

# General Specifications

## Electrical Capacity (Resistive Load)

<b>Power Level (silver):</b>	3A @ 125V AC for silver contacts
<b>Logic Level (gold):</b>	0.4VA maximum @ 28V AC/DC maximum for gold contacts (Applicable Range 0.1mA ~ 0.1A @ 20mV ~ 28V) Note: Find additional explanation of operating range in Supplement section.

## Other Ratings

<b>Contact Resistance:</b>	10 milliohms maximum for silver; 20 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; 1,500V AC minimum between contacts and case for 1 minute minimum
<b>Mechanical Life:</b>	100,000 operations minimum
<b>Electrical Life:</b>	25,000 operations minimum for silver; 50,000 operations minimum for gold
<b>Nominal Operating Force:</b>	Single Pole: 2.35N for Momentary and 2.65N for Alternate Action Double Pole: 2.94N for Momentary and 3.63N for Alternate Action
<b>Travel:</b>	Momentary: Pretravel .047" (1.2mm); Overtravel .016" (0.4mm); Total Travel .063" (1.6mm) Alternate: Pretravel .071" (1.8mm); Overtravel .016" (0.4mm); Total Travel .087" (2.2mm)

## Materials & Finishes

<b>Plunger:</b>	Brass with chrome plating for Momentary; brass with nickel plating for Alternate
<b>Bushing:</b>	Brass with nickel plating
<b>Frame:</b>	Stainless steel
<b>Case:</b>	Melamine phenolic resin (UL94V-0)
<b>Movable Contacts:</b>	Copper with silver or gold plating
<b>Stationary Contacts:</b>	Silver with silver or gold plating
<b>Terminals:</b>	Copper with silver or gold plating

## Environmental Data

<b>Operating Temp Range:</b>	-10°C through +70°C (+14°F through +158°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 5 shocks in each direction)

## Installation

<b>Mounting Torque:</b>	1.47Nm (13.0 lb•in) for double nut; 0.68Nm (6.0 lb•in) for single nut
<b>Cap Installation Force:</b>	78.5N (17.65 lbf) maximum downward force on actuator
<b>Soldering Time &amp; Temp:</b>	Wave Solder (Straight PC): See Profile B in Supplement section. Manual Soldering: See Profile B in Supplement section.
<b>Cleaning:</b>	These devices are not process sealed. Hand clean locally using alcohol based solution.

## Standards & Certifications

<b>Flammability Standards:</b>	UL94V-0 case
<b>UL:</b>	File No. E44145 All single and double pole models recognized at 3A @ 125V AC. Add "/U" to end of part number to order UL mark on switch. Add "/CUL" to end of part number to order cULus mark on switch.
<b>CSA:</b>	File No. 023535_0_000 Single pole solder lug and PC models certified at 3A @ 125V AC; double pole PC models certified at 3A @ 125V AC. Add "/C" to end of part number to order CSA mark on switch.

# Distinctive Characteristics

Power and logic level capabilities available to suit varying applications.

Bushing and snap-in mount versions available; snap-in models offer many style and color choices to enhance front panel appearance.

Light touch actuation.

High torque bushing prevents rotation and separation from metal frame during installation.

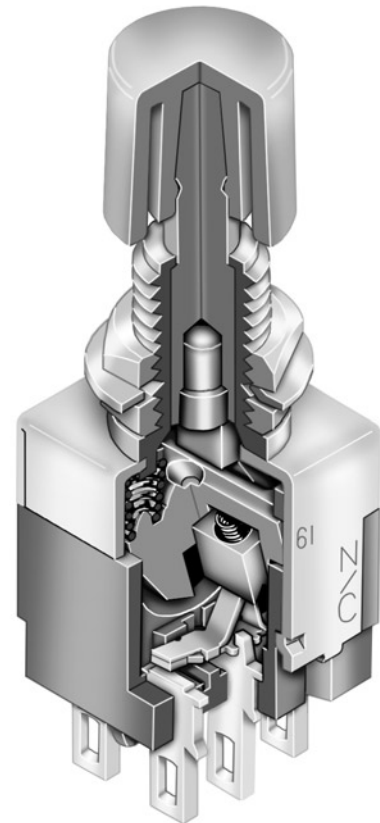
Stainless steel frame resists corrosion.

