

## 语音 OTP 芯片原理接线图 TG010 / OTP10 秒



深圳市环芯半导体有限公司

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[Http://www.ATChip.Com](http://www.ATChip.Com)

### ◆ Description

TG010 is a 10 Sec Easy Use Speech IC. It Support PWM or DAC voice output with high quality speech ,2 input pin and 2 I/O pin simple speech. 10 Sec. Voice Length at 6 KHz sampling and 4 bit hardware compression. Built-in 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,Outpurt Status,Voice Section,Mute length,I/OType & Simple Programming Function. User selectable 8bit / 5bit / 4 bit data compression. Support three mode trigger function (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 Groups : 64
- MAX Step : 700
- Signal step mute length : 0.64 s ( 6k sample rate )
- Operating Voltage range: 2.4V ~ 3.6V
- Total Voice Duration : 10" (60K Samples)
- Input pin : 2
- I/O pin : 2
- Voice output : PWM and DAC
- Sequential Key : TG1 -> 32 Groups.  
  TG2 -> 21 Groups.  
  TG3,TG4-> 1 Group
- Debounce time : 50 us or 10 ms
- On/Off function : only for TG1 & TG2
- Trigger mode (for all Input pins) :
  - Key Stand-alone Trigger Mode :
    - A. Edge/Level
    - B. Hold/Unhold

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## C. Retrigger/Irretrigger

### - Serial Trigger Mode :

Combinations of TG1 and TG2 to trigger maximum 64 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 :

TG010 can provide different play rate in one code as follow

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

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## ◆ TG010 Pad Location

CHIP SIZE: (0, 0) (1734,715) UM



NO	PAD NAME	X	Y	NO	PAD NAME	X	Y
1	TG2	-777	-184	5,6	VSS	268 443	-267 -267
2	TG1	-777	-269	7	PWM1	794	-289
3	TG3	-606	-268	8	VDD	797	-204
4	TG4	-521	-268	9	PWM2 / DAC	794	-119

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## ◆ PIN Descriptions

PIN NAME	I/O	Function
TG1	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).
TG2	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 64 Voice Group
		CPU Command Mode : TG2 is used as Clock Pin (CLK).
TG3	INPUT	Key Stand-alone Trigger Mode : TG3 is used trigger Only One Group.
		CPU Command Mode : TG3 is used as Data Input Pin (DIO1).
	OUTPUT	As Output PIN , Output the BUSY or Flash Signal .
TG4	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.
PWM1	OUTPUT	As a PWM PIN , can Directly drive the Speaker .
PWM2	OUTPUT	As a PWM PIN , can Directly drive the Speaker .
		As a DAC PIN , 8 bit D/A Current Output.
VDD	INPUT	Power Supply PIN , @ 2.4~3.6 V Working Voltage.
VSS	INPUT	Connected to Ground.

