

74ACT16254

16-BIT ADDRESS/DATA MULTIPLEXER WITH 3-STATE OUTPUTS

SCAS527A – AUGUST 1995 – NOVEMBER 1995

- Member of the Texas Instruments *Widebus™* Family
- Latch-Up Performance Exceeds 500 mA Per JEDEC Standard JESD-17
- Bus-Hold Inputs Eliminate the Need for External Pullup Resistors
- Typical V_{OLP} (Output Ground Bounce) < 0.8 V at $V_{CC} = 5$ V, $T_A = 25^\circ\text{C}$
- Distributed V_{CC} and GND Pin Configuration Minimizes High-Speed Switching Noise
- Packaged in Plastic Thin Shrink Small-Outline (DGG) Package

description

The 74ACT16254 is a dual 16-bit, noninverting bus-interface device. The A and C ports perform a transceiver function, like that of the 74ACT245. The B and C ports perform the buffer/driver function of the 74ACT244. The A and C port outputs are designed to sink up to 12 mA.

The 74ACT16254 is designed for asynchronous communication between data buses. The control function implementation minimizes external timing requirements.

Data transmission from the A port to the C port, C port to A port, or B port to C port is accomplished by setting the appropriate logic levels on the bus enable (EN1 and EN2) inputs.

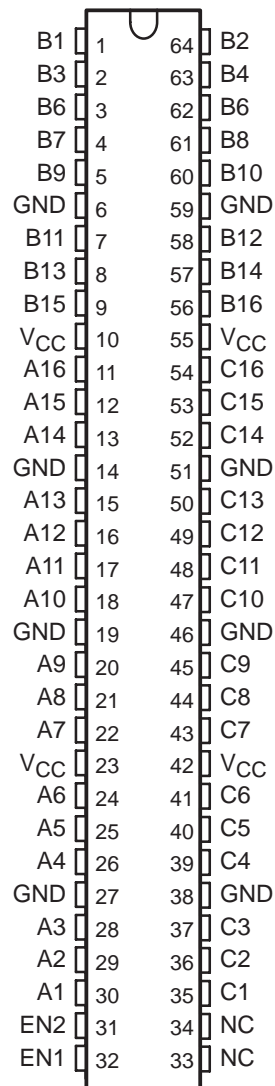
All outputs are disabled when logic highs are placed on both EN1 and EN2; the buses are effectively isolated.

The 74ACT16254 is packaged in TI's thin shrink small-outline package (DGG), which provides twice the I/O pin count and functionality of standard small-outline packages in the same printed-circuit-board area.

Active bus-hold circuitry is provided to hold unused or floating data and I/O pins at a valid logic level.

The 74ACT16254 is characterized for operation from -40°C to 85°C .

DGG PACKAGE
(TOP VIEW)



NC – No internal connection



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.

Widebus is a trademark of Texas Instruments Incorporated.

PRODUCTION DATA information is 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.



