# Contents Tactiles

















# General Specifications

## Electrical Capacity (Resistive Load)

**Low/Logic Level:** 50mA @ 24V DC maximum

## Other Ratings

**Contact Resistance:** 100 milliohms maximum
**Insulation Resistance:** 100 megohms minimum @ 250V DC
**Dielectric Strength:** 250V AC minimum between contacts & between contacts & case for 1 minute minimum
**Mechanical Life:** 100,000 operations minimum
**Electrical Life:** 100,000 operations minimum
**Nominal Operating Force:** 1.57N
**Total Travel:** .010" (.250mm)

## Materials & Finishes

**Actuator:** Glass fiber reinforced polyamide (UL94V-0)
**Case:** Stainless steel
**Seal:** Polytetrafluoroethylene
**Base:** Polyphthalamide (UL94V-0)
**Movable Contacts:** Beryllium copper with silver plating
**Stationary Contacts:** Brass with silver plating
**Terminals:** Brass with silver plating

## Environmental Data

**Operating Temperature Range:** –25°C through +70°C (–13°F through +158°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)

## PCB Processing

**Soldering:** Wave Soldering Recommended. See Profile A in Supplement section.
Manual Soldering: See Profile A in Supplement section.
**Cleaning:** Automated cleaning. See Cleaning specifications in Supplement section.

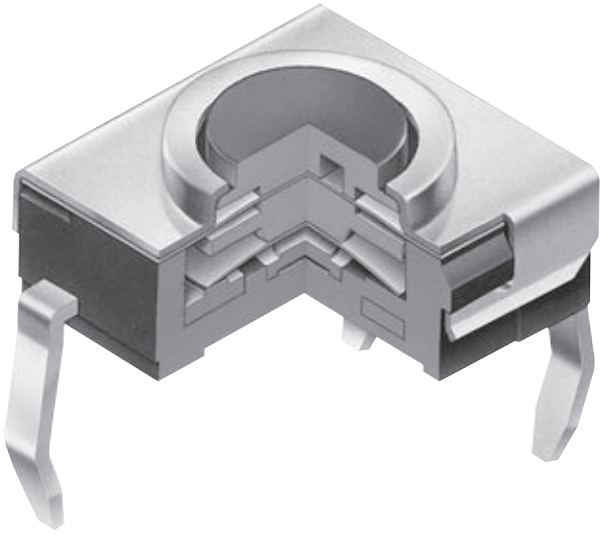
## Standards & Certifications

**Flammability Standards:** UL94V-0 actuator & base
The CB Series tactiles have not been tested for UL recognition or CSA certification.
These switches are designed for use in a low-voltage, low-current, logic-level circuit.
When used as intended in a logic-level circuit, the results do not produce hazardous energy.

# Distinctive Characteristics

Sealed construction prevents contact contamination and allows automated soldering and cleaning.

.244" (6.2mm) square body allows compact mounting.



Actuator and base meet UL flammability rating of 94V-0.

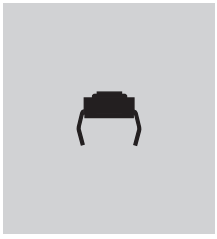
Dome contact gives crisp tactile feedback to positively indicate circuit transfer and assures high reliability and long life – more than 100,000 operations.

Crimped terminals ensure secure mounting and prevent dislodging during wave soldering.

Insert molded terminals lock out flux, solvents, and other contaminants.

Packaged in stick tube or partitioned tray.

Actual Size



## TYPICAL SWITCH ORDERING EXAMPLE

CB | 15 | F | P | — | ☐

| Pole & Circuit | | | |
|---|---|---|---|
| **15** | SPST | OFF | (ON) |
| ( ) = Momentary | | | |

| Actuator | |
|---|---|
| **F** | Flat Button |

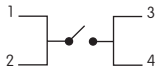
| Terminals | |
|---|---|
| **P** | Straight PC |

| Packaging | |
|---|---|
| **S** | Stick-Tube<br>50 Pieces/Tube |
| **No Code** | Partitioned Tray |

### DESCRIPTION FOR TYPICAL ORDERING EXAMPLE

**CB15FP**


## POLE & CIRCUIT

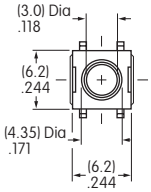
| | | Actuator Position ( ) = Momentary | | Switch Throw & Schematic | |
|---|---|---|---|---|---|
| **Pole** | **Model** | **Normal** | **Down** | | |
| SP | **CB15** | OFF | (ON) | SPST  | Note: Terminal numbers are not actually on the switch. |

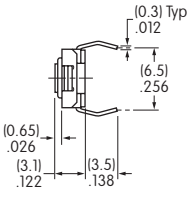


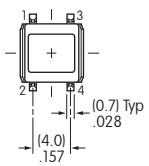
## TYPICAL SWITCH DIMENSIONS

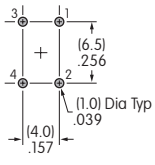
### Single Pole • Single Throw

**CB15FP**



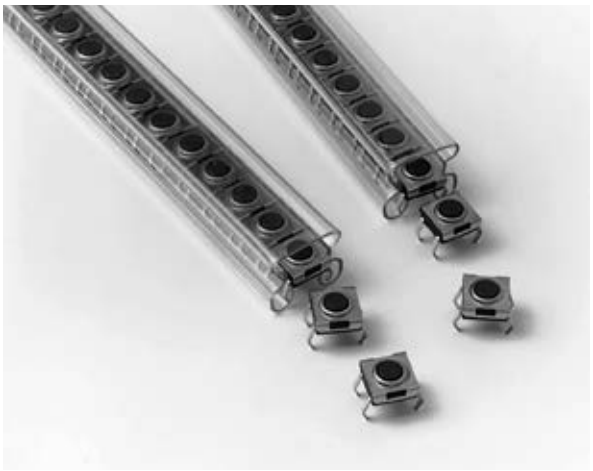
## PACKAGING

**S** **Stick-Tube**

Switches must be ordered in 50-piece increments when stick-tube packaging is selected.

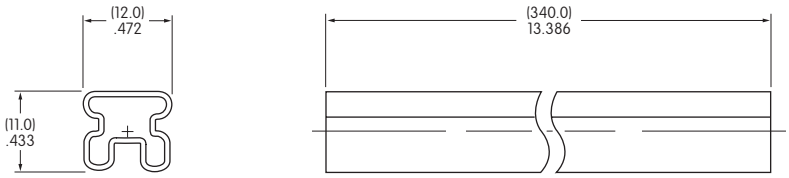
**No Code** **Partitioned Tray**

If ordered in less than 50-piece increments, the switches are packaged in a partitioned tray.



### Stick-Tube Dimensions

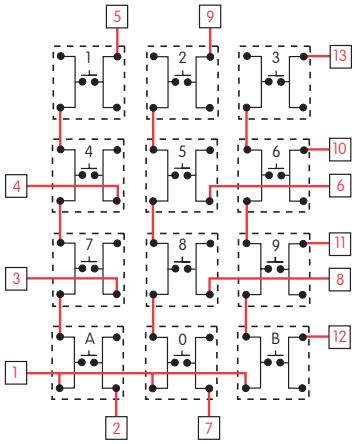
Each stick-tube contains 50 switches

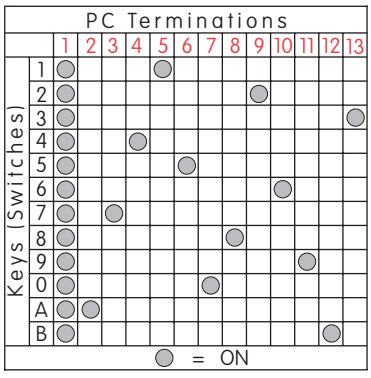



## KEYBOARD MATRIX

### Common Bus Matrix

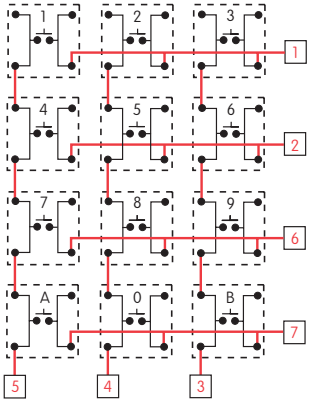
These single pole, single throw switches can be used in a keyboard matrix and, using strapped terminals, achieve a common bus electrical configuration on a single-sided PC board.

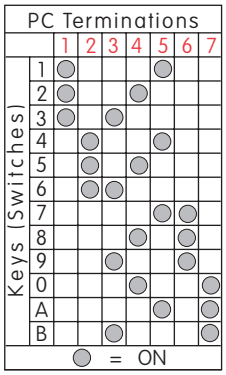





### X-Y Matrix

These single pole, single throw switches can be arranged on a single-sided PC board matrix with strapped terminals to achieve an X-Y type electrical interconnection.






**Red = PCB Trace  Black = Switch Circuit**

# General Specifications

## Electrical Capacity (Resistive Load)

**Low/Logic Level:** 50mA @ 24V DC maximum

## Other Ratings

**Contact Resistance:** 100 milliohms maximum
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**Case:** Stainless steel
**Seal:** Polytetrafluoroethylene
**Base:** Polyphthalamide (UL94V-0)
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**Stationary Contacts:** Brass with silver plating
**Terminals:** Brass with silver plating

## Environmental Data

**Operating Temperature Range:** –25°C through +70°C (–13°F through +158°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)

## Processing

**Soldering:** Reflow Soldering Recommended. See Profile A in Supplement section.
Manual Soldering: See Profile A in Supplement section.
**Cleaning:** Automated cleaning. See Cleaning Specifications in Supplement section.

## Standards & Certifications

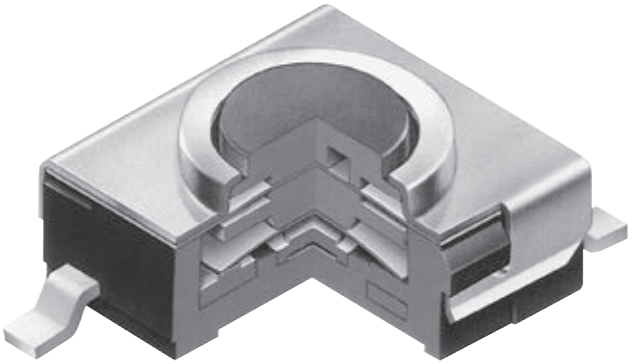
**Flammability Standards:** UL94V-0 actuator & base
The CB3 Series tactiles have not been tested for UL recognition or CSA certification.
These switches are designed for use in a low-voltage, low-current, logic-level circuit.
When used as intended in a logic-level circuit, the results do not produce hazardous energy.

# Distinctive Characteristics

Sealed construction prevents contact contamination and allows automated soldering and cleaning.

.244" (6.2mm) square body allows compact mounting.

Heat tolerant resin used for actuator and base meets UL flammability rating of 94V-0 and maintains switch reliability through vapor phase and infrared convection reflow soldering.



Dome contact gives crisp tactile feedback to positively indicate circuit transfer and assures high reliability and long life – more than 100,000 operations.

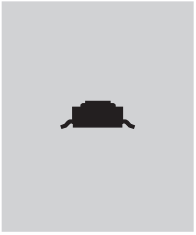
Gull-winged terminals ensure mechanical stability during soldering and simplify solder joint inspection.

Insert molded terminals lock out flux, solvents, and other contaminants.

Packaged in tape-reel or partitioned tray. Tape-reel packaging meets EIA-481-D Standard.

Coplanarity: all considered surfaces must lie between two parallel planes that are a maximum distance apart of .0059" (0.15mm). (Additional coplanarity details in Terms and Acronyms in the Supplement section.)

Actual Size



## TYPICAL SWITCH ORDERING EXAMPLE

CB3 | 15 | F | P | — | ☐

**Pole & Circuit**

| | | | |
|---|---|---|---|
| 15 | SPST | OFF | (ON) |
| ( ) = Momentary | | | |

**Actuator**

| | |
|---|---|
| F | Flat Button |

**Terminals**

| | |
|---|---|
| P | Gull Wing for Upright Mount |

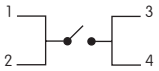
**Packaging**

| | |
|---|---|
| R | Tape-Reel 1,000 Pieces/Reel |
| No Code | Partitioned Tray |

### DESCRIPTION FOR TYPICAL ORDERING EXAMPLE

**CB315FP**


## POLE & CIRCUIT

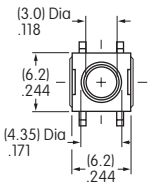
| | | Actuator Position ( ) = Momentary | | Switch Throw & Schematic | |
|---|---|---|---|---|---|
| Pole | Model | Normal | Down | | |
| SP | CB315 | OFF | (ON) | SPST  | Note: Terminal numbers are not actually on switch. |

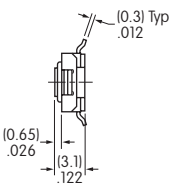


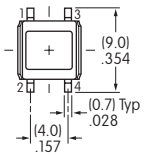
## TYPICAL SWITCH DIMENSIONS

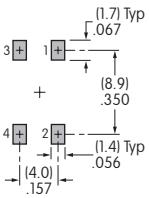
### Single Pole • Single Throw

CB315FP



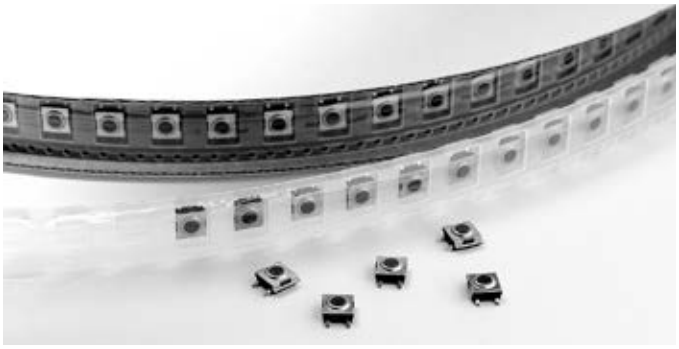



## PACKAGING

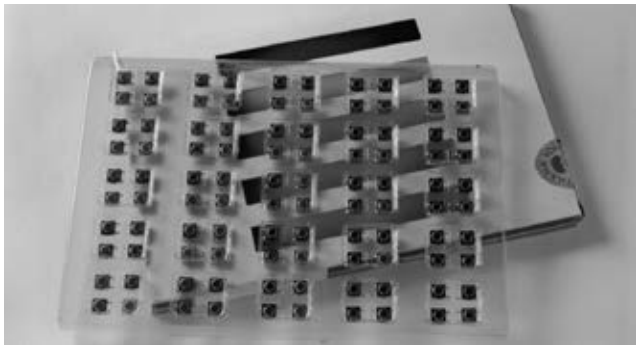
**R** **Tape-Reel** (packaged to EIA-481-D standard)

Switches must be ordered in 1,000-piece increments when tape-reel packaging is selected.



