

# General Specifications

## B Electrical Capacity (Resistive Load)

**Power Level (silver):** 6A @ 125V AC & 3A @ 250V AC  
4A @ 30V DC for On-None-On; 3A @ 30V DC for all other circuits

**Logic Level (gold):** 0.4VA maximum @ 28V AC/DC maximum  
(Applicable Range 0.1mA ~ 0.1A @ 20mV ~ 28V)

**Logic/Power Level (gold over silver):** Combines silver & gold 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:** **File No. E44145 - Recognized only when ordered with marking on switch.**  
Add "/U" before first dash in part number to order UL recognized switch.  
All models recognized at 6A @ 125V AC, 3A @ 250V AC or 0.4VA maximum @ 28V DC maximum.  
**CSA:** **File No. 023535\_0\_000 - Certified only when ordered with marking on switch.**  
Add "/C" before first dash in part number to order CSA certified switch.  
All models certified at 6A @ 125V AC or 3A @ 250V AC or 0.4VA maximum @ 28V maximum.

# 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.

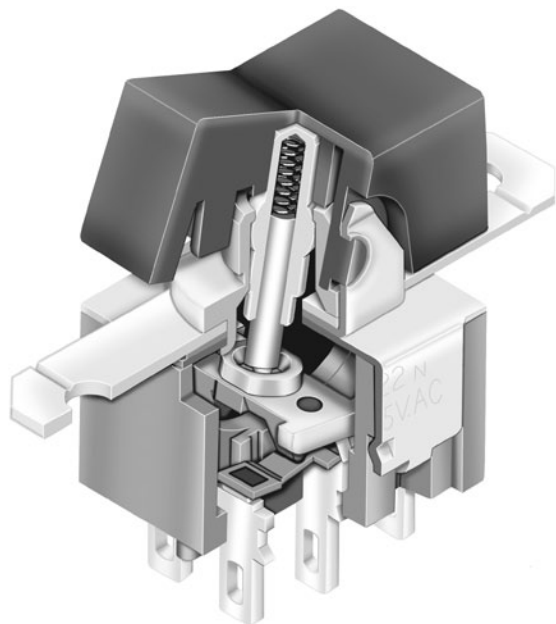
The molded diallyl phthalate case has a UL 94V-0 flammability rating.

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

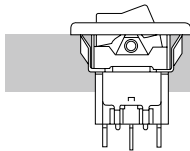
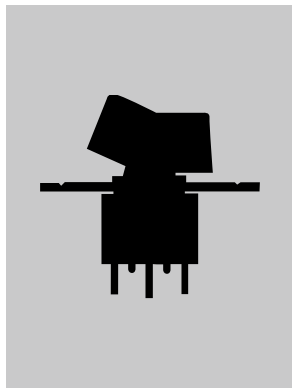
Prominent external insulating barriers increase insulation resistance and dielectric strength.

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.

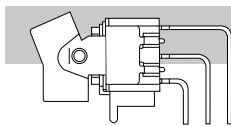


Actual Size



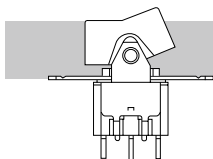
Snap-in Mount

Page B64



Bracket PC Mount

Page B72



Flat Frame Mount

Page B83

TYPICAL SWITCH ORDERING EXAMPLE

M20

1

2

TN

W

01

—

D

C

Poles

|   |              |
|---|--------------|
| 1 | SPDT         |
| 2 | DPDT<br>SP3T |
| 3 | 3PDT         |
| 4 | 4PDT<br>DP3T |

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

Mounting Frames

|    |                                   |
|----|-----------------------------------|
| TN | .272" (6.9mm) Wide<br>Flat Frame  |
| TY | .504" (12.8mm) Wide<br>Flat Frame |

