

DM74ALS541 Octal Buffer and Line Driver with TRI-STATE® Outputs

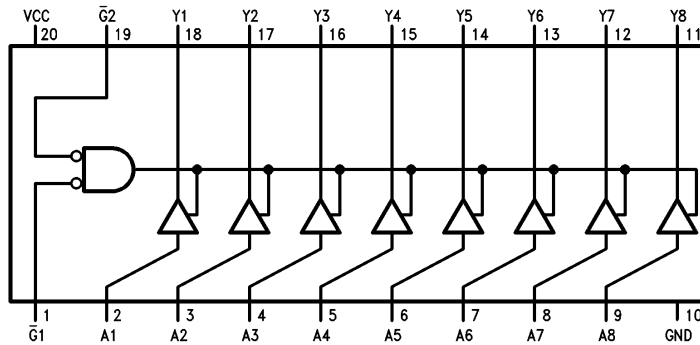
General Description

This octal buffer and line driver is 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 greatly enhances circuit board layout. The TRI-STATE control gate is a 2-input NOR such that if either G1 or 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

Connection Diagram



TL/F/9171-1

Order Number DM74ALS541WM, DM74ALS541SJ or DM74ALS541N
See NS Package Number M20B, M20D or N20A

Function Table

Input			Output Y
G1	G2	A	
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 Low or High Logic Level)
Hi-Z = High Impedance (Off) State

TRI-STATE® is a registered trademark of National Semiconductor Corporation.

Absolute Maximum Ratings

Supply Voltage	7V
Input Voltage: Control Inputs	7V
Voltage Applied to a Disabled TRI-STATE Output	5.5V
Operating Free-Air Temperature Range	0°C to +70°C
DM74ALS	−65°C to +150°C
Storage Temperature Range	−65°C to +150°C
Typical θ_{JA}	
N Package	58.5°C/W
M Package	77.5°C/W

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	DM74ALS541			Units
		Min	Nom	Max	
V_{CC}	Supply Voltage	4.5	5	5.5	V
V_{IH}	High Level Input Voltage	2			V
V_{IL}	Low Level Input Voltage			0.8	V
I_{OH}	High Level Output Current			−15	mA
I_{OL}	Low Level Output Current			24	mA
T_A	Free Air Operating Temperature	0		70	°C

Electrical Characteristics over recommended free air temperature range

Symbol	Parameter	Test Conditions	Min	Typ	Max	Units
V_{IK}	Input Clamp Voltage	$V_{CC} = \text{Min}, I_I = -18 \text{ mA}$			−1.2	V
V_{OH}	High Level Output Voltage	$V_{CC} = 4.5\text{V to } 5.5\text{V}$	$I_{OH} = -0.4 \text{ mA}$	$V_{CC} - 2$		V
		$V_{CC} = \text{Min}$	$I_{OH} = -3 \text{ mA}$	2.4	3.2	
			$I_{OH} = \text{Max}$	2		
V_{OL}	Low Level Output Voltage	$V_{CC} = \text{Min}$	$I_{OL} = 12 \text{ mA}$	0.25	0.4	mA
			$I_{OL} = 24 \text{ mA}$	0.35	0.5	
I_I	Input Current at Max Input Voltage	$V_{CC} = \text{Max}, V_I = 7\text{V}$			100	μA
I_{IH}	High Level Input Current	$V_{CC} = \text{Max}, V_I = 2.7\text{V}$			20	μA
I_{IL}	Low Level Input Current	$V_{CC} = \text{Max}, V_I = 0.4\text{V}$			−100	μA
I_{OZH}	High Level TRI-STATE Output Current	$V_{CC} = \text{Max}, V_O = 2.7\text{V}$			20	μA
I_{OZL}	Low Level TRI-STATE Output Current	$V_{CC} = \text{Max}, V_O = 0.4\text{V}$			−20	μA
I_O	Output Drive Current	$V_{CC} = \text{Max}, V_O = 2.25\text{V}$	−30		−112	mA
I_{CC}	Supply Current	$V_{CC} = \text{Max}$	Outputs High	6	14	mA
			Outputs Low	15	25	
			Outputs Disabled	13.5	22	

Switching Characteristics over recommended operating free air temperature range (Note 1)

Symbol	Parameter	Conditions	From (Input) To (Output)	DM74ALS541		Units
				Min	Max	
t_{PLH}	Propagation Delay Time Low to High Level Output	$V_{CC} = 4.5V$ to $5.5V$, $R_1 = R_2 = 500\Omega$, $C_L = 50$ pF	A to Y	4	14	ns
t_{PHL}	Propagation Delay Time High to Low Level Output		A to Y	2	10	ns
t_{PZH}	Output Enable Time to High Level Output		$\overline{G}$ to Y	5	15	ns
t_{PZL}	Output Enable Time to Low Level Output		$\overline{G}$ to Y	8	20	ns
t_{PHZ}	Output Disable Time from High Level Output		$\overline{G}$ to Y	1	10	ns
t_{PLZ}	Output DisableTime from Low Level Output		$\overline{G}$ to Y	2	12	ns

Note 1: See Section 5 for test waveforms and output load.

