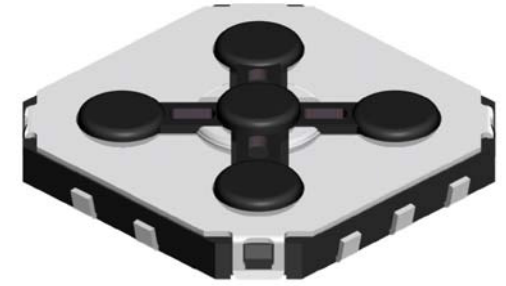
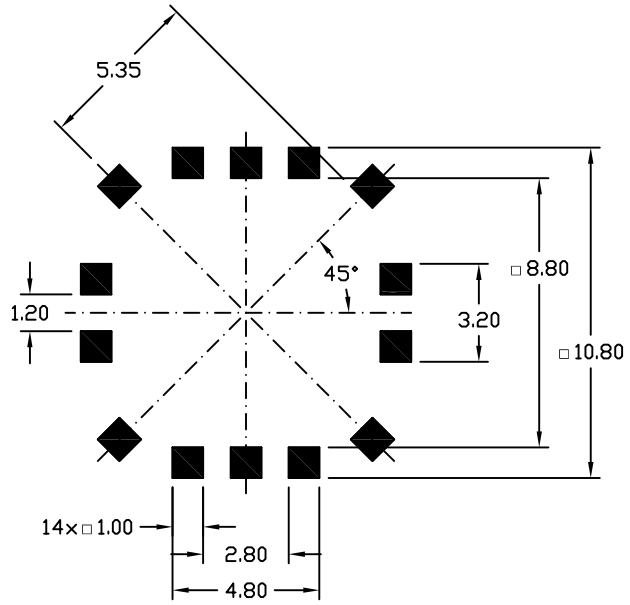


| REV. | LOCAS. | DESCRIPTION | DATE       | DRAWN |
|------|--------|-------------|------------|-------|
| A    |        | NEW         | 01.03.2010 | RH    |

Recommended PCB Layout



ORDER CODE  
**TNJ-TT05-L1C/1SZ**



Specification

Electrical

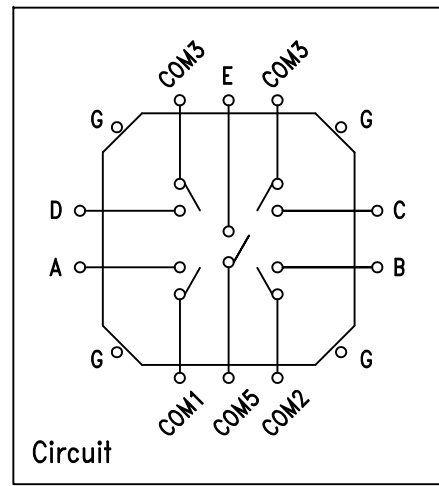
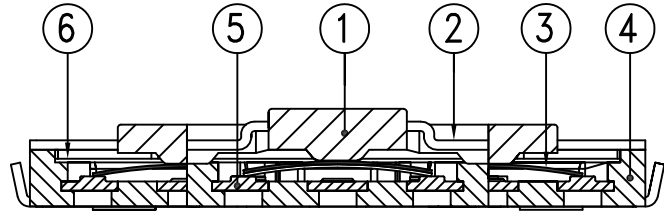
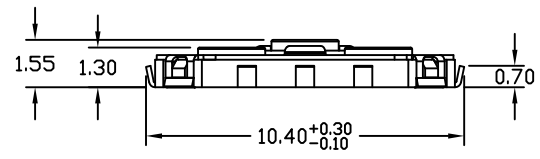
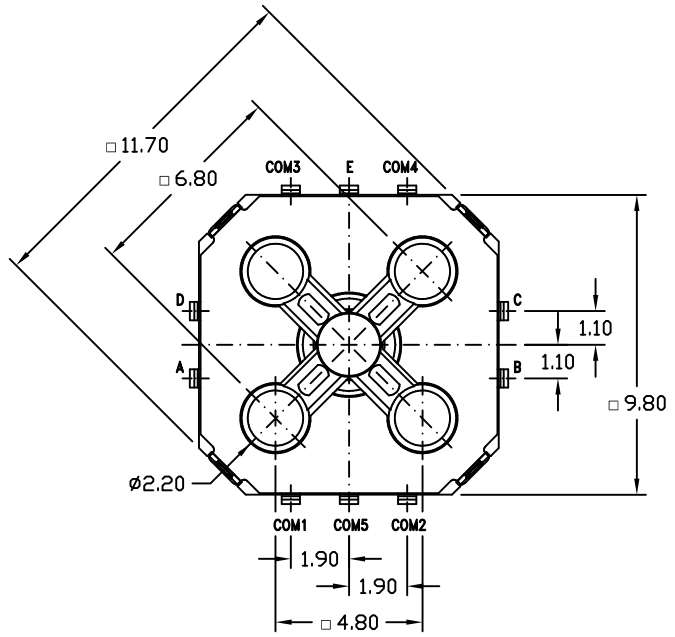
- Current rating: 50mA 12V DC
- Insulation resistance: 100MΩ min. @ 500V DC
- Dielectric withstanding: 250V AC / 1 Minute
- Contact resistance: 100mΩ max.
- Capacitance: 5pf max. @ 1MHz ±10kHz

Material

1. Stem: Nylon PA 9T UL 94V-0 (black)
2. Cover: Nickel Silver
3. Contact: Stainless, with Silver cladding
4. Base: Nylon PA 9T UL 94V-0 (black)
5. Terminal: Brass with Silver plated
6. Tape: Teflon

Mechanical

- Operating force: a) Side 180 ±60gf  
 b) Center 320 +80/-60gf  
 c) Stroke 0.25 ±0.15mm
- Operating temperature: -20°C to +70°C
- Storage temperature: -40°C to +85°C
- Solder temperature: +350°C 5sec. max.
- Operating Life: 200.000 cycles min.



|       |      |                   |             |       |            |                  |           |
|-------|------|-------------------|-------------|-------|------------|------------------|-----------|
| UNIT  | mm   | GENERAL TOLERANCE |             | DRAWN | DATE       | DWG. NO.         | SHEET 1/1 |
| SCALE | Free | X.° ± 5°          | X. ± 0.30   | Ronny | 01.03.2010 | TNJ-L1C/1SZ      | REV. A    |
|       |      | .X° ± 3°          | .X ± 0.25   | Hogj  | 01.03.2010 | SERIES NO.       |           |
|       |      | .XX° ± 2°         | .XX ± 0.15  |       | 01.03.2010 | TNJ-TT05-L1C/1SZ |           |
|       |      | .XXX° ± 1°        | .XXX ± 0.10 |       |            |                  |           |

**TACT SWITCH**  
**Multi Function Navigation**  
**"SMT" Type**

| REV. | DESCRIPTION    | DATE       | DRAWN |
|------|----------------|------------|-------|
| A    | New            | 21.11.2014 | Ronny |
| B    | general update | 04.03.2019 | Ronny |

## Order Code TSM-602-xxNC/1SZ

Stem height Option ("H")

