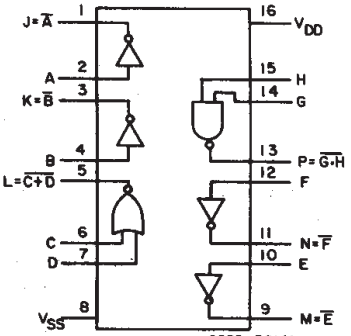
TEXAS INSTRUMENTS
Data sheet acquired from Harris Semiconductor
SCHS090

CD4572UB Types



FUNCTIONAL DIAGRAM

CMOS Hex Gate

Four Inverters, One 2-Input NOR Gate, One 2-Input NAND Gate

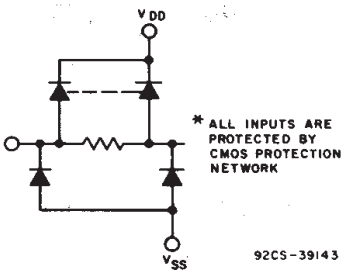
Features:

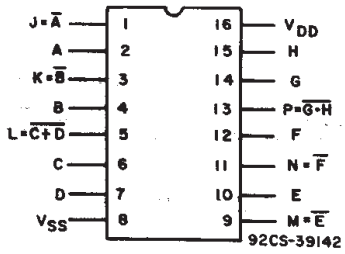
- *Pin 7 NOR input positioned adjacent to V_{SS} for easy use of gate as an inverter*
- *Pin 15 NAND input positioned adjacent to V_{DD} for easy use of gate as an inverter*
- *Standard symmetrical output characteristics*
- *100% tested for quiescent current at 20 V*
- *Maximum input current of 1 μA at 18 V over full package-temperature range: 100 nA at 18 V and 25°C*
- *5-V, 10-V, and 15-V parametric ratings*
- *Meets all requirements of JEDEC Standard No. 13B, "Standard Specifications for Description of 'B' Series CMOS Devices"*

■ CD4572UB Hex Gate provides the system designer with direct implementation of inverter, NAND, and NOR functions and supplements the existing family of CMOS gates.

The CD4572UB devices meet all requirements of JEDEC Standard No. 13B, "Standard Specifications for Description of 'B' Series CMOS Devices."

The CD4572UB types are supplied in 16-lead dual-in-line ceramic packages (D and F suffixes), a 16-lead dual-in-line plastic package (E suffix), and in chip form (H suffix).





TERMINAL ASSIGNMENT

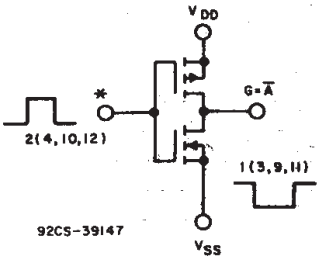


Fig. 1 - Schematic diagram of one of four identical inverters.

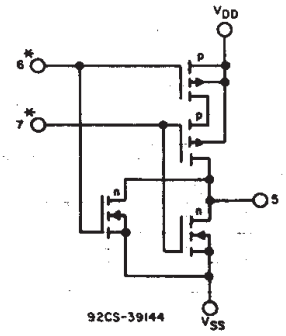


Fig. 2 - Schematic diagram for the 2-input NOR gate.

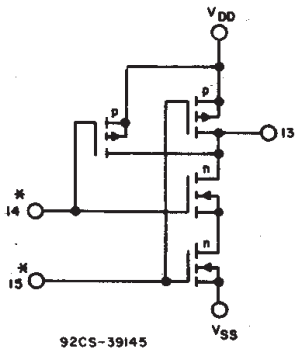


Fig. 3 - Schematic diagram for the 2-input NAND gate.

