Customer's Name

TO.

| DESIGN | CHECK | APPROVAL |
|---|---|---|
| | | |




# Approval Sheet

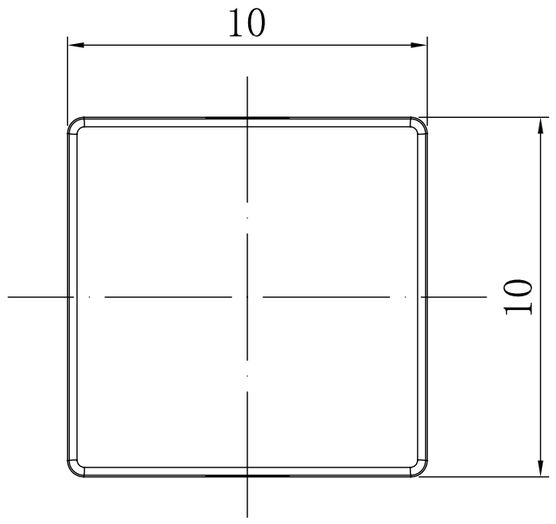
PART TL1-ENNFN-BTW

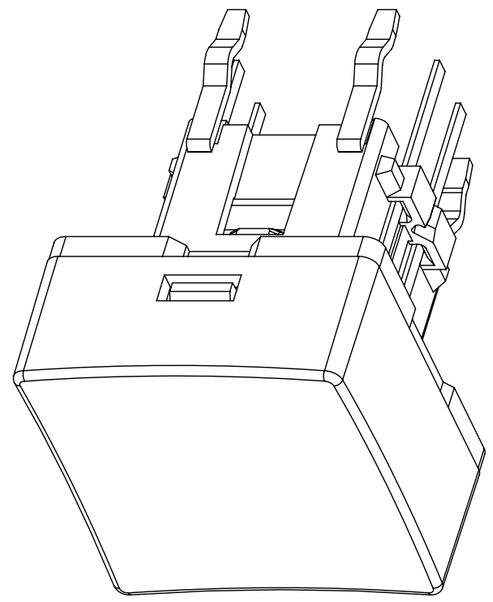
| CONTENTS | |
|---|---|
| **DESCRIPTION** | **CUSTOMER'S APPROVAL** |
| Assembled Drawing | |
| Specification | |
| LED sheet | |
| | |

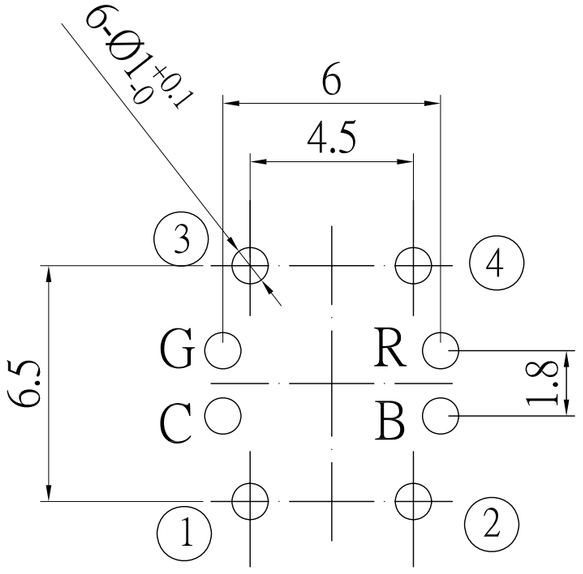
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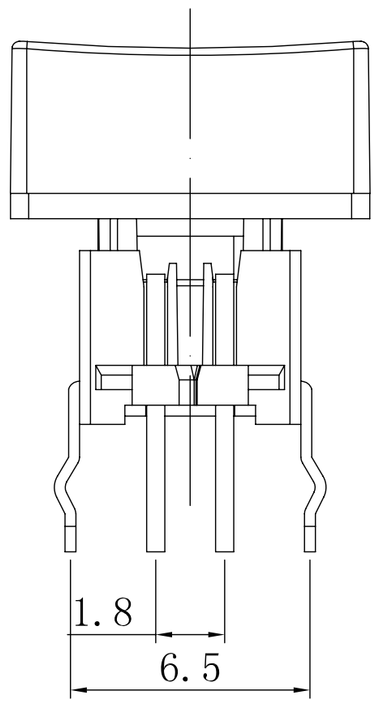
| DIMENSION | TOLERANCE |
|---|---|
| BELOW 10 mm | ± 0.25 |
| 10~50 mm | ± 0.4 |
| ABOVE 50 mm | ± 0.7 |

