

PRELIMINARY

Notice: This is not a final specification.
Some parametric limits are subject to change.

MITSUBISHI SOUND PROCESSOR ICs

M62429P/FP

SERIAL DATA CONTROL DUAL ELECTRONIC VOLUME

DESCRIPTION

The M62429 is a dual channel electronic volume controlled with 2-wire serial data.

The built-in reference circuit can compose of an electronic volume with less external parts.

FEATURES

- Built-in reference circuit
- Control with serial data
Volume 0 to -83dB (1dB/step), $-\infty$
(Independent control is allowed in each channel)
- Low noise and low distortion
 $VNO = 5\mu V_{rms}$ (ATT = $-\infty$, JIS-A)
 $THD = 0.01\%$ Typ. ($V_0 = 0.5V_{rms}$, DIN-AUDIO)



Outline 8P4 (P)
2.54mm pitch 300mil DIP
(6.3mmx8.9mmx3.3mm)



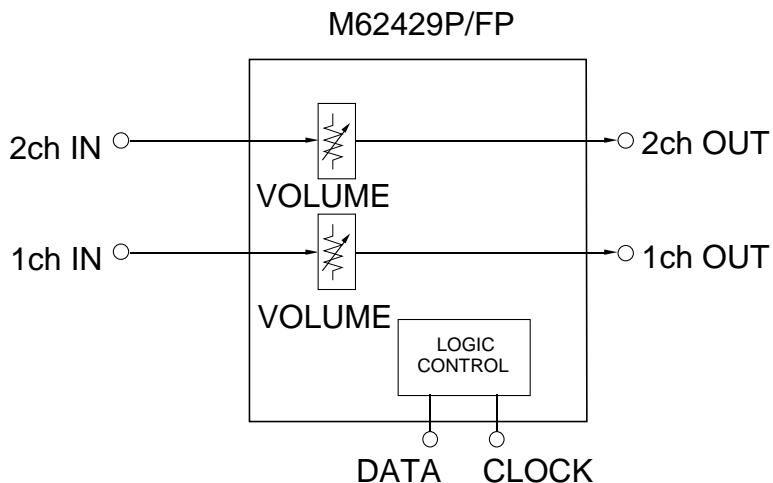
Outline 8P2S-A(FP)
1.27mm pitch 225mil SOP
(4.4mmx5.0mmx1.5mm)

RECOMMENDED OPERATING CONDITIONS

Supply voltage range..... $V_{cc} = 4.5$ to $5.5V$

Rated supply voltage..... $V_{cc} = 5V$

SYSTEM CONFIGURATION



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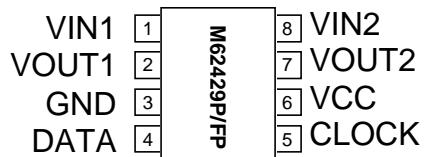
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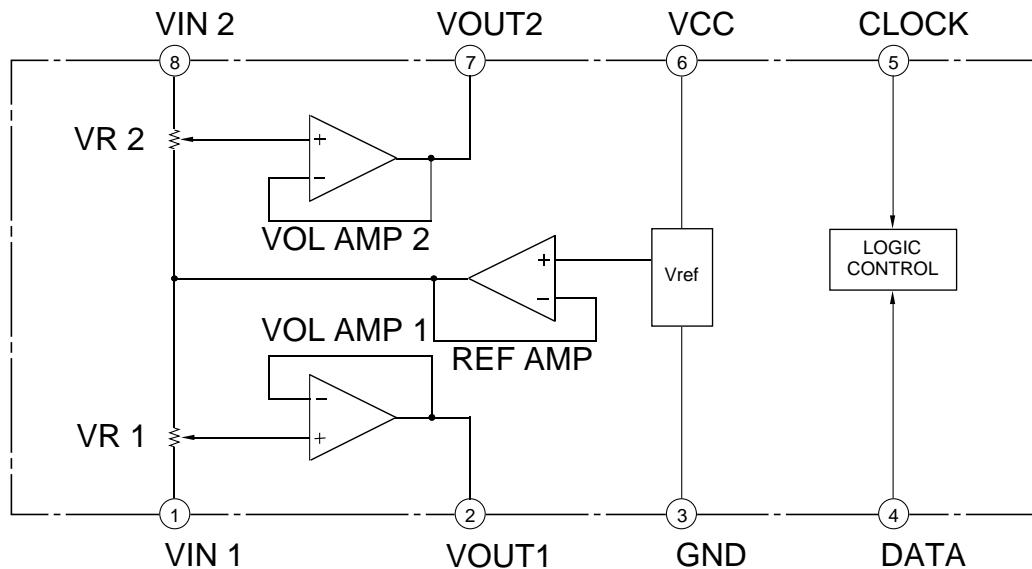
SERIAL DATA CONTROL DUAL ELECTRONIC VOLUME

