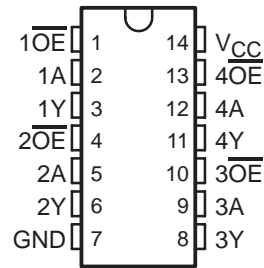


# SN64BCT125A QUADRUPLER BUS BUFFER GATE WITH 3-STATE OUTPUTS

SCBS052B – JULY 1990 – REVISED MAY 1994

- State-of-the-Art BiCMOS Design Significantly Reduces  $I_{CCZ}$
- High-Impedance State During Power-Up and Power-Down
- 3-State Outputs Drive Bus Lines or Buffer-Memory Address Registers
- ESD Protection Exceeds 2000 V Per MIL-STD-883C Method 3015
- Package Options Include Plastic Small-Outline (D) Packages and Standard Plastic 300-mil DIPs (N)

D OR N PACKAGE  
(TOP VIEW)



## description

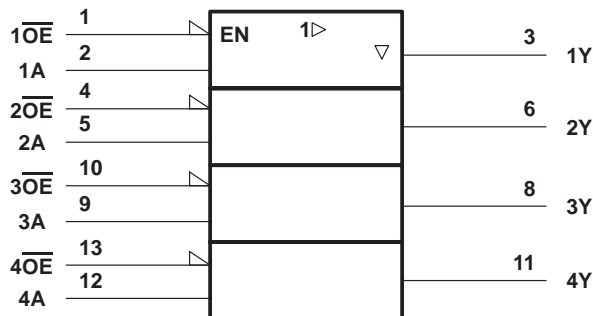
The SN64BCT125A bus buffer features independent line drivers with 3-state outputs. Each output is disabled when the associated output-enable (OE) input is high.

The SN64BCT125A is characterized for operation from  $-40^{\circ}\text{C}$  to  $85^{\circ}\text{C}$  and  $0^{\circ}\text{C}$  to  $70^{\circ}\text{C}$ .

FUNCTION TABLE  
(each buffer)

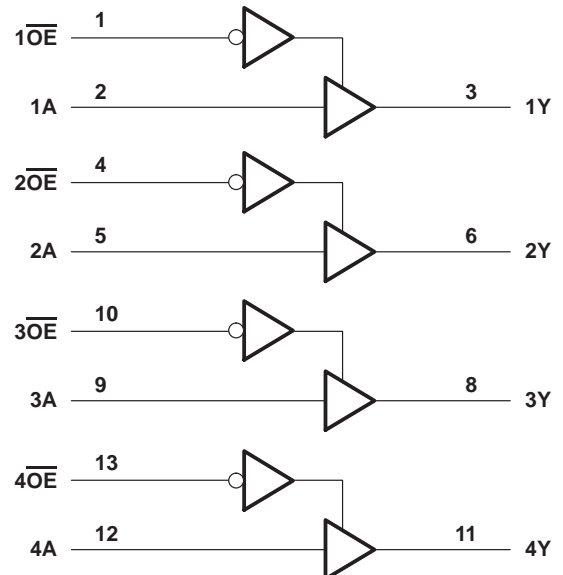
INPUTS		OUTPUT
OE	A	Y
L	H	H
L	L	L
H	X	Z

## logic symbol†



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

## logic diagram (positive logic)



# SN64BCT125A

## QUADRUPLE BUS BUFFER GATE

### WITH 3-STATE OUTPUTS

SCBS052B – JULY 1990 – REVISED MAY 1994

#### absolute maximum ratings over operating free-air temperature range (unless otherwise noted)<sup>†</sup>

Supply voltage range, $V_{CC}$	– 0.5 V to 7 V
Input voltage range, $V_I$ (see Note 1)	– 0.5 V to 7 V
Voltage range applied to any output in the disabled or power-off state, $V_O$	– 0.5 V to 5.5 V
Voltage range applied to any output in the high state, $V_O$	– 0.5 V to $V_{CC}$
Current into any output in the low state	128 mA
Operating free-air temperature range	– 40°C to 85°C
Storage temperature range	– 65°C to 150°C

<sup>†</sup> 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 input and output voltage ratings may be exceeded if the input and output current ratings are observed.

