D3057, OCTOBER 1987—REVISED OCTOBER 1988

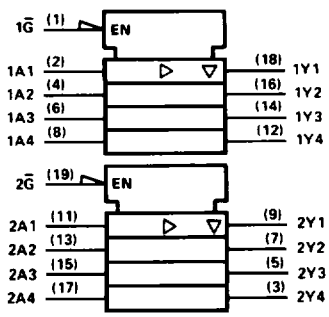
- **3-State Outputs Drive Bus Lines or Buffer Memory Address Registers**
- **P-N-P Inputs Reduce DC Loading**
- **State of the Art BICMOS Design Significantly Reduces I_{CCZ}**
- **Comparable Speed and Improved Power Performance Relative to 54F/74F244**
- **ESD Protection Exceeds 2000 V per MIL-STD-883C, Method 3015**
- **Package Options Include "Small Outline" Packages, Ceramic Chip Carriers, and Standard Plastic and Ceramic 300-mil DIPs**
- **Dependable Texas Instruments Quality and Reliability**

description

These octal buffers and line drivers are designed specifically to improve both the performance and density of three-state memory address drivers, clock drivers, and bus-oriented receivers and transmitters. Taken together with the 'BCT240 and 'BCT241, these devices provide the choice of selected combinations of inverting outputs, symmetrical $\overline{G}$ (active-low output control) inputs, and complementary G and $\overline{G}$ inputs.

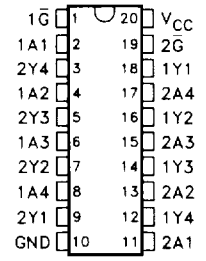
The SN54BCT244 is characterized for operation over the full military temperature range of −55°C to 125°C. The SN74BCT244 is characterized for operation from 0°C to 70°C.

logic symbol†

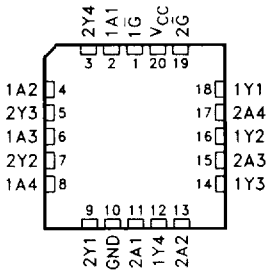


† This symbol is in accordance with ANSI/IEEE Std 91-1984 and IEC Publication 617-12.

SN54BCT244 ... J PACKAGE
SN74BCT244 ... DW OR N PACKAGE
(TOP VIEW)



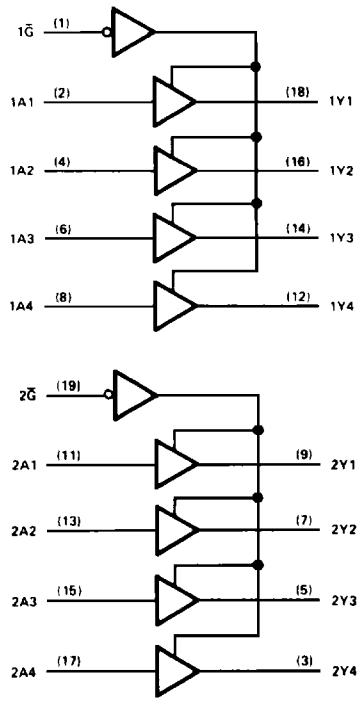
SN54BCT244 ... JK PACKAGE
(TOP VIEW)



FUNCTION TABLE

OUTPUT CONTROL	DATA INPUT	OUTPUT
$1\overline{G}$, $2\overline{G}$	A	Y
H	X	Z
L	L	L
L	H	H

logic diagram (positive logic)



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

Supply voltage, V_{CC} ..... −0.5 V to 7 V
Input voltage ..... −0.5 V to 7 V
Voltage applied to any output in the disabled or power-off state ..... −0.5 V to 5.5 V
Voltage applied to any output in the high state ..... −0.5 V to V_{CC}
Current into any output in the low state: SN54BCT244 ..... 96 mA
SN74BCT244 ..... 128 mA
Operating free-air temperature range: SN54BCT244 ..... −55°C to 125°C
SN74BCT244 ..... 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.

