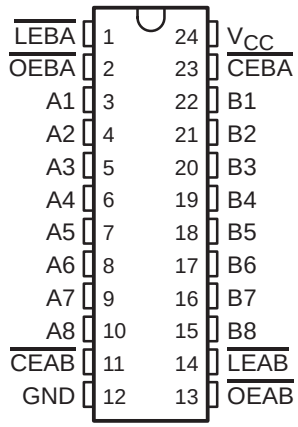
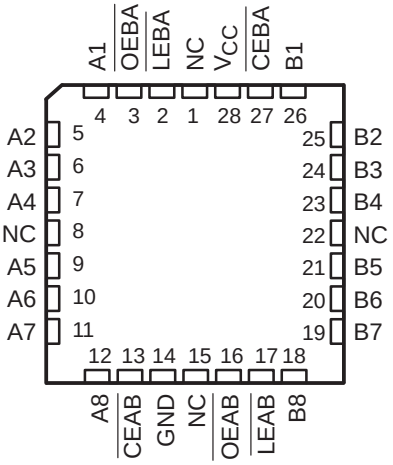
- **State-of-the-Art BiCMOS Design Significantly Reduces I_{CCZ}**
- **ESD Protection Exceeds 2000 V Per MIL-STD-883C, Method 3015**
- **Power-Up High-Impedance State**
- **3-State Inverting Outputs**
- **Back-to-Back Registers for Storage**
- **Package Options Include Plastic Small-Outline (DW) Packages, Ceramic Chip Carriers (FK) and Flatpacks (W), and Plastic and Ceramic 300-mil DIPs (JT, NT)**

SN54BCT544 . . . JT OR W PACKAGE
SN74BCT544 . . . DW OR NT PACKAGE
(TOP VIEW)



SN54BCT544 . . . FK PACKAGE
(TOP VIEW)



NC – No internal connection

description

The ′BCT544 octal registered transceiver contains two sets of D-type latches for temporary storage of data flowing in either direction. Separate latch-enable ($\overline{\text{LEAB}}$ or $\overline{\text{LEBA}}$) and output-enable ($\overline{\text{OEAB}}$ or $\overline{\text{OEBA}}$) inputs are provided for each register to permit independent control in either direction of data flow.

The A-to-B enable ($\overline{\text{CEAB}}$) input must be low in order to enter data from A or to output data from B. If $\overline{\text{CEAB}}$ is low and $\overline{\text{LEAB}}$ is low, the A-to-B latches are transparent; a subsequent low-to-high transition of $\overline{\text{LEAB}}$ puts the A latches in the storage mode. With $\overline{\text{CEAB}}$ and $\overline{\text{OEAB}}$ both low, the 3-state B outputs are active and reflect the inverted data present at the output of the A latches. Data flow from B to A is similar, but requires using the $\overline{\text{CEBA}}$, $\overline{\text{LEBA}}$, and $\overline{\text{OEBA}}$ inputs.

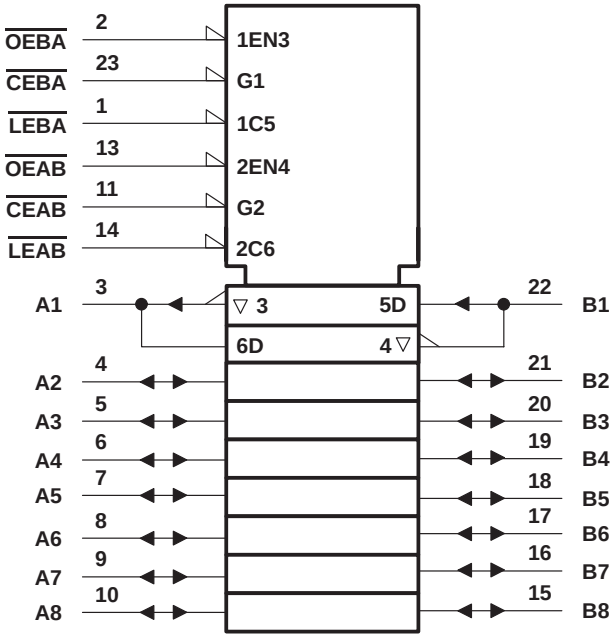
The SN54BCT544 is characterized for operation over the full military temperature range of –55°C to 125°C. The SN74BCT544 is characterized for operation from 0°C to 70°C.

