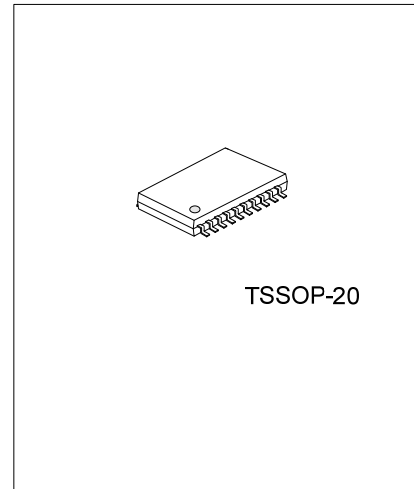




# U74HC563

CMOS IC

## OCTAL TRANSPARENT D-TYPE LATCHES WITH 3-STATE OUTPUTS



### DESCRIPTION

The UTC **74HC563** are octal D-type transparent latches featuring separated D-type inputs for each latch and inverting 3-state outputs for bus-oriented applications.

### FEATURES

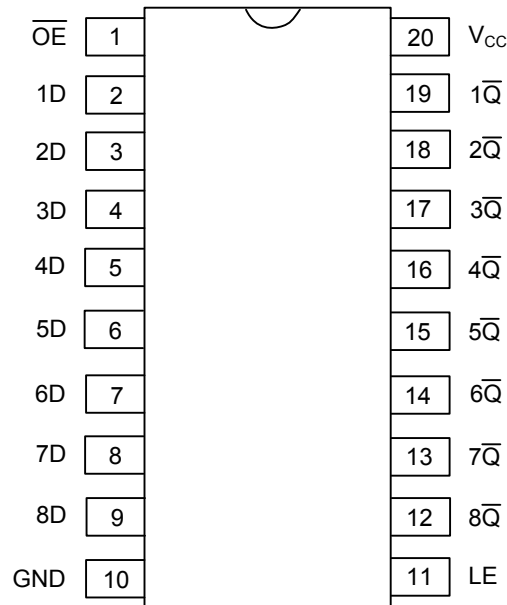
- \* Operation Voltage Range:2~6V
- \* 3-state Inverting Outputs for Bus-oriented Applications
- \* Common 3-state Output Enable Input

### ORDERING INFORMATION

Ordering Number		Package	Packing
Lead Free	Halogen Free		
U74HC563L-P20-R	U74HC563G-P20-R	TSSOP-20	Tape Reel
U74HC563L-P20-T	U74HC563G-P20-T	TSSOP-20	Tube

<p>U74HC563L-P20-T</p> <p>(1)Packing Type (2)Package Type (3)Lead Free</p>	<p>(1) R: Tape Reel, T: Tube (2) P20: TSSOP-20 (3) G: Halogen Free, L: Lead Free</p>
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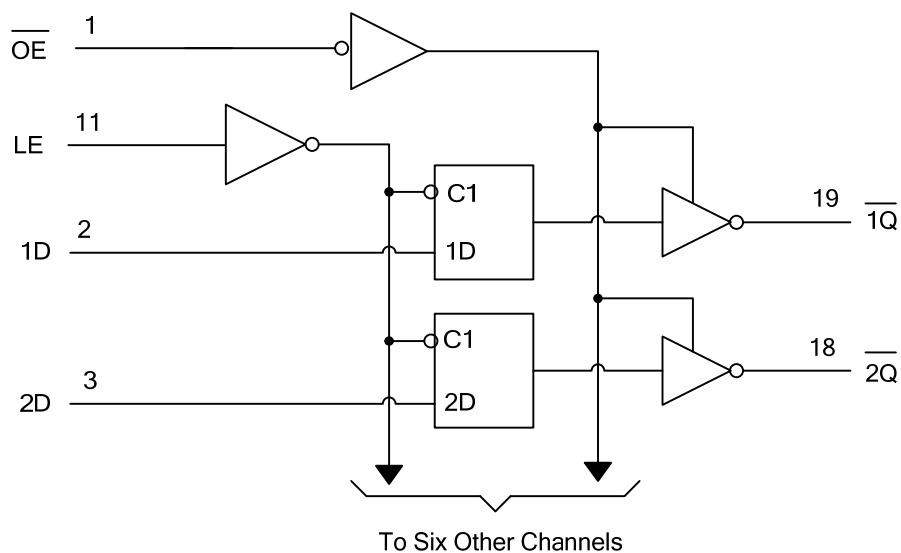
■ PIN CONFIGURATION