Contact Materials  
& Ratings

|   |                                                                        |
|---|------------------------------------------------------------------------|
| W | Silver; Rated 6A @ 125V<br>AC & 3A @ 250V AC                           |
| G | Gold; Rated 0.4VA max @<br>28V AC/DC max                               |
| A | Gold over Silver; Rated<br>6A @ 125V AC & 0.4VA<br>max @ 28V AC/DC max |

Rockers & Paddles

Small Actuators (TN Frame)

|   |                                |
|---|--------------------------------|
| D | .365" (9.27mm)<br>Wide Rocker  |
| E | .365" (9.27mm)<br>Wide Paddle  |
| F | .450" (11.43mm)<br>Wide Rocker |
| G | .450" (11.43mm)<br>Wide Paddle |

Large Actuators (TY Frame)

|   |                                |
|---|--------------------------------|
| J | .595" (15.11mm)<br>Wide Rocker |
| H | .595" (15.11mm)<br>Wide Paddle |

Terminals

|    |                               |
|----|-------------------------------|
| 01 | Solder Lug*                   |
| 03 | .250" (6.35mm)<br>Straight PC |

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.  
**UL & CSA recognized only when ordered with marking on the switch.**  
Specific models, ratings, & ordering instructions are noted on General Specifications page.

\* Wire harness & cable assemblies offered only in Americas

DESCRIPTION FOR TYPICAL ORDERING EXAMPLE

M2012TNW01-DC

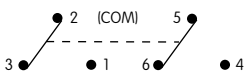
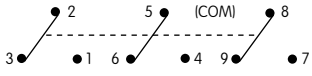
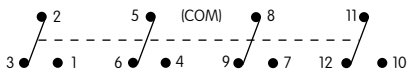
NIKK  
SWITCHES

www.nkk.com

B83

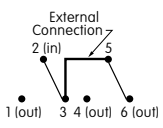
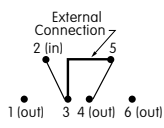
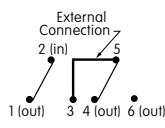
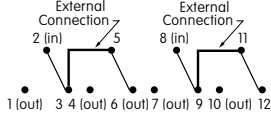
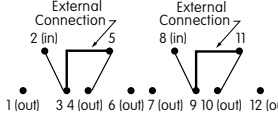
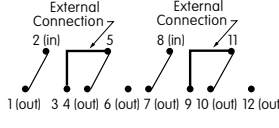
Toggles  
Rockers  
Pushbuttons  
Illuminated PB  
Programmable  
Keylocks  
Rotaries  
Slides  
Tactiles  
Tilt  
Touch  
Indicators  
Accessories  
Supplement

### POLES & CIRCUITS

| Pole | Model | Rocker Position<br>( ) = Momentary |        |      | Connected Terminals |        |                   | Throw & Schematics                                                                            |
|------|-------|------------------------------------|--------|------|---------------------|--------|-------------------|-----------------------------------------------------------------------------------------------|
|      |       | Down                               | Center | Up   | Down                | Center | Up                |                                                                                               |
| SP   | M2012 | ON                                 | NONE   | ON   |                     |        |                   | SPDT<br>   |
|      | 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<br>   |
|      | 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<br>   |
|      | M2033 | ON                                 | OFF    | ON   |                     |        |                   |                                                                                               |
|      | M2035 | ON                                 | NONE   | (ON) | 2-3 5-6 8-9         | OPEN   | 2-1 5-4 8-7       |                                                                                               |
|      | M2038 | (ON)                               | OFF    | (ON) |                     |        |                   |                                                                                               |
|      | M2039 | ON                                 | OFF    | (ON) |                     |        |                   |                                                                                               |
| 4P   | M2042 | ON                                 | NONE   | ON   |                     |        |                   | 4PDT<br> |
|      | M2043 | ON                                 | OFF    | ON   |                     |        |                   |                                                                                               |
|      | M2045 | ON                                 | NONE   | (ON) | 2-3 5-6 8-9 11-12   | OPEN   | 2-1 5-4 8-7 11-10 |                                                                                               |
|      | M2048 | (ON)                               | OFF    | (ON) |                     |        |                   |                                                                                               |
|      | M2049 | ON                                 | OFF    | (ON) |                     |        |                   |                                                                                               |

