



## Hex "D" Master-Slave Flip-Flop with Reset

ELECTRICALLY TESTED PER: 5962-8756301

The 10H586 is a hex D type flip-flop with common reset and clock lines. This MECL 10H part is a functional/pinout duplication of the standard MECL 10K family part, with 100% improvement in clock toggle frequency and propagation delay and no increase in power supply current.

- Propagation Delay, 1.7 ns Typical
- 660 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 |                                |
| V <sub>CC</sub> 1 | 1               | 5     | 2   | GND                            |
| Q <sub>0</sub>    | 2               | 6     | 3   | 51 $\Omega$ to V <sub>TT</sub> |
| Q <sub>1</sub>    | 3               | 7     | 4   | 51 $\Omega$ to V <sub>TT</sub> |
| Q <sub>2</sub>    | 4               | 8     | 5   | 51 $\Omega$ to V <sub>TT</sub> |
| D <sub>0</sub>    | 5               | 9     | 7   | GND                            |
| D <sub>1</sub>    | 6               | 10    | 8   | GND                            |
| D <sub>2</sub>    | 7               | 11    | 9   | GND                            |
| V <sub>EE</sub>   | 8               | 12    | 10  | V <sub>EE</sub>                |
| Clock             | 9               | 13    | 12  | CP1                            |
| D <sub>3</sub>    | 10              | 14    | 13  | GND                            |
| D <sub>4</sub>    | 11              | 15    | 14  | GND                            |
| D <sub>5</sub>    | 12              | 16    | 15  | GND                            |
| Q <sub>3</sub>    | 13              | 1     | 17  | 51 $\Omega$ to V <sub>TT</sub> |
| Q <sub>4</sub>    | 14              | 2     | 18  | 51 $\Omega$ to V <sub>TT</sub> |
| Q <sub>5</sub>    | 15              | 3     | 19  | 51 $\Omega$ to V <sub>TT</sub> |
| V <sub>CC</sub> 2 | 16              | 4     | 20  | GND                            |

### BURN - IN CONDITIONS:

V<sub>TT</sub> = -2.0 V MAX/ -2.2 V MIN

V<sub>EE</sub> = -5.7 V MAX/ -5.2 V MIN

**Military 10H586**

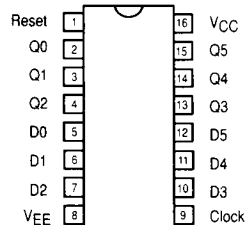


### AVAILABLE AS

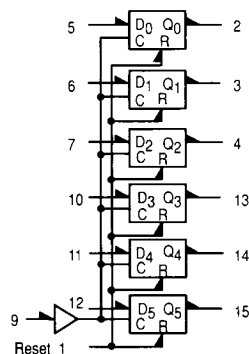
- 1) JAN: N/A
  - 2) SMD: 5962-8756301
  - 3) 883: 10H586/BXAJC
- X = CASE OUTLINE AS FOLLOWS:

PACKAGE: CERP: E  
CERFLAT: F  
LCC: 2

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



### LOGIC DIAGRAM



# 10H586

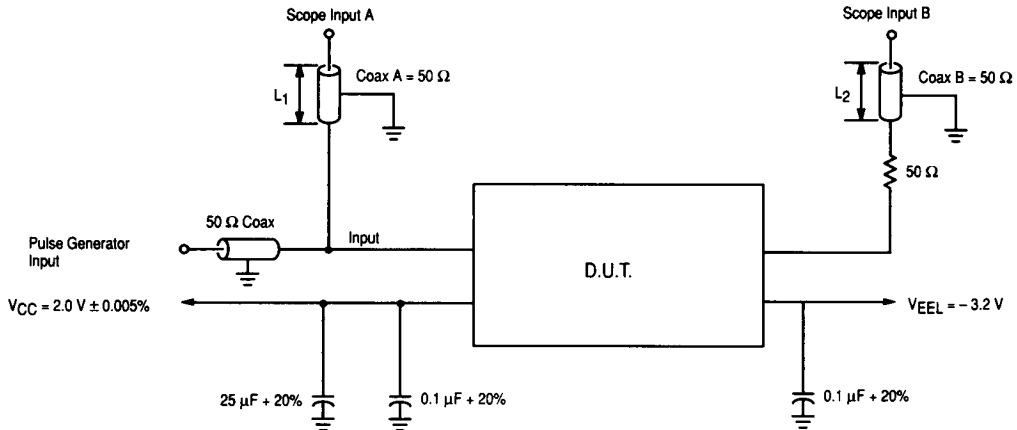
CLOCKED TRUTH TABLE

| R | C  | Q | Q <sub>n</sub> + 1 |
|---|----|---|--------------------|
| L | L  | Ø | Q <sub>n</sub>     |
| L | H* | L | L                  |
| L | H* | H | H                  |
| H | L  | Ø | L                  |

