# General Specifications

## Electrical Capacity (Resistive Load)

**Power Level (silver):** 3A @ 125V AC or 3A @ 250V AC or 3A @ 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 milliohms maximum for silver; 100 milliohms 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 circuit
200,000 operations minimum for maintained circuit
**Electrical Life:** 100,000 operations minimum
**Nominal Operating Force:** 4.41N
**Contact Timing:** Nonshorting (break-before-make)
**Travel:** Pretravel .059" (1.5mm); Overtravel .059" (1.5mm); Total Travel .118" (3.0mm)

## Materials & Finishes

**Housing:** Glass fiber reinforced polyamide (UL94V-0)
**Snap-in Frame:** Stainless steel
**Movable Contact:** Silver alloy or copper with gold plating
**Stationary Contacts:** Silver alloy or copper with gold plating
**Base:** Liquid crystal polymer (UL94V-0)
**Switch Terminals:** Phosphor bronze with silver or gold plating
**Lamp Terminals:** Brass with silver plating

## Environmental Data

**Operating Temperature Range:** –25°C through +50°C (–13°F through +122°F) for Illuminated
–25°C through +70°C (–13°F through +158°F) for Nonilluminated
Note: When used with a polyvinyl chloride splash cover, the lowest limit is 0°C (32°F)
**Humidity:** 90 ~ 95% humidity for 96 hours @ 40°C (104°F)
**Vibration:** 10 ~ 55Hz with peak-to-peak amplitude of 1.5mm traversing the frequency range & returning in 1 minute; 3 right angled directions for 2 hours
**Shock:** 50G (490m/s$^2$) acceleration (tested in 6 right angled directions, with 5 shocks in each direction)
**Sealing:** Not available for snap-in; see next section for panel seal.

## Installation

**Cap Installation Force:** 3.92N maximum downward force on cap
**Quick Connect Force:** 52.95N maximum downward force on connector
**Soldering Time & Temperature:** Manual Soldering: See Profile A in Supplement section.

## Standards & Certifications

**Flammability Standards:** UL94V-0 housing & base
**UL:** **File No. E44145 - Recognized only when ordered with marking on switch.**
Add "/U" or "/CUL" before first dash in part number to order UL recognized switch.
All models recognized at 3A @ 125V or 250V AC or 0.4VA @ 28V AC/DC maximum.
**CSA:** **File No. 023535_0_000 - Certified only when ordered with marking on switch.**
Add "/C" before first dash in part number to order CSA certified switch.
All models certified at 3A @ 125V or 250V AC or 0.4VA @ 28V AC/DC maximum.

# Distinctive Characteristics

Carefully designed light diffusion and filtering system produces bright, full surface illumination with front panel relamping.

Spot illumination available in single and bicolor LEDs.

Choice of super bright LEDs in white, green, and blue in addition to standard or bright red, amber, and green LEDs.

Stainless steel clips provide secure mounting with a wide range of panel thicknesses.

Latchdown feature gives indication of circuit status. Audible and tactile feedback with smooth and responsive operation.

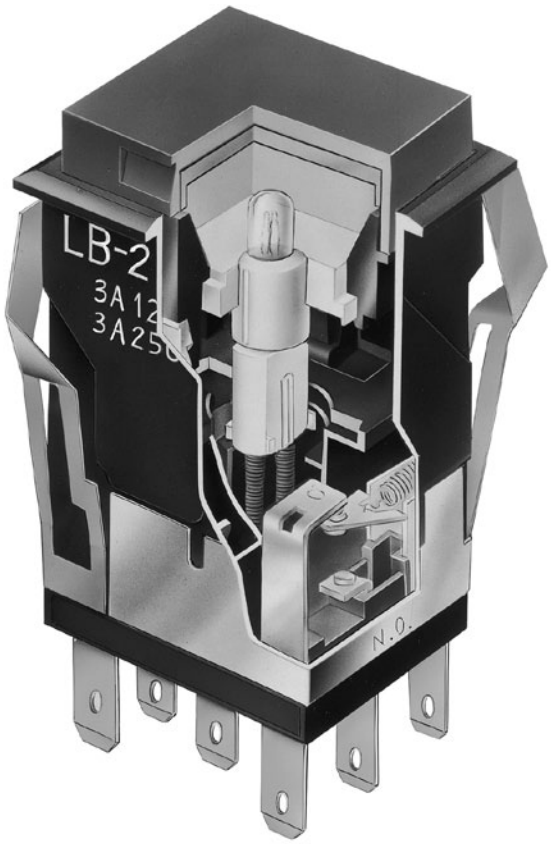
Snap-action contact mechanism gives long electrical life and sensitivity of actuation.

Combination solder lug and .110" quick connect terminals are epoxy sealed to prevent entry of flux, dust, and other contaminants.

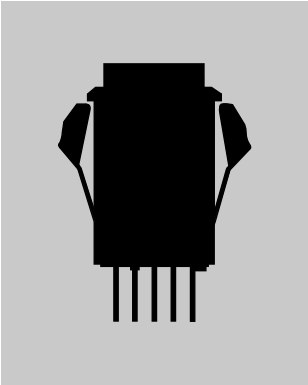
Panel sealed model meets IP65 of IEC60529 specifications (similar to NEMA 4 & 13).

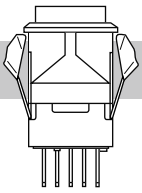
Compact switch design minimizes behind panel depth.

Matching indicators available.