Physical Dimensions inches (millimeters)

0.496 - 0.512
(12.598 - 13.005)

0.394 - 0.419
(10.008 - 10.643)

LEAD NO. 1 IDENT

30° TYP

0.010 MAX
(0.254)

0.010 - 0.029
(0.254 - 0.737) × 45°

0.291 - 0.299
(7.391 - 7.595)

8° MAX TYP
ALL LEADS

0.009 - 0.013
(0.229 - 0.330)
TYP ALL LEADS

0.004
(0.102)
ALL LEAD TIPS

0.016 - 0.050
(0.406 - 1.270)
TYP ALL LEADS

0.093 - 0.104
(2.362 - 2.642)

0.004 - 0.012
(0.102 - 0.305)

SEATING PLANE

0.014
(0.356)

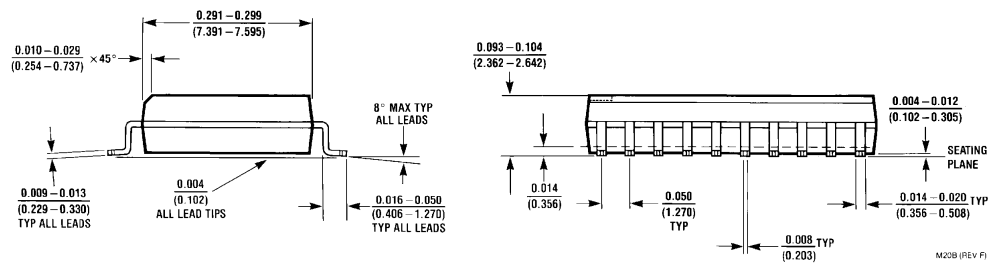
0.050
(1.270)
TYP

0.014 - 0.020 TYP
(0.356 - 0.508)

0.008 TYP
(0.203)

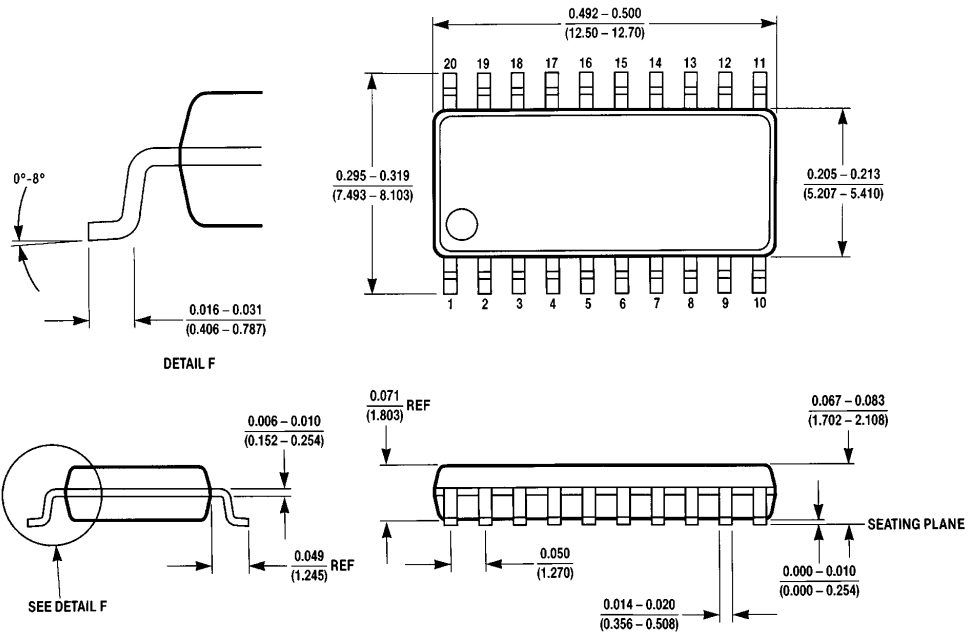
S.O. Package (M)
Order Number DM74ALS541WM
NS Package Number M20B

M20B (REV F)



S.O. Package (M)
Order Number DM74ALS541WM
NS Package Number M20B

Physical Dimensions inches (millimeters) (Continued)



M20D (REV A)

S.O. Package (SJ)
Order Number DM74ALS541SJ
NS Package Number M20D



LIFE SUPPORT POLICY

1. Life support devices or systems are devices or systems which, (a) are intended for surgical implant into the body, or (b) support or sustain life, and whose failure to perform, when properly used in accordance with instructions for use provided in the labeling, can be reasonably expected to result in a significant injury to the user.
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.

