

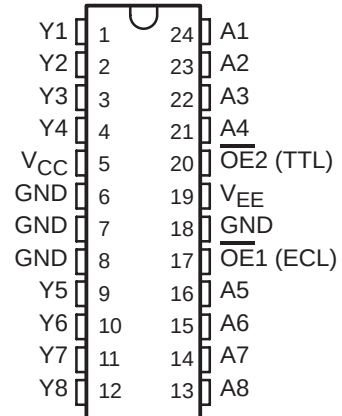
SN100KT5539 OCTAL ECL-TO-TTL TRANSLATOR WITH OPEN-COLLECTOR OUTPUTS

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

(TOP 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 $\overline{OE1}$ and $\overline{OE2}$ are provided for output-enable control. These control inputs are ANDed together with $\overline{OE1}$ being ECL-compatible and $\overline{OE2}$ being TTL-compatible. This offers the choice of controlling the outputs of the device from either a TTL or ECL signal environment.

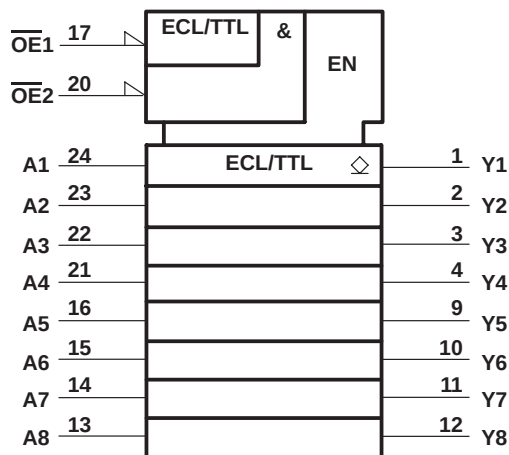
The SN100KT5539 is characterized for operation from 0°C to 85°C.

FUNCTION TABLE

OUTPUT ENABLE		DATA INPUT	OUTPUT (TTL)
$\overline{OE1}$	$\overline{OE2}$	A	Y
H	X	X	H
X	H	X	H
L	L	L	L
L	L	H	H

SDZS008 – JANUARY 1990 – REVISED OCTOBER 1990

logic diagram (positive logic)



The diagram illustrates a 24-bit bus system. On the left, 24-bit inputs are labeled A1 through A8 (lines 13-16) and OE1 (ECL, line 17) and OE2 (TTL, line 20). Each input line is connected to a buffer labeled 'ECL/TTL'. The outputs of these buffers are connected to a central vertical bus line. On the right, 8-bit outputs are labeled Y1 through Y8 (lines 9-12). Each output line is connected to an OR gate. The inputs to these OR gates are connected to the central bus line. The bus line is also connected to a 2-to-1 multiplexer (MUX) block, which has two inputs labeled OE1 (ECL) and OE2 (TTL). The output of the MUX is connected to the central bus line. The bus line is also connected to a 2-to-1 MUX block, which has two inputs labeled OE1 (ECL) and OE2 (TTL). The output of this MUX is connected to the central bus line.

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

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} OE2 only	$V_{CC} = 4.5\text{ V}$, $V_{EE} = -4.2\text{ V}$, $I_I = -18\text{ mA}$			-1.2	V
I_{OH}	$V_{CC} = 4.5\text{ V}$, $V_{EE} = -4.2\text{ V}$, $V_{OH} = 5.5\text{ V}$			250	μA
V_{OL}	$V_{CC} = 4.5\text{ V}$, $V_{EE} = -4.5\text{ V} \pm 0.3\text{ V}$, $I_{OL} = 48\text{ mA}$		0.38	0.55	V
I_I OE2 only	$V_{CC} = 5.5\text{ V}$, $V_{EE} = -4.8\text{ V}$, $V_I = 7\text{ V}$			0.1	mA
I_{IH} OE2 only	$V_{CC} = 5.5\text{ V}$, $V_{EE} = -4.8\text{ V}$, $V_I = 2.7\text{ V}$			20	μA
I_{IH} A inputs and OE1	$V_{CC} = 5.5\text{ V}$, $V_{EE} = -4.8\text{ V}$, $V_I = -840\text{ mV}$			350	μA
I_{IL} OE2 only	$V_{CC} = 5.5\text{ V}$, $V_{EE} = -4.8\text{ V}$, $V_I = 0.5\text{ V}$			-0.5	mA
I_{IL} A inputs and OE1	$V_{CC} = 5.5\text{ V}$, $V_{EE} = -4.8\text{ V}$, $V_I = -1810\text{ mV}$	0.5			μA
I_{CCH}	$V_{CC} = 5.5\text{ V}$, $V_{EE} = -4.8\text{ V}$		63	91	mA
I_{CCL}	$V_{CC} = 5.5\text{ V}$, $V_{EE} = -4.8\text{ V}$		79	114	mA
I_{EE}	$V_{CC} = 5.5\text{ V}$, $V_{EE} = -4.2\text{ V}$		-22	-32	mA
C_i	$V_{CC} = 5\text{ V}$, $V_{EE} = -4.5\text{ V}$		6		pF
C_o	$V_{CC} = 5\text{ V}$, $V_{EE} = -4.5\text{ V}$		5		pF

[‡] All typical values are at $V_{CC} = 5\text{ V}$, $V_{EE} = -4.5\text{ V}$, $T_A = 25^\circ\text{C}$.

