

HD14517B

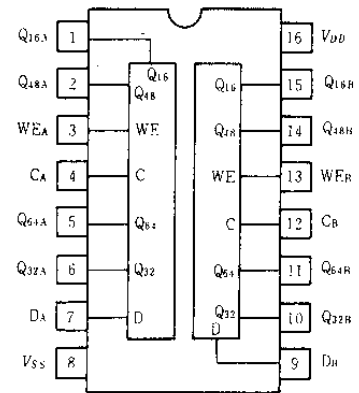
Dual 64-bit Static Shift Register

The HD14517B dual 64-bit static shift register consists of two identical, independent, 64-bit registers. Each register has separate clock and write enable inputs, as well as outputs at bits 16, 32, 48 and 64. Data at the data input is entered by clocking, regardless of the state of the write enable input. An output is disabled (open circuited) when the write enable input is high. During this time, data appearing at the data input as well as the 16-bit, 32-bit, and 48-bit taps may be entered into the device by application of a clock pulse. This feature permits the register to be loaded with 64 bits in 16 clock periods, and also permits bus logic to be used. This device is useful in time delay circuits, temporary memory storage circuits, and other serial shift register applications.

FEATURES

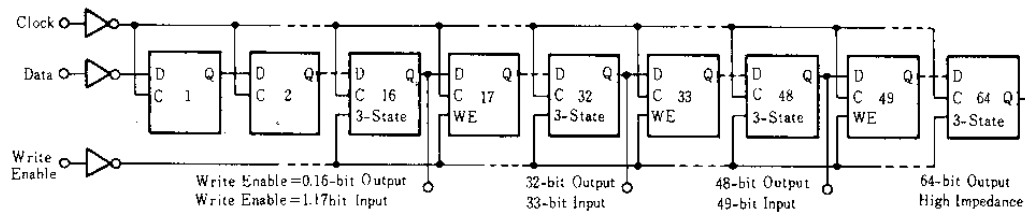
- Quiescent Current = 10nA/pkg typ. @5V
- Noise Immunity of V_{DD} typ.
- Fully Static Operation
- Output Transitions Occur on the Rising Edge of the Clock Pulse
- 6.7MHz Operation @10V
- Exceedingly Slow Input Transition Rates May Be Applied to the Clock Input
- 3-state Output at 64th-bit Allows Use in Bus Logic Applications
- Shift Registers of any Length may be Fully Loaded with 16 Clock Pulses
- Supply Voltage Range = 3 to 18V
- Capable of Driving One Low-power Schottky TTL Load Over the Rated Temperature Range

PIN ARRANGEMENT



(Top View)

BLOCK DIAGRAM (1/2)



TRUTH TABLE

Clock	Write Enable	Data	16-bit Tap	32-bit Tap	48-bit Tap	64-bit Tap
0	0	x	Content of 16-bit Displayed	Content of 32-bit Displayed	Content of 48-bit Displayed	Content of 64-bit Displayed
0	1	x	High Impedance	High Impedance	High Impedance	High Impedance
1	0	x	Content of 16-bit Displayed	Content of 32-bit Displayed	Content of 48-bit Displayed	Content of 64-bit Displayed
1	1	x	High Impedance	High Impedance	High Impedance	High Impedance
—	0	Data entered into 1st Bit	Content of 16-bit Displayed	Content of 32-bit Displayed	Content of 48-bit Displayed	Content of 64-bit Displayed
—	1	Data entered into 1st Bit	Data at tap entered into 17-bit	Data at tap entered into 33-bit	Data at tap entered into 49-bit	High Impedance
—	0	x	Content of 16-bit Displayed	Content of 32-bit Displayed	Content of 48-bit Displayed	Content of 64-bit Displayed
—	1	x	High Impedance	High Impedance	High Impedance	High Impedance

