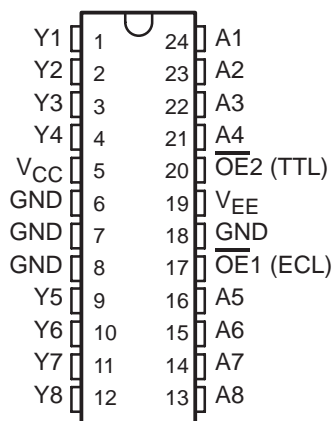


SN10KHT5540 OCTAL ECL-TO-TTL TRANSLATOR WITH 3-STATE OUTPUTS

SDZS006 – DECEMBER 1990

- 10KH Compatible
- ECL and TTL Control Inputs
- Inverting Outputs
- 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

DW OR NT PACKAGE
(TOP VIEW)



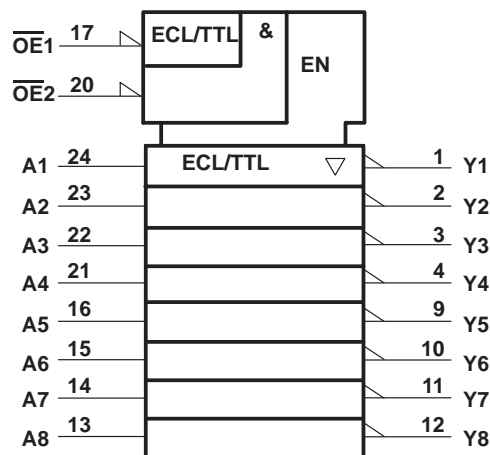
description

This octal ECL-to-TTL translator is designed to provide a 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.

Two output enable pins, $\overline{OE}1$ and $\overline{OE}2$, are provided. 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 SN10KHT5540 is characterized for operation from 0°C to 75°C.

logic symbol†



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

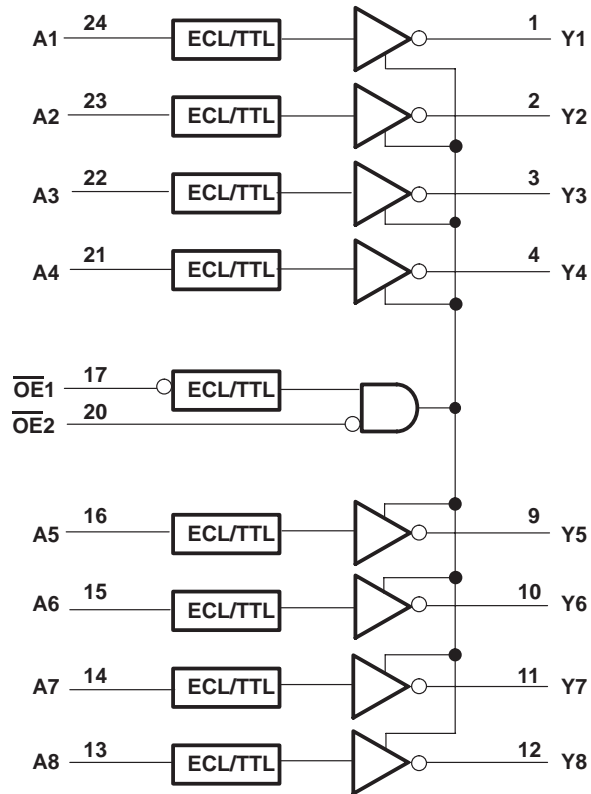
FUNCTION TABLE

OUTPUT ENABLE		DATA INPUT A	OUTPUT (TTL)
OE1	OE2		Y
X	H	X	Z
H	X	X	Z
L	L	L	H
L	L	H	L

SN10KHT5540 OCTAL ECL-TO-TTL TRANSLATOR WITH 3-STATE OUTPUTS

SDZS006 - DECEMBER 1990

logic diagram (positive logic)



