DW PACKAGE

SCAS087A - APRIL 1993 - REVISED APRIL 1996

- Independent Registers and Enables for A and B Buses
- Multiplexed Real-Time and Stored Data
- Flow-Through Architecture Optimizes
 PCB Layout
- Center-Pin V_{CC} and GND Configurations Minimize High-Speed Switching Noise
- EPIC™ (Enhanced-Performance Implanted CMOS) 1-µm Process
- 500-mA Typical Latch-Up Immunity at 125°C

description

This device consists of bus transceiver circuits, D-type flip-flops, and control circuitry arranged for multiplexed transmission of data directly from the data bus or from the internal storage registers. Enable GAB and $\overline{G}BA$ are provided to control the transceiver functions. SAB and SBA control pins are provided to select whether real-time or stored data is transferred. The circuitry used for select control eliminates the typical decoding glitch that occurs in a multiplexer during the transition between stored and real-time data. A low input level selects real-time data, and a high selects stored data. Figure 1 illustrates the four fundamental bus-management functions that can be performed with the octal bus transceivers and registers.

(TOP VIEW) 28 CAB GAB 27 SAB A1 2 A2 3 26 II B1 25 B2 A3L A4 5 24**∏** B3 GND [23 B4 22 V_{CC} GND 21 🛮 V_{CC} GND GND 20 B5 19 B6 A5 🛛 10 11 18 **1** B7 A6 A7 12 17 ∏ B8 13 16 CBA A8 14 15 SBA GBA

Data on the A or B data bus, or both, can be stored in the internal D flip-flops by low-to-high transitions at the appropriate clock pins (CAB or CBA), regardless of the select or enable control pins. When SAB and SBA are in the real-time transfer mode, it is also possible to store data without using the internal D-type flip-flops by simultaneously enabling GAB and $\overline{G}BA$. In this configuration, each output reinforces its input. Thus, when all other data sources to the two sets of bus lines are at high impedance, each set of bus lines remains at its last state.

The 74ACT11652 is characterized for operation from -40°C to 85°C.



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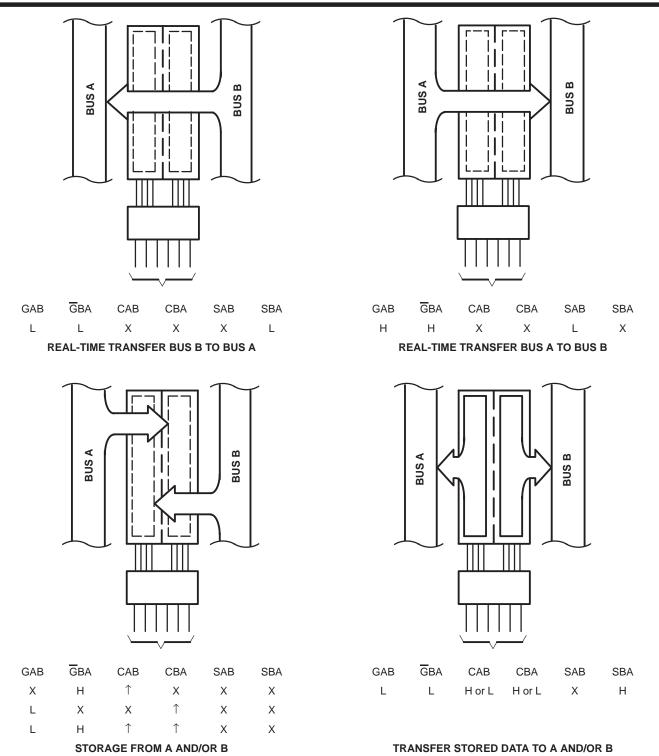


