

# General Specifications

## Electrical Capacity (Resistive Load)

<b>Power Level (silver):</b>	5A @ 125/250V AC or 5A @ 30V DC
<b>Logic Level (gold):</b>	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

<b>Contact Resistance:</b>	50 milliohms maximum for silver; 100 milliohms maximum for gold
<b>Insulation Resistance:</b>	200 megohms minimum @ 500V DC
<b>Dielectric Strength:</b>	1,000V AC minimum between contacts for 1 minute minimum; 1,500V AC minimum between contacts & case for 1 minute minimum
<b>Mechanical Life:</b>	1,000,000 operations minimum for momentary; 200,000 operations minimum for alternate action
<b>Electrical Life:</b>	10,000 operations minimum for silver; 100,000 operations minimum for silver with resistive load of 3A @ 125V AC 200,000 operations minimum for gold
<b>Nominal Operating Force:</b>	Single Pole: 1.9N for Square & 1.9N for Rectangular Double Pole: 2.55N for Square & 3.1N for Rectangular
<b>Contact Timing:</b>	Break before make
<b>Travel:</b>	Pretravel .067" (1.7mm); Overtravel .024" (0.6mm); Total Travel .091" (2.3mm)

## Materials & Finishes

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

## Environmental Data

<b>Operating Temperature Range:</b>	-25°C through +50°C (-13°F through +122°F) for Illuminated -20°C through +70°C (-4°F through +158°F) for Nonilluminated
<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>Cap Installation Force:</b>	7.55N (1.70 lbf) maximum downward force on cap
<b>Soldering Time &amp; Temp:</b>	Wave Soldering (PC version): See Profile A in Supplement section. Manual Soldering: See Profile A 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 housing/bezel & base
<b>UL:</b>	<b>File No. E44145 - Recognized only when ordered with marking on switch.</b> 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.
<b>CSA:</b>	<b>File No. 023535_0_000 - Certified only when ordered with marking on switch.</b> Add "/C" before dash in part number to order CSA certified switch. All single & double pole models certified at 5A @ 125/250V AC or 5A @ 30V DC or 0.4VA maximum @ 28V AC/DC maximum.

# Distinctive Characteristics

Red/green and amber/blue bicolors with alternating standard or custom legends.  
Super bright LED provides brilliant uniform illumination.

Bright or super bright LEDs (an integral part of the switch) of red, amber, green, blue, or white, in full face or spot illumination plus square or rectangular models.

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

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

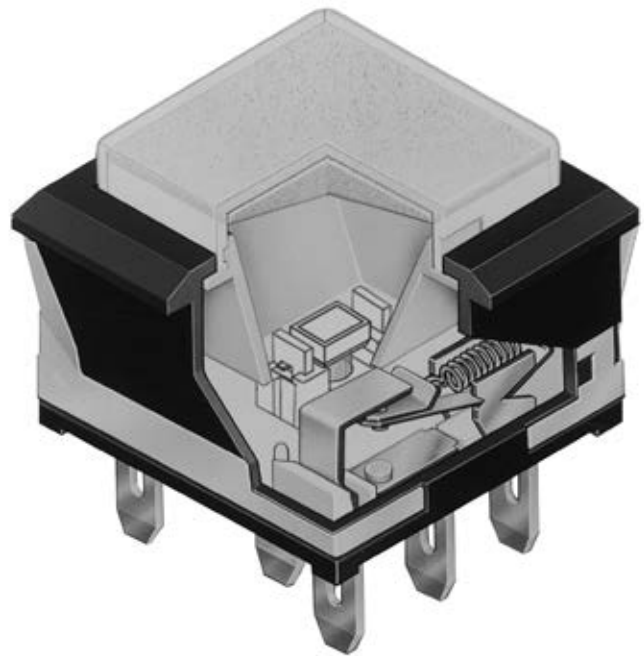
Snap-acting contact mechanism provides sensitive actuation with audible feedback; quick-make, quick-break characteristic limits arcing and prolongs electrical life.

Latchdown mechanism, independent of switching mechanism, gives visible and tactile indication of circuit status.

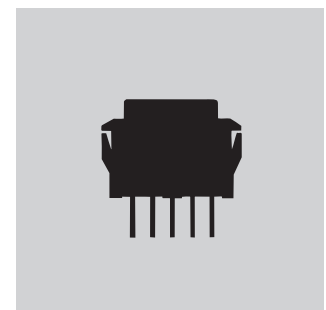
Terminals are epoxy sealed to lock out flux, solvents, and other contaminants.

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

Matching indicators available.

