

# 640, 643

## Octal Bus Transceiver (3-State)

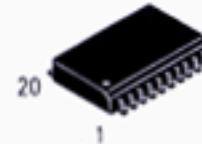
These octal bus transceivers are designed for asynchronous two-way communication between data buses. These devices transmit data from the A bus to the B bus or from the B bus to the A bus depending upon the level at the Direction control input. The Output Enable can be used to disable the device so the buses are effectively isolated. The '640 provides data inversion in both directions. The '643 provides inversion in only one direction.

- AVG's LS operates over extended Vcc from 4.5 to 5.5 V
- AVG's LS and ALS both have guaranteed DC and AC specification over full temperature and Vcc range
- Switching specifications for ALS at 50 pF
- AVG's ALS has the lowest speed power product (4pJ per gate typical) of all logic series

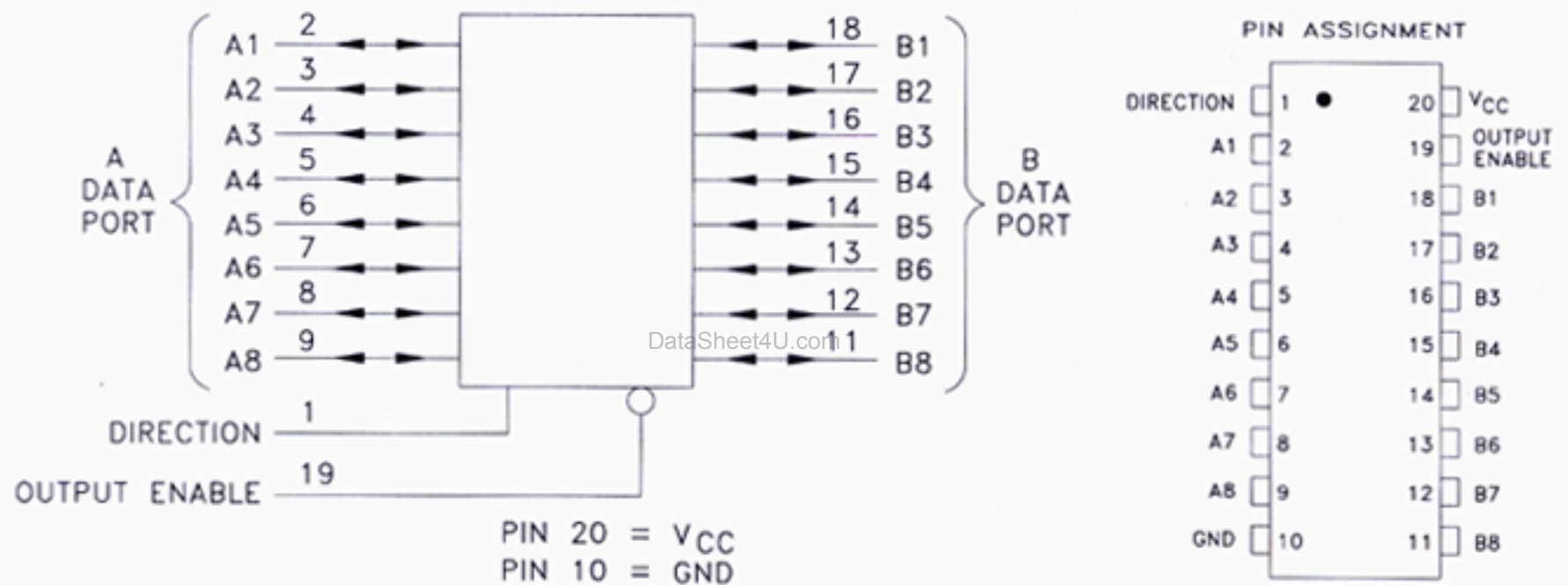
### DV74LS640, DV74ALS640A DV74LS643, DV74ALS643A



N Suffix  
Plastic DIP  
AVG-005 Case



D Suffix  
Plastic SOP  
AVG-006 Case



'640 Function Table		
Control Inputs		Operation
Output Enable	Direction	
L	L	$\bar{B}$ Data to A Bus
L	H	A Data to B Bus
H	X	High Impedance

L=Low State  
H=High State  
X=Don't Care

'643 Function Table		
Control Inputs		Operation
Output Enable	Direction	
L	L	$\bar{B}$ Data to A Bus
L	H	A Data to B Bus
H	X	High Impedance

#### ABSOLUTE MAXIMUM RATINGS

Maximum ratings are those values beyond which damage to the device may occur.

