

# 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 between contacts for 1 minute minimum;  
500V AC minimum between contacts & case for 1 minute minimum  
**Mechanical Life:** 100,000 operations minimum for On-None-On & On-Off-On  
50,000 operations minimum for other circuits  
**Electrical Life:** 50,000 operations minimum  
**Nominal Operating Force:** 1.47N (momentary); 1.18N (maintained) for .394" (10.0mm) toggles  
2.73N (momentary); 1.84N (maintained) for all other toggles  
**Contact Timing:** Nonshorting (break-before-make)  
**Angle of Throw:** 26°

## Materials & Finishes

**Toggle:** Glass fiber reinforced polyamide for antistatic; nickel plated brass for all others  
**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 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)

## PCB Processing

**Soldering:** Wave Soldering Recommended. See Profile A in Supplement section.  
Manual Soldering: See Profile B in Supplement section.  
**Cleaning:** Automated cleaning. See Cleaning Specifications in Supplement section.

## Standards & Certifications

The A Series toggles 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 saves space on PC boards.

Specifically developed for logic-level applications.

Totally sealed body construction prevents contact contamination and allows time- and money-saving automated soldering and cleaning.

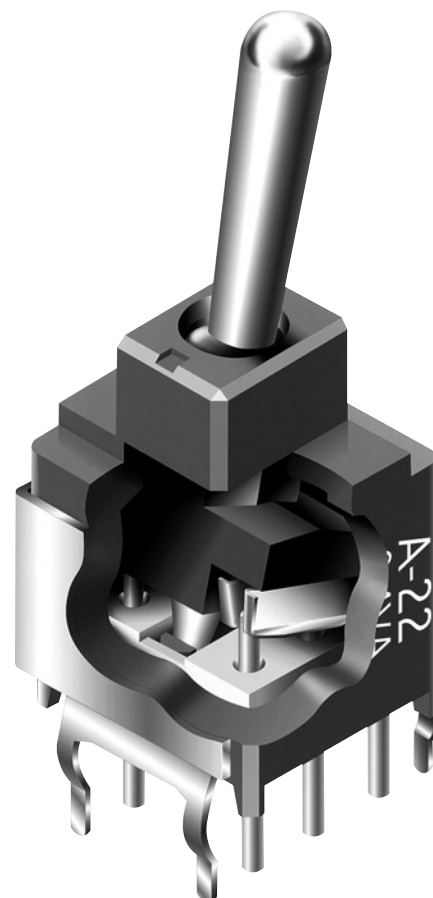
Award-winning STC contact mechanism with benefits unavailable in conventional mechanisms: smoother, positive detent actuation, increased contact stability and unparalleled logic-level reliability. (Additional STC details in Terms & Acronyms; see Supplement contents.)

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

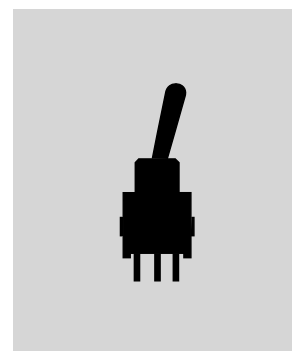
.100" x .100" (2.54mm x 2.54mm) terminal spacing conforms to standard PC board grid spacing.

Toggle option in antistatic material available for dissipating electrostatic discharges.

