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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HD74ALVC2G53

2-channel Analog Multiplexer Demultiplexer

REJ03D0168–0400Z
(Previous ADE-205-636C (Z))
Rev.4.00
Dec.18.2003

Description

The HD74ALVC2G53 has 2-channel analog multiplexer / demultiplexer in an 8 pin package. Applications include signal gating, chopping, modulation, or demodulation (modem), and signal multiplexing for analog to digital and digital to analog conversion systems. Low voltage and high-speed operation is suitable for the battery powered products (e.g., notebook computers), and the low power consumption extends the battery life.

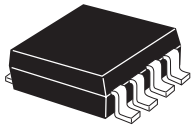
Features

- The basic gate function is lined up as Renesas uni logic series.
- Supplied on emboss taping for high-speed automatic mounting.
- Supply voltage range : 1.2 to 3.6 V
  Operating temperature range: –40 to +85°C
- All control input V_{IH} (Max.) = 3.6 V (@V_{CC} = 0 V to 3.6 V)
- Ordering Information

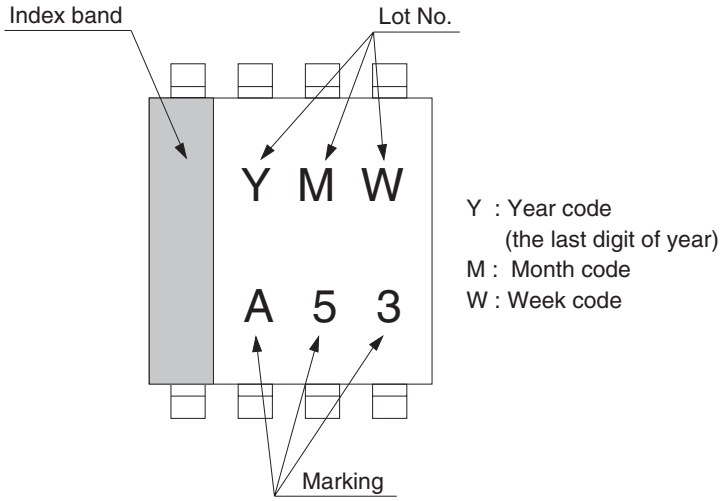
Part Name	Package Type	Package Code	Package Abbreviation	Taping Abbreviation (Quantity)
HD74ALVC2G53USE	SSOP-8 pin	TTP-8DBV	US	E (3,000 pcs/reel)

Outline and Article Indication

• HD74ALVC2G53



SSOP-8



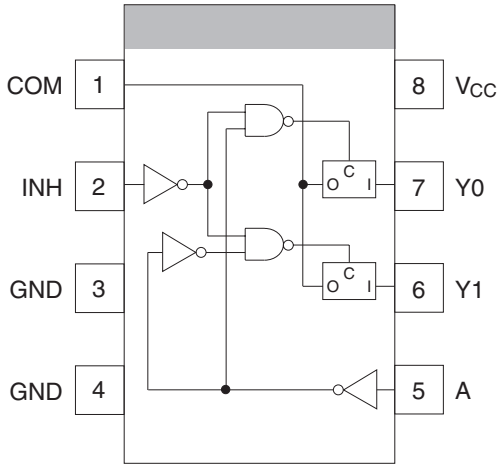
Function Table

Control inputs

INH	A	On channel
H	X	None
L	H	Y1
L	L	Y0

H: High level
L: Low level
X: Immaterial

Pin Arrangement



(Top view)

Absolute Maximum Ratings

Item	Symbol	Ratings	Unit	Conditions
Supply voltage range	V_{CC}	–0.5 to 4.6	V	
Input voltage range [*1]	V_I	–0.5 to 4.6	V	
Output voltage range [*1, 2]	V_O	–0.5 to V_{CC}+0.5	V	Output : H or L
Input clamp current	I_{IK}	–50	mA	$V_I < 0$
Output clamp current	I_{OK}	±50	mA	$V_O < 0$ or $V_O > V_{CC}$
Continuous output current	I_O	±50	mA	V_O = 0 to V_{CC}
Continuous current through V_{CC} or GND	I_{CC} or I_{GND}	±100	mA	
Maximum power dissipation at Ta = 25°C (in still air) [*3]	P_T	200	mW	
Storage temperature	Tstg	–65 to 150	°C	

Notes: The absolute maximum ratings are values, which must not individually be exceeded, and furthermore, no two of which may be realized at the same time.