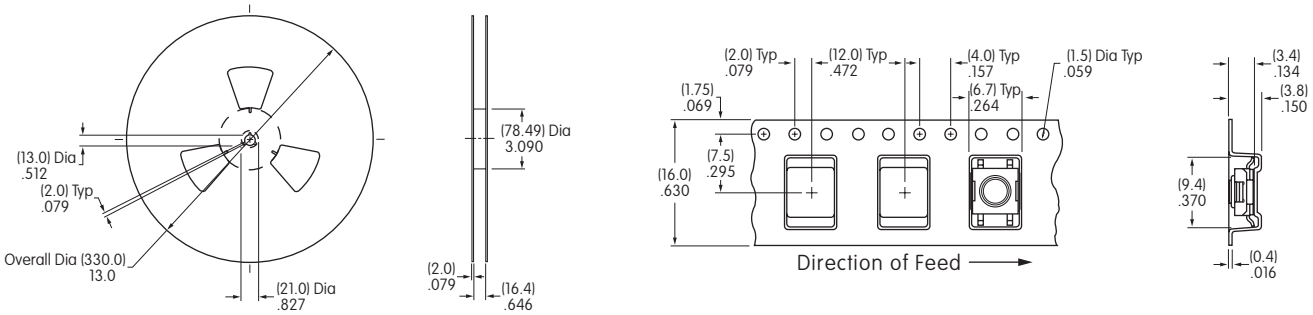
**No Code** **Partitioned Tray**

If less than 1,000 pieces are ordered, the switches are packaged in a partitioned tray. No code is required.



### Tape-Reel Dimensions & Specifications

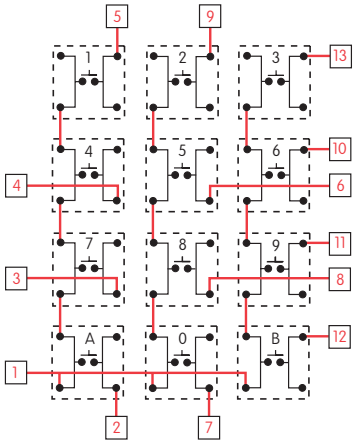
Each tape-reel of 1,050 pockets contains 1,000 switches
Minimum Leader Length: 16.54" (420mm) Minimum Trailer Length: 7.09" (180mm)

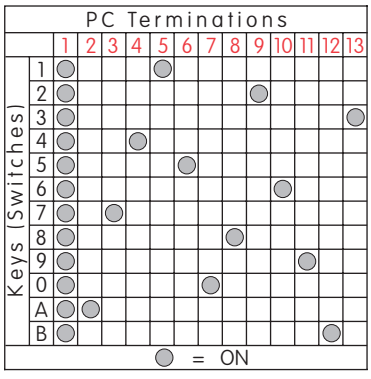



## KEYBOARD MATRIX

### Common Bus Matrix

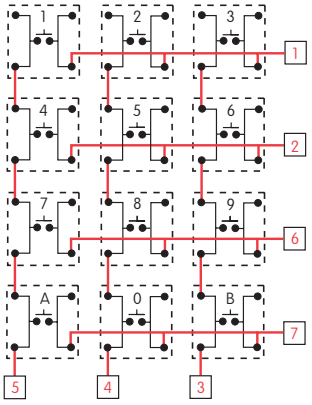
These single pole, single throw switches can be used in a keyboard matrix and, using strapped terminals, achieve a common bus electrical configuration on a single-sided PC board.

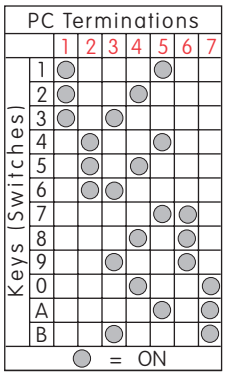



### X-Y Matrix

These single pole, single throw switches can be arranged on a single-sided PC board matrix with strapped terminals to achieve an X-Y type electrical interconnection.




**Red = PCB Trace** **Black = Switch Circuit**

# General Specifications

## Electrical Capacity (Resistive Load)

**Power Level (silver):** 3VA maximum @ 28V DC maximum
(Applicable Range 10mA ~ 125mA @ 0.1V ~ 28V)

**Logic Level (gold):** 0.4VA maximum @ 28V AC/DC maximum
(Applicable Range 0.1mA ~ 0.1A @ 20mV ~ 28V)

Note: See Supplement for further explanation of operating range.

## Other Ratings

**Contact Resistance:** 100 milliohms maximum
**Insulation Resistance:** 100 megohms minimum @ 100V DC
**Dielectric Strength:** 250V AC minimum for 1 minute minimum between contacts & between contacts & case
**Mechanical Life:** 500,000 operations minimum
**Electrical Life:** 500,000 operations minimum
**Nominal Operating Force:** 1.60N
**Total Travel:** .008" (0.2mm)

## Materials & Finishes

**Actuator:** Glass fiber reinforced polyamide (UL94V-0)
**Case:** Stainless steel
**Base:** Glass fiber reinforced polyamide (UL94V-0)
**Movable Contacts:** Stainless steel with silver or gold plating
**Stationary Contacts:** Brass with silver or gold plating
**Terminals:** Brass with silver or gold plating

## Environmental Data

**Operating Temperature Range:** –20°C through +70°C (–4°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:** 100G (981m/s$^2$) acceleration (tested in 6 right angled directions, with 5 shocks in each direction)

## PCB Processing

**Soldering:** Wave Soldering Recommended. 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.

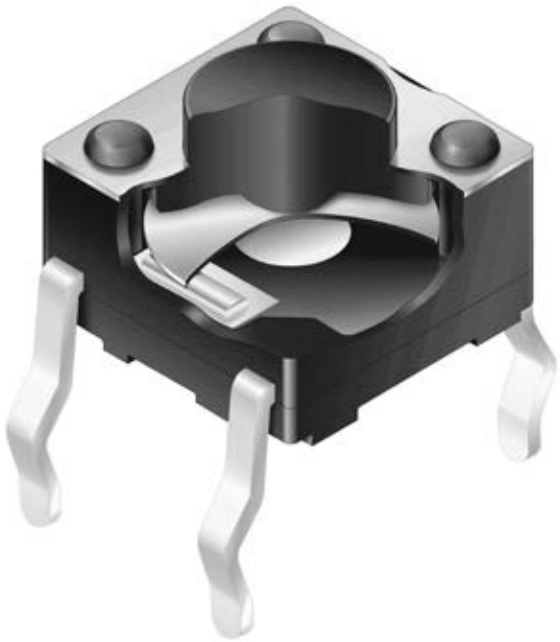
## Standards & Certifications

**Flammability Standards:** UL94V-0 actuator and base
These switches are designed for use in a low-voltage, low-current circuit.
When used as intended, the results do not produce hazardous energy.

# Distinctive Characteristics

.244" (6.2mm) square body allows compact mounting.

Heat resistant resin body meets lead-free solder processing requirements and UL flammability rating of 94V-0.



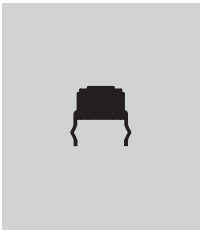
Stick-tube packaging allows rapid automated placement of devices.

Gold plated contacts available for very low voltage/current applications offer advantages of little or no oxidization or sulfurization and stable contact resistance.

Crimped terminals provide a spring type action which ensures secure mounting and prevents dislodging during automated soldering.

Insert molded terminals lock out flux, solvents, and other contaminants and allow automated soldering.

Actual Size



## TYPICAL SWITCH ORDERING EXAMPLE

HP02 | 15A | F | K | P2 | — | S

**Pole & Circuit**

| | | | |
|---|---|---|---|
| **15A** | SPST | OFF | (ON) |

( ) = Momentary
Normally Open Contacts

**Actuator**

| | |
|---|---|
| **F** | Flat Button |

**Actuator Color**

| | |
|---|---|
| **K** | Black |

**Terminals & Contacts**

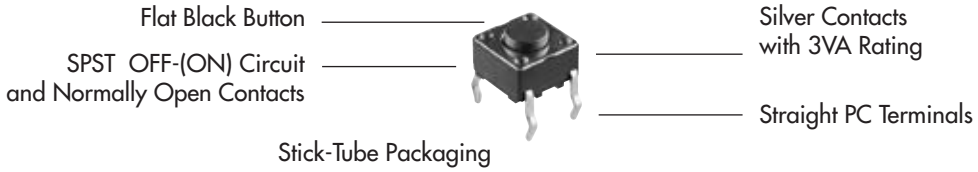
| | |
|---|---|
| **P2** | Straight PC; Silver Contacts Rated 3VA max. DC |
| **P4** | Straight PC; Gold Contacts Rated 0.4VA max. @ 28V AC/DC max. |

**Packaging**

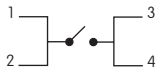
| | |
|---|---|
| **S** | Stick-Tube 100 Pieces/ Tube |

### DESCRIPTION FOR TYPICAL ORDERING EXAMPLE

**HP0215AFKP2-S**




## POLE & CIRCUIT

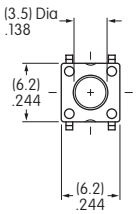
| | | Actuator Position ( ) = Momentary | | Switch Throw & Schematic | |
|---|---|---|---|---|---|
| **Pole** | **Model** | **Normal** | **Down** | | |
| SP | **HP0215A** | OFF | (ON) | SPST  | Note: Terminal numbers are not actually on the switch. |

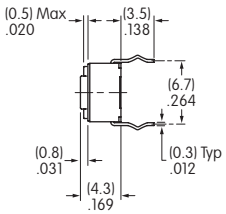


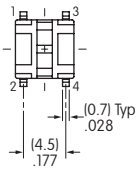
## TYPICAL SWITCH DIMENSIONS

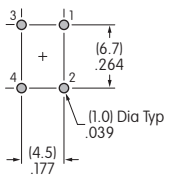
**Straight PC**

HP0215AFKP2



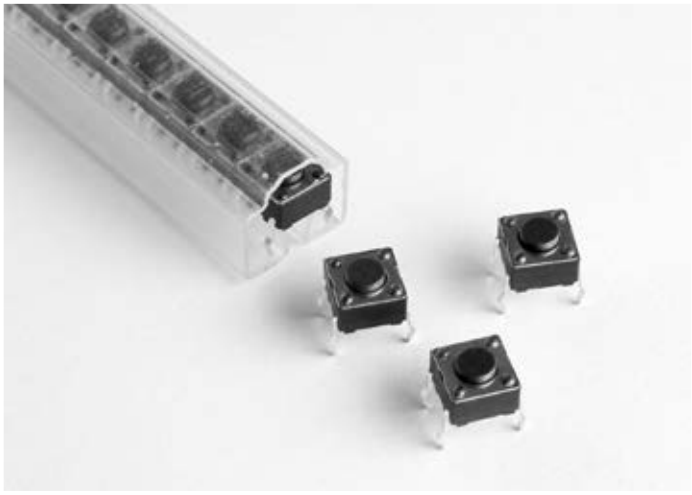



## PACKAGING

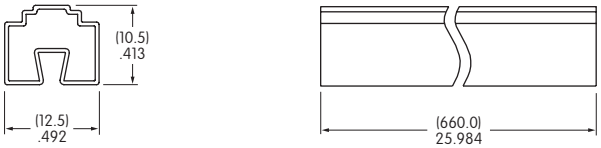
**S** **Stick-Tube**

Switches must be ordered in 100-piece increments.



### Stick-Tube Dimensions

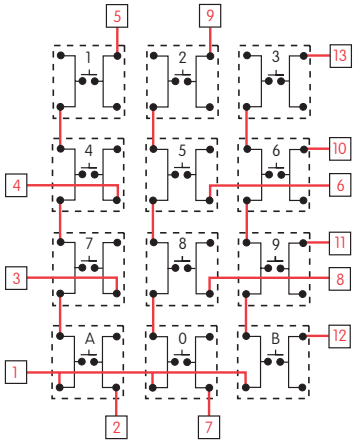
Each stick-tube contains 100 switches.

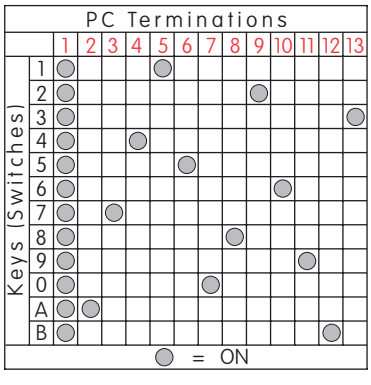



## KEYBOARD MATRIX

### Common Bus Matrix

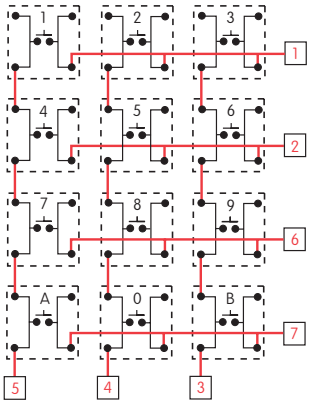
These single pole, single throw switches can be used in a keyboard matrix and, using strapped terminals, achieve a common bus electrical configuration on a single-sided PC board.

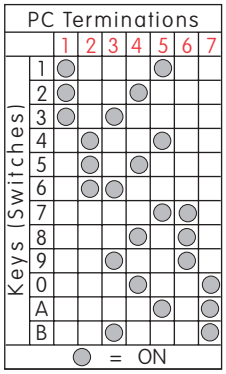





### X-Y Matrix

These single pole, single throw switches can be arranged on a single-sided PC board matrix with strapped terminals to achieve an X-Y type electrical interconnection.






**Red = PCB Trace  Black = Switch Circuit**

# General Specifications

## Electrical Capacity (Resistive Load)

**Power Level (silver):** 3VA maximum @ 28V DC maximum
(Applicable Range 10mA ~ 125mA @ 0.1V ~ 28V)

**Logic Level (gold):** 0.4VA maximum @ 28V AC/DC maximum
(Applicable Range 0.1mA ~ 0.1A @ 20mV ~ 28V)
Note: See Supplement for further explanation of operating range.

## Other Ratings

**Contact Resistance:** 100 milliohms maximum
**Insulation Resistance:** 100 megohms minimum @ 100V DC
**Dielectric Strength:** 250V AC minimum for 1 minute minimum between contacts & between contacts & case
**Mechanical Life:** 500,000 operations minimum
**Electrical Life:** 500,000 operations minimum
**Nominal Operating Force:** 1.60N
**Total Travel:** .008" (0.2mm)

## Materials & Finishes

**Actuator:** Glass fiber reinforced polyamide (UL94V-0)
**Case:** Stainless steel
**Base:** Glass fiber reinforced polyamide (UL94V-0)
**Movable Contacts:** Stainless steel with silver or gold plating
**Stationary Contacts:** Brass with silver or gold plating
**Terminals:** Brass with silver or gold plating

## Environmental Data

**Operating Temperature Range:** –20°C through +70°C (–4°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:** 100G (981m/s$^2$) acceleration (tested in 6 right angled directions, with 5 shocks in each direction)

## Processing

**Soldering:** Reflow Soldering Recommended. 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.

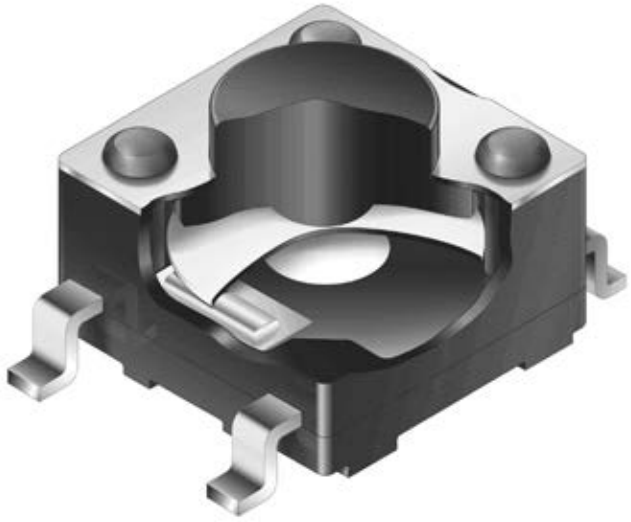
## Standards & Certifications

**Flammability Standards:** UL94V-0 actuator and base
These switches are designed for use in a low-voltage, low-current circuit.
When used as intended, the results do not produce hazardous energy.

