

OKI Semiconductor

MSM6295

4-Channel Mixing ADPCM Voice Synthesis IC

GENERAL DESCRIPTION

The MSM6295 can access an external ROM, where voice or sound effects data is stored. The maximum external ROM size is 256 Kbytes.

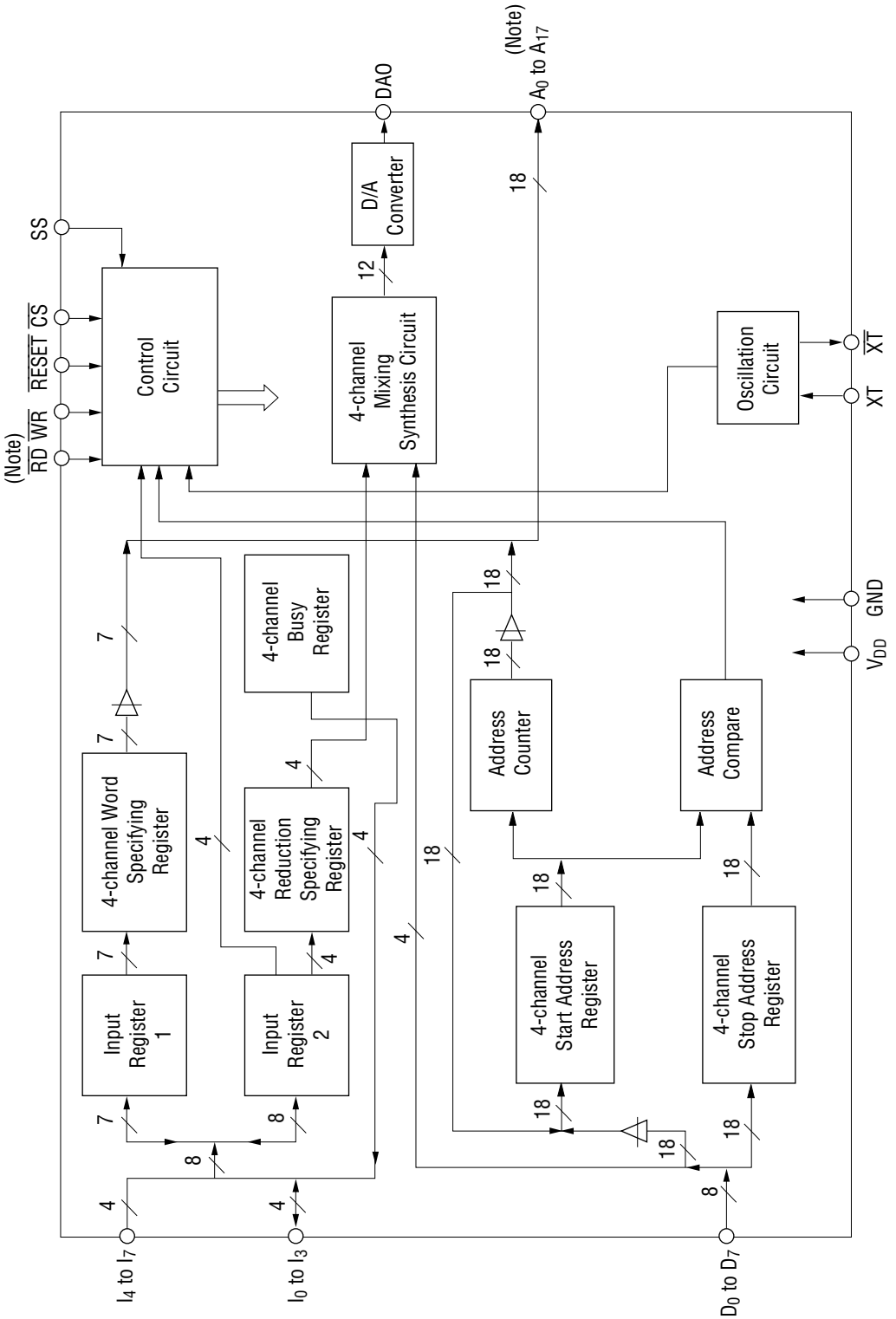
The MSM6295 has a 4-channel synthesis stage which allows the simultaneous playback of four different channels. It is used to have a voice with BGM (background music) effect, instrumental sound, echo, etc.

