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

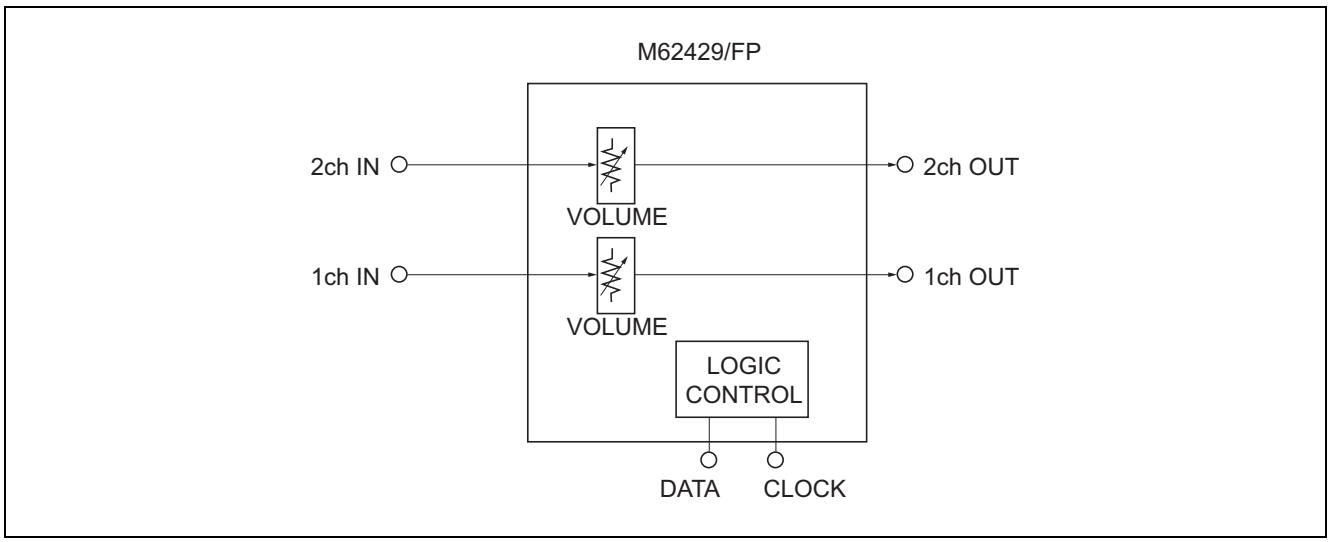
- Built-in reference circuit
- Control with serial data
  Volume 0 to –83 dB (1 dB/step), –∞
  (Independent control is allowed in each channel)
- Low noise and low distortion
  VNO = 5 μVrms (ATT = –∞, JIS-A)
  THD = 0.01 % Typ. (V0 = 0.5 Vrms, DIN-AUDIO)

Recommended Operating Conditions

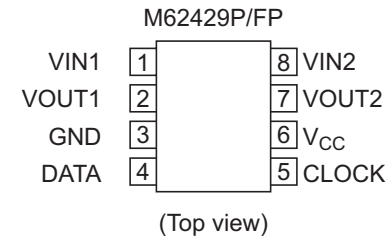
Supply voltage range: V_{CC} = 4.5 to 5.5 V