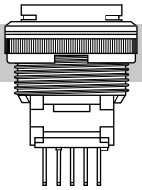



Actual Size





Snap-in Mount Page D46



Panel Seal Page D57

## TYPICAL SWITCH ORDERING EXAMPLE

LB 1 5 S K W01 — 5C12 — JC

### Poles

| | |
|---|---|
| 1 | SPDT |
| 2 | DPDT |

### Circuits

| | | |
|---|---|---|
| 5 | ON | (ON) |
| ( ) = Momentary | | |
| 6 | ON | ON |
| Alternate Action with Latchdown | | |

### Shapes

| | |
|---|---|
| S | Square |
| C | Round |
| R | Rectangular |

### Housing

| | |
|---|---|
| K | Black |
| G | Gray |

### Contacts & Terminals

| | |
|---|---|
| W01 | Silver Contacts<br>Rated 3A @ 125/250V AC<br>Solder Lug/Quick Connect Terminals* |
| G01 | Gold Contacts<br>Rated 0.4VA @ 28V AC/DC<br>Solder Lug/Quick Connect Terminals* |

* Wire harness & cable assemblies offered only in Americas

### 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

**LB15SKW01-5C12-JC**

Red, 12-volt, Bright LED with Resistor

SPDT ON-(ON) Circuit

Silver Contacts Rated 3A @ 125/250V AC; Solder Lug/Quick Connect Terminals

Clear Cap with Red Diffuser

Square Shape

Black Housing

### Lamps

#### Incandescent Lamp Used with Solid Cap

| | |
|---|---|
| 05 | 5-volt |
| 12 | 12-volt |
| No Code | Nonilluminated |

#### Incandescent or Neon Used with Insert Cap

| | |
|---|---|
| 01 | 110-volt Neon |
| 05 | 5-volt Incandescent |
| 12 | 12-volt Incandescent |
| No Code | Nonilluminated |

#### Bright LED Used with LED Cap

| Colors | | Resistor | |
|---|---|---|---|
| 5C | Red | No Code | No Resistor |
| 5D | Amber | 05 | 5-volt |
| | | 12 | 12-volt |
| 5F | Green | 24 | 24-volt |

#### Super Bright LED Used with LED Cap

| | |
|---|---|
| 6B | White |
| 6F | Green |
| 6G | Blue |

#### LED in Spot Illuminated Cap

| | |
|---|---|
| 1C | Red Single Color |
| 1D | Amber Single Color |
| 1F | Green Single Color |
| CF | Red/Green Bicolor |

#### Nonilluminated

| | |
|---|---|
| No Code | Nonilluminated |

### Cap Types & Colors

#### Solid Cap: Lens/Filter Colors

| | |
|---|---|
| BJ | White/Clear |
| CJ | Red/Clear |
| EJ | Yellow/Clear |
| FJ | Green/Clear |
| GJ | Blue/Clear |

#### Insert Cap: Lens/Filter Colors

| | |
|---|---|
| JB | Clear/White |
| JC | Clear/Red |
| JE | Clear/Yellow |
| *JF | Clear/Green |
| *JG | Clear/Blue |

*JF & JG not suitable with neon.

#### LED Cap: Lens/Diffuser Colors

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

#### LED Cap: Lens/Diffuser Colors

| | |
|---|---|
| JB | Clear/White |

#### Spot Illuminated Cap Colors

| | | |
|---|---|---|
| A | Black | Available in Square and Round only. |
| B | White | |
| C | Red | |
| F | Green | |

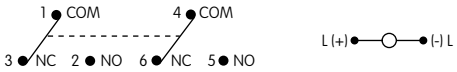
#### Nonilluminated Cap Colors

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

# Series LB

## Standard Size Snap-in Pushbuttons

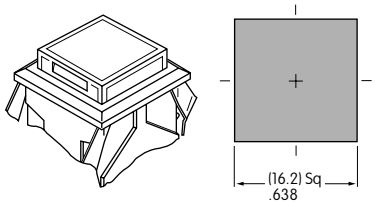
## POLES & CIRCUITS

| | | Plunger Position ( ) = Momentary | | Connected Terminals | | Throw & Switch/Lamp Schematics |
|---|---|---|---|---|---|---|
| Pole | Model | Normal | Down | Normal | Down | Notes: Switch is marked with NC, NO, COM, L+, L–. Lamp circuit is isolated and requires an external power source. |
| SP | LB15<br>*LB16 | ON<br>ON | (ON)<br>ON | 1-3 | 1-2 | SPDT |
| DP | LB25<br>*LB26 | ON<br>ON | (ON)<br>ON | 1-3 4-6 | 1-2 4-5 | DPDT   |

* When in latchdown position for the alternate circuit, cap position is .039″ (1.0mm) above the built-in bezel.

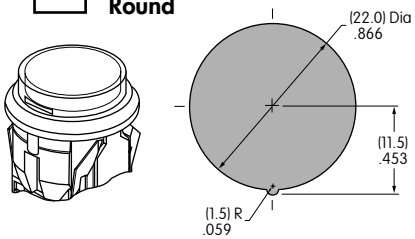
## SHAPES & PANEL CUTOUTS

**S** **.622″ (15.8mm) Square**

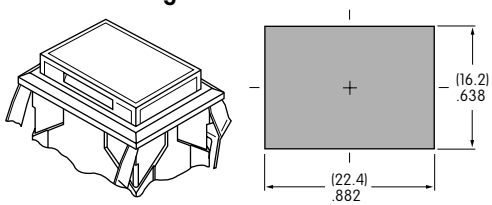



Cutout for 1 switch:
.638″ x .638″ (16.2mm x 16.2mm)
Cutout for 1 switch with barriers:
.638″ x .815″ (16.2mm x 20.7mm)

**C** **.854″ (21.7mm) Round**




**R** **.622″ x .866″ (15.8mm x 22.0mm) Rectangular**




Cutout for 1 switch:
.638″ x .882″ (16.2mm x 22.4mm)
Cutout for 1 switch with barriers:
.638″ x 1.059″ (16.2mm x 26.9mm)

**Panel Thickness for Switches & Barriers:** .039″ ~ .157″ (1.0 ~ 4.0mm)
**Panel Thickness for Protective Guards & Splash Covers:** .039″ ~ .138″ (1.0 ~ 3.5mm)

## HOUSING

**Housing Colors Available:** **K** Black **G** Gray

## CONTACT MATERIALS, RATINGS & TERMINALS

**W01** **Silver Contacts**

**G01** **Gold Contacts**

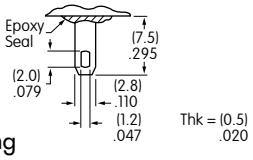
**Power Level**
**3A @ 125V AC & 250V AC**

**Logic Level**
**0.4VA max. @ 28V AC/DC max.**

Complete explanation of operating range in Supplement section.

**Solder Lug/Quick Connect**

Optional PCB adaptors AT711 & AT712 available; illustrated in "Optional Accessories" immediately following "Typical Switch Dimensions."




