

## ◆ Description

**SK080H** 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: 2.5V ~ 4.5V
- Total Voice Duration : 80" (120K Samples)
- I/O pin : 12
- Voice output : PWM or DAC
- Sequential Key : TG1 -> 32 Groups.  
                                  TG2 -> 29 Groups.  
                                  TG3~TG12-> 1 Group
- Debounce time : 50 us or 10 ms
- On/Off function : only for all TH 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 with SPI 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 :**

SK080H 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

## ◆ SK080H Pad Location



CHIP SIZE: (0, 0) (1840,2008) UM

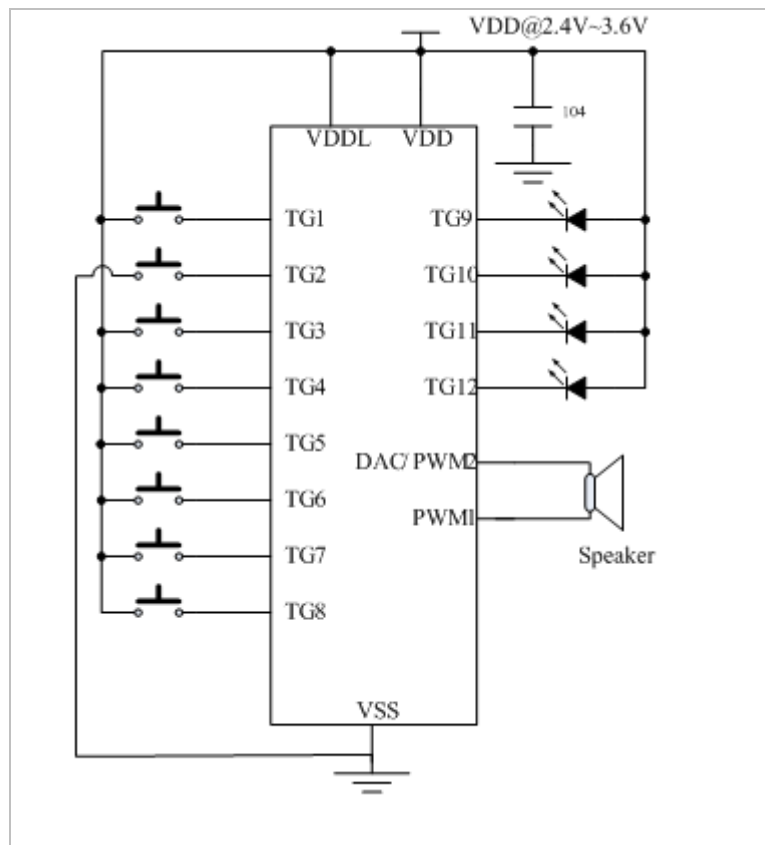
| NO. | PAD NAME | X    | Y    | NO. | PAD NAME | X    | Y    |
|-----|----------|------|------|-----|----------|------|------|
| 1   | TG2/RSTB | -831 | -539 | 10  | TG10     | -265 | -915 |
| 2   | TG1      | -831 | -630 | 11  | TG11     | -175 | -915 |
| 3   | TG3      | -831 | -720 | 12  | TG12     | -85  | -915 |
| 4   | TG4      | -831 | -810 | 13  | VSS      | 192  | -903 |
| 5   | TG5      | -831 | -900 | 14  | VSS      | 338  | -903 |
| 6   | TG6      | -625 | -915 | 15  | PWM1     | 809  | -929 |
| 7   | TG7      | -535 | -915 | 16  | PWM2/DAC | 810  | -806 |
| 8   | TG8      | -445 | -915 | 17  | VDD      | 844  | -718 |
| 9   | TG9      | -355 | -915 | 18  | VDDL     | 844  | -633 |

## ◆ SK080H PIN Description

| 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 (DI).                                                    |
|                 | OUTPUT | As Output PIN , Output the BUSY or Flash Signal.                                                          |
| <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 31 Voice Group                                   |
|                 |        | CPU Command Mode : TG2 is used as Clock Pin (SCK).                                                        |
| <b>TG3</b>      | INPUT  | Key Stand-alone Trigger Mode : TG3 is used trigger Only One Group.                                        |
|                 |        | CPU Command Mode : TG3 is used as Clock Pin (DO).                                                         |
|                 | OUTPUT | As Output PIN , Output the BUSY or Flash Signal.                                                          |
| <b>TG4</b>      | INPUT  | Key Stand-alone Trigger Mode : TG4 is used trigger Only One Group.                                        |
|                 | OUTPUT | As Output PIN , Output the BUSY or Flash Signal.                                                          |
| <b>TG5</b>      | INPUT  | Key Stand-alone Trigger Mode : TG5 is used trigger Only One Group.                                        |
|                 | OUTPUT | As Output PIN , Output the BUSY or Flash Signal.                                                          |
| <b>TG6</b>      | INPUT  | Key Stand-alone Trigger Mode : TG6 is used trigger Only One Group.                                        |
|                 | OUTPUT | As Output PIN , Output the BUSY or Flash Signal.                                                          |
| <b>TG7</b>      | INPUT  | Key Stand-alone Trigger Mode : TG7 is used trigger Only One Group.                                        |
|                 | OUTPUT | As Output PIN , Output the BUSY or Flash Signal.                                                          |
| <b>TG8</b>      | INPUT  | Key Stand-alone Trigger Mode : TG8 is used trigger Only One Group.                                        |
|                 | OUTPUT | As Output PIN , Output the BUSY or Flash Signal.                                                          |
| <b>TG9</b>      | INPUT  | Key Stand-alone Trigger Mode : TG9 is used trigger Only One Group.                                        |
|                 | OUTPUT | As Output PIN , Output the BUSY or Flash Signal.                                                          |
| <b>TG10</b>     | INPUT  | Key Stand-alone Trigger Mode : TG10 is used trigger Only One Group.                                       |
|                 | OUTPUT | As Output PIN , Output the BUSY or Flash Signal.                                                          |
| <b>TG11</b>     | INPUT  | Key Stand-alone Trigger Mode : TG11 is used trigger Only One Group.                                       |
|                 | OUTPUT | As Output PIN , Output the BUSY or Flash Signal.                                                          |
| <b>TG12</b>     | INPUT  | Key Stand-alone Trigger Mode : TG12 is used trigger Only One Group.                                       |
|                 | OUTPUT | As Output PIN , Output the BUSY or Flash Signal.                                                          |

