

### ◆ Description

**SK080G** is a 80 Sec Easy Use Speech IC .It Support PWM or DAC voice output with high quality speech , There are 80 second Voice Length under 6 KHz sampling and 4 bit hardware compression. Its internal built-in a oscillator for system clock **without an external resistor**. Maximum 63 voice groups. One Group contain several steps(voice section ); **Maximum 700 steps** for all the Groups. **Each Step** can be define **Trigger Mode, Output Status, Voice Section, Mute length, I/O Type** & **Simple Programming Function**. User can select **8bit / 5bit / 4bit** data compression. **Support three mode trigger IC** (Stand Alone, Serial Trigger Mode, CPU Command Mode ). Easy use development system is for function selection and voice combination . PC download the ROM code by the USB Port .

## ◆ Functions

- MAX voice file : 700
- MAX Trigger Groups : 63
- Power On Trigger Group :1
- MAX Step : 700
- Signal step mute length : 0.64 s ( 6k sample rate )
- Operating Voltage range: 2.4V ~ 3.6V
- Total Voice Duration : 80'' (120K Samples)
- I/O pin : 4
- Voice output : PWM or DAC
- Sequential Key : TG1 -> 32 Groups.  
                                TG2 -> 29 Groups.  
                                TG3,TG4-> 1 Group
- Debounce time : 50 us or 10 ms
- On/Off function : only for all TG PIN
- Sequential Key for Volume control function.
- Step can change Trigger I/O Type, Trigger Mode & Output Status.
- Hardware Trigger Group Repeat function.
- **Simple Programming Function :**
  - (a) Write data to working register.
  - (b) Working Register Increasing.
  - (c) Step Jump by Working Register / Volume Status.

- **Three Mode Trigger IC :**

- Key Stand-alone Trigger Mode :
  - A. Edge/Level
  - B. Hold/Unhold
  - C. Retrigger/Irretrigger
- Serial Trigger Mode :  
Combinations of TG1 and TG2 to trigger maximum 63 Voice Group.
- CPU Command Mode :  
User command through TG1,TG2,TG3 & TG4 with serial CPU Interface to control the Multi-Playback function.

- **Output status** (for each Output pin):

- A. Stand by Status. (High/Low Status)
- B. Busy Low Active.
- C. Busy High Active.
- D. LED Flash at 6 Hz.
- E. LED Flash at 3 Hz.
- F. LED Flash at 1.5 Hz.
- G. LED Flash at 0.75 Hz.

***H. PWM for LED Dimming Control.***

- **Play rate level :**

SK080G can provide different play rate in one code as follow below  
Reference Sample Rate.

3K, 3.2K, 3.31K, 3.42K, 3.55K, 3.69K, 3.84K, 4K, 4.17K, 4.36K, 4.57K,  
4.8K, 5.05K, 5.33K, 5.64K, 6K, 6.4K, 6.85K, 7.38K, 8K, 8.72K, 9.6K,  
10.66K, 12K, 13.71K, 16K, 19.2K, 24K.

- **TG2 Low Reset**

- **TG3 Volume Control**

## ◆ SK080G Pad Location

CHIP SIZE= X : 1721um Y : 1003um

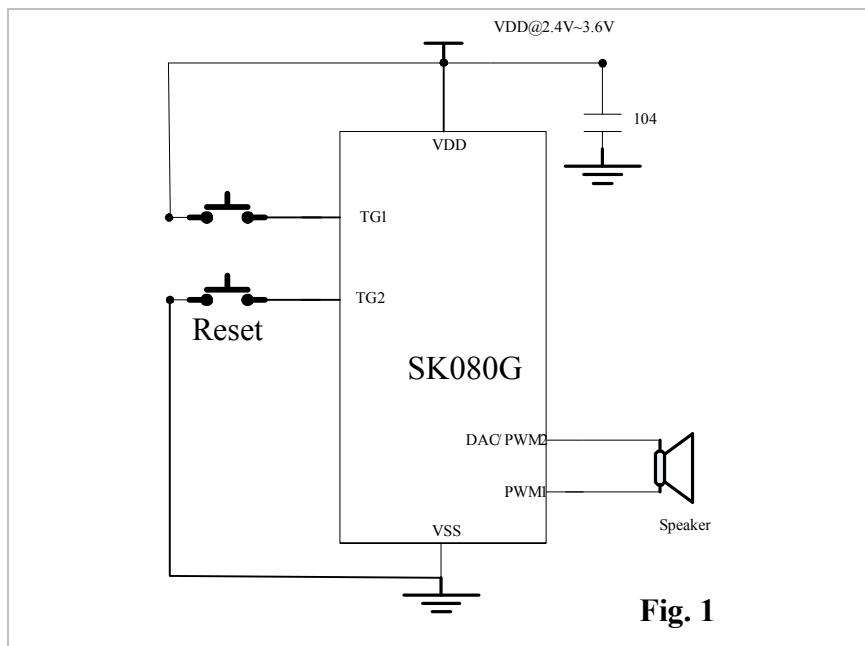


| NO. | PAD NAME | X    | Y    | NO. | PAD NAME | X   | Y    |
|-----|----------|------|------|-----|----------|-----|------|
| 1   | TG2/RSTB | -770 | -328 | 6   | VSS      | 433 | -410 |
| 2   | TG1      | -770 | -414 | 7   | PWM1     | 787 | -432 |
| 3   | TG3      | -599 | -411 | 8   | VDD      | 790 | -348 |
| 4   | TG4      | -514 | -411 | 9   | PWM2     | 787 | -263 |
| 5   | VSS      | 250  | -415 |     |          |     |      |