1. The input and output voltage ratings may be exceeded if the input and output clamp-current ratings are observed.
2. This value is limited to 4.6 V maximum.
3. The maximum package power dissipation was calculated using a junction temperature of 150°C.

Recommended Operating Conditions

Item	Symbol	Min	Max	Unit	Conditions
Supply voltage range	V_{CC}	1.2	3.6	V	
Input voltage range	V_I	0	3.6	V	
Input / output voltage range	$V_{I/O}$	0	V_{CC}	V	
Input transition rise or fall rate	$\Delta t / \Delta v$	0	20	ns / V	V_{CC} = 1.2 to 2.7 V
		0	10		V_{CC} = 3.3±0.3 V
Operating free-air temperature	Ta	–40	85	°C	

Note: Unused or floating inputs must be held high or low.

Electrical Characteristics

Item	Symbol	V_{CC} (V)	Ta=25°C			Ta=-40 to 85°C			Unit	Test conditions
			Min	Typ	Max	Min	Typ	Max		
Input voltage	V_{IH}	1.2	—	—	—	V_{CC}×0.75	—	—	V	Control input only
		1.4 to 1.6	—	—	—	V_{CC}×0.7	—	—		
		1.65 to 1.95	—	—	—	V_{CC}×0.7	—	—		
		2.3 to 2.7	—	—	—	1.7	—	—		
		3.0 to 3.6	—	—	—	2.0	—	—		
	V_{IL}	1.2	—	—	—	—	—	V_{CC}×0.25		
		1.4 to 1.6	—	—	—	—	—	V_{CC}×0.3		
		1.65 to 1.95	—	—	—	—	—	V_{CC}×0.3		
		2.3 to 2.7	—	—	—	—	—	0.7		
		3.0 to 3.6	—	—	—	—	—	0.8		
On-state switch resistance	R_{ON}	1.2	—	14	—	—	—	—	Ω	V_I = 0 V, I_O = 1 mA
			—	29	—	—	—	—		V_I = 1.2 V, I_O = 1 mA
		1.4	—	12	25	—	—	30		V_I = 0 V, I_O = 2 mA
			—	21	35	—	—	40		V_I = 1.4 V, I_O = 2 mA
		1.65	—	10	17	—	—	20		V_I = 0 V, I_O = 4 mA
			—	17	27	—	—	30		V_I = 1.65 V, I_O = 4 mA
		2.3	—	8	11	—	—	13		V_I = 0 V, I_O = 8 mA
			—	13	18	—	—	20		V_I = 2.3 V, I_O = 8 mA
		3.0	—	7	9.5	—	—	10		V_I = 0 V, I_O = 24 mA
			—	11	14.5	—	—	15.5		V_I = 3.0 V, I_O = 24 mA
Peak on resistance	$R_{ON\ (p)}$	1.2	—	280	—	—	—	—	Ω	I_O = 1 mA
		1.4	—	125	250	—	—	350		I_O = 2 mA
		1.65	—	55	110	—	—	150		I_O = 4 mA
		2.3	—	20	30	—	—	35		I_O = 8 mA
		3.0	—	13	18	—	—	20		I_O = 24 mA
Difference of on-state	ΔR_{ON}	1.2	—	1.0	—	—	—	—	Ω	I_O = 1 mA
		1.4	—	0.8	12	—	—	15		I_O = 2 mA

Electrical Characteristics (cont)

