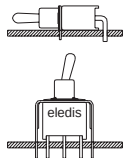




## SERIES 1B

- Sealed miniature toggle switches



## AGENCY APPROVALS



File N° E195524



File N° E195524

**IP67**

In conformity with:  
• EN 60529: 1991  
• IEC 529: 1989

## CHARACTERISTICS

- Case and bushing in glass filled nylon with o-ring in the bushing for added seal.
- Many convenient options.

## SPECIFICATIONS

**Contact Rating:** **S** (silver) - 5A with resistive load @ 125 VAC or 28 VDC - 2A with resistive load @ 250 VAC  
**A** (gold) - 0.4 VA max @ 20 VAC or DC max  
**Electrical life:** 50,000 make and break cycles at full load  
**Contact Resistance:** 10 mΩ max. initial @ 2-4 VDC - 100 mA, for both silver and gold plated contacts  
**Insulation Resistance:** 1000 MΩ min.  
**Dielectric Strength:** 1500 VRMS @ sea level  
**Operating Temperature:** -30°C to 85°C

## MATERIALS

**Case & bushing:** Glass filled nylon 6/6, flame retardant, heat stabilized (UL94V-0)  
**Actuator:** Black nylon-with internal o-ring seal std with all actuators  
**Switch support:** Brass or steel, tin plated  
**Switch support retainer:** Stainless steel  
**Terminal seal:** Epoxy

## HOW TO ORDER

|                             |          |                  |                             |                          |                            |                      |                       |              |  |                |            |
|-----------------------------|----------|------------------|-----------------------------|--------------------------|----------------------------|----------------------|-----------------------|--------------|--|----------------|------------|
| <b>1</b>                    | <b>B</b> |                  |                             | -                        |                            |                      |                       |              |  | <b>E</b>       |            |
| <b>N° OF POLES</b>          |          | <b>ACTUATORS</b> |                             |                          |                            | <b>TERMINATIONS</b>  |                       |              |  | <b>SEALING</b> |            |
| 1                           | SPDT     | N                | Round (std)                 | PC                       | PCB                        |                      |                       |              |  | E              | Seal (std) |
| 2                           | DPDT     | N2               | Short round                 | W1                       | Wire wrap 19.05 mm         |                      |                       |              |  |                |            |
| 3                           | 3PDT     | ES               | ESD plastic toggle 6.70 mm  | W2                       | Wire wrap 24.48 mm         |                      |                       |              |  |                |            |
|                             |          | ES4              | ESD plastic toggle 10.70 mm | W3                       | Wire wrap 10.80 mm         |                      |                       |              |  |                |            |
|                             |          |                  |                             | W4                       | Wire wrap 26.97 mm         |                      |                       |              |  |                |            |
|                             |          |                  |                             | ST                       | Solder tag                 |                      |                       |              |  |                |            |
|                             |          |                  |                             | H9                       | 90° horizontal             |                      |                       |              |  |                |            |
|                             |          |                  |                             | H9S                      | 90° horizontal snap-in     |                      |                       |              |  |                |            |
|                             |          |                  |                             | V9                       | 90° vertical               |                      |                       |              |  |                |            |
|                             |          |                  |                             | V9S                      | 90° vertical snap-in       |                      |                       |              |  |                |            |
|                             |          |                  |                             | U2                       | U bracket 11.68 mm         |                      |                       |              |  |                |            |
|                             |          |                  |                             | U2S                      | U bracket snap-in 11.68 mm |                      |                       |              |  |                |            |
|                             |          |                  |                             | U3                       | U bracket 16.00 mm         |                      |                       |              |  |                |            |
|                             |          |                  |                             | U3S                      | U bracket snap-in 16.00 mm |                      |                       |              |  |                |            |
|                             |          |                  |                             | U4                       | U bracket 11.68 mm         |                      |                       |              |  |                |            |
|                             |          |                  |                             | U4S                      | U bracket snap-in 11.68 mm |                      |                       |              |  |                |            |
|                             |          |                  |                             | U5                       | U bracket 16.00 mm         |                      |                       |              |  |                |            |
|                             |          |                  |                             | U5S                      | U bracket snap-in 16.00 mm |                      |                       |              |  |                |            |
|                             |          |                  |                             | QC                       | U bracket sna              |                      |                       |              |  |                |            |
| <b>ELECTRICAL FUNCTIONS</b> |          | <b>BUSHING</b>   |                             |                          |                            | <b>QUICK CONNECT</b> |                       |              |  |                |            |
| 1                           | on       | none             | on                          | F1                       | Threaded standard          | S                    | Silver (std)          |              |  |                |            |
| 2                           | on       | none             | (on)                        | F4                       | Unthreaded Std             | A                    | Gold                  |              |  |                |            |
| 3                           | on       | off              | on                          |                          |                            | G                    | Gold on silver        |              |  |                |            |
| 4                           | (on)     | off              | (on)                        |                          |                            | T(◇)                 | Tinned silver         |              |  |                |            |
| 5                           | on       | off              | (on)                        |                          |                            | K(◇)                 | Tinned gold           |              |  |                |            |
| 6 (※)                       | on       | on               | on                          |                          |                            | V(◇)                 | Tinned gold on silver |              |  |                |            |
| 7 (※)                       | (on)     | on               | (on)                        |                          |                            |                      |                       |              |  |                |            |
| 8 (※)                       | on       | on               | (on)                        |                          |                            |                      |                       |              |  |                |            |
|                             |          |                  |                             | <b>STANDARD HARDWARE</b> |                            |                      |                       |              |  |                |            |
|                             |          |                  |                             | 2                        |                            |                      |                       | Nuts         |  |                |            |
|                             |          |                  |                             | 1                        |                            |                      |                       | Locking Ring |  |                |            |
|                             |          |                  |                             | 1                        |                            |                      |                       | Lockwasher   |  |                |            |

