

DM74LS574

Octal D-Type Flip-Flop with 3-STATE Outputs

General Description

The DM74LS574 is a high speed low power octal flip-flop with a buffered common Clock (CP) and a buffered common Output Enable (\overline{OE}). The information presented to the D inputs is stored in the flip-flops on the LOW-to-HIGH Clock (CP) transition.

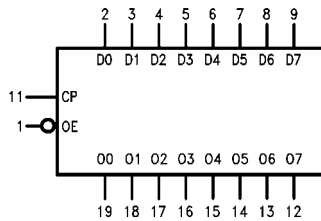
This device is functionally identical to the DM74LS374 except for the pinouts.

Ordering Code:

| Order Number | Package Number | Package Description |
|--------------|----------------|---|
| DM74LS574WM | M20B | 20-Lead Small Outline Integrated Circuit (SOIC), JEDEC MS-013, 0.300 Wide |
| DM74LS574N | N20A | 20-Lead Plastic Dual-In-Line Package (PDIP), JEDEC MS-001, 0.300 Wide |

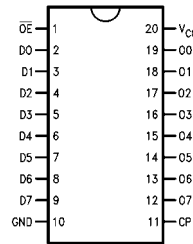
Devices also available in Tape and Reel. Specify by appending the suffix letter "X" to the ordering code.

Logic Symbol



V_{CC} = Pin 20
GND = Pin 10

Connection Diagram



Truth Table

| Inputs | | Outputs | |
|--------|----|---------|----|
| Dn | CP | OE | On |
| H | ↗ | L | H |
| L | ↗ | L | L |
| X | X | H | Z |

H = HIGH Voltage Level
L = LOW Voltage Level
X = Immaterial
Z = High Impedance
↗ = HIGH-to-LOW Clock (CP) transition

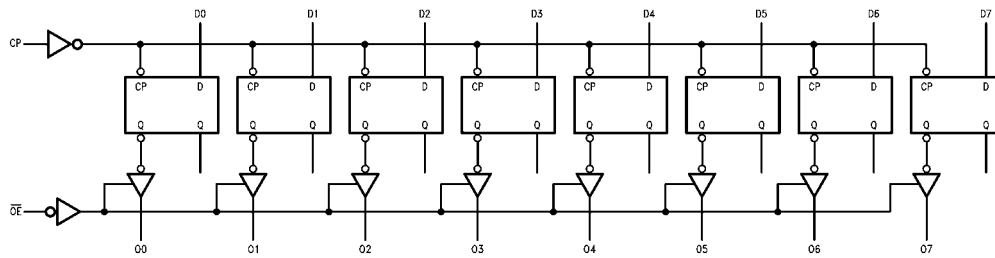
DM74LS574 Octal D-Type Flip-Flop with 3-STATE Outputs

Functional Description

The DM74LS574 consists of eight edge-triggered flip-flops with individual D-type inputs and 3-STATE true outputs. The buffered clock and buffered Outputs Enable are common to all flip-flops. The eight flip-flops will store the state of their individual D inputs that meet the setup and hold times requirements on the LOW-to-HIGH Clock (CP) tran-

sition. With the Output Enable (\overline{OE}) LOW, the contents of the eight flip-flops are available at the outputs. When the \overline{OE} is HIGH, the outputs go to the high impedance state. Operation of the \overline{OE} input does not affect the state of the flip-flops.

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 _{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 | | | -2.6 | mA |
| I _{OL} | LOW Level Output Current | | | 24 | mA |
| T _A | Free Air Operating Temperature | 0 | | 70 | °C |
| t _S (H) | Setup Time HIGH or LOW | 20 | | | ns |
| t _S (L) | Dn to CP | 20 | | | ns |
| t _H (H) | Hold Time HIGH or LOW | 0 | | | ns |
| t _H (L) | Dn to CP | 0 | | | ns |
| t _W (H) | CP Pulse Width | 15 | | | ns |
| t _W (L) | HIGH or LOW | 15 | | | ns |

Electrical Characteristics

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

| Symbol | Parameter | Conditions | Min | Typ (Note 2) | Max | Units |
|------------------|---|---|-----|-----------------|------------|-------|
| V _I | Input Clamp Voltage | V _{CC} = Min, I _I = -18 mA | | | -1.5 | V |
| V _{OH} | HIGH Level Output Voltage | V _{CC} = Min, I _{OH} = Max, V _{IL} = Max, V _{IH} = Min | 2.4 | 3.3 | | V |
| V _{OL} | LOW Level Output Voltage | V _{CC} = Min, I _{OL} = Max, V _{IL} = Max, V _{IH} = Min I _{OL} = 12 mA, V _{CC} = Min | | 0.35 0.25 | 0.5 0.4 | V |
| I _I | Input Current @ Max Input Voltage | V _{CC} = Max, V _I = 7V | | | 0.1 | mA |
| I _{IH} | HIGH Level Input Current | V _{CC} = Max, V _I = 2.7V | | | 20 | μA |
| I _{IL} | LOW Level Input Current | V _{CC} = Max, V _I = 0.4V | | | -400 | μA |
| I _{OZH} | OFF-State Output Current with HIGH Level Output Voltage Applied | V _{CC} = Max, V _O = 2.4V V _{IH} = Min, V _{IL} = Max | | | 20 | μA |
| I _{OZL} | OFF-State Output Current with LOW Level Output Voltage Applied | V _{CC} = Max, V _O = 0.4V V _{IH} = Min, V _{IL} = Max | | | -20 | μA |
| I _{OS} | Short Circuit Output Current (Note 3) | V _{CC} = Max | -30 | | -130 | mA |
| I _{CC} | Supply Current | V _{CC} = Max (Note 4) | | | 45 | mA |

Note 2: All typicals are at V_{CC} = 5V, T_A = 25°C.

