

MC10H176

Hex D Master-Slave Flip-Flop

The MC10H176 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.

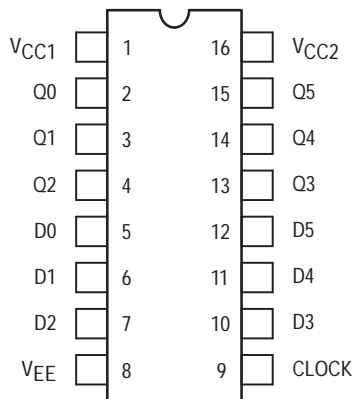
- Propagation Delay, 1.7 ns Typical
- Power Dissipation, 460 mW Typical
- Improved Noise Margin 150 mV (Over Operating Voltage and Temperature Range)
- Voltage Compensated
- MECL 10K-Compatible

CLOCKED TRUTH TABLE

| | | |
|----|---|------------------|
| C | Q | Q _{n+1} |
| L | X | Q _n |
| H* | L | L |
| H* | H | H |

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

DIP PIN ASSIGNMENT



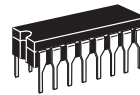
Pin assignment is for Dual-in-Line Package.
For PLCC pin assignment, see the Pin Conversion Tables on page 18 of the ON Semiconductor MECL Data Book (DL122/D).



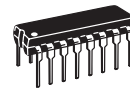
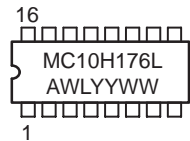
ON Semiconductor

<http://onsemi.com>

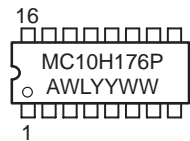
MARKING DIAGRAMS



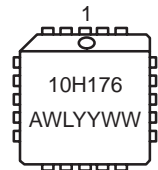
CDIP-16
L SUFFIX
CASE 620



PDIP-16
P SUFFIX
CASE 648



PLCC-20
FN SUFFIX
CASE 775



A = Assembly Location
WL = Wafer Lot
YY = Year
WW = Work Week

ORDERING INFORMATION

| Device | Package | Shipping |
|------------|---------|---------------|
| MC10H176L | CDIP-16 | 25 Units/Rail |
| MC10H176P | PDIP-16 | 25 Units/Rail |
| MC10H176FN | PLCC-20 | 46 Units/Rail |

MC10H176

MAXIMUM RATINGS

| Symbol | Characteristic | Rating | Unit |
|-----------|--|----------------------------|----------|
| V_{EE} | Power Supply ($V_{CC} = 0$) | -8.0 to 0 | Vdc |
| V_I | Input Voltage ($V_{CC} = 0$) | 0 to V_{EE} | Vdc |
| I_{out} | Output Current – Continuous – Surge | 50 100 | mA |
| T_A | Operating Temperature Range | 0 to +75 | °C |
| T_{stg} | Storage Temperature Range – Plastic – Ceramic | -55 to +150 -55 to +165 | °C °C |

ELECTRICAL CHARACTERISTICS ($V_{EE} = -5.2\text{ V} \pm 5\%$) (See Note 1.)

| Symbol | Characteristic | 0° | | 25° | | 75° | | Unit |
|-----------|--|-------|-------|-------|-------|-------|--------|---------------|
| | | Min | Max | Min | Max | Min | Max | |
| I_E | Power Supply Current | – | 123 | – | 112 | – | 123 | mA |
| I_{inH} | Input Current High Pins 5,6,7,10,11,12 Pin 9 | – | 425 | – | 265 | – | 265 | μA |
| | | – | 670 | – | 420 | – | 420 | |
| I_{inL} | Input Current Low | 0.5 | – | 0.5 | – | 0.3 | – | μA |
| V_{OH} | High Output Voltage | -1.02 | -0.84 | -0.98 | -0.81 | -0.92 | -0.735 | Vdc |
| V_{OL} | Low Output Voltage | -1.95 | -1.63 | -1.95 | -1.63 | -1.95 | -1.60 | Vdc |
| V_{IH} | High Input Voltage | -1.17 | -0.84 | -1.13 | -0.81 | -1.07 | -0.735 | Vdc |
| V_{IL} | Low Input Voltage | -1.95 | -1.48 | -1.95 | -1.48 | -1.95 | -1.45 | Vdc |

AC PARAMETERS

| | | | | | | | | |
|------------|-------------------|-----|-----|-----|-----|-----|-----|-----|
| t_{pd} | Propagation Delay | 0.9 | 2.1 | 0.9 | 2.2 | 1.0 | 2.4 | ns |
| t_{set} | Set-up Time | 1.5 | – | 1.5 | – | 1.5 | – | ns |
| t_{hold} | Hold Time | 0.9 | – | 0.9 | – | 1.0 | – | ns |
| t_r | Rise Time | 0.5 | 1.8 | 0.5 | 1.9 | 0.5 | 2.0 | ns |
| t_f | Fall Time | 0.5 | 1.8 | 0.5 | 1.9 | 0.5 | 2.0 | ns |
| f_{tog} | Toggle Frequency | 250 | – | 250 | – | 250 | – | MHz |

- 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 50-ohm resistor to -2.0 volts.