(※) 3-way external wiring required - Please Enquire  
(◇) Please enquire

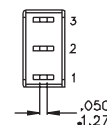
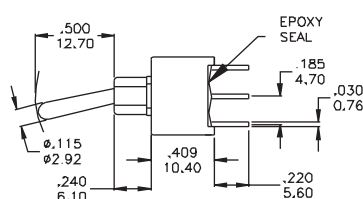
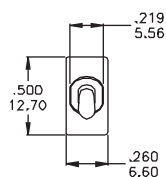
## SERIES 1B

## ELECTRICAL FUNCTIONS

## DIMENSIONS

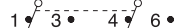
| SPDT  |  |  |  |
|-------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|
| 1     | on                                                                                | none                                                                              | on                                                                                |
| 2     | on                                                                                | none                                                                              | (on)                                                                              |
| 3     | on                                                                                | off                                                                               | on                                                                                |
| 4     | (on)                                                                              | off                                                                               | (on)                                                                              |
| 5     | on                                                                                | off                                                                               | (on)                                                                              |
| 2 - 3 | open                                                                              | 2 - 1                                                                             |                                                                                   |

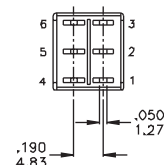
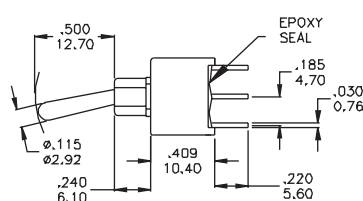
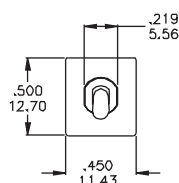
2 Comm.  
 3 •



Part N° shown: 1B11-NF4PCAE

| DPDT     |  |  |  |
|----------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|
| 1        | on                                                                                | none                                                                              | on                                                                                |
| 2        | on                                                                                | none                                                                              | (on)                                                                              |
| 3        | on                                                                                | off                                                                               | on                                                                                |
| 4        | (on)                                                                              | off                                                                               | (on)                                                                              |
| 5        | on                                                                                | off                                                                               | (on)                                                                              |
| 6 (*)    | on                                                                                | on                                                                                | on                                                                                |
| 7 (*)    | (on)                                                                              | on                                                                                | (on)                                                                              |
| 8 (*)    | on                                                                                | on                                                                                | (on)                                                                              |
| 2-3, 5-6 | open                                                                              | 2-1, 5-4                                                                          |                                                                                   |