MAXIMUM RATINGS, *Absolute-Maximum Values:*

DC SUPPLY-VOLTAGE RANGE, (V_{DD})
(Voltages referenced to V_{SS} Terminal) ..... -0.5V to +20V
INPUT VOLTAGE RANGE, ALL INPUTS ..... -0.5V to V_{DD} +0.5V
DC INPUT CURRENT, ANY ONE INPUT ..... ±10mA
POWER DISSIPATION PER PACKAGE (P_D):
For T_A = -55°C to +100°C 500mW
For T_A = +100°C to +125°C ..... Derate Linearity at 12mW/°C to 200mW
DEVICE DISSIPATION PER OUTPUT TRANSISTOR
FOR T_A = FULL PACKAGE-TEMPERATURE RANGE (All Package Types) 100mW
OPERATING-TEMPERATURE RANGE (T_A) ..... -55°C to +125°C
STORAGE TEMPERATURE RANGE (T_{stg}) ..... -65°C to +150°C
LEAD TEMPERATURE (DURING SOLDERING):
At distance 1/16 ± 1/32 inch (1.59 ± 0.79mm) from case for 10s max ..... +265°C

RECOMMENDED OPERATING CONDITIONS

For maximum reliability, nominal operating conditions should be selected so that operation is always within the following ranges:

CHARACTERISTIC	LIMITS		UNITS
	Min.	Max.	
Supply-Voltage Range (For T_A=Full Package-Temperature Range)	3	18	V

STATIC ELECTRICAL CHARACTERISTICS

CHARACTERISTIC	CONDITIONS			LIMITS AT INDICATED TEMPERATURES (°C)							UNITS
	V_O (V)	V_{IN} (V)	V_{DD} (V)					+25			
				-55	-40	+85	+125	Min.	Typ.	Max.	
Quiescent Device Current, I_{DD} Max.	—	0, 5	5	0.25	0.25	7.5	7.5	—	0.01	0.25	μA
	—	0, 10	10	0.5	0.5	15	15	—	0.01	0.5	
	—	0, 15	15	1	1	30	30	—	0.01	1	
	—	0, 20	20	5	5	150	150	—	0.02	5	
Output Low (Sink) Current I_{OL} Min.	0.4	0, 5	5	0.64	0.61	0.42	0.36	0.51	1	—	mA
	0.5	0, 10	10	1.6	1.5	1.1	0.9	1.3	2.6	—	
	1.5	0, 15	15	4.2	4	2.8	2.4	3.4	6.8	—	
Output High (Source) Current, I_{OH} Min.	4.6	0, 5	5	-0.64	-0.61	-0.42	-0.36	-0.51	-1	—	
	2.5	0, 5	5	-2	-1.8	-1.3	-1.15	-1.6	-3.2	—	
	9.5	0, 10	10	-1.6	-1.5	-1.1	-0.9	-1.3	-2.6	—	
	13.5	0, 15	15	-4.2	-4	-2.8	-2.4	-3.4	-6.8	—	
Output Voltage: Low-Level, V_{OL} Max.	—	0, 5	5	0.05				—	0	0.05	V
	—	0, 10	10	0.05				—	0	0.05	
	—	0, 15	15	0.05				—	0	0.05	
Output Voltage: High-Level, V_{OH} Min.	—	0, 5	5	4.95				4.95	5	—	
	—	0, 10	10	9.95				9.95	10	—	
	—	0, 15	15	14.95				14.95	15	—	
Input Low Voltage, V_{IL} Max.	0.5, 4.5	—	5	1				—	—	1	
	1, 9	—	10	2				—	—	2	
	1.5, 13.5	—	15	2.5				—	—	2.5	
Input High Voltage, V_{IH} Min.	0.5, 4.5	—	5	4				4	—	—	
	1, 9	—	10	8				8	—	—	
	1.5, 13.5	—	15	12.5				12.5	—	—	
Input Current, I_{IN} Max.	—	0, 18	18	±0.1	±0.1	±1	±1	—	$±10^{-5}$	±0.1	μA

DYNAMIC ELECTRICAL CHARACTERISTICS at T_A=25°C, Input t_r,t_f=20 ns, C_L=50 pF, R_L=200 KΩ

CHARACTERISTIC	SYMBOL	TEST CONDITIONS	LIMITS			UNITS
		V_{DD} (V)	Min.	Typ.	Max.	
Propagation Delay Time	t_{PHL}, t_{PLH}	5	—	100	200	ns
		10	—	55	110	
		15	—	40	85	
Transition Time	t_{THL}, t_{TLH}	5	—	100	200	
		10	—	50	100	
		15	—	40	80	
Input Capacitance	C_{IN}	Any Input	—	10	15	pF

