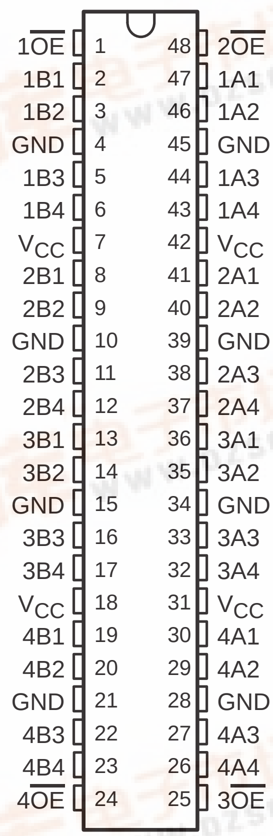
- **Standard ’16244-Type Pinout**
- **5-Ω Switch Connection Between Two Ports**
- **TTL-Compatible Input Levels**
- **Package Options Include Plastic Thin Shrink Small-Outline (DGG), Thin Very Small-Outline (DGV), and Shrink Small-Outline (DL) Packages, and Ceramic Flat (WD) Package**

SN54CBT16244 . . . WD PACKAGE
SN74CBT16244 . . . DGG, DGV, OR DL PACKAGE
(TOP VIEW)



description

The ’CBT16244 devices provide 16 bits of high-speed TTL-compatible bus switching in a standard ’16244 device pinout. The low on-state resistance of the switch allows connections to be made with minimal propagation delay.

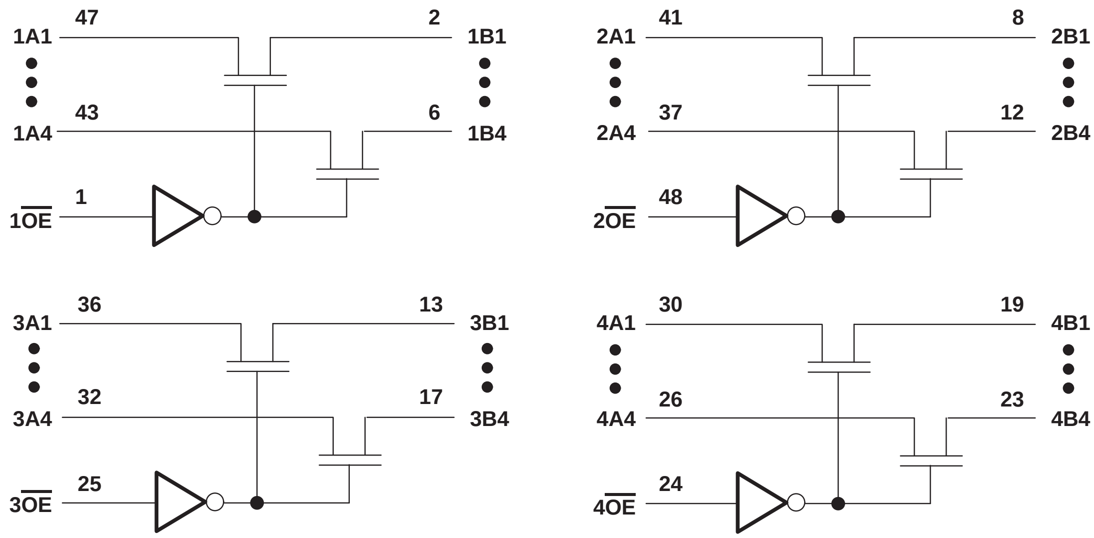
These devices are organized as four 4-bit low-impedance switches with separate output-enable ($\overline{OE}$) inputs. When $\overline{OE}$ is low, the switch is on, and data can flow from port A to port B, or vice versa. When $\overline{OE}$ is high, the switch is open, and a high-impedance state exists between the two ports.

The SN54CBT16244 is characterized for operation over the full military temperature range of –55°C to 125°C. The SN74CBT16244 is characterized for operation from –40°C to 85°C.

FUNCTION TABLE
(each 4-bit bus switch)

INPUT $\overline{OE}$	OUTPUTS A, B
L	A port = B port
H	Z

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
Continuous channel current . . . . 128 mA
Input clamp current, I_{IK} ($V_{I/O}$ < 0) . . . . –50 mA
Package thermal impedance, θ_{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

† 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)

