

# Distinctive Characteristics

Three methods of panel mounting: flat frame for flush with face or subpanel, snap-in, and PCB.

High insulating barriers increase isolation of circuits in multipole devices and provide added protection to contact points.

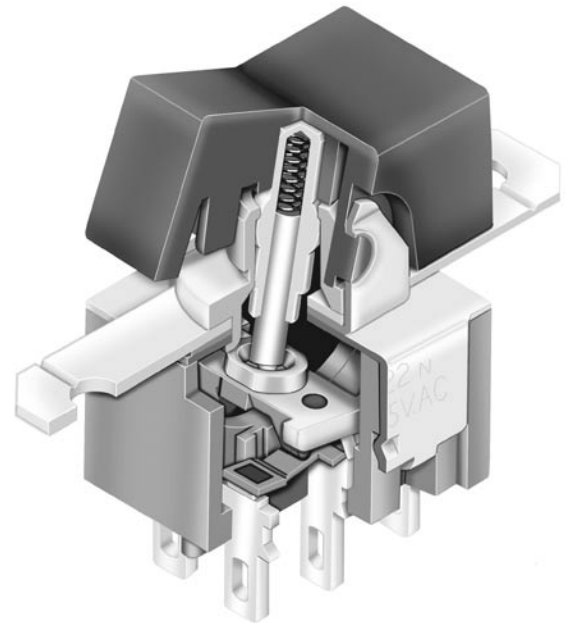
The molded diallyl phthalate case has a UL 94V-0 flammability rating.

Epoxy sealed terminals prevent entry of solder flux and other contaminants.

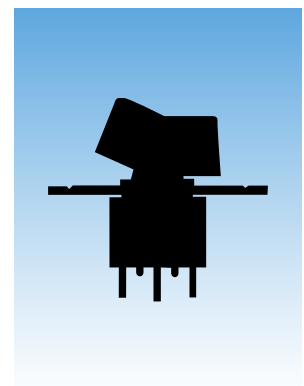
Prominent external insulating barriers increase insulation resistance and dielectric strength.

Bias guard prevents misalignment of contacts; interlocking of actuator block with rocker and internal guide does not allow transmission of diagonal force on rocker to reach contact mechanism.

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



Actual Size



# General Specifications

## Electrical Capacity (Resistive Load)

- Power Level (code W):** 6A @ 125V AC & 3A @ 250V AC  
4A @ 30V DC for On-None-On; 3A @ 30V DC for all other circuits
- Logic Level (code G):** 0.4VA maximum @ 28V AC/DC maximum  
(Applicable Range 0.1mA ~ 0.1A @ 20mV ~ 28V)
- Logic/Power Level (code A):** Combines W & G ratings  
Note: Find additional explanation of dual rating & operating range in Supplement section.

## Other Ratings

- Contact Resistance:** 10 milliohms maximum for silver; 20 milliohms maximum for gold
- Insulation Resistance:** 1,000 megohms minimum @ 500V DC
- Dielectric Strength:** 1,000V AC minimum between contacts for 1 minute minimum;  
1,500V AC minimum between contacts and case for 1 minute minimum
- Mechanical Life:** 50,000 operations minimum
- Electrical Life:** 25,000 operations minimum for silver; 50,000 operations minimum for gold;  
50,000 operations minimum for silver at 3A @ 125V AC
- Angle of Throw:** 25°

## Materials & Finishes

- Actuator Clip & Mounting Frame:** Stainless Steel
- Body Frame:** Stainless steel
- Case:** Diallyl phthalate resin (UL94V-0)
- Movable Contactor:** Phosphor bronze with silver or gold plating
- Movable Contacts:** Silver alloy (code W); copper with gold plating (code G); or silver alloy with gold plating (code A)
- Stationary Contacts:** Silver with silver plating (code W); copper or brass with gold plating (code G); or silver with gold plating (code A)
- Terminals:** Copper or brass with silver plating; or copper or brass with gold plating



## Environmental Data

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

## Processing

- Soldering:** Wave Soldering (PC version) for Gold: See Profile A in Supplement section.  
Manual Soldering for Gold: See Profile A in Supplement section.  
Wave Soldering (PC version) for Silver: See Profile B in Supplement section.  
Manual Soldering for Silver: See Profile B in Supplement section.  
Note: Actuator must be in OFF (center) position while soldering.
- Cleaning:** These devices are not process sealed. Hand clean locally using alcohol based solution.

## Standards & Certifications

- Flammability Standards:** UL94V-0 for case
-  **UL Recognized:** All models recognized at 6A @ 125V AC or 3A @ 250V AC or 0.4VA maximum @ 28V DC maximum; UL File No. WOYR2.E44145; add "/U" to end of part number to order UL mark on switch.
-  **CSA Certified:** All models recognized at 6A @ 125V AC or 3A @ 250V AC or 0.4VA maximum @ 28V maximum; CSA File No. 023535-0-000; add "/C" to end of part number to order CSA mark on switch.

