

### Features

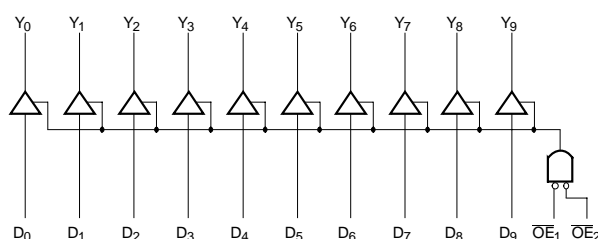
- Function, pinout, and drive compatible with FCT, F, and AM29827 logic
- FCT-C speed at 4.4 ns max. (Com'l)  
FCT-A speed at 5.0 ns max. (Com'l)
- Reduced  $V_{OH}$  (typically = 3.3V) versions of equivalent FCT functions
- Edge-rate control circuitry for significantly improved noise characteristics
- Power-off disable feature
- ESD > 2000V
- Matched rise and fall times
- Fully compatible with TTL input and output logic levels

- Sink current 64 mA (Com'l),  
32 mA (Mil)
- Source current 32 mA (Com'l),  
12 mA (Mil)

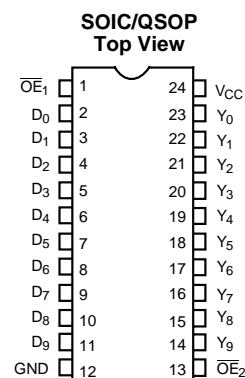
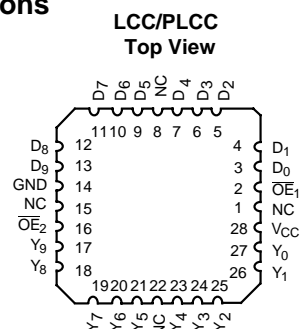
### Functional Description

The FCT827T 10-bit bus driver provides high-performance bus interface buffering for wide data/address paths or buses carrying parity. The 10-bit buffers have NAND-ed output enables for maximum control flexibility. The FCT827T is designed for high-capacitance load drive capability, while providing low-capacitance bus loading at both inputs and outputs. All outputs are designed for low-capacitance bus loading in the high-impedance state and are designed with a power-off disable feature to allow for live insertion of boards.

### Logic Block Diagram



### Pin Configurations



### Function Table<sup>[1]</sup>

Inputs			Outputs	Function
$\overline{OE}_1$	$\overline{OE}_2$	D	Y	
L	L	L	L	Transparent
L	L	H	H	
H	X	X	Z	Three-State
X	H	X	Z	

**Note:**

1. H = HIGH Voltage Level. L = LOW Voltage Level. X = Don't Care

**Maximum Ratings**<sup>[2, 3]</sup>

(Above which the useful life may be impaired. For user guidelines, not tested.)

Storage Temperature ..... -65°C to +150°C  
 Ambient Temperature with  
 Power Applied ..... -65°C to +135°C  
 Supply Voltage to Ground Potential ..... -0.5V to +7.0V  
 DC Input Voltage ..... -0.5V to +7.0V  
 DC Output Voltage ..... -0.5V to +7.0V  
 DC Output Current (Maximum Sink Current/Pin) ..... 120 mA

Power Dissipation ..... 0.5W  
 Static Discharge Voltage ..... >2001V  
 (per MIL-STD-883, Method 3015)

**Operating Range**

Range	Range	Ambient Temperature	V <sub>CC</sub>
Commercial	All	-40°C to +85°C	5V ± 5%
Military <sup>[4]</sup>	All	-55°C to +125°C	5V ± 10%

