# TK8021
# 1-key Touch Chip

# Product Specification

**Specification Revision History:**

| Version | Date | Description |
|---|---|---|
| 2020-07-A1 | 2020-07 | New |
| 2021-12-B1 | 2021-12 | Modify the content |
| 2022-03-B2 | 2022-03 | Modify the marking code and notes in the ordering information |
| 2023-01-B3 | 2023-01 | Modify the content |
| 2024-01-C1 | 2024-01 | Update the template; Modify the content |

# Contents

## 1、General Description

TK8021 is a 1-key touch chip, which has the advantages of high sensitivity, strong anti-interference ability, waterproof and dustproof, high reliability, etc., and can widely replace traditional mechanical keys. It is mainly used for key detection in household appliances, consumer electronics, industrial control and other fields.

**Features:**

- Single-channel touch key detection
- Supply voltage range: 2.1V to 5.5V
- Supply current: 1.4uA@$V_{DD}$=3V (Typ.)
- No key for 16 seconds enter low power mode
- Sensitivity can be adjusted by CLD capacitor (1nF to 22nF)
- active LOW
- Touch key long press time: 16s
- Packaging information: SOT23-6

**Ordering Information:**

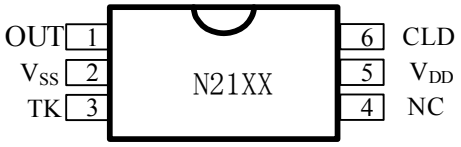
**Reel packing specifications:**

| Material number | Packaging form | Marking code | Reel quantity | Boxed reel quantity | Notes |
|---|---|---|---|---|---|
| TK8021NHGB236.TR | SOT23-6 | N21XX | 3000 PCS/reel | 30000 PCS/box | Dimensions of plastic enclosure: 2.9mm× 1.6mm Pin spacing:0.95mm |
| TK8021NNGB236.TR | SOT23-6 | T21XX | 3000 PCS/reel | 30000 PCS/box | Dimensions of plastic enclosure: 2.9mm× 1.6mm Pin spacing:0.95mm |

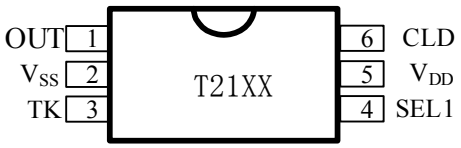
Note 1: “XX” refers to variable content, meaning year and package batch serial number.
Note 2: If the physical information is inconsistent with the ordering information, please refer to the actual product.

## 2、Block Diagram And Pin Description

### 2.1、Block Diagram




TK8021NH




TK8021NN

### 2.2、Pin Description

| Pin No. | Pin Name | I/O | Description |
|---|---|---|---|
| 1 | OUT | O | touch output, active LOW |
| 2 | $V_{SS}$ | P | ground |
| 3 | TK | I | touch input |
| 4 | NC | I | not connected |
| | SEL1 | I | SEL1 is connected to $V_{DD}$: OUT is a switch mode output<br>SEL1 is connected to $V_{SS}$: OUT is a key mode output |
| 5 | $V_{DD}$ | P | supply voltage |
| 6 | CLD | I/O | Touch sensitivity adjustment capacitor (1nF to 22nF) |

## 3、Electrical Parameter

### 3.1、Absolute Maximum Ratings

($T_{amb}$=25℃, unless otherwise specified)

| Characteristic | Symbol | Conditions | Value | Unit |
|---|---|---|---|---|
| supply voltage | $V_{DD}$ | - | $V_{SS}$-0.3 to $V_{SS}$+5.5 | V |
| input voltage | $V_I$ | - | $V_{SS}$-0.3 to $V_{DD}$+0.3 | V |
| operating temperature | $T_{amb}$ | - | -40 to +85 | ℃ |
| storage temperature | $T_{stg}$ | - | -65 to +150 | ℃ |
| soldering temperature | $T_L$ | 10s | 260 | ℃ |

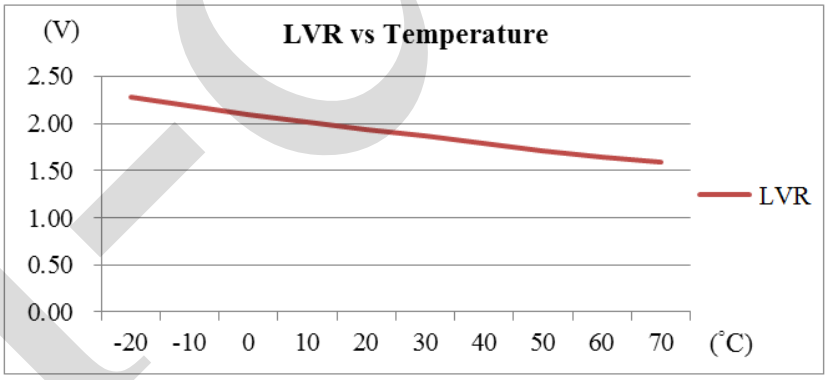
### 3.2、Electrical Characteristics

#### 3.2.1、DC Characteristics

($T_{amb}$=25℃, unless otherwise specified)