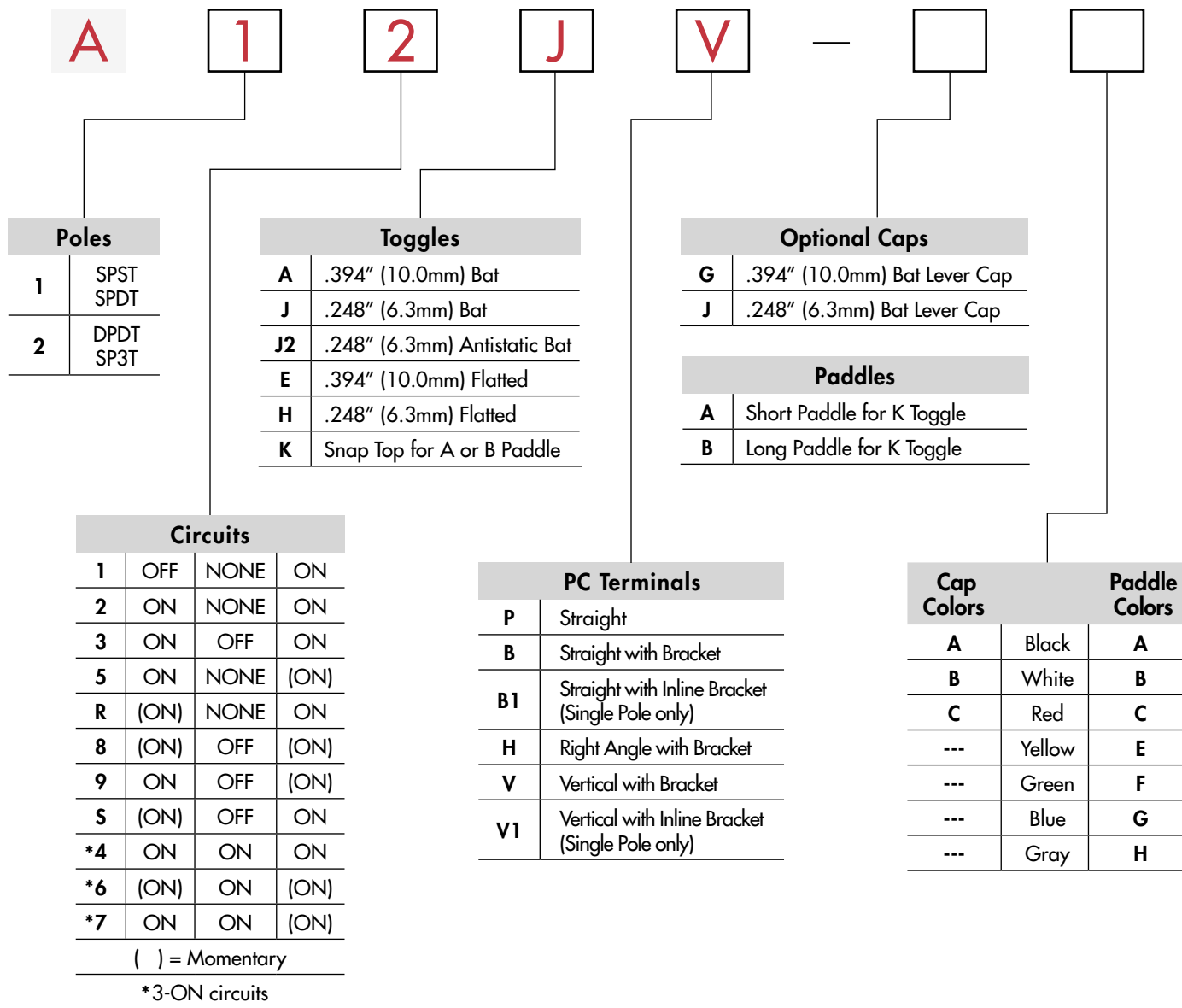
Matching indicators available.



Actual Size

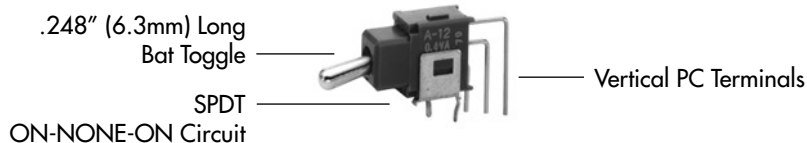


### TYPICAL SWITCH ORDERING EXAMPLE



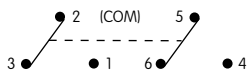
### DESCRIPTION FOR TYPICAL ORDERING EXAMPLE

**A12JV**

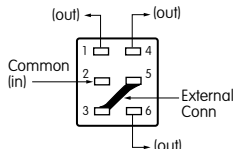
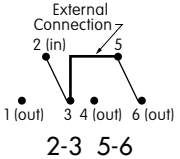
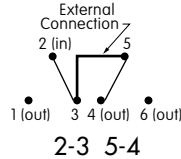
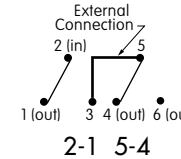