■ FUNCTION TABLE

INPUTS( $\overline{OE}$ )	INPUTS(LE)	INPUTS(D)	OUTPUT( $\overline{Q}$ )
L	H	H	L
L	H	L	H
L	L	X	$\overline{Q}_0$
H	X	X	Z

■ LOGIC DIAGRAM



■ ABSOLUTE MAXIMUM RATING(unless otherwise specified)

PARAMETER	SYMBOL	RATINGS	UNIT
Supply Voltage	$V_{CC}$	-0.5~7.0	V
Input Voltage	$V_{IN}$	-0.5~ $V_{CC}+0.5$	V
Output Voltage(active mode)	$V_{OUT}$	-0.5~ $V_{CC}+0.5$	V
Input Clamp Current ( $V_{IN}<0$ )	$I_{IK}$	$\pm 20$	mA
Output Clamp Current ( $V_{OUT}<0$ )	$I_{OK}$	$\pm 20$	mA
Output Current	$I_{OUT}$	$\pm 35$	mA
$V_{CC}$ or GND Current	$I_{CC}$	$\pm 70$	mA
Storage Temperature	$T_{STG}$	-65 ~ +150	°C

Notes: 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.

■ RECOMMENDED OPERATING COMDITIONS

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Supply Voltage	$V_{CC}$		2	5	6	V
Input Voltage	$V_{IN}$		0		$V_{CC}$	V
Output Voltage	$V_{OUT}$		0		$V_{CC}$	V
Operating Temperature	$T_{OPR}$		-40		85	°C
Input Transition Rise or Fall Rate	$t_r$	$V_{CC}=2V$			1000	ns
		$V_{CC}=4.5V$			500	ns
		$V_{CC}=6V$			400	ns

■ ELECTRICAL CHARACTERISTICS( $T_A=25^\circ C$ , unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
High-level input voltage	$V_{IH}$	$V_{CC}=2V$	1.5			V
		$V_{CC}=4.5V$	3.15			V
		$V_{CC}=6V$	4.2			V
Low-lever output voltage	$V_{IL}$	$V_{CC}=2V$			0.5	V
		$V_{CC}=4.5V$			1.35	V
		$V_{CC}=6V$			1.8	V
High-Level Output Voltage	$V_{OH}$	$V_{CC}=2V, I_{OH}=-20\mu A$	1.9	1.998		V
		$V_{CC}=4.5V, I_{OH}=-20\mu A$	4.4	4.499		V
		$V_{CC}=6V, I_{OH}=-20\mu A$	5.9	5.999		V
		$V_{CC}=4.5V, I_{OH}=-6mA$	3.98	4.3		V
		$V_{CC}=6V, I_{OH}=-7.8mA$	5.48	5.8		V
Low-Level Output Voltage	$V_{OL}$	$V_{CC}=2V, I_{OL}=20\mu A$		0.002	0.1	V
		$V_{CC}=4.5V, I_{OL}=20\mu A$		0.001	0.1	V
		$V_{CC}=6V, I_{OL}=20\mu A$		0.001	0.1	V
		$V_{CC}=4.5V, I_{OH}=6mA$		0.17	0.26	V
		$V_{CC}=6V, I_{OL}=7.8mA$		0.15	0.26	V
Input Leakage Current	$I_{I(LEAK)}$	$V_{CC}=6V, V_{IN}=V_{CC}$ or GND		$\pm 0.1$	$\pm 100$	nA
Output OFF -state current	$I_{OZ}$	$V_{CC}=6V, V_{OUT}=V_{CC}$ or GND		$\pm 0.01$	$\pm 0.5$	$\mu A$
Quiescent Supply Current	$I_Q$	$V_{CC}=6V, V_{IN}=V_{CC}$ or GND, $I_{OUT}=0$			8	$\mu A$
Input Capacitance	$C_{IN}$	$V_{CC}=6V, V_{IN}=V_{CC}$ or GND		3	10	pF

