## General Specifications

### Electrical Capacity (Resistive Load)
- **Power Level (silver):** 5A @ 125/250V AC or 5A @ 30V DC
- **Logic Level (gold):** 0.4VA maximum @ 28V AC/DC maximum
  (Applicable Range 0.1mA – 0.1A @ 20mV – 28V)
  
  **Note:** Find additional explanation of operating range in Supplement section.

### Other Ratings
- **Contact Resistance:** 50 millionths maximum for silver; 100 millionths maximum for gold
- **Insulation Resistance:** 200 megohms minimum @ 500V DC
- **Dielectric Strength:** 1,000V AC minimum between contacts for 1 minute minimum;
  1,500V AC minimum between contacts & case for 1 minute minimum
- **Mechanical Life:** 1,000,000 operations minimum for momentary;
  200,000 operations minimum for alternate action
- **Electrical Life:** 10,000 operations minimum for silver;
  200,000 operations minimum for gold
- **Nominal Operating Force:**
  - Single Pole: 1.90N
  - Double Pole: 2.55N
- **Contact Timing:**
  - Break before make
- **Travel:**
  - Pretravel .067” (1.7mm); Overtravel .024” (0.6mm); Total Travel .091” (2.3mm)

### Materials & Finishes
- **Housing/Bezel:** Glass fiber reinforced polyamide (UL94V-0)
- **Snap-in Frame:** Stainless steel
- **Movable Contactor:** Phosphor bronze
- **Movable Contacts:** Silver alloy or copper with gold plating
- **Stationary Contacts:** Silver alloy or copper with gold plating
- **Switch Terminals:** Phosphor bronze with silver or gold plating
- **Lamp Terminals:** Brass with tin plating
- **Base:** Glass fiber reinforced liquid crystal polymer (UL94V-0)

### Environmental Data
- **Operating Temperature Range:**
  - Illuminated: –25°C through +50°C (–13°F through +122°F)
  - Nonilluminated: –25°C through +70°C (–13°F through +158°F)
- **Humidity:** 90 ~ 95% humidity for 240 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/s²) acceleration (tested in 6 right angled directions, with 5 shocks in each direction)

### Installation
- **Cap Installation Force:** 15.0N maximum downward force on cap

### Processing
- **Soldering:** Wave Soldering (PC version): See Profile A in Supplement section.
  Manual Soldering: See Profile A in Supplement section.
- **Cleaning:** These devices are not process sealed. Hand clean locally using alcohol based solution.

### Standards & Certifications
- **Flammability Standards:** UL94V-0 housing/bezel & base
- **UL:** File No. E44145 - Recognized only when ordered with marking on switch.
  Add “/U” or “/CUL” before dash in part number to order UL recognized switch.
  UL recognized only when ordered switch body with cap assembled.
  All single & double pole models recognized at 5A @ 125/250V AC or 0.014A @ 28V DC.
Distinctive Characteristics

Wide selection of illumination effects is achieved with single and bicolor, 1- or 6-element LEDs in flat, beveled, or sculptured caps.

Alternating legends in choice of sculptured or flat caps, combined with super bright bicolor LED.

Combination of PCB mountability and short body allows use in compact applications.

Small behind panel dimension for snap-in mounting in tight spaces.

Snap-acting contact mechanism provides sensitive actuation with audible feedback; quick-make, quick-break characteristic limits arcing and prolongs electrical life.

Latchdown mechanism, independent of switching mechanism, gives outstanding stability and reliability plus visible and tactile indication of circuit status.

Terminals are epoxy sealed to lock out flux, solvents, and other contaminants.

Momentary and alternate action circuits available in the same space-saving body size.

