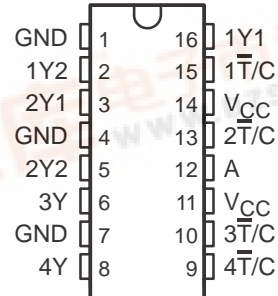


1-LINE TO 6-LINE CLOCK DRIVER WITH SELECTABLE POLARITY

SCBS116B – JANUARY 1991 – REVISED MARCH 1994

- Replaces SN74ABT328
- Low Output Skew for Clock-Distribution and Clock-Generation Applications
- TTL-Compatible Inputs and Outputs
- Distributes One Clock Input to Six Clock Outputs
- Polarity Control Selects True or Complementary Outputs
- Distributed V_{CC} and GND Pins Reduce Switching Noise
- High-Drive Outputs ($-15\text{-mA } I_{OH}$, $64\text{-mA } I_{OL}$)
- State-of-the-Art EPIC-II B™ BiCMOS Design Significantly Reduces Power Dissipation
- Package Options Include Plastic Small-Outline (D) and Shrink Small-Outline (DB) Packages

D OR DB PACKAGE
(TOP VIEW)



description

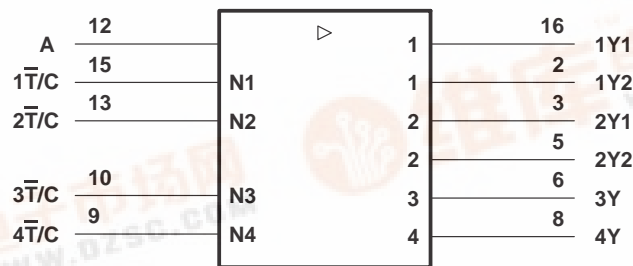
The CDC328 contains a clock-driver circuit that distributes one input signal to six outputs with minimum skew for clock distribution. Through the use of the polarity-control inputs ($\overline{T/C}$), various combinations of true and complementary outputs can be obtained.

The CDC328 is characterized for operation from -40°C to 85°C .

FUNCTION TABLE

INPUTS		OUTPUT
$\overline{T/C}$	A	Y
L	L	L
L	H	H
H	L	H
H	H	L

logic symbol†



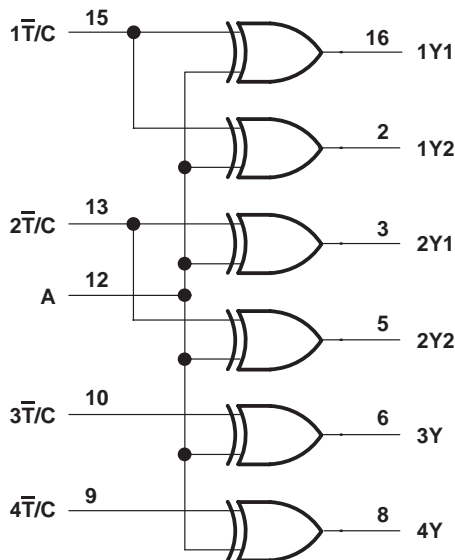
† This symbol is in accordance with ANSI/IEEE Std 91-1984 and IEC Publication 617-12.

CDC328

1-LINE TO 6-LINE CLOCK DRIVER WITH SELECTABLE POLARITY

SCBS116B – JANUARY 1991 – REVISED MARCH 1994

logic diagram (positive logic)



absolute maximum ratings over operating free-air temperature range (unless otherwise noted)[†]

Supply voltage range, V_{CC}	-0.5 V to 7 V
Input voltage range, V_I (see Note 1)	-0.5 V to 7 V
Voltage range applied to any output in the high state or power-off state, V_O (see Note 1)	-0.5 V to $V_{CC} + 0.5$ V
Current into any output in the low state, I_O	128 mA
Input clamp current, I_{IK} ($V_I < 0$)	-18 mA
Output clamp current, I_{OK} ($V_O < 0$)	-50 mA
Continuous total power dissipation at (or below) 25°C free-air temperature (see Note 2)	1000 mW
Storage temperature range, T_{Stg}	-65°C to 150°C

[†] 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. For operation above 25°C free-air temperature, derate to 478 mW at 85°C at the rate of 8.7 mW/°C.

recommended operating conditions (see Note 3)

	MIN	NOM	MAX	UNIT
V_{CC} Supply voltage	4.75	5	5.25	V
V_{IH} High-level input voltage	2			V
V_{IL} Low-level input voltage			0.8	V
V_I Input voltage	0		V_{CC}	V
I_{OH} High-level output current			-15	mA
I_{OL} Low-level output current			64	mA
$\Delta t/\Delta v$ Input transition rise or fall rate			5	ns/V
f_{clock} Input clock frequency			80	MHz
T_A Operating free-air temperature	-40		85	°C

NOTE 3: Unused inputs must be held high or low.