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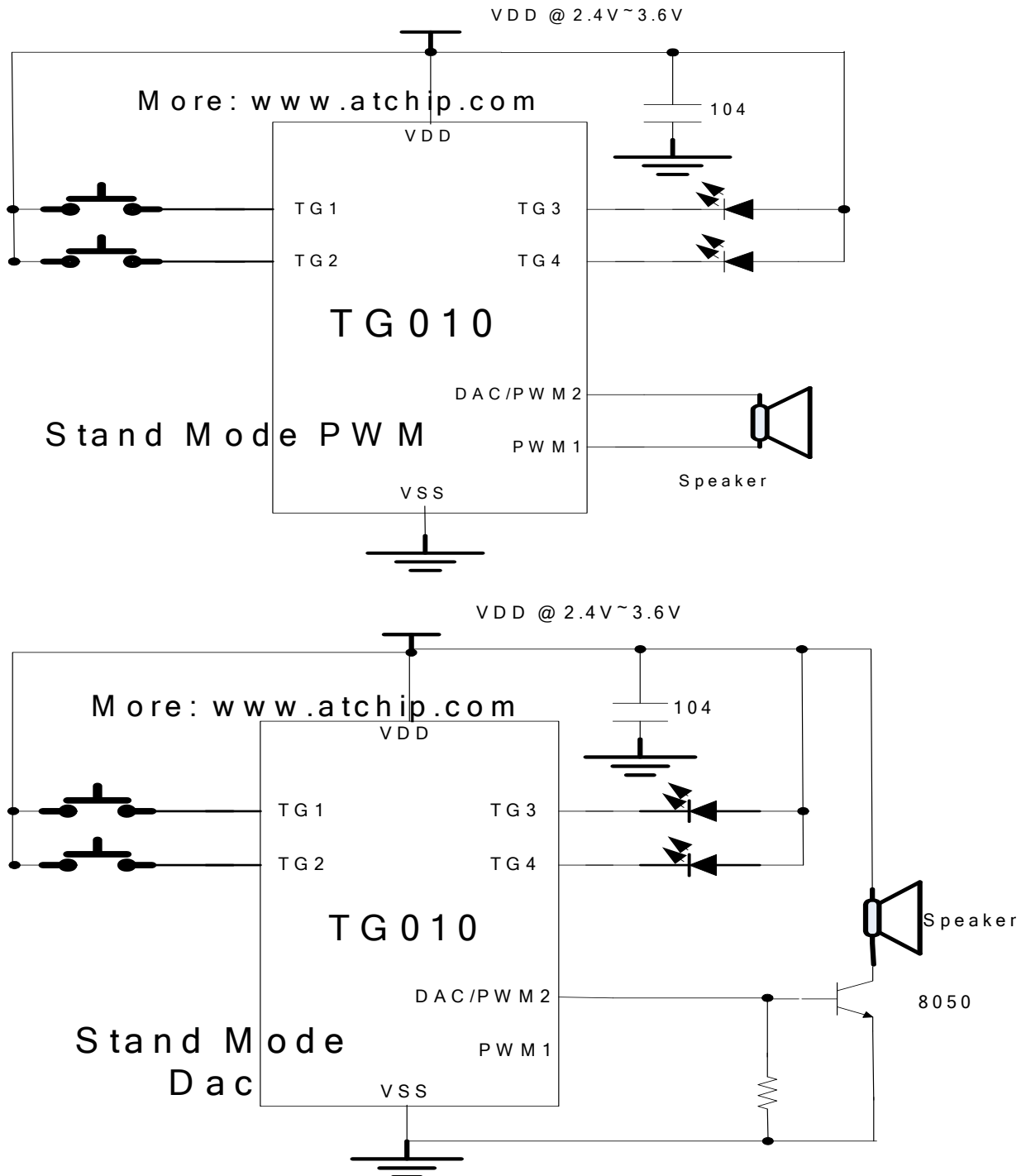
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## ◆ TG010 Application Circuit

