



W522AXXX Data Sheet

PWM SYNTHESIZER

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1. GENERAL DESCRIPTION

W522AXXX is a synthesis IC that utilizes the 8-bit PCM coding method to generate high quality voice effects. In order to save power, the W522AXXX provides PWM output to drive speaker directly without extra transistor and resistor.

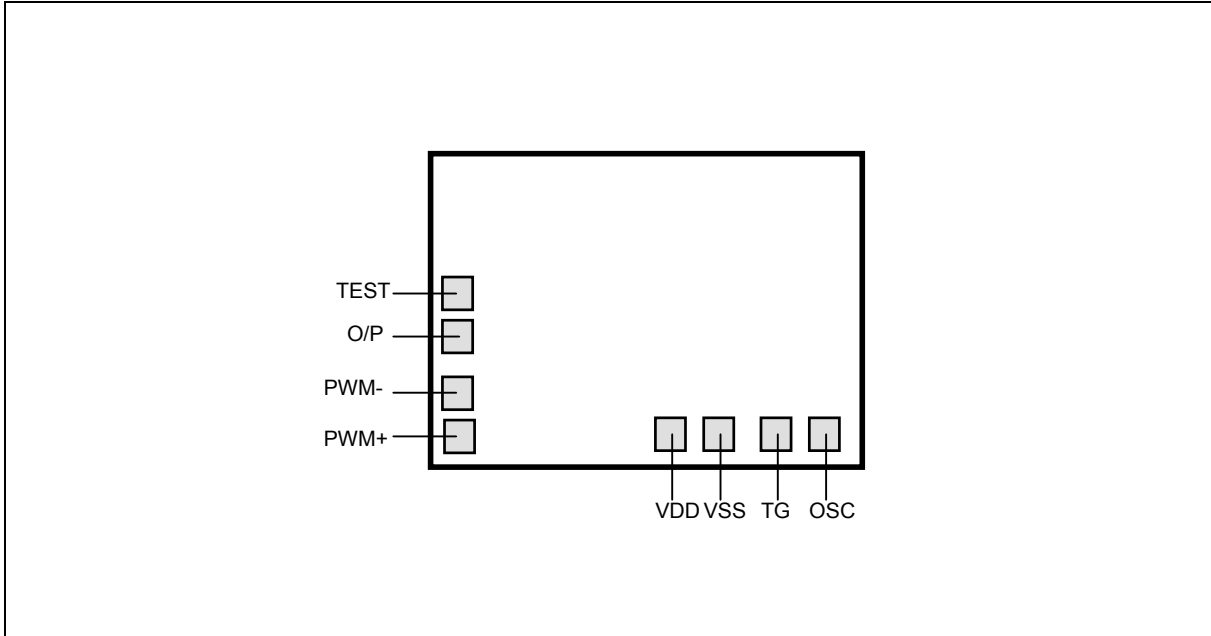
The W522AXXX's part number and corresponding duration time at various sampling rate listed as below:

Part number	Duration @ 4KHz	Duration @ 4.8KHz	Duration @ 6KHz	Duration @ 8KHz
W522A008	12.00 seconds	10.00 seconds	8.00 seconds	6.00 seconds
W522A010	16.00 seconds	13.00 seconds	10.50 seconds	8.00 seconds

