

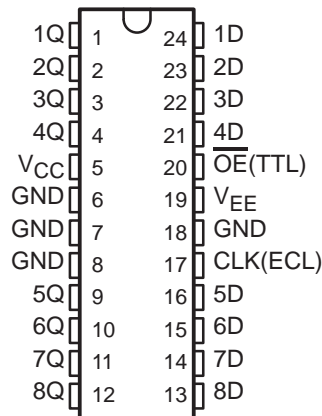
SN10KHT5574

OCTAL ECL-TO-TTL TRANSLATOR WITH D-TYPE EDGE-TRIGGERED FLIP-FLOPS AND 3-STATE OUTPUTS

SDZS010 – JANUARY 1990 – REVISED OCTOBER 1990

- 10KH Compatible
- ECL Clock and TTL Control Inputs
- Flow-Through Architecture Optimizes PCB Layout
- Center Pin V_{CC} , V_{EE} , and GND Configurations Minimize High-Speed Switching Noise
- Package Options Include “Small Outline” Packages and Standard Plastic DIPs

DW OR NT PACKAGE
(TOP VIEW)



description

This octal ECL-to-TTL translator is designed to provide efficient translation between a 10KH ECL signal environment and a TTL signal environment.

This device is designed specifically to improve the performance and density of ECL-to-TTL CPU/bus-oriented functions such as memory-address drivers, clock drivers, and bus-oriented receivers and transmitters.

The eight flip-flops of the SN10KHT5574 are edge-triggered D-type flip-flops. On the positive transition of the clock, the Q outputs are set to the logic levels that were set up at the D inputs.

A buffered output-enable input (\overline{OE}) can be used to place the eight outputs in either a normal logic state (high or low logic levels) or a high-impedance state. In the high-impedance state, the outputs neither load nor drive the bus lines significantly. The high-impedance third state and increased drive provide the capability to drive bus lines without need for interface or pullup components.

The output-enable input \overline{OE} does not affect the internal operations of the flip-flops. Old data can be retained or new data can be entered while the outputs are off.

The SN10KHT5574 is characterized for operation from 0°C to 75°C.

FUNCTION TABLE

INPUTS			OUTPUT (TTL)
\overline{OE}	CLK	D	Q
L	↑	L	L
L	↑	H	H
L	L	X	Q_0
H	X	X	Z

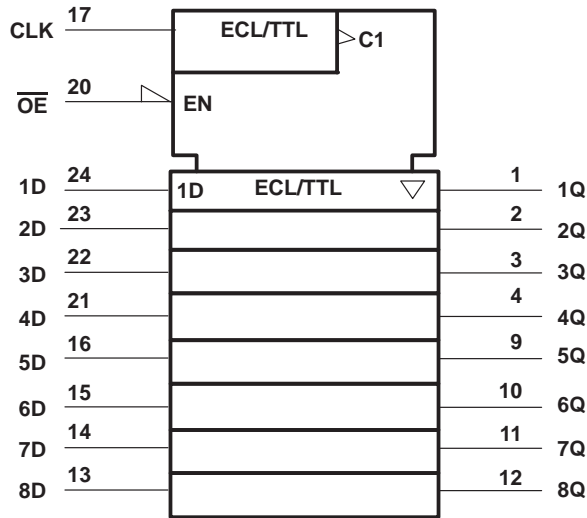
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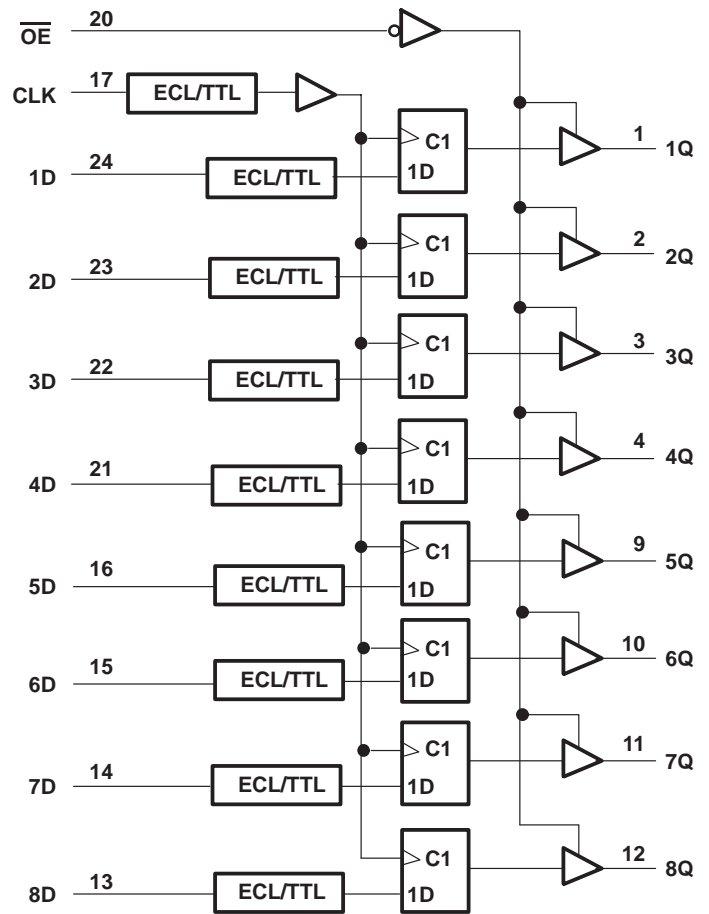
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logic symbol†