### TG010 3V Stand-alone Mode



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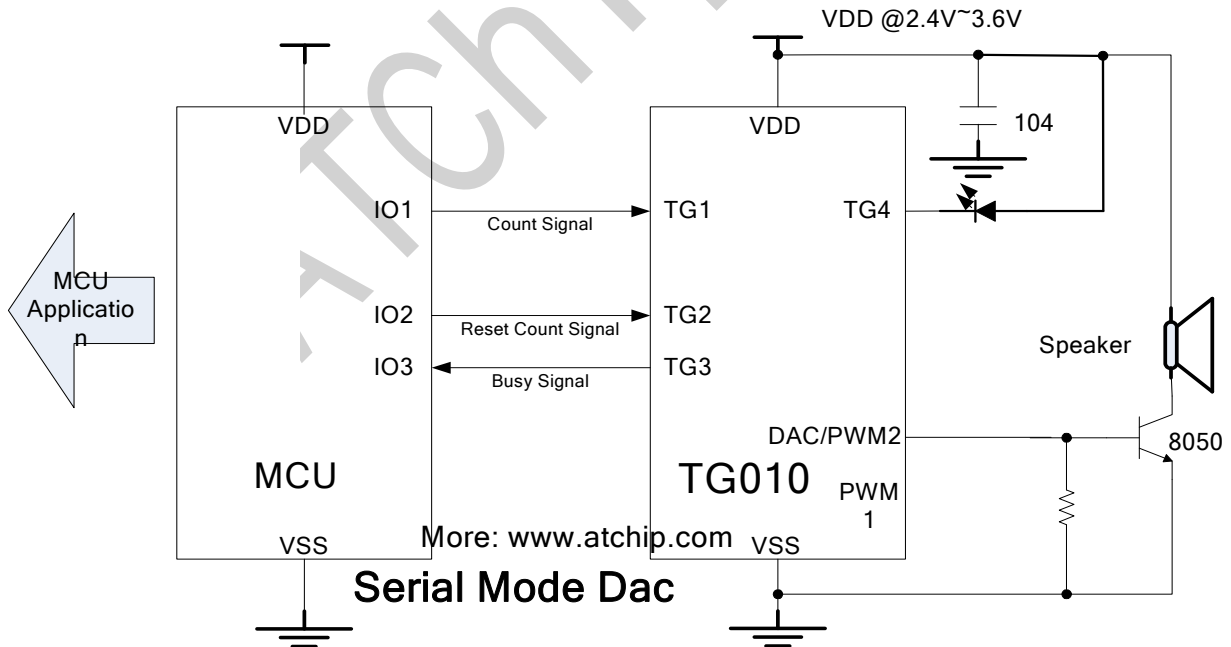
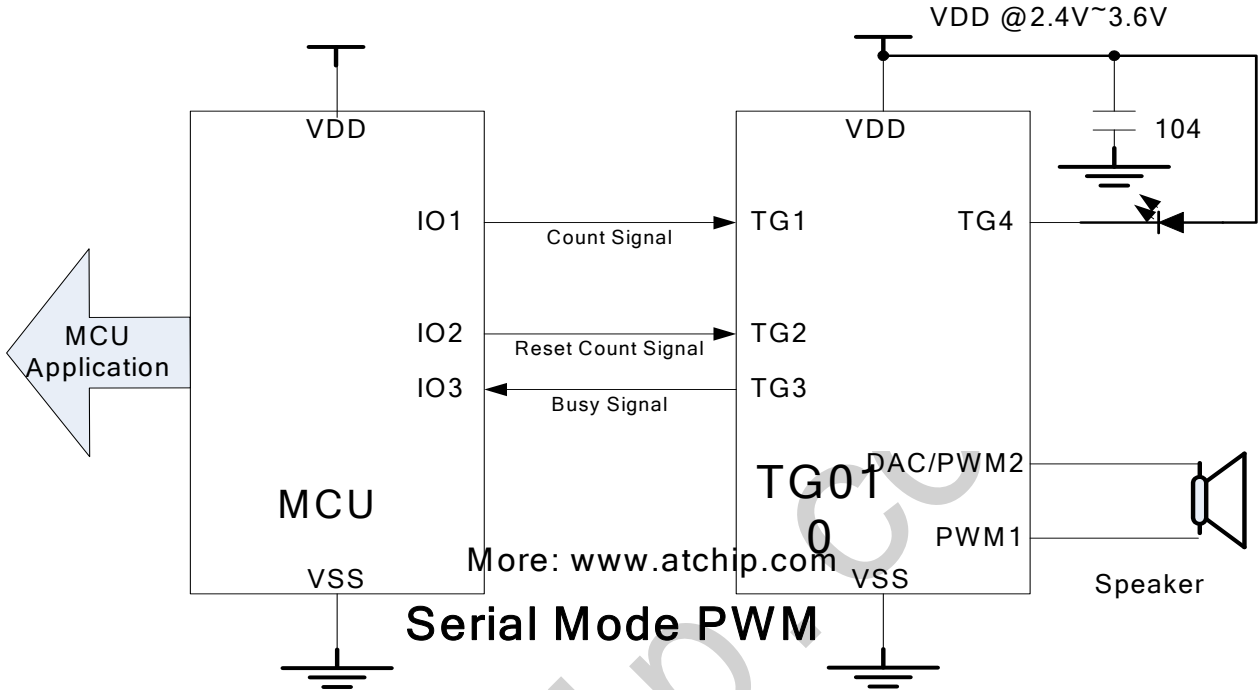
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## TG010 3V Serial Mode