**TYPICAL SWITCH ORDERING EXAMPLE**

**M20**

POLES	
1	SPDT
2	DPDT SP3T
3	3PDT (used only with terminal codes 30 & 41 & frame code TX)
4	4PDT DP3T (used only with terminal code 41 & frame code TX)

**1**

MOUNTING FRAMES	
TX	Narrow Frame for Small Actuator
TZ	Wide Frame for Large Actuator

**3**

CIRCUITS			
2	ON	NONE	ON
3	ON	OFF	ON
5	ON	NONE	(ON)
8	(ON)	OFF	(ON)
9	ON	OFF	(ON)
*4	ON	ON	ON
*6	(ON)	ON	(ON)
*7	ON	ON	(ON)

( ) = Momentary  
\* 3-ON circuits

**TX**

**G**

CONTACT MATERIALS & RATINGS	
W	Silver; Rated 6A @ 125V AC & 3A @ 250V AC
G	Gold; Rated 0.4VA max @ 28V AC/DC max
A	Gold over Silver; Rated 6A @ 125V AC & 0.4VA max @ 28V AC/DC max

**41**

TERMINALS FOR TX & TZ FRAMES	
<b>Straight PC with Bracket (1-2 Pole only)</b>	
13	.250" (6.35mm) Straight PC with .465" (11.8mm) Bracket
15	.425" (10.8mm) Straight PC with .630" (16.0mm) Bracket
17	.964" (24.5mm) Straight PC with 1.150" (29.2mm) Bracket
<b>Straight PC with Reinforced Bracket (1-2 Pole only)</b>	
23	.250" (6.35mm) Straight PC with .465" (11.8mm) Bracket
25	.425" (10.8mm) Straight PC with .630" (16.0mm) Bracket
26	.750" (19.05mm) Straight PC with .953" (24.2mm) Bracket

TERMINALS FOR TX FRAME ONLY	
<b>Right Angle PC with Support (1-3 Pole only)</b>	
30	.150" (3.81mm) Right Angle PC
<b>Vertical PC with Support (1-4 Pole)</b>	
41	.150" (3.81mm) Vertical PC

**D**

ROCKERS & PADDLES	
<b>Small Actuators (TX Frame)</b>	
D	.365" (9.27mm) Wide Rocker
E	.365" (9.27mm) Wide Paddle
F	.450" (11.43mm) Wide Rocker
G	.450" (11.43mm) Wide Paddle
<b>Large Actuators (TZ Frame)</b>	
J	.595" (15.11mm) Wide Rocker
H	.595" (15.11mm) Wide Paddle

**C**


ROCKER & PADDLE COLORS	
A	Black
B	White
C	Red
E	Yellow
F	Green
G	Blue
H	Gray

**IMPORTANT:**

Switches are supplied without UL & CSA marking unless specified. Specific models & ratings noted on General Specifications page.

**DESCRIPTION FOR TYPICAL ORDERING EXAMPLE**

**M2013TXG41-DC**



SPDT ON-OFF-ON Circuit

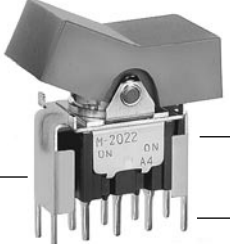
TX Frame with .365" (9.27mm) Wide Red Rocker

Gold Contacts with 0.4VA Rating

.150" (3.81mm) Vertical PC Terminals with Support

**DESCRIPTION FOR TYPICAL ORDERING EXAMPLE**

**M2022TZG23-JC**



TZ Frame with .595" (15.11mm) Wide Red Rocker

DPDT ON-NONE-ON Circuit

Gold Contacts with 0.4VA Rating

.250" (6.35mm) Straight PC Terminals with Reinforced Bracket

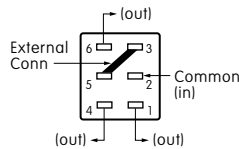
### POLES & CIRCUITS

Pole	Model	Rocker Position ( ) = Momentary			Connected Terminals			Throw & Schematics  Note: Terminal numbers are not actually on the switch. * Reverse circuits available for vertical mount SP & DP upon request.
		Down	Center	Up	Down	Center	Up	
SP	M2012	ON	NONE	ON				SPDT  
	M2013	ON	OFF	ON				
	*M2015	ON	NONE	(ON)	2-3	OPEN	2-1	
	M2018	(ON)	OFF	(ON)				
	*M2019	ON	OFF	(ON)				
DP	M2022	ON	NONE	ON				DPDT  
	M2023	ON	OFF	ON				
	*M2025	ON	NONE	(ON)	2-3 5-6	OPEN	2-1 5-4	
	M2028	(ON)	OFF	(ON)				
	*M2029	ON	OFF	(ON)				
3P	M2032	ON	NONE	ON				3PDT  
	M2033	ON	OFF	ON				
	M2035	ON	NONE	(ON)	2-3 5-6	OPEN	2-1 5-4	
	M2038	(ON)	OFF	(ON)	8-9		8-7	
	M2039	ON	OFF	(ON)				
4P	M2042	ON	NONE	ON				4PDT  
	M2043	ON	OFF	ON				
	M2045	ON	NONE	(ON)	2-3 5-6	OPEN	2-1 5-4	
	M2048	(ON)	OFF	(ON)	8-9 11-12		8-7 11-10	
	M2049	ON	OFF	(ON)				

### For 3 Throw (3-On)

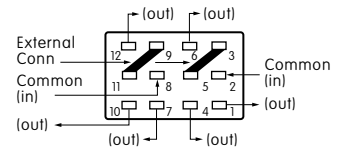
Pole	Model	Down	Center	Up	Connected Terminals & Schematics
SP	M2024	ON	ON	ON	
	M2026	(ON)	ON	(ON)	
	M2027	ON	ON	(ON)	
DP	M2044	ON	ON	ON	
	M2046	(ON)	ON	(ON)	
	M2047	ON	ON	(ON)	

The SP3T model utilizes a double pole base.



