nuvoTon

ISD15D00

Part No.	ISD15D00
Datasheet	ISD15D00.pdf
Description	The ISD15D00 is a digital ChipCorder ® featuring digital compression, comprehensive memory management, and integrated analog/digital audio signal paths. The ISD15D00 utilizes serial flash memory to provide non-volatile audio playback for a two-chip solution. The ISD15D00 provides an I 2S digital audio interface, faster digital programming, higher sampling frequency, and a signal path with SNR 80dB. ISD15D00 is the The ISD15D00 can take digital audio data via I 2S or SPI interface. When I 2S input is selected, it will replace the analog audio inputs and will support sample rates of 32, 44.1 or 48 kHz depending upon clock configuration. When SPI interface is chosen, the sample rate of the audio data sent must be one of the ISD15D00 supported sample rates. The ISD15D00 has inbuilt analog audio inputs, analog audio line driver, and speaker driver output. The analog audio input, Aux-in, has a fixed gain configured by SPI command. Aux-in can directly feed-through to the analog outputs; it can also mix with the DAC output and then feed-through to the analog outputs. Analog outputs are available in two forms: (1) Aux-out is an analog single-ended voltage output; (2) Class-AB BTL (bridge-tied-load) is an analog differential voltage output. Class-AB BTL delivers 1-watt output power at VCCSPK = 5V. Class-D PWM direct-drive is also available, which delivers 1-watt output power at VCCSPK = 5V
Diagram	
Features	External Memory: The ISD15D00 supports the following flash:

Manufacturer	Winbond		Numonyx			MXIC
Family	25X	25Q	25P	25PX	25PE	25L / 25V
JEDEC ID	EF 30 1X	EF 40 1X	20 20 1X	20 71 1X	20 80 1X	C2 20 1X

The addressing ability of ISD15D00 is up to 128Mbit, which is 64-minute playback time based on 8kHz/4bit ADPCM.
Inbuilt 3V voltage regulator to provide power source to the external flash memory
Fast Digital Programming
Programming rate can go up to 1Mbits/second mainly limited by the flash memory write rate.
Memory Management
Store pre-recorded audio (Voice Prompts) using high quality digital compression
Use a simple index-based command for playback
Execute pre-programmed macro scripts (Voice Macros) designed to control the configuration of the device and play back Voice Prompts sequences.
Sample Rate
Seven sampling frequencies are available for a given master sample rate. For example, the sampling frequencies of 4, 5.3, 6.4, 8, 12.8, 16 and 32kHz are available when the device is clocked at a 32kHz master sample rate.
For I 2S operation, 32, 44.1 and 48kHz master sample rates are available with playback sampling frequencies scaling accordingly.
Compression Algorithms
For Pre-Recorded Voice Prompts
μ-Law, Differential μ-Law, PCM, Enhanced ADPCM, Variable-bit-rate optimized compression. This allows best possible compression given a metric of SNR and background noise levels.
Oscillator
Internal oscillator with internal reference: Internal oscillator with external resistor, External crystal or clock input
I 2S bit clock input
Inputs
Aux-in: Analog input with 2-bit gain control configured by SPI command
Outputs
PWM: Class-D speaker driver to directly drive an 8Ω speaker or buzzer
Deliver 1-watt output power at VCCSPK = 5V
Aux-out: an analog single-ended voltage output
Class-AB BTL: an analog differential voltage output
Deliver 1-watt output power at VCCSPK = 5V
Class-AB BTL can directly drive an 8Ω speaker or buzzer
Class-AB BTL can drive an 8Ω speaker or buzzer via an external amplifier
I/Os
SPI interface: MISO, MOSI, SCLK, SSB for commands and digital audio data
I 2S interface: I 2S_CLK, I 2S_WS, I 2S_SDI, I 2S_SDO for digital audio data
8 GPIO pins:
GPIO pins can trigger Voice Macro for a pushbutton application
8-bit Volume Control set by SPI command for flexible mixing
Operating Voltage: 2.7 ~ 5.5V
Standby Current: 1uA typical
Package:
Green 48L-LQFP
Temperature Options:
Industrial: -40 ° C to 85 ° C

Package	48L-LQFP
Other Files	N/A
Development Tools	ISD-ES15D00 USB ISD-ES_Mni_USB
Others	N/A