- 61** = 0.80 mm
- 62** = 1.50 mm
- 63** = 3.50 mm
- 64** = 4.50 mm
- 65** = 6.00 mm
- 66** = 9.50 mm

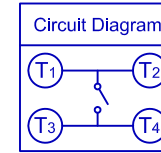
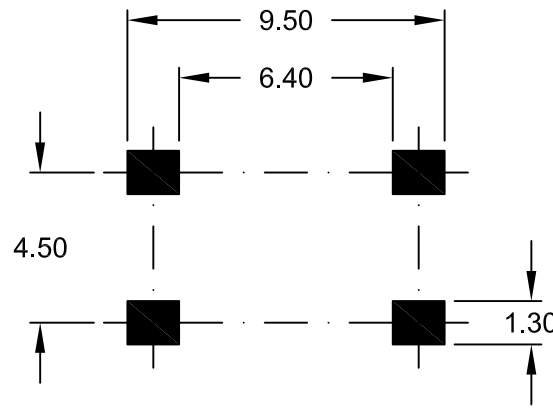
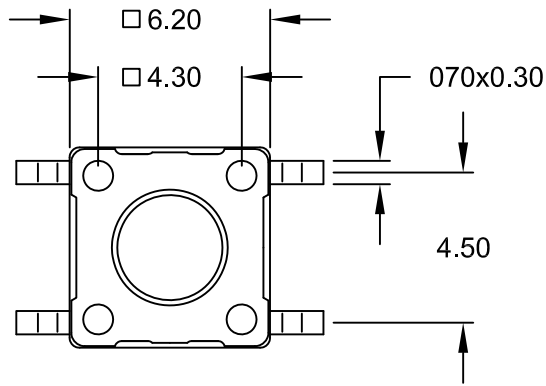
### Specifications

#### Electrical

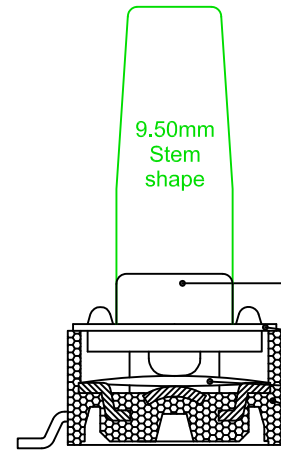
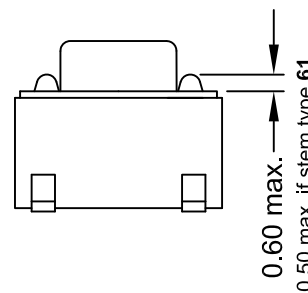
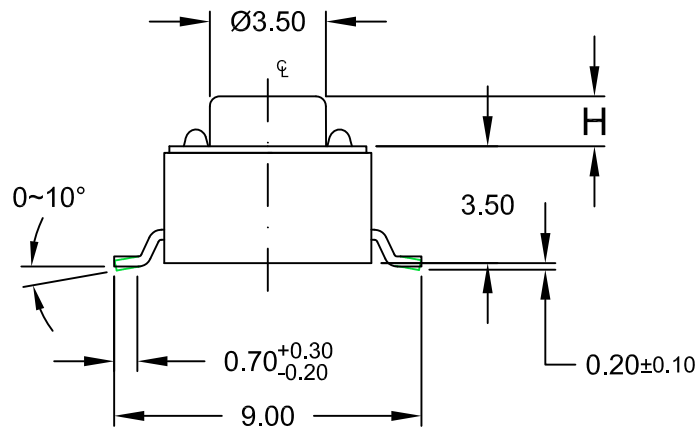
Current rating: 50mA, 12V DC  
 Insulation resistance: 100MΩ min.  
 Withstanding voltage: 50V AC (50Hz or 60Hz) 1Minute  
 Contact resistance: 100mΩ max.  
 Temperature range: -40°C to +85°C  
 Solder heat resistance: +255°C +0/-5°C  
 for 5 to 10 seconds  
 Operating force: 1.6N ±0.50N

Packing: Reel (*Tube on request*)

| ITEM | DESC.    | MATERIALS       | TREATMENT  |
|------|----------|-----------------|--|
| 1    | Stem     | Nylon UL 94V-0  | 1.6N = brown<br>(colour depend on operating force) |
| 2    | Cover    | stainless steel | none   |
| 3    | Contact  | Phosphor Bronze | with Silver cladding                               |
| 4    | Base     | Nylon UL 94V-0  | molded black                                       |
| 5    | Terminal | Brass           | with Silver plating<br>0.5µm                       |



Recommended PCB Layout  
(Top View)



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| UNIT  | GENERAL TOLERANCE |            |
|-------|-------------------|------------|
| mm    | X.° ±             | X. ±       |
| SCALE | .X° ±             | .X ±       |
| Free  | .XX° ±            | .XX ± 0.20 |
|       | .XXX° ±           | .XXX ±     |

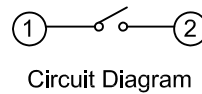
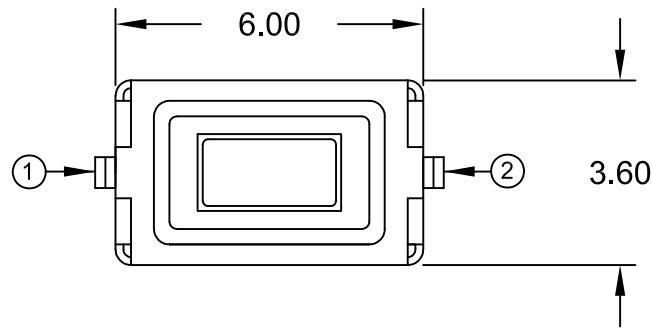
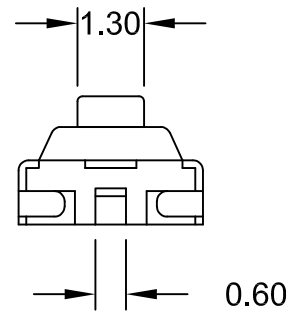
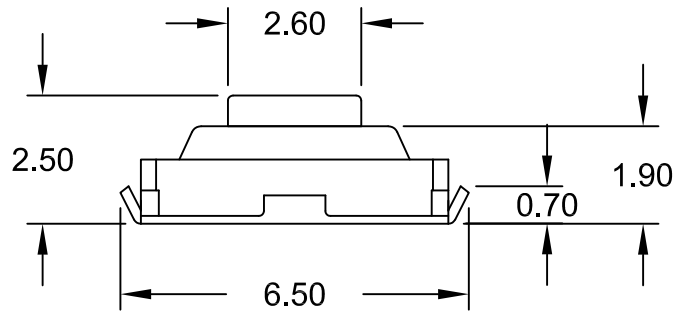
|         |       |      |            |
|---------|-------|------|------------|
| DRAWN   | Ronny | DATE | 21.11.2014 |
| CHECK   | Hogi  | DATE | 04.03.2019 |
| APPROVE | Hogi  | DATE | 04.03.2019 |

|            |                  |       |     |
|------------|------------------|-------|-----|
| DWG. NO.   | TSM-6NC/1SZ      | SHEET | 1/1 |
| SERIES NO. | TSM-602-xxNC/1SZ | REV.  | B   |

