

- Standard '16245-Type Pinout
- 25-Ω Switch Connection Between Two Ports
- TTL-Compatible Input Levels
- Package Options Include Plastic Thin Shrink Small-Outline (DGG), Thin Very Small-Outline (DGV), and Shrink Small-Outline (DL) Packages

### description

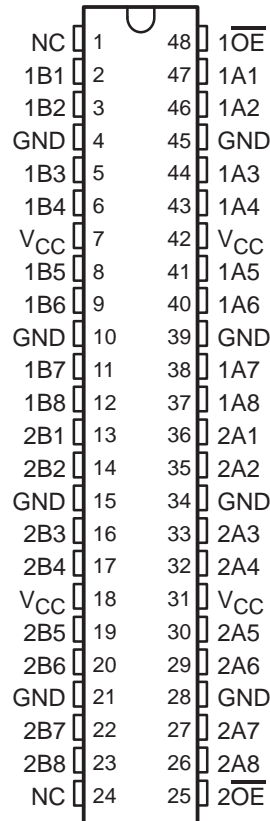
The SN74CBTR16245 provides 16 bits of high-speed TTL-compatible bus switching in a standard '16245 device pinout. The low on-state resistance of the switch allows connections to be made with minimal propagation delay.

The device is organized as two 8-bit low-impedance switches with separate output-enable ( $\overline{OE}$ ) inputs. When  $\overline{OE}$  is low, the switch is on, and data can flow from port A to port B, or vice versa. When  $\overline{OE}$  is high, the switch is open, and a high-impedance state exists between the two ports.

The device has equivalent 25-Ω series resistors to reduce signal-reflection noise. This eliminates the need for external terminating resistors.

The SN74CBTR16245 is characterized for operation from -40°C to 85°C.

### DGG, DGV, OR DL PACKAGE (TOP VIEW)



NC – No internal connection

FUNCTION TABLE  
(each 8-bit bus switch)

INPUT $\overline{OE}$	FUNCTION
L	A port = B port
H	Disconnect



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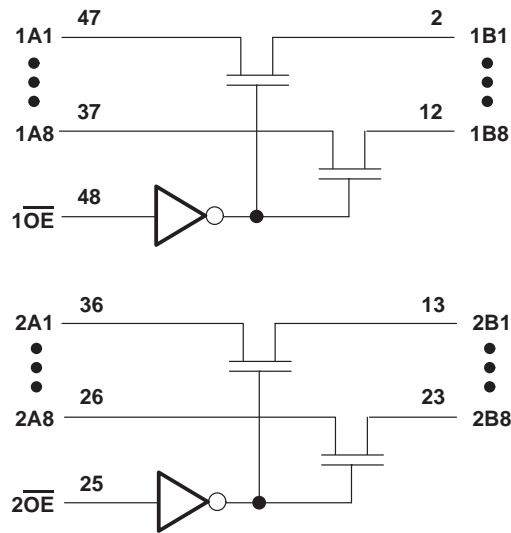
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PRODUCT PREVIEW

# SN74CBTR16245 16-BIT FET BUS SWITCH

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## logic diagram (positive logic)



## 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 7 V
Continuous channel current	128 mA
Input clamp current, $I_{IK}$ ( $V_{I/O} < 0$ )	–50 mA
Package thermal impedance, $\theta_{JA}$ (see Note 2): DGG package	70°C/W
DGV package	58°C/W
DL package	63°C/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 package thermal impedance is calculated in accordance with JESD 51.

## recommended operating conditions (see Note 3)

	MIN	MAX	UNIT
$V_{CC}$ Supply voltage	4.5	5.5	V
$V_{IH}$ High-level control input voltage	2		V
$V_{IL}$ Low-level control input voltage		0.8	V
$T_A$ Operating free-air temperature	–40	85	°C

NOTE 3: All unused control inputs of the device must be held at  $V_{CC}$  or GND to ensure proper device operation. Refer to the TI application report, *Implications of Slow or Floating CMOS Inputs*, literature number SCBA004.

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

PARAMETER		TEST CONDITIONS			MIN	TYP†	MAX	UNIT
V <sub>IK</sub>		V <sub>CC</sub> = 4.5 V, I <sub>I</sub> = −18 mA					−1.2	V
I <sub>I</sub>		V <sub>CC</sub> = 0	V <sub>I</sub> = 5.5 V				10	μA
		V <sub>CC</sub> = 5.5 V	V <sub>I</sub> = 5.5 V or GND				±1	
I <sub>CC</sub>		V <sub>CC</sub> = 5.5 V,	I <sub>O</sub> = 0, V <sub>I</sub> = V <sub>CC</sub> or GND				3	μA
ΔI <sub>CC</sub> ‡	Control inputs	V <sub>CC</sub> = 5.5 V,	One input at 3.4 V,	Other inputs at V <sub>CC</sub> or GND			2.5	mA
C <sub>i</sub>	Control inputs	V <sub>I</sub> = 3 V or 0						pF
C <sub>io</sub> (OFF)		V <sub>O</sub> = 3 V or 0, $\overline{\text{OE}}$ = V <sub>CC</sub>						pF
r <sub>on</sub> §		V <sub>CC</sub> = 4.5 V	V <sub>I</sub> = 0	I <sub>I</sub> = 64 mA				Ω
				I <sub>I</sub> = 30 mA				
			V <sub>I</sub> = 2.4 V, I <sub>I</sub> = 15 mA					

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

‡ This is the increase in supply current for each input that is at the specified TTL voltage level rather than  $V_{CC}$  or GND.

