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DM74174 Hex/Quad D-Type Flip-Flop with Clear

General Description

These positive-edge triggered flip-flops utilize TTL circuitry to implement D-type flip-flop logic. All have a direct clear input.

Information at the D inputs meeting the setup and hold time requirements is transferred to the Q outputs on the positive-going edge of the clock pulse. Clock triggering occurs at a particular voltage level and is not directly related to the transition time of the positive-going pulse. When the clock input is at either the HIGH or LOW level, the D input signal has no effect at the output.

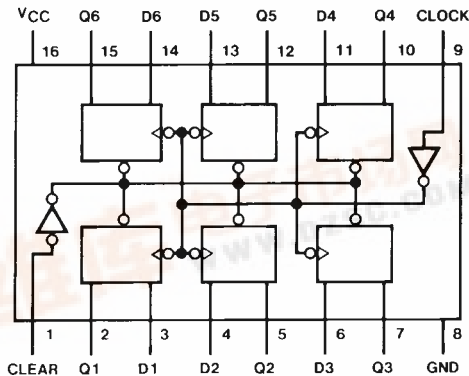
Features

- Contains six flip-flops with single-rail outputs
- Buffered clock and direct clear inputs
- Individual data input to each flip-flop
- Applications include:
 - Buffer/storage registers
 - Shift registers
 - Pattern generators
- Typical clock frequency 40 MHz
- Typical power dissipation per flip-flop 38 mW

Ordering Code:

| Order Number | Package Number | Package Description |
|--------------|----------------|---|
| DM74174 | N16E | 16-Lead Plastic Dual-In-Line Package (PDIP), JEDEC MS-001, 0.300 Wide |

Connection Diagram



Function Table

(Each Flip-Flop)

| Clear | Inputs | | Outputs |
|-------|--------|---|----------------|
| | Clock | D | Q |
| L | X | X | L |
| H | ↑ | H | H |
| H | ↑ | L | L |
| H | L | X | Q ₀ |

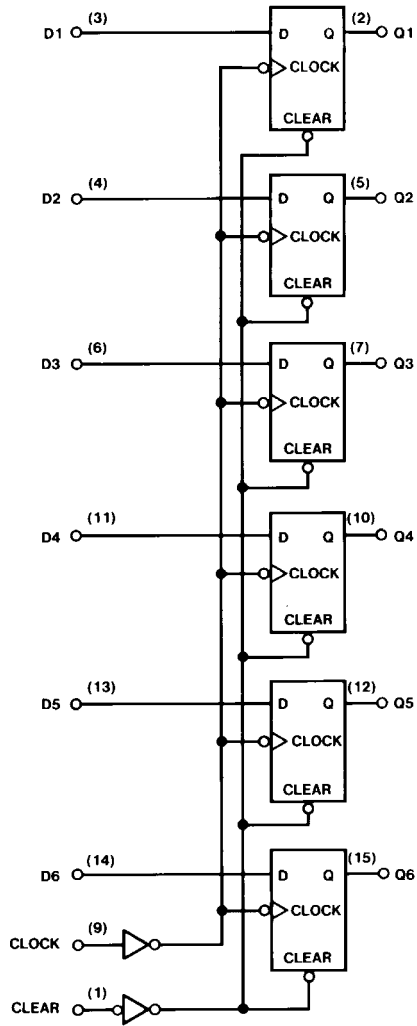
H = HIGH Level (steady state)
L = LOW Level (steady state)
X = Don't Care
↑ = Transition from LOW-to-HIGH level
Q₀ = The level of Q before the indicated steady-state input conditions were established.

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DM74174

Logic Diagram



Absolute Maximum Ratings^(Note 1)

| | |
|--------------------------------------|-----------------|
| Supply Voltage | 7V |
| Input Voltage | 5.5V |
| 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 _{CC} | Supply Voltage | 4.75 | 5 | 5.25 | V |
| V _{IH} | HIGH Level Input Voltage | 2 | | | V |
| V _{IL} | LOW Level Input Voltage | | | 0.8 | V |
| I _{OH} | HIGH Level Output Current | | | -0.8 | mA |
| I _{OL} | LOW Level Output Current | | | 16 | mA |
| f _{CLK} | Clock Frequency (Note 2) | 0 | | 30 | MHz |
| t _W | Pulse Width (Note 2) | Clock LOW | 25 | | ns |
| | | Clock HIGH | 10 | | |
| | | Clear | 20 | | |
| t _{SU} | Data Setup Time (Note 2) | 20 | | | ns |
| t _H | Data Hold Time (Note 2) | 0 | | | ns |
| t _{REL} | Clear Release Time (Note 2) | 30 | | | ns |
| T _A | Free Air Operating Temperature | 0 | | 70 | °C |

Note 2: T_A = 25°C and V_{CC} = 5V.