External connection must be made during field installation.

The DP3T model utilizes a four pole base.

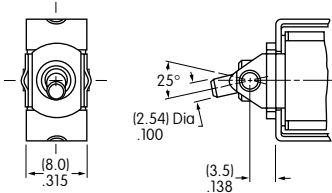


External connection must be made during field installation.

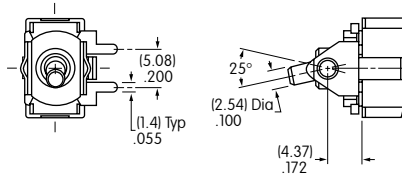
### MOUNTING FRAMES

**TX** Narrow Mounting Frame for Small Actuators with Straight PC Terminals (codes 13, 15, 17, 23, 25, & 26) or with Angle PC Terminals (codes 30 & 41)

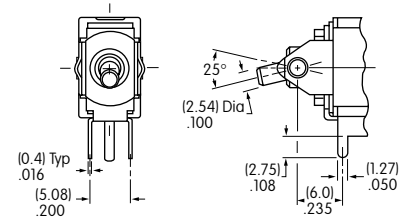
Straight PC Mounting



Right Angle PC Mounting

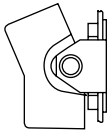


Vertical PC Mounting

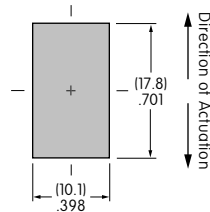
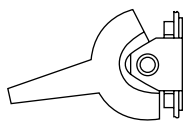


Small Actuators & Panel Cutouts for TX Frame (actuator details on the following pages)

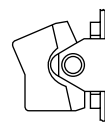
AT4148



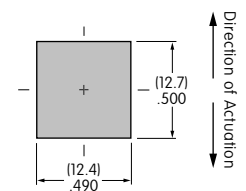
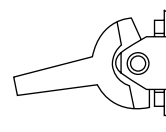
AT4149



AT4150



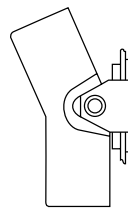
AT4151



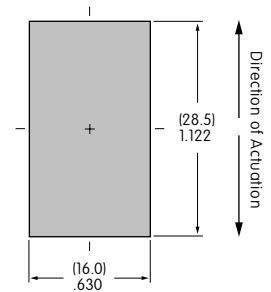
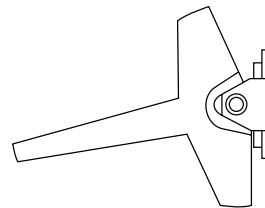
**TZ** Wide Mounting Frame for Large Actuators with Straight PC Terminals (codes 13, 15, 17, 23, 25, & 26)

Large Actuators & Panel Cutouts for TZ Frame (actuator details on the following pages)

AT4156



AT4157



### CONTACT MATERIALS & RATINGS

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

**G** Gold over Brass or Copper      Logic Level      0.4VA maximum @ 28V AC/DC maximum

Note: See Supplement section to find complete explanation of operating range.

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

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

### TERMINALS

For TX and TZ 1-2 Pole  
Straight PC Mount with Bracket

For TX and TZ 1-2 Pole  
Straight PC Mount with Reinforced Bracket

**13**

.250" (6.35mm)  
Terminal with  
.465" (11.8mm)  
Bracket

**15**

.425" (10.8mm)  
Terminal with  
.630" (16.0mm)  
Bracket

**17**

.964" (24.5mm)  
Terminal with  
1.150" (29.2mm)  
Bracket

**23**

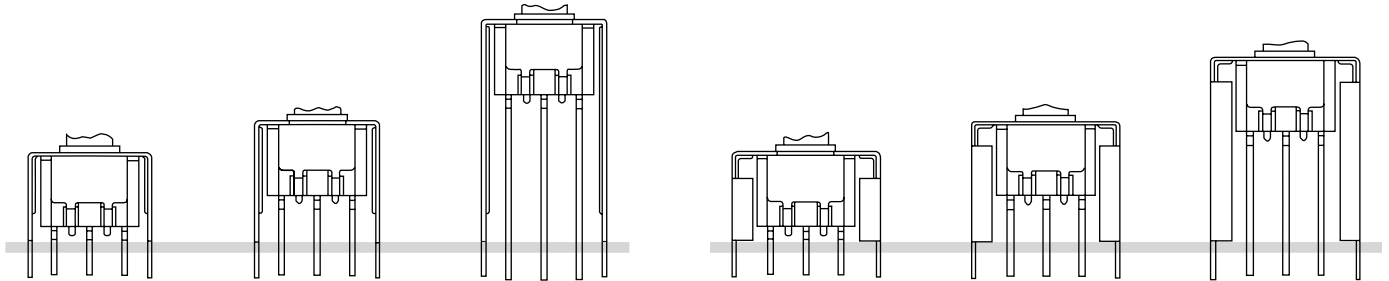
.250" (6.35mm)  
Terminal with  
.465" (11.8mm)  
Bracket

**25**

.425" (10.8mm)  
Terminal with  
.630" (16.0mm)  
Bracket

**26**

.750" (19.05mm)  
Terminal with  
.953" (24.2mm)  
Bracket



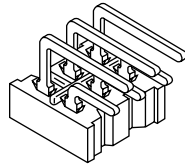
PCB footprints are on the following Typical Switch Dimension pages.