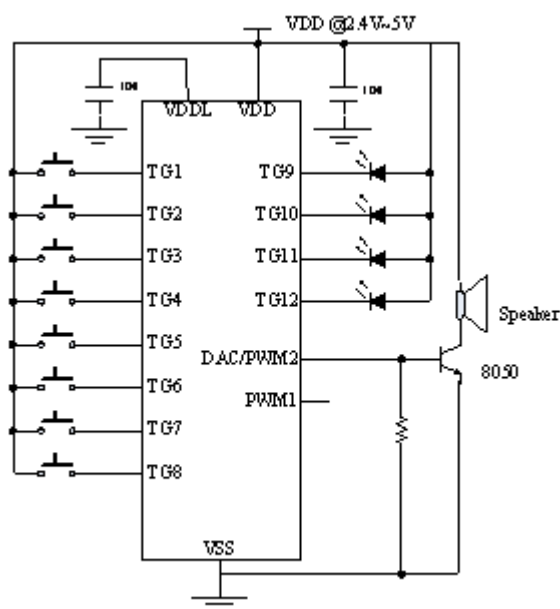
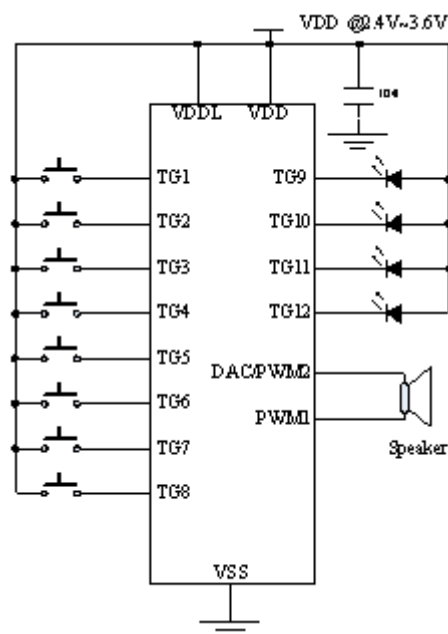
|             |        |                                                                             |
|-------------|--------|-----------------------------------------------------------------------------|
| <b>PWM2</b> | OUTPUT | As a PWM PIN , can Directly drive the Speaker .                             |
|             |        | As a DAC PIN , 8 bit D/A Current Output.                                    |
| <b>PWM1</b> | OUTPUT | As a PWM PIN , can Directly drive the Speaker .                             |
| <b>VDD</b>  | INPUT  | Power Supply PIN , Connected with a 0.1 uF to VSS.                          |
| <b>VDDL</b> | INPUT  | Power Supply PIN , Connected with VDDL @ 2.4~3.6 V Working Voltage.         |
|             |        | Power Supply PIN , Connected with a 0.1 uF to VSS. @3.6~5V Working Voltage. |
| <b>VSS</b>  | INPUT  | Connected to Ground.                                                        |

## ◆ TG2 Low Reset

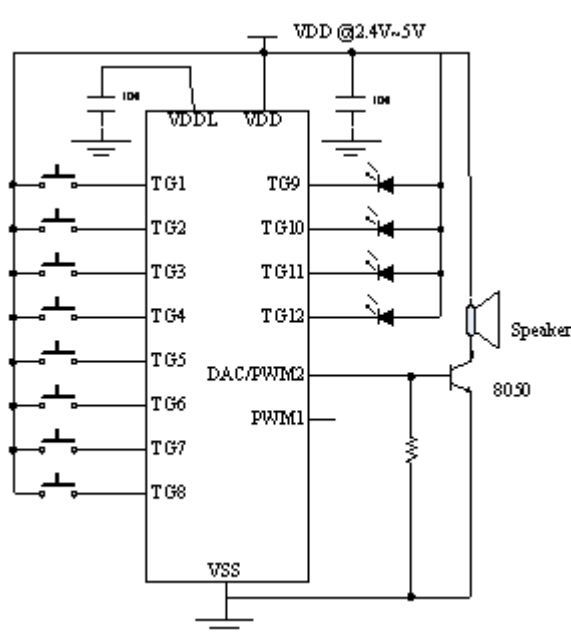
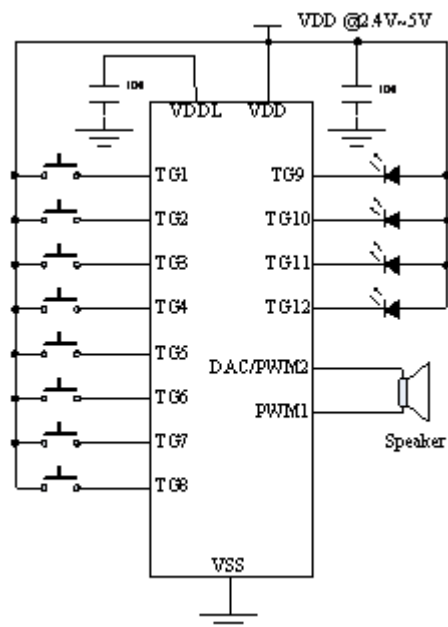