SN10KHT5540 OCTAL ECL-TO-TTL TRANSLATOR WITH 3-STATE OUTPUTS

SDZS006 – DECEMBER 1990

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
Input voltage range (ECL)	V_{EE} to 0 V
Voltage applied to any output in the disabled or power-off state	–0.5 V to 5.5 V
Voltage applied to any output in the high state	–0.5 V to V_{CC}
Input current range (TTL)	–30 mA to 5 mA
Current into any output in the low state	96 mA
Operating free-air temperature range	0°C to 75°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	–4.94	–5.2	–5.46	V
V_{IH}	TTL high-level input voltage	2			V
V_{IL}	TTL low-level input voltage			0.8	V
V_{IH}^{\ddagger}	ECL high-level input voltage	$T_A = 0^\circ\text{C}$		–840	mV
		$T_A = 25^\circ\text{C}$	–1130	–810	
		$T_A = 75^\circ\text{C}$	–1070	–735	
V_{IL}^{\ddagger}	ECL low-level input voltage	$T_A = 0^\circ\text{C}$	–1950	–1480	mV
		$T_A = 25^\circ\text{C}$	–1950	–1480	
		$T_A = 75^\circ\text{C}$	–1950	–1450	
I_{IK}	TTL input clamp current			–18	mA
I_{OH}	High-level output current			–15	mA
I_{OL}	Low-level output current			48	mA
T_A	Operating free-air temperature	0		75	°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.



SN10KHT5540

OCTAL ECL-TO-TTL TRANSLATOR

WITH 3-STATE OUTPUTS

SDZS006 – DECEMBER 1990

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} = -4.94 V, I _I = -18 mA				-1.2	V
V _{OH}		V _{CC} = 4.5 V, V _{EE} = -5.2 V ± 5%, I _{OH} = -3 mA		2.4	3.3		V
		V _{CC} = 4.5 V, V _{EE} = -5.2 V ± 5%, I _{OH} = -15 mA		2	3.1		
V _{OL}		V _{CC} = 4.5 V, V _{EE} = -5.2 V ± 5%, I _{OL} = 48 mA		0.38	0.55		V
I _I	$\overline{OE}2$ only	V _{CC} = 5.5 V, V _{EE} = -5.46 V, V _I = 7 V				0.1	mA
I _{IH}	$\overline{OE}2$ only	V _{CC} = 5.5 V, V _{EE} = -5.46 V, V _I = 2.7 V				20	μA
I _{IL}	$\overline{OE}2$ only	V _{CC} = 5.5 V, V _{EE} = -5.46 V, V _I = 0.5 V				-0.5	mA
I _{IH}	Data inputs and $\overline{OE}1$	V _{CC} = 5.5 V, V _{EE} = -5.46 V, V _I = -840 mV	T _A = 0°C			350	μA
		V _{CC} = 5.5 V, V _{EE} = -5.46 V, V _I = -810 mV	T _A = 25°C			350	
		V _{CC} = 5.5 V, V _{EE} = -5.46 V, V _I = -735 mV	T _A = 75°C			350	
I _{IL}	Data inputs and $\overline{OE}1$	V _{CC} = 5.5 V, V _{EE} = -5.46 V, V _I = -1950 mV	T _A = 0°C	0.5			μA
			T _A = 25°C	0.5			
			T _A = 75°C	0.5			
I _{OZH}		V _{CC} = 5.5 V, V _{EE} = -5.46 V, V _O = 2.7 V				50	μA
I _{OZL}		V _{CC} = 5.5 V, V _{EE} = -5.46 V, V _O = 0.5 V				-50	μA
I _{OS} [‡]		V _{CC} = 5.5 V, V _{EE} = -5.46 V, V _O = 0		-100		-225	mA
I _{CCH}		V _{CC} = 5.5 V, V _{EE} = -5.46 V			67	97	mA
I _{CCL}		V _{CC} = 5.5 V, V _{EE} = -5.46 V			84	120	mA
I _{CCZ}		V _{CC} = 5.5 V, V _{EE} = -5.46 V			81	116	mA
I _{EE}		V _{CC} = 5.5 V, V _{EE} = -5.46 V			-23	-33	mA
C _i		V _{CC} = 5 V, V _{EE} = -5.2 V			5		pF
C _o		V _{CC} = 5 V, V _{EE} = -5.2 V			7		pF

[†] All typical values are at V_{CC} = 5 V, V_{EE} = -5.2 V, T_A = 25°C.

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

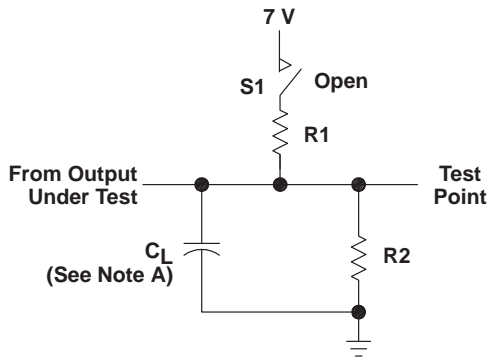
switching characteristics over recommended ranges of operating free-air temperature and supply voltage (see Figure 1)