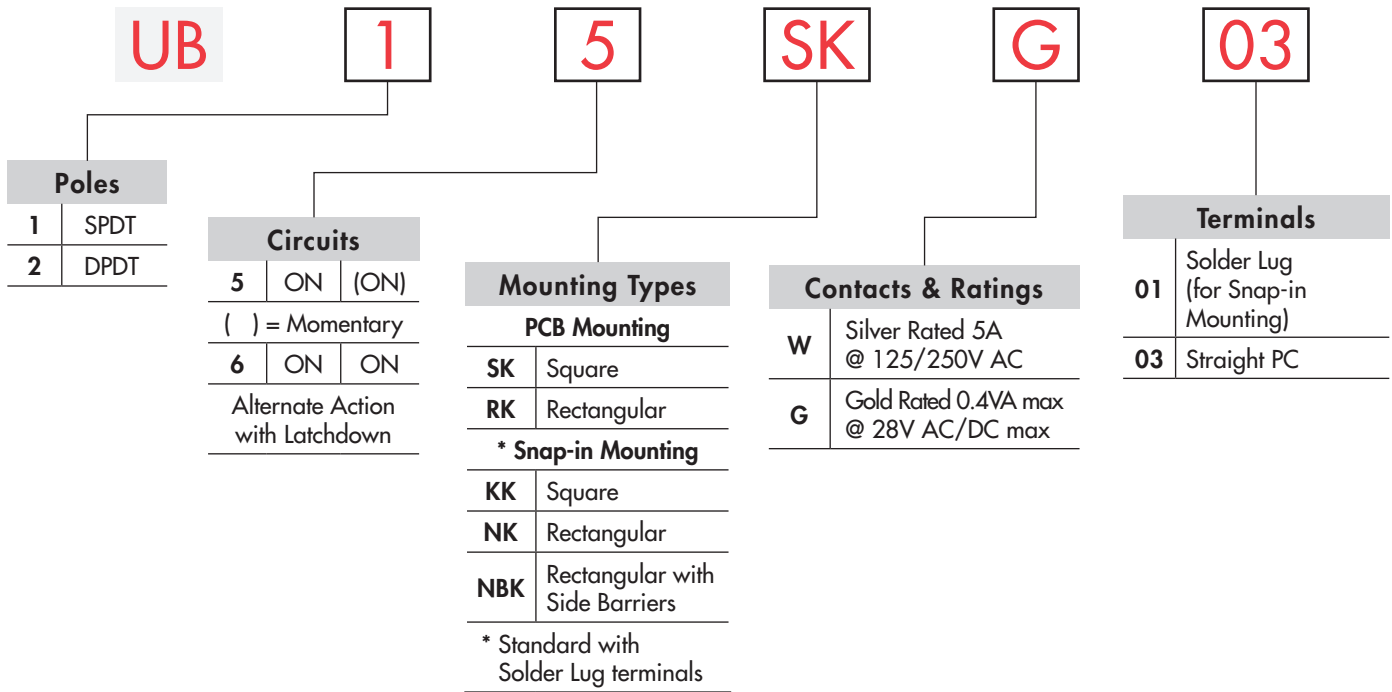


Actual Size



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

### TYPICAL SWITCH



#### 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.



#### DESCRIPTION FOR TYPICAL ORDERING EXAMPLE

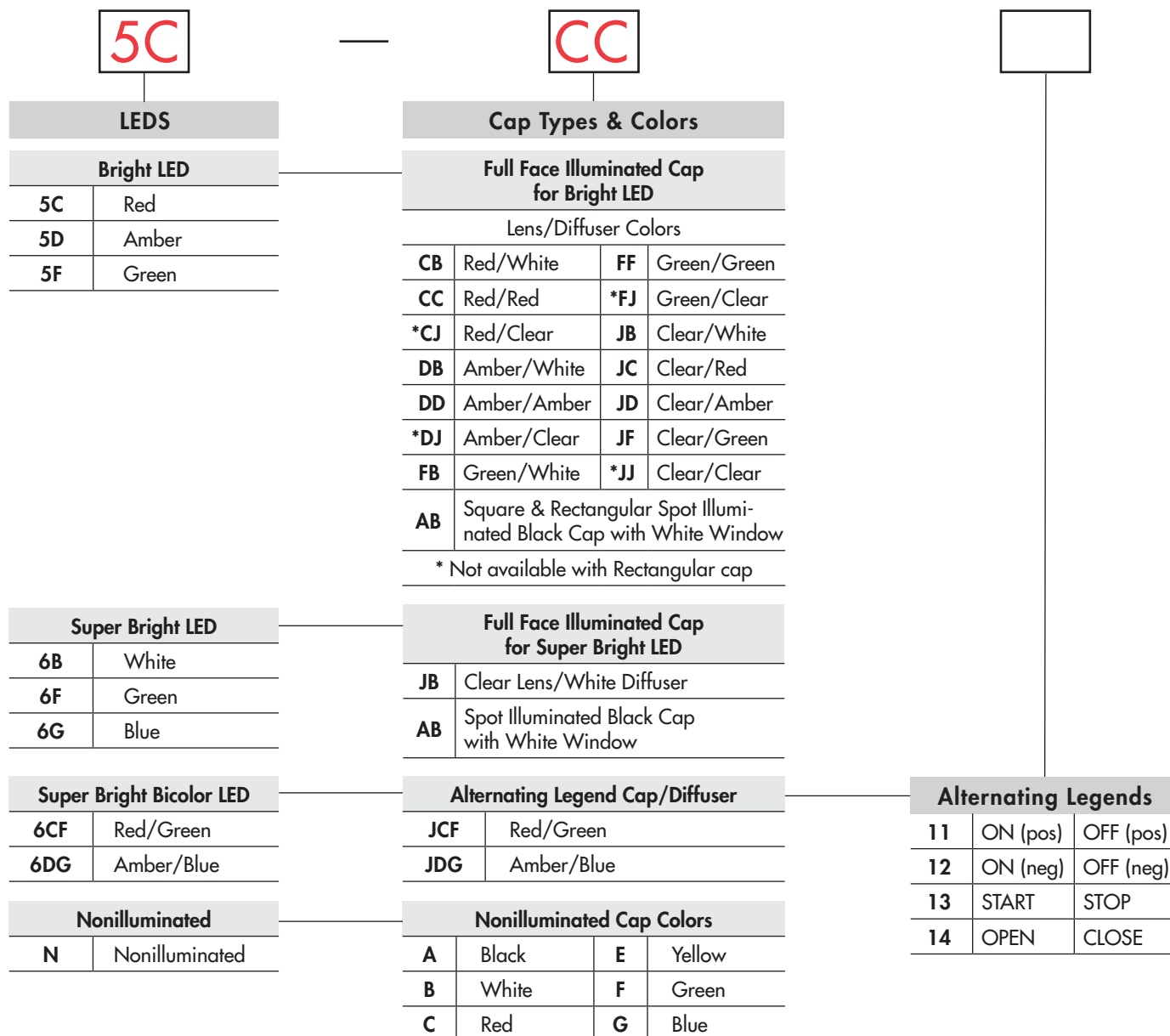
**UB15SKG035C-CC**

Gold Contacts with 0.4VA Rating  
Square with PCB Mounting



Red, Bright LED & Red Lens with Red Diffuser  
SPDT ON-(ON) Circuit  
Straight PC Terminals