2. FEATURES

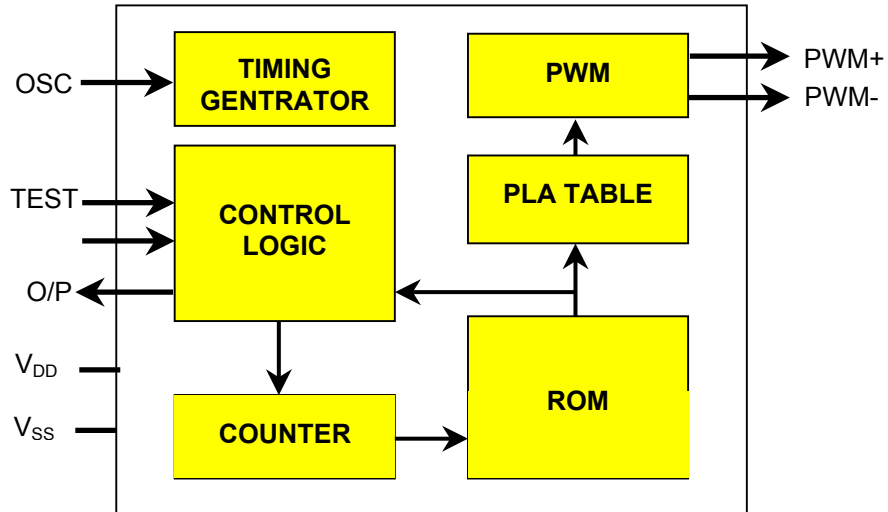
- Wide operating voltage range: 2.4 to 5.5 volts
- 8-bit PCM algorithm for high sound quality
- PWM output to directly drive speaker
- Provides 1 direct trigger input (including CDS control circuit) with following mask option of play modes:
 - One shot (enable or disable interruption)
 - Toggle ON/OFF
 - Level hold
 - Complete cycle level hold (enable or disable interruption)
 - Single cycle level hold
- Provides 1 output with following mask options:
 - Active high or low in BUSY signal output while voice playing (not including silence)
 - LED flash type: 1.5Hz, 3Hz or 6Hz.
 - LED volume control: $\frac{1}{4}$, $\frac{1}{2}$, $\frac{3}{4}$.
- Maximum duration (voice duration + silence) in repeat cycle is around 21 seconds at 6 KHz
- Repeat number 1 to 8 can be mask optioned for both one shot and single-cycle level hold
- Two kinds of trigger input de-bounce time (10 mS or 50 μ S) by mask option
- Four kinds of frequencies, 4/4.8/6/8 KHz, can be chosen by mask option

3. PIN DESCRIPTION



PIN NAME	I/O	DESCRIPTION
TEST	I	Test pin with internally pull-high
O/P	O	Output: BUSY, LED flash by mask option
PWM+/PWM-	O	PWM driver positive/negative output
VDD	Power	Positive power supply for oscillator, logical cells and PWM driver
VSS	Ground	
TG	I	Trigger input
OSC	I	Resistor of ring oscillator is connected between OSC and VDD

4. BLOCK DIAGRAM



5. ABSOLUTE MAXIMUM RATINGS

PARAMETER	SYMBOL	CONDITIONS	RATED VALUE	UNIT
Power Supply	$V_{DD}-V_{SS}$	-	-0.3 to +7.0	V
Input Voltage	V_{IN}	All Inputs	$V_{SS}-0.3$ to $V_{DD}+0.3$	V
Storage Temp.	T_{STG}	-	-55 to +150	°C
Operating Temp.	T_{OPR}	-	0 to +70	°C

