



**National
Semiconductor
Corporation**

DM54/DM74ALS465A/466A/467A/468A Octal TRI-STATE® Bidirectional Bus Drivers

General Description

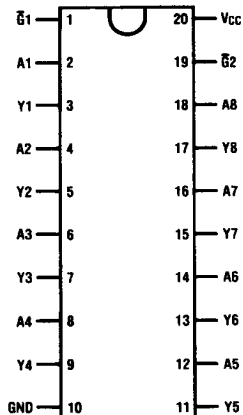
These octal TRI-STATE bus drivers are designed to provide the designer with flexibility in implementing a bus interface with memory, microprocessor, or communication systems. The output TRI-STATE gating control is organized into two separate groups of four buffers on the ALS467A and ALS468A, and one common gating control for all eight buffers on the ALS465A and ALS466A. All control inputs are active low enabling. The buffers on the ALS465A and ALS467A are non-inverting and the buffers on the ALS466A and ALS468A are inverting. 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 and the DM71/81LS95, 96, 97, 98
- 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

Connection Diagrams

Dual-In-Line Package

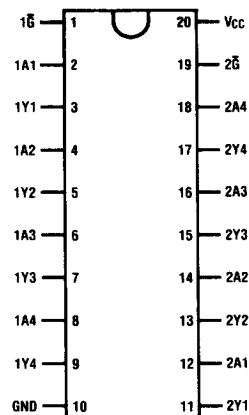


Top View

TL/F/6221-1

**Order Number DM54ALS465AJ, DM54ALS466AJ,
DM74ALS465AWM, DM74ALS466AWM,
DM74ALS465AN or DM74ALS466AN
See NS Package Number J20A, M20B or N20A**

Dual-In-Line Package



Top View

TL/F/6221-2

**Order Number DM54ALS467AJ, DM54ALS468AJ,
DM74ALS467AWM, DM74ALS468AWM,
DM74ALS467AN or DM74ALS468AN
See NS Package Number J20A, M20B or N20A**

Absolute Maximum Ratings

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

Supply Voltage, V_{CC}	7V
Input Voltage	7V
Output Voltage (Disabled)	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	DM54ALS465A DM54ALS466A DM54ALS467A DM54ALS468A			DM74ALS465A DM74ALS466A DM74ALS467A DM74ALS468A			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	DM54ALS465A DM54ALS466A DM54ALS467A DM54ALS468A			DM74ALS465A DM74ALS466A DM74ALS467A DM74ALS468A			Units
			Min	Typ	Max	Min	Typ	Max	
V_{IK}	Input Clamp Voltage	$V_{CC} = 4.5V, I_I = -18\text{ mA}$			-1.5			-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	$V_{CC} = 4.5V$		0.25	0.4		0.25	0.4	V
		$I_{OL} = 54\text{ ALS (Max)}$							
		$I_{OL} = 74\text{ ALS (Max)}$		—	—		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

Electrical Characteristics (Continued)

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

Symbol	Parameter	Conditions	DM54ALS465A DM54ALS466A DM54ALS467A DM54ALS468A			DM74ALS465A DM74ALS466A DM74ALS467A DM74ALS468A			Units
			Min	Typ	Max	Min	Typ	Max	
I _{CC}	Supply Current	V _{CC} = 5.5V, ALS465A							
		Outputs High		11	21		11	16	mA
		Outputs Low		19	33		19	28	
		Outputs TRI-STATE		23	38		23	33	
		V _{CC} = 5.5V, ALS466A							
		Outputs High		7	15		7	10	mA
		Outputs Low		16	29		16	24	
		Outputs TRI-STATE		19	32		19	27	
		V _{CC} = 5.5V, ALS467A							
		Outputs High		11	21		11	16	mA
		Outputs Low		19	33		19	28	
		Outputs TRI-STATE		23	38		23	33	
		V _{CC} = 5.5V, ALS468A							
		Outputs High		7	15		7	10	mA
		Outputs Low		16	29		16	24	
		Outputs TRI-STATE		19	32		19	27	

'ALS465A and 'ALS467A Switching Characteristics

over recommended operating free air temperature range (Note 1)

Parameter	Conditions	From (Input)	To (Output)	DM54ALS465A DM54ALS467A		DM74ALS465A DM74ALS467A		Units
				Min	Max	Min	Max	
t _{PLH}	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	16	2	13	ns
t _{PHL}				4	15	4	12	ns
t _{PZH}		$\overline{G}$	Any Y	4	27	4	23	ns
t _{PZL}				5	30	5	25	ns
t _{PHZ}		$\overline{G}$	Any Y	2	12	2	10	ns
t _{PLZ}				3	21	3	18	ns

'ALS466A and 'ALS468A Switching Characteristics

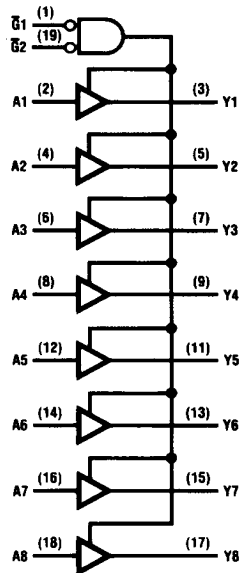
over recommended operating free air temperature range (Note 1)

Parameter	Conditions	From (Input)	To (Output)	DM54ALS466A DM54ALS468A		DM74ALS466A DM74ALS468A		Units
				Min	Max	Min	Max	
t _{PLH}	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	14	3	12	ns
t _{PHL}				2	11	2	9	ns
t _{PZH}		$\overline{G}$	Any Y	4	21	4	16	ns
t _{PZL}				7	25	7	23	ns
t _{PHZ}		$\overline{G}$	Any Y	2	12	2	10	ns
t _{PLZ}				2	20	2	17	ns

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

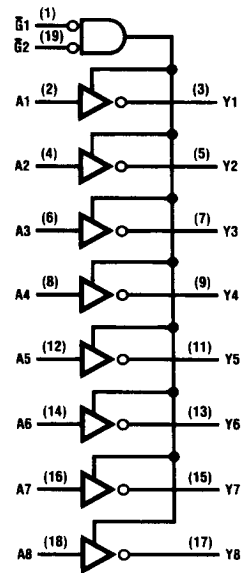
Logic Diagrams

ALS465A



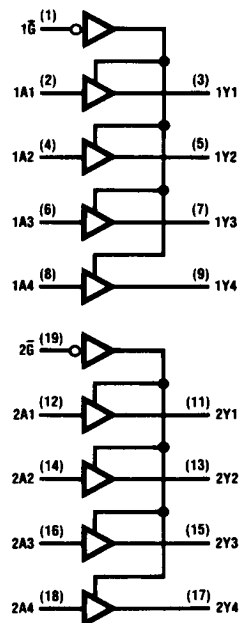
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ALS466A



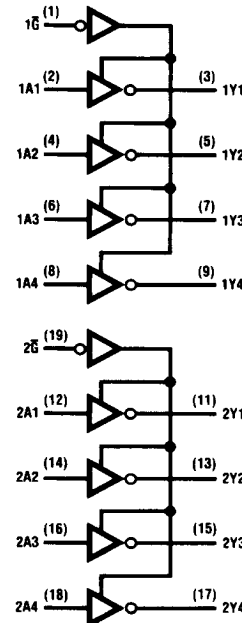
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ALS467A



TL/F/6221-5

ALS468A



TL/F/6221-6