Case of heat resistant resin meets UL 94V-0 flammability rating.

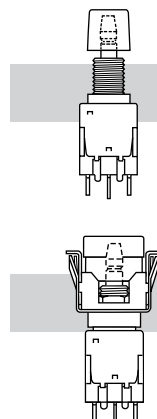
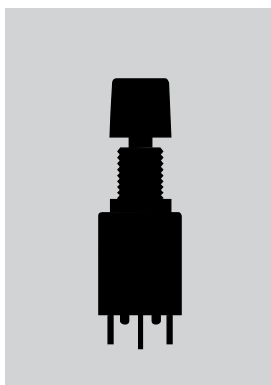
Higher insulating barriers protect against crossover in double pole devices.

1,500V dielectric strength between contacts and case is accomplished by clinching the frame away from the terminals.

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



Actual Size



Bushing Mount

Page C26

Snap-in Mount

Page C30

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

## TYPICAL SWITCH ORDERING EXAMPLES

**EB20** — **11** — **B** — **J23**

Poles & Circuits			
11	SPDT	ON	(ON)
65	SPDT	ON	ON
61	DPDT	ON	(ON)
85	DPDT	ON	ON
( ) = Momentary			

Contacts, Ratings, & Terminals	
<b>No Code</b>	Silver Contacts; Solder Lug Terminals* 3A @ 125V AC
<b>G</b>	Gold Contacts; Solder Lug Terminals* 0.4VA max @ 28V AC/DC max
<b>P</b>	Silver Contacts; Straight PC Terminals; 3A @ 125V AC
<b>PG</b>	Gold Contacts; Straight PC Terminals 0.4VA max @ 28V AC/DC max

Cap Colors	
<b>A</b>	Black
<b>B</b>	White
<b>C</b>	Red
<b>E</b>	Yellow
<b>F</b>	Green
<b>G</b>	Blue
<b>H</b>	Gray

Cap Extensions & Bezel Types				
Low Rise		High Rise		Description
Momentary	Alternate	Momentary	Alternate	
<b>J20</b>	<b>J30</b>	<b>J40</b>	<b>J50</b>	Without Bezel
<b>J21</b>	<b>J31</b>	<b>J41</b>	<b>J51</b>	Bezel without LED
<b>J22</b>	<b>J32</b>	<b>J42</b>	<b>J52</b>	Bezel with 1 Round LED
<b>J23</b>	<b>J33</b>	<b>J43</b>	<b>J53</b>	Bezel with 2 Round LEDs
<b>J24</b>	<b>J34</b>	<b>J44</b>	<b>J54</b>	Bezel with 2 Rectangular LEDs

\* Wire harness & cable assemblies offered only in Americas

**IMPORTANT:**

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

**A** — **C F**

Bezel Colors			
Bezel without LEDs			
<b>A</b>	Black	<b>F</b>	Green
<b>B</b>	White	<b>G</b>	Blue
<b>C</b>	Red	<b>H</b>	Gray
<b>E</b>	Yellow		

Bezel with 1 Round LED	
<b>A</b>	Black

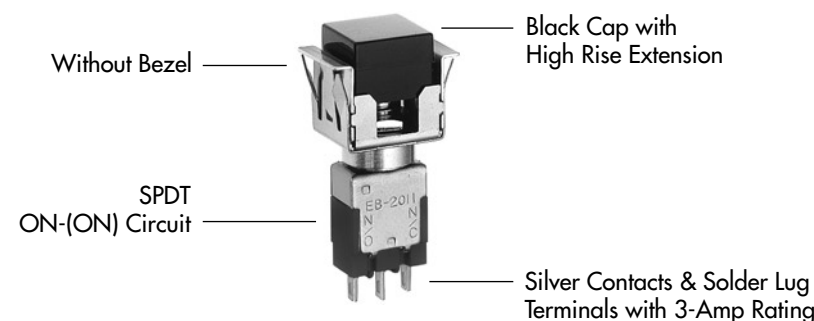
Bezel with 2 Round or Rectangular LEDs	
<b>A</b>	Black