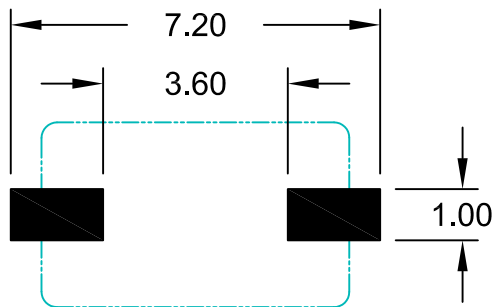
**Tactile Switch SMT 6x6**  
**1.6N Type**  
**NON-washable**



| REV. | DESCRIPTION | DATE       | DRAWN |
|------|-------------|------------|-------|
| A    | New         | 27.04.2017 | Ronny |



**Order Code**  
**TSM-126-60WC/5SZ**



Recommended PCB Layout Top View  
(Tolerance ±0.05)

**Specifications**

**Electrical**

Current rating: 50mA 12V DC max.  
Contact resistance: 100mΩ max.  
Insulation resistance: 100MΩ min.  
Voltage Rating  
Maximum: 12V DC 50mA  
Minimum: 1V DC 10μA



**Material**

Stem & Case: PA6T (white) UL 94V-0  
Contact: Stainless Steel; Ag plated  
Terminal: Brass; Ag plated  
Cover: Stainless Steel

**Mechanical Requirements**

Travel: 0.25±0.10mm  
Operating force: 160±50gf  
Operating life: 30.000 cycles min.

Processing Temperature: +260°C for 3 sec.  
Operating Temperature: -20°C to +70°C  
Storage Temperature: -30°C to +80°C

Packing: 3.000 pcs. / Reel

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| UNIT  | GENERAL TOLERANCE |            | DRAWN   | DATE       | DWG. NO.         | SHEET 1/1 |
|-------|-------------------|------------|---------|------------|------------------|-----------|
| mm    | X.° ±             | X. ±       | Ronny   | 27.04.2017 | TSM-126-60WC/5   | REV. A    |
| SCALE | .X° ±             | .X ±       | Hogi    | 27.04.2017 | SERIES NO.       |           |
|       | .XX° ±            | .XX ± 0.20 | APPROVE | DATE       | TSM-126-60WC/5XX |           |
|       | .XXX° ±           | .XXX ±     | Hogi    | 27.04.2017 |                  |           |

**Tactile Switch SMT**  
Top push -Tactile feedback Type



| REV. | DESCRIPTION  | DATE       | DRAWN |
|------|--|------------|-------|
| A    | New  | 01.06.2015 | Ryan  |
| B    | general update; add operating life & material option | 04.03.2019 | Ryan  |

## Order Code

# TSM-602-xx X RC/1SZ

| Stem height Option ("H") | Contact Material                 |
|--------------------------|----------------------------------|
| 0.80 mm = <b>61</b>      | <b>no suffix = Standard PhBz</b> |
| 1.50 mm = <b>62</b>      | <b>S = Stainless Steel</b>       |
| 3.50 mm = <b>63</b>      |                                  |
| 6.00 mm = <b>65</b>      |                                  |
| 9.50 mm = <b>66</b>      |                                  |

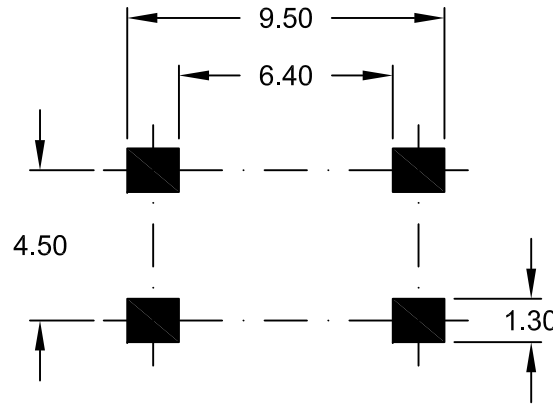
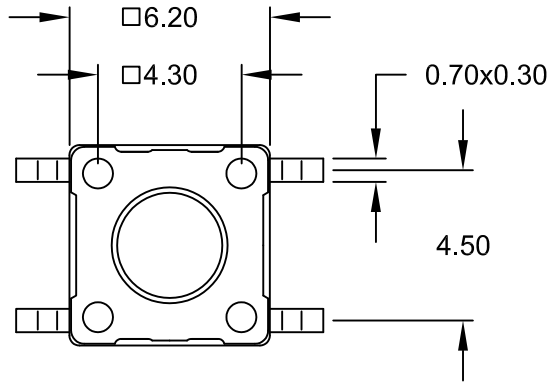
## Specifications

### Electrical

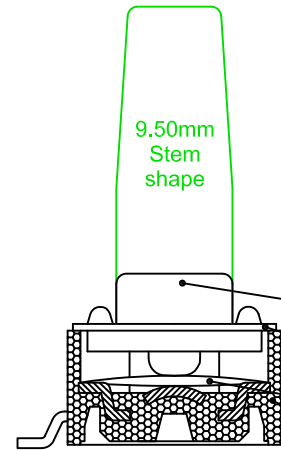
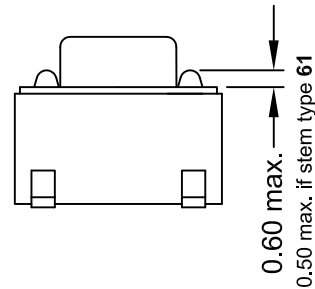
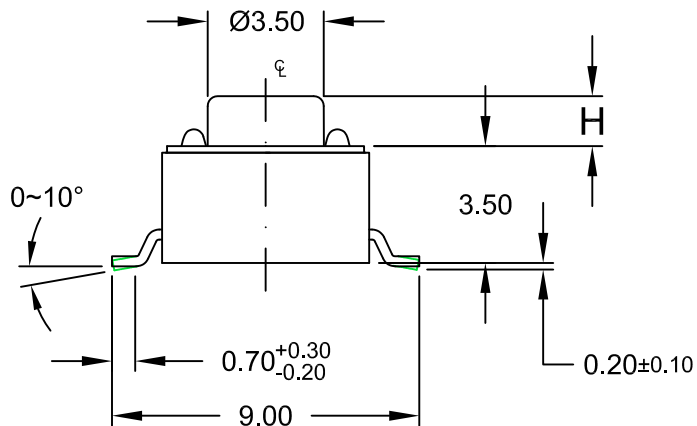
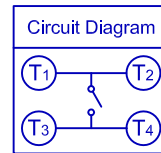
Current rating: 50mA, 12V DC  
 Insulation resistance: 100MΩ min.  
 Withstanding voltage: 50V AC (50Hz or 60Hz) 1Minute  
 Contact resistance: 100mΩ max.  
 Temperature range: -40°C to +85°C  
 Solder heat resistance: +255°C +0/-5°C  
 for 5 to 10 seconds  
 Operating force: 2.6N ±0.50N  
 Operating life: 100,000 cycles min. if PhBz  
 500,000 cycles min. if Stainless Steel