FEATURES

- 4-bit ADPCM method
- External ROM capacity: MSM6295GS-K/-2K: 2 Mbits (Max.)
MSM6295VRS: 1 Mbit (Max.)
- Interface with common CPU and MPU
- Sampling frequency: 6.4 kHz and 8 kHz (@1.056 MHz clock)
25.6 kHz and 32 kHz (@4.224 MHz clock)
- Voice level attenuation: 0dB to -24dB (9 steps)
Attenuation on each channel: -3dB/step
- Low power CMOS process
- 5 V single power supply
- Number of mixing channels: 4 (Max.)
- Package options:
44-pin plastic QFP (QFP44-P-910-K) (Product name: MSM6295GS-K)
44-pin plastic QFP (QFP44-P-910-2K) (Product name: MSM6295GS-2K)
42-pin plastic DIP (DIP42-P-600) (Product name: MSM6295VRS) (Note)

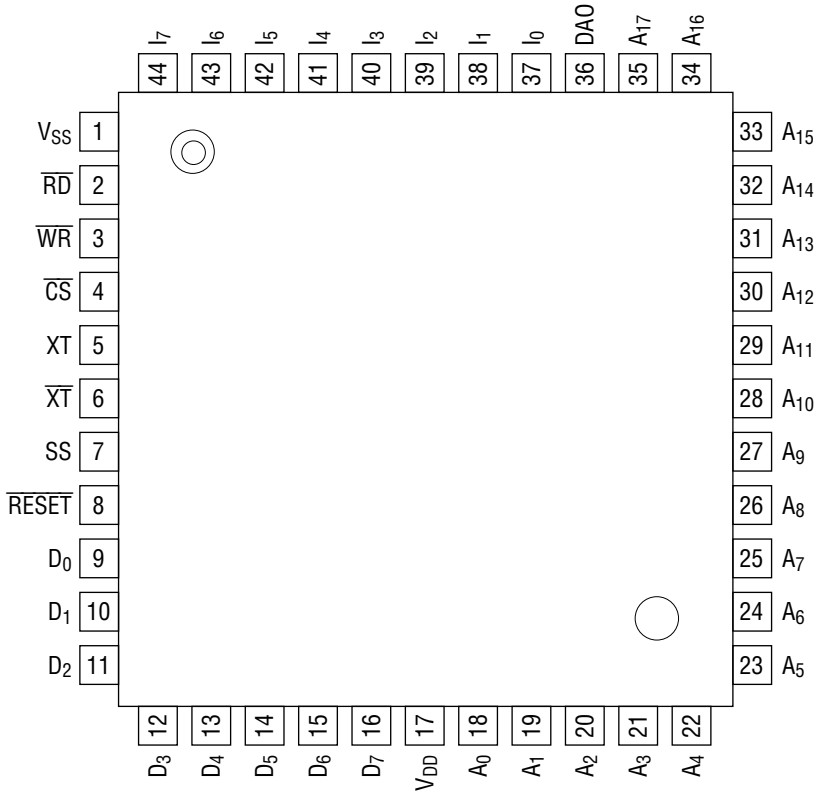
Note: Since the 42-pin DIP type MSM6295VRS does not have Pin A17, the external ROM capacity is limited to up to 1 Mbit. Moreover, since the IC does not have the \overline{RD} pin either, the busy status cannot be read.