For TX 1-3 Pole Right Angle PC Mount

For TX 1-4 Pole Vertical PC Mount

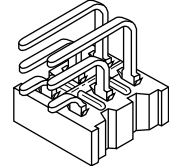
**30**

.150" (3.81mm)  
Right Angle PC



**41**

.150" (3.81mm)  
Vertical PC

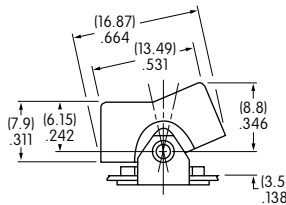
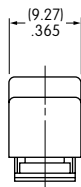


### ROCKERS & PADDLES FOR TX MOUNTING FRAMES

**D**

AT4148 .365" (9.27mm)  
Wide Rocker

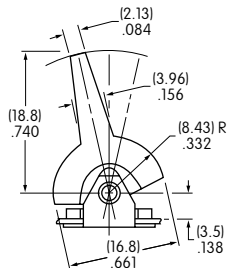
Material: Polyamide  
Finish: Matte



**E**

AT4149 .365" (9.27mm)  
Wide Paddle

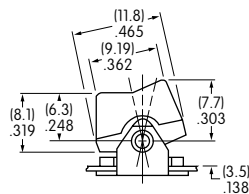
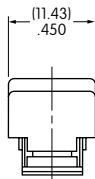
Material: Polyamide  
Finish: Matte



**F**

AT4150 .450" (11.43mm)  
Wide Rocker

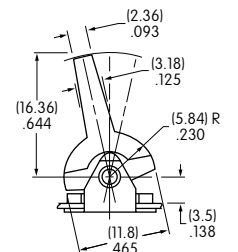
Material: Polyamide  
Finish: Matte



**G**

AT4151 .450" (11.43mm)  
Wide Paddle

Material: Polyamide  
Finish: Matte



Cap Colors  
Available:

**A**

Black

**B**

White

**C**

Red

**E**

Yellow

**F**

Green

**G**

Blue

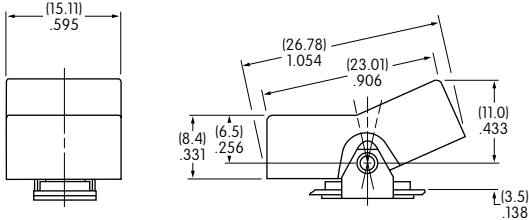
**H**

Gray

### ROCKERS & PADDLES FOR TZ MOUNTING FRAMES

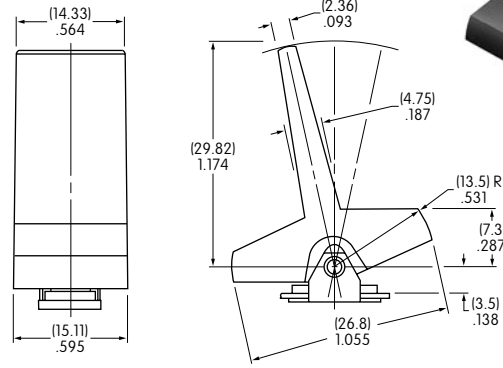
#### J AT4156 .595" (15.11mm) Wide Rocker

Material: Polyamide  
Finish: Matte



#### H AT4157 .595" (15.11mm) Wide Paddle

Material: Polyamide  
Finish: Matte



Cap Colors Available:



Black



White



Red



Yellow



Green



Blue



Gray

### OPTIONAL SNAP-IN PANEL FRAMES

Used with AT4148 Rocker and AT4149 Paddle

#### AT064-1

Accommodates .047" ~ .090"  
(1.2 ~ 2.3mm) panel thickness

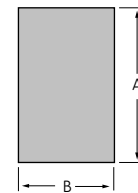
Material: Polyamide  
Finish: Matte  
Color: Black

Mounted separately from switches

Cutout Tolerances:

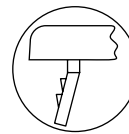
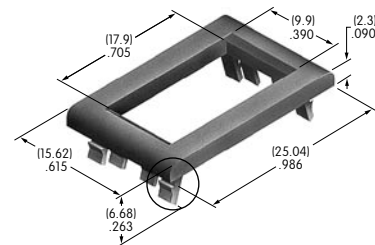
Dimension A:  
.797" ~ .803" (20.24 ~ 20.4mm)

Dimension B:  
.495" ~ .505" (12.57 ~ 12.83mm)

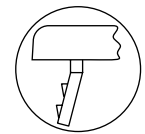


#### AT064-2

Accommodates .062" ~ .125"  
(1.57 ~ 3.18mm) panel thickness



AT064-1 Enlarged Detail



AT064-2 Enlarged Detail

Used with AT4150 Rocker and AT4151 Paddle

#### AT065-1

Accommodates .047" ~ .090"  
(1.2 ~ 2.3mm) panel thickness

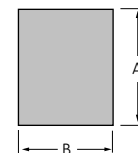
Material: Polyamide  
Finish: Matte  
Color: Black

Mounted separately from switches

Cutout Tolerances:

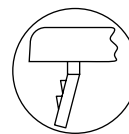
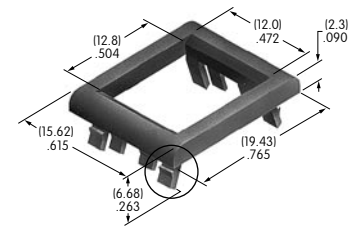
Dimension A:  
.595" ~ .605" (15.11 ~ 15.37mm)

Dimension B:  
.495" ~ .500" (12.57 ~ 12.7mm)

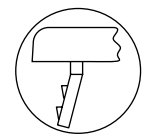


#### AT065-2

Accommodates .062" ~ .125"  
(1.57 ~ 3.18mm) panel thickness



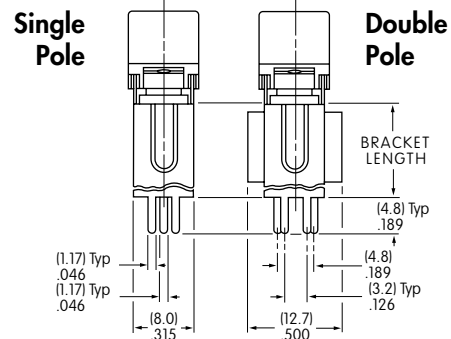
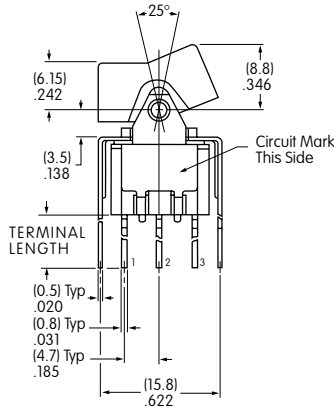
AT065-1 Enlarged Detail



AT065-2 Enlarged Detail

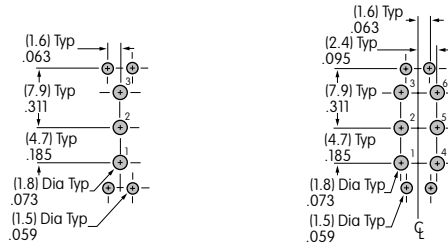
### TYPICAL SWITCH DIMENSIONS

#### Straight PC • Bracket

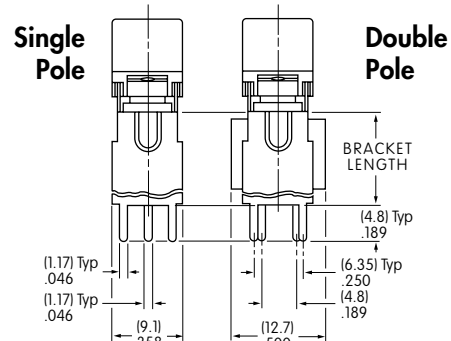
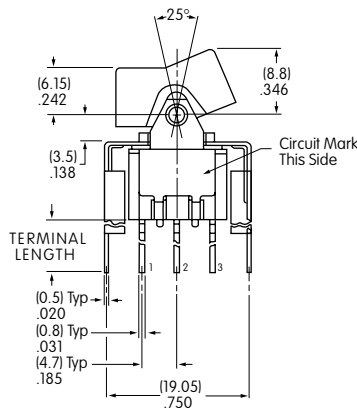


M2012TXG13-DC

Terminal Code:	Terminal Length:	Bracket Length:
13	.250" (6.35mm)	.465" (11.8mm)
15	.425" (10.8mm)	.630" (16.0mm)
17	.964" (24.5mm)	1.150" (29.2mm)

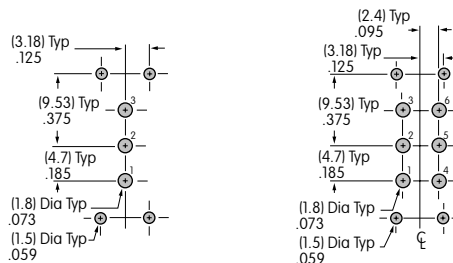


#### Straight PC • Reinforced Bracket



M2012TXG23-DC

Terminal Code:	Terminal Length:	Bracket Length:
23	.250" (6.35mm)	.465" (11.8mm)
25	.425" (10.8mm)	.630" (16.0mm)
26	.750" (19.05mm)	.953" (24.2mm)