POST OFFICE BOX 655303 • DALLAS, TEXAS 75265
POST OFFICE BOX 1443 • HOUSTON, TEXAS 77251-1443

Copyright © 1995, Texas Instruments Incorporated

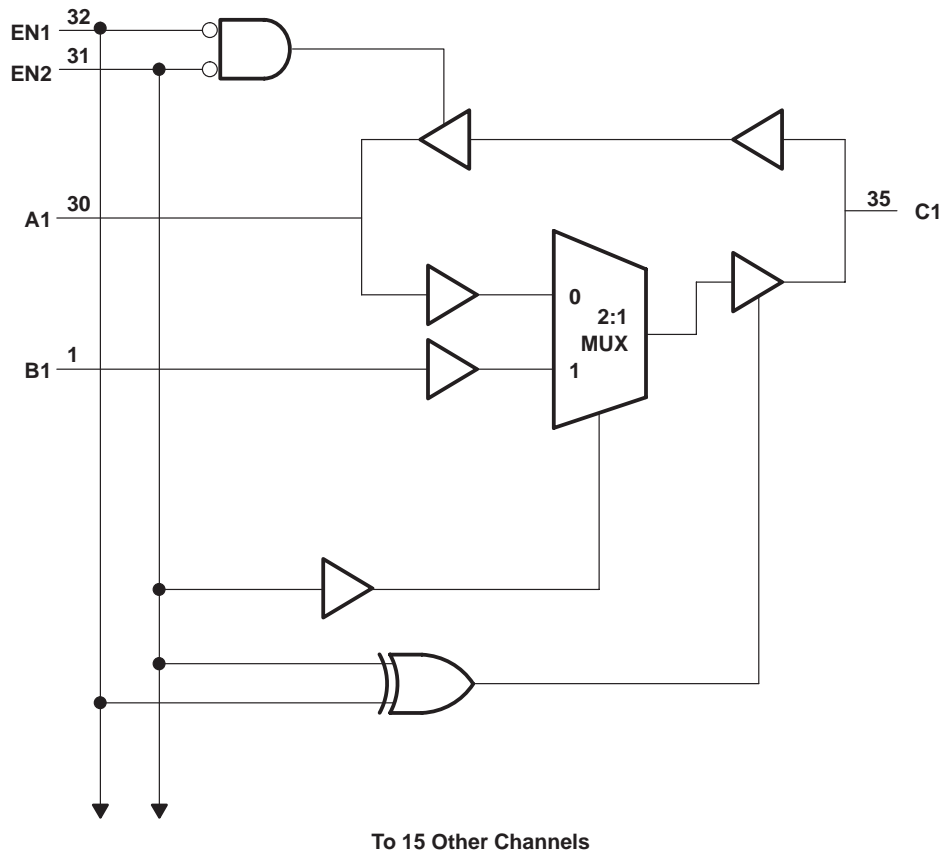
74ACT16254
16-BIT ADDRESS/DATA MULTIPLEXER
WITH 3-STATE OUTPUTS

SCAS527A – AUGUST 1995 – NOVEMBER 1995

FUNCTION TABLE

INPUTS		OPERATION
EN2	EN1	
H	H	Isolation
H	L	B data to C bus
L	H	A data to C bus
L	L	C data to A bus

logic diagram, each port (positive logic)



74ACT16254
16-BIT ADDRESS/DATA MULTIPLEXER
WITH 3-STATE OUTPUTS

SCAS527A – AUGUST 1995 – NOVEMBER 1995

absolute maximum ratings over operating free-air temperature range (unless otherwise noted)†

Supply voltage range, V_{CC}	–0.5 V to 7 V
Input voltage range, V_I (see Note 1)	–0.5 V to $V_{CC} + 0.5$ V
Output voltage range, V_O (see Note 1)	–0.5 V to $V_{CC} + 0.5$ V
Current into any output in the low state, I_O	50 mA
Input clamp current, I_{IK} ($V_I < 0$)	–50 mA
Output clamp current, I_{OK} ($V_O < 0$)	–50mA
Continuous current through V_{CC} or GND	±100 mA
Maximum power dissipation at $T_A = 55^\circ\text{C}$ (in still air) (see Note 2)	1 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 negative-voltage ratings may be exceeded if the input and output clamp-current ratings are observed.
2. The maximum package power dissipation is calculated using a junction temperature of 150°C and a board trace length of 750 mils.

recommended operating conditions (see Note 3)

	MIN	MAX	UNIT
V_{CC} Supply voltage	4.5	5.5	V
V_{IH} High-level input voltage	2		V
V_{IL} Low-level input voltage		0.8	V
V_I Input voltage	0	V_{CC}	V
I_{OH} High-level output current		–12	mA
I_{OL} Low-level output current		12	mA
$\Delta t/\Delta v$ Input transition rise or fall rate		10	ns/V
T_A Operating free-air temperature	–40	85	°C

NOTE 3: Unused inputs must be held high or low to prevent them from floating.