Symbol	Parameter	LS640, ALS640A, LS643, ALS643	Unit
V <sub>CC</sub>	Supply Voltage	+7.0	V
V <sub>IN</sub>	Input Voltage, Control Inputs I/O Ports	-0.5 to +7.0 5.5	V
V <sub>OUT</sub>	Voltage Applied to Disabled Output	5.5	V
T <sub>STG</sub>	Storage Temperature Range	-65 to 150	°C

**GUARANTEED OPERATING CONDITIONS**

Symbol	Parameter	LS640, ALS640, LS643, ALS643A		Unit
		Min	Max	
V <sub>CC</sub>	Supply Voltage	4.5	5.5	V
V <sub>IH</sub>	High Level Input Voltage	2.0		V
V <sub>IL</sub>	Low Level Input Voltage		0.8	V
I <sub>OH</sub>	High Level Output Current		-15	mA
I <sub>OL</sub>	Low Level Output Current		24	mA
T <sub>A</sub>	Operating Free Air Temperature	-10	70	°C

**DC ELECTRICAL CHARACTERISTICS** over full operating range

Symbol	Parameter	Condition	LS640, LS643			ALS640A, ALS 643A			Unit
			Min	Typ	Max	Min	Typ	Max	
V <sub>IK</sub>	Input Clamp Voltage	V <sub>CC</sub> = 4.5V, I <sub>IN</sub> = 0-18 mA			-1.5			-1.5	V
V <sub>OH</sub>	High Level Output Voltage	V <sub>CC</sub> =4.5V, I <sub>OH</sub> =Max	2			2			V
V <sub>OL</sub>	Low Level Output Voltage	I <sub>OL</sub> =12mA		0.25	0.4		0.25	0.4	V
		I <sub>OL</sub> =24mA		0.35	0.5		0.35	0.5	V
I <sub>IN</sub>	Input Current	I/O Ports, V <sub>IN</sub> =5.5V Control Inputs, V <sub>IN</sub> =7.0V			0.1 0.1			0.1 0.1	mA
I <sub>IH</sub>	High Level Input Current	V <sub>CC</sub> =5.5, V <sub>IN</sub> = 2.7V; I/O Ports and Control Inputs			20			20	μA
I <sub>IL</sub>	Low Level Input Current	V <sub>CC</sub> =5.5, V <sub>IN</sub> =0.4V, I/O Ports and Control Inputs			-0.4			-0.1	mA
I <sub>O</sub>	Output Short Circuit Current	V <sub>CC</sub> =5.5V, V <sub>O</sub> = 2.25V	-40		-225	-30		-112	mA
I <sub>CC</sub>	Supply Current	V <sub>CC</sub> =5.5V (Outputs Disabled)			95		28	43	mA

**SWITCHING CHARACTERISTICS** over full operating conditions

Symbol	Parameter	LS640, LS643 C <sub>L</sub> = 45p R <sub>1</sub> =667Ω		ALS640A, ALS643A C <sub>L</sub> = 50pF, R <sub>1</sub> =500Ω, R <sub>2</sub> =500Ω		Unit
		Min	Max	Min	Max	
t <sub>PLH</sub> t <sub>PHL</sub>	Propagation Delay Time, From A or B to B or A		10 15	2 2	13 11	ns
t <sub>PZH</sub> t <sub>PZL</sub>	Output Enable Time, From OE, DIR to A; or OE, DIR to B		40 40	31 26	40 40	ns
t <sub>PLZ</sub> t <sub>PHZ</sub>	Output Disable Time From OE, DIR to A; or OE, DIR to B		25 25	15 15	25 25	ns

**SWITCHING WAVEFORMS**