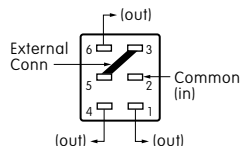
For 3 Throw (3-On)

### Connected Terminals & Schematics

| Pole | Model | Down | Center | Up   | Down                                                                                                     | Center                                                                                                    | Up                                                                                                         |
|------|-------|------|--------|------|----------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------|
| SP   | M2024 | ON   | ON     | ON   | <br>2-3 5-6           | <br>2-3 5-4           | <br>2-1 5-4           |
|      | M2026 | (ON) | ON     | (ON) |                                                                                                          |                                                                                                           |                                                                                                            |
|      | M2027 | ON   | ON     | (ON) |                                                                                                          |                                                                                                           |                                                                                                            |
| DP   | M2044 | ON   | ON     | ON   | <br>2-3 5-6 8-9 11-12 | <br>2-3 5-4 8-9 11-10 | <br>2-1 5-4 8-7 11-10 |
|      | M2046 | (ON) | ON     | (ON) |                                                                                                          |                                                                                                           |                                                                                                            |
|      | M2047 | ON   | ON     | (ON) |                                                                                                          |                                                                                                           |                                                                                                            |

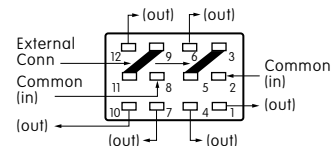
The SP3T model utilizes a double pole base.

External connection must be made during field installation.



The DP3T model utilizes a four pole base.

External connection must be made during field installation.

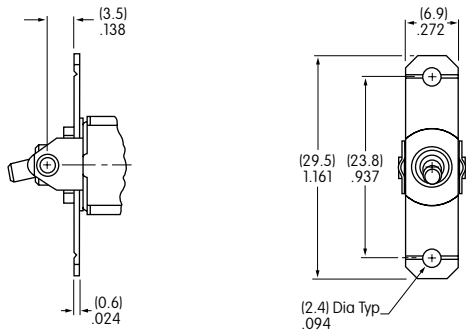


Flat Frame Mount Miniature Rockers

MOUNTING FRAMES

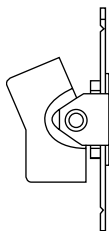
**TN** .272" (6.9mm)  
Wide Flat Frame

Mounting hardware kit HK-1, as shown on the following page, must be ordered separately.

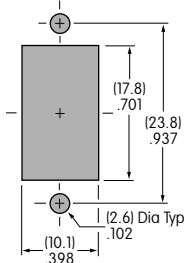
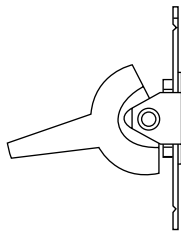


Small Actuators & Panel Cutouts for TN Frame (actuator details on the following pages)

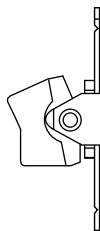
AT4148



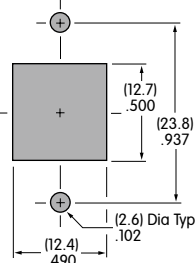
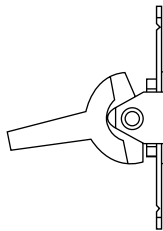
AT4149



