



U74LVC640

CMOS IC

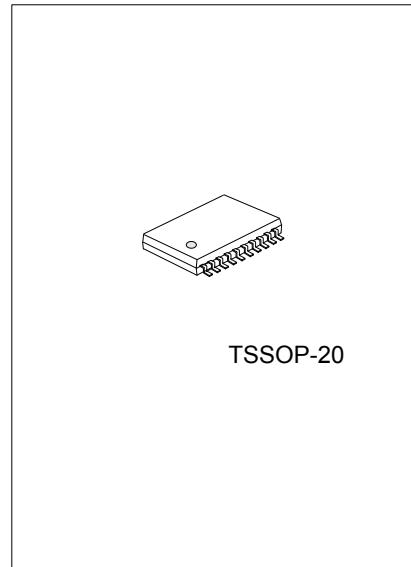
OCTAL BUS TRANSCEIVER WITH 3-STATE INVERTING OUTPUTS

DESCRIPTION

The **U74LVC640** is designed for asynchronous communication between data buses and has inverting outputs. While the direction-control(DIR) input is high, data transmits from the A bus to the B bus. In contrast, Data transmits from the B bus to the A bus DIR input is low. The output-enable(\overline{OE}) will disable the device and isolate from the buses when high voltage is applied on it.

FEATURES

- * Supply Voltage Range From 1.2V to 3.6V
- * Input Accept Voltages up to 5.5V
- * Partial-Power-Down Mode Operation
- * Max t_{pd} is 6.3ns at 3.3V

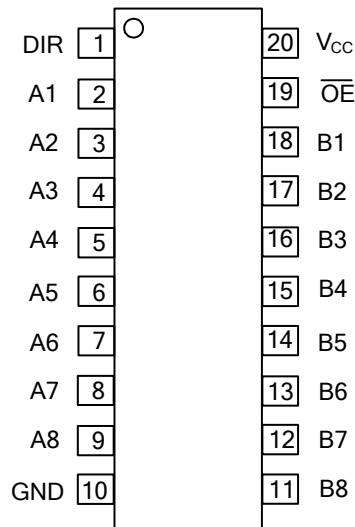


ORDERING INFORMATION

Ordering Number	Package	Packing
U74LVC640G-P20-R	TSSOP-20	Tape Reel

U74LVC640G-P20-R 	(1) Packing Type (2) Package Type (3) Halogen Free	(1) R: Tape Reel, T: Tube (2) P20: TSSOP-20 (3) G: Halogen Free
----------------------	--	---

■ PIN CONFIGURATION

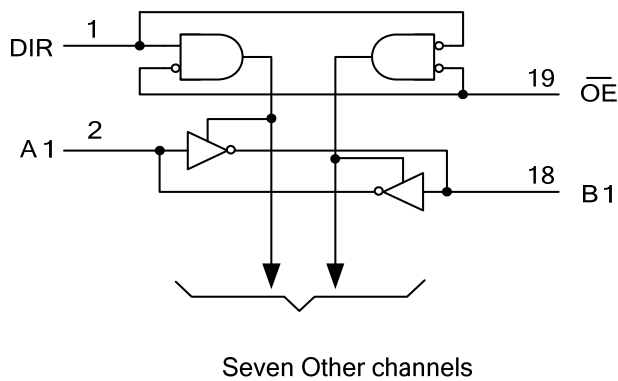


■ FUNCTION TABLE

INPUT		FUNCTION
\overline{OE}	DIR	
H	X	Isolation
L	H	Transmit data from A bus to B bus, B=A
L	L	Transmit data from B bus to A bus, A=B

Note: H: HIGH voltage level L: LOW voltage level X: Don't care

■ LOGIC DIAGRAM (Negative Logic)



■ ABSOLUTE MAXIMUM RATING

PARAMETER	SYMBOL	RATINGS	UNIT
Supply Voltage	V_{CC}	-0.5~6.5	V
Input Voltage	V_{IN}	-0.5~ 6.5	V
Voltage Applied To Output In High-Impedance Or Power-Off State	V_{OUT}	-0.5~6.5	V
Voltage applied to output in high or low state		-0.5~ $V_{CC}+0.5$	
Input Clamp Current	I_{IK}	-50	mA
Output Clamp Current	I_{OK}	-50	mA
Output Current	I_{OUT}	±50	mA
V_{CC} or GND Current	I_{CC}	±100	mA
Storage Temperature	T_{STG}	-65 ~ +150	°C

Note: 1. Absolute maximum ratings are those values beyond which the device could be permanently damaged. Absolute maximum ratings are stress ratings only and functional device operation is not implied.

