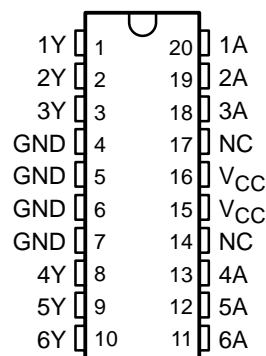


# CDC204, CDC204-7 HEX INVERTERS/CLOCK DRIVERS

SCAS098C – OCTOBER 1989– REVISED MARCH 1994

- CDC204 Replaces 74AC11204
- CDC204-7 Replaces 74AC11204-7
- Low-Skew Propagation Delay Specifications for Clock-Driver Applications
- CMOS-Compatible Inputs and Outputs
- Flow-Through Architecture Optimizes PCB Layout
- Center-Pin  $V_{CC}$  and GND Pin Configurations Minimize High-Speed Switching Noise
- EPIC™ (Enhanced-Performance Implanted CMOS) 1- $\mu$ m Process
- 500-mA Typical Latch-Up Immunity at 125°C
- Package Options Include Plastic Small-Outline Package (DW) and Standard Plastic 300-mil DIPs (N)

DW OR N PACKAGE  
(TOP VIEW)



NC – No internal connection

## description

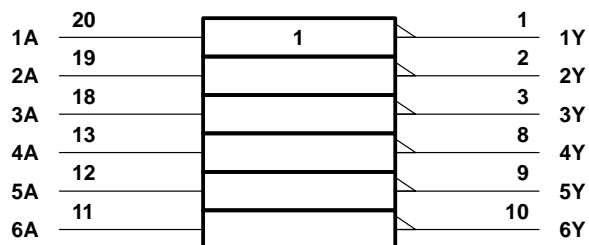
The CDC204/204-7 contains six independent inverters. The device performs the Boolean function  $Y = \bar{A}$ . It is designed specifically for applications requiring low skew between switching outputs.

The CDC204/204-7 is characterized for operation from 25°C to 70°C.

FUNCTION TABLE

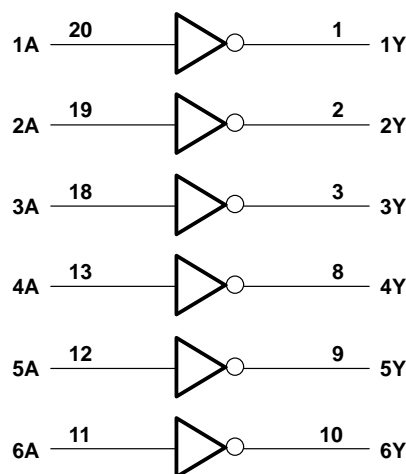
INPUT A	OUTPUT Y
H	L
L	H

## logic symbol†



† This symbol is in accordance with ANSI/IEEE Std 91-1984 and IEC Publication 617-12.

## logic diagram (positive logic)



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# CDC204, CDC204-7

## HEX INVERTERS/CLOCK DRIVERS

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### absolute maximum ratings over operating free-air temperature range (unless otherwise noted)<sup>†</sup>

Supply voltage range, $V_{CC}$	–0.5 V to 7 V
Input voltage range, $V_I$ (see Note 1)	–0.5 V to $V_{CC} + 0.5$ V
Output voltage range, $V_O$ (see Note 1)	–0.5 V to $V_{CC} + 0.5$ V
Input clamp current, $I_{IK}$ ( $V_I < 0$ or $V_I > V_{CC}$ )	±20 mA
Output clamp current, $I_{OK}$ ( $V_O < 0$ or $V_O > V_{CC}$ )	±50 mA
Continuous output current, $I_O$ ( $V_O = 0$ to $V_{CC}$ )	±50 mA
Continuous current through $V_{CC}$ or GND	±150 mA
Maximum power dissipation at $T_A = 55^\circ\text{C}$ (in still air) (see Note 2): DW package	1.6 W
N package	1.3 W
Storage temperature range, $T_{stg}$	–65°C to 150°C

<sup>†</sup> Stresses beyond those listed under “absolute maximum ratings” may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated under “recommended operating conditions” is not implied. Exposure to absolute-maximum-rated conditions for extended periods may affect device reliability.

NOTES: 1. The input and output negative-voltage ratings may be exceeded if the input and output clamp-current ratings are observed.  
2. The maximum package power dissipation is calculated using a junction temperature of 150°C and a board trace length of 750 mils, except for the N package, which has a trace length of zero. For more information, refer to the *Package Thermal Considerations* application note in the 1994 *ABT Advanced BiCMOS Technology Data Book*, literature number SCBD002B.