## ORDERING EXAMPLE



Part Numbers for Alternating Legends							
Square Alternating Legends				Rectangular Alternating Legends			
Color	Part Number	Color	Part Number	Color	Part Number	Color	Part Number
Red/Green	AT9450CF11	Amber/Blue	AT9450DG11	Red/Green	AT9451CF11	Amber/Blue	AT9451DG11
	AT9450CF12		AT9450DG12		AT9451CF12		AT9451DG12
	AT9450CF13		AT9450DG13		AT9451CF13		AT9451DG13
	AT9450CF14		AT9450DG14		AT9451CF14		AT9451DG14

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

Toggles

Rockers

Pushbuttons

Illuminated PB

Programmable

Keylocks

Rotaries

Slides

Tactiles

Tilt

Touch

Indicators

Accessories

Supplement

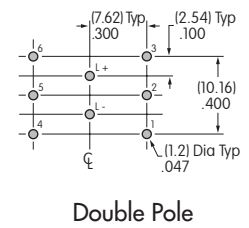
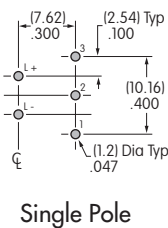
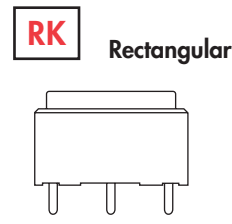
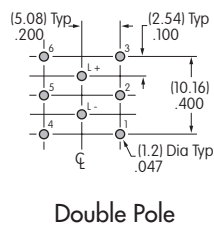
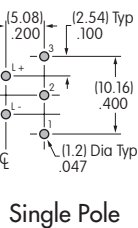
## POLES & CIRCUITS

Pole	Model	Plunger Position ( ) = Momentary		Connected Terminals		Throw & Switch/Lamp Schematics
		Normal	Down	Normal	Down	
SP	UB15 *UB16	ON ON	(ON) ON	1-3 1-2	1-2	SPDT 
DP	UB25 *UB26	ON ON	(ON) ON	1-3 4-6 1-2 4-5	1-2 4-5	DPDT 

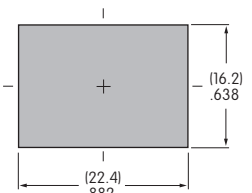
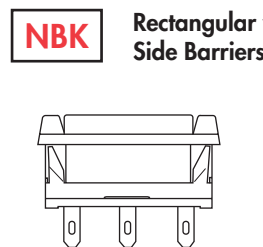
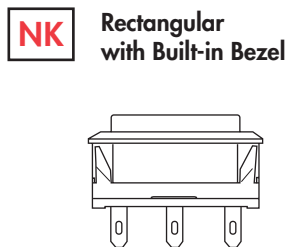
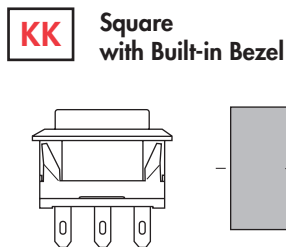
\* When in latchdown position for the alternate circuit, cap position is .039" (1.0mm) above the housing.

## MOUNTING TYPES & SHAPES

### PCB Mounting



### Snap-in Mounting (Solder Lug)



Snap-in Mounting with Solder Lug terminals is the standard combination. Panel Thickness: .039 ~ .126" (1.0 ~ 3.2mm)

## CONTACT MATERIALS & RATINGS



Silver Contacts

Power Level

5A @ 125V AC & 250V AC



Gold Contacts

Logic Level

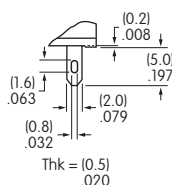
0.4VA maximum @ 28V AC/DC maximum

Complete explanation of operating range in Supplement section.

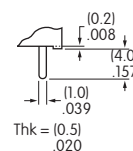
## TERMINALS



Solder Lug




Straight PC



## BRIGHT & SUPER BRIGHT LED COLORS & SPECIFICATIONS

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

Super Bright LEDs are Electrostatic Sensitive		Bright			Super Bright			Unit
		5C	5D	5F	6B	6F	6G	
Color		Red	Amber	Green	White	Green	Blue	
Maximum Forward Current	$I_{FM}$	30	30	25	20	30	30	mA
Typical Forward Current	$I_F$	20	20	20	15	20	20	mA
Forward Voltage	$V_F$	1.85	2.0	2.1	3.3	3.2	2.9	V
Maximum Reverse Voltage	$V_{RM}$	5	5	5	5	5	5	V
Current Reduction Rate Above 25°C	$\Delta I_F$	0.40	0.42	0.46	0.25	0.40	0.33	mA/°C
Ambient Temperature Range		-25° ~ +50°C			-25° ~ +50°C			

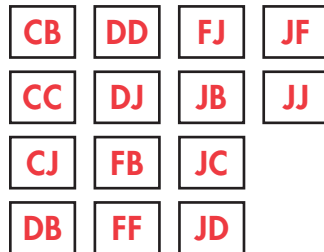
**N** No Lamp

## CAP TYPES & COLOR COMBINATIONS

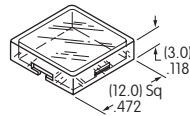
### Full Face Illuminated Cap for Bright LED & Super Bright Single Color LED

Lens/Diffuser

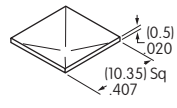
Colors Available for Square Cap:



AT4074 Lens



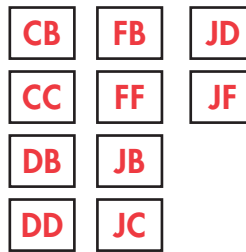
AT4075 Diffuser



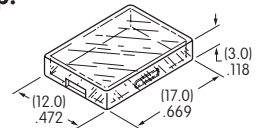
Lens & Diffuser Material: Polycarbonate

Lens/Diffuser

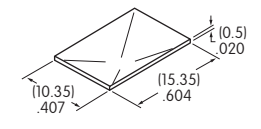
Colors Available for Rectangular Cap:



AT4117 Lens



AT4118 Diffuser



Lens Finish: Glossy

Diffuser Finish: Textured

### Spot Illuminated Caps for Bright & Super Bright LEDs

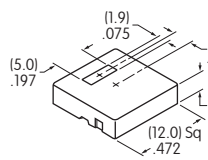
Cap/Window Colors Available:

**AB** Black Cap with Translucent White Window for LED Display

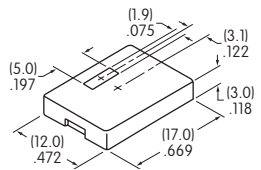
Material: Polycarbonate

AT4119 Square for Bright and Super Bright LED

Finish: Matte



AT4120 Rectangular for Bright and Super Bright LED

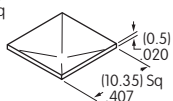
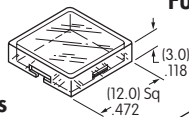


### Full Face Illuminated Caps for Super Bright Bicolor LED

**JB**

AT4074 Square Lens

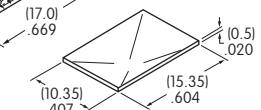
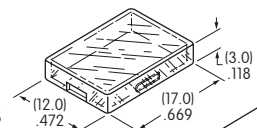
AT4188 Square Diffuser



Lens & Diffuser Material: Polycarbonate

AT4117 Rectangular Lens

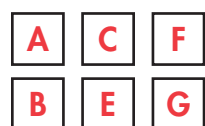
AT4189 Rectangular Diffuser



Lens Finish: Glossy

Diffuser Finish: Textured

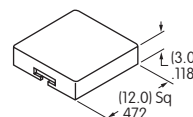
Cap Colors Available:



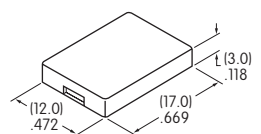
Material: Polycarbonate  
Finish: Glossy

### Opaque Caps for Nonilluminated

AT4073 Square



AT4116 Rectangular




Color Codes: A Black B White C Red D Amber E Yellow F Green G Blue J Clear

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

## SUPER BRIGHT BICOLOR LEDS FOR ALTERNATING LEGENDS

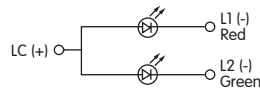
The electrical specifications shown are determined at a basic temperature of 25°C. LED circuit is isolated and requires external power source. Polarity marks are on bottom of switch. If the source voltage exceeds the rated voltage, a ballast resistor is required. Resistor value can be calculated by using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

### Electrical Specifications for Super Bright Bicolor LEDs

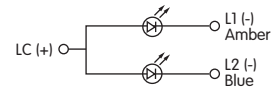
Super Bright LEDs are Electrostatic Sensitive		<b>6CF</b> Red/Green		<b>6DG</b> Amber/Blue		Unit
		Color	Red	Green	Amber	
Maximum Forward Current	$I_{FM}$	* 30	* 30	* 30	* 30	mA
Typical Forward Current	$I_F$	20	20	20	20	mA
Forward Voltage	$V_F$	2.3	3.2	2.1	3.0	V
Maximum Reverse Voltage	$V_{RM}$	4	4	4	4	V
Current Reduction Rate Above 25°C	$\Delta I_F$	0.33	0.33	0.33	0.33	mA/°C
Ambient Temperature Range		-25° ~ +50°		-25° ~ +50°		°C

\* Value applies to single color illumination for either Red or Green or Amber or Blue. When both colors are illuminated simultaneously, the sum of the currents should not exceed the smallest value of the maximum forward current.

Super Bright Bicolor Red/Green LED with 2 elements



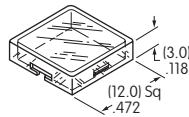
Super Bright Bicolor Amber/Blue LED with 2 elements



### Alternating Legend Caps for Super Bright Bicolor LED

**JCF** **JDG**

**AT4074 12.0mm Square Flat Cap**



**AT9450 Square Legend Insert**

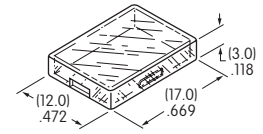


**AT4188 Square Diffuser**



**JCF** **JDG**

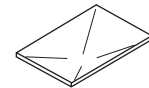
**AT4117 12.0mm x 17.0mm Rectangular Flat Cap**



**AT9451 Rectangular Legend Insert**



**AT4189 Rectangular Diffuser**



Lens & Diffuser Material: Polycarbonate Legend Insert Material: Polyethylene Terephthalate (PET)

Lens Finish: Glossy Diffuser Finish: Textured

### Standard Alternating Legend Pairs

**11**

**ON OFF**

Green/Red or Blue/Amber

**12**

**ON OFF**

Green/Red or Blue/Amber

**13**

**START STOP**

Green/Red or Blue/Amber

**14**

**OPEN CLOSE**

Green/Red or Blue/Amber

Cap illumination is alternating Green/Red or Blue/Amber; legend text is black.  
Contact factory for other Alternating Legends.