Rated supply voltage: V_{CC} = 5 V

System Block Diagram



Pin Arrangement



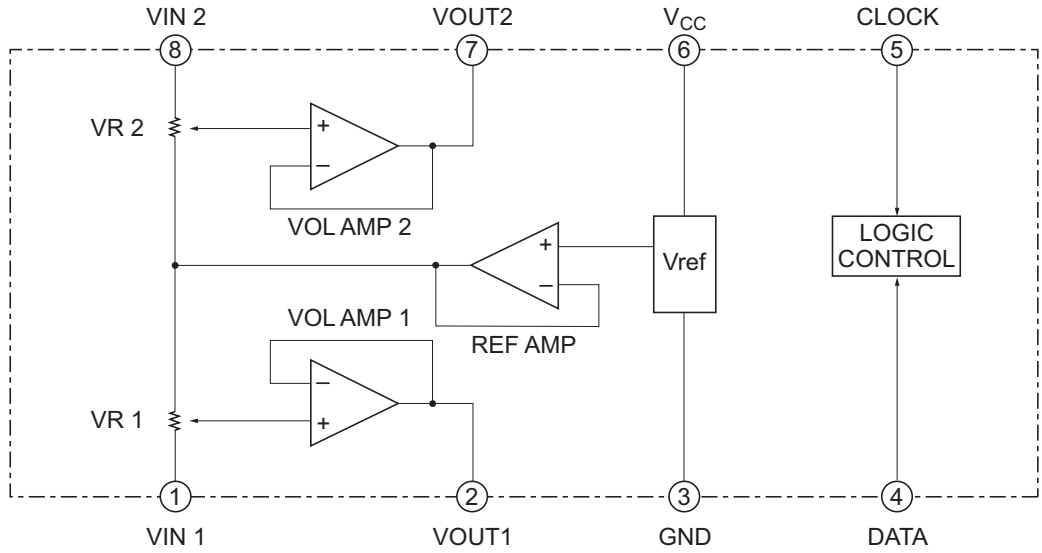
(Top view)

Outline: PRDP0008AA-A (8P4) [P]
PRSP0008DE-C [FP] (recommend)
PRSP0008DA-A (8P2S-A) [FP] (not recommend for new design)

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_{CC}	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

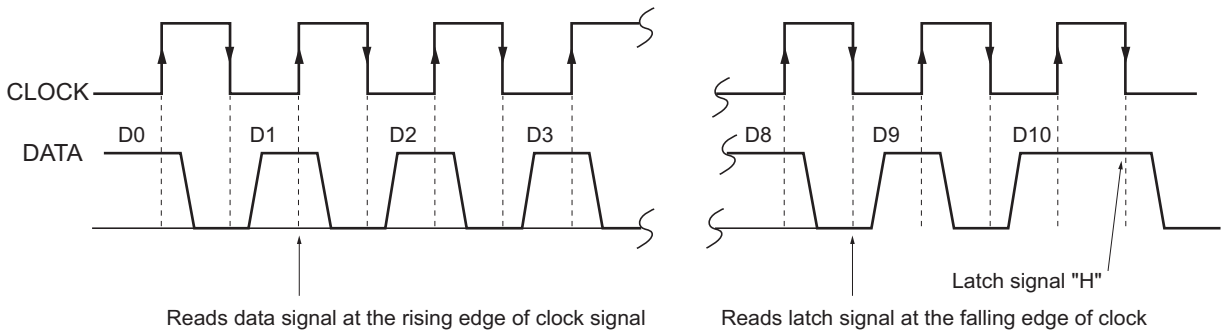
Item	Symbol	Ratings	Unit
Supply voltage	V_{CC}, V_{DD}	6.0	V
Power dissipation	Pd	625 (P), 440 (FP)	mW
Operating temperature	Topr	–20 to +75	°C
Storage temperature	Tstg	–55 to +125	°C

Electrical Characteristics

(V_{CC} = 5 V, Ta= 25 °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} = –∞
Attenuation error	ΔA_{TT}	–2.0	0	2.0	dB	A_{TT} = 0
Maximum input voltage	V_{IM}	1.5	1.7	—	Vrms	THD = 1 %, A_{TT} = –6 dB
Maximum output voltage	V_{OM}	0.8	1.3	—	Vrms	THD = 1 %
Output noise voltage	$V_{NO}1$	—	4	10	μVrms	A_{TT} = 0, Rg = 0, JIS-A
	$V_{NO}2$	—	5	10		A_{TT} = –∞, Rg = 0, JIS-A
Total harmonic distortion	THD	—	0.01	0.05	%	f = 1 kHz, Vo = 0.5 Vrms, A_{TT} = 0
Channel separation	CS	—	–80	–70	dB	f = 1 kHz, JIS-A

