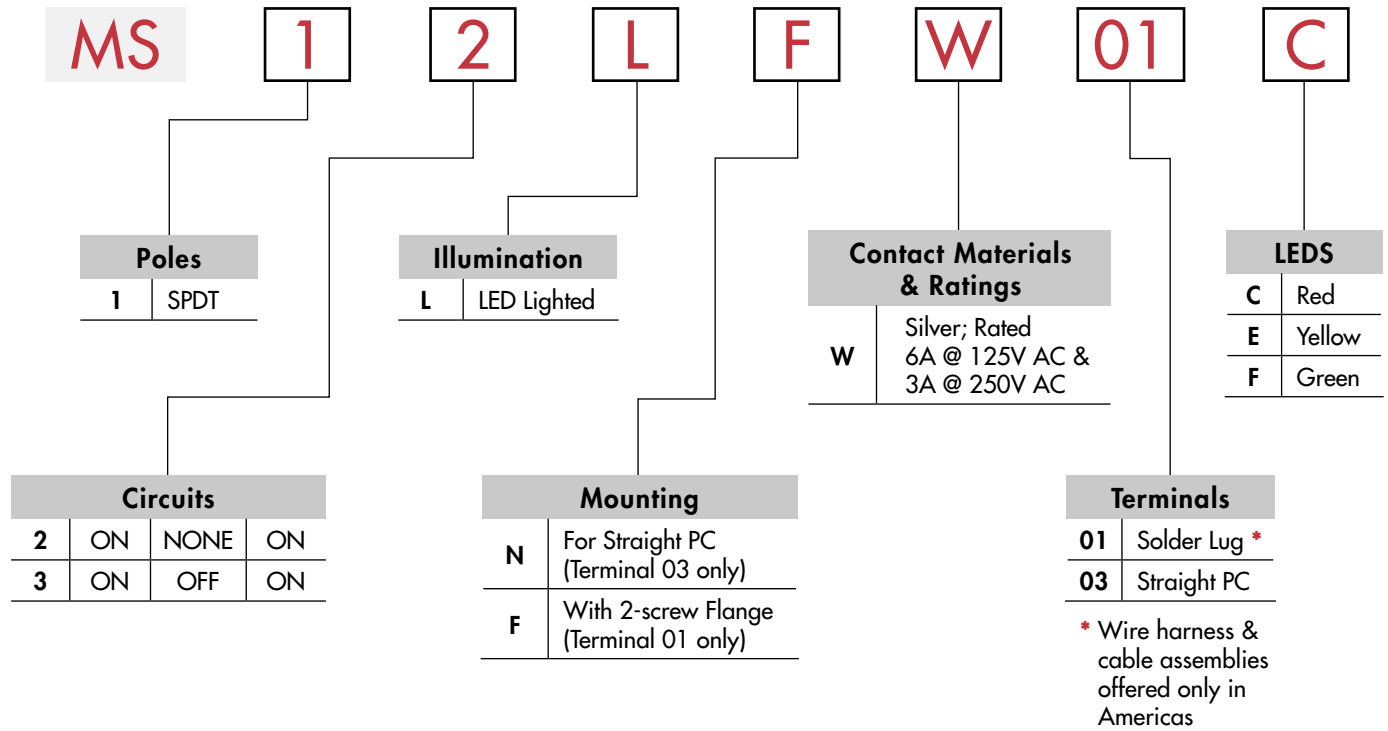
Touch

Indicators

Accessories

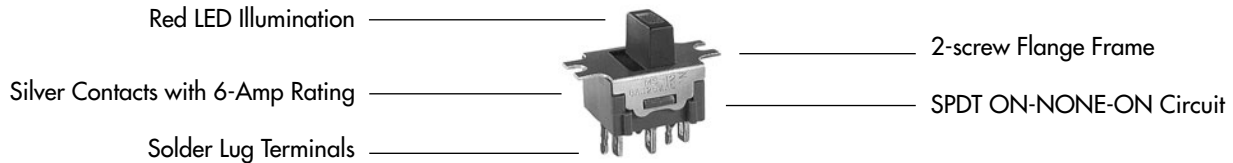
Supplement

## TYPICAL SWITCH ORDERING EXAMPLE



## DESCRIPTION FOR TYPICAL ORDERING EXAMPLE

### MS12LFW01C



## POLES & CIRCUITS

Pole	Model	Slide Position			Connected Terminals			Throw & Schematics
		Left	Center	Right	Left	Center	Right	
SP	MS12	ON	NONE	ON	2-1	OPEN	2-3	Note: Terminal numbers are not actually on the switch. LED circuit is isolated and requires an external connection.
	MS13	ON	OFF	ON				

## CONTACT MATERIALS & RATINGS

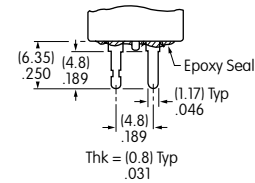
<b>W</b>	Silver over Silver	Power Level	6A @ 125V AC & 3A @ 250V AC
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## MOUNTING TYPES & TERMINALS

**N** Straight PC Mount  
(Combines with  
Straight PC Terminal  
03 only)



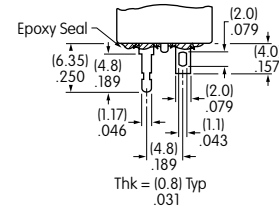
**03** Straight PC



**F** 2-screw Flange  
(Combines with Solder  
Lug Terminal 01 only)



**01** Solder Lug

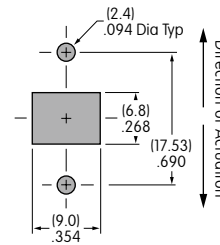
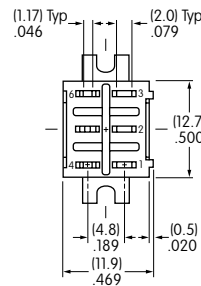
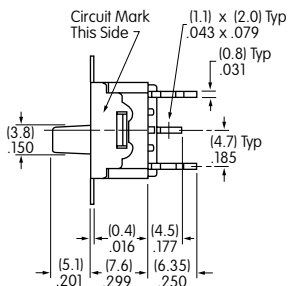
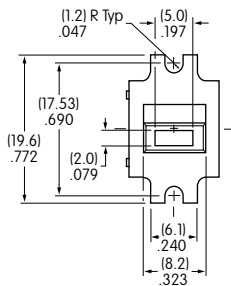


## LED COLORS & SPECIFICATIONS

LEDs are supplied as an integral part of the switch (not available separately). The lamp circuit is independent of switch operation. Electrical specifications shown are determined at a basic temperature of 25°C. If the source voltage exceeds the rated voltage, a ballast resistor is required. The resistor value can be calculated by using the formula given in the Supplement.