1 LED	
<b>C</b>	Red
<b>F</b>	Green

2 LEDs			
Top LED		Bottom LED	
<b>C</b>	Red	<b>C</b>	Red
<b>E</b>	Yellow	<b>E</b>	Yellow
<b>F</b>	Green	<b>F</b>	Green

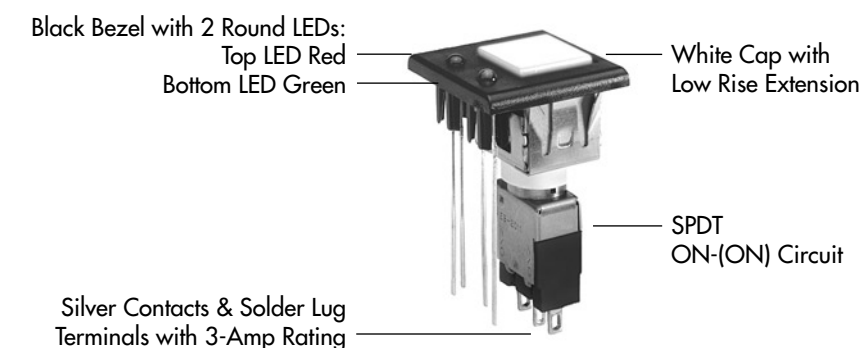
### DESCRIPTION FOR TYPICAL ORDERING EXAMPLE WITHOUT BEZEL

**EB2011-A-J40**



### DESCRIPTION FOR TYPICAL ORDERING EXAMPLE WITH BEZEL

**EB2011-B-J23ACF**



Toggles

Rockers

Pushbuttons

Illuminated PB

Programmable

Keylocks

Rotaries

Slides

Tactiles

Tilt

Touch

Indicators

Accessories

Supplement

## POLES & CIRCUITS

		Plunger Position ( ) = Momentary		Connected Terminals		Throw & Switch Schematics
Pole	Model	Normal 	Down 	Normal 	Down 	
SP	EB2011 EB2065	ON ON	(ON) ON	2-3	2-1	SPDT 
DP	EB2061 EB2085	ON ON	(ON) ON	2-3 5-6	2-1 5-4	DPDT 

Note: Terminal numbers are not actually on the switch.

## CONTACT MATERIALS, RATINGS, & TERMINALS



**Solder Lug  
Silver Contacts**

**Power Level**

**3A @ 125V AC**

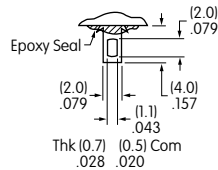


**Solder Lug  
Gold Contacts**

**Logic Level**

**0.4VA maximum @ 28V AC/DC maximum**

Complete explanation of operating range in Supplement section.



**Straight PC  
Silver Contacts**

**Power Level**

**3A @ 125V AC**



**Straight PC  
Gold Contacts**

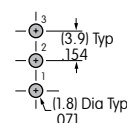
**Logic Level**

**0.4VA maximum @ 28V AC/DC maximum**

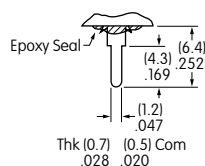
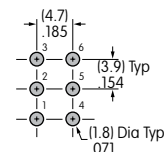
Complete explanation of operating range in Supplement section.

### PCB Footprints

Single Pole



Double Pole



## CAP COLORS

Factory Assembled on the Switch:  
 Square snap-on cap AT465, snap-in moulder  
 AT529, and optional bezels which follow.