Electrical Characteristics

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

| Symbol | Parameter | Conditions | Min | Typ (Note 3) | Max | Units |
|-----------------|-----------------------------------|--|-----|-----------------|------|-------|
| V _I | Input Clamp Voltage | V _{CC} = Min, I _I = -12 mA | | | -1.5 | V |
| V _{OH} | HIGH Level Output Voltage | V _{CC} = Min, I _{OH} = Max V _{IL} = Max, V _{IH} = Min | 2.4 | | | V |
| V _{OL} | LOW Level Output Voltage | V _{CC} = Min, I _{OL} = Max V _{IH} = Min, V _{IL} = Max | | | 0.4 | V |
| I _I | Input Current @ Max Input Voltage | V _{CC} = Max, V _I = 5.5V | | | 1 | mA |
| I _{IH} | HIGH Level Input Current | V _{CC} = Max, V _I = 2.4V | | | 40 | μA |
| I _{IL} | LOW Level Input Current | V _{CC} = Max, V _I = 0.4V | | | -1.6 | mA |
| I _{OS} | Short Circuit Output Current | V _{CC} = Max (Note 4) | -18 | | -57 | mA |
| I _{CC} | Supply Current | V _{CC} = Max (Note 5) | | 45 | 65 | mA |

Note 3: All typicals are at V_{CC} = 5V, T_A = 25°C.

Note 4: Not more than one output should be shorted at a time.

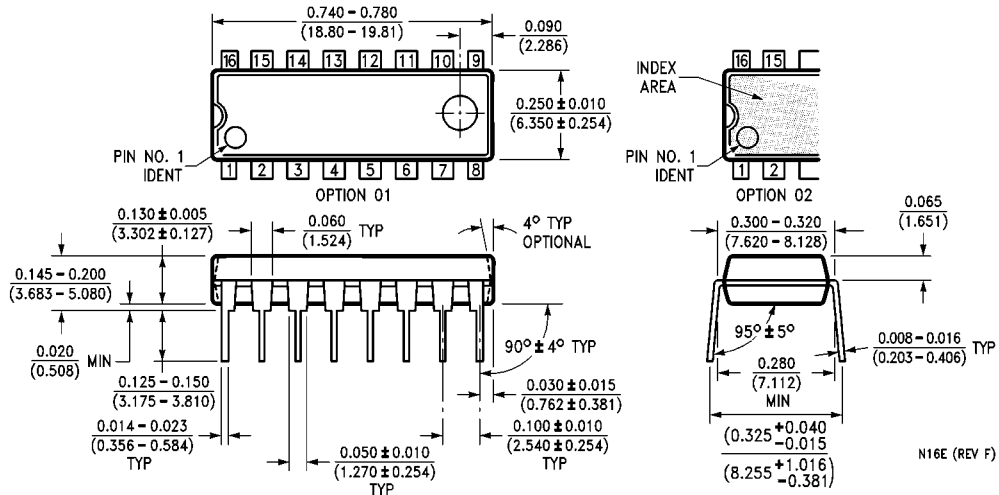
Note 5: With all outputs open and all DATA and CLEAR inputs at 4.5V, I_{CC} is measured after a momentary ground, then 4.5V applied to the CLOCK input.

Switching Characteristics

at V_{CC} = 5V and T_A = 25°C

| Symbol | Parameter | From (Input) To (Output) | R _L = 400Ω, C _L = 15 pF | | Units |
|------------------|--|-----------------------------|---|-----|-------|
| | | | Min | Max | |
| f _{MAX} | Maximum Clock Frequency | | 30 | | MHz |
| t _{PLH} | Propagation Delay Time LOW-to-HIGH Level Output | Clock to Any Q | | 25 | ns |
| t _{PHL} | Propagation Delay Time HIGH-to-LOW Level Output | Clock to Any Q | | 25 | ns |
| t _{PHL} | Propagation Delay Time HIGH-to-LOW Level Output | Clear to Any Q | | 40 | ns |

Physical Dimensions inches (millimeters) unless otherwise noted



**16-Lead Plastic Dual-In-Line Package (PDIP), JEDEC MS-001, 0.300 Wide
Package Number N16E**

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