## ◆ SK080H Application Circuit

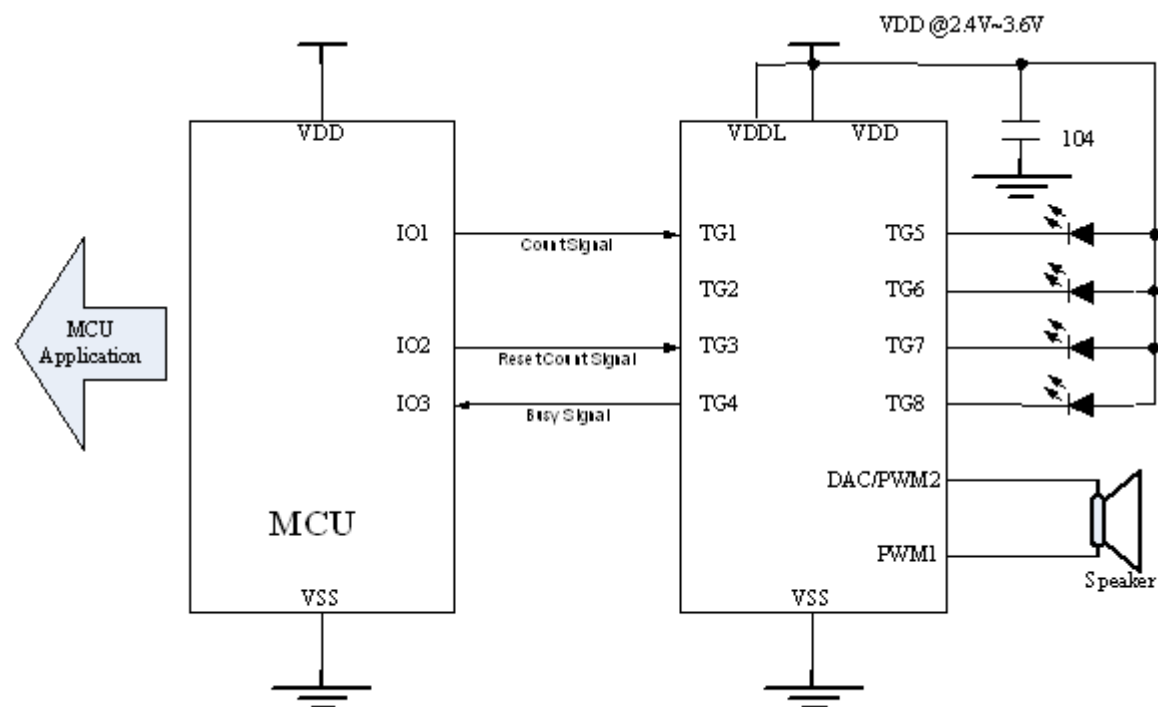
### SK080H 3V Stand-alone Mode



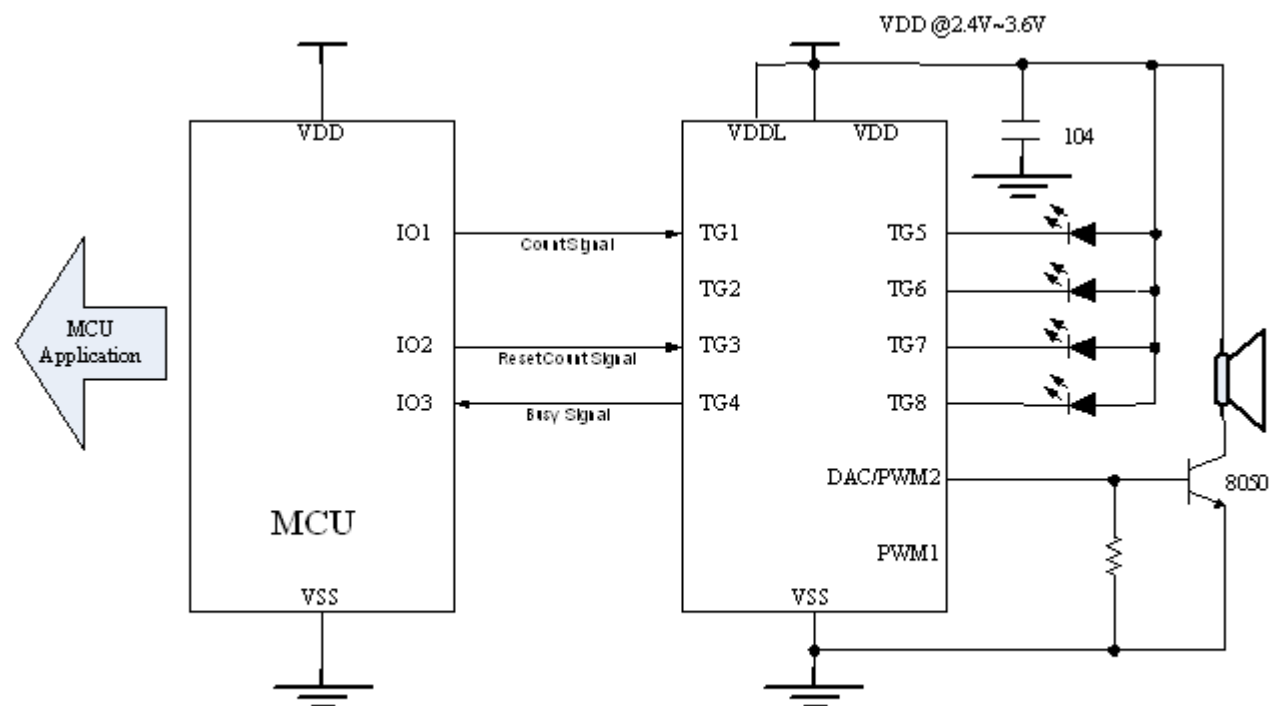
### SK080H 5V Stand-alone Mode



**SK080H 3V Serial Mode**