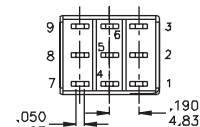
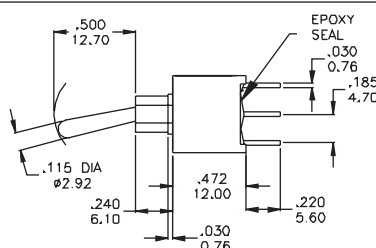
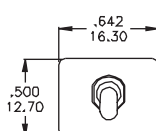
2 Comm. 5 Comm.  
 3 • 4 • 6 •



Part N° shown: 1B21-NF4PCAE

| 3PDT     |  |  |  |
|----------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|
| 1        | on                                                                                | none                                                                              | on                                                                                |
| 2        | on                                                                                | none                                                                              | (on)                                                                              |
| 3        | on                                                                                | off                                                                               | on                                                                                |
| 4        | (on)                                                                              | off                                                                               | (on)                                                                              |
| 5        | on                                                                                | off                                                                               | (on)                                                                              |
| 2-3, 5-6 | open                                                                              | 2-1, 5-4                                                                          |                                                                                   |

2 Comm. 5 Comm. 8 Comm.  
 3 • 4 • 6 • 7 • 9 •

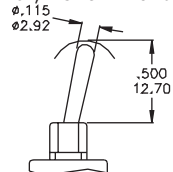


Part N° shown: 1B31-NF4PCAE

(\*) See wiring for 3-Way Switching Functions pag. iii in the Technical Notations section

## ACTUATORS

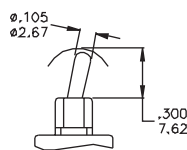
Standard when ordered with ST, PC terminations



Subtract 2.68 for F1 bushing

N

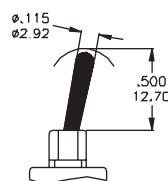
Standard when ordered with H9, V9, U2 terminations



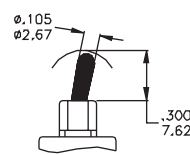
Subtract 2.68 for F1 bushing

N2

Antistatic Plastic Black Toggle



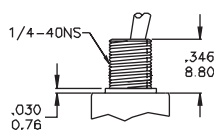
ES



ES4

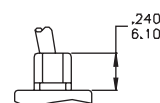
**Note:** Static resistance 9000 VDC, between actuator and terminals.  
 Not available with E1 conductive bushing

## BUSHING



F1

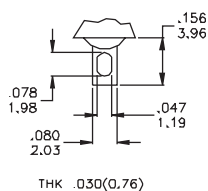
Standard with PC, H9, V9, U terminations



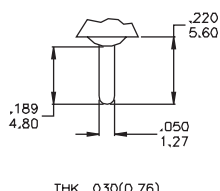
F4

**SERIES 1B**

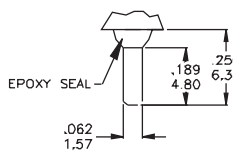
## TERMINATIONS



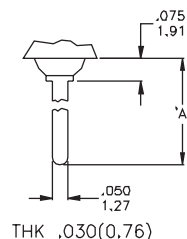
ST



PC



QC

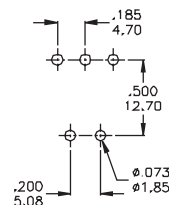
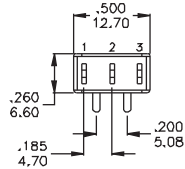
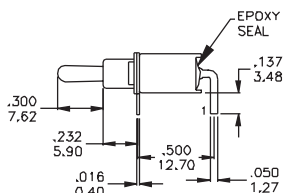
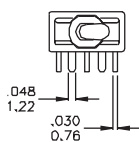