## INCANDESCENT & NEON LAMP CODES & SPECIFICATIONS

**AT607 & AT607N**

T-1 Bi-pin

| AT607 Incandescent 5-volt or 12-volt; AT607N Neon 110-volt | | 05 | 12 | 01 * |
|---|---|---|---|---|
| Voltage | V | 5V AC | 12V AC | 110V AC |
| Current | I | 115mA | 60mA | 1.5mA |
| Endurance | Avg. Hours | 10,000 | | 10,000 |
| Ambient Temp. Range | | –25°C ~ +50°C | | |

The electrical specifications shown are determined at a basic temperature of 25°C. Lamp circuit is isolated and requires external power source.

* Recommended Resistors for Neon:
33K ohms for 110V AC;
100K ohms for 220V AC

## 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 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.
Additional lamp detail is shown in the Accessories & Hardware section.

### Bright LED without Resistor

**AT635**

LEDs are colored in OFF state.

T-1½ Bi-pin

| Color Codes | Red 5C | Amber 5D | Green 5F | No Code No Resistor | | |
|---|---|---|---|---|---|---|
| | | | | Red | Amber | Green |
| Forward Peak Current | $I_{FM}$ | | | 30mA | 30mA | 30mA |
| Typical Forward Current | $I_F$ | | | 20mA | 20mA | 20mA |
| Forward Voltage | $V_F$ | | | 1.9V | 2.0V | 2.1V |
| Reverse Peak Voltage | $V_{RM}$ | | | 5V | 5V | 5V |
| Current Reduction Rate Above 25°C | $\Delta I_F$ | | | 0.42mA/°C | | |
| Ambient Temperature Range | | | | −25° ~ +50°C | | |

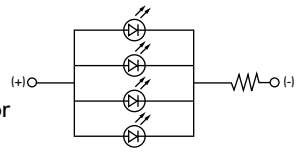
### Bright LED with Resistor

**AT627 with Resistor**

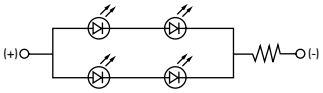
T-1 Bi-pin

| Color Codes: | Red 5C | Amber 5D | Green 5F | Resistor Codes 05 | 12 | 24 |
|---|---|---|---|---|---|---|
| Forward Peak Current | $I_{FM}$ | | | — | — | — |
| Typical Forward Current | $I_F$ | | | 52mA | 26mA | 13mA |
| Forward Voltage | $V_F$ | | | 5V | 12V | 24V |
| Reverse Peak Voltage | $V_{RM}$ | | | 4V | 8V | 16V |
| Current Reduction Rate Above 25°C | $\Delta I_F$ | | | 0.50mA/°C | | |
| Ambient Temperature Range | | | | −25° ~ +50°C | | |

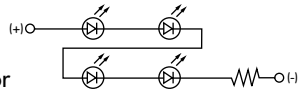
AT627 5-volt 4-element with Resistor




AT627 12-volt 4-element with Resistor




AT627 24-volt 4-element with Resistor




### Super Bright Single Element LED

**AT625G Blue**
**AT631B White**
**AT632F Green**

T-1 Bi-pin

ATTENTION ELECTROSTATIC SENSITIVE DEVICES

| Color | | 6B White | 6F Green | 6G Blue |
|---|---|---|---|---|
| Forward Peak Current | $I_{FM}$ | 30mA | 30mA | 30mA |
| Typical Forward Current | $I_F$ | 20mA | 20mA | 20mA |
| Forward Voltage | $V_F$ | 3.6V | 3.5V | 3.6V |
| Reverse Peak Voltage | $V_{RM}$ | 5V | 5V | 5V |
| Current Reduction Rate Above 25°C | $\Delta I_F$ | 0.50mA/°C | | |
| Ambient Temperature Range | | −25° ~ +50°C | | |

**No Code** **No Lamp**

## CAP TYPES & COLOR COMBINATIONS

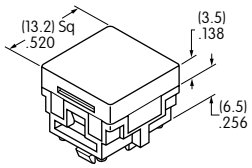
**Color Codes:** **B** White **C** Red **D** Amber **E** Yellow **F** Green **G** Blue **J** Clear

### Solid Cap for Incandescent Lamp & Nonilluminated

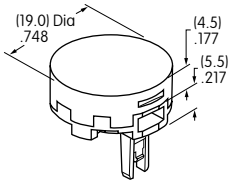
**Lens/Filter Colors Available:**

BJ FJ
CJ GJ
EJ

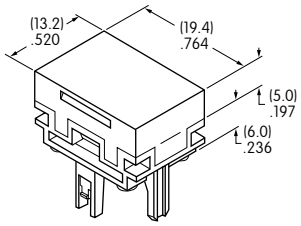
**AT476 Square**

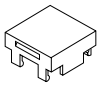



**AT4012 Round**




**AT4026 Rectangular**





Translucent Colored Lens

Transparent Clear Filter

Lamp AT607

Material: Polycarbonate Finish: Glossy

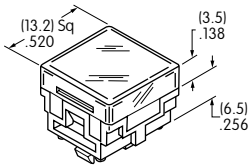
### Insert Cap for Incandescent or Neon Lamp & Nonilluminated

**Lens/Filter Colors Available:**

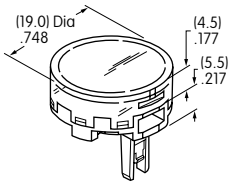
JB JF
JC JG
JE

JF and JG not suitable with neon lamp.