§ Measured by the voltage drop between the A and B terminals at the indicated current through the switch. On-state resistance is determined by the lower of the voltages of the two (A or B) terminals.

**switching characteristics over recommended operating free-air temperature range,  $C_L = 50\text{ pF}$  (unless otherwise noted) (see Figure 1)**

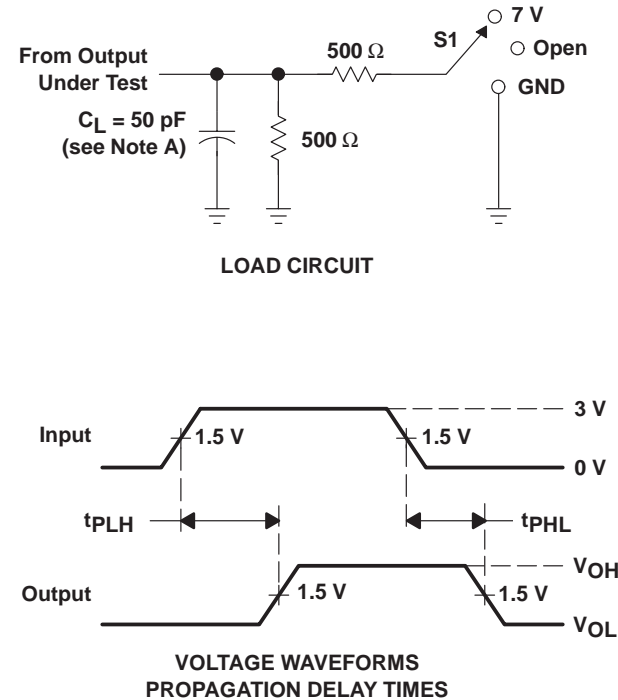
PARAMETER	FROM (INPUT)	TO (OUTPUT)	MIN	MAX	UNIT
$t_{pd}^\P$	A or B	B or A			ns
$t_{en}$	$\overline{OE}$	A or B			ns
$t_{dis}$	$\overline{OE}$	A or B			ns

¶ The propagation delay is the calculated RC time constant of the typical on-state resistance of the switch and the specified load capacitance, when driven by an ideal voltage source (zero output impedance).

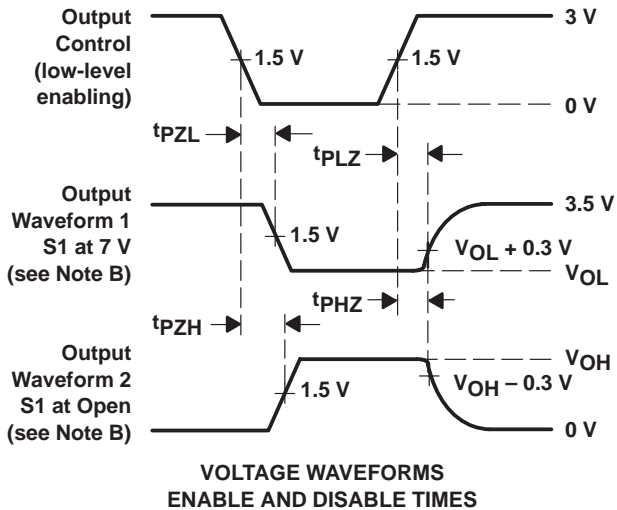
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## PARAMETER MEASUREMENT INFORMATION



TEST	S1
$t_{pd}$	Open
$t_{PLZ}/t_{PZL}$	7 V
$t_{PHZ}/t_{PZH}$	Open



- NOTES:
- A.  $C_L$  includes probe and jig capacitance.
  - B. Waveform 1 is for an output with internal conditions such that the output is low except when disabled by the output control. Waveform 2 is for an output with internal conditions such that the output is high except when disabled by the output control.
  - C. All input pulses are supplied by generators having the following characteristics:  $PRR \leq 10 \text{ MHz}$ ,  $Z_O = 50 \Omega$ ,  $t_r \leq 2.5 \text{ ns}$ ,  $t_f \leq 2.5 \text{ ns}$ .
  - D. The outputs are measured one at a time with one transition per measurement.
  - E.  $t_{PLZ}$  and  $t_{PHZ}$  are the same as  $t_{dis}$ .
  - F.  $t_{PZL}$  and  $t_{PZH}$  are the same as  $t_{en}$ .
  - G.  $t_{PLH}$  and  $t_{PHL}$  are the same as  $t_{pd}$ .

Figure 1. Load Circuit and Voltage Waveforms

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