## ◆ PIN Descriptions

| PIN NAME        | I/O    | Function                                                                                                  |
|-----------------|--------|-----------------------------------------------------------------------------------------------------------|
| <b>TG1</b>      | INPUT  | Key Stand-alone Trigger Mode : TG1 is used to trigger the maximum 32 Voice Group one by one sequentially. |
|                 |        | Serial Trigger Mode : TG1 is used to trigger the maximum 63 Voice Group.                                  |
|                 |        | CPU Command Mode : TG1 is used as Data Input Pin (CS).                                                    |
|                 | OUTPUT | As Output PIN , Output the BUSY or Flash Signal ./By Code Control                                         |
| <b>TG2/RSTB</b> | INPUT  | Key Stand-alone Trigger Mode : TG2 is used to trigger the maximum 21 Voice Group one by one sequentially. |
|                 |        | Serial Trigger Mode : TG2 is used to trigger the maximum 29 Voice Group                                   |
|                 |        | CPU Command Mode : TG2 is used as Clock Pin (CLK).                                                        |
| <b>TG3</b>      | INPUT  | Key Stand-alone Trigger Mode : TG11 is used trigger Only One Group.                                       |
|                 |        | CPU Command Mode : TG11 is used as Data Input Pin (DIO1).                                                 |
|                 | OUTPUT | As Output PIN , Output the BUSY or Flash Signal ./By Code Control                                         |
| <b>TG4</b>      | INPUT  | Key Stand-alone Trigger Mode : TG4 is used trigger Only One Group.                                        |
|                 |        | CPU Command Mode . TG4 is used as Selected Pin (DIO2).                                                    |
|                 | OUTPUT | As Output PIN , Output the BUSY or Flash Signal./By Code Control                                          |
| <b>PWM1</b>     | OUTPUT | As a PWM PIN , can Directly drive the Speaker .                                                           |
| <b>PWM2</b>     | OUTPUT | As a PWM PIN , can Directly drive the Speaker .                                                           |
|                 |        | As a DAC PIN , 8 bit D/A Current Output.                                                                  |
| <b>VDD</b>      | INPUT  | Power Supply PIN , @ 2.4~3.6 V Working Voltage.                                                           |
| <b>VSS</b>      | INPUT  | Connected to Ground.                                                                                      |

