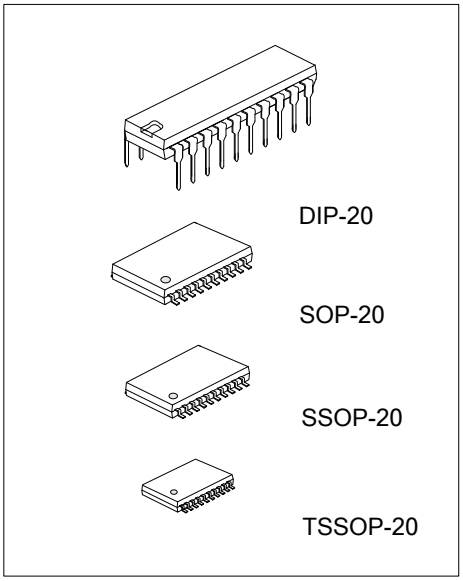
U74HCT640

CMOS IC

OCTAL BUS TRANSCEIVERS WITH 3-STATE OUTPUTS



■ DESCRIPTION

The **U74HCT640** is a octal bus transceivers with 3-state outputs. It is designed for asynchronous two-way communication between data buses. Depending on the direction-control (DIR) input, data are transmitted from the A bus to the B bus or from B bus to the A bus.

When $\overline{OE}$ is high, the buses are effectively isolated. When $\overline{OE}$ is low, the buses are enable.

■ FEATURES

* Inputs are TTL-voltage compatible
* Typical t_{PD} of 12ns at 5.5V, C_L=50pF
* Low power consumption, I_{CC} = 8μA (Max) at 5.5V
* ±6mA output driver at 4.5V

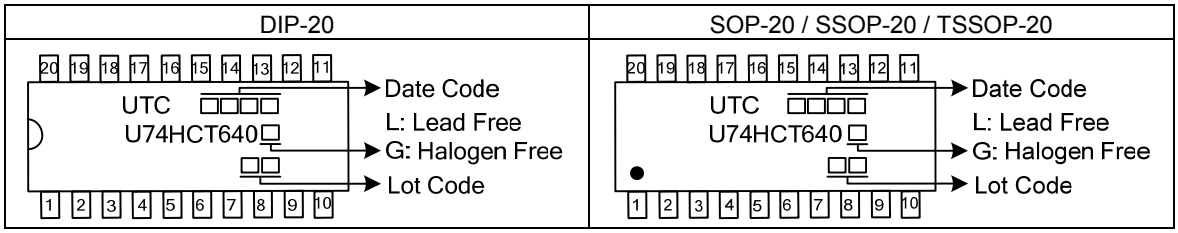
■ ORDERING INFORMATION

Ordering Number		Package	Packing
Lead Free	Halogen Free		
U74HCT640L-D20-T	U74HCT640G-D20-T	DIP-20	Tube
U74HCT640L-S20-R	U74HCT640G-S20-R	SOP-20	Tape Reel
U74HCT640L-R20-R	U74HCT640G-R20-R	SSOP-20	Tape Reel
U74HCT640L-P20-R	U74HCT640G-P20-R	TSSOP-20	Tape Reel

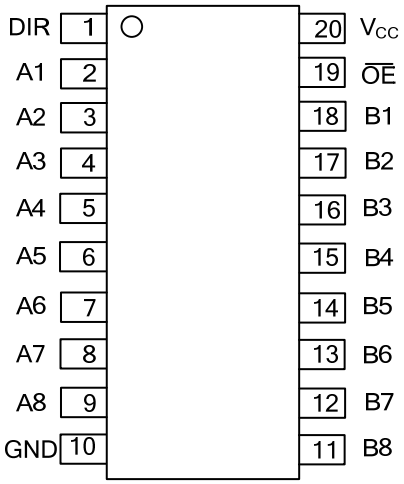
U74HCT640G-D20-T
(1)Packing Type
(2)Package Type
(3)Green Package

(1) R: Tape Reel, T: Tube
(2) D20: DIP-20, P20: TSSOP-20, R20: SSOP-20, S20: SOP-20
(3) G: Halogen Free and Lead Free, L: Lead Free

■ MARKING



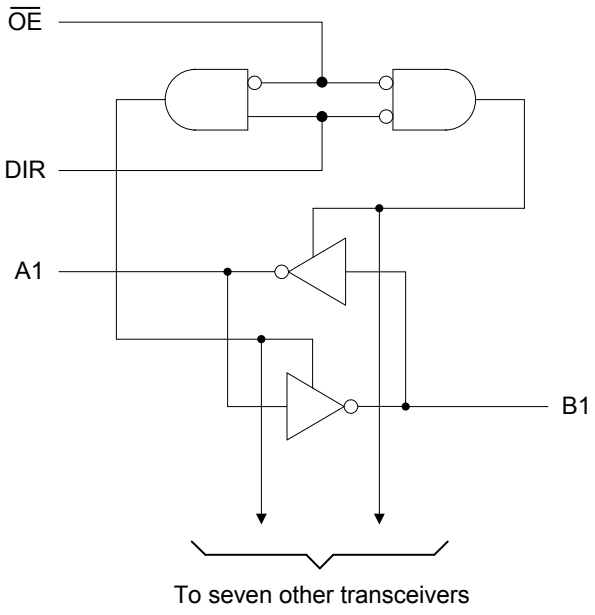
■ PIN CONFIGURATION



■ FUNCTION TABLE (each buffer)

