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FAIRCHILD SEMICONDUCTOR™

DM74LS533
Octal Transparent Latch with 3-STATE Outputs

General Description

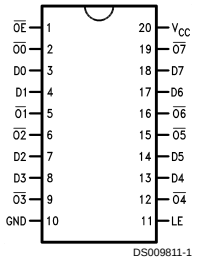
The 'LS533 consists of eight latches with 3-STATE outputs for bus organized system applications. The flip-flops appear transparent to the data when Latch Enable (LE) is HIGH. When LE is LOW, the data that meets the setup times is latched. Data appears on the bus when the Output Enable ($\overline{OE}$) is LOW. When $\overline{OE}$ is HIGH the bus output is in the high impedance state. The 'LS533 is the same as the 'LS373, except that the outputs are inverted. For detailed specifications please see the 'LS373 data sheet, but note that the propagation delays from data to output are 5.0 ns longer for the 'LS533 than for the 'LS373.

Features

- Eight latches in a single package
- 3-STATE outputs for bus interfacing

Connection Diagram

Dual-In-Line Package



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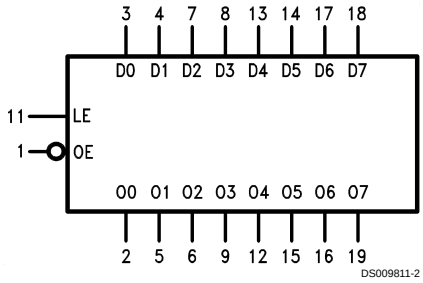
Order Number DM74LS533WM or DM74LS533N
See Package Number M20B or N20A

Logic Symbol



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V_{CC} = Pin 20
GND = Pin 10

Pin Names	Description
D0, D7	Data Inputs
LE	Latch Enable Input (Active HIGH)
$\overline{OE}$	Output Enable Input (Active LOW)
$\overline{O}$0–$\overline{O}$7	Complementary 3-STATE Outputs

Function Table

$\overline{OUTPUT}$ Enable	Latch Enable	D	Output $\overline{O}$
L	H	H	L
L	H	L	H
L	L	X	$\overline{Q}_O$
H	X	X	Z

L = Low State, H = High State, X = Don't Care
Z = High Impedance State
$\overline{Q}_O$ = Previous Condition of $\overline{O}$

Absolute Maximum Ratings (Note 1)

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

Recommended Operating Conditions

Symbol	Parameter	DM74LS533			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

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" table are not guaranteed at the absolute maximum ratings. The "Recommended Operating Conditions" table will define the conditions for actual device operation.*

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	DM74	2.4	3.4		V
V_{OL}	Low Level Output Voltage	V_{CC} = Min, I_{OL} = Max, V_{IH} = Min	DM74		0.35	0.5	V
		I_{OL} = 12 mA, V_{CC} = Min	DM74			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 3)	DM74	−20		−100	mA
I_{CCZ}	Supply Current	V_{CC} = Max				46	mA
I_{OZL}	3-STATE Output Off Current LOW	V_{CC} = V_{CCH} V_{OZL} = 0.4V				−20.0	µA
I_{OZH}	3-STATE Output Off Current HIGH	V_{CC} = V_{CCH} V_{OZH} = 2.7V				20.0	µA

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.