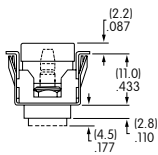
- |                |                |               |                 |
|----------------|----------------|---------------|-----------------|
| <b>A</b> Black | <b>B</b> White | <b>C</b> Red  | <b>E</b> Yellow |
| <b>F</b> Green | <b>G</b> Blue  | <b>H</b> Gray |                 |

## CAP EXTENSIONS & BEZEL TYPES

Cap Extension without Bezel

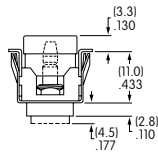
**J20**

Low Rise Momentary



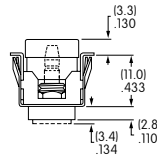
**J30**

Low Rise Alternate



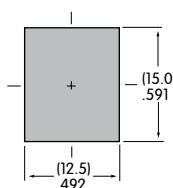
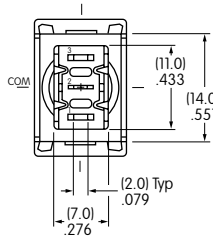
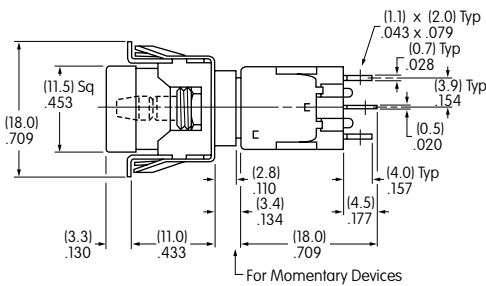
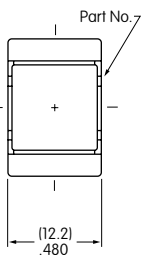
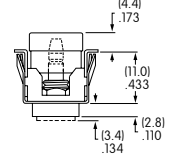
**J40**

High Rise Momentary



**J50**

High Rise Alternate



Maximum Panel Thickness  
 .039" ~ .157" (1.0mm ~ 4.0mm)  
 Cutout applies to SP & DP



High Rise

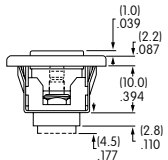
Single Pole

**EB2011-A-J40**

Cap Extension with Bezel

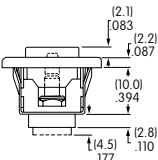
**J21**

Low Rise Momentary



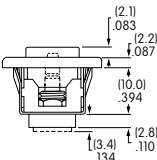
**J31**

Low Rise Alternate



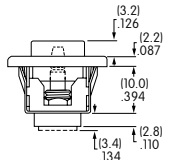
**J41**

High Rise Momentary



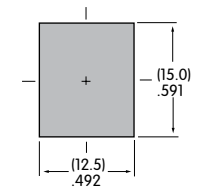
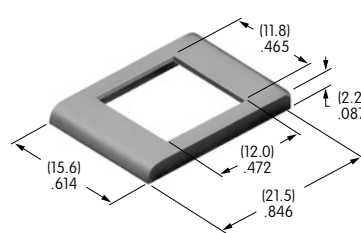
**J51**

High Rise Alternate

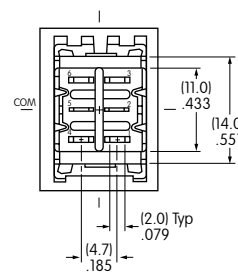
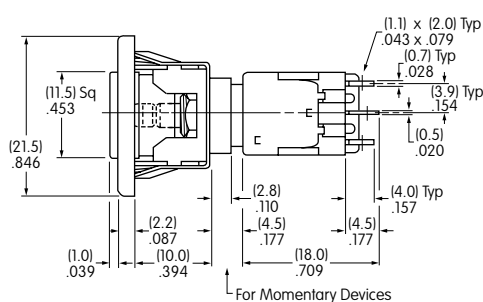
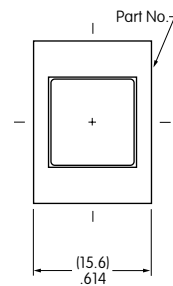


