

**Features**

- Function and pinout compatible with FCT, F, and AM29827 logic
- FCT-C speed at 5.0 ns max. (Com'l), FCT-A speed at 8.0 ns max. (Com'l)
- 25Ω output series resistors to reduce transmission line reflection noise
- 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

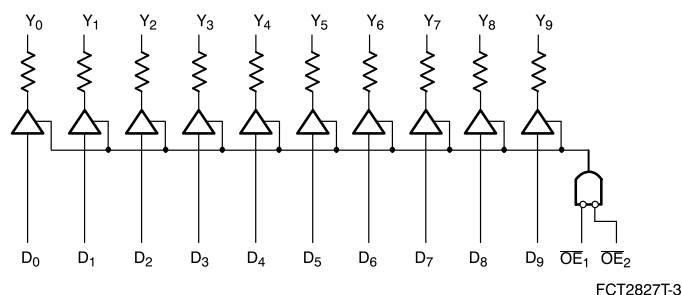
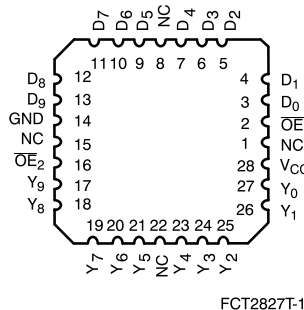
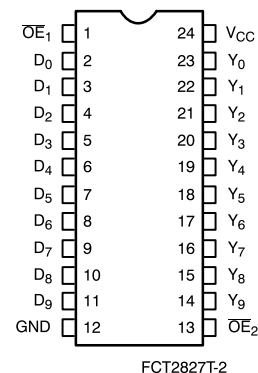
- Matched rise and fall times
- Fully compatible with TTL input and output logic levels
- Sink current           12 mA (Com'l),  
                              12 mA (Mil)
- Source current       15 mA (Com'l),  
                              12 mA (Mil)

**Functional Description**

The FCT2827T 10-bit bus driver provides high-performance bus interface buffering for wide data/address paths or buses carrying parity. This 10-bit buffer has NAND-ed output enables for maximum control flexibility. The FCT2827T is designed for

high-capacitance load drive capability, while providing low-capacitance bus loading at both inputs and outputs. All inputs have clamp diodes and all outputs are designed for low-capacitance bus loading in the high impedance state. On-chip termination resistors have been added to the outputs to reduce system noise caused by reflections. The FCT2827T can be used to replace the FCT827T to reduce noise in an existing design.

The outputs are designed with a power-off disable feature to allow for live insertion of boards.

**Logic Block Diagram**

**Pin Configurations**
**LCC/PLCC  
Top View**

**DIP  
Top View**

**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 .....  $-65^{\circ}\text{C}$  to  $+150^{\circ}\text{C}$   
 Ambient Temperature with  
 Power Applied .....  $-65^{\circ}\text{C}$  to  $+135^{\circ}\text{C}$   
 Supply Voltage to Ground Potential .....  $-0.5\text{V}$  to  $+7.0\text{V}$   
 DC Input Voltage .....  $-0.5\text{V}$  to  $+7.0\text{V}$   
 DC Output Voltage .....  $-0.5\text{V}$  to  $+7.0\text{V}$   
 DC Output Current (Maximum Sink Current/Pin) .... 120 mA  
 Power Dissipation ..... 0.5W

Static Discharge Voltage .....  $>2001\text{V}$   
 (per MIL-STD-883, Method 3015)

## Operating Range

Range	Range	Ambient Temperature	V <sub>CC</sub>
Commercial	CT	$0^{\circ}\text{C}$ to $+70^{\circ}\text{C}$	$5\text{V} \pm 5\%$
Commercial	AT, BT	$-40^{\circ}\text{C}$ to $+85^{\circ}\text{C}$	$5\text{V} \pm 5\%$
Military <sup>[4]</sup>	All	$-55^{\circ}\text{C}$ to $+125^{\circ}\text{C}$	$5\text{V} \pm 10\%$