Packing: Reel (*Tube on request*)

| ITEM | DESC.    | MATERIALS                          | TREATMENT  |
|------|----------|------------------------------------|--|
| 1    | Stem     | Nylon UL 94V-0                     | 2.6N = red<br>(colour depend on operating force) |
| 2    | Cover    | Stainless Steel                    | none   |
| 3    | Contact  | Phosphor Bronze or Stainless Steel | with Silver cladding                             |
| 4    | Base     | Nylon UL 94V-0                     | molded brown                                     |
| 5    | Terminal | Brass                              | with Silver plating 0.5µm                        |



Recommended PCB Layout  
(Top View)



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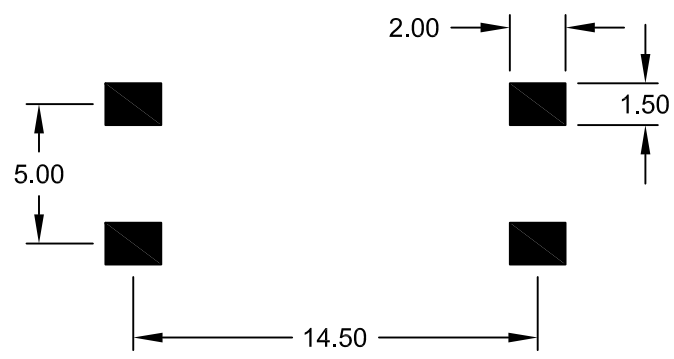
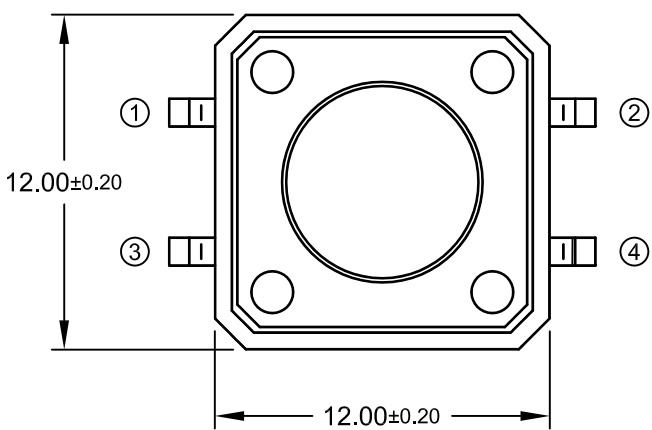
| UNIT  | GENERAL TOLERANCE |            |
|-------|-------------------|------------|
| mm    | X.° ±             | X. ±       |
| SCALE | .X° ±             | .X ±       |
| Free  | .XX° ±            | .XX ± 0.20 |
|       | .XXX° ±           | .XXX ±     |

|         |            |                  |           |
|---------|------------|------------------|-----------|
| DRAWN   | DATE       | DWG. NO.         | SHEET 1/1 |
| Ryan    | 01.06.2015 | TSM-6RC/1SZ      |           |
| CHECK   | DATE       | SERIES NO.       | REV. B    |
| Hogi    | 07.03.2019 | TSM-602-xxRC/1SZ |           |
| APPROVE | DATE       |                  |           |
| Hogi    | 07.03.2019 |                  |           |

**Tactile Switch SMT 6x6**  
**2.6N Type**  
**NON-washable**

|      |             |            |        |
|------|-------------|------------|--------|
| REV. | DESCRIPTION | DATE       | DRAWN  |
| A    | New         | 24.01.2019 | Cherry |

**Order Code**  
**TSM-120-xx x XC/6SZ**



Recommended PCB Layout "Top View"  
(Tolerance ±0.05)

Stem height option ("H")

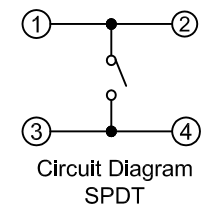
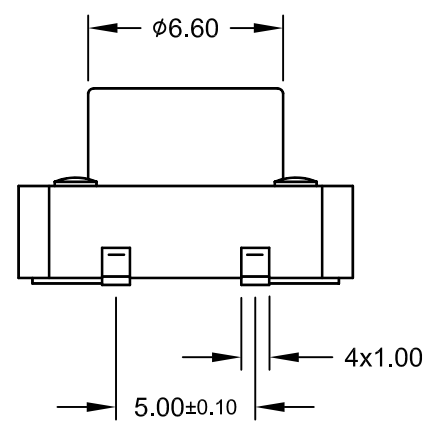
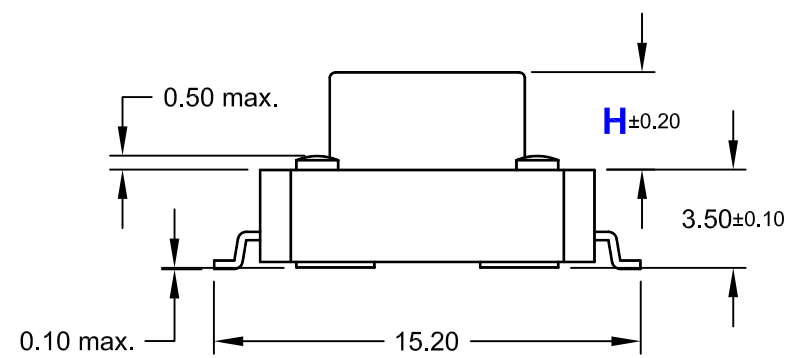
- 0.80mm = 61
- 1.50mm = 62
- 2.50mm = 25
- 3.50mm = 63
- 5.00mm = 50

Operating Force

- K** = 0.98N (1,000,000 Cycles)
- N** = 1.57N (1,000,000 Cycles)
- R** = 2.55N (500,000 Cycles)
- S** = 3.14N (500,000 Cycles)
- Y** = 5.10N (200,000 Cycles)

Stem Color

- 0 = black
- 1 = brown
- 2 = red
- 3 = orange
- 4 = yellow
- 5 = green
- 6 = blue
- 7 = purple
- 8 = gray
- 9 = white



**Specifications**

**Electrical**  
Current rating: 50mA @12V DC  
Insulation resistance: 100MΩ min.  
Contact resistance: 100mΩ max.  
Withstanding voltage: 250V AC / Minute

**Material**  
Housing: PPA UL 94-V0  
Stem: PPA UL 94V-0  
Contact: Stainless Steel; Silver plated  
Terminal: Brass; Silver plated  
Cover: cold pressed steel; Cu/Sn plated

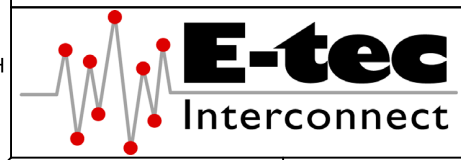
Operating temperature: -20°C to +70°C  
Storage temperature: -40°C to +85°C