SN100KT5539

OCTAL ECL-TO-TTL TRANSLATOR

WITH OPEN-COLLECTOR OUTPUTS

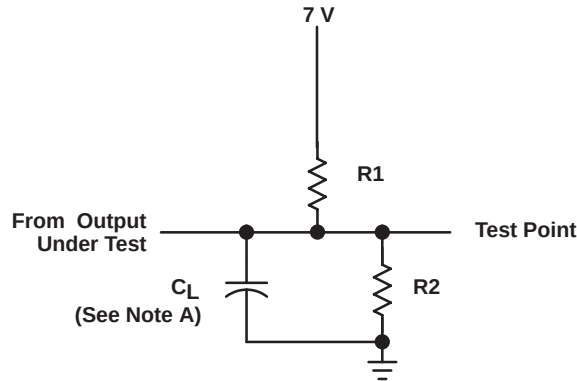
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switching characteristics over recommended ranges of supply voltage and operating free-air temperature (unless otherwise noted) (see Figure 1)

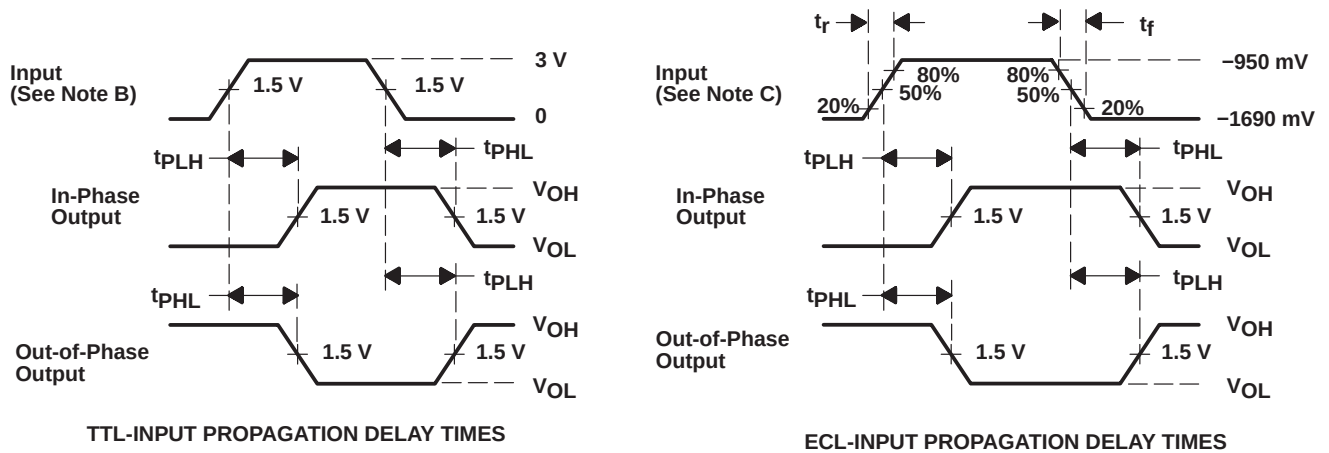
PARAMETER	FROM (INPUT)	TO (OUTPUT)	C _L = 50 pF, R1 = 500 Ω, R2 = 500 Ω			UNIT
			MIN	TYP [†]	MAX	
t _{PLH}	Any A	Y	6.2	9.3	12.4	ns
t _{PHL}			2.6	4.9	7.3	
t _{PLH}	$\overline{\text{OE1}}$ (ECL)	Y	7.1	10.3	13.5	ns
t _{PHL}			3.2	5.8	8.4	
t _{PLH}	$\overline{\text{OE2}}$ (TTL)	Y	6.5	9.5	12.4	ns
t _{PHL}			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



- 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, $Z_0 = 50 \Omega$, $t_r \leq 0.7$ ns, $t_f \leq 0.7$ ns.
D. The outputs are measured one at a time with one transition per measurement.

FIGURE 1. LOAD CIRCUIT AND VOLTAGE WAVEFORMS

PACKAGING INFORMATION

Orderable Device	Status ⁽¹⁾	Package Type	Package Drawing	Pins	Package Qty	Eco Plan ⁽²⁾	Lead/Ball Finish	MSL Peak Temp ⁽³⁾
SN100KT5539DW	OBSOLETE	SOIC	DW	24		TBD	Call TI	Call TI
SN100KT5539NT	OBSOLETE	PDIP	NT	24		TBD	Call TI	Call TI
SN100KT5539NT	OBSOLETE	PDIP	NT	24		TBD	Call TI	Call TI

⁽¹⁾ The marketing status values are defined as follows:

ACTIVE: Product device recommended for new designs.

LIFEBUY: TI has announced that the device will be discontinued, and a lifetime-buy period is in effect.

NRND: Not recommended for new designs. Device is in production to support existing customers, but TI does not recommend using this part in a new design.

PREVIEW: Device has been announced but is not in production. Samples may or may not be available.

OBSOLETE: TI has discontinued the production of the device.

⁽²⁾ Eco Plan - The planned eco-friendly classification: Pb-Free (RoHS) or Green (RoHS & no Sb/Br) - please check <http://www.ti.com/productcontent> for the latest availability information and additional product content details.

TBD: The Pb-Free/Green conversion plan has not been defined.

Pb-Free (RoHS): TI's terms "Lead-Free" or "Pb-Free" mean semiconductor products that are compatible with the current RoHS requirements for all 6 substances, including the requirement that lead not exceed 0.1% by weight in homogeneous materials. Where designed to be soldered at high temperatures, TI Pb-Free products are suitable for use in specified lead-free processes.

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⁽³⁾ MSL, Peak Temp. -- The Moisture Sensitivity Level rating according to the JEDEC industry standard classifications, and peak solder temperature.

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