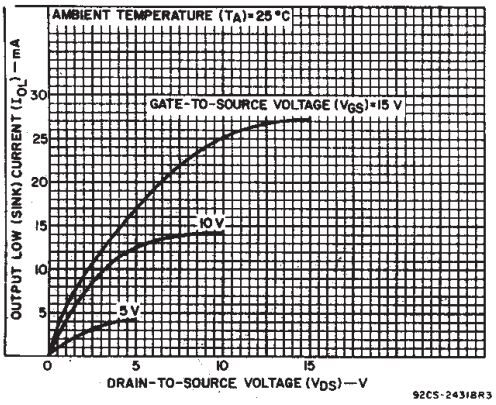


Fig. 4 - Typical output low (sink) current characteristics.

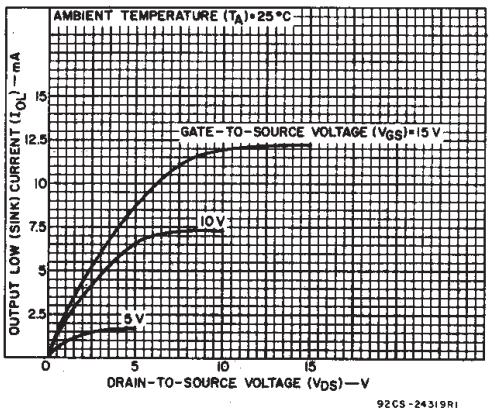


Fig. 5 - Minimum output low (sink) current characteristics.

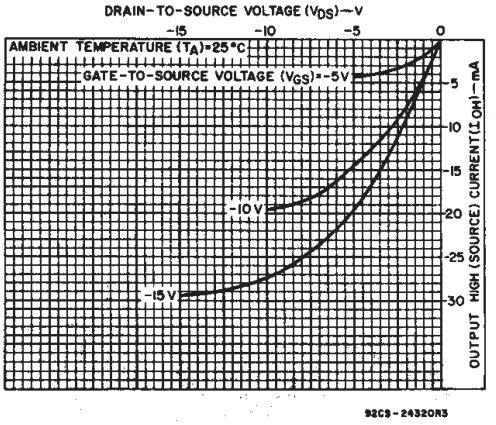


Fig. 6 - Typical output high (source) current characteristics.

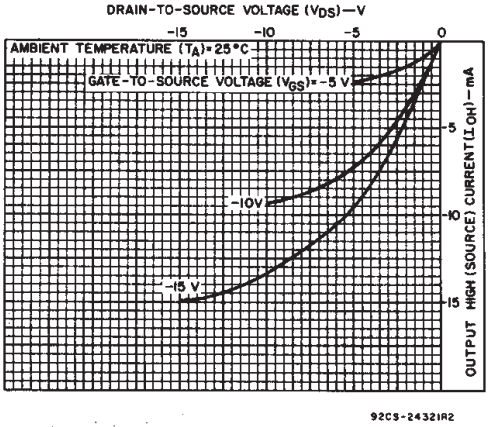


Fig. 7 - Minimum output high (source) current characteristics.

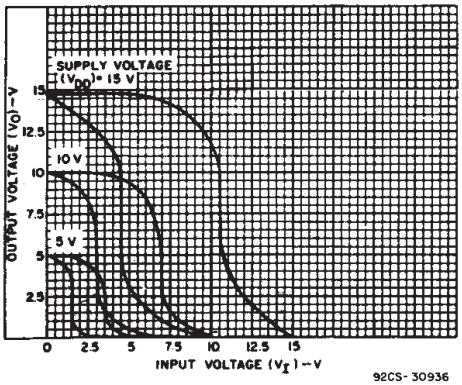


Fig. 8 - Minimum and maximum inverter voltage transfer characteristics.

