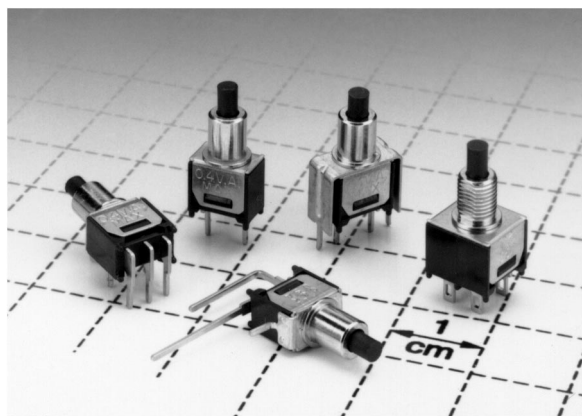


# TP Series Tiny Pushbutton Switches



## Features/Benefits

- **Subminiature size**—capable of switching 1 AMP
- **Vertical & right angle terminations**
- **PC & panel mount models**
- **Snap-in front panel mounting available**

## Typical Applications

- **Telecommunications and networking equipment**
- **Computers and peripherals**
- **Instrumentation and controls**

## Build-A-Switch

Our easy Build-A-Switch concept allows you to mix and match options to create the switch you need. Below is a complete listing of options shown in catalog. To order, simply select desired option from each category and place in the appropriate box. Switches with standard options are shown on pages B-11 and B-12. Available options are shown and described on pages B-12 thru B-16. For additional options not shown in catalog, consult Customer Service Center. All models have epoxy terminal seal and are compatible with all "bottom-wash" PCB cleaning methods.

Typical Example: T P 1 1 — S H 8 — A — B — E —   —  

### Switch Function

- TP11** (STD.) SPST Off-Mom.  
**TP12** (STD.) SPDT On-Mom.  
**TP21** DPST Off-Mom.

### Actuator or Bushing

- SH** (STD.) .155" high plunger, unthreaded, .220" high bushing, round  
**SH8** (STD.) .155" high plunger, unthreaded, .220" high bushing, flat  
**SH9** (STD.) .155" high plunger, .220" high bushing  
**J80** Snap-in  
**J81** Snap-in with frame  
**LT** .215" high plunger, .310" high bushing, flat  
**LT9** .215" high plunger, unthreaded, .310" high bushing, flat  
**MS9** .130" high plunger, .020" high bushing, round

### Terminations

- A** (STD.) Right angle, PC thru-hole  
**C** (STD.) PC Thru-hole  
**Z** (STD.) Solder lug  
**AV** Vertical right angle, PC thru-hole  
**V3** Vertical mount, v-bracket  
**W** Wire wrap

### Contact Material

- B** (STD.) Gold  
**Q** (STD.) silver  
**K** Gold  
**M** silver  
**G** Gold over silver  
**L** Gold over silver

### Seal

- E** (STD.) Epoxy

### Cap Color

- 2** (STD.) Black  
**NONE** Models with no cap  
**1** White  
**3** Red

### Frame Color

- 2** (STD.) Black  
**NONE** Models with no frame



## Specifications

**CONTACT RATING:** B contact material: 0.4 VA max. @ 20 V AC or DC max. Q contact material: 1 AMP @ 120 V AC or 28 V DC. See page B-16 for additional ratings.

**ELECTRICAL LIFE:** TP11, TP21 MODELS: 60,000 make-and-break cycles at full load.  
TP12 MODELS: 30,000 cycles.

**CONTACT RESISTANCE:** Below 20 milliohms typ. initial @ 2-4 V DC, 100 mA, for both silver and gold plated contacts.

**INSULATION RESISTANCE:** 10<sup>9</sup> ohms min.

**DIELECTRIC STRENGTH:** 1000 V RMS min. @ sea level.

**OPERATING TEMPERATURE:** -30°C to 85°C.

**SOLDERABILITY:** Per MIL-STD-202F method 208D, or EIA RS-186E method 9 (1 hour steam aging).

**NOTE:** Specifications and materials listed above are for switches with standard options. For information on specific and custom switches, consult Customer Service Center.