BLOCK DIAGRAM

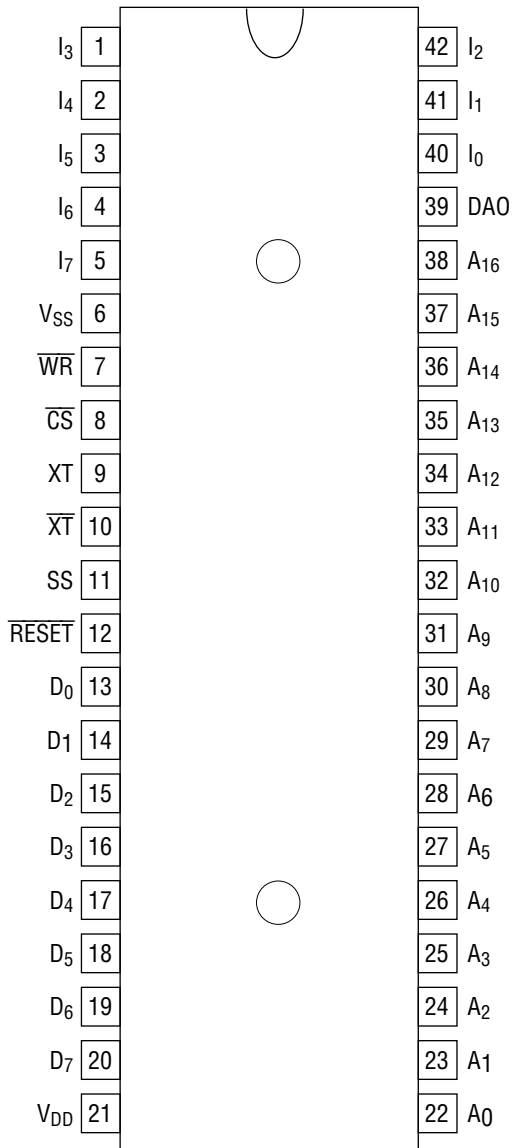


Note: The MSM6295VRS does not have pins \overline{RD} and A17.

PIN CONFIGURATION (TOP VIEW)



44-Pin Plastic QFP



42-Pin Plastic DIP

PIN DESCRIPTION

| Pin | Symbol | Type | Description | | | | | | | | | |
|---------------------------------|--|--------------|---|--|----------|----------|---------------------------------|-------|---------|---------------------------------|--------|----------|
| 37 | I ₀ | I/O | Instruction bus and condition outputs These pins are inputs for phrase specification. Maximum number of phrases is 127. I ₀ to I ₃ pins are also outputs of the operating state, busy state, for channels 1 to 4 and are further used to select the channel attenuation rate. | | | | | | | | | |
| 38 | I ₁ | I/O | | | | | | | | | | |
| 39 | I ₂ | I/O | | | | | | | | | | |
| 40 | I ₃ | I/O | | | | | | | | | | |
| 41 | I ₄ | I | | | | | | | | | | |
| 42 | I ₅ | I | | | | | | | | | | |
| 43 | I ₆ | I | | | | | | | | | | |
| 44 | I ₇ | I | | | | | | | | | | |
| 3 | \overline{WR} | I | Write enable input Data is written on the data bus of I ₀ to I ₇ . The data is written when \overline{WR} goes low. | | | | | | | | | |
| 2 | \overline{RD} (Note) | I | Read enable input The output busy state of channels 1 to 4 on the data bus of I ₀ to I ₃ , can be read using this input. A high level indicates busy. | | | | | | | | | |
| 4 | \overline{CS} | I | Chip select input Input "L" level either when \overline{WR} signal is input or when \overline{RD} signal is input. | | | | | | | | | |
| 8 | \overline{RESET} | I | Reset input Reset condition is available by inputting "L" level. All functions are suspended during reset. | | | | | | | | | |
| 18 to 35 | A ₀ to A ₁₇ (Note) | I to I | Address outputs These pins are to address the external ROM in which voice data is stored. | | | | | | | | | |
| 9 to 16 | D ₀ to D ₇ | I to I | Voice data inputs | | | | | | | | | |
| 7 | SS | I | Sampling frequency select input When oscillation frequency is 1.056 MHz or 4.224 MHz, the following choices are available by inputting "H" level or "L" level to SS. <table border="1" data-bbox="443 1367 1169 1479"> <thead> <tr> <th></th> <th>SS = "H"</th> <th>SS = "L"</th> </tr> </thead> <tbody> <tr> <td>Oscillation frequency 1.056 MHz</td> <td>8 kHz</td> <td>6.4 kHz</td> </tr> <tr> <td>Oscillation frequency 4.224 MHz</td> <td>32 kHz</td> <td>25.6 kHz</td> </tr> </tbody> </table> | | SS = "H" | SS = "L" | Oscillation frequency 1.056 MHz | 8 kHz | 6.4 kHz | Oscillation frequency 4.224 MHz | 32 kHz | 25.6 kHz |
| | SS = "H" | SS = "L" | | | | | | | | | | |
| Oscillation frequency 1.056 MHz | 8 kHz | 6.4 kHz | | | | | | | | | | |
| Oscillation frequency 4.224 MHz | 32 kHz | 25.6 kHz | | | | | | | | | | |
| 36 | DAO | O | Voice synthesis output Voice synthesized analog signal is output from this pin. | | | | | | | | | |
| 5 | XT | I | Crystal oscillator pin | | | | | | | | | |
| 6 | \overline{XT} | O | Crystal oscillator pin | | | | | | | | | |
| 17 | V _{DD} | — | Power supply pin. Insert a bypass capacitor of 0.1 μF or more between this pin and the V _{SS} pin. | | | | | | | | | |
| 1 | V _{SS} | — | Ground | | | | | | | | | |

