

SN54HCT623, SN74HCT623 OCTAL BUS TRANSCEIVERS WITH 3-STATE OUTPUTS

SCLS016B – MARCH 1984 – REVISED MAY 1997

- Inputs Are TTL-Voltage Compatible
- Lock Bus-Latch Capability
- True Logic
- High-Current 3-State Outputs Can Drive up to 15 LSTTL Loads
- Package Options Include Plastic Small-Outline (DW) and Ceramic Flat (W) Packages, Ceramic Chip Carriers (FK), and Standard Plastic (N) and Ceramic (J) 300-mil DIPs

description

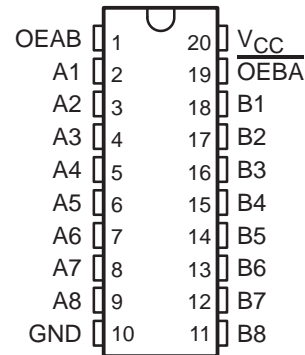
These octal bus transceivers are designed for asynchronous two-way communication between data buses. The control-function implementation allows for maximum flexibility in timing.

The 'HCT623 allow data transmission from the A bus to the B bus or from the B bus to the A bus, depending upon the logic levels at the output-enable (OEAB and $\overline{\text{OEBA}}$) inputs.

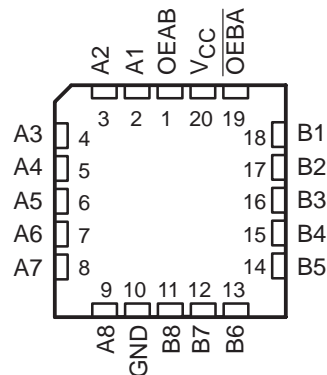
The output-enable inputs disable the device so that the buses are effectively isolated. The dual-enable configuration gives the transceivers the capability to store data by simultaneously enabling OEAB and $\overline{\text{OEBA}}$. Each output reinforces its input in this transceiver configuration. When both OEAB and $\overline{\text{OEBA}}$ are enabled and all other data sources to the two sets of bus lines are in the high-impedance state, both sets of bus lines (16 total) remain at their last states. The 8-bit codes appearing on the two sets of buses are identical.

The SN54HCT623 is characterized for operation over the full military temperature range of -55°C to 125°C . The SN74HCT623 is characterized for operation from -40°C to 85°C .

SN54HCT623 . . . J OR W PACKAGE
SN74HCT623 . . . DW OR N PACKAGE
(TOP VIEW)



SN54HCT623 . . . FK PACKAGE
(TOP VIEW)



FUNCTION TABLE

INPUTS		OPERATION
$\overline{\text{OEBA}}$	OEAB	
L	L	B data to A bus
H	H	A data to B bus
H	L	Isolation
L	H	B data to A bus, A data to B bus



Please be aware that an important notice concerning availability, standard warranty, and use in critical applications of Texas Instruments semiconductor products and disclaimers thereto appears at the end of this data sheet.

UNLESS OTHERWISE NOTED this document contains PRODUCTION DATA information current as of publication date. Products conform to specifications per the terms of Texas Instruments standard warranty. Production processing does not necessarily include testing of all parameters.

**TEXAS
INSTRUMENTS**

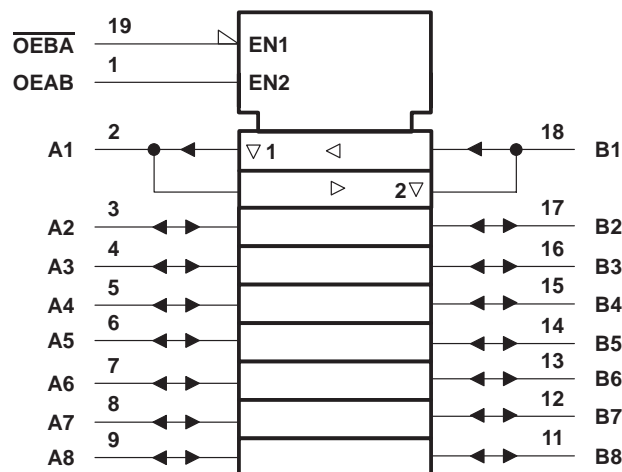
POST OFFICE BOX 655303 • DALLAS, TEXAS 75265

