



PRELIMINARY

DM54ALS1638/DM74ALS1638, DM54ALS1639/DM74ALS1639 Octal Bus Transceivers

General Description

These advanced low power Schottky TRI-STATE® octal bus transceivers are designed to provide high speed bidirectional communication between data buses. The output characteristics of the circuits are low enough impedance to drive transmission lines terminated down to 133Ω. The input characteristics of the circuits are high impedance so they will not significantly load the transmission line. These devices allow 8-bit wide bidirectional data transmission controlled by the logic level at the (DIR) input. The TRI-STATE enable input ($\bar{G}$) can be used to isolate both buses. In addition, the TRI-STATE circuitry contains a protection feature that prevents the buffer from glitching the bus during power-up or power-down. To provide design flexibility, the 'ALS1638 and 'ALS1639 have open-collector outputs on the A bus and TRI-STATE outputs on the B bus.

The DM74ALS-1 version of these devices is identical to its standard counterparts except that maximum recommended I_{OL} has been increased to 24 mA. There is no 54ALS-1 version of these parts.

- 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 74ALS-1 = 24 mA, 74ALS = 16 mA, 54ALS = 8 mA
- Glitch-free bus during power-up/down
- A bus outputs are open-collector, B bus outputs are TRI-STATE

Absolute Maximum Ratings (Note 1)

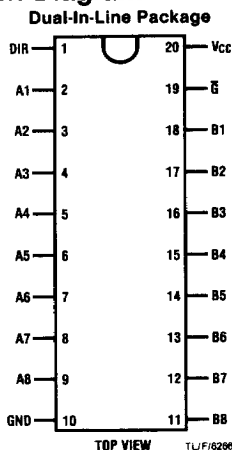
Supply Voltage, V_{CC}	7V
Input Voltage	
Control Inputs	7V
A Bus I/O Ports	7V
B Bus I/O Ports	5.5V
Storage Temperature Range	-65°C to 150°C

Features

- Low power versions of ALS638, 639
- Advanced low power oxide-isolated ion-implanted Schottky TTL process
- Functional and pin compatible with the DM54/74ALS638, 639

Note 1: 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.

Connection Diagram



DM54ALS1638, DM54ALS1639 (J)
DM74ALS1638, DM74ALS1639 (N)

Function Table

Control Inputs		Operation	
$\bar{G}$	DIR	'ALS1638	'ALS1639
L	L	B data to A bus	B data to A bus
L	H	A data to B bus	A data to B bus
H	X	Isolation	Isolation

This document contains information on a product under development. NSC reserves the right to change or discontinue this product without notice.

Recommended Operating Conditions

Symbol	Parameter	DM54ALS1638 DM54ALS1639			DM74ALS1638 DM74ALS1639			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			0.8			0.8	V
I_{OH}	High Level Output Current, B Bus Only			-12			-15	mA
I_{OL}	Low Level Output Current			8			16	mA
	74ALS-1			—			24	mA
V_{OH}	High Level Output Voltage, A Bus Only			5.5			5.5	V
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	DM54ALS			DM74ALS			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, B Bus Only	$V_{CC} = 4.5V\text{ to }5.5V, I_{OH} = -0.4\text{ mA}$	$V_{CC} - 2$			$V_{CC} - 2$			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	$V_{CC} = 4.5V, I_{OL} = 8\text{ mA}$		0.25	0.4		0.25	0.4	V
		$I_{OL} = 16\text{ mA}$		—	—		0.35	0.5	V
		$I_{OL} = 24\text{ mA for -1 Options}$					0.35	0.5	V
									V
I_I	Input Current at Max Input Voltage	$V_{CC} = 5.5V, V_I = 7V(\text{Control Inputs})$			0.1			0.1	mA
		$V_I = 5.5V(I/O\text{ Ports})$			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	$V_{CC} = 5.5V, V_{IL} = 0.4V(\text{Control Inputs})$			-0.10			-0.10	mA
		(I/O Port)			-0.10			-0.10	mA
I_O	Output Drive Current	$V_{CC} = 5.5V, V_O = 2.25V$ (B Ports Only)	-30		-112	-30		-112	mA
I_{OH}	High Level Output Current	$V_{CC} = 4.5V, V_{OH} = 5.5V$ (A Bus Only)			0.1			0.1	mA
I_{CC}	ALS1638	$V_{CC} = 5.5V$							mA
		Outputs High		21			21		mA
		Outputs Low		23			23		mA
	ALS1639	Outputs Disabled		25			25		mA
		Outputs High		21			21		mA
		Outputs Low		23			23		mA
		Outputs Disabled		25			25		mA

'ALS1638 Switching Characteristics (Note 1)

Parameter	From (Input)	To (Output)	$V_{CC} = 4.5V \text{ to } 5.5V,$ $C_L = 50 \text{ pF},$ $R_L = 500\Omega \text{ (A Outputs),}$ $T_A = \text{Min to Max}$						Units
			DM54ALS1638			DM74ALS1638			
			Min	Typ	Max	Min	Typ	Max	
t_{PLH}	A	B		6			6		ns
t_{PHL}				21			21		ns
t_{PLH}	B	A		6			6		ns
t_{PHL}				8			8		ns
t_{PLH}	$\bar{G}$	A		23			23		ns
t_{PHL}				17			17		ns
t_{PZH}	$\bar{G}$	B		12			12		ns
t_{PZL}				15			15		ns
t_{PHZ}	$\bar{G}$	B		6			6		ns
t_{PLZ}				7			7		ns

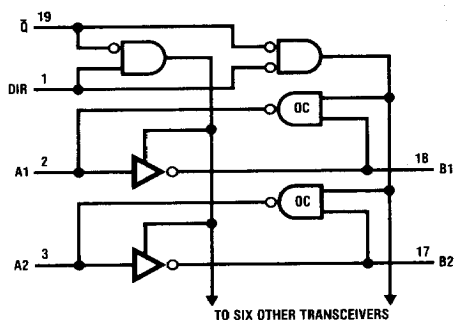
'ALS1639 Switching Characteristics (Note 1)

Parameter	From (Input)	To (Output)	$V_{CC} = 4.5V \text{ to } 5.5V,$ $C_L = 50 \text{ pF},$ $R_L = 500\Omega,$ $T_A = \text{Min to Max}$						Units
			DM54ALS1639			DM74ALS1639			
			Min	Typ	Max	Min	Typ	Max	
t_{PLH}	A	B		7			7		ns
t_{PHL}				21			21		ns
t_{PLH}	B	A		7			7		ns
t_{PHL}				9			9		ns
t_{PLH}	$\bar{G}$	A		23			23		ns
t_{PHL}				19			19		ns
t_{PZH}	$\bar{G}$	B		14			14		ns
t_{PZL}				17			17		ns
t_{PHZ}	$\bar{G}$	B		7			7		ns
t_{PLZ}				9			9		ns

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

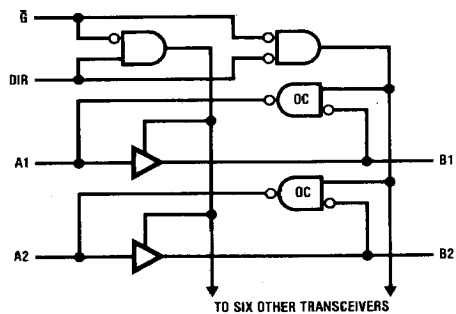
Logic Diagrams

'ALS1638



TL/F/6266.2

'ALS1639



TL/F/6266.3

OC denotes open-collector outputs