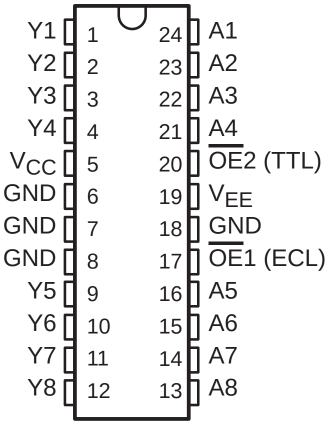
SN100KT5539
OCTAL ECL-TO-TTL TRANSLATOR
WITH OPEN-COLLECTOR OUTPUTS

SDZS008 – JANUARY 1990 – REVISED OCTOBER 1990

- **100K Compatible**
- **Open-Collector Outputs Drive Bus Lines or Buffer Memory Address Registers**
- **ECL and TTL Output-Enable 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 300-mil DIPs**

R NT PACKAGE

(T0P VIEW)



description

This octal ECL-to-TTL translator is designed to provide efficient translation between a 100K 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 while eliminating the need for three-state overlap protection.

Two pins $\overline{OE}$1 and $\overline{OE}$2 are provided for output-enable control. These control inputs are ANDed together with $\overline{OE}$1 being ECL-compatible and $\overline{OE}$2 being TTL-compatible. This offers the choice of controlling the outputs of the device from either a TTL or ECL signal environment.

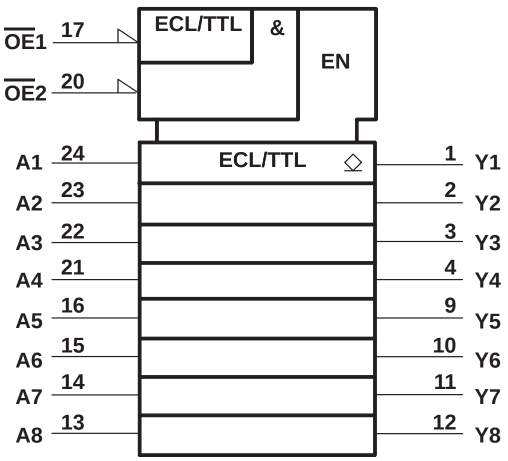
The SN100KT5539 is characterized for operation from 0°C to 85°C.

FUNCTION TABLE

OUTPUT ENABLE		DATA INPUT	OUTPUT (TTL)
$\overline{OE}$1	**$\overline{OE}$2**	**A**	**Y**
H	X	X	H
X	H	X	H
L	L	L	L
L	L	H	H

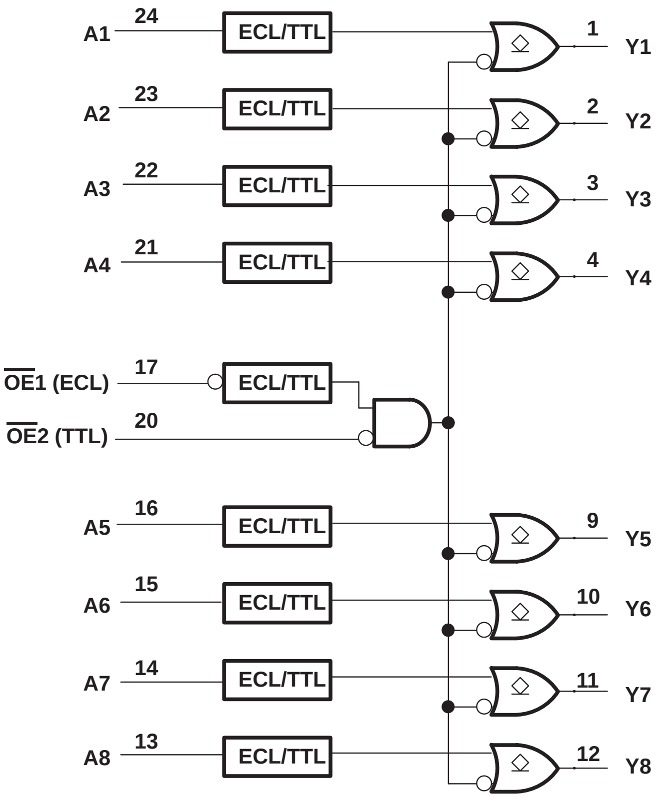
TEXAS INSTRUMENTS

logic symbol[†]