x=Don't Care

ELECTRICAL CHARACTERISTICS

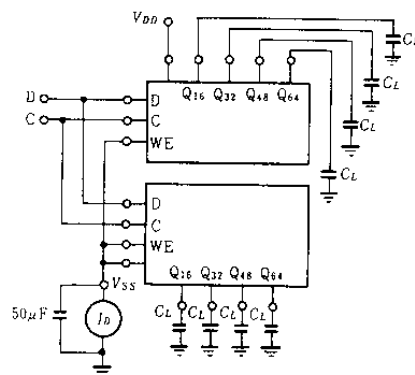
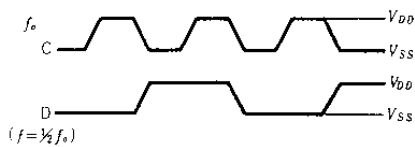
Characteristic	Symbol	V _{DD} (V)	Test Conditions	-40°C		25°C			85°C		Unit
				min	max	min	typ	max	min	max	
Output Voltage	V _{OL}	5.0	V _{in} = V _{DD} or 0	—	0.05	—	0	0.05	—	0.05	V
		10		—	0.05	—	0	0.05	—	0.05	
		15		—	0.05	—	0	0.05	—	0.05	
	V _{OH}	5.0	V _{in} = 0 or V _{DD}	4.95	—	4.95	5.0	—	4.95	—	V
		10		9.95	—	9.95	10	—	9.95	—	
		15		14.95	—	14.95	15	—	14.95	—	
Input Voltage	V _{IL}	5.0	V _{out} = 4.5 or 0.5V	—	1.5	—	2.25	1.5	—	1.5	V
		10	V _{out} = 9.0 or 1.0V	—	3.0	—	4.50	3.0	—	3.0	
		15	V _{out} = 13.5 or 1.5V	—	4.0	—	6.75	4.0	—	4.0	
	V _{IH}	5.0	V _{out} = 0.5 or 4.5V	3.5	—	3.5	2.75	—	3.5	—	V
		10	V _{out} = 1.0 or 9.0V	7.0	—	7.0	5.50	—	7.0	—	
		15	V _{out} = 1.5 or 13.5V	11.0	—	11.0	8.25	—	11.0	—	
Output Drive Current	I _{OH}	5.0	V _{OH} = 2.5V	-1.0	—	-0.8	-1.7	—	-0.6	—	mA
		5.0	V _{OH} = 4.6V	-0.2	—	-0.16	-0.36	—	-0.12	—	
		10	V _{OH} = 9.5V	-0.5	—	-0.4	-0.9	—	-0.3	—	
	I _{OL}	5.0	V _{OL} = 0.4V	0.52	—	0.44	0.88	—	0.36	—	mA
		10	V _{OL} = 0.5V	1.3	—	1.1	2.25	—	0.9	—	
		15	V _{OL} = 1.5V	3.6	—	3.0	8.8	—	2.4	—	
Input Current	I _{in}	15		—	±0.3	—	±0.00001	±0.3	—	±1.0	μA
Input Capacitance	C _{in}		V _{in} = 0	—	—	—	5.0	7.5	—	—	pF
Quiescent Current	I _{DD}	5.0	Zero Signal, per Package	—	50	—	0.010	50	—	375	μA
		10		—	100	—	0.020	100	—	750	
		15		—	200	—	0.030	200	—	1500	
Total Supply Current*	I _T	5.0	Dynamic + I _{DD} , per Gate	—	—	—	4.2	—	—	—	μA
		10		—	—	—	8.8	—	—	—	
		15		C _L = 50pF, f = 1kHz	—	—	—	13.7	—	—	
Three-State Output Leakage Current	I _{TL}	15		—	±1.0	—	±0.00001	±1.0	—	±7.5	μA

* To calculate total supply current at frequency other than 1kHz.