AT207 Bezel without LED

- |                 |                |                            |                   |
|-----------------|----------------|----------------------------|-------------------|
| <b>E</b> Yellow | <b>F</b> Green | Material:<br>Polycarbonate |                   |
| <b>A</b> Black  | <b>G</b> Blue  |                            | Finish:<br>Glossy |
| <b>B</b> White  | <b>H</b> Gray  |                            |                   |
| <b>C</b> Red    |                |                            |                   |



Maximum Panel Thickness  
 .039" ~ .126" (1.0mm ~ 3.2mm)  
 Cutout applies to SP & DP



Low Rise

Double Pole

**EB2061-B-J21A**

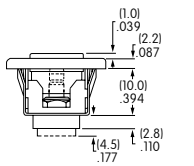
Toggles  
 Rockers  
 Pushbuttons  
 Illuminated PB  
 Programmable  
 Keylocks  
 Rotaries  
 Slides  
 Tactiles  
 Tilt  
 Touch  
 Indicators  
 Accessories  
 Supplement

## CAP EXTENSIONS & BEZEL TYPES

**Cap Extension with Bezel**

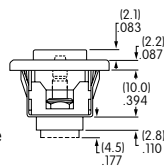
**J22**

Low Rise Momentary



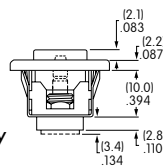
**J32**

Low Rise Alternate



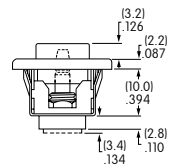
**J42**

High Rise Momentary



**J52**

High Rise Alternate

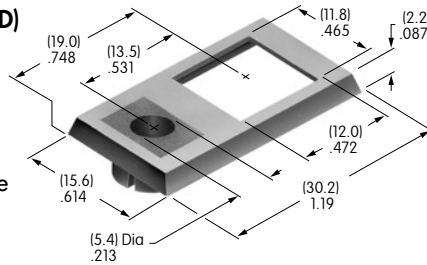


**AT208 Bezel with 1 Round LED (AT070 LED)**

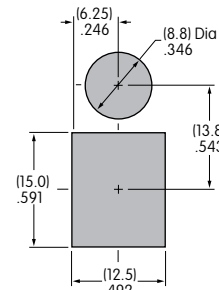
**A**

Black

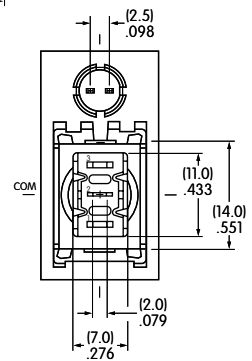
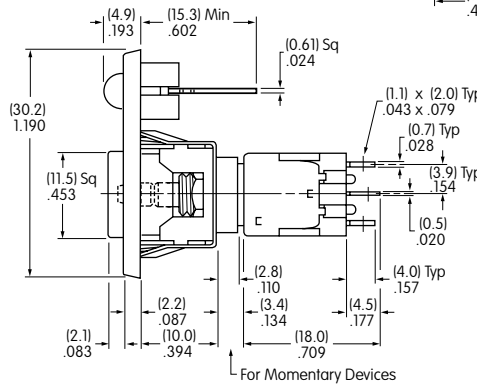
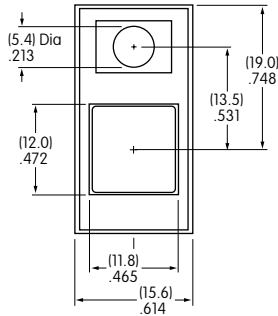
Material: Polycarbonate  
Finish: Glossy



Maximum Panel Thickness  
.039" ~ .126"  
(1.0mm ~ 3.2mm)  
Cutout applies to SP & DP



LED colors and specifications on next to last page of this EB section.