74ACT16254

16-BIT ADDRESS/DATA MULTIPLEXER

WITH 3-STATE OUTPUTS

SCAS527A – AUGUST 1995 – NOVEMBER 1995

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

PARAMETER	TEST CONDITIONS		MIN	TYP†	MAX	UNIT
V_{IK}	$V_{CC} = 4.5\text{ V}$,	$I_I = -18\text{ mA}$			-1.2	V
V_{OH}	$V_{CC} = 4.5\text{ V}$,	$I_{OH} = -100\text{ }\mu\text{A}$	3			V
	$V_{CC} = 5.5\text{ V}$,	$I_{OH} = -100\text{ }\mu\text{A}$	4.2			
	$V_{CC} = 4.5\text{ V}$,	$I_{OH} = -12\text{ mA}$	3			
V_{OL}	$V_{CC} = 4.5\text{ V to }5.5\text{ V}$,	$I_{OL} = 100\text{ }\mu\text{A}$			0.1	V
	$V_{CC} = 4.5\text{ V}$,	$I_{OL} = 12\text{ mA}$			0.4	
I_I	$V_{CC} = 5.5\text{ V}$,	$V_I = V_{CC}$ or GND	Inputs only		± 10	μA
I_{hold}	$V_{CC} = 4.5\text{ V}$,	$V_I = 2\text{ V}$	A, B, or C port		-100	μA
	$V_{CC} = 4.5\text{ V}$,	$V_I = 0.8\text{ V}$			100	
I_{OZ}^\ddagger	$V_{CC} = 5.5\text{ V}$,	$V_O = V_{CC}$ or GND			± 20	μA
I_{CC}	$V_{CC} = 5.5\text{ V}$,	$I_O = 0$, $V_I = V_{CC}$ or GND			50	μA
ΔI_{CC}^\S	$V_{CC} = 5.5\text{ V}$, Other inputs at V_{CC} or GND	One input at 3.4 V,			500	μA
C_i	$V_{CC} = 5\text{ V}$,	$V_I = V_{CC}$ or GND		3.5		pF
C_{io}	$V_{CC} = 5\text{ V}$,	$V_O = V_{CC}$ or GND		5		pF

† All typical values are at $T_A = 25^\circ\text{C}$.

‡ The parameter I_{OZ} includes the input-leakage current.

§ This is the increase in supply current for each input that is at the specified TTL voltage level rather than V_{CC} or GND.

switching characteristics over recommended ranges of supply voltage and operating free-air temperature, $C_L = 50\text{ pF}$ (unless otherwise noted) (see Figure 1)