Relationship between Data and Clock



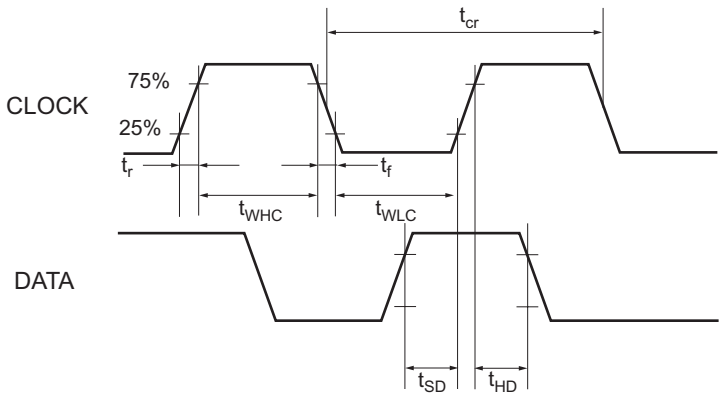
DC Characteristics of Digital Block

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	µA	V_I = 0	Data, clock pin
"H" level input current	I_{IH}	—	—	10	µA	V_I = 5 V	

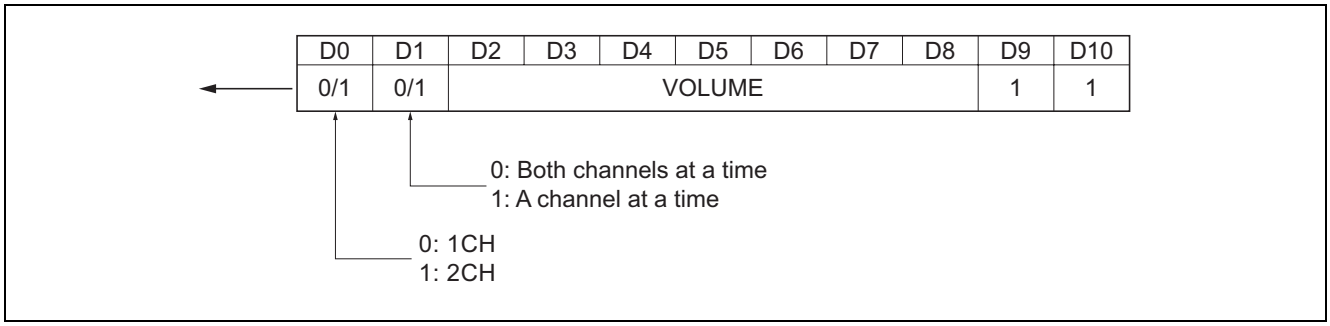
AC Characteristics of Digital Block

