

# M62429P/FP

## Serial Data Control Dual Electronic Volume

REJ03F0209-0300  
Rev.3.00  
Jun 15, 2007

### 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

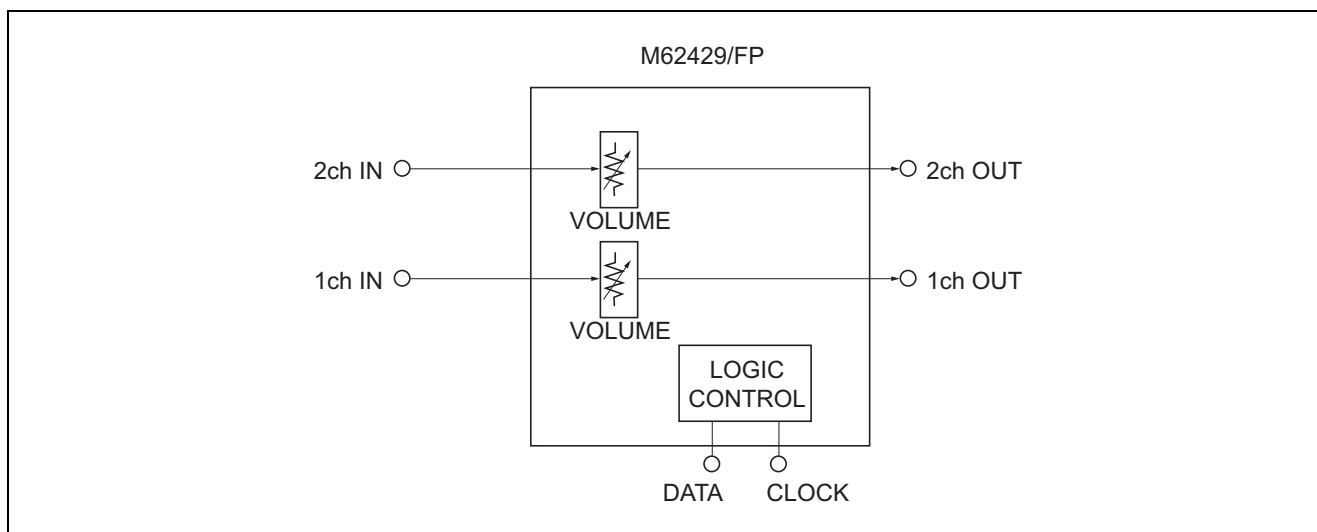
- Built-in reference circuit
- Control with serial data  
Volume 0 to  $-83$  dB (1 dB/step),  $-\infty$   
(Independent control is allowed in each channel)
- Low noise and low distortion  
VNO =  $5 \mu\text{Vrms}$  (ATT =  $-\infty$ , JIS-A)  
THD = 0.01 % Typ. (V0 = 0.5 Vrms, DIN-AUDIO)

### Recommended Operating Conditions

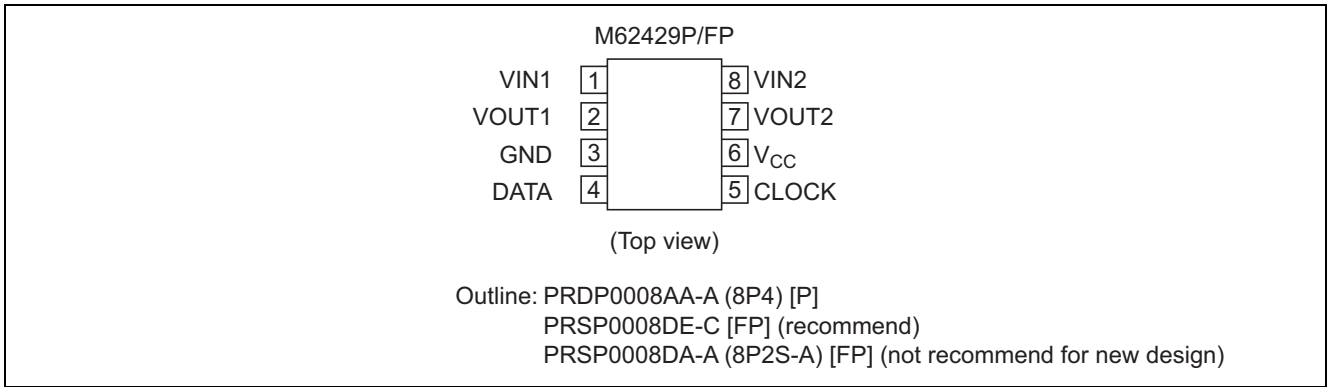
Supply voltage range:  $V_{CC} = 4.5$  to  $5.5$  V