| Parameter | Symbol | Conditions | | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|---|---|
| HIGH-level input voltage | $V_{IH}$ | input port | - | 0.8$V_{DD}$ | - | - | V |
| LOW-level input voltage | $V_{IL}$ | | | - | - | 0.2$V_{DD}$ | V |
| port source current | $I_{OH}$ | output port | $V_{DD}$=3.0V $V_{OH}$=2.7V | - | 5 | - | mA |
| | | | $V_{DD}$=5.0V $V_{OH}$=4.5V | - | 10 | - | mA |
| port sink current | $I_{OL}$ | output port | $V_{DD}$=5.0V $V_{OL}$=0.3V | - | 11 | - | mA |
| | | | $V_{DD}$=5.0V $V_{OL}$=0.5V | - | 20 | - | mA |
| supply current (normal mode) | $I_{DD}$ | LVR=1.9V | $V_{DD}$=5.0V | - | 5.7 | - | uA |
| | | LVR=1.9V | $V_{DD}$=3.0V | - | 1.7 | - | |
| supply current (low power mode) | $I_{DD}$ | LVR=1.9V | $V_{DD}$=5.0V | - | 4.5 | - | uA |
| | | LVR=1.9V | $V_{DD}$=3V | - | 1.2 | - | |
| time-out preparation time | $T_{LT}$ | LVR=1.9V | $V_{DD}$=3 to 5V | - | 16/64 | — | S |
| Low voltage reset voltage | $V_{LVR}$ | - | | 1.7 | 1.9 | 2.1 | V |

## 4、Characteristic Curve

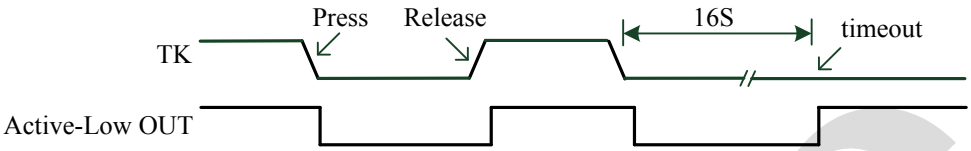


## 5、Function Description

### 5.1、Key Output

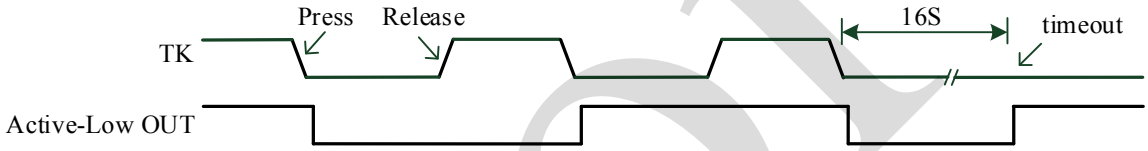
This mode requires SEL1 of TK8021NNGB236 to be connected to $V_{SS}$. TK8021NHGB236 only works in key mode output.

When the touch key is pressed, the OUT output signal flips, and when the key is released, the output signal resumes. It is suitable for replacing ordinary keys. The waveform of the Key output is as follows:




### 5.2、Switch Output

This mode requires SEL1 of TK8021NNGB236 to be connected to $V_{DD}$, each time the touch key is pressed, the OUT output signal flips once. It is suitable for replacing ordinary switches. The waveform of the switch output is as follows:




### 5.3、Touch Sensitivity Adjustment

The sensitivity of the touch key can be adjusted by the capacitance C1 of the CLD port. The adjustment range is 1nF to 22nF. The larger the capacitance, the higher the sensitivity.

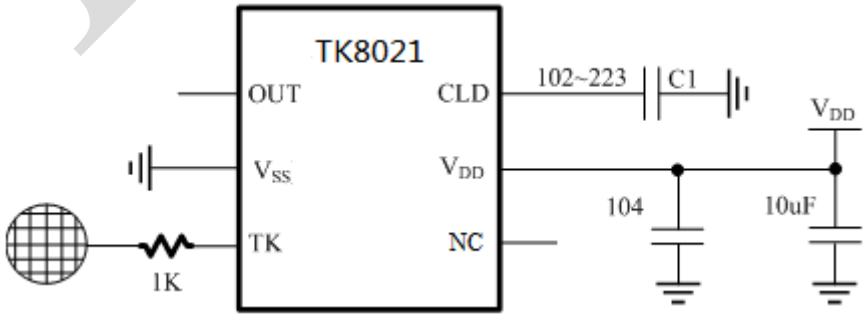
### 5.4、Touch The Key For The Maximum Time

Long press of any touch key for more than 16s, the chip will be pressed to reset.