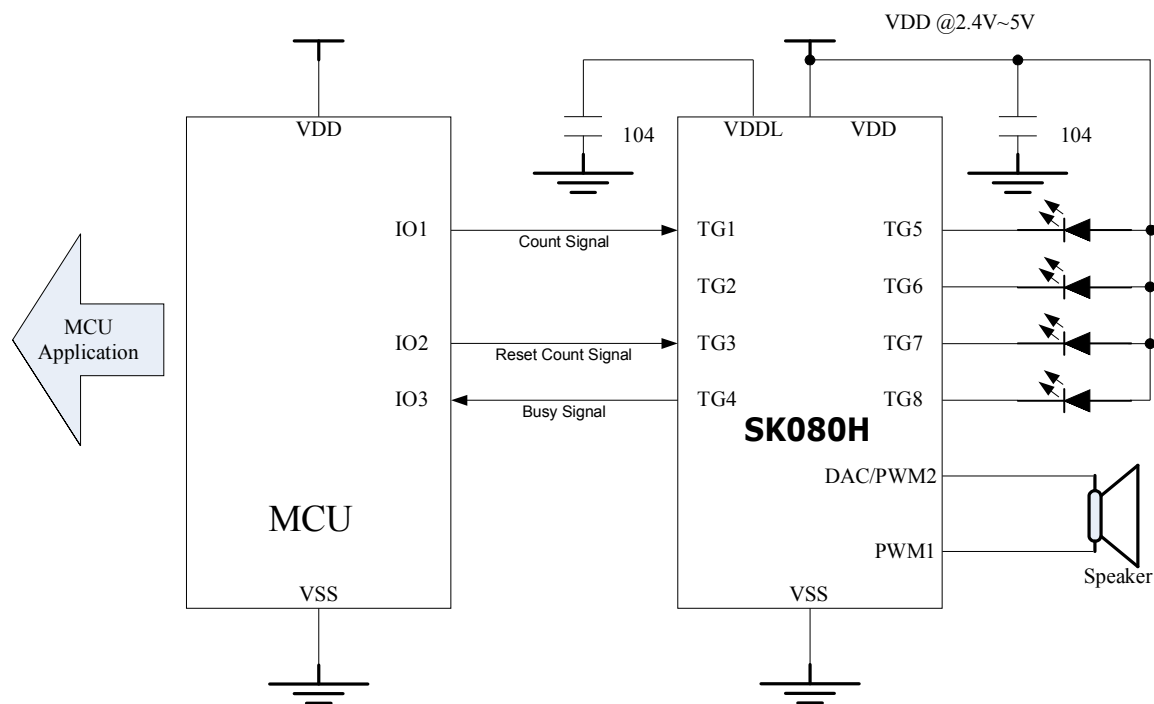


**Fig. 5**

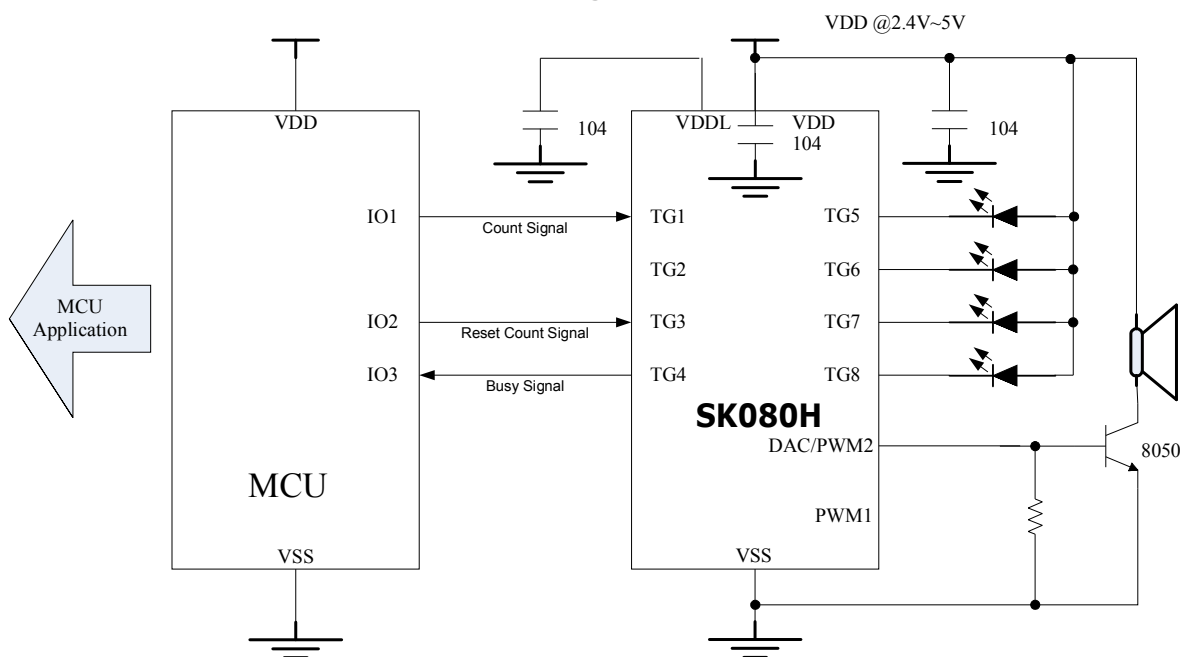


**Fig. 6**

**SK080H 5V Serial Mode**

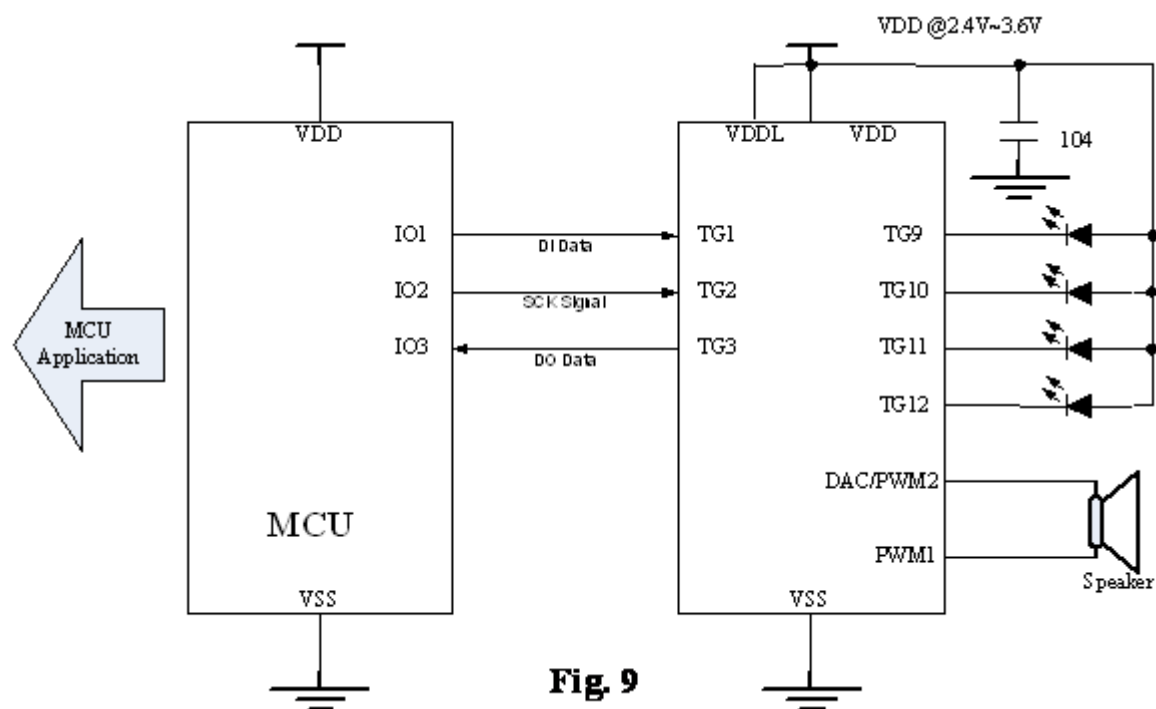


**Fig. 7**

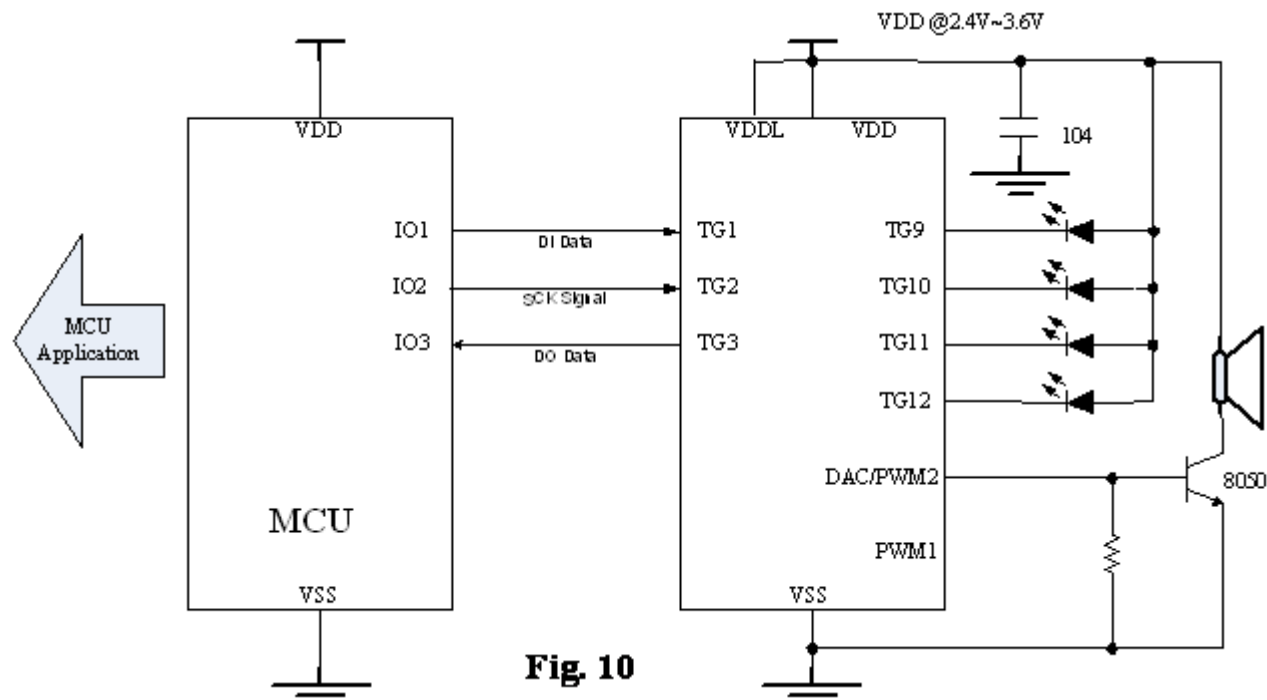