# Distinctive Characteristics

.244" (6.2mm) square body allows compact mounting.

Heat resistant resin body meets lead-free solder processing requirements and UL flammability rating of 94V-0.



Stick-tube and tape-reel packaging allow rapid automated placement of devices.

Gold plated contacts available for very low voltage/current applications offer advantages of little or no oxidization or sulfurization and stable contact resistance.

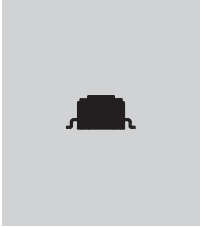
Gull-winged terminals ensure mechanical stability during soldering and simplified solder joint inspection.

Insert molded terminals lock out flux, solvents, and other contaminants and allow automated soldering.

Tape-reel packaging meets EIA-481-D Standard.

Coplanarity: all considered surfaces must lie between two parallel planes that are a maximum distance apart of .0039" (0.10mm). (Additional coplanarity details in Terms and Acronyms in the Supplement section.)

Actual Size



## TYPICAL SWITCH ORDERING EXAMPLE

HP03 | 15A | F | K | P4 | — | R

### Pole & Circuit

| | | | |
|---|---|---|---|
| **15A** | SPST | OFF | (ON) |

( ) = Momentary
Normally Open Contacts

### Actuator

| | |
|---|---|
| **F** | Flat Button |

### Actuator Color

| | |
|---|---|
| **K** | Black |

### Terminals & Contacts

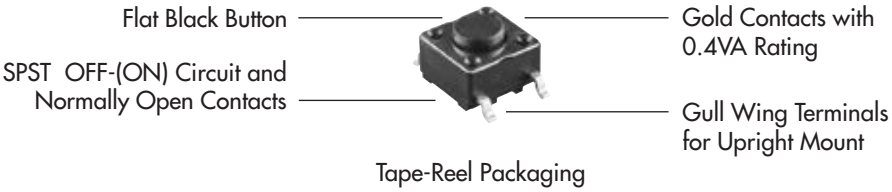
| | |
|---|---|
| **P2** | Gull Wing for Upright Mount; Silver Contacts Rated 3VA max. DC |
| **P4** | Gull Wing for Upright Mount; Gold Contacts Rated 0.4VA max. @ 28V AC/DC max. |

### Packaging

| | |
|---|---|
| **S** | Stick-Tube 100 Pieces/ Tube |
| **R** | Tape-Reel 1,000 Pieces/ Reel |

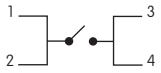
### DESCRIPTION FOR TYPICAL ORDERING EXAMPLE

**HP0315AFKP4-R**




Tape-Reel Packaging

## POLE & CIRCUIT

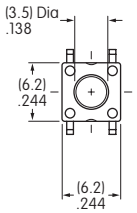
| | | Actuator Position ( ) = Momentary | | Switch Throw & Schematic | |
|---|---|---|---|---|---|
| **Pole** | **Model** | **Normal** | **Down** | | |
| SP | **HP0315A** | OFF | (ON) | SPST  | Note: Terminal numbers are not actually on the switch. |

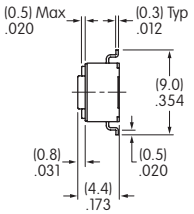


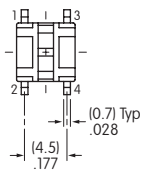
## TYPICAL SWITCH DIMENSIONS

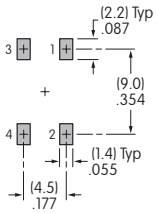
### Gull-winged

HP0315AFKP4



## PACKAGING

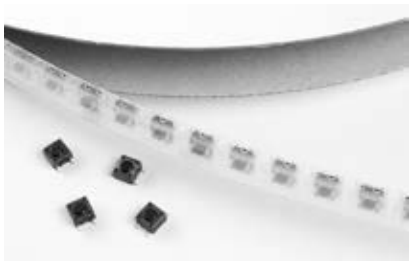
**S** **Stick-Tube**

Switches must be ordered in 100-piece increments when stick-tube packaging is selected.

**R** **Tape-Reel**

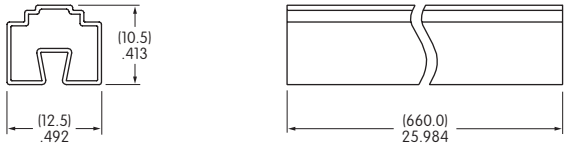
Switches must be ordered in 1,000-piece increments when tape-reel packaging is selected.

Packaging meets EIA-481-D Standard.



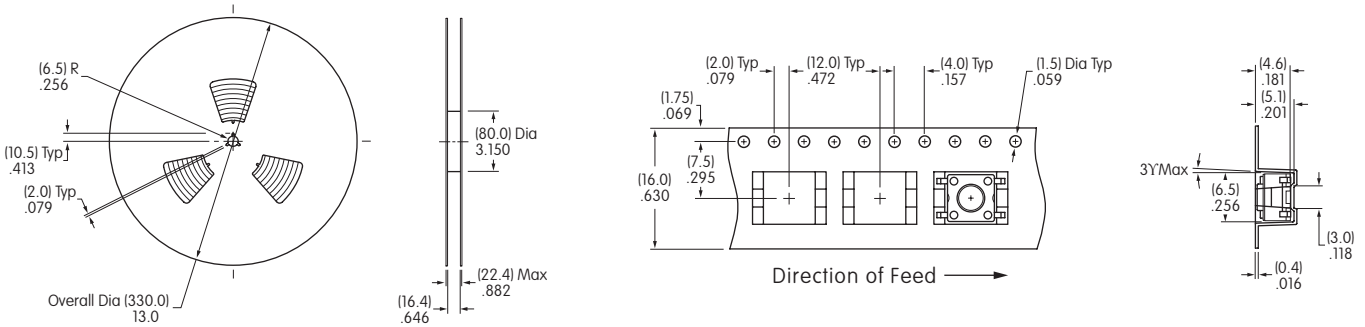
### Stick-Tube Dimensions

Each stick-tube contains 100 switches




### Tape-Reel Dimensions

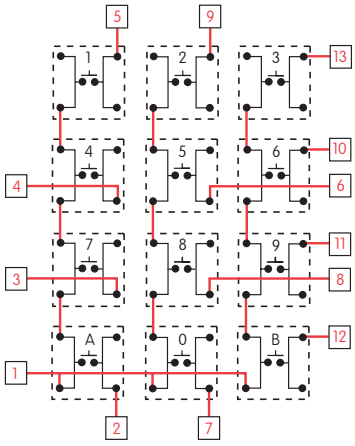
Each tape-reel of 1,100 pockets contains 1,000 switches.
Minimum Leader Length: 15.748" (400mm). Minimum Trailer Length: 6.299" (160mm).

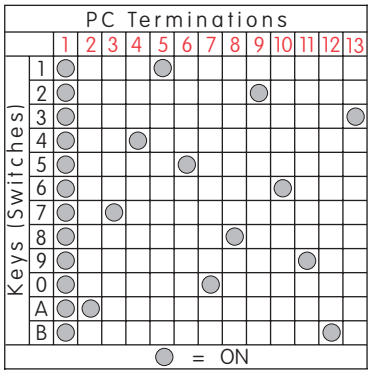



## KEYBOARD MATRIX

### Common Bus Matrix

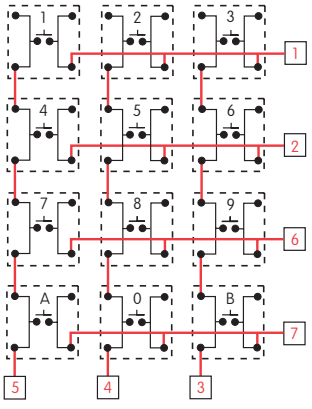
These single pole, single throw switches can be used in a keyboard matrix and, using strapped terminals, achieve a common bus electrical configuration on a single-sided PC board.

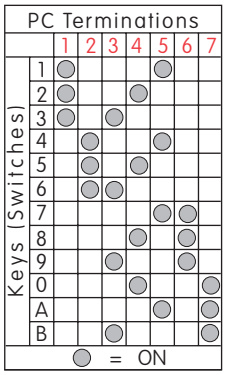





### X-Y Matrix

These single pole, single throw switches can be arranged on a single-sided PC board matrix with strapped terminals to achieve an X-Y type electrical interconnection.






**Red = PCB Trace** **Black = Switch Circuit**

# General Specifications

## Electrical Capacity (Resistive Load)

**Low/Logic Level:** 50mA @ 24V DC maximum for Standard Operating Force models
125mA @ 24V DC maximum for High Operating Force models

## Other Ratings

| | Standard Operating Force | High Operating Force |
|---|---|---|
| **Contact Resistance:** | 50 milliohms maximum | 50 milliohms maximum |
| **Insulation Resistance:** | 500 megohms minimum @ 250V DC | 500 megohms minimum @ 250V DC |
| **Dielectric Strength:** | 250V AC minimum for 1 minute minimum | 250V AC minimum for 1 minute minimum |
| **Mechanical Life:** | 5,000,000 operations minimum | 1,000,000 operations minimum |
| **Electrical Life:** | 5,000,000 operations minimum | 1,000,000 operations minimum |
| **Nominal Operating Force:** | 1.76N for JB15 | 2.65N for JB15H |
| **Total Travel:** | .010" (.250mm) | .012" (.300mm) |

## Materials & Finishes

**Actuator:** Glass fiber reinforced PBT for Extended actuator; PBT for Flat; Polyacetal for Short
**Case:** Glass fiber reinforced polyamide (UL94V-0)
**Seal:** Nitrile butadiene rubber
**Base:** Glass fiber reinforced PBT (UL94V-0)
**Movable Contacts:** Stainless steel
**Stationary Contacts:** Brass with silver plating
**Terminals:** Brass with silver plating
**Mounting Bracket:** Phosphor bronze with tin plating

## Environmental Data

**Operating Temperature Range:** –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)

## PCB Processing

**Soldering:** Wave Soldering Recommended. See Profile A in Supplement section.
Manual Soldering: See Profile A in Supplement section.
**Cleaning:** Automated cleaning. See Cleaning specifications in Supplement section.

## Standards & Certifications

**Flammability Standards:** UL94V-0 rated case & base
The JB Series tactiles have not been tested for UL recognition or CSA certification.
These switches are designed for use in a low-voltage, low-current, logic-level circuit.
When used as intended in a logic-level circuit, the results do not produce hazardous energy.

# Distinctive Characteristics

Special bracket for right angle mounting provides added design variations.

Higher operating force type provides more pronounced operating feel.

Rubber seal construction prevents contact contamination and allows automated soldering and cleaning.

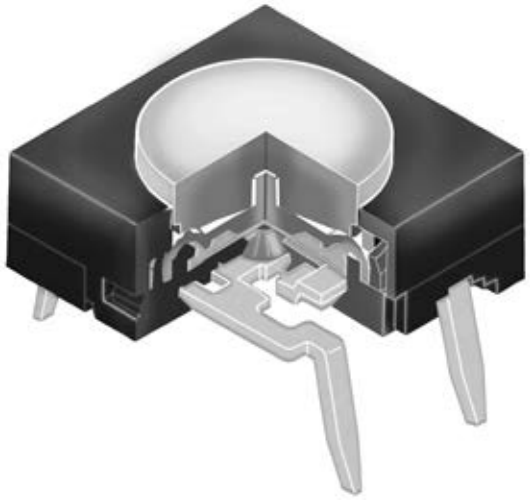
Choice of dimensions from PCB to top of cap allows design flexibility.

Dome contact gives crisp tactile feedback to positively indicate circuit transfer and assures high reliability and long life of up to 5,000,000 operations.

Slanted terminals provide a spring type action which ensures secure mounting and prevents dislodging during wave soldering.

Molded-in terminals are part of the sealed construction which allows automated soldering and washing.

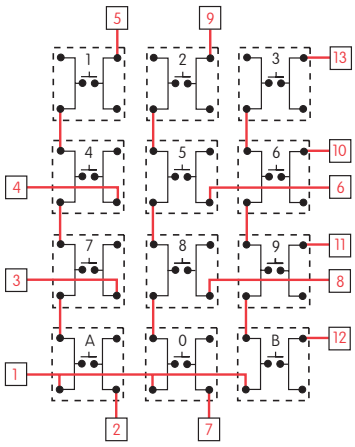
Terminal spacing conforms to standard .100" (2.54mm) PCB grid.

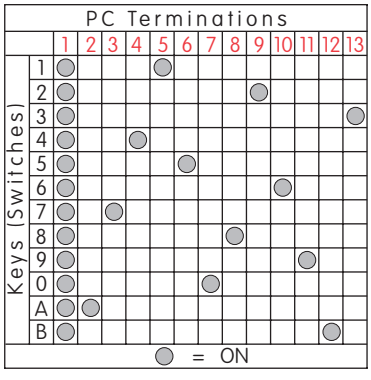


Actual Size

## Common Bus Matrix

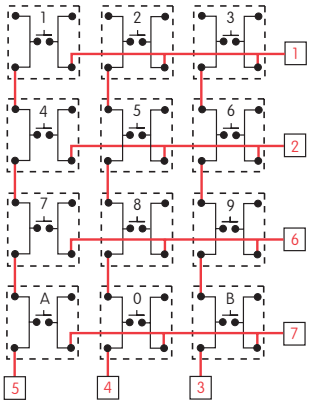
These single pole, single throw switches can be used in a keyboard matrix and, using strapped terminals, achieve a common bus electrical configuration on a single-sided PC board.

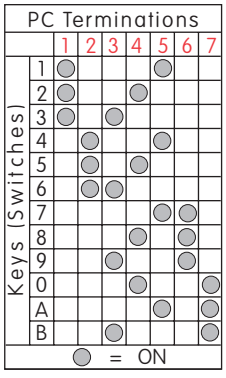



## X-Y Matrix

These single pole, single throw switches can be arranged on a single-sided PC board matrix with strapped terminals to achieve an X-Y type electrical interconnection.




