

# HD14529B

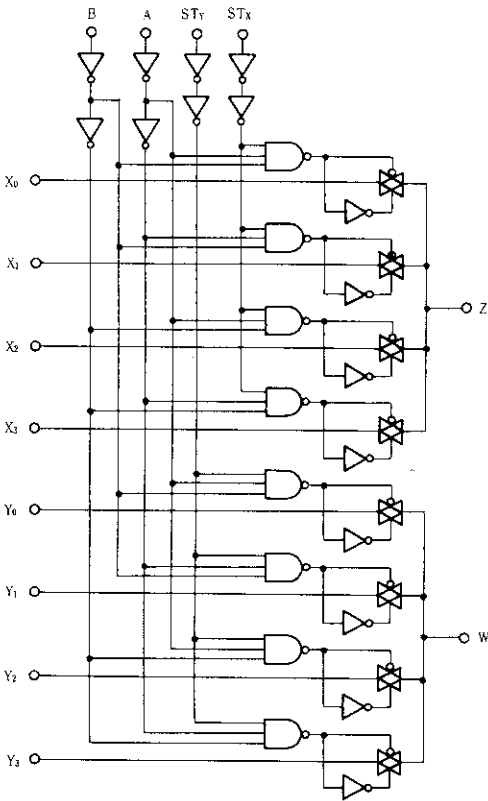
## Dual 4-Channel Analog Data Selector

The HD14529B analog data selector is a dual 4-channel or single 8-channel device depending on the input coding. The device is suitable for digital as well as analog application, including various one-of-four and one-of-eight data selector functions. Since the device has bidirectional analog characteristics it can also be used as a dual binary to 1-of-4 or a binary to 1-of-8 decoder.

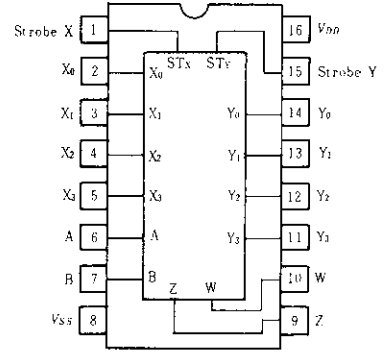
### FEATURES

- Data Paths are Bidirectional
- Quiescent Current = 1nA/pkg typ. @5V
- 10MHz Operation (typ.)
- 3-state Outputs
- Linear "ON" Resistance
- "ON" Resistance 120Ω typ. @15V
- Low Noise = 12nV  $\sqrt{\text{Cycle}}$ ,  $f \geq 1\text{kHz}$  typ.
- Supply Voltage Range = 3 to 18V
- Capable of Driving One Low-power Schottky TTL Load Over the Rated Temperature Range

### LOGIC DIAGRAM



### PIN ARRANGEMENT



(Top View)

### TRUTH TABLE

Strobe X	Strobe Y	B	A	Z	W	Mode
1	1	0	0	X <sub>0</sub>	Y <sub>0</sub>	Dual 4-Channel 2 Output
1	1	0	1	X <sub>1</sub>	Y <sub>1</sub>	
1	1	1	0	X <sub>2</sub>	Y <sub>2</sub>	
1	1	1	1	X <sub>3</sub>	Y <sub>3</sub>	
1	0	0	0	X <sub>0</sub>		Single 8-Channel 1 Output (Z and W tied together)
1	0	0	1	X <sub>1</sub>		
1	0	1	0	X <sub>2</sub>		
1	0	1	1	X <sub>3</sub>		
0	1	0	0	Y <sub>0</sub>		
0	1	0	1	Y <sub>1</sub>		
0	1	1	0	Y <sub>2</sub>		
0	1	1	1	Y <sub>3</sub>		
0	0	×	×	High Impedance		