### recommended operating conditions

		MIN	NOM	MAX	UNIT
$V_{CC}$	Supply voltage	4.75	5	5.25	V
$V_{IH}$	High-level input voltage	$V_{CC} = 4.75$ V		3.3	V
		$V_{CC} = 5.25$ V		3.7	
$V_{IL}$	Low-level input voltage	$V_{CC} = 4.75$ V		1.4	V
		$V_{CC} = 5.25$ V		1.6	
$V_I$	Input voltage	0		$V_{CC}$	V
$I_{OH}$	High-level output current	$V_{CC} = 4.75$ V		–24	mA
		$V_{CC} = 5.25$ V		–24	
$I_{OL}$	Low-level output current	$V_{CC} = 4.75$ V		24	mA
		$V_{CC} = 5.25$ V		24	
$\Delta t/\Delta v$	Input transition rise or fall rate	0		10	ns/V
$f_{clock}$	Input clock frequency			80	MHz
$T_A$	Operating free-air temperature	25		70	°C

**electrical characteristics over recommended operating free-air temperature range (unless otherwise noted)**

PARAMETER	TEST CONDITIONS	V <sub>CC</sub>	TA = 25°C			CDC204		CDC204-7		UNIT
			MIN	TYP	MAX	MIN	MAX	MIN	MAX	
V <sub>OH</sub>	I <sub>OH</sub> = – 50 µA	4.75 V	4.65			4.65		4.65		V
		5.25 V	5.15			5.15		5.15		
	I <sub>OH</sub> = – 24 mA	4.75 V	4.19			4.05		4.05		
		5.25 V	4.68			4.55		4.55		
	I <sub>OH</sub> = – 75 mA†	5.25 V				3.6		3.6		
V <sub>OL</sub>	I <sub>OL</sub> = 50 µA	4.75 V			0.1		0.1		0.1	V
		5.25 V			0.1		0.1		0.1	
	I <sub>OL</sub> = 24 mA	4.75 V			0.36		0.44		0.44	
		5.25 V			0.36		0.44		0.44	
	I <sub>OL</sub> = 75 mA†	5.25 V					1.65		1.65	
I <sub>I</sub>	V <sub>I</sub> = V <sub>CC</sub> or GND	5.25 V			±0.1		±1		±1	µA
I <sub>CC</sub>	V <sub>I</sub> = V <sub>CC</sub> or GND, I <sub>O</sub> = 0	5.25 V			4		40		40	µA
C <sub>i</sub>	V <sub>I</sub> = V <sub>CC</sub> or GND	5 V		4						pF

† Not more than one output should be tested at a time, and the duration of the test should not exceed 10 ms.

**switching characteristics over recommended operating free-air temperature range,  
V<sub>CC</sub> = 5 V ± 0.25 V (see Note 3 and Figures 1 and 2)**

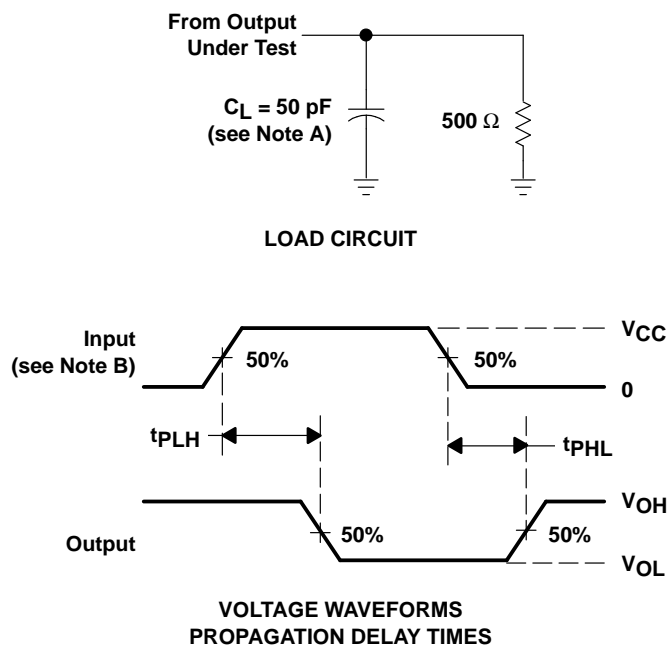
PARAMETER	FROM (INPUT)	TO (OUTPUT)	CDC204		CDC204-7		UNIT
			MIN	MAX	MIN	MAX	
t <sub>PLH</sub>	A	Y	3.7	5.7	3.7	5.7	ns
t <sub>PHL</sub>			3.7	5.7	3.7	5.7	
t <sub>sk(o)</sub>	A	Y		1		0.7	ns

NOTE 3: All specifications are valid only for all outputs switching simultaneously and in phase.