Rated supply voltage:  $V_{CC} = 5$  V

### System Block Diagram



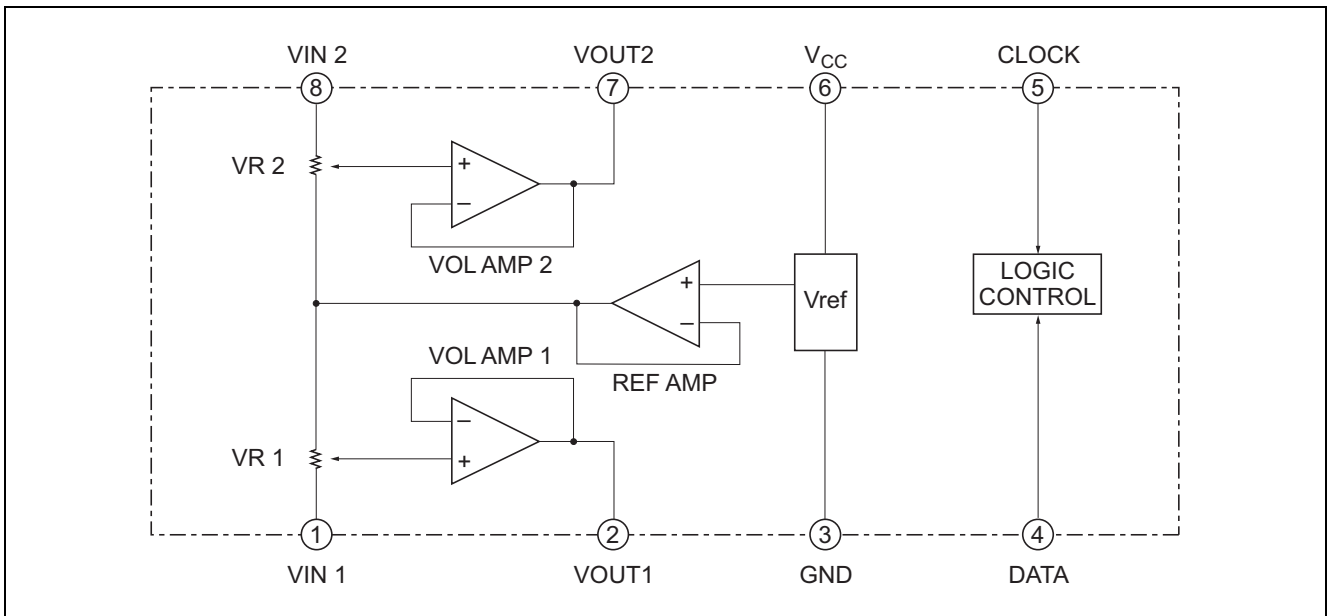
## Pin Arrangement



## 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	V <sub>CC</sub>	Power supply pin. Stabilize the pin with decoupling capacitor.
7	VOUT2	2-ch output pin
8	VIN2	2-ch input pin