		<b>C</b> Red	<b>E</b> Yellow	<b>F</b> Green
Forward Peak Current	$I_{FM}$	30mA	30mA	25mA
Typical Forward Current	$I_F$	16mA	16mA	16mA
Forward Voltage	$V_F$	1.98V	2.06V	2.16V
Reverse Peak Voltage	$V_{RM}$	5V	5V	5V
Current Reduction Rate Above 25°C	$\Delta I_F$	0.40mA/°C	0.42mA/°C	0.33mA/°C
Ambient Temperature Range		-15° ~ +60°C		

## TYPICAL SWITCH DIMENSIONS



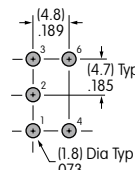
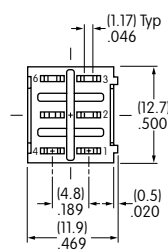
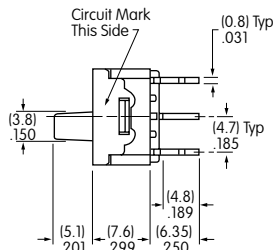
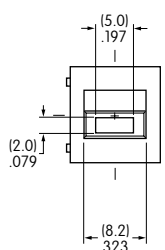
### Solder Lug Terminals



Actuator in LEFT Position

Maximum Panel Thickness .197" (5.0mm)

**MS12LFW01C**



### Straight PC Terminals



Actuator in LEFT Position

Maximum Panel Thickness .197" (5.0mm)

**MS12LNW03C**

# General Specifications

## Electrical Capacity (Resistive Load)

<b>Maximum Level:</b>	500mA @ 12V DC
<b>Minimum Level:</b>	1.0mA maximum @ 10mV AC/DC maximum

## Other Ratings

<b>Contact Resistance:</b>	30 milliohms maximum
<b>Insulation Resistance:</b>	100 megohms minimum @ 500V DC
<b>Dielectric Strength:</b>	500V AC for 1 minute minimum
<b>Mechanical Life:</b>	1,000 operations minimum
<b>Electrical Life:</b>	1,000 operations minimum
<b>Nominal Operating Force:</b>	2.0N
<b>Contact Timing:</b>	Nonshorting (Break-before-make)
<b>Total Travel:</b>	.063" (1.6mm)

## Materials & Finishes

<b>Actuator:</b>	Glass fiber reinforced polyester (UL94V-0)
<b>Case:</b>	Glass fiber reinforced polyamide (UL94V-0)
<b>Lower Case:</b>	Glass fiber reinforced polyester (UL94V-0)
<b>Movable Contacts:</b>	Brass with gold plating over nickel
<b>Stationary Contacts:</b>	Brass with gold plating over nickel
<b>Terminals:</b>	Brass with gold plating over nickel

## Environmental Data

<b>Operating Temp Range:</b>	-40°C through +85°C (-40°F through +185°F)
<b>Humidity:</b>	90-95% humidity for 96 hours @ 40°C (104°F)
<b>Vibration:</b>	10 ~ 55Hz with peak-to-peak amplitude of 1.5mm traversing the frequency range & returning in 1 minute; 3 right angled directions for 2 hours
<b>Shock:</b>	50G (490m/s <sup>2</sup> ) acceleration (tested in 6 right angled directions, with 5 shocks in each direction)

## PCB Processing

<b>Soldering:</b>	Wave Soldering Recommended: See Profile A in Supplement section. Manual Soldering: See Profile B in Supplement section.
<b>Cleaning:</b>	These devices are not process sealed. Hand clean locally using alcohol based solution.

## Standards & Certifications

<b>Flammability Standards:</b>	Actuator and lower case of glass fiber reinforced polyester and case of glass fiber reinforced polyamide UL94V-0 The SM series devices have not been tested for UL recognition and CSA certification. These switches are designed for use in a low-voltage, low-current circuit. When used as intended in a low-voltage, low-current circuit, the results do not produce hazardous energy.
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# Distinctive Characteristics

Very compact dimensions allow for high density, side-by-side or end-to-end mounting within tight dimensional applications.

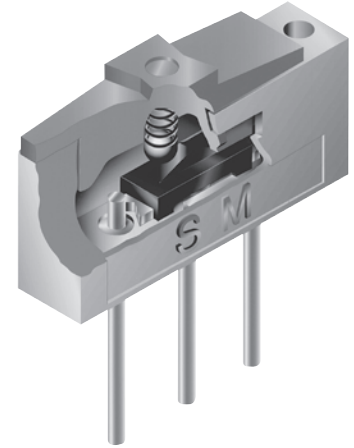
Detent mechanism provides positive actuation to indicate circuit status.

Visible indication of position by spot on top of red actuator and through window on side.

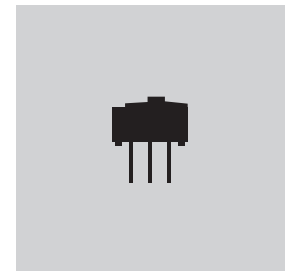
Twin sliding contact mechanism with self-cleaning action provides smooth actuation and produces high contact reliability.

.100" x .100" (2.54mm x .254mm) center-to-center inch terminal spacing allows standard PC board mounting in side-by-side or end-to-end arrangements.

Insert molded terminals lock out flux, solvents, and other contaminants.



Actual Size

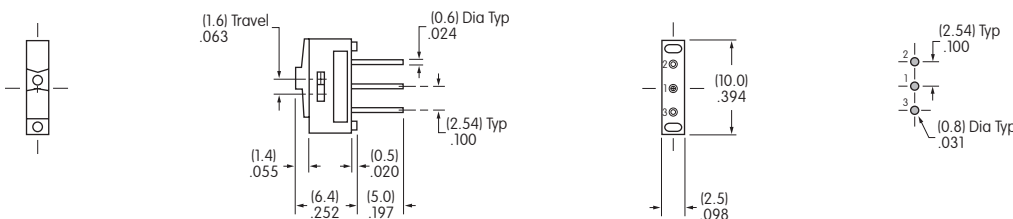


## POLES & CIRCUITS

Model	Slide Position			Connected Terminals			Throw & Schematics
	Right	Center	Left	Right	Center	Left	
SM0320102	ON	NONE	ON	1-3	OPEN	1-2	SPDT

## TYPICAL SWITCH DIMENSIONS

Single Pole • Straight PC



Actuator shown in RIGHT position



SM0320102

- Toggles
- Rockers
- Pushbuttons
- Illuminated PB
- Programmable
- Keylocks
- Rotaries
- H Slides**
- Tactiles
- Tilt
- Touch
- Indicators
- Accessories
- Supplement

# General Specifications

## Electrical Capacity (Resistive Load)

<b>Power Level (silver):</b>	0.1A @ 30V DC
<b>Logic Level (gold):</b>	0.4VA maximum @ 28V AC/DC maximum (Applicable Range 0.1mA ~ 0.1A @ 20mV ~ 28V)

Note: Find additional explanation of operating range in Supplement section.