Ø = Don't Care

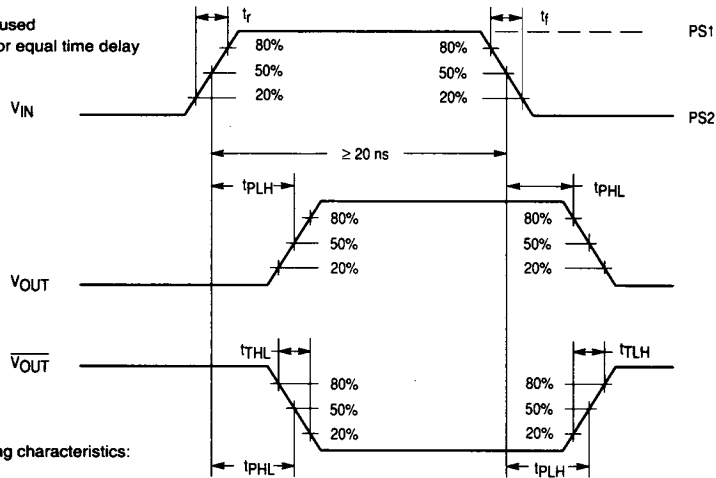
\* A clock H is a clock transition from a low to a high state

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## NOTES

1. Pulse generator must be capable of rise and fall time of  $1.0 \text{ ns} \pm 0.1 \text{ ms}$
2. Unused outputs connected to  $100 \Omega$  resistor to ground
3. 2:1 divider may be used
4.  $L1 = L2$ : matched for equal time delay

