

# General Specifications

## Electrical Capacity (Resistive Load)

|                                                  |                                                                                           |
|--------------------------------------------------|-------------------------------------------------------------------------------------------|
| <b>Power Level (silver):</b>                     | 3A @ 125V AC                                                                              |
| <b>Logic Level (gold):</b>                       | 0.4VA maximum @ 28V AC/DC maximum (Applicable Range 0.1mA ~ 0.1A @ 20mV ~ 28V)            |
| <b>Logic/Power Level:<br/>(gold over silver)</b> | Combines silver & gold ratings                                                            |
|                                                  | Note: Find additional explanation of dual rating & operating range in Supplement section. |

## Other Ratings

|                                 |                                                                                                                            |
|---------------------------------|----------------------------------------------------------------------------------------------------------------------------|
| <b>Contact Resistance:</b>      | 20 milliohms maximum for silver; 30 milliohms maximum for gold                                                             |
| <b>Insulation Resistance:</b>   | 1,000 megohms minimum @ 500V DC                                                                                            |
| <b>Dielectric Strength:</b>     | 1,000V AC minimum between contacts for 1 minute minimum;<br>1,500V AC minimum between contacts & case for 1 minute minimum |
| <b>Mechanical Life:</b>         | 200,000 operations minimum                                                                                                 |
| <b>Electrical Life:</b>         | 25,000 operations minimum for silver; 100,000 operations minimum for gold                                                  |
| <b>Nominal Operating Force:</b> | Single pole 2.45N; double pole 3.92N                                                                                       |
| <b>Travel</b>                   | Pretravel .024" (0.6mm); Overtravel .016" (0.4mm); Total Travel .039" (1.0mm)                                              |

## Materials & Finishes

|                             |                                                                                                                             |
|-----------------------------|-----------------------------------------------------------------------------------------------------------------------------|
| <b>Plunger:</b>             | Brass with nickel plating                                                                                                   |
| <b>Bushing:</b>             | Brass with nickel plating                                                                                                   |
| <b>Frame:</b>               | Stainless steel                                                                                                             |
| <b>Case:</b>                | Polybutylene terephthalate (PBT) (UL94V-0)                                                                                  |
| <b>Base:</b>                | Diallyl phthalate resin (UL94V-0)                                                                                           |
| <b>Movable Contactor:</b>   | Phosphor bronze with silver or gold plating                                                                                 |
| <b>Movable Contacts:</b>    | Silver alloy (code W); copper with gold plating (code G); or silver alloy with gold plating (code A)                        |
| <b>Stationary Contacts:</b> | Silver alloy with silver plating (code W); copper or brass with gold plating (code G); or silver with gold plating (code A) |
| <b>Terminals:</b>           | Copper or brass with silver plating; copper or brass with gold plating                                                      |

## Environmental Data

|                              |                                                                                                                                              |
|------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Operating Temp Range:</b> | -30°C through +85°C (-22°F through +185°F)                                                                                                   |
| <b>Humidity:</b>             | 90 ~ 95% humidity for 96 hours @ 40°C (104°F)                                                                                                |
| <b>Vibration:</b>            | 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 |
| <b>Shock:</b>                | 50G (490m/s <sup>2</sup> ) acceleration (tested in 6 right angled directions, with 3 shocks in each direction)                               |

## Installation

|                                |                                                                                                                                           |
|--------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Mounting Torque:</b>        | 1.5Nm (13.0 lb•in) for double nut; 0.7Nm (6.0 lb•in) for single nut                                                                       |
| <b>Cap Installation Force:</b> | 80.0N (18.0 lbf) maximum downward force on actuator                                                                                       |
| <b>Soldering:</b>              | Wave Soldering (PC version): See Profile B in Supplement section.<br>Manual Soldering: See Profile B in Supplement section.               |
| <b>Cleaning:</b>               | These devices are not process sealed. Hand clean locally using alcohol based solution. See Cleaning Specifications in Supplement section. |

## Standards & Certifications

|                                |                                                                                                                                                                                                                                                                                                                         |
|--------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Flammability Standards:</b> | UL94V-0 case & base                                                                                                                                                                                                                                                                                                     |
| <b>UL:</b>                     | <b>File No. E44145 - Recognized only when ordered with marking on switch.</b><br>Add "/U" or "/CUL" before dash in part number to order UL recognized switch.<br>All single and double pole models recognized at 3A @ 125V AC or 0.4VA max. @ 28V DC max.                                                               |
| <b>CSA:</b>                    | <b>File No. 023535_0_000 - Certified only when ordered with marking on switch.</b><br>Add "/C" before dash in part number to order CSA certified switch.<br>Single pole models with PC, solder lug, or Wirewrap terminals & double pole with PC or Wirewrap terminals certified at 3A @ 125V AC or 0.4VA @ 28V maximum. |

## Distinctive Characteristics

Snap-acting mechanism gives smooth actuation, short stroke, light touch, and audible feedback. This mechanism also provides long mechanical life.