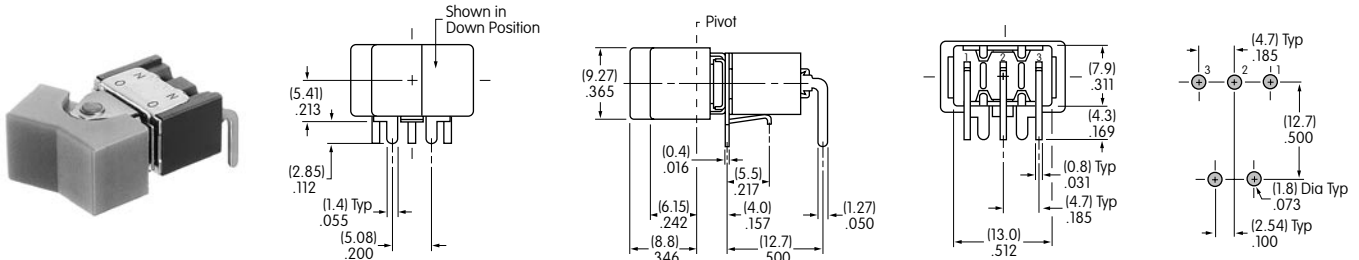




### TYPICAL SWITCH DIMENSIONS

#### .150" (3.81mm) Right Angle PC

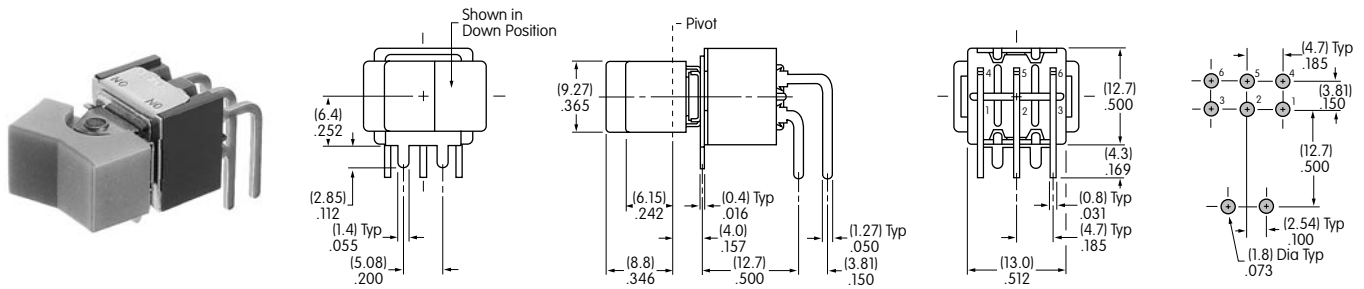
#### Single Pole



M2012TXG30-DC

#### .150" (3.81mm) Right Angle PC

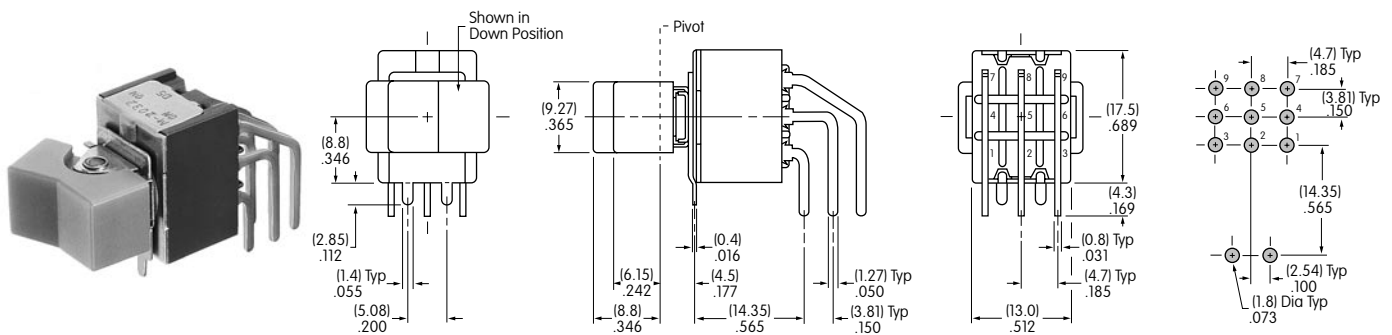
#### Double Pole



M2022TXG30-DC

#### .150" (3.81mm) Right Angle PC

#### Three Pole

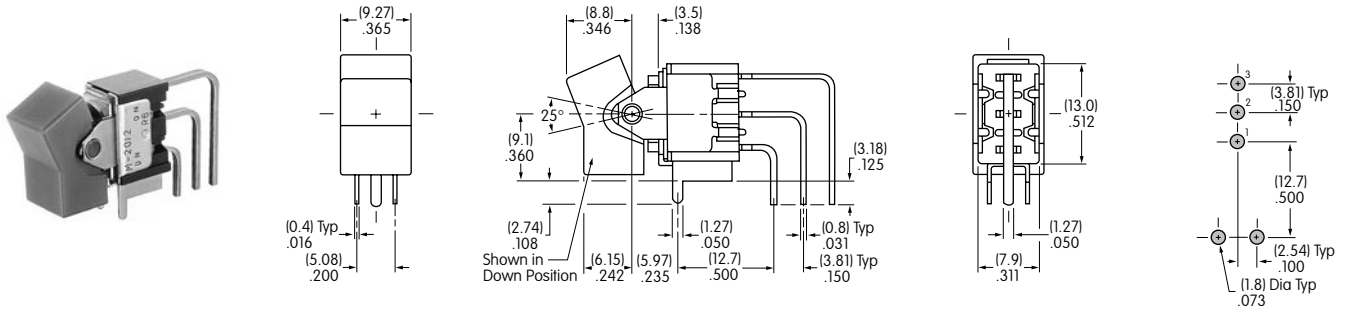


M2032TXG30-DC