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

Clock and Data Timing



Data Input Format

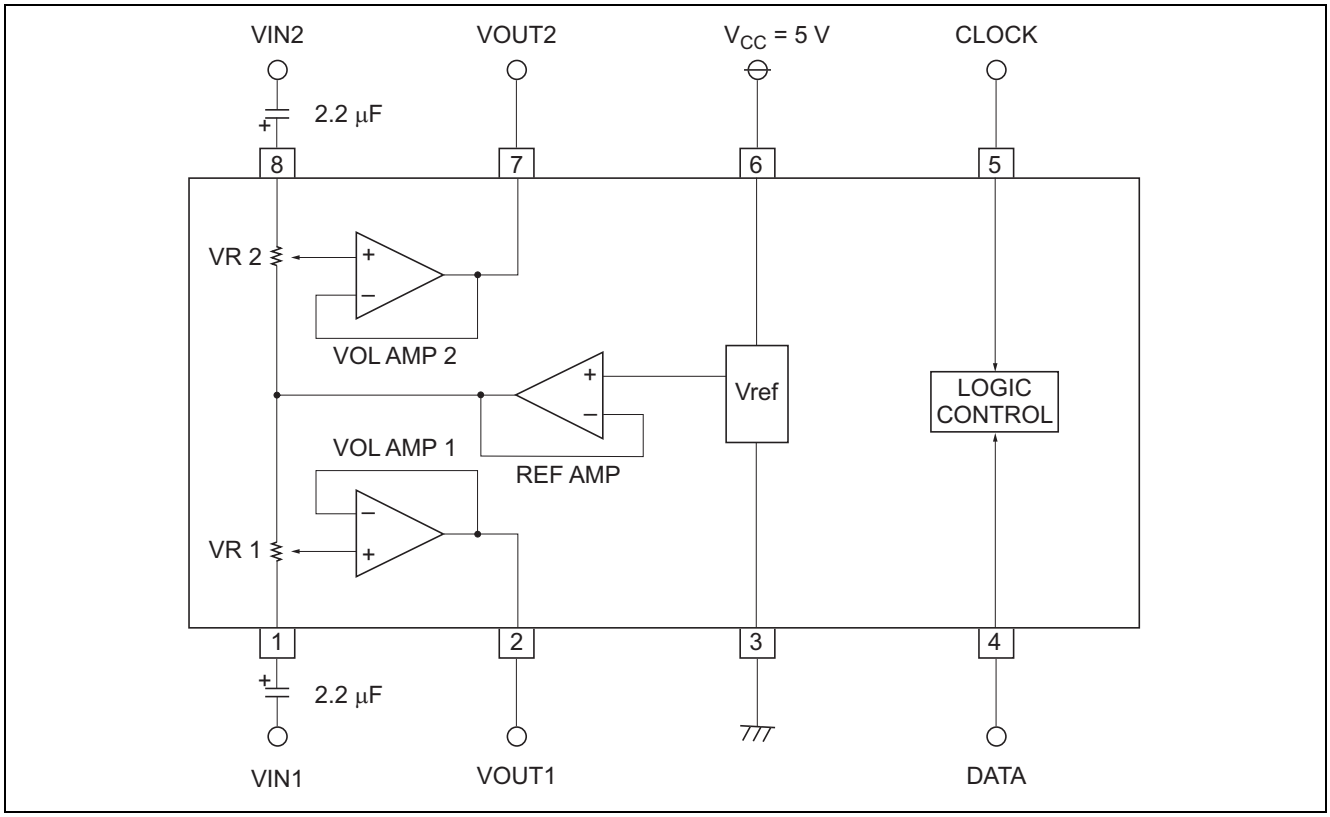


Volume Code

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

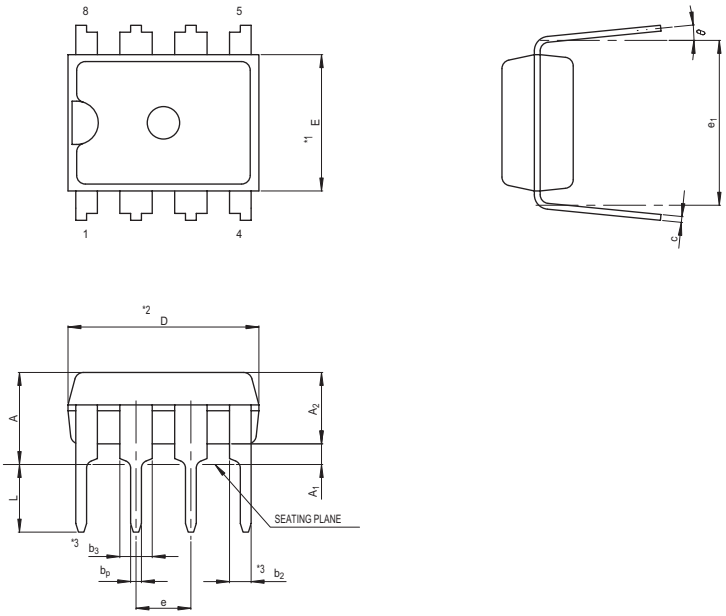
ATT2	D7	D8
0 dB	H	H
–1 dB	L	H
–2 dB	H	L
–3 dB	L	L