## Materials

**CASE:** Glass filled nylon 6/6, flame retardant, heat stabilized or diallyl phthalate (DAP), (UL 94V-0).

**PLUNGER:** Thermoplastic polyester (UL 94V-0).

**CAP & FRAME:** Nylon, black standard.

**BUSHING:** Brass, nickel plated.

**HOUSING:** Stainless steel.

**SWITCH SUPPORT:** Brass, tin plated.

**END CONTACTS:** B contact material: Copper alloy, with gold plate over nickel plate. Q contact material: Coin silver, silver plated. See page B-16 for additional contact materials.

**CENTER CONTACT & ALL TERMINALS:** B contact material: Copper alloy, with gold plate over nickel plate. Q contact material: Copper alloy, silver plated. See page B-16 for additional contact materials.

**TERMINAL SEAL:** Epoxy.

**HARDWARE:** Nut & Locking Ring: Brass nickel plated.  
Lockwasher: Steel, nickel plated.



**B**

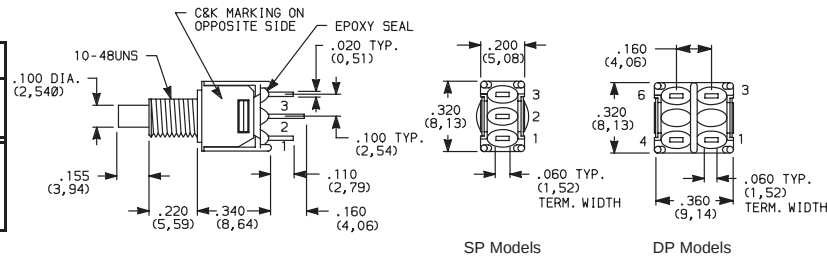
Pushbutton

## SWITCHES WITH STANDARD OPTIONS

| PART NUMBER      | FUNCTION | POS. 1 | POS. 2 |
|------------------|----------|--------|--------|
|                  |          |        |        |
| <b>TP11SHZQE</b> | SPST     | OFF    | MOM.   |
| <b>TP12SHZQE</b> | SPDT     | ON     | MOM.   |
| <b>TP21SHZQE</b> | DPST     | OFF    | MOM.   |

MOM. = Momentary

**NOTE:** For PC termination, replace 'Z' with 'C'.  
For panel & PC mounting information, see page B-13.



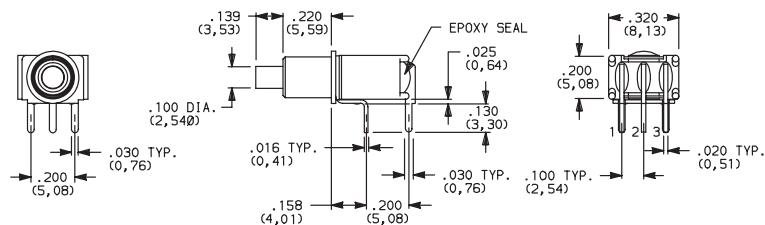
TP12SHZQE  
SPDT

Omit center terminals for SPST & DPST models.

| PART NUMBER       | FUNCTION | POS. 1 | POS. 2 |
|-------------------|----------|--------|--------|
|                   |          |        |        |
| <b>TP11SH8ABE</b> | SPST     | OFF    | MOM.   |
| <b>TP12SH8ABE</b> | SPDT     | ON     | MOM.   |

MOM. = Momentary

**NOTE:** For PC mounting information, see page B-14.



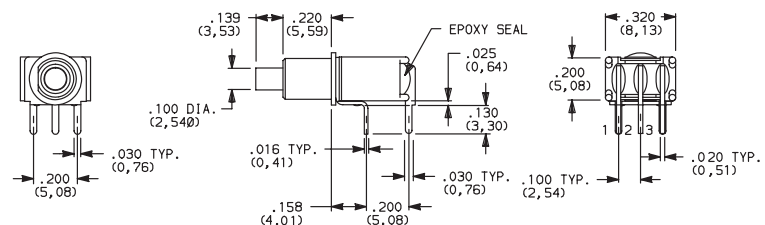
TP12SH8ABE  
SPDT

Omit center terminal for SPST models.

| PART NUMBER       | FUNCTION | POS. 1 | POS. 2 |
|-------------------|----------|--------|--------|
|                   |          |        |        |
| <b>TP11SH9ABE</b> | SPST     | OFF    | MOM.   |
| <b>TP12SH9ABE</b> | SPDT     | ON     | MOM.   |

