



T54LS640/641/645
T74LS640/641/645

PRELIMINARY DATA

OCTAL BUS TRANSCEIVERS

DESCRIPTION

The T54LS/T74LS640/641/645 are octal bus transceivers designed for asynchronous two-way communication between data buses. Control function implementation reduces to a minimum external timing requirements. This circuit permits transmission of data from the A bus to B or from the B bus to A bus depending upon the logic level of the direction control (DIR) input. The device can be disabled by the Enable input (\bar{G}) causing the buses to be effectively isolated.

DEVICE	OUTPUT	LOGIC
LS640	3-State	Inverting
LS641	Open-Collector	True
LS645	3-State	True

B1
Plastic Package

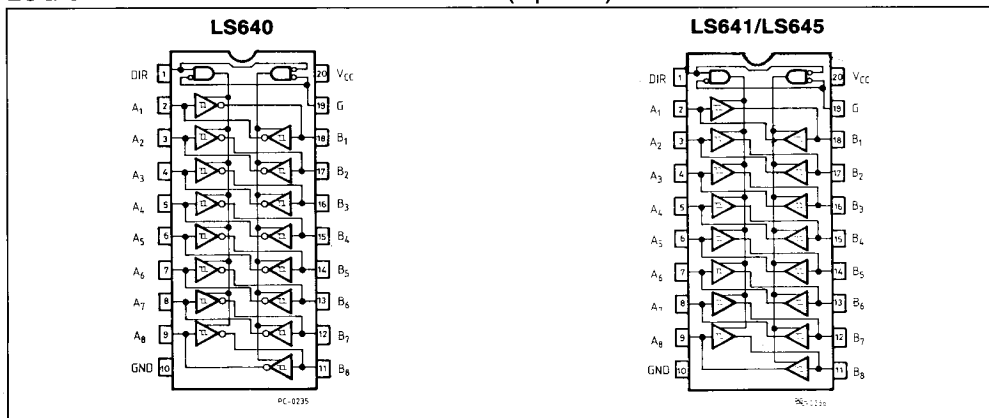
D1/D2
Ceramic Package

M1
Micro Package

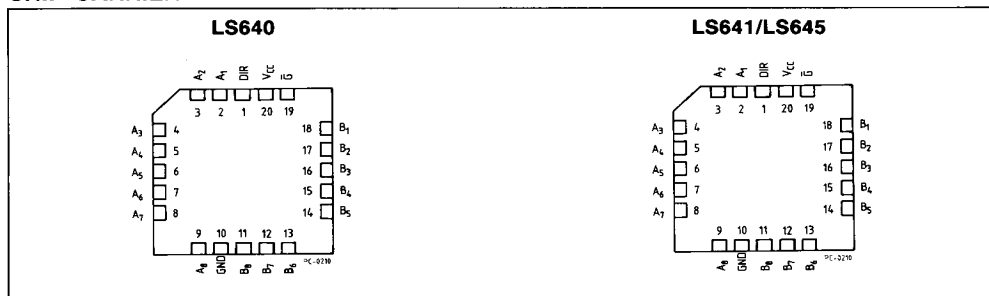
C1
Plastic Chip Carrier

ORDERING NUMBERS:
 T54LSXXX D2 T74LSXXX C1
 T74LSXXX D1 T74LSXXX M1
 T74LSXXX B1

LOGIC AND CONNECTION DIAGRAMS DIP (top view)



CHIP CARRIER





TRUTH TABLE

CONTROL INPUTS		OPERATION	
		LS640	LS641 LS645
\bar{G}	DIR		
L	L	\bar{B} data to A bus	B data to A bus
L	H	\bar{A} data to B bus	A data to B bus
H	X	Isolation	Isolation

L = LOW Voltage Level,
H = HIGH Voltage Level
X = Don't Care

ABSOLUTE MAXIMUM RATINGS

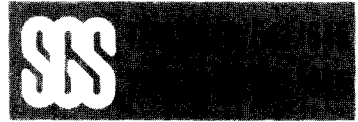
Symbol	Parameter	Value	Unit
V_{CC}	Supply Voltage	- 0.5 to 7	V
V_I	Input Voltage, Applied to Input	- 0.5 to 15	V
V_O	Output Voltage, Applied to Output	0 to 10	V
I_I	Input Current, Into Inputs	- 30 to 5	mA
I_O	Output Current, Into Outputs	50	mA

Stresses in excess of those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. This is a stress rating only and functional operation of the device at these or any other conditions in excess of those indicated in the operational sections of this specification is not implied. Exposure to absolute maximum rating conditions for extended periods may affect device reliability.

GUARANTEED OPERATING RANGES

Part Numbers	Supply Voltage			Temperature
	Min	Typ	Max	
T54LS640/641/645D2	4.5 V	5.0 V	5.5 V	- 55°C to + 125°C
T74LS640/641/645XX	4.75 V	5.0 V	5.25 V	0°C to + 70°C

XX = package type.