**Red = PCB Trace  Black = Switch Circuit**

## TYPICAL SWITCH ORDERING EXAMPLE

JB | 15 | ☐ | F | P | — | ☐ | ☐

### Pole & Circuit

| | | | |
|---|---|---|---|
| 15 | SPST | OFF | (ON) |

( ) = Momentary

### Operating Force

| | |
|---|---|
| No Code | Standard for Actuators F & K |
| H | High for Actuators F, K & A |

### Actuators

| | |
|---|---|
| F | Flat Blue Button |
| K | Short |
| A | Extended (H operating force only; not for Right Angle) |

### Terminals

| | |
|---|---|
| P | Straight PC |
| H | Right Angle PC |

### Snap-On Caps

**For Straight & Right Angle PC**

| | |
|---|---|
| No Code | No Cap for F Actuator |

**For Straight PC**

| | |
|---|---|
| 1 | Sculptured |
| 2 | Flat |
| 4 | Framed |
| 5 | Cap with Black Mounter |

**For Right Angle PC**

| | |
|---|---|
| 6 | Flat |

### Cap Colors

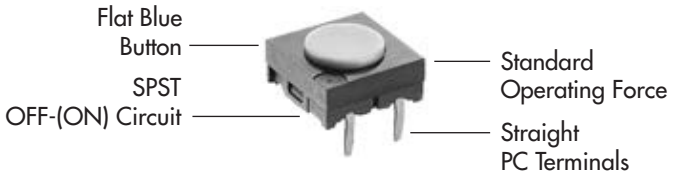
| | |
|---|---|
| A | Black |
| B | White |
| C | Red |
| E | Yellow |
| F | Green |
| G | Blue |
| H | Gray |

For Framed (4):

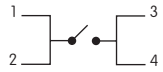
| Button | | Frame |
|---|---|---|
| B | White | B |
| C | Red | C |
| E | Yellow | E |
| F | Green | F |
| G | Blue | G |
| H | Gray | H |

### DESCRIPTION FOR TYPICAL ORDERING EXAMPLE

**JB15FP**



## POLE & CIRCUIT

| | | Actuator Position ( ) = Momentary | | Switch Throw & Schematic | |
|---|---|---|---|---|---|
| Pole | Model | Normal | Down | | |
| SP | **JB15** | OFF | (ON) | SPST   | Note: Terminal numbers are shown on the switch. |

## OPERATING FORCE

**No Code** — **Standard Operating Force**
1.76N

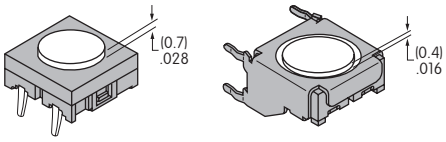
For F & K Actuators

**H** — **High Operating Force**
2.65N

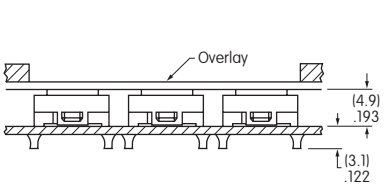
For F, K & A Actuators

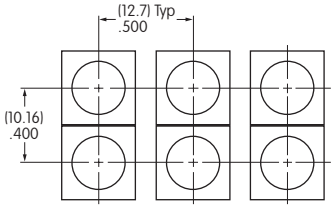
## ACTUATORS

### F Flat Blue Button



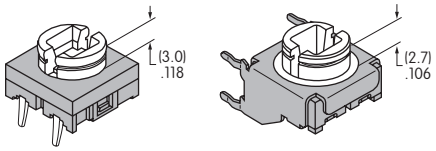

Flat button is an integral part of the switch and cannot be ordered separately.

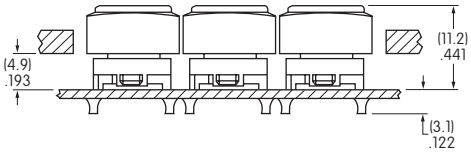


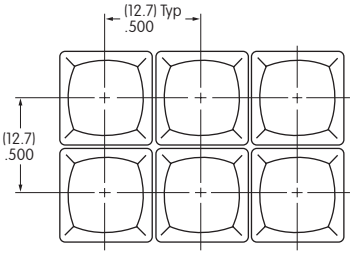




Custom keyboards can be designed with flat buttons beneath an overlay. Not applicable for right angle mounting.

### K Short Actuator

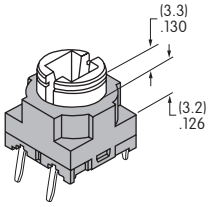


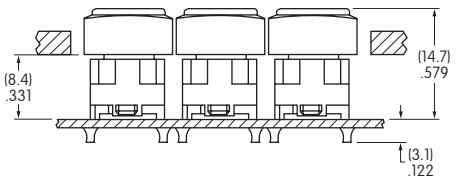



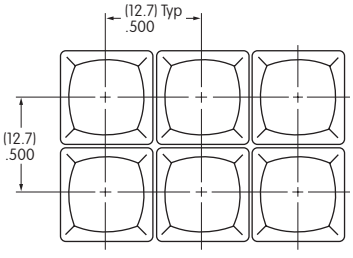

Custom keyboards can be designed with caps installed through a panel cutout (illustration with framed cap AT4078 and button AT4077). Not applicable for right angle mounting.

### A Extended Actuator




Combines with high operating force only; not for right angle.

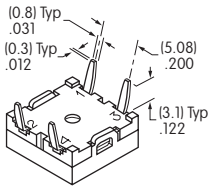


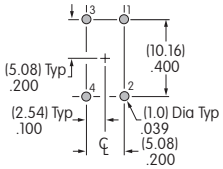




Custom keyboards can be designed with caps installed through a panel cutout (illustration with framed cap AT4078 and button AT4077).

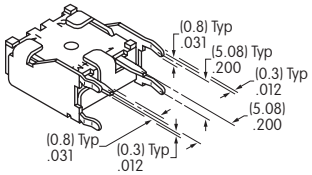
## TERMINALS

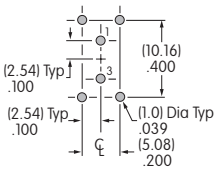
### P Straight PC




### H Right Angle PC



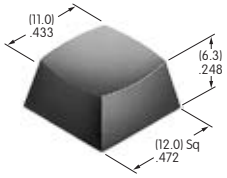




Further details shown in Typical Switch Dimensions

## SNAP-ON CAPS

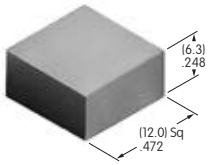
### 1 AT4058 Sculptured for Straight PC

Material: Polyamide
Finish: Matte
Colors: A B C E F G H



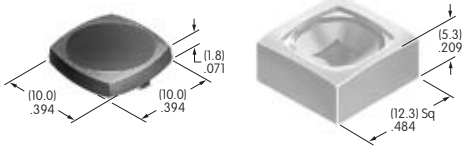

### 2 AT4059 Flat for Straight PC

Material: Polycarbonate
Finish: Glossy
Colors: A B C E F G H



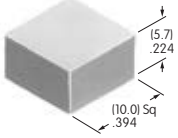

### 4 Framed: AT4077 Button & AT4078 Frame for Straight PC

Material: Polycarbonate
Finish: Matte
Colors: B C E F G H




### 6 AT4139 Flat for Right Angle PC

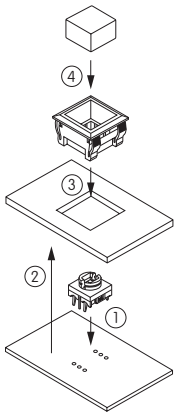
Material: Polycarbonate
Finish: Glossy
Colors: A B C H




### 5 AT4140 Cap with AT547 Mounter for Straight PC

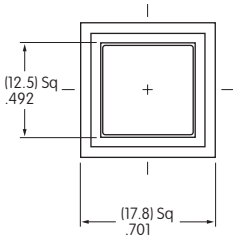
Cap
Material: Polycarbonate
Finish: Glossy
Colors: A B C H

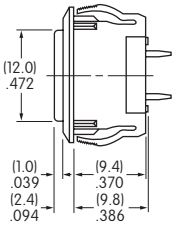
Mounter
Material: Polyamide
Finish: Matte
Color: A




#### Assembly Procedure

1. Solder switch to PCB.
2. Install PCB in equipment.
3. Snap mounter into panel. Dimension from top of panel to top of PCB is .386" (9.8mm).
4. Snap cap onto plunger.

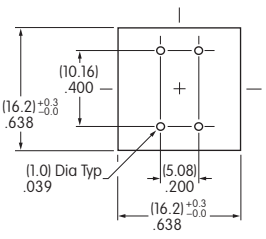



#### Panel Mounting Dimensions

Panel Thickness:
.039" ~ .079"
(1.0mm ~ 2.0mm)

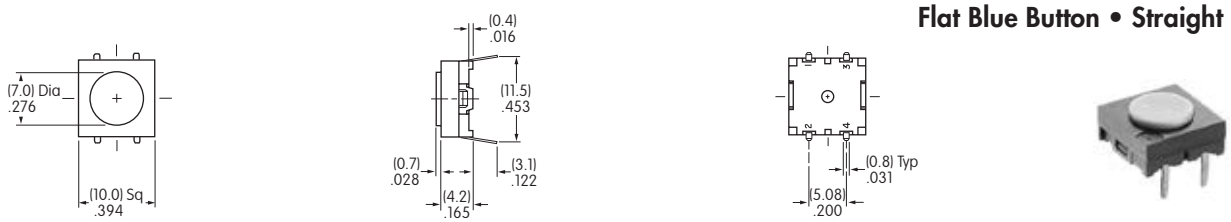
#### Panel Cutout & Footprint




**Cap Colors Available:** A Black · B White · C Red · E Yellow · F Green · G Blue · H Gray

## TYPICAL SWITCH DIMENSIONS

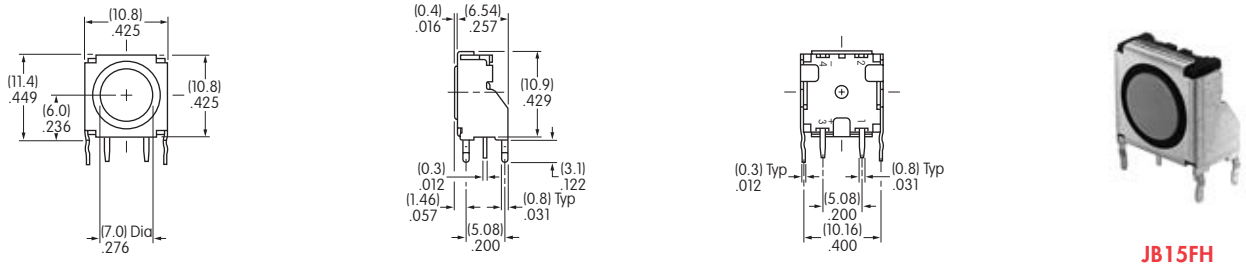
### Flat Blue Button • Straight PC




Spring action terminals conform to .100" (2.54mm) PCB spacing

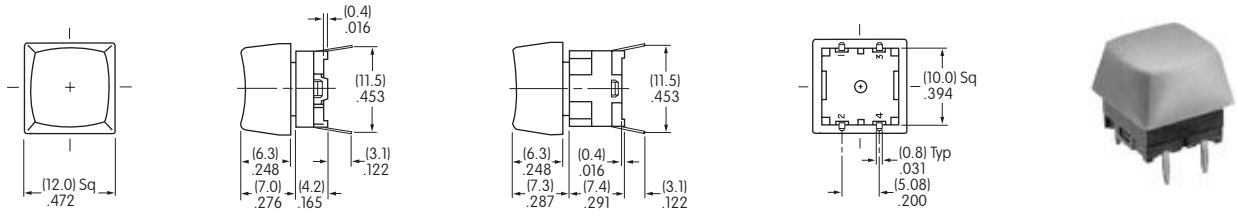
JB15FP

### Flat Blue Button • Right Angle PC




JB15FH

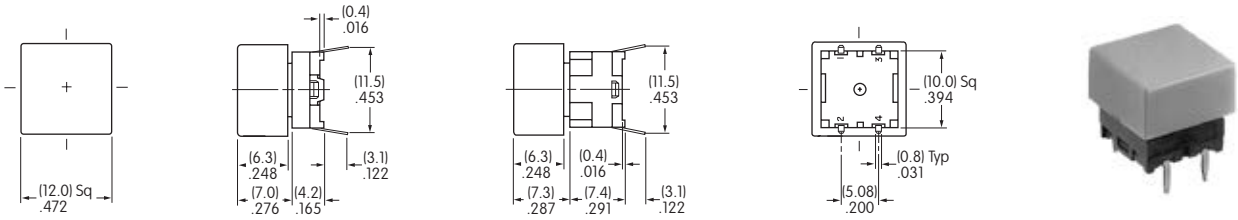
### Short Actuator / Extended Actuator / Sculptured Snap-on Cap • Straight PC




Spring action terminals conform to .100" (2.54mm) PCB spacing

JB15KP-1C

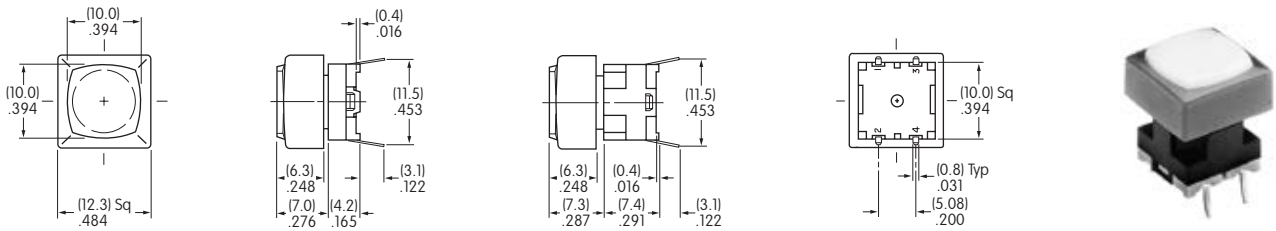
### Short Actuator / Extended Actuator / Flat Snap-on Cap • Straight PC




Spring action terminals conform to .100" (2.54mm) PCB spacing

JB15KP-2C

### Short Actuator / Extended Actuator / Framed Snap-on Cap • Straight PC



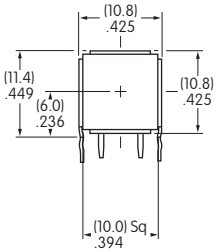

Spring action terminals conform to .100" (2.54mm) PCB spacing

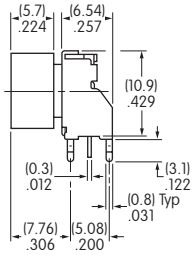
JB15FHAP-4BC

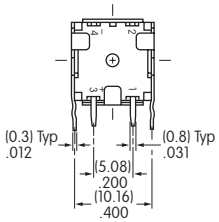
## TYPICAL SWITCH DIMENSIONS

### Flat Snap-on Cap • Right Angle PC

JB15KH-6C



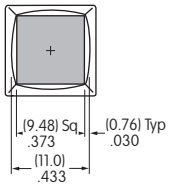




## LEGENDS

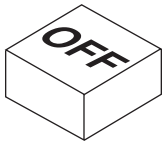
NKK Switches can provide custom legends for caps. Contact factory for more information.