**Mechanical Requirements**  
Operating life: see under "Operating Force"

**Packing**  
Reel



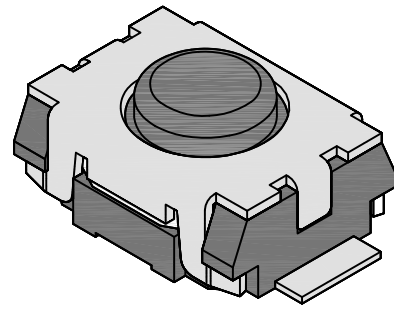
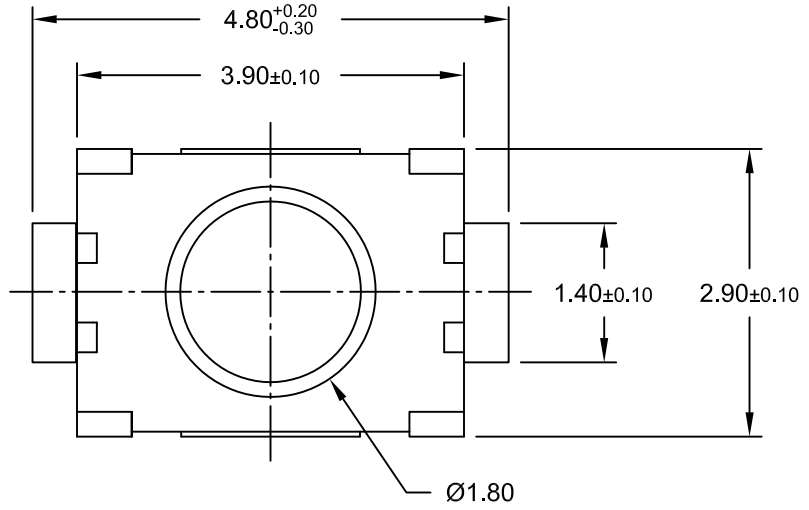
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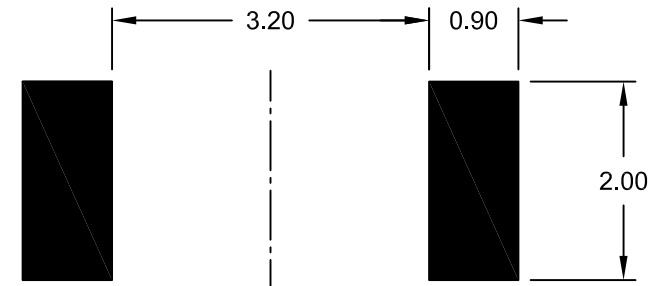
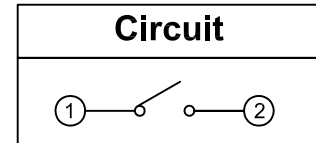
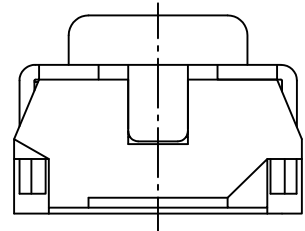
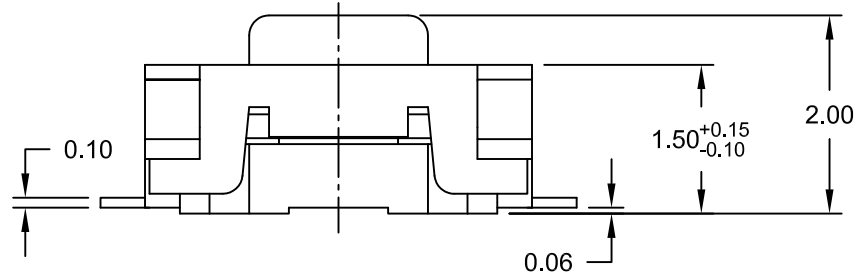
|            |                   |         |                 |                    |                         |            |               |                    |                 |                    |                                 |
|------------|-------------------|---------|-----------------|--------------------|-------------------------|------------|---------------|--------------------|-----------------|--------------------|---------------------------------|
| UNIT<br>mm | GENERAL TOLERANCE |         | DRAWN<br>Cherry | DATE<br>24.01.2019 | DWG. NO.<br>TSM-120-C/6 | SHEET 1/1  |               |                    |                 |                    |                                 |
|            | SCALE<br>Free     | X.° ±   |                 |                    |                         | X. ±       | CHECK<br>Hogi | DATE<br>24.01.2019 | REV. A          |                    |                                 |
|            |                   | .XX° ±  |                 |                    |                         | .XX ± 0.30 |               |                    | APPROVE<br>Hogi | DATE<br>24.01.2019 | SERIES NO.<br>TSM-120-xxxXC/6SZ |
|            |                   | .XXX° ± |                 |                    |                         | .XXX ±     |               |                    |                 |                    |                                 |

**Tactile Switch SMT 12X12**  
**NON-washable**

| REV. | DESCRIPTION              | DATE       | DRAWN |
|------|--------------------------|------------|-------|
| A    | New                      | 13.09.2010 | Ronny |
| B    | general update; new RoHS | 04.08.2017 | RH    |



**Order Code**  
**TSM-102-E2C/1SZ**



Recommended PCB Layout Top View  
(Tolerance ±0.05)

**Material**

Contact: Stainless Steel; Silver plated  
Solder Terminal: PhBz; Silver plated  
Cover: Stainless Steel  
Stem: LCP UL 94V-0



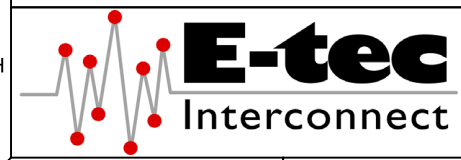
Operating force (off): side push 2.2N ±0.6N  
vertical push 1.6N ±0.5N  
Stroke: side push 0.20 ±0.10mm  
vertical push 0.13 ±0.10mm  
Operating life: 100.000 cycles min.

Operating temperature: -20°C to +70°C  
Processing temperature: +250°C +0/-5°C  
for 10 seconds

**Specifications**

**Electrical**  
Current rating: 50mA @ 12V DC  
Insulation resistance: 100MΩ min.  
Contact resistance: 100mΩ max.  
Withstanding voltage: 100V AC  
Capacitance: 5pF max. @ 1MHz ±10KHz

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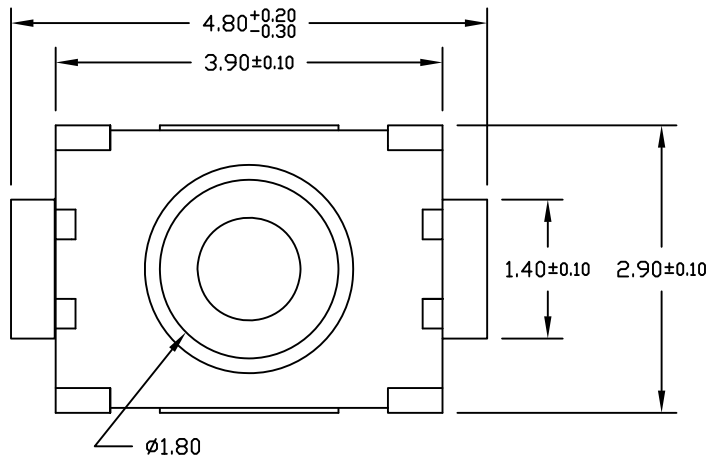
| UNIT  | GENERAL TOLERANCE |            | DRAWN   | DATE       | DWG. NO.        | SHEET 1/1 |
|-------|-------------------|------------|---------|------------|-----------------|-----------|
| mm    | X.° ±             | X. ±       | Ronny   | 13.09.2010 | TSM-E2C/1SZ     | REV. B    |
| SCALE | .X° ±             | .X ±       | Hogi    | 04.08.2017 | SERIES NO.      |           |
|       | .XX° ±            | .XX ± 0.20 | APPROVE | DATE       | TSM-102-E2C/1SZ |           |
|       | .XXX° ±           | .XXX ±     | Hogi    | 04.08.2017 |                 |           |