× = Don't Care

■ ELECTRICAL CHARACTERISTICS

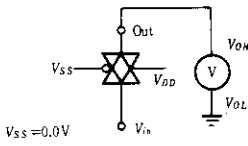
Characteristic	Symbol	Test Circuit	Test Conditions		-40°C		25°C			85°C		Unit		
			$V_{SS}(V)$	$V_{DD}(V)$	min	max	min	typ	max	min	max			
Output Voltage	$V_{OL}$	1	0	5.0	$V_{in} = V_{DD}$ or 0	—	0.05	—	0	0.05	—	0.05	V	
				10		—	0.05	—	0	0.05	—	0.05		
				15		—	0.05	—	0	0.05	—	0.05		
	$V_{OH}$		0	5.0	$V_{in} = 0$ or $V_{DD}$	4.95	—	4.95	5.0	—	4.95	—	V	
				10		9.95	—	9.95	10	—	9.95	—		
				15		14.95	—	14.95	15	—	14.95	—		
Noise Immunity	$V_{NL}$	2	0	$I_{sw} \leq 10\mu A$	5.0	1.5	—	1.5	2.25	—	1.4	—	V	
					10	3.0	—	3.0	4.50	—	2.9	—		
					15	4.0	—	4.5	6.75	—	4.4	—		
	$V_{NH}$		0	$I_{sw} \geq 10\mu A$	5.0	1.4	—	1.5	2.25	—	1.5	—	V	
					10	2.9	—	3.0	4.50	—	3.0	—		
					15	4.4	—	4.5	6.75	—	4.5	—		
Input Current	$I_{in}$		0	15	—	$\pm 0.3$	—	$\pm 0.00001$	$\pm 0.3$	—	$\pm 1.0$	$\mu A$		
Input Capacitance	Control	$C_{in}$	0		—	—	—	5.0	7.5	—	—	pF		
	Switch Input				—	—	—	8.0	—	—	—			
	Switch Output				—	—	—	20	—	—	—			
	Feed Through				—	—	—	0.3	—	—	—			
Quiescent Current	$I_{DD}$	3		5.0	Zero Signal, per Package	—	5.0	—	0.001	5.0	—	70	$\mu A$	
				10		—	5.0	—	0.002	5.0	—	70		
				15		—	10	—	0.003	10	—	140		
ON Resistance	$R_{ON}$	4	-5.0	5.0	$V_C = V_{DD},$ $R_L = 10k\Omega$	$V_{in} = +5.0V$	—	410	—	200	480	—	560	$\Omega$
						$V_{in} = -5.0V$	—	410	—	200	480	—	560	
						$V_{in} = \pm 0.25V$	—	410	—	190	480	—	560	
						$V_{in} = +7.5V$	—	250	—	160	270	—	350	
						$V_{in} = -7.5V$	—	250	—	160	270	—	350	
						$V_{in} = \pm 0.25V$	—	250	—	120	270	—	350	
			-7.5	7.5	$V_C = V_{DD},$ $R_L = 10k\Omega$	$V_{in} = +10V$	—	410	—	180	480	—	560	
						$V_{in} = +0.25V$	—	410	—	180	480	—	560	
						$V_{in} = +5.6V$	—	410	—	220	480	—	560	
			0	10	$V_C = V_{DD},$ $R_L = 10k\Omega$	$V_{in} = +15V$	—	250	—	180	270	—	350	
						$V_{in} = +0.25V$	—	250	—	180	270	—	350	
						$V_{in} = +9.3V$	—	250	—	215	270	—	350	
0	15	$V_C = V_{DD},$ $R_L = 10k\Omega$	$V_{in} = +15V$	—	250	—	180	270	—	350				
			$V_{in} = +0.25V$	—	250	—	180	270	—	350				
			$V_{in} = +9.3V$	—	250	—	215	270	—	350				
$\Delta$ ON Resistance Between Any Two Channels	$\Delta R_{ON}$		-5.0	5.0	$V_{in} = \pm 5.0V$	—	—	—	15	—	—	—	$\Omega$	
			-7.5	7.5	$V_{in} = \pm 7.5V$	—	—	—	10	—	—	—		