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

logic diagram (positive logic)



absolute maximum ratings over operating free-air temperature range (unless otherwise noted)[‡]

Supply voltage range, V_{CC}	–0.5 V to 7 V
Supply voltage range, V_{EE}	–8 V to 0 V
Input voltage range: TTL (see Note 1)	–1.2 V to 7 V
ECL	V_{EE} to 0 V
Input current range: TTL	–30 mA to 5 mA
Voltage applied to any output in the high state	–0.5 V to V_{CC}
Current into any output in the low state	96 mA
Operating free-air temperature range	0°C to 85°C
Storage temperature range	–65°C to 150°C

[‡] Stresses beyond those listed under “absolute maximum ratings” may cause permanent damage to the device. These are stress ratings only and functional operation of the device at these or any other conditions beyond those indicated under “recommended operating conditions” is not implied. Exposure to absolute-maximum-rated conditions for extended periods may affect device reliability.

NOTE 1: The TTL input voltage ratings may be exceeded provided the input current ratings are observed.

recommended operating conditions

		MIN	NOM	MAX	UNIT
V_{CC}	TTL supply voltage	4.5	5	5.5	V
V_{EE}	ECL supply voltage	–4.2	–4.5	–4.8	V
V_{IH}	TTL high-level input voltage	2			V
V_{IL}	TTL low-level input voltage			0.8	V
V_{IH}	ECL high-level input voltage†	–1150		–840	mV
V_{IL}	ECL low-level input voltage†	–1810		–1490	mV
V_{OH}	TTL high-level output voltage			5.5	V
I_{OL}	TTL low-level output current			48	mA
I_{IK}	TTL input clamp current			–18	mA
T_A	Operating free-air temperature range	0		85	°C

† The algebraic convention, in which the least positive (most negative) value is designated minimum, is used in this data sheet for logic levels only.

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

PARAMETER		TEST CONDITIONS			MIN	TYP‡	MAX	UNIT
V_{IK}	$\overline{OE}$2 only	V_{CC} = 4.5 V,	V_{EE} = –4.2 V,	I_I = –18 mA			–1.2	V
I_{OH}		V_{CC} = 4.5 V,	V_{EE} = –4.2 V,	V_{OH} = 5.5 V			250	µA
V_{OL}		V_{CC} = 4.5 V,	V_{EE} = –4.5 V ± 0.3 V,	I_{OL} = 48 mA		0.38	0.55	V
I_I	$\overline{OE}$2 only	V_{CC} = 5.5 V,	V_{EE} = –4.8 V,	V_I = 7 V			0.1	mA
I_{IH}	$\overline{OE}$2 only	V_{CC} = 5.5 V,	V_{EE} = –4.8 V,	V_I = 2.7 V			20	µA
	A inputs and $\overline{OE}$1	V_{CC} = 5.5 V,	V_{EE} = –4.8 V,	V_I = –840 mV			350	µA
I_{IL}	$\overline{OE}$2 only	V_{CC} = 5.5 V,	V_{EE} = –4.8 V,	V_I = 0.5 V			–0.5	mA
	A inputs and $\overline{OE}$1	V_{CC} = 5.5 V,	V_{EE} = –4.8 V,	V_I = –1810 mV	0.5			µA
I_{CCH}		V_{CC} = 5.5 V,	V_{EE} = –4.8 V			63	91	mA
I_{CCL}		V_{CC} = 5.5 V,	V_{EE} = –4.8 V			79	114	mA
I_{EE}		V_{CC} = 5.5 V,	V_{EE} = –4.2 V			–22	–32	mA
C_i		V_{CC} = 5 V,	V_{EE} = –4.5 V			6		pF
C_o		V_{CC} = 5 V,	V_{EE} = –4.5 V			5		pF