**Tactile Switch**  
**SMT Type**  
extended Actuator 2.00mm



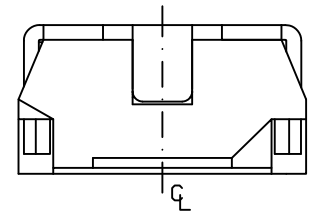
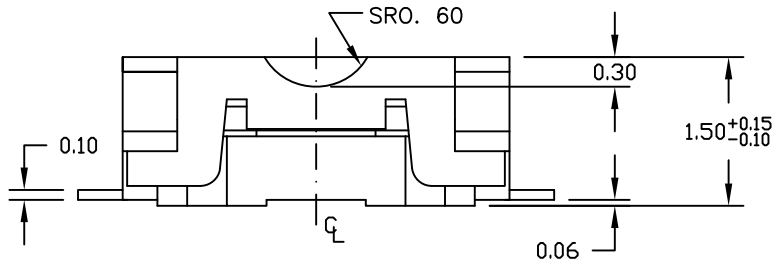
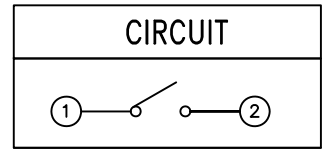
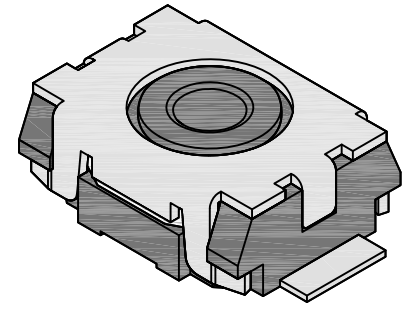


|      |        |             |            |       |
|------|--------|-------------|------------|-------|
| REV. | LOCAS. | DESCRIPTION | DATE       | DRAWN |
| A    | NEW    |             | 29.09.2009 | Ronny |



**ORDER CODE**  
**TSM-102-L1C/1SZ**

Packing  
Reel = C



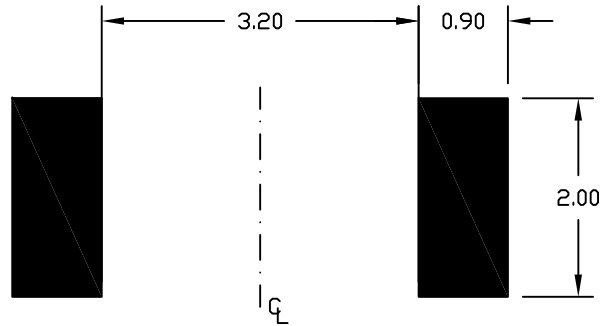
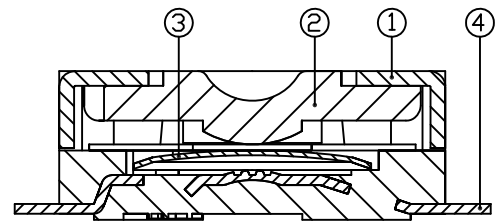
**Specifications**

- Current rating: 50mA 12V DC
- Insulation resistance: 100MΩ min.
- Dielectric withstanding: 100V AC
- Contact resistance: 100mΩ max.
- Capacitance: 5pf max.; 1MHz ±10kHz

**Materials**

1. Cover: Stainless Steel
2. Stem: LCP
3. Contact: Stainless Steel, Silver plated
4. Solder Terminal: PhBz, Silver plated

- Operating temperature: -20°C to +70°C
- Storage temperature: -30°C ~ +80°C
- Solder temperature: +260°C 5sec. max.
- Operating Life: 100.000 cycles min.



RECOMMENDED PCB LAYOUT



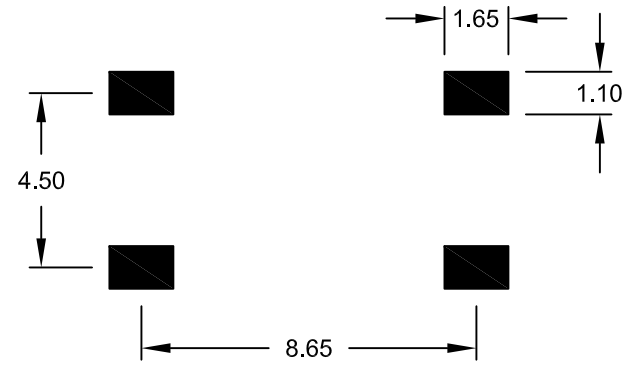
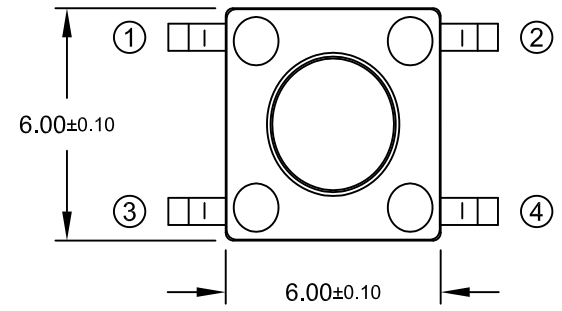
|       |      |                   |            |       |            |                 |           |
|-------|------|-------------------|------------|-------|------------|-----------------|-----------|
| UNIT  | mm   | GENERAL TOLERANCE |            | DRAWN | DATE       | DWG. NO.        | SHEET 1/1 |
| SCALE | Free | X.° ±             | X. ±       | Ronny | 29.09.2009 | TSM-L1C/1SZ     | REV. A    |
|       |      | .XX° ±            | .X ±       | Ronny | 29.09.2009 | SERIES NO.      |           |
|       |      | .XX° ±            | .XX ± 0.20 | Hogl  | 29.09.2009 | TSM-102-Xxx/1SZ |           |

**TACTILE SWITCH**  
**"SMT" Type**  
**low Actuator 1.50mm**

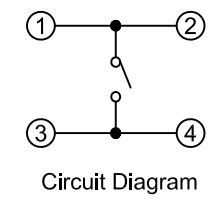
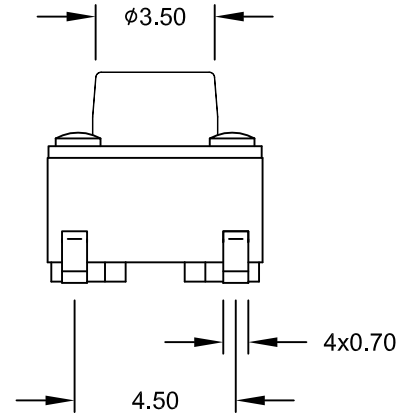
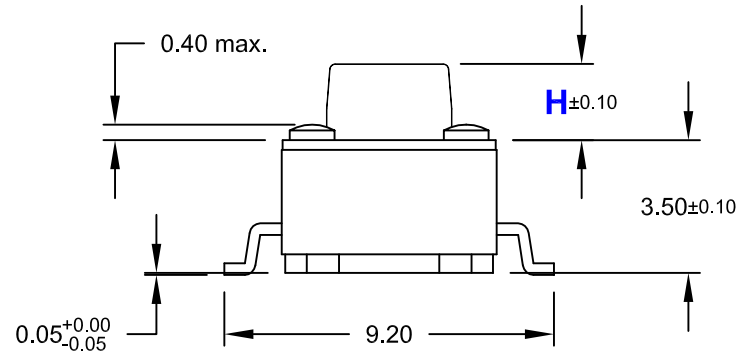
| REV. | DESCRIPTION                | DATE       | DRAWN  |
|------|----------------------------|------------|--------|
| A    | New                        | 24.01.2019 | Cherry |
| B    | add Stem height option "H" | 13.05.2019 | Cherry |

