74AC11257 QUADRUPLE 2-LINE TO 1-LINE DATA SELECTOR/MULTIPLEXER WITH 3-STATE OUTPUTS

SCAS049C - MARCH 1989 - REVISED MAY 2004

- 3-State Outputs Interface Directly With System Bus
- Flow-Through Architecture Optimizes PCB Layout
- Center-Pin V_{CC} and GND Configurations Minimize High-Speed Switching Noise
- 500-mA Typical Latch-Up Immunity at 125°C
- Provides Bus Interface From Multiple Sources in High-Performance Systems

(TOP VIEW) 20 1 1A Ā/B [19 1B 1Y 2Y 🛛 3 18 T 2A GND 1 4 17 D 2B GND II 5 16 V_{CC} GND II 6 15 V_{CC} GND ∏ 7 14 🛮 3A 3Y 🛮 8 13 3B 4Y 🛮 9 12 4A 11 **∏** 4B

DB, DW, N, OR PW PACKAGE

description/ordering information

This device is designed to multiplex signals from 4-bit data sources to four output data lines in bus-organized systems. The 3-state outputs do not load the data lines when the output-enable (OE) input is at a high logic level.

To ensure the high-impedance state during power up or power down, \overline{OE} should be tied to V_{CC} through a pullup resistor; the minimum value of the resistor is determined by the current-sinking capability of the driver.

ORDERING INFORMATION

T _A	PACK	AGE†	ORDERABLE PART NUMBER	TOP-SIDE MARKING
	PDIP – N Tube 74AC11257N		74AC11257N	
	0010 DW	Tube	74AC11257DW	A044057
	SOIC - DW	Tape and reel	74AC11257DWR	AC11257
–40°C to 85°C	SSOP – DB	Tape and reel	74AC11257DBR	AE257
	TOOOD DW	Tube	74AC11257PW	A F.0.5.7
	TSSOP – PW	Tape and reel	74AC11257PWR	AE257

[†] Package drawings, standard packing quantities, thermal data, symbolization, and PCB design guidelines are available at www.ti.com/sc/package.

FUNCTION TABLE

	INPUT	S					
ŎĒ.	SELECT	DA	TA	OUTPUT			
OE	A/B						
Н	Х	Х	Х	Z			
L	L	L	Х	L			
L	L	Н	Х	Н			
L	Н	Х	L	L			
L	Н	Χ	Н	Н			

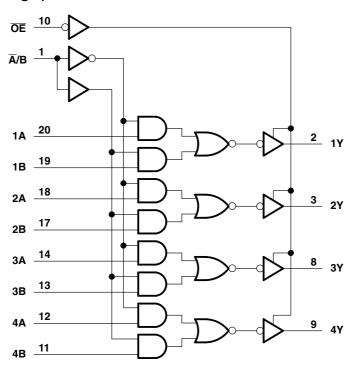


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logic diagram (positive logic)



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

Supply voltage range, V _{CC}		–0.5 V to 7 V
Input voltage range, V _I (see Note 1)		. $-0.5 \text{ V to V}_{CC} + 0.5 \text{ V}$
Output voltage range, V _O (see Note 1)		. $-0.5 \text{ V to V}_{CC} + 0.5 \text{ V}$
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		±100 mA
Package thermal impedance, θ_{JA} (see Note 2):	DB package	70°C/W
	DW package	58°C/W
	N package	60°C/W
	PW package	83°C/W
Storage temperature range, T _{stq}		–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 51-7.



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recommended operating conditions (see Note 3)

	·		MIN	NOM	MAX	UNIT
V_{CC}	Supply voltage		3	5	5.5	V
		V _{CC} = 3 V	2.1			
V_{IH}	High-level input voltage	$V_{CC} = 4.5 \text{ V}$	3.15			V
		$V_{CC} = 5.5 \text{ V}$	3.85			
		V _{CC} = 3 V			0.9	
V_{IL}	Low-level input voltage	$V_{CC} = 4.5 \text{ V}$			1.35	V
		V _{CC} = 5.5 V			1.65	
VI	Input voltage	•	0		V_{CC}	V
Vo	Output voltage		0		V_{CC}	V
		V _{CC} = 3 V			-4	
I _{OH}	High-level output current	V _{CC} = 4.5 V			-24	mA
		V _{CC} = 5.5 V			-24	
		V _{CC} = 3 V			12	
I_{OL}	Low-level output current	V _{CC} = 4.5 V			24	mA
		$V_{CC} = 5.5 \text{ V}$			24	
Δt/Δν	Input transition rise or fall rate				10	ns/V
T _A	Operating free-air temperature		-40		85	°C

NOTE 3: All unused inputs of the device must be held at V_{CC} or GND to ensure proper device operation. Refer to the TI application report, *Implications of Slow or Floating CMOS Inputs*, literature number SCBA004.