CDC328
1-LINE TO 6-LINE CLOCK DRIVER
WITH SELECTABLE POLARITY
 SCBS116B – JANUARY 1991 – REVISED MARCH 1994

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

PARAMETER	TEST CONDITIONS		MIN	TYP†	MAX	UNIT
V_{IK}	$V_{CC} = 4.75\text{ V}$,	$I_I = -18\text{ mA}$			-1.2	V
V_{OH}	$V_{CC} = 4.75\text{ V}$,	$I_{OH} = -15\text{ mA}$	2.5			V
V_{OL}	$V_{CC} = 4.75\text{ V}$,	$I_{OL} = 64\text{ mA}$			0.55	V
I_I	$V_{CC} = 5.25\text{ V}$,	$V_I = V_{CC}$ or GND			± 1	μA
$I_{O\ddagger}$	$V_{CC} = 5.25\text{ V}$,	$V_O = 2.5\text{ V}$	-15		-100	mA
I_{CC}	$V_{CC} = 5.25\text{ V}$, $V_I = V_{CC}$ or GND	$I_O = 0$,	Outputs high		50	μA
			Outputs low		20	30
C_i	$V_I = 2.5\text{ V}$ or 0.5 V			3		pF

† All typical values are at $V_{CC} = 5\text{ V}$, $T_A = 25^\circ\text{C}$

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

switching characteristics over recommended ranges of supply voltage and operating free-air temperature (see Figures 1 and 2)

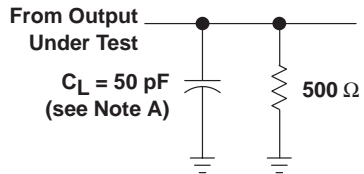
PARAMETER	FROM (INPUT)	TO (OUTPUT)	MIN	TYP	MAX	UNIT
t_{PLH}	A	Any Y	1.7		7	ns
t_{PHL}			1.5		5.4	
t_{PLH}	\bar{T}/C	Any Y	1.5		8	ns
t_{PHL}			1.4		6.6	
$t_{sk(o)}$	A	Any Y (same phase)			0.7	ns
		Any Y (any phase)			2.6	
t_r				1.2		ns
t_f				0.5		ns

switching characteristics, $V_{CC} = 5\text{ V} \pm 0.25\text{ V}$, $T_A = 25^\circ\text{C}$ to 70°C (see Figures 1 and 2)

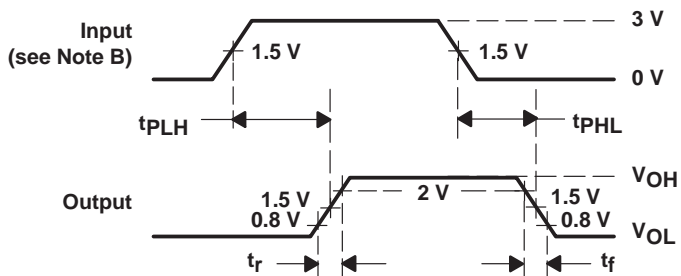
PARAMETER	FROM (INPUT)	TO (OUTPUT)	MIN	MAX	UNIT
t_{PLH}	A	Any Y	2.1	6.1	ns
t_{PHL}			1.7	4.8	
$t_{sk(o)}$	A	Any Y (same phase)		0.7	ns
		Any Y (any phase)		2.1	

