

P54/74FCT373/A/C (P54/74PCT373/A/C) P54/74FCT573/A/C (P54/74PCT573/A/C) OCTAL TRANSPARENT LATCHES WITH 3-STATE OUTPUTS

★ FEATURES

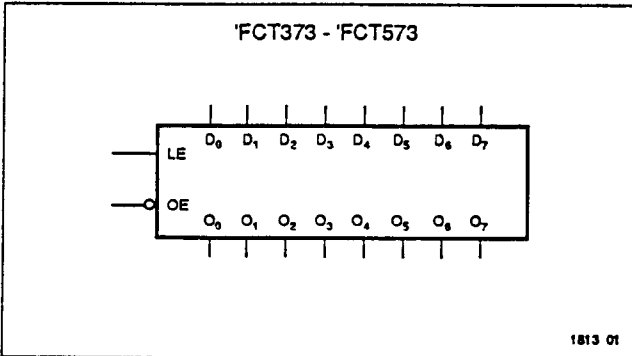
- Function, Pinout, and Drive Compatible with the FCT and F Logic
- FCT-C speed at 4.2ns max. (Com'I)
FCT-A speed at 5.2ns max. (Com'I)
- CMOS V_{OH} Levels for Low Power Consumption — Typically 1/3 of FAST Bipolar Logic
- Edge-rate Control Circuitry for Significantly Improved Noise Characteristics
- ESD protection exceeds 2000V
- Inputs and Outputs Interface Directly with TTL, NMOS, and CMOS Devices
- Outputs Meet Levels Required for CMOS Static RAM Low Power Standby Mode
- 64 mA Sink Current (Com'I), 48 mA (MII)
15 mA Source Current (Com'I), 12 mA (MII)
- Manufactured in 0.8 micron PACE Technology™

★ DESCRIPTION

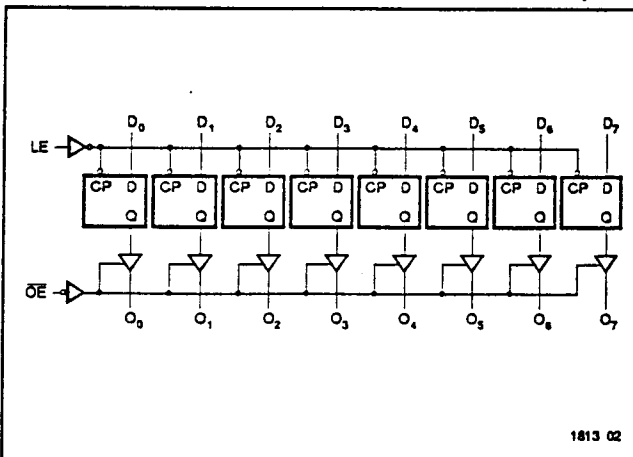
The 'FCT373 and 'FCT573 consists of eight latches with 3-state outputs for bus organized system applications. When latch enable (LE) is HIGH, the flip flops appear transparent to the data. Data that meets the required set-up times are latched when LE transitions from HIGH to LOW. Data appears on the bus when the output enable

(\overline{OE}) is LOW. When output enable is HIGH, the bus output is in the high impedance state. In this mode, data may be entered into the latches. The 'FCT573 is the same as the 'FCT373, except that the outputs are inverted. The 'FCT573 is identical to 'FCT373 except that all the inputs are on one side of the package and the outputs on the other side.

