TONE GENERATOR WITH μC SERIAL INTERFACE

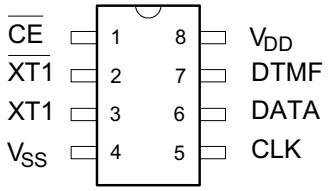
GENERAL DESCRIPTION

The W91082N is Si-gate CMOS IC that provides DTMF signals. It can be programmed by a μC to generate 16 dual tones and 8 single tones from the DTMF pin. The W91082N provides a serial mode interface for various applications such as cordless, KTS, PBX and Caller ID system.

FEATURES

- Operating voltage: 2.0V–5.5V
- Generate 16 dual tones and 8 single tones
- Serial mode interface with μC
- Uses 3.579545 MHz crystal or ceramic resonator
- Packaged in 8-pin plastic DIP

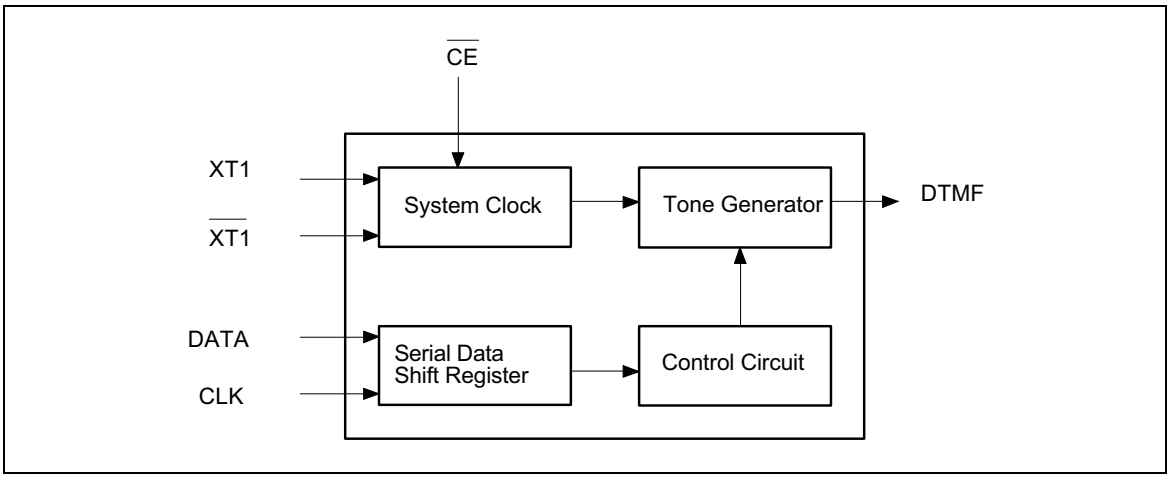
PIN CONFIGURATION



PIN DESCRIPTION

SYMBOL	PIN NO.	I/O	FUNCTION
$\overline{CE}$	1	I	Chip enable signal, low active.
XT1, $\overline{XT1}$	3, 2	I, O	A built-in inverter provides oscillation with an inexpensive 3.579545 MHz crystal or ceramic resonater. The crystal frequency deviation is ±0.02%.
DATA	6	I	Data input pin for serial receiving.
CLK	5	I	Clock input pin for serial receiving.
DTMF	7	O	DTMF signal output pin.
V_{DD}, V_{SS}	8, 4	I	Power input pins.

BLOCK DIAGRAM



FUNCTIONAL DESCRIPTION

The W91082N is a Tone generator with μC serial interface.

When chip enable ($\overline{CE}$ pin goes to low level), the DATA and CLK pins receive the correspondent code to generate a DTMF signal.

The W91082N defines every digit to have 5 bits code, and D0 (LSB) as the first received bit. The W91082N latches the data on the falling edge of the clock. The relationship between the digital codes and the tone output frequency is shown in Table1. The control timing waveform is shown in Figure 1.

