

# DM74LS377

## Octal D-Type Flip-Flop with Common Enable and Clock

### General Description

The DM74LS377 is an 8-bit register built using advanced low power Schottky technology. This register consists of eight D-type flip-flops with a buffered common clock and a buffered common input enable. The device is packaged in the space-saving (0.3 inch row spacing) 20-pin package.

### Features

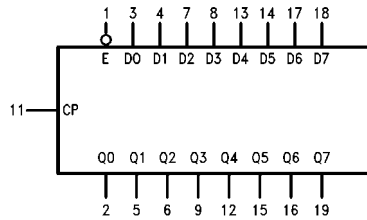
- 8-bit high speed parallel registers
- Positive edge-triggered D-type flip-flops
- Fully buffered common clock and enable inputs

### Ordering Code:

Order Number	Package Number	Package Description
DM74LS377WM	M20B	20-Lead Small Outline Integrated Circuit (SOIC), JEDEC MS-013, 0.300 Wide
DM74LS377N	N20A	20-Lead Plastic Dual-In-Line Package (PDIP), JEDEC MS-001, 0.300 Wide

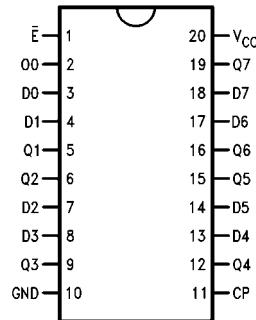
Devices also available in Tape and Reel. Specify by appending the suffix letter "X" to the ordering code.

### Logic Symbol



$V_{CC}$  = Pin 20  
GND = Pin 10

### Connection Diagram



### Pin Descriptions

Pin Names	Description
$\bar{E}$	Enable Input (Active LOW)
$D_0$ – $D_7$	Data Inputs
$CP$	Clock Pulse Input (Active Rising Edge)
$Q_0$ – $Q_7$	Flip-Flop Outputs

### Truth Table

Inputs			Output
$\bar{E}$	$CP$	$D_n$	$Q_n$
H	X	X	No Change
L	↗	H	H
L	↘	L	L

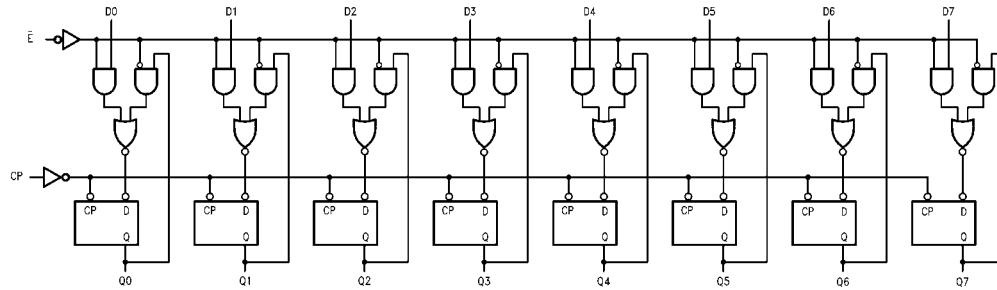
H = HIGH Voltage Level  
L = LOW Voltage Level  
X = Immaterial

## Functional Description

The DM74LS377 consists of eight edge-triggered D flip-flops with individual D inputs and Q outputs. The Clock (CP) and Enable input ( $\bar{E}$ ) are common to all flip-flops.

When  $\bar{E}$  is LOW, new data is entered into the register on the next LOW-to-HIGH transition of CP. When  $\bar{E}$  is HIGH, the register will retain the present data independent of the CP.

## Logic Diagram



**Absolute Maximum Ratings**(Note 1)

Supply Voltage	7V
Input Voltage	7V
Operating Free Air Temperature Range	0°C to +70°C
Storage Temperature Range	-65°C to +150°C

**Note 1:** The "Absolute Maximum Ratings" are those values beyond which the safety of the device cannot be guaranteed. The device should not be operated at these limits. The parametric values defined in the Electrical Characteristics tables are not guaranteed at the absolute maximum ratings. The "Recommended Operating Conditions" table will define the conditions for actual device operation.