## 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> =-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> =12 mA	Com'l		0.3	0.55	V
		V <sub>CC</sub> =Min., I <sub>OL</sub> =12 mA	Mil		0.3	0.55	V
R <sub>OUT</sub>	Output Resistance	V <sub>CC</sub> =Min., I <sub>OL</sub> =12 mA	Com'l	20	25	40	$\Omega$
		V <sub>CC</sub> =Min., I <sub>OL</sub> =12 mA	Mil		25		$\Omega$
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	$\mu\text{A}$
I <sub>IH</sub>	Input HIGH Current	V <sub>CC</sub> =Max., V <sub>IN</sub> =2.7V				$\pm 1$	$\mu\text{A}$
I <sub>IL</sub>	Input LOW Current	V <sub>CC</sub> =Max., V <sub>IN</sub> =0.5V				$\pm 1$	$\mu\text{A}$
I <sub>OZH</sub>	Off State HIGH-Level Output Current	V <sub>CC</sub> = Max., V <sub>OUT</sub> = 2.7V				10	$\mu\text{A}$
I <sub>OZL</sub>	Off State LOW-Level Output Current	V <sub>CC</sub> = Max., V <sub>OUT</sub> = 0.5V				-10	$\mu\text{A}$
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				$\pm 1$	$\mu\text{A}$

## 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 guaranteed 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 $f_1 = 10 \text{ MHz}$ , $\overline{OE}_1$ 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 $f_1 = 10 \text{ MHz}$ , $\overline{OE}_1$ 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 $f_1 = 2.5 \text{ MHz}$ , $\overline{OE}_1$ 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 $f_1 = 2.5 \text{ MHz}$ , $\overline{OE}_1$ 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.  $I_C = I_{QUIESCENT} + I_{INPUTS} + I_{DYNAMIC}$   
 $I_C = I_{CC} + \Delta I_{CC} D_H N_T + I_{CCD} (f_0/2 + f_1 N_1)$   
 $I_{CC}$  = 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 milliamperes and all frequencies are in megahertz.

11. Values for these conditions are examples of the  $I_{CC}$  formula. These limits are guaranteed but not tested.

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

Param.	Description	Test Load	FCT2827AT				FCT2827BT				Unit	Fig. No. <sup>[13]</sup>
			Military		Commercial		Military		Commercial			
			Min.	Max.	Min.	Max.	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	1.5	6.5	1.5	5.0	ns	1, 3
t <sub>PLH</sub> t <sub>PHL</sub>	Propagation Delay D to Y <sup>[6]</sup>	C <sub>L</sub> =300 pF R <sub>L</sub> =500Ω	1.5	17.0	1.5	15.0	1.5	14.0	1.5	13.0	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	1.5	9.0	1.5	8.0	ns	1, 7, 8
t <sub>PZH</sub> t <sub>PZL</sub>	Output Enable Time OE to Y <sup>[6]</sup>	C <sub>L</sub> =300 pF R <sub>L</sub> =500Ω	1.5	25.0	1.5	23.0	1.5	16.0	1.5	15.0	ns	1, 7, 8
t <sub>PHZ</sub> t <sub>PHL</sub>	Output Disable Time OE to Y <sup>[6]</sup>	C <sub>L</sub> =5 pF R <sub>L</sub> =500Ω	1.5	10.0	1.5	9.0	1.5	7.0	1.5	6.0	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	9.0	1.5	8.0	1.5	7.0	ns	1, 7, 8

Param.	Description	Test Load	FCT2827CT				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	5.0	1.5	4.4	ns	1, 3
t <sub>PLH</sub> t <sub>PHL</sub>	Propagation Delay D to Y <sup>[6]</sup>	C <sub>L</sub> =300 pF R <sub>L</sub> =500Ω	1.5	11.0	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	8.0	1.5	7.0	ns	1, 7, 8
t <sub>PZH</sub> t <sub>PZL</sub>	Output Enable Time OE to Y <sup>[6]</sup>	C <sub>L</sub> =300 pF R <sub>L</sub> =500Ω	1.5	15.0	1.5	14.0	ns	1, 7, 8
t <sub>PHZ</sub> t <sub>PHL</sub>	Output Disable Time OE to Y <sup>[6]</sup>	C <sub>L</sub> =5 pF R <sub>L</sub> =500Ω	1.5	6.7	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	7.0	1.5	6.0	ns	1, 7, 8