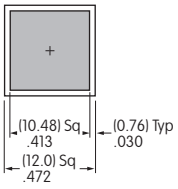
**Shaded Areas are Printable Areas**

AT4058

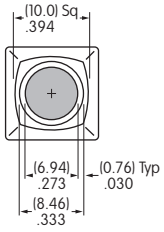




AT4059 & AT4140

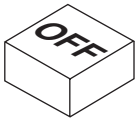


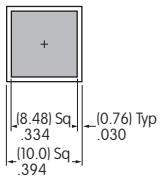




AT4077 Button


AT4139




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

# General Specifications

## Electrical Capacity (Resistive Load)

**Low/Logic Level:** 50mA @ 24V DC maximum for Standard Operating Force models
125mA @ 24V DC maximum for High Operating Force models

## Other Ratings

| | Standard Operating Force | High Operating Force |
|---|---|---|
| **Contact Resistance:** | 50 milliohms maximum | 50 milliohms maximum |
| **Insulation Resistance:** | 500 megohms minimum @ 250V DC | 500 megohms minimum @ 250V DC |
| **Dielectric Strength:** | 250V AC minimum for 1 minute minimum | 250V AC minimum for 1 minute minimum |
| **Mechanical Life:** | 5,000,000 operations minimum | 1,000,000 operations minimum |
| **Electrical Life:** | 5,000,000 operations minimum | 1,000,000 operations minimum |
| **Nominal Operating Force:** | 1.76N for JB15L | 2.65N for JB15HL & JB15HB |
| **Total Travel:** | .010" (.254mm) | .012" (.300mm) |

## Materials & Finishes

**Actuator:** Polyacetal for Short; Glass fiber reinforced PBT for Extended
**Case:** Glass fiber reinforced polyamide (UL94V-0)
**Seal:** Nitrile butadiene rubber
**Base:** Glass fiber reinforced PBT (UL94V-0)
**Movable Contacts:** Stainless steel
**Stationary Contacts:** Brass with silver plating
**Terminals:** Brass with silver plating

## Environmental Data

**Operating Temperature Range:** –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/s$^2$) acceleration (tested in 6 right angled directions, with 5 shocks in each direction)

## PCB Processing

**Soldering:** Wave Soldering recommended. See Profile A in Supplement section.
Manual Soldering: See Profile A in Supplement section.
**Cleaning:** Automated cleaning. See Cleaning specifications in Supplement section.

## Standards & Certifications

**Flammability Standards:** UL94V-0 rated case & base
The JB Series tactiles have not been tested for UL recognition or CSA certification.
These switches are designed for use in a low-voltage, low-current, logic-level circuit.
When used as intended in a logic-level circuit, the results do not produce hazardous energy.

# Distinctive Characteristics

Choice of dimensions from PCB to top of cap adds to design flexibility.

Bright, full-face illumination with red, green, or yellow LEDs for attractive, functional panel layouts.

Higher operating force type provides more pronounced operating feel.

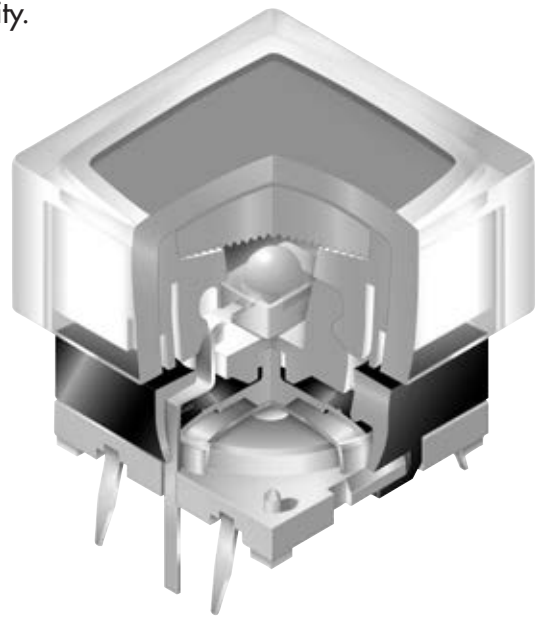
Dome contact gives crisp tactile feedback to positively indicate circuit transfer and assures high reliability and long life of up to 5,000,000 operations.

Rubber seal construction prevents contact contamination and allows automated soldering and cleaning.

Slanted terminals provide a spring type action which ensures secure mounting and prevents dislodging during wave soldering.

Molded-in terminals are part of the sealed construction which allows automated soldering and cleaning.

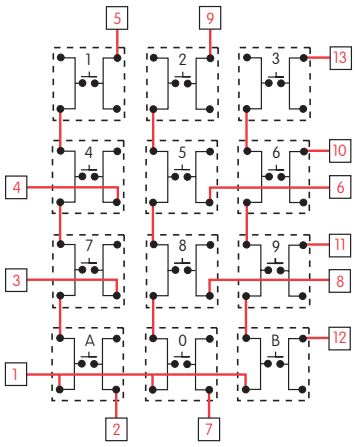
Terminal spacing conforms to standard .100" (2.54mm) PCB grid.

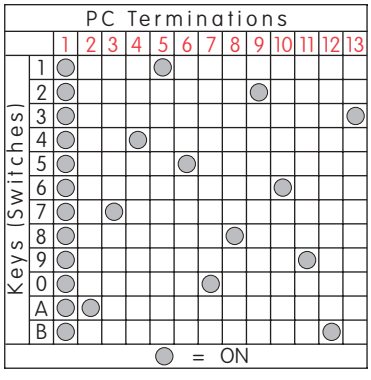


Actual Size

## Common Bus Matrix

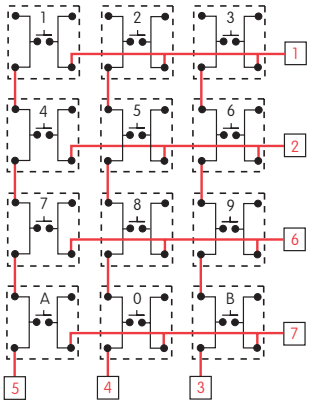
These single pole, single throw switches can be used in a keyboard matrix and, using strapped terminals, achieve a common bus electrical configuration on a single-sided PC board.

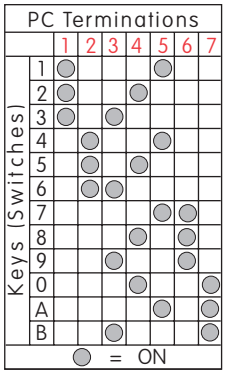



## X-Y Matrix

These single pole, single throw switches can be arranged on a single-sided PC board matrix with strapped terminals to achieve an X-Y type electrical interconnection.




**Red = PCB Trace  Black = Switch Circuit**

## TYPICAL SWITCH ORDERING EXAMPLE

JB 15 [ ] L P C – JC

### Pole & Circuit

| | | | |
|---|---|---|---|
| 15 | SPST | OFF | (ON) |

( ) = Momentary

### Actuators

| | |
|---|---|
| L | Short |
| B | Extended (H operating force only) |

### Operating Force

| | |
|---|---|
| No Code | Standard (L actuator only) |
| H | High |

### Terminals

| | |
|---|---|
| P | Straight PC |

### LED Colors

| | |
|---|---|
| C | Red |
| E | Yellow |
| F | Green |

### Cap Types & Colors

**Flat Cap Colors**

| | |
|---|---|
| B | Translucent White |
| C | Red |
| E | Yellow |
| F | Green |

**Flat Cap Lens/Diffuser Colors**

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

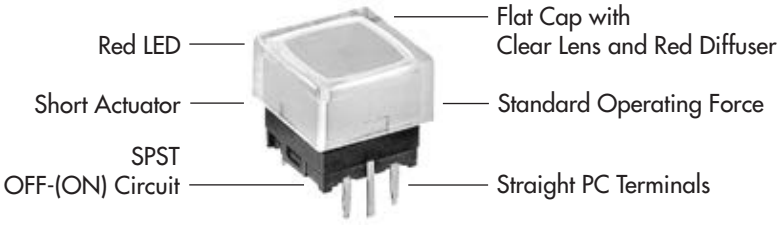
For JC, JE & JF, diffuser color must match LED color

**Framed Cap Button/Frame Colors**

| | |
|---|---|
| BB | White/White |
| BC | White/Red |
| BE | White/Yellow |
| BF | White/Green |
| BH | White/Gray |

### DESCRIPTION FOR TYPICAL ORDERING EXAMPLE

**JB15LPC-JC**




## POLE & CIRCUIT

| Pole & Throw | Model | Actuator Position ( ) = Momentary: Normal | Actuator Position ( ) = Momentary: Down | Switch Throw & Schematic | LED Schematic | |
|---|---|---|---|---|---|---|
| SPST | JB15 | OFF | (ON) | SPST 1 2 3 4 | (+) (-) | Notes: Terminal numbers are shown on switch. LED circuit is isolated & requires external power source. |

## OPERATING FORCE

**No Code** — **Standard Nominal Operating Force**
1.76N

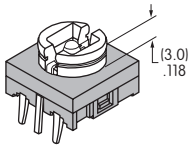
Available with short actuator only (code L)

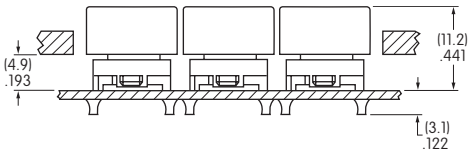
**H** — **High Nominal Operating Force**
2.65N

Available with both short and extended actuators

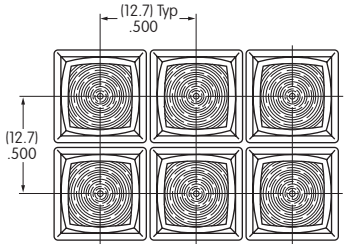
## ACTUATORS

**L** — **Short Actuator**

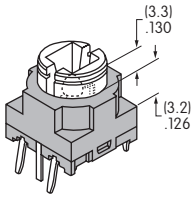


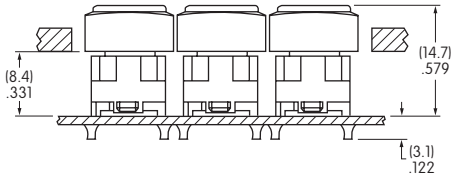

Custom keyboards can be designed with caps installed through a panel cutout (illustration with cap AT4060).



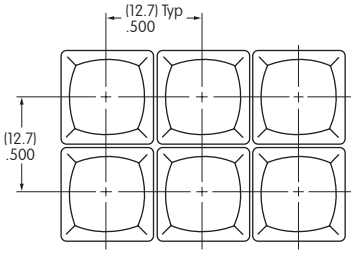

**B** — **Extended Actuator**




High operating force only



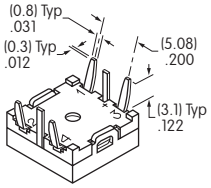

Custom keyboards can be designed with caps installed through a panel cutout (illustration with cap AT4076).

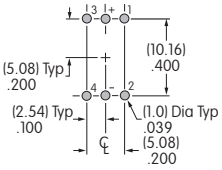



## TERMINALS

**P** — **Straight PC Terminals**

Further details in Typical Switch Dimensions




## LED COLORS & SPECIFICATIONS

LEDs are supplied as an integral part of illuminated devices and are not available separately.

LED polarity markings are on the bottom of the switch.

The electrical specifications shown here are determined at a basic temperature of 25°C.

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.

| Color | | C Red | E Yellow | F Green |
|---|---|---|---|---|
| Maximum Forward Current | $I_{FM}$ | 30mA | 20mA | 30mA |
| Typical Forward Current | $I_F$ | 10mA | 10mA | 10mA |
| Forward Voltage | $V_F$ | 1.8V | 2.0V | 2.1V |
| Maximum Reverse Voltage | $V_{RM}$ | 5V | 5V | 5V |
| Current Reduction Rate Above 25°C | $\Delta I_F$ | * 0.50mA/°C | * 0.33mA/°C | * 0.50mA/°C |
| Ambient Temperature Range | | −25°C ~ +70°C | | |

* Applies to temperatures above 50°C

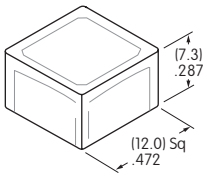
## SNAP-ON CAPS

### AT4135 Flat

Cap Color Codes:

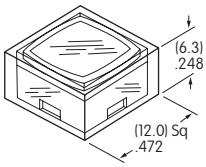
- **B** Translucent White
- **C** Red
- **E** Yellow
- **F** Green

Material: Polycarbonate Finish: Frosted

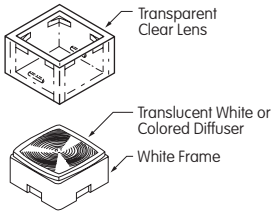



### AT4060 Flat

Lens/Diffuser Color Codes:



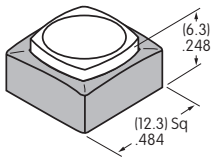

- **JB** Clear/Translucent White
- **JC** Clear/Red
- **JE** Clear/Yellow
- **JF** Clear/Green



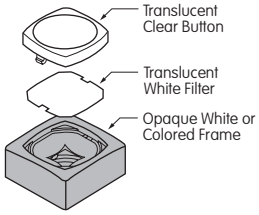

Material: Polycarbonate Lens Finish: Glossy

### Framed:
### AT4076 Button with Frame

Translucent Button/Frame Color Codes:



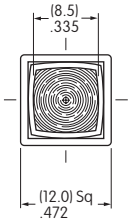

- **BB** White/White
- **BC** White/Red
- **BE** White/Yellow
- **BF** White/Green
- **BH** White/Gray



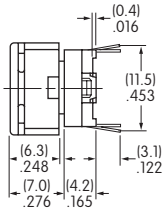

Material: Polycarbonate Button Finish: Frosted

## TYPICAL SWITCH DIMENSIONS

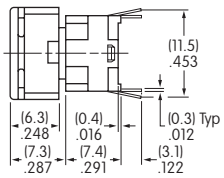
### Flat Snap-on Cap

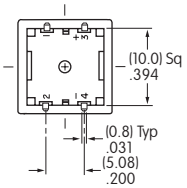



**Short Actuator**




**Extended Actuator**

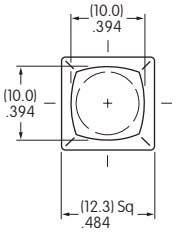


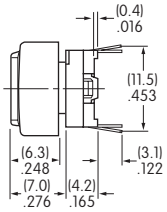

**JB15LPC-JC**

Spring action terminals conform to .100" (2.54mm) PCB spacing

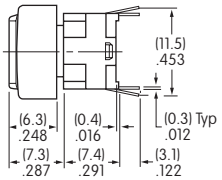
### Framed Snap-on Cap

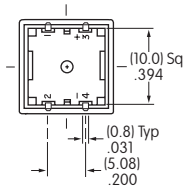



**Short Actuator**




**Extended Actuator**




**JB15HBPC-BC**

Spring action terminals conform to .100" (2.54mm) PCB spacing

## LEGENDS

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

### Suggested Printable Area for Cap, Lens, or Button

**Recommended Methods:**

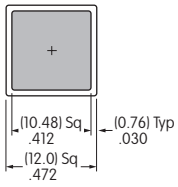
Laser Etch, Screen Print or Pad Print

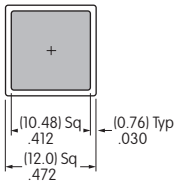
Epoxy based ink is recommended.

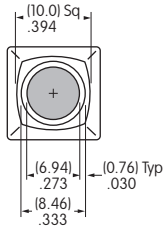


Laser Etch or Pad Print

Epoxy based ink is recommended.