AT4150



AT4151

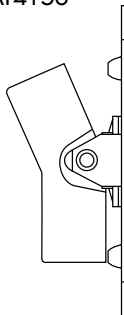


**TY** .504" (12.8mm)  
Wide Flat Frame

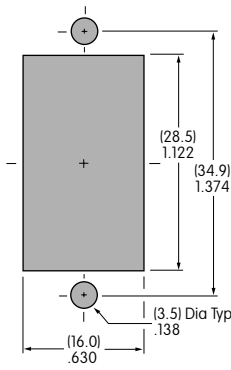
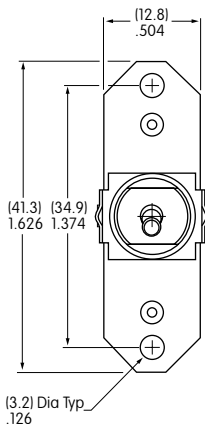
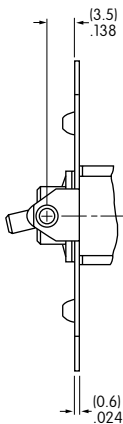
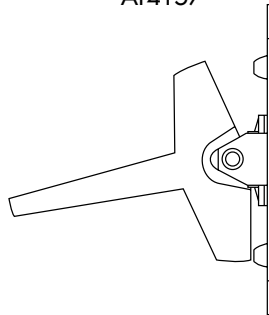
Large Actuators & Panel Cutout for TY Frame  
(actuator details on the following pages)

Mounting hardware kit HK-2, as shown on the following page, must be ordered separately.

AT4156

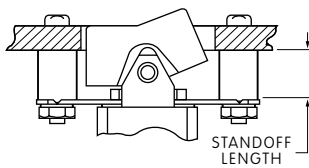


AT4157



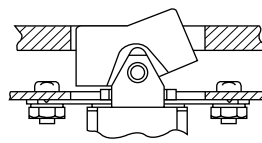
### MOUNTING FRAMES (CONTINUED)

#### Face Panel Mounting



Flat frame devices may also be mounted to the face panel. Standoffs are used to recess the actuator and achieve an attractive front panel appearance.

#### Subpanel Mounting



These devices are especially designed for subpanel mounting. When installed on a mounting plate behind the panel, hardware is completely concealed and the front panel retains a clean, attractive appearance.

#### Optional Hardware Kits for Subpanel or Face Panel Mounting

| Frame    | Panel Thickness | Standoff Length | Hardware Kit Number |
|----------|-----------------|-----------------|---------------------|
| TN Frame | .125" (3.175mm) | .233" (5.918mm) | ATHK-1              |
| TY Frame | .125" (3.175mm) | .312" (7.925mm) | ATHK-2              |

Hardware kits include:  
2 stainless steel screws, 2 hex nuts, 2 lockwashers, & 2 standoffs

#### Optional Snap-in Panel Frames



AT064-1  
AT064-2



AT065-1  
AT065-2

Further details are shown in the previous bracketed PC mount subsection.

### CONTACT MATERIALS & RATINGS



**Silver over Silver**

**Power Level**

**6A @ 125V AC & 3A @ 250V AC**



**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.



**Gold over Silver**

**Power Level  
or Logic Level**

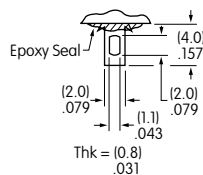
**6A @ 125V AC  
or 0.4VA maximum @ 28V AC/DC maximum**

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.

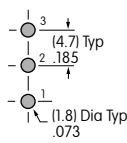
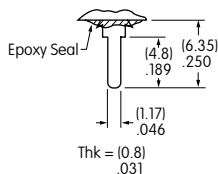
### TERMINALS