### ■ SWITCHING CHARACTERISTICS ( $T_a=25^\circ\text{C}$ )

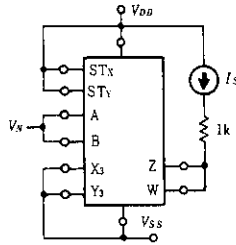
Characteristic	Symbol	Test Circuit	$V_{SS}$ (V)	$V_{DD}$ (V)	Test Conditions	typ	max	Unit		
Propagation Delay Time	$V_{in}$ to $V_{out}$	$t_{PLH}$	5	0	5.0	$C_L=50\text{pF}$ , $R_L=1.0\text{k}\Omega$	20	60	ns	
					10		10	30		
					15		8.0	25		
	Control to Output	$t_{PHL}$	6	0	5.0	$V_{in}=V_{DD}$ or $V_{SS}$	200	600		
					10	$V_{in}\leq 10\text{V}$ , $C_L=50\text{pF}$	80	240		
					15	$R_L=1.0\text{k}\Omega$	50	180		
Crosstalk (Control to Output)		7	0	5.0	$C_L=50\text{pF}$ , $R_L=1.0\text{k}\Omega$ , $R_{out}=10\text{k}\Omega$	5.0	—	mV		
				10		5.0	—			
				15		5.0	—			
Maximum Control Input Pulse Frequency		8	0	5.0	$C_L=50\text{pF}$ , $R_L=1.0\text{k}\Omega$	5.0	—	MHz		
				10		10	—			
				15		12	—			
Noise Voltage		9	0	5.0	$f=100\text{Hz}$	24	—	nV/ $\sqrt{\text{Hz}}$		
				10		25	—			
				15		30	—			
				5.0		$f=100\text{kHz}$	12		—	
				10			12		—	
				15			15		—	
Sine Wave (Distortion)			-5.0	5.0	$V_{in}=1.77\text{V}$ , $R_L=10\text{k}\Omega$ , $f=1.0\text{kHz}$	0.36	—	%		
Input/Output Leakage Current					$V_{in}=+5.0\text{V}$ , $V_{out}=-5.0\text{V}$	$\pm 0.001$	$\pm 125$	nA		
					$V_{in}=-5.0\text{V}$ , $V_{out}=+5.0\text{V}$	$\pm 0.001$	$\pm 125$			
					$V_{in}=+7.5\text{V}$ , $V_{out}=-7.5\text{V}$	$\pm 0.0015$	$\pm 250$			
					$V_{in}=-7.5\text{V}$ , $V_{out}=+7.5\text{V}$	$\pm 0.0015$	$\pm 250$			
Insertion Loss				-5.0	5.0	$V_{in}=1.77\text{V}$ , $f=1\text{MHz}$ , $I_{loss}=20\log_{10}\frac{V_{out}}{V_{in}}$	$R_L=1.0\text{k}\Omega$	2.0	—	dB
							$R_L=10\text{k}\Omega$	0.8	—	
							$R_L=100\text{k}\Omega$	0.25	—	
							$R_L=1.0\text{M}\Omega$	0.01	—	
Bandwidth	$BW$			-5.0	5.0	$V_{in}=1.77\text{V}$	$R_L=1.0\text{k}\Omega$	35	—	MHz
							$R_L=10\text{k}\Omega$	28	—	
							$R_L=100\text{k}\Omega$	27	—	
							$R_L=1.0\text{M}\Omega$	26	—	
Feedthrough and Crosstalk				-5.0	5.0	$20\log_{10}\frac{V_{out}}{V_{in}}=-50\text{dB}$	$R_L=1.0\text{k}\Omega$	850	—	kHz
							$R_L=10\text{k}\Omega$	100	—	
							$R_L=100\text{k}\Omega$	12	—	
							$R_L=1.0\text{M}\Omega$	1.5	—	

■ DC CHARACTERISTIC TEST CIRCUIT

1.

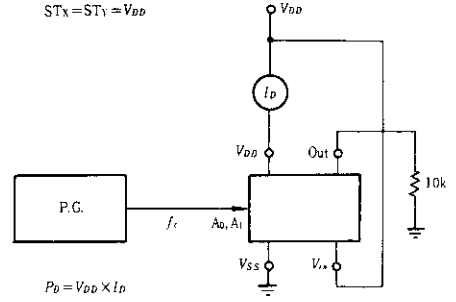


2.

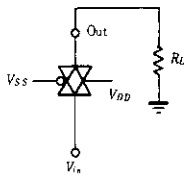


$V_{OL} = V_x$  (when  $I_S = 10\mu A$ )  
 $V_{OH} = V_{DD} - V_x$  (when  $I_S = 10\mu A$ )  
 Pins 2, 3, 4, 12, 13 and 14 are left open.

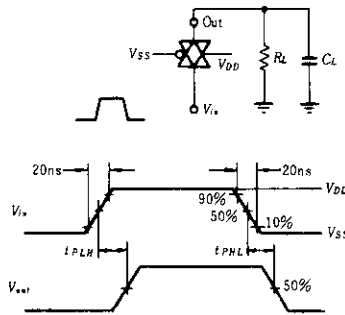
3.



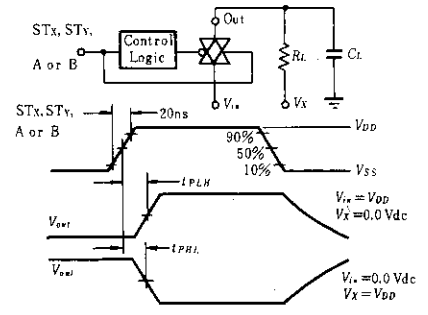
4.



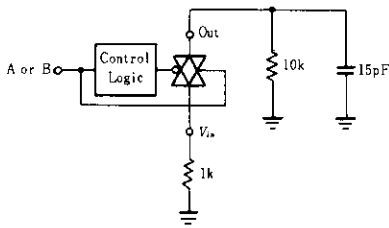
5.



