



# ISD1400 Series

## Single-Chip Voice Record/Playback Devices

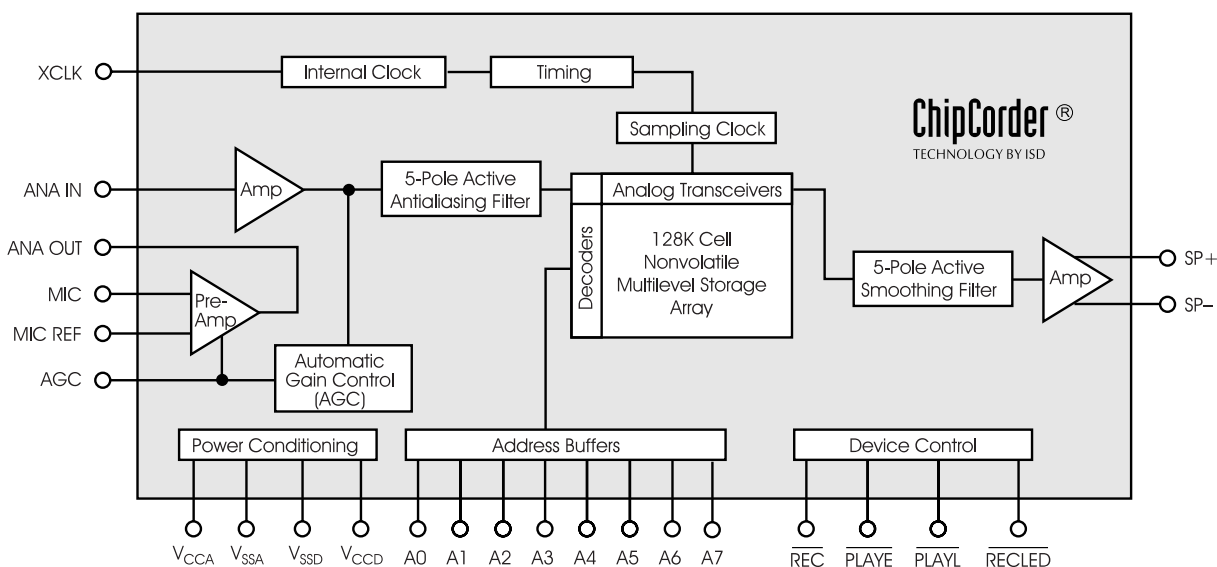
### 16- and 20-Second Durations

#### GENERAL DESCRIPTION

Information Storage Devices' ISD1400 ChipCorder® series provides high-quality, single-chip record/playback solutions to short-duration messaging applications. The CMOS devices include an on-chip oscillator, microphone preamplifier, automatic gain control, antialiasing filter, smoothing filter, and speaker amplifier. A minimum record/playback subsystem can be configured with a microphone, a speaker, several passives, two push-buttons, and a power source.

Recordings are stored in on-chip nonvolatile memory cells, providing zero-power message storage. This unique, single-chip solution is made possible through ISD's patented multilevel storage technology. Voice and audio signals are stored directly into memory in their natural form, providing high-quality, solid-state voice reproduction.

Figure: ISD1400 Series Block Diagram



**FEATURES**

- Easy-to-use single-chip voice record/playback solution
- High-quality, natural voice/audio reproduction
- Push-button interface
  - Playback can be edge- or level-activated
- Single-chip durations of 16 and 20 seconds
- Automatic power-down mode
  - Enters standby mode immediately following a record or playback cycle
  - Standby current 0.5  $\mu$ A (typical)
- Zero-power message storage
  - Eliminates battery backup circuits
- Fully addressable to handle multiple messages
- 100-year message retention (typical)
- 100,000 record cycles (typical)
- On-chip clock source
- No programmer or development system needed
- Single +5 volt power supply
- Available in die form, DIP, and SOIC packaging
- Industrial temperature (–40°C to +85°C) versions available