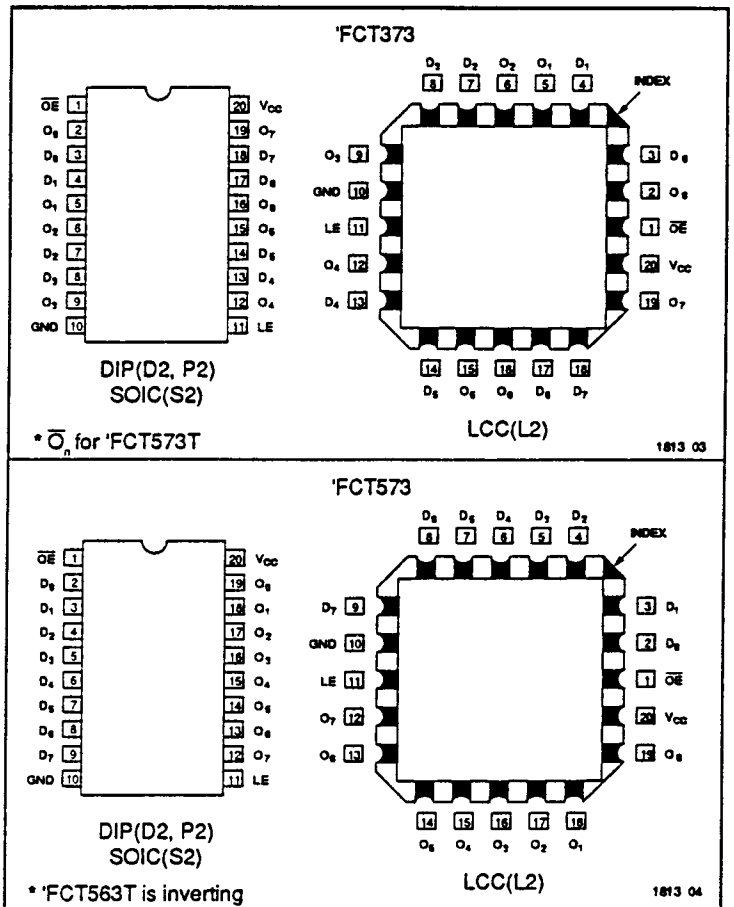
★ LOGIC SYMBOL



LOGIC DIAGRAM ('FCT373 - 'FCT573)



PIN CONFIGURATIONS





ABSOLUTE MAXIMUM RATINGS^{1,2}

Symbol	Parameter	Value	Unit
T _{STG}	Storage Temperature	-65 to +150	°C
T _A	Ambient Temperature Under Bias	-65 to +135	°C
V _{CC}	V _{CC} Potential to Ground	-0.5 to +7.0	V
I _{IN}	Input Current	-30 to +5.0	mA

Notes:

1813 Tbl 01

1. Operation beyond the limits set forth in the above table may impair the useful life of the device. Unless otherwise noted, these limits are over the operating free-air temperature range.

Symbol	Parameter	Value	Unit
I _{OUTPUT}	Current Applied to Output	120	mA
V _{IN}	Input Voltage	-0.5 to V _{CC} + 0.5	V
V _{OUT}	Voltage Applied to Output	-0.5 to V _{CC} + 0.5	V

1813 Tbl 02

2. Unused inputs must always be connected to an appropriate logic voltage level, preferably either V_{CC} or ground.

RECOMMENDED OPERATING CONDITIONS

Free Air Ambient Temperature	Min	Max
Military	-55°C	+125°C
Commercial	0°C	+70°C

1813 Tbl 03

Supply Voltage (V _{CC})	Min	Max
Military	+4.5V	+5.5V
Commercial	+4.75V	+5.25V

1813 Tbl 04

DC ELECTRICAL CHARACTERISTICS (Over recommended operating conditions)

Symbol	Parameter	Min	Typ ¹	Max	Units	V _{CC}	Conditions	
V _{IH}	Input HIGH Voltage	2.0			V			
V _{IL}	Input LOW Voltage			0.8	V			
V _H	Hysteresis		0.35		V		All inputs	
V _{CD}	Input Clamp Diode Voltage		-0.7	-1.2	V	MIN	I _{IN} = -18mA	
V _{OH}	Output HIGH Voltage	V _{CC} = 3V, V _{IN} = 0.2V, or V _{CC} - 0.2V		V _{CC} - 0.2	V _{CC}	V	I _{OH} = -32µA	
		Military/Commercial (CMOS)	V _{CC} - 0.2	V _{CC}	V	MIN	I _{OH} = -300µA	
		Military (TTL)	2.4	4.3	V	MIN	I _{OH} = -12mA	
		Commercial (TTL)	2.4	4.3	V	MIN	I _{OH} = -15mA	
V _{OL}	Output LOW Voltage	V _{CC} = 3V, V _{IN} = 0.2V, or V _{CC} - 0.2V			GND	0.2	V	I _{OL} = 300µA
		Military/Commercial (CMOS)		GND	0.2	V	MIN	I _{OL} = 300µA
		Military (TTL)		0.3	0.5	V	MIN	I _{OL} = 32mA
		Commercial (TTL)		0.3	0.5	V	MIN	I _{OL} = 48mA
	Commercial (TTL)		0.3	0.5	V	MIN	I _{OL} = 64mA	
I _{IH}	Input HIGH Current			5	µA	MAX	V _{IN} = V _{CC}	
I _{IL}	Input LOW Current			-5	µA	MAX	V _{IN} = GND	
I _{IH}	Input HIGH Current ³			5	µA	MAX	V _{IN} = 2.7V	
I _{IL}	Input LOW Current ³			-5	µA	MAX	V _{IN} = 0.5V	
I _{OZH}	Off State I _{OUT} HIGH-Level Output Current			10	µA	MAX	V _{OUT} = V _{CC}	
I _{OZL}	Off State I _{OUT} LOW-Level Output Current			-10	µA	MAX	V _{OUT} = GND	
I _{OZH}	Off State I _{OUT} HIGH-Level Output Current			10	µA	MAX	V _{OUT} = 2.7V	
I _{OZL}	Off State I _{OUT} LOW-Level Output Current			-10	µA	MAX	V _{OUT} = 0.5V	
I _{OS}	Output Short Circuit Current ²	-60			mA	MAX	V _{OUT} = 0.0V	
C _{IN}	Input Capacitance ³		5	10	pF	MAX	All inputs	
C _{OUT}	Output Capacitance ³		9	12	pF	MAX	All outputs	