## IC Internal Block Diagram



## Absolute Maximum Ratings

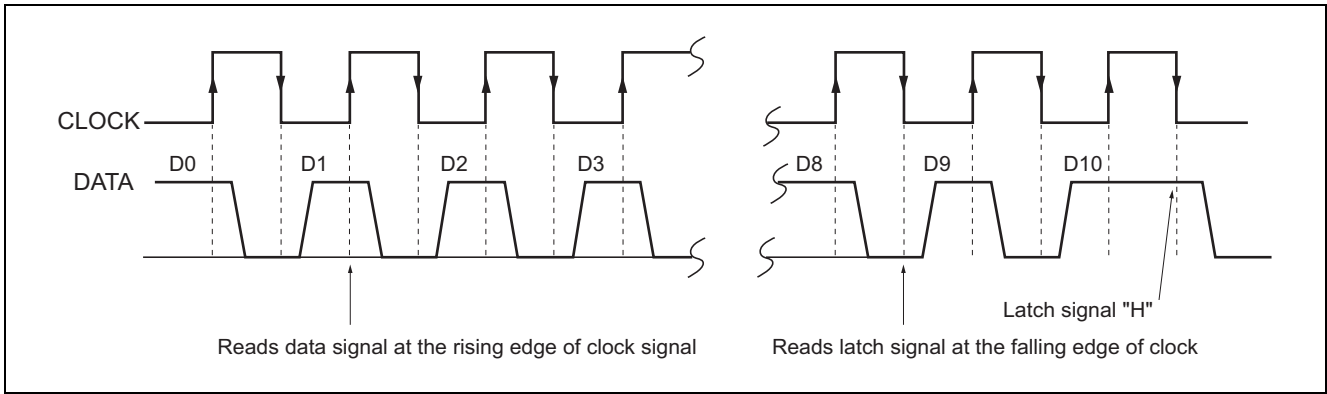
Item	Symbol	Ratings	Unit
Supply voltage	$V_{CC}, V_{DD}$	6.0	V
Power dissipation	$P_d$	625 (P), 440 (FP)	mW
Operating temperature	$T_{opr}$	-20 to +75	°C
Storage temperature	$T_{stg}$	-55 to +125	°C

## Electrical Characteristics

( $V_{CC} = 5\text{ V}$ ,  $T_a = 25\text{ °C}$ , unless otherwise noted)

Item	Symbol	Limits			Unit	Conditions
		Min	Typ	Max		
Circuit current	$I_{CC}$	—	8	16	mA	
Maximum attenuation	$A_{TT}$	—	-90	-80	dB	$A_{TT} = -\infty$
Attenuation error	$\Delta A_{TT}$	-2.0	0	2.0	dB	$A_{TT} = 0$
Maximum input voltage	$V_{IM}$	1.5	1.7	—	V <sub>rms</sub>	THD = 1 %, $A_{TT} = -6\text{ dB}$
Maximum output voltage	$V_{OM}$	0.8	1.3	—	V <sub>rms</sub>	THD = 1 %
Output noise voltage	$V_{NO1}$	—	4	10	$\mu\text{V}_{rms}$	$A_{TT} = 0$ , $R_g = 0$ , JIS-A
	$V_{NO2}$	—	5	10		$A_{TT} = -\infty$ , $R_g = 0$ , JIS-A
Total harmonic distortion	THD	—	0.01	0.05	%	$f = 1\text{ kHz}$ , $V_o = 0.5\text{ V}_{rms}$ , $A_{TT} = 0$
Channel separation	CS	—	-80	-70	dB	$f = 1\text{ kHz}$ , JIS-A