**Fig. 8**

**SK080H 3V CPU Mode**

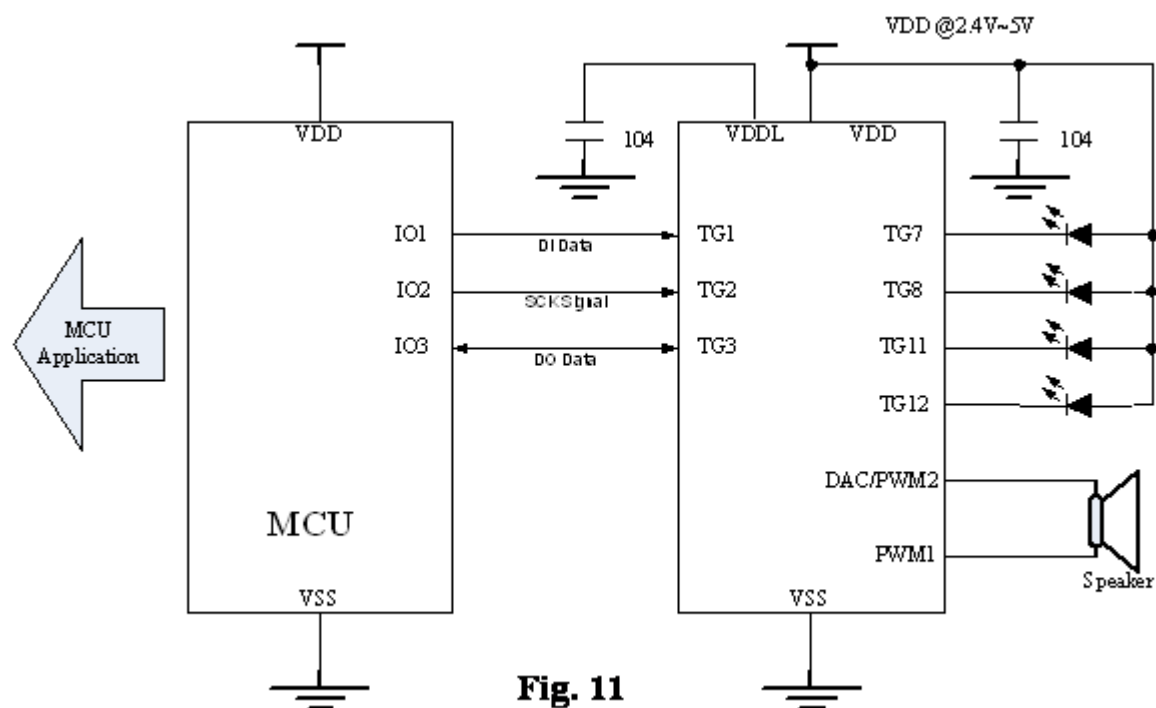


**Fig. 9**

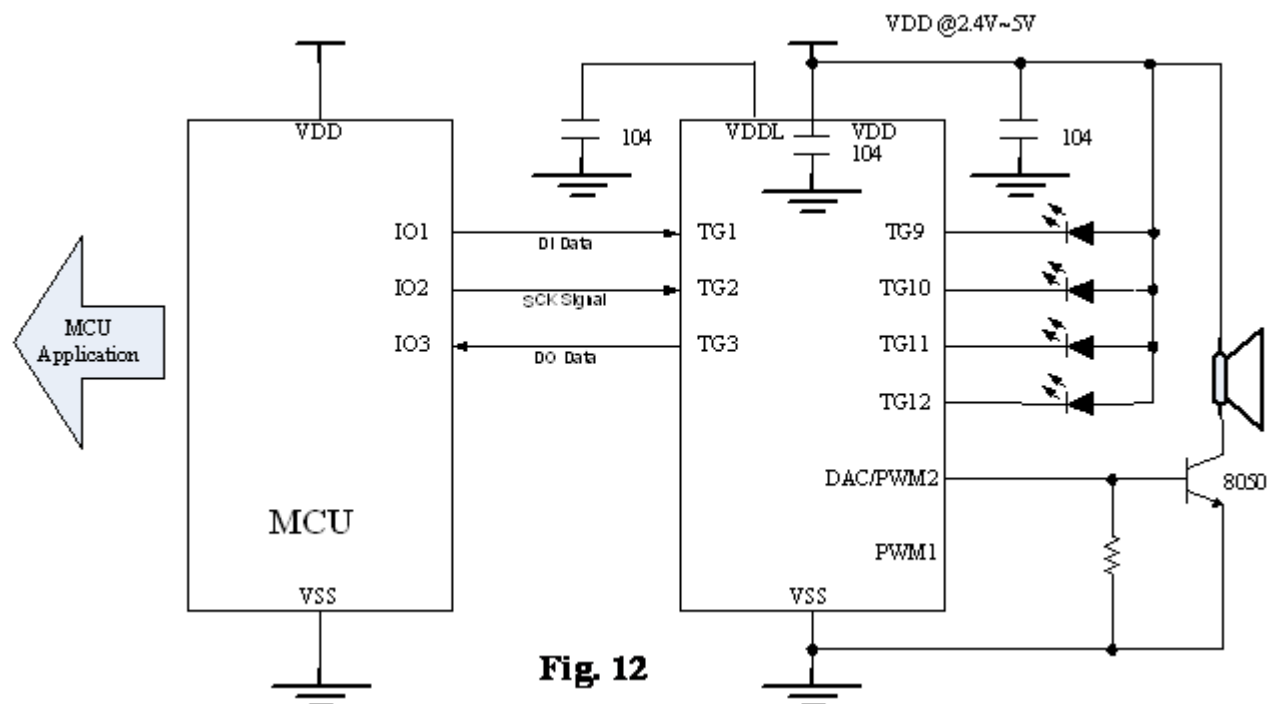


**Fig. 10**

**SK080H 5V CPU Mode**

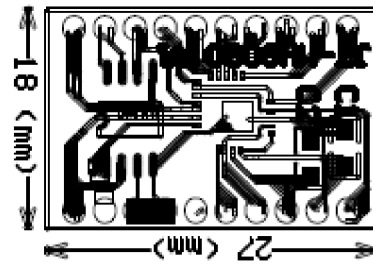


