To our customers,

Old Company Name in Catalogs and Other Documents

On April 1st, 2010, NEC Electronics Corporation merged with Renesas Technology Corporation, and Renesas Electronics Corporation took over all the business of both companies. Therefore, although the old company name remains in this document, it is a valid Renesas Electronics document. We appreciate your understanding.

Renesas Electronics website: http://www.renesas.com

April 1st, 2010
Renesas Electronics Corporation

Issued by: Renesas Electronics Corporation (http://www.renesas.com)

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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

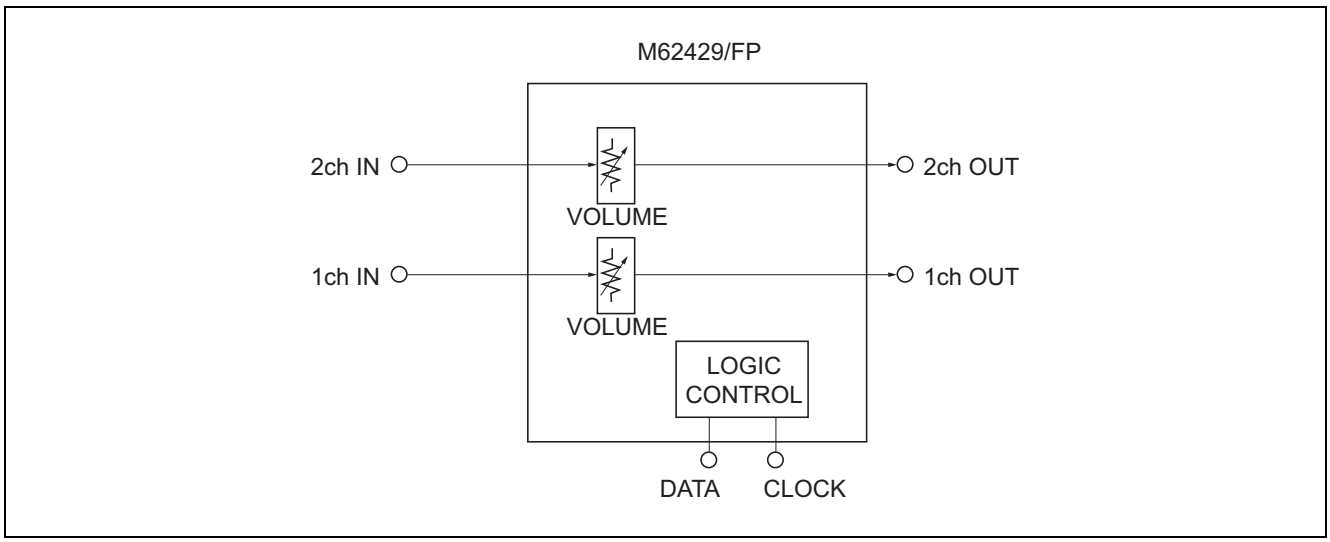
- Built-in reference circuit
- Control with serial data
  Volume 0 to –83 dB (1 dB/step), –∞
  (Independent control is allowed in each channel)
- Low noise and low distortion
  VNO = 5 μVrms (ATT = –∞, JIS-A)
  THD = 0.01 % Typ. (V0 = 0.5 Vrms, DIN-AUDIO)

Recommended Operating Conditions

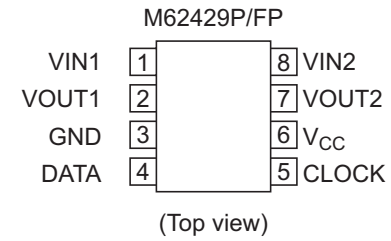
Supply voltage range: V_{CC} = 4.5 to 5.5 V