Switching Characteristics

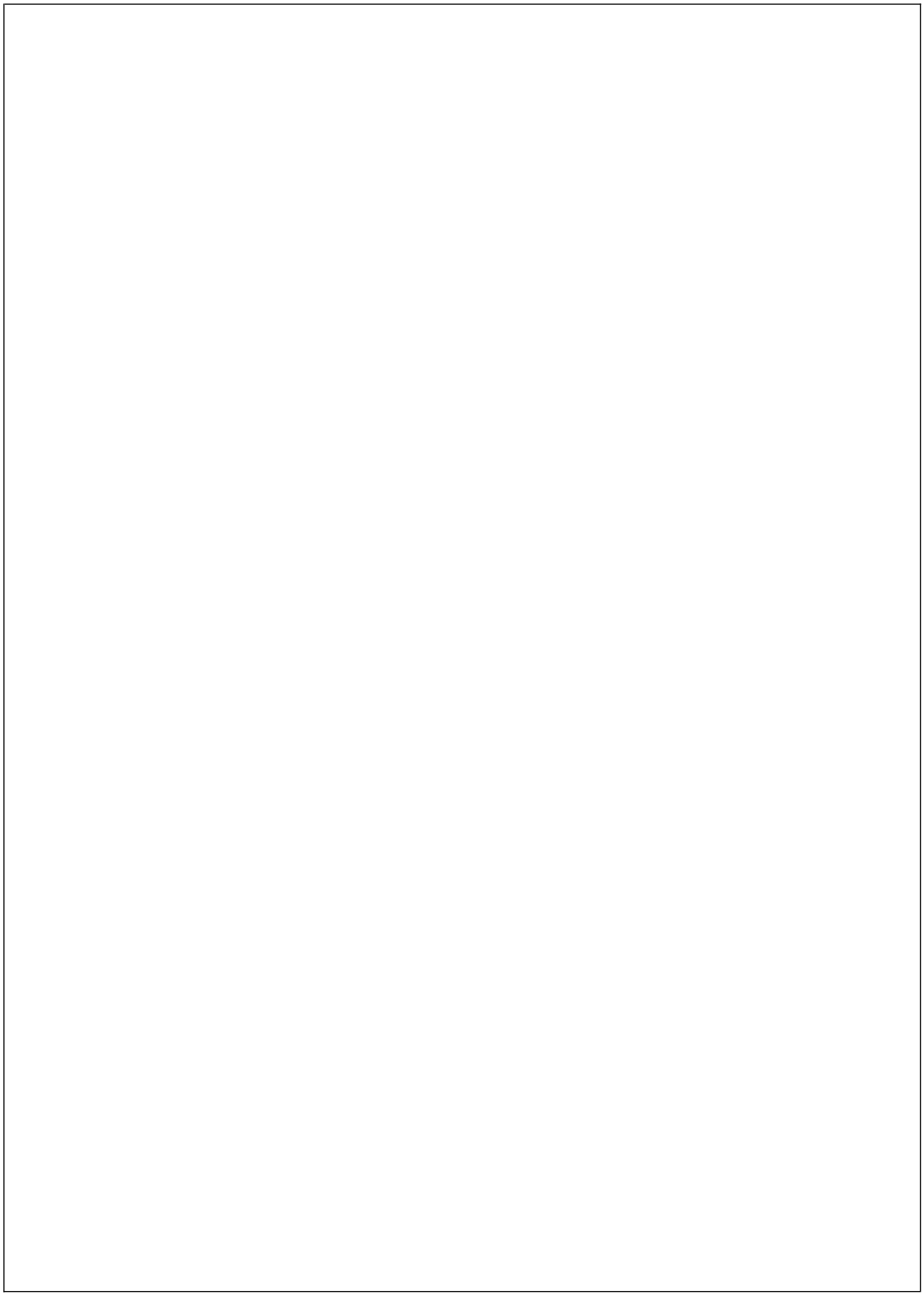
V_{CC} = +5.0V, T_A = +25˚C (See Section 1 for waveforms and load configurations)

Symbol	Parameter	C_L = 50 pF R_L = 2 kΩ		Units
		Min	Max	
t_{PLH}	Propagation Delay		23	ns
t_{PHL}	Data to $\overline{Q}_x$		23	
t_{PLH}	Propagation Delay		30	ns
t_{PHL}	LE to $\overline{Q}_x$		25	