recommended operating conditions

		SN54BCT244			SN74BCT244			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		SN54BCT244			SN74BCT244			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_{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			0.1			0.1	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			−1			−1	mA
I_{OZH}	V_{CC} = 5.5 V,	V_O = 2.7 V			50			50	μA
I_{OZL}	V_{CC} = 5.5 V,	V_O = 0.5 V			−50			−50	μA
I_{OS}‡	V_{CC} = 5.5 V,	V_O = 0	−100		−225	−100		−225	mA
I_{CCH}	V_{CC} = 5.5 V	Outputs high		23	40		23	40	mA
I_{CCL}		Outputs low		53	80		53	80	mA
I_{CCZ}		Outputs disabled		4	10		4	10	mA

† All typical values are at V_{CC} = 5 V, T_A = 25°C.

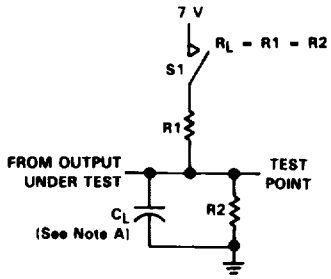
‡ Not more than one output should be shorted at a time, and the duration of the short circuit should not exceed one second.

switching characteristics (see Figure 1)

PARAMETER	FROM (INPUT)	TO (OUTPUT)	V_{CC} = 5 V, C_L = 50 pF, R1 = 500 Ω, R2 = 500 Ω, T_A = 25°C			V_{CC} = 4.5 V to 5.5 V, C_L = 50 pF, R1 = 500 Ω, R2 = 500 Ω, T_A = MIN to MAX§				UNIT
			'BCT244			SN54BCT244		SN74BCT244		
			MIN	TYP	MAX	MIN	MAX	MIN	MAX	
t_{PLH}	A	Y	1.2	2.5	4.4	0.9	5.3	0.7	5	ns
t_{PHL}			1.7	3.2	5	1.4	6	1.4	5.5	
t_{PZH}	$\overline{G}$	Y	2	5.7	7.8	2	9	2	8.7	ns
t_{PZL}			2	5.9	8.1	2	9.4	2	8.9	
t_{PHZ}	$\overline{G}$	Y	2	5.4	6.7	2	8	2	7.7	ns
t_{PLZ}			2	6.1	7.6	2	9.8	2	8.9	

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

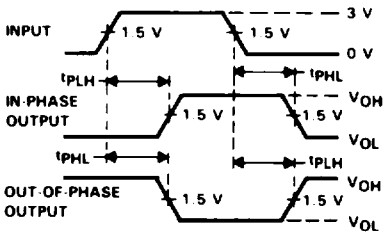
PARAMETER MEASUREMENT INFORMATION



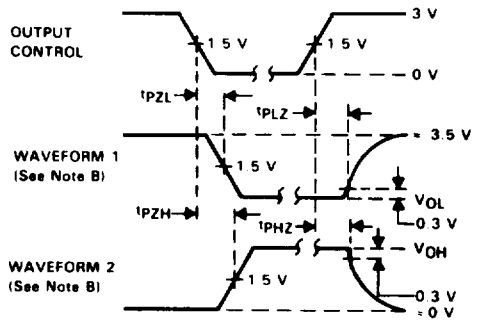
LOAD CIRCUIT

SWITCH POSITION TABLE

TEST	S1
t_{PLH}	Open
t_{PHL}	Open
t_{PZH}	Open
t_{PZL}	Closed
t_{PHZ}	Open
t_{PLZ}	Closed



VOLTAGE WAVEFORMS
PROPAGATION DELAY TIMES



VOLTAGE WAVEFORMS
ENABLE AND DISABLE TIMES, THREE-STATE OUTPUTS

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 the generators having the following characteristics: PRR ≤ 10 MHz, Z_O = 50 Ω, t_r ≤ 2.5 ns, t_f ≤ 2.5 ns.
D. The outputs are measured one at a time with one transition per measurement.

FIGURE 1. SWITCHING CHARACTERISTICS