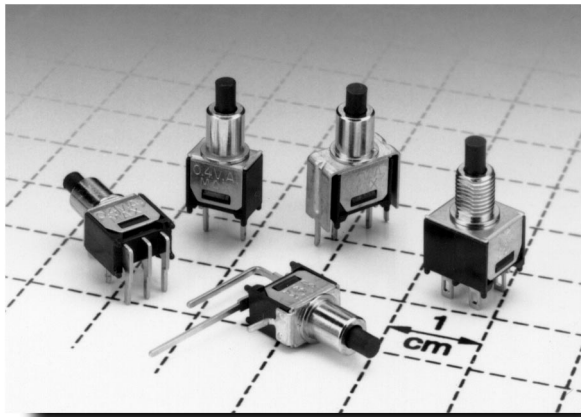


# TP Series Tiny Pushbutton Switches



## 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



Pushbutton

## 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



# TP Series Tiny Pushbutton Switches

## 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.

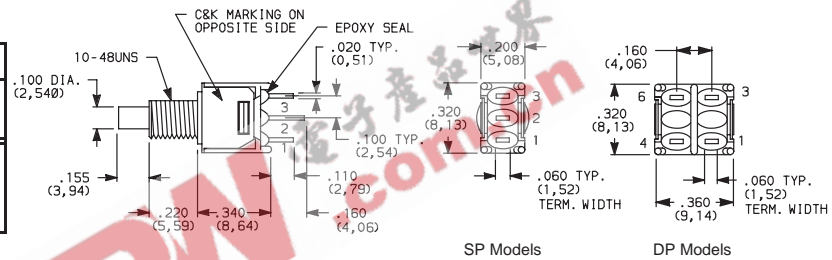
**HARDWARE:** Nut & Locking Ring: Brass nickel plated.  
Lockwasher: Steel, nickel plated.

## 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.



SP Models

DP Models



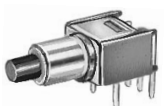
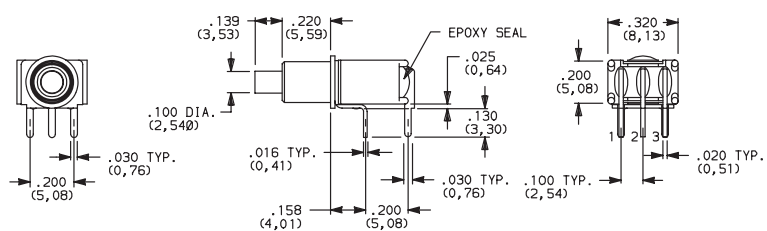
TP12SHZQE  
SPDT

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.



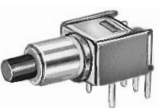
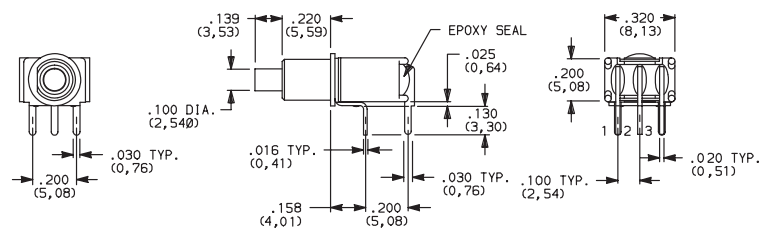
TP12SH8ABE  
SPDT

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.



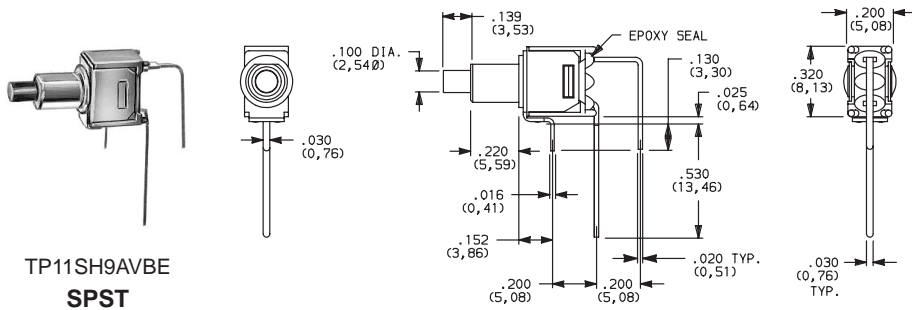
TP12SH9ABE  
SPDT

Omit center terminal for SPST models.