Item	Symbol	V_{CC} (V)	Ta=25°C			Ta=-40 to 85°C			Unit	Test conditions
			Min	Typ	Max	Min	Typ	Max		
resistance between switches		1.65	—	0.6	9	—	—	12		I_O = 4 mA
		2.3	—	0.5	5	—	—	9		I_O = 8 mA
		3.0	—	0.2	3	—	—	4		I_O = 24 mA
Off-state switch leakage current	$I_{S (OFF)}$	3.6	—	—	±0.1	—	—	±1.0	µA	V_{IN} = V_{CC}, V_{OUT} = GND or V_{IN} = GND, V_O = V_{CC}, V_C = V_{IL}
On-state switch leakage current	$I_{S (ON)}$	3.6	—	—	±0.1	—	—	±1.0	µA	V_{IN} = V_{CC} or GND V_C = V_{IH}
Input current	I_{IN}	0 to 3.6	—	—	±0.1	—	—	±1.0	µA	V_{IN} = 3.6 V or GND
Quiescent supply current	I_{CC}	3.6	—	—	—	—	—	10	µA	V_{IN} = V_{CC} or GND
Control input capacitance	C_{IC}	—	—	4.5	—	—	—	—	pF	
Switch terminal capacitance	$C_{IN / OUT}$	—	—	5.5	—	—	—	—	pF	
Feed through capacitance	C_{IN-OUT}	—	—	0.2	—	—	—	—	pF	

Switching Characteristics

(Ta = –40 to 85°C)

V_{CC} = 1.2 V

Item	Symbol	Min	Typ	Max	Unit	Test conditions	FROM (Input)	TO (Output)
Propagation delay time *1	t_{PLH} t_{PHL}	—	0.4	—	ns	C_L = 15 pF	COM or Yn	Yn or COM
Enable time	t_{ZH} t_{ZL}	—	6.5	—	ns	C_L = 15 pF	INH	COM or Yn
Disable time	t_{HZ} t_{LZ}	—	7.2	—	ns	C_L = 15 pF	INH	COM or Yn

V_{CC} = 1.5±0.1 V

Item	Symbol	Min	Typ	Max	Unit	Test conditions	FROM (Input)	TO (Output)
Propagation delay time *1	t_{PLH} t_{PHL}	—	—	0.3	ns	C_L = 15 pF	COM or Yn	Yn or COM
Enable time	t_{ZH} t_{ZL}	2.0	—	9.0	ns	C_L = 15 pF	INH	COM or Yn
Disable time	t_{HZ} t_{LZ}	2.0	—	10.0	ns	C_L = 15 pF	INH	COM or Yn

V_{CC} = 1.8±0.15 V

Item	Symbol	Min	Typ	Max	Unit	Test conditions	FROM (Input)	TO (Output)
Propagation delay time *1	t_{PLH} t_{PHL}	—	—	0.48	ns	C_L = 30 pF	COM or Yn	Yn or COM
Enable time	t_{ZH} t_{ZL}	1.5	—	7.0	ns	C_L = 30 pF	INH	COM or Yn
Disable time	t_{HZ} t_{LZ}	1.5	—	8.0	ns	C_L = 30 pF	INH	COM or Yn

Switching Characteristics (cont)

V_{CC} = 2.5±0.2 V

Item	Symbol	Min	Typ	Max	Unit	Test conditions	FROM (Input)	TO (Output)
Propagation delay time [*1]	t_{PLH} t_{PHL}	—	—	0.35	ns	C_L = 30 pF	COM or Yn	Yn or COM
Enable time	t_{ZH} t_{ZL}	1.0	—	5.0	ns	C_L = 30 pF	INH	COM or Yn
Disable time	t_{HZ} t_{LZ}	1.0	—	6.0	ns	C_L = 30 pF	INH	COM or Yn

V_{CC} = 3.3±0.3 V

Item	Symbol	Min	Typ	Max	Unit	Test conditions	FROM (Input)	TO (Output)
Propagation delay time [*1]	t_{PLH} t_{PHL}	—	—	0.3	ns	C_L = 30 pF	COM or Yn	Yn or COM
Enable time	t_{ZH} t_{ZL}	1.0	—	4.0	ns	C_L = 30 pF	INH	COM or Yn
Disable time	t_{HZ} t_{LZ}	1.0	—	5.0	ns	C_L = 30 pF	INH	COM or Yn

Note: 1. The propagation delay time is calculated by the RC (on-resistance and load capacitance) time constant.