W

**Dim. A**

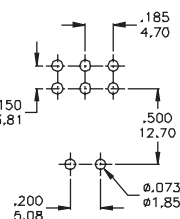
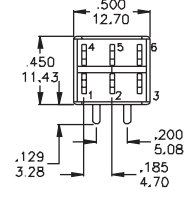
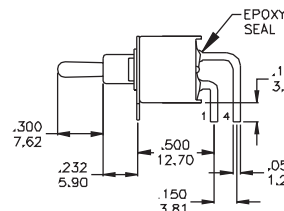
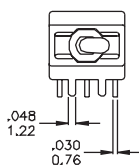
|           |                      |
|-----------|----------------------|
| <b>W1</b> | <b>.750 (19.05)</b>  |
| <b>W2</b> | <b>.964 (24.48)</b>  |
| <b>W3</b> | <b>.425 (10.80)</b>  |
| <b>W4</b> | <b>1.062 (26.97)</b> |

**H9**  
**SPDT**



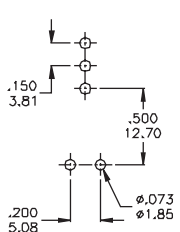
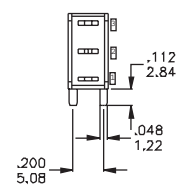
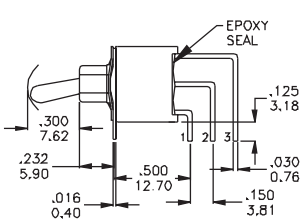
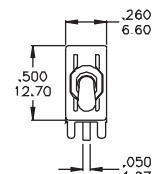
Part N° shown: 1B11-N2F4H9AE

**H9**  
**DPDT**



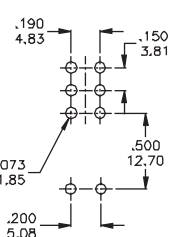
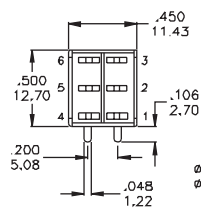
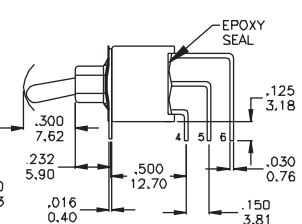
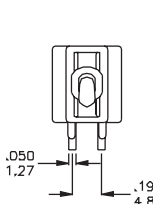
Part N° shown: 1B21-N2F4H9AE

**V9**  
**SPDT**



Part N° shown: 1B11-N2F4V9AE

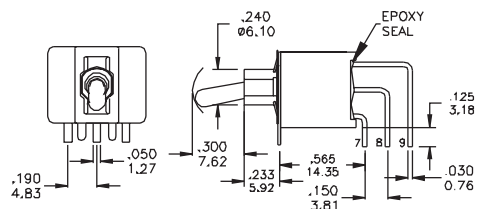
**V9**  
**DPDT**



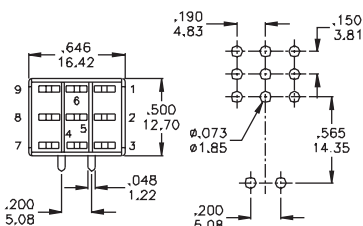
Part N° shown: 1B21-N2F4V9AE

## SERIES 1B

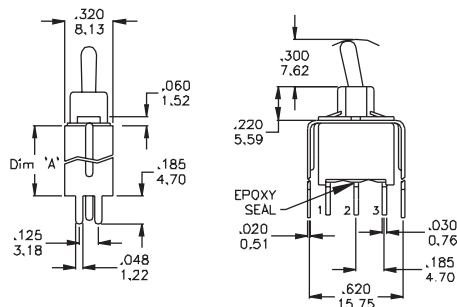
## TERMINATIONS

**V9**  
**3PDT**


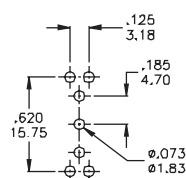
## P.C. LAYOUT



Part N° shown: 1B31-N2F4V9AE

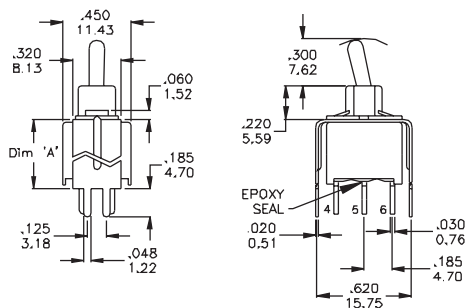
**U2 U3**  
**SPDT**


## P.C. LAYOUT

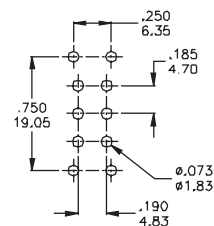


| Dim. A |              |
|--------|--------------|
| U2     | .460 (11.68) |
| U3     | .630 (16.00) |

