

T-52-07



# 74FCT827B

## 10-Bit Buffer/Line Driver with TRI-STATE® Outputs

### General Description

The 74FCT827B 10-bit bus buffer provides high performance bus interface buffering for wide data/address paths or buses carrying parity. The 10-bit buffers have NOR output enables for maximum control flexibility.

FACT™ FCTB utilizes NSC Quiet Series™ technology to provide improved quiet output switching and dynamic threshold performance.

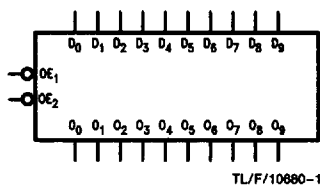
FACT FCTB features an undershoot corrector in addition to a split ground bus for superior performance.

### Features

- NSC 74FCT827B is pin and functionally equivalent to IDT 74FCT827B
- High Speed parallel registers with positive edge-triggered D-type flip-flops
- Input clamp diodes to limit bus reflections
- TTL/CMOS input and output level compatible
- $I_{OL} = 48 \text{ mA}$
- CMOS power levels
- 4 kV minimum ESD Immunity

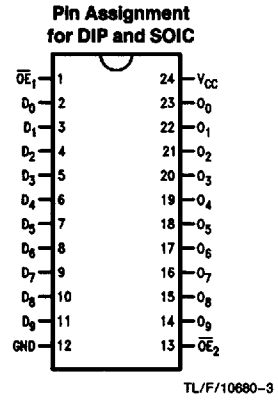
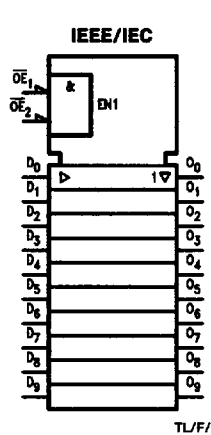
**Ordering Code:** See Section 8

### Logic Symbols



Pin Names	Description
$\overline{OE}_1, \overline{OE}_2$	Output Enable
$D_0-D_9$	Data Inputs
$O_0-O_9$	Data Outputs

### Connection Diagram



827B

### Absolute Maximum Ratings (Note 1)

Terminal Voltage with Respect to GND ( $V_{TERM}$ )	
74FCTB	-0.5V to +7.0V
Temperature under Bias ( $T_{BIAS}$ )	
74FCTB	-55°C to +125°C
Storage Temperature ( $T_{STG}$ )	
74FCTB	-55°C to +125°C
Power Dissipation ( $P_T$ )	0.5W
DC Output Current ( $I_{OUT}$ )	120 mA

Note 1: Absolute maximum ratings are those values beyond which damage to the device may occur. Exposure to absolute maximum rating conditions for extended periods may affect reliability. The databook specifications should be met, without exception, to ensure that the system design is reliable over its power supply, temperature, and output/input loading variables.

### Recommended Operating Conditions

Supply Voltage ( $V_{CC}$ )	74FCTB	4.75V to 5.25V
Input Voltage		0V to $V_{CC}$
Output Voltage		0V to $V_{CC}$
Operating Temperature ( $T_A$ )	74FCTB	0°C to +70°C
Junction Temperature ( $T_J$ )	PDIP	140°C

Note: All commercial packaging is not recommended for applications requiring greater than 2000 temperature cycles from -40°C to +125°C.

### DC Characteristics for 74FCTB Family Devices

Typical values are at  $V_{CC} = 5.0V$ , 25°C ambient and maximum loading. For test conditions shown as Max, use the value specified for the appropriate device type:  $V_{CC} = 5.0V \pm 5\%$ ,  $T_A = 0^\circ C$  to  $+70^\circ C$ ;  $V_{HC} = V_{CC} - 0.2V$

Symbol	Parameter	74FCTB			Units	Conditions	
		Min	Typ	Max			
$V_{IH}$	Minimum High Level Input Voltage	2.0			V		
$V_{IL}$	Maximum Low Level Input Voltage				V		
$I_{IH}$	Input High Current				$\mu A$	$V_{CC} = \text{Max}$	$V_I = V_{CC}$ $V_I = 2.7V$ (Note 2)
$I_{IL}$	Input Low Current				$\mu A$	$V_{CC} = \text{Max}$	$V_I = 0.5V$ (Note 2) $V_I = GND$
$I_{OZ}$	Maximum TRI-STATE Current				$\mu A$	$V_{CC} = \text{Max}$	$V_O = V_{CC}$ $V_O = 2.7V$ (Note 2) $V_O = 0.5V$ (Note 2) $V_O = GND$
$V_{IK}$	Clamp Diode Voltage	-0.7	-1.2		V	$V_{CC} = \text{Min}$ ; $I_{IJ} = -18 \text{ mA}$	
$I_{OS}$	Short Circuit Current	-75	-120		mA	$V_{CC} = \text{Max}$ (Note 1); $V_O = GND$	
$V_{OH}$	Minimum High Level Output Voltage	2.9 $V_{HC}$ 2.4	3.0 $V_{CC}$ 4.3		V	$V_{CC} = 3V$ ; $V_{IN} = 0.2V$ or $V_{HC}$ ; $I_{OH} = -32 \mu A$	$I_{OH} = -300 \mu A$ $I_{OH} = -24 \text{ mA}$
$V_{OL}$	Maximum Low Level Output Voltage	GND			V	$V_{CC} = 3V$ ; $V_{IN} = 0.2V$ or $V_{HC}$ ; $I_{OL} = 300 \mu A$	$I_{OL} = 300 \mu A$ $I_{OH} = 48 \text{ mA}$
$I_{CC}$	Maximum Quiescent Supply Current	0.2			mA	$V_{CC} = \text{Max}$ ; $V_{IN} \geq V_{HC}$ ; $V_{IN} \leq 0.2V$ ; $f_1 = 0$	
$\Delta I_{CC}$	Quiescent Supply Current TTL Input HIGH	0.5			mA	$V_{CC} = \text{Max}$ ; $V_{IN} = 3.4V$ (Note 3)	
$I_{CCD}$	Dynamic Power Supply Current (Note 4)	0.15	0.5		mA/MHz	$V_{CC} = \text{Max}$ Outputs Open $\overline{OE}_1 = \overline{OE}_2 = GND$ One Input Toggling 50% Duty Cycle	$V_{IN} \geq V_{HC}$ $V_{IN} \leq 0.2V$