PARAMETER	FROM (INPUT)	TO (OUTPUT)	C _L = 50 pF, R ₁ = 500 Ω, R ₂ = 500 Ω			UNIT
			MIN	TYP [§]	MAX	
t _{PLH}	A	Y	1.6	3.9	6.4	ns
t _{PHL}			1.6	4.2	6.4	
t _{PZH}	$\overline{OE}1$	Y	2.4	4.5	6.9	ns
t _{PZL}			3.5	5.9	8.7	
t _{PHZ}	$\overline{OE}1$	Y	2.8	5.2	8.1	ns
t _{PLZ}			2.2	4.6	8	
t _{PZH}	$\overline{OE}2$	Y	1.4	3.3	6.1	ns
t _{PZL}			2.5	4.7	7.9	
t _{PHZ}	$\overline{OE}2$	Y	1.6	4.1	6.5	ns
t _{PLZ}			0.7	3.3	6.4	

[§] All typical values are at V_{CC} = 5 V, V_{EE} = -5.2 V, T_A = 25°C.

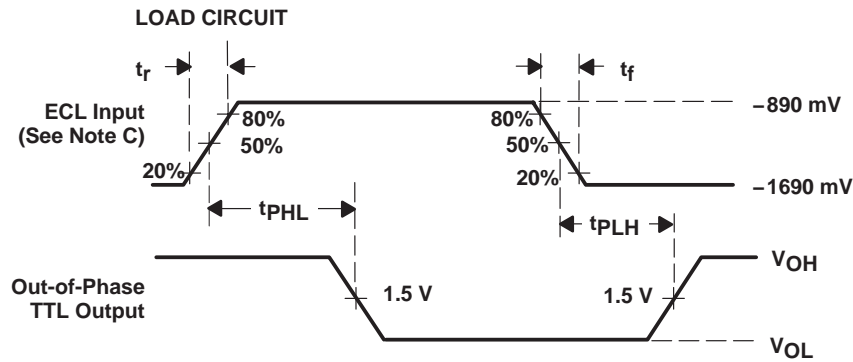


PARAMETER MEASUREMENT INFORMATION

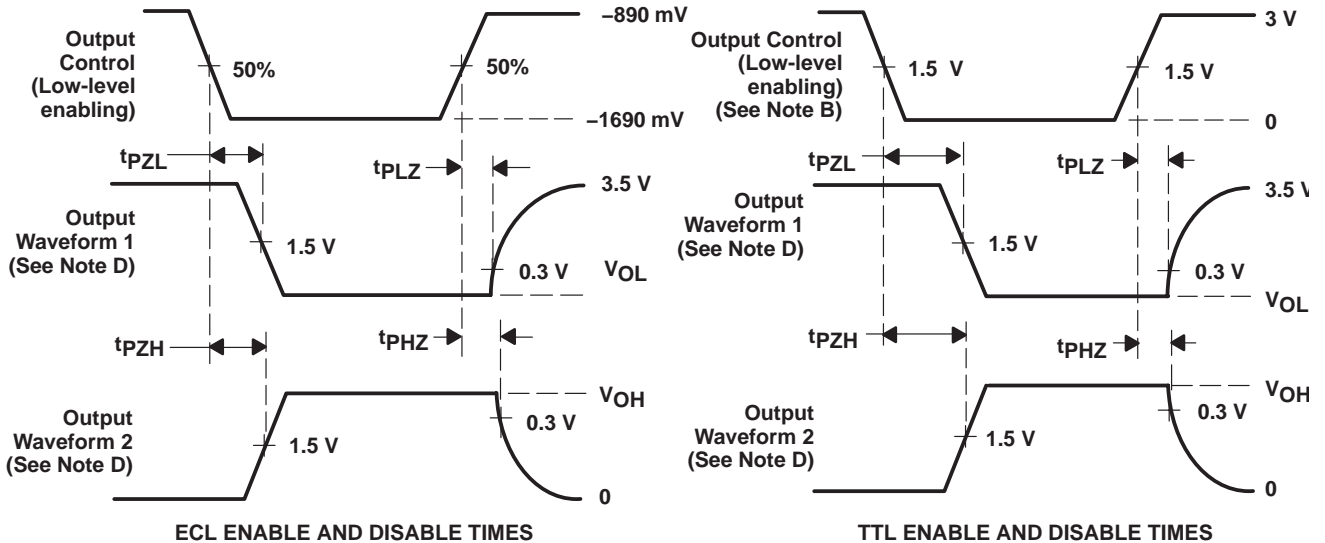


SWITCH POSITION TABLE

TEST	S1
t _{PLH}	Open
t _{PHL}	Open
t _{PZH}	Open
t _{PZL}	Closed
t _{PHZ}	Open
t _{PLZ}	Closed



