DATA SHEET

凌通科技
Generalplus

GPDS301A

Voice Engine

NOV. 18, 2005

Version 1.0

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VOICE ENGINE

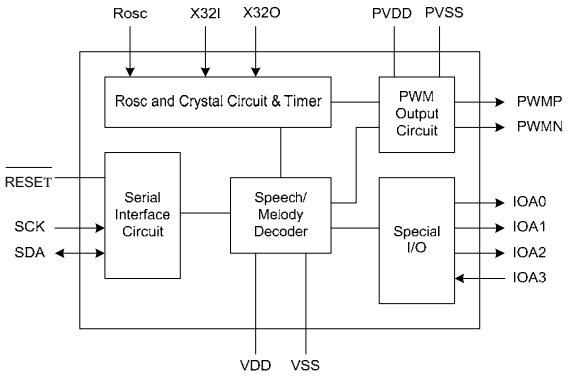
1. GENERAL DESCRIPTION

GPDS301A, an advanced speech decoder, is designed to co-work with a host controller for speech/melody decoder. The host controller is able to issue commands and data to GPDS301A as well as receiving status from GPDS301A through Generalplus Serial Interface IO (SIO). GPDS301A supports S200 (1.4Kbps, 2.8Kbps, 3.36Kbps), S480 (4.8Kbps), S720 (7.2Kbps), A1600 (10Kbps~ 24Kbps), MS01 (4-channel FM, 2 channel ADPCM), not only does the host store data efficiently, but it also retains a good resolution to the original sound. User can easily get high quality speech sound from 12-bit PWM without any amplifier to drive a speaker.

2. FEATURES

- Operating voltage : 2.4V ~ 3.6V
- A pair of PWM output with 12-bit resolution
- Built in Generalplus Serial Interface (SIO)
- R oscillator
- Algorithms:
  - S200 (1.4K, 2.8K, 3.36K bps), supports speed control and pitch control.
  - S480/S720 (4.8K/7.2K bps)
  - A1600 (10K, 12K, 14K, 16K, 20K, 24K bps)
  - MS01(4 channel FM, 2 channel ADPCM)

3. BLOCK DIAGRAM



4. APPLICATION FIELD

- Intelligent interactive talking toys
- Advanced educational toys
- Kids learning products
- Kids storybook
- General speech synthesizer
- Long duration audio products

5. SIGNAL DESCRIPTIONS

5.1. PIN Descriptions

Mnemonic	PIN No.	Pin description
ROSC	1	R-osc input
X32O	2	32KHz crystal output
X32I	3	32KHz crystal input
$\overline{\text{RESET}}$	4	Reset PIN low enable
VSS	5	Core ground
VDD	6	Core power
IOA0	7	PWM Sample rate
IOA1	8	FIFO Ready
IOA2	9	Buffer Ready
IOA3	10	Chip Select
SCK	11	SIO clock
SDA	12	SIO data
PWMN	13	PWM output
PVSS	14	PWM ground
PWMP	15	PWM output
PVDD	16	PWM power

6. ELECTRICAL SPECIFICATIONS

6.1. Absolute Maximum Ratings

Characteristics	Symbol	Ratings
DC Supply Voltage	V_+	< 3.6V
Input Voltage Range	V_{IN}	-0.5V to V_+ + 0.5V
Operating Temperature	T_A	-45℃ to +85℃
Storage Temperature	T_{STO}	-50℃ to +150℃

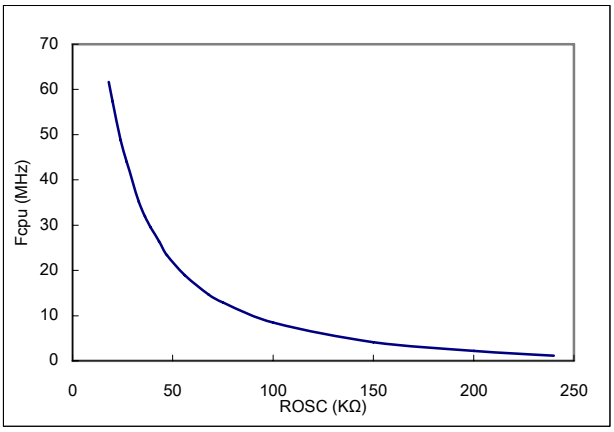
Note: Stresses beyond those given in the Absolute Maximum Rating table may cause operational errors or damage to the device. For normal operational conditions, see AC/DC Electrical Characteristics.