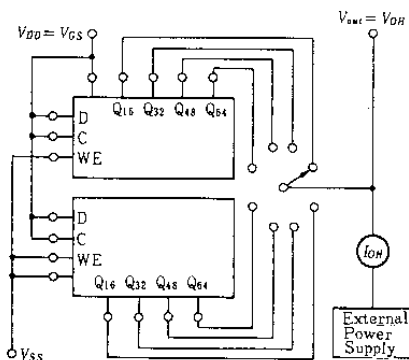
@V_{DD} = 5.0V I_T = (4.2 μA/kHz)f + I_{DD}, @V_{DD} = 10V I_T = (8.8 μA/kHz)f + I_{DD}, @V_{DD} = 15V I_T = (13.7 μA/kHz)f + I_{DD}

DC CHARACTERISTIC TEST CIRCUIT

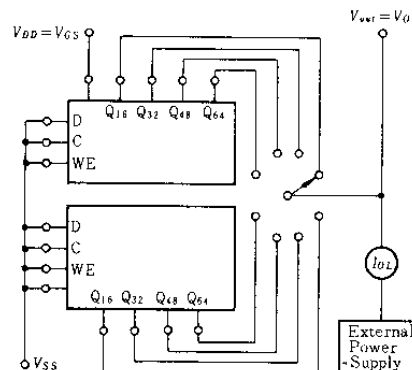
POWER DISSIPATION TEST CIRCUIT AND WAVEFORM



● I_{OH}



● I_{OL}

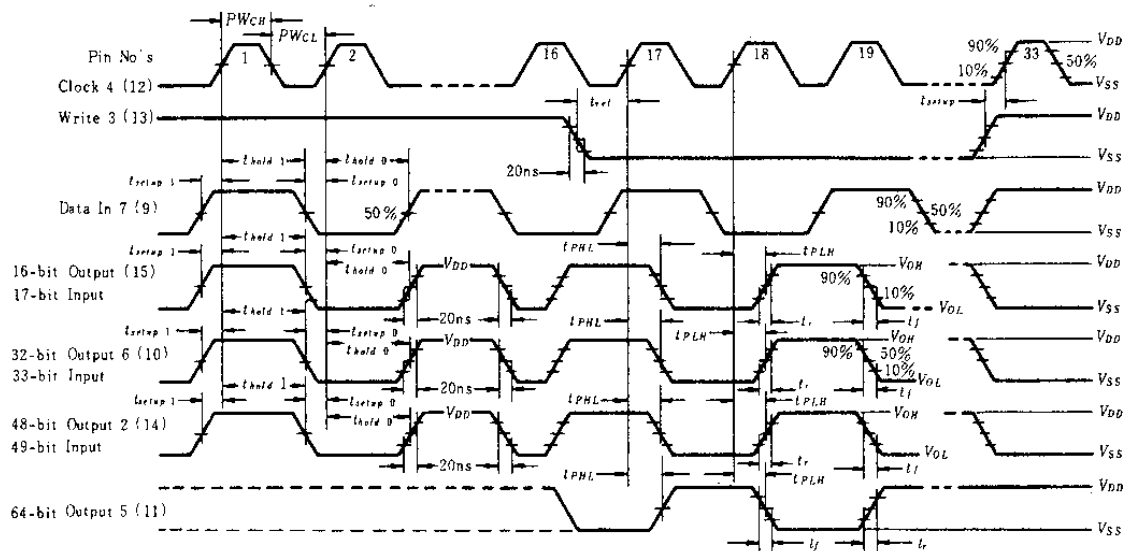


■ SWITCHING CHARACTERISTICS ($C_L = 50\text{pF}$, $T_a = 25^\circ\text{C}$)