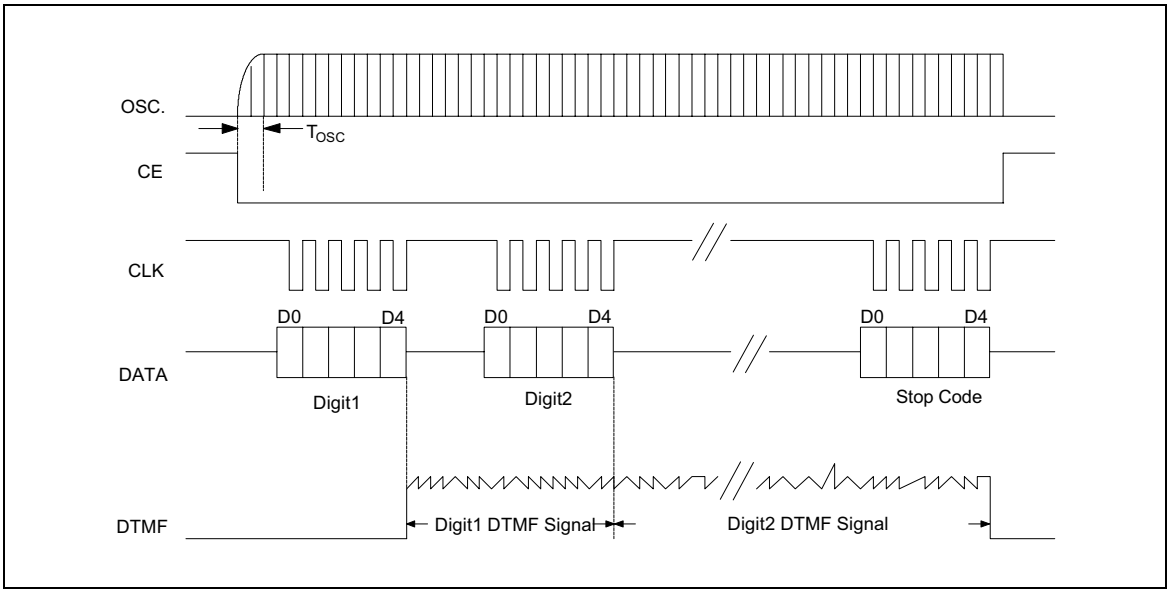


Figure 1. Serial interface control timing waveform

DIGIT	D4	D3	D2	D1	D0	TONE OUTPUT FREQUENCY (Hz)
1	0	0	0	0	1	697+1209
2	0	0	0	1	0	697+1336
3	0	0	0	1	1	697+1477
4	0	0	1	0	0	770+1209
5	0	0	1	0	1	770+1336
6	0	0	1	1	0	770+1477
7	0	0	1	1	1	852+1209
8	0	1	0	0	0	852+1336
9	0	1	0	0	1	852+1477
0	0	1	0	1	0	941+1336
*	0	1	0	1	1	941+1209
#	0	1	1	0	0	941+1477
A	0	1	1	0	1	697+1633
B	0	1	1	1	0	770+1633
C	0	1	1	1	1	852+1633
D	0	0	0	0	0	941+1633
	1	0	0	0	0	697
	1	0	0	0	1	770
	1	0	0	1	0	852
	1	0	0	1	1	941
	1	0	1	0	0	1209
	1	0	1	0	1	1336
	1	0	1	1	0	1477
	1	0	1	1	1	1633
DTMF OFF	1	1	-	-	-	

Table 1. The relationship between data input and tone output frequency

ABSOLUTION MAXIMUM RATINGS

PARAMETER	SYMBOL	RATING	UNIT
DC Supply Voltage	V_{DD}–V_{SS}	-0.3 to +7.0	V
Input/Output Voltage	V_{IL}	V_{SS} –0.3	V
	V_{IH}	V_{DD} +0.3	
	V_{OL}	V_{SS} –0.3	
	V_{OH}	V_{DD} +0.3	
Power Dissipation	P_D	120	mW
Operating Temperature	T_{OPR}	-0.5 to +70	°C
Storage Temperature	T_{STG}	-55 to +125	°C

Note: Exposure to conditions beyond those listed under Absolute Maximum Ratings may adversely affect the life and reliability of the device.

ELECTRICAL CHARACTERISTICS

DC CHARACTERISTICS

(V_{DD}-V_{SS} = 2.5V. F_{OSC} = 3.58 MHz, T_A = 25° C, All outputs unloaded.)

PARAMETER	SYMBOL	CONDITIONS	MIN.	TYP.	MAX.	UNIT
Operating Voltage	V_{DD}	-	2.0	-	5.5	V
Operating Current	I_{OP}	$\overline{CE}$ = 0, Unloaded	-	0.3	1.0	mA
Standby Current	I_{SB}	$\overline{CE}$ = 1, Unloaded	-	-	1	μA
Tone Output Voltage	V_{TO}	Row group RL = 10 KΩ	-	150	170	mVrms
DTMF Distortion	THD	RL = 10 KΩ V_{DD} = 2.0 to 5.5V	-	-30	-23	dB
DTMF Output DC Level	V_{TDC}	V_{DD} = 2.0 to 5.5V	1.0	-	3.0	V
DTMF Output Sink Current	I_{TL}	V_{TO} = 0.5V	0.2	-	-	mA

AC CHARACTERISTICS

(V_{DD}-V_{SS} = 2.5V , $F_{OSC.}$ = 3.58 MHz , T_A = 25° C, All outputs unloaded.)

PARAMETER	SYMBOL	CONDITIONS	MIN.	TYP.	MAX.	UNIT
OSC. Starting Time	T_{OSC}	-	-	-	10	mS
Clock Input Rate	F_{CLK}	-	-	100	500	KHz
System Frequency	F_{OSC}	-	-	3.5795	-	MHz

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Note: All data and specifications are subject to change without notice.