**Fig. 11**

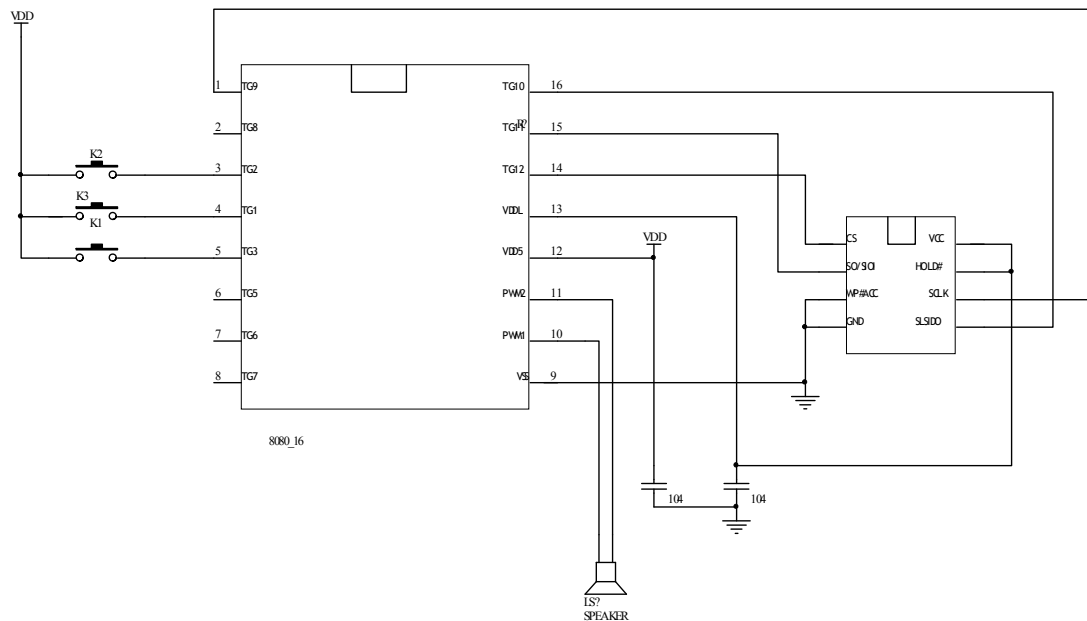


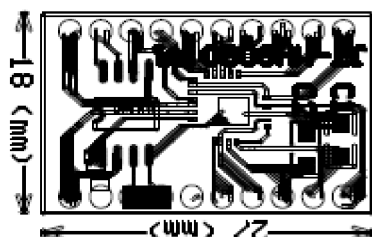
**Fig. 12**





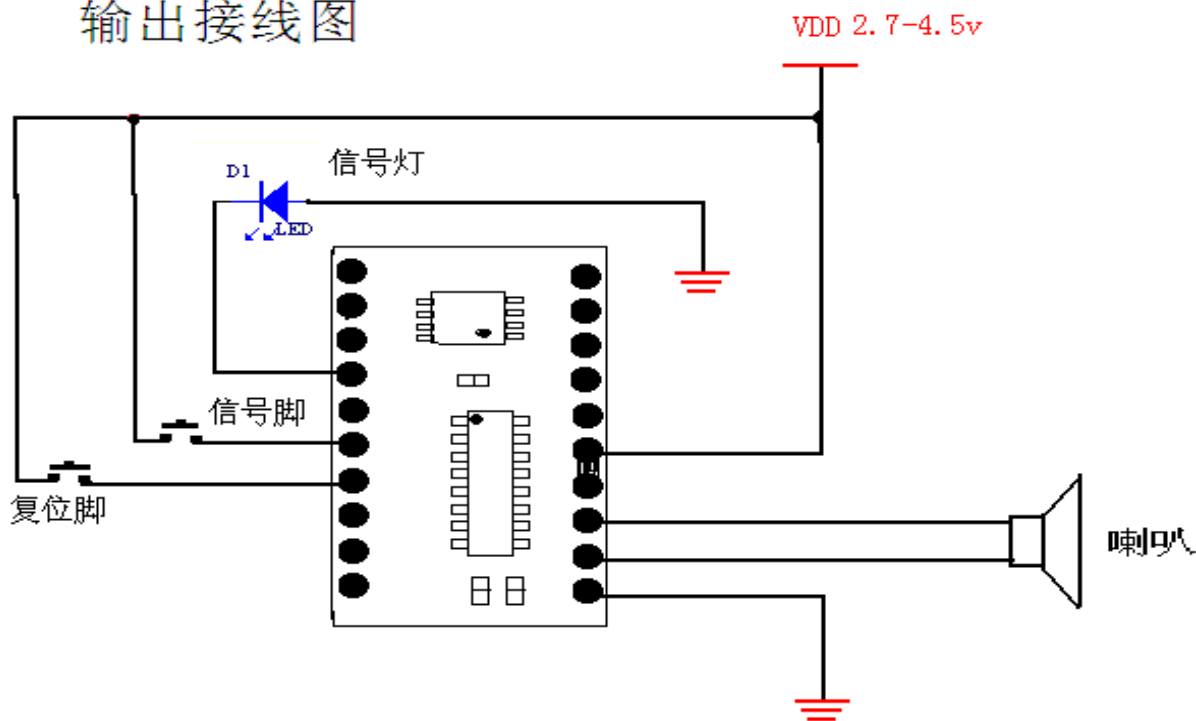
外挂 f u l a s h p c b 图.





外挂f u l a s h p c b 图.

