National Semiconductor

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DM74LS564
Octal D-Type Flip-Flop with TRI-STATE® Outputs

General Description

The 'LS564 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

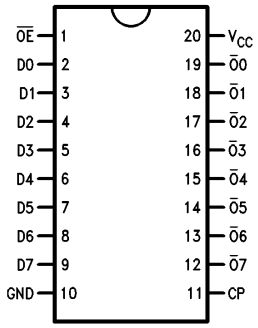
This device is functionally identical to the 'LS574, but has inverted outputs. For complete discussions of operations, truth tables, AC and DC electrical specifications, refer to the 'LS374 data sheet.

Features

- Inputs and outputs on opposite sides of package allowing easy interface with microprocessors
- Useful as input or output port for microprocessors
- Functionally identical to 'LS574
- Input clamp diodes limit high speed termination effects
- Fully TTL and CMOS compatible

Connection Diagram

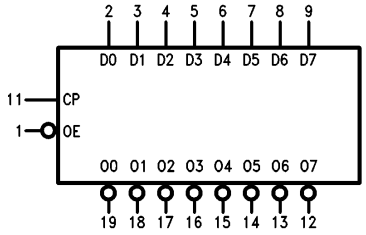
Dual-In-Line Package



TL/F/10191–1

Order Number DM74LS564WM or DM74LS564N
See NS Package Number M20B or N20A

Logic Symbol



TL/F/10191–2

V_{CC} = Pin 20
GND = Pin 10

Pin Names	Description
D0–D7	Data Inputs
CP	Clock Pulse Input (Active Rising Edge)
$\overline{OE}$	TRI-STATE® Output Enable Input (Active LOW)
$\overline{O}0$–$\overline{O}7$	TRI-STATE Outputs

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Absolute Maximum Ratings (Note)

If Military/Aerospace specified devices are required, please contact the National Semiconductor Sales Office/Distributors for availability and specifications.

Supply Voltage	7V
Input Voltage	7V
Operating Free Air Temperature Range	
DM74LS	0°C to +70°C
Storage Temperature Range	−65°C to +150°C

Note: *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" table 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	DM74LS564			Units
		Min	Nom	Max	
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

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

Symbol	Parameter	Conditions	Min	Typ (Note 1)	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	2.4	3.4		V
V_{OL}	Low Level Output Voltage	V_{CC} = Min, I_{OL} = Max, V_{IH} = Min		0.35	0.5	V
		I_{OL} = 12 mA, V_{CC} = Min		0.25	0.4	
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			−0.4	mA
I_{OS}	Short Circuit Output Current	V_{CC} = Max (Note 2)	−30		−130	mA
I_{CC}	Supply Current	V_{CC} = Max			60	mA
I_{OZH}	TRI-STATE Output OFF Current HIGH	V_{CC} = Max, V_O = 2.4V			20	μA
I_{OZL}	TRI-STATE Output OFF Current LOW	V_{CC} = Max, V_O = 0.4V			−20	μA

Note 1: All typicals are at V_{CC} = 5V, T_A = 25°C.