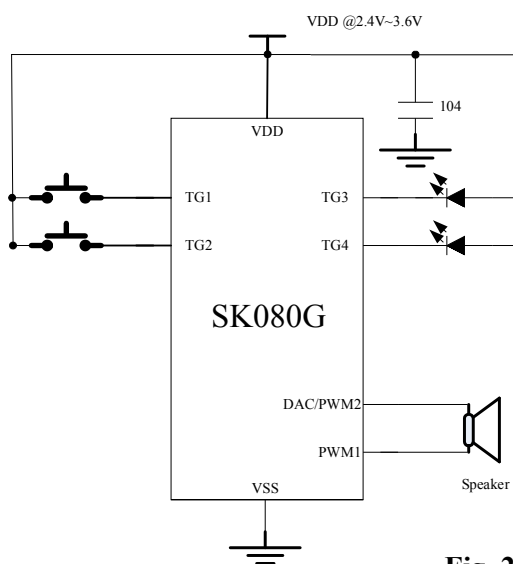
## ◆ TG2 Low Reset



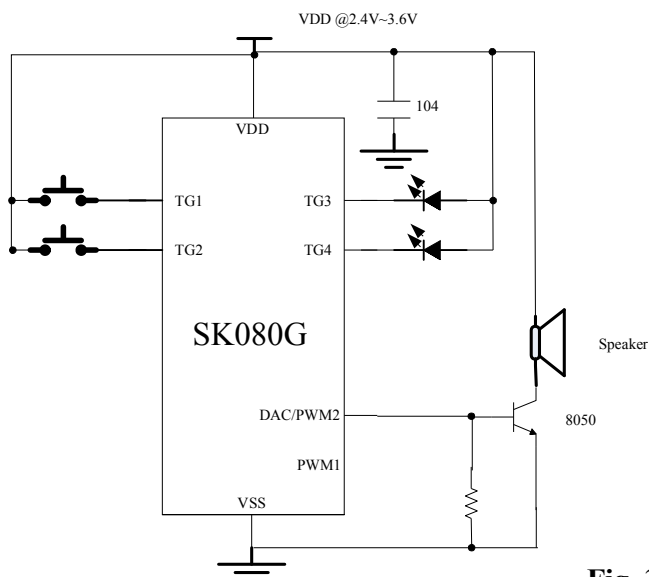
## ◆SK080G Application Circuit

### SK080G 3V Standalone Mode

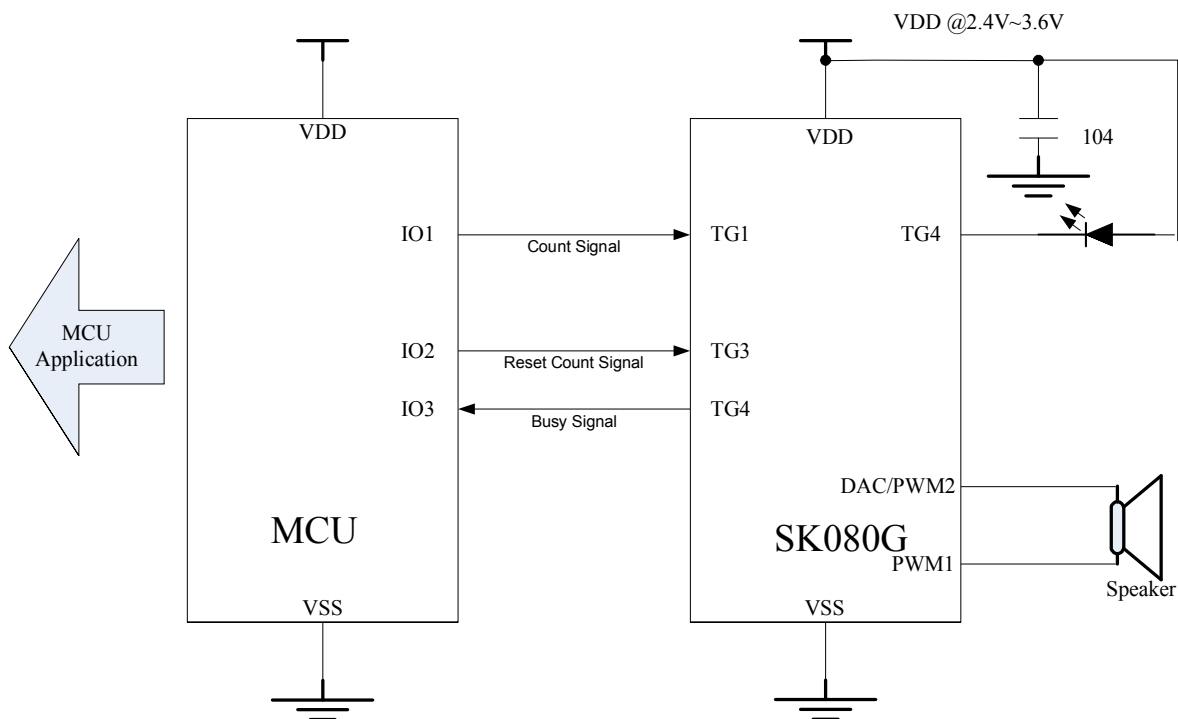
*PWM*



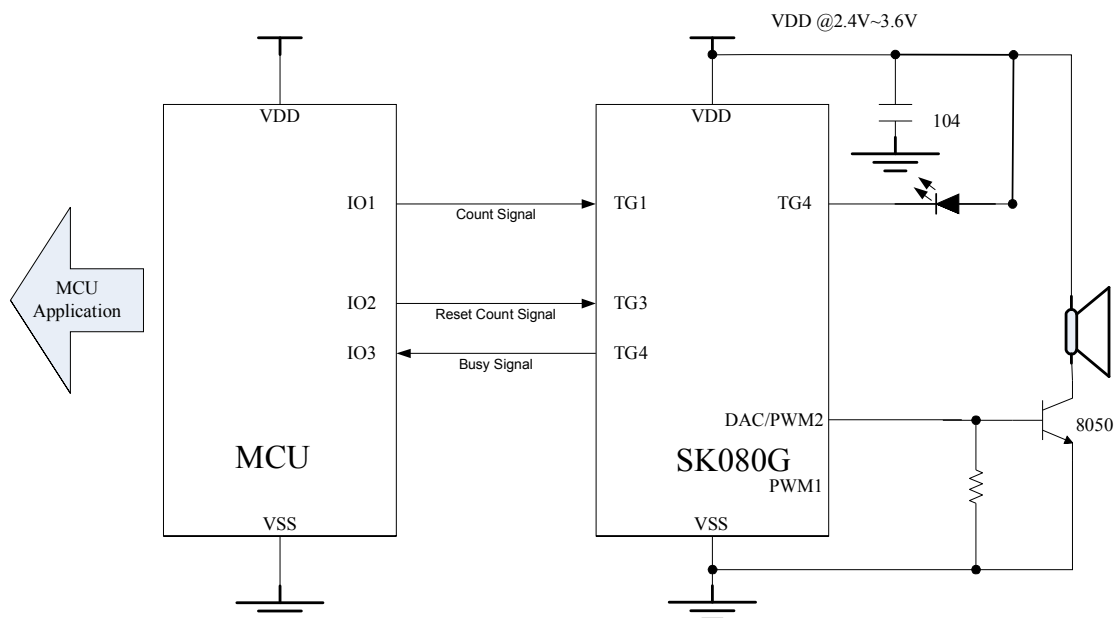
*DAC*



## SK080G 3V Serial Mode

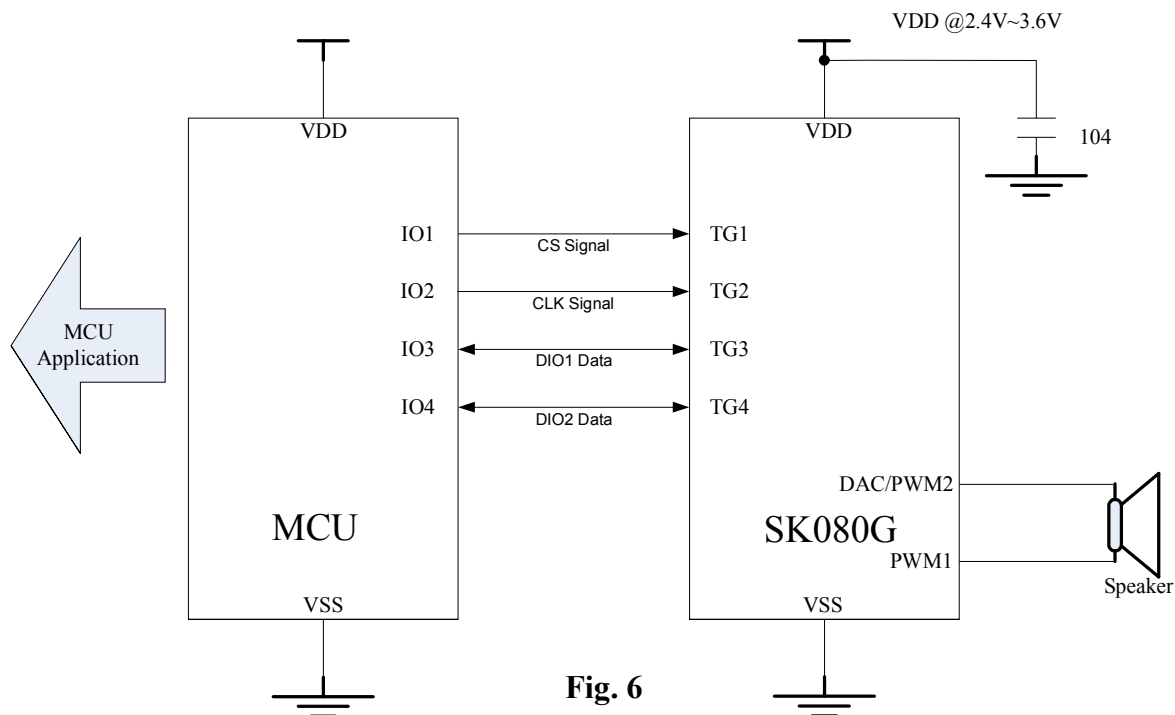


**Fig. 4**

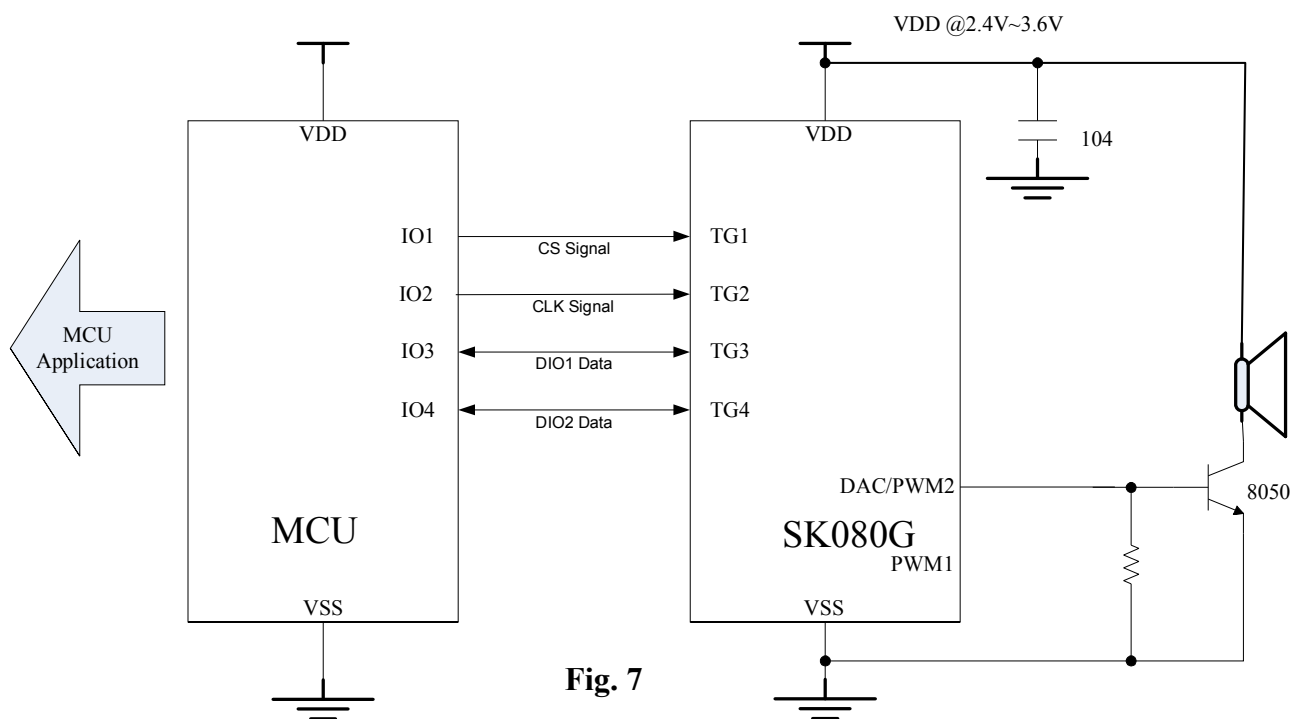


**Fig. 5**

**SK080G 3V CPU Mode**



**Fig. 6**

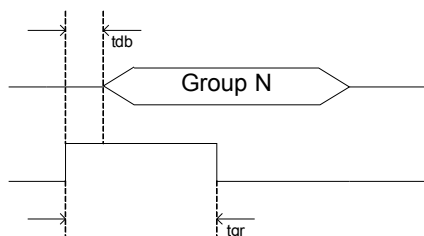


**Fig. 7**

## ◆ SK080G Trigger Timing

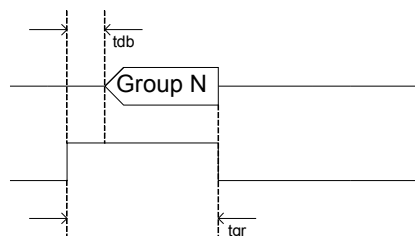
(a) Trigger Pulse Width < Group Length

Option Setting = Edge / Unhold



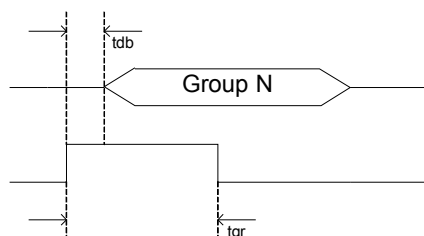