■ TIMING REQUIREMENTS( $T_A=25^{\circ}\text{C}$ , unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Pulse Duration, LE High	$t_W$	$V_{CC}=2V$	80			ns
		$V_{CC}=4.5V$	16			
		$V_{CC}=6V$	14			
Setup Time, Data Before LE $\downarrow$	$t_{SU}$	$V_{CC}=2V$	50			ns
		$V_{CC}=4.5V$	10			
		$V_{CC}=6V$	9			
Hold Time, Data After LE $\downarrow$	$t_H$	$V_{CC}=2V$	5			ns
		$V_{CC}=4.5V$	5			
		$V_{CC}=6V$	5			

■ DYNAMIC CHARACTERISTICS( $T_A=25^{\circ}\text{C}$ ,  $R_L=1k\Omega$ , unless otherwise specified)

$C_L=50pF$

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Propagation delay from input (D) to output ( $\bar{Q}$ )	$t_{PD}$ ( $t_{PLH}/t_{PHL}$ )	$V_{CC}=2V$		77	175	ns
		$V_{CC}=4.5V$		26	35	ns
		$V_{CC}=6V$		23	30	ns
Propagation delay from input (LE) to output ( $\bar{Q}$ )	$t_{PD}$ ( $t_{PLH}/t_{PHL}$ )	$V_{CC}=2V$		90	175	ns
		$V_{CC}=4.5V$		27	35	ns
		$V_{CC}=6V$		23	30	ns
3-state output enable time from input ( $\bar{OE}$ ) to output ( $\bar{Q}$ )	$t_{EN}$ ( $t_{PZL}/t_{PZH}$ )	$V_{CC}=2V$		70	150	ns
		$V_{CC}=4.5V$		24	30	ns
		$V_{CC}=6V$		21	26	ns
3-state output disable time from input ( $\bar{OE}$ ) to output ( $\bar{Q}$ )	$t_{DIS}$ ( $t_{PLZ}/t_{PHZ}$ )	$V_{CC}=2V$		47	150	ns
		$V_{CC}=4.5V$		23	30	ns
		$V_{CC}=6V$		21	26	ns
Output transition time, ( $\bar{Q}$ )	$t_T$ ( $t_R/t_F$ )	$V_{CC}=2V$		28	60	ns
		$V_{CC}=4.5V$		8	12	ns
		$V_{CC}=6V$		6	10	ns