MOM. = Momentary

**NOTE:** For PC mounting information, see page B-14.



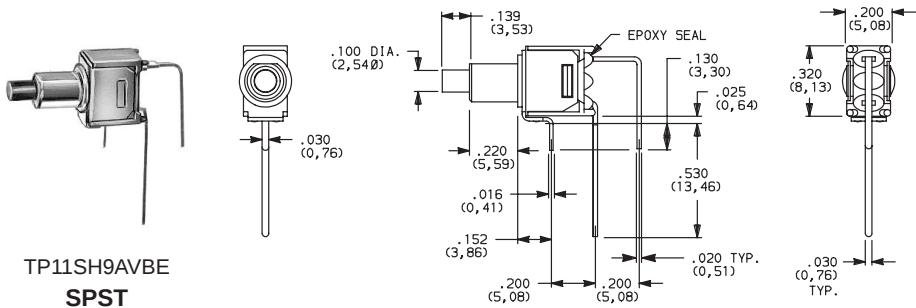
TP12SH9ABE  
SPDT

Omit center terminal for SPST models.

TP Series  
Tiny Pushbutton Switches



SWITCHES WITH STANDARD OPTIONS



| PART NUMBER | FUNCTION | POS. 1 | POS. 2 |
|-------------|----------|--------|--------|
|             |          |        |        |
| TP11SH9AVBE | SPST     | OFF    | MOM.   |

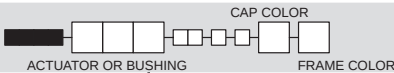
MOM. = Momentary  
NOTE: For PC mounting information, see page B-14.

SWITCH FUNCTION

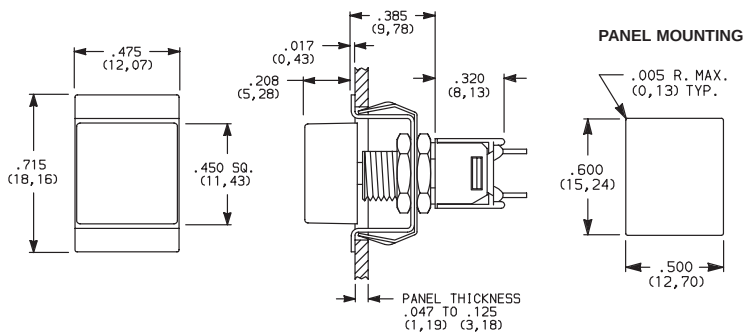
| NO. POLES | MODEL NO.   | SWITCH FUNCTION |        | CONNECTED TERMINALS |         | SCHEMATIC |
|-----------|-------------|-----------------|--------|---------------------|---------|-----------|
|           |             | POS. 1          | POS. 2 | POS. 1              | POS. 2  |           |
| SP        | TP11 (STD.) | OFF             | MOM.   | OPEN                | 1-3     | SPST      |
|           | TP12 (STD.) | ON              | MOM.   | 2-1                 | 2-3     | SPDT      |
| DP        | TP21        | OFF             | MOM.   | OPEN                | 1-3,4-6 | DPST      |

MOM. = Momentary  
All models with all options when ordered with G, L, M or Q contact material.

ACTUATOR—SNAP-IN FRONT MOUNT



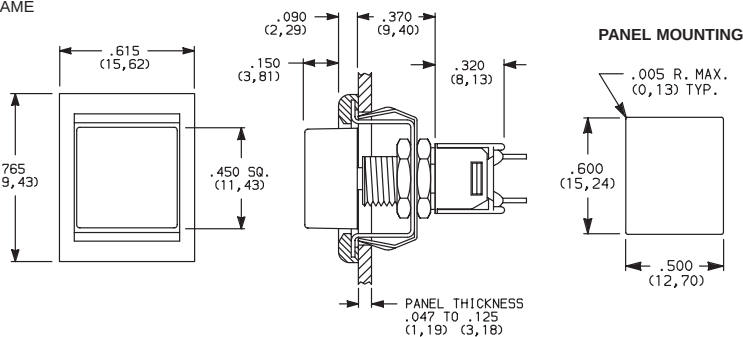
J80 SNAP-IN



NOTE: No frame color choice required.