**Order Code**  
**TSM-600-xx x XC/6SZ**

| Stem height option ("H") | Operating Force          | Stem Color               |
|--------------------------|--------------------------|--------------------------|
| 0.80mm = <b>61</b>       | <b>K</b> = 0.98N         | <b>0</b> = black         |
| 1.50mm = <b>62</b>       | <b>N</b> = 1.57N         | <b>1</b> = brown         |
| 6.00mm = <b>65</b>       | <i>others on request</i> | <b>2</b> = red           |
| 9.50mm = <b>66</b>       | <i>others on request</i> | <i>others on request</i> |



Recommended PCB Layout "Top View"  
(Tolerance ±0.05)



**Specifications**  
**Electrical**  
Current rating: 50mA @12V DC  
Insulation resistance: 100MΩ min.  
Contact resistance: 100mΩ max.  
Withstanding voltage: 250V AC / Minute

**Material**  
Housing: PA6T UL 94-V0  
Stem: PA6T UL 94V-0  
Contact: Stainless Steel; Silver plated  
Terminal: Brass; Silver plated  
Cover: cold pressed steel; Cu/Sn plated

Operating temperature: -20°C to +70°C  
Storage temperature: -40°C to +85°C

**Mechanical Requirements**  
Operating life: 1.000.000 cycles min.

**Packing**  
Reel



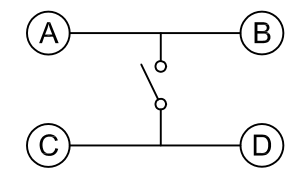
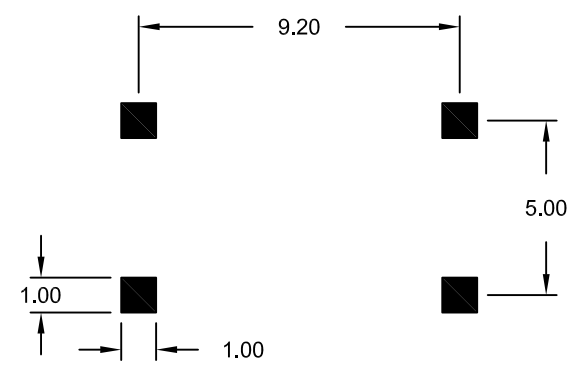
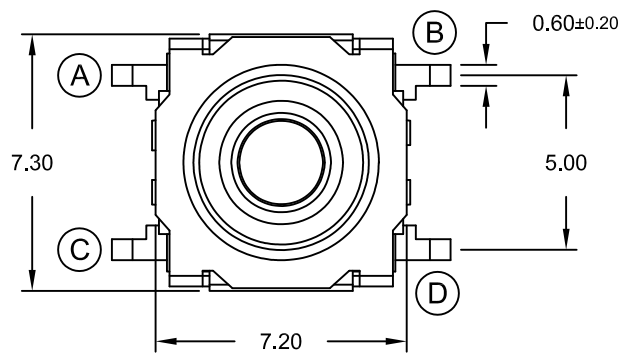
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| UNIT  | GENERAL TOLERANCE |            | DRAWN   | DATE       | DWG. NO.          | SHEET 1/1 |
|-------|-------------------|------------|---------|------------|-------------------|-----------|
| mm    | X.° ±             | X. ±       | Cherry  | 24.01.2019 | TSM-600-C/6       | REV. B    |
| SCALE | .X° ±             | .X ±       | Hogi    | 13.05.2019 | SERIES NO.        |           |
| Free  | .XX° ±            | .XX ± 0.30 | APPROVE | DATE       | TSM-600-xxxXC/6SZ |           |
|       | .XXX° ±           | .XXX ±     | Hogi    | 13.05.2019 |                   |           |

**Tactile Switch SMT 6X6**  
**NON-washable**

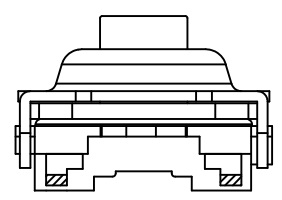
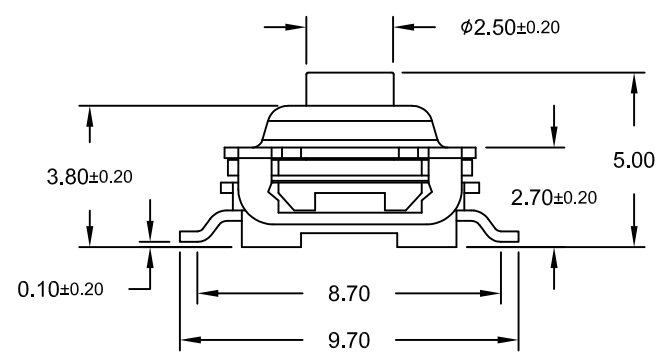
| REV. | DESCRIPTION | DATE       | DRAWN  |
|------|-------------|------------|--------|
| A    | New         | 13.06.2018 | Cherry |



Circuit Diagram

Recommended PCB Layout Top View  
(Tolerance ±0.05)

**Order Code**  
**TSM-702-12BLC/5SZ**



**Specifications**

**Electrical**

Current rating: 50mA 12V DC max.  
 Contact resistance: 100mΩ max.  
 Insulation resistance: 100MΩ min.  
 Voltage Rating  
 Maximum: 12V DC 50mA  
 Minimum: 1V DC 10μA

**Material**

Stem & Case: PPA (blue) UL 94V-0  
 Contact: Stainless Steel; Ag plated  
 Terminal: H62Y; Ag plated  
 Cover: H65M; Cu Sn plated



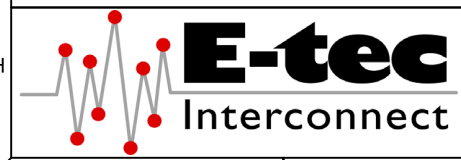
**Mechanical Requirements**

Travel: 0.35±0.10mm  
 Operating force: 250±50gf  
 Operating life: 100.000 cycles min.

