National Semiconductor

DM74ALS540A Octal Inverting Buffer and Line Driver with TRI-STATE® Outputs

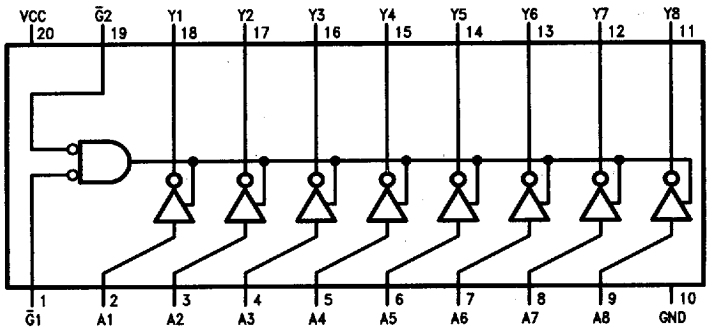
General Description

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 printed circuit board layout. The TRI-STATE control gate is a 2-input NOR such that if either $\overline{G}1$ or $\overline{G}2$ 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/9170–1

Order Number DM74ALS540AWM, DM74ALS540ASJ or DM74ALS540AN
See NS Package Number M20B, M20D or N20A

Function Table

Inputs			Output
$\overline{G}1$	$\overline{G}2$	A	Y
H	X	X	Hi-Z
X	H	X	Hi-Z
L	L	L	H
L	L	H	L

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

Supply Voltage	7V
Input Voltage	7V
Voltage Applied to a Disabled TRI-STATE Output	5.5V
Operating Free-Air Temperature Range DM74ALS	0°C to +70°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	Min	Nom	Max	Units
V_{CC}	Supply Voltage	4.5	5	5.5	V
V_{IH}	High Level Input Voltage	2			V
V_{IL}	Low Level Input Voltage			0.7	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} = Min, I_I = −18 mA				−1.5	V
V_{OH}	High Level Output Voltage	V_{CC} = 4.5V to 5.5V	I_{OH} = −0.4 mA	V_{CC} − 2			V
		V_{CC} = Min	I_{OH} = −3 mA	2.4	3.2		
			I_{OH} = Max	2			
V_{OL}	Low Level Output Voltage	V_{CC} = Min	I_{OL} = 12 mA		0.25	0.4	mA
			I_{OL} = 24 mA		0.35	0.5	
I_I	Input Current @ Max 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_{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_O	Output Drive Current	V_{CC} = Max, V_O = 2.25V		−30		−112	mA
I_{CC}	Supply Current	V_{CC} = Max	Outputs High		5	10	mA
			Outputs Low		13	22	
			Outputs Disabled		11	19	

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

Symbol	Parameter	Conditions	From (Input) To (Output)	Min	Max	Units
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 or B to Y	2	12	ns
t_{PHL}	Propagation Delay Time High to Low Level Output		A or B to Y	2	9	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.