**Electrical Characteristics** Over the Operating Range

Parameter	Description	Test Conditions	Min.	Typ. <sup>[5]</sup>	Max.	Unit	
V <sub>OH</sub>	Output HIGH Voltage	V <sub>CC</sub> = Min., I <sub>OH</sub> = -32 mA	Com'l	2.0		V	
		V <sub>CC</sub> = Min., I <sub>OH</sub> = -15 mA	Com'l	2.4	3.3	V	
		V <sub>CC</sub> = Min., I <sub>OH</sub> = -12 mA	Mil	2.4	3.3	V	
V <sub>OL</sub>	Output LOW Voltage	V <sub>CC</sub> = Min., I <sub>OL</sub> = 64 mA	Com'l		0.3	0.55	V
		V <sub>CC</sub> = Min., I <sub>OL</sub> = 32 mA	Mil		0.3	0.55	V
V <sub>IH</sub>	Input HIGH Voltage		2.0			V	
V <sub>IL</sub>	Input LOW Voltage				0.8	V	
V <sub>H</sub>	Hysteresis <sup>[6]</sup>	All inputs		0.2		V	
V <sub>IK</sub>	Input Clamp Diode Voltage	V <sub>CC</sub> = Min., I <sub>IN</sub> = -18 mA		-0.7	-1.2	V	
I <sub>I</sub>	Input HIGH Current	V <sub>CC</sub> = Max., V <sub>IN</sub> = V <sub>CC</sub>			5	μA	
I <sub>IH</sub>	Input HIGH Current	V <sub>CC</sub> = Max., V <sub>IN</sub> = 2.7V			±1	μA	
I <sub>IL</sub>	Input LOW Current	V <sub>CC</sub> = Max., V <sub>IN</sub> = 0.5V			±1	μA	
I <sub>OZH</sub>	Off State HIGH-Level Output Current	V <sub>CC</sub> = Max., V <sub>OUT</sub> = 2.7V			10	μA	
I <sub>OZL</sub>	Off State LOW-Level Output Current	V <sub>CC</sub> = Max., V <sub>OUT</sub> = 0.5V			-10	μA	
I <sub>OS</sub>	Output Short Circuit Current <sup>[7]</sup>	V <sub>CC</sub> = Max., V <sub>OUT</sub> = 0.0V	-60	-120	-225	mA	
I <sub>OFF</sub>	Power-Off Disable	V <sub>CC</sub> = 0V, V <sub>OUT</sub> = 4.5V			±1	μA	

**Capacitance**<sup>[6]</sup>

Parameter	Description	Typ. <sup>[5]</sup>	Max.	Unit
C <sub>IN</sub>	Input Capacitance	5	10	pF
C <sub>OUT</sub>	Output Capacitance	9	12	pF

**Notes:**

- Unless otherwise noted, these limits are over the operating free-air temperature range.
- Unused inputs must always be connected to an appropriate logic voltage level, preferably either V<sub>CC</sub> or ground.
- T<sub>A</sub> is the "instant on" case temperature.
- Typical values are at V<sub>CC</sub>=5.0V, T<sub>A</sub>=+25°C ambient.
- This parameter is specified but not tested.
- Not more than one output should be shorted at a time. Duration of short should not exceed one second. The use of high-speed test apparatus and/or sample and hold techniques are preferable in order to minimize internal chip heating and more accurately reflect operational values. Otherwise prolonged shorting of a high output may raise the chip temperature well above normal and thereby cause invalid readings in other parametric tests. In any sequence of parameter tests, I<sub>OS</sub> tests should be performed last.