### TYPICAL SWITCH DIMENSIONS

#### .150" (3.81mm) Vertical PC

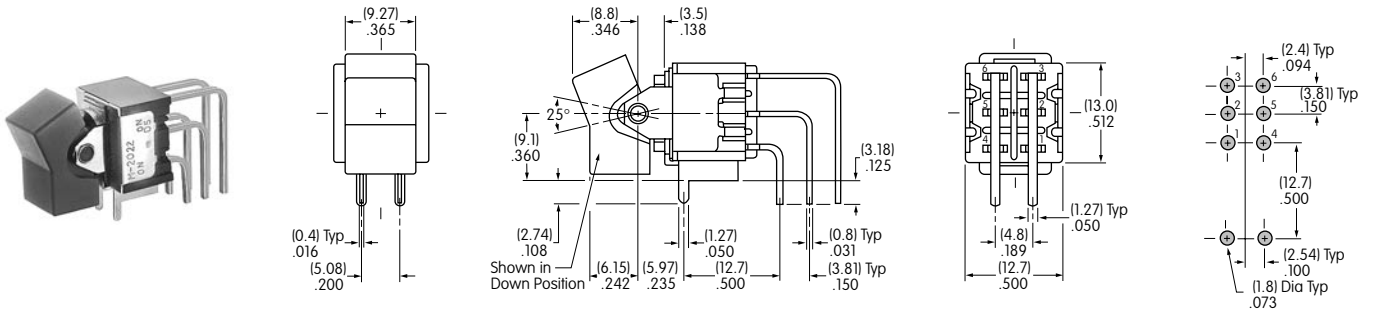
#### Single Pole



M2012TXG41-DC

#### .150" (3.81mm) Vertical PC

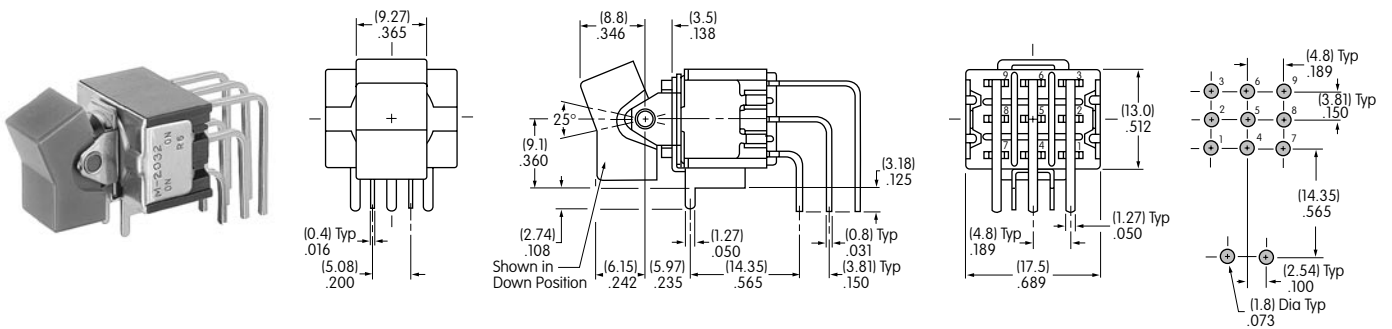
#### Double Pole



M2022TXG41-DC

#### .150" (3.81mm) Vertical PC

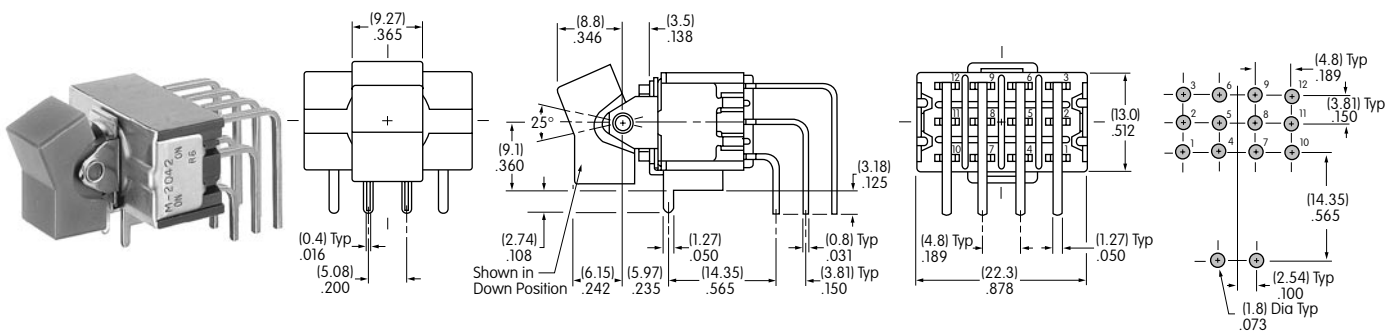
#### Three Pole



M2032TXG41-DC

#### .150" (3.81mm) Vertical PC

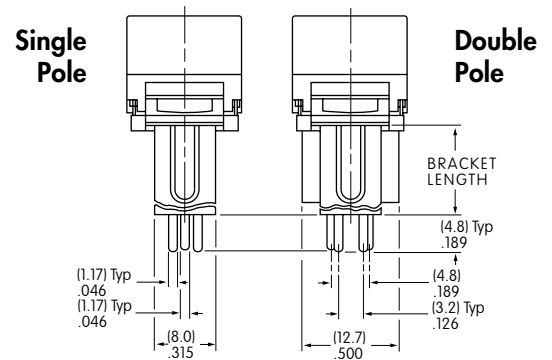
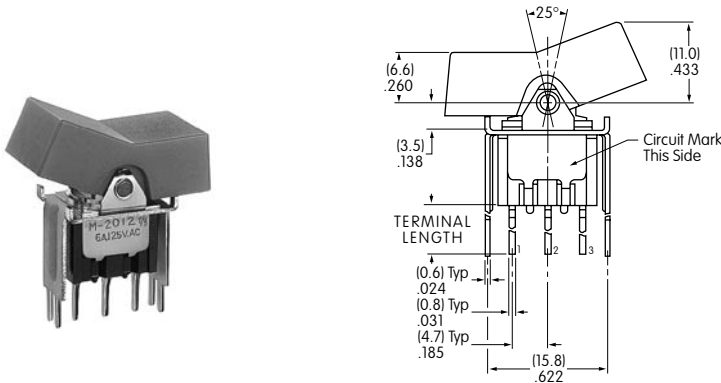
#### Four Pole



