



文件名称 DOCUMENT NAME: PRODUCT SPECIFICATION		主 题 SUBJECT: 2X3 TACT SWITCH 1TS032A-1600-2903-CT		文件编号 DOCUMENT NO.: EB1-AS1C-294			
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## 1. 通则 General Characteristics

### 1.1 应用范围 Application range:

此产品规格书适用于轻触开关 1TS032A-1600-2903-CT。

This product specification is applied to the 1TS032A-1600-2903-CT push-on type tact switch.

### 1.2 使用环境条件 Acclimatization:

使用温度范围 Operating Temperature range: -30℃~85℃

保存温度范围 Preservative Temperature range: -40℃~90℃

### 1.3 测试条件 Test Conditions:

若没有特别说明,则试验条件如下:

Unless otherwise specified, the atmospheric conditions for making measurements and tests are as follows:

温度 Temperature: 5~35℃

相对湿度 Relative Humidity:25~85%

气压 Air pressure:86~106Kpa

如对判定产生疑义, 则试验按以下条件进行:

However, if doubt arises on the decision based on the measured values under the above mentioned conditions, the following conditions shall be employed:

温度 Temperature:20±2℃

相对湿度 Relative Humidity:65±5%

气压 Air pressure:86~106Kpa

## 2. 外观和安装尺寸 Appearance & Mounting Dimensions:

### 2.1 外观 Appearance:

产品外观良好,无破损、锈蚀、裂纹和镀层缺陷。

The switch shall have good finishing, and no rust, crack or plating defects.

### 2.2 安装尺寸 Mounting dimensions:

应符合产品外形图 1TS032A 的要求。

Refer to product appearance drawing No.:1TS032A

## 3. 驱动方式 Operate Mode:

按钮式 Push-on types.

## 4. 回路方式 Circuit Mode:

如成品图 1TS032A 所示(as assembly drawing 1TS032A).

## 5. 额定负荷及寿命 Rating and Operating life.

额定负载 Rating: DC12V, 50mA max.

负荷寿命 Operate Life With Load: 200,000cycles.



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## 6. 电气性能 Electrical Characteristics

### 6.1 外观检查 Visual Examination

测试条件 Test Method/Condition	标准 Criteria
产品在未受力的情况下进行外观检查。 By Visual Examination choke without any out Pressure & testing.	产品无明显缺陷,不影响使用 There shall be no defects that affect the serviceability of the product.

### 6.2 镀层结合力测试

测试条件 Test Method/Condition	标准 Criteria
胶带测试法: 用钢刀划出不少于 3 条平行线, 然后用粘结强度不小于 45g/mm 的 3M 胶带拉表面镀层 (内部弹片和焊脚都需要测试)。	在40倍显微镜下镀层无起皮、起泡、裂纹、脱落现象。

### 6.3 接触电阻 Contact Resistance

测试条件 Test Method/Condition	标准 Criteria
开关在无电气负荷状态下, 动作 3 次以上后, 用接触电阻测试仪器测量各接点的接触电阻。 Switch without load, operate more than 3 times, use contact resistance testing apparatus to test the contact resistance of each point of contact.	常态 Normal 500mΩ max 气候及寿命试验后 after weather and life proof: 1000mΩ max

### 6.4 绝缘电阻 Insulation resistance

测试条件 Test Method/Condition	标准 Criteria
在相互绝缘的所有端子之间及各接线端子与外露的非载流金属零件之间加载 100VDC , 持续时间 60 ±5 S。 100VDC Voltage is applied between each pair of terminals and between the terminal and the metal frame for 60±5S.	常态 Normal 100MΩ min 气候及寿命试验后 after weather and life proof: 10MΩ min

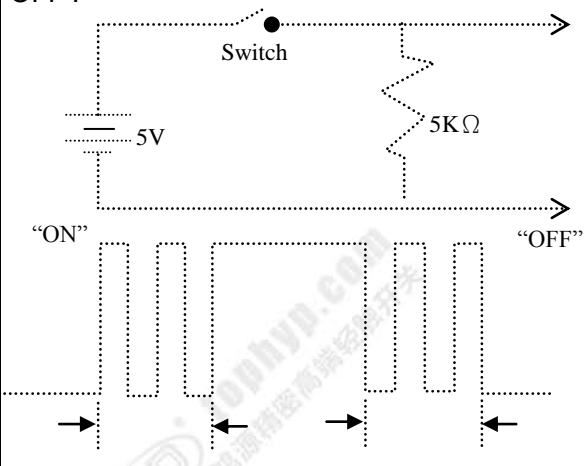


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## 6.5 抗电强度 Dielectric strength

测试条件 Test Method/Condition	标准 Criteria
在相互绝缘的所有接线端子之间加载 250VAC (泄漏电流应不超过 0.5mA )的交流电,持续时间 60±5 S。 250VAC (leak current 0.5mA max ) alternate current load is applied between open terminals connected with wires, for 60±5S	无击穿和飞弧现象。 No dielectric breakdown shall occur.
各接线端子与金属铁壳之间加载 250VAC (泄漏 电流应不超过 0.5mA ) 交流电,持续时间 60±5 S。 250VAC (leak current 0.5mA max )alternate current load is applied between terminal and metal cover, for 60±5S.	无击穿和飞弧现象。 No dielectric breakdown shall occur.