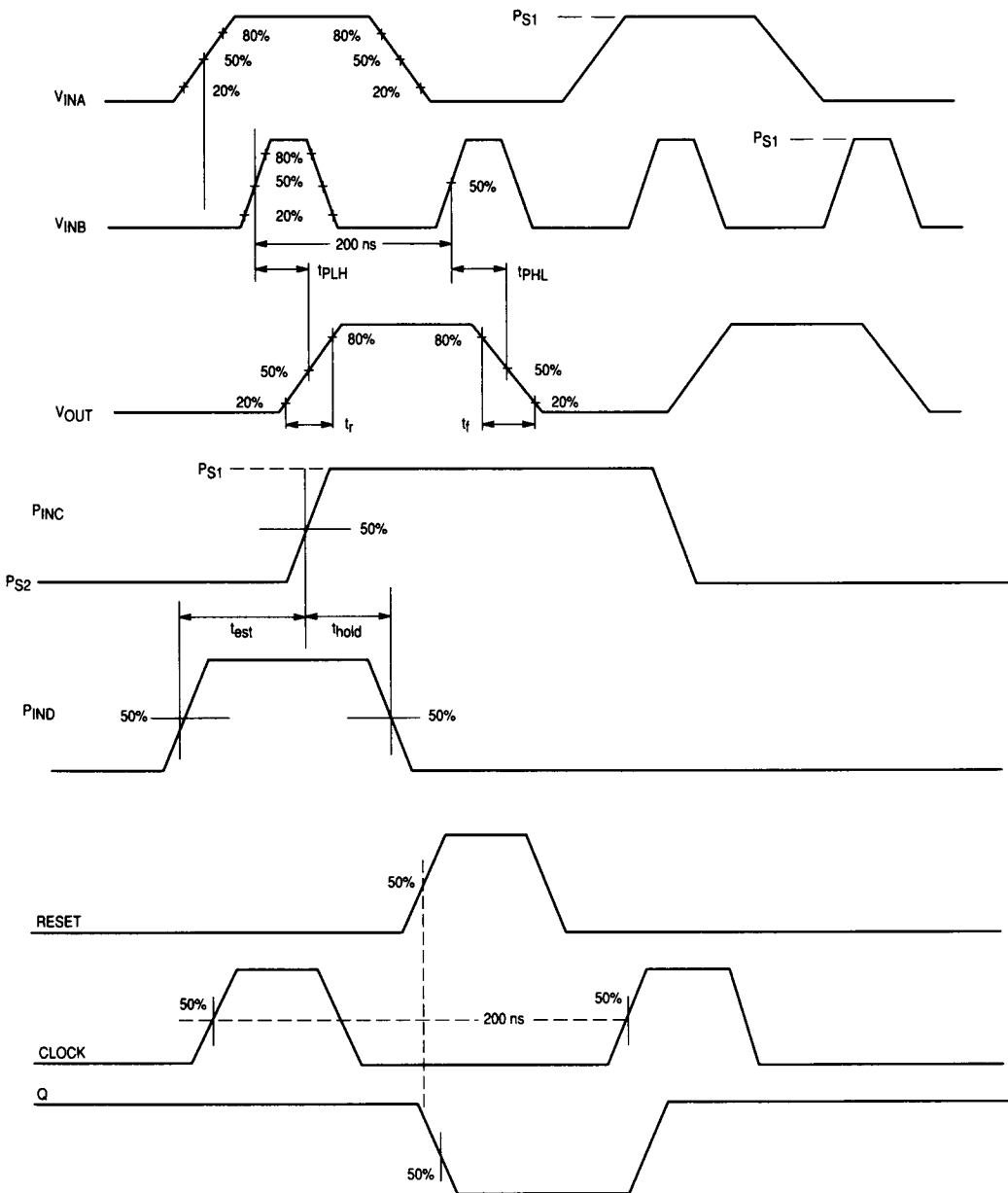


## NOTES

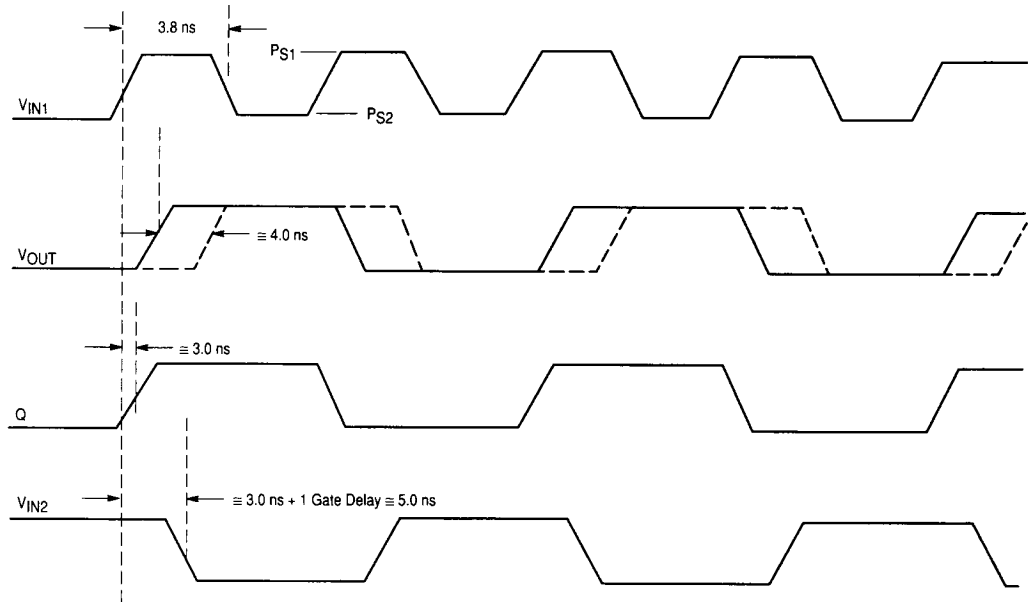
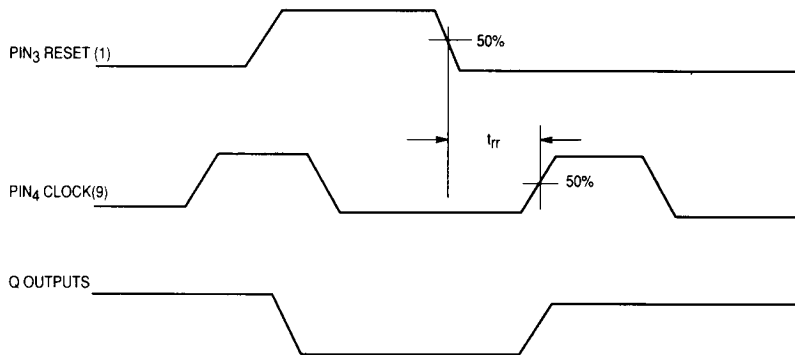
1.  $V_{IN}$  has the following characteristics:
  - a)  $PW \geq 20 \text{ ns}$
  - b)  $f = 1.0 \text{ MHz}$