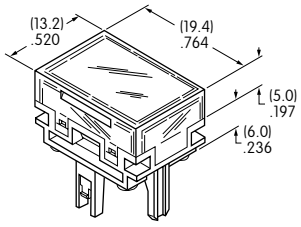
**AT477 Square**




**AT4013 Round**




**AT4027 Rectangular**



Transparent Clear Lens

Translucent Colored Filter

Lamp AT607 or 607N

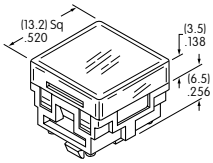
Material: Polycarbonate Finish: Glossy

### Cap for Bright LED without Resistor

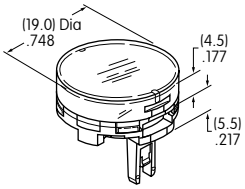
**Lens/Diffuser Colors Available:**

JB
JC
JD
JF

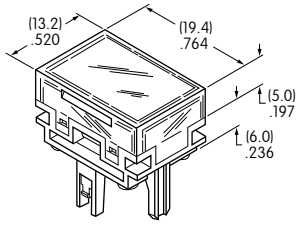
**AT4176 Square**

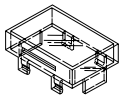


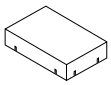

**AT4178 Round**




**AT4177 Rectangular**





Transparent Clear Lens


Translucent Colored Diffuser

Bright LED AT635

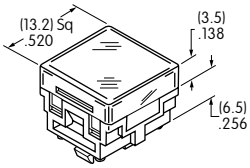
Material: Polycarbonate Finish: Glossy

### Cap for Bright LED with Resistor

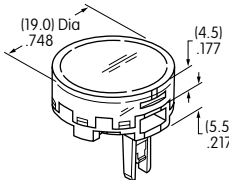
**Lens/Diffuser Colors Available:**

JB
JC
JD
JF

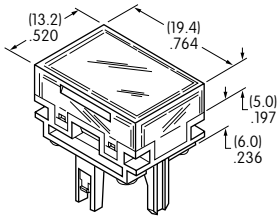
**AT4162 Square**

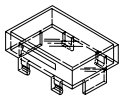


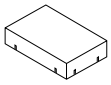

**AT4164 Round**




**AT4163 Rectangular**





Transparent Clear Lens


Translucent Colored Diffuser

Bright LED AT627

Material: Polycarbonate Finish: Glossy

## CAP TYPES & COLOR COMBINATIONS

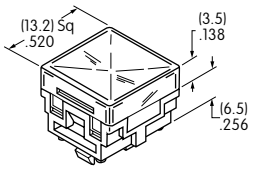
**Color Codes:** **A** Black **B** White **C** Red **D** Amber **E** Yellow **F** Green **G** Blue **H** Gray **J** Clear

### Cap for Super Bright LEDs

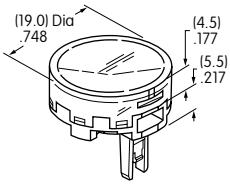
**JB** **Clear Lens White Diffuser**

Material: Polycarbonate
Finish: Glossy

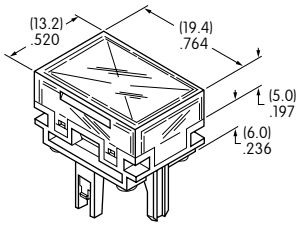
**AT4129 Square**

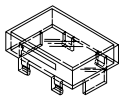


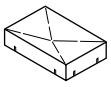

**AT4128 Round**




**AT4130 Rectangular**





Transparent Clear Lens


Translucent White Diffuser

LEDs AT625 AT631 AT632

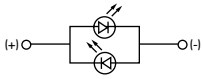
### Spot Illuminated Cap with LED

The electrical specifications shown are determined at a basic temperature of 25°C. LED circuit is isolated and requires an external power source. Single color LEDs are colored in OFF state; bicolor LEDs are translucent white in OFF state. Polarity marks are on 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. Additional lamp detail is shown in the Accessories & Hardware section.

### LED Specifications

LED factory assembled in Spot Illuminated Caps

**Not Available Separately**

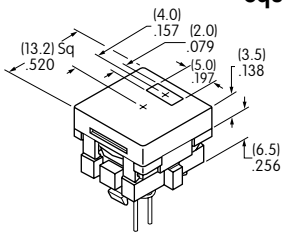
| | Single Color LED with 1 Element | Bicolor LED with 2 Elements  | Single Color | | | Bicolor |
|---|---|---|---|---|---|---|
| | | | **1C** Red | **1D** Amber | **1F** Green | **CF** Red/Green |
| Forward Peak Current | | $I_{FM}$ | 10mA | 30mA | 30mA | 30/25mA |
| Typical Forward Current | | $I_F$ | 8mA | 24mA | 24mA | 20mA |
| Forward Voltage | | $V_F$ | 1.9V | 2.0V | 2.1V | 2.0/2.2V |
| Reverse Peak Voltage | | $V_{RM}$ | 5V | 5V | 5V | — |
| Current Reduction Rate Above 25°C | | $\Delta I_F$ | 0.13mA/°C | 0.40mA/°C | 0.40mA/°C | 0.43/0.38mA/°C |
| Ambient Temperature Range | | | −25° ~ +50°C | | | |

**Cap Colors Available:**

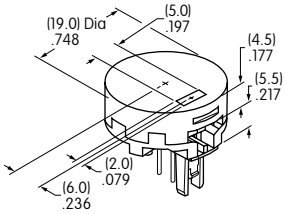
**A** **C**
**B** **F**

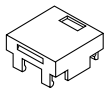
Material: Polycarbonate
Finish: Glossy

**AT480 Square**




**AT4016 Round**





Cap with Window

Factory Assembled LED; Not Available Separately

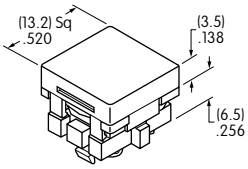
When ordering spot illuminated cap separately, LED color must be specified.
Examples: AT480CA (red LED, black cap); AT4016CFB (red/green bicolored LED, white cap)