Matching indicators available.
Series UB2

Low Profile Pushbuttons

**UB2**

**Poles**

<table>
<thead>
<tr>
<th>1</th>
<th>SPDT</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>DPDT</td>
</tr>
</tbody>
</table>

**Circuits**

<table>
<thead>
<tr>
<th>5</th>
<th>ON</th>
<th>(ON)</th>
</tr>
</thead>
<tbody>
<tr>
<td>6</td>
<td>ON</td>
<td>ON</td>
</tr>
</tbody>
</table>

*Alternate Action with Latchdown*

**Mounting Types**

- **PCB Mounting**
  - SK: Square
    - *Snap-in Mounting*
    - KK: Square
      - *Standard with Solder Lug terminals*

**Terminals**

- 01: Solder Lug (for Snap-in Mounting)
- 03: Straight PC

**Contacts & Ratings**

- **W**: Silver Rated 5A @ 125/250V AC
- **G**: Gold Rated 0.4VA max @ 28V AC/DC max

**Part Numbers for Alternating Legends**

<table>
<thead>
<tr>
<th>Color</th>
<th>15mm Square Sculptured Cap</th>
<th>15mm Square Flat Cap</th>
</tr>
</thead>
<tbody>
<tr>
<td>Red/Green</td>
<td>AT3069JCF11 ~ AT3069JCF14</td>
<td>AT3070JCF11 ~ AT3070JCF14</td>
</tr>
<tr>
<td>Amber/Blue</td>
<td>AT3069JDG11 ~ AT3069JDG14</td>
<td>AT3070JDG11 ~ AT3070JDG14</td>
</tr>
</tbody>
</table>

Refer to Ordering Table for Alternating Legend that corresponds with last 2 digits of part number.

**IMPORTANT:**

Switches are supplied without UL & cULus marking unless specified. UL & cULus recognized only when ordered with marking on switch. Specific models, ratings, & ordering instructions are noted on the General Specifications page.

**DESCRIPTION FOR TYPICAL ORDERING EXAMPLE**

**UB215SKG035C-1JC**

- Gold Contacts with 0.4VA Rating
- Square with PCB Mounting
- Straight PC Terminals
- Red, Bright LED and Sculptured Cap with Clear Lens and Red Diffuser
- SPDT ON-(ON) Circuit

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# Low Profile Pushbuttons

## ORDERING EXAMPLE

<table>
<thead>
<tr>
<th>LEDs</th>
<th>Cap Types &amp; Colors</th>
<th>Sculptured Cap Lens/Diffuser Colors</th>
<th>Beveled Cap &amp; Colors</th>
<th>Flatt Cap Lens/Diffuser Colors</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bright LED</td>
<td>Sculptured Cap Lens/Diffuser Color</td>
<td>1JB Clear/White</td>
<td>2B White</td>
<td>3JB Clear/White</td>
</tr>
<tr>
<td>5C Red</td>
<td>1JC Clear/Red</td>
<td>2C Red</td>
<td>3JC Clear/Red</td>
<td></td>
</tr>
<tr>
<td>5D Amber</td>
<td>1JD Clear/Amber</td>
<td>2D Amber</td>
<td>3JD Clear/Amber</td>
<td></td>
</tr>
<tr>
<td>5F Green</td>
<td>1JF Clear/Green</td>
<td>2F Green</td>
<td>3JF Clear/Green</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Beveled Cap &amp; Colors</th>
<th>Sculptured Cap with Alternating Legend</th>
<th>Flat Cap Lens/Diffuser Color</th>
<th>Sculptured Cap with Alternating Legend</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sculptured Cap Lens/Insert Colors</td>
<td>Sculptured Cap Lens/Diffuser Color</td>
<td>1JB Clear/White</td>
<td>2B White</td>
</tr>
<tr>
<td>4JA Clear/Black</td>
<td>Beveled Cap &amp; Colors</td>
<td>3JB Clear/White</td>
<td>3JB Clear/White</td>
</tr>
<tr>
<td>4JB Clear/White</td>
<td>5JA Black</td>
<td>4JD Clear/Amber</td>
<td>5JD Clear/Amber</td>
</tr>
<tr>
<td>4JC Clear/Red</td>
<td>5JC Clear/Red</td>
<td>4JDG Clear/Amber</td>
<td>5JDF Clear/Amber</td>
</tr>
<tr>
<td>5A Black</td>
<td>4JF Clear/Green</td>
<td>4JDF Clear/Amber</td>
<td>5JFC Clear/Green</td>
</tr>
<tr>
<td>5B White</td>
<td>5D Amber</td>
<td>5DF Amber</td>
<td>5F Green</td>
</tr>
<tr>
<td>5C Red</td>
<td>5JD Green</td>
<td>5F Green</td>
<td>5C Red</td>
</tr>
</tbody>
</table>