† This symbol is in accordance with ANSI/IEEE Std 91-1984 and IEC Publication 617-12.

logic diagram (positive logic)



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electrical characteristics over recommended operating free-air temperature range (unless otherwise noted)

PARAMETER		TEST CONDITIONS		MIN	TYP†	MAX	UNIT	
V_{IK}	OE only	$V_{CC} = 4.5\text{ V}$, $V_{EE} = -4.94\text{ V}$, $I_I = -18\text{ mA}$				-1.2	V	
V_{OH}		$V_{CC} = 4.5\text{ V}$, $V_{EE} = -5.2\text{ V} \pm 5\%$, $I_{OH} = -3\text{ mA}$		2.4	3.3		V	
		$V_{CC} = 4.5\text{ V}$, $V_{EE} = -5.2\text{ V} \pm 5\%$, $I_{OH} = -15\text{ mA}$		2	3.1			
V_{OL}		$V_{CC} = 4.5\text{ V}$, $V_{EE} = -5.2\text{ V} \pm 5\%$, $I_{OL} = 48\text{ mA}$			0.38	0.55	V	
I_I	OE only	$V_{CC} = 5.5\text{ V}$, $V_{EE} = -5.46\text{ V}$, $V_I = 7\text{ V}$				0.1	mA	
I_{IH}	OE only	$V_{CC} = 5.5\text{ V}$, $V_{EE} = -5.46\text{ V}$, $V_I = 2.7\text{ V}$				20	μA	
I_{IL}	OE only	$V_{CC} = 5.5\text{ V}$, $V_{EE} = -5.46\text{ V}$, $V_I = 0.5\text{ V}$				-0.5	mA	
I_{IH}	Data inputs and CLK	$V_{CC} = 5.5\text{ V}$, $V_{EE} = -5.46\text{ V}$, $V_I = -840\text{ mV}$	$T_A = 0^\circ\text{C}$			350	μA	
		$V_{CC} = 5.5\text{ V}$, $V_{EE} = -5.46\text{ V}$, $V_I = -810\text{ mV}$	$T_A = 25^\circ\text{C}$			350		
		$V_{CC} = 5.5\text{ V}$, $V_{EE} = -5.46\text{ V}$, $V_I = -735\text{ mV}$	$T_A = 75^\circ\text{C}$			350		
I_{IL}	Data inputs and CLK	$V_{CC} = 5.5\text{ V}$, $V_{EE} = -5.46\text{ V}$, $V_I = -1950\text{ mV}$	$T_A = 0^\circ\text{C}$			0.5	μA	
			$T_A = 25^\circ\text{C}$			0.5		
			$T_A = 75^\circ\text{C}$			0.5		
I_{OZH}		$V_{CC} = 5.5\text{ V}$, $V_{EE} = -5.46\text{ V}$, $V_O = 2.7\text{ V}$				50	μA	
I_{OZL}		$V_{CC} = 5.5\text{ V}$, $V_{EE} = -5.46\text{ V}$, $V_O = 0.5\text{ V}$				-50	μA	
I_{OS}^\ddagger		$V_{CC} = 5.5\text{ V}$, $V_{EE} = -5.46\text{ V}$, $V_O = 0\text{ V}$				-100	-225	mA
I_{CCH}		$V_{CC} = 5.5\text{ V}$, $V_{EE} = -5.46\text{ V}$				66	95	mA
I_{CCL}		$V_{CC} = 5.5\text{ V}$, $V_{EE} = -5.46\text{ V}$				76	110	mA
I_{CCZ}		$V_{CC} = 5.5\text{ V}$, $V_{EE} = -5.46\text{ V}$				74	106	mA
I_{EE}		$V_{CC} = 5.5\text{ V}$, $V_{EE} = -5.46\text{ V}$				-43	-61	mA
C_i		$V_{CC} = 5.5\text{ V}$, $V_{EE} = -5.2\text{ V}$, $f = 10\text{ MHz}$				5		pF
C_o		$V_{CC} = 5.5\text{ V}$, $V_{EE} = -5.2\text{ V}$, $f = 10\text{ MHz}$				7		pF