### 5.5、Normal Mode and Low Power Mode

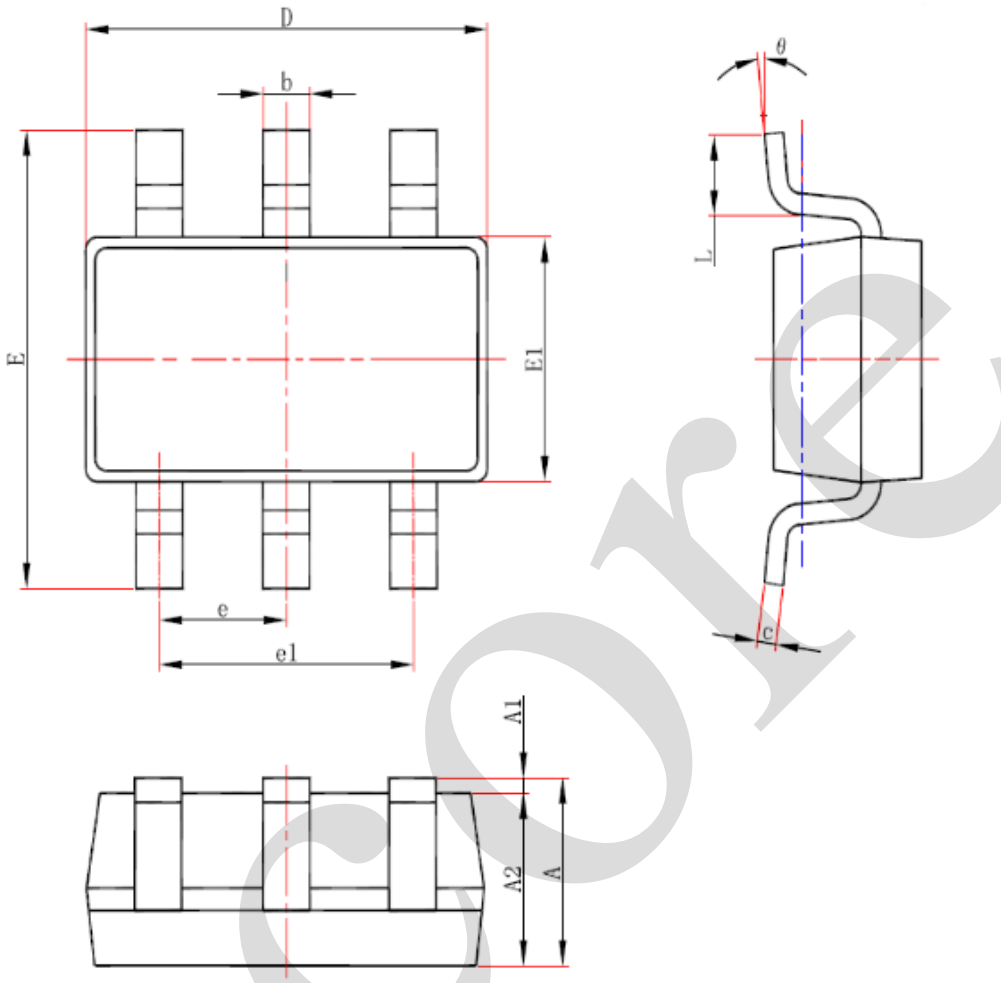
Chip reset is to operate in normal mode. When there is no trigger within 16s, the chip will chip will switch to low power mode. After the chip detects the change in the capacitance of the TK pin , it will return from the low power mode to the normal mode.

## 6、Typical Application Circuit And Application Note



## 7、Package Information

### 7.1、SOT23-6




| Symbol | Dimensions (mm) | |
|---|---|---|
| | Min. | Max. |
| A | - | 1.25 |
| A1 | 0.00 | 0.12 |
| A2 | 1.00 | 1.20 |
| b | 0.30 | 0.50 |
| c | 0.10 | 0.20 |
| D | 2.82 | 3.02 |
| E | 2.60 | 3.00 |
| E1 | 1.50 | 1.70 |
| e | 0.95 | |
| e1 | 1.80 | 2.00 |
| L | 0.30 | 0.60 |
| θ | 0° | 8° |

## 8、Statements And Notes

### 8.1、The name and content of Hazardous substances or Elements in the product

| Part name | Hazardous substances or Elements | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Lead and lead compounds | Mercury and mercury compounds | Cadmium and cadmium compounds | Hexavalent chromium compounds | Polybrominated biphenyls | Polybrominated biphenyl ethers | Dibutyl phthalate | Butylbenzyl phthalate | Di-2-ethylhexyl phthalate | Diisobutyl phthalate |
| Lead frame | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| Plastic resin | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| Chip | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| The lead | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| Plastic sheet installed | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| explanation | ○：Indicates that the content of hazardous substances or elements in the detection limit of the following the SJ/T11363-2006 standard.<br>×：Indicates that the content of hazardous substances or elements exceeding the SJ/T11363-2006 Standard limit requirements. | | | | | | | | | |

### 8.2、Notes

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