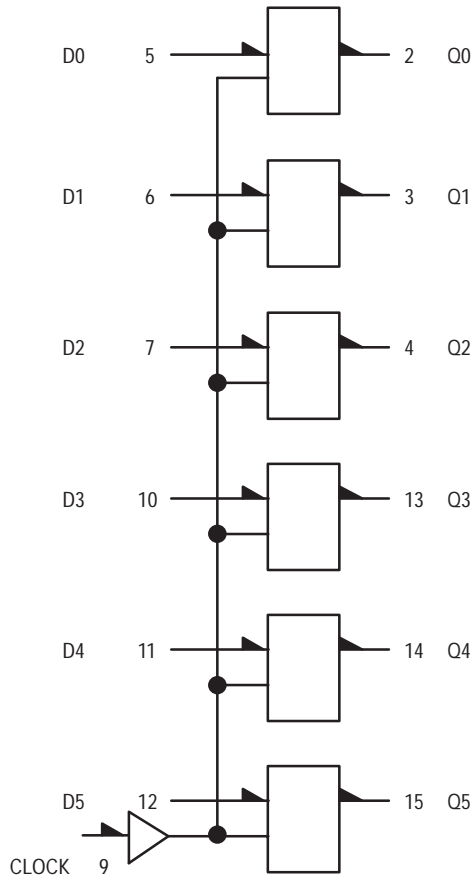
MC10H176

APPLICATION INFORMATION

The MC10H176 contains six high-speed, master slave type "D" flip-flops. Data is entered into the master when the clock is low. Master-to-slave data transfer takes place on the positive-going Clock transition. Thus, outputs may

change only on a positive-going Clock transition. A change in the information present at the data (D) input will not affect the output information any other time due to the master-slave construction of this device.