(b) Trigger Pulse Width < Group Length

Option Setting = Edge / Hold



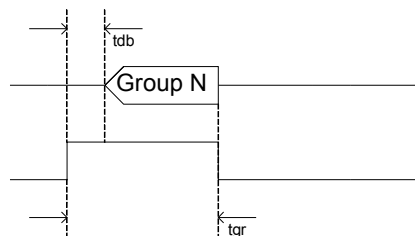
(c) Trigger Pulse Width < Group Length

Option Setting = Level / Unhold



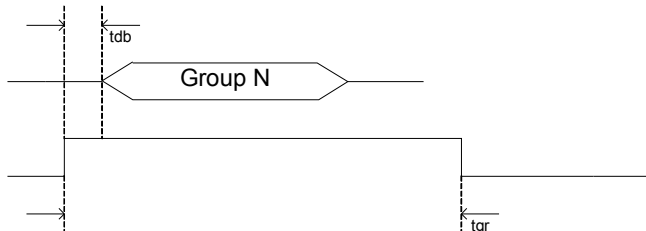
(d) Trigger Pulse Width < Group Length

Option Setting = Level / Hold



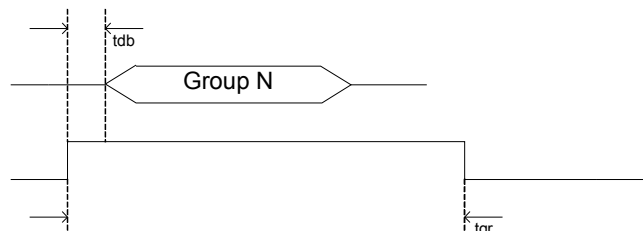
(e) Trigger Pulse Width > Group Length

Option Setting = Edge / Unhold



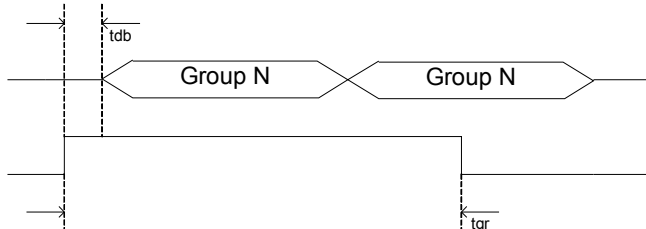
(f) Trigger Pulse Width > Group Length

Option Setting = Edge / Hold



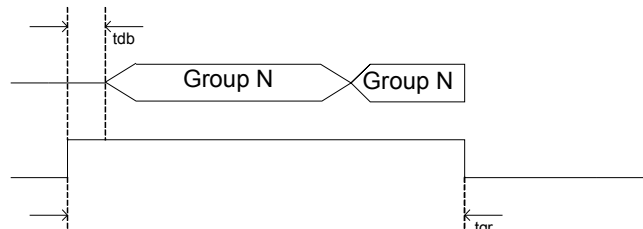
(g) Trigger Pulse Width > Group Length

Option Setting = Level / Unhold



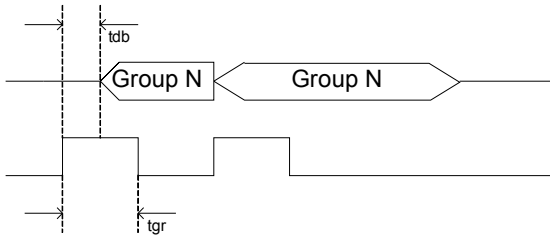