High torque bushing construction prevents rotation or separation from frame during installation.

Antijamming design protects contacts from damage due to excessive downward force on the actuator.

Compatible companions with M series toggles. Body, bushing, and footprint dimensions ideal for mounting MB2400 pushbuttons and M toggles next to one another.

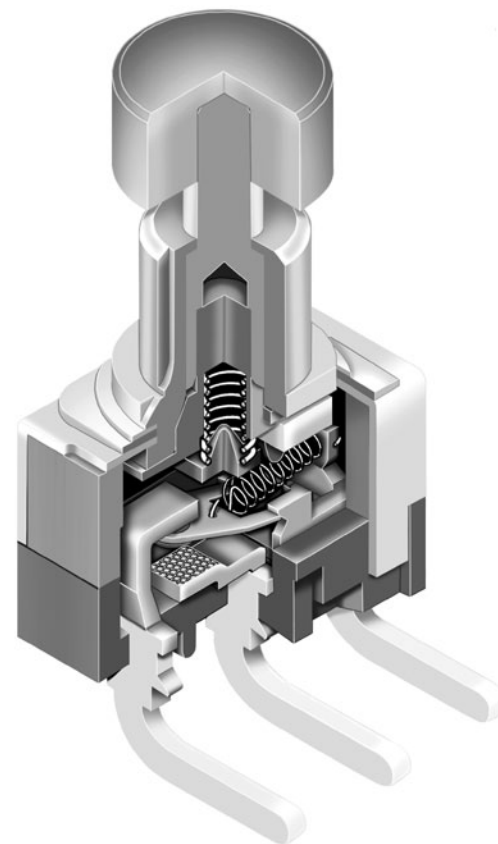
Stainless steel frame resists corrosion.

Longer center solder lug terminal simplifies wiring and soldering.

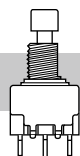
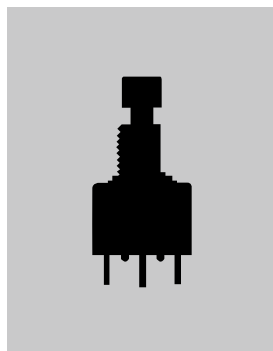
Silver contacts of specially composed alloy for hardness.

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

Prominent external insulating barriers increase insulation resistance and dielectric strength.

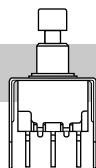


Actual Size



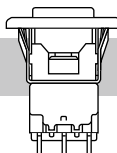
Bushing Mount

Page C98



Bracket PC Mount

Page C102



Snap-in Mount

Page C108

TYPICAL SWITCH ORDERING EXAMPLE

MB24

11

J

W

01

C

| Poles & Circuits |      |    |      |
|------------------|------|----|------|
| 11               | SPDT | ON | (ON) |
| 61               | DPDT | ON | (ON) |
| ( ) = Momentary  |      |    |      |

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

| Cap & Cap Colors |        |
|------------------|--------|
| A                | Black  |
| B                | White  |
| C                | Red    |
| E                | Yellow |
| F                | Green  |
| G                | Blue   |
| H                | Gray   |

| Mounting Frame |               |
|----------------|---------------|
| J              | Snap-in Frame |

| Terminals |                            |
|-----------|----------------------------|
| 01        | Solder Lug*                |
| 03        | .250" (6.35mm) Straight PC |
| 05        | .425" (10.8mm) Wirewrap    |
| 06        | .750" (19.05mm) Wirewrap   |
| 07        | .964" (24.5mm) Wirewrap    |

!