Figure 1. Bus Transfer Diagram

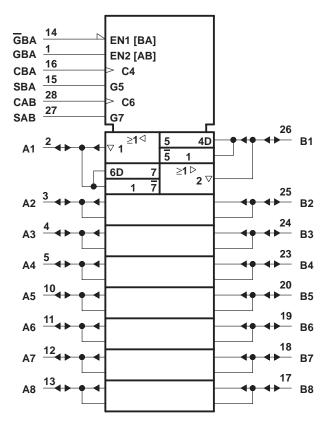


FUNCTION TABLE

		INF	PUTS			DATA	. I/O†	OPERATION OR FUNCTION
GAB	GBA	CAB	CBA	SAB	SBA	A1-A8	B1-B8	OPERATION OR FUNCTION
L	Н	H or L	H or L	Х	Х	Innut	Innut	Isolation
L	Н	↑	1	Х	X	Input	Input	Store A and B data
Χ	Н	1	H or L	Х	Х	Input	Unspecified [†]	Store A, hold B
Н	Н	↑	1	χ‡	Χ	Input	Output	Store A in both registers
L	Х	H or L	1	Х	Х	Unspecified [†]	Input	Hold A, store B
L	L	↑	\uparrow	Х	X‡	Output	Input	Store B in both registers
L	L	Х	Х	Х	L	Output	loout	Real-time B data to A bus
L	L	X	H or L	Х	Н	Output	Input	Stored B data to A bus
Н	Н	Х	Х	L	Х	Innut	Output	Real-time A data to B bus
Н	Н	H or L	Χ	Н	X	Input	Output	Stored A data to B bus
Н	L	H or L	H or L	Н	Н	Output	Output	Stored A data to B bus and stored B data to A bus

[†] The data-output functions may be enabled or disabled by various signals at the GAB or GBA inputs. Data-input functions are always enabled, i.e., data at the bus terminals is stored on every low-to-high transition on the clock inputs.

logic symbol§



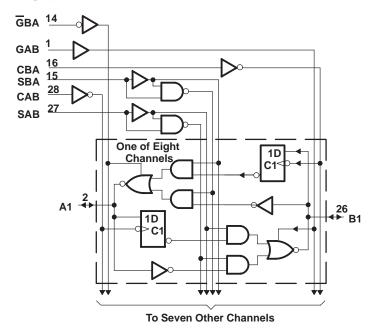
§ This symbol is in accordance with ANSI/IEEE Std 91-1984 and IEC Publication 617-12.



[‡] Select control = L: clocks can occur simultaneously. Select control = H: clocks must be staggered to load both registers.

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logic diagram (positive logic)



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

Supply voltage, 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, VO (see Note 1)	0.5 V to V _{CC} + 0.5 V
Input clamp current, I_{IK} ($V_I < 0$ or $V_I > V_{CC}$)	±20 mA
Output clamp current, I _{OK} (V _O < 0 or V _O > V _{CC})	±50 mA
Continuous output current, $I_O(V_O = 0 \text{ to } V_{CC})$	±50 mA
Continuous current through V _{CC} or GND	±200 mA
Maximum power dissipation at $T_A = 55^{\circ}C$ (in still air) (see Note 2)	
Storage temperature range, T _{sta}	

[†] 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.

recommended operating conditions (see Note 3)

		MIN	MAX	UNIT
Vcc	Supply voltage	4.5	5.5	V
VIH	High-level input voltage	2		V
V _{IL}	Low-level input voltage		0.8	V
٧ _I	Input voltage	0	VCC	V
Vo	Output voltage	0	VCC	V
IOH	High-level output current		-24	mA
lOL	Low-level output current		24	mA
Δt/ΔV	Input transition rise or fall rate	0	10	ns/V
TA	Operating free-air temperature	-40	85	°C

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



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

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

PARAMETER		TEST CONDITIONS		T _A = 25°C			MIN	MAX	UNIT
	MAWIETER	TEST CONDITIONS		MIN	TYP	MAX	IVIIIV	IVIAA	ONIT
		ΙΟΗ = – 50 μΑ		4.4			4.4		V
				5.4			5.4		
Vон		J		3.94			3.8		
		IOH = -24 mA		4.94			4.8		
		$I_{OH} = -75 \text{ mA}^{\dagger}$	5.5 V				3.85		
		Ι _{ΟL} = 50 μΑ				0.1		0.1	V
						0.1		0.1	
VOL		I _{OL} = 24 mA				0.36		0.44	
						0.36		0.44	
		$I_{OL} = 75 \text{ mA}^{\dagger}$	5.5 V					1.65	
loz	A or B ports‡	$V_O = V_{CC}$ or GND	5.5 V			±0.5		±5	μА
ΙĮ	GAB or GBA	$V_I = V_{CC}$ or GND	5.5 V			±0.1		±1	μΑ
Icc		$V_I = V_{CC}$ or GND, $I_O = 0$	5.5 V			8		80	μА
Δlcc§	3	One input at 3.4 V, Other inputs at GND or V _{CC}	5.5 V			0.9		1	mA
Ci	GAB or GBA	V _I = V _{CC} or GND	5 V		4.5				pF
Co	A or B ports	$V_O = V_{CC}$ or GND	5 V		12				pF

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

timing requirements over recommended ranges of supply voltage and operating free-air temperature (unless otherwise noted) (see Figure 2)

	PARAMETER		T _A = 25°C		MAX	UNIT
	FARAWEIER	MIN	MAX	MIN	IVIAA	UNIT
fclock	Clock frequency	0	105	0	105	MHz
t _W	Pulse duration, CAB or CBA high or low	4.8		4.8		ns
t _{su}	Setup time, A before CLK↑ or B before CBA↑	4		4		ns
th	Hold time, A after CAB↑ or B after CBA↑	2.5		2.5		ns



[‡] For I/O ports, the parameter IOZ includes the input leakage current.