† All typical values are at $V_{CC} = 5\text{ V}$, $V_{EE} = -5.2\text{ V}$, $T_A = 25^\circ\text{C}$.

‡ Not more than one output should be tested at a time, and the duration of the test should not exceed 10 ms.

timing requirements

			$V_{CC} = 4.5\text{ V to }5.5\text{ V}$, $V_{EE} = -4.94\text{ V to }-5.46\text{ V}$, $T_A = \text{MIN to MAX}^\S$		UNIT
			MIN	MAX	
t_w	Pulse duration	CLK high	4		ns
		CLK low	4		
t_{su}	Setup time before CLK \uparrow	Data high	1		ns
		Data low	1		
t_h	Hold time after CLK \uparrow	Data high	1		ns
		Data low	1		

§ For conditions shown as MIN or MAX, use the appropriate value specified under recommended operating conditions.

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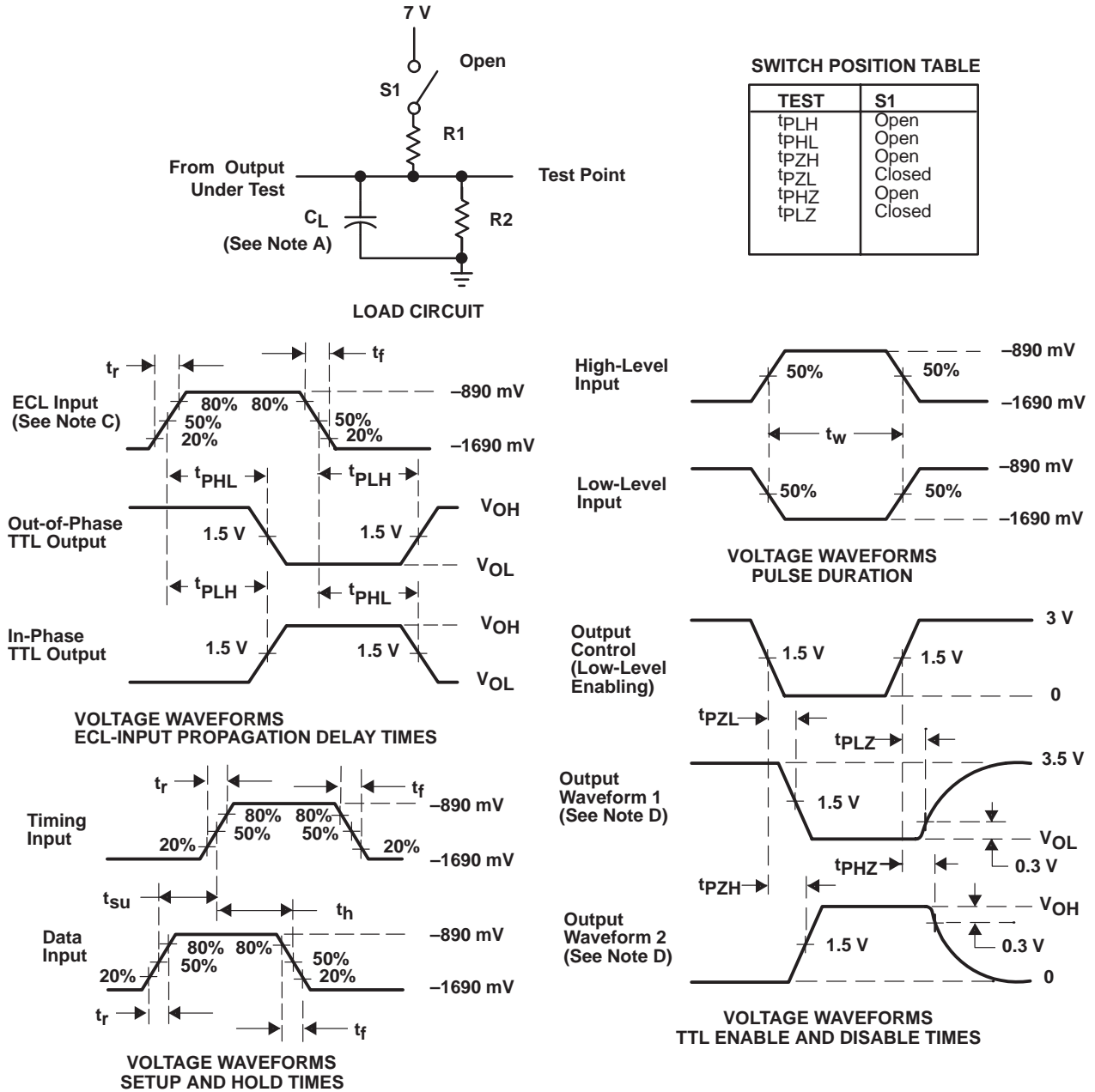
switching characteristics over recommended ranges of operating free-air temperature and supply voltage (see Figure 1)

PARAMETER	FROM (INPUT)	TO (OUTPUT)	$C_L = 50 \text{ pF}$, $R_1 = 500 \Omega$, $R_2 = 500 \Omega$			UNIT
			MIN	TYP†	MAX	
f_{\max}			200	300		MHz
t_{PLH}	CLK	Q	2.3	4.1	7	ns
t_{PHL}			2.9	4.6	7.4	
t_{PZH}	\overline{OE}	Q	1.9	3.6	6.3	ns
t_{PZL}			2.7	4.8	7.7	
t_{PHZ}	\overline{OE}	Q	2.1	3.9	6.1	ns
t_{PLZ}			0.5	3.4	6.3	

† All typical values are at $V_{CC} = 5 \text{ V}$, $V_{EE} = -5.2 \text{ V}$, $T_A = 25^\circ\text{C}$.

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PARAMETER MEASUREMENT INFORMATION



- NOTES: A. C_L includes probe and jig capacitance.
 B. For TTL inputs, input pulses are supplied by generators having the following characteristics $PRR \leq 10$ MHz, $Z_0 = 50 \Omega$, $t_r \leq 2.5$ ns, $t_f \leq 2.5$ ns.
 C. For ECL inputs, input pulses are supplied by generators having the following characteristics: $PRR \leq 10$ MHz, $Z_0 = 50 \Omega$, $t_r \leq 1.5$ ns, $t_f \leq 1.5$ ns.
 D. Waveform 1 is for an output with internal conditions such that the output is low except when disabled by the output control. Waveform 2 is for an output with internal conditions such that the output is high except when disabled by the output control.
 E. The outputs are measured one at a time with one transition per measurement.

Figure 1. Load circuit and voltage waveforms

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