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

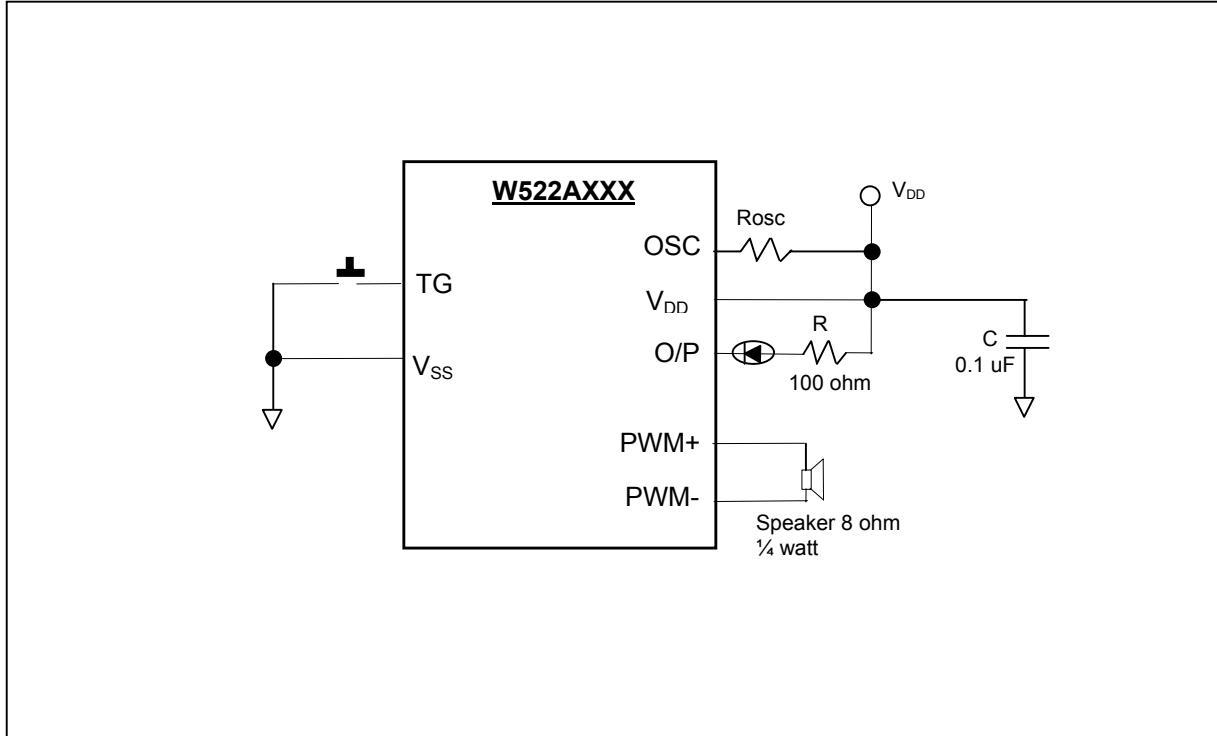
6. ELECTRICAL CHARACTERISTICS

(T_A = 25° C, V_{SS} = 0 V)

PARAMETER	SYM.	CONDITIONS	LIMITS			UNIT
			MIN.	TYP.	MAX.	
Operating Voltage	V _{DD}	-	2.4	3	5.5	V
Input Voltage	V _{IL}	All Input Pins	V _{SS} -0.3	-	0.3*V _{DD}	V
	V _{IH}		0.7 V _{DD}	-	V _{DD}	
Standby Current	I _{DD1}	V _{DD} = 3V, No Playing	-	-	1.0	μA
	I _{DD2}	V _{DD} = 4.5V, No Playing	-	-	1.0	
Operating Current	I _{OP1}	V _{DD} = 3V, No Load	-	-	4	mA
	I _{OP2}	V _{DD} = 5V, No Load	-	-	8	
Input Current for TG	I _{IN}	V _{DD} = 3V, V _{IN} = 0V	4	8	12	μA
Input Current TEST	I _{TEST}	V _{DD} = 3V, V _{TEST} = 3V	6	10	20	μA
PWM Drive Current	I _{PD}	V _{DD} = 3V, R _L = 8 Ω	-130	-	-	mA
PWM Sink Current	I _{PS}	V _{DD} = 3V, R _L = 8 Ω	130	-	-	mA
Output Current	I _{OL}	V _{DD} = 3V, V _{OUT} = 1V	10	-	-	mA
	I _{OH}	V _{DD} = 3V, V _{OUT} = 2V	-5	-	-	
Oscillation Freq.	F _{OSC}	V _{DD} = 3V, R _{OSC} = Typ.	2.7	3	3.3	MHz
		V _{DD} = 4.5V, R _{OSC} = Typ.	2.7	3	3.3	
Oscillation Freq. Deviation by Voltage Drop	$\frac{\Delta F_{OSC}}{F_{OSC}}$	[F(5.5V)-F(2.4V)]/F(2.4V)	-	-	10	%

Note: R_{osc} = typical value = 510K ohm

7. APPLICATION CIRCUIT



Notes:

1. In principle, the playing speed determined by ROSC should correspond to the sampling rate during the coding phase. The playing speed may be adjusted by varying ROSC. The typical value of R_{osc} is 510K ohm.
2. The capacitor, C (0.1uF), shunted between V_{DD} and V_{SS} is necessary for PWM output.
3. R is used to limit the current on the LED.
4. No warranty for production.

**8. REVISION HISTORY**

REVISION	DATE	MODIFICATIONS
A1	Jan- 2002	Preliminary release.
A2	June 3, 2003	Provides two part number W522A008, W522A010 Operation current max. 400 and 800uA → 4 and 8 mA



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