CDC328
1-LINE TO 6-LINE CLOCK DRIVER
WITH SELECTABLE POLARITY
 SCBS116B – JANUARY 1991 – REVISED MARCH 1994

PARAMETER MEASUREMENT INFORMATION



LOAD CIRCUIT FOR OUTPUTS

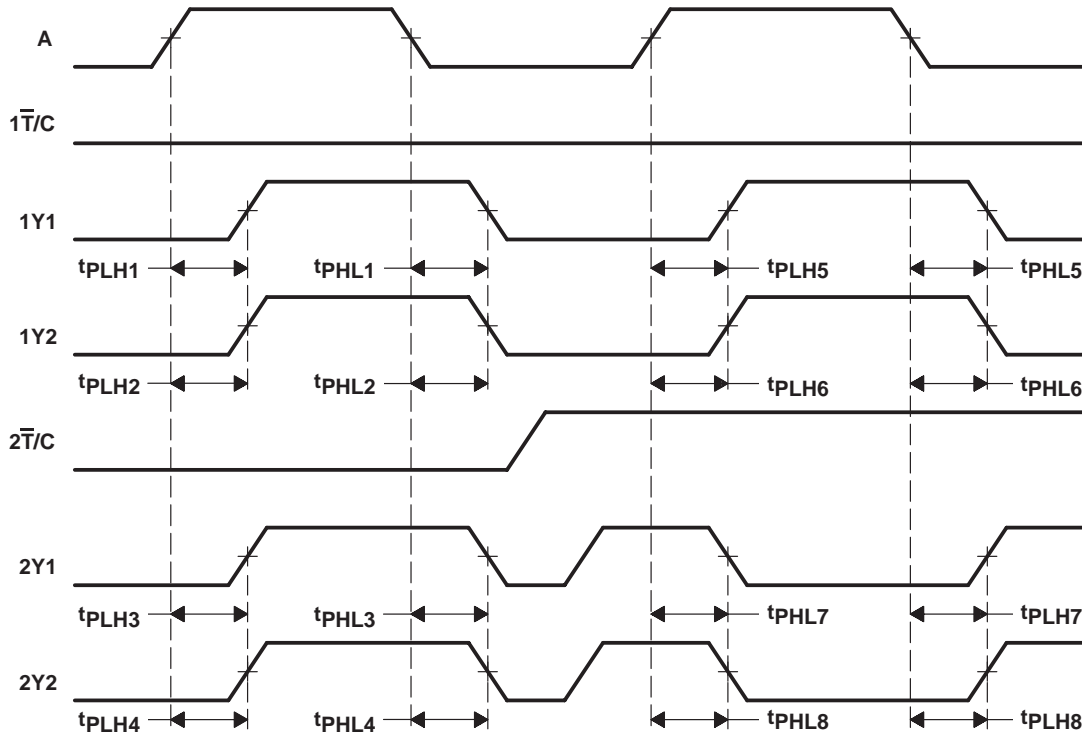


VOLTAGE WAVEFORMS
PROPAGATION DELAY TIMES

- NOTES: A. C_L includes probe and jig capacitance.
 B. All input pulses are supplied by generators having the following characteristics: $PRR \leq 10 \text{ MHz}$, $Z_O = 50 \Omega$, $t_r \leq 2.5 \text{ ns}$, $t_f \leq 2.5 \text{ ns}$.

Figure 1. Load Circuit and Voltage Waveforms

PARAMETER MEASUREMENT INFORMATION



- NOTES: A. Output skew, $t_{sk(o)}$, from A to any Y (same phase), can be measured only between outputs for which the respective polarity-control inputs (\bar{T}/C) are at the same logic level. It is calculated as the greater of:
- The difference between the fastest and slowest of t_{PLH} from $A\uparrow$ to any Y (e.g., t_{PLHn} , $n = 1$ to 4 ; or t_{PLHn} , $n = 5$ to 6)
 - The difference between the fastest and slowest of t_{PHL} from $A\downarrow$ to any Y (e.g., t_{PHLn} , $n = 1$ to 4 ; or t_{PHLn} , $n = 5$ to 6)
 - The difference between the fastest and slowest of t_{PLH} from $A\downarrow$ to any Y (e.g., t_{PLHn} , $n = 7$ to 8)
 - The difference between the fastest and slowest of t_{PHL} from $A\uparrow$ to any Y (e.g., t_{PHLn} , $n = 7$ to 8)
- B. Output skew, $t_{sk(o)}$, from A to any Y (any phase), can be measured between outputs for which the respective polarity-control inputs (\bar{T}/C) are at the same or different logic levels. It is calculated as the greater of:
- The difference between the fastest and slowest of t_{PLH} from $A\uparrow$ to any Y or t_{PHL} from $A\uparrow$ to any Y (e.g., t_{PLHn} , $n = 1$ to 4 ; or t_{PLHn} , $n = 5$ to 6 , and t_{PHLn} , $n = 7$ to 8)
 - The difference between the fastest and slowest of t_{PHL} from $A\downarrow$ to any Y or t_{PLH} from $A\downarrow$ to any Y (e.g., t_{PHLn} , $n = 1$ to 4 ; or t_{PHLn} , $n = 5$ to 6 , and t_{PLHn} , $n = 7$ to 8)

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

IMPORTANT NOTICE

Texas Instruments and its subsidiaries (TI) reserve the right to make changes to their products or to discontinue any product or service without notice, and advise customers to obtain the latest version of relevant information to verify, before placing orders, that information being relied on is current and complete. All products are sold subject to the terms and conditions of sale supplied at the time of order acknowledgement, including those pertaining to warranty, patent infringement, and limitation of liability.

TI warrants performance of its semiconductor products to the specifications applicable at the time of sale in accordance with TI's standard warranty. Testing and other quality control techniques are utilized to the extent TI deems necessary to support this warranty. Specific testing of all parameters of each device is not necessarily performed, except those mandated by government requirements.

CERTAIN APPLICATIONS USING SEMICONDUCTOR PRODUCTS MAY INVOLVE POTENTIAL RISKS OF DEATH, PERSONAL INJURY, OR SEVERE PROPERTY OR ENVIRONMENTAL DAMAGE ("CRITICAL APPLICATIONS"). TI SEMICONDUCTOR PRODUCTS ARE NOT DESIGNED, AUTHORIZED, OR WARRANTED TO BE SUITABLE FOR USE IN LIFE-SUPPORT DEVICES OR SYSTEMS OR OTHER CRITICAL APPLICATIONS. INCLUSION OF TI PRODUCTS IN SUCH APPLICATIONS IS UNDERSTOOD TO BE FULLY AT THE CUSTOMER'S RISK.

In order to minimize risks associated with the customer's applications, adequate design and operating safeguards must be provided by the customer to minimize inherent or procedural hazards.

TI assumes no liability for applications assistance or customer product design. TI does not warrant or represent that any license, either express or implied, is granted under any patent right, copyright, mask work right, or other intellectual property right of TI covering or relating to any combination, machine, or process in which such semiconductor products or services might be or are used. TI's publication of information regarding any third party's products or services does not constitute TI's approval, warranty or endorsement thereof.