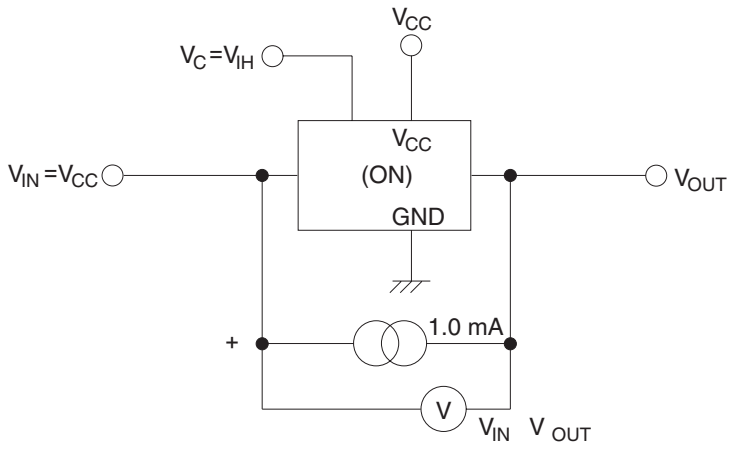
Operating Characteristics

(Ta = 25°C)

Item	Symbol	V_{CC} (V)	Min	Typ	Max	Unit	Test conditions
Power dissipation capacitance	C_{PD}	1.5	—	11.5	—	pF	f = 10 MHz
		1.8	—	11.5	—		
		2.5	—	12.5	—		
		3.3	—	14.0	—		

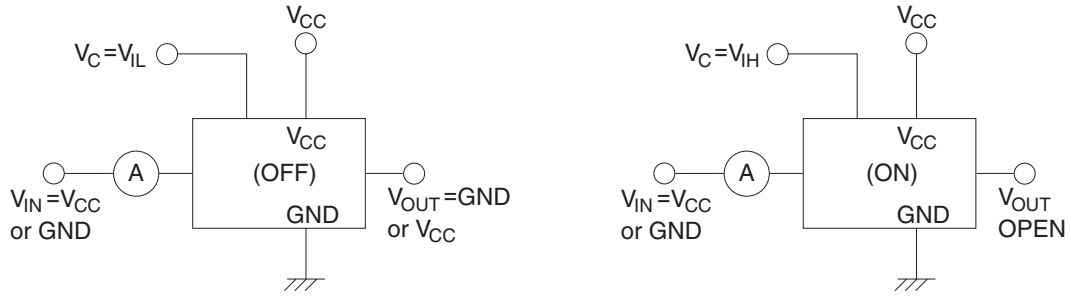
Test Circuit

R_{ON}

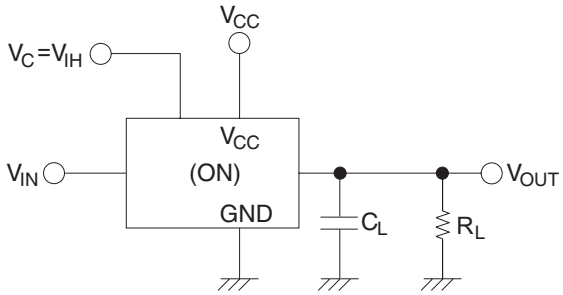


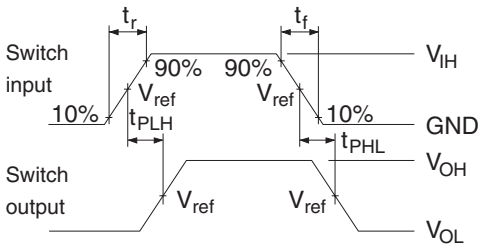
$$R_{ON} = \frac{V_{IN\text{-}OUT}}{10^{-3}} \quad ( )$$

- I_S (off), I_S (on)