## Other Ratings

<b>Contact Resistance:</b>	20 milliohms maximum for power level; 40 milliohms maximum for logic level
<b>Insulation Resistance:</b>	100 megohms minimum @ 500V DC
<b>Dielectric Strength:</b>	500V AC minimum 1 minute minimum
<b>Mechanical Life:</b>	10,000 operations minimum
<b>Electrical Life:</b>	10,000 operations minimum
<b>Contact Timing:</b>	SS12S & SS22S – Shorting (make-before-break); SS14M – Nonshorting (break-before-make)
<b>Total Travel:</b>	.079" (2.0mm)

## Materials & Finishes

<b>Actuator:</b>	Polyamide
<b>Upper Case:</b>	Polyester for 3-On models; polyacetal for all other models
<b>Lower Case:</b>	Glass fiber reinforced polyester for 3-On models; glass fiber reinforced polybutylene terephthalate (thermoplastic) for other models
<b>Movable Contactor:</b>	Phosphor bronze with silver plating (code 2) or phosphor bronze with gold plating (code 4)
<b>Interior Base:</b>	Phenolic resin (thermoset)
<b>Terminals:</b>	Brass with silver plating over copper plating or brass with gold plating

## Environmental Data

<b>Operating Temp Range:</b>	-15°C through +60°C (+5°F through +140°F)
<b>Humidity:</b>	90 ~ 95% humidity for 96 hours @ 40°C (104°F)
<b>Vibration:</b>	10 ~ 55Hz with peak-to-peak amplitude of 1.5mm traversing the frequency range & returning in 1 minute; 3 right angled directions for 2 hours
<b>Shock:</b>	50G (490m/s <sup>2</sup> ) acceleration (tested in 6 right angled directions, with 5 shocks in each direction)

## PCB Processing

<b>Soldering:</b>	Wave Soldering: For non-supported through-hole, see Profile B in Supplement section. For supported through-hole, 5 seconds maximum @ 250°C maximum. Manual Solder: See Profile B in Supplement section.
<b>Cleaning:</b>	These devices are not process sealed. Hand clean locally using alcohol based solution.

## Standards & Certifications

The SS series devices have not been tested for UL recognition and CSA certification. These switches are designed for use in a low-voltage, low-current circuit. When used as intended in a low-voltage, low-current circuit, the results do not produce hazardous energy.

# Distinctive Characteristics

Top or side actuation permits flexible board design.

Compact dimensions and low profile allow high density mounting and close stacking of PC boards.

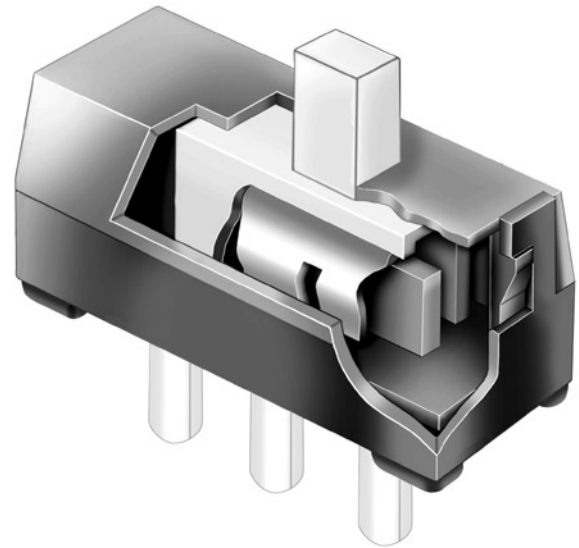
Crisp actuation positively indicates circuit status.

Double molded thermoset base and thermo-plastic housing prevent loosening of terminals due to high soldering temperatures.

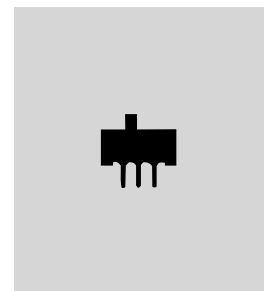
Award-winning STC mechanism with benefits unavailable in conventional mechanisms: smoother, positive detent actuation, increased contact stability, and unparalleled logic-level reliability. (Additional STC details in Terms and Acronyms in the Supplement section.)

Insert molded terminals lock out flux, solvents, and other contaminants.

Inch or metric terminal spacing for standard PC board grid (.100" x .100" or 2.0mm x 2.0mm).



Actual Size





## TYPICAL SWITCH ORDERING EXAMPLE

SS

12S

D

P

2

Poles & Circuits				
12S	SPDT	ON	NONE	ON
SS12S model has shorting contacts.				
* 14M	SP3T	ON	ON	ON
SS14M model has nonshorting contacts.				
22S	DPDT	ON	NONE	ON
SS22S model has shorting contacts.				
See Poles & Circuits chart below.				
* 14M Circuit with silver contacts only.				

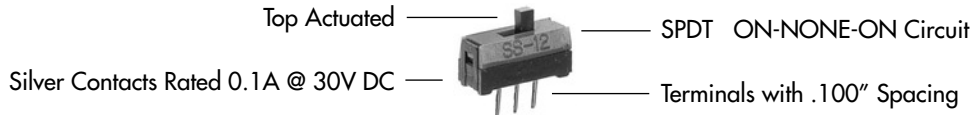
Terminal Spacing	
B	Metric 2.0mm x 2.0mm
D	Inch .100" x .100"

Contact Material & Ratings	
2	Silver Rated 0.1A @ 30V DC
* 4	Gold Rated 0.4VA maximum @ 28V AC/DC maximum
* Gold not available with SS14M.	

Actuation	
P	Top Actuated
H	Side Actuated

### DESCRIPTION FOR TYPICAL ORDERING EXAMPLE

**SS12SDP2**



### POLES & CIRCUITS

Pole	Model	Slide Position			Connected Terminals			Throw & Schematics
		Right	Center	Left	Right	Center	Left	
SP	SS12S	ON	NONE	ON	2-1	NONE	2-3	SPDT Note: Terminal numbers are not actually on switch. 
SP	SS14M	ON	ON	ON	3-4	3-2	3-1	SP3T Make-Before-Break ON-OFF-ON circuit can be created by not connecting terminal 2. 
DP	SS22S	ON	NONE	ON	2-1 5-4	NONE	2-3 5-6	DPDT 

Toggles

Rockers

Pushbuttons

Illuminated PB

Programmable

Keylocks

Rotaries

Slides

Tactiles

Tilt

Touch

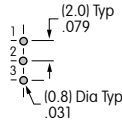
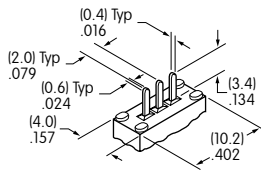
Indicators

