

SN54BCT125A, SN74BCT125A QUADRUPLE BUS BUFFER GATES WITH 3-STATE OUTPUTS

SCBS032E – SEPTEMBER 1988 – REVISED APRIL 1994

- State-of-the-Art BiCMOS Design Significantly Reduces I_{CCZ}
- 3-State Outputs Drive Bus Lines or Buffer Memory Address Registers
- Package Options Include Plastic Small-Outline (D) Packages, Ceramic Chip Carriers (FK) and Flatpacks (W), and Standard Plastic and Ceramic 300-mil DIPs (J, N)

description

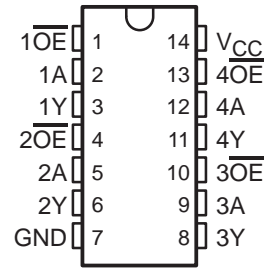
The 'BCT125A bus buffer features independent line drivers with 3-state outputs. Each output is disabled when the associated output-enable (\overline{OE}) input is high.

The SN54BCT125A is characterized for operation over the full military temperature range of -55°C to 125°C . The SN74BCT125A is characterized for operation from 0°C to 70°C .

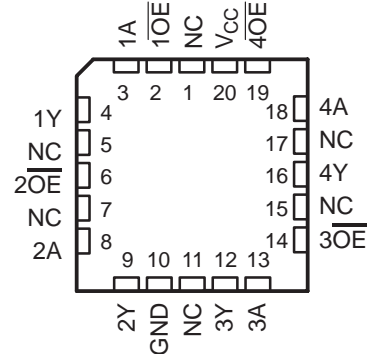
FUNCTION TABLE
(each buffer)

INPUTS		OUTPUT
\overline{OE}	A	Y
L	H	H
L	L	L
H	X	Z

SN54BCT125A . . . J OR W PACKAGE
SN74BCT125A . . . D OR N PACKAGE
(TOP VIEW)

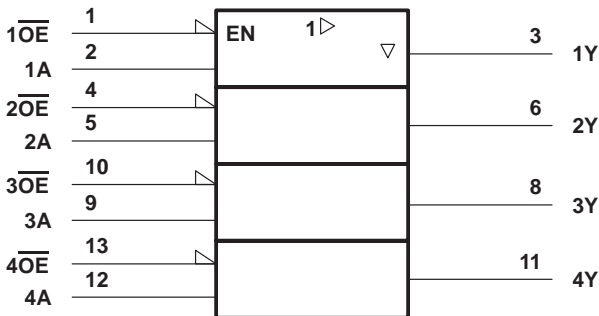


SN54BCT125A . . . FK PACKAGE
(TOP VIEW)



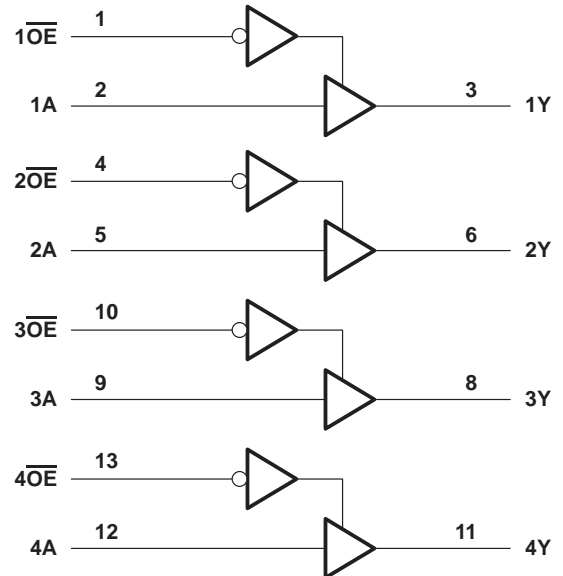
NC – No internal connection

logic symbol†



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

logic diagram (positive logic)



Pin numbers shown are for the J, N, and W packages.

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.

TEXAS
INSTRUMENTS

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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 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: SN54BCT125A	96 mA
SN74BCT125A	128 mA
Operating free-air temperature range: SN54BCT125A	– 55°C to 125°C
SN74BCT125A	0°C to 70°C
Storage temperature range	– 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.