FUNCTION TABLE†

INPUTS				OUTPUT
$\overline{\text{CEAB}}$	$\overline{\text{LEAB}}$	$\overline{\text{OEAB}}$	A	B
H	X	X	X	Z
L	X	H	X	Z
L	H	L	X	B_0‡
L	L	L	L	H
L	L	L	H	L

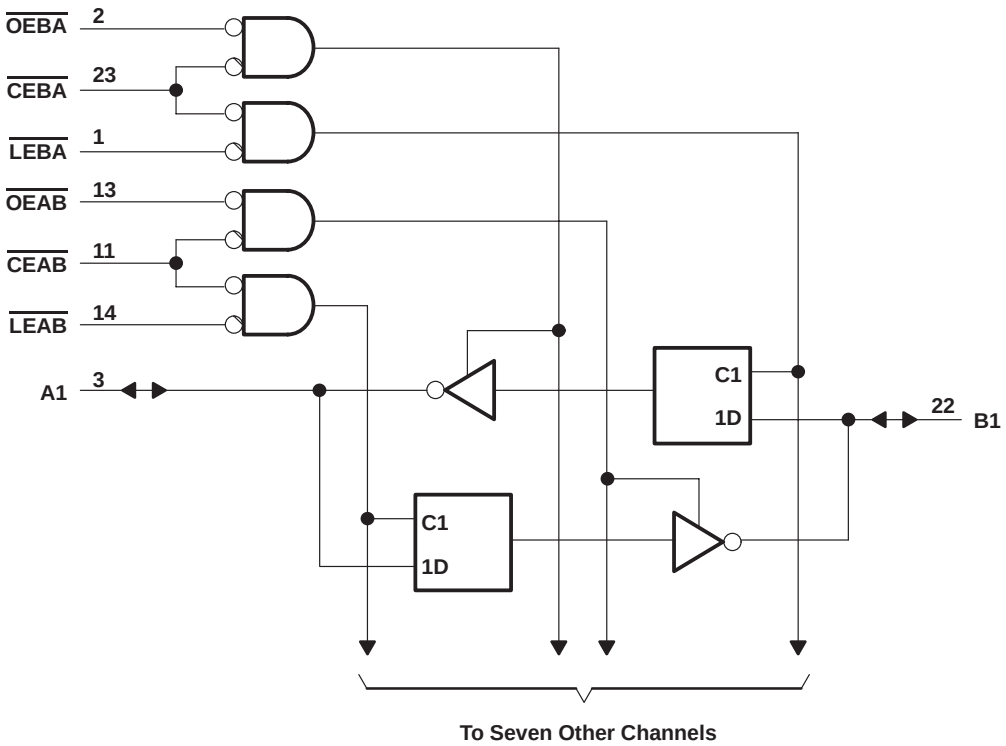
† A-to-B data flow is shown; B-to-A flow control is the same except that it uses $\overline{\text{CEBA}}$, $\overline{\text{LEBA}}$, and $\overline{\text{OEBA}}$.
‡ Output level before the indicated steady-state input conditions were established.

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 DW, JT, NT, and W packages.

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: Control inputs (see Note 1) . . . . . – 0.5 V to 7 V
I/O ports (see Note 1) . . . . . – 0.5 V to 5.5 V
Voltage range applied to any output in the disabled or power-off state, V_O . . . . . – 0.5 V to 7 V
Voltage range applied to any output in the high state, V_O . . . . . – 0.5 V to V_{CC}
Input clamp current . . . . . –30 mA
Current into any output in the low state: SN54BCT544 . . . . . 96 mA
SN74BCT544 . . . . . 128 mA
Operating free-air temperature range: SN54BCT544 . . . . . – 55°C to 125°C
SN74BCT544 . . . . . 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 negative voltage rating may be exceeded if the input clamp-current rating is observed.

recommended operating conditions

		SN54BCT544			SN74BCT544			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

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

PARAMETER	TEST CONDITIONS		SN54BCT544			SN74BCT544			UNIT
			MIN	TYP†	MAX	MIN	TYP†	MAX	
V_{IK}	V_{CC} = 4.5 V,	I_I = –18 mA			–1.2			–1.2	V
V_{OH}	V_{CC} = 4.5 V	I_{OH} = –3 mA	2.4	3.3		2.4	3.3		V
		I_{OH} = –12 mA	2	3.2					
		I_{OH} = –15 mA				2	3.1		
	V_{CC} = 4.75 V,	I_{OH} = –3 mA				2.7			
V_{OL}	V_{CC} = 4.5 V	I_{OL} = 48 mA		0.38	0.55				V
		I_{OL} = 64 mA					0.42	0.55	
I_I	V_{CC} = 5.5 V,	V_I = 5.5 V			0.4			0.4	mA
I_{IH}‡	V_{CC} = 5.5 V,	V_I = 2.7 V			20			20	µA
I_{IL}‡	V_{CC} = 5.5 V,	V_I = 0.5 V			–0.6			–0.6	mA
I_{OS}§	V_{CC} = 5.5 V,	V_O = 0	–100		–225	–100		–225	mA
I_{CCH}	V_{CC} = 5.5 V			7	11		7	11	mA
I_{CCL}	V_{CC} = 5.5 V			43	68		43	68	mA
I_{CCZ}	V_{CC} = 5.5 V			9	15		9	15	mA
C_i	V_{CC} = 5 V,	V_I = 2.5 V or 0.5 V		6			6		pF
C_{io}	V_{CC} = 5 V,	V_O = 2.5 V or 0.5 V		16			16		pF