ECL INPUT PROPAGATION DELAY TIMES



ECL ENABLE AND DISABLE TIMES

TTL ENABLE AND DISABLE 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, Z₀ = 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, Z₀ = 50 Ω, t_r ≤ 1.5 ns, t_f ≤ 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

IMPORTANT NOTICE

Texas Instruments Incorporated and its subsidiaries (TI) reserve the right to make corrections, modifications, enhancements, improvements, and other changes to its products and services at any time and to discontinue any product or service without notice. Customers should obtain the latest relevant information before placing orders and should verify that such information is current and complete. All products are sold subject to TI's terms and conditions of sale supplied at the time of order acknowledgment.

TI warrants performance of its hardware products to the specifications applicable at the time of sale in accordance with TI's standard warranty. Testing and other quality control techniques are used to the extent TI deems necessary to support this warranty. Except where mandated by government requirements, testing of all parameters of each product is not necessarily performed.

TI assumes no liability for applications assistance or customer product design. Customers are responsible for their products and applications using TI components. To minimize the risks associated with customer products and applications, customers should provide adequate design and operating safeguards.

TI does not warrant or represent that any license, either express or implied, is granted under any TI patent right, copyright, mask work right, or other TI intellectual property right relating to any combination, machine, or process in which TI products or services are used. Information published by TI regarding third-party products or services does not constitute a license from TI to use such products or services or a warranty or endorsement thereof. Use of such information may require a license from a third party under the patents or other intellectual property of the third party, or a license from TI under the patents or other intellectual property of TI.

Reproduction of TI information in TI data books or data sheets is permissible only if reproduction is without alteration and is accompanied by all associated warranties, conditions, limitations, and notices. Reproduction of this information with alteration is an unfair and deceptive business practice. TI is not responsible or liable for such altered documentation. Information of third parties may be subject to additional restrictions.

Resale of TI products or services with statements different from or beyond the parameters stated by TI for that product or service voids all express and any implied warranties for the associated TI product or service and is an unfair and deceptive business practice. TI is not responsible or liable for any such statements.

TI products are not authorized for use in safety-critical applications (such as life support) where a failure of the TI product would reasonably be expected to cause severe personal injury or death, unless officers of the parties have executed an agreement specifically governing such use. Buyers represent that they have all necessary expertise in the safety and regulatory ramifications of their applications, and acknowledge and agree that they are solely responsible for all legal, regulatory and safety-related requirements concerning their products and any use of TI products in such safety-critical applications, notwithstanding any applications-related information or support that may be provided by TI. Further, Buyers must fully indemnify TI and its representatives against any damages arising out of the use of TI products in such safety-critical applications.

TI products are neither designed nor intended for use in military/aerospace applications or environments unless the TI products are specifically designated by TI as military-grade or "enhanced plastic." Only products designated by TI as military-grade meet military specifications. Buyers acknowledge and agree that any such use of TI products which TI has not designated as military-grade is solely at the Buyer's risk, and that they are solely responsible for compliance with all legal and regulatory requirements in connection with such use.

TI products are neither designed nor intended for use in automotive applications or environments unless the specific TI products are designated by TI as compliant with ISO/TS 16949 requirements. Buyers acknowledge and agree that, if they use any non-designated products in automotive applications, TI will not be responsible for any failure to meet such requirements.

Following are URLs where you can obtain information on other Texas Instruments products and application solutions:

Products

Amplifiers	amplifier.ti.com
Data Converters	dataconverter.ti.com
DSP	dsp.ti.com
Clocks and Timers	www.ti.com/clocks
Interface	interface.ti.com
Logic	logic.ti.com
Power Mgmt	power.ti.com
Microcontrollers	microcontroller.ti.com
RFID	www.ti-rfid.com
RF/IF and ZigBee® Solutions	www.ti.com/lprf

Applications

Audio	www.ti.com/audio
Automotive	www.ti.com/automotive
Broadband	www.ti.com/broadband
Digital Control	www.ti.com/digitalcontrol
Medical	www.ti.com/medical
Military	www.ti.com/military
Optical Networking	www.ti.com/opticalnetwork
Security	www.ti.com/security
Telephony	www.ti.com/telephony
Video & Imaging	www.ti.com/video
Wireless	www.ti.com/wireless

Mailing Address: Texas Instruments, Post Office Box 655303, Dallas, Texas 75265
Copyright © 2008, Texas Instruments Incorporated