



LOW-VOLTAGE OCTAL BUS SWITCH

IDT74CBTLV3244

FEATURES:

- Pin-out compatible with standard '244 logic
- 5Ω A/B bidirectional switch
- Isolation Under Power-Off Conditions
- Over-voltage tolerant
- Latch-up performance exceeds 100mA
- $V_{CC} = 2.3V - 3.6V$, Normal Range
- ESD > 2000V per MIL-STD-883, Method 3015;
> 200V using machine model (C = 200pF, R = 0)
- Available in SSOP, QSOP, and TSSOP packages

APPLICATIONS:

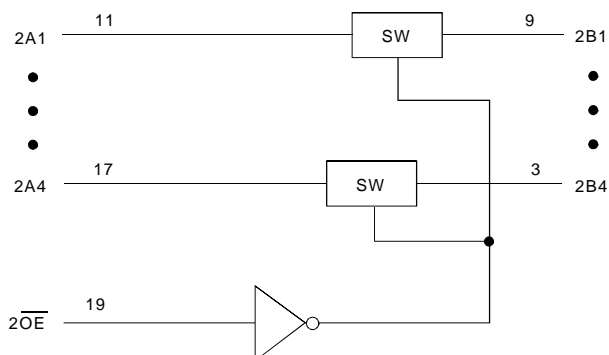
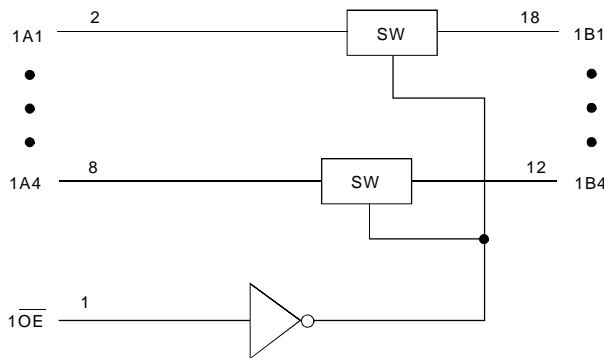
- 3.3V High Speed Bus Switching and Bus Isolation

DESCRIPTION:

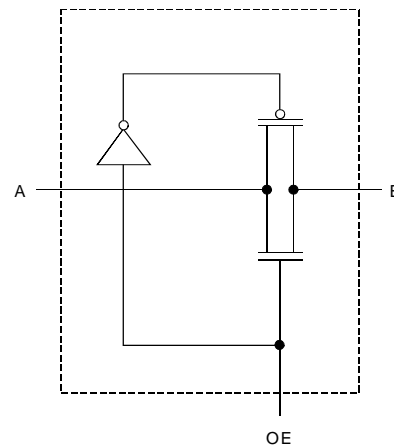
The octal bus switch has standard 244 pinouts. The CBTLV3244 is designed for asynchronous communication between data buses. Sets of four switches are controlled by one output Enable (\overline{OE}). When \overline{OE} is low, the set of four bus switches is on and port A is connected to port B. When \overline{OE} is high, the set of four bus switches is off and a high impedance exists between port A and port B.

To ensure the high-impedance state during power up or power down, both \overline{OE} s should be tied to V_{CC} through a pullup resistor.

FUNCTIONAL BLOCK DIAGRAM



SIMPLIFIED SCHEMATIC, EACH SWITCH

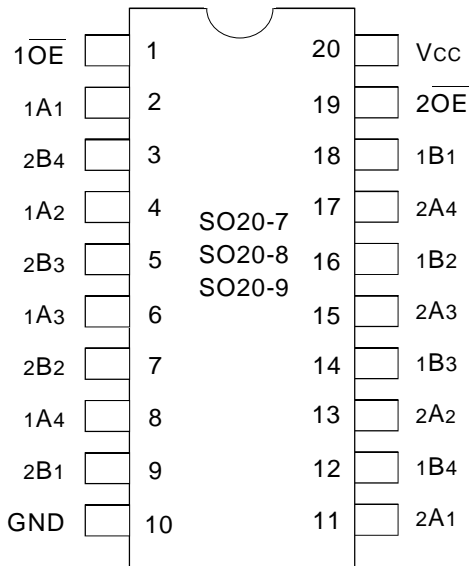


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INDUSTRIAL TEMPERATURE RANGE