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

recommended operating conditions

	SN54BCT125A			SN74BCT125A			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	2			2			V
V_{IL} Low-level input voltage			0.8			0.8	V
I_{IK} Input clamp current			–18			–18	mA
I_{OH} High-level output current			–12			–15	mA
I_{OL} Low-level output current			48			64	mA
T_A Operating free-air temperature	–55		125	0		70	°C

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

PARAMETER	TEST CONDITIONS		SN54BCT125A			SN74BCT125A			UNIT
			MIN	TYP†	MAX	MIN	TYP†	MAX	
V_{IK}	$V_{CC} = 4.5\text{ V}$,	$I_I = -18\text{ mA}$			-1.2			-1.2	V
V_{OH}	$V_{CC} = 4.5\text{ V}$	$I_{OH} = -3\text{ mA}$	2.4	3.3		2.4	3.3		V
		$I_{OH} = -12\text{ mA}$	2	3.2					
		$I_{OH} = -15\text{ mA}$				2	3.1		
V_{OL}	$V_{CC} = 4.5\text{ V}$	$I_{OL} = 48\text{ mA}$		0.38	0.55				V
		$I_{OL} = 64\text{ mA}$					0.42	0.55	
I_I	$V_{CC} = 0$,	$V_I = 7\text{ V}$			0.1			0.1	mA
I_{IH}	$V_{CC} = 5.5\text{ V}$,	$V_I = 2.7\text{ V}$			35			25	μA
I_{IL}	$V_{CC} = 5.5\text{ V}$,	$V_I = 0.5\text{ V}$			-20			-20	μA
I_{OZH}	$V_{CC} = 5.5\text{ V}$,	$V_O = 2.7\text{ V}$			50			50	μA
I_{OZL}	$V_{CC} = 5.5\text{ V}$,	$V_O = 0.5\text{ V}$			-50			-50	μA
$I_{OS}‡$	$V_{CC} = 5.5\text{ V}$,	$V_O = 0$	-100		-225	-100		-225	mA
I_{CCH}	$V_{CC} = 5.5\text{ V}$,	Outputs open		19	31		19	31	mA
I_{CCL}	$V_{CC} = 5.5\text{ V}$,	Outputs open		46	49		46	49	mA
I_{CCZ}	$V_{CC} = 5.5\text{ V}$,	Outputs open		6	14		6	14	mA
C_i	$V_{CC} = 5\text{ V}$,	$V_I = 2.5\text{ V}$ or 0.5 V		4			4		pF
C_o	$V_{CC} = 5\text{ V}$,	$V_O = 2.5\text{ V}$ or 0.5 V		9			9		pF

† All typical values are at $V_{CC} = 5\text{ V}$.

‡ Not more than one output should be tested at a time, and the duration of the test should not exceed one second.

switching characteristics (see Note 2)

PARAMETER	FROM (INPUT)	TO (OUTPUT)	$V_{CC} = 5\text{ V}$, $C_L = 50\text{ pF}$, $R_1 = 500\ \Omega$, $R_2 = 500\ \Omega$, $T_A = 25^\circ\text{C}$			$V_{CC} = 4.5\text{ V to }5.5\text{ V}$, $C_L = 50\text{ pF}$, $R_1 = 500\ \Omega$, $R_2 = 500\ \Omega$, $T_A = \text{MIN to MAX}§$				UNIT
			BCT125A			SN54BCT125A		SN74BCT125A		
			MIN	TYP	MAX	MIN	MAX	MIN	MAX	
t_{PLH}	A	Y	1.6	3.5	5.2	1.6	6	1.6	5.7	ns
t_{PHL}			2.7	5	6.9	2.7	8	2.7	7.7	
t_{PZH}	\overline{OE}	Y	3.4	6.7	9	3.4	11.1	3.4	10.3	ns
t_{PZL}			5	8.2	10.4	5	12.8	5	11.7	
t_{PHZ}	OE	Y	3	5.8	7.4	3	9.4	3	8.9	ns
t_{PLZ}			2.8	5.5	7.3	2.8	9.9	2.8	8.6	

§ For conditions shown as MIN or MAX, use the appropriate value specified under recommended operating conditions.

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



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