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

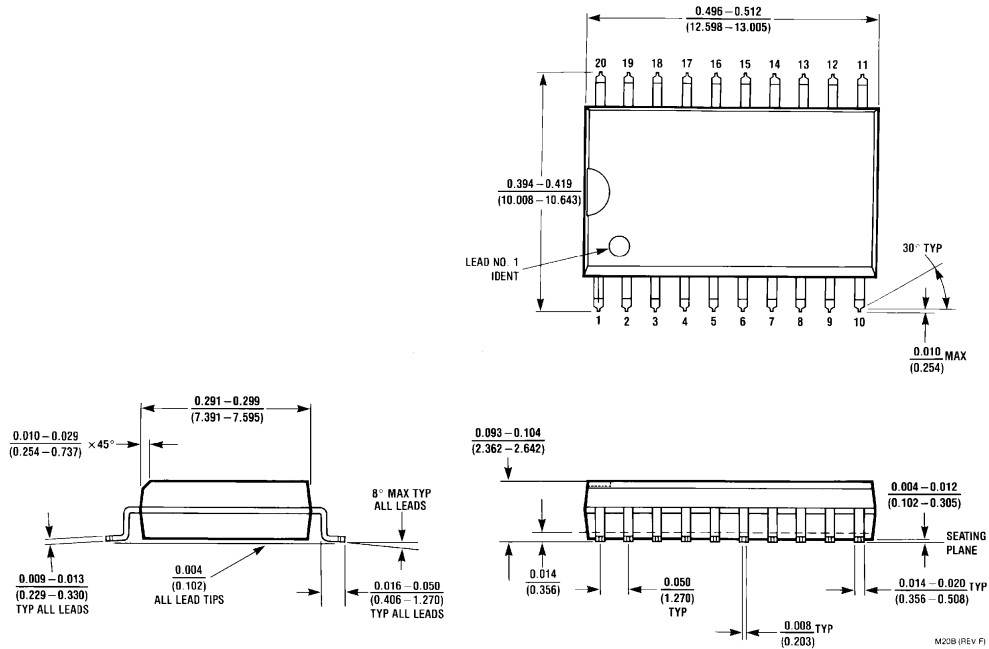
Note 4: I_{CC} is measured with the DATA inputs grounded and the OUTPUT CONTROLS at 4.5V.

Switching Characteristics

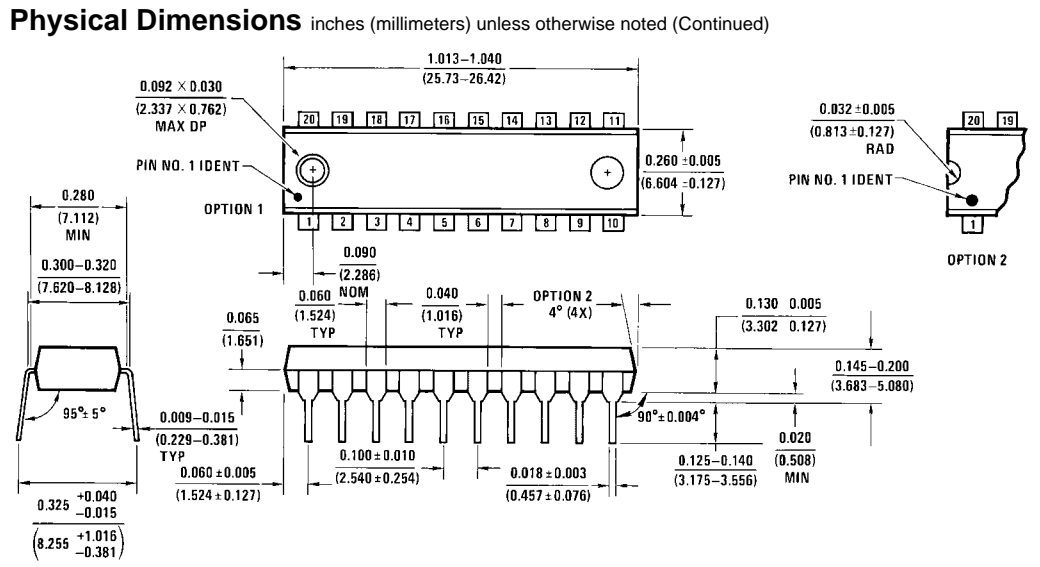
$V_{CC} = +5.0V, T_A = +25^\circ C$

| Symbol | Parameter | $R_L = 2\text{ k}\Omega, C_L = 45\text{ pF}$ | | Units |
|-----------|-------------------------|--|-----|-------|
| | | Min | Max | |
| f_{MAX} | Maximum Clock Frequency | 35 | | MHz |
| t_{PLH} | Propagation Delay | | 28 | ns |
| t_{PHL} | CP to On | | 28 | |
| t_{PZH} | Output Enable Time | | 28 | ns |
| t_{PZL} | | | 28 | |
| t_{PHZ} | Output Disable Time | | 20 | ns |
| t_{PLZ} | | | 25 | |

Physical Dimensions inches (millimeters) unless otherwise noted



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



N20A (REV G)

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