SEPTEMBER 2001

PIN CONFIGURATION



SSOP/ TSSOP/ QSOP
TOP VIEW

ABSOLUTE MAXIMUM RATINGS (1)

Symbol	Description	Max.	Unit
V _{CC}	Supply Voltage Range	-0.5 to 4.6	V
V _I	Input Voltage Range	-0.5 to 4.6	V
	Continuous Channel Current	128	mA
I _{IK}	Input Clamp Current, V _{I/O} < 0	-50	mA
T _{STG}	Storage Temperature	-65 to +150	°C

NOTE:

- Stresses greater than those listed under ABSOLUTE MAXIMUM RATINGS may cause permanent damage to the device. This is a stress rating only and functional operation of the device at these or any other conditions above those indicated in the operational sections of this specification is not implied. Exposure to absolute maximum rating conditions for extended periods may affect reliability.

PIN DESCRIPTION

Pin Names	Description
x \overline{OE}	Output Enable (Active LOW)
A _x	Port A Inputs or Outputs
B _x	Port B Inputs or Outputs

FUNCTION TABLE (1)

Input		1A, 1B I/Os	2A, 2B I/Os
$\overline{1OE}$	$\overline{2OE}$		
H	H	Disconnect	Disconnect
L	H	1A Port = 1B Port	Disconnect
H	L	Disconnect	2A Port = 2B Port
L	L	1A Port = 1B Port	2A Port = 2B Port

NOTE:

- H = HIGH Voltage Level
L = LOW Voltage Level

OPERATING CHARACTERISTICS, T_A = 25°C

Symbol	Parameter	Test Conditions	Min.	Max.	Unit
V _{CC}	Supply Voltage		2.3	3.6	V
V _{IH}	High-Level Control Input Voltage	V _{CC} = 2.3V to 2.7V	1.7	—	V
		V _{CC} = 2.7V to 3.6V	2	—	
V _{IL}	Low-Level Control Input Voltage	V _{CC} = 2.3V to 2.7V	—	0.7	V
		V _{CC} = 2.7V to 3.6V	—	0.8	
T _A	Operating Free-Air Temperature		-40	85	°C

NOTE:

- All unused control inputs must be held at V_{CC} or GND to ensure proper device operation.

DC ELECTRICAL CHARACTERISTICS OVER OPERATING RANGE

Following Conditions Apply Unless Otherwise Specified:

Operating Condition: $T_A = -40^\circ\text{C}$ to $+85^\circ\text{C}$

Symbol	Parameter	Test Conditions		Min.	Typ.	Max.	Unit
V_{IK}	Control Inputs, Data I/O	$V_{CC} = 3V, I_I = -18\text{mA}$		—	—	-1.2	V
I_I	Control Inputs, Data I/O	$V_{CC} = 3.6V, V_I = V_{CC}$ or GND		—	—	± 1	μA
I_{OZ}	Data I/O	$V_{CC} = 3.6V, V_O = 0$ or $3.6V$, switch disabled		—	—	5	μA
I_{OFF}		$V_{CC} = 0, V_I$ or $V_O = 0$ to $3.6V$		—	—	50	μA
I_{CC}		$V_{CC} = 3.6V, I_O = 0, V_I = V_{CC}$ or GND		—	—	10	μA
$\Delta I_{CC}^{(1)}$	Control Inputs	$V_{CC} = 3.6V$, One input at $3V$. Other inputs at V_{CC} or GND		—	—	300	μA
C_I	Control Inputs	$V_I = 3V$ or 0		—	4	—	pF
$C_{IO(OFF)}$		$V_O = 3V$ or $0, \overline{OE} = V_{CC}$		—	6	—	pF
$R_{ON}^{(2)}$	Max at $V_{CC} = 2.3V$ Typ at $V_{CC} = 2.5V$	$V_I = 0$	$I_O = 64\text{mA}$	—	5	8	Ω
			$I_O = 24\text{mA}$	—	5	8	
	$V_I = 1.7V$	$I_O = 15\text{mA}$	—	27	40		
		$I_O = 64\text{mA}$	—	5	7		
	$V_{CC} = 3V$	$V_I = 0$	$I_O = 24\text{mA}$	—	5	7	
			$I_O = 15\text{mA}$	—	10	15	

