HD74LV2GT53A

2–channel Analog Multiplexer / Demultiplexer

REJ03D0144–0200Z
(Previous ADE-205-697A (Z))
Rev.2.00
Oct.17.2003

Description

The HD74LV2GT53A 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.

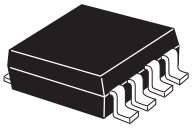
Features

- The basic gate function is lined up as Renesas uni logic series.
- Supplied on emboss taping for high-speed automatic mounting.
- Control input is TTL compatible input level.
  Supply voltage range : 3.0 to 5.5 V
  Operating temperature range : –40 to +85°C
- Control inputs V_{IH} (Max.) = 5.5 V (@V_{CC} = 0 V to 5.5 V)
- Control inputs have hysteresis voltage for the slow transition.
- Ordering Information

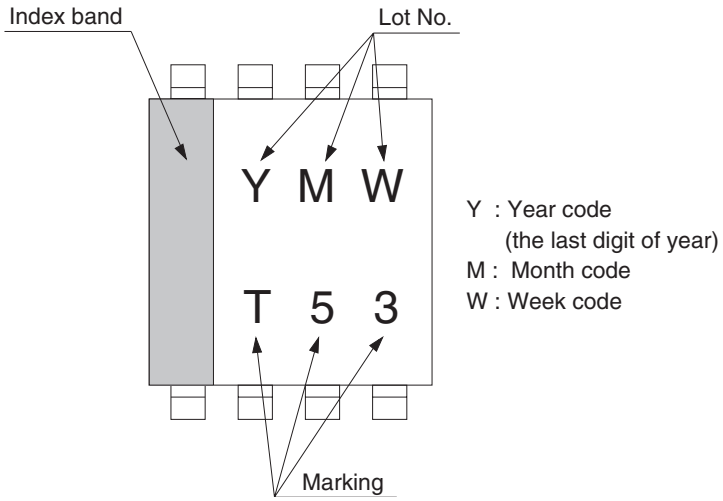
Part Name	Package Type	Package Code	Package Abbreviation	Taping Abbreviation (Quantity)
HD74LV2GT53AUSE	SSOP-8 pin	TTP-8DBV	US	E (3,000 pcs/reel)

Outline and Article Indication

• HD74LV2GT53A



SSOP–8



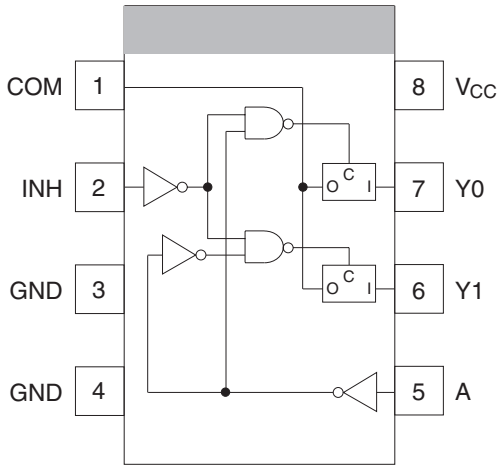
Function Table

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	Test Conditions
Supply voltage range	V_{CC}	–0.5 to 7.0	V	
Input voltage range [*1]	V_I	–0.5 to 7.0	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}	–20	mA	$V_I < 0$
Output clamp current	I_{OK}	±50	mA	$V_O < 0$ or $V_O > V_{CC}$
Continuous output current	I_O	±25	mA	V_O = 0 to V_{CC}
Continuous current through V_{CC} or GND	I_{CC} or I_{GND}	±50	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 5.5 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}	3.0	5.5	V	
Input voltage range	V_I	0	5.5	V	
Input / output voltage range	$V_{I/O}$	0	V_{CC}	V	
Input transition rise or fall rate	$\Delta t / \Delta v$	0	100	ns / V	V_{CC} = 3.0 to 3.6 V
		0	20		V_{CC} = 4.5 to 5.5 V
Operating free-air temperature	T_a	–40	85	°C	