(h) Trigger Pulse Width > Group Length

Option Setting = Level / Hold

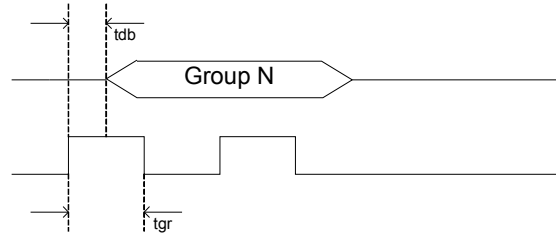




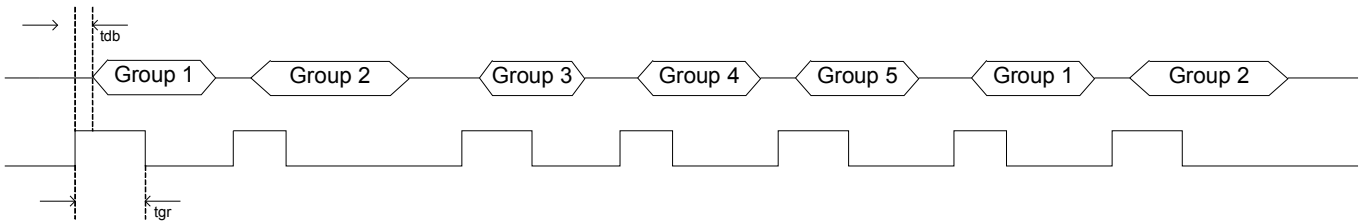
(i) Option Setting = Retrigger



(j) Option Setting = Irretrigger



(k) TG1 = Sequential Trigger & From Group1~Group5



## ◆ SK080G Trigger Voice Combination Example

| Voice File   | Description        |
|--------------|--------------------|
| Voice File A | Hello ( 1.5'')     |
| Voice File B | Good Morning (3'') |
| Voice File C | John (1'')         |
| Voice File D | Tom (1'')          |
| Voice File E | Mary (1.5'')       |
|              |                    |
|              |                    |