Process Sealed Subminiature Toggles

POLES & CIRCUITS

|      |       | Toggle Position<br>( ) = Momentary                                                      |                                                                                             |                                                                                           | Connected Terminals                                                                     |                                                                                             |                                                                                           | Throw & Schematics                                     |                                                                                     |
|------|-------|-----------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------|--------------------------------------------------------|-------------------------------------------------------------------------------------|
| Pole | Model | Up<br> | Center<br> | Down<br> | Up<br> | Center<br> | Down<br> | Note: Terminal numbers are not actually on the switch. |                                                                                     |
| SP   | A11   | OFF                                                                                     | NONE                                                                                        | ON                                                                                        | OPEN                                                                                    | OPEN                                                                                        | 3-1                                                                                       | SPST                                                   |  |
| SP   | A12   | ON                                                                                      | NONE                                                                                        | ON                                                                                        | 2-3                                                                                     | OPEN                                                                                        | 2-1                                                                                       | SPDT                                                   |  |
|      | A13   | ON                                                                                      | OFF                                                                                         | ON                                                                                        |                                                                                         |                                                                                             |                                                                                           |                                                        |                                                                                     |
|      | A15   | ON                                                                                      | NONE                                                                                        | (ON)                                                                                      |                                                                                         |                                                                                             |                                                                                           |                                                        |                                                                                     |
|      | A1R   | (ON)                                                                                    | NONE                                                                                        | ON                                                                                        |                                                                                         |                                                                                             |                                                                                           |                                                        |                                                                                     |
|      | A18   | (ON)                                                                                    | OFF                                                                                         | (ON)                                                                                      |                                                                                         |                                                                                             |                                                                                           |                                                        |                                                                                     |
|      | A19   | ON                                                                                      | OFF                                                                                         | (ON)                                                                                      |                                                                                         |                                                                                             |                                                                                           |                                                        |                                                                                     |
|      | A1S   | (ON)                                                                                    | OFF                                                                                         | ON                                                                                        |                                                                                         |                                                                                             |                                                                                           |                                                        |                                                                                     |
| DP   | A22   | ON                                                                                      | NONE                                                                                        | ON                                                                                        | 2-3 5-6                                                                                 | OPEN                                                                                        | 2-1 5-4                                                                                   | DPDT                                                   |  |
|      | A23   | ON                                                                                      | OFF                                                                                         | ON                                                                                        |                                                                                         |                                                                                             |                                                                                           |                                                        |                                                                                     |
|      | A25   | ON                                                                                      | NONE                                                                                        | (ON)                                                                                      |                                                                                         |                                                                                             |                                                                                           |                                                        |                                                                                     |
|      | A2R   | (ON)                                                                                    | NONE                                                                                        | ON                                                                                        |                                                                                         |                                                                                             |                                                                                           |                                                        |                                                                                     |
|      | A28   | (ON)                                                                                    | OFF                                                                                         | (ON)                                                                                      |                                                                                         |                                                                                             |                                                                                           |                                                        |                                                                                     |
|      | A29   | ON                                                                                      | OFF                                                                                         | (ON)                                                                                      |                                                                                         |                                                                                             |                                                                                           |                                                        |                                                                                     |
|      | A2S   | (ON)                                                                                    | OFF                                                                                         | ON                                                                                        |                                                                                         |                                                                                             |                                                                                           |                                                        |                                                                                     |

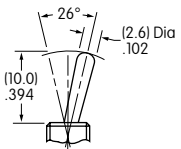
For 3 Throw (3-on)

| Connected Terminals & Schematics |                   |                                                                                                         |                                                                                                       |                                                                                                           | External Connection                                                                                                                                                                                          |
|----------------------------------|-------------------|---------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Pole                             | Model             | Up                                                                                                      | Center                                                                                                | Down                                                                                                      | <p>The SP3T model utilizes a double pole base.</p> <p>External connections must be made during field installation.</p>  |
| SP                               | A24<br>A26<br>A27 | ON<br>(ON)<br>ON<br> | ON<br>ON<br>ON<br> | ON<br>(ON)<br>(ON)<br> |                                                                                                                                                                                                              |

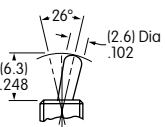
TOGGLES

Standard Material & Finish: Brass with Bright Nickel    Material & Finish for J2: Matte finish black glass fiber reinforced polyamide