Figure 1. Switching Test Circuit and Waveforms

# 10H586



**Figure 2. Switching Test Circuit and Waveforms**

Figure 3.  $t_{\text{TOGGLE}}$  WaveformsFigure 4.  $t_{rr}$  Waveforms

# 10H586 QUIESCENT LIMIT TABLE \*

## \* ELECTRICAL CHARACTERISTICS

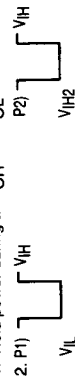
Each MECL 10H series circuit has been designed to meet the dc specifications shown in the test table, after thermal equilibrium has been established. The circuit is in a test socket or mounted on a printed circuit board and transverse air flow greater than 500 linear fpm is maintained. Outputs are terminated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

| Test Temperature        | Test Voltage Values (Volts) |                  |                  |                 |                 |       |       |       |  |  |
|-------------------------|-----------------------------|------------------|------------------|-----------------|-----------------|-------|-------|-------|--|--|
|                         | V <sub>IH1</sub>            | V <sub>IH2</sub> | V <sub>IL2</sub> | PS <sub>1</sub> | PS <sub>2</sub> | VEE1  | VEE2  | VEEL  |  |  |
| T <sub>A</sub> = 25 °C  | -0.78                       | -1.11            | -1.480           | +1.11           | +0.31           | -5.46 | -4.94 | -2.94 |  |  |
| T <sub>A</sub> = 125 °C | -0.65                       | -0.96            | -1.465           | +1.24           | +0.36           | -5.46 | -4.94 | -2.94 |  |  |
| T <sub>A</sub> = -55 °C | -0.84                       | -1.16            | -1.510           | +1.01           | +0.28           | -5.46 | -4.94 | -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> = 0 V, Output Load = 100 Ω to - 2.0 V |                    |                  |                   |                  |                  |                 |                 |  |  |
|                  |                      | Subgroup 1 |        | Subgroup 2 |         | Subgroup 3 |        |       |                                                                                                                        |                    |                  |                   |                  |                  |                 |                 |  |  |
|                  |                      | Min        | Max    | Min        | Max     | Min        | Max    |       | V <sub>IH1</sub>                                                                                                       | V <sub>IL1</sub>   | V <sub>IH2</sub> | V <sub>IL2</sub>  | V <sub>EE1</sub> | V <sub>EE2</sub> | V <sub>CC</sub> | P. U. T.        |  |  |
| V <sub>OH</sub>  | High Output Voltage  | - 1.01     | - 0.78 | - 0.86     | - 0.65  | - 1.06     | - 0.84 | V     | 5 - 7<br>9 - 12                                                                                                        | 5 - 7<br>9 - 12    |                  |                   | 8                |                  | 16              | 2 - 4, 13 - 15  |  |  |
| V <sub>OL</sub>  | Low Output Voltage   | - 1.95     | - 1.58 | - 1.95     | - 1.565 | - 1.95     | - 1.61 | V     | 5 - 7<br>9 - 12                                                                                                        | 5 - 7<br>9 - 12    |                  |                   | 8                |                  | 16              | 2 - 4, 13 - 15  |  |  |
| V <sub>OH1</sub> | High Output Voltage  | - 1.01     | - 0.78 | - 0.86     | - 0.65  | - 1.06     | - 0.84 | V     | 5 - 7<br>9 - 12                                                                                                        | 1.5 - 7<br>10 - 12 | 5 - 7<br>10 - 12 | 1                 | 8                | 8                | 16              | 2 - 4, 13 - 15  |  |  |
| V <sub>OL1</sub> | Low Output Voltage   | - 1.95     | - 1.58 | - 1.95     | - 1.565 | - 1.95     | - 1.61 | V     | 5 - 7<br>10 - 12                                                                                                       | 1.5 - 7<br>9 - 12  | 1                | 5 - 7,<br>10 - 12 | 8                | 8                | 16              | 2 - 4, 13 - 15  |  |  |
| I <sub>EE</sub>  | Power Supply Current | - 110      |        | - 121      |         | - 121      |        | mA    |                                                                                                                        |                    |                  |                   | 8                |                  | 16              | 8               |  |  |
| I <sub>IH</sub>  | Input Current High   |            | 420    |            | 670     |            | 670    | μA    | 9                                                                                                                      |                    |                  |                   | 8                |                  | 16              | 9               |  |  |
| I <sub>IH1</sub> | Input Current High   |            | 265    |            | 430     |            | 430    | μA    | 5 - 7<br>10 - 12                                                                                                       |                    |                  |                   | 8                |                  | 16              | 5 - 7, 10 - 12  |  |  |
| I <sub>IH2</sub> | Input Current High   |            | 1200   |            | 1900    |            | 1900   | μA    | 1                                                                                                                      |                    |                  |                   | 8                |                  | 16              | 1               |  |  |
| I <sub>IL</sub>  | Input Current Low    | 0.5        |        | 0.3        |         | 0.5        |        | μA    |                                                                                                                        |                    |                  |                   |                  | 8                | 16              | 1.5 - 7, 9 - 12 |  |  |