**IMPORTANT:**

Switches are supplied without UL, cULus & CSA marking unless specified. **UL, cULus & 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

3

A

C F

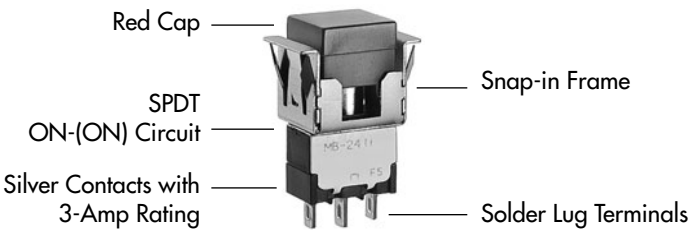
| Optional Bezels                 |                               |
|---------------------------------|-------------------------------|
| 1                               | Bezel without LEDs            |
| *2                              | Bezel with 1 Round LED        |
| *3                              | Bezel with 2 Round LEDs       |
| *4                              | Bezel with 2 Rectangular LEDs |
| * Available in Black color only |                               |

| Bezel Colors |        |
|--------------|--------|
| A            | Black  |
| B            | White  |
| C            | Red    |
| E            | Yellow |
| F            | Green  |
| G            | Blue   |
| H            | Gray   |

| LED Colors |            |
|------------|------------|
| 1 LED      |            |
| C          | Red        |
| F          | Green      |
| 2 LEDs     |            |
| Top LED    | Bottom LED |
| C          | Red        |
| E          | Yellow     |
| F          | Green      |

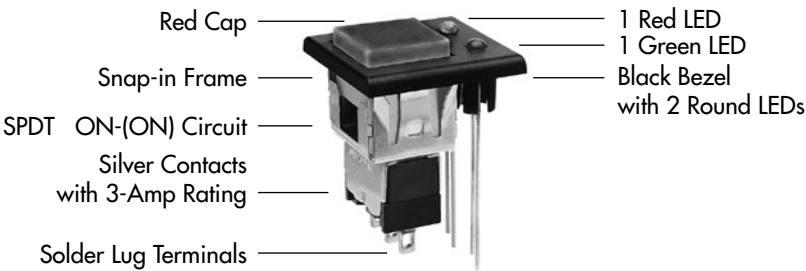
DESCRIPTION FOR TYPICAL ORDERING EXAMPLE

MB2411JW01-C



DESCRIPTION FOR TYPICAL ORDERING EXAMPLE

MB2411JW01-C-3A-CF



### POLES & CIRCUITS

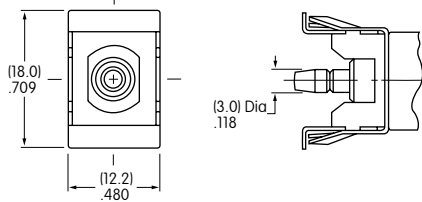
| Pole | Model  | Plunger Position<br>( ) = Momentary |      | Connected Terminals |         | Throw & Switch Schematics |
|------|--------|-------------------------------------|------|---------------------|---------|---------------------------|
|      |        | Normal                              | Down | Normal              | Down    |                           |
| SP   | MB2411 | ON                                  | (ON) | 1-3                 | 1-2     | SPDT<br>                  |
| DP   | MB2461 | ON                                  | (ON) | 1-3 4-6             | 1-2 4-5 | DPDT<br>                  |

Note: Terminal numbers are not actually on the switch.

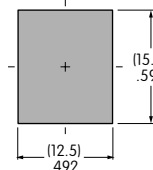
### MOUNTING FRAME

**J**

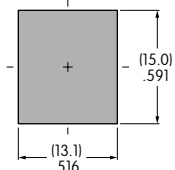
#### Snap-in Frame



Panel Cutout  
for Single Pole  
without Bezel



Panel Cutout  
for Double Pole  
without Bezel



Panel Thickness without Bezel: .039" ~ .157" (1.0mm ~ 4.0mm)

Panel Thickness with Bezel: .039" ~ .126" (1.0mm ~ 3.2mm)

### CONTACT MATERIALS & RATINGS

**W**

Silver over Silver

Power Level

3A @ 125V AC

**G**

Gold over Brass or Copper

Logic Level

0.4VA maximum @ 28V AC/DC maximum

Note: Complete explanation of operating range in Supplement section.

**A**

Gold over Silver

Power Level  
or Logic Level

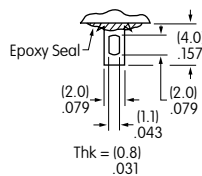
3A @ 125V AC  
or 0.4VA maximum @ 28V AC/DC maximum

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 for complete explanation of dual rating and operating range.