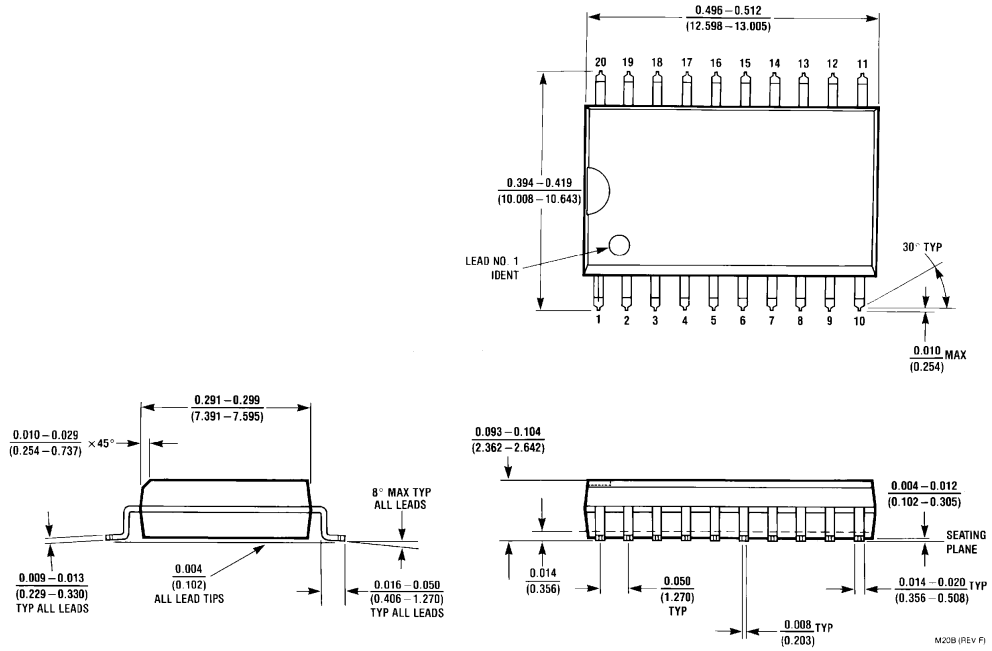
Switching Characteristics (Continued)

V_{CC} = +5.0V, T_A = +25°C (See Section 1 for waveforms and load configurations)

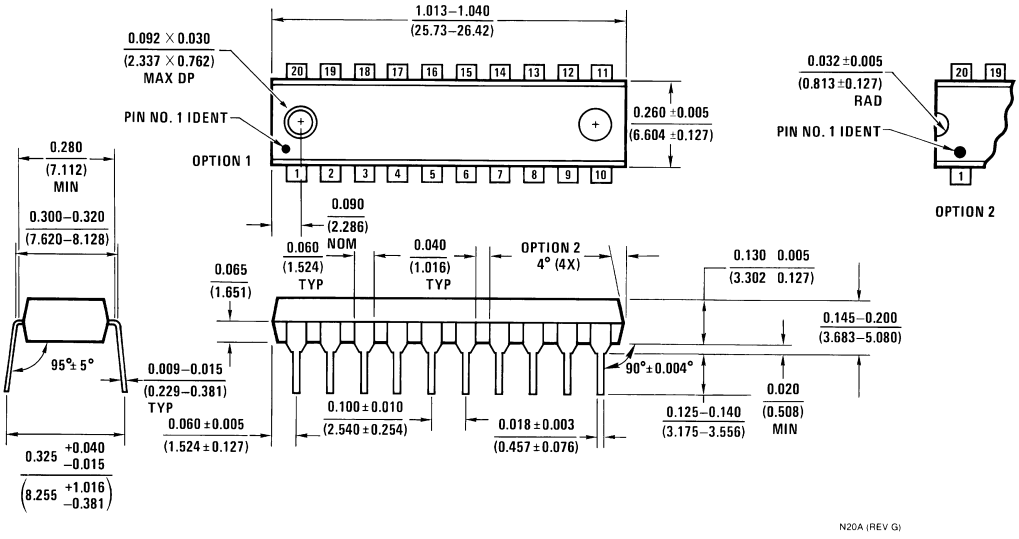
Symbol	Parameter	C_L = 50 pF, R_L = 2 kΩ		Units
		Min	Max	
t_{PZL}	Output Enable Time		22	ns
t_{PZH}	$\overline{OE}$ to $\overline{Q}_x$		20	
t_{PHZ}	Output Enable Time		20	ns
t_{PLZ}	$\overline{OE}$ to $\overline{Q}_x$		25	



Physical Dimensions inches (millimeters) unless otherwise noted



20-Lead Wide Small Outline Molded Package (M)
Order Number DM74LS533WM
Package Number M20B



20-Lead Molded Dual-In-Line Package (N)
Order Number DM74LS533N
Package Number N20A

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2. A critical component in 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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