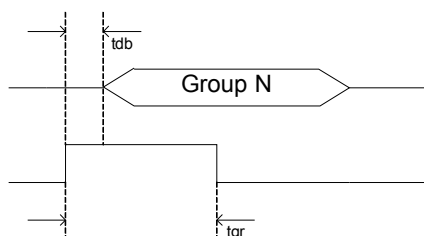
# SK080H-16M-COB-PWM 输出接线图



## ◆ SK080H Trigger Timing

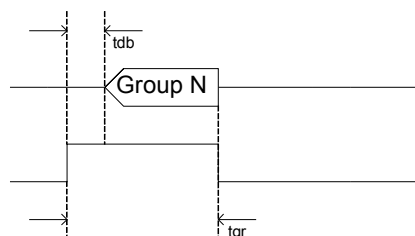
(a) Trigger Pulse Width < Group Length

Option Setting = Edge / Unhold



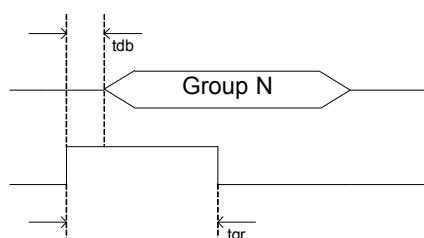
(b) Trigger Pulse Width < Group Length

Option Setting = Edge / Hold



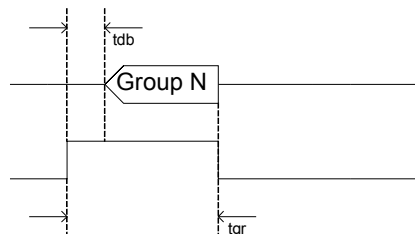
(c) Trigger Pulse Width < Group Length

Option Setting = Level / Unhold



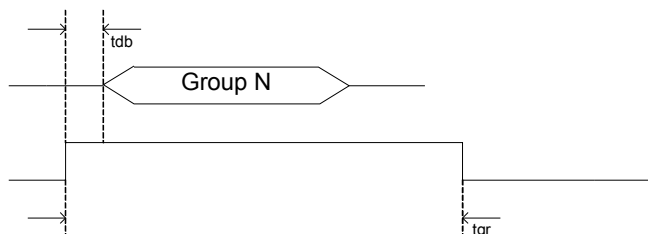
(d) Trigger Pulse Width < Group Length

Option Setting = Level / Hold



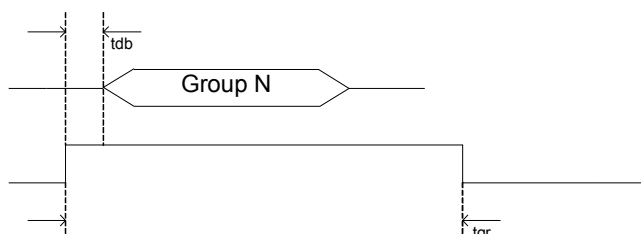
(e) Trigger Pulse Width > Group Length

Option Setting = Edge / Unhold



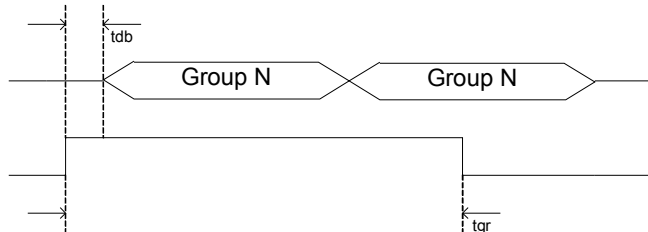
(f) Trigger Pulse Width > Group Length

Option Setting = Edge / Hold



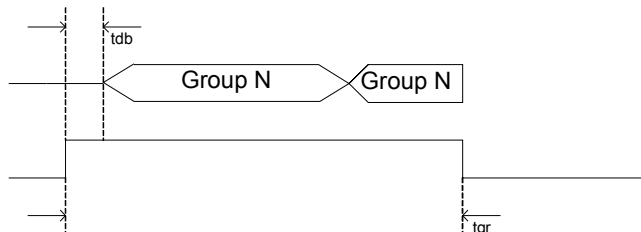
(g) Trigger Pulse Width > Group Length

Option Setting = Level / Unhold

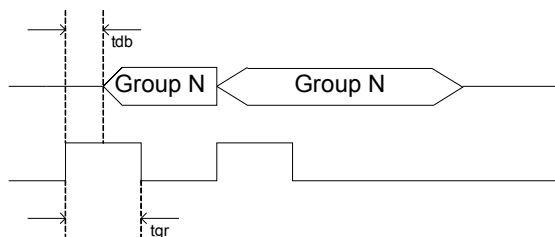


(h) Trigger Pulse Width > Group Length

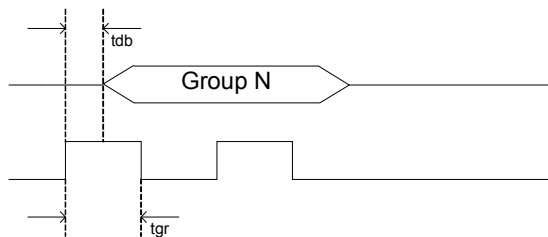
Option Setting = Level / Hold



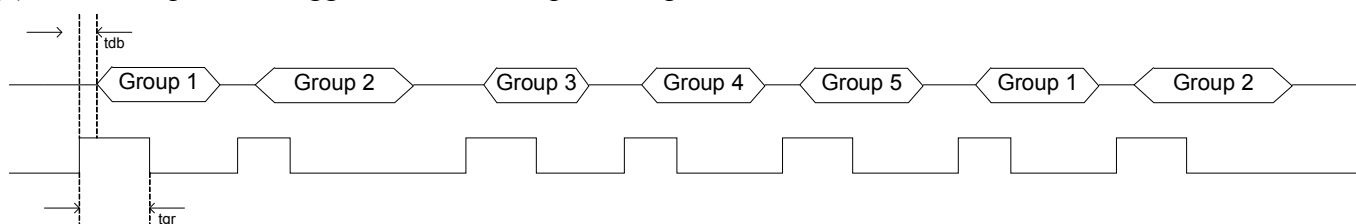
(i) Option Setting = Retrigger



(j) Option Setting = Irretrigger



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



## ◆ SK080H 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''

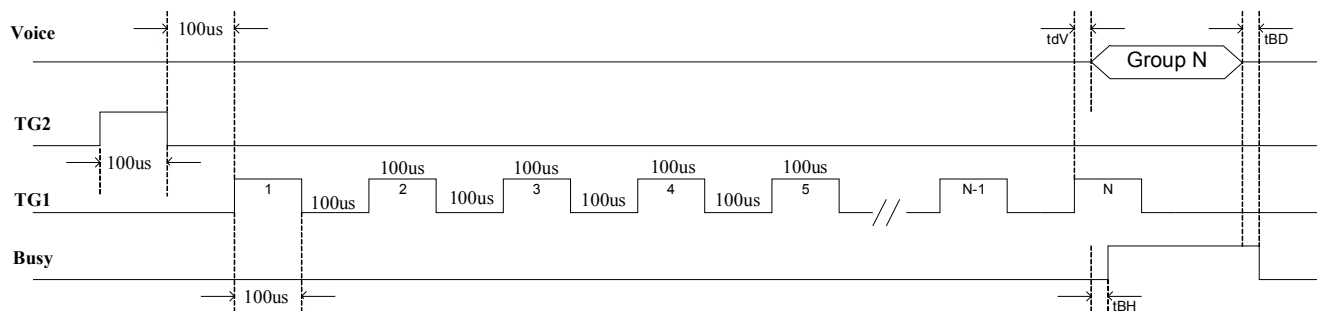
Total duration = 8'' ( 20''-8'' = 32'' space are free , can add more Voice File )

