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SEMICONDUCTOR™

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## DM74LS534 Octal D-Type Flip-Flop with 3-STATE Outputs

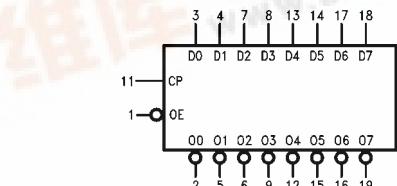
### General Description

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 (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

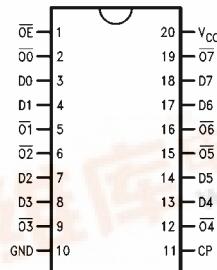
### Logic Symbol



V<sub>CC</sub> = Pin 20

GND = Pin 10

### Connection Diagram



### Pin Descriptions

Pin Name	Description
D0-D7	Data Inputs
CP	Clock Pulse Input (Active Rising Edge)
OE	3-STATE Output Enable Input (Active LOW)
00-07	Complementary 3-STATE Outputs

### Truth Table

Inputs		Outputs	
D <sub>n</sub>	CP	OE	O <sub>n</sub>
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) transition

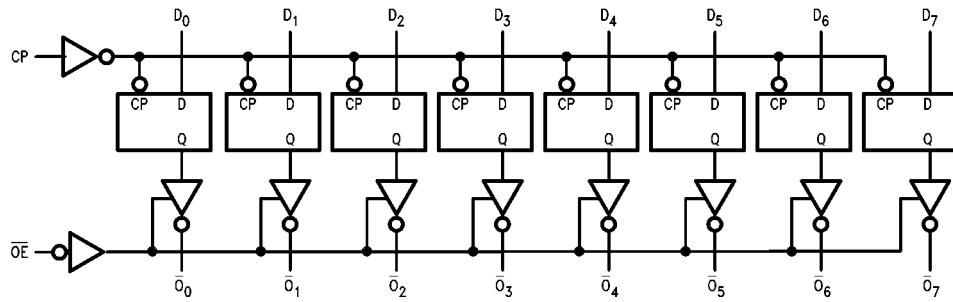
### DM74LS534 Octal D-Type Flip-Flop with 3-STATE Outputs

## 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) transi-

sition. With the Output Enable ( $\overline{OE}$ ) LOW, the contents of the eight flip-flops are available at the outputs. When the  $OE$  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) $t_S$ (L)	Setup Time HIGH or LOW $D_n$ to $\overline{CP}$	20 20			ns
$t_H$ (H) $t_H$ (L)	Hold Time HIGH or LOW $D_n$ to $\overline{CP}$	0 0			ns
$t_W$ (H) $t_W$ (L)	CP Pulse Width HIGH or LOW	15 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	$V_{CC} = \text{Min}$ , $I_I = -18 \text{ mA}$			-1.5	V
$V_{OH}$	HIGH Level Output Voltage	$V_{CC} = \text{Min}$ , $I_{OH} = \text{Max}$ $V_{IL} = \text{Max}$ , $V_{IH} = \text{Min}$	2.4	3.3		V
$V_{OL}$	LOW Level Output Voltage	$V_{CC} = \text{Min}$ , $I_{OL} = \text{Max}$ $V_{IL} = \text{Max}$ , $V_{IH} = \text{Min}$ $I_{OL} = 12 \text{ mA}$ , $V_{CC} = \text{Min}$		0.35 0.25	0.5 0.4	V
$I_I$	Input Current @ Max Input Voltage	$V_{CC} = \text{Max}$ , $V_I = 7V$			0.1	mA
$I_{IH}$	HIGH Level Input Current	$V_{CC} = \text{Max}$ , $V_I = 2.7V$			20	μA
$I_{IL}$	LOW Level Input Current	$V_{CC} = \text{Max}$ , $V_I = 0.5V$			-400	μA
$I_{OZH}$	Off-State Output Current with HIGH Level Output Voltage Applied	$V_{CC} = \text{Max}$ , $V_O = 2.4V$ $V_{IH} = \text{Min}$ , $V_{IL} = \text{Max}$			20	μA
$I_{OZL}$	Off-State Output Current with LOW Level Output Voltage Applied	$V_{CC} = \text{Max}$ , $V_O = 0.4V$ $V_{IH} = \text{Min}$ , $V_{IL} = \text{Max}$			-20	μA
$I_{OS}$	Short Circuit Output Current	$V_{CC} = \text{Max}$ (Note 3)	-20		-100	mA
$I_{CC}$	Supply Current	$V_{CC} = \text{Max}$ (Note 4)		45		mA

**Note 2:** All typicals are at  $V_{CC} = 5V$ ,  $T_A = 25^\circ\text{C}$ .

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

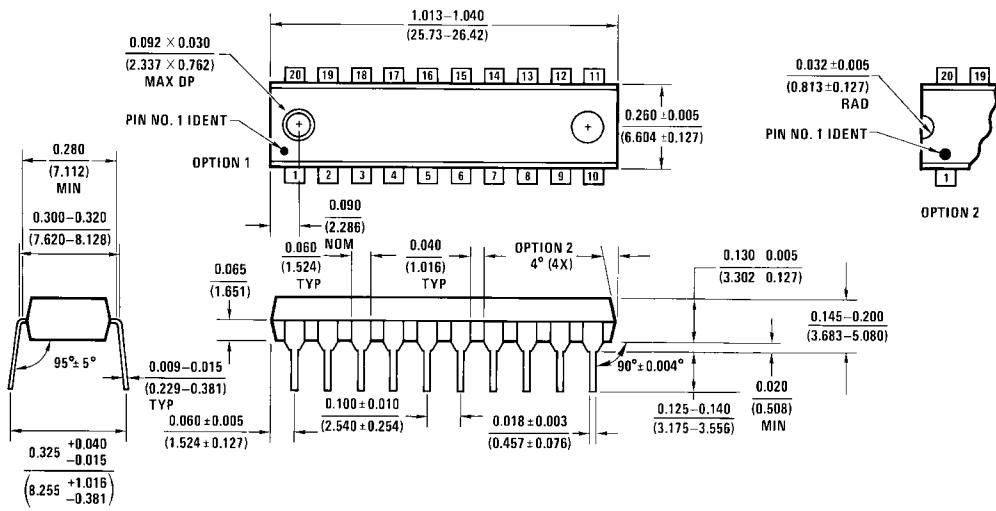
**Note 4:**  $I_{CC}$  is measured with the DATA inputs grounded and the OUTPUT CONTROLS at 4.5V.

**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	
$t_{PHL}$			28	ns
$t_{PZH}$	Output Enable Time		28	
$t_{PZL}$			28	ns
$t_{PHZ}$	Output Disable Time		20	
$t_{PLZ}$			25	ns

## DM74LS534 Octal D-Type Flip-Flop with 3-STATE Outputs

## **Physical Dimensions** inches (millimeters) unless otherwise noted



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

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