## 6.6 弹跳 Bounce

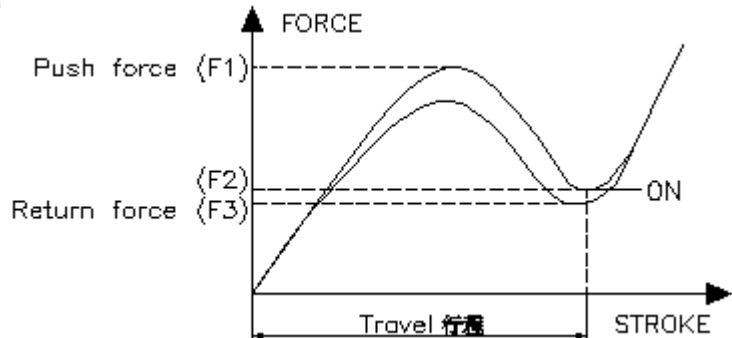
测试条件 Test Method/Condition	标准 Criteria
开关在正常的操作条件下 (3~4 次/秒), 测试通 断弹跳时间。 Lightly striking the center of the stem at a rate encountered in normal use (3 to 4 operations per sec.) bounce shall be tested at 'ON' and 'OFF'. 	5 m seconds max



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## 7. 机械性能 Mechanical Characteristics

### 7.1 操作力&回弹力 Operation force & Return force

测试条件 Test Method/Condition	标准 Criteria
在操作按钮末端沿操作方向均匀施加静载荷至行程末端,量测最大力度 A static load shall be applied to the tip of actuator in operating direction. Measure the maximum force during all the travel.	FP =160±30gf
在操作按钮末端沿操作方向均匀施加静载荷,量测按钮返回过程中最小力度 A static load shall be applied to the tip of actuator in operating direction. Measure the minimum force during actuator return.	FR =30gf min.
参考下面曲线图。 Refer to the nether graph. Click ratio = (F1-F2)/F1×100%	CR=40% min.
	

### 7.2 行程 Travels

测试条件 Test Method/Condition	标准 Criteria
开关发生转换后,操作组件末端与初始位置之间的距离。 Distance from the end of operating component to the start position when switch is being transformed	0.12±0.05mm



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### 7.3 操作件强度 Operating Part Strength

测试条件 Test Method/Condition	标准 Criteria
置开关于正常安装位置，向开关的操作方向施加 3Kgf 静负荷，时间为 15 S。 Put the switch in the normal gearing position, add static force of 3Kgf vertically to the center of push button for 15 seconds.	无机械和电气损伤。符合第 7.1 & 7.2 项要求。 The switch shall be free from abnormalities in electric and mechanism. According to item 7.1 & 7.2 to examine.

### 7.4 耐焊接热 Solder Heat Resistance

测试条件 Test Method/Condition	标准 Criteria
试件在下述条件下进行试验：焊槽试验：1) 焊接温度:300±5℃；2) 焊接时间:5±1 S；3) 熔锡面积：PCB 板厚度的一半 PCB: t=1.6) 。 Switch shall be checked after following test: Solder trough test: 1) Soldering temperature: 300±5℃；2) Soldering time:5±1S；3) Soldering area, t/2 of PCB thickness (PCB: t=1.6)	无机械和电气损伤。符合第 6.6 项要求。 The switch shall be free from abnormalities in electric and mechanism. According to item 6 .6 to examine.

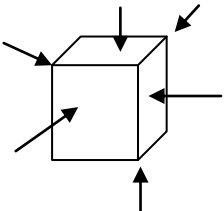
### 7.5 振动 Vibration Proof

测试条件 Test Method/Condition	标准 Criteria
开关采用常规安装方法牢固地安装在试验设备上，按下述参数进行试验： 1) 振频:10~55HZ 2) 振幅:1.52 mm 3) 振动变化速率:10~55~10HZ 大约 1 分钟 4) 变频方法:对数或线形方式 5) 振动方向:三个互相垂直的方向，其中一个方向为操作元件运动的方向 6) 时间：每个方向 2 小时（共 6 小时）。 Switch shall be secured to a testing machine by a normal mounting device and method, Switch shall be measured after following test: 1)Vibration frequency range:10~5HZ 2)Total amplitude:1.5mm 3) Sweep ratio:10~55~10Hz,Approx 1 minute 4) Method of changing the sweep vibration frequency : logarithmic or linear 5) Direction of vibration : Three perpendicular directions including actuating direction. 6) Duration : 2 hours(6hours in total)	无机械和电气损伤。符合第 6.3 - 6.6 项和第 7.1 - 7.2 项要求。 The switch shall be free from abnormalities in electric and mechanism. According to item 6.3 - 6.6 and item 7.1-7.2 to examine.