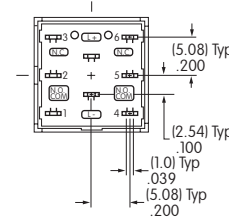
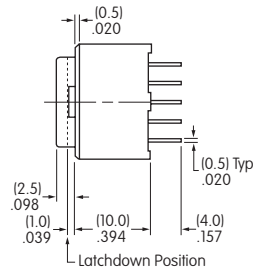
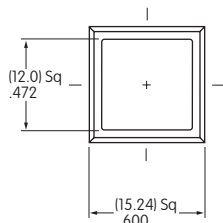
Legend illustrations are approximate representations of the actual characters on the filters.



TYPICAL SWITCH DIMENSIONS

Single & Double Pole

Square • PCB Mount

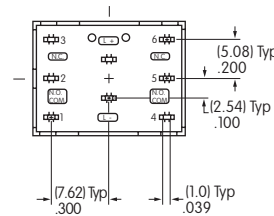
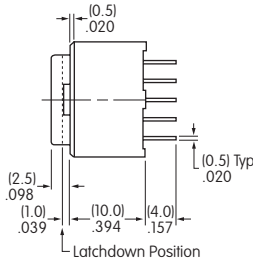
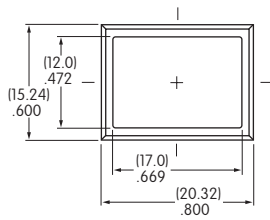


Single pole models do not have terminals 4, 5, & 6.

UB15SKG035C-CB

Single & Double Pole

Rectangular • PCB Mount

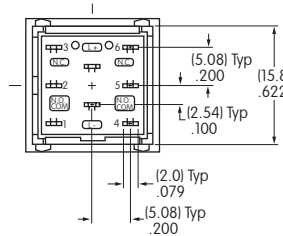
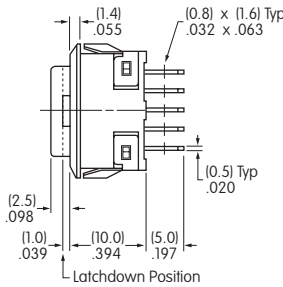
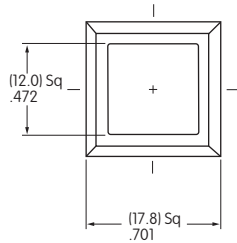


Single pole models do not have terminals 4, 5, & 6.

UB26RKG035D-DD

Single & Double Pole

Square • Snap-in Mount • Built-in Bezel

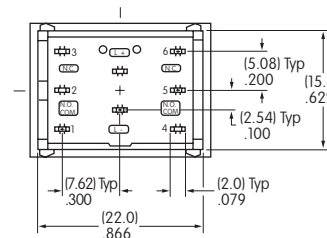
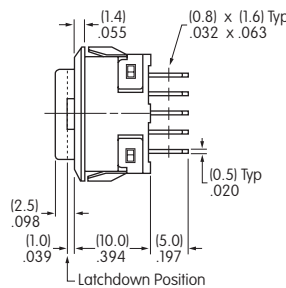
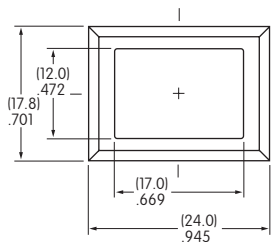


Single pole models do not have terminals 4, 5, & 6.

UB25KKW015C-CB

Single & Double Pole

Rectangular • Snap-in Mount • Built-in Bezel

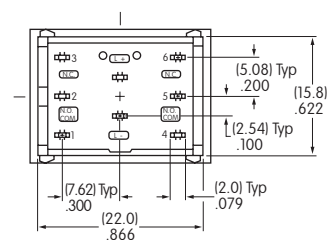
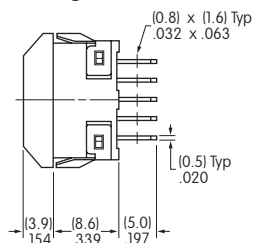
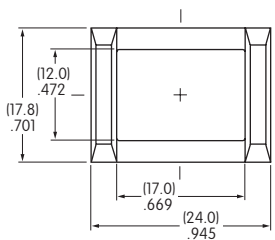


Single pole models do not have terminals 4, 5, & 6.

UB26NKW015F-FF

Single & Double Pole

Rectangular • Snap-in Mount • Built-in Side Barriers



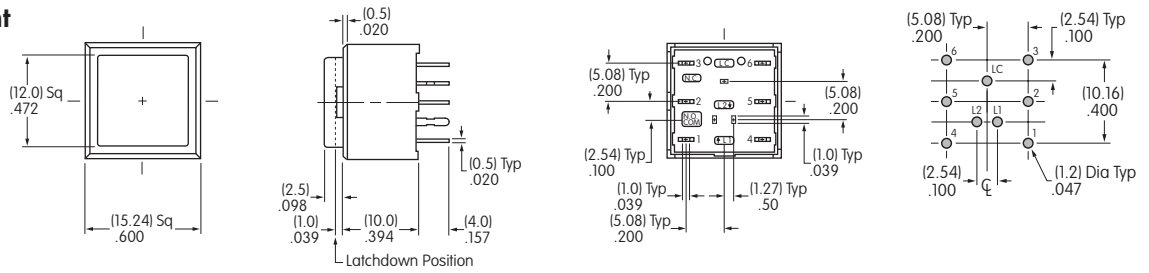
Single pole models do not have terminals 4, 5, & 6.