[§] 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 VCC.

74ACT11652 OCTAL BUS TRANSCEIVER AND REGISTER WITH 3-STATE OUTPUTS

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switching characteristics over recommended ranges of supply voltage and operating free-air temperature (unless otherwise noted) (see Figure 2)

PARAMETER	FROM	то	T,	T _A = 25°C			MAX	UNIT
FARAMETER	(INPUT)	(OUTPUT)	MIN	TYP	MAX	MIN	WAX	ONIT
f _{max}			105			105		MHz
t _{PLH}	A or B	P or A	3.8	7	9.9	3.8	11.1	20
^t PHL	AOIB	B or A	3.4	6.7	10.7	3.4	11.6	ns
^t PLH	CDA or CAD	A or B	5.4	8.4	11.8	5.4	13.1	ns
^t PHL	CBA or CAB	AUID	6.1	9.4	13.1	6.1	14.4	TIS
^t PLH	SBA or SAB [†] with A or B high	A or B	2.8	6.2	10.1	2.8	11	ns
t _{PHL}			5.5	8.7	12.1	5.5	13.3	
^t PLH	SBA or SAB†	A or D	4.9	7.8	11	4.9	12.2	
t _{PHL}	with A or B low	A or B	3.9	7.5	11.6	3.9	12.6	ns
^t PZH	GBA	Δ.	3.3	7.2	11.4	3.3	12.6	
^t PZL	GBA	А	4.1	7.8	12.6	4.1	13.8	ns
^t PHZ	GBA	Λ	5.2	7.2	9.3	5.2	9.9	
t _{PLZ}	GBA	A	4.8	6.7	8.6	4.8	9.3	ns
^t PZH	CAR	В	5.1	9.1	13.4	5.1	15.2	
^t PZL	GAB		5.8	9.7	14.2	5.8	16.1	ns
^t PHZ	GAB	D	3.4	6.8	9.7	3.4	10.3	
^t PLZ	GAB	В	3.1	6	8.8	3.1	9.3	ns

[†] These parameters are measured with the internal output state of the storage register opposite that of the bus input.

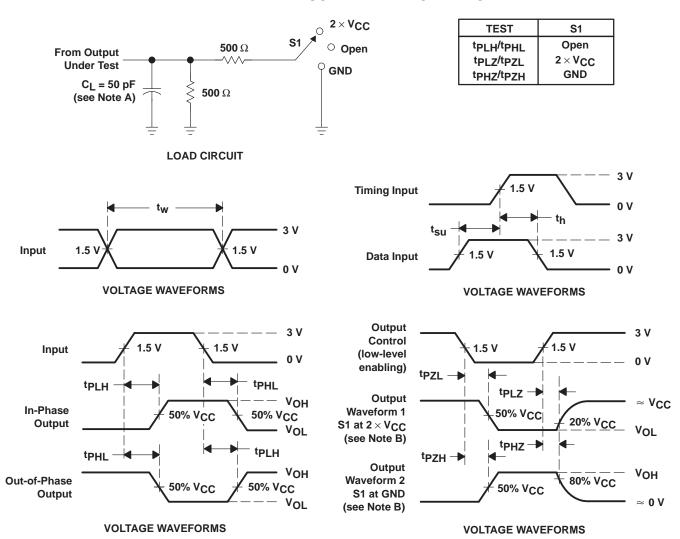
operating characteristics, $V_{CC} = 5 \text{ V}$, $T_A = 25^{\circ}\text{C}$

PARAMETER			TEST CO	TYP	UNIT	
C _{pd}	Power dissinction appealtance per transcriver	Outputs enabled	C 50 pE	f = 1 MHz	59	pF
	Power dissipation capacitance per transceiver	Outputs disabled	$C_L = 50 \text{ pF},$	t = 1 MHz	14	



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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 MHz, $Z_O = 50~\Omega$, $t_f = 3~ns$, $t_f = 3~ns$.
- D. The outputs are measured one at a time with one input transition per measurement.

Figure 2. Load Circuit and Voltage Waveforms

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