### Alternating Legends

- 11 ON (pos) OFF (pos)
- 12 ON (neg) OFF (neg)
- 13 START STOP
- 14 OPEN CLOSE

See Part Numbers Table on Previous Page.

Contact factory for custom options.
### Series UB2

#### Low Profile Pushbuttons

#### POLES & CIRCUITS

<table>
<thead>
<tr>
<th>Pole</th>
<th>Model</th>
<th>Normal</th>
<th>Down</th>
<th>Normal</th>
<th>Down</th>
<th>Connected Terminals</th>
<th>Throw &amp; Switch/Lamp Schematics</th>
</tr>
</thead>
<tbody>
<tr>
<td>SP</td>
<td>UB215 *UB216</td>
<td>ON</td>
<td>(ON)</td>
<td>1-3</td>
<td>1-2</td>
<td>SPDT</td>
<td></td>
</tr>
<tr>
<td>DP</td>
<td>UB225 *UB226</td>
<td>ON</td>
<td>(ON)</td>
<td>1-3 4-6</td>
<td>1-2 4-5</td>
<td>DPDT</td>
<td></td>
</tr>
</tbody>
</table>

* When in latchdown position for the alternate circuit, cap positions above the housing are: .059” (1.5mm) for snap-in models & .276” (7.0mm) for PCB models.

#### MOUNTING TYPES & SHAPES

**PCB Mounting**

- **SK** Square
- **KK** Square with Built-in Bezel

#### CONTACT MATERIALS & RATINGS

<table>
<thead>
<tr>
<th>W</th>
<th>Silver Contacts</th>
<th>Power Level</th>
<th>5A @ 125V AC &amp; 250V AC</th>
</tr>
</thead>
<tbody>
<tr>
<td>G</td>
<td>Gold Contacts</td>
<td>Logic Level</td>
<td>0.4VA maximum @ 28V AC/DC maximum</td>
</tr>
</tbody>
</table>

Complete explanation of operating range in Supplement section.

#### SWITCH & LAMP TERMINALS

<table>
<thead>
<tr>
<th>01</th>
<th>Solder Lug</th>
<th>For Switch &amp; Bright LED</th>
<th>For Super Bright &amp; Bicolor LED</th>
</tr>
</thead>
<tbody>
<tr>
<td>03</td>
<td>Straight PC</td>
<td>For Switch &amp; Bright LED</td>
<td>For Super Bright &amp; Bicolor LED</td>
</tr>
</tbody>
</table>
BRIGHT LED & CAPS

The electrical specifications shown are determined at a basic temperature of 25°C. LED circuit is isolated and requires an external power source. Polarity marks are on the bottom of the switch. If the source voltage exceeds the rated voltage, a ballast resistor is required. The resistor value can be calculated by using the formula in the Supplement section.

The LED is an integral part of the switch and not available separately.

Electrical Specifications for Bright LED

<table>
<thead>
<tr>
<th>Color</th>
<th>5C</th>
<th>5D</th>
<th>5F</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maximum Forward Current</td>
<td>$I_{FM}$</td>
<td>30</td>
<td>30</td>
<td>25</td>
</tr>
<tr>
<td>Typical Forward Current</td>
<td>$I_f$</td>
<td>20</td>
<td>20</td>
<td>20</td>
</tr>
<tr>
<td>Forward Voltage</td>
<td>$V_f$</td>
<td>1.85</td>
<td>2.0</td>
<td>2.1</td>
</tr>
<tr>
<td>Maximum Reverse Voltage</td>
<td>$V_{BM}$</td>
<td>5</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>Current Reduction Rate Above 25°C</td>
<td>$\Delta I_f$</td>
<td>0.40</td>
<td>0.42</td>
<td>0.46</td>
</tr>
<tr>
<td>Ambient Temperature Range</td>
<td></td>
<td></td>
<td></td>
<td>$-25° \sim +50°$</td>
</tr>
</tbody>
</table>