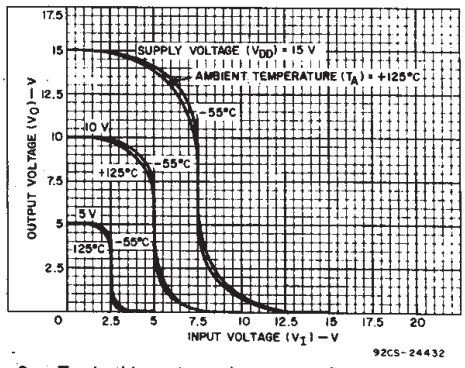


Fig. 9 - Typical inverter voltage transfer characteristics as a function of temperature.

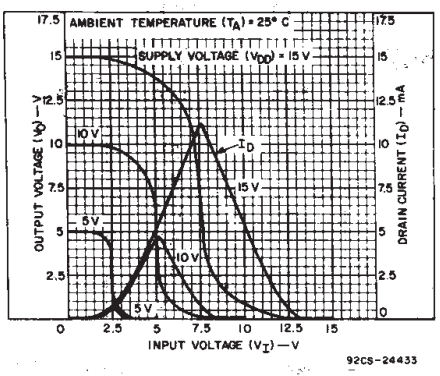


Fig. 10 - Typical inverter current and voltage transfer characteristics.

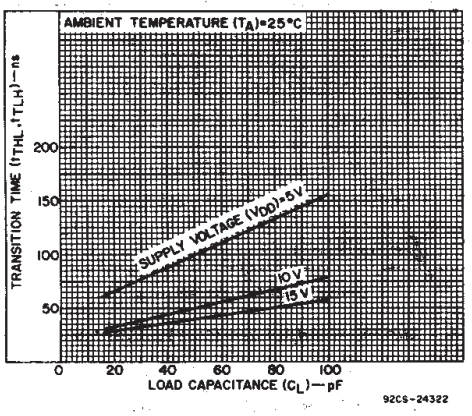


Fig. 12 - Typical transition time vs. load capacitance.

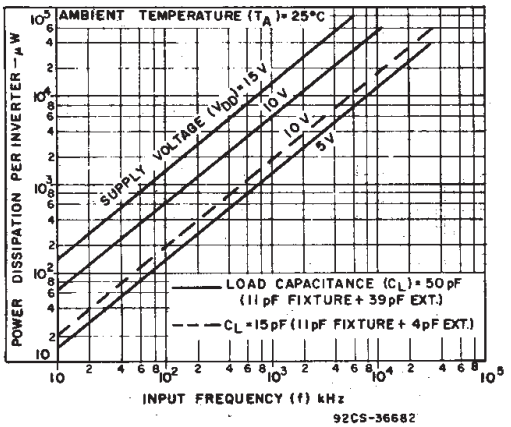


Fig. 14 - Typical dynamic power dissipation vs. frequency.

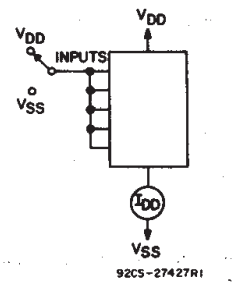


Fig. 16 - Quiescent device current test circuit.

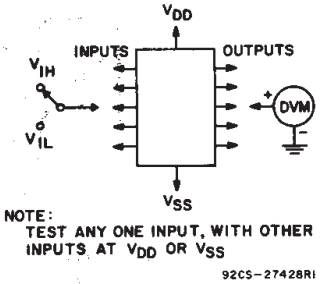


Fig. 17 - Noise immunity test circuit.

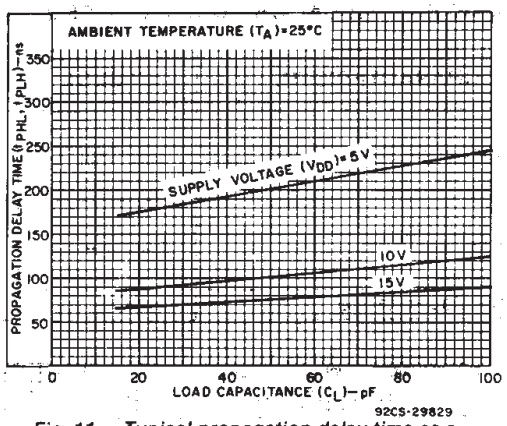


Fig. 11 - Typical propagation delay time as a function of load capacitance.

