



# Hex "D" Master-Slave Flip-Flop

**ELECTRICALLY TESTED PER:  
5962-8751201**

The 10H576 contains six master slave type "D" flip-flops with a common clock. This MECL 10H part is a functional/pinout duplication of the standard MECL 10K family part, with 100% improvement in clock frequency and propagation delay and no increase in power-supply current.

- Propagation Delay, 1.7 ns Typical
- 675 mW Max/Pkg (No Load)
- Improved Noise Margin 150 mV (Over Operating Voltage and Temperature Range)
- Voltage Compensated
- MECL 10K-Compatible

| FUNCTION | PIN ASSIGNMENTS |       |     | BURN-IN<br>(CONDITION C) |
|----------|-----------------|-------|-----|--------------------------|
|          | DIL             | FLATS | LCC |                          |
| VCC1     | 1               | 5     | 2   | GND                      |
| Q0       | 2               | 6     | 3   | 51 Ω to V <sub>TT</sub>  |
| Q1       | 3               | 7     | 4   | 51 Ω to V <sub>TT</sub>  |
| Q2       | 4               | 8     | 5   | 51 Ω to V <sub>TT</sub>  |
| D0       | 5               | 9     | 7   | GND                      |
| D1       | 6               | 10    | 8   | GND                      |
| D2       | 7               | 11    | 9   | GND                      |
| VEE      | 8               | 12    | 10  | VEE                      |
| Clock    | 9               | 13    | 12  | CP1                      |
| D3       | 10              | 14    | 13  | GND                      |
| D4       | 11              | 15    | 14  | GND                      |
| D5       | 12              | 16    | 15  | GND                      |
| Q3       | 13              | 1     | 17  | 51 Ω to V <sub>TT</sub>  |
| Q4       | 14              | 2     | 18  | 51 Ω to V <sub>TT</sub>  |
| Q5       | 15              | 3     | 19  | 51 Ω to V <sub>TT</sub>  |
| VCC2     | 16              | 4     | 20  | GND                      |

**BURN - IN CONDITIONS:**  
**V<sub>TT</sub> = - 2.0 V MAX/ - 2.2 V MIN**  
**VEE = - 5.7 V MAX/ - 5.2 V MIN**

## Military 10H576

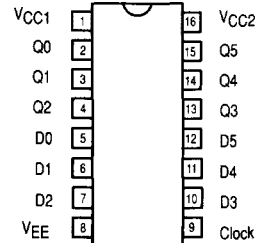


### AVAILABLE AS

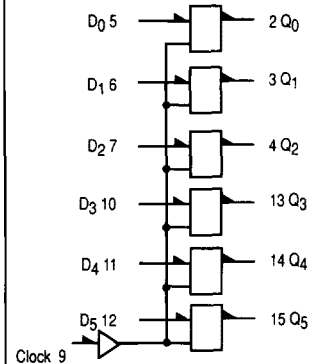
- 1) JAN: N/A
  - 2) SMD: 5962-8751201
  - 3) 883: 10H576/BXAJC
- X = CASE OUTLINE AS FOLLOWS:

**PACKAGE: CERDIP: E**  
**CERFLAT: F**  
**LCC: 2**

**The letter "M" appears before the slash on LCC.**



### LOGIC DIAGRAM



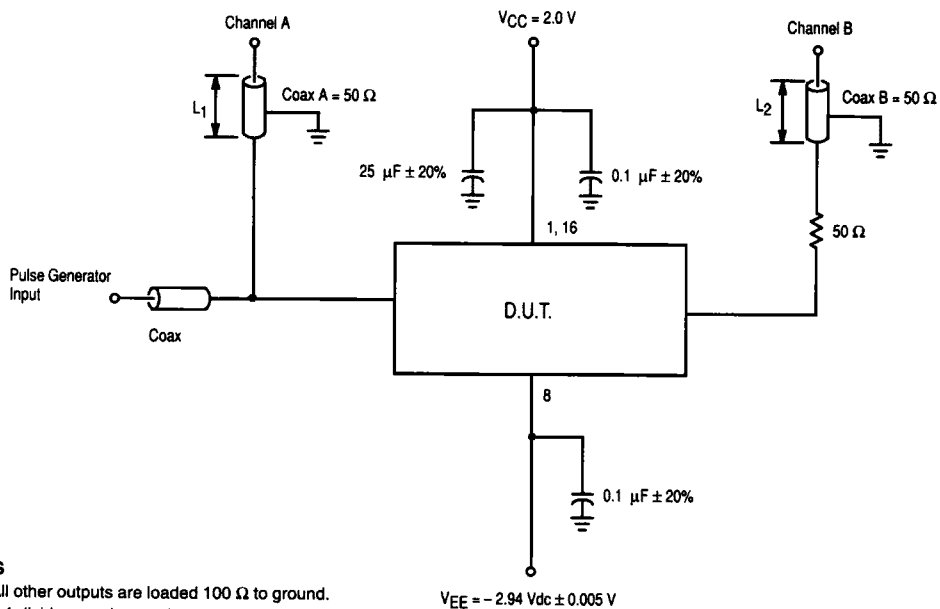
# 10H576

| CLOCK TRUTH TABLE |   |           |
|-------------------|---|-----------|
| C                 | D | $Q_{n+1}$ |
| L                 | Ø | $Q_n$     |
| H*                | L | L         |
| H*                | H | H         |

Ø = Don't Care

\* A clock H is a clock transition from a low to a high state

2

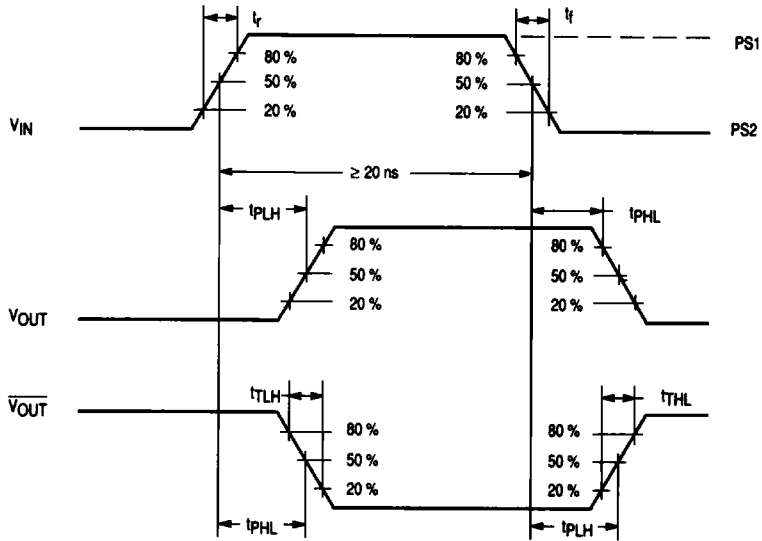


### NOTES

1. All other outputs are loaded 100  $\Omega$  to ground.
2. 2:1 divider may be used.
3.  $L_1$ ;  $L_2$ : Matched for equal time delay.
4.  $V_{IN} = 20$  ns.
5.  $f_{IN} = 1.0$  MHz.
6.  $t_r = t_f = 1.0$  ns (20% - 80%)  $\pm 0.1$  ns.

Figure 1. Test Circuit

# 10H576



## NOTES

1. All other outputs are loaded  $100\ \Omega$  to ground.
2. 2:1 divider may be used.
3.  $L_1, L_2$ : Matched for equal time delay.
4.  $V_{IN} = 20\ \text{ns}$ .
5.  $f_{IN} = 1.0\ \text{MHz}$ .
6.  $t_r = t_f = 1.0\ \text{ns}$  (20% - 80%)  $\pm 0.1\ \text{ns}$ .