---

**Table: ISD1400 Series Summary**

<b>Part Number</b>	<b>Minimum Duration (Seconds)</b>	<b>Input Sample Rate (KHz)</b>	<b>Typical Filter Pass Band (KHz)</b>
ISD1416	16	8.0	3.3
ISD1420	20	6.4	2.6

# Table of Contents

---

## ISD1400 Series

Single-Chip Voice Record/Playback Devices  
16- and 20-Second Durations

DETAILED DESCRIPTION	1
Speech/Sound Quality	1
Duration	1
EEPROM Storage	1
Basic Operation	1
Automatic Power-Down Mode	1
Addressing (optional)	1
PIN DESCRIPTION	2
Voltage Inputs ( $V_{CCA}$ , $V_{CCD}$ )	2
Ground Inputs ( $V_{SSA}$ , $V_{SSD}$ )	2
Record ( $\overline{REC}$ )	2
Playback, Edge-Activated ( $\overline{PLAYE}$ )	2
Playback, Level-Activated ( $\overline{PLAYL}$ )	2
Record LED Output ( $\overline{RECLD}$ )	3
Microphone Input (MIC)	3
Microphone Reference (MIC REF)	3
Automatic Gain Control (AGC)	3
Analog Output (ANA OUT)	3
Analog Input (ANA IN)	3
External Clock Input (XCLK)	3
Speaker Outputs (SP+, SP-)	4
Address Inputs (A0–A7)	4
OPERATIONAL MODES	4
OPERATIONAL MODES DESCRIPTION	5
A0 — Message Cueing	5
A1 — Delete EOM Markers	5
A2 — Unused	5
A3 — Message Looping	5
A4 — Consecutive Addressing	5
A5 — Unused	5
TIMING DIAGRAMS	6
TYPICAL PARAMETER VARIATION WITH VOLTAGE AND TEMPERATURE (PACKAGED PARTS)	10
TYPICAL PARAMETER VARIATION WITH VOLTAGE AND TEMPERATURE (DIE)	14
FUNCTIONAL DESCRIPTION EXAMPLE	15
APPLICATIONS NOTE	16
ISD1400 SERIES PHYSICAL DIMENSIONS	17
ORDERING INFORMATION	21

## FIGURES, CHARTS, AND TABLES IN THE ISD1400 SERIES DATASHEET

Figure 1:	ISD1400 Series Pinouts	2
Figure 2:	Record	6
Figure 3:	Playback	6
Figure 4:	Application Example	15
Figure 5:	28-Lead 0.600-Inch Plastic Dual Inline Package (PDIP) (P)	17
Figure 6:	28-Lead 0.300-Inch Plastic Small Outline Integrated Circuit (SOIC) (S)	18
Figure 7:	ISD1400 Series Bonding Physical Layout	19
Chart 1:	Record Mode Operating Current ( $I_{CC}$ )	10
Chart 2:	Total Harmonic Distortion	10
Chart 3:	Standby Current ( $I_{SB}$ )	10
Chart 4:	Oscillator Stability	10
Chart 5:	Record Mode Operating Current ( $I_{CC}$ )	14
Chart 6:	Total Harmonic Distortion	14
Chart 7:	Standby Current ( $I_{SB}$ )	14
Chart 8:	Oscillator Stability	14
Table 1:	Device Playback/Record Durations	1
Table 2:	External Clock Sample Rates	3
Table 3:	Operational Modes Table	5
Table 4:	Absolute Maximum Ratings (Packaged Parts)	7
Table 5:	Operating Conditions (Packaged Parts)	7
Table 6:	DC Parameters (Packaged Parts)	7
Table 7:	AC Parameters (Packaged Parts)	8
Table 8:	Absolute Maximum Ratings (Die)	11
Table 9:	Operating Conditions (Die)	11
Table 10:	DC Parameters (Die)	11
Table 11:	AC Parameters (Die)	12
Table 12:	Plastic Dual Inline Package (PDIP) (P) Dimensions	17
Table 13:	Plastic Small Outline Integrated Circuit (SOIC) (S) Dimensions	18
Table 14:	ISD1400 Series PIN/PAD Designations, with Respect to Die Center ( $\mu\text{m}$ )	20