LOGIC DIAGRAM

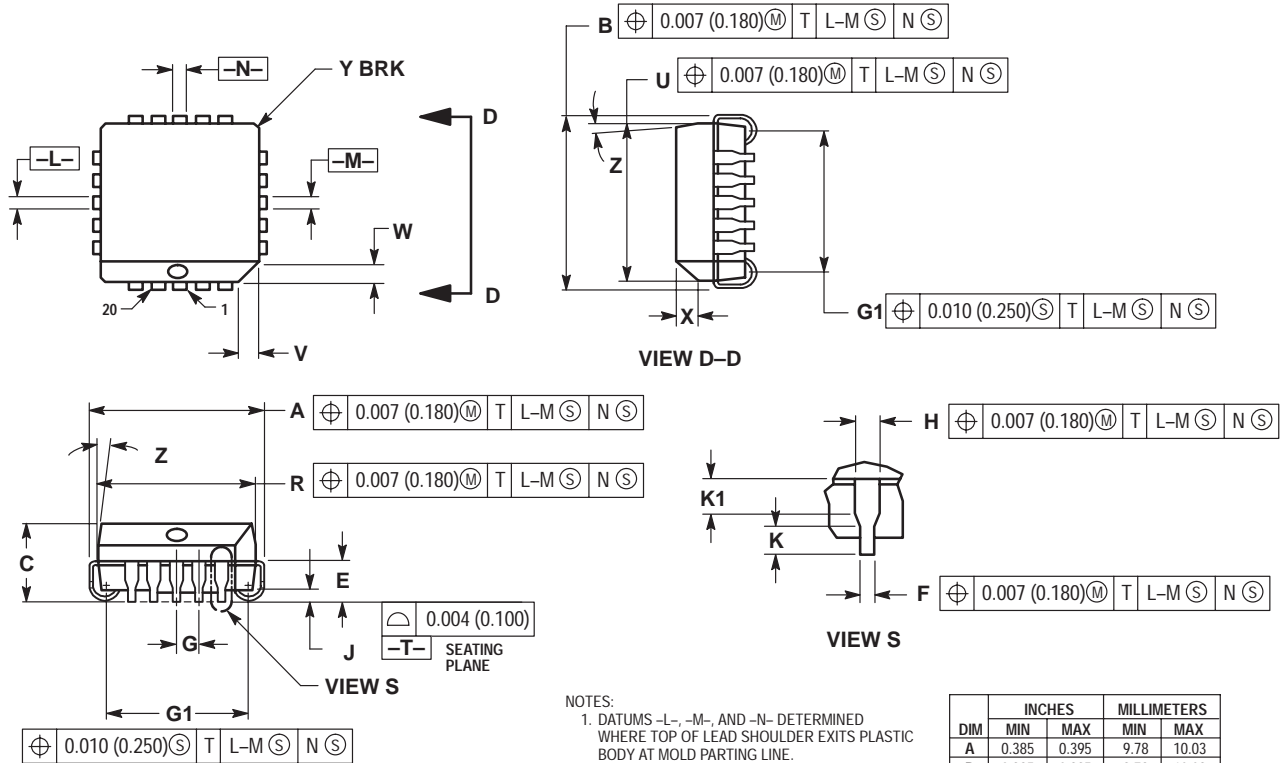


VCC1 = PIN 1
VCC2 = PIN 16
VEE = PIN 8

MC10H176

PACKAGE DIMENSIONS

PLCC-20
FN SUFFIX
PLASTIC PLCC PACKAGE
CASE 775-02
ISSUE C



NOTES:

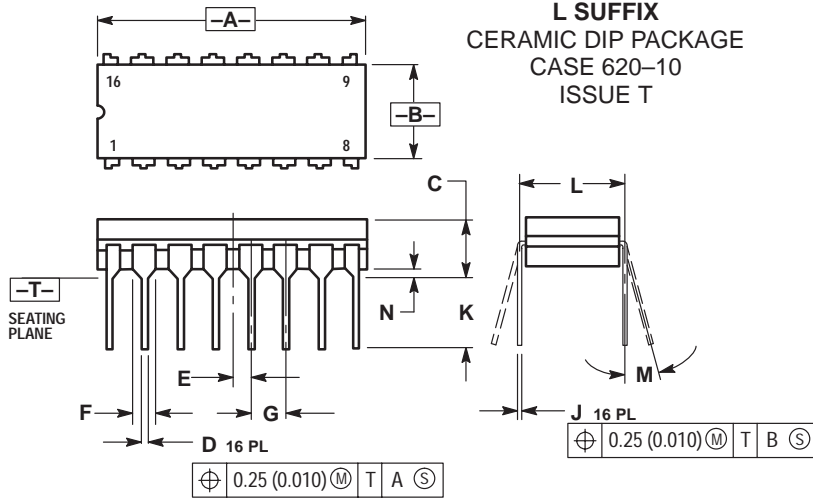
- DATUMS -L-, -M-, AND -N- DETERMINED WHERE TOP OF LEAD SHOULDER EXITS PLASTIC BODY AT MOLD PARTING LINE.
- DIMENSION G1, TRUE POSITION TO BE MEASURED AT DATUM -T-, SEATING PLANE.
- DIMENSIONS R AND U DO NOT INCLUDE MOLD FLASH. ALLOWABLE MOLD FLASH IS 0.010 (0.250) PER SIDE.
- DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
- CONTROLLING DIMENSION: INCH.
- THE PACKAGE TOP MAY BE SMALLER THAN THE PACKAGE BOTTOM BY UP TO 0.012 (0.300). DIMENSIONS R AND U ARE DETERMINED AT THE OUTERMOST EXTREMES OF THE PLASTIC BODY EXCLUSIVE OF MOLD FLASH, TIE BAR BURRS, GATE BURRS AND INTERLEAD FLASH, BUT INCLUDING ANY MISMATCH BETWEEN THE TOP AND BOTTOM OF THE PLASTIC BODY.
- DIMENSION H DOES NOT INCLUDE DAMBAR PROTRUSION OR INTRUSION. THE DAMBAR PROTRUSION(S) SHALL NOT CAUSE THE H DIMENSION TO BE GREATER THAN 0.037 (0.940). THE DAMBAR INTRUSION(S) SHALL NOT CAUSE THE H DIMENSION TO BE SMALLER THAN 0.025 (0.635).