• t_{PLH}, t_{PHL}

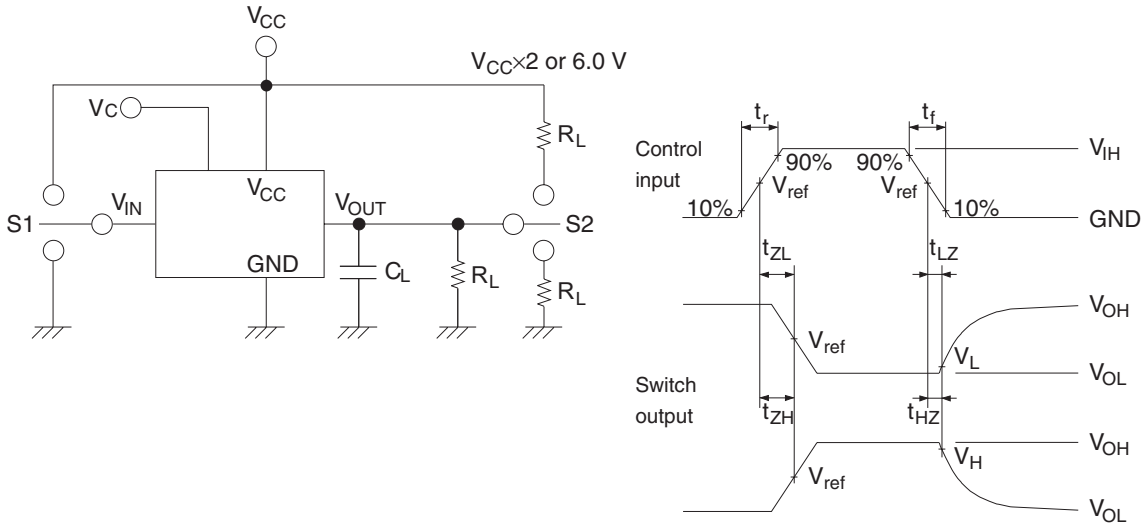




Symbol	V_{CC} = 1.2 V, 1.5±0.1 V	V_{CC} = 1.8±0.15 V	V_{CC} = 2.5±0.2 V, 3.3±0.3 V
R_L	2.0 kΩ	1.0 kΩ	500 Ω
C_L	15 pF	30 pF	30 pF

Symbol	V_{CC} = 1.2 V, 1.5±0.1 V, 1.8±0.15 V	V_{CC} = 2.5±0.2 V	V_{CC} = 3.3±0.3 V
t_r / t_f	2.0 ns	2.5 ns	2.5 ns
V_{IH}	V_{CC}	V_{CC}	2.7 V
V_{ref}	50%	50%	1.5 V

• t_{ZH},t_{ZL}/ t_{HZ},t_{LZ}

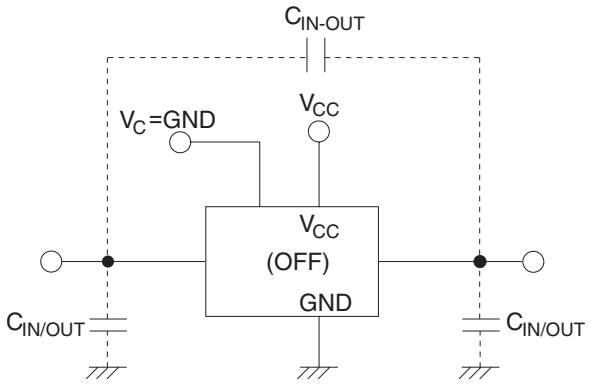


	S1		S2	
Symbol	V_{CC} = 1.2 V, 1.5±0.1 V, 1.8±0.15 V, 2.5±0.2 V	V_{CC} = 3.3±0.3 V	V_{CC} = 1.2 V, 1.5±0.1 V, 1.8±0.15 V, 2.5±0.2 V	V_{CC} = 3.3±0.3 V
t_{HZ} / t_{ZH}	V_{CC}	V_{CC}	GND	GND
t_{LZ} / t_{ZL}	GND	GND	V_{CC}×2	6.0 V