### TERMINALS

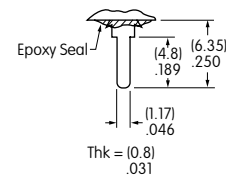
**01**

Solder Lug



**03**

.250" (6.35mm)  
Straight PC



#### Wirewrap or Extended PC

**05**

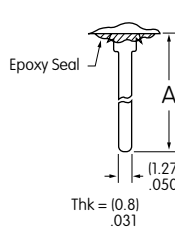
.425"  
(10.8mm)

**06**

.750"  
(19.05mm)

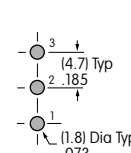
**07**

.964"  
(24.5mm)

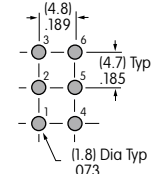


Refer to footprints if using  
as extended PC terminal.

Dimension A = terminal  
lengths as shown beside  
the code boxes at left.



Single Pole

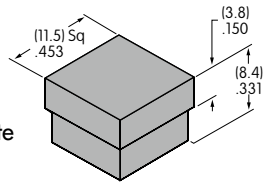


Double Pole

## CAP & CAP COLORS

### AT465 .453" (11.5mm) Square Cap

Material: Polycarbonate  
Finish: Glossy



Contact factory  
for matte finish.

Legend details  
at end of this  
section.

**A**

Black

**B**

White

**C**

Red

**E**

Yellow

**F**

Green

**G**

Blue

**H**

Gray

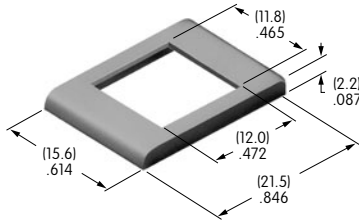
## OPTIONAL SNAP-IN BEZELS & BEZEL COLORS

**1**

### AT207 Bezel

Material: Polycarbonate  
Finish: Glossy

Contact factory for matte  
finish.



**A**

Black

**B**

White

**C**

Red

**E**

Yellow

**F**

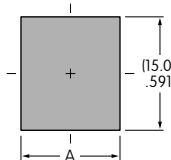
Green

**G**

Blue

**H**

Gray



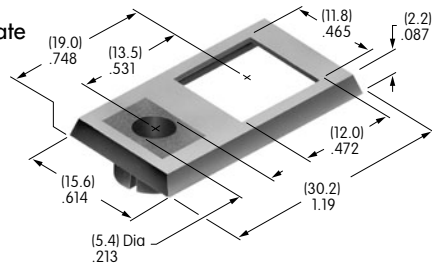
|   | Single Pole       | Double Pole       |
|---|-------------------|-------------------|
| A | (12.5)mm<br>.492" | (13.1)mm<br>.516" |

**2**

### AT208 Bezel for AT070 LED

Material: Polycarbonate  
Finish: Glossy

Contact factory for  
matte finish.

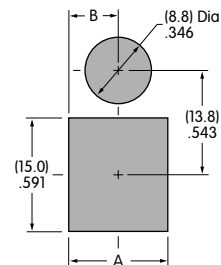


**A**

Black

LED colors & specifications  
on next page.

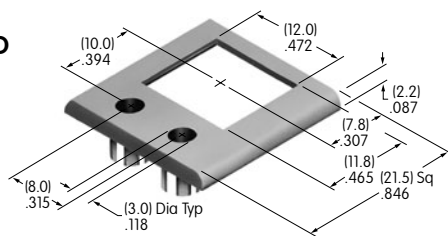
|   | Single Pole       | Double Pole       |
|---|-------------------|-------------------|
| A | (12.5)mm<br>.492" | (13.1)mm<br>.516" |
| B | (6.25)mm<br>.246" | (6.55)mm<br>.258" |



**3**

### AT212 Bezel for AT617 LED

Material:  
Polycarbonate  
Finish:  
Semi-glossy

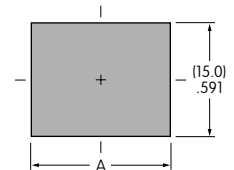


**A**

Black

LED colors & specifications  
on next page.