| OPTION CODE | CAP COLOR    |
|-------------|--------------|
| 2           | (STD.) BLACK |
| 1           | WHITE        |
| 3           | RED          |

J81 SNAP-IN WITH FRAME



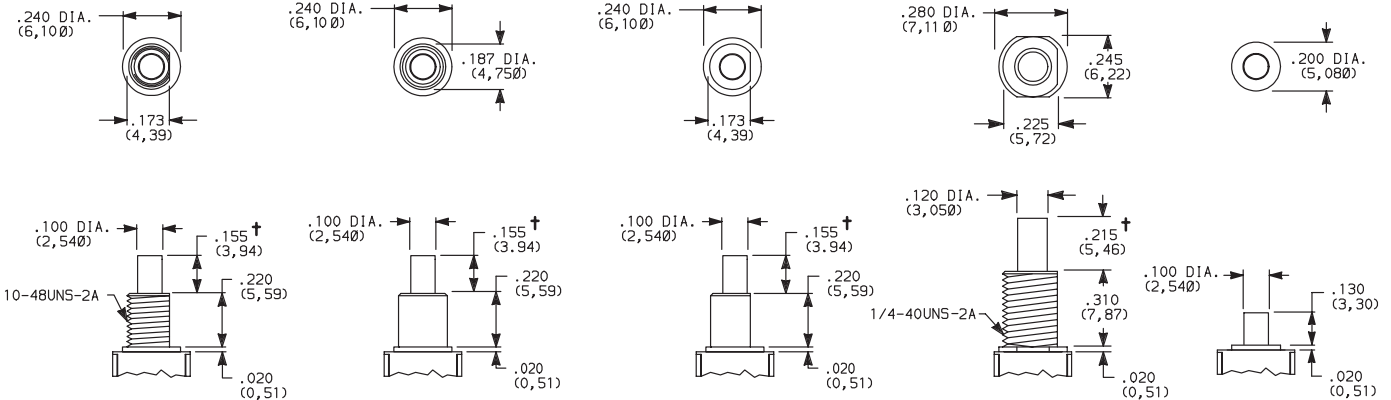
| OPTION CODE | FRAME COLOR                 |
|-------------|-----------------------------|
| 2           | (STD.) BLACK                |
| NONE        | No Frame Color (J80 option) |

Cap and Frame Finish: matte. Other colors available, consult Customer Service Center.  
NOTE: Available with Z, C, or W terminations.

## BUSHING



- SH** (STD.) .155" HIGH PLUNGER, .220" HIGH BUSHING, THREADED, FLAT
- SH8** (STD.) .155" HIGH PLUNGER, .220" HIGH BUSHING, UNTHREADED
- SH9** (STD.) .155" HIGH PLUNGER, .220" HIGH BUSHING, UNTHREADED, FLAT
- LT** .215" HIGH PLUNGER, .310" HIGH BUSHING, THREADED
- MS9** .130" HIGH PLUNGER
- LT9** .215" HIGH PLUNGER, .310" HIGH BUSHING, UNTHREADED



Standard with Z, C, W terminations.

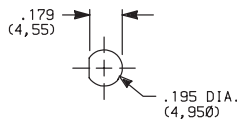
Standard with A, AV, V3 terminations.

Not available with Z terminations.

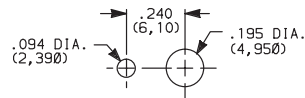
† Subtract .016 (0,41) for models with A, AV or V3 terminations.

## PANEL MOUNTING

10-48 BUSHING

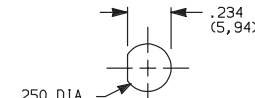


Without locking ring

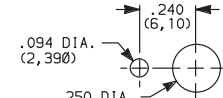


With standard locking ring

1/4 IN. BUSHING



Without locking ring



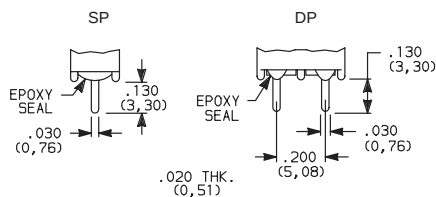
With standard locking ring

**NOTE:** One mounting nut, locking ring and lockwasher supplied standard with 10-48 threaded bushings (two nuts with 1/4-40 bushings). Optional mounting nut and locking ring styles and finishes available separately, see section L.