1813 Tbl 05

Notes:

- Typical limits are at V_{CC} = 5.0V, T_A = +25°C ambient.
- 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 parameter tests. In any sequence of parameter tests, I_{OS} tests should be performed last.

3. This parameter is guaranteed but not tested.

DC CHARACTERISTICS (Over recommended operating conditions unless otherwise specified.)

Symbol	Parameter	Typ ¹	Max	Units	Conditions
I_{CC}	Quiescent Power Supply Current (CMOS inputs)	0.003	0.5	mA	$V_{CC} = \text{MAX}, f_1 = 0,$ Outputs Open, $V_{IN} \leq 0.2V$ or $V_{IN} \geq V_{CC} - 0.2V$
ΔI_{CC}	Quiescent Power Supply Current (TTL inputs)	0.5	2.0	mA	$V_{CC} = \text{MAX}, V_{IN} = 3.4V^2,$ $f_1 = 0,$ Outputs Open
I_{CCD}	Dynamic Power Supply Current ³	0.15	0.25	mA/ mHz	$V_{CC} = \text{MAX},$ One Input Toggling, 50% Duty Cycle, $\overline{OE} = \text{GND},$ $V_{IN} \leq 0.2V$ or $V_{IN} \geq V_{CC} - 0.2V,$ Outputs Open, $LE = V_{CC}$
I_C	Total Power Supply Current ⁵	1.7	4.0	mA	$V_{CC} = \text{MAX}, LE = V_{CC},$ 50% Duty Cycle, Outputs Open, One Bit Toggling at $f_1 = 10\text{MHz},$ $\overline{OE} = \text{GND}$ and $V_{IN} \leq 0.2V$ or $V_{IN} \geq V_{CC} - 0.2V$
		2.0	5.0	mA	$V_{CC} = \text{MAX}, LE = V_{CC},$ 50% Duty Cycle, Outputs Open, One Bit Toggling at $f_1 = 10\text{MHz},$ $\overline{OE} = \text{GND}$ and $V_{IN} = 3.4V$ or $V_{IN} = \text{GND}$
		3.2	6.5 ⁴	mA	$V_{CC} = \text{MAX}, LE = V_{CC},$ 50% Duty Cycle, Outputs Open, Eight Bits Toggling at $f_1 = 2.5\text{MHz},$ $\overline{OE} = \text{GND}$ and $V_{IN} \leq 0.2V$ or $V_{IN} \geq V_{CC} - 0.2V$
		5.2	14.5 ⁴	mA	$V_{CC} = \text{MAX}, LE = V_{CC},$ 50% Duty Cycle, Outputs Open, Eight Bits Toggling at $f_1 = 2.5\text{MHz},$ $\overline{OE} = \text{GND}$ and $V_{IN} = 3.4V$ or $V_{IN} = \text{GND}$

Notes:

- Typical values are at $V_{CC} = 5.0V,$ +25°C ambient and maximum loading.
- Per TTL driven input ($V_{IN} = 3.4V$); all other inputs at V_{CC} or GND.
- This parameter is not directly testable, but is derived for use in Total Power Supply calculations.
- Values for these conditions are examples of the I_{CC} formula. These limits are guaranteed but not tested.
- $$I_{CC} = I_{QUIESCENT} + I_{INPUTS} + I_{DYNAMIC}$$

$$I_{CC} = I_{CCOC} + I_{CCOT} D_H N_T + I_{CCD} (f_0/2 + f_1 N_1)$$

$$I_{CCOC} = \text{Quiescent Current with CMOS input levels}$$

I_{CCO} = 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 Register Devices (Zero for Non-Register Devices)

f_1 = Input Frequency

N_1 = Number of Inputs at f_1

All currents are in milliamps and all frequencies are in megahertz.

