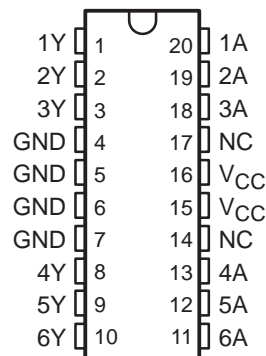


- CDC204 Replaces 74AC11204
- Low-Skew Propagation Delay Specifications for Clock-Driver Applications
- CMOS-Compatible Inputs and Outputs
- Flow-Through Architecture Optimizes PCB Layout
- Center-Pin  $V_{CC}$  and GND Pin Configurations Minimize High-Speed Switching Noise
- EPIC™ (Enhanced-Performance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

DW PACKAGE  
(TOP VIEW)



NC – No internal connection

## description

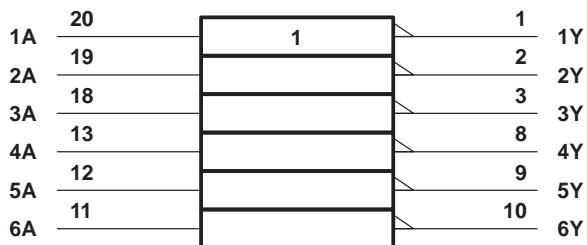
The CDC204 contains six independent inverters. The device performs the Boolean function  $Y = \bar{A}$ . It is designed specifically for applications requiring low skew between switching outputs.

The CDC204 is characterized for operation from  $T_A = 25^\circ\text{C}$  to  $70^\circ\text{C}$ .

FUNCTION TABLE

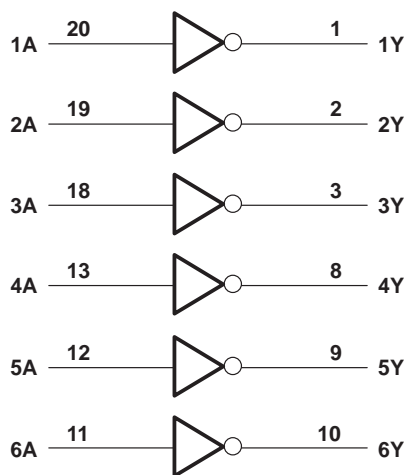
INPUT A	OUTPUT Y
H	L
L	H

## 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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PRODUCTION DATA information is current as of publication date. Products conform to specifications per the terms of Texas Instruments standard warranty. Production processing does not necessarily include testing of all parameters.

TEXAS  
INSTRUMENTS

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# CDC204

## HEX INVERTER/CLOCK DRIVER

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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)	1.6 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. 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



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

PARAMETER		TEST CONDITIONS		T <sub>A</sub> †	MIN	TYP	MAX	UNIT
V <sub>OH</sub>	High-level voltage output	I <sub>OH</sub> = – 50 μA	V <sub>CC</sub> = 4.75 V	25°C	4.65			V
				Full range	4.65			
			V <sub>CC</sub> = 5.25 V	25°C	5.15			
				Full range	5.15			
		I <sub>OH</sub> = – 24 mA	V <sub>CC</sub> = 4.75 V	25°C	4.19			
				Full range	4.05			
			V <sub>CC</sub> = 5.25 V	25°C	4.68			
				Full range	4.55			
		I <sub>OH</sub> = – 75 mA‡, V <sub>CC</sub> = 5.25 V		Full range	3.6			
V <sub>OL</sub>	Low-level voltage output	I <sub>OL</sub> = 50 μA	V <sub>CC</sub> = 4.75 V	25°C			0.1	V
				Full range			0.1	
			V <sub>CC</sub> = 5.25 V	25°C			0.1	
				Full range			0.1	
		I <sub>OL</sub> = 24 mA	V <sub>CC</sub> = 4.75 V	25°C			0.36	
				Full range			0.44	
			V <sub>CC</sub> = 5.25 V	25°C			0.36	
				Full range			0.44	
		I <sub>OL</sub> = 75 mA‡, V <sub>CC</sub> = 5.25 V		Full range			1.65	
I <sub>I</sub>	Input current	V <sub>I</sub> = V <sub>CC</sub> or GND	V <sub>CC</sub> = 5.25 V	25°C			±0.1	μA
				Full range			±1	
I <sub>CC</sub>	Supply current	V <sub>I</sub> = V <sub>CC</sub> or GND, I <sub>O</sub> = 0	V <sub>CC</sub> = 5.25 V,	25°C			4	μA
				Full range			40	
C <sub>i</sub>	Input capacitance	V <sub>I</sub> = V <sub>CC</sub> or GND,	V <sub>CC</sub> = 5 V	25°C		4		pF

<sup>†</sup> Full range is T<sub>A</sub> = 25°C to 70°C.