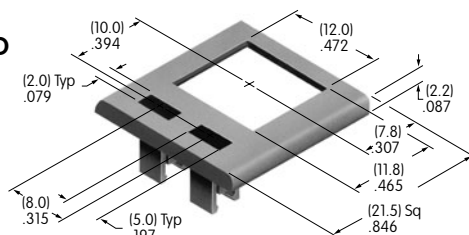
|   | Single Pole       | Double Pole       |
|---|-------------------|-------------------|
| A | (18.4)mm<br>.724" | (18.7)mm<br>.736" |



**4**

### AT213 Bezel for AT618 LED

Material:  
Polycarbonate  
Finish:  
Semi-glossy

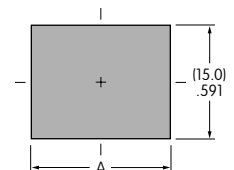


**A**

Black

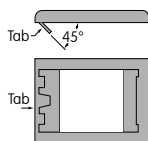
LED colors & specifications  
on next page.

|   | Single Pole       | Double Pole       |
|---|-------------------|-------------------|
| A | (18.4)mm<br>.724" | (18.7)mm<br>.736" |

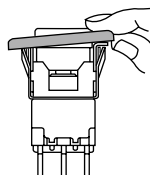


## Bezel Assembly

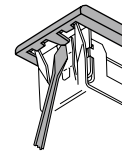
1. Pry out  
tab on  
bezel to a  
45° angle.



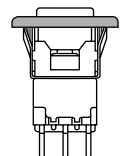
2. Insert  
switch frame  
under tab  
and snap  
on the bezel.



3. Push tab  
back into  
place.



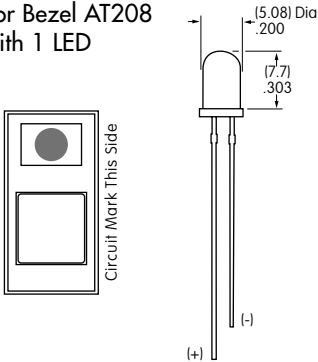
4. Snap  
assembled  
bezel and  
switch into  
panel.



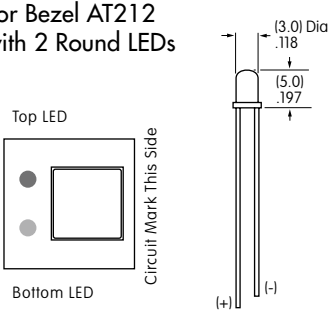
LED COLORS & SPECIFICATIONS

Bezel Orientation on Switch

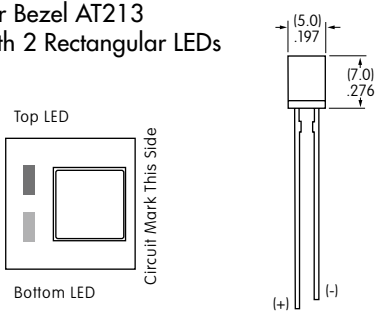
AT070 LED  
For Bezel AT208  
with 1 LED



AT617 LED  
For Bezel AT212  
with 2 Round LEDs



AT618 LED  
For Bezel AT213  
with 2 Rectangular LEDs



Note: Lead lengths may differ from manufacturing lot to lot. The longer lead is the anode (+).