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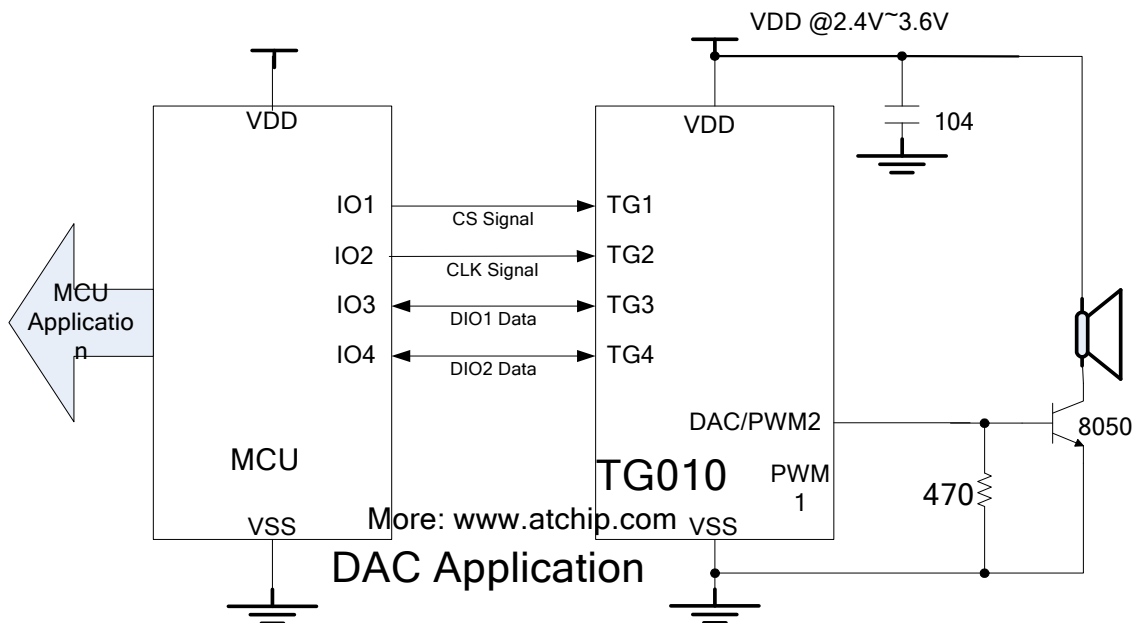
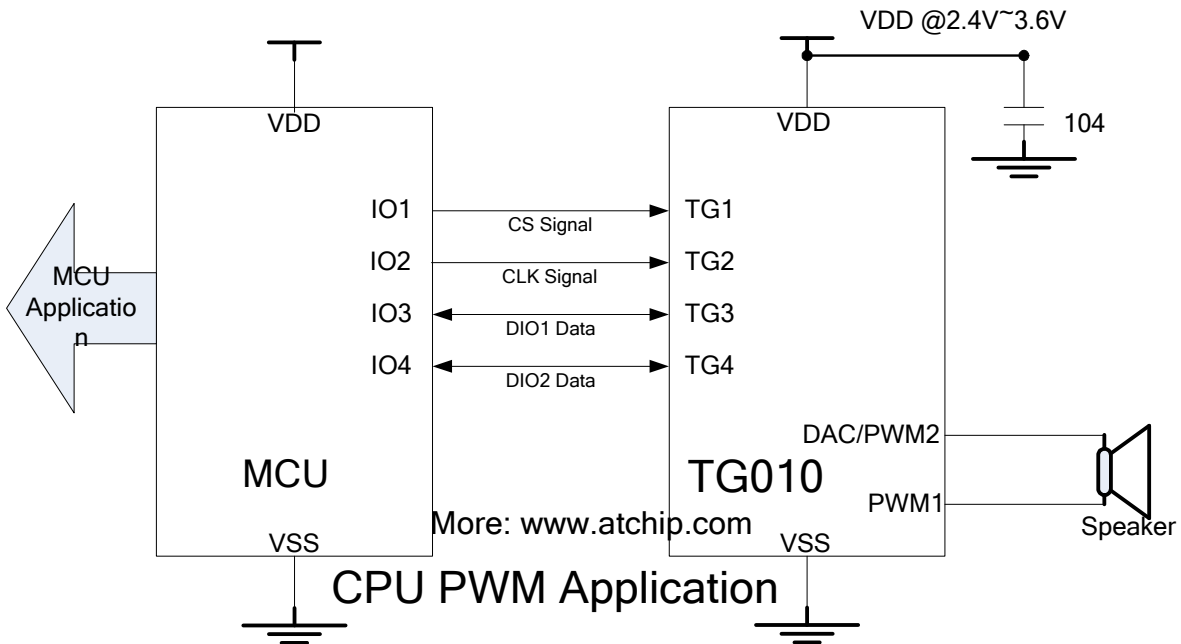
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## TG010 3V CPU Mode