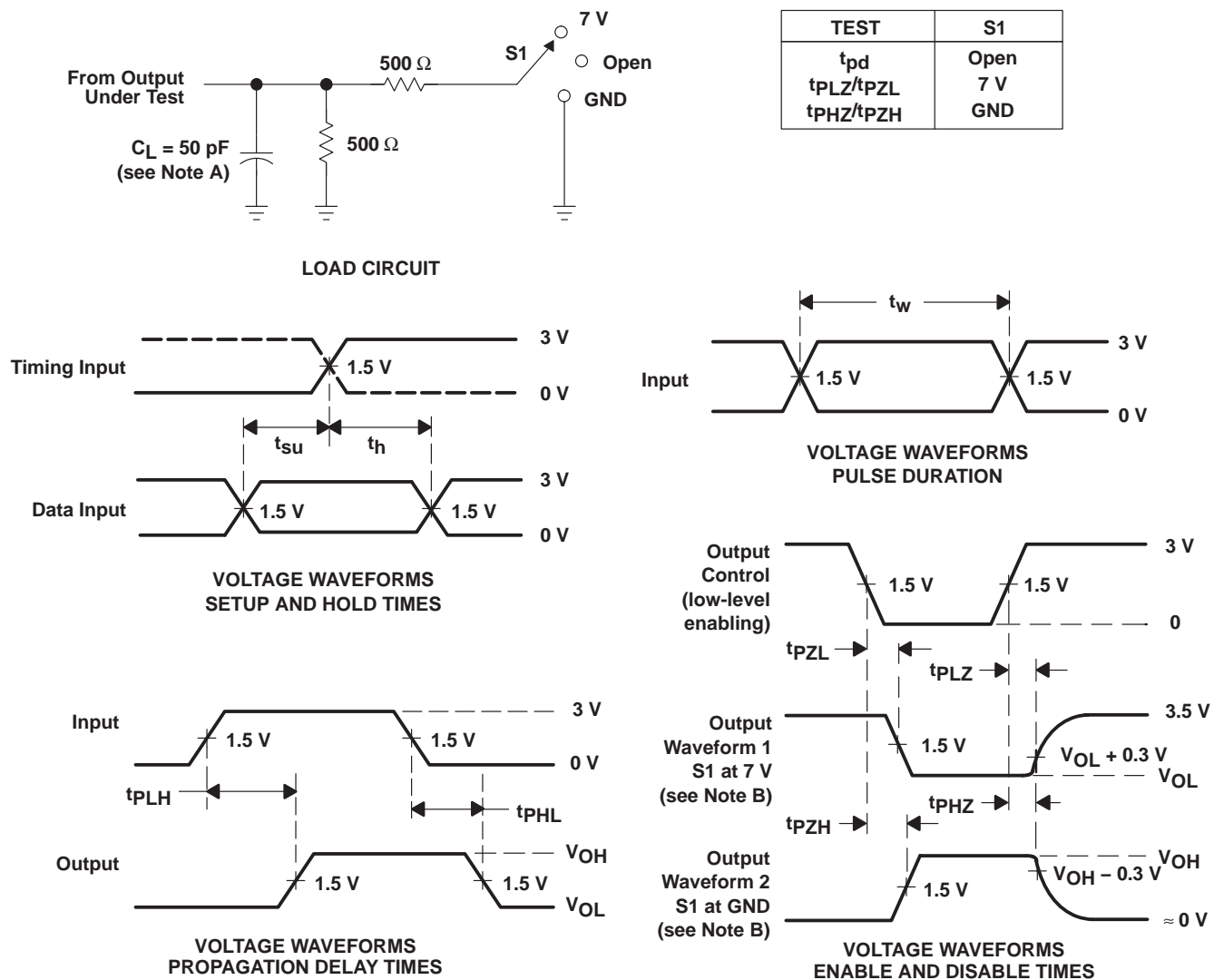
PARAMETER	FROM (INPUT)	TO (OUTPUT)	$T_A = 25^\circ\text{C}$			UNIT
			MIN	TYP	MAX	
t_{pd}	A or B	C	1.5	3.7	6.2	ns
t_{pd}	C	A	1.5	3.3	5.5	ns
t_{en}	EN1 or EN2	C	1.5	5.3	9.5	ns
t_{dis}	EN1 or EN2	C	1.5	4.4	8	ns
t_{en}	EN2	A	1.5	6.2	10.5	ns
t_{dis}	EN2	A	1.5	4.8	8	ns

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

PARAMETER		TEST CONDITIONS	TYP	UNIT
C_{pd}	Power dissipation capacitance	Outputs enabled	16	pF
		Outputs disabled	2	pF



PARAMETER MEASUREMENT INFORMATION



- NOTES:
- A. C_L includes probe and jig 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. All input pulses are supplied by generators having the following characteristics: $PRR \leq 1 \text{ MHz}$, $Z_O = 50 \Omega$, $t_r \leq 2.5 \text{ ns}$, $t_f \leq 2.5 \text{ ns}$.
 - D. The outputs are measured one at a time with one input transition per measurement.
 - E. t_{PLZ} and t_{PHZ} are the same as t_{dis} .
 - F. t_{PZL} and t_{PZH} are the same as t_{en} .
 - G. t_{PHL} and t_{PLH} are the same as t_{pd} .

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
DLP® Products	www.dlp.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 © 2009, Texas Instruments Incorporated