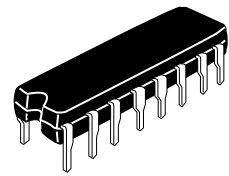
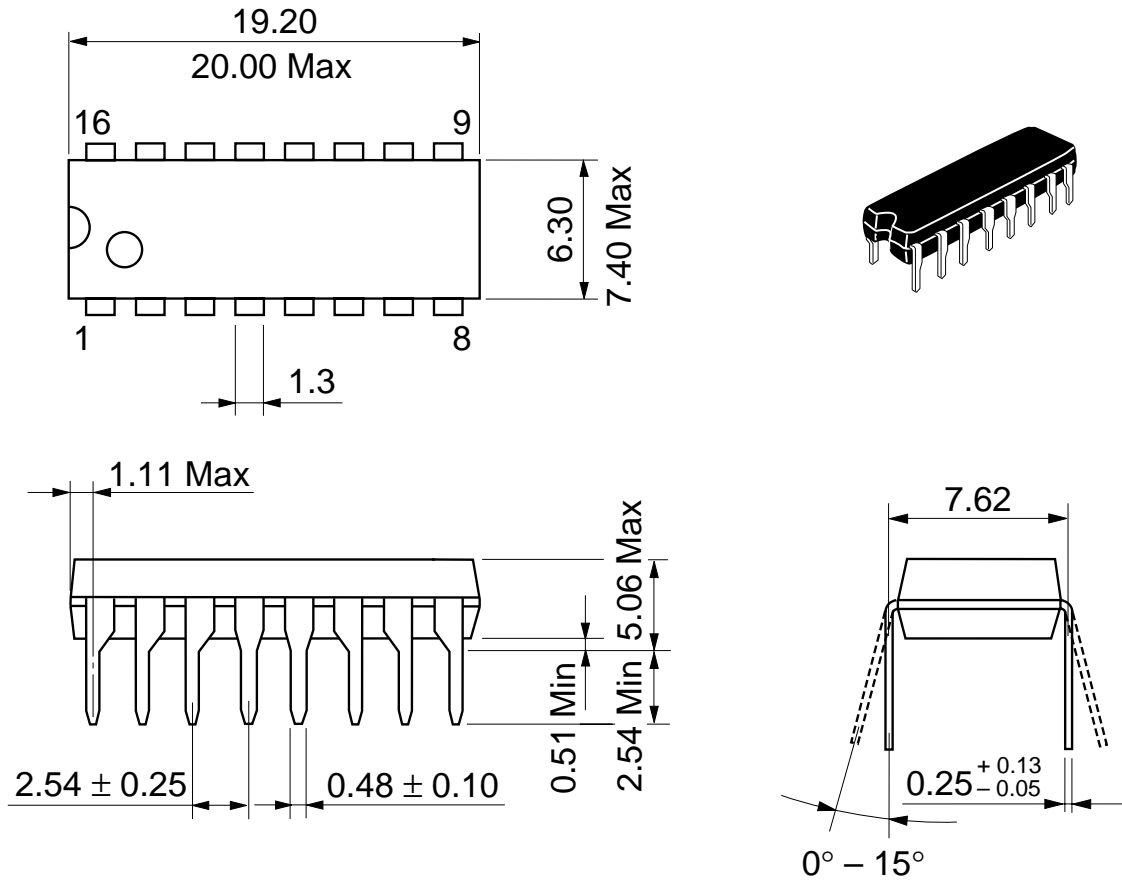
Characteristic	Symbol	$V_{DD}(\text{V})$	min	typ	max	Unit
Output Rise Time	t_r	5.0	—	180	400	ns
		10	—	90	200	
		15	—	65	160	
Output Fall Time	t_f	5.0	—	100	200	ns
		10	—	50	100	
		15	—	37	80	
Propagation Delay Time	t_{PLH} , t_{PHL}	5.0	—	475	770	ns
		10	—	210	300	
		15	—	140	215	
Clock Pulse Width	PW_C	5.0	330	170	—	ns
		10	125	75	—	
		15	100	60	—	
Clock Frequency	PRF	5.0	—	3.0	1.5	MHz
		10	—	6.7	4.0	
		15	—	8.3	5.3	
Clock Pulse Rise and Fall Time	t_r, t_f	5.0	*			
		10	*			
		15	*			
Setup Time	t_{setup}	5.0	0	-40	—	ns
		10	10	-15	—	
		15	15	0	—	
Hold Time	t_{hold}	5.0	150	75	—	ns
		10	75	25	—	
		15	35	10	—	
Write Enable to Clock Setup Time	t_{setup}	5.0	400	170	—	ns
		10	200	65	—	
		15	110	50	—	
Write Enable to Clock Release Time	t_{ret}	5.0	380	160	—	ns
		10	180	55	—	
		15	100	40	—	

* When shift register sections are cascaded, the maximum rise and fall time of the clock input should be equal to or less than the rise and fall time of the data outputs, driving data inputs, plus the propagation delay of the output driving stage.

● DYNAMIC SIGNAL WAVEFORMS



Unit: mm



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 NorthAmerica : <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
 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 StraÙe 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