PIN CONFIGURATION (TOP VIEW)



Outline 8P4(P)
8P2S-A(FP)

IC INTERNAL BLOCK DIAGRAM



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SERIAL DATA CONTROL DUAL ELECTRONIC VOLUME**PIN DESCRIPTION**

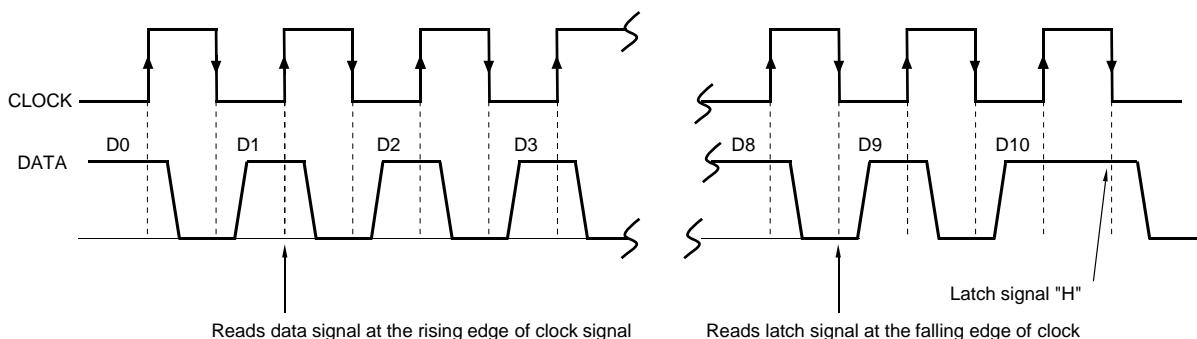
| Pin No. | Symbol | Function |
|---------|--------|--|
| ① | VIN1 | 1-ch input pin |
| ② | VOUT1 | 1-ch output pin |
| ③ | GND | Ground pin |
| ④ | DATA | Control data input pin. Inputs data in synchronization with clock. |
| ⑤ | CLOCK | Clock input pin for transferring serial data. |
| ⑥ | Vcc | Power supply pin. Stabilize the pin with decoupling capacitor. |
| ⑦ | VOUT2 | 2-ch output pin |
| ⑧ | VIN2 | 1-ch input pin |

ABSOLUTE MAXIMUM RATINGS

| Symbol | Parameter | Ratings | Unit |
|----------|-----------------------|-----------------|------|
| Vcc, VDD | Supply voltage | 6.0 | V |
| Pd | Power dissipation | 625(P), 440(FP) | mW |
| Topr | Operating temperature | -20 to +75 | °C |
| Tstg | Storage temperature | -55 to +125 | °C |