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

Electrical Characteristics

			T_a = 25°C			T_a = –40 to 85°C				
Item	Symbol	V_{CC} (V)	Min	Typ	Max	Min	Typ	Max	Unit	Test Conditions
Input voltage	V_{IH}	3.0 to 3.6	—	—	—	1.5	—	—	V	Control input only
		4.5 to 5.5	—	—	—	2.0	—	—		
	V_{IL}	3.0 to 3.6	—	—	—	—	—	0.6		
		4.5 to 5.5	—	—	—	—	—	0.8		
Hysteresis voltage	V_H	3.3	—	—	—	—	0.10	—	V	$V_T^+ - V_T^-$
		5.0	—	—	—	—	0.15	—		
On-state switch resistance	R_{ON}	3.0	—	50	150	—	—	190	Ω	V_{IN} = V_{CC} or GND V_C = V_{IH} I_T = 2 mA
		4.5	—	40	75	—	—	100		
Peak on resistance	$R_{ON (P)}$	3.0	—	90	180	—	—	225	Ω	V_{IN} = V_{CC} to GND V_C = V_{IH} I_T = 2 mA
		4.5	—	50	100	—	—	125		
Difference of on-state resistance between switches	ΔR_{ON}	3.0	—	10	20	—	—	30	Ω	V_{IN} = V_{CC} to GND V_{INH} = V_{IL} I_T = 2 mA
		4.5	—	7	15	—	—	20		
Off-state switch leakage current	$I_{s (OFF)}$	5.5	—	—	±0.1	—	—	±1.0	μA	V_{IN} = V_{CC}, V_{OUT} = GND or V_{IN} = GND, V_O = V_{CC}, V_{INH} = V_{IH}
On-state switch leakage current	$I_{s (ON)}$	5.5	—	—	±0.1	—	—	±1.0	μA	V_{IN} = V_{CC} or GND V_{INH} = V_{IL}
Input current	I_{IN}	0 to 5.5	—	—	±0.1	—	—	±1.0	μA	V_{IN} = 5.5 V or GND
Quiescent supply current	I_{CC}	5.5	—	—	—	—	—	10	μA	V_{IN} = V_{CC} or GND
	ΔI_{CC}	5.5	—	—	—	—	—	1.5	mA	V_{IN} = 3.4 V
Control input capacitance	C_{IC}	—	—	3.5	—	—	—	—	pF	
Switch terminal capacitance	$C_{IN / OUT}$	—	—	6.0	—	—	—	—	pF	
Feed through capacitance	$C_{IN–OUT}$	—	—	0.5	—	—	—	—	pF	

Switching Characteristics

- V_{CC} = 3.3 ± 0.3 V

Item	Symbol	T_a = 25°C			T_a = –40 to 85°C		Unit	Test Conditions	FROM (Input)	TO (Output)
		Min	Typ	Max	Min	Max				
Propagation delay time	t_{PLH}	—	2.0	6.0	—	10.0	ns	C_L = 15 pF	COM or Yn	Yn or COM
	t_{PHL}	—	4.0	9.0	—	12.0		C_L = 50 pF		
Enable time	t_{ZH}	—	5.0	12.0	—	15.0	ns	C_L = 15 pF	INH	COM or Yn
	t_{ZL}	—	7.0	20.0	—	25.0		C_L = 50 pF		
Disable time	t_{HZ}	—	7.0	12.0	—	15.0	ns	C_L = 15 pF	INH	COM or Yn
	t_{LZ}	—	10.0	20.0	—	25.0		C_L = 50 pF		

- V_{CC} = 5.0 ± 0.5 V

Item	Symbol	T_a = 25°C			T_a = –40 to 85°C		Unit	Test Conditions	FROM (Input)	TO (Output)
		Min	Typ	Max	Min	Max				
Propagation delay time	t_{PLH}	—	1.5	4.0	—	7.0	ns	C_L = 15 pF	COM or Yn	Yn or COM
	t_{PHL}	—	3.0	6.0	—	8.0		C_L = 50 pF		
Enable time	t_{ZH}	—	4.0	8.0	—	10.0	ns	C_L = 15 pF	INH	COM or Yn
	t_{ZL}	—	5.0	14.0	—	18.0		C_L = 50 pF		
Disable time	t_{HZ}	—	5.0	8.0	—	10.0	ns	C_L = 15 pF	INH	COM or Yn
	t_{LZ}	—	8.0	14.0	—	18.0		C_L = 50 pF		

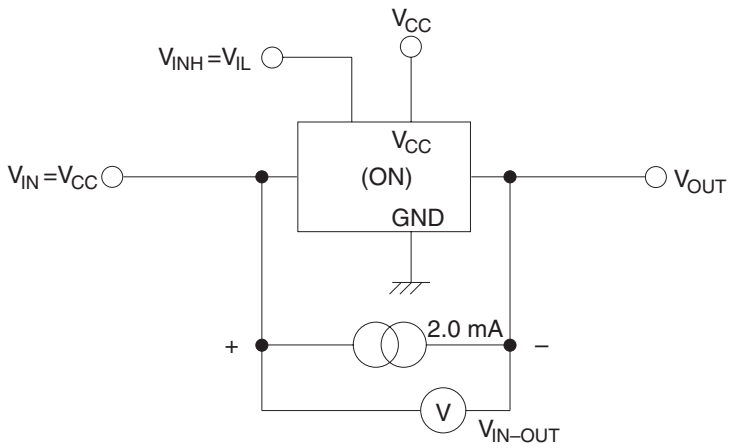
Operating Characteristics

- C_L = 50 pF

Item	Symbol	V_{CC} (V)	T_a = 25°C			Unit	Test Conditions
			Min	Typ	Max		
Power dissipation capacitance	C_{PD}	5.0	—	8.0	—	pF	f = 10 MHz