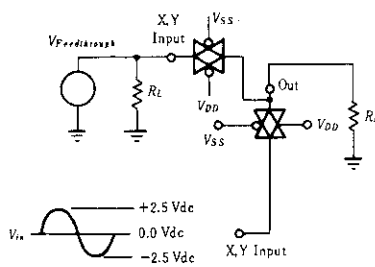
6.



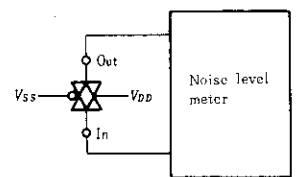
7.



8.



9.





Hitachi Code	DP-16
JEDEC	Conforms
EIAJ	Conforms
Weight (reference value)	1.07 g

## Cautions

1. Hitachi neither warrants nor grants licenses of any rights of Hitachi's or any third party's patent, copyright, trademark, or other intellectual property rights for information contained in this document. Hitachi bears no responsibility for problems that may arise with third party's rights, including intellectual property rights, in connection with use of the information contained in this document.
2. Products and product specifications may be subject to change without notice. Confirm that you have received the latest product standards or specifications before final design, purchase or use.
3. Hitachi makes every attempt to ensure that its products are of high quality and reliability. However, contact Hitachi's sales office before using the product in an application that demands especially high quality and reliability or where its failure or malfunction may directly threaten human life or cause risk of bodily injury, such as aerospace, aeronautics, nuclear power, combustion control, transportation, traffic, safety equipment or medical equipment for life support.
4. Design your application so that the product is used within the ranges guaranteed by Hitachi particularly for maximum rating, operating supply voltage range, heat radiation characteristics, installation conditions and other characteristics. Hitachi bears no responsibility for failure or damage when used beyond the guaranteed ranges. Even within the guaranteed ranges, consider normally foreseeable failure rates or failure modes in semiconductor devices and employ systemic measures such as fail-safes, so that the equipment incorporating Hitachi product does not cause bodily injury, fire or other consequential damage due to operation of the Hitachi product.
5. This product is not designed to be radiation resistant.
6. No one is permitted to reproduce or duplicate, in any form, the whole or part of this document without written approval from Hitachi.
7. Contact Hitachi's sales office for any questions regarding this document or Hitachi semiconductor products.

# HITACHI

## Hitachi, Ltd.

Semiconductor & Integrated Circuits.  
Nippon Bldg., 2-6-2, Ohte-machi, Chiyoda-ku, Tokyo 100-0004, Japan  
Tel: Tokyo (03) 3270-2111 Fax: (03) 3270-5109

URL      North America      : <http://semiconductor.hitachi.com/>  
             Europe                : <http://www.hitachi-eu.com/hel/ecg>  
             Asia (Singapore)      : <http://www.has.hitachi.com.sg/grp3/sicd/index.htm>  
             Asia (Taiwan)            : [http://www.hitachi.com.tw/E/Product/SICD\\_Frame.htm](http://www.hitachi.com.tw/E/Product/SICD_Frame.htm)  
             Asia (HongKong)        : <http://www.hitachi.com.hk/eng/bo/grp3/index.htm>  
             Japan                        : <http://www.hitachi.co.jp/Sicd/indx.htm>

## For further information write to:

Hitachi Semiconductor  
(America) Inc.  
179 East Tasman Drive,  
San Jose, CA 95134  
Tel: <1> (408) 433-1990  
Fax: <1> (408) 433-0223

Hitachi Europe GmbH  
Electronic components Group  
Dornacher Straße 3  
D-85622 Feldkirchen, Munich  
Germany  
Tel: <49> (89) 9 9180-0  
Fax: <49> (89) 9 29 30 00

Hitachi Europe Ltd.  
Electronic Components Group.  
Whitebrook Park  
Lower Cookham Road  
Maidenhead  
Berkshire SL6 8YA, United Kingdom  
Tel: <44> (1628) 585000  
Fax: <44> (1628) 778322

Hitachi Asia Pte. Ltd.  
16 Collyer Quay #20-00  
Hitachi Tower  
Singapore 049318  
Tel: 535-2100  
Fax: 535-1533

Hitachi Asia Ltd.  
Taipei Branch Office  
3F, Hung Kuo Building, No.167,  
Tun-Hwa North Road, Taipei (105)  
Tel: <886> (2) 2718-3666  
Fax: <886> (2) 2718-8180

Hitachi Asia (Hong Kong) Ltd.  
Group III (Electronic Components)  
7/F., North Tower, World Finance Centre,  
Harbour City, Canton Road, Tsim Sha Tsui,  
Kowloon, Hong Kong  
Tel: <852> (2) 735 9218  
Fax: <852> (2) 730 0281  
Telex: 40815 HITEC HX

Copyright ' Hitachi, Ltd., 1999. All rights reserved. Printed in Japan.

## HITACHI