## Relationship between Data and Clock



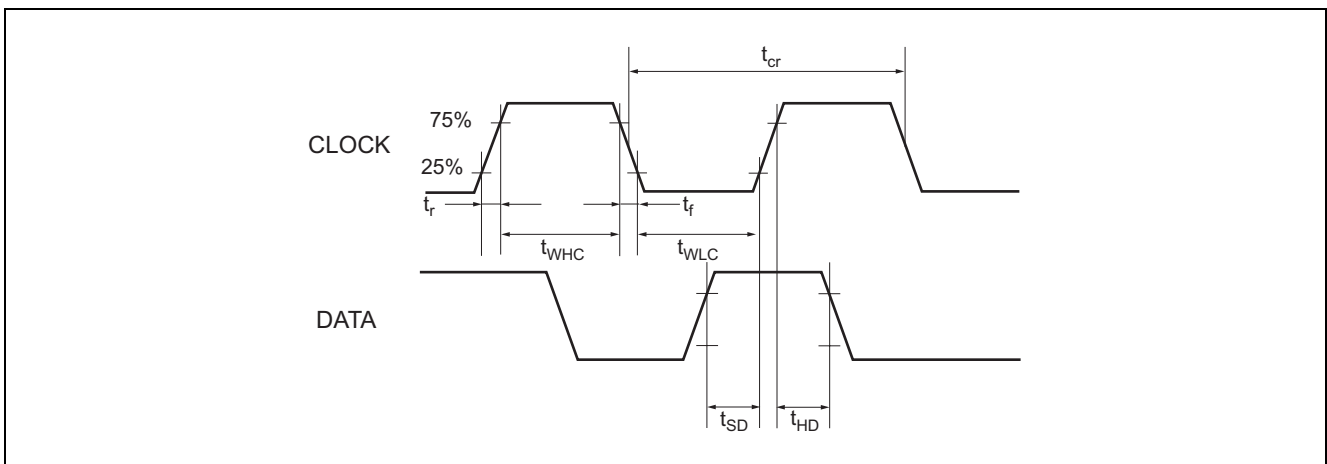
### DC Characteristics of Digital Block

Item	Symbol	Limits			Unit	Test Conditions	
		Min	Typ	Max			
"L" level input voltage	$V_{IL}$	0	~	$0.2 V_{CC}$	V	Data, clock pin	
"H" level input voltage	$V_{IH}$	$0.8 V_{CC}$	~	$V_{CC}$	V		
"L" level input current	$I_{IL}$	-10	—	10	$\mu A$	$V_I = 0$	Data, clock pin
"H" level input current	$I_{IH}$	—	—	10	$\mu A$	$V_I = 5 V$	

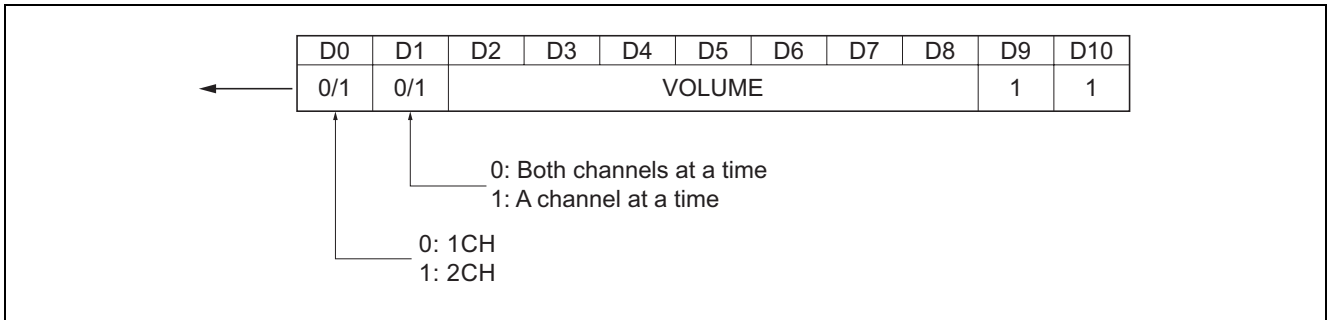
### AC Characteristics of Digital Block

Item	Symbol	Limits			Unit
		Min	Typ	Max	
Cycle time of clock	$t_{cr}$	4	—	—	$\mu S$
Pulse width of clock ("H" level)	$t_{WHC}$	1.6	—	—	$\mu S$
Pulse width of clock ("L" level)	$t_{WLC}$	1.6	—	—	$\mu S$
Clock rising time	$t_r$	—	—	0.4	$\mu S$
Clock falling time	$t_f$	—	—	0.4	$\mu S$
Data setup time	$t_{SD}$	0.8	—	—	$\mu S$
Data hold time	$t_{HD}$	0.8	—	—	$\mu S$