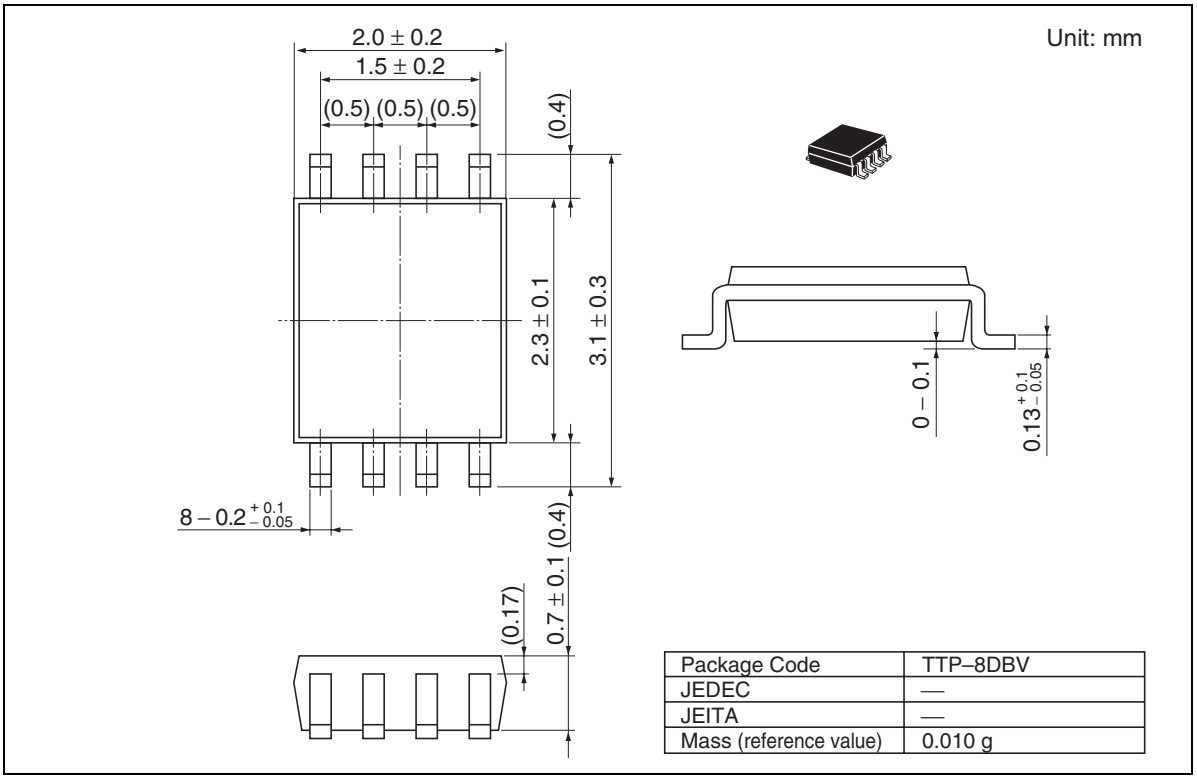
Symbol	V_{CC} = 1.2 V, 1.5±0.1 V	V_{CC} = 1.8±0.15 V	V_{CC} = 2.5±0.2 V, 3.3±0.3 V
R_L	2.0 kΩ	1.0 kΩ	500 Ω
C_L	15 pF	30 pF	30 pF

Symbol	V_{CC} = 1.2 V, 1.5±0.1 V	V_{CC} = 1.8±0.15 V	V_{CC} = 2.5±0.2 V	V_{CC} = 3.3±0.3 V
t_r / t_f	2.0 ns	2.0 ns	2.5 ns	2.5 ns
V_{IH}	V_{CC}	V_{CC}	V_{CC}	2.7 V
V_{ref}	50%	50%	50%	1.5 V
V_H / V_L	V_H = V_{OH}-0.1 V V_L = V_{OL}+0.1 V	V_H = V_{OH}-0.15 V V_L = V_{OL}+0.15 V	V_H = V_{OH}-0.15 V V_L = V_{OL}+0.15 V	V_H = V_{OH}-0.3 V V_L = V_{OL}+0.3 V

• $C_{IN/OUT}$, C_{IN-OUT}



Package Dimensions



Package Code	TTP–8DBV
JEDEC	—
JEITA	—
Mass (reference value)	0.010 g

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