■ OPERATING CHARACTERISTICS

PARAMETER	SYMBOL	TEST CONDITIONS	TYP	UNIT	
Power Dissipation Capacitance Per Transceiver	C_{PD}	$\overline{OE} = 0$ f=10MHZ	$V_{CC} = 1.8V$	42	pF
			$V_{CC} = 2.5V$	43	
			$V_{CC} = 3.3V$	45	
		$\overline{OE} = 1$ f=10MHZ	$V_{CC} = 1.8V$	1	
			$V_{CC} = 2.5V$	1	
			$V_{CC} = 3.3V$	2	

■ RECOMMENDED OPERATING CONDITIONS

PARAMETER	SYMBOL	TEST CONDITIONS	Min	TYP	Max	UNIT
Supply Voltage	V_{CC}	Operating	1.65		3.6	V
		Data retention only	1.5			
High-Level Input Voltage	V_{IH}	$V_{CC} = 1.65 V \sim 1.95 V$	0.65* V_{CC}			V
		$V_{CC} = 2.3 V \sim 2.7 V$	1.7			
		$V_{CC} = 2.7 V \sim 3.6 V$	2			
Low-Level Input Voltage	V_{IL}	$V_{CC} = 1.65 V \sim 1.95 V$			0.35* V_{CC}	V
		$V_{CC} = 2.3 V \sim 2.7 V$			0.7	
		$V_{CC} = 2.7 V \sim 3.6 V$			0.8	
Input Voltage	V_{IN}		0		5.5	V
Output Voltage	V_{OUT}		0		V_{CC}	V
Output High Current	I_{OH}	$V_{CC} = 1.65 V$			-4	mA
		$V_{CC} = 2.3 V$			-8	
		$V_{CC} = 2.7 V$			-12	
		$V_{CC} = 3 V$			-24	
Output Low Current	I_{OL}	$V_{CC} = 1.65 V$			4	mA
		$V_{CC} = 2.3 V$			8	
		$V_{CC} = 2.7 V$			12	
		$V_{CC} = 3 V$			24	

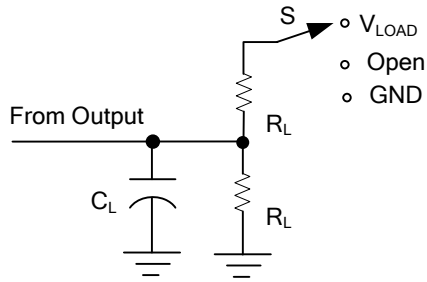
■ ELECTRICAL CHARACTERISTICS

PARAMETER	SYMBOL	TEST CONDITIONS	Min	TYP	Max	UNIT
High-Level Output Voltage	V _{OH}	I _{OH} = -100μA, V _{CC} =1.65 V to 3.6 V	V _{CC} -0.2			V
		I _{OH} = -4mA, V _{CC} =1.65V	1.29			
		I _{OH} = -8mA, V _{CC} =2.3V	1.9			
		I _{OH} = -12mA, V _{CC} =2.7V	2.2			
		I _{OH} = -12mA, V _{CC} =3V	2.4			
		I _{OH} = -24mA, V _{CC} =3V	2.3			
Low-Level Output Voltage	V _{OL}	I _{OH} = 100μA, V _{CC} =1.65 V to 3.6 V			0.1	V
		I _{OH} = 4mA, V _{CC} =1.65V			0.24	
		I _{OH} = 8mA, V _{CC} =2.3V			0.3	
		I _{OH} = 12mA, V _{CC} =2.7V			0.4	
		I _{OH} = 24mA, V _{CC} =3V			0.55	
Input Current	I _{I(LEAK)}	V _{IN} = 5.5 V or GND, V _{CC} =3.6V			±1	μA
Power OFF Leakage Current	I _{OFF}	V _{IN} = 5.5 V or GND, V _{CC} =0V			±1	μA
Output Off-State Current	I _{OZ}	V _{OUT} = 0 to 5.5 V, V _{CC} =3.6V			±1	μA
Quiescent Supply Current	I _Q	V _{IN} =V _{CC} or GND, I _{OUT} =0, V _{CC} =3.6V			1	μA
		V _{IN} =3.6~5.5V, I _{OUT} =0, V _{CC} =3.6V			1	μA
Additional Quiescent Current Per Input Pin	ΔI _Q	V _{CC} =2.7V ~ 3.6V, V _{IN} = V _{CC} -0.6V, I _{OUT} =0			500	μA