# TP Series Tiny Pushbutton Switches



## SWITCHES WITH STANDARD OPTIONS

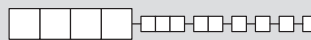


PART NUMBER	FUNCTION	POS. 1	POS. 2

MOM. = Momentary

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

## SWITCH FUNCTION

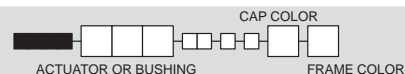


NO. POLES	MODEL NO.	SWITCH FUNCTION		CONNECTED TERMINALS		SCHEMATIC
		POS. 1	POS. 2	POS. 1	POS. 2	
SP	TP11 (STD.)	OFF	MOM.	OPEN	1-3	
	TP12 (STD.)	ON	MOM.	2-1	2-3	
DP	TP21	OFF	MOM.	OPEN	1-3,4-6	

MOM. = Momentary

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

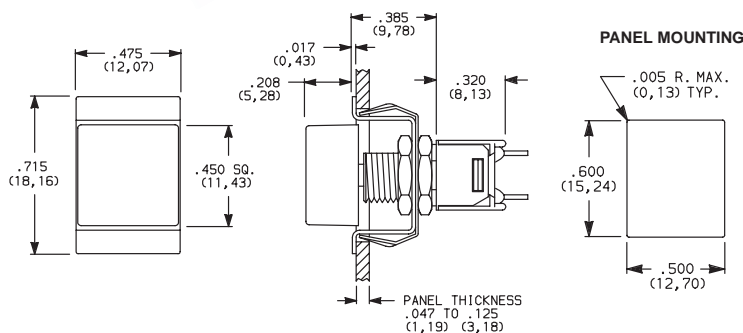
## ACTUATOR—SNAP-IN FRONT MOUNT



### J80 SNAP-IN



TP11J80ZQE  
SPST



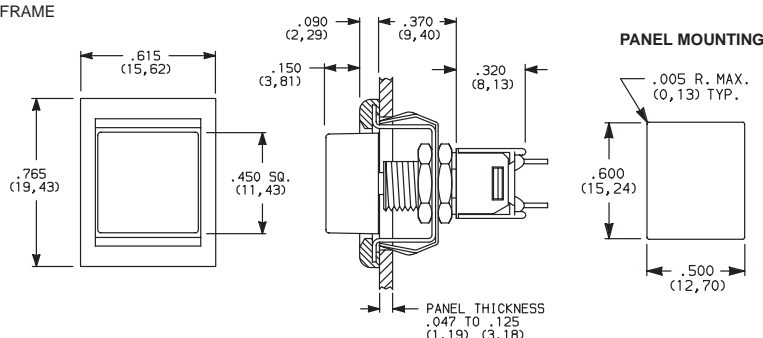
NOTE: No frame color choice required.

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

### J81 SNAP-IN WITH FRAME



TP11J81ZQE  
SPST



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.