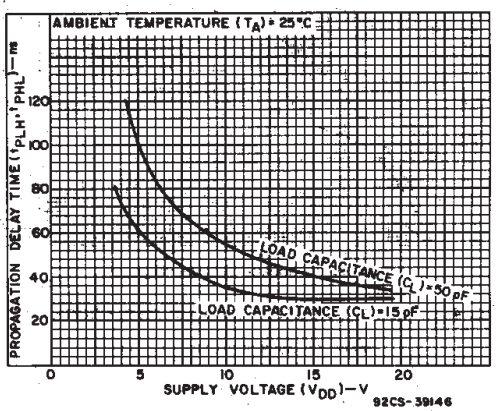


Fig. 13 - Typical propagation delay time vs. supply voltage.

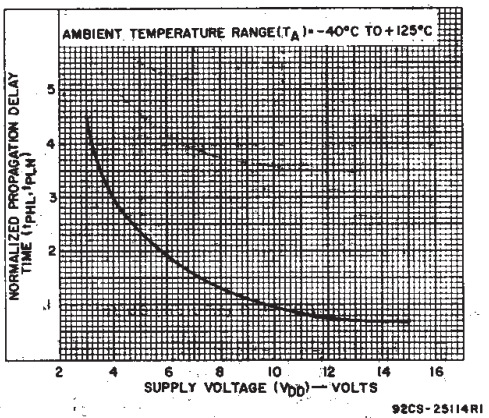


Fig. 15 - Variation of normalized propagation delay time (t_{PHL} and t_{PLH}) with supply voltage.

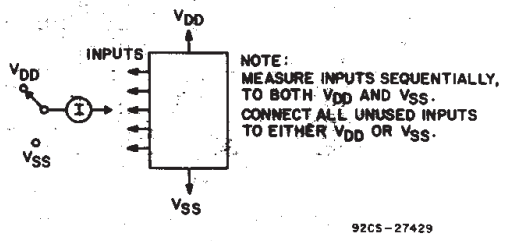


Fig. 18 - Input leakage current test circuit.

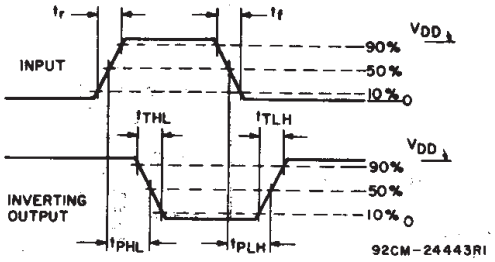
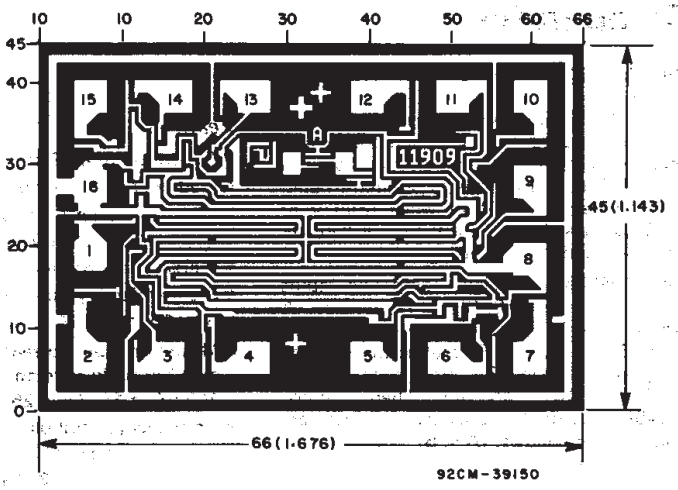


Fig. 19 - Transition times and propagation delay times, combination logic.



Dimensions and pad layout for CD4572UBH.

Dimensions in parentheses are in millimeters and are derived from the basic inch dimensions as indicated. Grid graduations are in mils (10^{-3} inch).

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