Rated supply voltage: V_{CC} = 5 V

System Block Diagram



Pin Arrangement



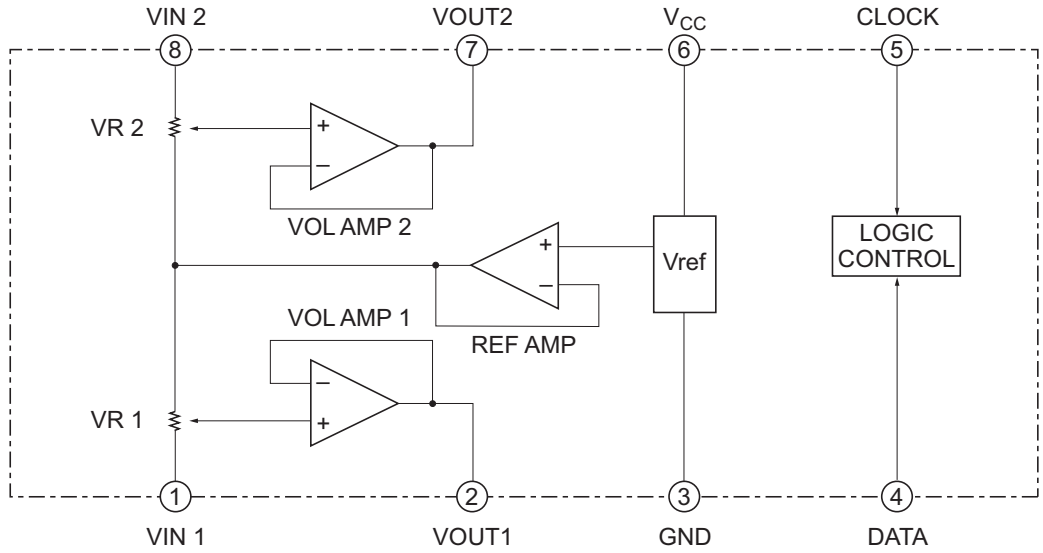
(Top view)

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

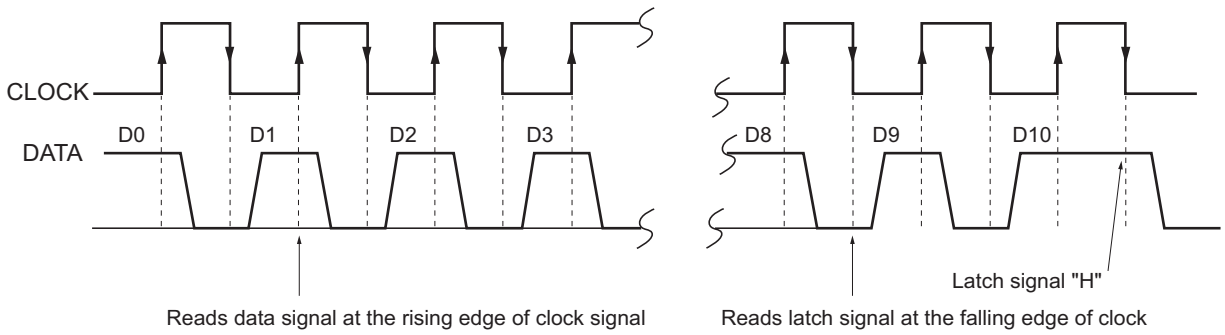
Item	Symbol	Ratings	Unit
Supply voltage	V_{CC}, V_{DD}	6.0	V
Power dissipation	Pd	625 (P), 440 (FP)	mW
Operating temperature	Topr	–20 to +75	°C
Storage temperature	Tstg	–55 to +125	°C