6.2. DC Characteristics (T_A = 25℃)

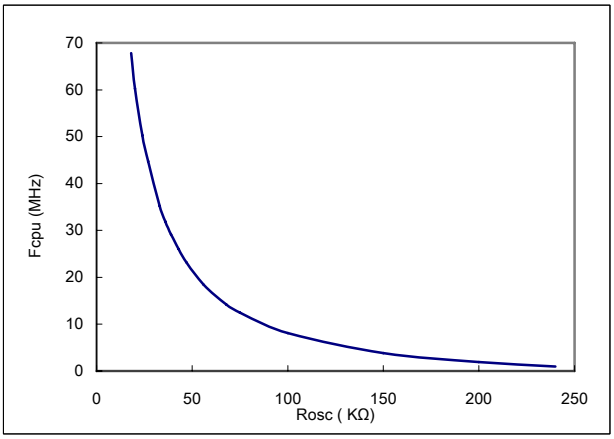
Characteristics	Symbol	Limit			Unit	Condition
		Min.	Typ.	Max.		
Operating Voltage	VDD	2.4	-	3.6	V	-
Operating Current 1	I_{OP1}	-	8.0	-	mA	F_{CPU} = 30MHz @ 3.0V, no load, R_{OSC} = 39Kohm
Standby Mode Current	I_{HALT}	-	-	2.0	μA	Disable 32768Hz OSC, ROSC
Output Sink Current IOA[3:0],SCK, SDA	I_{OL}	-	-42	-	mA	VDD = 3.6V V_{OL} = 1.2V
Output Sink Current IOA[3:0],SCK, SDA	Ioh	-	25	-	mA	VDD = 3.6V V_{Oh} = 2.4V
Pull High Resistor IOA[3:0], SCK, SDA $\overline{\text{RESET}}$	R_{HIGH}	-	120	-	KΩ	VDD = 3.6V
Voltage of Input high IOA[3:0], SCK, SDA $\overline{\text{RESET}}$	Vih	2.4	-	-	V	VDD = 3.6 V
Voltage of input low IOA[3:0], SCK, SDA $\overline{\text{RESET}}$	Vil	-	-	1.8	V	VDD = 3.6V
ROSC Frequency	F_{OSCH}	-	30	-	MHz	VDD = 3.0V, R_{OSC} = 39KΩ
CPU Operating Speed	F_{CPU}	-	30	-	MHz	VDD = 2.4V ~ 3.6V, R_{OSC} = 39KΩ