Copyright © 1997, Texas Instruments Incorporated

SN54HCT623, SN74HCT623 OCTAL BUS TRANSCEIVERS WITH 3-STATE OUTPUTS

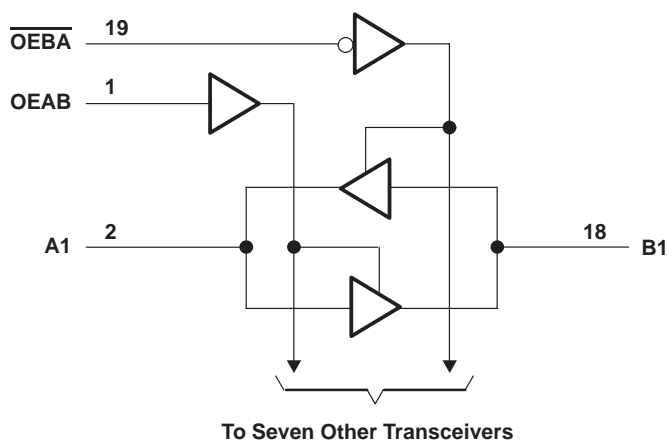
SCLS016B – MARCH 1984 – REVISED MAY 1997

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‡

Supply voltage range, V_{CC}	–0.5 V to 7 V
Input clamp current, I_{IK} ($V_I < 0$ or $V_I > V_{CC}$) (see Note 1)	±20 mA
Output clamp current, I_{OK} ($V_O < 0$ or $V_O > V_{CC}$) (see Note 1)	±20 mA
Continuous output current, I_O ($V_O = 0$ to V_{CC})	±35 mA
Continuous current through V_{CC} or GND	±70 mA
Package thermal impedance, θ_{JA} (see Note 2): DW package	97°C/W
N package	67°C/W
Storage temperature range, T_{stg}	–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.

NOTES: 1. The input and output voltage ratings may be exceeded if the input and output current ratings are observed.

2. The package thermal impedance is calculated in accordance with JESD 51, except for through-hole packages, which use a trace length of zero.



POST OFFICE BOX 655303 • DALLAS, TEXAS 75265

recommended operating conditions

			SN54HCT623			SN74HCT623			UNIT
			MIN	NOM	MAX	MIN	NOM	MAX	
V _{CC}	Supply voltage		4.5	5	5.5	4.5	5	5.5	V
V _{IH}	High-level input voltage	V _{CC} = 4.5 V to 5.5 V	2			2			V
V _{IL}	Low-level input voltage	V _{CC} = 4.5 V to 5.5 V	0		0.8	0		0.8	V
V _I	Input voltage		0		V _{CC}	0		V _{CC}	V
V _O	Output voltage		0		V _{CC}	0		V _{CC}	V
t _t	Input transition (rise and fall) time		0		500	0		500	ns
T _A	Operating free-air temperature		–55		125	–40		85	°C

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

PARAMETER		TEST CONDITIONS		V _{CC}	T _A = 25°C			SN54HCT623		SN74HCT623		UNIT
					MIN	TYP	MAX	MIN	MAX	MIN	MAX	
V _{OH}		V _I = V _{IH} or V _{IL}	I _{OH} = –20 µA	4.5 V	4.4	4.499		4.4		4.4		V
			I _{OH} = –6 mA		3.98	4.3		3.7		3.84		
V _{OL}		V _I = V _{IH} or V _{IL}	I _{OL} = 20 µA	4.5 V		0.001	0.1		0.1		0.1	V
			I _{OL} = 6 mA			0.17	0.26		0.4		0.33	
I _I	OEAB or OEBA	V _I = V _{CC} or 0		5.5 V		±0.1	±100		±1000		±1000	nA
I _{OZ}	A or B	V _O = V _{CC} or GND		5.5 V		±0.01	±0.5		±10		±5	µA
I _{CC}		V _I = V _{CC} or 0, I _O = 0		5.5 V			8		160		80	µA
ΔI _{CC} †		One input at 0.5 V or 2.4 V, Other inputs at 0 or V _{CC}		5.5 V		1.4	2.4		3		2.9	mA
C _i	OEAB or OEBA			4.5 V to 5.5 V		3	10		10		10	pF

† This is the increase in supply current for each input that is at one of the specified TTL voltage levels rather than 0 V or V_{CC}.

switching characteristics over recommended operating free-air temperature range, C_L = 50 pF (unless otherwise noted) (see Figure 1)