1813 TR 06

FUNCTION TABLES (Each Latch)

Inputs			Outputs 'FCT373—'FCT573
\overline{OE}	LE	D	O
L	H	H	H
L	H	L	L
L	L	X	Q_0
H	X	X	Z

1813 TR 07

H = HIGH Voltage Level

L = LOW Voltage Level

X = Don't Care

Z = HIGH Impedance

Q_0 = previous state of flip flops (Q_{n-1})

AC CHARACTERISTICS ('FCT373 — 'FCT573)

Sym.	Parameter	'FCT373 'FCT573				'FCT373A 'FCT573A				'FCT373C 'FCT573C				Units	Fig. No.
		MIL		COM'L		MIL		COM'L		MIL		COM'L			
		Min. ¹	Max.	Min. ¹	Max.	Min. ¹	Max.	Min. ¹	Max.	Min. ¹	Max.	Min. ¹	Max.		
t_{PLH} t_{PHL}	Prop Delay D_n to O_n	1.5	8.0	1.5	7.0	1.5	5.6	1.5	5.2	1.5	5.1	1.5	4.2	ns	1, 3
t_{PLH} t_{PHL}	Prop Delay LE to O_n	2.0	10.0	2.0	9.0	2.0	9.6	2.0	8.5	2.0	8.0	2.0	5.5	ns	1, 5
t_{PZH} t_{PZL}	Output Enable Time	1.5	10.0	1.5	9.0	1.5	7.5	1.5	6.5	1.5	6.3	1.5	5.5	ns	1 7
t_{PHZ} t_{PLZ}	Output Disable Time	1.5	8.5	1.5	7.5	1.5	6.5	1.5	5.5	1.5	5.9	1.5	5.0	ns	8

1813 Tbl 08

AC CHARACTERISTICS

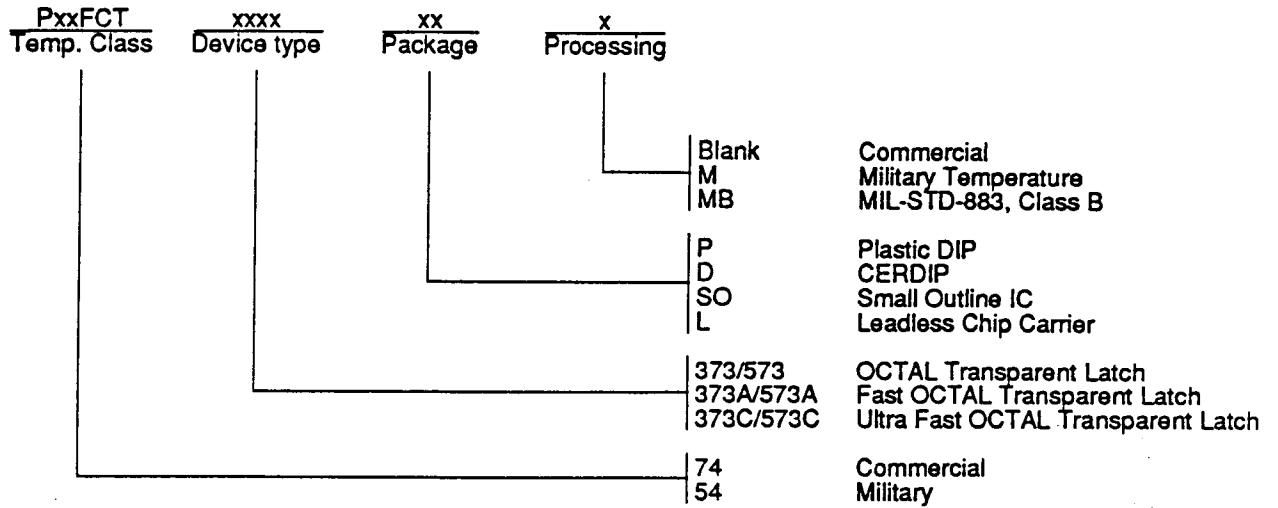
Sym.	Parameter	'FCT373 'FCT573				'FCT373A 'FCT573A				'FCT373C 'FCT573C				Units	Fig. No.
		MIL		COM'L		MIL		COM'L		MIL		COM'L			
		Min. ¹	Max.	Min. ¹	Max.	Min. ¹	Max.	Min. ¹	Max.	Min. ¹	Max.	Min. ¹	Max.		
$t_s(H)$ $t_s(L)$	Setup Time, High to Low D_n to LE	2.0	—	2.0	—	2.0	—	2.0	—	2.0	—	2.0	—	ns	9
$t_n(H)$ $t_n(L)$	Hold Time, High to Low D_n to LE	1.5	—	1.5	—	1.5	—	1.5	—	1.5	—	1.5	—	ns	
$t_w(H)$	LE Pulse Width High	6.0	—	6.0	—	6.0	—	5.0	—	6.0	—	5.0	—	ns	5

1813 Tbl 09

Note:

1. Minimum limits are guaranteed but not tested on Propagation Delays.
AC Characteristics guaranteed with $C_L = 50$ pF as shown in Figure 1.

ORDERING INFORMATION



1813 05