Accessories

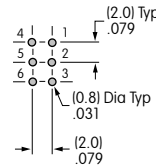
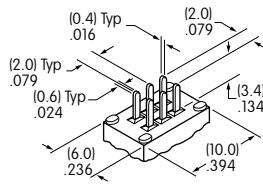
Supplement

TERMINAL SPACING

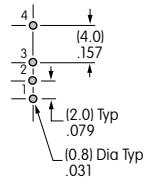
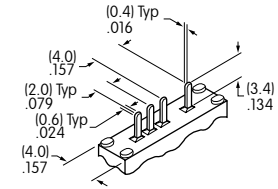
**B** Metric 2.0mm x 2.0mm with Black Base



On-None-On Single Pole Models

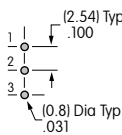
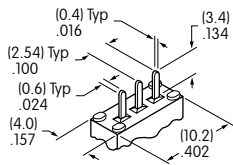


On-None-On Double Pole Models

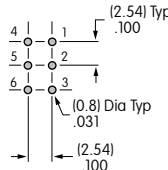
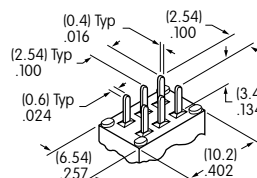


3-On Models

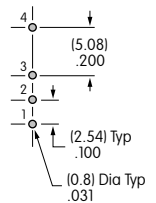
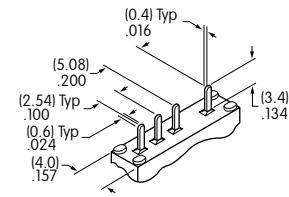
**D** Inch .100" x .100" with Gray Base



On-None-On Single Pole Models



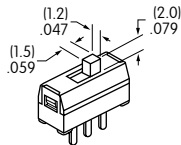
On-None-On Double Pole Models



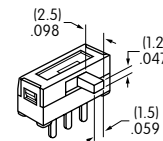
3-On Models

ACTUATION

**P** Top Actuated



**H** Side Actuated



CONTACT MATERIALS & RATINGS

**2** Silver over Phosphor Bronze

Power Level

0.1A @ 30V DC

**4** Gold over Silver/Phosphor Bronze

Logic Level

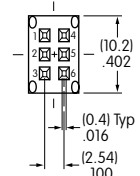
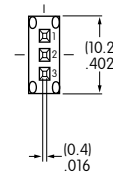
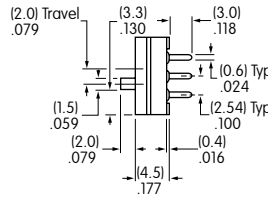
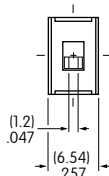
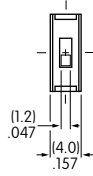
0.4VA max @ 28V AC/DC max

Complete explanation of operating range in Supplement section.

## TYPICAL SWITCH DIMENSIONS

### Top Actuated

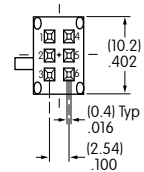
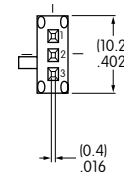
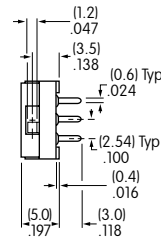
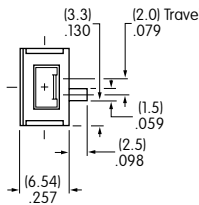
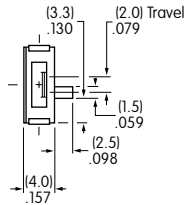
### Single & Double Pole



SS12SDP2

### Side Actuated

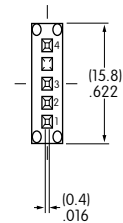
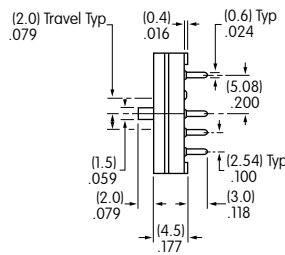
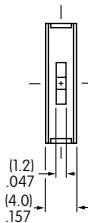
### Single & Double Pole



SS12SDH2

### 3-On Circuit • Top Actuated

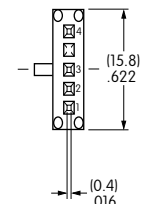
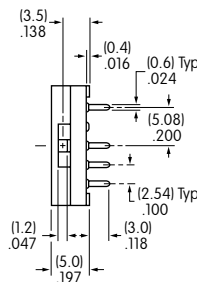
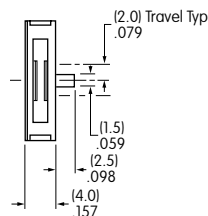
### Single Pole



SS14MDP2

### 3-On Circuit • Side Actuated

### Single Pole



SS14MDH2

# Distinctive Characteristics

Top or side actuation permits flexible board design.

Bright, LED illumination at tip of actuator.

Compact dimensions and low profile allow high density mounting and close stacking of PC boards.

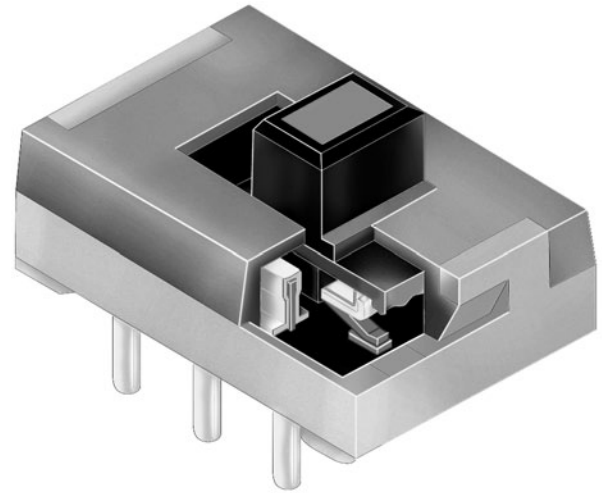
Crisp actuation positively indicates circuit status.

Double molded thermoset base and thermoplastic housing prevent loosening of terminals due to high soldering temperatures.

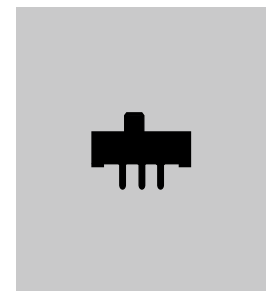
Sliding twin contact mechanism with self-cleaning action provides smooth actuation and produces high contact reliability.

Insert molded terminals lock out flux, solvents, and other contaminants.

Inch terminal spacing for standard PC board grid (.100" x .100").