<sup>‡</sup> 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)	MIN	MAX	UNIT
t <sub>PLH</sub> Propagation delay time, low-to-high level (see Figure 1)	A	Y	3.7	5.7	ns
t <sub>PHL</sub> Propagation delay time, high-to-low level (see Figure 1)			2.9	5.7	
t <sub>sk(o)</sub> Output skew time (see Figure 2)	A	Y		1	ns

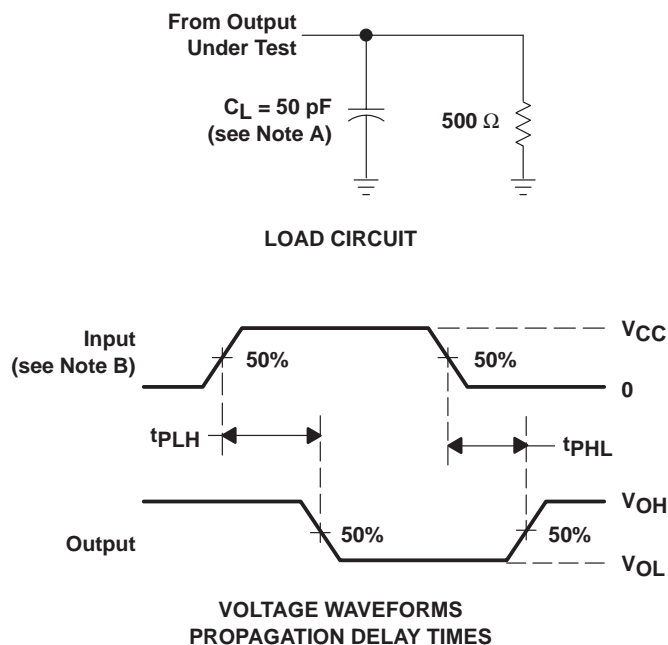
NOTE 3: All specifications are valid only for all outputs switching simultaneously and in phase.

# CDC204

## HEX INVERTER/CLOCK DRIVER

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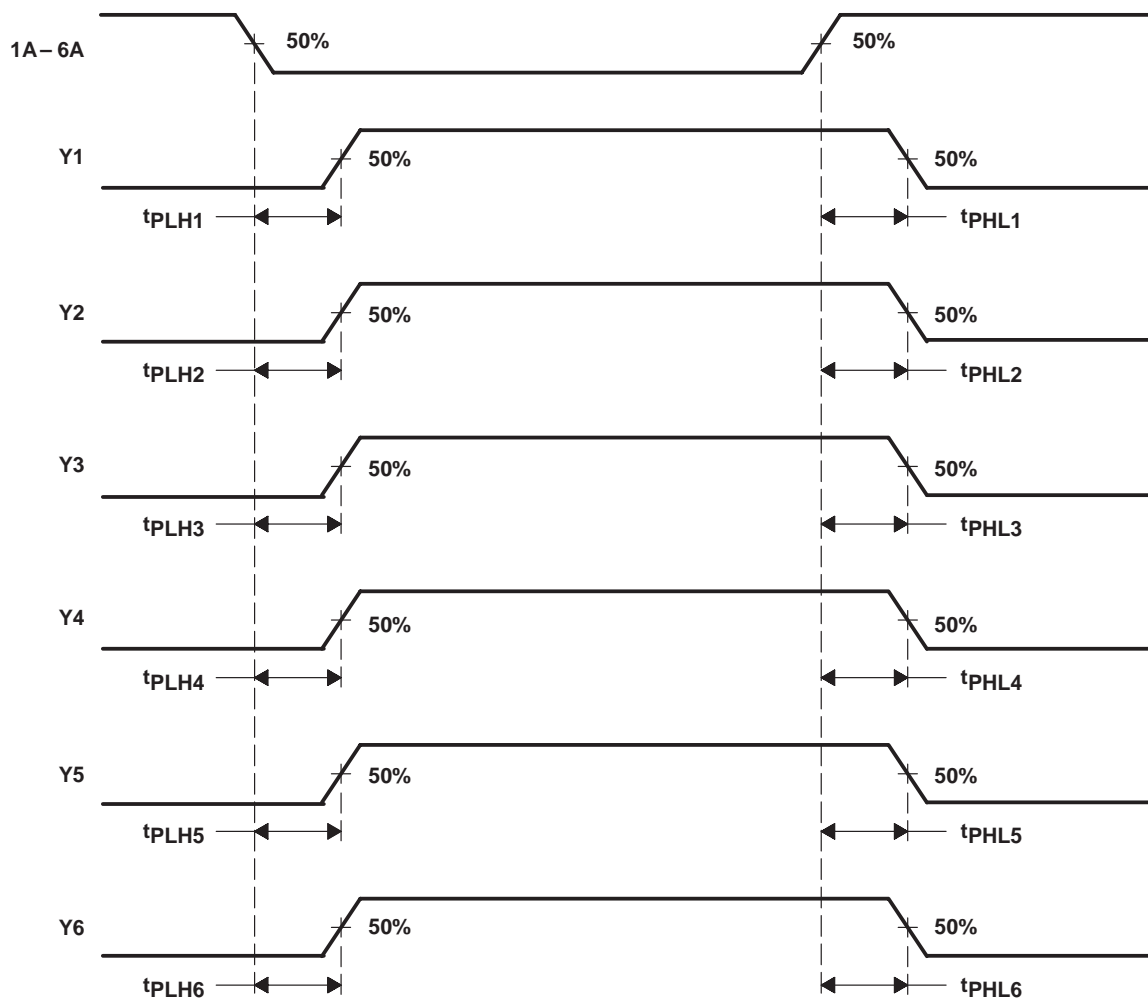
### PARAMETER MEASUREMENT INFORMATION