### Cap for Nonilluminated

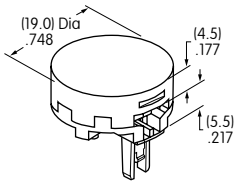
**Cap Colors Available:**

**A** **E** **H**
**B** **F**
**C** **G**

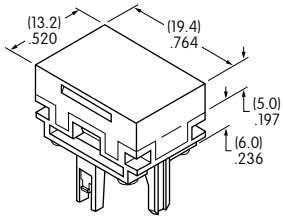
**AT484 Square**

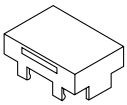



**AT4017 Round**




**AT4030 Rectangular**





Cap

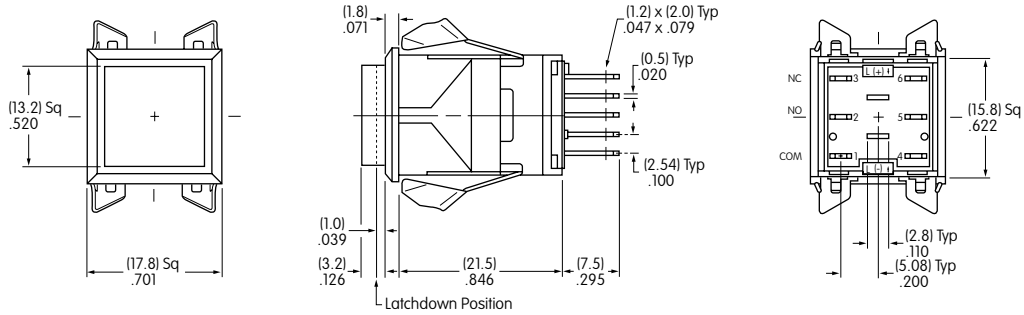
No Lamp

Material: Polycarbonate Finish: Glossy

## TYPICAL SWITCH DIMENSIONS

### Square

### Single & Double Pole

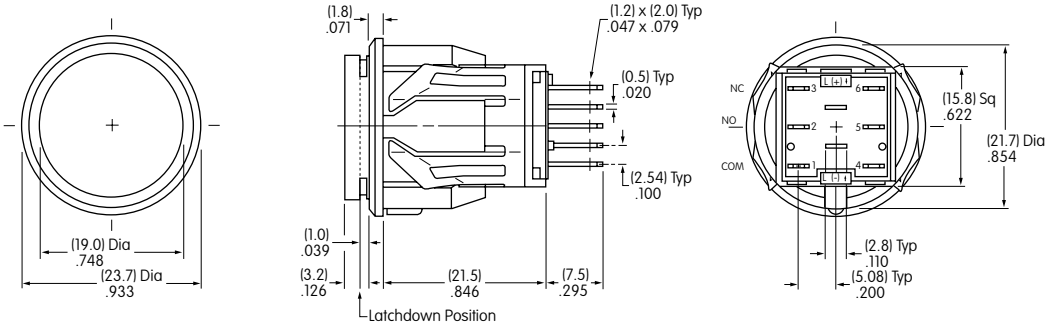



LB15SKW01-12-CJ

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

### Round

### Single & Double Pole

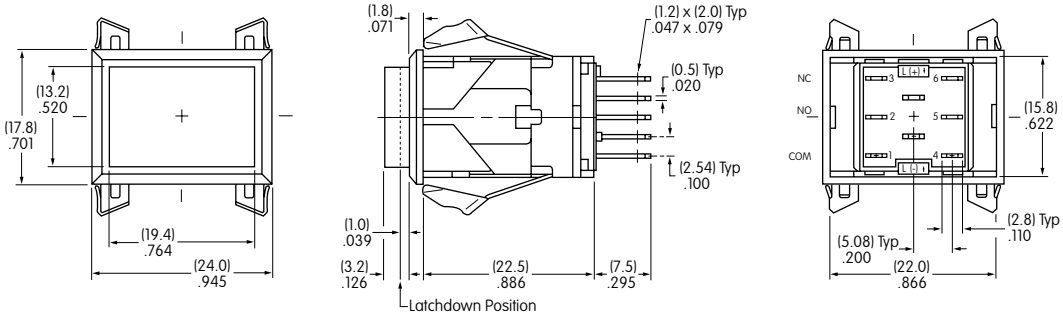



LB16CKW01-12-CJ

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

### Rectangular

### Single & Double Pole



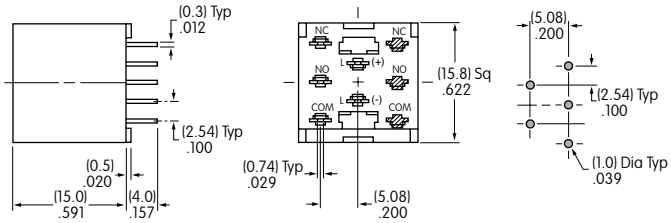

LB26RGW01-12-CJ

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

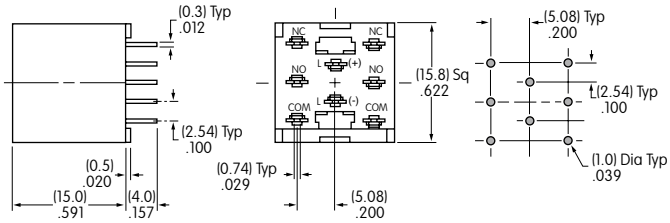
## OPTIONAL ACCESSORIES

### PCB Adaptors

**AT711** Single Pole • Straight PC Terminals




**AT712** Double Pole • Straight PC Terminals

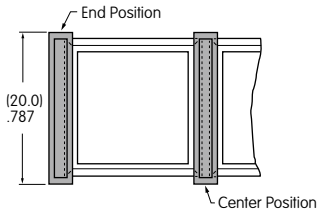


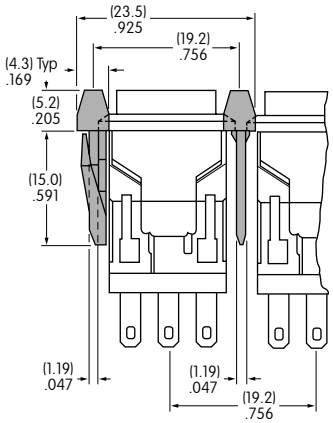

Note: Order adaptors separately.

