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

description

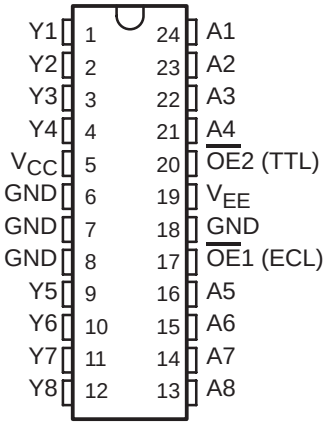
This octal ECL-to-TTL translator is designed to provide efficient translation between a 100K signal environment and a TTL signal environment. This device is designed specifically to improve the performance and density of ECL-to-TTL CPU/bus oriented functions such as memory address drivers, clock drivers, and bus-oriented receivers and transmitters while eliminating the need for three-state overlap protection.

Two output enables, $\overline{OE}1$ and $\overline{OE}2$, are provided. These enable 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.

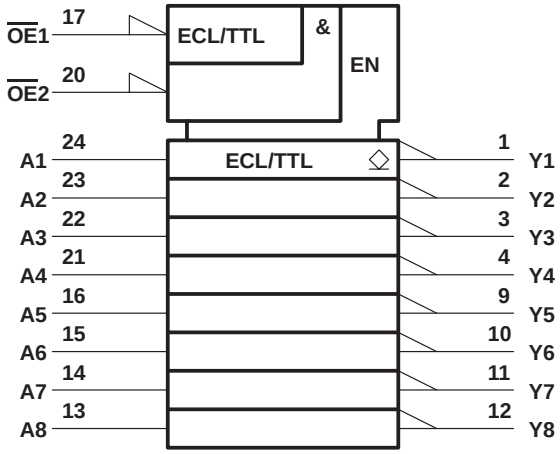
The SN100KT5538 is characterized for operation from 0°C to 85°C.

)R NT PACKAGE

(T0P VIEW)



logic symbol†

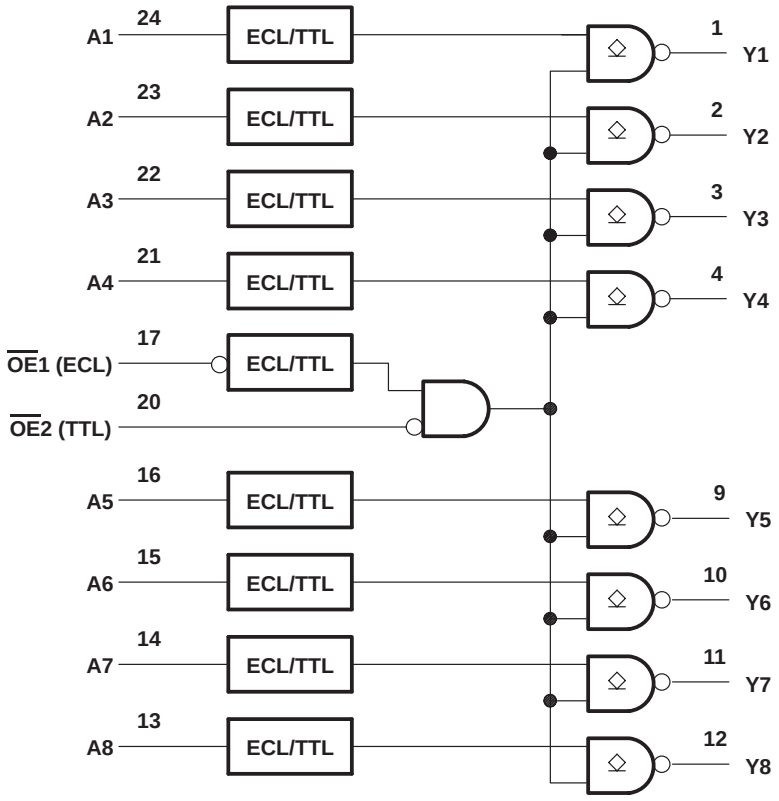


† This symbol is in accordance with ANSI/IEEE Std 91-1984 and IEC Publication 617-12.

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	H
L	L	H	L

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
Input voltage range (ECL) . . . . . V_{EE} to 0 V
Input current range (TTL) . . . . . −30 mA to 5 mA
Current into any output in the low state . . . . . 96 mA
Voltage applied to any output in the high state . . . . . −0.5 V to V_{CC}
Operating 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}	High-level input voltage	TTL	2			V
		ECL (see Note 2)	−1150		−840	mV
V_{IL}	Low-level input voltage	TTL			0.8	V
		ECL (see Note 2)	−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		0		85	°C

NOTE 2: 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)