INPUTS		OPERATION
$\overline{OE}$	DIR	
L	L	$\overline{B}$ data to A bus
L	H	$\overline{A}$ data to B bus
H	X	Isolation

■ LOGIC DIAGRAM (positive logic)



■ ABSOLUTE MAXIMUM RATING (Unless otherwise specified)

PARAMETER	SYMBOL	RATINGS	UNIT
Supply Voltage	V_{CC}	-0.5 ~ 7	V
Input Voltage	V_{IN}	-0.5 ~ 7	V
Output Voltage	V_{OUT}	-0.5 ~ V_{CC}+0.5	V
Input Clamp Current (V_{IN}<0)	I_{IK}	±20	mA
Output Clamp Current (V_{OUT}<0, or V_{OUT}>V_{CC})	I_{OK}	±20	mA
Output Current	I_{OUT}	±25	mA
V_{CC} or GND Current	I_{CC}	±50	mA
Storage Temperature	T_{STG}	-65 ~ +150	°C

Note: 1. The input and output voltage ratings may be exceeded if the input and output current ratings are observed.
2. 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.

■ RECOMMENDED OPERATING COMDITIONS

PARAMETER	SYMBOL	CONDITIONS	MIN	TYP	MAX	UNIT
Supply Voltage	V_{CC}		4.5	5	5.5	V
High-Level Input Voltage	V_{IH}	V_{CC} = 4.5V to 5.5V	2			V
Low-Level Input Voltage	V_{IL}	V_{CC} = 4.5V to 5.5V	0		0.8	V
Input Voltage	V_{IN}		0		V_{CC}	V
Output Voltage	V_{OUT}		0		V_{CC}	V
Input Rise and Fall Times	t_R, t_F	V_{CC} = 4.5V	0		500	ns
Operating Temperature	T_A		-40		+125	°C

■ ELECTRICAL CHARACTERISTICS (Unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
High-Level Output Voltage	V_{OH}	I_{OH}=-20μA, V_{CC}=4.5V	4.4	4.499		V
		I_{OH}=-6mA, V_{CC}=4.5V	3.98	4.30		
Low-Level Output Voltage	V_{OL}	I_{OL}=20μA, V_{CC}=4.5V		0.001	0.1	V
		I_{OL}=6mA, V_{CC}=4.5V		0.17	0.26	
Input Leakage Current (DIR or $\overline{OE}$)	$I_{I(LEAK)}$	V_{IN}=V_{CC} or 0, V_{CC}=5.5V		±0.1	±100	μA
High-Impedance State Current (A or B)	I_{OZ}	V_{OUT}= V_{CC} or 0, V_{CC}=5.5V		±0.01	±0.5	μA
Quiescent Supply Current	I_{CC}	V_{IN}=V_{CC} or 0, I_{OUT}=0, V_{CC}=5.5V			8	μA
Additional Quiescent Supply Current	ΔI_{CC}	One input at 0.5V or 2.4V, other inputs at 0V or V_{CC}, V_{CC} =5.5V		1.4	2.4	mA
Input Capacitance (DIR or $\overline{OE}$)	C_{IN}	V_{IN}=V_{CC} or 0, V_{CC}=4.5V to 5.5V		3	10	pF

■ SWITCHING CHARACTERISTICS (Unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Propagation delay from A to B or B to A	t_{PD}	V_{CC}=4.5V, C_L=50pF, R_L=1kΩ		14	21	ns
		V_{CC}=5.5V, C_L=50pF, R_L=1kΩ		12	18	
Enable times from $\overline{OE}$ to A or B	t_{EN}	V_{CC}=4.5V, C_L=50pF, R_L=1kΩ		27	35	ns
		V_{CC}=5.5V, C_L=50pF, R_L=1kΩ		24	32	
Disable times from $\overline{OE}$ to A or B	t_{DIS}	V_{CC}=4.5V, C_L=50pF, R_L=1kΩ		20	30	ns
		V_{CC}=5.5V, C_L=50pF, R_L=1kΩ		18	26	
Output rise or fall time	t_T	V_{CC}=4.5V, C_L=50pF, R_L=1kΩ		9	12	ns
		V_{CC}=5.5V, C_L=50pF, R_L=1kΩ		8	11	