Actual Size



# General Specifications

## Electrical Capacity (Resistive Load)

**Power Level:** 0.1 A @ 30V DC

## Other Ratings

<b>Contact Resistance:</b>	20 milliohms maximum
<b>Insulation Resistance:</b>	100 megohms minimum @ 500V DC
<b>Dielectric Strength:</b>	500V AC minimum 1 minute minimum
<b>Mechanical Life:</b>	10,000 operations minimum
<b>Electrical Life:</b>	10,000 operations minimum
<b>Contact Timing:</b>	Shorting (make-before-break)
<b>Total Travel:</b>	.079" (2.0mm)

## Materials & Finishes

<b>Actuator:</b>	Polyacetal
<b>Upper Case:</b>	Polyacetal
<b>Lower Case:</b>	Glass fiber reinforced polyester
<b>Movable Contactor:</b>	Phosphor bronze with silver plating
<b>Interior Base:</b>	Phenolic resin (thermoset)
<b>Terminals:</b>	Brass with silver plating over copper plating

## Environmental Data

<b>Operating Temp Range:</b>	-15°C through +60°C (+5°F through +140°F)
<b>Humidity:</b>	90 ~ 95% humidity for 96 hours @ 40°C (104°F)
<b>Vibration:</b>	10 ~ 55Hz with peak-to-peak amplitude of 1.5mm traversing the frequency range & returning in 1 minute; 3 right angled directions for 2 hours
<b>Shock:</b>	50G (490m/s <sup>2</sup> ) acceleration (tested in 6 right angled directions, with 5 shocks in each direction)

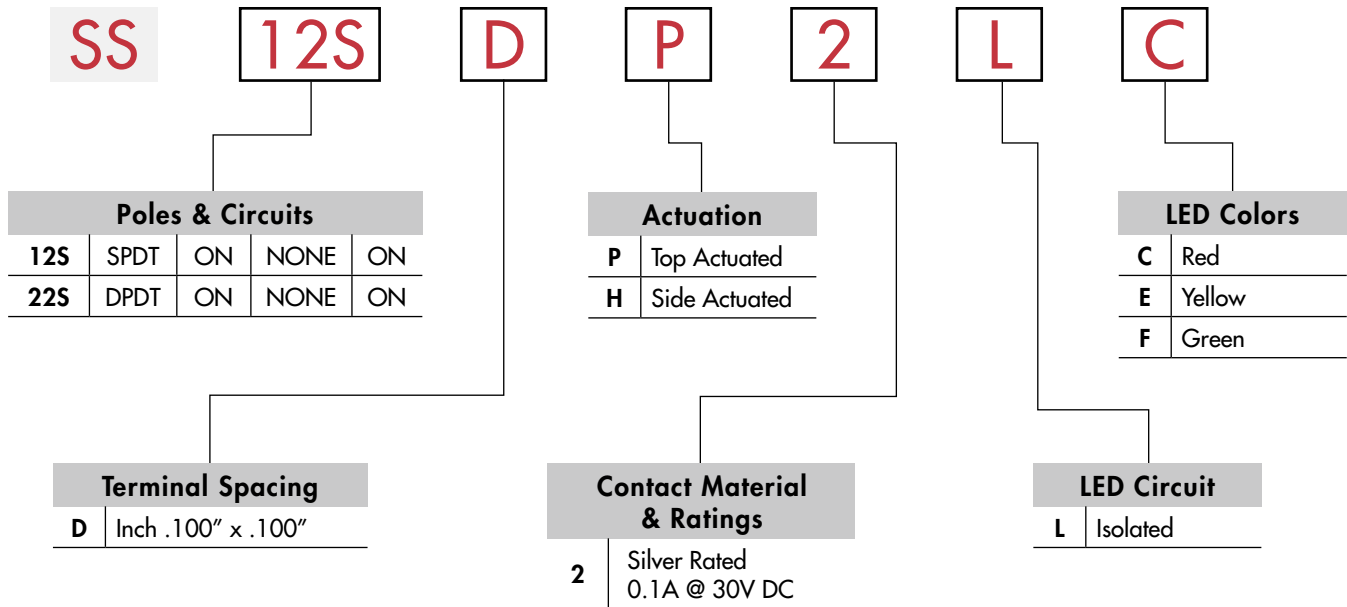
## PCB Processing

<b>Soldering:</b>	Wave Soldering: For non-supported through-hole, see Profile B in Supplement section. For supported through-hole, 5 seconds maximum @ 250°C maximum. Manual Soldering: See Profile B in Supplement section.
<b>Cleaning:</b>	These devices are not process sealed. Hand clean locally using alcohol based solution.

## Standards & Certifications

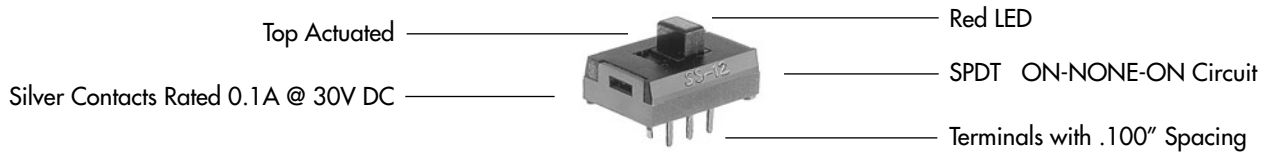
The SS series devices have not been tested for UL recognition and CSA certification. These switches are designed for use in a low-voltage, low-current circuit. When used as intended in a low-voltage, low-current circuit, the results do not produce hazardous energy.

## TYPICAL SWITCH ORDERING EXAMPLE



### DESCRIPTION FOR TYPICAL ORDERING EXAMPLE

#### SS12SDP2LC



### POLES & CIRCUITS

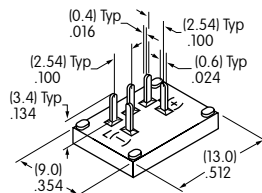
Pole	Model	Slide Position			Connected Terminals			Throw & Schematics
		Right	Center	Left	Right	Center	Left	
SP	SS12S	ON	NONE	ON	2-1	NONE	2-3	SPDT
DP	SS22S	ON	NONE	ON	2-1 5-4	NONE	2-3 5-6	DPDT

Note: Terminal numbers are not actually on switch. Isolated LED circuit requires external power source.