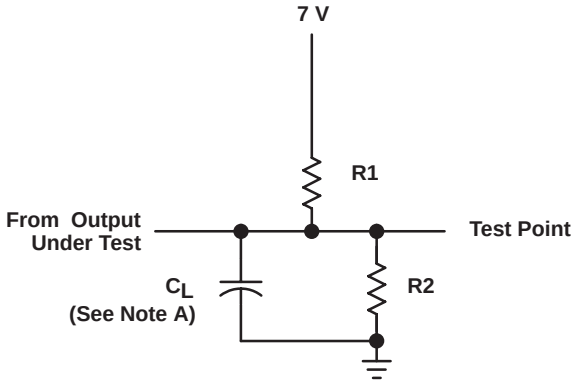
PARAMETER		TEST CONDITIONS			MIN	TYP†	MAX	UNIT
V_{IK}	$\overline{OE}2$ only	V_{CC} = 4.5 V,	V_{EE} = −4.2 V,	I_I = −18 mA			−1.2	V
V_{OL}		V_{CC} = 4.5 V,	V_{EE} = −4.5 V ± 0.3 V,	I_{OL} = 48 mA		0.38	0.55	V
I_I	$\overline{OE}2$ only	V_{CC} = 5.5 V,	V_{EE} = −4.8 V,	V_I = 7 V			0.1	mA
I_{IH}	$\overline{OE}2$ 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	
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_{OH}		V_{CC} = 4.5 V,	V_{EE} = −4.2 V,	V_{OH} = 5.5 V			250	µA
I_{CCH}		V_{CC} = 5.5 V,	V_{EE} = −4.8 V			66	95	mA
I_{CCL}		V_{CC} = 5.5 V,	V_{EE} = −4.8 V			79.5	114	mA
I_{EE}		V_{CC} = 5.5 V,	V_{EE} = −4.2 V			−23	−33	mA
C_i		V_{CC} = 5.5 V,	V_{EE} = −4.5 V			5		pF
C_o		V_{CC} = 5.5 V,	V_{EE} = −4.5 V			5		pF

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

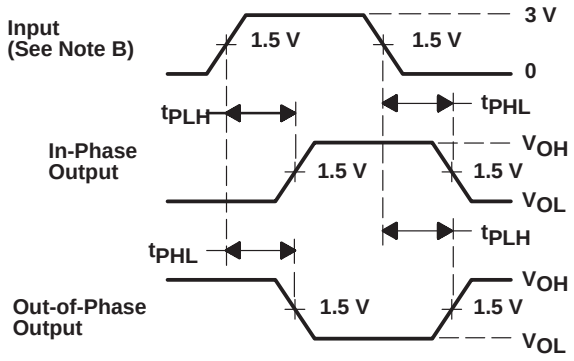
PARAMETER	FROM (INPUT)	TO (OUTPUT)	C_L = 50 pF, R1 = 500 Ω, R2 = 500 Ω			UNIT
			MIN	TYP†	MAX	
t_{PLH}	Any A	Y	6.4	9.1	11.7	ns
t_{PHL}			2.7	4.9	7.2	
t_{PLH}	$\overline{OE}1$ (ECL)	Y	7	10.1	13.3	ns
t_{PHL}			3.6	6.2	8.8	
t_{PLH}	$\overline{OE}2$ (TTL)	Y	6.5	9.1	11.6	ns
t_{PHL}			2.8	5.3	7.9	

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

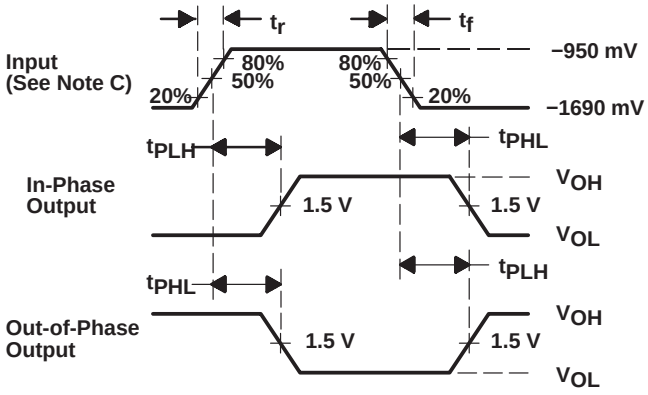
PARAMETER MEASUREMENT INFORMATION



LOAD CIRCUIT



VOLTAGE WAVEFORMS
TTL-INPUT PROPAGATION DELAY TIMES



VOLTAGE WAVEFORMS
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

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		**Applications**	
Amplifiers	amplifier.ti.com	Audio	www.ti.com/audio
Data Converters	dataconverter.ti.com	Automotive	www.ti.com/automotive
DSP	dsp.ti.com	Broadband	www.ti.com/broadband
Clocks and Timers	www.ti.com/clocks	Digital Control	www.ti.com/digitalcontrol
Interface	interface.ti.com	Medical	www.ti.com/medical
Logic	logic.ti.com	Military	www.ti.com/military
Power Mgmt	power.ti.com	Optical Networking	www.ti.com/opticalnetwork
Microcontrollers	microcontroller.ti.com	Security	www.ti.com/security
RFID	www.ti-rfid.com	Telephony	www.ti.com/telephony
RF/IF and ZigBee® Solutions	www.ti.com/lprf	Video & Imaging	www.ti.com/video
		Wireless	www.ti.com/wireless

Mailing Address: Texas Instruments, Post Office Box 655303, Dallas, Texas 75265