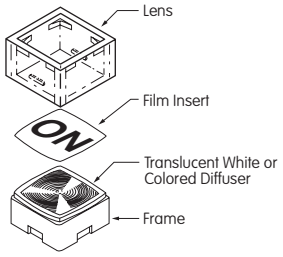



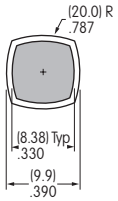




Shaded areas are printable areas.

### Suggested Printable Area for Film Insert




Shaded area is printable area.

Film Insert: Clear Polyester 7 mil maximum thickness

# General Specifications

## Electrical Capacity (Resistive Load)

**Low/Logic Level:** 50mA @ 24V DC

## Other Ratings

**Contact Resistance:** 50 milliohms maximum
**Insulation Resistance:** 500 megohms minimum @ 250V DC
**Dielectric Strength:** 250V AC minimum for 1 minute minimum
**Mechanical Life:** 500,000 operations minimum
**Electrical Life:** 500,000 operations minimum
**Nominal Operating Force:** 1.96N for sculptured actuator
2.0N for piano actuator
3.0N for square & round flush actuators
**Total Travel:** Flush Actuators .016" (0.4mm)
Sculptured & Piano Actuators .031" (0.8mm)

## Materials & Finishes

**Actuator:** Polyamide
**Case:** Glass fiber reinforced polyamide
**Seal:** Nitrile butadiene rubber
**Base:** Glass fiber reinforced polyester
**Movable Contact:** Phosphor bronze with silver plating
**Stationary Contacts:** Brass with silver plating
**Terminals:** Brass with silver plating

## Environmental Data

**Operating Temperature Range:** –25°C through +85°C (–13°F through +185°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)

## PCB Processing

**Soldering:** Wave Soldering Recommended. See Profile A in Supplement section.
Manual Soldering: See Profile A in Supplement section.
**Cleaning:** Automated cleaning. See Cleaning specifications in Supplement section.

## Standards & Certifications

The JF Series tactiles have not been tested for UL recognition or CSA certification.
These switches are designed for use in a low-voltage, low-current, logic-level circuit.
When used as intended in a logic-level circuit, the results do not produce hazardous energy.

# Distinctive Characteristics

Extremely low profile of 5mm from PCB to top of switch.

Rubber seal construction prevents contact contamination and allows automated soldering and cleaning.

Minimal operating force and short stroke permit light touch operation.

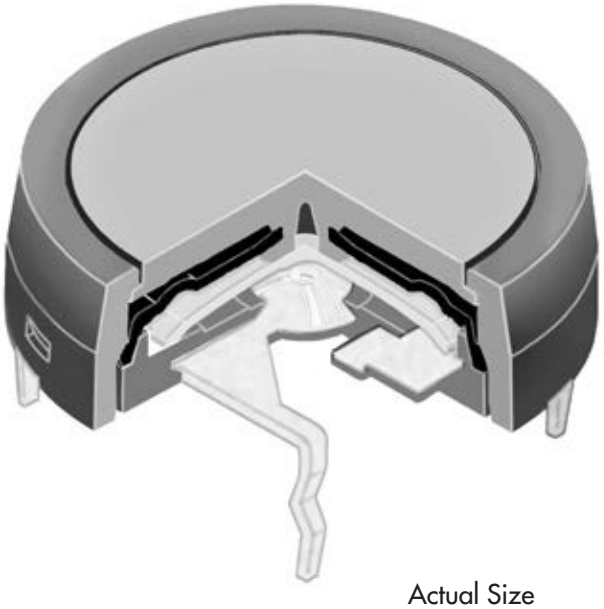
Dome contact gives crisp tactile and audible feedback to positively indicate circuit transfer and assures high reliability and long life.

Wide choice of body shapes and colors.

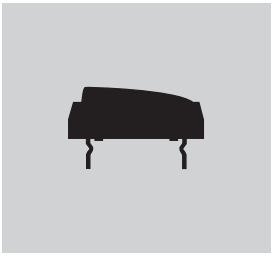
Crimped terminals provide a spring type action to ensure secure mounting and prevent dislodging during wave soldering.

Space saving body dimensions provide for compact, side-by-side mounting on a standard grid.

Terminal spacing conforms to standard .100" (2.54mm) PCB grid.

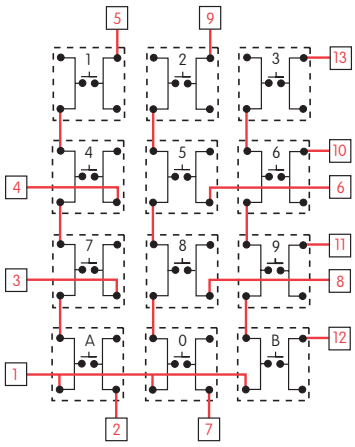


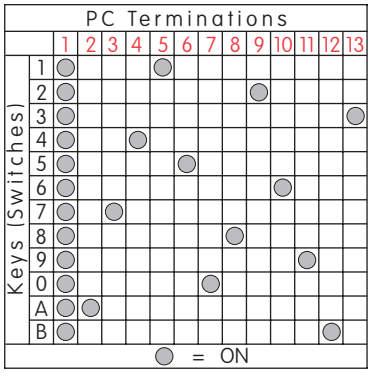
Actual Size



## Common Bus Matrix

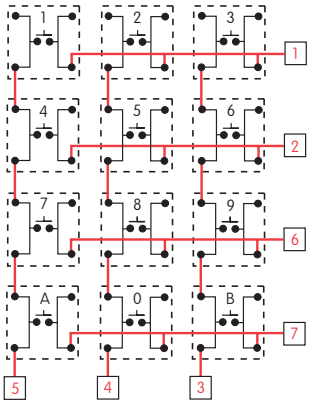
These single pole, single throw switches can be used in a keyboard matrix and, using strapped terminals, achieve a common bus electrical configuration on a single-sided PC board.

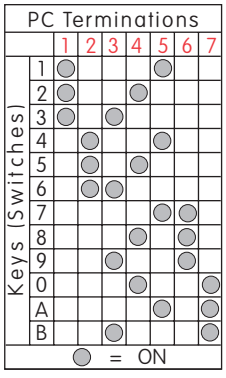



## X-Y Matrix

These single pole, single throw switches can be arranged on a single-sided PC board matrix with strapped terminals to achieve an X-Y type electrical interconnection.




**Red = PCB Trace  Black = Switch Circuit**

## TYPICAL SWITCH ORDERING EXAMPLE

JF | 15 | S | P | 2 | C

**Pole & Circuit**

| | | | |
|---|---|---|---|
| **15** | SPST | OFF | (ON) |

( ) = Momentary

**Housing Shapes**

| | |
|---|---|
| **C** | Round (with round actuator only) |
| **S** | Square |

**Terminals**

| | |
|---|---|
| **P** | Straight PC |

**Actuator Types**

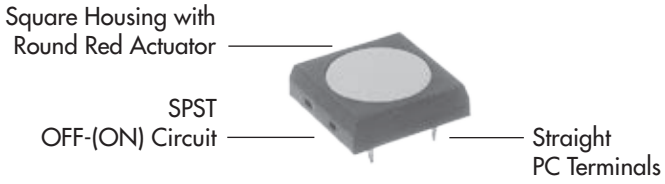
| | |
|---|---|
| **1** | Square |
| **2** | Round |
| **3** | Sculptured |
| **4** | Piano |

**Actuator Colors**

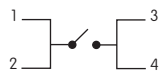
| | |
|---|---|
| **C** | Red |
| **D** | Orange |
| **F** | Green |
| **G** | Blue |
| **H** | Gray |

### DESCRIPTION FOR TYPICAL ORDERING EXAMPLE

**JF15SP2C**




## POLE & CIRCUIT

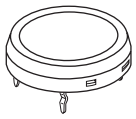
| | | Actuator Position ( ) = Momentary | | Switch Throw & Schematic | |
|---|---|---|---|---|---|
| **Pole** | **Model** | **Normal** | **Down** | | |
| SP | **JF15** | OFF | (ON) | SPST  | Note: Terminal numbers are shown on the switch. |

## HOUSING SHAPES & ACTUATOR TYPES

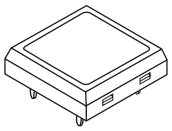
**C** Round Housing

**S** Square Housing

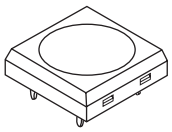
**2** Round Actuator



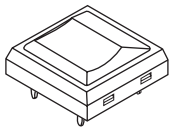
**1** Square Actuator



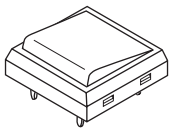
**2** Round Actuator



**3** Sculptured Actuator



**4** Piano Actuator



**Actuator Colors Available:**

**C** Red

**D** Orange

**F** Green

**G** Blue

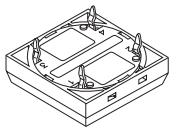
**H** Gray

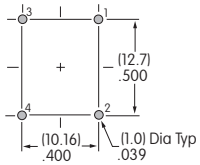
Housing is Black

## TERMINALS & PANEL DESIGN

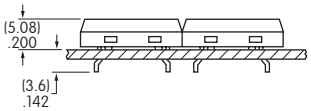
**P** Straight PC

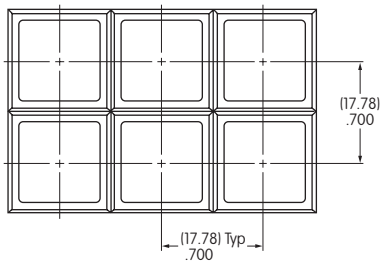
Additional details in Typical Switch Dimensions





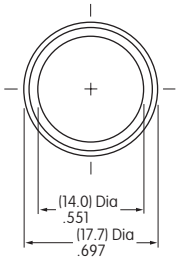

Versatile panel arrangements can be made to fit individual design needs.

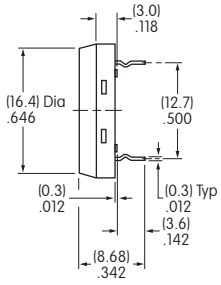


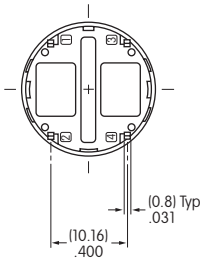




## TYPICAL SWITCH DIMENSIONS

**Round Actuator**



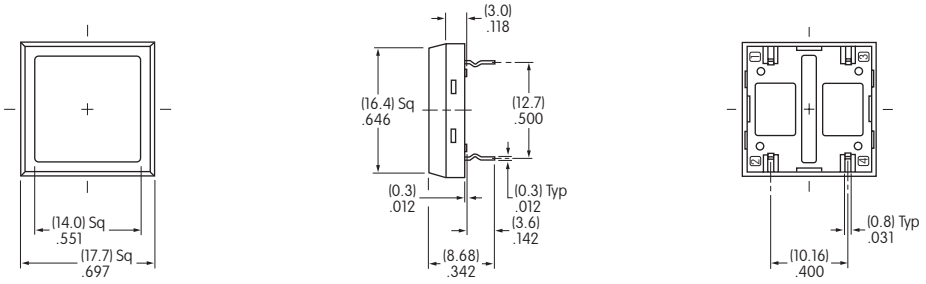




JF15CP2C

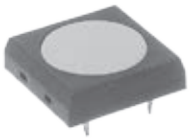
## TYPICAL SWITCH DIMENSIONS

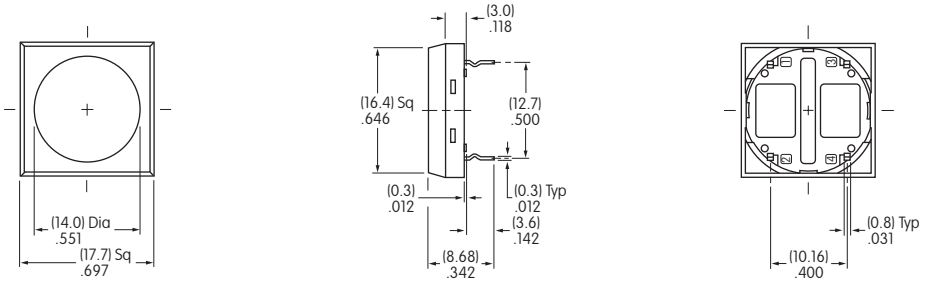
### Square Actuator




JF15SP1C

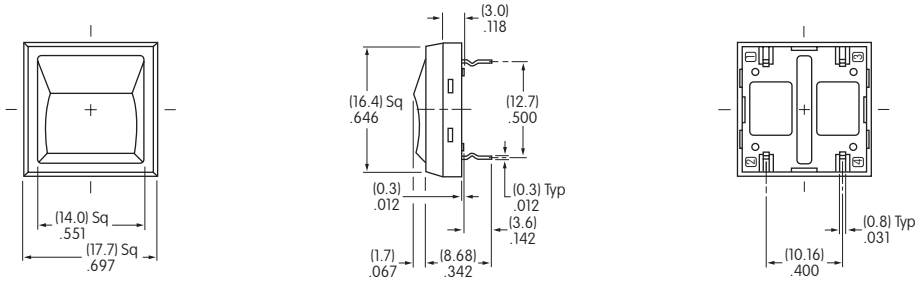
### Round Actuator





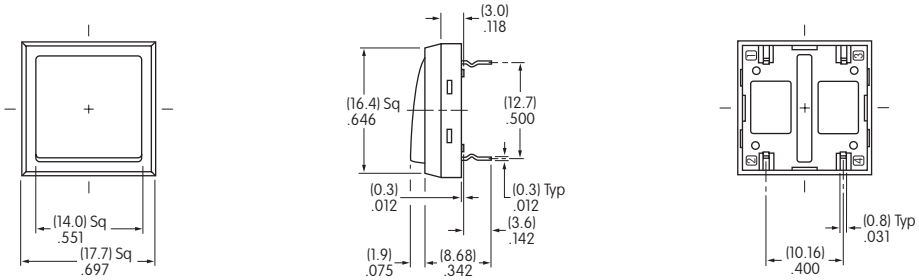

JF15SP2C

### Sculptured Actuator




JF15SP3C

### Piano Actuator

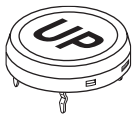



JF15SP4C

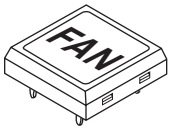
## LEGENDS

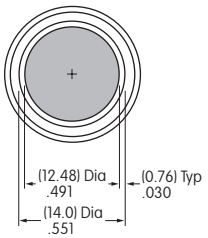
NKK Switches can provide custom legends for caps. Contact factory for more information.