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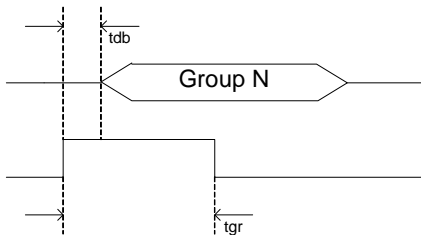
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## ◆ TG010 Trigger Timing

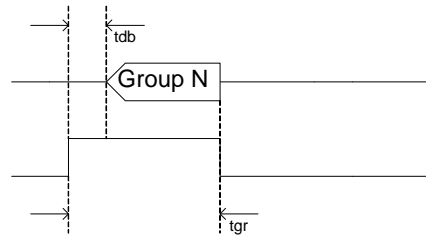
(a) Trigger Pulse Width < Group Length

Option Setting = Edge / Unhold



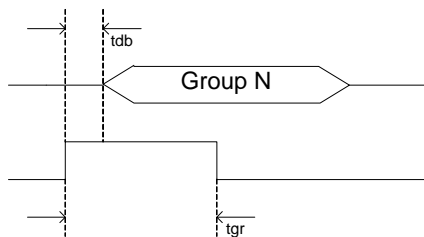
(b) Trigger Pulse Width < Group Length

Option Setting = Edge / Hold



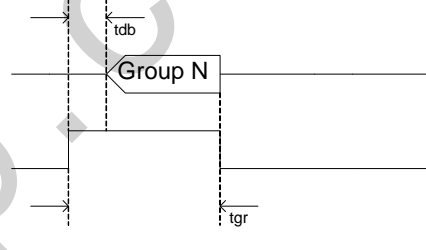
(c) Trigger Pulse Width < Group Length

Option Setting = Level / Unhold



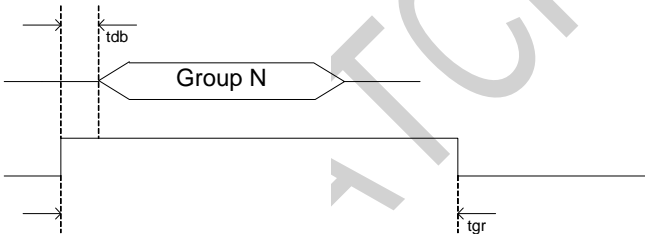
(d) Trigger Pulse Width < Group Length

Option Setting = Level / Hold



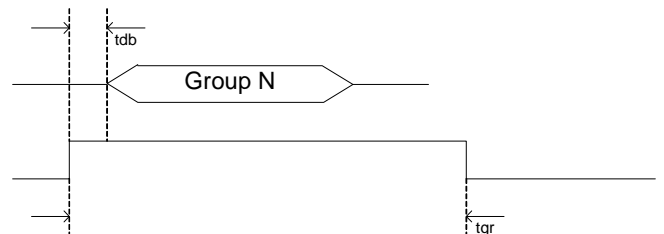
(e) Trigger Pulse Width > Group Length

Option Setting = Edge / Unhold



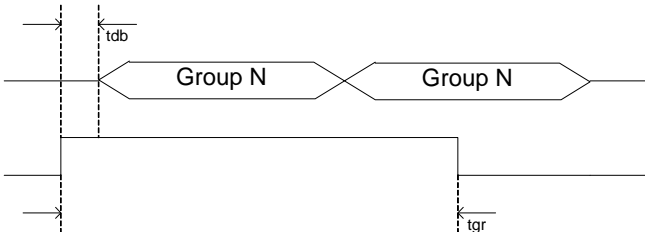
(f) Trigger Pulse Width > Group Length

Option Setting = Edge / Hold



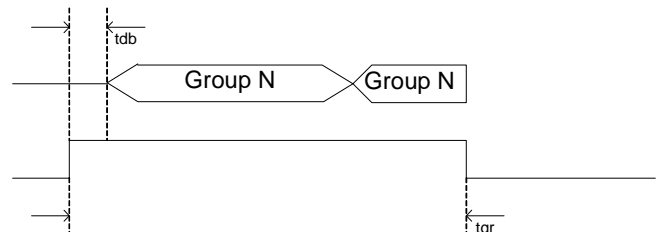
(g) Trigger Pulse Width > Group Length

Option Setting = Level / Unhold



(h) Trigger Pulse Width > Group Length

Option Setting = Level / Hold





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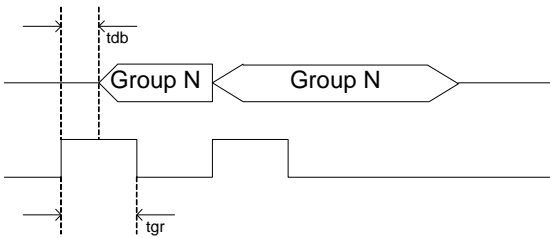
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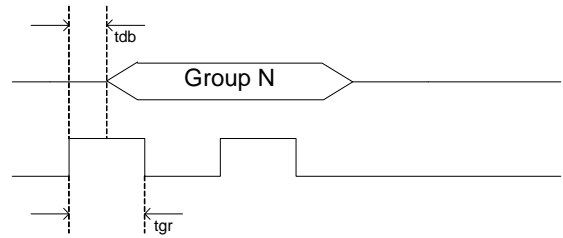