Part N° shown: 1B11-N2F4U\_AE

**U4 U5**  
**SPDT**


## P.C. LAYOUT



| Dim. A |              |
|--------|--------------|
| U4     | .460 (11.68) |
| U5     | .630 (16.00) |

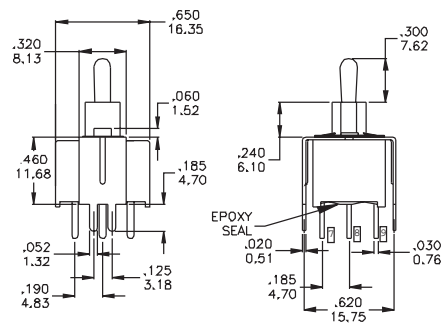
Part N° shown: 1B11-N2F4U\_AE



## SERIES 1B

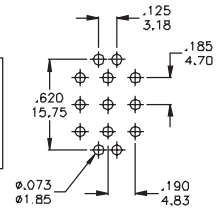
### TERMINATIONS

**U4 U5**  
**3PDT**



| Dim. A    |                     |
|-----------|---------------------|
| <b>U4</b> | <b>.460 (11.68)</b> |
| <b>U5</b> | <b>.630 (16.00)</b> |

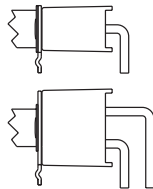
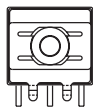
#### P.C. LAYOUT



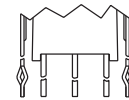
Part N° shown: 1B31-N2F4U\_AE

#### Snap-in termination options

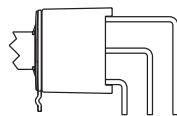
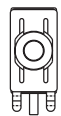
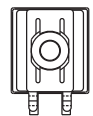
**H9S**



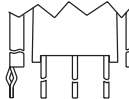
**U2S**  
**U3S**



**V9S**



**U4S**  
**U5S**



**H9S, V9S, U2S, U3S, U4S, U5S** have the same P.C layout but are supplied with snap-in bracket to grip onto the PCB



# TOGGLE SWITCHES

## SERIES 1B

### CONTACT MATERIALS

### CONTACT RATINGS

- S (std)** **Moving Contacts:** coin silver  
**Terminals:** copper alloy, silver plated  
**Rating:** 2 Amps with resistive load @ 250 VAC  
 5 Amps with resistive load @ 125 VAC or 28 VDC
- A** **Moving Contacts:** copper alloy with gold plating over nickel plating  
**Terminals:** copper alloy with gold plating over nickel plating  
**Rating:** 0.4 Volts/Amps max @ 20 Volts max (AC or DC)
- G** **Moving Contacts:** gold plating over silver  
**End Terminals:** gold plating over silver  
**Center Terminals:** gold plating over copper alloy, silver plated  
**Note:** G option used for either "high" (2 Amps @ 250 VAC) or "low" (0.4 Volts/Amps max) contact rating (one exclude the other)

### PACKAGING

#### Transparent Trays 15x21x4 cm



Qty per tray: (ST, PC Terminals)  
 Series 1B1x 200 pcs  
 1B2x 100 pcs  
 1B3x 100 pcs

### MARKING (on products)

The switches are individually marked with the following information:

- Side 1** TRADE MARK  
 SERIES AND MODEL  
 DATE CODE
- Side 2** RATING  
 CONTACTS

Note: Not all information may be available on some products.

### LABELLING (on packaging)

The label on each tray gives full information on the products contained.

|                                         |  |
|-----------------------------------------|--|
| P/N:<br>EL.FNC.:<br>Q.TY:<br>DATE CODE: |  |
|                                         |  |
| Made in Taiwan                          |  |
| Remarks                                 |  |

A Bar code indicating Model, Quantity, Date Code enables easy traceability.