National Semiconductor Corporation

DM54ALS2541/DM74ALS2541
# Octal Buffers and MOS Line Drivers with TRI-STATE® Outputs

General Description

These octal buffers and line drivers are designed to have the performance of the 'ALS240 series and, at the same time, offer a pinout with inputs and outputs on opposite sides of the package. This arrangement of input/outputs enhances printed circuit board layout. These drivers are designed to drive the capacitive inputs of MOS devices. The outputs have 25Ω resistors in series, thus external components are not required. The TRI-STATE control gate is a 2-input NOR such that if either $\overline{G1}$ or $\overline{G2}$ is high, all eight outputs are in the high impedance state.

Features

- Advanced oxide-isolated ion-implanted Schottky TTL process
- Switching performance is guaranteed over full temperature and V_{CC} supply range
- Data Flow-Thru Pinout (All inputs on opposite side from outputs)
- P-N-P Inputs reduce DC loading
- Outputs have 25Ω series resistors thus no external resistors are required

Connection Diagram
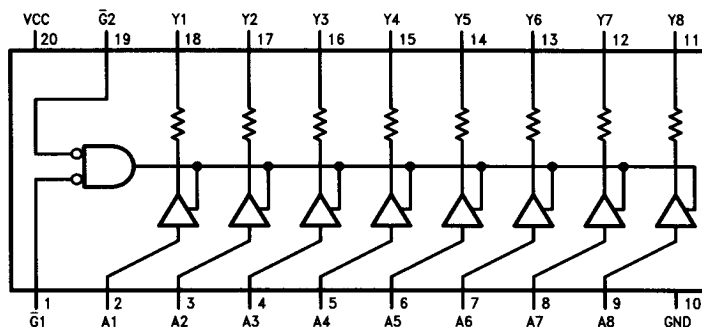
Order Number DM54ALS2541J or DM74ALS2541WM, N
See NS Package Number J20A, M20B or N20A

TL/F/9165-1

Function Table

Input			Output
$\overline{G1}$	$\overline{G2}$	A	Y
H	X	X	Hi-Z
X	H	X	Hi-Z
L	L	L	L
L	L	H	H

H = High Logic Level, L = Low Logic Level
X = Don't Care (Either high or low logic level)
Hi-Z = High Impedance (Off) State

Absolute Maximum Ratings

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

Supply Voltage	7V
Input Voltage	7V
Voltage Applied to a Disabled TRI-STATE Output	5.5V
Operating Free-Air Temperature Range	
DM54ALS	$-55°C$ to $+125°C$
DM74ALS	$0°C$ 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	DM54ALS2541			DM74ALS2541			Units
		Min	Nom	Max	Min	Nom	Max	
V_{CC}	Supply Voltage	4.5	5	5.5	4.5	5	5.5	V
V_{IH}	High Level Input Voltage	2			2			V
V_{IL}	Low Level Input Voltage			0.7			0.8	V
I_{OH}	High Level Output Current			-0.4			-0.4	mA
I_{OL}	Low Level Output Current			12			12	mA
T_A	Operating Free Air Temperature Range	-55		125	0		70	°C

Electrical Characteristics over recommended free air temperature range

Symbol	Parameter	Test Conditions		Min	Typ	Max	Units
V_{IK}	Input Clamp Voltage	V_{CC} = Min, $I_I = -18$ mA				-1.2	V
V_{OH}	High Level Output Voltage	V_{CC} = 4.5V to 5.5V, $I_{OH} = -0.4$ mA		$V_{CC} - 2$			mA
V_{OL}	Low Level Output Voltage	V_{CC} = Min	$I_{OL} = 1$ mA		0.15	0.5	
			$I_{OL} = 12$ mA		0.35	0.8	
I_{OZH}	High Level TRI-STATE Output Current	V_{CC} = Max, V_O = 2.7V				20	μA
I_{OZL}	Low Level TRI-STATE Output Current	V_{CC} = Max, V_O = 0.4V				-20	μA
I_{OH}	High Level Output Current	V_{CC} = Min, V_O = 2V		-15			mA
I_{OL}	Low Level Output Current	V_{CC} = Min, V_O = 2V		30			mA
I_I	Input Current @ Maximum Input Voltage	V_{CC} = Max, V_I = 7V				100	μA
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				-100	μA
I_O	Output Drive Current	V_{CC} = Max, V_O = 2.25V		-15		-70	mA
I_{CC}	Supply Current	V_{CC} = Max	Outputs High		6	14	mA
			Outputs Low		15	25	
			Outputs Disabled		13.5	22	

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Switching Characteristics over recommended operating free air temperature range

Symbol	Parameter	Conditions	From (Input) To (Output)	DM54ALS2541		DM74ALS2541		Units
				Min	Max	Min	Max	
t_{PLH}	Propagation Delay Time Low to High Level Output	V_{CC} = 4.5V to 5.5V, R_1 = R_2 = 500Ω (Note 1) C_L = 50 pF	A to Y	2	17	2	15	ns
t_{PHL}	Propagation Delay Time High to Low Level Output		A to Y	2	14	2	12	ns
t_{PZH}	Output Enable Time to High Level Output		$\overline{G}$ to Y	5	18	5	15	ns
t_{PZL}	Output Enable Time to Low Level Output		$\overline{G}$ to Y	8	24	8	20	ns
t_{PHZ}	Output Disable Time from High Level Output		$\overline{G}$ to Y	1	12	1	10	ns
t_{PLZ}	Output Disable Time from Low Level Output		$\overline{G}$ to Y	2	14	2	12	ns

Note 1: See Section 1 for output load and test waveforms.