**A** .394" (10.0mm) Bat



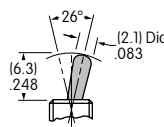
**J** .248" (6.3mm) Bat



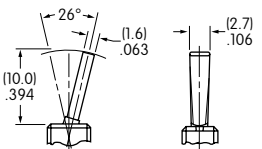
**J2** .248" (6.3mm) Antistatic Bat

Dissipating 20Kv ESD: Straight PC

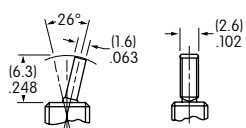
Dissipating 10Kv ESD: Straight PC with Bracket, Right Angle, & Vertical



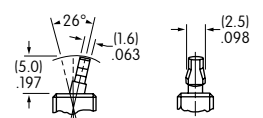
**E** .394" (10.0mm) Flatted



**H** .248" (6.3mm) Flatted



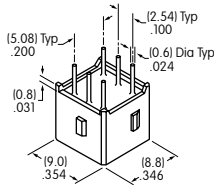
**K** Snap Top for Paddles



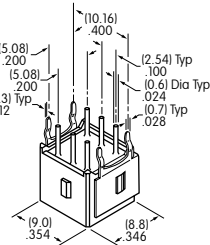
### PC TERMINALS

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

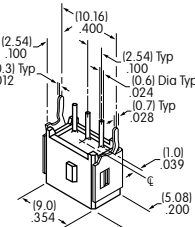
#### P Straight



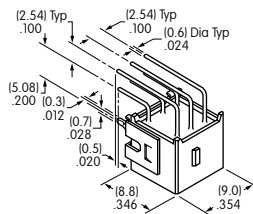
#### B Straight with Bracket



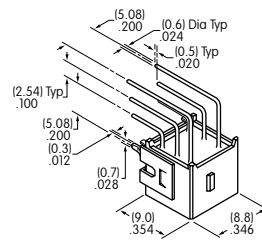
#### B1 Straight with Inline Bracket Single Pole only



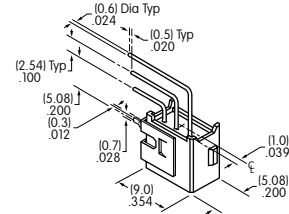
#### H Right Angle with Bracket



#### V Vertical with Bracket



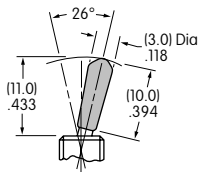
#### V1 Vertical with Inline Bracket Single Pole only



### CAPS & PADDLES

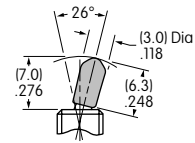
#### G AT4003 .394" (10.0mm) Bat Lever Cap

Material: PVC  
Colors Available:  
A, B, C



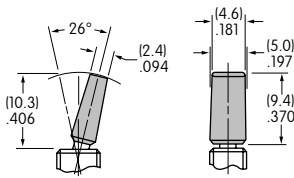
#### J AT4064 .248" (6.3mm) Bat Lever Cap

Material: PVC  
Colors Available:  
A, B, C



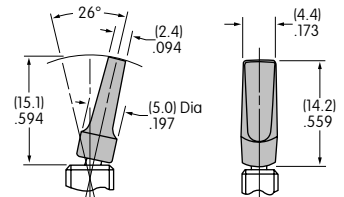
#### A AT467 Short Paddle

Material: Polyamide  
Colors Available:  
A, B, C, E, F, G, H



#### B AT468 Long Paddle

Material: Polyamide  
Colors Available:  
A, B, C, E, F, G, H



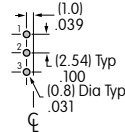
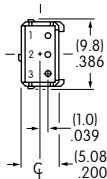
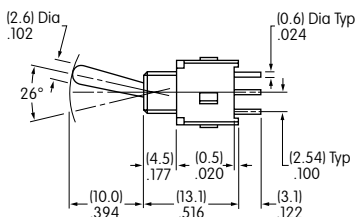
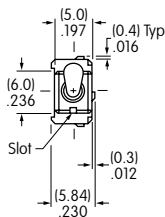
#### Color Codes:

**A** Black **B** White **C** Red **E** Yellow **F** Green **G** Blue **H** Gray

TYPICAL SWITCH DIMENSIONS

Single Pole

Straight PC

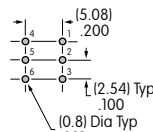
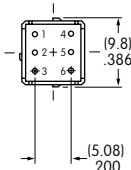
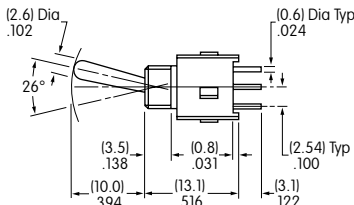
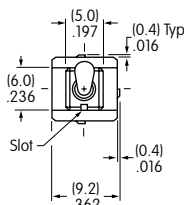


A11 models do not have Terminal 2

A12AP

Double Pole

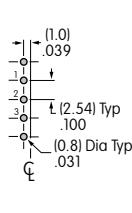
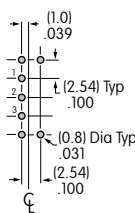
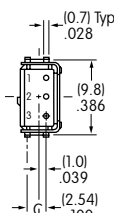
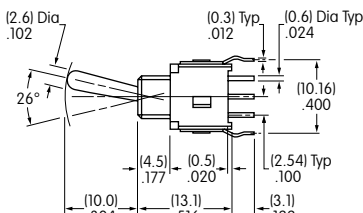
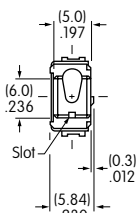
Straight PC



A22AP

Single Pole

Straight PC • Bracket



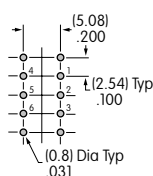
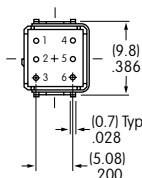
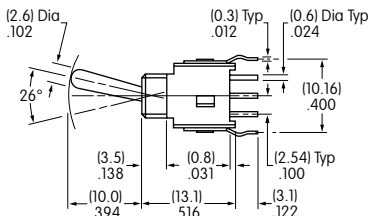
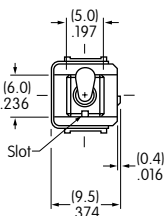
B Terminals

B1 Terminals

A12AB

Double Pole

Straight PC • Bracket



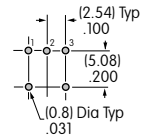
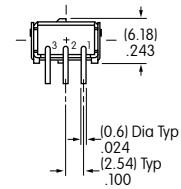
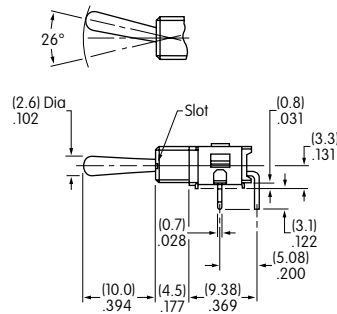
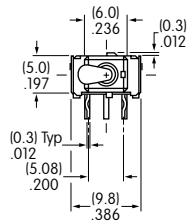
A22AB

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

### TYPICAL SWITCH DIMENSIONS

#### Right Angle PC

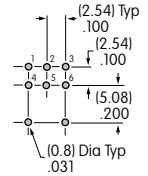
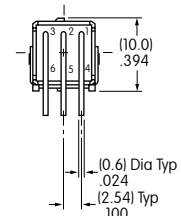
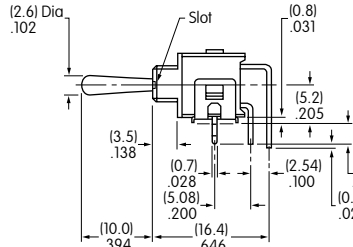
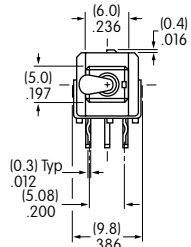
#### Single Pole



A12AH

#### Right Angle PC

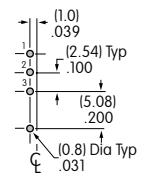
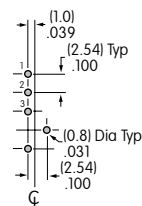
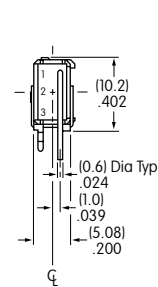
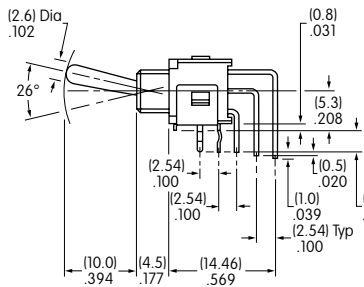
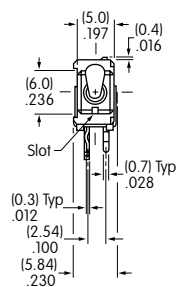
#### Double Pole