Note: The MSM6295VRS does not have the \overline{RD} and A₁₇ pins.

ABSOLUTE MAXIMUM RATINGS

| Parameter | Symbol | Condition | Rating | Unit |
|----------------------|-----------|--------------------------|------------------------|------------------|
| Power Supply Voltage | V_{DD} | $T_a = 25^\circ\text{C}$ | -0.3 to +7.0 | V |
| Input Voltage | V_{IN} | $T_a = 25^\circ\text{C}$ | -0.3 to $V_{DD} + 0.3$ | V |
| Storage Temperature | T_{STG} | — | -55 to +150 | $^\circ\text{C}$ |

RECOMMENDED OPERATING CONDITIONS

| Parameter | Symbol | Condition | Range | Unit |
|-----------------------|-----------|-----------------------|-------------|------------------|
| Power Supply Voltage | V_{DD} | $V_{SS} = 0\text{ V}$ | 4.5 to +5.5 | V |
| Operating Temperature | T_{op} | $V_{SS} = 0\text{ V}$ | -40 to +85 | $^\circ\text{C}$ |
| Oscillation Frequency | f_{OSC} | $V_{SS} = 0\text{ V}$ | 1 to 5 | MHz |

ELECTRICAL CHARACTERISTICS

DC Characteristics

($V_{DD} = 4.5$ to 5.5 V , $V_{SS} = 0\text{ V}$, $T_a = -40$ to $+85^\circ\text{C}$)

| Parameter | Symbol | Condition | Min. | Typ. | Max. | Unit |
|--------------------------|-------------|-----------------------------------|------|------|------|------------------|
| "L" Input Current | I_{IL} | $V_{IL} = V_{SS}$ | -10 | — | — | μA |
| "H" Input Current | I_{IH} | $V_{IH} = V_{DD}$ | — | — | 10 | |
| "L" Input Voltage | V_{IL} | — | — | — | 0.8 | V |
| "H" Input Voltage | V_{IH} | — | 2.4 | — | — | |
| "L" Output Voltage | V_{OL} | $I_{OL} = 0.8\text{ mA}$ | — | — | 0.45 | V |
| "H" Output Voltage | V_{OH} | $I_{OH} = -40\ \mu\text{A}$ | 3.7 | — | — | |
| Output Leakage Current | I_{LO} | $V_{SS} \leq V_{OUT} \leq V_{DD}$ | -10 | — | 10 | μA |
| Operating Current | I_{DD} | $f_{OSC} = 5.0\text{ MHz}$ | — | 5 | 10 | mA |
| DA Output Relative error | $ V_{DAE} $ | No load | — | — | 20 | mV |
| DA Output Impedance | R_{DAOUT} | — | — | 15 | — | $\text{k}\Omega$ |

APPLICATION CIRCUIT