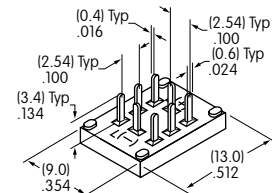
### TERMINAL SPACING

**D** Inch .100" x .100"

Single Pole Models



Double Pole Models



## CONTACT MATERIALS & RATINGS

2

Silver over Phosphor Bronze

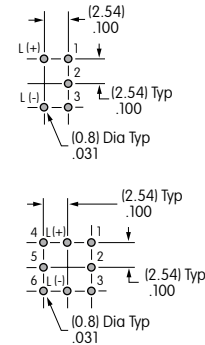
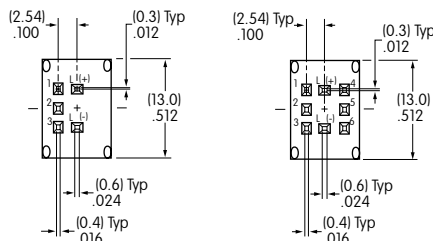
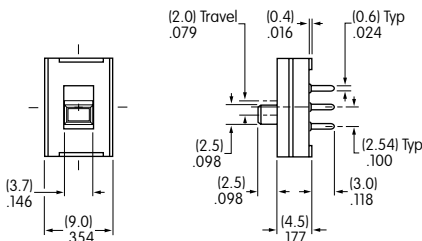
Power Level

0.1A @ 30V DC

## TYPICAL SWITCH DIMENSIONS

### Single & Double Pole

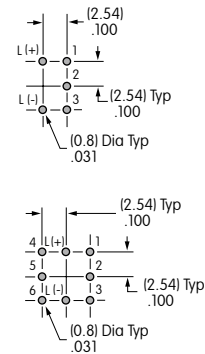
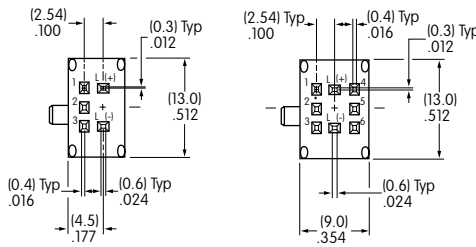
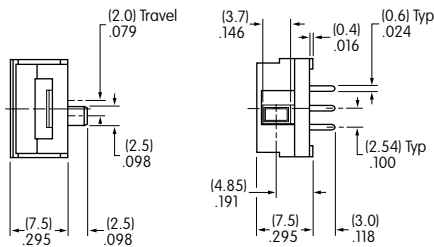
### Top Actuated



SS22SDP2LC

### Single & Double Pole

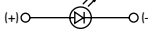
### Side Actuated



SS12SDH2LC

## LED COLORS & SPECIFICATIONS

LEDs are supplied as an integral part of the switch (not available separately). The lamp circuit is independent of switch operation. Electrical specifications shown are determined at a basic temperature of 25°C. If the source voltage exceeds the rated voltage, a ballast resistor is required. The resistor value can be calculated by using the formula given in the Supplement.

<div style="border: 1px solid black; padding: 2px;">L</div> <b>Isolated, 1-element</b> 	Color	<div style="border: 1px solid black; padding: 2px;">C</div> Red	<div style="border: 1px solid black; padding: 2px;">E</div> Yellow	<div style="border: 1px solid black; padding: 2px;">F</div> Green
	Forward Peak Current	$I_{FM}$	30mA	30mA
Typical Forward Current	$I_F$	16mA	16mA	16mA
Forward Voltage	$V_F$	1.98V	2.06V	2.16V
Reverse Peak Voltage	$V_{RM}$	5V	5V	5V
Current Reduction Rate Above 25°C	$\Delta I_F$	0.40mA/°C	0.42mA/°C	0.33mA/°C
Ambient Temperature Range		-15° ~ +60°C		

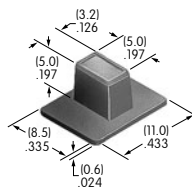
## OPTIONAL CAP

### AT4065 Slide Cap

Material: Polycarbonate

Cap can be assembled on request

Cap Color: Black only



Window color should match LED color.

Colors Available:

C Red    E Yellow    F Green

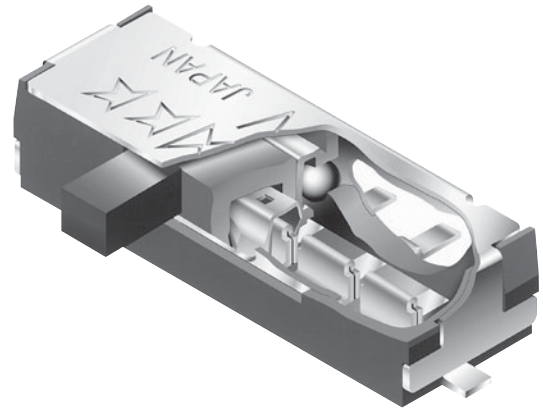
# Distinctive Characteristics

Compact dimensions and low profile allow high density mounting and close stacking of PC boards.

Crisp actuation positively indicates circuit status.

Heat resistant resin allows vapor phase and infrared convection reflow soldering.

Award-winning STC mechanism with benefits unavailable in conventional mechanisms: smoother, positive detent actuation, increased contact stability, and unparalleled logic-level reliability. (Additional STC details in Terms and Acronyms in the Supplement section.)



Insert molded terminals lock out flux, solvents, and other contaminants.

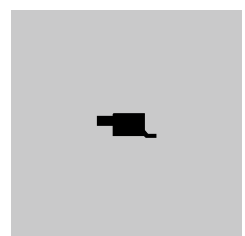
Metric terminal spacing for standard PC board grid (2.0mm x 2.0mm ).

Gull-wing terminals provide mechanical stability during soldering and simplified solder joint inspection.

Packaged in tape-reel or partitioned tray. Tape-reel packaging meets EIA-481-D Standard.

Coplanarity: all considered surfaces must lie between two parallel planes that are a maximum distance apart of .0059" (0.15mm). (Additional coplanarity details in Terms and Acronyms in the Supplement section.)

Actual Size





# General Specifications

## Electrical Capacity (Resistive Load)

**Logic Level:** 0.4VA maximum @ 28V AC/DC maximum  
(Applicable Range 0.1mA ~ 0.1A @ 20mV ~ 28V)  
Note: Find additional explanation of operating range in Supplement section.

## Other Ratings

**Contact Resistance:** 50 milliohms maximum  
**Insulation Resistance:** 100 megohms minimum @ 500V DC  
**Dielectric Strength:** 500V AC minimum for 1 minute minimum  
**Mechanical Life:** 10,000 operations minimum  
**Electrical Life:** 10,000 operations minimum  
**Contact Timing:** SS312S ~ Shorting (make-before-break); SS314M ~ Nonshorting (break-before-make)  
**Total Travel:** .079" (2.0mm)

## Materials & Finishes

**Actuator:** Polyphenylene sulfide  
**Housing:** Phosphor bronze with tin plating (UL94V-0)  
**Base:** Polyphenylene sulfide (UL94V-0)  
**Movable Contactor:** Phosphor bronze with gold plating over silver plating (code 4)  
**Terminals:** Phosphor bronze with gold plating

## Environmental Data

**Operating Temp Range:** -25°C through +85°C (-13°F through +185°F)  
**Humidity:** 90 ~ 95% humidity for 240 hours @ 40°C (104°F)  
**Vibration:** 10 ~ 55Hz with peak-to-peak amplitude of 1.5mm traversing the frequency range & returning in 1 minute; 3 right angled directions for 2 hours  
**Shock:** 50G (490m/s<sup>2</sup>) acceleration (tested in 6 right angled directions, with 5 shocks in each direction)