**EB2011-B-J42AC**

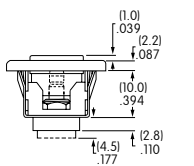
High Rise

Single Pole

**Cap Extension with Bezel**

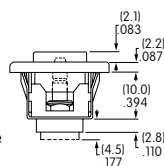
**J23**

Low Rise Momentary



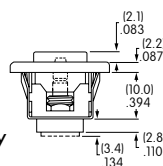
**J33**

Low Rise Alternate



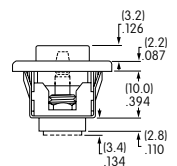
**J43**

High Rise Momentary



**J53**

High Rise Alternate

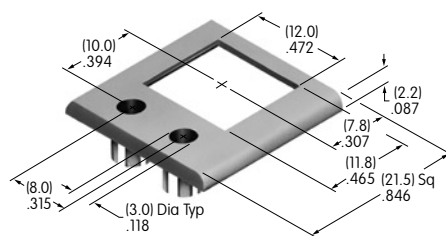


**AT212 Bezel with 2 Round LEDs (AT617 LEDs)**

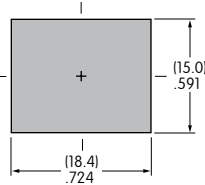
**A**

Black

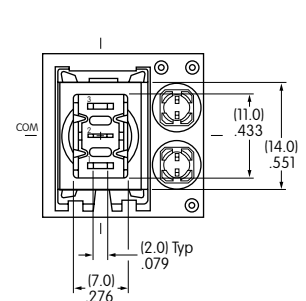
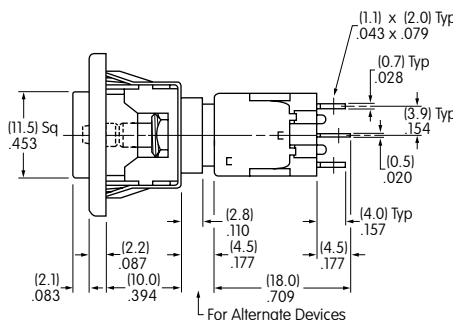
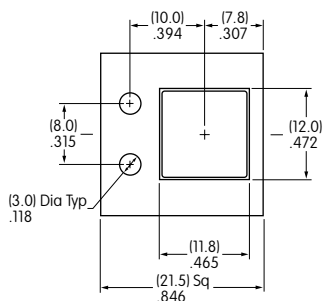
Material: Polycarbonate  
Finish: Glossy



Maximum Panel Thickness  
.039" ~ .126" (1.0mm ~ 3.2mm)  
Cutout applies to SP & DP



LED colors and specifications on next to last page of this EB section.



**EB2065-B-J33ACF**

Low Rise

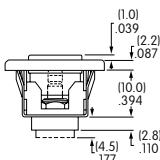
Single Pole

## CAP EXTENSIONS & BEZEL TYPES

Cap Extension with Bezel

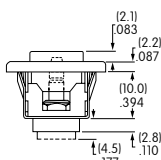
**J24**

Low Rise Momentary



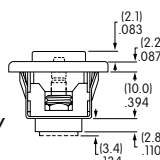
**J34**

Low Rise Alternate



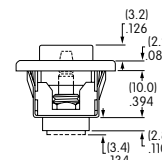
**J44**

High Rise Momentary



**J54**

High Rise Alternate

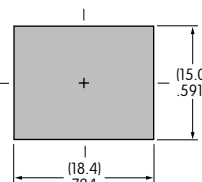
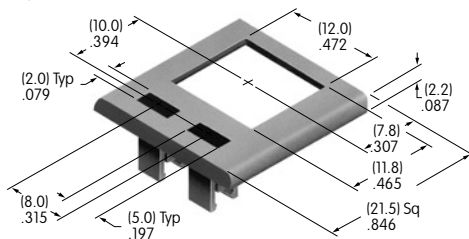


AT213 Bezel with 2 Rectangular LEDs (AT618 LEDs)