### Clock and Data Timing



## Data Input Format

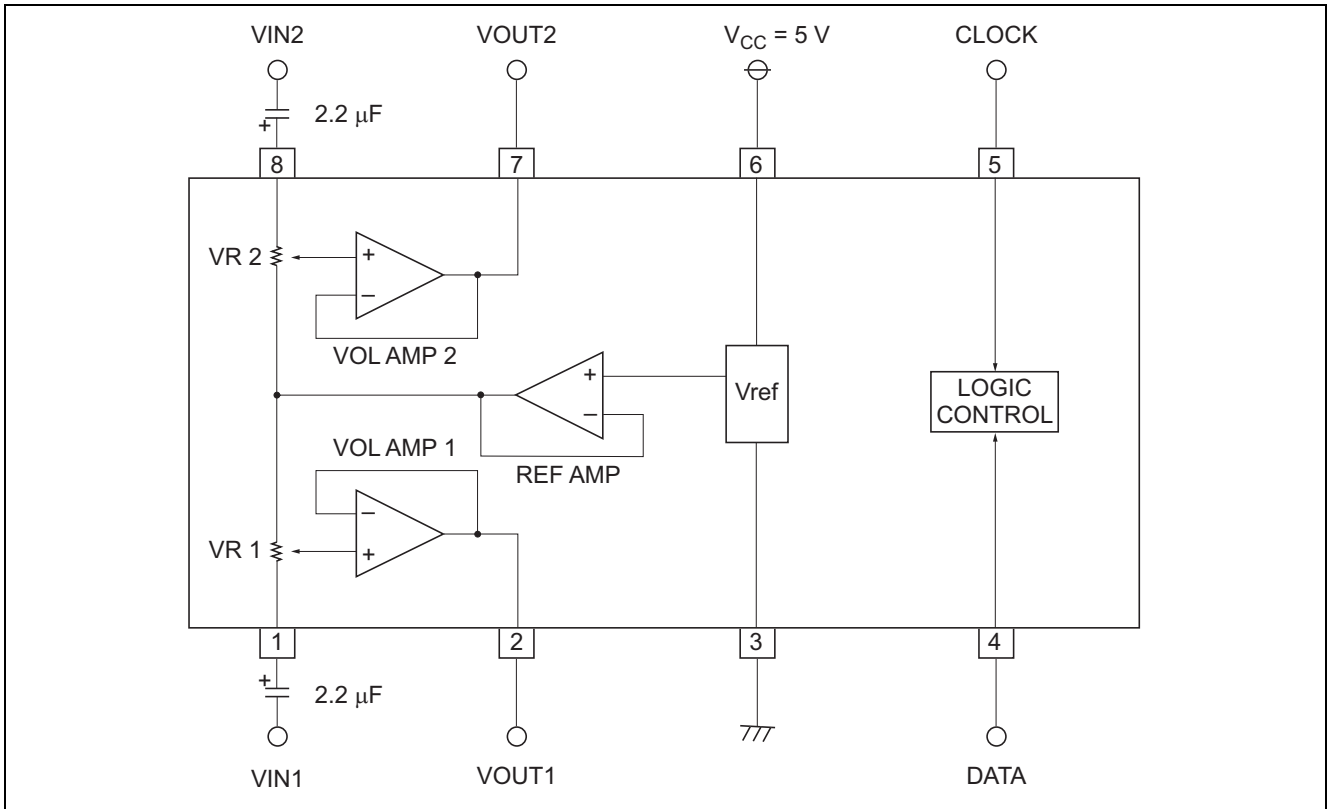


## Volume Code

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

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

Application Example



### Package Dimensions

JEITA Package Code	RENEASAS Code	Previous Code	MASS[Typ.]
P-DIP8-6.3x8.84-2.54	PRDP008AA-A	8P4	0.5g

NOTE)

- DIMENSIONS \*\*1\* AND \*\*2\* DO NOT INCLUDE MOLD FLASH.
- DIMENSION \*\*3\* DOES NOT INCLUDE TRIM OFFSET.