PARAMETER	FROM (INPUT)	TO (OUTPUT)	V _{CC}	T _A = 25°C			SN54HCT623		SN74HCT623		UNIT
				MIN	TYP	MAX	MIN	MAX	MIN	MAX	
t _{pd}	A or B	B or A	4.5 V		15	22		33		28	ns
			5.5 V		13	20		30		25	
t _{en}	$\overline{\text{OEBA}}$	A	4.5 V		30	42		63		53	ns
			5.5 V		23	38		57		48	
t _{dis}	$\overline{\text{OEBA}}$	A	4.5 V		18	30		45		38	ns
			5.5 V		16	28		42		35	
t _{en}	OEAB	B	4.5 V		30	42		63		53	ns
			5.5 V		23	38		57		48	
t _{dis}	OEAB	B	4.5 V		18	30		45		38	ns
			5.5 V		16	28		42		35	
t _t		A or B	4.5 V		9	12		18		15	ns
			5.5 V		8	11		16		14	

SN54HCT623, SN74HCT623 OCTAL BUS TRANSCEIVERS WITH 3-STATE OUTPUTS

SCLS016B – MARCH 1984 – REVISED MAY 1997

switching characteristics over recommended operating free-air temperature range, $C_L = 150 \text{ pF}$
(unless otherwise noted) (see Figure 1)

PARAMETER	FROM (INPUT)	TO (OUTPUT)	V_{CC}	$T_A = 25^\circ\text{C}$			SN54HCT623		SN74HCT623		UNIT
				MIN	TYP	MAX	MIN	MAX	MIN	MAX	
t_{pd}	A or B	B or A	4.5 V		18	38		58		47	ns
			5.5 V		11	34		52		42	
t_{en}	$\overline{\text{OEBA}}$	A	4.5 V		36	59		89		74	ns
			5.5 V		30	53		80		67	
	OEAB	B	4.5 V		36	59		89		74	
			5.5 V		30	53		80		67	
t_t		A or B	4.5 V		17	42		63		53	ns
			5.5 V		14	38		57		48	

operating characteristics, $T_A = 25^\circ\text{C}$

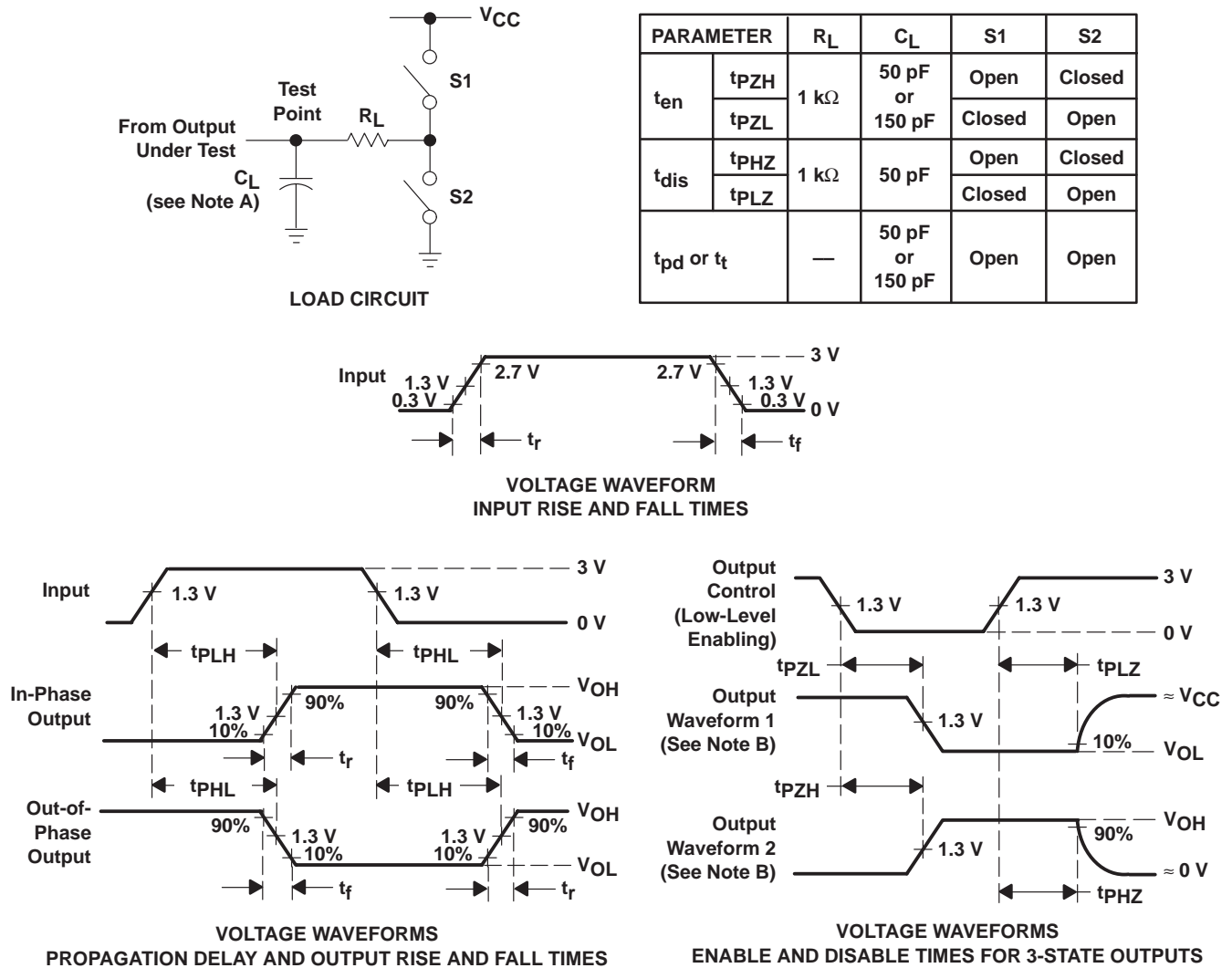
PARAMETER		TEST CONDITIONS	TYP	UNIT
C_{pd}	Power dissipation capacitance per transceiver	No load	40	pF