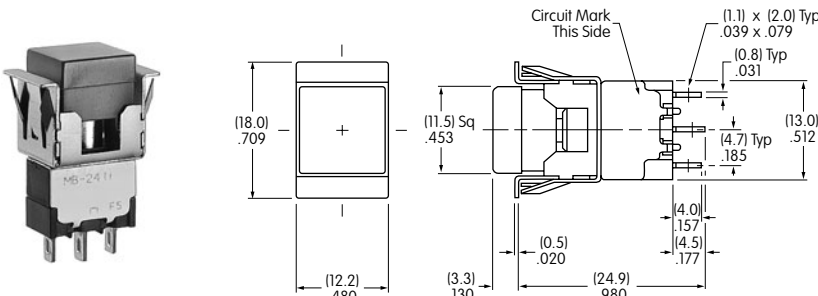
|                                                    |              | AT070        |            | AT617        |            |            | AT618        |            |            |
|----------------------------------------------------|--------------|--------------|------------|--------------|------------|------------|--------------|------------|------------|
|                                                    |              | C            | F          | C            | E          | F          | C            | E          | F          |
|                                                    | Color        | Red          | Green      | Red          | Yellow     | Green      | Red          | Yellow     | Green      |
| Forward Peak Current                               | $I_{FM}$     | 25mA         | 50mA       | 30mA         | 30mA       | 25mA       | 10mA         | 30mA       | 30mA       |
| Typical Forward Current                            | $I_F$        | 20mA         | 30mA       | 20mA         | 20mA       | 20mA       | 8mA          | 24mA       | 24mA       |
| Forward Voltage                                    | $V_F$        | 2.8V         | 2.1V       | 2.0V         | 2.1V       | 2.2V       | 1.9V         | 2.0V       | 2.1V       |
| Reverse Peak Voltage                               | $V_{RM}$     | 4V           | 5V         | 5V           | 5V         | 5V         | 5V           | 5V         | 5V         |
| Current Reduction Rate Above 25°C                  | $\Delta I_F$ | 0.33 mA/°C   | 0.40 mA/°C | 0.40 mA/°C   | 0.40 mA/°C | 0.33 mA/°C | 0.13 mA/°C   | 0.40 mA/°C | 0.40 mA/°C |
| Ambient Temperature Range (when used with a bezel) |              | -10° ~ +70°C |            | -15° ~ +70°C |            |            | -15° ~ +70°C |            |            |

The electrical specifications shown are determined at a basic temperature of 25°C.  
LED circuit is independent of switch operation. LED is colored in OFF state.

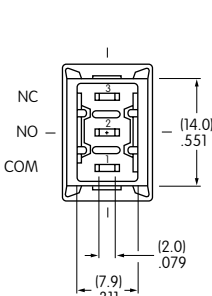
If the source voltage is greater than the rated voltage of the LED, a ballast resistor must be connected in series with the LED.  
The ballast resistor calculation and more lamp detail are shown in the Supplement section.