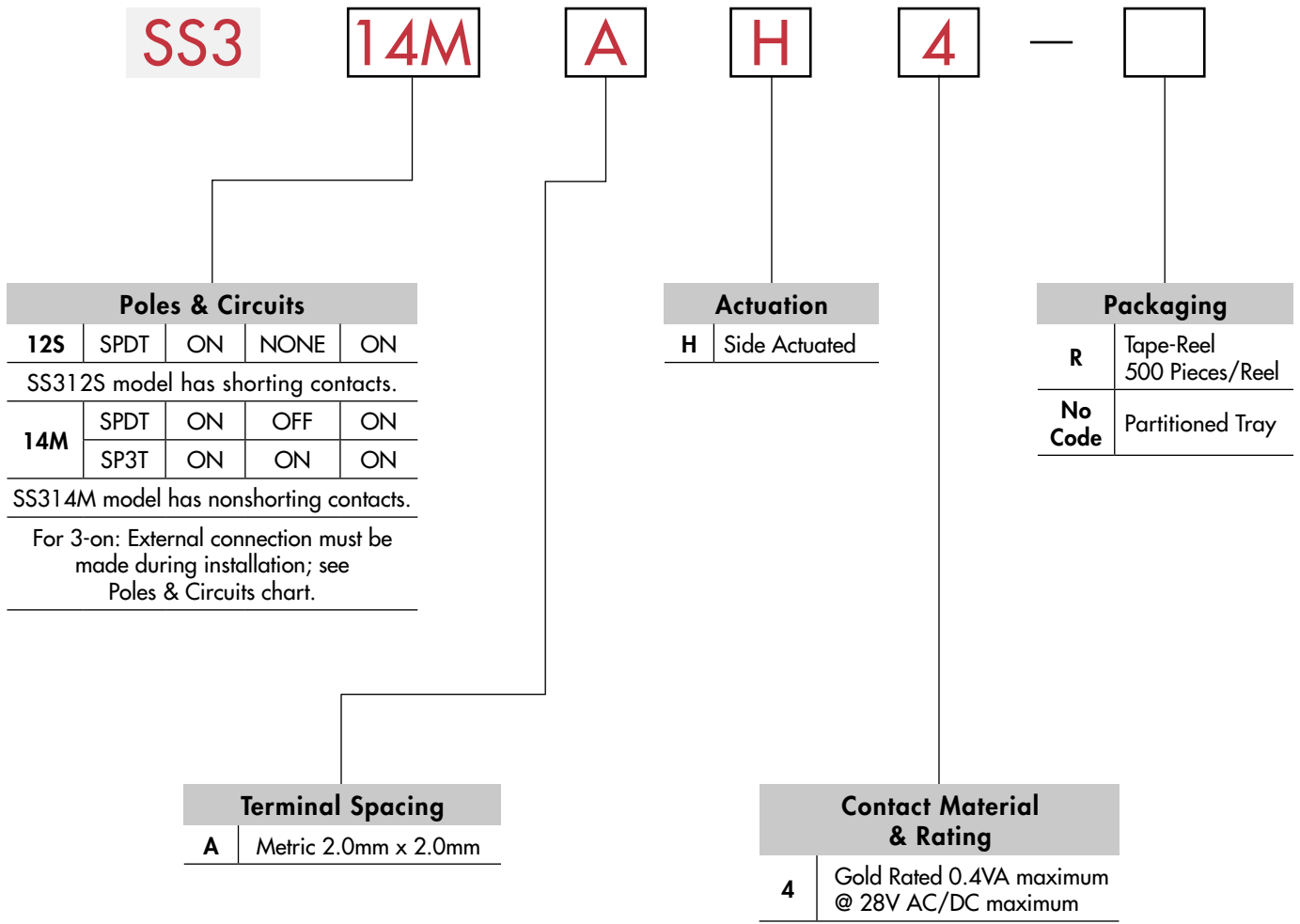
## Installation

**Soldering:** Reflow Soldering Recommended. See Profile A in Supplement section.  
Manual Soldering: See Profile A in Supplement section.  
**Cleaning:** These devices are not process sealed. Hand clean locally using alcohol based solution.

## Standards & Certifications

**Flammability Standards:** UL 94V-0 rated housing & base  
The SS3 Series slides have not been tested for UL recognition or CSA certification.  
These switches are designed for use in a low-voltage, low-current, logic-level circuit.  
When used as intended in a logic-level circuit, the results do not produce hazardous energy.

TYPICAL SWITCH ORDERING EXAMPLE



DESCRIPTION FOR TYPICAL ORDERING EXAMPLE

**SS314MAH4**



Toggle

Rocker

Pushbutton

Illuminated PB

Programmable

Keylocks

Rotaries

Slides

Tactiles

Tilt

Touch

Indicators

Accessories

Supplement

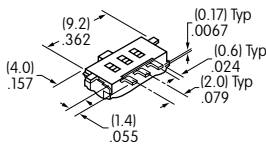
## POLES & CIRCUITS

		Slide Position			Connected Terminals			Throw & Schematics
Pole	Model	Right	Center	Left	Right	Center	Left	Note: Terminal numbers are not actually on switch.
SP	SS312S							
SP	SS314M	ON	OFF	ON	3-5	4-2	3-1	SPDT 
		ON	ON	ON	3-5	3-4	3-1	SP3T  External connection must be made during installation to create ON-ON-ON circuit.

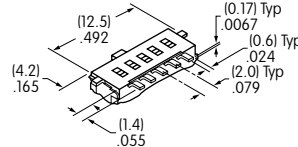
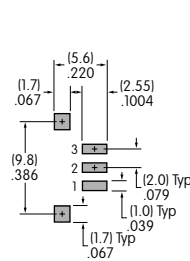
## TERMINAL SPACING

**A**

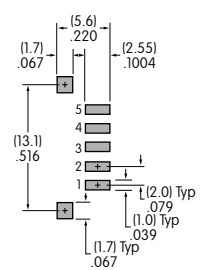
Metric 2.0mm x 2.0mm



SS312



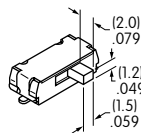
SS314



## ACTUATION

**H**

Side Actuated



## CONTACT MATERIALS & RATING

**4**

Gold over Silver/Phosphor Bronze

Logic Level

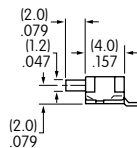
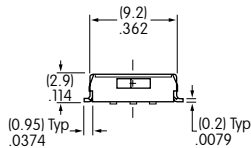
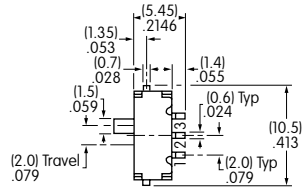
0.4VA maximum @ 28V AC/DC maximum

Complete explanation of operating range in Supplement section.