ELECTRICAL CHARACTERISTICS ($V_{cc} = 5V$, $T_a = 25^{\circ}\text{C}$, unless otherwise noted)

| Symbol | Parameter | Test conditions | Limits | | | Unit |
|--------|---------------------------|---------------------------|--------|------|------|-------|
| | | | Min. | Typ. | Max. | |
| Icc | Circuit current | | | 8 | 16 | mA |
| ATT | Maximum attenuation | ATT=- | - | -90 | -80 | dB |
| ATT | Attenuation error | ATT=0 | -2.0 | 0 | 2.0 | dB |
| VIM | Maximum input voltage | THD=1%, ATT=-6dB | 1.5 | 1.7 | - | Vrms |
| VOM | Maximum output voltage | THD=1% | 0.8 | 1.3 | - | Vrms |
| VNO1 | Output noise voltage | ATT=0, Rg=0, JIS-A | - | 4 | 10 | µVrms |
| VNO2 | | ATT=-, Rg=0, JIS-A | - | 5 | 10 | µVrms |
| THD | Total harmonic distortion | f=1kHz, Vo=0.5Vrms, ATT=0 | - | 0.01 | 0.05 | % |
| CS | Channel separation | f=1kHz, JIS-A | - | -80 | -70 | dB |

RELATIONSHIP BETWEEN DATA AND CLOCK

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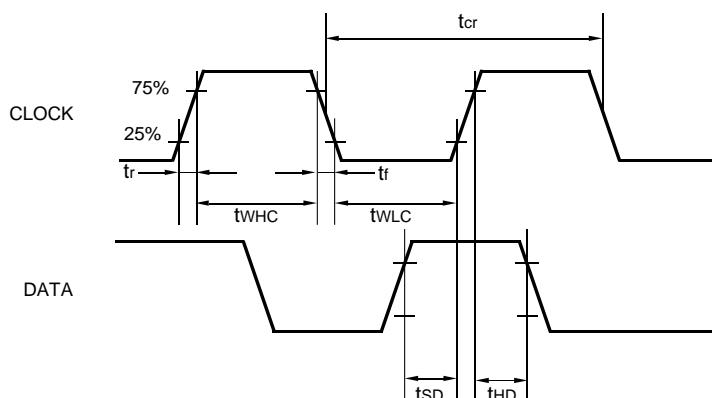
DC CHARACTERISTICS OF DIGITAL BLOCK

| Symbol | Parameter | Test conditions | Limits | | | Unit |
|-----------------|-------------------------|--------------------|--------------------|------|--------------------|------------|
| | | | Min. | Typ. | Max. | |
| V _{IL} | "L" level input voltage | Data, clock pin | 0 | ~ | 0.2V _{cc} | V |
| V _{IH} | "H" level input voltage | | 0.8V _{cc} | ~ | V _{cc} | V |
| I _{IL} | "L" level input current | V _i =0 | Data, clock pin | -10 | - | 10 μ A |
| I _{IH} | "H" level input current | V _i =5V | | - | - | 10 μ A |

AC CHARACTERISTICS OF DIGITAL BLOCK

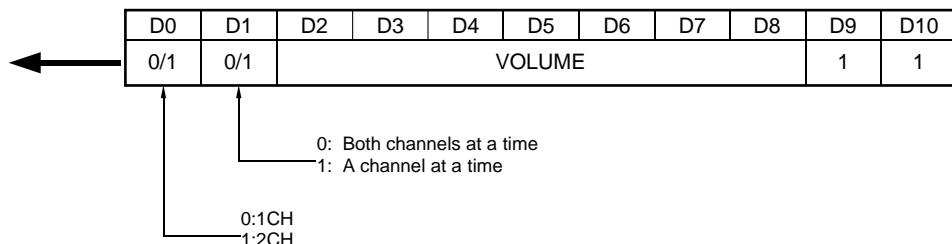
| Symbol | Parameter | Test conditions | Limits | | | Unit |
|------------------|----------------------------------|-----------------|--------|------|------|---------|
| | | | Min. | Typ. | Max. | |
| t _{cr} | Cycle time of clock | | 4 | - | - | μ s |
| t _{WHC} | Pulse width of clock ("H" level) | | 1.6 | - | - | μ s |
| t _{WLC} | Pulse width of clock ("L" level) | | 1.6 | - | - | μ s |
| t _r | Clock rising time | | - | - | 0.4 | μ s |
| t _f | Clock falling time | | - | - | 0.4 | μ s |
| t _{SD} | Data setup time | | 0.8 | - | - | μ s |
| t _{HD} | Data hold time | | 0.8 | - | - | μ s |