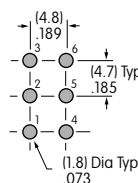
**Solder Lug**



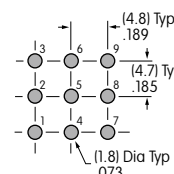
**.250" (6.35mm)  
Straight PC**



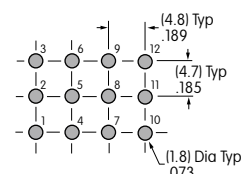
Single Pole



Double Pole



Three Pole



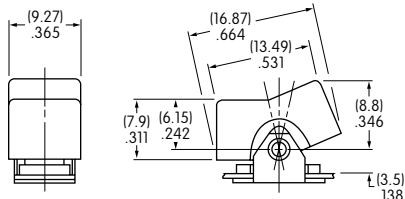
Four Pole

## ROCKERS & PADDLES

### For TN Frame

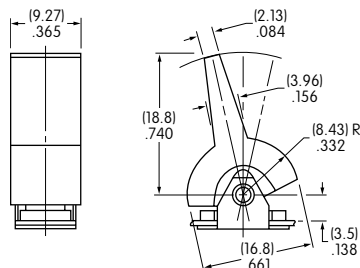
#### **D** AT4148 .365" (9.27mm) Wide Rocker

Material: Polyamide  
Finish: Matte



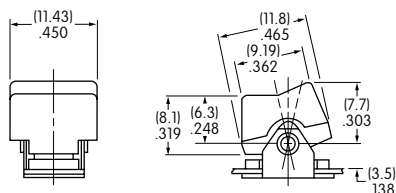
#### **E** AT4149 .365" (9.27mm) Wide Paddle

Material: Polyamide  
Finish: Matte



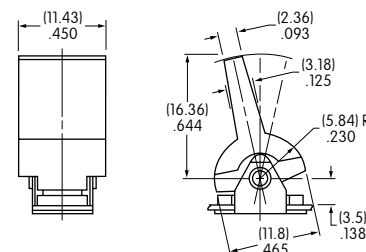
#### **F** AT4150 .450" (11.43mm) Wide Rocker

Material: Polyamide  
Finish: Matte



#### **G** AT4151 .450" (11.43mm) Wide Paddle

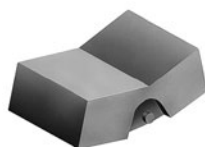
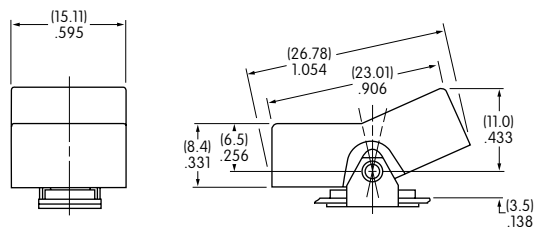
Material: Polyamide  
Finish: Matte



### For TY Frame

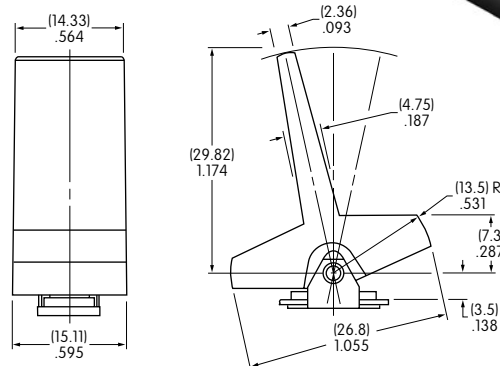
#### **J** AT4156 .595" (15.11mm) Wide Rocker

Material: Polyamide  
Finish: Matte



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

Material: Polyamide  
Finish: Matte



Cap Colors  
Available:

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

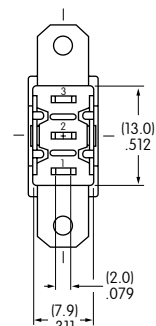
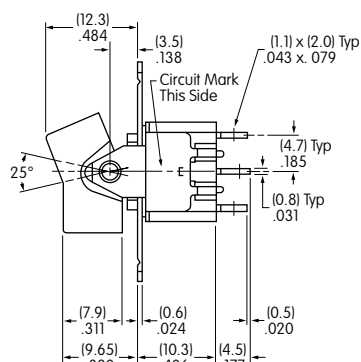
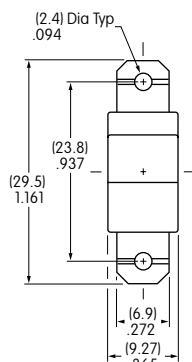
### TYPICAL SWITCH DIMENSIONS