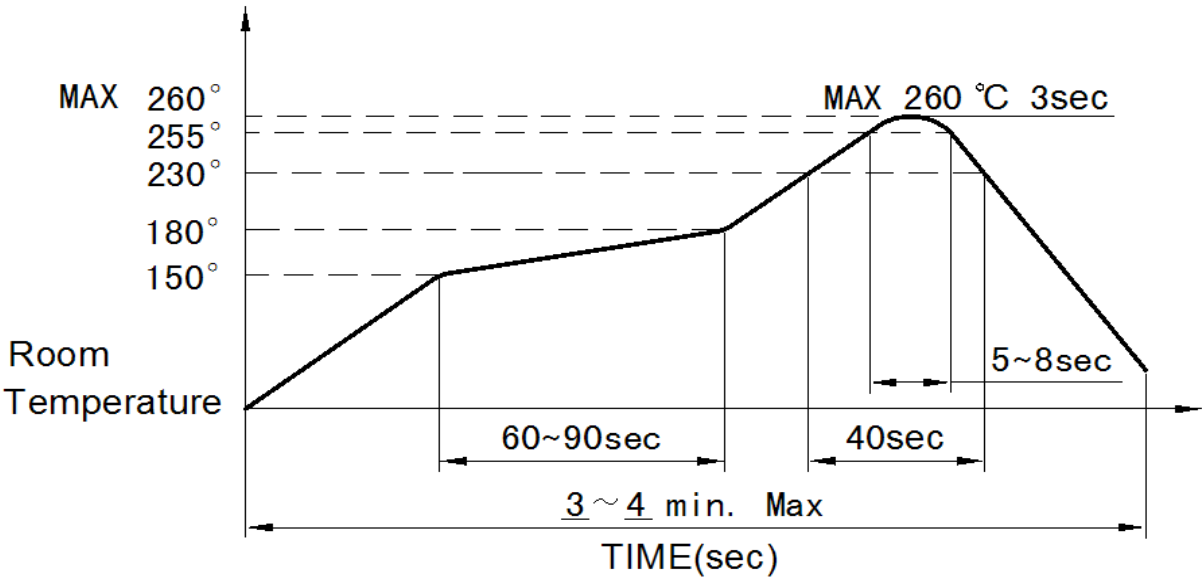


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## 7.6 冲击 Impact shock test

测试条件 Test Method/Condition	标准 Criteria
1) 加速度 Acceleration: $490\text{m/s}^2$ 2) 作用时间: 6ms 3) 冲击次数: 六个方向 3 次, 共 18 次 1) Acceleration: $490\text{m/s}^2$ 2) Acting time: 6ms 3) Cycle of test: 3 cycles each in 6 directions, for a total 18 cycles. 	无机械和电气损伤。符合第 6.3 - 6.6 项和第 7.1 - 7.2 项要求。 The switch shall be free from abnormalities in electric and mechanism. According to item 6.3 - 6.6 and item 7.1-7.2 to examine.

## 7.7 可焊性 Solder Ability

测试条件 Test Method/Condition	标准 Criteria
焊接温度参考如下 IR 图表 Soldering Temperature: SEE IR chart	除了端子的裁切面外, 所有样品的焊脚沾锡面积至少95%。 At least 95% of immersed area should be adequately wetted on all samples except on cutting edge of terminal.
	



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## 8 耐久性试验 Durability Characteristics

### 8.1 寿命试验 Operating Life

测试条件 Test Method/Condition	标准 Criteria
在额定负荷的条件下，在寿命测试设备上连续转换 200,000 次，频率:120 次/分钟，操作力为:300±100gf。 200,000 cycles of operation shall be performed continuously cycles with load at a rate of 120 cycles per minute, Push force: 300±100gf.	1) 动作力: 初始值的±30%。 Operating force : within ±30% initialization value. 2) 无机械和电气损伤。符合第 6.3 - 6.6 项和第 7.1 - 7.2 项要求。 The switch shall be free from abnormalities in electric and mechanism. According to item 6.3 - 6.6 and item 7.1-7.2 to examine.