Group1 = Step1 + Step 2

Group 2 = Step3 + Step 4 + Step 5

Group 3 = Step 6 + Step 7

Group1 = Hello John

Group 2= Hello Tom Good Morning

Group 3 = Good Morning Mary

Step1 = Voice File A

Step 2 = Voice File C

Step 3 = Voice File A

Step 4 = Voice File D

Step 5 = Voice File B

Step 6 = Voice File B

Step 7 = Voice File E

Total use 3 Group , 7 Steps

Voice duration= Hello + Good Morning + John + Tom + Mary

= 1.5'' + 3'' + 1'' + 1'' + 1.5''

= 8''

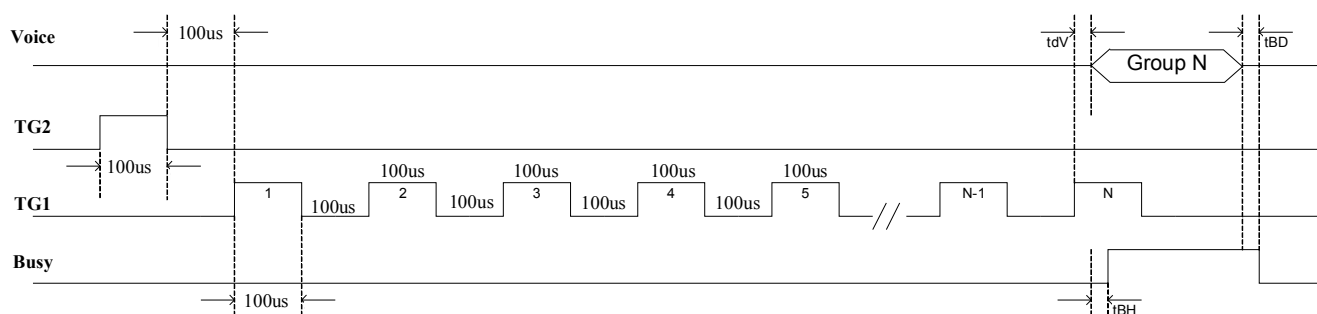
Total duration = 8'' ( 20''-8'' = 32'' space are free , can add more Voice File )