TYPICAL SWITCH DIMENSIONS

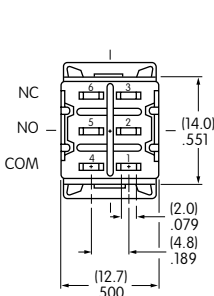
Solder Lug



Single Pole



Double Pole

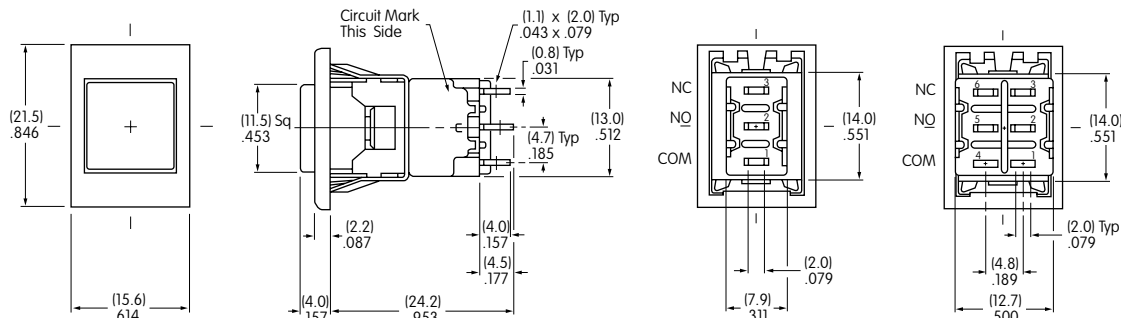


MB2411JW01-C

## TYPICAL SWITCH DIMENSIONS

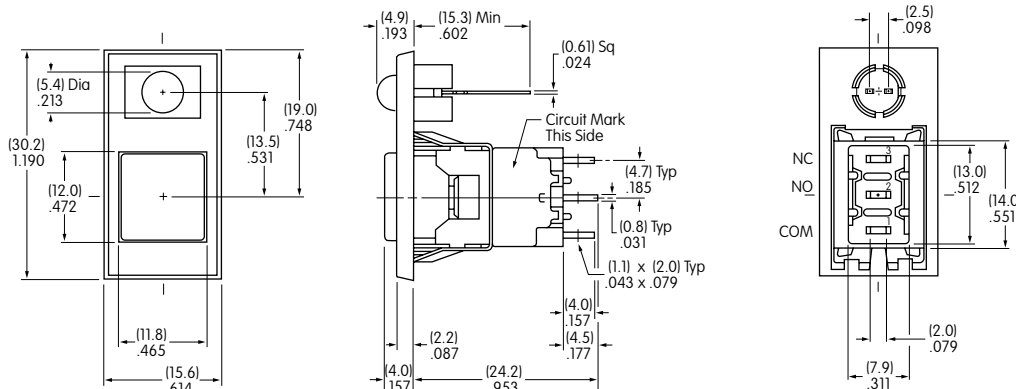
### Single & Double Pole

### Solder Lug • AT207 Bezel



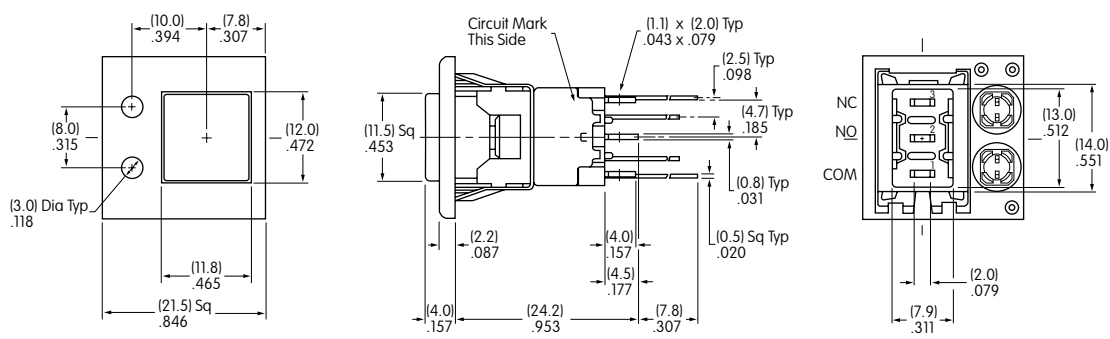
### Single Pole

### Solder Lug • AT208 Bezel



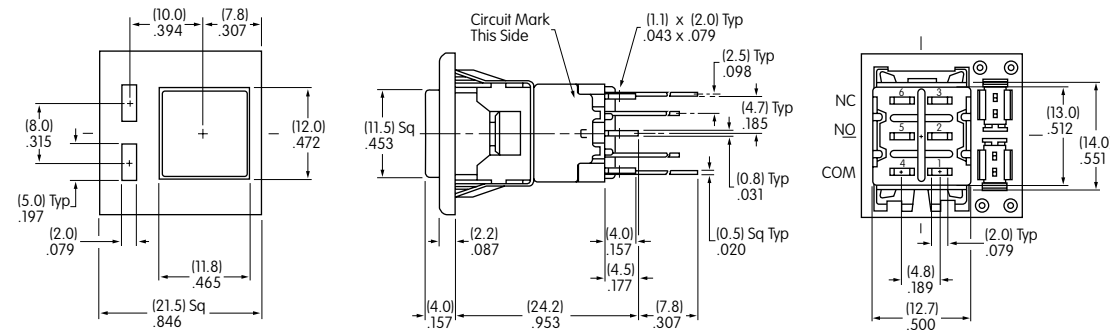
### Single Pole

### Solder Lug • AT212 Bezel



### Double Pole

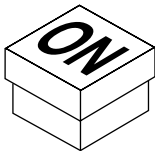
### Solder Lug • AT213 Bezel



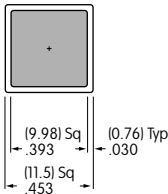
LEGENDS

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

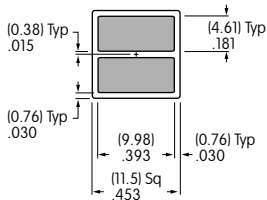
Suggested Printable Area for Cap



**Recommended Print Method:**  
Screen Print or Pad Print  
Epoxy based ink is recommended.



AT465



AT465

Shaded areas are printable areas.

## 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

### Офис по работе с юридическими лицами:

105318, г.Москва, ул.Щербаковская д.3, офис 1107, 1118, ДЦ «Щербаковский»

Телефон: +7 495 668-12-70 (многоканальный)

Факс: +7 495 668-12-70 (доб.304)

E-mail: [info@moschip.ru](mailto:info@moschip.ru)

Skype отдела продаж:

moschip.ru

moschip.ru\_4

moschip.ru\_6

moschip.ru\_9