NOTES:

- The increase in supply current is attributable to each input that is at the specified voltage level rather than V_{CC} or GND.
- This is measured by the voltage drop between the A and B terminals at the indicated current through the switch.

SWITCHING CHARACTERISTICS

Symbol	Parameter	$V_{CC} = 2.5V \pm 0.2V$		$V_{CC} = 3.3V \pm 0.3V$		Unit
		Min.	Max.	Min.	Max.	
$t_{PD}^{(1)}$	Propagation Delay A to B or B to A		0.15		0.25	ns
t_{EN}	Output Enable Time \overline{OE} to A or B	1	4.5	1	4	ns
t_{DIS}	Output Disable Time \overline{OE} to A or B	1	4.5	1	5	ns

NOTE:

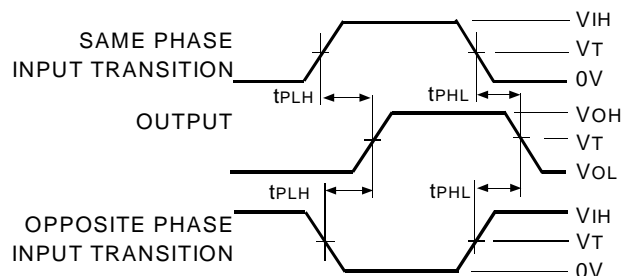
- The propagation delay is the calculated RC time constant of the typical on-state resistance of the switch and the specified load capacitance when driven by an ideal voltage source (zero output impedance).

TEST CIRCUITS AND WAVEFORMS

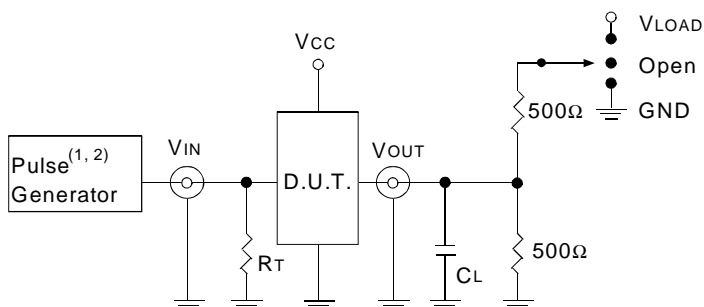
TEST CONDITIONS

Symbol	Vcc ⁽¹⁾ = 3.3V ± 0.3V	Vcc ⁽²⁾ = 2.5V ± 0.2V	Unit
V _{LOAD}	6	2 x Vcc	V
V _{IH}	3	Vcc	V
V _T	1.5	Vcc/2	V
V _{LZ}	300	150	mV
V _{HZ}	300	150	mV
C _L	50	30	pF

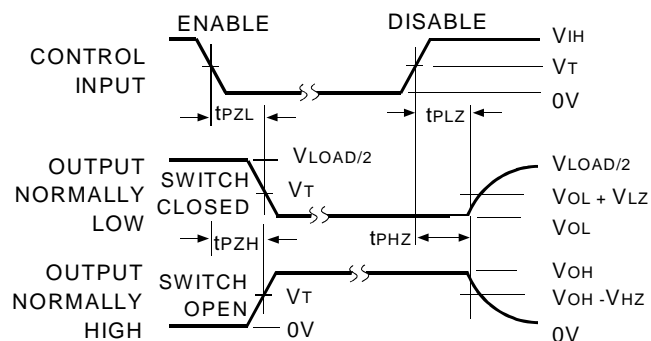
PROPAGATION DELAY



TEST CIRCUITS FOR ALL OUTPUTS



ENABLE AND DISABLE TIMES



DEFINITIONS:

1. C_L = Load capacitance: includes jig and probe capacitance.
2. R_T = Termination resistance: should be equal to Z_{OUT} of the Pulse Generator.

NOTES:

1. Pulse Generator for all pulses: Rate ≤ 10MHz; t_F ≤ 2.5ns; t_R ≤ 2.5ns.
2. Pulse Generator for all pulses: Rate ≤ 10MHz; t_F ≤ 2ns; t_R ≤ 2ns.

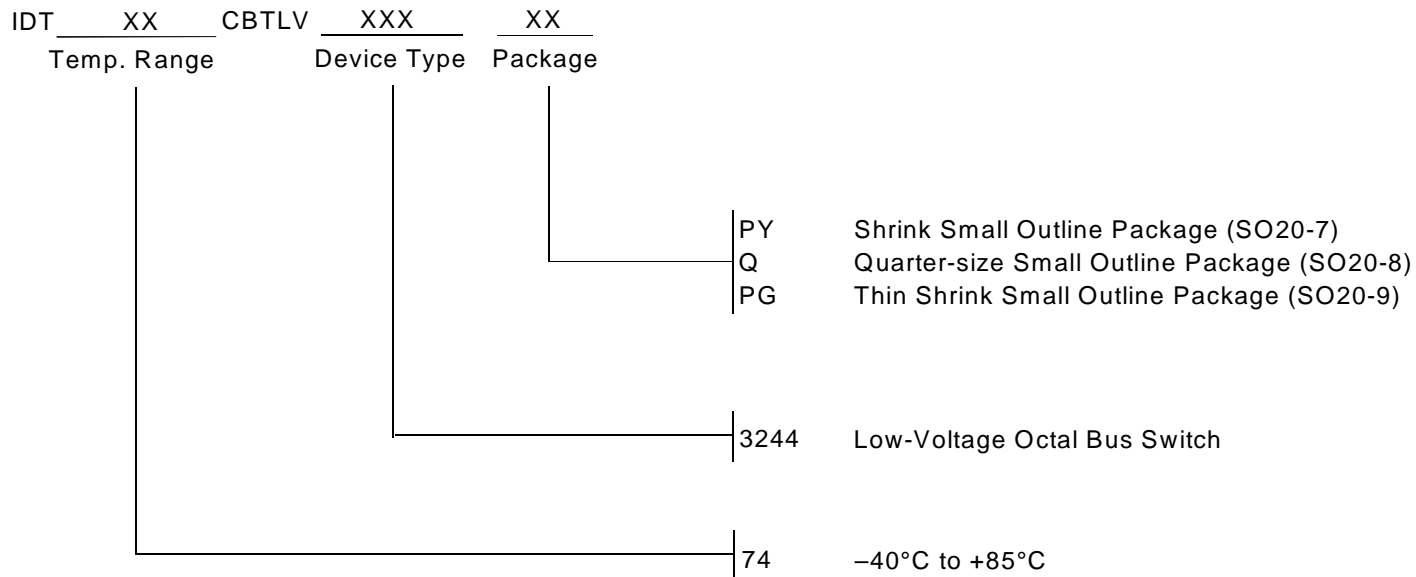
NOTE:

1. Diagram shown for input control Enable-LOW and input Control Disable-HIGH.

SWITCH POSITION

Test	Switch
t _{PLZ} /t _{PZL}	V _{LOAD}
t _{PHZ} /t _{PZH}	GND
t _{PD}	Open

ORDERING INFORMATION



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