**Notes:**

12. Minimum limits are guaranteed but not tested on Propagation Delays.

13. See "Parameter Measurement Information" in the General Information section.

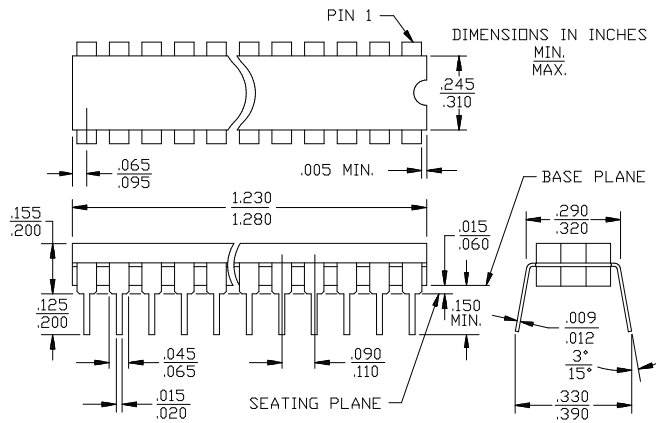
**Ordering Information**

Speed (ns)	Ordering Code	Package Name	Package Type	Operating Range
4.4	CY74FCT2827CTPC	P13/13A	24-Lead (300-Mil) Molded DIP	Commercial
	CY74FCT2827CTQC	Q13	24-Lead (150-Mil) QSOP	
	CY74FCT2827CTSOC	S13	24-Lead (300-Mil) Molded SOIC	
5.0	CY74FCT2827BTPC	P13/13A	24-Lead (300-Mil) Molded DIP	Commercial
	CY74FCT2827BTQC	Q13	24-Lead (150-Mil) QSOP	
	CY74FCT2827BTSOC	S13	24-Lead (300-Mil) Molded SOIC	
5.0	CY54FCT2827CTDMB	D14	24-Lead (300-Mil) CerDIP	Military
	CY54FCT2827CTLMB	L64	28-Square Leadless Chip Carrier	
6.5	CY54FCT2827BTDMB	D14	24-Lead (300-Mil) CerDIP	Military
	CY54FCT2827BTLMB	L64	28-Square Leadless Chip Carrier	
8.0	CY74FCT2827ATPC	P13/13A	24-Lead (300-Mil) Molded DIP	Commercial
	CY74FCT2827ATQC	Q13	24-Lead (150-Mil) QSOP	
	CY74FCT2827ATSOC	S13	24-Lead (300-Mil) Molded SOIC	
9.0	CY54FCT2827ATDMB	D14	24-Lead (300-Mil) CerDIP	Military
	CY54FCT2827ATLMB	L64	28-Square Leadless Chip Carrier	

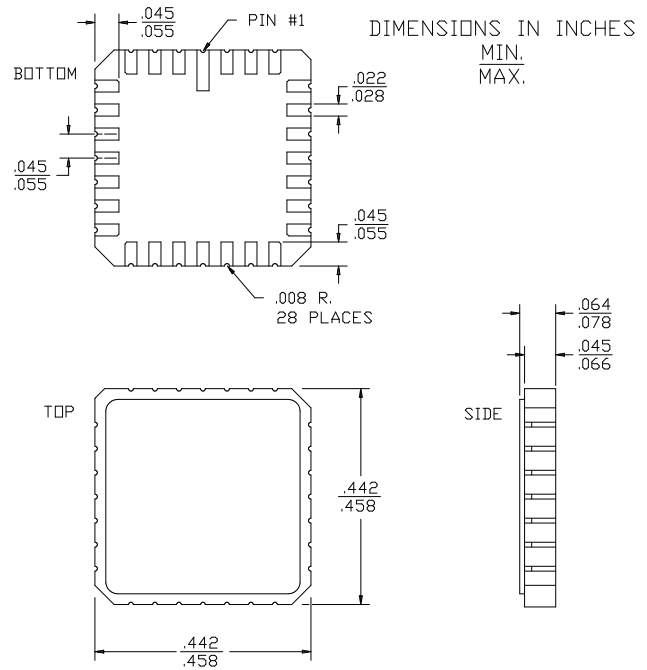
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**Package Diagrams**