**Power Supply Characteristics**

Parameter	Description	Test Conditions	Typ. <sup>[5]</sup>	Max.	Unit
$I_{CC}$	Quiescent Power Supply Current	$V_{CC}=\text{Max.}, V_{IN}\leq 0.2V, V_{IN}\geq V_{CC}-0.2V$	0.1	0.2	mA
$\Delta I_{CC}$	Quiescent Power Supply Current (TTL inputs HIGH)	$V_{CC}=\text{Max.}, V_{IN}=3.4V$ , <sup>[8]</sup> $f_1=0$ , Outputs Open	0.5	2.0	mA
$I_{CCD}$	Dynamic Power Supply Current <sup>[9]</sup>	$V_{CC}=\text{Max.}$ , One Input Toggling, 50% Duty Cycle, Outputs Open, $\overline{OE}_1$ or $\overline{OE}_2=\text{GND}$ , $V_{IN}\leq 0.2V$ or $V_{IN}\geq V_{CC}-0.2V$	0.06	0.12	mA/MHz
$I_C$	Total Power Supply Current <sup>[10]</sup>	$V_{CC}=\text{Max.}$ , 50% Duty Cycle, Outputs Open, One Bit Toggling at $f_1=10$ MHz, $\overline{OE}_1$ or $\overline{OE}_2=\text{GND}$ , $V_{IN}\leq 0.2V$ or $V_{IN}\geq V_{CC}-0.2V$	0.7	1.4	mA
		$V_{CC}=\text{Max.}$ , 50% Duty Cycle, Outputs Open, One Bit Toggling at $f_1=10$ MHz, $\overline{OE}_1$ or $\overline{OE}_2=\text{GND}$ , $V_{IN}=3.4V$ or $V_{IN}=\text{GND}$	1.0	2.4	mA
		$V_{CC}=\text{Max.}$ , 50% Duty Cycle, Outputs Open, Ten Bits Toggling at $f_1=2.5$ MHz, $\overline{OE}_1$ or $\overline{OE}_2=\text{GND}$ , $V_{IN}\leq 0.2V$ or $V_{IN}\geq V_{CC}-0.2V$	1.6	3.2 <sup>[11]</sup>	mA
		$V_{CC}=\text{Max.}$ , 50% Duty Cycle, Outputs Open, Ten Bits Toggling at $f_1=2.5$ MHz, $\overline{OE}_1$ or $\overline{OE}_2=\text{GND}$ , $V_{IN}=3.4V$ or $V_{IN}=\text{GND}$	4.1	13.2 <sup>[11]</sup>	mA

**Notes:**

8. Per TTL driven input ( $V_{IN}=3.4V$ ); all other inputs at  $V_{CC}$  or GND.
9. This parameter is not directly testable, but is derived for use in Total Power Supply calculations.
10.  $I_C = I_{\text{QUIESCENT}} + I_{\text{INPUTS}} + I_{\text{DYNAMIC}}$   
 $I_C = I_{CC} + \Delta I_{CC} D_H N_T + I_{CCD} (f_0/2 + f_1 N_1)$   
 $I_{CC}$  = Quiescent Current with CMOS input levels  
 $\Delta I_{CC}$  = Power Supply Current for a TTL HIGH input  $V_{IN}=3.4V$   
 $D_H$  = Duty Cycle for TTL inputs HIGH  
 $N_T$  = Number of TTL inputs at  $D_H$   
 $I_{CCD}$  = Dynamic Current caused by an input transition pair HLH or LHL  
 $f_0$  = Clock frequency for registered devices, otherwise zero  
 $f_1$  = Input signal frequency  
 $N_1$  = Number of inputs changing at  $f_1$   
 All currents are in milliamps and all frequencies are in megahertz.
11. Values for these conditions are examples of the  $I_{CC}$  formula. These limits are specified but not tested.

**Switching Characteristics** Over the Operating Range<sup>[12]</sup>

Parameter	Description	Test Load	FCT827AT				Unit	Fig. No. <sup>[13]</sup>
			Military		Commercial			
			Min.	Max.	Min.	Max.		
t <sub>PLH</sub> t <sub>PHL</sub>	Propagation Delay D to Y	C <sub>L</sub> =50 pF R <sub>L</sub> =500Ω	1.5	9.0	1.5	8.0	ns	1, 3
t <sub>PLH</sub> t <sub>PHL</sub>	Propagation Delay D to Y <sup>[12]</sup>	C <sub>L</sub> =300 pF R <sub>L</sub> =500Ω	1.5	17.0	1.5	15.0	ns	1, 3
t <sub>PZH</sub> t <sub>PZL</sub>	Output Enable Time OE to Y	C <sub>L</sub> =50 pF R <sub>L</sub> =500Ω	1.5	13.0	1.5	12.0	ns	1, 7, 8
t <sub>PZH</sub> t <sub>PZL</sub>	Output Enable Time OE to Y <sup>[12]</sup>	C <sub>L</sub> =300 pF R <sub>L</sub> =500Ω	1.5	25.0	1.5	23.0	ns	1, 7, 8
t <sub>PHZ</sub> t <sub>PHL</sub>	Output Disable Time OE to Y <sup>[12]</sup>	C <sub>L</sub> =5 pF R <sub>L</sub> =500Ω	1.5	9.0	1.5	9.0	ns	1, 7, 8
t <sub>PHZ</sub> t <sub>PHL</sub>	Output Disable Time OE to Y	C <sub>L</sub> =50 pF R <sub>L</sub> =500Ω	1.5	10.0	1.5	10.0	ns	1, 7, 8