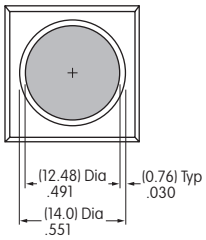
**Shaded Areas are Printable Areas**

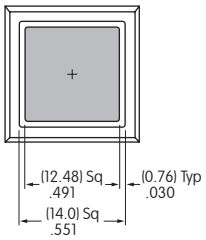


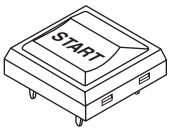


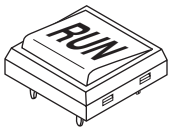


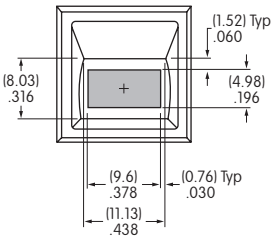



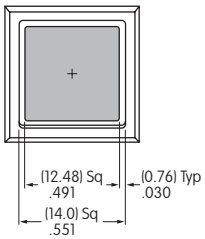




**Recommended Print Methods:** Screen Print or Pad Print. Epoxy based ink is recommended.

# General Specifications

## Electrical Capacity (Resistive Load)

**Low/Logic Level:** 50mA @ 24V DC

## Other Ratings

**Contact Resistance:** 50 milliohms maximum
**Insulation Resistance:** 500 megohms minimum @ 250V DC
**Dielectric Strength:** 250V AC minimum for 1 minute minimum
**Mechanical Life:** 500,000 operations minimum
**Electrical Life:** 500,000 operations minimum
**Nominal Operating Force:** 3.0N for flush actuator
2.0N for sculptured actuator
**Total Travel:** Flush Actuators .016" (0.4mm); Sculptured Actuator: .031" (0.8mm)

## Materials & Finishes

**Actuator:** Polyamide for spot illuminated; polycarbonate for full face
**Case:** Glass fiber reinforced polyamide
**Seal:** Nitrile butadiene rubber
**Base:** Glass fiber reinforced polyester
**Movable Contact:** Phosphor bronze with silver plating
**Stationary Contacts:** Brass with silver plating
**Terminals:** Brass with silver plating

## Environmental Data

**Operating Temperature Range:** –25°C through +70°C (–13°F through +158°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)

## PCB Processing

**Soldering:** Wave Soldering recommended. See Profile A in Supplement section.
Manual Soldering: See Profile A in Supplement section.
**Cleaning:** Automated cleaning. See Cleaning specifications in Supplement section.
Switches should not be operated or have any pressure on the actuators during cleaning.
Full face illuminated models suitable only for bottom board spray wash to avoid contamination of the 2-layered actuator, which may compromise the aesthetics.

## Standards & Certifications

The JF Series tactiles have not been tested for UL recognition or CSA certification.
These switches are designed for use in a low-voltage, low-current, logic-level circuit.
When used as intended in a logic-level circuit, the results do not produce hazardous energy.

# Distinctive Characteristics

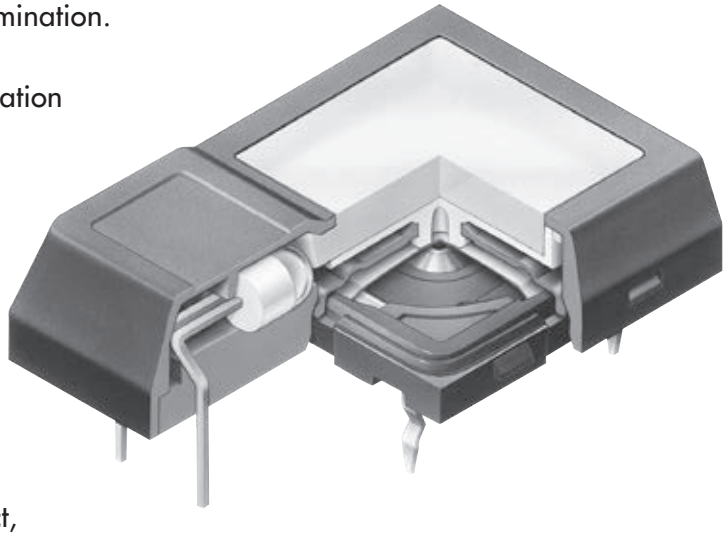
Extremely low profile of .224" (5.7mm) from PCB to top of switch.

Red, green, or yellow LED with spot or full face illumination.

Rubber seal construction prevents contact contamination and allows automated soldering and cleaning.

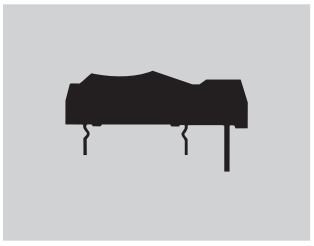
Minimal operating force and short stroke permit light touch operation.

Dome contact gives crisp tactile and audible feedback to positively indicate circuit transfer and assures high reliability and long life.



Space saving body dimensions provide for compact, side-by-side mounting on a standard grid.

Actual Size



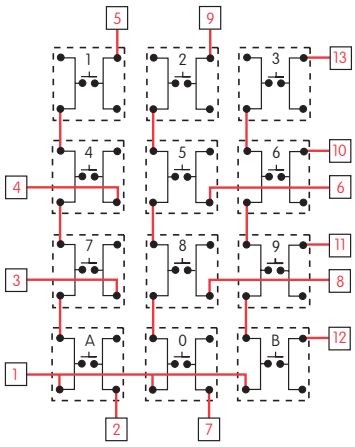
Crimped terminals ensure secure mounting and prevent dislodging during wave soldering.

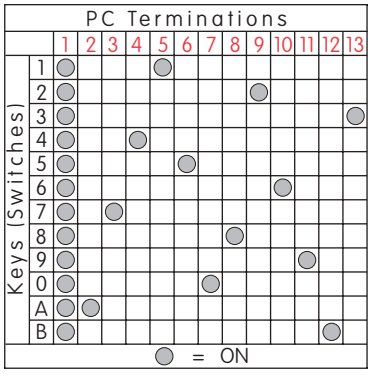
Terminal spacing conforms to standard .100" (2.54mm) PCB grid.

Matching indicator available and shown at the end of Section M.

## Common Bus Matrix

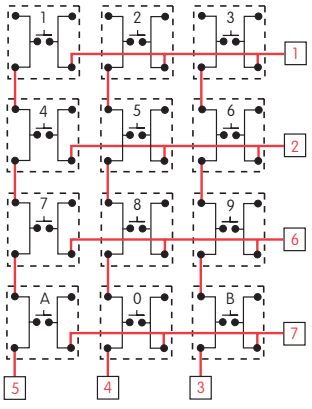
These single pole, single throw switches can be used in a keyboard matrix and, using strapped terminals, achieve a common bus electrical configuration on a single-sided PC board.

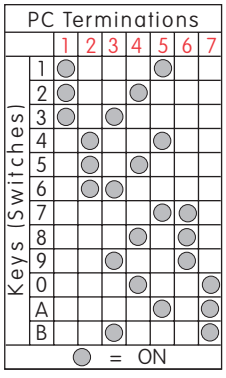



## X-Y Matrix

These single pole, single throw switches can be arranged on a single-sided PC board matrix with strapped terminals to achieve an X-Y type electrical interconnection.




**Red = PCB Trace  Black = Switch Circuit**

## TYPICAL SWITCH ORDERING EXAMPLE

JF | 15 | R | P | 2 | C | C

**Pole & Circuit**

| | | | |
|---|---|---|---|
| 15 | SPST | OFF | (ON) |

( ) = Momentary

**Terminals**

| | |
|---|---|
| P | Straight PC |

**Actuator Types**

| | |
|---|---|
| 1 | Square |
| 2 | Round |
| 3 | Sculptured |

**LED Colors**

| | |
|---|---|
| C | Red |
| E | Yellow |
| F | Green |

**Illumination**

| | |
|---|---|
| R | Spot |
| A | Full Face (with square actuator only) |

**Actuator Colors**

| | |
|---|---|
| **Spot Illuminated** | |
| C | Red |
| D | Orange |
| F | Green |
| G | Blue |
| H | Gray |
| ***Full Face Illuminated** | |
| C | Red |
| E | Yellow |
| F | Green |

*LED color must match actuator color.

### DESCRIPTION FOR TYPICAL ORDERING EXAMPLE

**JF15RP2CC**

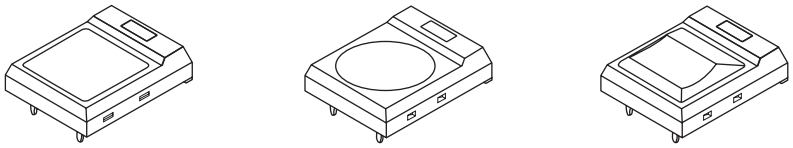

## POLE & CIRCUIT

| | | Actuator Position ( ) = Momentary | | Switch Throw & Schematic | LED Schematic | |
|---|---|---|---|---|---|---|
| Pole | Model | Normal | Down | | | |
| SP | JF15 | OFF | (ON) | SPST | | Notes: Terminal numbers are shown on switch. LED circuit is isolated & requires external power source. |

## ILLUMINATION & ACTUATOR TYPES

**R** **Spot Illumination**

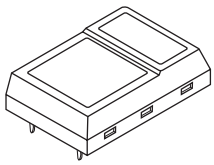
**1** **Square Actuator** **2** **Round Actuator** **3** **Sculptured Actuator**



**Actuator Colors Available:** C, D, F, G, H
Housing is black

**A** **Full Face Illumination**

**1** **Square Actuator**

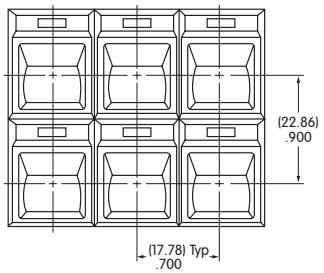


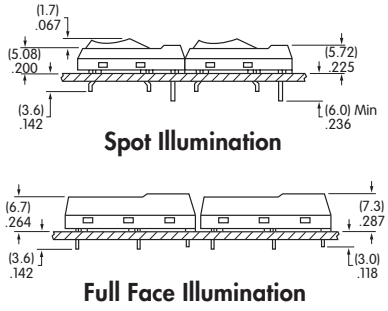
**Actuator Colors Available:** C, E, F
Housing is black

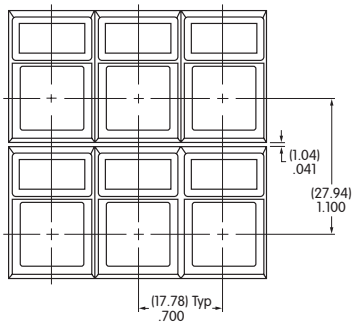
**Color Codes:** **C** Red **D** Orange **E** Yellow **F** Green **G** Blue **H** Gray

### Flexible Panel Design

Versatile panel arrangements can be made to fit individual design needs.



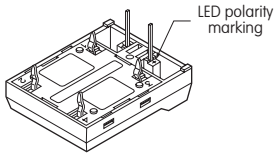




## TERMINALS

**P** **Straight PC Terminals**

With isolated lamp circuit
Further details in Typical Switch Dimensions




## LED COLORS & SPECIFICATIONS

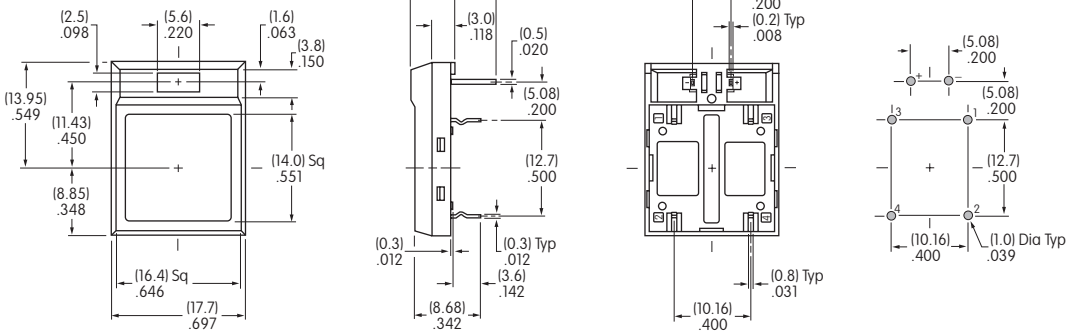
LEDs are supplied as an integral part of the switch. The electrical specifications shown are determined at a basic temperature of 25°C. The LED circuit is isolated and requires an external power source. For best results and safe use of LEDs, the supply voltage should be more than the LED forward voltage. Also, an appropriately valued ballast resistor should be used, or the LED will be damaged or destroyed. The resistor value can be calculated by using the formula in the Supplement section.

| | | Spot Illumination | | | Full Face Illumination | | |
|---|---|---|---|---|---|---|---|
| Color | | Red **C** | Yellow **E** | Green **F** | Red **C** | Yellow **E** | Green **F** |
| Maximum Forward Current | $I_{FM}$ | 30mA | 30mA | 30mA | 30mA | 30mA | 30mA |
| Typical Forward Current | $I_F$ | 20mA | 20mA | 20mA | 20mA | 20mA | 20mA |
| Forward Voltage | $V_F$ | 2.0V | 1.9V | 2.0V | 1.77V | 2.1V | 2.3V |
| Maximum Reverse Voltage | $V_{RM}$ | 5V | 5V | 5V | 4V | 4V | 4V |
| Current Reduction Rate Above 25°C | $\Delta I_F$ | 0.40mA/°C | 0.40mA/°C | 0.40mA/°C | 0.4mA/°C | 0.4mA/°C | 0.4mA/°C |
| Ambient Temperature Range | | −25° ~ +70°C | | | −25° ~ +70°C | | |

## TYPICAL SWITCH DIMENSIONS

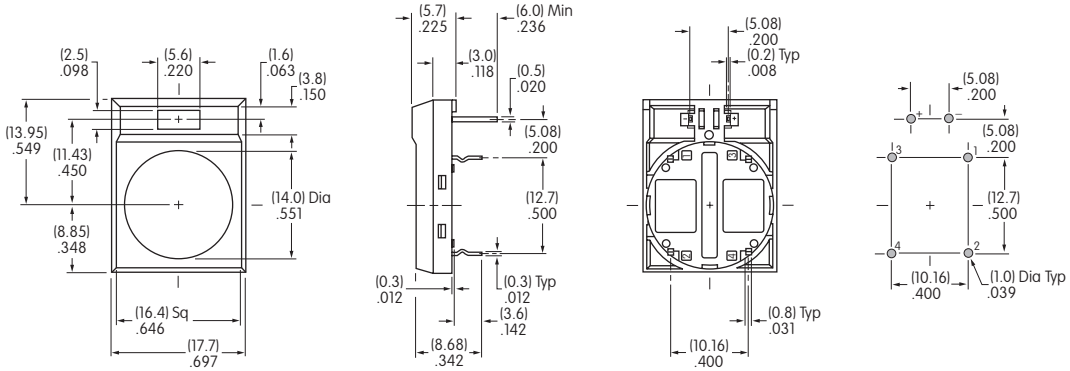
### Spot Illuminated with Square Actuator

