

# HD14572UB

## Hex Gate

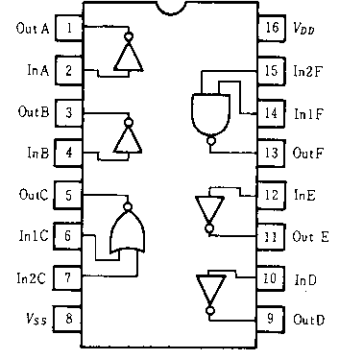
(4-Inverter  
2-input NOR Gate  
2-input NAND Gate)

The HD14572UB hex functional gate finds primary use where low power dissipation and/or high noise immunity is desired. The chip contains four inverters, one NOR gate and one NAND gate.

### FEATURES

- Quiescent Current  $\approx 0.5\text{nA/pkg typ. @5V}$
- Supply Voltage Range = 3 to 18V
- NOR Input Pin Adjacent to  $V_{SS}$  Pin to Simplify Use As An Inverter
- NAND Input Pin Adjacent to  $V_{DD}$  Pin to Simplify Use As An Inverter
- NOR Output Pin Adjacent to Inverter Input Pin For OR Application
- NAND Output Pin Adjacent to Inverter Input Pin For AND Application
- Capable of Driving One Low-power Schottky TTL Load Over the Rated Temperature Range

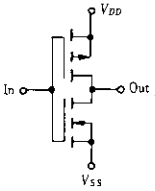
### PIN ARRANGEMENT



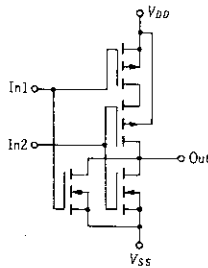
(Top View)

### CIRCUIT SCHEMATIC

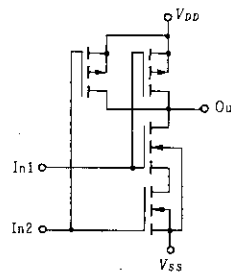
#### Inverter



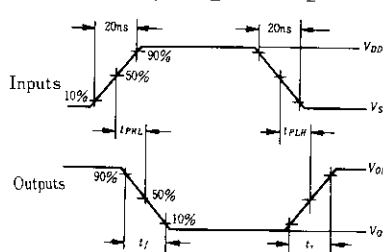
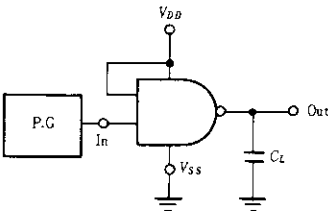
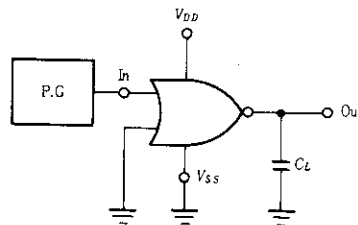
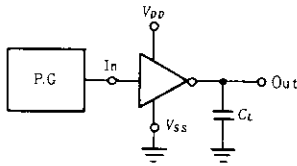
#### NOR



#### NAND



### SWITCHING TIME TEST CIRCUIT



**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	$V_{in} = V_{DD}$	—	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	$V_{in} = 0$	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	$V_{ovl} = 4.5V$	—	1.0	—	2.25	1.0	—	1.0	V
		10	$V_{ovl} = 9.0V$	—	2.0	—	4.50	2.0	—	2.0	
		15	$V_{ovl} = 13.5V$	—	2.5	—	6.75	2.5	—	2.5	
	$V_{IH}$	5.0	$V_{ovl} = 0.5V$	4.0	—	4.0	2.75	—	4.0	—	V
		10	$V_{ovl} = 1.0V$	8.0	—	8.0	5.50	—	8.0	—	
		15	$V_{ovl} = 1.5V$	12.5	—	12.5	8.25	—	12.5	—	
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		—	$\pm 0.3$	—	+0.0001	$\pm 0.3$	—	$\pm 1.0$	$\mu A$
Input Capacitance	$C_{in}$		$V_{in} = 0$	—	—	—	5.0	7.5	—	—	pF
Quiescent Current	$I_{DD}$	5.0	Zero Signal, per Package	—	0.5	—	0.0005	0.5	—	3.8	$\mu A$
		10		—	1.0	—	0.0010	1.0	—	7.5	
		15		—	2.0	—	0.0015	2.0	—	15	
Total Supply Current*	$I_T$	5.0	Dynamic + $I_{DD}$ , per Gate,	—	—	—	1.89	—	—	—	$\mu A$
		10		—	—	—	3.80	—	—	—	
		15		—	—	—	5.68	—	—	—	

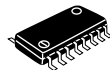
\* To calculate total supply current at frequency other than 1kHz.  
 @  $V_{DD} = 5.0V$   $I_T = (1.89\mu A/kHz)f + I_{DD}$ . @  $V_{DD} = 10V$   $I_T = (3.80\mu A/kHz)f + I_{DD}$ . @  $V_{DD} = 15V$   $I_T = (5.68\mu A/kHz)f + I_{DD}$

**SWITCHING CHARACTERISTICS ( $C_L = 50pF, T_a = 25^\circ C$ )**

Characteristic	Symbol	$V_{DD}(V)$	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	$t_{PLH}$	5.0	—	115	200	ns
		10	—	55	110	
		15	—	40	85	
	$t_{FHL}$	5.0	—	115	200	ns
		10	—	55	110	
		15	—	40	85	

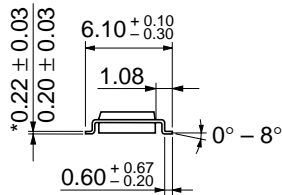


Hitachi Code	DP-16
JEDEC	Conforms
EIAJ	Conforms
Weight (reference value)	1.07 g



\*Dimension including the plating thickness  
 Base material dimension

Hitachi Code	FP-16DA
JEDEC	—
EIAJ	Conforms
Weight (reference value)	0.24 g



\*Dimension including the plating thickness  
Base material dimension

Hitachi Code	FP-16DN
JEDEC	Conforms
EIAJ	Conforms
Weight (reference value)	0.15 g

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