6.3. The Relationships between the R_{OSC} and the F_{CPU}

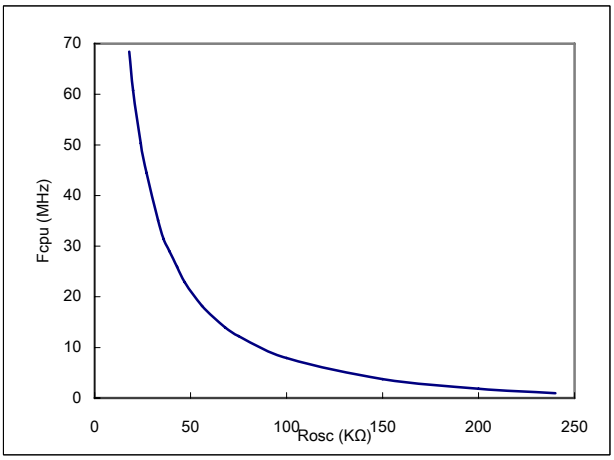
6.3.1. VDD = 2.4V, T_A = 25 °C



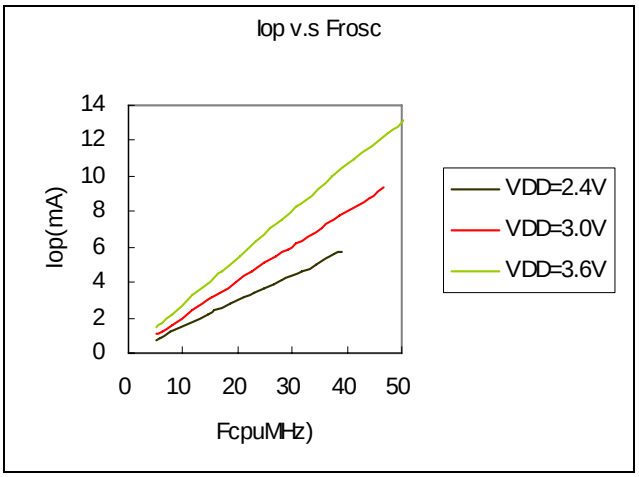
6.3.2. VDD = 3.0, T_A = 25 °C



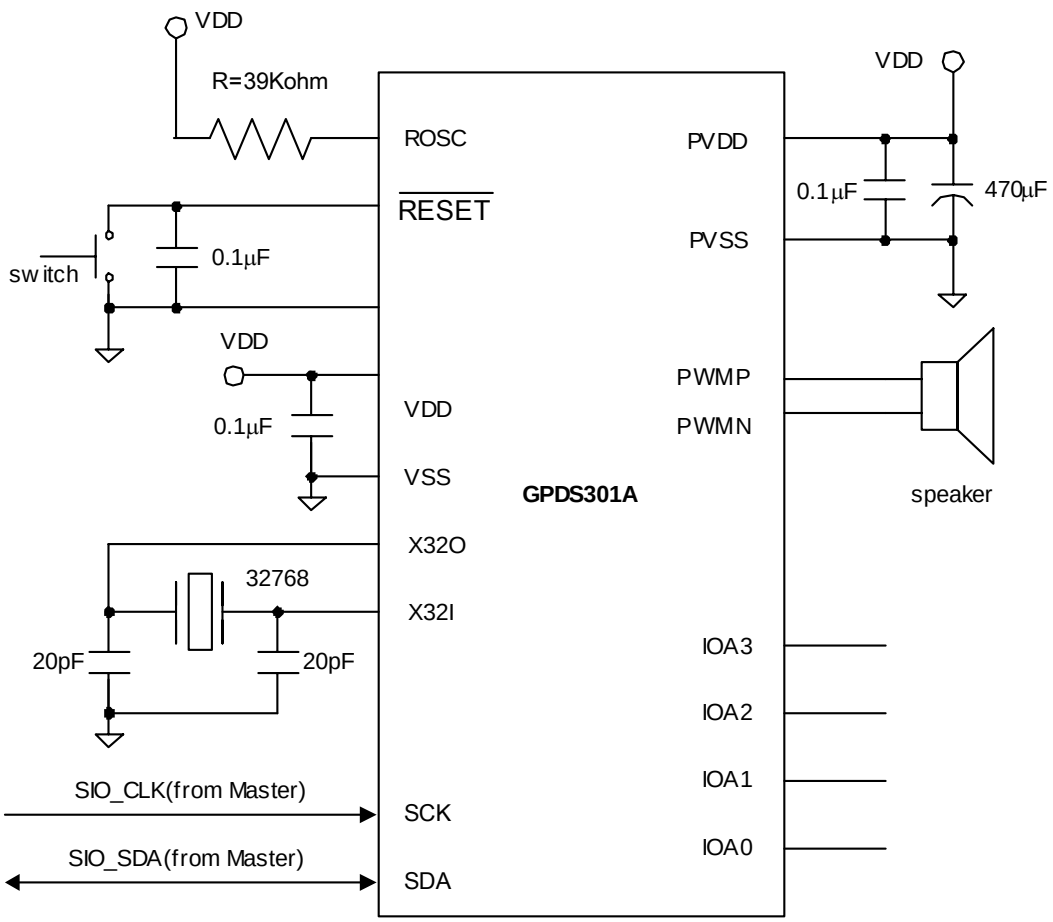
6.3.3. VDD = 3.6V, T_A = 25 °C



6.4. The Relationships between the F_{CPU} and the I_{OP}

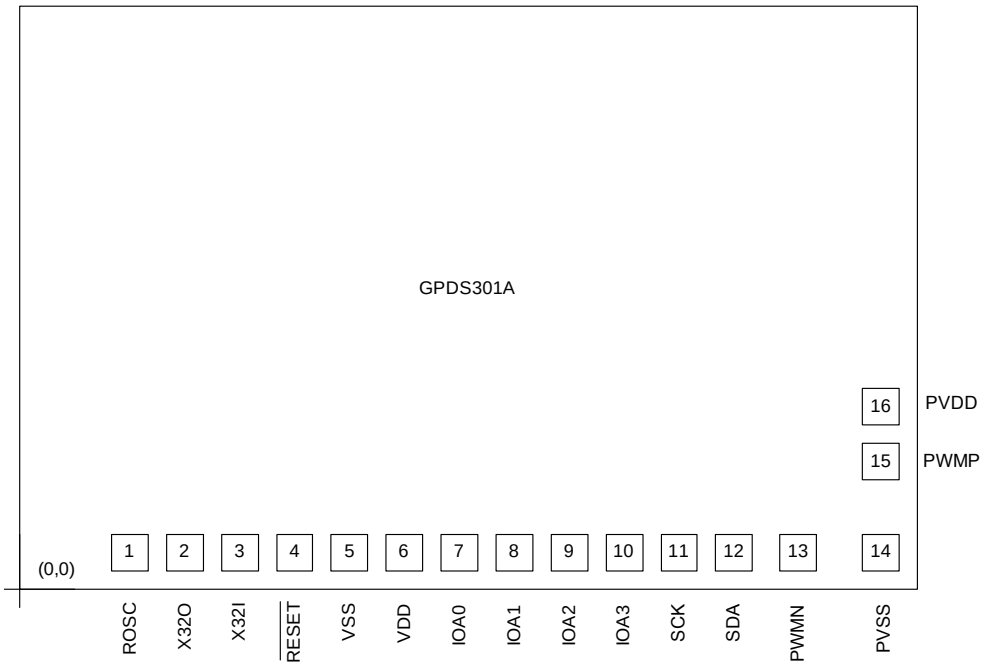


7. APPLICATION CIRCUIT



8. PACKAGE/PAD LOCATIONS

8.1. PAD Assignment



This IC substrate should be connected to VSS

Note1: To ensure that the IC functions properly, please bond all of VDD and VSS pins.
Note2: The 0.1μF capacitor between VDD and VSS should be placed to IC as close as possible.

8.2. Ordering Information

Product Number	Package Type
GPDS301A-NnnV-C	Chip form

Note1: Code number is assigned for customer.
Note2: Code number (N = A - Z or 0 - 9, nn = 00 - 99); version (V = A - Z).

9. DISCLAIMER

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10. REVISION HISTORY

Date	Revision #	Description	Page
NOV. 18, 2005	1.0	Original	10