**Recommended Operating Conditions**

Symbol	Parameter	Min	Nom	Max	Units
V <sub>CC</sub>	Supply Voltage	4.75	5	5.25	V
V <sub>IH</sub>	HIGH Level Input Voltage	2			V
V <sub>IL</sub>	LOW Level Input Voltage			0.8	V
I <sub>OH</sub>	HIGH Level Output Current			-0.4	mA
I <sub>OL</sub>	LOW Level Output Current			8	mA
T <sub>A</sub>	Free Air Operating Temperature	0		70	°C
t <sub>S</sub> (H)	Setup Time HIGH or LOW	10			ns
t <sub>S</sub> (L)	D <sub>n</sub> to CP	10			ns
t <sub>H</sub> (H)	Hold Time HIGH or LOW	5.0			ns
t <sub>H</sub> (L)	D <sub>n</sub> to CP	5.0			ns
t <sub>S</sub> (H)	Setup Time HIGH or LOW	10			ns
t <sub>S</sub> (L)	$\bar{E}$ to CP	20			ns
t <sub>H</sub> (H)	Hold Time HIGH or LOW	5.0			ns
t <sub>H</sub> (L)	$\bar{E}$ to CP	5.0			ns
t <sub>W</sub> (H)	CP Pulse Width HIGH or LOW	20			ns
t <sub>W</sub> (L)		20			ns

**Electrical Characteristics**

over recommended operating free air temperature range (unless otherwise noted)

Symbol	Parameter	Conditions	Min	Typ (Note 2)	Max	Units
V <sub>I</sub>	Input Clamp Voltage	V <sub>CC</sub> = Min, I <sub>I</sub> = -18 mA			-1.5	V
V <sub>OH</sub>	HIGH Level Output Voltage	V <sub>CC</sub> = Min, I <sub>OH</sub> = Max V <sub>IL</sub> = Max	2.7	3.4		V
V <sub>OL</sub>	LOW Level Output Voltage	V <sub>CC</sub> = Min, I <sub>OL</sub> = Max V <sub>IH</sub> = Min		0.35	0.5	V
		I <sub>OL</sub> = 4 mA, V <sub>CC</sub> = Min		0.25	0.4	
I <sub>I</sub>	Input Current @ Max Input Voltage	V <sub>CC</sub> = Max, V <sub>I</sub> = 7V V <sub>I</sub> = 10V			0.1	mA
I <sub>IH</sub>	HIGH Level Input Current	V <sub>CC</sub> = Max, V <sub>I</sub> = 2.7V			20.0	μA
I <sub>IL</sub>	LOW Level Input Current	V <sub>CC</sub> = Max, V <sub>I</sub> = 0.4V			-0.4	mA
I <sub>OS</sub>	Short Circuit Output Current	V <sub>CC</sub> = Max (Note 3)	-20		-100	mA
I <sub>CC</sub>	Supply Current	V <sub>CC</sub> = Max			28	mA