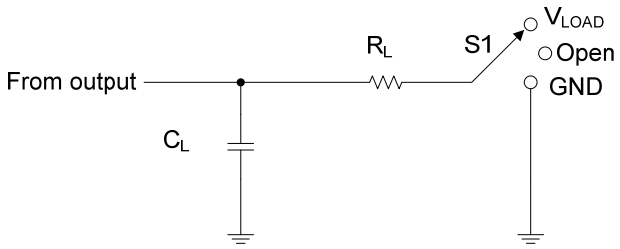
■ SWITCHING CHARACTERISTICS (Unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Propagation delay from A to B or B to A	t_{PD}	V_{CC}=4.5V, C_L=150pF, R_L=1kΩ		17	27	ns
		V_{CC}=5.5V, C_L=150pF, R_L=1kΩ		15	24	
Enable times from $\overline{OE}$ to A or B	t_{EN}	V_{CC}=4.5V, C_L=150pF, R_L=1kΩ		31	45	ns
		V_{CC}=5.5V, C_L=150pF, R_L=1kΩ		28	41	
Output rise or fall time	t_T	V_{CC}=4.5V, C_L=150pF, R_L=1kΩ		17	42	ns
		V_{CC}=5.5V, C_L=150pF, R_L=1kΩ		14	38	

■ OPERATING CHARACTERISTICS (Unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	TYP	UNIT
Power dissipation capacitance	C_{PD}	No load	40	pF

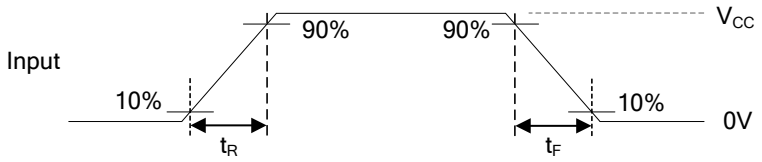
■ TEST CIRCUIT AND WAVEFORMS



Test Circuit

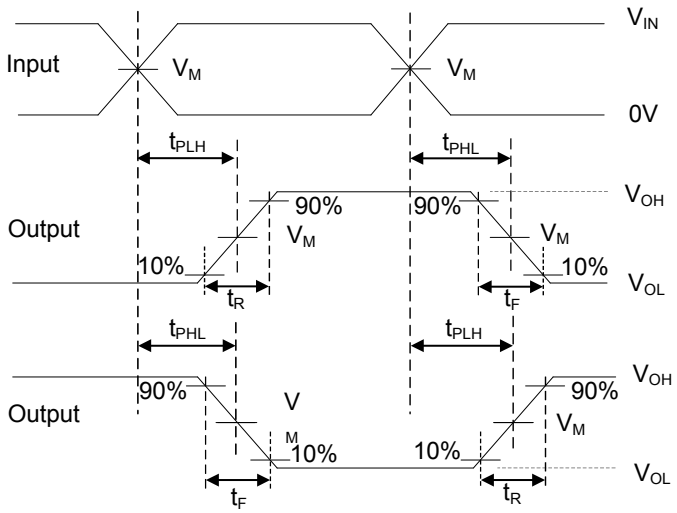
TEST	S1
t_{PLH}/t_{PHL}	Open
t_{PLZ}/t_{PZL}	V_{LOAD}
t_{PHZ}/t_{PZH}	GND

V_{CC}	Input		V_M	V_{LOAD}	C_L	R_L	V_Δ
	V_{IN}	t_R, t_F					
5V±0.5V	V_{CC}	≤6ns	$V_{CC}/2$	V_{CC}	50pF 150pF	1kΩ	0.5V

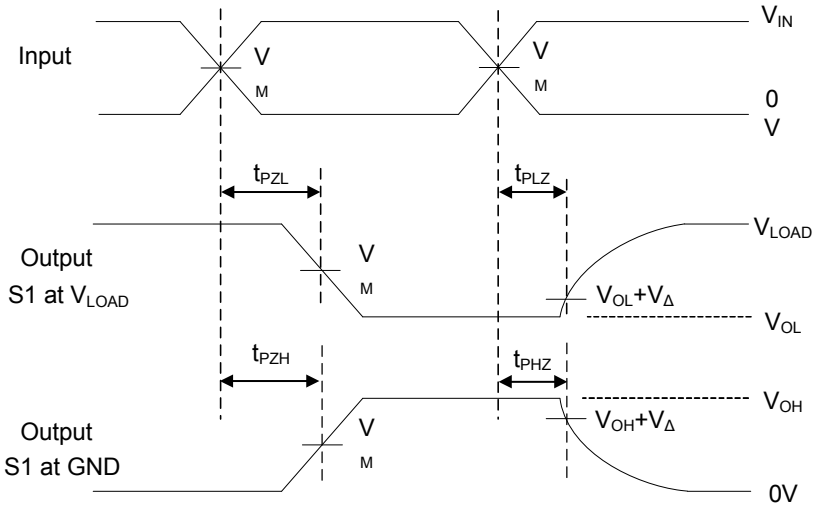


Voltage Waveforms Input Rise and Fall Times

■ TEST CIRCUIT AND WAVEFORMS (Cont.)



Voltage Waveforms
Propagation Delay and Output Transition Times



Voltage Waveforms Enable and Disable Times

Notes: 1. C_L includes probe and jig capacitance.
2. All input pulses are supplied by generators having the following characteristics: P_{RR} ≤1MHz, Z_O = 50Ω, t_R=6ns, t_F=6ns.
3. t_{PLH} and t_{PHL} are the same as t_{PD} .
4. t_{PLZ} and t_{PHZ} are the same as t_{DIS} .
5. t_{PZH} and t_{PZL} are the same as t_{EN} .