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

242445	TEGE COMPLETIONS		T,	_A = 25°C				
PARAMETER	TEST CONDITIONS	V _{CC}	MIN	TYP	MAX	MIN	MAX	UNIT
		3 V	2.9			2.9		
	$I_{OH} = -50 \mu A$	4.5 V	4.4			4.4		
		5.5 V	5.4			5.4		
V _{OH}	$I_{OH} = -4 \text{ mA}$	3 V	2.58			2.48		V
	04 mA	4.5 V	3.94			3.8		
	I _{OH} = -24 mA	5.5 V	4.94			4.8		
	$I_{OH} = -75 \text{ mA}^{\dagger}$	5.5 V				3.85		
		3 V			0.1		0.1	
	$I_{OL} = 50 \mu A$	4.5 V			0.1		0.1	
		5.5 V			0.1		0.1	
V _{OL}	$I_{OL} = 12 \text{ mA}$	3 V			0.36		0.44	V
		4.5 V			0.36		0.44	
	I _{OL} = 24 mA	5.5 V			0.36		0.44	
	$I_{OL} = 75 \text{ mA}^{\dagger}$	5.5 V					1.65	
l _{OZ}	$V_O = V_{CC}$ or GND	5.5 V			±0.5		±5	μΑ
I _I	V _I = V _{CC} or GND	5.5 V			±0.1		±1	μΑ
I _{CC}	$V_I = V_{CC}$ or GND, $I_O = 0$	5.5 V			8		80	μΑ
C _i	$V_I = V_{CC}$ or GND	5 V		3.5				pF
Co	V _O = V _{CC} or GND	5.5 V		8				pF

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



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switching characteristics over recommended operating free-air temperature range, V_{CC} = 3.3 V \pm 0.3 V (unless otherwise noted) (see Figure 1)

DADAMETER	FROM	то	T,	գ = 25°C	;	MINI	MAY	UNIT
PARAMETER	(INPUT)	(OUTPUT)	MIN	TYP	MAX	MIN	MAX	UNIT
t _{PLH}	A or B	Υ	1.5	5.6	8.1	1.5	8.9	20
t _{PHL}	AOID	Ť	1.5	6.2	9	1.5	10.1	ns
t _{PLH}	⊼/D	A V	1.5	6.1	9.2	1.5	10.2	ns
t _{PHL}	Ā/B	Any Y	1.5	6.6	10	1.5	11.2	
t _{PZH}	ΔF.	A.v. V	1.5	5.6	8.2	1.5	9.1	
t _{PZL}	ŌĒ	Any Y	1.5	7.5	10.4	1.5	11.8	ns
t _{PHZ}	OF.	Amy V	1.5	5.6	7.6	1.5	8.3	
t _{PLZ}	ŌĒ	Any Y	1.5	6.2	8.8	1.5	9.6	ns

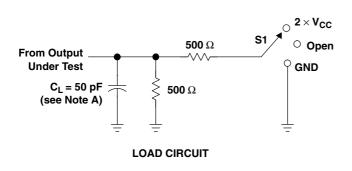
switching characteristics, over recommended operating free-air temperature range, V_{CC} = 5 V \pm 0.5 V (unless otherwise noted) (see Figure 1)

DADAMETER	FROM	то	T,	գ = 25°C	;		MAY	UNIT
PARAMETER	(INPUT)	(OUTPUT)	MIN	TYP	MAX	MIN	MAX	UNII
t _{PLH}	A - :: D	V	1.5	3.6	5.8	1.5	6.4	
t _{PHL}	A or B	Υ	1.5	4.1	6.5	1.5	7.2	ns
t _{PLH}	T/D	Am. V	1.5	4	6.5	1.5	7.2	ns
t _{PHL}	Ā/B	Any Y	1.5	4.4	7.1	1.5	7.9	
t _{PZH}		A.v. V	1.5	3.8	5.9	1.5	6.5	
t _{PZL}	ŌĒ	Any Y	1.5	5	7.6	1.5	8.6	ns
t _{PHZ}	OF.	Am., V	1.5	4.5	6.4	1.5	7.6	
t _{PLZ}	ŌĒ	Any Y	1.5	4.8	6.9	1.5	7.6	ns