- 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  $t_{sk(o)}$

# CDC204

## HEX INVERTER/CLOCK DRIVER

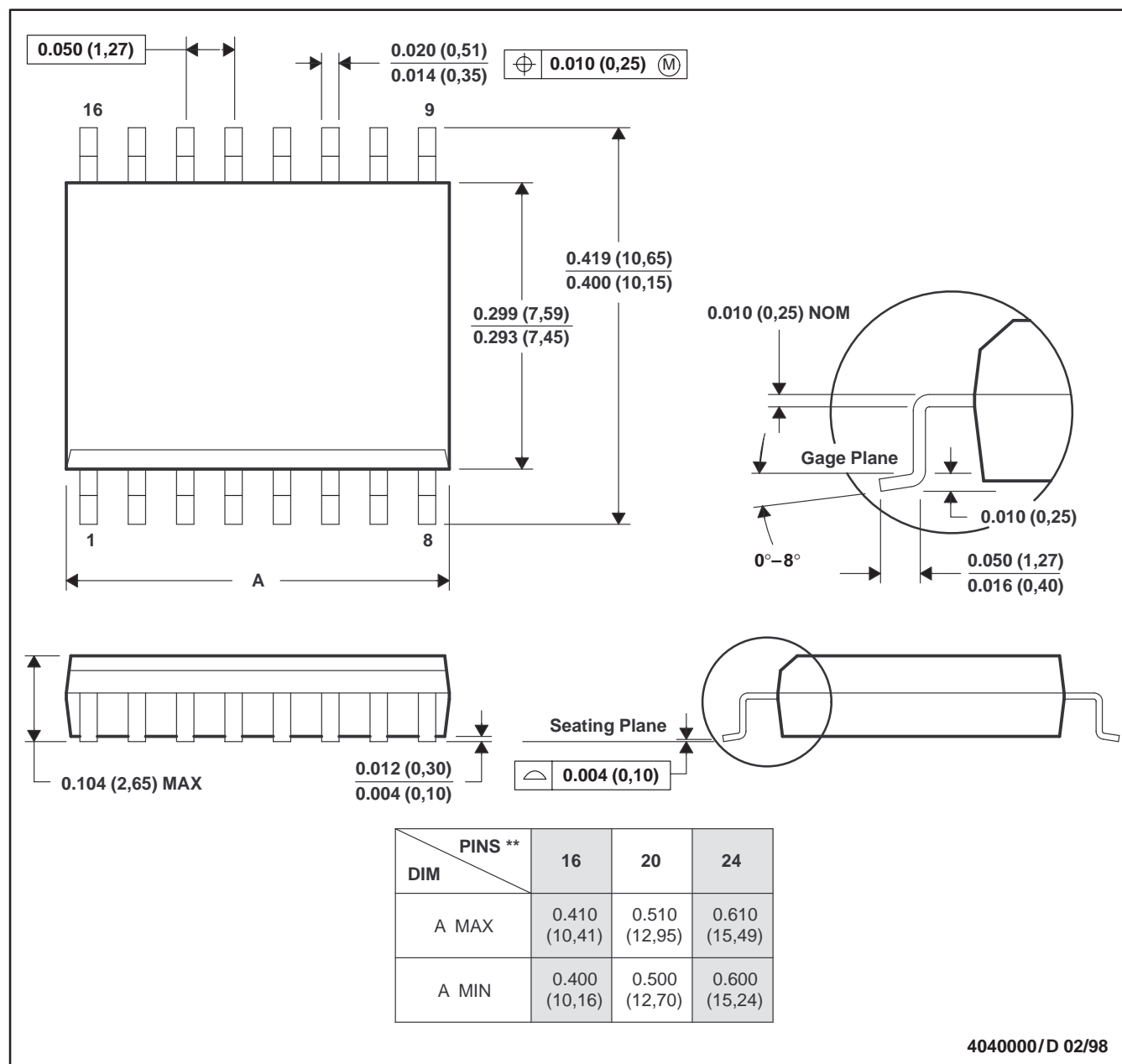
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### MECHANICAL INFORMATION

DW (R-PDSO-G\*\*)

PLASTIC SMALL-OUTLINE PACKAGE

16 PIN SHOWN



- NOTES: A. All linear dimensions are in inches (millimeters).  
 B. This drawing is subject to change without notice.  
 C. Body dimensions do not include mold flash or protrusion not to exceed 0.006 (0,15).  
 D. Falls within JEDEC MS-013

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