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



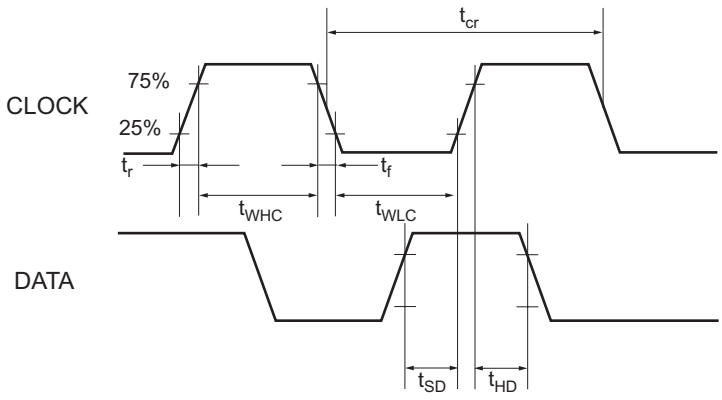
DC Characteristics of Digital Block

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	

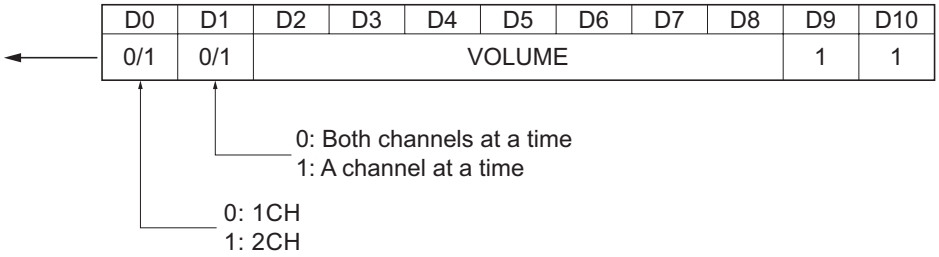
AC Characteristics of Digital Block

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

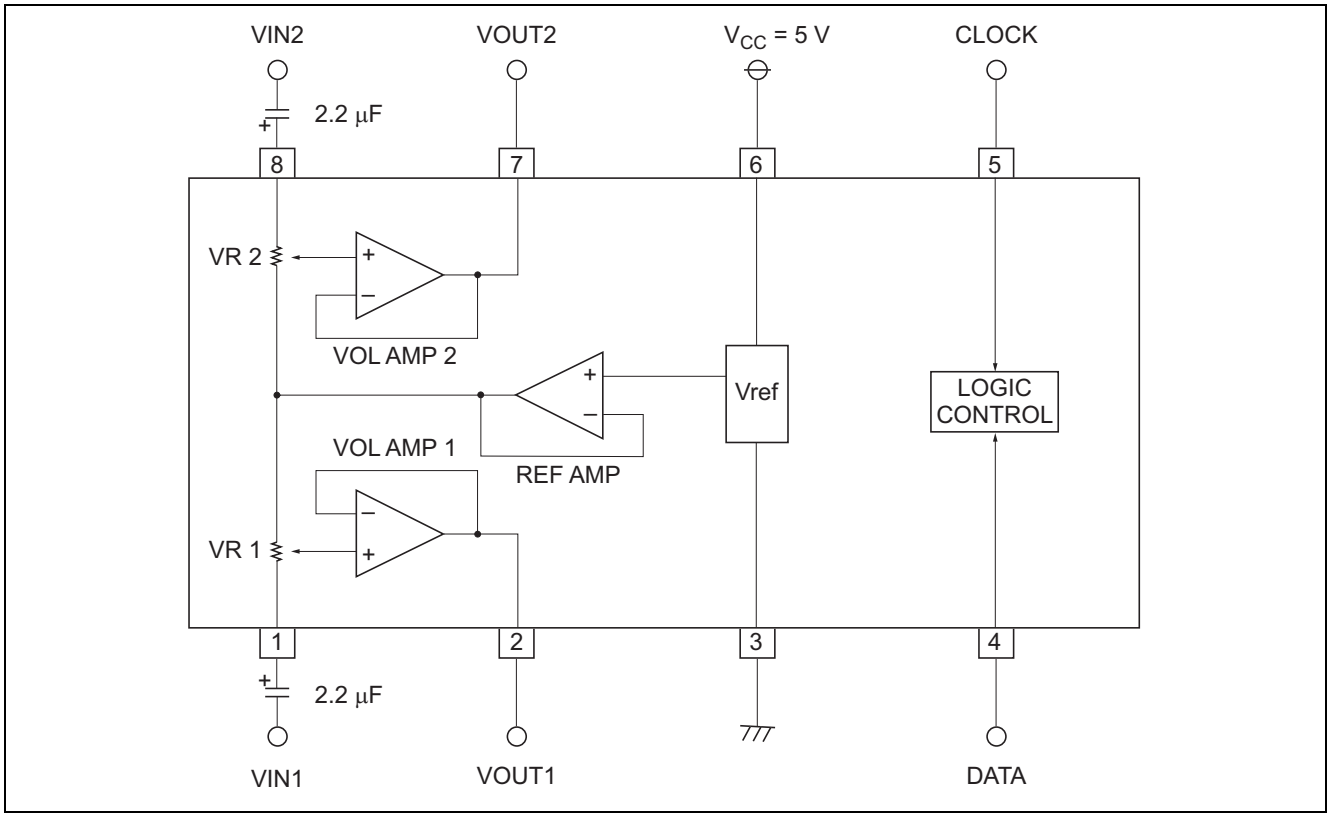


Volume Code

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

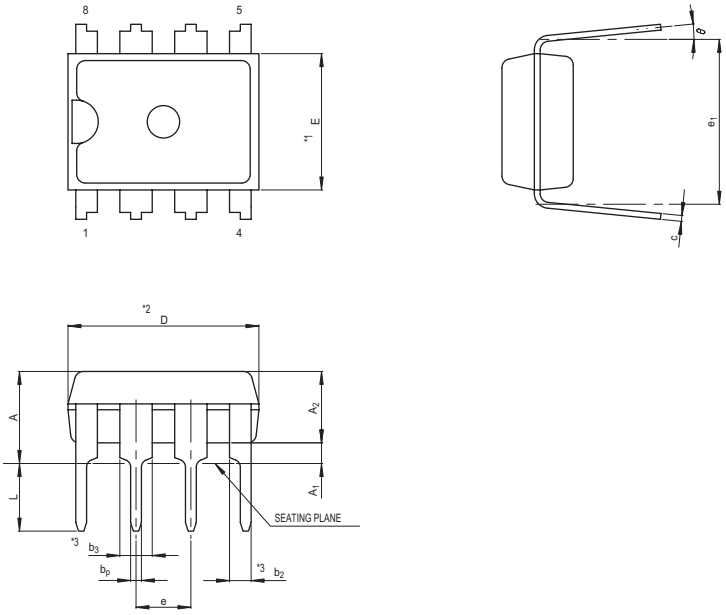
ATT2	D7	D8
0 dB	H	H
–1 dB	L	H
–2 dB	H	L
–3 dB	L	L