Figure 2. Test Circuit Waveform

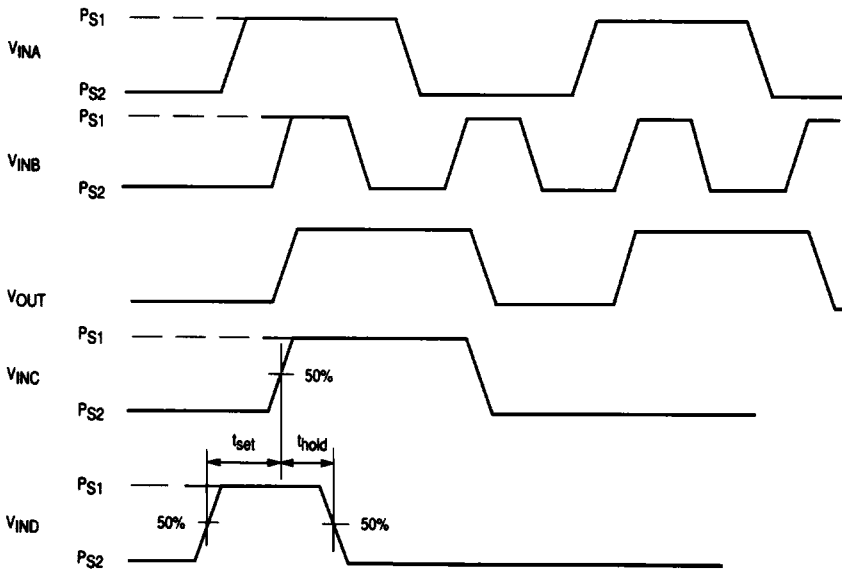


Figure 3.  $t_{SET}$  and  $t_{HOLD}$  Waveform

# 10H576 QUIESCENT LIMIT TABLE \*

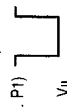
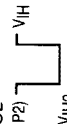

### \* ELECTRICAL CHARACTERISTICS

Each MECL 10H series circuit has been designed to meet the dc specifications shown in the test table, after thermal equilibrium has been established. The circuit is in a test socket or mounted on a printed circuit board and transverse air flow greater than 500 linear fpm is maintained. Outputs are terminated through a 100 Ω resistor to -2.0 volts.

| Test Temperature        | Test Voltage Values (Volts) |                  |                  |                  |       |       |       |       |
|-------------------------|-----------------------------|------------------|------------------|------------------|-------|-------|-------|-------|
|                         | V <sub>IH1</sub>            | V <sub>IL1</sub> | V <sub>IH2</sub> | V <sub>IL2</sub> | PS1   | PS2   | VEE1  | VEE2  |
| T <sub>A</sub> = 25 °C  | -0.78                       | -1.95            | -1.11            | -1.480           | +1.11 | +0.31 | -5.46 | -4.94 |
| T <sub>A</sub> = 125 °C | -0.65                       | -1.95            | -0.96            | -1.465           | +1.24 | +0.36 | -5.46 | -4.94 |
| T <sub>A</sub> = -55 °C | -0.84                       | -1.95            | -1.16            | -1.570           | +1.01 | +0.28 | -5.46 | -4.94 |

| Symbol           | Parameter            | Limits     |     |            |     |            |     | Units | TEST VOLTAGE APPLIED TO PINS BELOW   |                  |                  |                  |                  |                        |                   |                      |  |  |
|------------------|----------------------|------------|-----|------------|-----|------------|-----|-------|--|------------------|------------------|------------------|------------------|------------------------|-------------------|----------------------|--|--|
|                  |                      | + 25 °C    |     | + 125 °C   |     | - 55 °C    |     |       | Pinouts referenced are for DIL package, check Pin Assignments<br>V <sub>CC</sub> = 0 V, Output Load = 100 Ω to - 2.0 V |                  |                  |                  |                  |                        |                   |                      |  |  |
|                  |                      | Subgroup 1 |     | Subgroup 2 |     | Subgroup 3 |     |       | V <sub>IH1</sub>   | V <sub>IL1</sub> | V <sub>IH2</sub> | V <sub>IL2</sub> | V <sub>EE1</sub> | V <sub>CC</sub>        | CP1               | P. U. T.             |  |  |
| VOH              | High Output Voltage  | Min        | Max | Min        | Max | Min        | Max | V     | 5-7<br>10-12   |                  |                  |                  | 8                | 1, 16                  | 9, P <sub>1</sub> | 2-4<br>13-15         |  |  |
| VOL              | Low Output Voltage   | Min        | Max | Min        | Max | Min        | Max | V     |  | 5-7<br>10-12     |                  |                  | 8                | 1, 16                  | 9, P <sub>1</sub> | 2-4<br>13-15         |  |  |
| VOH1             | High Output Voltage  | Min        | Max | Min        | Max | Min        | Max | V     | 5-7<br>10-12   | 5-7<br>10-12     |                  | 8                | 1, 16            | 9<br>P <sub>1</sub> -3 |                   | 2-4<br>13-15         |  |  |
| VOL1             | Low Output Voltage   | Min        | Max | Min        | Max | Min        | Max | V     | 5-7<br>10-12   | 5-7<br>10-12     |                  | 8                | 1, 16            | 9<br>P <sub>1</sub> -3 |                   | 2-4<br>13-15         |  |  |
| IEE              | Power Supply Current | Min        | Max | Min        | Max | Min        | Max | mA    |  |                  |                  |                  | 8                | 1, 16                  |                   | 8                    |  |  |
| I <sub>IH</sub>  | Input Current High   |            | 265 |            | 425 |            | 425 | μA    | 5-7<br>10-12   |                  |                  |                  | 8                | 1, 16                  |                   | 5-7<br>10-12         |  |  |
| I <sub>IH1</sub> | Input Current High   |            | 420 |            | 670 |            | 670 | μA    | 9  |                  |                  |                  | 8                | 1, 16                  |                   | 9                    |  |  |
| I <sub>IL</sub>  | Input Current Low    | 0.5        |     | 0.3        |     | 0.5        |     | μA    |  |                  |                  |                  | 8                | 1, 16                  |                   | 5-7<br>9-12<br>10-12 |  |  |