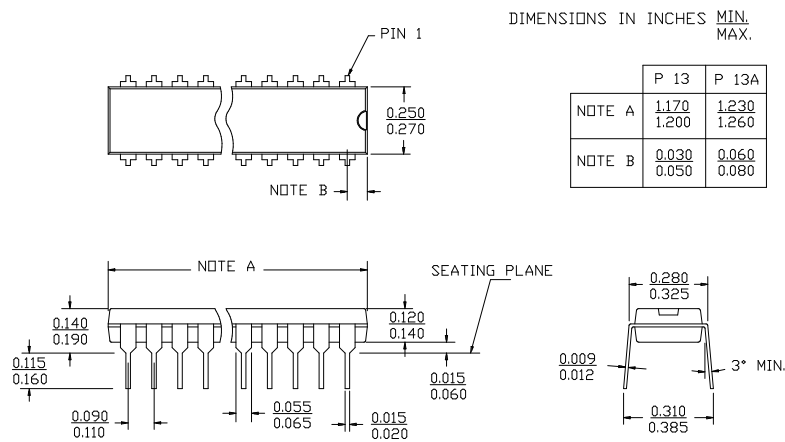
**24-Lead (300-Mil) CerDIP D14**  
MIL-STD-1835 D-9 Config. A

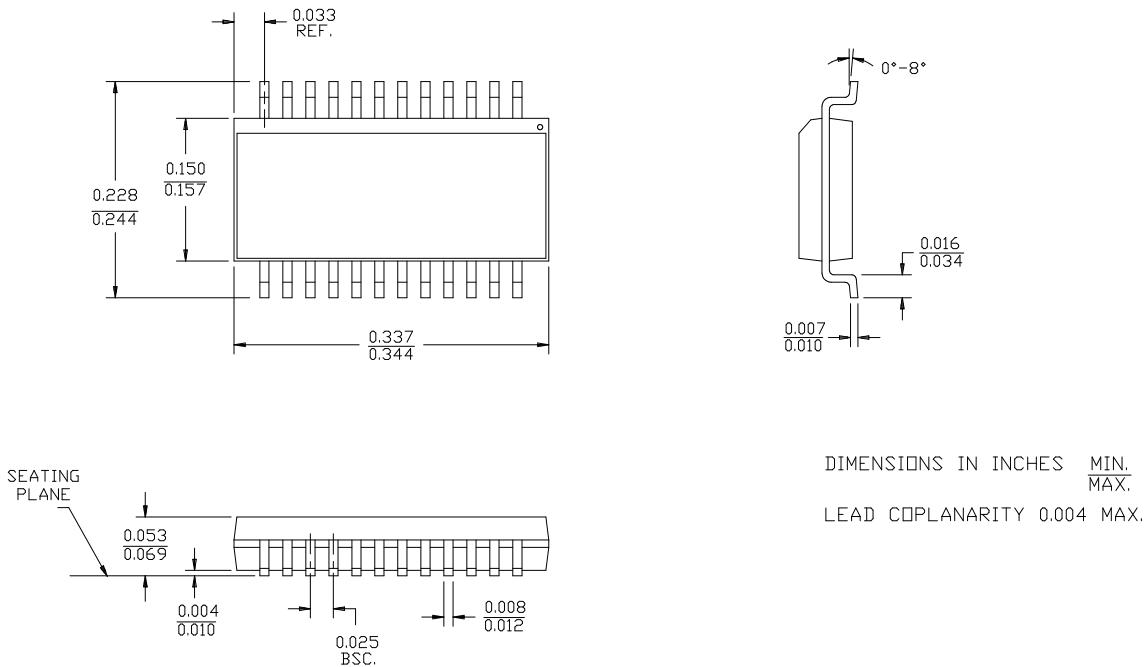


**28-Square Leadless Chip Carrier L64**  
MIL-STD-1835 C-4



**24-Lead (300-Mil) Molded DIP P13/P13A**



**Package Diagrams (continued)**
**24-Lead Quarter Size Outline Q13**

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