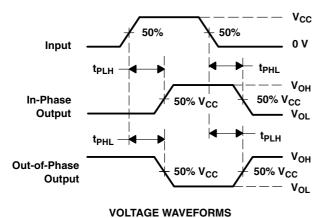
operating characteristics, $V_{CC} = 5 \text{ V}$, $T_A = 25^{\circ}\text{C}$

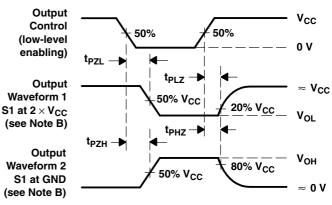
PARAMETER	TEST CO	TYP	UNIT		
Davis dissination consistence	Outputs enabled	0 50.55	£ 4 MII-	37	pF
Power dissipation capacitance	Outputs disabled	$C_L = 50 \text{ pF},$	f = 1 MHz	11	

PARAMETER MEASUREMENT INFORMATION



TEST	S1
t _{PLH} /t _{PHL}	Open
t _{PLZ} /t _{PZL}	$2 \times V_{CC}$
t _{PHZ} /t _{PZH}	GND





VOLTAGE WAVEFORMS

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, $Z_{O} = 50 \Omega$, $t_{r} = 3$ ns. $t_{f} = 3$ ns.
- D. The outputs are measured one at a time, with one input transition per measurement.

Figure 1. Load Circuit and Voltage Waveforms





24-Jan-2013

PACKAGING INFORMATION

Orderable Device	Status	Package Type	Package Drawing	Pins	Package Qty	Eco Plan	Lead/Ball Finish	MSL Peak Temp	Op Temp (°C)	Top-Side Markings	Samples
74AC11257DW	ACTIVE	SOIC	DW	20	25	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	-40 to 85	AC11257	Samples
74AC11257DWE4	ACTIVE	SOIC	DW	20	25	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	-40 to 85	AC11257	Samples
74AC11257DWG4	ACTIVE	SOIC	DW	20	25	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	-40 to 85	AC11257	Samples
74AC11257DWR	ACTIVE	SOIC	DW	20	2000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	-40 to 85	AC11257	Samples
74AC11257DWRE4	ACTIVE	SOIC	DW	20	2000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	-40 to 85	AC11257	Samples
74AC11257DWRG4	ACTIVE	SOIC	DW	20	2000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	-40 to 85	AC11257	Samples
74AC11257N	ACTIVE	PDIP	N	20	20	Pb-Free (RoHS)	CU NIPDAU	N / A for Pkg Type	-40 to 85	74AC11257N	Samples
74AC11257NE4	ACTIVE	PDIP	N	20	20	Pb-Free (RoHS)	CU NIPDAU	N / A for Pkg Type	-40 to 85	74AC11257N	Samples
74AC11257PW	ACTIVE	TSSOP	PW	20	70	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	-40 to 85	AE257	Samples
74AC11257PWE4	ACTIVE	TSSOP	PW	20	70	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	-40 to 85	AE257	Samples
74AC11257PWG4	ACTIVE	TSSOP	PW	20	70	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	-40 to 85	AE257	Samples

⁽¹⁾ The marketing status values are defined as follows:

ACTIVE: Product device recommended for new designs.

LIFEBUY: TI has announced that the device will be discontinued, and a lifetime-buy period is in effect.

NRND: Not recommended for new designs. Device is in production to support existing customers, but TI does not recommend using this part in a new design.

PREVIEW: Device has been announced but is not in production. Samples may or may not be available.

OBSOLETE: TI has discontinued the production of the device.

TBD: The Pb-Free/Green conversion plan has not been defined.

Pb-Free (RoHS): TI's terms "Lead-Free" or "Pb-Free" mean semiconductor products that are compatible with the current RoHS requirements for all 6 substances, including the requirement that lead not exceed 0.1% by weight in homogeneous materials. Where designed to be soldered at high temperatures, TI Pb-Free products are suitable for use in specified lead-free processes.