JF15RP1CC



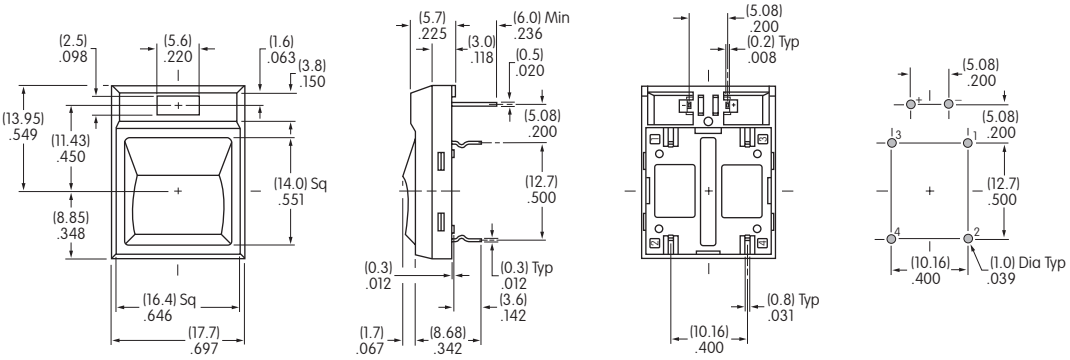

### Spot Illuminated with Round Actuator

JF15RP2CC



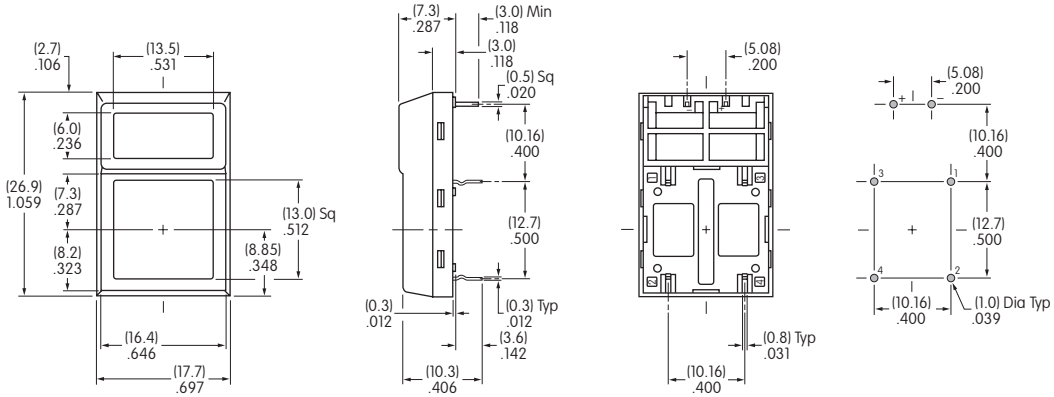

### Spot Illuminated with Sculptured Actuator

JF15RP3CC




### Full Face Illuminated with Square Actuator

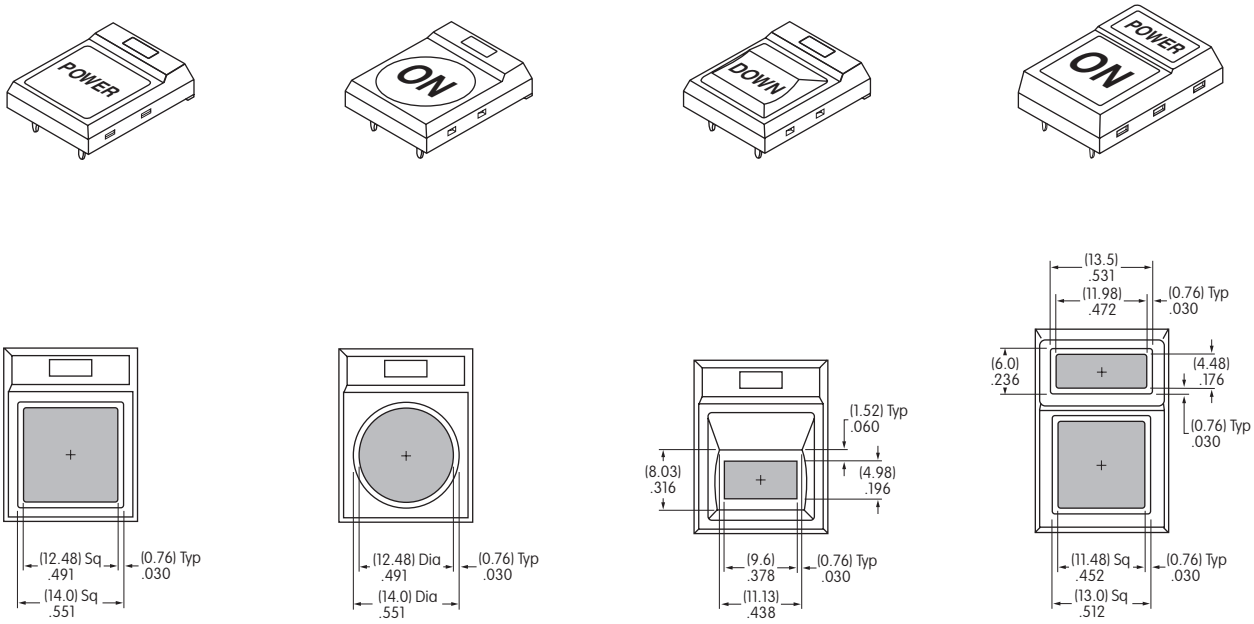
JF15AP1CC



## LEGENDS

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

### Suggested Printable Area




**Recommended Print Method:**

Screen Print or Pad Print

Epoxy based ink is recommended.

Shaded areas are printable areas.

# General Specifications

## Electrical Capacity (Resistive Load)

**Low/Logic Level:** 50mA @ 24V DC

## Other Ratings

**Contact Resistance:** 50 milliohms maximum
**Insulation Resistance:** 500 megohms minimum @ 250V DC
**Dielectric Strength:** 250V AC minimum for 1 minute minimum
**Mechanical Life:** 1,000,000 operations minimum
**Electrical Life:** 1,000,000 operations minimum
**Nominal Operating Force:** 3.0N
**Total Travel:** .030" (0.75mm)

## Materials & Finishes

**Actuator:** Polycarbonate
**Case:** Glass fiber reinforced polyamide
**Base:** Glass fiber reinforced polybutylene terephthalate (PBT)
**Movable Contact:** Stainless steel
**Stationary Contacts:** Brass with silver plating
**Switch Terminals:** Brass with silver plating
**Lamp Terminals:** Brass with tin plating

## Environmental Data

**Operating Temperature Range:** –25°C through +50°C (–13°F through +122°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/s$^2$) acceleration (tested in 6 right angled directions, with 5 shocks in each direction)

## PCB Processing

**Soldering:** Wave Soldering: 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.

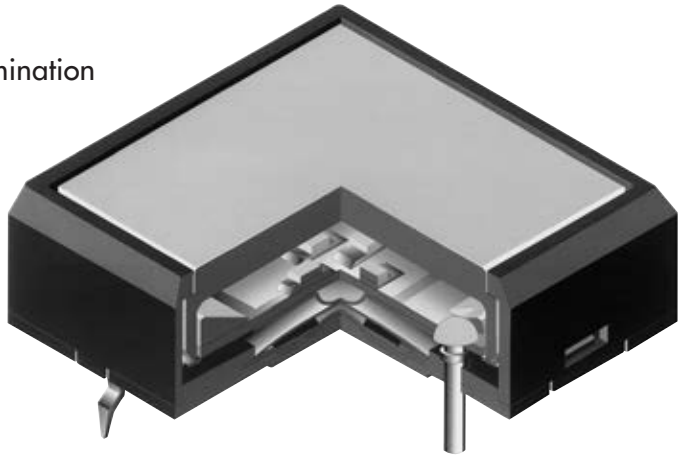
## Standards & Certifications

The JL Series tactiles have not been tested for UL recognition or CSA certification.
These switches are designed for use in a low-voltage, low-current circuit.
When used as intended, the results do not produce hazardous energy.

# Distinctive Characteristics

Bright, full face illumination with choice of red, green, or amber LEDs.

Multiple LED arrays and interior reflectors enhance illumination of the large, .75" (19mm) square actuator surface.

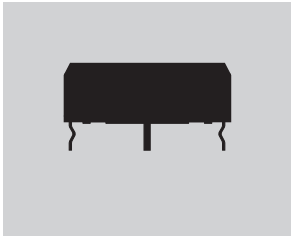


Distinctive design allows full face illumination in extra low profile of 0.31" (7.85mm) from PCB to top of switch.

Dome contact gives crisp tactile and audible feedback with short stroke and assures high reliability and long life of 1,000,000 operations.

Crimped terminals provide a spring type action to ensure secure mounting and prevent dislodging during the soldering process.

Actual Size

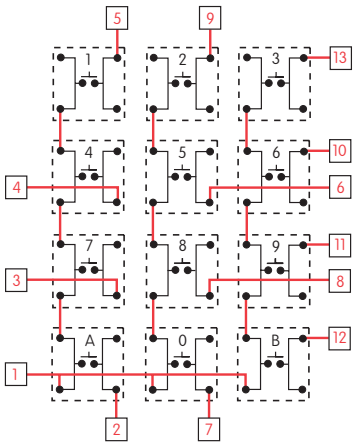


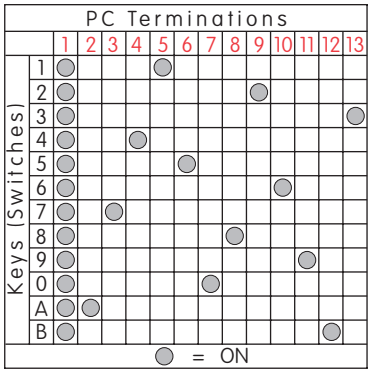
Streamlined housing dimensions provide for compact, side-by-side mounting on a standard grid.

Terminal spacing conforms to standard .100" (2.54mm) PCB grid.

### Common Bus Matrix

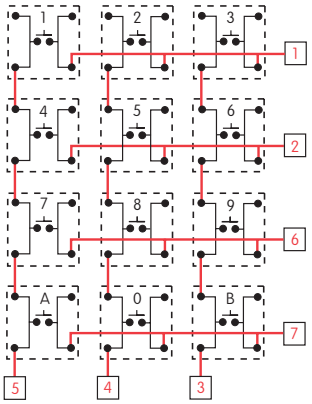
These single pole, single throw switches can be used in a keyboard matrix and, using strapped terminals, achieve a common bus electrical configuration on a single-sided PC board.

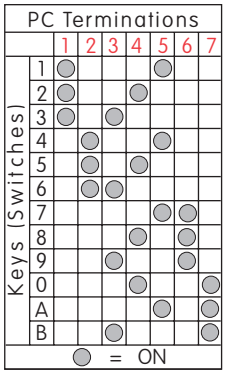



### X-Y Matrix

These single pole, single throw switches can be arranged on a single-sided PC board matrix with strapped terminals to achieve an X-Y type electrical interconnection.




**Red = PCB Trace  Black = Switch Circuit**

## TYPICAL SWITCH ORDERING EXAMPLE

JL | 15 | SK | S | C | C | P2

**Pole & Circuit**

| | | | |
|---|---|---|---|
| 15 | SPST | OFF | (ON) |

( ) = Momentary

**Housing & Color**

| | |
|---|---|
| SK | Square Black |

**Actuator Shape**

| | |
|---|---|
| S | Square |

**Actuator Colors**

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

**Terminals**

| | |
|---|---|
| P2 | Silver Contacts Straight PC |

**LED Colors**

| | |
|---|---|
| C | Red |
| D | Amber |
| F | Green |

### DESCRIPTION FOR TYPICAL ORDERING EXAMPLE

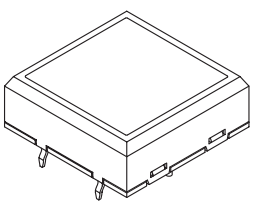
**JL15SKSCCP2**


## POLE & CIRCUIT

| | | Actuator Position ( ) = Momentary | | Switch Throw & Schematic | LED Schematic | |
|---|---|---|---|---|---|---|
| Pole | Model | Normal | Down | | | |
| SP | JL15 | OFF | (ON) | SPST | | Note: Terminal markings "1", "1a", "–", and "+" are shown on the switch. |

## HOUSING & COLOR

**SK** Square Black Housing



## ACTUATOR SHAPE & COLORS

**S** .748" (19.0mm) Square Actuator

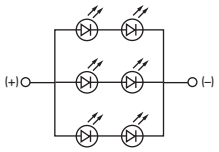
**Actuator Colors Available:**

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

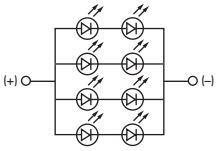
## LED COLORS & SPECIFICATIONS

LEDs are an integral part of the switch. The electrical specifications shown are determined at a basic temperature of 25°C.
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.

**Red LED model has 6 LEDs.**




**Amber & Green models each have 8 LEDs.**

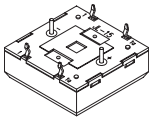



| 1-color, 1-element LEDs grouped in arrays of 6 or 8. | Color | C Red | D Amber | F Green |
|---|---|---|---|---|
| Maximum Forward Current | $I_{FM}$ | 90mA | 120mA | 120mA |
| Typical Forward Current | $I_F$ | 60mA | 80mA | 80mA |
| Forward Voltage | $V_F$ | 3.9V | 4.0V | 4.2V |
| Maximum Reverse Voltage | $V_{RM}$ | 10V | 10V | 10V |
| Current Reduction Rate Above 25°C | $\Delta I_F$ | 1.2mA/°C | 1.6mA/°C | 1.6mA/°C |
| Ambient Temperature Range | | –25°C ~ +50°C | | |

## TERMINALS

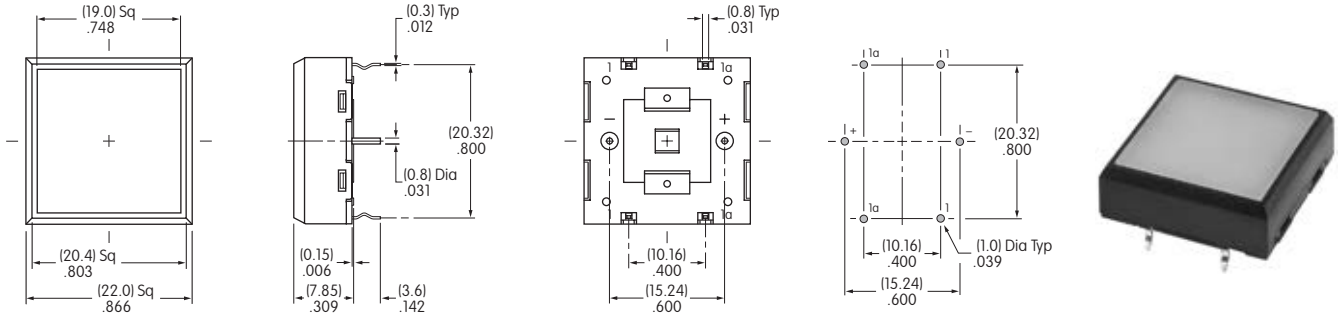
**P2** **Silver Contacts Straight PC**

Additional details in Typical Switch Dimensions



## TYPICAL SWITCH DIMENSIONS

**Square Actuator**

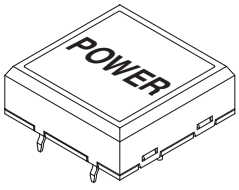


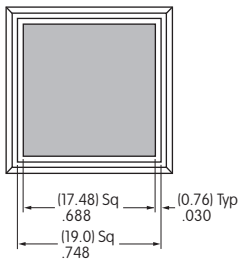



JL15SKSCCP2

## LEGENDS

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




**Shaded area is printable area.**

**Recommended Print Methods:**

Screen Print or Pad Print.

Epoxy based ink is recommended.

**Additional Method**

Engraving is not recommended as an additional method for legends.

Contact factory if engraving is required; it must be done before the actuator is assembled.