



T-52-09-00

DM54ALS240A/DM74ALS240A/DM74ALS241A

Octal TRI-STATE® Bus Driver

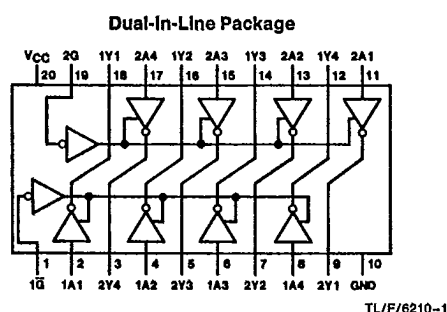
General Description

These octal TRI-STATE bus drivers are designed to provide the designer with flexibility in implementing a bus interface with memory, microprocessor, or communication systems. The output TRI-STATE gating control is organized into two separate groups of four buffers. The ALS240A control inputs symmetrically enable the respective outputs when set logic low, while the ALS241A has complementary enable gating. The TRI-STATE circuitry contains a feature that maintains the buffer outputs in TRI-STATE (high impedance state) during power supply ramp-up or ramp-down. This eliminates bus glitching problems that arise during power-up and power-down.

Features

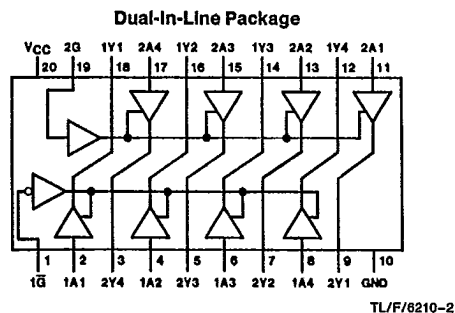
- Advanced low power oxide-isolated ion-implanted Schottky TTL process
- Functional and pin compatible with the DM54/74LS counterpart
- Improved switching performance with less power dissipation compared with the DM54/74LS counterpart
- Switching response specified into 500Ω and 50 pF load
- Switching response specifications guaranteed over full temperature and V_{CC} supply range
- PNP input design reduces input loading
- Low level drive current:
54ALS = 12 mA, 74ALS = 24 mA

Connection Diagram



Top View

Order Number DM54ALS240AJ, DM74ALS240AWM,
DM74ALS240AN or DM74ALS240ASJ
See NS Package Number J20A, M20B, M20D or N20A



Top View

Order Number DM74ALS241AWM or DM74ALS241AN
See NS Package Number M20B or N20A

Function Tables

'ALS240A

Input		Output
$\bar{G}$	A	Y
L	L	H
L	H	L
H	X	Z

'ALS241A

Input		Output
2G	2A	Y
H	L	L
H	H	H
L	X	Z

'ALS241A

Input		Output
1G	1A	Y
L	L	L
L	H	H
H	X	Z

H = High Level Logic State
L = Low Level Logic State
X = Don't Care (Either Low or High Level Logic State)
Z = High Impedance (Off) State

Absolute Maximum Ratings

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

Supply Voltage, V_{CC}	7V
Input Voltage	7V
Voltage Applied to Disabled 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

Typical θ_{JA}
N Package
M Package

60.5°C/W
79.8°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.

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Recommended Operating Conditions

Symbol	Parameter	DM54ALS240A, 241A			DM74ALS240A, 241A			Units
		Min	Typ	Max	Min	Typ	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			-12			-15	mA
I_{OL}	Low Level Output Current			12			24	mA
T_A	Operating Free Air Temperature	-55		125	0		70	°C

Electrical Characteristics

over recommended operating free-air temperature range (unless otherwise specified)