Parameter	Description	Test Load	FCT827CT		Unit	Fig. No. <sup>[13]</sup>
			Commercial			
			Min.	Max.		
t <sub>PLH</sub> t <sub>PHL</sub>	Propagation Delay D to Y	C <sub>L</sub> =50 pF R <sub>L</sub> =500Ω	1.5	4.4	ns	1, 3
t <sub>PLH</sub> t <sub>PHL</sub>	Propagation Delay D to Y <sup>[12]</sup>	C <sub>L</sub> =300 pF R <sub>L</sub> =500Ω	1.5	10.0	ns	1, 3
t <sub>PZH</sub> t <sub>PZL</sub>	Output Enable Time OE to Y	C <sub>L</sub> =50 pF R <sub>L</sub> =500Ω	1.5	7.0	ns	1, 7, 8
t <sub>PZH</sub> t <sub>PZL</sub>	Output Enable Time OE to Y <sup>[12]</sup>	C <sub>L</sub> =300 pF R <sub>L</sub> =500Ω	1.5	14.0	ns	1, 7, 8
t <sub>PHZ</sub> t <sub>PHL</sub>	Output Disable Time OE to Y <sup>[12]</sup>	C <sub>L</sub> =5 pF R <sub>L</sub> =500Ω	1.5	5.7	ns	1, 7, 8
t <sub>PHZ</sub> t <sub>PHL</sub>	Output Disable Time OE to Y	C <sub>L</sub> =50 pF R <sub>L</sub> =500Ω	1.5	6.0	ns	1, 7, 8

**Ordering Information**

Speed (ns)	Ordering Code	Package Name	Package Type	Operating Range
4.4	CY74FCT827CTQCT	Q13	24-Lead (150-Mil) QSOP	Commercial
	CY74FCT827CTSOC/SOCT	S13	24-Lead (300-Mil) Molded SOIC	
8.0	CY74FCT827ATQCT	Q13	24-Lead (150-Mil) QSOP	Commercial
	CY74FCT827ATSOC/SOCT	S13	24-Lead (300-Mil) Molded SOIC	
9.0	CY54FCT827ATLMB	L64	28-Square Leadless Chip Carrier	Military

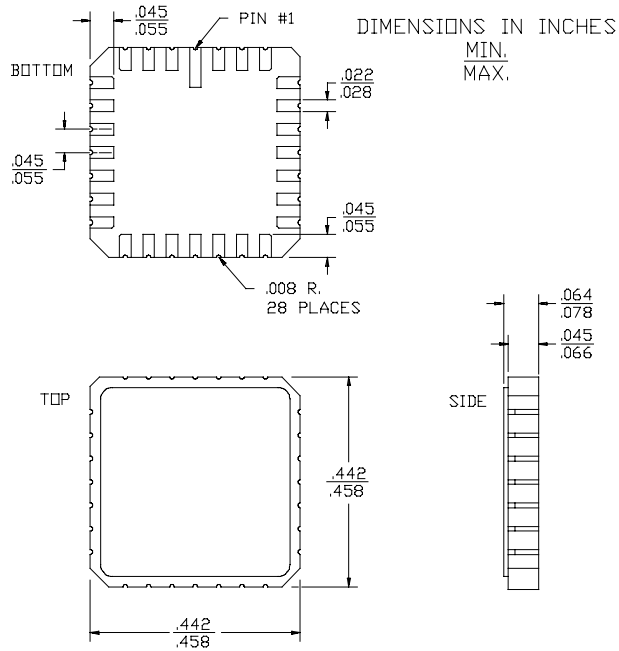
**Notes:**

12. Minimum limits are specified but not tested on Propagation Delays.  
13. See "Parameter Measurement Information" in the General Information section.