Bright Single Color LED with 1 element

Caps for Bright LED

1. AT3074 Sculptured
2. AT3075 Beveled
3. AT3076 Flat

- Clear Lens
- Translucent Colored Diffuser
- Translucent Colored Cap
- Clear Lens
- Translucent Colored Diffuser

Lens/Diffuser Colors Available:

- JB Clear/White
- JC Clear/Red
- JD Clear/Amber
- JF Clear/Green

Cap Colors Available:

- B White
- C Red
- D Amber
- F Green

- JB Clear/White
- JC Clear/Red
- JD Clear/Amber
- JF Clear/Green

Material: Polycarbonate Finish: Glossy

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Series UB2 Low Profile Pushbuttons
SUPER BRIGHT LEDs & CAPS

The electrical specifications shown are determined at a basic temperature of 25°C. LED circuit is isolated and requires an external power source. Polarity marks are on the bottom of the switch. If the source voltage exceeds the rated voltage, a ballast resistor is required. The resistor value can be calculated by using the formula in the Supplement section. The LED is an integral part of the switch and not available separately.

### Electrical Specifications for Super Bright LEDs

<table>
<thead>
<tr>
<th>Color</th>
<th>6B</th>
<th>6F</th>
<th>6G</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>White</td>
<td>Green</td>
<td>Blue</td>
</tr>
<tr>
<td>Maximum Forward Current</td>
<td>$I_{FM}$</td>
<td>20</td>
<td>30</td>
</tr>
<tr>
<td>Typical Forward Current</td>
<td>$I_{F}$</td>
<td>15</td>
<td>20</td>
</tr>
<tr>
<td>Forward Voltage</td>
<td>$V_{F}$</td>
<td>3.3</td>
<td>3.5</td>
</tr>
<tr>
<td>Maximum Reverse Voltage</td>
<td>$V_{RM}$</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>Current Reduction Rate Above 25°C</td>
<td>$\Delta I_{F}$</td>
<td>0.25</td>
<td>0.50</td>
</tr>
<tr>
<td>Ambient Temperature Range</td>
<td>-20° ~ +50°</td>
<td>°C</td>
<td></td>
</tr>
</tbody>
</table>

**Super Bright Single Color LED with 1 element**

**Caps for Super Bright LED**

1JB

**AT3074JB**

Sculptured Clear Lens/White Diffuser

2B

**AT3075B**

Beveled White Cap

3JB

**AT3076JB**

Flat Clear Lens/White Diffuser

Material: Polycarbonate Finish: Glossy

SUPER BRIGHT BICOLOR LEDs & CAPS

The electrical specifications shown are determined at a basic temperature of 25°C. LED circuit is isolated and requires an external power source. Polarity marks are on the bottom of the switch. If the source voltage exceeds the rated voltage, a ballast resistor is required. The resistor value can be calculated by using the formula in the Supplement section. The LED is an integral part of the switch and not available separately.

### Electrical Specifications for Super Bright Bicolor LEDs

<table>
<thead>
<tr>
<th>Color</th>
<th>6CF</th>
<th>6DG</th>
</tr>
</thead>
<tbody>
<tr>
<td>Red</td>
<td>Green</td>
<td>Amber</td>
</tr>
<tr>
<td>Maximum Forward Current</td>
<td>$I_{FM}$</td>
<td>30</td>
</tr>
<tr>
<td>Typical Forward Current</td>
<td>$I_{F}$</td>
<td>20</td>
</tr>
<tr>
<td>Forward Voltage</td>
<td>$V_{F}$</td>
<td>2.1</td>
</tr>
<tr>
<td>Maximum Reverse Voltage</td>
<td>$V_{RM}$</td>
<td>4</td>
</tr>
<tr>
<td>Current Reduction Rate Above 25°C</td>
<td>$\Delta I_{F}$</td>
<td>0.40</td>
</tr>
<tr>
<td>Ambient Temperature Range</td>
<td>-20° ~ +50°</td>
<td>°C</td>
</tr>
</tbody>
</table>