## OPTIONAL ACCESSORIES

### Barriers

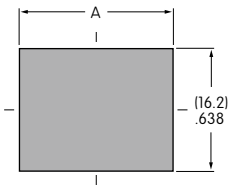
**AT497 End** **AT498 Center**




Material: Polyamide

Cutouts for More Than 1 Switch

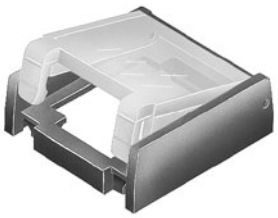


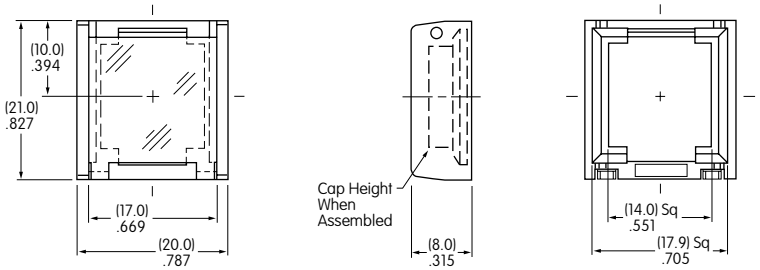

Square
A = .752″ (19.1mm) x Number of Switches + .051″ (1.3mm)
Rectangular
A = .996″ (25.3mm) x Number of Switches + .051″ (1.3mm)

### Protective Guard

**AT499 Square Protective Guard**

Opens 90°
Closes manually





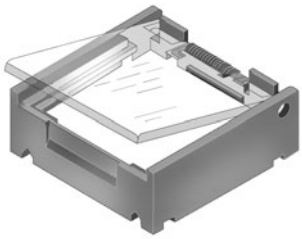

Material: Polyamide

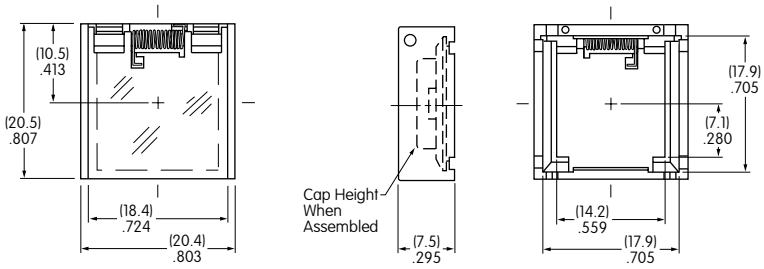
Protective Guards reduce depth of switch behind panel by .020″ (0.5mm).

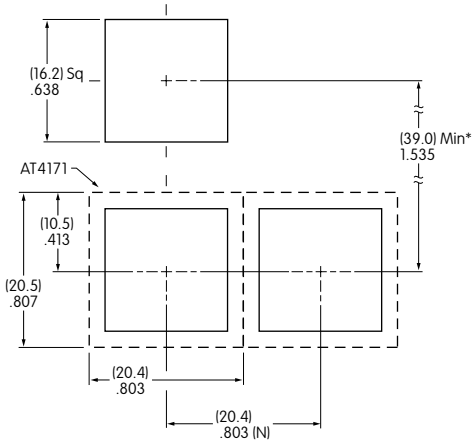
### Spring Loaded Protective Guard

**AT4171 Square Protective Guard**

Opens 180°
Closes automatically

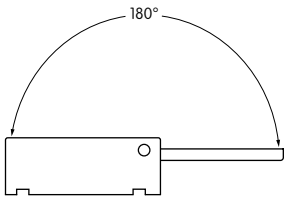





(N) = Number of switches * Minimum dimension allows opening of cover to 180°

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



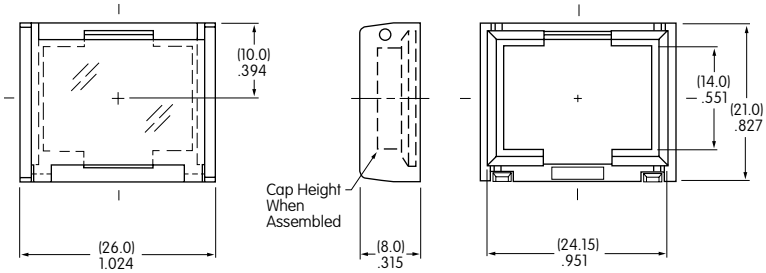

**Recommended Panel Thickness:**
.039″ ~ .106″ (1.0mm ~ 2.7mm)

## OPTIONAL ACCESSORIES

### Protective Guard

**AT4057**
**Rectangular**
**Protective Guard**

Opens 90°
Closes manually

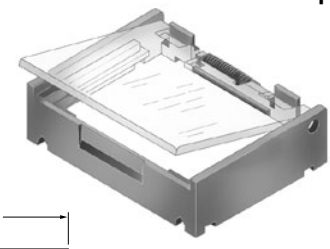


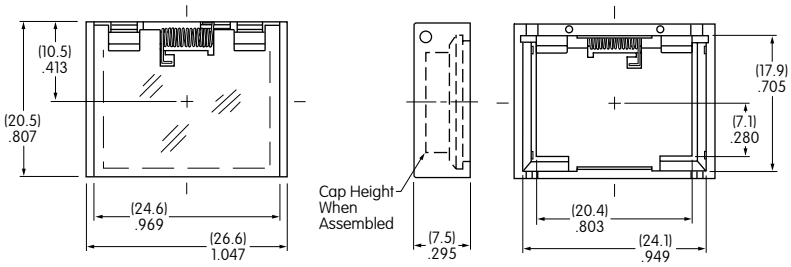

Material: Polyamide

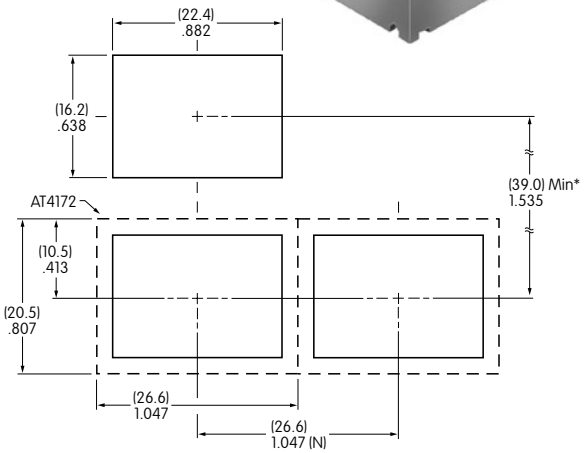
Protective Guards reduce depth of switch behind panel by .020″ (0.5mm).