UB25NBKW015F-FB



## TYPICAL SWITCH DIMENSIONS

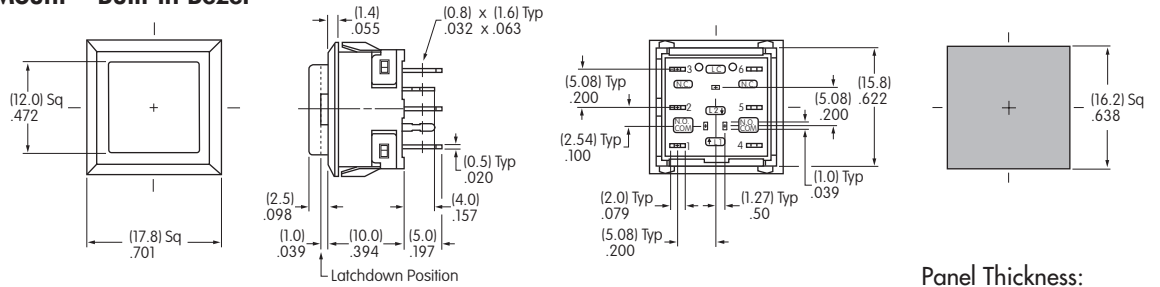
### Square • PCB Mount



**UB25SKG036DG-JDG11**

Single pole models do not have terminals 4, 5, & 6.

### Square • Snap-in Mount • Built-in Bezel

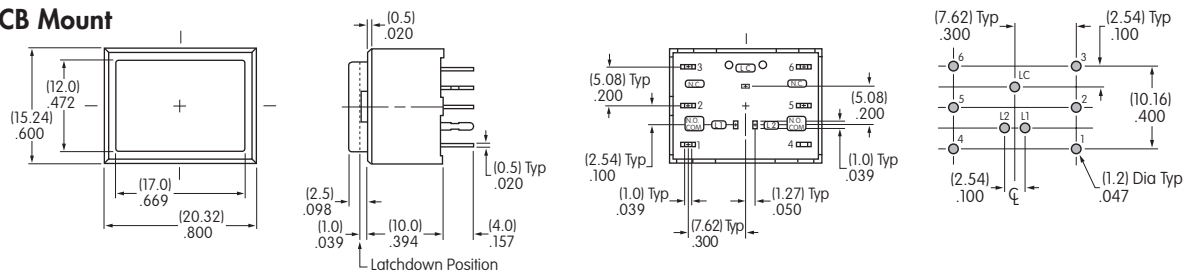


**UB25KKW016DG-JDG11**

Single pole models do not have terminals 4, 5, & 6.

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

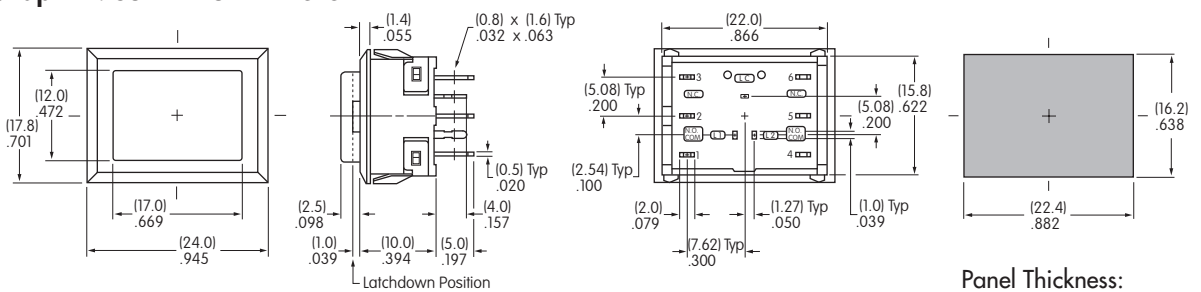
### Rectangular • PCB Mount



**UB25RKG036DG-JDG11**

Single pole models do not have terminals 4, 5, & 6.

### Rectangular • Snap-in Mount • Built-in Bezel

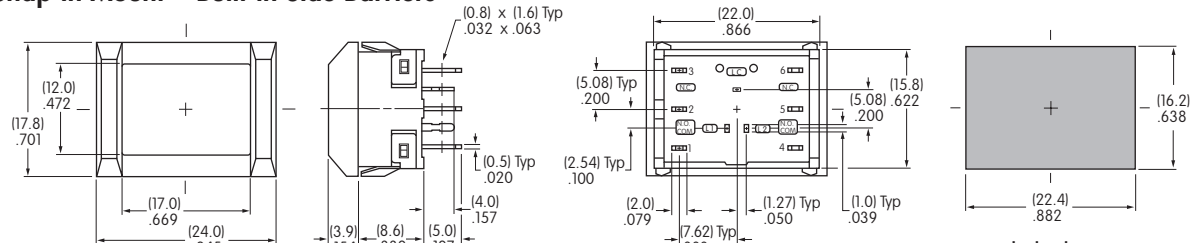


**UB26NKW016DG-JDG11**

Single pole models do not have terminals 4, 5, & 6.

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

### Rectangular • Snap-in Mount • Built-in Side Barriers



**UB26NBKW016DG-JDG11**

Single pole models do not have terminals 4, 5, & 6.

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

## OPTIONAL ACCESSORIES

### Spring Loaded Protective Guard for Snap-in Mounting of Square PCB Model

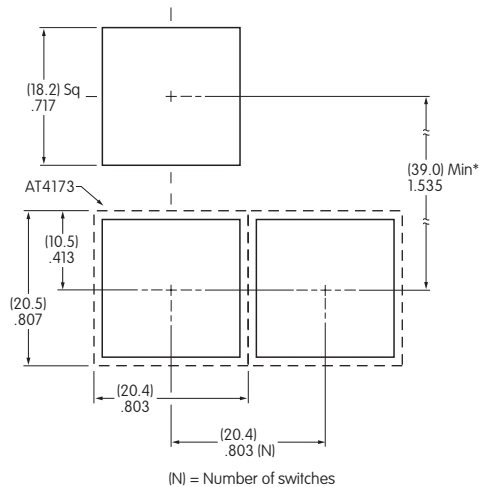
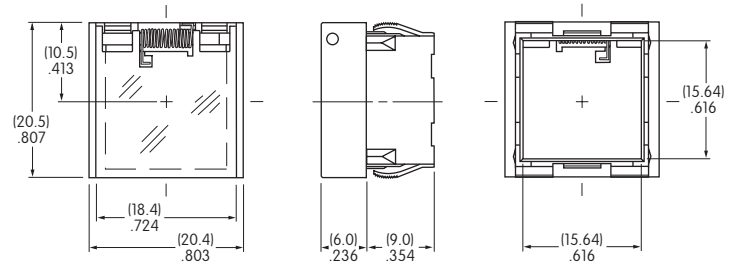
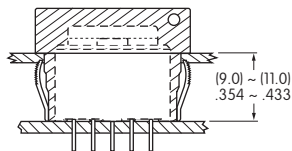
#### AT4173 Square Protective Guard/ Snap-in Frame