■ SWITCHING CHARACTERISTICS

PARAMETER	SYMBOL	TEST CONDITIONS	Min	TYP	Max	UNIT
Propagation Delay (From A to B Or From B to A)	t _{PLH} / t _{PHL}	V _{CC} =1.8 V ± 0.15 V	1	6	12.2	ns
		V _{CC} =2.5 V ± 0.2 V	1	3.9	7.8	
		V _{CC} =2.7 V	1	4.2	7.1	
		V _{CC} =3.3 V ± 0.3 V	1.5	3.8	6.1	
3-State Output Enable Time (From \overline{OE} to A or B)	t _{PZH} / t _{PZL}	V _{CC} =1.8 V ± 0.15 V	1	7	14.8	ns
		V _{CC} =2.5 V ± 0.2 V	1	4.5	10	
		V _{CC} =2.7 V	1	5.4	9.3	
		V _{CC} =3.3 V ± 0.3 V	1.5	4.4	8.3	
3-State Output Disable Time (From \overline{OE} A to A or B)	t _{PLZ} / t _{PLH}	V _{CC} =1.8 V ± 0.15 V	1	7.8	16.5	ns
		V _{CC} =2.5 V ± 0.2 V	1	4	9	
		V _{CC} =2.7 V	1	4.4	8.3	
		V _{CC} =3.3 V ± 0.3 V	1.7	4.1	7.3	

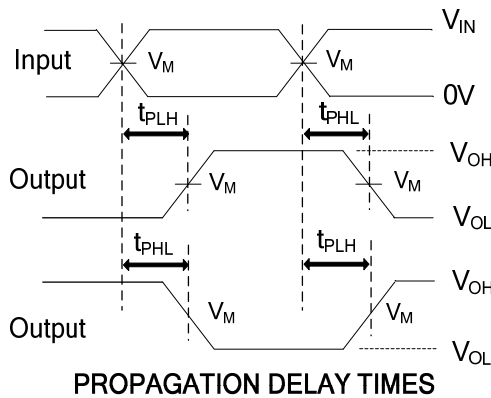
■ TEST CIRCUIT AND WAVEFORMS



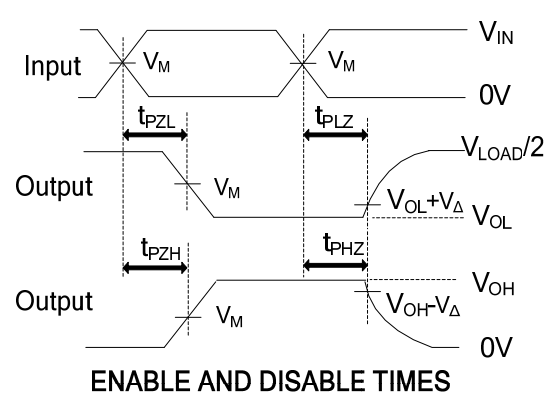
TEST	S
t_{PLH}/t_{PHL}	Open
t_{PHZ}/t_{PZH}	GND
t_{PLZ}/t_{PZL}	V_{LOAD}

TEST CIRCUIT

V_{CC}	INPUTS		V_M	V_{Δ}	C_L	R_L	V_{LOAD}
	V_{IN}	t_r/t_f					
$1.8V \pm 0.15V$	V_{CC}	$\leq 2ns$	$V_{CC}/2$	0.15V	30 pF	1 kΩ	$2 \times V_{CC}$
$2.5V \pm 0.2V$	V_{CC}	$\leq 2ns$	$V_{CC}/2$	0.15V	30 pF	500Ω	$2 \times V_{CC}$
2.7 V	2.7 V	$\leq 2.5ns$	1.5V	0.3V	50 pF	500Ω	6V
$3.3V \pm 0.3V$	2.7 V	$\leq 2.5ns$	1.5V	0.3V	50 pF	500Ω	6V



PROPAGATION DELAY TIMES



ENABLE AND DISABLE TIMES

Note: C_L includes probe and jig capacitance.

All input pulses are supplied by generators having the following characteristics: PRR $\leq 10MHz$, $Z_o = 50\Omega$.

UTC assumes no responsibility for equipment failures that result from using products at values that exceed, even momentarily, rated values (such as maximum ratings, operating condition ranges, or other parameters) listed in products specifications of any and all UTC products described or contained herein. UTC products are not designed for use in life support appliances, devices or systems where malfunction of these products can be reasonably expected to result in personal injury. Reproduction in whole or in part is prohibited without the prior written consent of the copyright owner. The information presented in this document does not form part of any quotation or contract, is believed to be accurate and reliable and may be changed without notice.