### DC Characteristics for 'FCTB Family Devices (Continued)

Typical values are at  $V_{CC} = 5.0V$ ,  $25^{\circ}C$  ambient and maximum loading. For test conditions shown as Max, use the value specified for the appropriate device type:  $V_{CC} = 5.0V \pm 5\%$ ,  $T_A = 0^{\circ}C$  to  $+70^{\circ}C$ ;  $V_{HC} = V_{CC} - 0.2V$

Symbol	Parameter	74FCTB			Units	Conditions	
		Min	Typ	Max			
$I_C$	Total Power Supply Current (Note 6)			5.5	mA	$V_{CC} = \text{Max}$ Outputs Open $\overline{OE}_1 = \overline{OE}_2 = \text{GND}$ $f_1 = 10 \text{ MHz}$ One Bit Toggling 50% Duty Cycle	$V_{IN} \geq V_{HC}$ $V_{IN} \leq 0.2V$
				6.0			$V_{IN} = 3.4V$ $V_{IN} = \text{GND}$
				9.5		(Note 5) $V_{CC} = \text{Max}$ Outputs Open $\overline{OE}_1 = \overline{OE}_2 = \text{GND}$ $f_1 = 2.5 \text{ MHz}$ Eight Bits Toggling 50% Duty Cycle	$V_{IN} \geq V_{HC}$ $V_{IN} \leq 0.2V$
				14.5			$V_{IN} = 3.4V$ $V_{IN} = \text{GND}$

- Note 1:** Maximum test duration not to exceed one second, not more than one output shorted at a time.
- Note 2:** This parameter is guaranteed but not tested.
- Note 3:** Per TTL driven input ( $V_{IN} = 3.4V$ ); all other inputs at  $V_{CC}$  or GND.
- Note 4:** This parameter is not directly testable, but is derived for use in Total Power Consumption Supply calculations.
- Note 5:** Values for these conditions are examples of the  $I_{CC}$  formula. These limits are guaranteed but not tested.
- Note 6:**  $I_C = I_{QUIESCENT} + I_{INPUTS} + I_{DYNAMIC}$   
 $I_C = I_{CC} + \Delta I_{CC} D_H N_T + I_{CCD} (f_{CP}/2 + f_1 N_i)$   
 $I_{CC}$  = Quiescent Current  
 $\Delta I_{CC}$  = Power Supply Current for a TTL High Input ( $V_{IN} = 3.4V$ )  
 $D_H$  = Duty Cycle for TTL Inputs High  
 $N_T$  = Number of Inputs at  $D_H$   
 $I_{CCD}$  = Dynamic Current Caused by an Input Transition Pair (HLH or LHL)  
 $f_{CP}$  = Clock Frequency for Register Devices (Zero for Non-Register Devices)  
 $f_1$  = Input Frequency  
 $N_i$  = Number of Inputs at  $f_1$   
 All currents are in mA and all frequencies are in MHz.

### AC Electrical Characteristics: See Section 2 for Waveforms

Symbol	Parameter	Conditions	74FCTB		Units	Fig. No.
			$T_A, V_{CC} = \text{Com}$			
			Min	Max		
$t_{PLH}$ $t_{PHL}$	Propagation Delay $D_n$ to $O_n$	$C_L = 50 \text{ pF}$ $R_L = 500\Omega$		5.0	ns	2-9
		$C_L = 300 \text{ pF}^{(1)}$ $R_L = 500\Omega$		13.0	ns	2-9
$t_{PZH}$ $t_{PZL}$	Output Enable Time $\overline{OE}$ to $D_n$	$C_L = 50 \text{ pF}$ $R_L = 500\Omega$		8.0	ns	2-11
		$C_L = 300 \text{ pF}^{(1)}$ $R_L = 500\Omega$		15.0	ns	2-11
$t_{PHZ}$ $t_{PLZ}$	Output Disable Time $\overline{OE}$ to $D_n$	$C_L = 5 \text{ pF}^{(1)}$ $R_L = 500\Omega$		6.0	ns	2-11
		$C_L = 50 \text{ pF}^{(1)}$ $R_L = 500\Omega$		7.0	ns	2-11

**Note 1:** This parameter is guaranteed but not tested.

### Capacitance $T_A = +25^{\circ}C, f = 1.0 \text{ MHz}$

Symbol	Parameter (Note 1)	Conditions	Typ	Max	Unit
$C_{IN}$	Input Capacitance	$V_{IN} = 0V$	6	10	pF
$C_{OUT}$	Output Capacitance	$V_{OUT} = 0V$	8	12	pF