**Note 2:** All typicals are at V<sub>CC</sub> = 5V, T<sub>A</sub> = 25°C.

**Note 3:** Not more than one output should be shorted at a time, and the duration should not exceed one second.

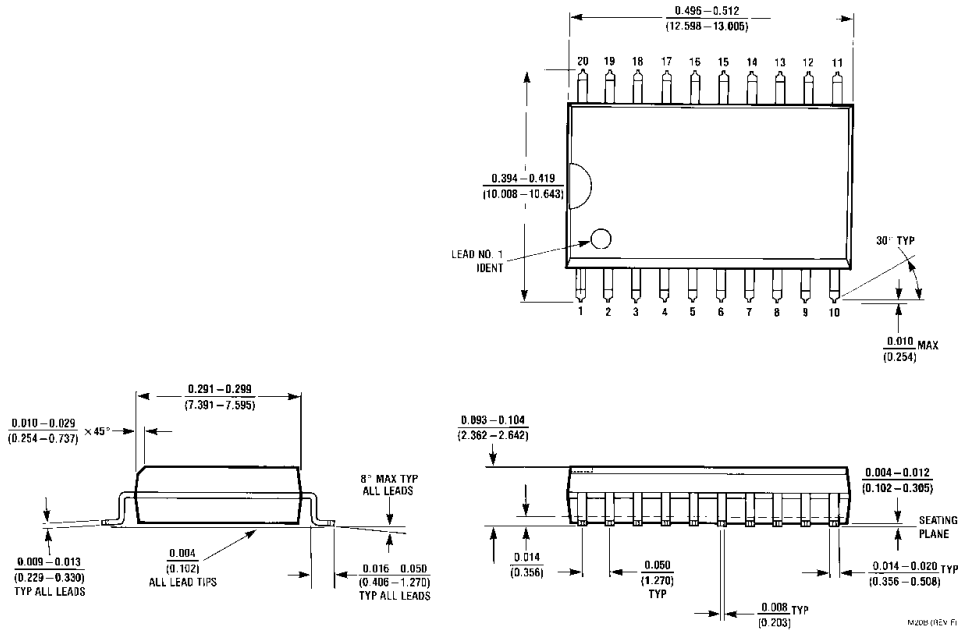
**Switching Characteristics**

V<sub>CC</sub> = +5.0V, T<sub>A</sub> = +25°C

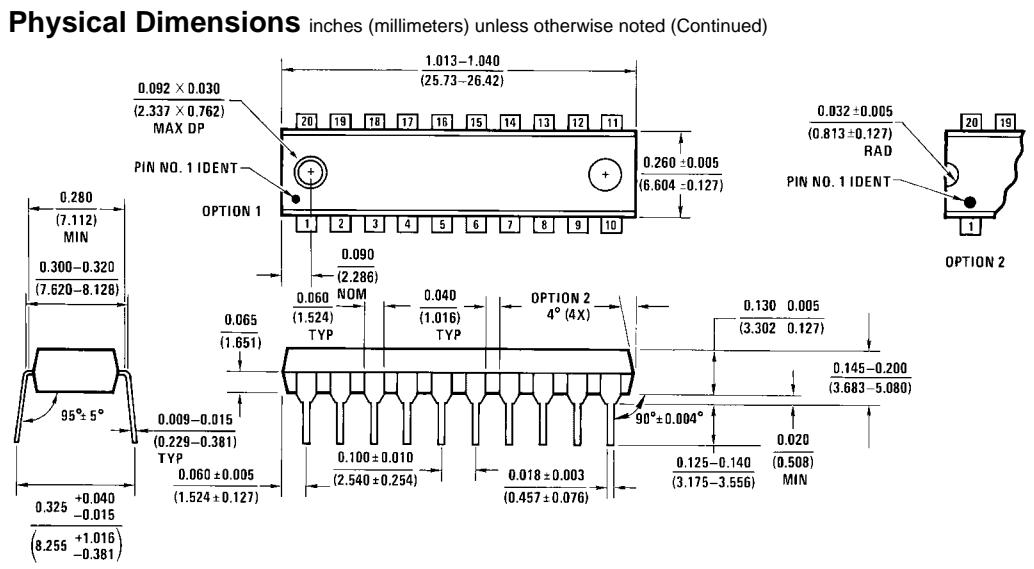
Symbol	Parameter	R <sub>L</sub> = 2 kΩ, C <sub>L</sub> = 15 pF		Units
		Min	Max	
f <sub>MAX</sub>	Maximum Clock Frequency	30		MHz
t <sub>PLH</sub>	Propagation Delay		25	ns
t <sub>PHL</sub>	CP to Q <sub>n</sub>		25	ns

DM74LS377

**Physical Dimensions** inches (millimeters) unless otherwise noted



**20-Lead Small Outline Integrated Circuit (SOIC), JEDEC MS-013, 0.300 Wide Package Number M20B**



**20-Lead Plastic Dual-In-Line Package (PDIP), JEDEC MS-001, 0.300 Wide  
Package Number N20A**

Fairchild does not assume any responsibility for use of any circuitry described, no circuit patent licenses are implied and Fairchild reserves the right at any time without notice to change said circuitry and specifications.

**LIFE SUPPORT POLICY**

FAIRCHILD'S PRODUCTS ARE NOT AUTHORIZED FOR USE AS CRITICAL COMPONENTS IN LIFE SUPPORT DEVICES OR SYSTEMS WITHOUT THE EXPRESS WRITTEN APPROVAL OF THE PRESIDENT OF FAIRCHILD SEMICONDUCTOR CORPORATION. As used herein:

1. Life support devices or systems are devices or systems which, (a) are intended for surgical implant into the body, or (b) support or sustain life, and (c) whose failure to perform when properly used in accordance with instructions for use provided in the labeling, can be reasonably expected to result in a significant injury to the user.
2. A critical component in any component of a life support device or system whose failure to perform can be reasonably expected to cause the failure of the life support device or system, or to affect its safety or effectiveness.

[www.fairchildsemi.com](http://www.fairchildsemi.com)