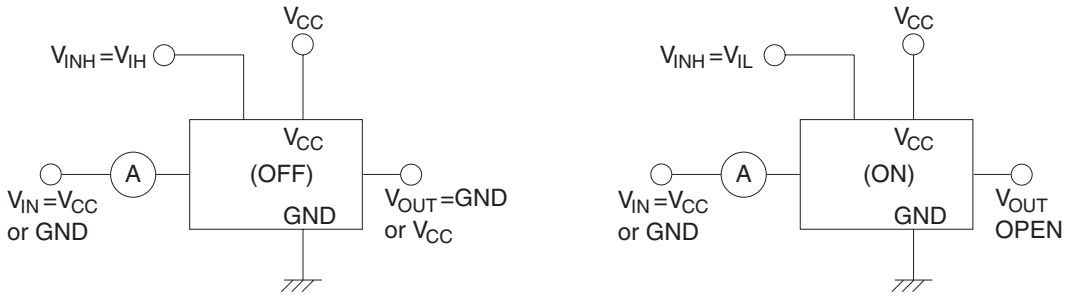
Test Circuit

• R_{ON}

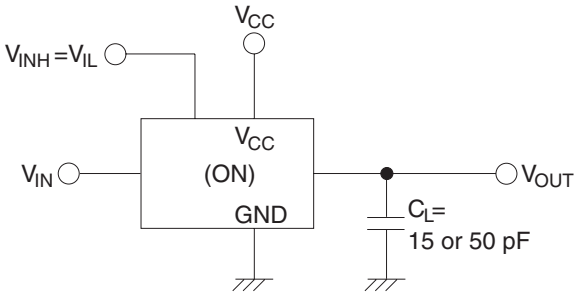


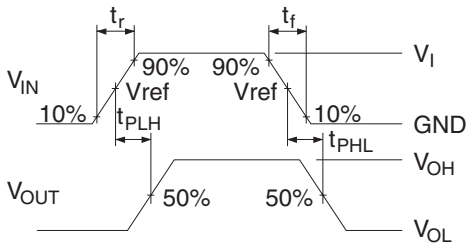
$$R_{ON} = \frac{V_{IN-OUT}}{2 \times 10^{-3}} \quad (\Omega)$$

• I_S (off), I_S (on)



• t_{PLH}, t_{PHL}

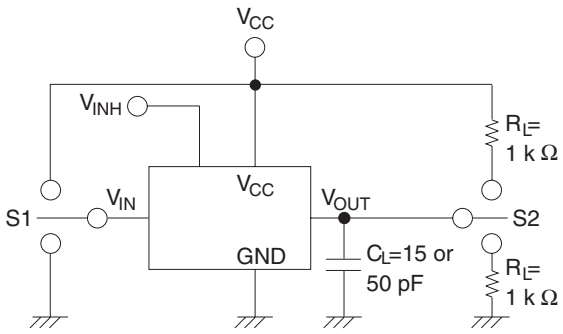




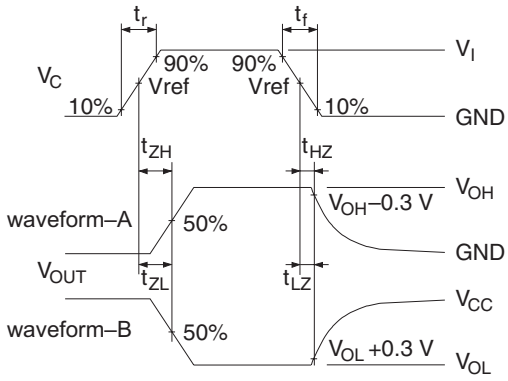
V_{CC} (V)	INPUTS		Vref
	V_I	t_r / t_f	
3.3±0.3	2.5 V	≤ 3.0 ns	50%
5.0±0.5	3 V	≤ 3.0 ns	1.5 V

Notes: 1. Input waveform : PRR ≤ 1 MHz, Zo = 50 Ω.
2. The output are measured one at a time with one transition per measurement.