#### recommended operating conditions

	MIN	NOM	MAX	UNIT
$V_{CC}$ Supply voltage	4.5	5	5.5	V
$V_{IH}$ High-level input voltage	2			V
$V_{IL}$ Low-level input voltage			0.8	V
$I_{IK}$ Input clamp current			–18	mA
$I_{OH}$ High-level output current			–15	mA
$I_{OL}$ Low-level output current			64	mA
$T_A$ Operating free-air temperature	–40		85	°C

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

PARAMETER	TEST CONDITIONS		MIN	TYP <sup>‡</sup>	MAX	UNIT
$V_{IK}$	$V_{CC} = 4.5$ V,	$I_I = -18$ mA			–1.2	V
$V_{OH}$	$V_{CC} = 4.5$ V	$I_{OH} = -3$ mA	2.4	3.3		V
		$I_{OH} = -15$ mA	2	3.1		
$V_{OL}$	$V_{CC} = 4.5$ V,	$I_{OH} = 64$ mA		0.42	0.55	V
$I_{OZH}$	$V_{CC} = 5.5$ V,	$V_O = 2.7$ V			50	μA
$I_{OZL}$	$V_{CC} = 5.5$ V,	$V_O = 0.5$ V			–50	μA
$I_{OZ}$	$V_{CC} = 0$ to 1.3 V (power up)	$V_O = 2.7$ V or 0.5 V, $\overline{OE}$ at 0.8 V			± 50	μA
	$V_{CC} = 1.3$ V to 0 (power down)				± 50	
$I_I$	$V_{CC} = 0$ ,	$V_I = 7$ V			0.1	mA
$I_{IH}$	$V_{CC} = 5.5$ V,	$V_I = 2.7$ V			25	μA
$I_{IL}$	$V_{CC} = 5.5$ V,	$V_I = 0.5$ V			–20	μA
$I_{OS}^{\S}$	$V_{CC} = 5.5$ V,	$V_O = 0$	–100		–225	mA
$I_{CCL}$	$V_{CC} = 5.5$ V			46	49	mA
$I_{CCH}$	$V_{CC} = 5.5$ V			19	31	mA
$I_{CCZ}$	$V_{CC} = 5.5$ V			6	14	mA
$C_i$	$V_{CC} = 5$ V,	$V_I = 2.5$ V or 0.5 V		4		pF
$C_o$	$V_{CC} = 5$ V,	$V_O = 2.5$ V or 0.5 V		9		pF

<sup>‡</sup> All typical values are at  $V_{CC} = 5$  V,  $T_A = 25^\circ\text{C}$ .

<sup>\S</sup> Not more than one output should be tested at a time, and the duration of the test should not exceed one second.

**SN64BCT125A**  
**QUADRUPLE BUS BUFFER GATE**  
**WITH 3-STATE OUTPUTS**

SCBS052B – JULY 1990 – REVISED MAY 1994

**switching characteristics (see Note 2)**

PARAMETER	FROM (INPUT)	TO (OUTPUT)	V <sub>CC</sub> = 5 V, C <sub>L</sub> = 50 pF, R1 = 500 Ω, R2 = 500 Ω, T <sub>A</sub> = 25°C			V <sub>CC</sub> = 4.5 V to 5.5 V, C <sub>L</sub> = 50 pF, R1 = 500 Ω, R2 = 500 Ω				UNIT
						T <sub>A</sub> = −40°C to 85°C		T <sub>A</sub> = 0°C to 70°C		
			MIN	TYP	MAX	MIN	MAX	MIN	MAX	
t <sub>PLH</sub>	A	Y	1.6	3.5	5.2	1.6	6	1.6	5.7	ns
t <sub>PHL</sub>			2.7	5	6.9	2.7	8	2.7	7.7	
t <sub>PZH</sub>	$\overline{\text{OE}}$	Y	3.4	6.7	9	3.4	11.1	3.4	10.3	ns
t <sub>PZL</sub>			5	8.2	10.4	5	12.8	5	11.7	
t <sub>PHZ</sub>	$\overline{\text{OE}}$	Y	3	5.8	7.4	3	9.4	3	8.9	ns
t <sub>PLZ</sub>			2.8	5.5	7.3	2.8	9.9	2.8	8.6	

NOTE 2: Load circuits and voltage waveforms are shown in Section 1.



## PACKAGING INFORMATION

Orderable part number	Status (1)	Material type (2)	Package   Pins	Package qty   Carrier	RoHS (3)	Lead finish/ Ball material (4)	MSL rating/ Peak reflow (5)	Op temp (°C)	Part marking (6)
<a href="#">SN64BCT125AD</a>	Active	Production	SOIC (D)   14	50   TUBE	Yes	NIPDAU	Level-1-260C-UNLIM	-40 to 85	6BCT125A
SN64BCT125AD.A	Active	Production	SOIC (D)   14	50   TUBE	Yes	NIPDAU	Level-1-260C-UNLIM	-40 to 85	6BCT125A
<a href="#">SN64BCT125AN</a>	Active	Production	PDIP (N)   14	25   TUBE	Yes	NIPDAU	N/A for Pkg Type	-40 to 85	SN64BCT125AN
SN64BCT125AN.A	Active	Production	PDIP (N)   14	25   TUBE	Yes	NIPDAU	N/A for Pkg Type	-40 to 85	SN64BCT125AN

<sup>(1)</sup> **Status:** For more details on status, see our [product life cycle](#).