### Spring Loaded Protective Guard

**AT4172**
**Rectangular**
**Protective Guard**





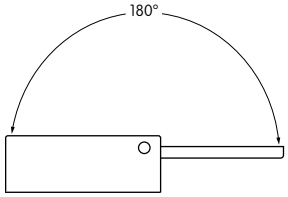




(N) = Number of switches * Minimum dimension allows opening of cover to 180°

Opens 180°
Closes automatically

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

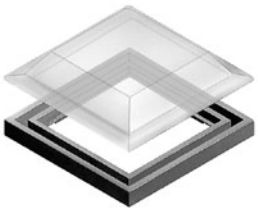
Recommended Panel Thickness:
.039″ ~ .106″ (1.0mm ~ 2.7mm)



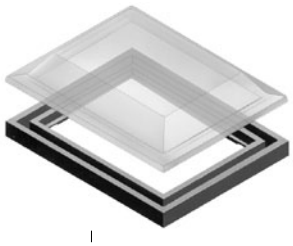

### Dust Covers

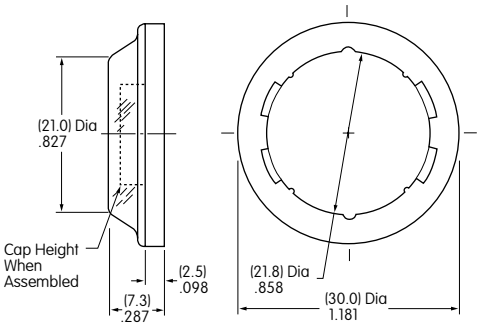
**AT4002**
**Round**

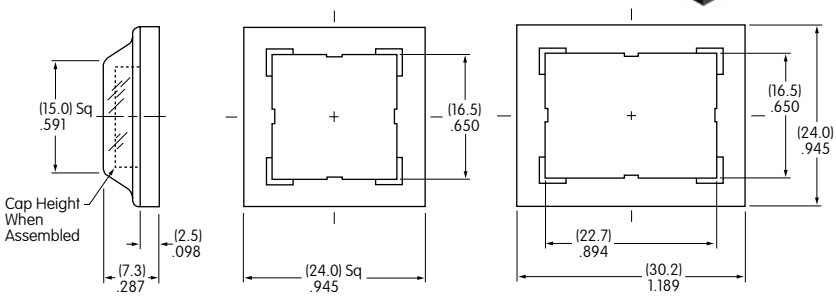
**AT4001**
**Square**



**AT4011**
**Rectangular**





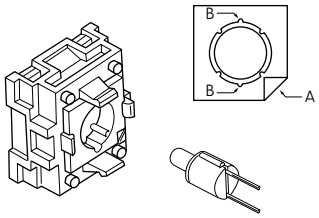

Materials: PVC with polyethylene gasket; PVC loses pliability below 0°C (32°F). Dust Covers reduce depth of switch behind panel by .020″ (0.5mm).

## ASSEMBLY INSTRUCTIONS

### Lamp Installation & LED Orientation

**Incandescent & Neon Lamps AT607 & AT607N**

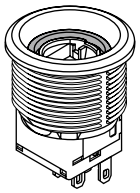
Align projections on lamp with grooves (B) in holder when inserting lamp. To correctly join the lamp holder and cap base, match the cut corners (A).




**Bright LED AT627**

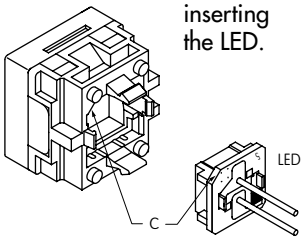
**Panel Seal Models**

For panel seal models, Bright LED must first be inserted into the lamp socket which is built into the switch. The cap can then be placed on the switch.



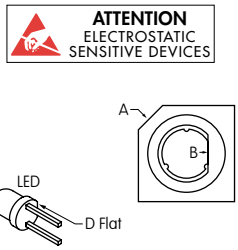
**Snap-in Models**

For snap-in models, Bright LED must be inserted into the cap first. Align cut corners (C) when inserting the LED.




**Bright & Super Bright LEDs AT625, AT631, AT632, AT635**

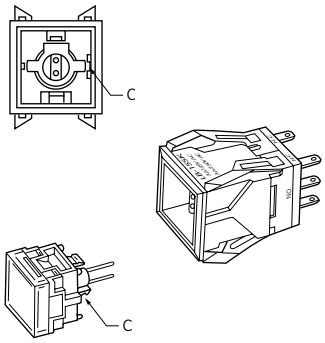
Align D-flat on LED with flat (B) in holder when inserting the LED.
To correctly join the lamp holder and cap base, match the cut corners (A).







### Switch & Cap Assembly

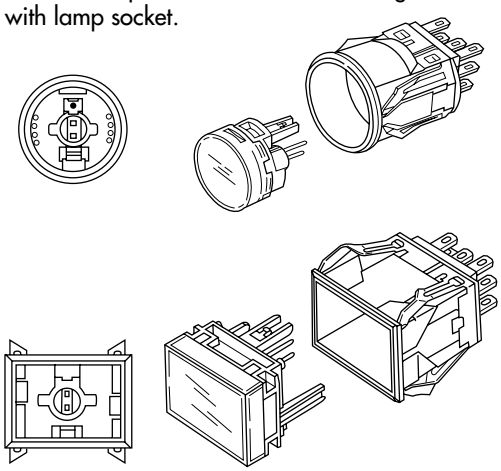


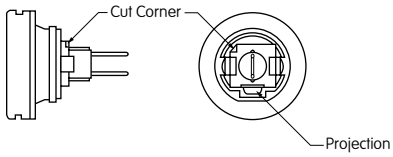

**Square**

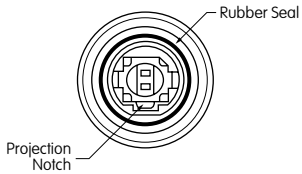
Match projection (C) on cap assembly with groove (C) inside switch. Lamp terminals will then be aligned correctly with lamp socket.

**Round & Rectangular**

Match clip on cap assembly with receptacle inside switch. Lamp terminals will then be aligned correctly with lamp socket.





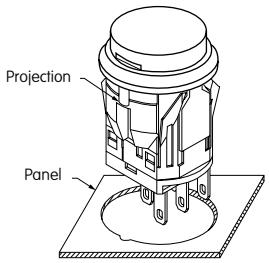

**Panel Seal**

With Lamps AT607, AT607N, and LEDs AT614, AT625, AT631, AT632: Match projection on cap assembly with notch inside switch. Lamp terminals will then be aligned correctly with lamp socket.