CLOCK AND DATA TIMING



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SERIAL DATA CONTROL DUAL ELECTRONIC VOLUME**DATA INPUT FORMAT****VOLUME CODE**

| ATT1 | D2 | D3 | D4 | D5 | D6 |
|-------|----|----|----|----|----|
| 0dB | H | L | H | L | H |
| -4dB | L | L | H | L | H |
| -8dB | H | H | L | L | H |
| -12dB | L | H | L | L | H |
| -16dB | H | L | L | L | H |
| -20dB | L | L | L | L | H |
| -24dB | H | H | H | H | L |
| -28dB | L | H | H | H | L |
| -32dB | H | L | H | H | L |
| -36dB | L | L | H | H | L |
| -40dB | H | H | L | H | L |
| -44dB | L | H | L | H | L |
| -48dB | H | L | L | H | L |
| -52dB | L | L | L | H | L |
| -56dB | H | H | H | L | L |
| -60dB | L | H | H | L | L |
| -64dB | H | L | H | L | L |
| -68dB | L | L | H | L | L |
| -72dB | H | H | L | L | L |
| -76dB | L | H | L | L | L |
| -80dB | H | L | L | L | L |
| - | L | L | L | L | L |

| ATT2 | D7 | D8 |
|------|----|----|
| 0dB | H | H |
| -1dB | L | H |
| -2dB | H | L |
| -3dB | L | L |

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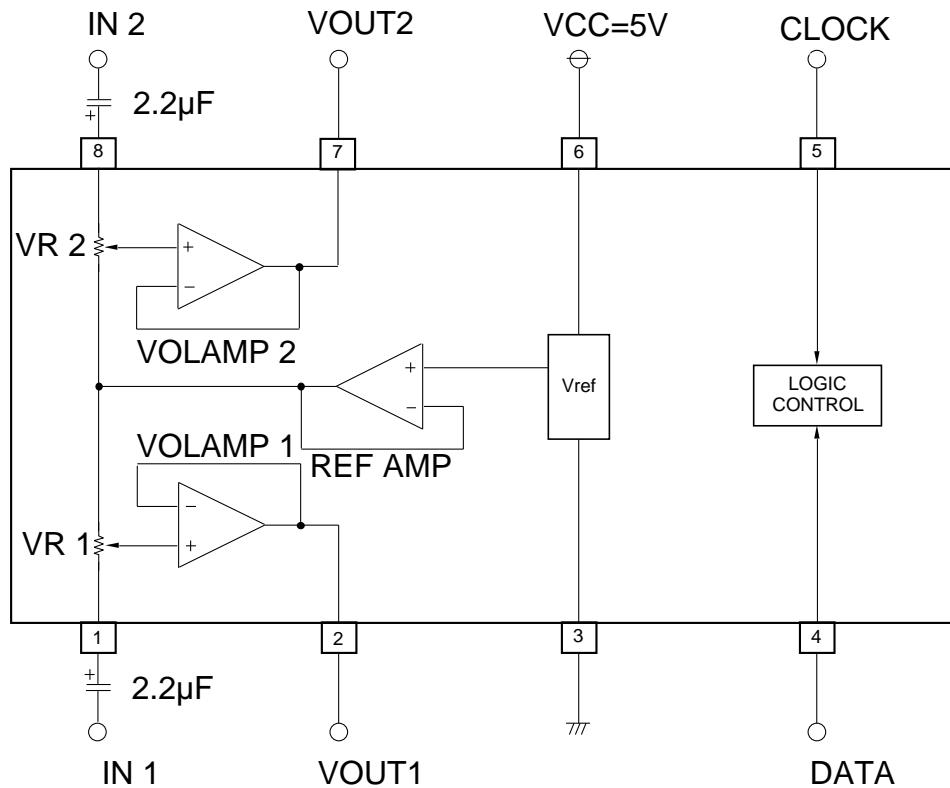
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APPLICATION EXAMPLE



Units Resistance :
Capacitance : F