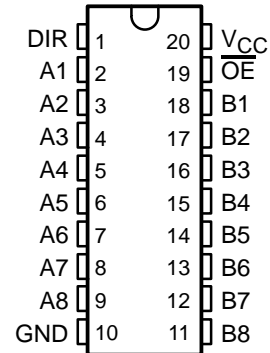


SN54BCT640, SN74BCT640 OCTAL BUS TRANSCEIVERS WITH 3-STATE OUTPUTS

SCBS025C – SEPTEMBER 1988 – REVISED APRIL 1994

- State-of-the-Art BiCMOS Design Substantially Reduces Standby Current
- Outputs Have Undershoot-Protection Circuitry
- Power-Up High-Impedance State
- Buffered Control Inputs to Reduce DC Loading Effects
- ESD Protection Exceeds 2000 V Per MIL-STD-883C, Method 3015
- Package Options Include Plastic Small-Outline (DW) Packages, Ceramic Chip Carriers (FK) and Flatpacks (W), and Plastic and Ceramic 300-mil DIPs (J, N)

SN54BCT640 . . . J OR W PACKAGE
SN74BCT640 . . . DW OR N PACKAGE
(TOP VIEW)

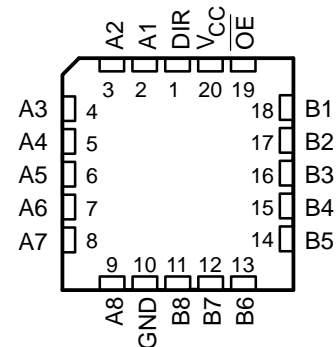


description

The 'BCT640 bus transceiver is designed for asynchronous communication between data buses. These devices transmit data from the A bus to the B bus or from the B bus to the A bus depending upon the level at the direction-control (DIR) input. The output-enable (\overline{OE}) input can be used to disable the device so that the buses are effectively isolated.

The SN54BCT640 is characterized for operation over the full military temperature range of -55°C to 125°C . The SN74BCT640 is characterized for operation from 0°C to 70°C .

SN54BCT640 . . . FK PACKAGE
(TOP VIEW)

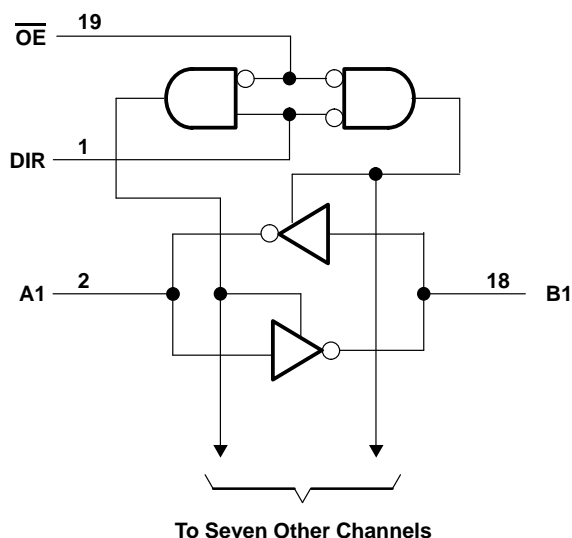
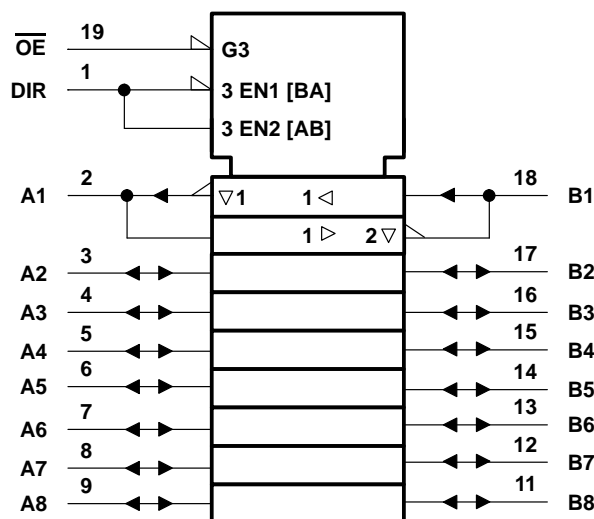


FUNCTION TABLE

INPUTS		OPERATION
\overline{OE}	DIR	
L	L	\overline{B} data to A bus
L	H	\overline{A} data to B bus
H	X	Isolation

SCBS025C – SEPTEMBER 1988 – REVISED APRIL 1994

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: 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 5.5 V
Voltage range applied to any output in the high state, V_O	.....	– 0.5 V to V_{CC}
Input clamp current, I_{IK}	.....	–30 mA
Current into any output in the low state: SN54BCT640	.....	96 mA
SN74BCT640	.....	128 mA
Operating free-air temperature range: SN54BCT640	.....	– 55°C to 125°C
SN74BCT640	.....	0°C to 70°C
Storage temperature range	.....	– 65°C to 150°C

