

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

### General Description

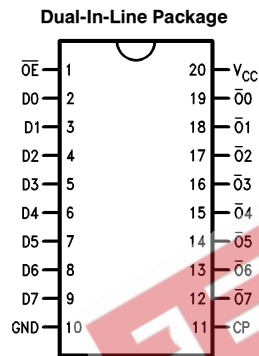
The 'LS564 is a high speed low power octal flip-flop with a buffered common Clock (CP) and a buffered common Output Enable ( $\overline{OE}$ ). The information presented to the D inputs is stored in the flip-flops on the LOW-to-HIGH Clock (CP) transition

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

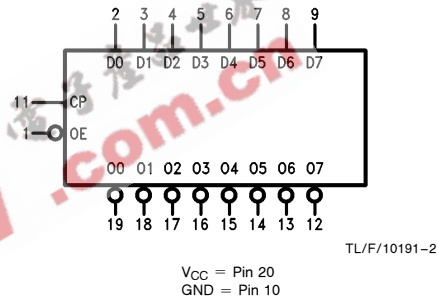
### Connection Diagram



TL/F/10191-1

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

### Logic Symbol



Pin Names	Description
D0-D7	Data Inputs
CP	Clock Pulse Input (Active Rising Edge)
$\overline{OE}$	TRI-STATE® Output Enable Input (Active LOW)
$\overline{O0}-\overline{O7}$	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 <sub>CC</sub>	Supply Voltage	4.75	5	5.25	V
V <sub>IH</sub>	High Level Input Voltage	2			V
V <sub>IL</sub>	Low Level Input Voltage			0.8	V
I <sub>OH</sub>	High Level Output Current			-2.6	mA
I <sub>OL</sub>	Low Level Output Current			24	mA
T <sub>A</sub>	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 <sub>I</sub>	Input Clamp Voltage	V <sub>CC</sub> = Min, I <sub>I</sub> = -18 mA			-1.5	V
V <sub>OH</sub>	High Level Output Voltage	V <sub>CC</sub> = Min, I <sub>OH</sub> = Max, V <sub>IL</sub> = Max	2.4	3.4		V
V <sub>OL</sub>	Low Level Output Voltage	V <sub>CC</sub> = Min, I <sub>OL</sub> = Max, V <sub>IH</sub> = Min		0.35	0.5	V
		I <sub>OL</sub> = 12 mA, V <sub>CC</sub> = Min		0.25	0.4	
I <sub>I</sub>	Input Current @ Max Input Voltage	V <sub>CC</sub> = Max, V <sub>I</sub> = 7V			0.1	mA
I <sub>IH</sub>	High Level Input Current	V <sub>CC</sub> = Max, V <sub>I</sub> = 2.7V			20	μA
I <sub>IL</sub>	Low Level Input Current	V <sub>CC</sub> = Max, V <sub>I</sub> = 0.4V			-0.4	mA
I <sub>OS</sub>	Short Circuit Output Current	V <sub>CC</sub> = Max (Note 2)	-30		-130	mA
I <sub>CC</sub>	Supply Current	V <sub>CC</sub> = Max			60	mA
I <sub>OZH</sub>	TRI-STATE Output OFF Current HIGH	V <sub>CC</sub> = Max, V <sub>O</sub> = 2.4V			20	μA
I <sub>OZL</sub>	TRI-STATE Output OFF Current LOW	V <sub>CC</sub> = Max, V <sub>O</sub> = 0.4V			-20	μA

Note 1: All typicals are at V<sub>CC</sub> = 5V, T<sub>A</sub> = 25°C.

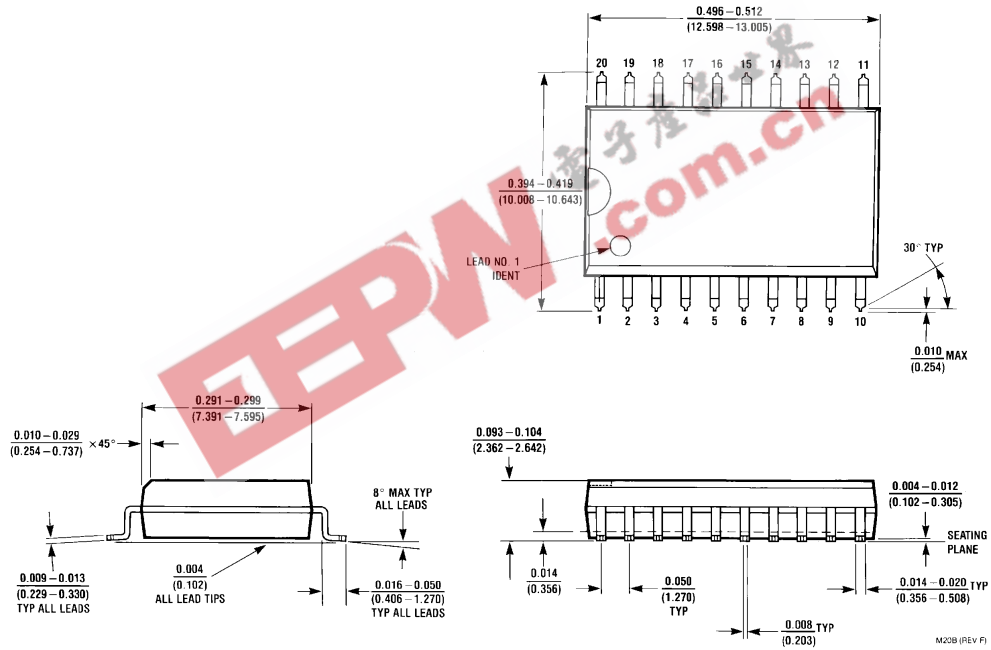
Note 2: Not more than one output should be shorted at a time, and the duration should not exceed one second.

