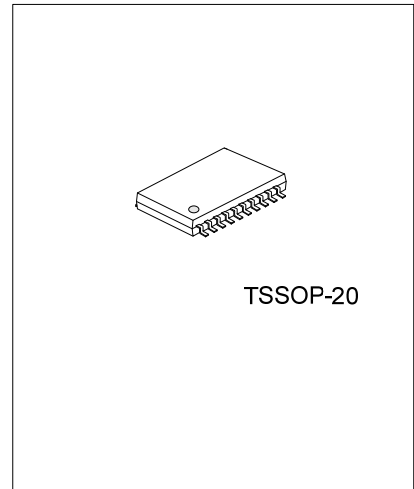




U74HC563

CMOS IC

OCTAL D-TYPE EDGE-TRIGGERED FLIP-FLOPS WITH 3-STATE OUTPUTS



DESCRIPTION

The UTC **74HC564** are octal D-type flip-flops featuring separated D-type inputs for each flip-flop and inverting 3-state outputs for bus-oriented applications.

FEATURES

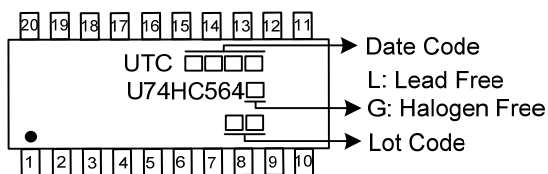
- * Operation Voltage Range: 2~6V
- * 3-state Inverting Outputs for Bus-oriented Applications
- * Common 3-state Output Enable Input

ORDERING INFORMATION

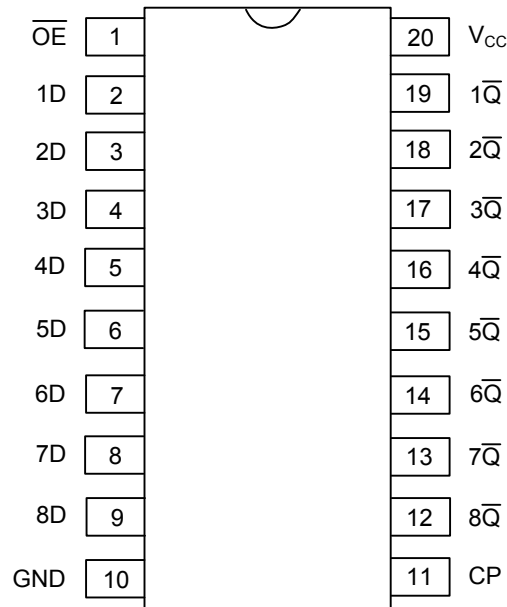
Ordering Number		Package	Packing
Lead Free	Halogen Free		
U74HC564L-P20-R	U74HC564G-P20-R	TSSOP-20	Tape Reel

<p>U74HC564G-P20-R</p> <p>(1) Packing Type (2) Package Type (3) Green Package</p>	<p>(1) R: Tape Reel (2) P20: TSSOP-20 (3) G: Halogen Free and Lead Free, L: Lead Free</p>
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MARKING



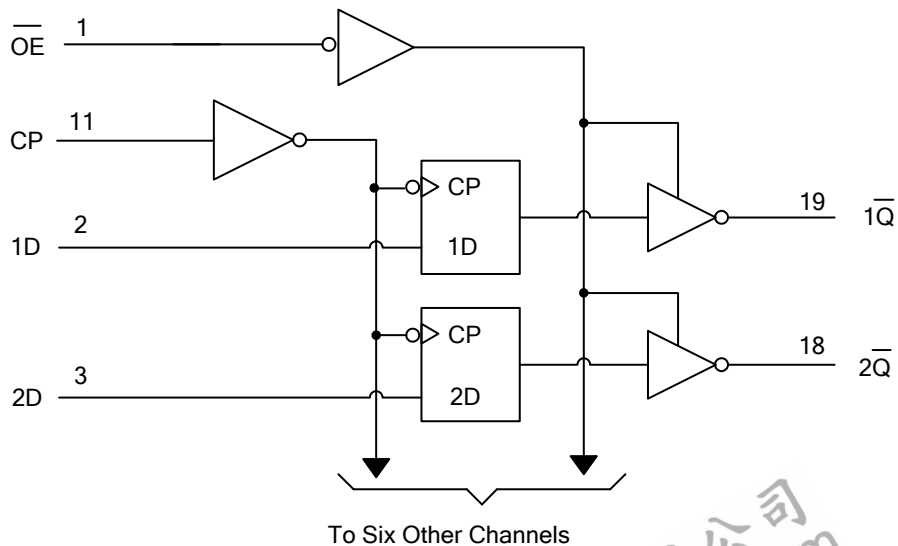
■ PIN CONFIGURATION



■ FUNCTION TABLE

INPUTS(\overline{OE})	INPUTS(CP)	INPUTS(D)	OUTPUT(\overline{Q})
L	\uparrow	H	L
L	\uparrow	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}	±20	mA
Output Clamp Current ($V_{OUT}<0$)	I_{OK}	±20	mA
Output Current	I_{OUT}	±35	mA
V_{CC} or GND Current	I_{CC}	±70	mA
Storage Temperature	T_{STG}	-65 ~ +150	°C

Note: 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
		$V_{CC}=4.5V, I_{OL}=6mA$		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		±0.1	±100	nA
Output OFF -state current	I_{OZ}	$V_{CC}=6V, V_{OUT}=V_{CC}$ or GND		±0.01	±0.5	μA
Quiescent Supply Current	I_Q	$V_{CC}=6V, V_{IN}=V_{CC}$ or GND, $I_{OUT}=0$			8	μA
Input Capacitance	C_{IN}	$V_{CC}=6V, V_{IN}=V_{CC}$ or GND		3	10	pF