† All typical values are at V_{CC} = 5 V, T_A = 25°C.
‡ For I/O ports, the parameters I_{IH} and I_{IL} include the off-state output current.
§ Not more than one output should be tested at a time, and the duration of the test should not exceed one second.

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

			V_{CC} = 5 V, T_A = 25°C		SN54BCT544		SN74BCT544		UNIT
			MIN	MAX	MIN	MAX	MIN	MAX	
t_w	Pulse duration, $\overline{LEAB}$ or $\overline{LEBA}$ low		7		8		7		ns
t_{su}	Setup time, data before $\overline{LEAB}$ or $\overline{LEBA}$↑	High or low	5		5.5		5		ns
t_h	Hold time, data after $\overline{LEAB}$ or $\overline{LEBA}$↑	High or low	1		1		1		ns

switching characteristics over recommended ranges of supply voltage and operating free-air temperature, C_L = 50 pF, R_L = 500 Ω (unless otherwise noted) (see Note 2)

PARAMETER	FROM (INPUT)	TO (OUTPUT)	V_{CC} = 5 V, T_A = 25°C		SN54BCT544		SN74BCT544		UNIT
			MIN	MAX	MIN	MAX	MIN	MAX	
t_{PLH}	A or B	B or A	2.4	7.6	2.4	10.3	2.4	9.7	ns
t_{PHL}			3	7.6	3	8.9	3	8.5	
t_{PLH}	$\overline{LEBA}$	A	3.5	10.3	3.5	14.2	3.5	13.3	ns
t_{PHL}			4.8	10.2	4.8	12.7	4.8	12.3	
t_{PLH}	$\overline{LEAB}$	B	3.5	10.3	3.5	14.4	3.5	13.4	ns
t_{PHL}			4.8	10.3	4.8	12.8	4.8	12.4	
t_{PZH}	$\overline{OE}$ or $\overline{CE}$	A or B	3	10.1	3	13.1	3	12.7	ns
t_{PZL}			5.1	11.8	5.1	14.2	5.1	13.9	
t_{PHZ}	$\overline{OE}$ or $\overline{CE}$	A or B	2.8	7.5	2	8.9	2.8	8.5	ns
t_{PLZ}			2.3	7.2	2.3	9	2.3	8.2	

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

IMPORTANT NOTICE

Texas Instruments and its subsidiaries (TI) reserve the right to make changes to their products or to discontinue any product or service without notice, and advise customers to obtain the latest version of relevant information to verify, before placing orders, that information being relied on is current and complete. All products are sold subject to the terms and conditions of sale supplied at the time of order acknowledgement, including those pertaining to warranty, patent infringement, and limitation of liability.

TI warrants performance of its semiconductor products to the specifications applicable at the time of sale in accordance with TI's standard warranty. Testing and other quality control techniques are utilized to the extent TI deems necessary to support this warranty. Specific testing of all parameters of each device is not necessarily performed, except those mandated by government requirements.

CERTAIN APPLICATIONS USING SEMICONDUCTOR PRODUCTS MAY INVOLVE POTENTIAL RISKS OF DEATH, PERSONAL INJURY, OR SEVERE PROPERTY OR ENVIRONMENTAL DAMAGE ("CRITICAL APPLICATIONS"). TI SEMICONDUCTOR PRODUCTS ARE NOT DESIGNED, AUTHORIZED, OR WARRANTED TO BE SUITABLE FOR USE IN LIFE-SUPPORT DEVICES OR SYSTEMS OR OTHER CRITICAL APPLICATIONS. INCLUSION OF TI PRODUCTS IN SUCH APPLICATIONS IS UNDERSTOOD TO BE FULLY AT THE CUSTOMER'S RISK.

In order to minimize risks associated with the customer's applications, adequate design and operating safeguards must be provided by the customer to minimize inherent or procedural hazards.

TI assumes no liability for applications assistance or customer product design. TI does not warrant or represent that any license, either express or implied, is granted under any patent right, copyright, mask work right, or other intellectual property right of TI covering or relating to any combination, machine, or process in which such semiconductor products or services might be or are used. TI's publication of information regarding any third party's products or services does not constitute TI's approval, warranty or endorsement thereof.