		SN54CBT16244		SN74CBT16244		UNIT
		MIN	MAX	MIN	MAX	
V_{CC}	Supply voltage	4	5.5	4	5.5	V
V_{IH}	High-level control input voltage	2		2		V
V_{IL}	Low-level control input voltage		0.8		0.8	V
T_A	Operating free-air temperature	–55	125	–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			SN54CBT16244			SN74CBT16244			UNIT
					MIN	TYP†	MAX	MIN	TYP†	MAX	
V_{IK}		V_{CC} = 4.5 V,	I_I = –18 mA				–1.2			–1.2	V
I_I		V_{CC} = 0	V_I = 5.5 V				10			10	µA
		V_{CC} = 5.5 V	V_I = 5.5 V or GND				±1			±1	
I_{CC}		V_{CC} = 5.5 V, V_I = V_{CC} or GND	I_O = 0,				3.2			3	µA
ΔI_{CC}‡	Control inputs	V_{CC} = 5.5 V, Other inputs at V_{CC} or GND	One input at 3.4 V,				2.5			2.5	mA
C_i	Control inputs	V_I = 3 V or 0				2.5			2.5		pF
$C_{io(OFF)}$		V_O = 3 V or 0,	$\overline{OE}$ = V_{CC}			4.5			4.5		pF
r_{on}§		V_{CC} = 4 V,	V_I = 2.4 V,	I_I = 15 mA			20			20	Ω
		V_{CC} = 4.5 V	V_I = 0,	I_I = 64 mA		5	10		5	7	
			V_I = 0,	I_I = 30 mA		5	10		5	7	
			V_I = 2.4 V,	I_I = 15 mA		8	14		8	12	

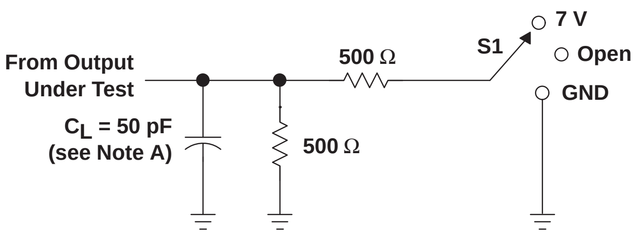
† All typical values are at V_{CC} = 5 V, T_A = 25°C.
‡ This is the increase in supply current for each input that is at the specified TTL voltage level rather than V_{CC} or GND.
§ Measured by the voltage drop between the A and B terminals at the indicated current through the switch. On-state resistance 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 pF (unless otherwise noted) (see Figure 1)

PARAMETER	FROM (INPUT)	TO (OUTPUT)	SN54CBT16244				SN74CBT16244				UNIT
			V_{CC} = 4 V		V_{CC} = 5 V ± 0.5 V		V_{CC} = 4 V		V_{CC} = 5 V ± 0.5 V		
			MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	
t_{pd}¶	A or B	B or A				0.8*		0.35		0.25	ns
t_{en}	$\overline{OE}$	A or B		10.3	1	9.2		5.5	1	5.1	ns
t_{dis}	$\overline{OE}$	A or B		9.7	1	8.2		5.2	1	5.4	ns

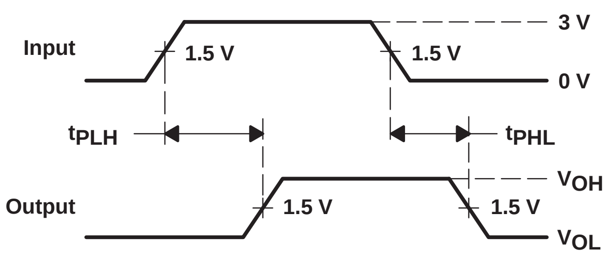
* On products compliant to MIL-PRF-38535, this parameter is not production tested.
¶ The propagation delay is the calculated RC time constant of the typical on-state resistance of the switch and the specified load capacitance, when driven by an ideal voltage source (zero output impedance).

PARAMETER MEASUREMENT INFORMATION

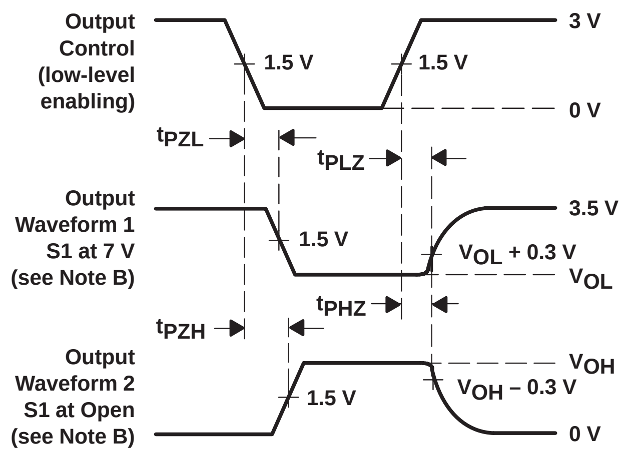


LOAD CIRCUIT

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



VOLTAGE WAVEFORMS
PROPAGATION DELAY TIMES



VOLTAGE WAVEFORMS
ENABLE AND DISABLE TIMES

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 ≤ 10 MHz, Z_O = 50 Ω, t_r ≤ 2.5 ns, t_f ≤ 2.5 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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