• t_{ZH}, t_{ZL} / t_{HZ}, t_{LZ}



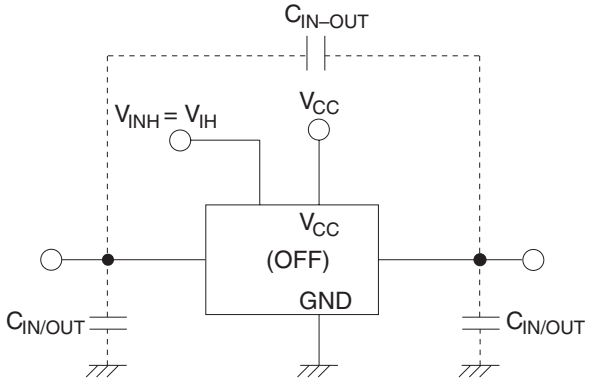
Item	S1	S2
t_{ZH}	V_{CC}	GND
t_{ZL}	GND	V_{CC}
t_{HZ}	V_{CC}	GND
t_{LZ}	GND	V_{CC}



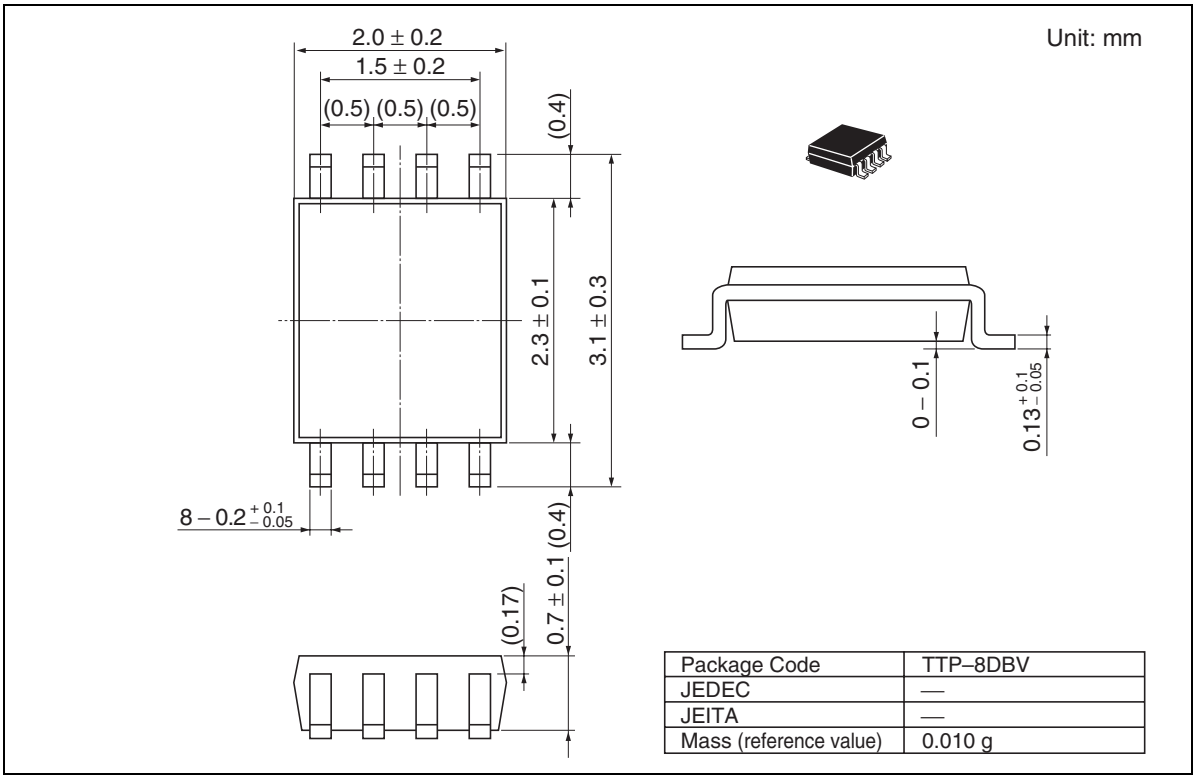
V_{CC} (V)	INPUTS		Vref
	V_I	t_r / t_f	
3.3±0.3	2.5 V	≤ 3.0 ns	50%
5.0±0.5	3 V	≤ 3.0 ns	1.5 V

Notes: 1. Input waveform : PRR ≤ 1 MHz, Zo = 50 Ω.
2. Waveform – A is for an output with internal conditions such that the output is low except when disabled by the output control.
3. Waveform – B is for an output with internal conditions such that the output is high except when disabled by the output control.
4. The output are measured one at a time with one transition per measurement.

• $C_{IN/OUT}$, $C_{IN–OUT}$



Package Dimensions



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

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