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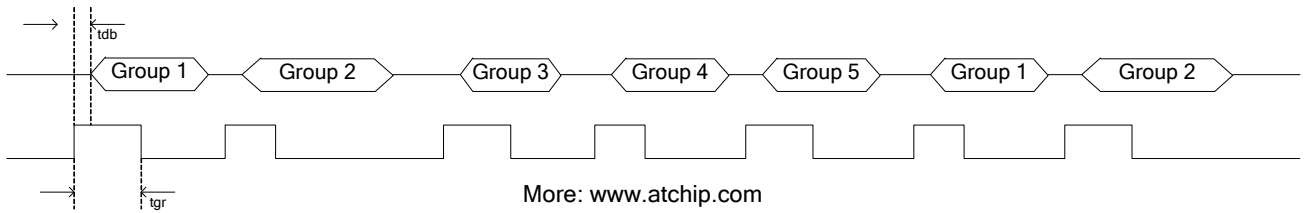
(i) Option Setting = Retrigger



(j) Option Setting = Irretrigger



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



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### ◆ TG010 Trigger Voice Combination Example

Voice File	Description
Voice File A	Hello ( 1.5" )
Voice File B	Welcom to ShenZhen HuanXin .LTD (3" )
Voice File C	0755-28149272 (1" )
Voice File D	ATChip.com (1" )
Voice File E	QQ:68681298 (1.5" )

Group1 = Step1 + Step 2

Group 2 = Step3 + Step 4 + Step 5

Group 3 = Step 6 + Step 7

Group1 = Hello 28149272

Group 2= Hello Www.ATChip.com Welcom to ShenZhen HuanXin .LTD

Group 3 = Welcom to ShenZhen HuanXin .LTD QQ:68681298

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 + Welcom to ShenZhen HuanXin .LTD + 0755-28149272 + ATChip.com +  
QQ:68681298

= 1.5" + 3" + 1" + 1" + 1.5"

= 8"

Total duration = 8" ( 10"-8" = 2" space are free , can add more Voice File )

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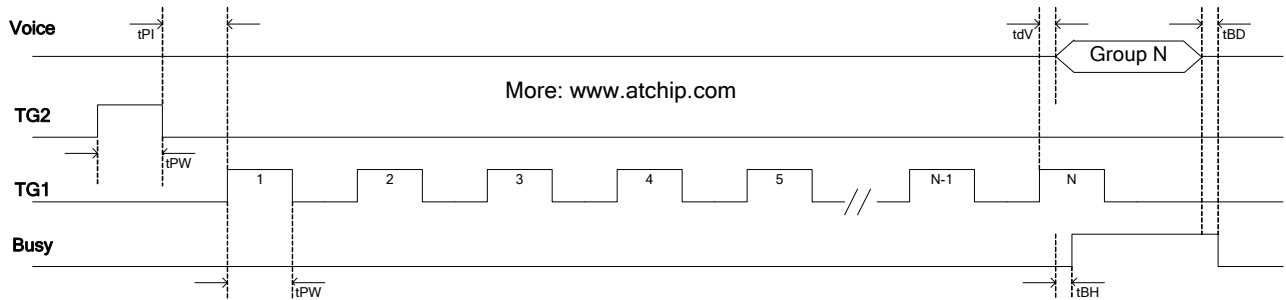
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## ◆ TG010 Serial Mode Timing