**Super Bright Bicolor LED with 2 elements**

* Amber color is achieved by lighting red and green simultaneously, but is not suitable for Alternating Legends.
Low Profile Pushbuttons

Series UB2

Caps for Super Bright Bicolor LED

1JB AT3074JB Sculptured Clear Lens/White Diffuser
2B AT3075B Beveled White Cap
3JB AT3076JB Flat Clear Lens/White Diffuser

Clear Lens
Translucent White Cap
Translucent White Diffuser

Material: Polycarbonate Finish: Glossy

Alternating Legend Caps for Super Bright Bicolor LED

AT3069J Sculptured Cap with Alternating Legend
AT3070J Flat Cap with Alternating Legend

4JCF Red/Green
4JDG Amber/Blue
5JCF Red/Green
5JDG Amber/Blue

Material: Polycarbonate Finish: Glossy

Standard Alternating Legend Pairs

11 ON OFF 12 ON OFF 13 START STOP 14 OPEN CLOSE

Green/Red or Blue/Amber Green/Red or Blue/Amber Green/Red or Blue/Amber Green/Red or Blue/Amber

Cap illumination is alternating Green/Red or Blue/Amber; legend text is black.
Contact factory for other Alternating Legends.
Legend illustrations are approximate representations of the actual characters on the filters.

No Code No Lamp

CAP TYPES & COLOR COMBINATIONS FOR NONILLUMINATED

4 AT3073 Sculptured Lens/Insert Colors Available:
JA Clear/Black
JB Clear/White
JC Clear/Red
JD Clear/Amber
JF Clear/Green

5 AT3077 Beveled Cap Colors Available:
A Black
B White
C Red
D Amber
E Green

Material: Polycarbonate Finish: Glossy

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D99
AT4141
Opens 90°
Closes manually

Materials:
Cover: Clear Polycarbonate
Base: Black GFR Polyamide

Recommended Panel Thickness:
.039" ~ .106" (1.0mm ~ 2.7mm)

AT4170
Opens 180°
Closes automatically

Materials:
Cover: Clear Polycarbonate
Base: Black Polyamide
Coil Spring: Stainless Steel

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

Recommended Panel-to-PCB Range:
.531" (13.5mm)

Installation
1. Install switch onto PC board.
2. Snap protective guard into panel.
3. Join the two assemblies.

* Minimum dimension allows opening of cover to 180°
Series UB2
Low Profile Pushbuttons

OPTIONAL ACCESSORIES

Spring Loaded Protective Guard for Snap-in Model

AT4142
Opens 180°
Closes automatically

Materials:
Cover: Clear Polycarbonate
Base: Black GFR Polyamide
Coil Spring: Stainless Steel

Recommended Panel Thickness:
.039" ~ .106" (1.0mm ~ 2.7mm)

Dust Cover

AT4145  Not for use with barriers.

Materials:
Lid: Clear PVC
Operating temperature range:
-0°C ~ +70°C (32°F ~ 158°F).
Gasket: Polyethylene

Recommended Panel Thickness
.039" ~ .098" (1.0mm ~ 2.5mm)

Barriers for Snap-in Mount

AT4143  AT4144
End  Center

Material: Polyamide

Cutouts for more than 1 Switch:
A = .799" (20.3mm) x Number of Switches + .063" (1.6mm)
LEGENDS

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

Suggested Printable Area for UB2 Lens, Film Insert or Diffuser

Recommended Methods: Laser Etch on clear lens, Screen Print or Pad Print on lens;
Laser Print on film insert.

Shaded areas are printable areas.

Film Insert: Clear Polyester 4 mil maximum thickness