DC CHARACTERISTICS OVER OPERATING TEMPERATURE RANGE(T54LS/T74LS640/645)

Symbol	Parameter		Limits			Test Conditions (Note 1)	Units	
			Min.	Typ.	Max.			
V _{IH}	Input HIGH Voltage		2.0			Guaranteed input HIGH Voltage for all Inputs	V	
V _{IL}	Input LOW Voltage	54			0.5	Guaranteed input LOW Voltage for all Inputs	V	
		74			0.6			
V _{CD}	Input Clamp Diode Voltage			-0.65	-1.5	V _{CC} = MIN, I _{IN} = -18mA	V	
V _{OH}	Output HIGH Voltage	54,74	2.4	3.4		V _{CC} = MIN, I _{OH} = -3.0mA	V	
		54	2.0			I _{OH} = -12mA	V	
		74	2.0			I _{OH} = -15mA		
V _{OL}	Output LOW Voltage	54,74		0.25	0.4	I _{OL} = 12mA	V _{CC} = MIN, V _{IN} = V _{IL} or V _{IH} per Truth Table	V
		74		0.35	0.5	I _{OL} = 24mA		
I _{OZH}	Output Off Current HIGH				20	V _{CC} = MAX, V _{OUT} = 2.7V	μA	
I _{OZL}	Output Off Current LOW				-400	V _{CC} = MAX, V _{OUT} = 0.4V	μA	
I _{IH}	Input HIGH Current A or B DIR or \bar{G} DIR or \bar{G} A or B				20	V _{CC} = MAX, V _{IN} = 2.7V	μA mA	
					0.1	V _{CC} = MAX, V _{IN} = 7.0V		
					0.1	V _{CC} = MAX, V _{IN} = 5.5V		
I _{IL}	Input LOW Current				-0.4	V _{CC} = MAX, V _{IN} = 0.4V	mA	
I _{OS}	Output Short Circuit Current (Note 2)		-40		-225	V _{CC} = MAX, V _{OUT} = 0V	mA	
I _{CC}	Power Supply Current Total, Output HIGH Total, Output LOW Total at HIGH Z				70 90 95	V _{CC} = MAX	mA	

AC CHARACTERISTICS: T_A = 25°C (T54LS/T74LS640/645)

Symbol	Parameter	Limits						Test Conditions	Units
		LS640			LS645				
		Min.	Typ.	Max.	Min.	Typ.	Max.		
t _{PLH}	Propagation Delay, A to B		6.0	10		8.0	15	C _L = 45pF R _L = 667Ω	ns
t _{PHL}			8.0	15		11	15		
t _{PLH}	Propagation Delay, B to A		6.0	10		8.0	15		ns
t _{PHL}			8.0	15		11	15		
t _{PZL}	Output Enable Time, \bar{G} DIR to A		31	40		31	40		ns
t _{PZH}			23	40		26	40		
t _{PZL}	Output Enable Time, \bar{G} DIR to B		31	40		31	40		ns
t _{PZH}			23	40		26	40		
t _{PLZ}	Output Disable Time, \bar{G} DIR to A		15	25		15	25	C _L = 5.0pF	ns
t _{PHZ}			15	25		15	25		
t _{PLZ}	Output Disable Time, \bar{G} DIR to B		15	25		15	25		ns
t _{PHZ}			15	25		15	25		

Notes:

- 1) For conditions shown as MIN or MAX, use the appropriate value specified under guaranteed operating ranges.
- 2) Not more than one output should be shorted at a time.
- 3) Typical values are at V_{CC} = 5.0V, T_A = 25°C



DC CHARACTERISTICS OVER OPERATING TEMPERATURE RANGE (T54LS/T74LS641)

Symbol	Parameter		Limits			Test Conditions (Note 1)	Units
			Min.	Typ.	Max.		
V _{IH}	Input HIGH Voltage		2.0			Guaranteed input HIGH Voltage for all Inputs	V
V _{IL}	Input LOW Voltage	54			0.5	Guaranteed input LOW Voltage for all Inputs	V
		74			0.6		
V _{CD}	Input Clamp Diode Voltage			-0.65	-1.5	V _{CC} = MIN, I _{IN} = -18mA	V
I _{OH}	Output HIGH Current				100	V _{CC} = MIN, V _{OH} = 5.5V	μA
V _{OL}	Output LOW Voltage	54,74		0.25	0.4	I _{OL} = 12mA V _{CC} = MIN, V _{IN} = V _{IL} or V _{IH} per Truth Table	V
		74		0.35	0.5		
I _{IH}	Input HIGH Current				20 0.1	V _{CC} = MAX, V _{IN} = 2.7V V _{CC} = MAX, V _{IN} = 7.0V	μA mA
I _{IL}	Input LOW Current				-0.4	V _{CC} = MAX, V _{IN} = 0.4V	mA
I _{CC}	Power Supply Current					V _{CC} = MAX	mA
	Total, Output HIGH				70		
	Total, Output LOW				90		
	Total at HIGH Z				95		

AC CHARACTERISTICS: T_A = 25°C (T54LS/T74LS641)

Symbol	Parameter		Limits			Test Conditions	Units
			Min.	Typ.	Max.		
t _{PLH} t _{PHL}	Propagation Delay, A to B			17 16	25 25	V _{CC} = 5.0V C _L = 45pF R _L = 667Ω	ns
t _{PLH} t _{PHL}	Propagation Delay, B to A			17 16	25 25		ns
t _{PLH} t _{PHL}	Propagation Delay, G, DIR to A			23 34	40 50		ns
t _{PLH} t _{PHL}	Propagation Delay, G, DIR to B			25 37	40 50		ns

Notes:

- 1) For conditions shown as MIN or MAX, use the appropriate value specified under guaranteed operating ranges.
- 2) Typical values are at V_{CC} = 5.0V, T_A = 25°C