PRODUCT PREVIEW information concerns products in the formative or design phase of development. Characteristic data and other specifications are design goals. Texas Instruments reserves the right to change or discontinue these products without notice.



POST OFFICE BOX 655303 • DALLAS, TEXAS 75265

PARAMETER MEASUREMENT INFORMATION



- NOTES:
- A. C_L includes probe and test-fixture capacitance.
 - B. 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.
 - C. Phase relationships between waveforms were chosen arbitrarily. All input pulses are supplied by generators having the following characteristics: $PRR \leq 1\text{ MHz}$, $Z_O = 50\text{ }\Omega$, $t_r = 6\text{ ns}$, $t_f = 6\text{ ns}$.
 - D. The outputs are measured one at a time with one input transition per measurement.
 - E. $tpLZ$ and $tpHZ$ are the same as t_{dis} .
 - F. $tpZL$ and $tpZH$ are the same as t_{en} .
 - G. $tpLH$ and $tpHL$ are the same as t_{pd} .

Figure 1. Load Circuit and Voltage Waveforms

IMPORTANT NOTICE

Texas Instruments and its subsidiaries (TI) reserve the right to make changes to their products or to discontinue any product or service without notice, and advise customers to obtain the latest version of relevant information to verify, before placing orders, that information being relied on is current and complete. All products are sold subject to the terms and conditions of sale supplied at the time of order acknowledgement, including those pertaining to warranty, patent infringement, and limitation of liability.

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

CERTAIN APPLICATIONS USING SEMICONDUCTOR PRODUCTS MAY INVOLVE POTENTIAL RISKS OF DEATH, PERSONAL INJURY, OR SEVERE PROPERTY OR ENVIRONMENTAL DAMAGE ("CRITICAL APPLICATIONS"). TI SEMICONDUCTOR PRODUCTS ARE NOT DESIGNED, AUTHORIZED, OR WARRANTED TO BE SUITABLE FOR USE IN LIFE-SUPPORT DEVICES OR SYSTEMS OR OTHER CRITICAL APPLICATIONS. INCLUSION OF TI PRODUCTS IN SUCH APPLICATIONS IS UNDERSTOOD TO BE FULLY AT THE CUSTOMER'S RISK.

In order to minimize risks associated with the customer's applications, adequate design and operating safeguards must be provided by the customer to minimize inherent or procedural hazards.

TI assumes no liability for applications assistance or customer product design. TI does not warrant or represent that any license, either express or implied, is granted under any patent right, copyright, mask work right, or other intellectual property right of TI covering or relating to any combination, machine, or process in which such semiconductor products or services might be or are used. TI's publication of information regarding any third party's products or services does not constitute TI's approval, warranty or endorsement thereof.