B

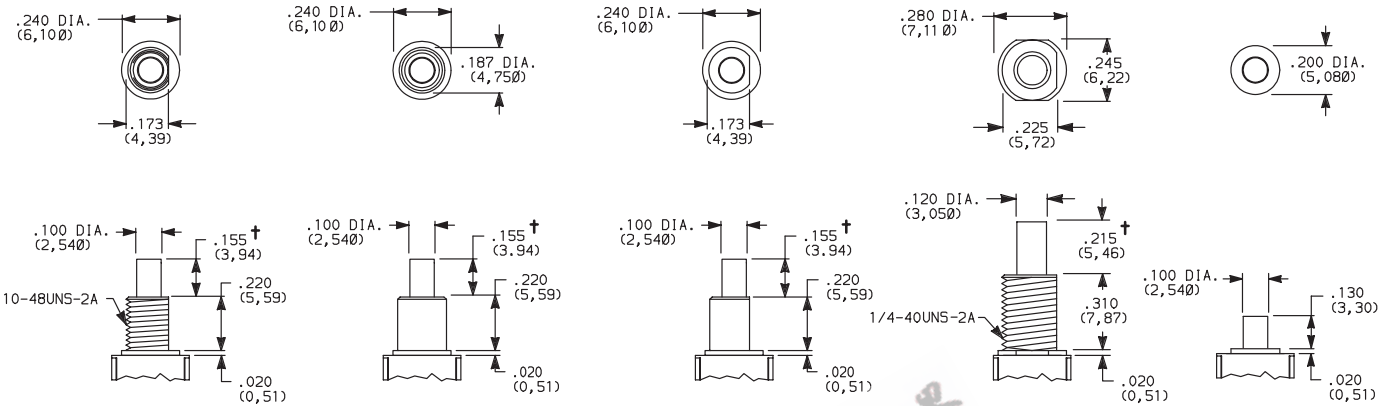
Pushbutton



# TP Series Tiny Pushbutton Switches

## 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, .200" HIGH BUSHING, UNTHREADED
- LT9** .215" HIGH PLUNGER, .310" HIGH BUSHING, UNTHREADED



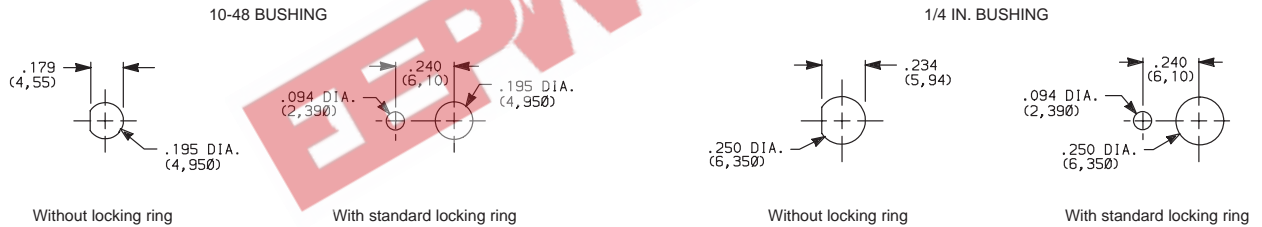
Standard with Z, C, W terminations.

Standard with A, AV, V3 terminations.

Not available with Z terminations.

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

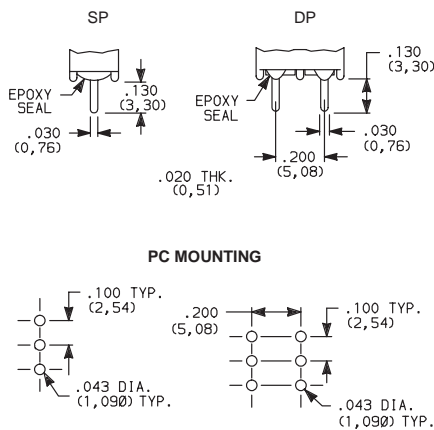
## PANEL MOUNTING



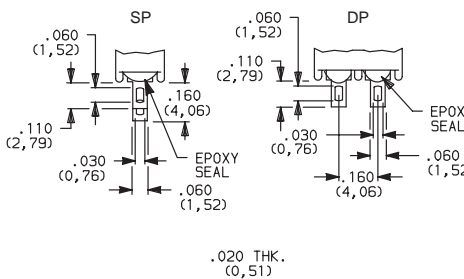
**NOTE:** One mounting nut, locking ring and lockwasher supplied standard with 10-48 threaded bushings (two nuts with 1/4-40 bushings). Optional mounting nut and locking ring styles and finishes available separately, see section L.