## ◆ SK080G Serial Mode Timing

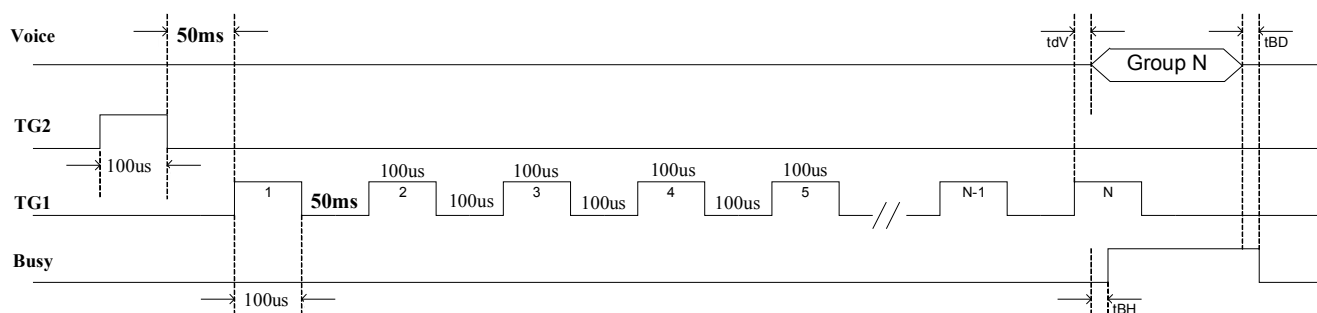
TG1=Edge/Unhold/Retrigger

TG3=Reset PIN

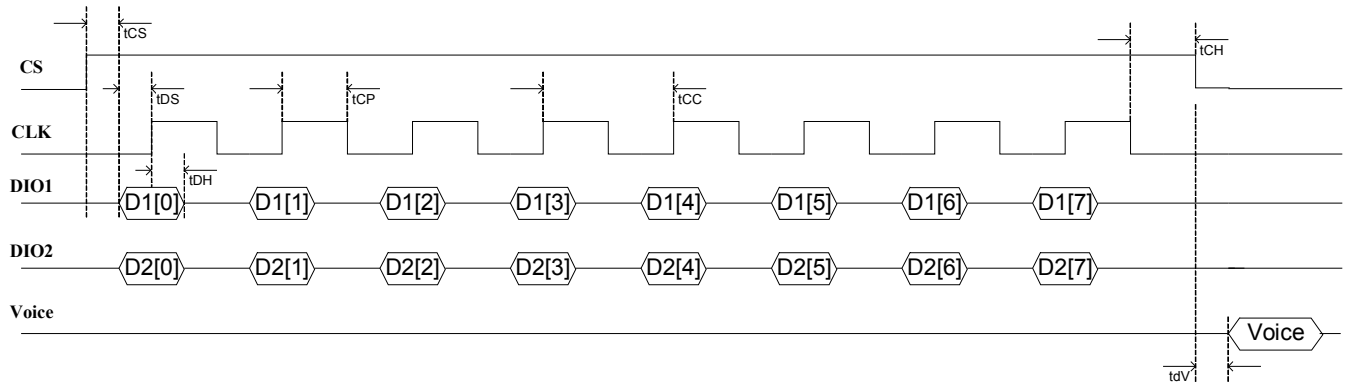
### ● PWM



### ● DAC



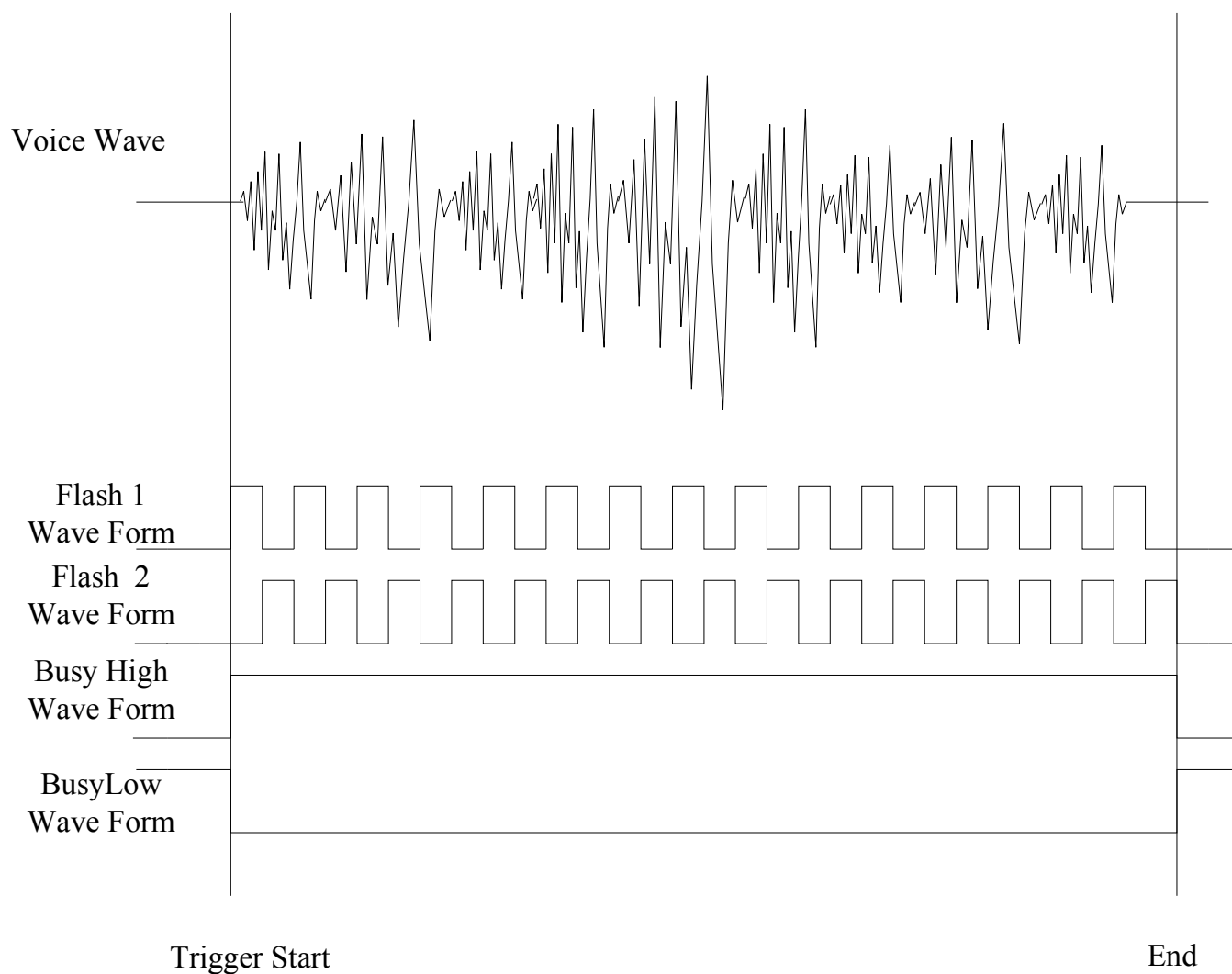
## ◆ SK080G CPU Mode Timing



| Command | PIN  | HEX | [7] | [6] | [5] | [4] | [3] | [2] | [1] | [0] | Description                                   |
|---------|------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----------------------------------------------|
| START   | DIO1 | A5h | 1   | 0   | 1   | 0   | 0   | 1   | 0   | 1   | Wake up the chip                              |
|         | DIO2 | 05h | 0   | 0   | 0   | 0   | 0   | 1   | 0   | 1   |                                               |
| END     | DIO1 | 81h | 1   | 0   | 0   | 0   | 0   | 0   | 0   | 1   | Power down the chip into standby status       |
|         | DIO2 | 05h | 0   | 0   | 0   | 0   | 0   | 1   | 0   | 1   |                                               |
| RESET   | DIO1 | 83h | 1   | 0   | 0   | 0   | 0   | 0   | 1   | 1   | Stop the Playback and wait a new command      |
|         | DIO2 | 02h | 0   | 0   | 0   | 0   | 0   | 0   | 1   | 1   |                                               |
| PAUSE   | DIO1 | 83h | 1   | 0   | 0   | 0   | 0   | 1   | 0   | 1   | Pause the Playback and hold at the Voice data |
|         | DIO2 | 07h | 0   | 0   | 0   | 0   | 0   | 1   | 1   | 1   |                                               |
| RESUME  | DIO1 | 05h | 0   | 0   | 0   | 0   | 0   | 1   | 0   | 1   | Resume Playback from the previous Voice data  |
|         | DIO2 | 07h | 0   | 0   | 0   | 0   | 0   | 1   | 1   | 1   |                                               |