■ TIMING REQUIREMENTS($T_A=25^{\circ}\text{C}$, $C_L=50\text{pF}$, unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Maximum Clock Frequency(CP)	f_{MAX}	$V_{\text{CC}}=2\text{V}$	6	11		MHz
		$V_{\text{CC}}=4.5\text{V}$	31	36		
		$V_{\text{CC}}=6\text{V}$	36	40		
Pulse duration, LE high	t_w	$V_{\text{CC}}=2\text{V}$	80			ns
		$V_{\text{CC}}=4.5\text{V}$	16			
		$V_{\text{CC}}=6\text{V}$	14			
Setup Time, data before LE ↓	t_{SU}	$V_{\text{CC}}=2\text{V}$	100			ns
		$V_{\text{CC}}=4.5\text{V}$	20			
		$V_{\text{CC}}=6\text{V}$	17			
Hold Time, data after LE ↓	t_{H}	$V_{\text{CC}}=2\text{V}$	5			ns
		$V_{\text{CC}}=4.5\text{V}$	5			
		$V_{\text{CC}}=6\text{V}$	5			

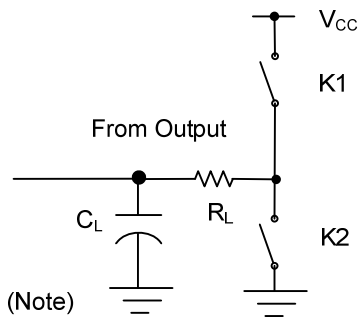
■ DYNAMIC CHARACTERISTICS($T_A=25^{\circ}\text{C}$, $C_L=50\text{pF}$, $R_L=1\text{k}\Omega$, unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Propagation delay from input (CP) to output (\bar{Q})	t_{PD} ($t_{\text{PLH}}/t_{\text{PHL}}$)	$V_{\text{CC}}=2\text{V}$		54	180	ns
		$V_{\text{CC}}=4.5\text{V}$		18	36	ns
		$V_{\text{CC}}=6\text{V}$		15	31	ns
3-state output enable time from input (\bar{OE}) to output (\bar{Q})	t_{EN} ($t_{\text{PZL}}/t_{\text{PZH}}$)	$V_{\text{CC}}=2\text{V}$		45	150	ns
		$V_{\text{CC}}=4.5\text{V}$		15	30	ns
		$V_{\text{CC}}=6\text{V}$		13	26	ns
3-state output disable time from input (\bar{OE}) to output (\bar{Q})	t_{DIS} ($t_{\text{PLZ}}/t_{\text{PHZ}}$)	$V_{\text{CC}}=2\text{V}$		45	150	ns
		$V_{\text{CC}}=4.5\text{V}$		15	30	ns
		$V_{\text{CC}}=6\text{V}$		13	26	ns
Output transition time, (\bar{Q})	t_{T} ($t_{\text{R}}/t_{\text{F}}$)	$V_{\text{CC}}=2\text{V}$		28	60	ns
		$V_{\text{CC}}=4.5\text{V}$		8	12	ns
		$V_{\text{CC}}=6\text{V}$		6	10	ns

■ OPERATING CHARACTERISTICS

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Power Dissipation Capacitance	C_{PD}	No load		100		pF

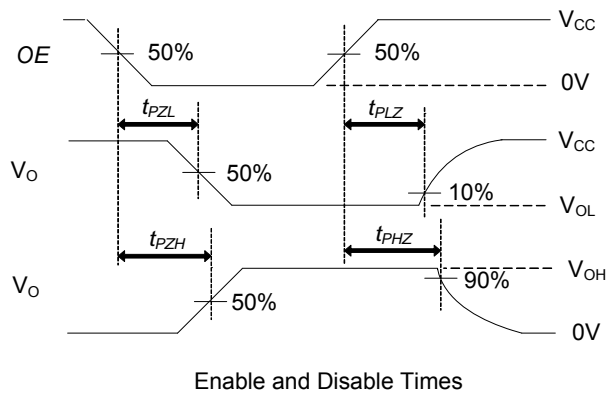
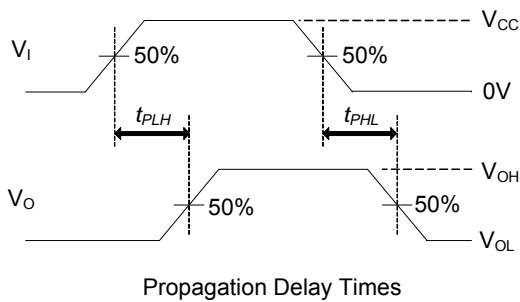
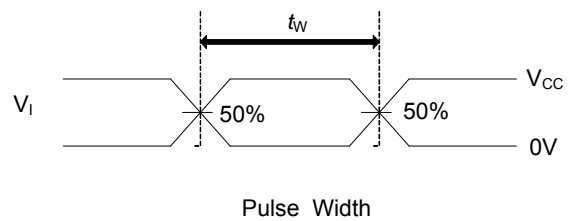
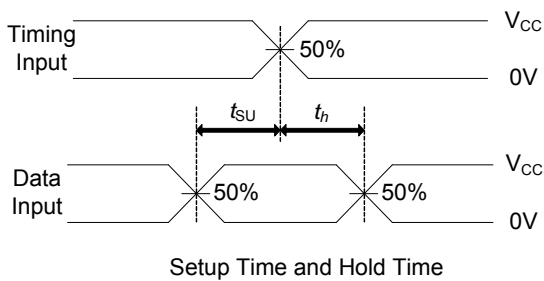
■ TEST CIRCUIT AND WAVEFORMS



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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