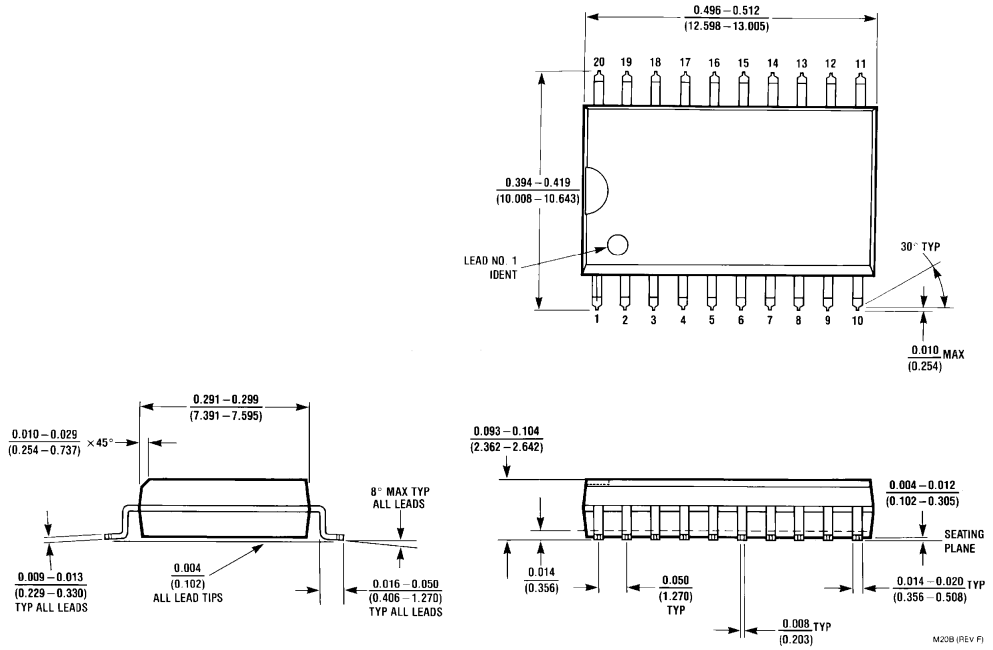
Note 2: Not more than one output should be shorted at a time, and the duration should not exceed one second.

Switching Characteristics

$V_{CC} = +5.0V, T_A = +25°C$

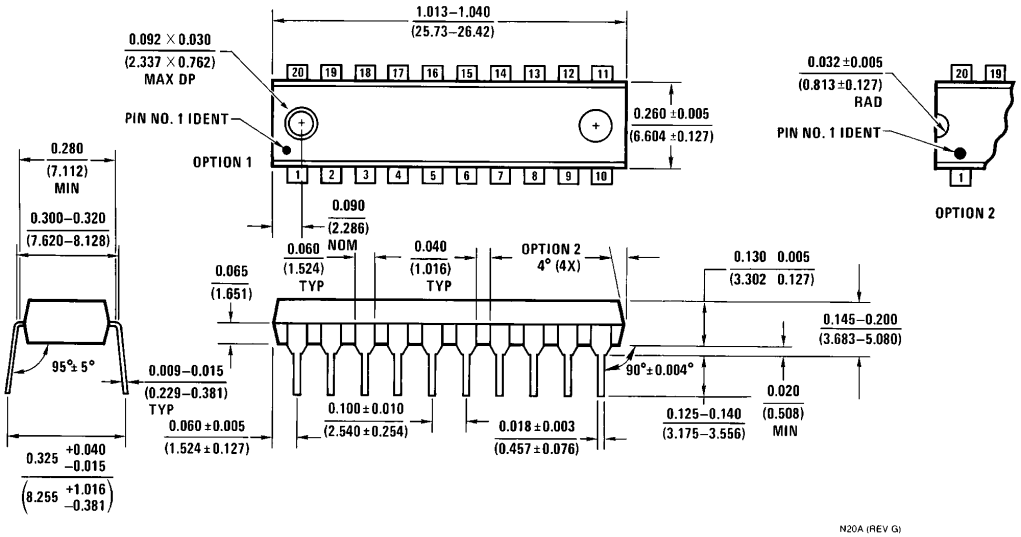
Symbol	Parameter	Min	Max	Units
t_{PLH} t_{PHL}	Propagation Delay CP to $\overline{O}n$		28 28	ns
t_{PZH} t_{PZL}	Enable Time $\overline{OE}$ to $\overline{O}n$		28 28	ns
t_{PHZ} t_{PLZ}	Enable Time $\overline{OE}$ to $\overline{O}n$		20 25	ns
t_s	Setup Time Dn to CP	20		ns
t_h	Hold Time Dn to CP	5		ns
t_w (H) t_w (L)	Pulse Width (HIGH/LOW) CP	20 15		ns

Physical Dimensions inches (millimeters)



20-Lead Wide Small Outline Molded Package (M)
Order Number DM74LS564WM
NS Package Number M20B

Physical Dimensions inches (millimeters) (Continued)



20-Lead Molded Dual-In-Line Package (N)
Order Number DM74LS564N
NS Package Number N20A

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2. A critical component is any component of a life support device or system whose failure to perform can be reasonably expected to cause the failure of the life support device or system, or to affect its safety or effectiveness.

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