### NOTES

1. Hold power during all VO<sub>H</sub> and VOL tests.
2. P1)  P2)  P3) 

# 10H576 QUIESCENT LIMIT TABLE \*

## \* ELECTRICAL CHARACTERISTICS

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| Test Temperature        | Test Voltage Values (Volts) |                  |                  |                  |                 |                 |       |       |       |       |
|-------------------------|-----------------------------|------------------|------------------|------------------|-----------------|-----------------|-------|-------|-------|-------|
|                         | V <sub>IH1</sub>            | V <sub>IL1</sub> | V <sub>IH2</sub> | V <sub>IL2</sub> | P <sub>S1</sub> | P <sub>S2</sub> | VEE1  | VEE2  | VEEL  | VEEL  |
| T <sub>A</sub> = 25 °C  | -0.78                       | -1.95            | -1.11            | -1.480           | +1.11           | +0.31           | -5.46 | -4.94 | -2.94 | -2.94 |
| T <sub>A</sub> = 125 °C | -0.65                       | -1.95            | -0.96            | -1.465           | +1.24           | +0.36           | -5.46 | -4.94 | -2.94 | -2.94 |
| T <sub>A</sub> = -55 °C | -0.84                       | -1.95            | -1.16            | -1.510           | +1.01           | +0.28           | -5.46 | -4.94 | -2.94 | -2.94 |

| Symbol              | Parameter         | Limits     |             |             |             |             |                 | Units | TEST VOLTAGE APPLIED TO PINS BELOW   |            |       |   |   |            |
|---------------------|-------------------|------------|-------------|-------------|-------------|-------------|-----------------|-------|--|------------|-------|---|---|------------|
|                     |                   | +25 °C     |             | +125 °C     |             | -55 °C      |                 |       | Pinouts referenced are for DIL package, check Pin Assignments<br>V <sub>CC</sub> = 2.0 V, Output Load = 100 Ω to GND |            |       |   |   |            |
|                     |                   | Subgroup 9 | Subgroup 10 | Subgroup 11 | Subgroup 11 | Subgroup 11 | V <sub>IN</sub> |       |  |            |       |   |   |            |
| t <sub>TLH</sub>    | Rise Time         | 0.7        | 1.8         | 0.8         | 1.9         | 0.8         | 1.8             | ns    | 5-7, 9-15  | 2-4, 13-15 | 1, 16 | 8 | 8 | 2-4, 13-15 |
| t <sub>THL</sub>    | Fall Time         | 0.7        | 1.8         | 0.8         | 1.9         | 0.8         | 1.8             | ns    | 5-7, 9-15  | 2-4, 13-15 | 1, 16 | 8 | 8 | 2-4, 13-15 |
| t <sub>PLH</sub>    | Propagation Delay | 1.0        | 2.7         | 1.0         | 3.0         | 1.0         | 2.9             | ns    | 5-7, 9-15  | 2-4, 13-15 | 1, 16 | 8 | 8 | 2-4, 13-15 |
| t <sub>PHL</sub>    | Propagation Delay | 1.0        | 2.7         | 1.0         | 3.0         | 1.0         | 2.9             | ns    | 5-7, 9-15  | 2-4, 13-15 | 1, 16 | 8 | 8 | 2-4, 13-15 |
| t <sub>Setup</sub>  | Setup Time        | 1.5        |             | 1.5         |             | 1.5         |                 | ns    | 5-7, 9-12  | 2-4, 13-15 | 1, 16 | 8 | 8 | 2-4, 13-15 |
| t <sub>Hold</sub>   | Hold Time         | 0.8        |             | 0.8         |             | 0.8         |                 | ns    | 5-7, 9-12  | 2-4, 13-15 | 1, 16 | 8 | 8 | 2-4, 13-15 |
| f <sub>Toggle</sub> | Toggle Frequency  | 250        |             | 250         |             | 250         |                 | MHz   | 5-7, 9-12  | 2-4, 13-15 | 1, 16 | 8 | 8 | 2-4, 13-15 |