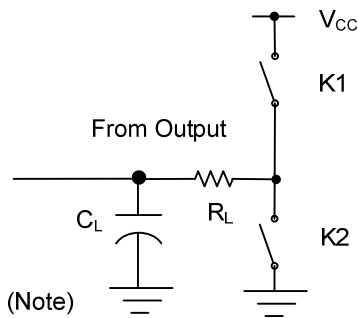
$C_L=150pF$

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Propagation delay from input (D) to output ( $\bar{Q}$ )	$t_{PD}$ ( $t_{PLH}/t_{PHL}$ )	$V_{CC}=2V$		95	200	ns
		$V_{CC}=4.5V$		33	40	ns
		$V_{CC}=6V$		29	34	ns
Propagation delay from input (LE) to output ( $\bar{Q}$ )	$t_{PD}$ ( $t_{PLH}/t_{PHL}$ )	$V_{CC}=2V$		103	225	ns
		$V_{CC}=4.5V$		33	45	ns
		$V_{CC}=6V$		29	38	ns
3-state output enable time from input ( $\bar{OE}$ ) to output ( $\bar{Q}$ )	$t_{EN}$ ( $t_{PZL}/t_{PZH}$ )	$V_{CC}=2V$		85	200	ns
		$V_{CC}=4.5V$		29	40	ns
		$V_{CC}=6V$		26	34	ns
Output transition time, ( $\bar{Q}$ )	$t_T$ ( $t_R/t_F$ )	$V_{CC}=2V$		60	210	ns
		$V_{CC}=4.5V$		17	42	ns
		$V_{CC}=6V$		14	36	ns

■ OPERATING CHARACTERISTICS

PARAMETER	SYMBOL	TEST CONDITIONS	RATINGS	UNIT
Power Dissipation Capacitance	$C_{PD}$	No load	50	pF

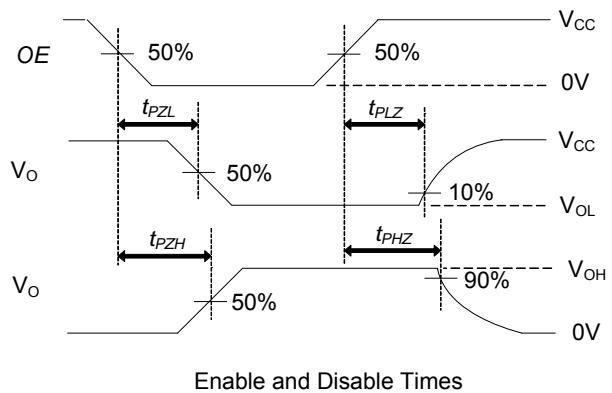
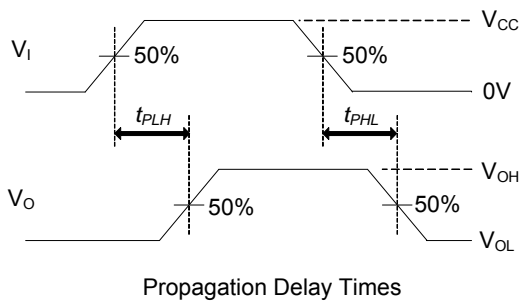
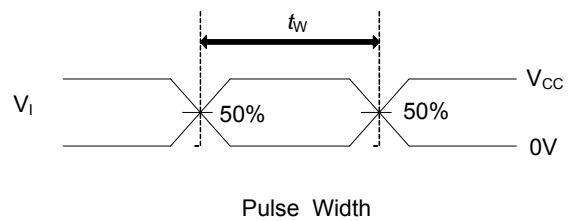
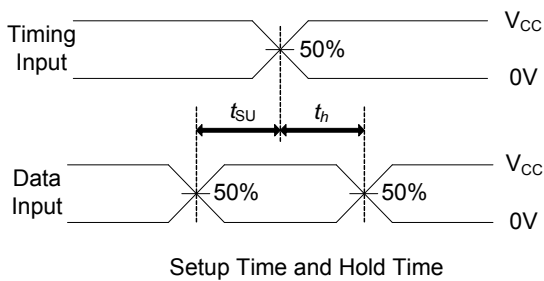
## ■ TEST CIRCUIT AND WAVEFORMS



TEST	K1	K2
$t_{PLH}/t_{PHL}$	Open	Open
$t_{PHZ}/t_{PZH}$	Open	Close
$t_{PLZ}/t_{PZL}$	Close	Open

Note:  $C_L$  includes probe and jig capacitance.

$$PRR \leq 1\text{MHz}, Z_o = 50\Omega, t_r \leq 6\text{ns}, t_f \leq 6\text{ns}$$



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