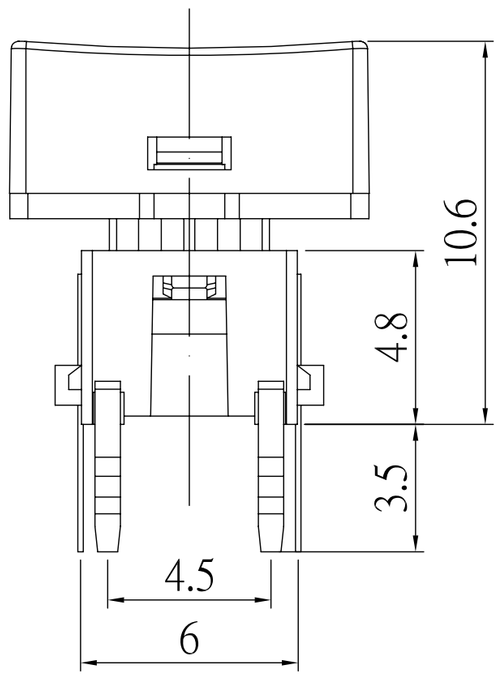


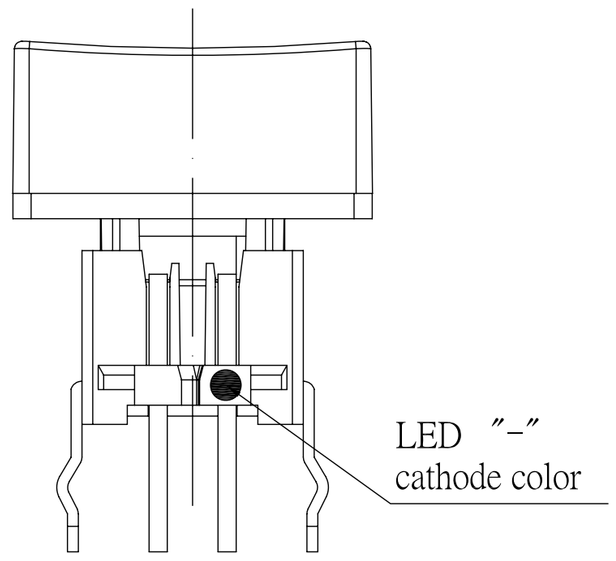



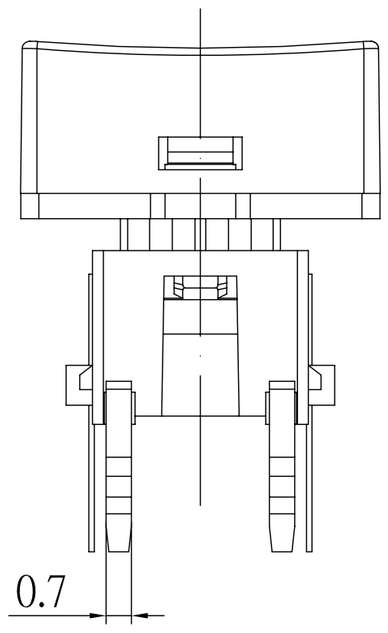


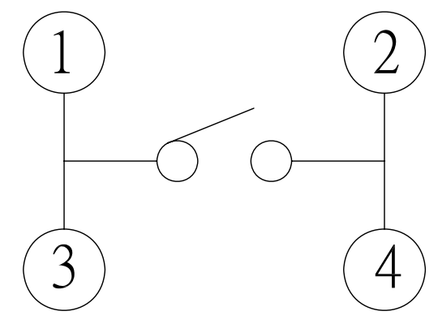

P.C.B LAYOUT

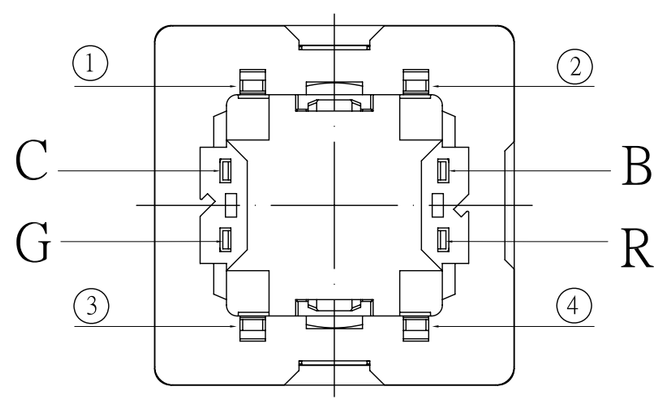


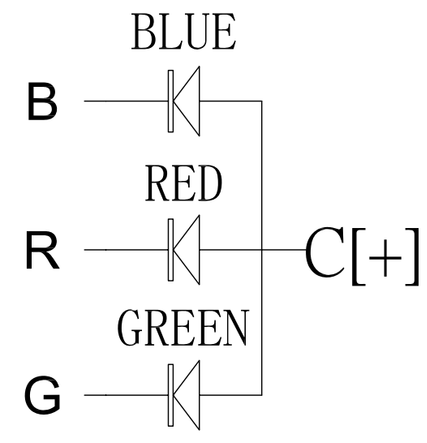




1. RATING : 12 V DC , 50 mA .
2. CONTACT RESISTANCE : 100 mΩ MAX .
3. INSULATION RESISTANCE : 500 V DC , 100MΩ MIN .
4. OPERATION FORCE : 250±80gf .
5. OPERATION TEMPERATURE RANGE : -20℃ ~ +70℃ .
6. OPERATION LIFE : 500,000 CYCLES .




CIRCUIT DIAGRAM

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | UNIT | mm | MODE | TACT WITH LED SWITCH |
| V0 | 2021/7/25 | JOHNSON | ALEN | MIKE | ORIGINAL DESIGN | SCALE | 1 : 1 | ANGLE TER | ± 3° |
| VER | DATE | APPROVAL | CONFIRM | DESIGN | ENGINEERING RECORD DESCRIPTION | PART | TL1-ENNFN-BTW | | |

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## 1. 一般特性 General Characteristics

| |
|---|
| 1.1 额定值(Rating Value)： DC12V 50mA. |
| 1.2 工作温度(Work Temperature Range)： -20℃ ~ 70℃ |
| 1.3 存贮温度(Store Temperature Range)： -40℃ ~ 85℃ |