## ◆ SK080H Serial Mode Timing

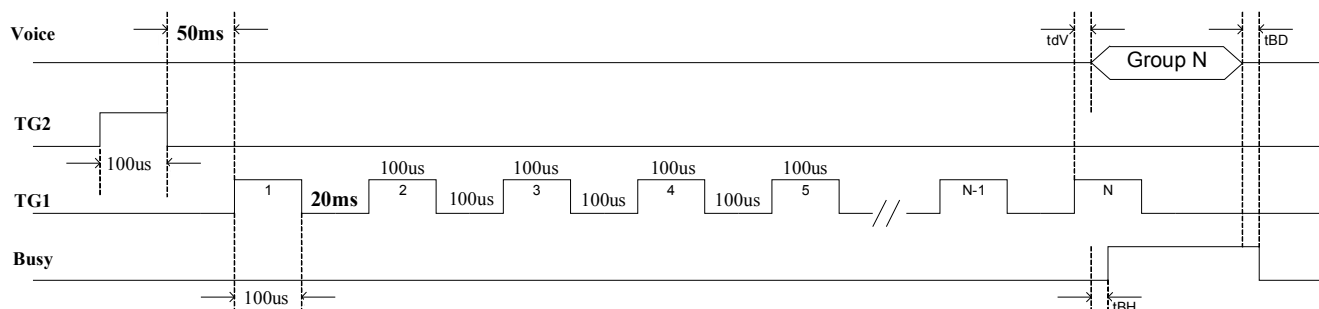
TG1=Edge/Unhold/Retrigger

TG3=Reset PIN

### ● PWM

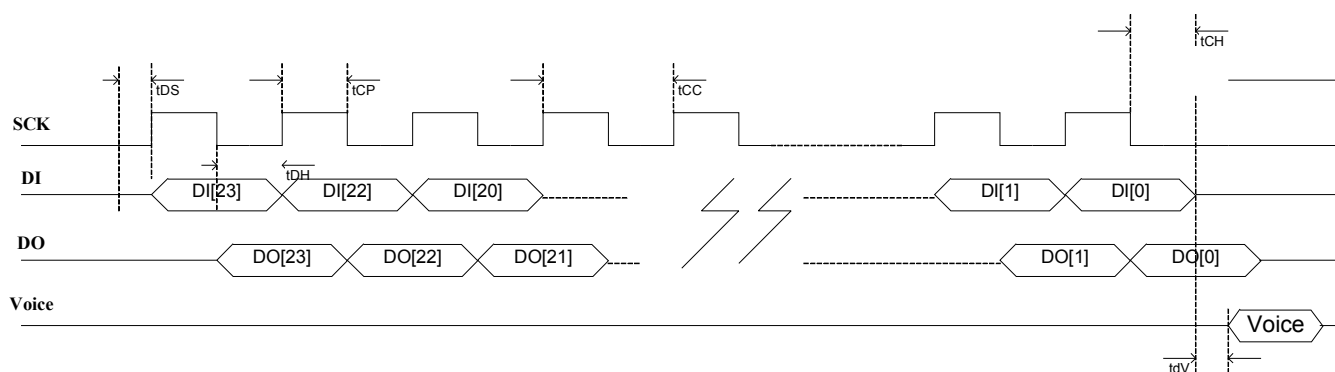


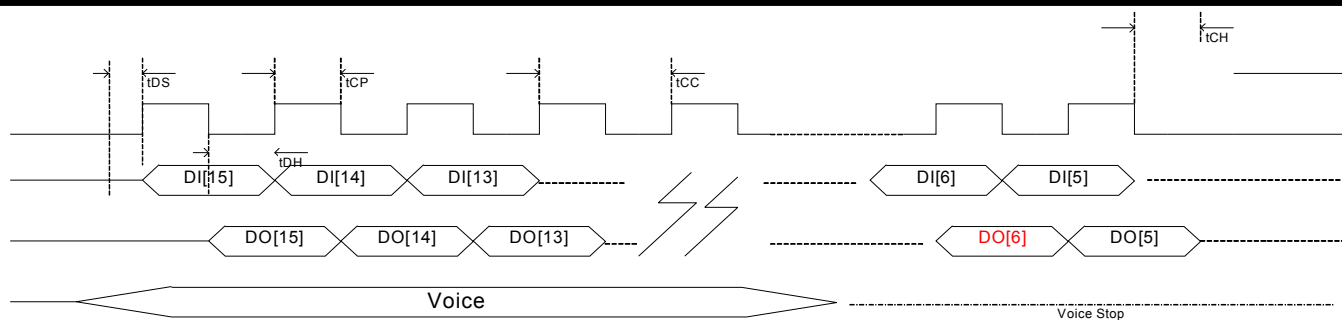
● **DAC**



◆ **SK080H CPU Mode Timing**

**SK080H Play Voice Timing**





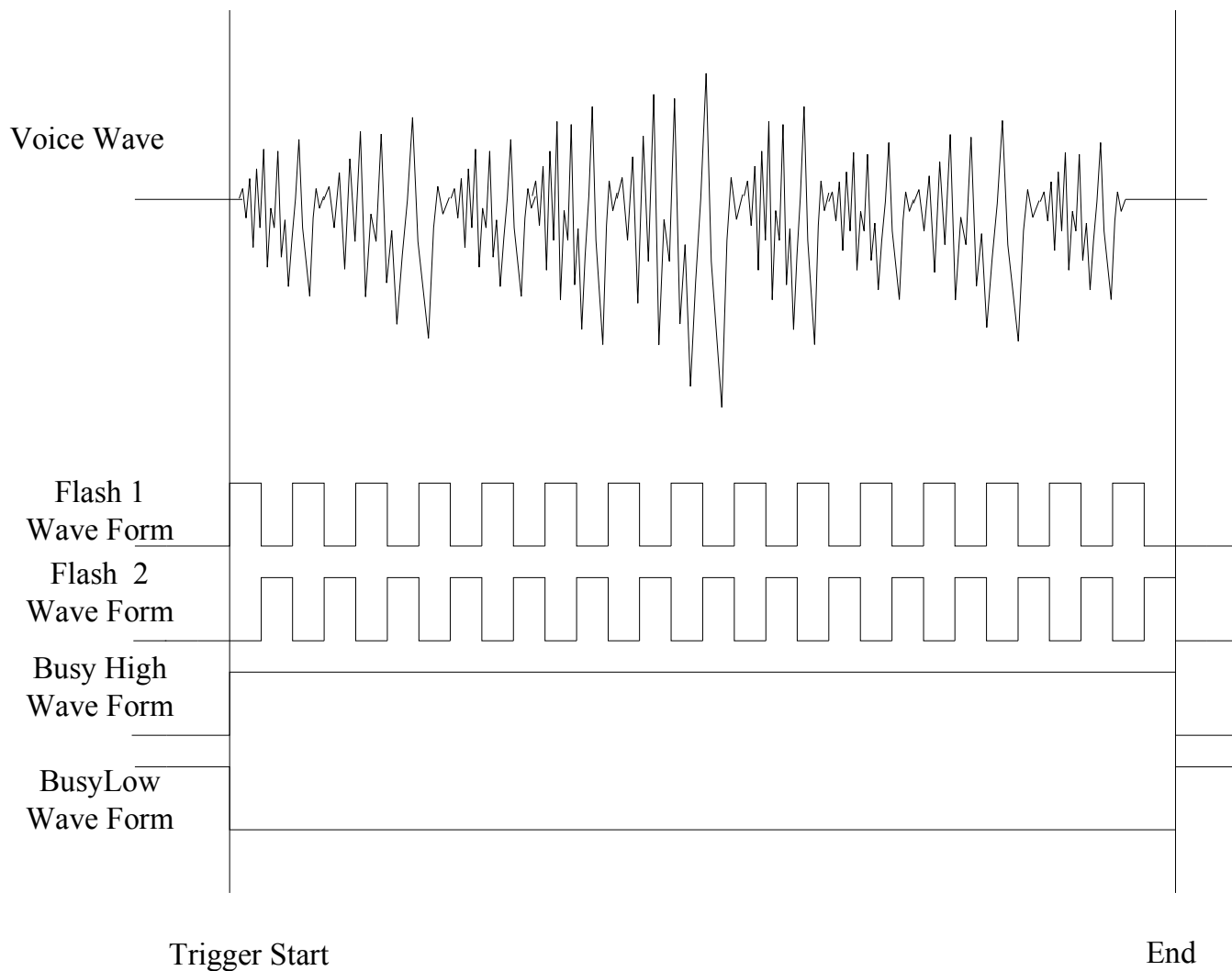
\* **DO[6]** =1 is Busy , =0 Voice Stop

### SK080H Check Voice Stop Timing

| Command   | PIN | Command Data       | Clock Count | Description                                   |
|-----------|-----|--------------------|-------------|-----------------------------------------------|
| START     | DI  | 0x0A0140           | 24 clk      | Wake up the chip                              |
|           | DO  |                    |             |                                               |
| PLAY      | DI  | 0x18+Step Address  | 24 clk      | Play Voice Step Address                       |
|           | DO  |                    |             |                                               |
| PAUSE     | DI  | 0x0A0148           | 24 clk      | Pause the Playback and hold at the Voice data |
|           | DO  |                    |             |                                               |
| RESUME    | DI  | 0x0A0140           | 24 clk      | Resume Playback from the previous Voice data  |
|           | DO  |                    |             |                                               |
| Read Busy | DI  | 0x2200             | 16 clk      | Check Voice is Stop or Not                    |
|           | DO  | Check <b>DO[6]</b> |             |                                               |

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

## ◆ SK080H Voice Wave & Output Status



## ◆ DC Electrical Characteristics

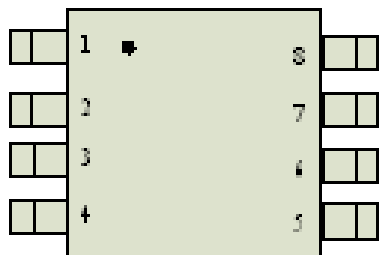
| Item                         | Symbol | Min | Typ | Max | Unit | Condition           |
|------------------------------|--------|-----|-----|-----|------|---------------------|
| Operating voltage            | VDD    | 2.4 | 3.0 | 4.5 | V    |                     |
| Standby current<br>(LDO ON)  | Isb    | 3   | 4   | 5   | uA   | VDD=3V,no load      |
| Standby current<br>(LDO OFF) | Isb    | 1   | 1.5 | 3   | uA   | VDD=3V,no load      |
| Operating current            | Iop    |     | 600 |     | uA   | VDD=3V,no load      |
| Drive current of Output      | Iod    |     | 10  |     | mA   | VDD=3V<br>VOUT=0.6V |
| Sink current of Output       | Ios    |     | 30  |     | mA   | VDD=3V<br>VOUT=2.4V |
| Drive current of PWM         | Iod    |     | 200 |     | mA   | VDD=3V,VOUT=1.5V    |
| Sink current of PWM          | Ios    |     | 200 |     | 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   |

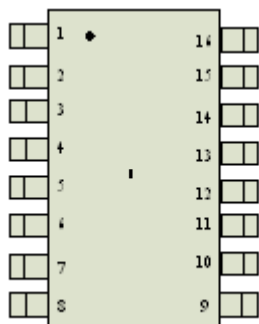
## ◆ SK080H Package Information

### SK080H-SOP8



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

### SK080H-SOP16



| PIN | NAME     |
|-----|----------|
| 1   | TG9      |
| 2   | TG8      |
| 3   | TG2      |
| 4   | TG1      |
| 5   | TG3      |
| 6   | TG5      |
| 7   | TG6      |
| 8   | TG7      |
| 9   | VSS      |
| 10  | PWM1     |
| 11  | PWM2/DAC |
| 12  | VDD      |
| 13  | VDDL     |
| 14  | TG12     |
| 15  | TG11     |
| 16  | TG10     |

## ◆ Writer Mapping Description

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

| OTP Writer Power Board Pin Mapping Table |                |              |                |
|------------------------------------------|----------------|--------------|----------------|
| DIP 20                                   | PAD Name       | AK080H-SO8   | AK080H-SO16    |
| 1 – VPP                                  | 1-TG2/RSTB     | 1-TG2/RSTB   | 2-TG2/RSTB     |
| 2 – DO                                   | 3-TG3          | 3-TG3        | 4-TG3          |
| 3 – DI                                   | 2-TG1          | 2-TG1        | 3-TG1          |
| 4 – GND                                  | 13,14-VSS      | 4-VSS        | 9-VSS          |
| 5 - TEST                                 | X              | X            | X              |
| 17 – RSTN                                | X              | X            | X              |
| NC                                       | X              | X            | X              |
| 19 – CLK                                 | 15-PWM1        | 5-PWM1       | 10-PWM1        |
| 20 – VCC                                 | 17-VDD,18-VDDL | 7-VDD,8-VDDL | 12-VDD,13-VDDL |

## ◆ Writer Board Slot Location (DIP20)