Application Example



Package Dimensions

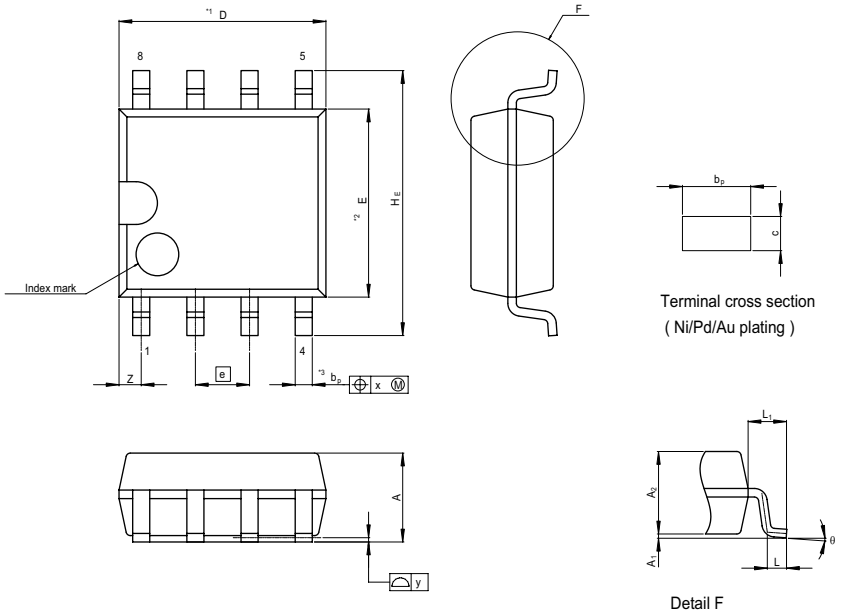
JEITA Package Code	RENESAS Code	Previous Code	MASS[Typ.]
P-DIP8-6.3x8.84-2.54	PRDP0008AA-A	8P4	0.5g



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	—	—

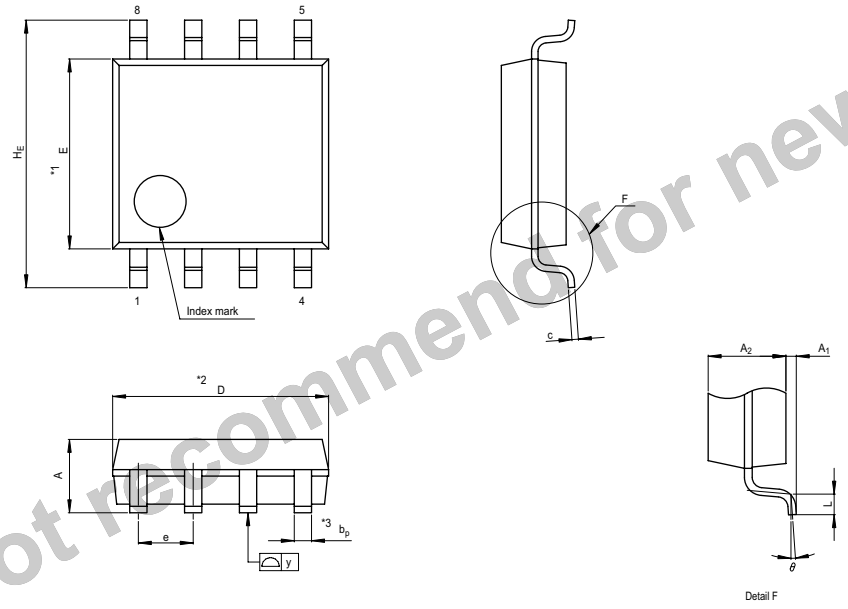
JEITA Package Code	RENESAS Code	Previous Code	MASS[Typ.]
P-SOP8-4.4x4.85-1.27	PRSP0008DE-C	—	0.1g



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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