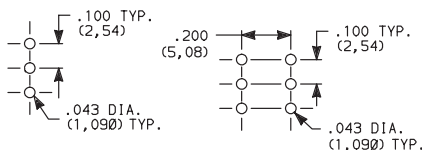
## TERMINATIONS



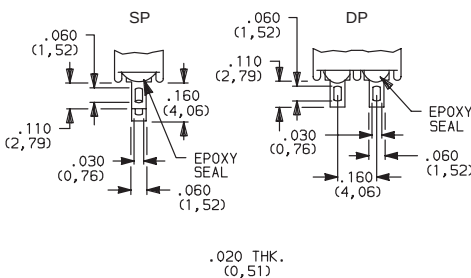
### C (STD.) PC THRU-HOLE



PC MOUNTING

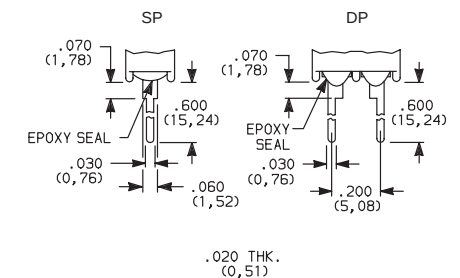


### Z (STD.) SOLDER LUG



Not available with MS9 bushing or K, L or M contact material.

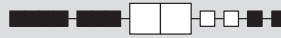
### W WIRE WRAP



# TP Series Tiny Pushbutton Switches



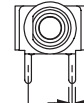
## TERMINATIONS



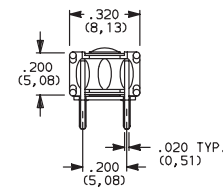
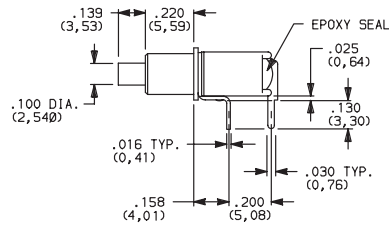
**A** (STD.) RIGHT ANGLE, PC THRU-HOLE



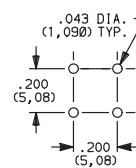
TP11SH9ABE  
SPST



.200  
(5,08)  
.030 TYP.  
(0,76)



### PC MOUNTING

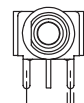


TP11 Only

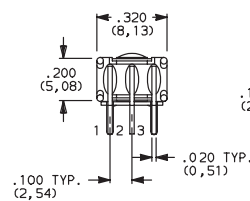
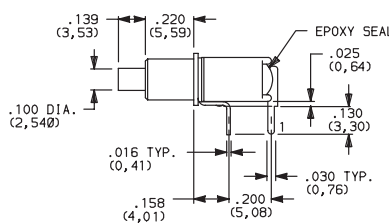
**A** (STD.) RIGHT ANGLE, PC THRU-HOLE



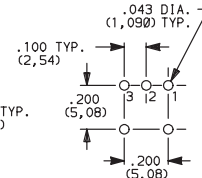
TP12SH9ABE  
SPDT



.200 (5,08)  
.030 TYP. (0,76)



### PC MOUNTING

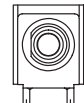


TP12 Only

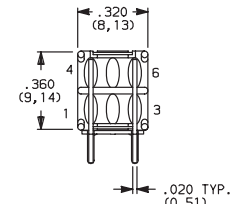
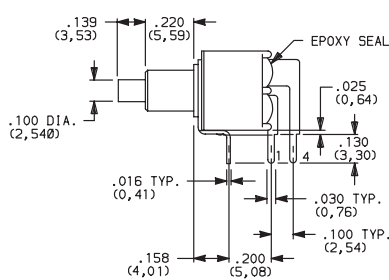
**A** (STD.) RIGHT ANGLE, PC THRU-HOLE



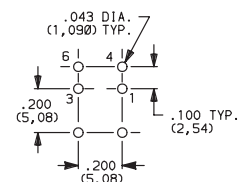
TP21SH9ABE  
DPST



.200 (5,08)  
.030 TYP. (0,76)