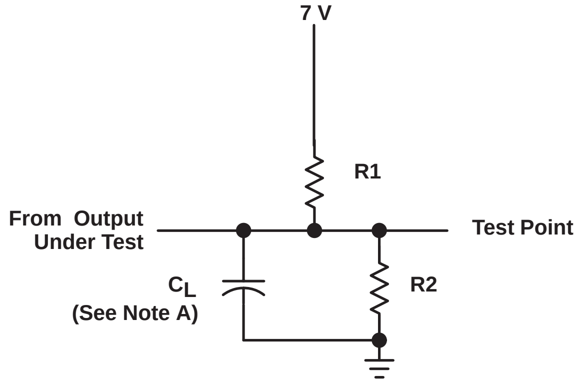
‡ All typical values are at V_{CC} = 5 V, V_{EE} = –4.5 V, T_A = 25°C.

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

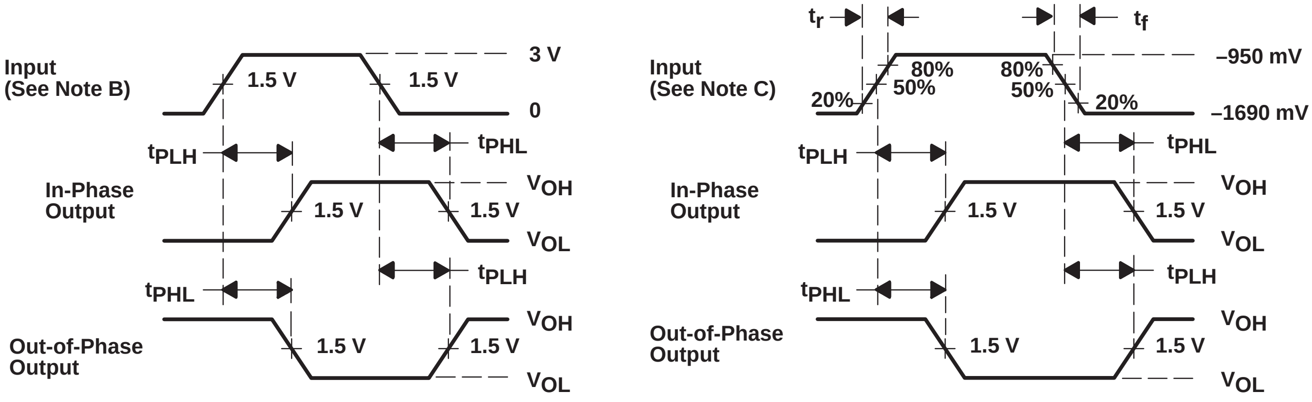
PARAMETER	FROM (INPUT)	TO (OUTPUT)	C_L = 50 pF, R1 = 500 Ω, R2 = 500 Ω			UNIT
			MIN	TYP†	MAX	
t_{PLH}	Any A	Y	6.2	9.3	12.4	ns
t_{PHL}			2.6	4.9	7.3	
t_{PLH}	$\overline{OE}1$ (ECL)	Y	7.1	10.3	13.5	ns
t_{PHL}			3.2	5.8	8.4	
t_{PLH}	$\overline{OE}2$ (TTL)	Y	6.5	9.5	12.4	ns
t_{PHL}			2.7	5.3	8	

All typical values are at V_{CC} = 5 V, V_{EE} = –4.5 V, T_A = 25°C.

PARAMETER MEASUREMENT INFORMATION



LOAD CIRCUIT



TTL-INPUT PROPAGATION DELAY TIMES

ECL-INPUT PROPAGATION DELAY TIMES

NOTES:
- A. C_L includes probe and jig capacitance.
- B. For TTL inputs, input pulses are supplied by generators having the following characteristics: PRR ≤ 10 MHz, Z_O = 50 Ω, t_r ≤ 2.5 ns, t_f ≤ 2.5 ns.
- C. For ECL inputs, input pulses are supplied by generators having the following characteristics: PRR ≤ 10 MHz, Z_O = 50 Ω, t_r ≤ 0.7 ns, t_f ≤ 0.7 ns.
- D. The outputs are measured one at a time with one transition per measurement.

FIGURE 1. LOAD CIRCUIT AND VOLTAGE WAVEFORMS

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