⁽²⁾ Eco Plan - The planned eco-friendly classification: Pb-Free (RoHS), Pb-Free (RoHS Exempt), or Green (RoHS & no Sb/Br) - please check http://www.ti.com/productcontent for the latest availability information and additional product content details.



PACKAGE OPTION ADDENDUM

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Pb-Free (RoHS Exempt): This component has a RoHS exemption for either 1) lead-based flip-chip solder bumps used between the die and package, or 2) lead-based die adhesive used between the die and leadframe. The component is otherwise considered Pb-Free (RoHS compatible) as defined above.

Green (RoHS & no Sb/Br): TI defines "Green" to mean Pb-Free (RoHS compatible), and free of Bromine (Br) and Antimony (Sb) based flame retardants (Br or Sb do not exceed 0.1% by weight in homogeneous material)

(3) MSL, Peak Temp. -- The Moisture Sensitivity Level rating according to the JEDEC industry standard classifications, and peak solder temperature.

(4) Only one of markings shown within the brackets will appear on the physical device.

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PACKAGE MATERIALS INFORMATION

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TAPE AND REEL INFORMATION





A0	
B0	Dimension designed to accommodate the component length
K0	Dimension designed to accommodate the component thickness
W	Overall width of the carrier tape
P1	Pitch between successive cavity centers

QUADRANT ASSIGNMENTS FOR PIN 1 ORIENTATION IN TAPE



*All dimensions are nominal

Device	Package Type	Package Drawing		SPQ	Reel Diameter (mm)	Reel Width W1 (mm)	A0 (mm)	B0 (mm)	K0 (mm)	P1 (mm)	W (mm)	Pin1 Quadrant
74AC11257DWR	SOIC	DW	20	2000	330.0	24.4	10.8	13.3	2.7	12.0	24.0	Q1

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*All dimensions are nominal

Device	Package Type	Package Drawing	Pins	SPQ	Length (mm)	Width (mm)	Height (mm)
74AC11257DWR	SOIC	DW	20	2000	367.0	367.0	45.0

N (R-PDIP-T**)

PLASTIC DUAL-IN-LINE PACKAGE

16 PINS SHOWN



- A. All linear dimensions are in inches (millimeters).
- B. This drawing is subject to change without notice.
- Falls within JEDEC MS-001, except 18 and 20 pin minimum body length (Dim A).
- The 20 pin end lead shoulder width is a vendor option, either half or full width.



DW (R-PDSO-G20)

PLASTIC SMALL OUTLINE



NOTES: A. All linear dimensions are in inches (millimeters). Dimensioning and tolerancing per ASME Y14.5M-1994.

- B. This drawing is subject to change without notice.
- C. Body dimensions do not include mold flash or protrusion not to exceed 0.006 (0,15).
- D. Falls within JEDEC MS-013 variation AC.



DW (R-PDSO-G20)

PLASTIC SMALL OUTLINE



- A. All linear dimensions are in millimeters.
- B. This drawing is subject to change without notice.
- C. Refer to IPC7351 for alternate board design.
- D. Laser cutting apertures with trapezoidal walls and also rounding corners will offer better paste release. Customers should contact their board assembly site for stencil design recommendations. Refer to IPC—7525
- E. Customers should contact their board fabrication site for solder mask tolerances between and around signal pads.



PW (R-PDSO-G20)

PLASTIC SMALL OUTLINE



- A. All linear dimensions are in millimeters. Dimensioning and tolerancing per ASME Y14.5M—1994.
- B. This drawing is subject to change without notice.
- Body length does not include mold flash, protrusions, or gate burrs. Mold flash, protrusions, or gate burrs shall not exceed 0,15 each side.
- Body width does not include interlead flash. Interlead flash shall not exceed 0,25 each side.
- E. Falls within JEDEC MO-153



PW (R-PDSO-G20)

PLASTIC SMALL OUTLINE



- A. All linear dimensions are in millimeters.
- B. This drawing is subject to change without notice.
- C. Publication IPC-7351 is recommended for alternate design.
- D. Laser cutting apertures with trapezoidal walls and also rounding corners will offer better paste release. Customers should contact their board assembly site for stencil design recommendations. Refer to IPC-7525 for other stencil recommendations.
- E. Customers should contact their board fabrication site for solder mask tolerances between and around signal pads.



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