#### TN Frame • Solder Lug

#### Single Pole



M2012TNW01-DC

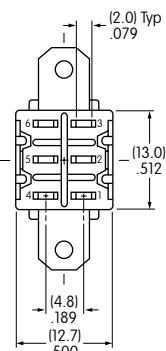
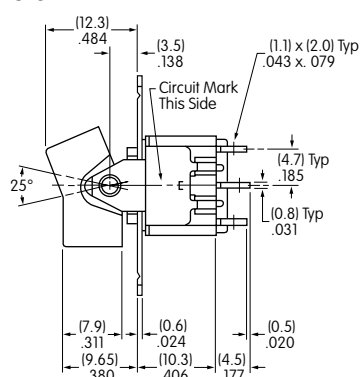
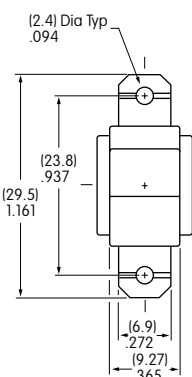


#### TN Frame • Solder Lug

#### Double Pole



M2022TNW01-DC

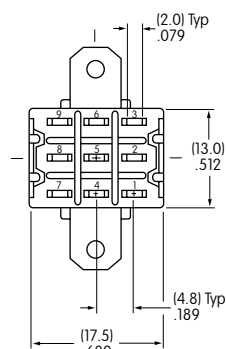
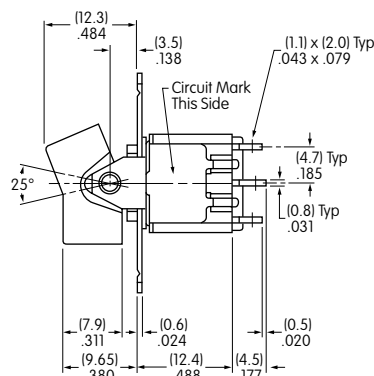
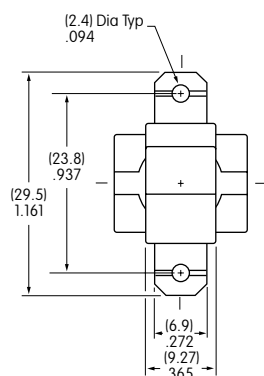


#### TN Frame • Solder Lug

#### Three Pole



M2032TNW01-DC

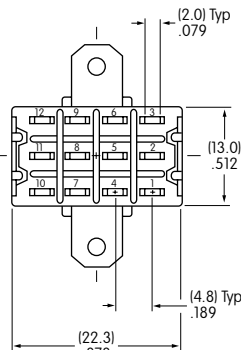
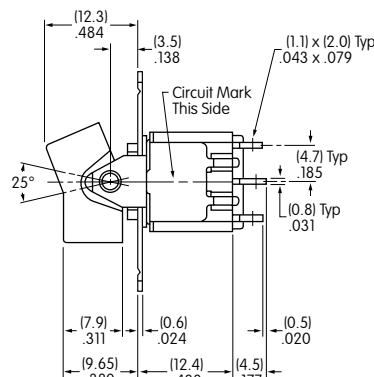
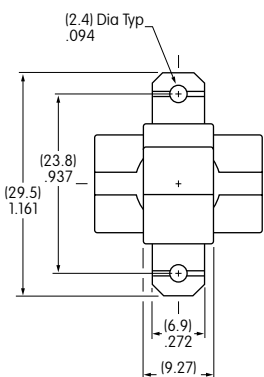