<sup>(2)</sup> **Material type:** When designated, preproduction parts are prototypes/experimental devices, and are not yet approved or released for full production. Testing and final process, including without limitation quality assurance, reliability performance testing, and/or process qualification, may not yet be complete, and this item is subject to further changes or possible discontinuation. If available for ordering, purchases will be subject to an additional waiver at checkout, and are intended for early internal evaluation purposes only. These items are sold without warranties of any kind.

<sup>(3)</sup> **RoHS values:** Yes, No, RoHS Exempt. See the [TI RoHS Statement](#) for additional information and value definition.

<sup>(4)</sup> **Lead finish/Ball material:** Parts may have multiple material finish options. Finish options are separated by a vertical ruled line. Lead finish/Ball material values may wrap to two lines if the finish value exceeds the maximum column width.

<sup>(5)</sup> **MSL rating/Peak reflow:** The moisture sensitivity level ratings and peak solder (reflow) temperatures. In the event that a part has multiple moisture sensitivity ratings, only the lowest level per JEDEC standards is shown. Refer to the shipping label for the actual reflow temperature that will be used to mount the part to the printed circuit board.

<sup>(6)</sup> **Part marking:** There may be an additional marking, which relates to the logo, the lot trace code information, or the environmental category of the part.

Multiple part markings will be inside parentheses. Only one part marking contained in parentheses and separated by a "~" will appear on a part. If a line is indented then it is a continuation of the previous line and the two combined represent the entire part marking for that device.

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## TUBE



\*All dimensions are nominal

Device	Package Name	Package Type	Pins	SPQ	L (mm)	W (mm)	T (μm)	B (mm)
SN64BCT125AD	D	SOIC	14	50	506.6	8	3940	4.32
SN64BCT125AD.A	D	SOIC	14	50	506.6	8	3940	4.32
SN64BCT125AN	N	PDIP	14	25	506	13.97	11230	4.32
SN64BCT125AN	N	PDIP	14	25	506	13.97	11230	4.32
SN64BCT125AN.A	N	PDIP	14	25	506	13.97	11230	4.32
SN64BCT125AN.A	N	PDIP	14	25	506	13.97	11230	4.32

**D0014A****PACKAGE OUTLINE****SOIC - 1.75 mm max height**

SMALL OUTLINE INTEGRATED CIRCUIT



4220718/A 09/2016

**NOTES:**

1. All linear dimensions are in millimeters. Dimensions in parenthesis are for reference only. Dimensioning and tolerancing per ASME Y14.5M.
2. This drawing is subject to change without notice.
3. This dimension does not include mold flash, protrusions, or gate burrs. Mold flash, protrusions, or gate burrs shall not exceed 0.15 mm, per side.
4. This dimension does not include interlead flash. Interlead flash shall not exceed 0.43 mm, per side.
5. Reference JEDEC registration MS-012, variation AB.

# EXAMPLE BOARD LAYOUT

D0014A

SOIC - 1.75 mm max height

SMALL OUTLINE INTEGRATED CIRCUIT



LAND PATTERN EXAMPLE  
SCALE:8X



NON SOLDER MASK  
DEFINED



SOLDER MASK  
DEFINED

SOLDER MASK DETAILS

4220718/A 09/2016

NOTES: (continued)

6. Publication IPC-7351 may have alternate designs.

7. Solder mask tolerances between and around signal pads can vary based on board fabrication site.

## EXAMPLE STENCIL DESIGN

D0014A

SOIC - 1.75 mm max height

SMALL OUTLINE INTEGRATED CIRCUIT



SOLDER PASTE EXAMPLE  
BASED ON 0.125 mm THICK STENCIL  
SCALE:8X

4220718/A 09/2016

NOTES: (continued)

8. Laser cutting apertures with trapezoidal walls and rounded corners may offer better paste release. IPC-7525 may have alternate design recommendations.
9. Board assembly site may have different recommendations for stencil design.



N (R-PDIP-T\*\*)

16 PINS SHOWN

## PLASTIC DUAL-IN-LINE PACKAGE



PINS ** DIM	14	16	18	20
A MAX	0.775 (19,69)	0.775 (19,69)	0.920 (23,37)	1.060 (26,92)
A MIN	0.745 (18,92)	0.745 (18,92)	0.850 (21,59)	0.940 (23,88)
MS-001 VARIATION	AA	BB	AC	AD



4040049/E 12/2002

NOTES:

- 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.

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