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## DM54ALS244A/DM74ALS244A Octal TRI-STATE® Bus Driver

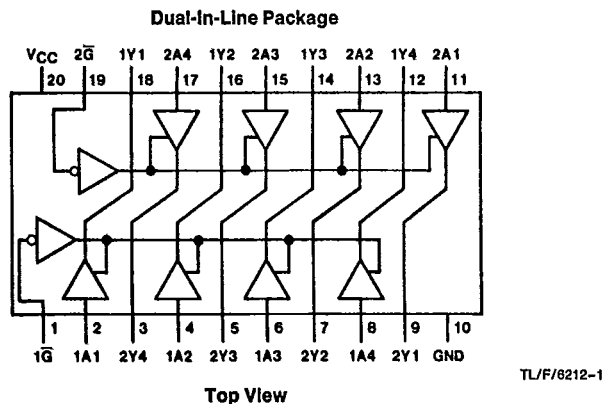
### General Description

This octal TRI-STATE bus driver is 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, and both control inputs enable the respective outputs when set logic low. 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<sub>CC</sub> supply range
- PNP input design reduces input loading
- Low level drive current:  
54ALS = 12 mA, 74ALS = 24 mA

### Connection Diagram



Order Number DM54ALS244AJ, DM74ALS244AWM, DM74ALS244AN or DM74ALS244ASJ  
See NS Package Number J20A, M20B, M20D or N20A

### Function Table

Input		Output
$\bar{G}$	A	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

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**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 <sub>CC</sub>	7V
Input Voltage	7V
Voltage Applied to Disabled Output	5.5V
Operating Free Air Temperature Range	
DM54ALS	-55°C to +125°C
DM74ALS	0 to +70°C
Storage Temperature Range	-65°C to +150°C
Typical $\theta_{JA}$	
N Package	60.5°C/W
M Package	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.

**Recommended Operating Conditions**

Symbol	Parameter	DM54ALS244A			DM74ALS244A			Units
		Min	Typ	Max	Min	Typ	Max	
V <sub>CC</sub>	Supply Voltage	4.5	5	5.5	4.5	5	5.5	V
V <sub>IH</sub>	High Level Input Voltage	2			2			V
V <sub>IL</sub>	Low Level Input Voltage			0.7			0.8	V
I <sub>OH</sub>	High Level Output Current			-12			-15	mA
I <sub>OL</sub>	Low Level Output Current			12			24	mA
T <sub>A</sub>	Operating Free-Air Temperature	-55		125	0		70	°C

**Electrical Characteristics** over recommended operating free air temperature (unless otherwise specified)

Symbol	Parameter	Conditions	DM54ALS244A			DM74ALS244A			Units
			Min	Typ	Max	Min	Typ	Max	
V <sub>IK</sub>	Input Clamp Voltage	V <sub>CC</sub> = 4.5V, I <sub>I</sub> = -18 mA			-1.5			-1.5	V
V <sub>OH</sub>	High Level Output Voltage	V <sub>CC</sub> = 4.5V to 5.5V, I <sub>OH</sub> = -0.4 mA	V <sub>CC</sub> - 2			V <sub>CC</sub> - 2			V
		V <sub>CC</sub> = 4.5V, I <sub>OH</sub> = -3 mA	2.4			2.4			V
		I <sub>OH</sub> = Max	2			2			V
V <sub>OL</sub>	Low Level Output Voltage	V <sub>CC</sub> = 4.5V, I <sub>OL</sub> = 54ALS (Max)		0.25	0.4				V
		I <sub>OL</sub> = 74ALS (Max)		—	—	0.35	0.5		V
I <sub>I</sub>	Input Current at Max Input Voltage	V <sub>CC</sub> = 5.5V, V <sub>I</sub> = 7V			0.1			0.1	mA
I <sub>IH</sub>	High Level Input Current	V <sub>CC</sub> = 5.5V, V <sub>I</sub> = 2.7V			20			20	μA
I <sub>IL</sub>	Low Level Input Current	V <sub>CC</sub> = 5.5V, V <sub>IL</sub> = 0.4V			-0.1			-0.1	mA
I <sub>O</sub>	Output Drive Current	V <sub>CC</sub> = 5.5V, V <sub>O</sub> = 2.25V	-30		-112	-30		-112	mA
I <sub>OZH</sub>	High Level TRI-STATE Output Current	V <sub>CC</sub> = 5.5V, V <sub>O</sub> = 2.7V			20			20	μA
I <sub>OZL</sub>	Low Level TRI-STATE Output Current	V <sub>CC</sub> = 5.5V, V <sub>O</sub> = 0.4V			-20			-20	μA
I <sub>CC</sub>	Supply Current	V <sub>CC</sub> = 5.5V, Outputs High		9	15		9	15	mA
		Outputs Low		15	24		15	24	mA
		Outputs TRI-STATE		17	27		17	27	mA



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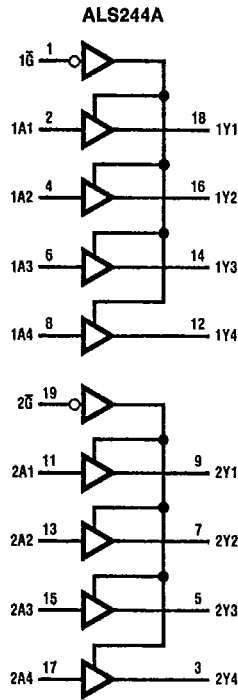
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**Switching Characteristics** over recommended operating free-air temperature range (Note 1)

Symbol	Parameter	From (Input)	To (Output)	Conditions	54ALS244A		74ALS244A		Units
					Min	Max	Min	Max	
t <sub>PLH</sub>	Propagation Delay Time Low to High Level Output	A	Y	V <sub>CC</sub> = 4.5V to 5.5V, C <sub>L</sub> = 50 pF, R1 = 500Ω, R2 = 500Ω, T <sub>A</sub> = Min to Max	1	16	3	10	ns
t <sub>PHL</sub>	Propagation Delay Time High to Low Level Output	A	Y		3	12	3	10	ns
t <sub>pZH</sub>	Output Enable Time to High Level Output	$\bar{G}$	Y		1	26	3	20	ns
t <sub>pZL</sub>	Output Enable Time to Low Level Output	$\bar{G}$	Y		1	24	3	20	ns
t <sub>pHZ</sub>	Output Disable Time from High Level Output	$\bar{G}$	Y		2	10	2	10	ns
t <sub>pLZ</sub>	Output Disable Time from Low Level Output	$\bar{G}$	Y		1	21	1	13	ns

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

**Logic Diagram**



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