## NOTES

1. Hold power during all V<sub>OH</sub> and V<sub>OL</sub> tests.



# 10H586 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  $\Omega$  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> | P <sub>S1</sub> | P <sub>S2</sub> | V <sub>EE1</sub> | V <sub>EE2</sub> | 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                                                                       |                 |                  |                 |      |                |  |
|---------------------|---------------------------------------|------------|-----|-------------|-----|-------------|-----|-------|----------------------------------------------------------------------------------------------------------|-----------------|------------------|-----------------|------|----------------|--|
|                     | Functional Parameters:                | + 25 °C    |     | + 125 °C    |     | - 55 °C     |     |       | Pinouts referenced are for DIL package, check Pin Assignments<br>VCC = 2.0 V, Output Load = 100 Ω to GND |                 |                  |                 |      |                |  |
|                     |                                       | Subgroup 9 |     | Subgroup 10 |     | Subgroup 11 |     |       |                                                                                                          |                 |                  |                 |      |                |  |
|                     |                                       | Min        | Max | Min         | Max | Min         | Max |       |                                                                                                          |                 |                  |                 |      |                |  |
| t <sub>TLH</sub>    | Rise Time                             | 0.7        | 2.4 | 0.7         | 2.6 | 0.7         | 2.6 | ns    | PS1                                                                                                      | V <sub>IN</sub> | V <sub>OUT</sub> | V <sub>CC</sub> | VEEL | P. U. T.       |  |
| t <sub>THL</sub>    | Fall Time                             | 0.7        | 2.4 | 0.7         | 2.6 | 0.7         | 2.6 | ns    |                                                                                                          | 5 - 7, 9 - 12   | 2 - 4, 13 - 15   | 16              | 8    | 2 - 4, 13 - 15 |  |
| t <sub>PLH</sub>    | Propagation Delay<br>Ck or Reset to Q | 0.7        | 2.7 | 0.7         | 3.0 | 0.7         | 3.0 | ns    | 5 - 7<br>10 - 12                                                                                         | 5 - 7, 9 - 12   | 2 - 4, 13 - 15   | 16              | 8    | 2 - 4, 13 - 15 |  |
| t <sub>PLH</sub>    | Propagation Delay<br>Ck or Reset to Q | 0.7        | 2.7 | 0.7         | 3.0 | 0.7         | 3.0 | ns    | 5 - 7<br>10 - 12                                                                                         | 5 - 7, 9 - 12   | 2 - 4, 13 - 15   | 16              | 8    | 2 - 4, 13 - 15 |  |
| t <sub>SET</sub>    | Setup Time                            | 1.5        |     | 1.5         |     | 1.5         |     | ns    |                                                                                                          | 5 - 7, 9 - 12   | 2 - 4, 13 - 15   | 16              | 8    | 2 - 4, 13 - 15 |  |
| t <sub>HOLD</sub>   | Hold Time                             | 1.0        |     | 1.0         |     | 1.0         |     | ns    |                                                                                                          | 5 - 7, 9 - 12   | 2 - 4, 13 - 15   | 16              | 8    | 2 - 4, 13 - 15 |  |
| t <sub>RR</sub>     | Reset Recovery<br>Time                | 3.0        |     | 3.0         |     | 3.0         |     | ns    | 5 - 7<br>10 - 12                                                                                         | 9               | 2 - 4, 13 - 15   | 16              | 8    | 2 - 4, 13 - 15 |  |
| t <sub>TOGGLE</sub> | Toggle Frequency                      | 250        |     | 250         |     | 250         |     | MHz   |                                                                                                          | 5 - 7, 9 - 12   | 2 - 4, 13 - 15   | 16              | 8    | 2 - 4, 13 - 15 |  |