TG1=Edge/Unhold/Retrigger

TG2=Reset PIN

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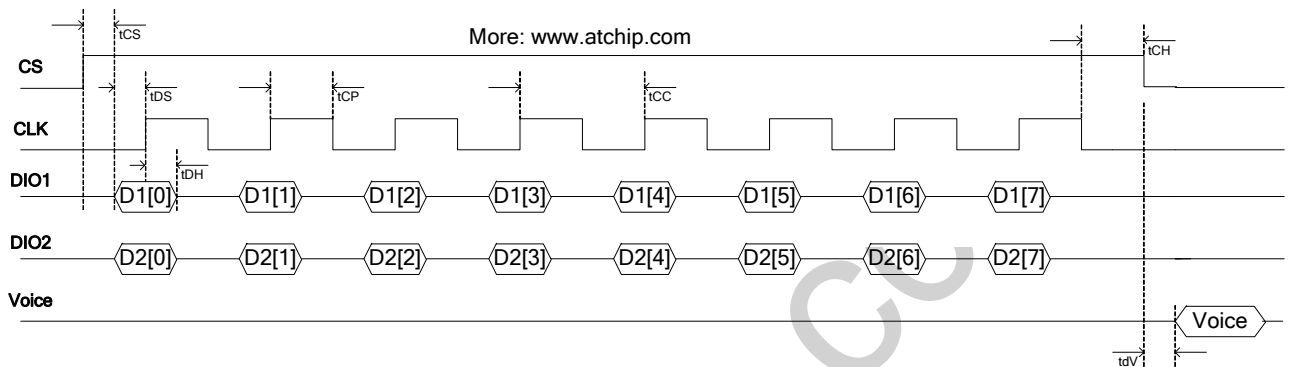
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## ◆ TG010 CPU Mode Timing



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.

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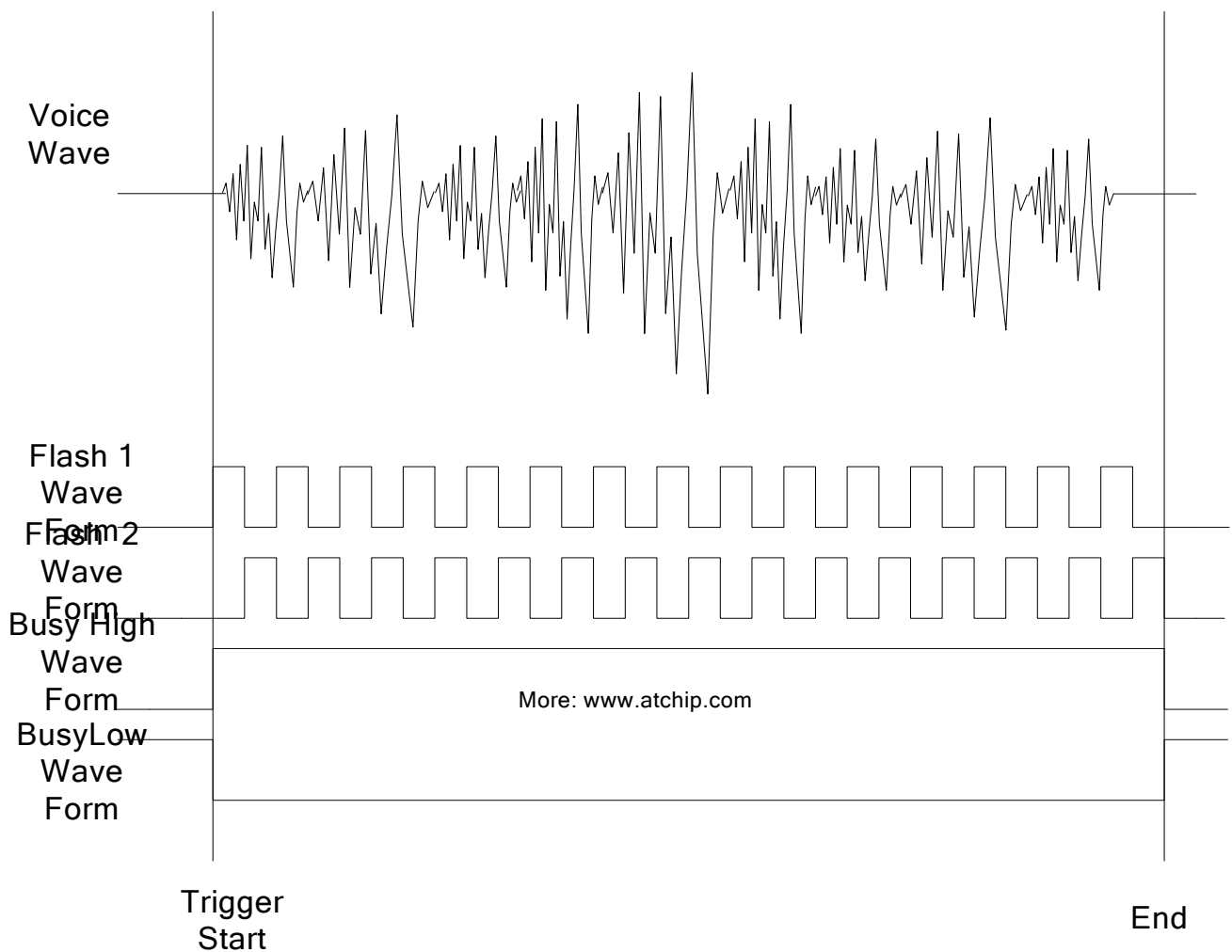
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## ◆ TG010 Voice Wave & Output Status