Symbol	Parameter	Conditions	DM54ALS240A			DM74ALS240A, 241A			Units
			Min	Typ	Max	Min	Typ	Max	
V_{IK}	Input Clamp Voltage	$V_{CC} = 4.5V, I_I = -18\text{ mA}$			-1.2			-1.5	V
V_{OH}	High Level Output Voltage	$V_{CC} = 4.5V\text{ to }5.5V, I_{OH} = -0.4\text{ mA}$	$V_{CC} - 2$			$V_{CC} - 2$			V
		$V_{CC} = 4.5V, I_{OH} = -3\text{ mA}$	2.4			2.4			V
		$I_{OH} = \text{Max}$	2			2			V
V_{OL}	Low Level Output Voltage	$V_{CC} = 4.5V, I_{OL} = 54\text{ ALS (Max)}$		0.25	0.4		0.25	0.4	V
		$I_{OL} = 74\text{ ALS (Max)}$		—	—		0.35	0.5	V
I_I	Input Current at Max Input Voltage	$V_{CC} = 5.5V, V_I = 7V$			0.1			0.1	mA
I_{IH}	High Level Input Current	$V_{CC} = 5.5V, V_I = 2.7V$			20			20	μA
I_{IL}	Low Level Input Current	$V_{CC} = 5.5V, V_{IL} = 0.4V$			-0.1			-0.1	mA
I_O	Output Drive Current	$V_{CC} = 5.5V, V_O = 2.25V$	-30		-112	-30		-112	mA
I_{OZH}	High Level TRI-STATE Output Current	$V_{CC} = 5.5V, V_O = 2.7V$			20			20	μA
I_{OZL}	Low Level TRI-STATE Output Current	$V_{CC} = 5.5V, V_O = 0.4V$			-20			-20	μA
I_{CC}	Supply Current	$V_{CC} = 5.5V, \text{ALS240A Outputs High}$		4	11		4	10	mA
		Outputs Low		13	23		13	23	mA
		Outputs TRI-STATE		14	25		14	25	mA
		$V_{CC} = 5.5V, \text{ALS241A Outputs High}$		9	17		9	15	mA
		Outputs Low		15	28		15	26	mA
		Outputs TRI-STATE		17	32		17	30	mA

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'ALS240A Switching Characteristics over recommended operating free air temperature range

Symbol	Parameter	Conditions	From (Input)	To (Output)	DM54ALS240A		DM74ALS240A		Units
					Min	Max	Min	Max	
t _{PLH}	Propagation Delay Time Low to High Level Output	V _{CC} = 4.5V to 5.5V, C _L = 50 pF, R ₁ = 500Ω, R ₂ = 500Ω, T _A = Min to Max	A	Y	2	12	2	9	ns
t _{PHL}	Propagation Delay Time High to Low Level Output				2	9	2	9	ns
t _{pZH}	Output Enable Time to High Level Output		G	Y	4	15	3	13	ns
t _{pZL}	Output Enable Time to Low Level Output				5	18	3	18	ns
t _{PHZ}	Output Disable Time from High Level Output		G	Y	1	10	2	10	ns
t _{PLZ}	Output Disable Time from Low Level Output				3	15	3	12	ns

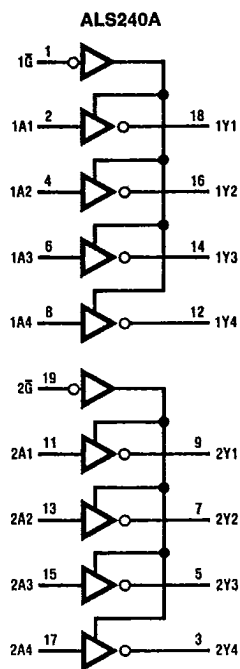
'ALS241A Switching Characteristics over recommended operating free air temperature range

Symbol	Parameter	Conditions	From (Input)	To (Output)	DM74ALS241A		Units
					Min	Max	
t _{PLH}	Propagation Delay Time Low to High Level Output	V _{CC} = 4.5V to 5.5V, C _L = 50 pF, R ₁ = 500Ω, R ₂ = 500Ω, T _A = Min to Max	A	Y	3	11	ns
t _{PHL}	Propagation Delay Time High to Low Level Output				3	10	ns
t _{pZH}	Output Enable Time to High Level Output		1G	Y	3	21	ns
t _{pZL}	Output Enable Time to High Level Output				3	21	ns
t _{PHZ}	Output Disable Time to High Level Output		1G	Y	2	10	ns
t _{PLZ}	Output Disable Time to Low Level Output				3	15	ns
t _{pZH}	Output Enable Time to High Level Output		2G	Y	7	21	ns
t _{pZL}	Output Enable Time to Low Level Output				7	21	ns
t _{PHZ}	Output Disable Time from High Level Output		2G	Y	2	10	ns
t _{PLZ}	Output Disable Time from Low Level Output				3	15	ns

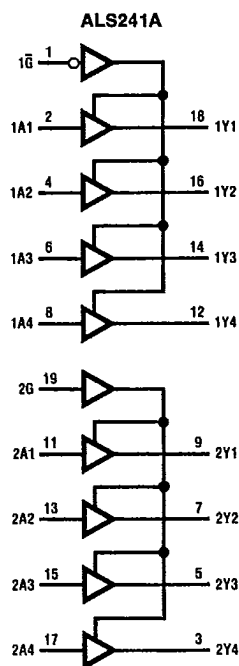
Logic Diagrams

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TL/F/6210-4

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