| DIM | INCHES | | MILLIMETERS | |
|-----|-----------|-------|-------------|-------|
| | MIN | MAX | MIN | MAX |
| A | 0.385 | 0.395 | 9.78 | 10.03 |
| B | 0.385 | 0.395 | 9.78 | 10.03 |
| C | 0.165 | 0.180 | 4.20 | 4.57 |
| E | 0.090 | 0.110 | 2.29 | 2.79 |
| F | 0.013 | 0.019 | 0.33 | 0.48 |
| G | 0.050 BSC | | 1.27 BSC | |
| H | 0.026 | 0.032 | 0.66 | 0.81 |
| J | 0.020 | --- | 0.51 | --- |
| K | 0.025 | --- | 0.64 | --- |
| R | 0.350 | 0.356 | 8.89 | 9.04 |
| U | 0.350 | 0.356 | 8.89 | 9.04 |
| V | 0.042 | 0.048 | 1.07 | 1.21 |
| W | 0.042 | 0.048 | 1.07 | 1.21 |
| X | 0.042 | 0.056 | 1.07 | 1.42 |
| Y | --- | 0.020 | --- | 0.50 |
| Z | 2° | 10° | 2° | 10° |
| G1 | 0.310 | 0.330 | 7.88 | 8.38 |
| K1 | 0.040 | --- | 1.02 | --- |

MC10H176

PACKAGE DIMENSIONS

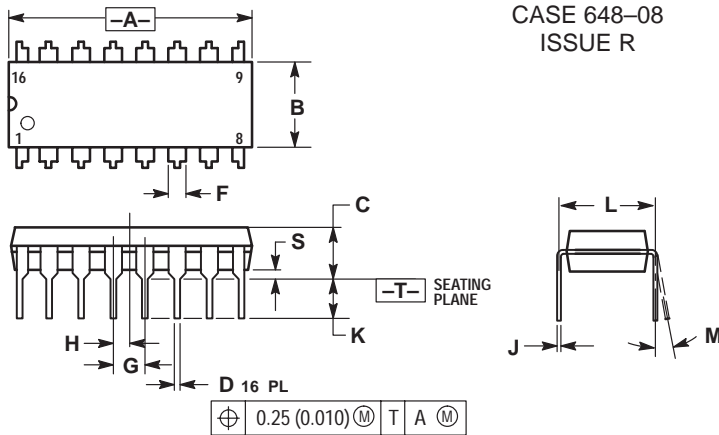
CDIP-16 L SUFFIX CERAMIC DIP PACKAGE CASE 620-10 ISSUE T



- NOTES:
1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
 2. CONTROLLING DIMENSION: INCH.
 3. DIMENSION L TO CENTER OF LEAD WHEN FORMED PARALLEL.
 4. DIMENSION F MAY NARROW TO 0.76 (0.030) WHERE THE LEAD ENTERS THE CERAMIC BODY.

| DIM | INCHES | | MILLIMETERS | |
|-----|-----------|-------|-------------|-------|
| | MIN | MAX | MIN | MAX |
| A | 0.750 | 0.785 | 19.05 | 19.93 |
| B | 0.240 | 0.295 | 6.10 | 7.49 |
| C | --- | 0.200 | --- | 5.08 |
| D | 0.015 | 0.020 | 0.39 | 0.50 |
| E | 0.050 BSC | | 1.27 BSC | |
| F | 0.055 | 0.065 | 1.40 | 1.65 |
| G | 0.100 BSC | | 2.54 BSC | |
| H | 0.008 | 0.015 | 0.21 | 0.38 |
| K | 0.125 | 0.170 | 3.18 | 4.31 |
| L | 0.300 BSC | | 7.62 BSC | |
| M | 0° | 15° | 0° | 15° |
| N | 0.020 | 0.040 | 0.51 | 1.01 |

PDIP-16 P SUFFIX PLASTIC DIP PACKAGE CASE 648-08 ISSUE R



- NOTES:
1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
 2. CONTROLLING DIMENSION: INCH.
 3. DIMENSION L TO CENTER OF LEADS WHEN FORMED PARALLEL.
 4. DIMENSION B DOES NOT INCLUDE MOLD FLASH.
 5. ROUNDED CORNERS OPTIONAL.

| DIM | INCHES | | MILLIMETERS | |
|-----|-----------|-------|-------------|-------|
| | MIN | MAX | MIN | MAX |
| A | 0.740 | 0.770 | 18.80 | 19.55 |
| B | 0.250 | 0.270 | 6.35 | 6.85 |
| C | 0.145 | 0.175 | 3.69 | 4.44 |
| D | 0.015 | 0.021 | 0.39 | 0.53 |
| F | 0.040 | 0.70 | 1.02 | 1.77 |
| G | 0.100 BSC | | 2.54 BSC | |
| H | 0.050 BSC | | 1.27 BSC | |
| J | 0.008 | 0.015 | 0.21 | 0.38 |
| K | 0.110 | 0.130 | 2.80 | 3.30 |
| L | 0.295 | 0.305 | 7.50 | 7.74 |
| M | 0° | 10° | 0° | 10° |
| S | 0.020 | 0.040 | 0.51 | 1.01 |

Notes

Notes

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