### PC MOUNTING

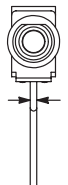


TP21 Only

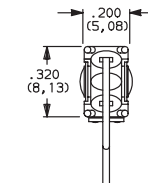
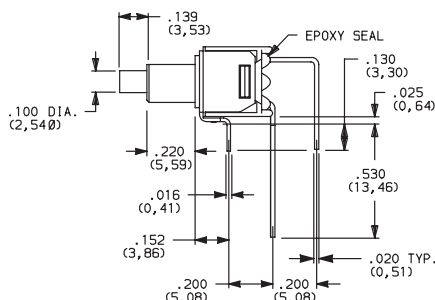
**AV** VERTICAL RIGHT ANGLE, PC THRU-HOLE



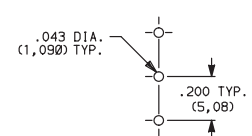
TP11SH9AVBE  
SPST



.030 (0,76)



### PC MOUNTING



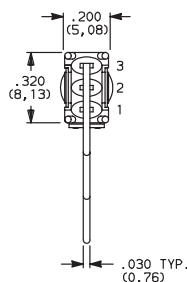
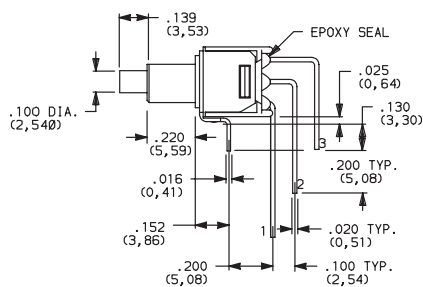
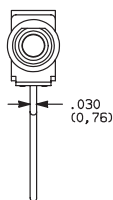
TP11 Only

NOTE: Terminal bend radii and lead-in manufacturing option.

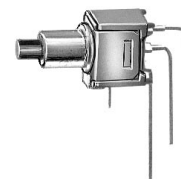
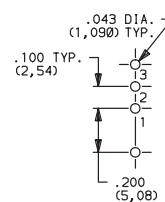
## TERMINATIONS



**AV** VERTICAL RIGHT ANGLE, PC THRU-HOLE



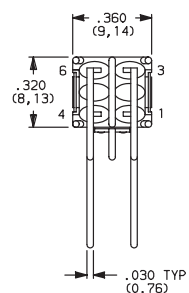
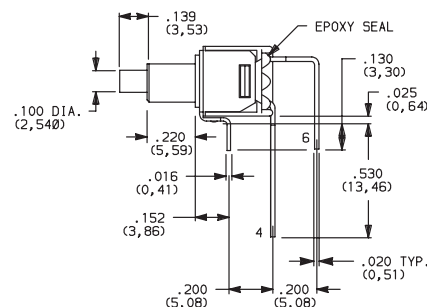
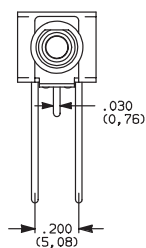
## PC MOUNTING

TP12SH9AVBE  
SPDT

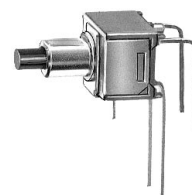
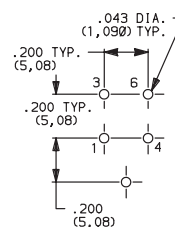
**TP12 Only**

**NOTE:** Terminal bend radii and lead-in manufacturing option.

**AV** VERTICAL RIGHT ANGLE, PC THRU-HOLE



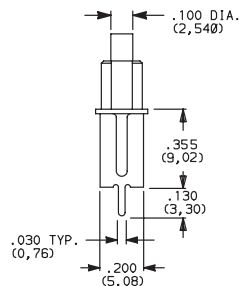
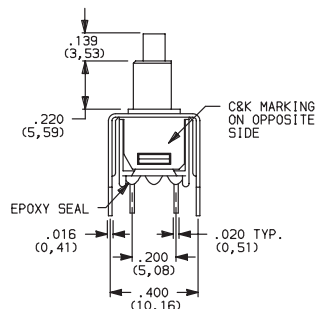
## PC MOUNTING