| 1.4 正常测试条件(未有特殊说明量测在以下条件进行)：<br>General test condition (Tests and measurements shall be made under the following standard conditions unless otherwise specified)：<br>正常温度：5℃~35℃ 相对湿度：45%~85% RH 气 压：8,600~10,600 帕<br>Temperature: 5℃~35℃ Relative humidity: 45%~85% Air pressure: 8,600~10,600 pa |

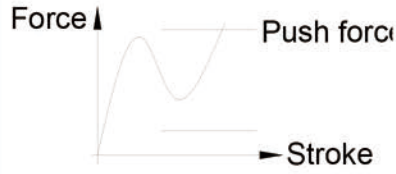
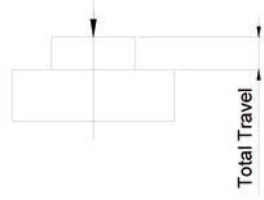
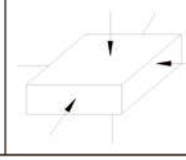
## 2. 产品外观及尺寸要求 Appearance & Dimension Requirement

| |
|---|
| 2.1 产品外形结构紧凑,无配合不良.<br>The structure of product is compact, and assembly of parts has no badness. |
| 2.2 产品塑胶部件无严重缩水、披锋、欠注、斑点、破损或变形现象.<br>The plastic parts of product have no serious defects such as very serious shrink, scarcity, fleck, disrepair, transmutation, etc. |
| 2.3 产品引脚和外壳无严重氧化、脏污、变形、毛刺或电镀不良.<br>Lead feet and shell have no serious defects such as oxidation, smudge, disrepair, burr, defects on plating. |
| 2.4 开关操作顺畅,节奏感强,无明显卡塞现象,(自锁开关锁芯锁住后,允许导芯倾斜正负 2°)<br>Operating switch is unhindered, rhythmed , and there is not palpable clag.( After the keystoke is locked, it is normal that the keystoke tilt to one side plus or minus 2 ° ) |
| 2.5 产品结构及尺寸参见产品规格图纸。<br>Construction and dimensions：Refer to individual product drawing. |