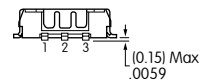
TYPICAL SWITCH DIMENSIONS

Shorting Contacts

Single Pole



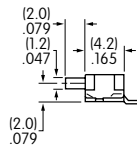
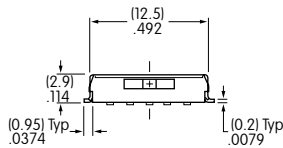
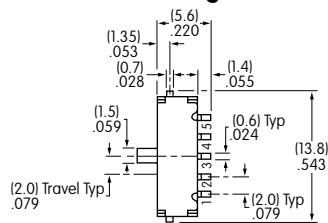
Coplanar Dimension



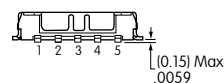
SS312SAH4

Nonshorting Contacts

Single Pole



Coplanar Dimension



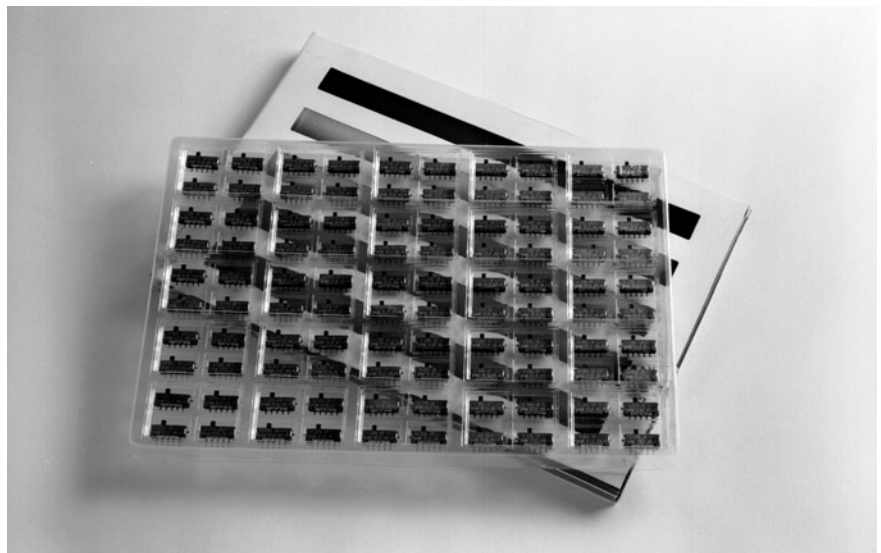
SS314MAH4

PACKAGING

No Code

Partitioned Tray

If the SS3 is ordered in less than 500-piece increments, the switches are packaged in a partitioned tray. No code is required.



Toggles

Rockers

Pushbuttons

Programmable Illuminated PB

Keylocks

Rotaries

Slides **H**

Tactiles

Tilt

Touch

Indicators

Accessories

Supplement

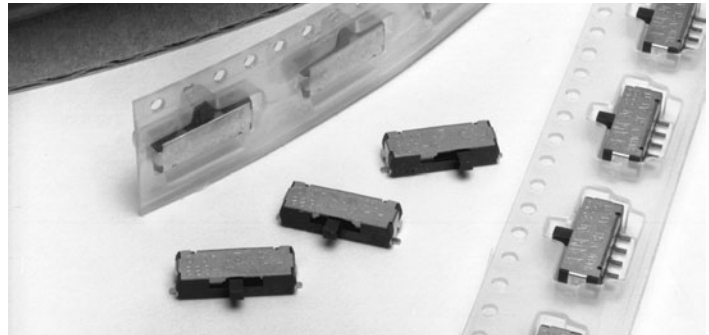
## PACKAGING

**R**

### Tape-Reel Packaging

Switches must be ordered in 500-piece increments when tape-reel packaging is selected.

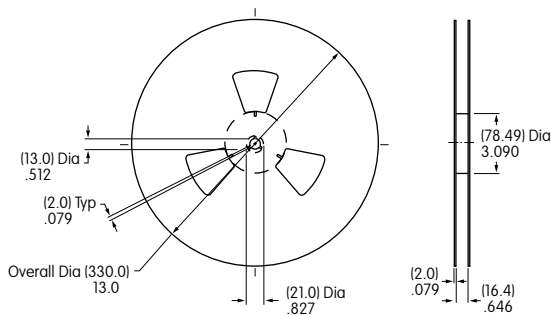
Tape-reel packaging meets EIA-481-D Standard.



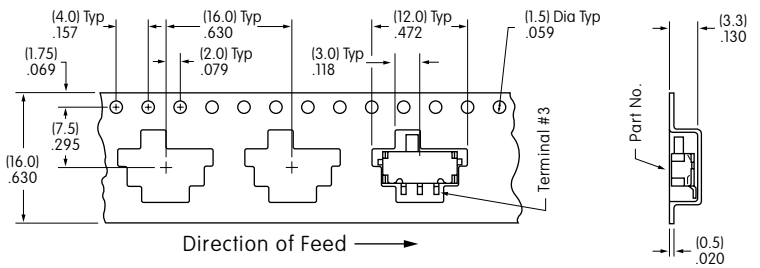
### Tape-Reel Packaging for SS312SAH4

Each tape-reel of 530 pockets contains 500 switches.

Minimum Leader Length: 11.97" (304mm) Minimum Trailer Length: 6.93" (176mm)



Reel Dimensions

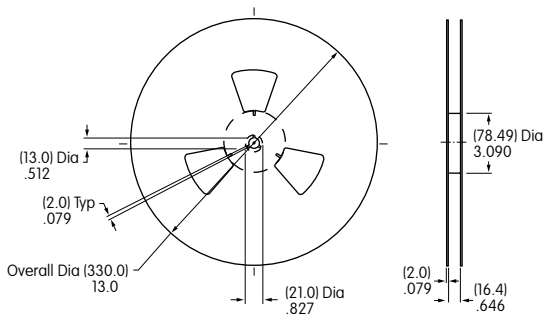


Tape Dimensions

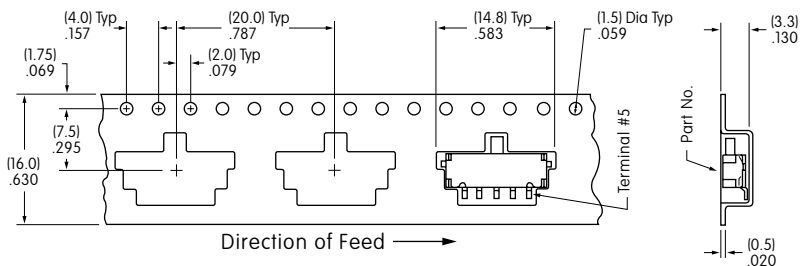
### Tape-Reel Packaging for SS314MAH4

Each tape-reel of 530 pockets contains 500 switches.

Minimum Leader Length: 14.96" (380mm) Minimum Trailer Length: 8.66" (220mm)



Reel Dimensions



Tape Dimensions