Opens 180°  
Closes automatically

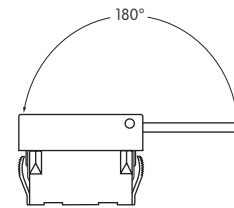
**Materials:**  
Cover: Clear Polycarbonate  
Base: Black Polyamide  
Coil Spring: Stainless Steel

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

**Recommended Panel-to-PCB Range:**  
.354" ~ .433"  
(9.0mm ~ 11.0mm)

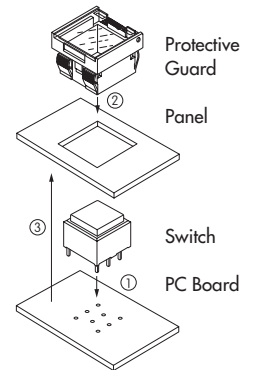


(N) = Number of switches  
\* Minimum dimension allows opening of cover to 180°



#### Installation

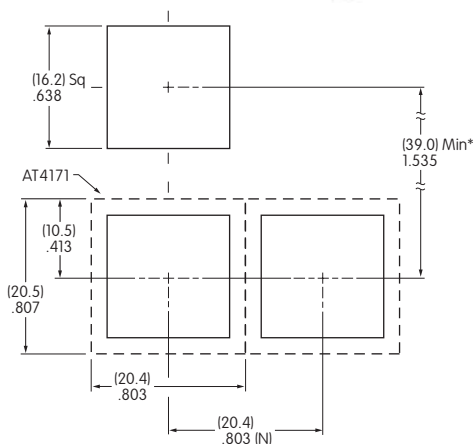
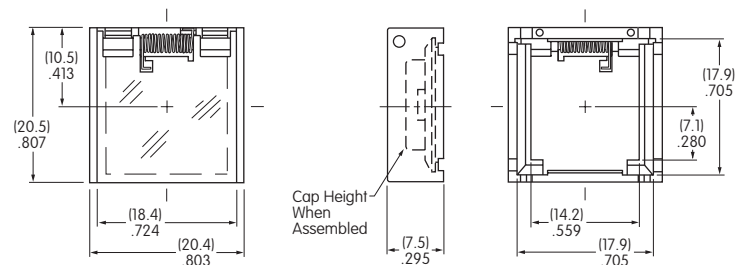
- 1 Install switch onto PC board.
- 2 Snap protective guard into panel.
- 3 Join the two assemblies.



### Spring Loaded Protective Guard for Square Snap-in Model

#### AT4171 Square Protective Guard

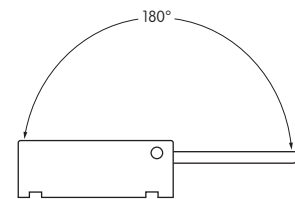
Opens 180°  
Closes automatically



(N) = Number of switches \* Minimum dimension allows opening of cover to 180°

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

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



## OPTIONAL ACCESSORIES

### Spring Loaded Protective Guard for Snap-in Mounting of Rectangular PCB Model

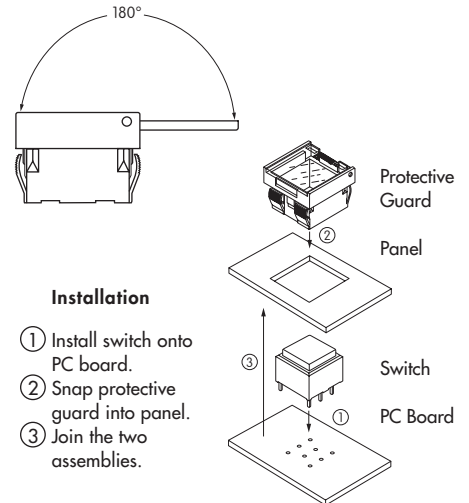
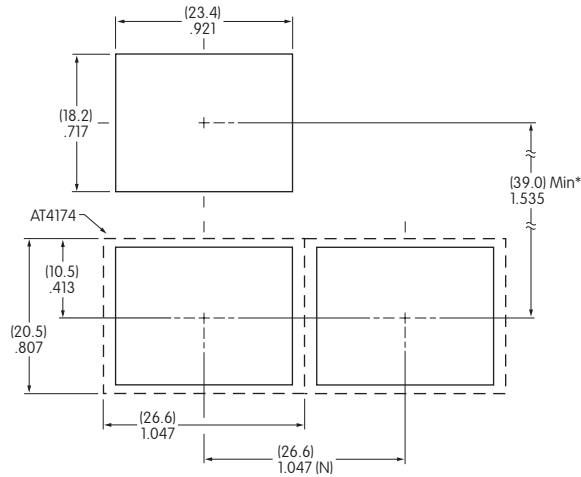
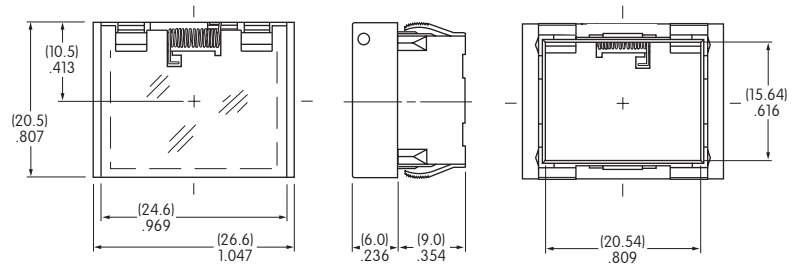
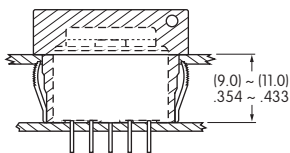
#### AT4174 Rectangular Protective Guard/ Snap-in Frame