## 3. 电气特性 Electronic Characteristics

| No. | 项 目<br>Item | 测试方法<br>Test Method | 测试设备<br>Equipment | 特性要求<br>Requirements |
|---|---|---|---|---|
| 3.1 | 接触电阻<br>Contact Resistance | 在低电流（≤100mA）条件下测试.<br>Measured at low current (100mA or less). | 低电阻测试仪<br>Low Resistance Meter | 100mΩ max |
| 3.2 | 绝缘阻抗<br>Insulation Resistance | 测试相邻引脚之间,引脚与外壳之间的绝缘阻抗(DC 500V).<br>Measurement shall be made between adjacent terminals, between terminal and shell(DC 500V). | 绝缘测试机<br>Insulation Resistance Tester | 100MΩ min |
| 3.3 | 耐压测试<br>Dielectric Withstand Voltage | 输入一定电压(50-60Hz,电压值AC 500V)1分钟,漏电流为2mA,测试邻近端子间.<br>Apply certain voltage (50-60Hz, AC 500V) for 1 minute between adjacent contacts of the connector with 2mA leakage sensitivity. | 耐压测试机<br>Puncture Tester | 没有绝缘破坏. 电弧等异常.<br>No arcing , break down and damaging insulation. |

## 4. 机械特性 Mechanical Characteristics

| No. | 项 目<br>Item | 测试方法<br>Test Method | 测试设备<br>Equipment | 特性要求<br>Requirements |
|---|---|---|---|---|
| 4.1 | 操 作 力<br>Operation Force | Push by recommended operating condition:<br>按下的操作条件:<br> | 测力计<br>Force Gauge | 250±80gf<br>180±50gf |
| 4.2 | 行 程<br>Full travel | Push by recommended operating condition<br>按下的操作条件:<br> | 游标卡尺<br>Vernier Caliper | 0.25±0.1mm |
| 4.3 | TERMINAL STRENGTH<br>端子强度 | A static load of 500gf shall be applied in the direction of stem operation for a period of 60 seconds.<br>任意方向加 500gf 作用于按钮上，时间为 60 秒 1 个周期 | 张力计 | No damage ,Mechanical and electrical characteristics shall be satisfied.<br>没有破坏满足于机械、电气性能 |
| 4.4 | VIBRATION TEST<br>振动测试 | 1) Amplitude : 1.5mm<br>2) Sweep rate :10-55-10Hz for 1 minute.<br>3) Sweep method : Logarithmic frequency sweep rate.<br>4)Vibration direction : X.Y.Z(3 directions)<br>5)Time : Each direction 2 hours (Total 6 hours)<br>按振幅 1.5 mm 速度 10-55-10Hz 1 分钟振动方向为 XYZ，每个方向 2 小时，共 6 小时进行测试 | 震动测试仪 | Mechanical and electrical characteristics shall be satisfied.<br>满足于机械、电气性能 |
| 4.5 | IMPACT TEST<br>撞击测试 | 1) Acceleration : 80G<br>2)Cycles of test : 3 cycles each in 6 directions, for a total 18 cycles.<br>撞击力量为 80G，3 个周期 6 个方向共 18 次进行测试 |  | Mechanical and electrical characteristics shall be satisfied.<br>满足于机械、电气性能 |

## 5. 可靠性测试 Reliability trial

| No. | 项 目<br>Item | 测试方法<br>Test Method | 测试设备<br>Equipment | 特性要求<br>Requirements |
|---|---|---|---|---|
| 5.1 | 可焊性试验 Solder ability Test | 端子顶部被浸入焊锡炉中，温度为 260±5℃，时间 5±1 秒.<br>The top of the terminals shall be dipped in the solder bath at 260±5℃ for5±1 seconds. | 控温锡炉<br>Solder Stove | 引脚至少 95%上锡.<br>Ninety-five percent of terminals shall be dipped. |
| 5.2 | 寿命试验<br>Operation Life | 开关在寿命试验设备上以约 90 次 / 分的速度连续被操作，具体次数见规格图示。<br>Switch shall be operated continuously at about 90 cycles /min without load. | 寿命试验机<br>Life Tester | 寿命：500,000 次<br>实验后：<br>绝缘电阻：10MΩ Min<br>操作力：变化在±50%内<br>开关外观及结构无损坏。<br>Life test:500,000cycles<br>After test:<br>Insulation resistance: 10MΩ Min<br>Operating force: Change should be within ±50% of specified value.<br>No abnormalities shall be recognized in appearance and construction. |
| 5.3 | 耐焊接热<br>Resistance to Soldering heat | 端子焊接部分浸入焊炉，焊炉温度 260±5℃，焊接时间 5±1 秒。（焊接时不可于端子施加外力）。<br>Terminals shall be dipped in the solder bath at 260±5℃ for 5±1 seconds without additional force for terminals. | 控温锡炉<br>Solder Stove | 本体无变形，能满足于机械、电气性能.<br>Appearance should be not damaged, electrical and mechanical characteristics shall be satisfied. |
| 5.4 | 耐高温测试<br>Resistance to Heat Test | 放置在温度 85±2℃环境中 96 小时后，再置于正常条件下 1 小时后测定。<br>The switch shall be stored at a temperature of 85±2℃ for 96 hours, Measurements shall be made after it be subjected to the standard conditions for 1 hour. | 高低温试验机<br>High & Low Temperature Tester | 外观，机械及电气性能均符合要求。<br>Appearance, electrical and mechanical characteristics shall be satisfied. |