# CDC204, CDC204-7 HEX INVERTERS/CLOCK DRIVERS

SCAS098C – OCTOBER 1989– REVISED MARCH 1994

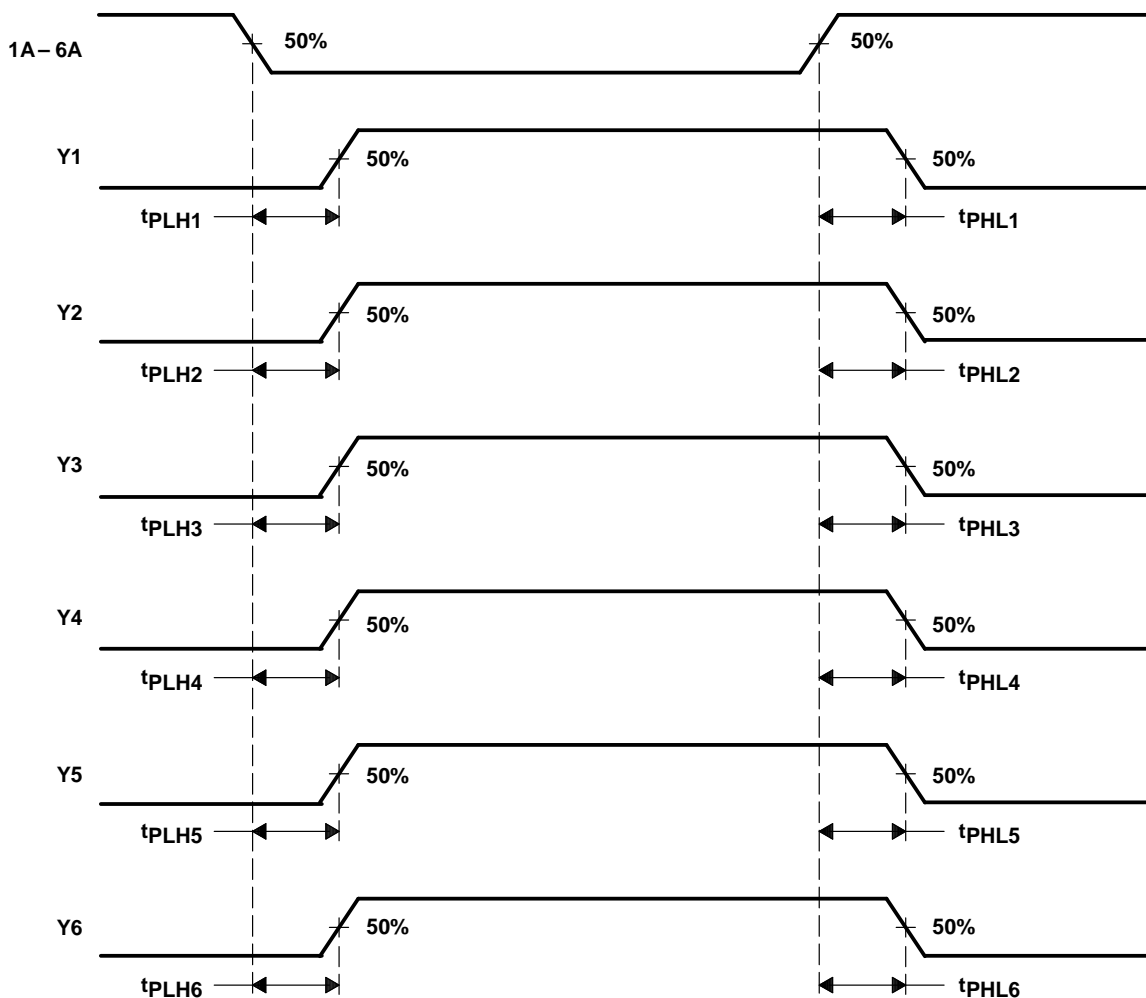
## PARAMETER MEASUREMENT INFORMATION



- NOTES: A.  $C_L$  includes probe and jig capacitance.  
B. Input pulses are supplied by generators having the following characteristics:  $PRR \leq 10 \text{ MHz}$ ,  $Z_O = 50 \Omega$ ,  $t_r = 3 \text{ ns}$ ,  $t_f = 3 \text{ ns}$ .  
C. The outputs are measured one at a time with one input transition per measurement.

**Figure 1. Load Circuit and Voltage Waveforms**

PARAMETER MEASUREMENT INFORMATION



NOTE A: Output skew,  $t_{sk(o)}$ , is calculated as the greater of:

- The difference between the fastest and slowest of  $t_{PHLn}$  ( $n = 1, 2, \dots, 6$ )
- The difference between the fastest and slowest of  $t_{PLHn}$  ( $n = 1, 2, \dots, 6$ )

Figure 2. Waveforms for Calculation of  $t_{sk(o)}$



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