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

SN54BCT640, SN74BCT640 OCTAL BUS TRANSCEIVERS WITH 3-STATE OUTPUTS

SCBS025C – SEPTEMBER 1988 – REVISED APRIL 1994

recommended operating conditions

		SN54BCT640			SN74BCT640			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	A port		-3	A port		-3	mA
		B port		-12	B port		-15	
I_{OL}	Low-level output current	A port		20	A port		24	mA
		B port		48	B port		64	
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		SN54BCT640		SN74BCT640		UNIT
				MIN	TYP†	MAX	MIN	
V_{IK}		$V_{CC} = 4.5\text{ V}$, $I_I = -18\text{ mA}$			-1.2		-1.2	V
V_{OH}	A port	$V_{CC} = 4.5\text{ V}$	$I_{OH} = -1\text{ mA}$	2.5	3.4	2.5	3.4	V
			$I_{OH} = -3\text{ mA}$	2.4	3.3	2.4	3.3	
	B port	$V_{CC} = 4.5\text{ V}$	$I_{OH} = -3\text{ mA}$	2.4	3.3	2.4	3.3	
			$I_{OH} = -12\text{ mA}$	2	3.2			
			$I_{OH} = -15\text{ mA}$			2	3.1	
V_{OL}	A port	$V_{CC} = 4.5\text{ V}$	$I_{OL} = 20\text{ mA}$		0.3	0.5		V
			$I_{OL} = 24\text{ mA}$				0.35	
	B port	$V_{CC} = 4.5\text{ V}$	$I_{OL} = 48\text{ mA}$		0.38	0.55		
			$I_{OL} = 64\text{ mA}$				0.42	
I_I	A or B port	$V_{CC} = 5.5\text{ V}$, $V_I = 5.5\text{ V}$			1		1	mA
	Control inputs				0.1		0.1	
I_{IH}^\ddagger	A or B port	$V_{CC} = 5.5\text{ V}$, $V_I = 2.7\text{ V}$			70		70	μA
	Control inputs				20		20	
I_{IL}^\ddagger	A or B port	$V_{CC} = 5.5\text{ V}$, $V_I = 0.5\text{ V}$			-0.6		-0.6	mA
	Control inputs				-0.65		-0.65	
I_{OS}^\S	A port	$V_{CC} = 5.5\text{ V}$, $V_O = 0$		-60	-150	-60	-150	mA
	B port			-100	-225	-100	-225	
I_{CCL}	A to B	$V_{CC} = 5.5\text{ V}$		53	84	53	94	mA
I_{CCH}	A to B	$V_{CC} = 5.5\text{ V}$		23	37	23	41	mA
I_{CCZ}		$V_{CC} = 5.5\text{ V}$		4	10	4	11	mA

† All typical values are at $V_{CC} = 5\text{ V}$, $T_A = 25^\circ\text{C}$.

‡ 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.

SN54BCT640, SN74BCT640

OCTAL BUS TRANSCEIVERS

WITH 3-STATE OUTPUTS

SCBS025C – SEPTEMBER 1988 – REVISED APRIL 1994

switching characteristics (see Note 2)

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
			'BCT640			SN54BCT640		SN74BCT640		
			MIN	TYP	MAX	MIN	MAX	MIN	MAX	
t _{PLH}	A or B	B or A	0.5	3.6	5.6	0.5	7	0.5	6.5	ns
t _{PHL}			0.5	1.9	3.4	0.5	3.8	0.5	3.7	
t _{PZH}	$\overline{\text{OE}}$	A or B	3.1	6.4	8.9	2.6	10.5	2.6	10.2	ns
t _{PZL}			4.1	6.9	9.5	3.5	12.3	3.5	10.7	
t _{PHZ}	$\overline{\text{OE}}$	A or B	1.9	5	7.9	1.4	12.2	1.4	10.2	ns
t _{PLZ}			1.8	4.3	6.8	1.5	8.3	1.5	7.8	

† 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.

IMPORTANT NOTICE

Texas Instruments (TI) reserves the right to make changes to its products or to discontinue any semiconductor product or service without notice, and advises its customers to obtain the latest version of relevant information to verify, before placing orders, that the information being relied on is current.

TI warrants performance of its semiconductor products and related software 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, INTENDED, AUTHORIZED, OR WARRANTED TO BE SUITABLE FOR USE IN LIFE-SUPPORT APPLICATIONS, DEVICES OR SYSTEMS OR OTHER CRITICAL APPLICATIONS.

Inclusion of TI products in such applications is understood to be fully at the risk of the customer. Use of TI products in such applications requires the written approval of an appropriate TI officer. Questions concerning potential risk applications should be directed to TI through a local SC sales office.

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

TI assumes no liability for applications assistance, customer product design, software performance, or infringement of patents or services described herein. Nor does TI 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.