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## ◆ DC Electrical Characteristics

Item	Symbol	Min	Typ	Max	Unit	Condition
Operating voltage	VDD	2.4	3.0	3.6	V	
Standby current	I <sub>sb</sub>		1	5	uA	VDD=3V,no load
Operating current	I <sub>op</sub>		600		uA	VDD=3V,no load
Drive current of Output	I <sub>od</sub>		10		mA	VDD=3V VOUT=0.6V
Sink current of Output	I <sub>os</sub>		30		mA	VDD=3V VOUT=2.4V
Drive current of PWM	I <sub>od</sub>		200		mA	VDD=3V,VOUT=1.5V
Sink current of PWM	I <sub>os</sub>		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
tgr	Key Trigger Pulse width				
tPW	Serial Mode Input Pulse Width	100			us
tPI	The interval of two pulse	100			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

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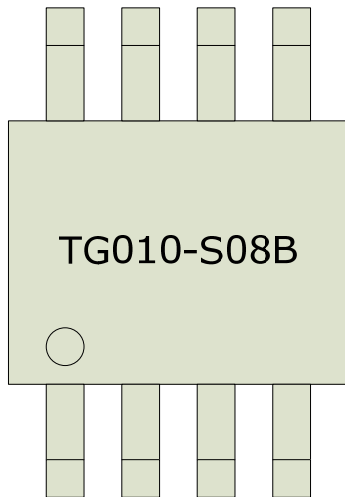
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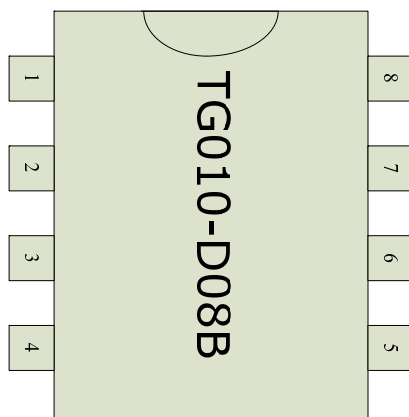
## TG010 Package Information

### TG010-S08B



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

### TG010-D08B



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

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## ◆ Writer Mapping Description

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

DIP 48	PAD Name	TG010-SOP8	TG010-DIP8
10 - RSTN			
11 - GND	5-VSS	5-VSS	5-VSS
12 - SCK	7-PWM1	7-PWM1	7-PWM1
13 - CS	2-TG1	2-TG1	2-TG1
14 - VCC	8-VDD	8-VDD	8-VDD
36 - TEST			
37 - VPP	1-TG2/RSTB	1-TG2/RSTB	1-TG2/RSTB
38 - DIO1	3-TG3	3-TG3	3-TG3
39 - DIO2	4-TG4	4-TG4	4-TG4
NC	9-PWM2/DAC	9-PWM2/DAC	9-PWM2/DAC

## ◆ Writer Board Slot Location