**A**

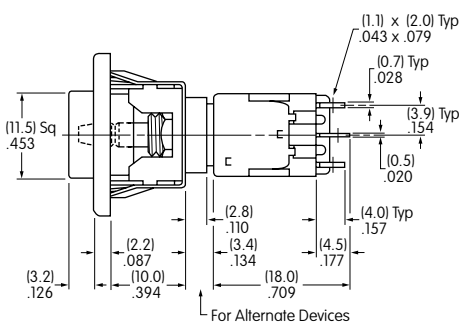
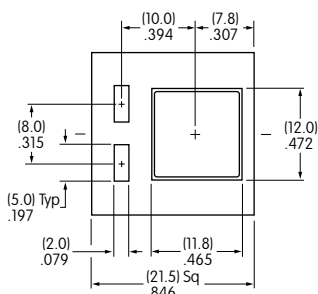
Black

Material: Polycarbonate  
Finish: Glossy

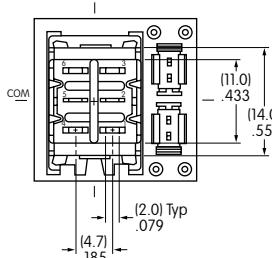


Maximum Panel Thickness  
.039" ~ .126" (1.0mm ~ 3.2mm)  
Cutout applies to SP & DP

LED colors and specifications on next page of this EB section.



High Rise



Double Pole



EB2085-B-J54ACF

Toggles

Rockers

**C** Pushbuttons

Illuminated PB

Programmable

Keylocks

Rotaries

Slides

Tactiles

Tilt

Touch

Indicators

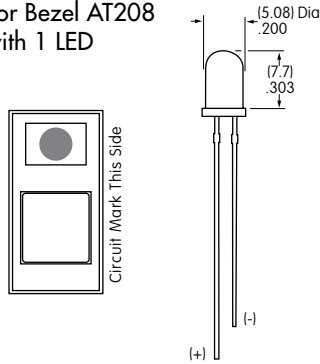
Accessories

Supplement

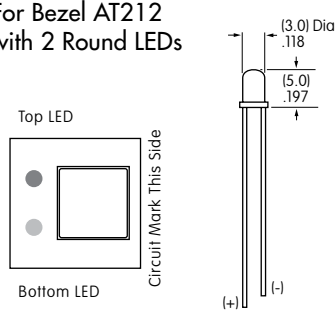
## LED COLORS & SPECIFICATIONS

### Bezel Orientation on Switch

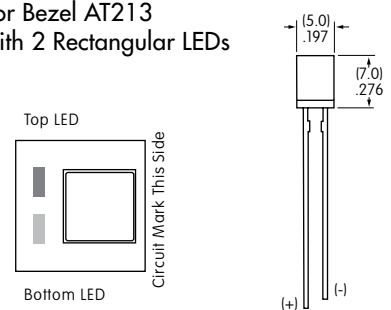
**AT070 LED**  
For Bezel AT208  
with 1 LED



**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	30mA	30mA	30mA	25mA	10mA	30mA	30mA
Continuous Forward Current	$I_F$	20mA	20mA	24mA	24mA	20mA	8mA	24mA	24mA
Forward Voltage	$V_F$	2.8V	2.1V	2.0V	2.0V	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.

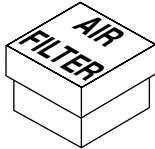
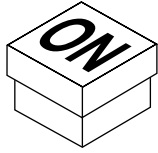
If the source voltage is greater than the rated voltage of the LED, a ballast resistor must be connected in series with the lamp.  
The ballast resistor calculation and more lamp detail are shown in the Supplement section.



## LEGENDS

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

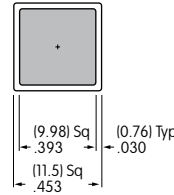
### Suggested Printable Area for Cap



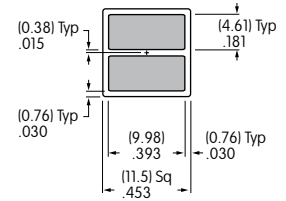
#### Recommended Print Method:

Screen Print or Pad Print

Epoxy based ink is recommended.



AT465



AT465

Shaded areas are printable areas.

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