## TERMINATIONS

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

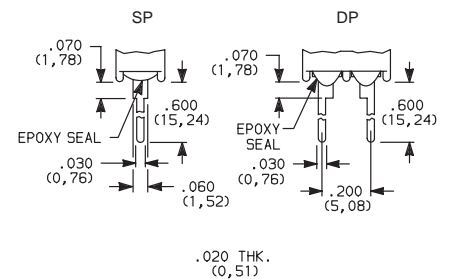


### Z (STD.) SOLDER LUG



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

### W WIRE WRAP

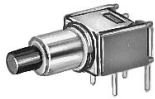


# TP Series Tiny Pushbutton Switches

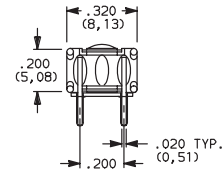
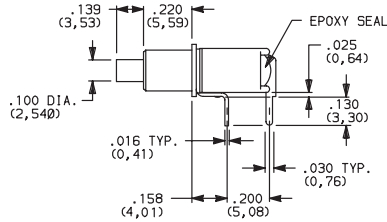
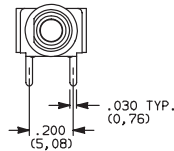


## TERMINATIONS

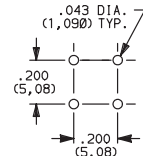
**A** (STD.) RIGHT ANGLE, PC THRU-HOLE



TP11SH9ABE  
SPST



PC MOUNTING

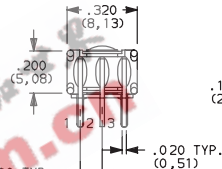
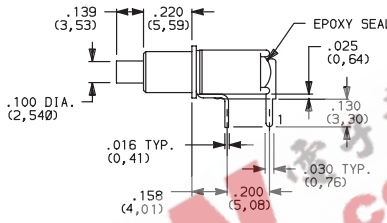
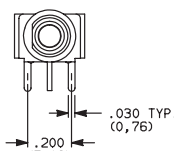


TP11 Only

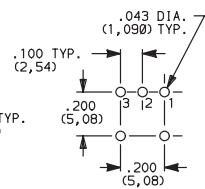
**A** (STD.) RIGHT ANGLE, PC THRU-HOLE



TP12SH9ABE  
SPDT

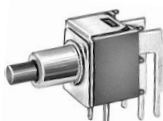


PC MOUNTING

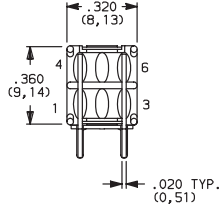
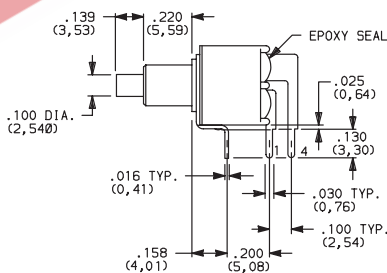
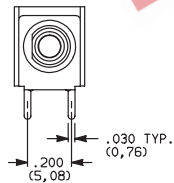


TP12 Only

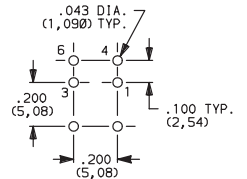
**A** (STD.) RIGHT ANGLE, PC THRU-HOLE



TP21SH9ABE  
DPST



PC MOUNTING

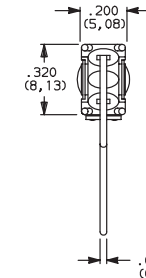
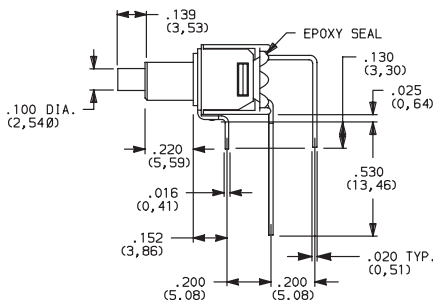
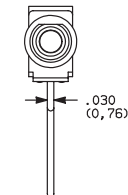


