

DM74LS534

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

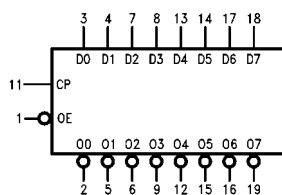
General Description

The DM74LS534 is a high speed, low power octal D-type flip-flop featuring separate D-type inputs for each flip-flop and 3-STATE outputs for bus oriented applications. A buffered Clock (CP) and Output Enable (\overline{OE}) is common to all flip-flops. The DM74LS534 is the same as the DM74LS374 except that the outputs are inverted.

Ordering Code:

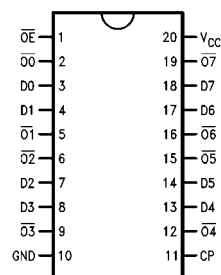
| Order Number | Package Number | Package Description |
|--------------|----------------|---|
| DM74LS534N | N20A | 20-Lead Plastic Dual-In-Line Package (PDIP), JEDEC MS-001, 0.300 Wide |

Logic Symbol



V_{CC} = Pin 20
GND = Pin 10

Connection Diagram



Pin Descriptions

| Pin Name | Description |
|-----------------------------------|--|
| D0–D7 | Data Inputs |
| CP | Clock Pulse Input (Active Rising Edge) |
| \overline{OE} | 3-STATE Output Enable Input (Active LOW) |
| $\overline{O0}$ – $\overline{O7}$ | Complementary 3-STATE Outputs |

Truth Table

| Inputs | | Outputs | |
|--------|----|---------|-------|
| D_n | CP | OE | O_n |
| H | ↗ | L | L |
| L | ↗ | L | H |
| X | X | H | Z |

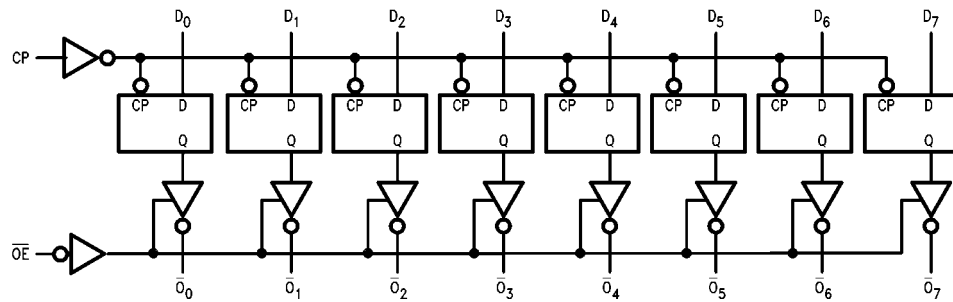
H = HIGH Voltage Level
L = LOW Voltage Level
X = Immaterial
Z = High Impedance
↗ = LOW-to-HIGH Clock (CP) transistion

Functional Description

The DM74LS534 consists of eight edge-triggered flip-flops with individual D-type inputs and 3-STATE true outputs. The buffered clock and buffered Output 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 |
| V _{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) | D _n to \overline{CP} | 20 | | | ns |
| t _H (H) | Hold Time HIGH or LOW | 0 | | | ns |
| t _H (L) | D _n to \overline{CP} | 0 | | | ns |
| t _W (H) | CP Pulse Width HIGH or LOW | 15 | | | ns |
| t _W (L) | | 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 = 0.5V | | | –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 | V _{CC} = Max (Note 3) | –20 | | –100 | 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.

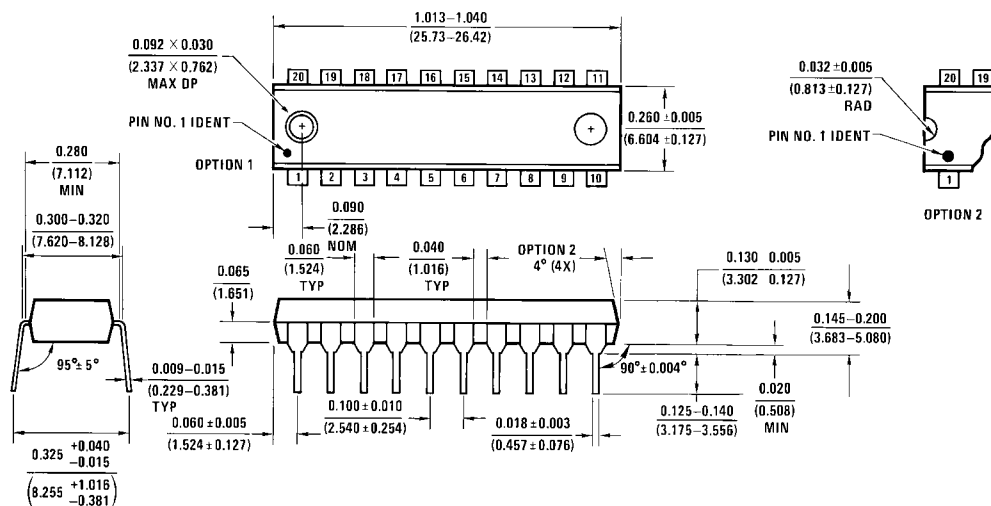
Note 3: Not more than one output should be shorted at a time, and the duration should not exceed one second.

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 CP to Q_n | | 28 | ns |
| t_{PHL} | | | 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



N20A (REV G)

20-Lead Plastic Dual-In-Line Package (PDIP), JEDEC MS-001, 0.300 Wide
Package Number N20A

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