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:**  
.354" ~ .433"  
(9.0mm ~ 11.0mm)



#### Installation

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

(N) = Number of switches \* Minimum dimension allows opening of cover to 180°

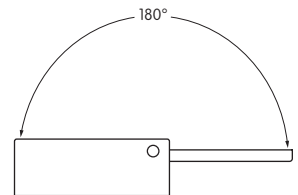
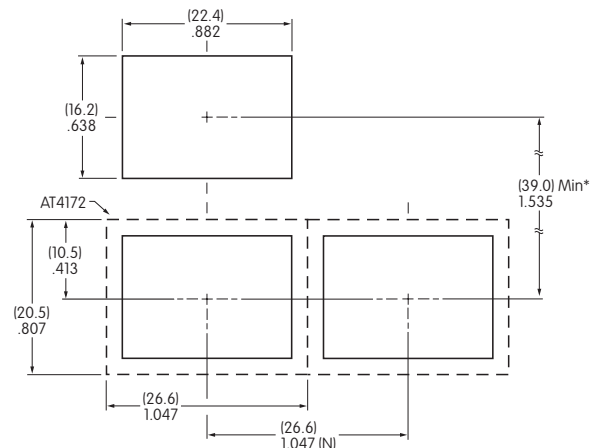
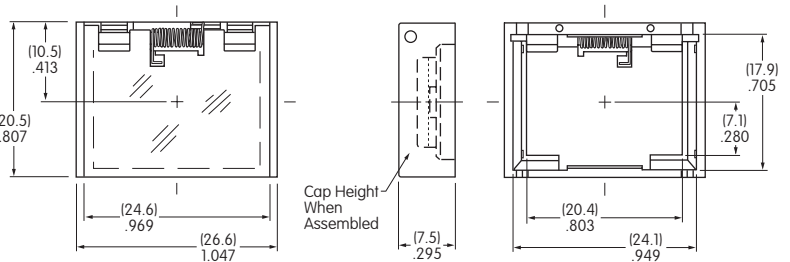
### Spring Loaded Protective Guard for Rectangular Snap-in Model

#### AT4172 Rectangular Protective Guard

Opens 180°  
Closes automatically

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

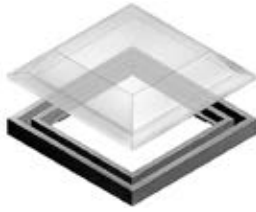
**Recommended Panel Thickness:**  
.039" ~ .106" (1.0mm ~ 2.7mm)



(N) = Number of switches \* Minimum dimension allows opening of cover to 180°

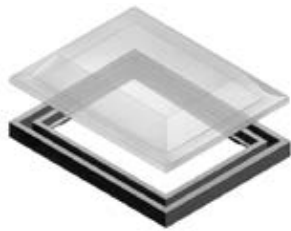
OPTIONAL ACCESSORIES

AT4001  
Square



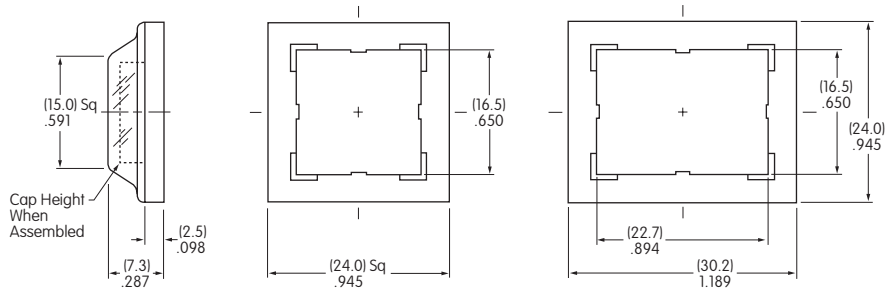
Only for use with KK mounting type

AT4011  
Rectangular



Only for use with NK mounting type

Dust Covers



Materials:

PVC with polyethylene gasket  
(PVC loses pliability below 0°C (32°F).)

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

LEGENDS

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

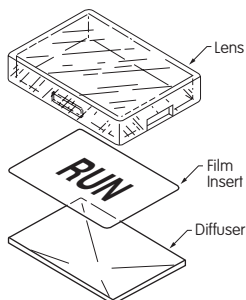
Suggested Printable Area for UB Lens & Film Insert

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

Square Cap

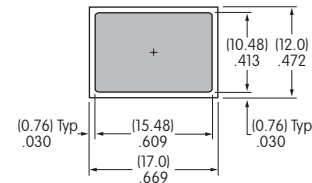
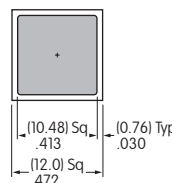


Rectangular Cap

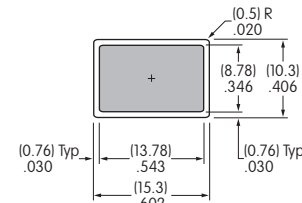
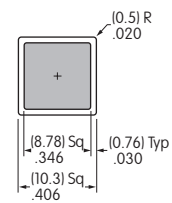


Shaded areas are printable areas.

Lens



Film Insert



Film Insert: Clear Polyester 0.15mm max. thickness

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

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