TP21 Only

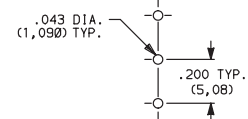
**AV** VERTICAL RIGHT ANGLE, PC THRU-HOLE



TP11SH9AVBE  
SPST



PC MOUNTING



TP11 Only

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

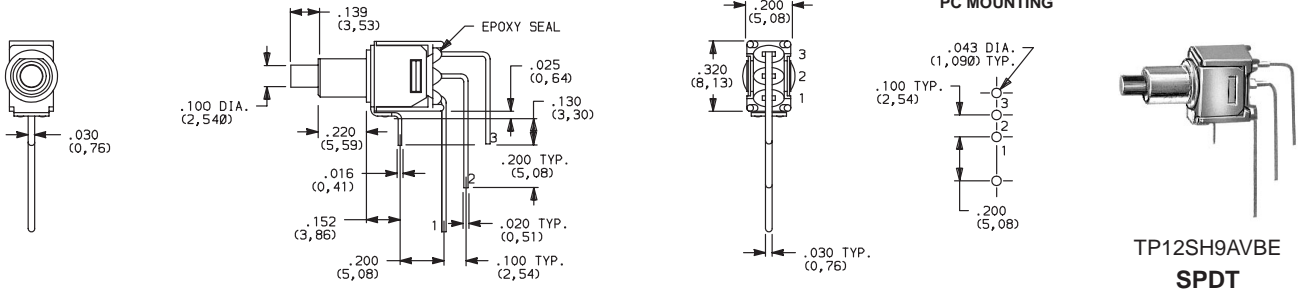
B

Pushbutton

## TERMINATIONS



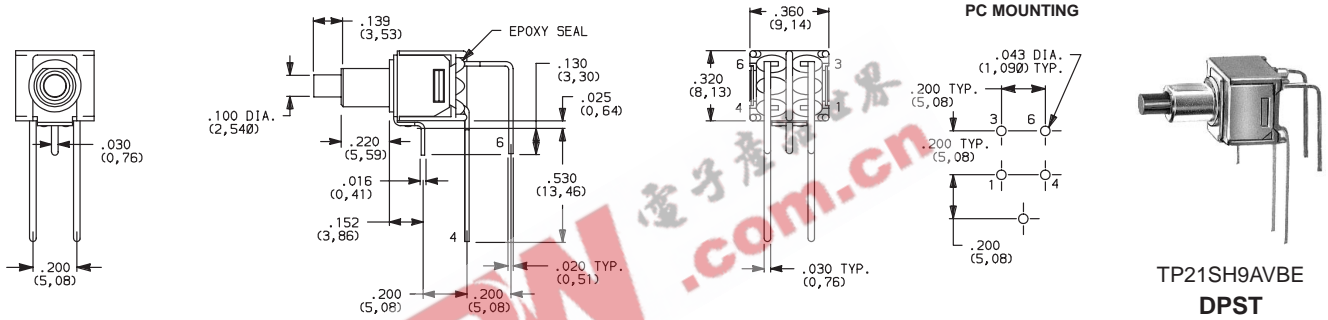
### AV VERTICAL RIGHT ANGLE, PC THRU-HOLE