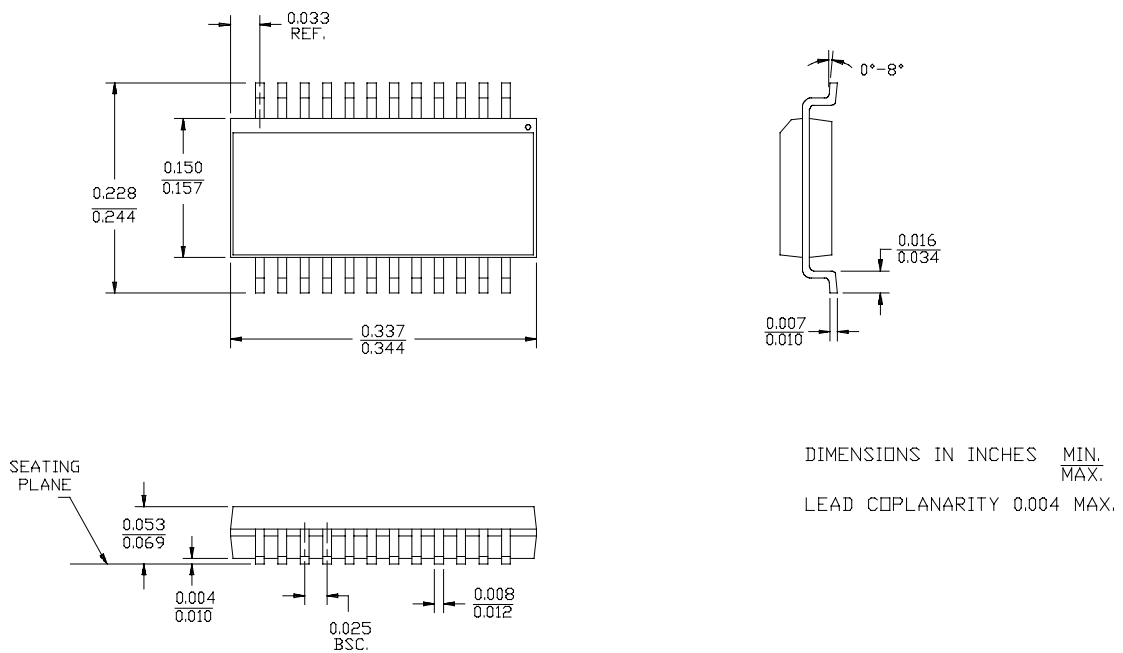
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**Package Diagrams**

**28-Square Leadless Chip Carrier L64  
MIL-STD-1835 C-4**

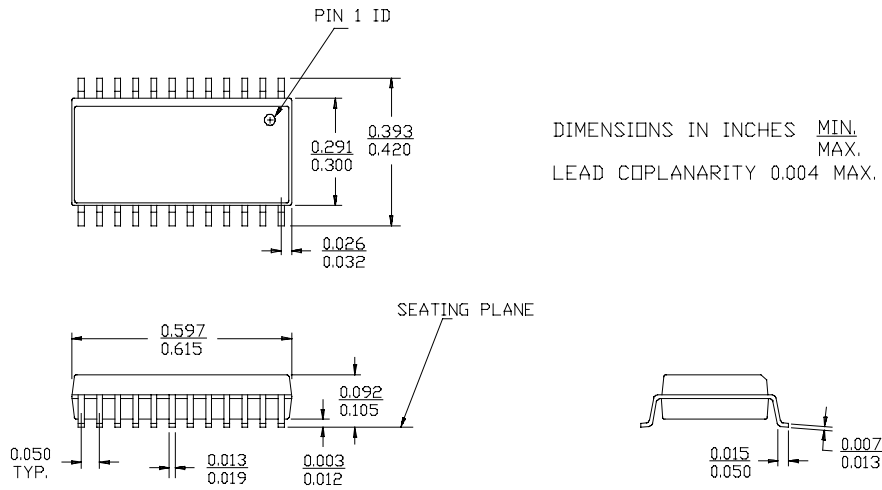


**24-Lead Quarter Size Outline Q13**



Package Diagrams (continued)

**24-Lead (300-Mil) Molded SOIC S13**



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