**Play** Address Command is generated by the Tool.

## ◆ SK080G Voice Wave & Output Status



## ◆ DC Electrical Characteristics

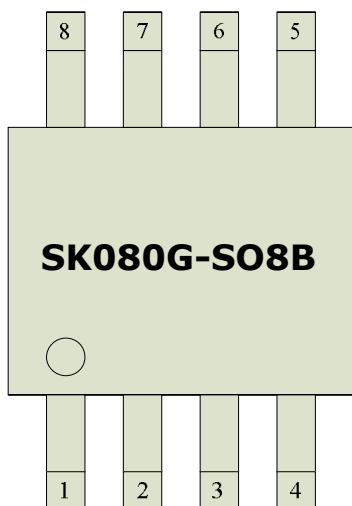
| Item                    | Symbol          | Min | Typ        | Max | Unit | Condition           |
|-------------------------|-----------------|-----|------------|-----|------|---------------------|
| Operating voltage       | VDD             | 2.4 | <b>3.0</b> | 3.6 | V    |                     |
| Standby current         | I <sub>sb</sub> |     | <b>1</b>   | 5   | uA   | VDD=3V,no load      |
| Operating current       | I <sub>op</sub> |     | <b>600</b> |     | uA   | VDD=3V,no load      |
| Drive current of Output | I <sub>od</sub> |     | <b>10</b>  |     | mA   | VDD=3V<br>VOUT=0.6V |
| Sink current of Output  | I <sub>os</sub> |     | <b>30</b>  |     | mA   | VDD=3V<br>VOUT=2.4V |
| Drive current of PWM    | I <sub>od</sub> |     | <b>200</b> |     | mA   | VDD=3V,VOUT=1.5V    |
| Sink current of PWM     | I <sub>os</sub> |     | <b>200</b> |     | mA   | VDD=3V,VOUT=1.5V    |
|                         |                 |     |            |     |      |                     |

## ◆ AC Electrical Characteristics

| Symbol | Characteristic                    | Rating |      |      | Unit |
|--------|-----------------------------------|--------|------|------|------|
|        |                                   | Min.   | Typ. | Max. |      |
| tdb    | Key Trigger debounce time (long)  | 14     |      |      | ms   |
| tdb    | Key Trigger debounce time (short) | 50     |      |      | us   |
| tBH    | Busy signal output hold time      | 200    |      |      | us   |
| tBD    | Busy signal output delay time     | 200    |      |      | us   |
| tdV    | Voice output delay time           | 200    |      |      | us   |
| tCS    | Chip Select setup time            | 1      |      |      | us   |
| tDS    | Data In setup time                | 1      |      |      | us   |
| tDH    | Data In hold time                 | 1      |      |      | us   |
| tCP    | Clock Pulse Width                 | 1      |      |      | us   |
| tCC    | Clock Cycle time                  | 2      |      |      | us   |
| tCH    | Chip Select hold time             | 1      |      |      | us   |

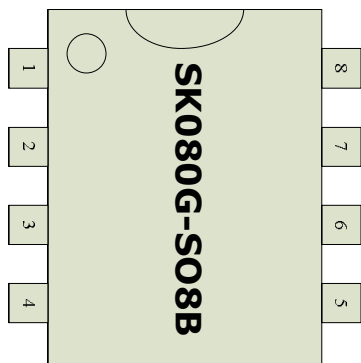
## ◆ SK080G Package Information

### SK080G-SO8B



| PIN | NAME     |
|-----|----------|
| 1   | TG2/RSTB |
| 2   | TG1      |
| 3   | TG3      |
| 4   | TG4      |
| 5   | VSS      |
| 6   | PWM1     |
| 7   | VDD      |
| 8   | PWM2/DAC |

### SK080G-DO8B



| PIN | NAME     |
|-----|----------|
| 1   | TG2/RSTB |
| 2   | TG1      |
| 3   | TG3      |
| 4   | TG4      |
| 5   | VSS      |
| 6   | PWM1     |
| 7   | VDD      |
| 8   | PWM2/DAC |



## ◆ Writer Mapping Description

**Writer Pin : TG2,TG1,TG3,TG4,PWM1,VDD,VSS**

| OTP Writer Power Board Pin Mapping Table |           |            |            |            |
|------------------------------------------|-----------|------------|------------|------------|
| DIP 20                                   | DIP 48    | PAD Name   | TG005-S08B | TG005-D08B |
| 1 – VPP                                  | 37 – VPP  | 1-TG2/RSTB | 1-TG2/RSTB | 1-TG2/RSTB |
| 2 – DIO1                                 | 38 – DIO1 | 3-TG3      | 3-TG3      | 3-TG3      |
| 3 – DIO2                                 | 39 – DIO2 | 4-TG4      | 4-TG4      | 4-TG4      |
| 4 – GND                                  | 11 – GND  | 5,6-VSS    | 5-VSS      | 5-VSS      |
| 5 - TEST                                 | X         | X          | X          | X          |
| 17 – RSTN                                | 10 – RSTN | X          | X          | X          |
| 18 – CLK                                 | 12 – CLK  | 7-PWM1     | 6-PWM1     | 6-PWM1     |
| 19 – CS                                  | 13 – CS   | 2-TG1      | 2-TG1      | 2-TG1      |
| 20 – VCC                                 | 14 – VCC  | 8-VDD      | 7-VDD      | 7-VDD      |

## ◆ Writer Board Slot Location (DIP20)