TP21SH9AVBE  
DPST

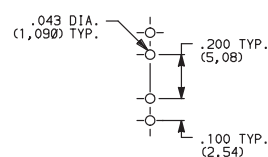
**TP21 Only**

**NOTE:** Terminal bend radii and lead-in manufacturing option.

**V3** VERTICAL MOUNT, V-BRACKET

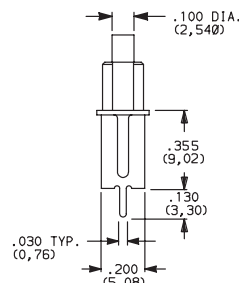
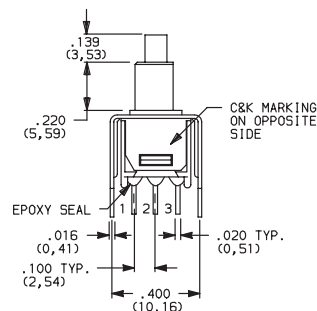


## PC MOUNTING

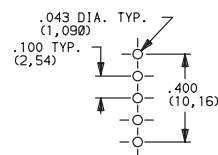
TP11SH9V3BE  
**SPST**

**TP11 Only**

**V3** VERTICAL MOUNT, V-BRACKET



## PC MOUNTING



TP12SH9V3BE  
**SPDT**

**TP12 Only**

# TP Series Tiny Pushbutton Switches

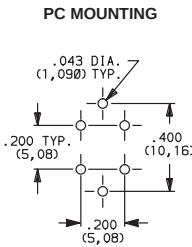
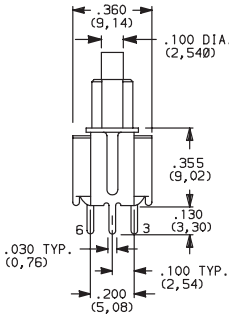
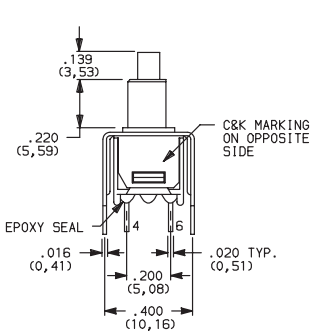


## TERMINATIONS

V3 VERTICAL MOUNT, V-BRACKET



TP21SH9V3BE  
DPST



TP21 Only

## CONTACT MATERIAL

| OPTION CODE     | CONTACT MATERIAL                | TERMINAL PLATING      | RATINGS                          |                                                                    |
|-----------------|---------------------------------|-----------------------|----------------------------------|--------------------------------------------------------------------|
| <b>B</b> (STD.) | GOLD <sup>1</sup>               | GOLD <sup>1</sup>     | LOW LEVEL / DRY CIRCUIT          | 0.4 VA MAX. @ 20 V AC OR DC MAX.                                   |
| <b>K</b>        |                                 | TIN-LEAD <sup>6</sup> |                                  |                                                                    |
| <b>Q</b> (STD.) | SILVER <sup>4,5</sup>           | SILVER <sup>5</sup>   | POWER                            | 1 AMP @ 120 V AC OR 28 V DC.                                       |
| <b>M</b>        |                                 | TIN-LEAD <sup>6</sup> |                                  |                                                                    |
| <b>G</b>        | GOLD OVER SILVER <sup>2,3</sup> | GOLD <sup>3</sup>     | LOW LEVEL / DRY CIRCUIT OR POWER | 0.4 VA MAX @ 20 V AC OR DC MAX. OR<br>1 AMP @ 120 V AC OR 28 V DC. |
| <b>L</b>        |                                 | TIN-LEAD <sup>6</sup> |                                  |                                                                    |

CONTACT MATERIAL / APPLICATION RECOMMENDATIONS—SEE CHART, PAGE L-31.

- CONTACTS & TERMINALS: Copper alloy, with gold plate over nickel plate.
- END CONTACTS: Coin silver, with gold plate over nickel plate.
- CENTER CONTACTS & ALL TERMINALS: Copper alloy, with gold plate over nickel plate.
- END CONTACTS: Coin silver, silver plated.
- CENTER CONTACTS & ALL TERMINALS: Copper alloy, silver plated.
- TERMINALS: Copper alloy, with tin-lead alloy over nickel plate.

All models  with all options when ordered with G, L, M or Q contact material.  
 B contact material standard with A, AV, V3 & W terminations.  
 Q contact material standard with C & Z terminations.  
**K, L & M contact materials not available with Z terminations.**

## SEAL

E (STD.) EPOXY SEAL