## Switching Characteristics

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

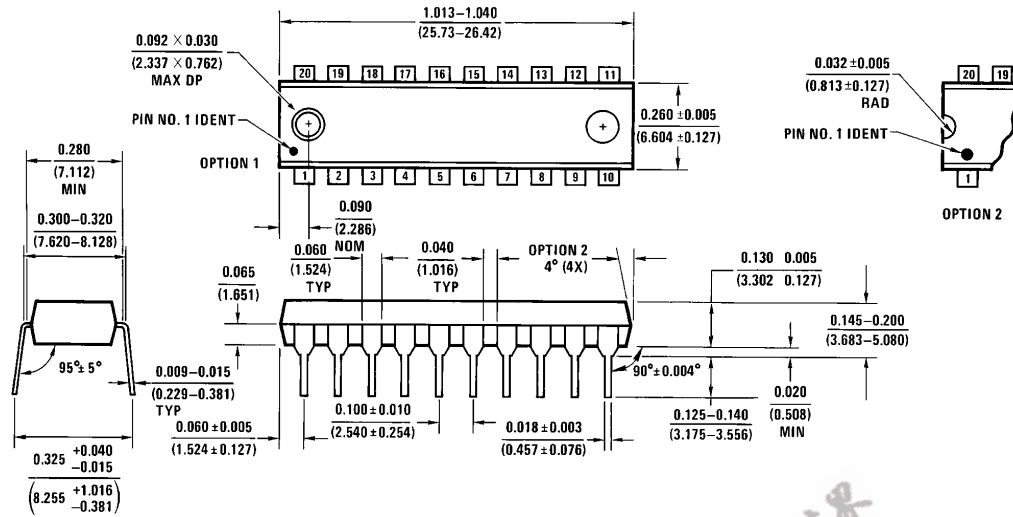
Symbol	Parameter	Min	Max	Units
$t_{PLH}$	Propagation Delay CP to $\bar{O}n$		28	ns
$t_{PHL}$	Propagation Delay CP to $\bar{O}n$		28	ns
$t_{PZH}$	Enable Time $\bar{O}E$ to $\bar{O}n$		28	ns
$t_{PZL}$	Enable Time $\bar{O}E$ to $\bar{O}n$		28	ns
$t_{PHZ}$	Enable Time $\bar{O}E$ to $\bar{O}n$		20	ns
$t_{PLZ}$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

## Physical Dimensions inches (millimeters)

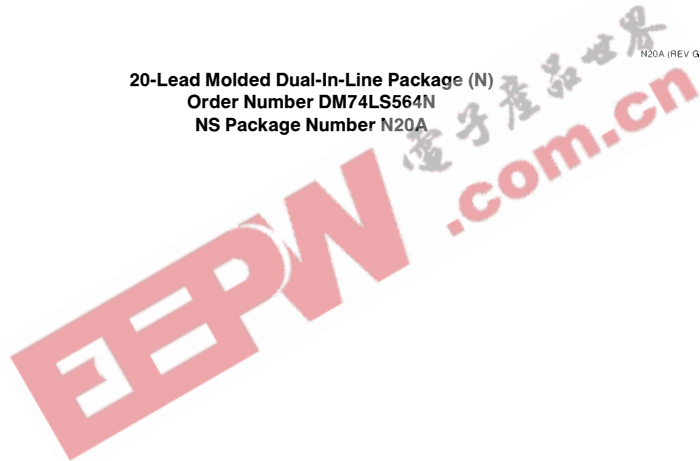


20-Lead Wide Small Outline Molded Package (M)  
Order Number DM74LS564WM  
NS Package Number M20B

**Physical Dimensions** inches (millimeters) (Continued)



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



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