Processing Temperature: +260°C for 3 sec.  
 Operating Temperature: -20°C to +70°C  
 Storage Temperature: -20°C to +80°C

Waterproof rating: IP67  
 Packing: 800 pcs. / Reel

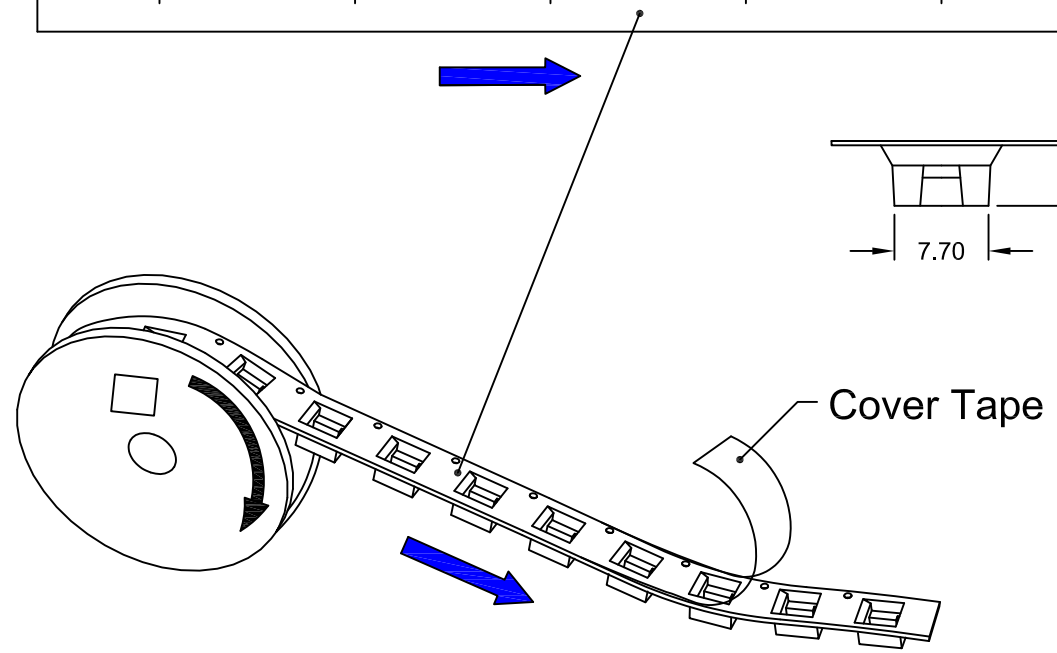
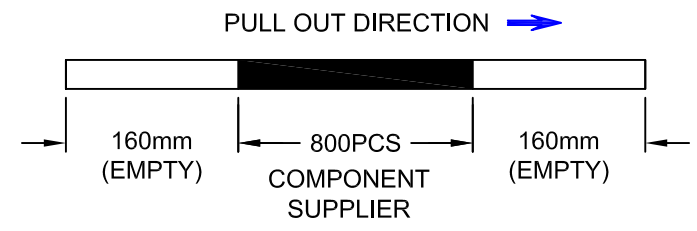
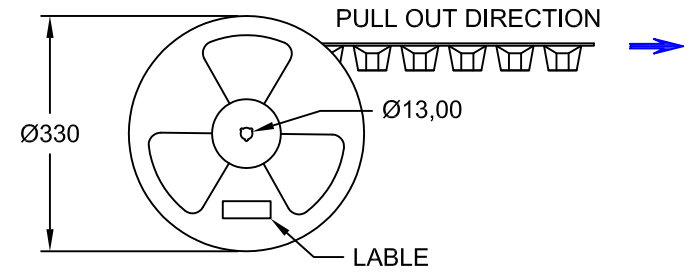
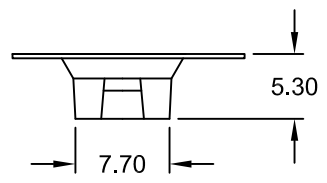
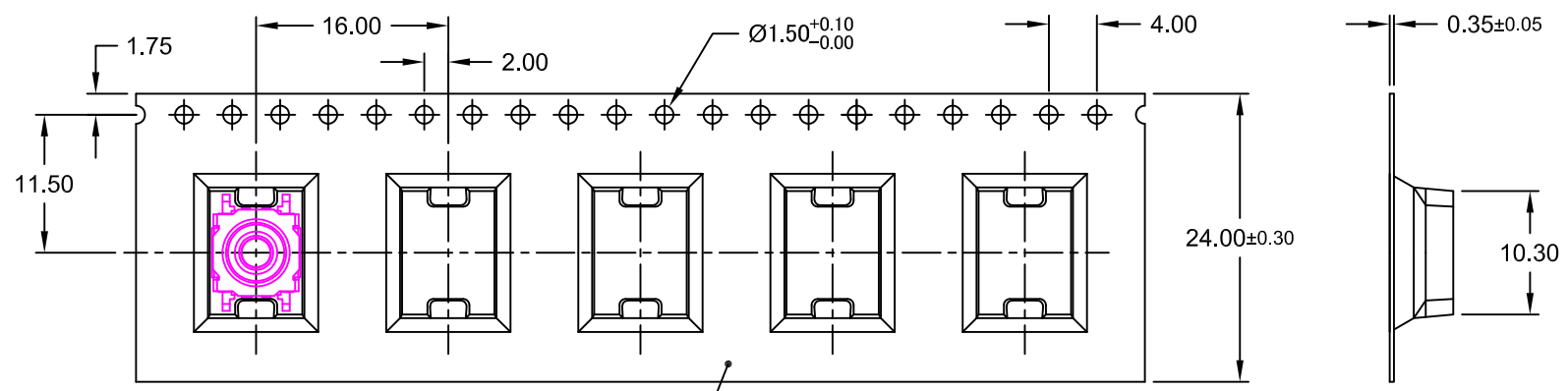
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| UNIT  | GENERAL TOLERANCE |            | DRAWN   | DATE       | DWG. NO.          | SHEET 1/2 |
|-------|-------------------|------------|---------|------------|-------------------|-----------|
| mm    | X.° ±             | X. ±       | Cherry  | 13.06.2018 | TSM-702-12BLC/5   | REV. A    |
| SCALE | .X° ±             | .X ±       | CHECK   | 13.06.2018 | SERIES NO.        |           |
| Free  | .XX° ±            | .XX ± 0.30 | APPROVE | 13.06.2018 | TSM-702-12BLC/5XZ |           |
|       | .XXX° ±           | .XXX ±     | Hogi    |            |                   |           |

**Tactile Switch SMT**  
 Top Push - washable Type

| REV. | DESCRIPTION | DATE       | DRAWN  |
|------|-------------|------------|--------|
| A    | New         | 13.06.2018 | Cherry |



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|            |                   |            |                 |                    |                                    |           |
|------------|-------------------|------------|-----------------|--------------------|------------------------------------|-----------|
| UNIT<br>mm | GENERAL TOLERANCE |            | DRAWN<br>Cherry | DATE<br>13.06.2018 | DWG. NO.<br>Reel TSM-702-12BLC_5SZ | SHEET 2/2 |
|            | X.° ±             | X. ±       | CHECK<br>Hogi   | DATE<br>13.06.2018 | SERIES NO.                         | REV. A    |
|            | .XX° ±            | .XX ± 0.10 | APPROVE<br>Hogi | DATE<br>13.06.2018 |                                    |           |
|            | .XXX° ±           | .XXX ±     |                 |                    |                                    |           |
|            | SCALE<br>Free     |            |                 |                    |                                    |           |
|            |                   |            |                 |                    |                                    |           |

**Reel packing Information**  
for E-tec Tactile Switch  
**TSM-702-12BLC/5SZ**