| No. | 项 目<br>Item | 测试方法<br>Test Method | 测试设备<br>Equipment | 特性要求<br>Requirements |
|---|---|---|---|---|
| 5.5 | 耐低温测试<br>Resistance to Cold Test | 放置在温度-40±2℃环境中 96 小时后，再置于正常条件下 1 小时后测定。<br>The switch shall be stored at a temperature of -40±2℃ for 96 hours, Measurements shall be made after it be subjected to the standard conditions for 1 hour. | 高低温试验机<br>High & Low Temperature Tester | 外观，机械及电气性能均符合要求。<br>Appearance, electrical and mechanical characteristics shall be satisfied. |
| 5.6 | 耐湿性测试<br>Resistance to Humidity Test | 放置于温度 40±2℃，相对湿度为 90~96%环境中 96 小时后，再置于正常条件下 1 小时后测定(注意要擦去水滴)。<br>The switch shall be stored at a temperature of 40±2℃, relative humidity 90~96% for 96 hours, Measurements shall be made after it be subjected to the standard conditions for 1 hour (Wipe out water drip). | 恒温恒湿箱<br>Temperature & Humidity Tester Chamber | 外观，机械及电气性能均符合要求。<br>Appearance, electrical and mechanical characteristics shall be satisfied. |
| 5.7 | 盐雾实验<br>Salt Mist Test | 试件在下述实验后测量：<br>1．温度： 35±5°C<br>2．盐溶液浓度：5±1%（质量百分比），<br>3．试验时间： 24 小时，<br>4．试验后，将盐沉积物用水冲掉。<br>The switch shall be checked after following test:<br>1. Temperature: 35±5°C<br>2. Salt solution: 5±1%(Solids by mass)<br>3. Duration: 24 hours,<br>4. After immersing, salt deposit shall be removed by running water. | 盐雾试验机<br>Salt Spray Tester | 在金属件上没有严重腐蚀斑点。<br>No remarkable corrosion shall be recognized in metal parts. |

## 6. TL1 LED [常规品 LED 按此表格记录，如为客户特殊需求 LED 再单独提供]

| LED Characteristics | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| The electric specfications shown are determined at a basic temperature of 25℃ if the source voltage exceeds the rated voltage of LED,add last resistor must be connected in series with the LED | | | | | | | | | | | | |
| Chip | Forward voltage VF(V) If=20mA | | | | | Peak Wave Length λp(nm) | Dominant Wave Length λdom(nm) | Absolute Maximun Rating | | | | Viewing Angle 2Θ 1/2 (deg) |
| | VF(V) | | IF(mcd) | | | | | | | | | |
| Color | Typ | Max | Min | Typ | Max | | | △λ nm | Pd mW | If mA | Peak If mA | |
| Super RED | 1.8 | 2.4 | | | | 625 | 620-630 | | 60 | 20 | 100 | 35 |
| Super GREEN | 2.8 | 3.4 | 400 | | 800 | | 520-525 | | 60 | 20 | 100 | 35 |
| Super ORANGE | 1.8 | 2.4 | | | | 605 | 600-610 | | 60 | 20 | 100 | 35 |
| Super BLUE | 2.8 | 3.4 | 200 | | 400 | | 460~465 | | 60 | 20 | 100 | 35 |
| Super WHITE | 3.1 | 3.6 | X=0.25~0.31 Y=0.24~0.33 | | | | | | | | | |