Application Example



Package Dimensions

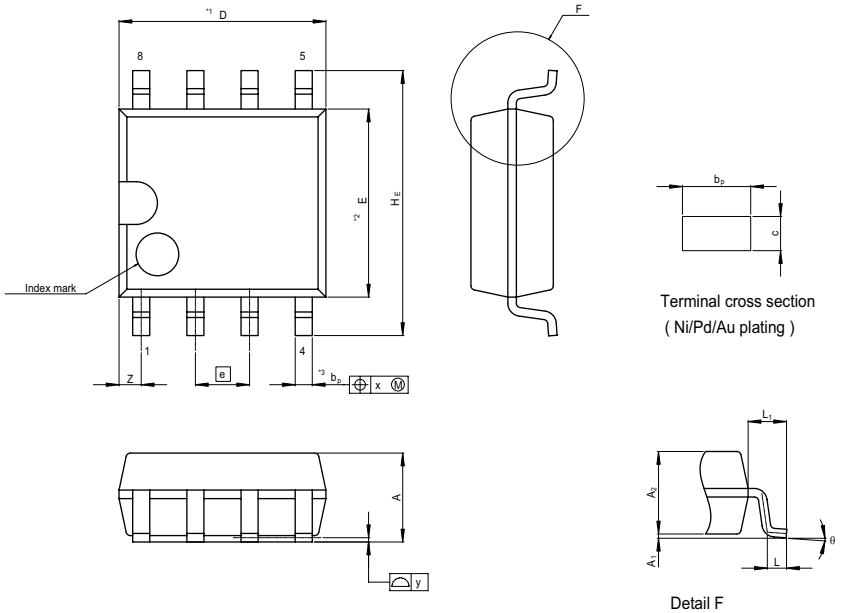
JEITA Package Code	RENESAS Code	Previous Code	MASS[Typ.]
P-DIP8-6.3x8.84-2.54	PRDP0008AA-A	8P4	0.5g



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
e_1	7.32	7.62	7.92
D	8.7	8.9	9.1
E	6.15	6.3	6.45
A	—	—	4.5
A_1	0.51	—	—
A_2	—	3.3	—
b_p	0.4	0.5	0.6
b_2	0.9	1.0	1.3
b_3	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	—	—

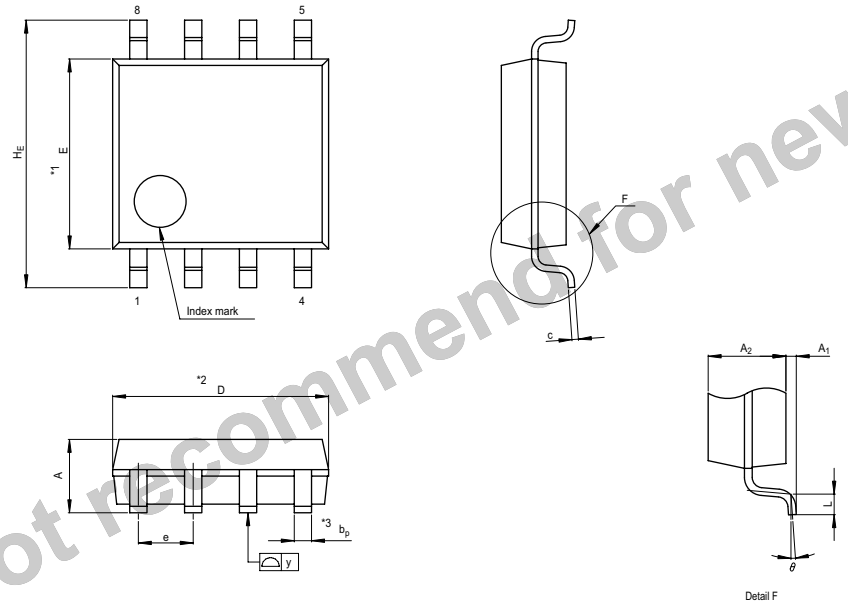
JEITA Package Code	RENESAS Code	Previous Code	MASS[Typ.]
P-SOP8-4.4x4.85-1.27	PRSP0008DE-C	—	0.1g



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

Reference Symbol	Dimension in Millimeters		
	Min	Nom	Max
D	4.65	4.85	5.05
E	4.2	4.4	4.6
A_2	—	1.85	—
A_1	0.00	0.1	0.20
A	—	—	2.03
b_p	0.34	0.4	0.46
b_1	—	—	—
c	0.15	0.20	0.25
c_1	—	—	—
θ	0°	—	8°
H_E	5.7	6.2	6.5
e	1.12	1.27	1.42
x	—	—	0.12
y	—	—	0.10
Z	—	—	0.75
L	0.25	0.45	0.65
L_1	—	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_2	—	1.5	—
A_1	0.05	—	—
A	—	—	1.9
b_p	0.35	0.4	0.5
c	0.13	0.15	0.2
θ	0°	—	10°
H_E	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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