M2042TXG41-DC

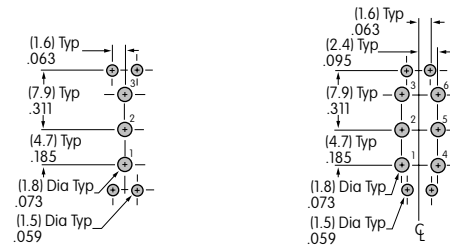
### TYPICAL SWITCH DIMENSIONS

#### Straight PC • Bracket

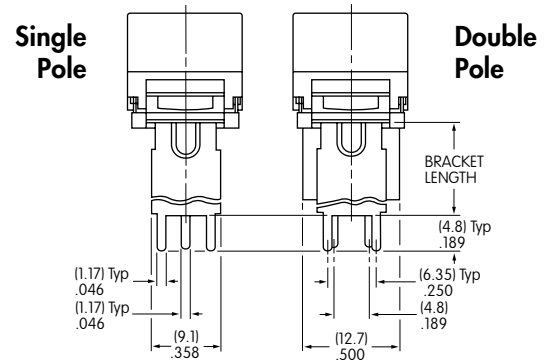
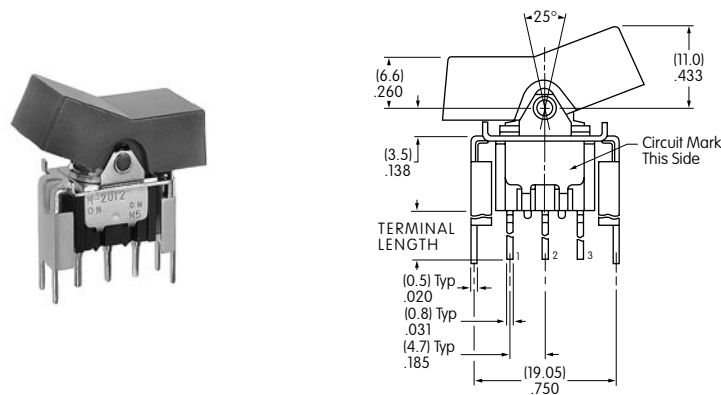


M2012TZG13-JC

Terminal Code:	Terminal Length:	Bracket Length:
13	.250" (6.35mm)	.465" (11.8mm)
15	.425" (10.8mm)	.630" (16.0mm)
17	.964" (24.5mm)	1.150" (29.2mm)

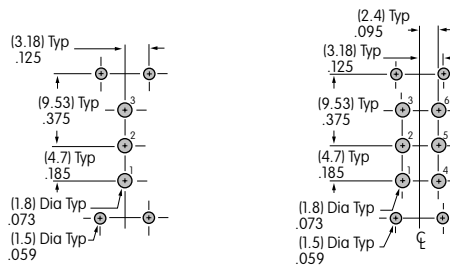


#### Straight PC • Reinforced Bracket



M2012TZG23-JC

Terminal Code:	Terminal Length:	Bracket Length:
23	.250" (6.35mm)	.465" (11.8mm)
25	.425" (10.8mm)	.630" (16.0mm)
26	.750" (19.05mm)	.953" (24.2mm)

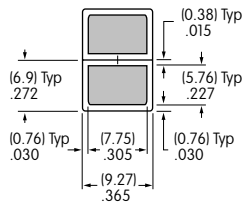


## LEGENDS

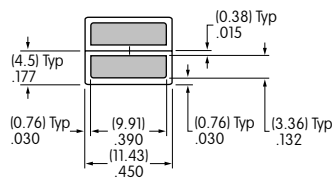
General information and basic specifications are presented here for customers who want to do their own legends.

### Suggested Printable Area for Cap

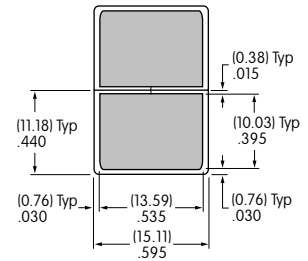
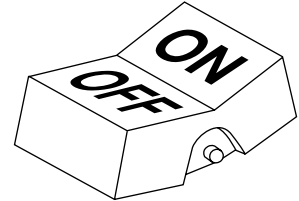
AT4148



AT4150



AT4156



Shaded areas are printable areas.

### Recommended Print Method:

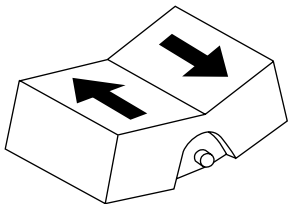
Screen Print or Pad Print

Epoxy based ink is recommended.

### Additional Method

An additional method for legends is engraving the cap. Maximum depth for engraving is .012" (0.3mm) on the cap. Enamel paint is recommended to fill the engraved area.

## LEGEND PACKET



1. To order caps with legends contact the factory and request the M Rocker Legend Packet.
2. Once you determine your desired legend, fill out the ordering work sheet included in the packet.
3. Return the completed work sheet to receive a quotation.