### TP12 Only

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

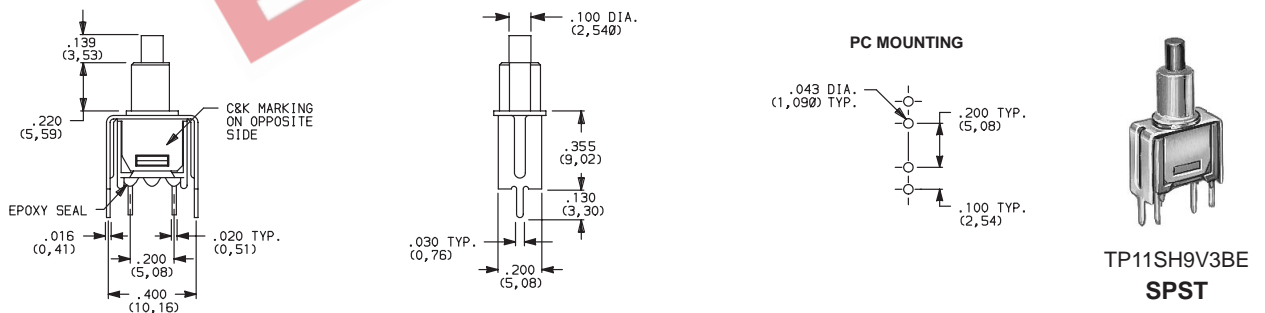
### AV VERTICAL RIGHT ANGLE, PC THRU-HOLE



### TP21 Only

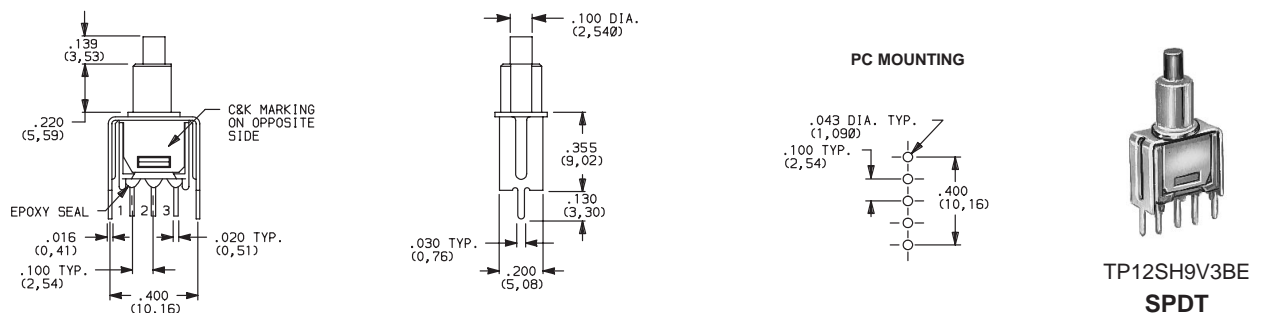
NOTE: Terminal bend radii and lead-in manufacturing option.

### V3 VERTICAL MOUNT, V-BRACKET



### TP11 Only

### V3 VERTICAL MOUNT, V-BRACKET



### TP12 Only



# TP Series Tiny Pushbutton Switches

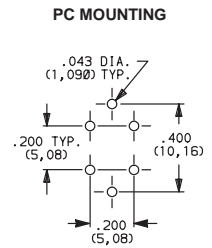
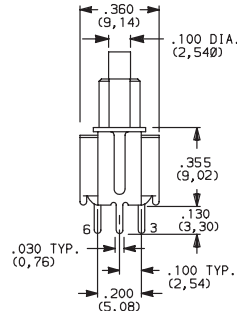
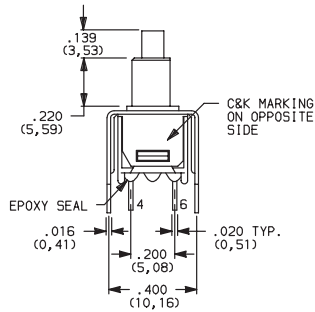


## TERMINATIONS

**V3** VERTICAL MOUNT, V-BRACKET



TP21SH9V3BE  
DPST



TP21 Only

## CONTACT MATERIAL

OPTION CODE	CONTACT MATERIAL	TERMINAL PLATING	RATINGS	
<b>B (STD.)</b>	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 (STD.)</b>	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 1 AMP @ 120 V AC OR 28 V DC.
<b>L</b>		TIN-LEAD <sup>6</sup>		

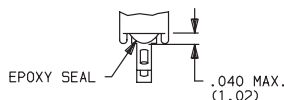
CONTACT MATERIAL/APPLICATION RECOMMENDATIONS—SEE CHART, PAGE L-31.

- 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



Pushbutton

B