Reference Symbol	Dimension in Millimeters		
	Min	Nom	Max
e1	7.32	7.62	7.92
D	8.7	8.9	9.1
E	6.15	6.3	6.45
A	—	—	4.5
A1	0.51	—	—
A2	—	3.3	—
bp	0.4	0.5	0.6
b2	0.9	1.0	1.3
b3	1.4	1.5	1.8
c	0.22	0.27	0.34
θ	0°	—	15°
e	2.29	2.54	2.79
L	3.0	—	—

JEITA Package Code	RENEASAS Code	Previous Code	MASS[Typ.]
P-SOP8-4.4x4.85-1.27	PRSP008DE-C	—	0.1g

NOTE)

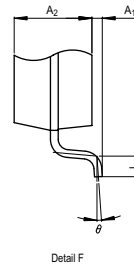
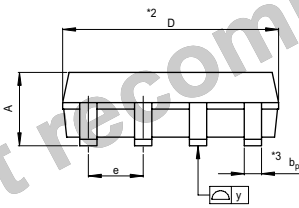
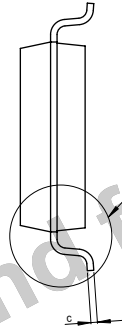
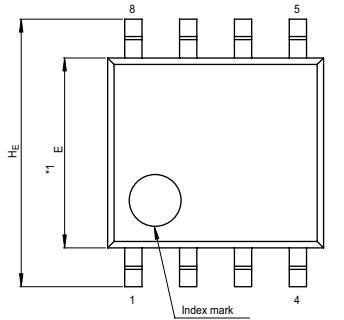
- DIMENSIONS\*\*1 (Nom)\*AND\*\*2\* DO NOT INCLUDE MOLD FLASH.
- DIMENSION\*\*3\* DOES NOT INCLUDE TRIM OFFSET.

Terminal cross section (Ni/Pd/Au plating)

Detail F

Reference Symbol	Dimension in Millimeters		
	Min	Nom	Max
D	4.65	4.85	5.05
E	4.2	4.4	4.6
A2	—	1.85	—
A1	0.00	0.1	0.20
A	—	—	2.03
bp	0.34	0.4	0.46
b1	—	—	—
c	0.15	0.20	0.25
c1	—	—	—
θ	0°	—	8°
HE	5.7	6.2	6.5
Ⓧ	1.12	1.27	1.42
x	—	—	0.12
y	—	—	0.10
z	—	—	0.75
L	0.25	0.45	0.65
L1	—	0.90	—

JEITA Package Code	RENESAS Code	Previous Code	MASS[Typ.]
P-SOP8-4.4x5-1.27	PRSP0008DA-A	8P2S-A	0.07g



NOTE)  
 1. DIMENSIONS \*\*1\* AND \*\*2\* DO NOT INCLUDE MOLD FLASH.  
 2. DIMENSION \*\*3\* DOES NOT INCLUDE TRIM OFFSET.

Reference Symbol	Dimension in Millimeters		
	Min	Nom	Max
D	4.8	5.0	5.2
E	4.2	4.4	4.6
A <sub>2</sub>	—	1.5	—
A <sub>1</sub>	0.05	—	—
A	—	—	1.9
b <sub>p</sub>	0.35	0.4	0.5
c	0.13	0.15	0.2
θ	0°	—	10°
H <sub>E</sub>	5.9	6.2	6.5
e	1.12	1.27	1.42
y	—	—	0.1
L	0.2	0.4	0.6



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