### Installation & Maintenance

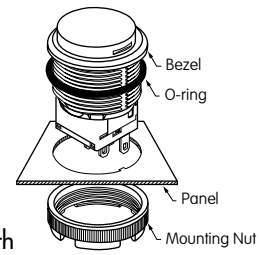
**Snap-in Mount**

Snap-in clip holds all switches firmly in place.
To mount round switch, match the antirotation projection on switch with guide cut in panel. Snap into panel cutout.



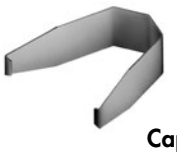

**Panel Seal Bushing Mount**

Insert switch from the front of the panel with the o-ring between the built-in bezel and the panel. Install mounting nut AT075 (supplied with switch) from the rear of the panel.
Overtightening mounting nut may damage the switch housing.




**Lamp Replacement**

Actuator must be in UP position.
Pull off cap with cap extractor AT109.
Replace lamp and reassemble as shown above.



**AT109**
**Cap Extractor**

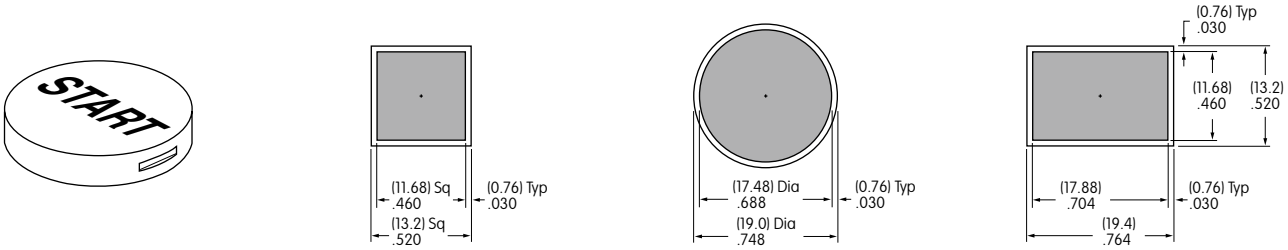
**AT112**
**Socket Wrench**

## LEGENDS

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

### Suggested Printable Area for Lens

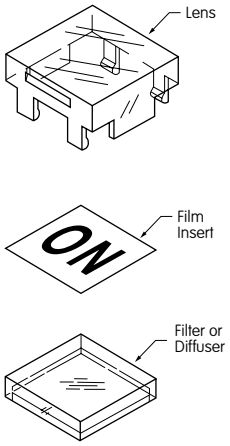
**Recommended Methods:** Laser Etch on clear lens, Screen Print, or Pad Print on lens.
Epoxy based ink is recommended.



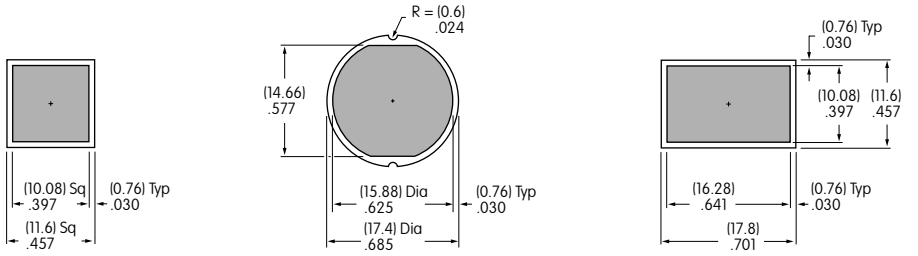

Shaded areas are printable areas.

### Suggested Printable Area for Film Insert

**Recommended Print Method:** Laser Print or Screen Print with Epoxy based ink




Film Insert: Clear Polyester, 4 mil max. thickness




Shaded areas are printable areas.

# OCEAN CHIPS
## Океан Электроники
### Поставка электронных компонентов

Компания «Океан Электроники» предлагает заключение долгосрочных отношений при поставках импортных электронных компонентов на взаимовыгодных условиях!

Наши преимущества:

- Поставка оригинальных импортных электронных компонентов напрямую с производств Америки, Европы и Азии, а так же с крупнейших складов мира;
- Широкая линейка поставок активных и пассивных импортных электронных компонентов (более 30 млн. наименований);
- Поставка сложных, дефицитных, либо снятых с производства позиций;
- Оперативные сроки поставки под заказ (от 5 рабочих дней);
- Экспресс доставка в любую точку России;
- Помощь Конструкторского Отдела и консультации квалифицированных инженеров;
- Техническая поддержка проекта, помощь в подборе аналогов, поставка прототипов;
- Поставка электронных компонентов под контролем ВП;
- Система менеджмента качества сертифицирована по Международному стандарту ISO 9001;
- При необходимости вся продукция военного и аэрокосмического назначения проходит испытания и сертификацию в лаборатории (по согласованию с заказчиком);
- Поставка специализированных компонентов военного и аэрокосмического уровня качества (Xilinx, Altera, Analog Devices, Intersil, Interpoint, Microsemi, Actel, Aeroflex, Peregrine, VPT, Syfer, Eurofarad, Texas Instruments, MS Kennedy, Miteq, Cobham, E2V, MA-COM, Hittite, Mini-Circuits, General Dynamics и др.);

Компания «Океан Электроники» является официальным дистрибьютором и эксклюзивным представителем в России одного из крупнейших производителей разъемов военного и аэрокосмического назначения **«JONHON»**, а так же официальным дистрибьютором и эксклюзивным представителем в России производителя высокотехнологичных и надежных решений для передачи СВЧ сигналов **«FORSTAR»**.

AVIC JONHON

**«JONHON»** (основан в 1970 г.)

Разъемы специального, военного и аэрокосмического назначения:

(Применяются в военной, авиационной, аэрокосмической, морской, железнодорожной, горно- и нефтедобывающей отраслях промышленности)

**«FORSTAR»** (основан в 1998 г.)

ВЧ соединители, коаксиальные кабели, кабельные сборки и микроволновые компоненты:

(Применяются в телекоммуникациях гражданского и специального назначения, в средствах связи, РЛС, а так же военной, авиационной и аэрокосмической отраслях промышленности).

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