#### TN Frame • Solder Lug

#### Four Pole

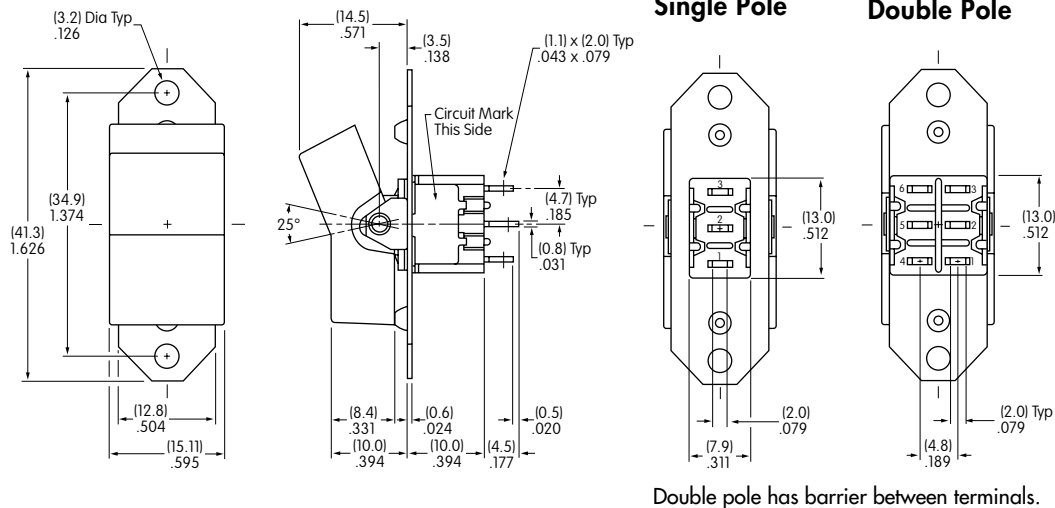


M2042TNW01-DC



## TYPICAL SWITCH DIMENSIONS

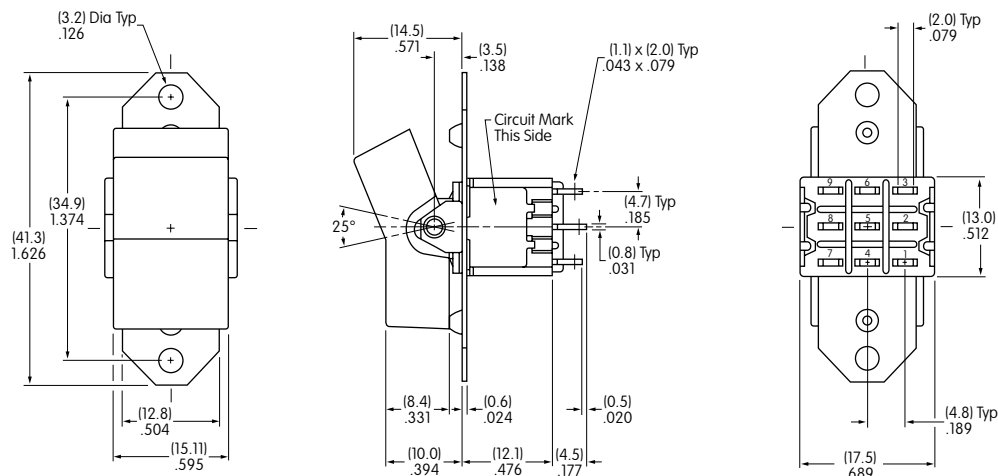
### TY Frame • Solder Lug



M2012YW01-JC

### Three Pole

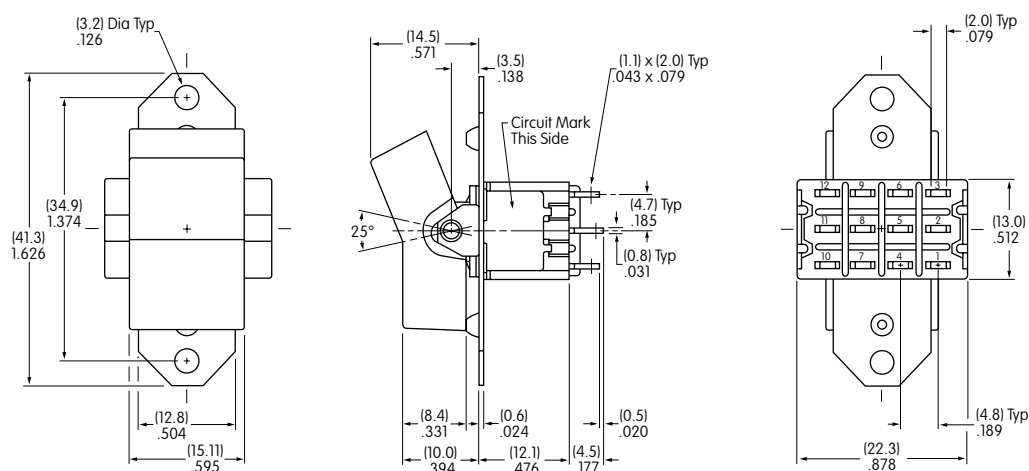
### TY Frame • Solder Lug



M2032YW01-JC

### Four Pole

### TY Frame • Solder Lug



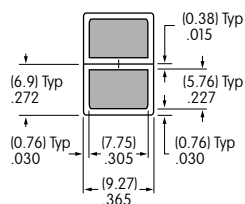
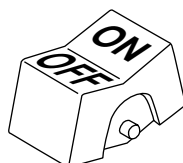
M2042YW01-JC

### LEGENDS

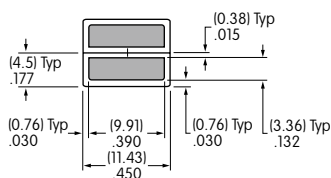
NKK Switches can provide custom legends for caps. Contact factory for more information.

#### Suggested Printable Area for Caps

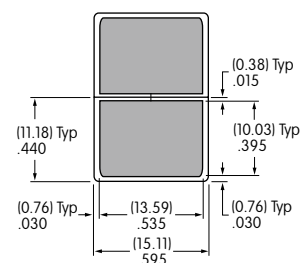
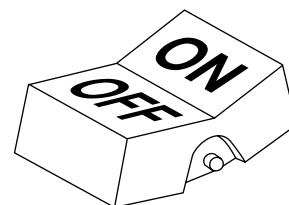
AT4148



AT4150



AT4156



Shaded areas are printable areas.

#### Recommended Print Method:

Pad Print

Epoxy based ink is recommended.

## Данный компонент на территории Российской Федерации

**Вы можете приобрести в компании MosChip.**

Для оперативного оформления запроса Вам необходимо перейти по данной ссылке:

<http://moschip.ru/get-element>

Вы можете разместить у нас заказ для любого Вашего проекта, будь то серийное производство или разработка единичного прибора.

В нашем ассортименте представлены ведущие мировые производители активных и пассивных электронных компонентов.

Нашей специализацией является поставка электронной компонентной базы двойного назначения, продукции таких производителей как XILINX, Intel (ex.ALTERA), Vicor, Microchip, Texas Instruments, Analog Devices, Mini-Circuits, Amphenol, Glenair.

Сотрудничество с глобальными дистрибьюторами электронных компонентов, предоставляет возможность заказывать и получать с международных складов практически любой перечень компонентов в оптимальные для Вас сроки.

На всех этапах разработки и производства наши партнеры могут получить квалифицированную поддержку опытных инженеров.

Система менеджмента качества компании отвечает требованиям в соответствии с ГОСТ Р ИСО 9001, ГОСТ РВ 0015-002 и ЭС РД 009

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