## 9 耐候试验 Weather Proof Characteristics

### 9.1 耐低温 Resistance Low Temperature

测试条件 Test Method/Condition	标准 Criteria
试件在-40±2℃的温控箱内保持 96 小时，然后在正常温度和湿度下恢复 1 小时，并在此后的 1 小时内对试件进行测量，水滴应消失。 After testing at -40±2℃for 96hours, the switch shall be allowed to stand under normal temperature and humidity conditions for 1 hour, and measurement shall be made with 1 hour after that, water drops shall be eliminated.	无机械和电气损伤。符合第 6.3 - 6.6 项和第 7.1 - 7.2 项要求。 The switch shall be free from abnormalities in electric and mechanism. According to item 6.3 - 6.6 and item 7.1-7.2 to examine.



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## 9.2 耐热性 Heat Resistance

测试条件 Test Method/Condition	标准 Criteria
试件在 $85\pm 2^{\circ}\text{C}$ 的温控箱内保持 96 小时，然后在正常温度和湿度下恢复 1 小时，并在此后的 1 小时内对试件进行测量，水滴应消失。 After testing at $85\pm 2^{\circ}\text{C}$ for 96 hours the switch shall be allowed to stand under normal temperature and humidity conditions for 1 hour and measurement shall be made with 1 hour after that, water drops shall be eliminated.	无机械和电气损伤。符合第 6.3 - 6.6 项和第 7.1 - 7.2 项要求。 The switch shall be free from abnormalities in and mechanism. According to item 6.3 - 6.6 and 7.1 - 7.2 to examine.

## 9.3 恒定湿热 Humidity Resistance

Test Method/Condition	Requirement
试件在 $60\pm 2^{\circ}\text{C}$ , 90~95%RH 的温控箱内保持 96 小时，然后在正常温度和湿度下恢复 1 小时，并在此后的 1 小时内对试件进行测量，水滴应消失。 After testing at $60\pm 2^{\circ}\text{C}$ , 90-95%RH for 96 hours, the switch shall be allowed to stand under normal temperature and humidity conditions for 1 hour, and measurement shall be made within 1 hour after that. Water drops shall be eliminated.	无机械和电气损伤。符合第 6.3 - 6.6 项和第 7.1 - 7.2 项要求。 The switch shall be free from abnormalities in electric and mechanism. According to item 6.3 - 6.6 and item 7.1-7.2 to examine.

## 9.4 盐雾 Salt spray

测试条件 Test Method/Condition	标准 Criteria
1) 测试时间：48小时 2) 测试温度湿度： $35^{\circ}\pm 2^{\circ}\text{C}$ , 湿度 95~98% 3) Salt NaCl mist 5% 测试后用水冲洗连接器，然后放在室温下静置16小时 1) Time of test：48 hour 2) temp： $35^{\circ}\pm 2^{\circ}\text{C}$ R/H 95-98% 3) Salt NaCl mist 5% After test wash parts and return to room ambient for 16hours.	无机械和电气损伤。符合第 6.3 - 6.6 项和第 7.1 - 7.2 项要求。 The switch shall be free from abnormalities in electric and mechanism. According to item 6.3 - 6.6 and item 7.1-7.2 to examine.



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## 10 保护结构 Protection

### 10.1 防尘保护 Dust Protection

IP6X相当 IP6X equivalent

测试条件 Test Method/Condition	标准 Criteria
开关按下述参数条件进行试验: 1) 滑石粉量: 2 kg/m <sup>3</sup> 2) 测试时间: 8 h 3) 试验后, 试件外部粉尘应去除。 Switch shall be checked after following test: 1) Amount of talc: 2 kg/m <sup>3</sup> 2) Time of test: 8 h 3) Dusts shall be removed.	1) 开关内不能有粉尘浸入。 No penetration of dusts shall be found inside of switch. 2) 无机械和电气损伤。符合第 6.3 - 6.6 项和第 7.1 - 7.2 项要求。 The switch shall be free from abnormalities in electric and mechanism. According to item 6.3 - 6.6 and item 7.1-7.2 to examine.

### 10.2 防水保护 Water Protection

IPX8相当 IPX8 equivalent

测试条件 Test Method/Condition	标准 Criteria
开关按下述参数条件进行试验: 1) 浸泡深度: 1.5 m 2) 浸泡时间: 30 分钟 min 3) 试验后, 试件外部水滴应去除。 Switch shall be checked after following test: 1) Depth of immersion: 1.5 m 2) Duration of immersion : 30 minute min 3) Water drops shall be removed.	1) 开关内不能有明显的水渍浸入影响产品性能。 No outstanding penetration of water which effects the functionality. 2) 无机械和电气损伤。符合第 6.3 - 6.6 项和第 7.1 - 7.2 项要求。 The switch shall be free from abnormalities in electric and mechanism. According to item 6.3 - 6.6 and item 7.1-7.2 to examine.