A22AH

#### Vertical PC

#### Single Pole



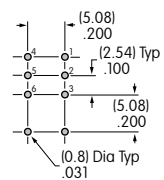
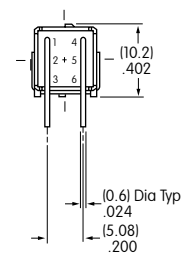
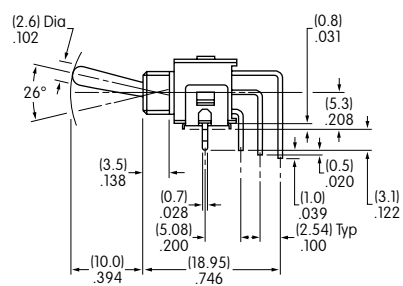
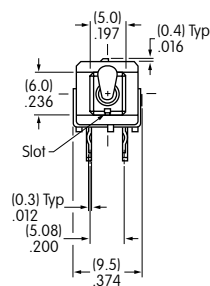
A12AV

V Terminals

V1 Terminals

#### Vertical PC

#### Double Pole



A22AV

# Mouser Electronics

Authorized Distributor

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## NKK Switches:

[A19KP-AA](#) [A12JP](#) [A12AH](#) [A12AP](#) [A18KP-AA](#) [A18KP-AC](#) [A12KP-AA](#) [A11JP-JC](#) [A12KH-AA](#) [A22AP](#) [A18HP](#)  
[A12KV-AA](#) [A13AB1-GA](#) [A22AW-GA](#) [A11JV1-RO](#) [A11JW](#) [A12EB-RO](#) [A12EH-RO](#) [A12EV-RO](#) [A12HB-RO](#) [A12HH-](#)  
[RO](#) [A12HW](#) [A12JB-RO](#) [A12JV-RO](#) [A12JW](#) [A12KB-RO](#) [A12KH-RO](#) [A12KP](#) [A12KV-RO](#) [A13AB-RO](#) [A13EB-RO](#)  
[A13EV-RO](#) [A13HB-RO](#) [A13HH-RO](#) [A13JB-RO](#) [A15AV-RO](#) [A18AW](#) [A18HW](#) [A18JV1-JA-RO](#) [A18KB1-AA-RO](#)  
[A18KH-AB-RO](#) [A18KV1-AG-RO](#) [A19JH-RO](#) [A1RAV](#) [A1SJV](#) [A22AW](#) [A22EW](#) [A22HB-RO](#) [A22HW](#) [A22JW](#) [A22KB-](#)  
[BB-RO](#) [A23EV](#) [A23EW](#) [A23JH-RO](#) [A23JV-RO](#) [A23JW](#) [A24AH](#) [A24HB-RO](#) [A24HW](#) [A24JW](#) [A24KB](#) [A25AP](#)  
[A26AB](#) [A26EH-RO](#) [A26EW](#) [A27HB](#) [A28JH/328-RO](#) [A29HH](#) [A29HW](#) [A2SAH](#) [A2SHV-RO](#) [A12J2B1](#) [A12J2H](#)  
[A18JV1-JC](#) [A18JV1](#) [A18KV1-BF](#) [A18EV1](#) [A12AB-RO](#) [A13JV-RO](#) [A18EH-RO](#) [A12JH-RO](#) [A24JH-RO](#) [A13AV1-RO](#)  
[A22AH-RO](#) [A22HH-RO](#) [A23HV-RO](#) [A18AH-RO](#) [A18HB-RO](#) [A19AP](#) [A19JP](#) [A19KP-AF](#) [A1RAV1](#) [A1SAV1](#) [A1SJH](#)  
[A22AP-GA](#) [A22EP](#) [A11AB1](#) [A11AP](#) [A11HB](#) [A11HH](#)