- **State-of-the-Art BiCMOS Design Significantly Reduces I_{CCZ}**
- **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)**

description

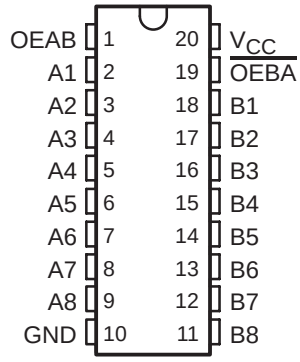
The ′BCT623 bus transceiver is designed for asynchronous communication between data buses. The control function implementation allows for maximum flexibility in timing. The ′BCT623 provides true data at its outputs.

This device allows data transmission from the A bus to the B bus or from the B bus to the A bus depending upon the logic levels at the output-enable (OEAB and $\overline{\text{OEBA}}$) inputs.

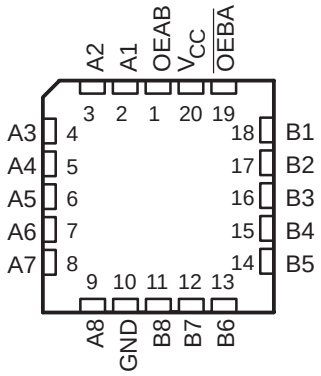
The output-enable inputs can be used to disable the device so that the buses are effectively isolated. The dual-enable configuration gives the transceivers the capability of storing data by simultaneously enabling OEAB and $\overline{\text{OEBA}}$. Each output reinforces its input in this configuration. When both OEAB and $\overline{\text{OEBA}}$ are enabled and all other data sources to the two sets of bus lines are at high impedance, both sets of bus lines (16 in all) will remain at their last states.

The SN54BCT623 is characterized for operation over the full military temperature range of −55°C to 125°C. The SN74BCT623 is characterized for operation from 0°C to 70°C.

SN54BCT623 . . . J OR W PACKAGE
SN74BCT623 . . . DW OR N PACKAGE
(TOP VIEW)



SN54BCT623 . . . FK PACKAGE
(TOP VIEW)



FUNCTION TABLE

INPUTS		OPERATION
$\overline{\text{OEBA}}$	OEAB	
L	L	B data to A bus
L	H	B data to A bus, A data to B bus
H	L	Isolation
H	H	A data to B bus

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.

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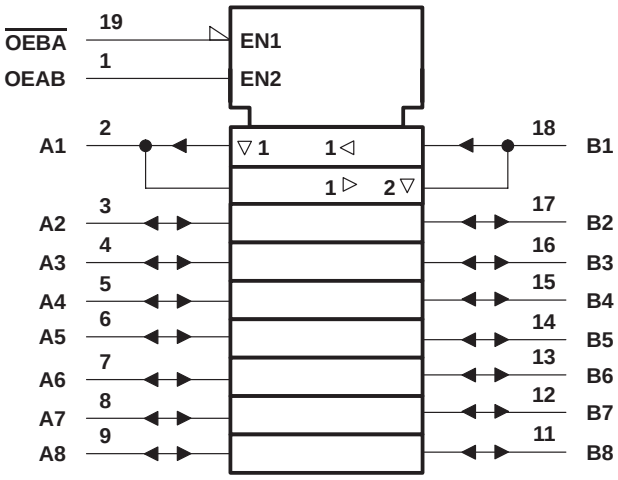
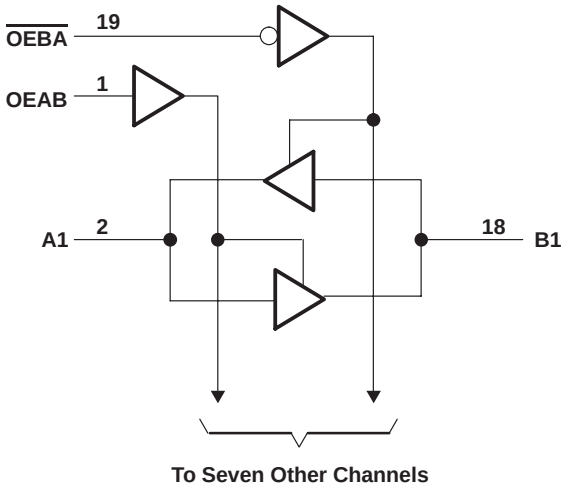
logic symbol†



logic diagram (positive logic)



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

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: SN54BCT623 . . . . . 96 mA
SN74BCT623 . . . . . 128 mA
Operating free-air temperature range: SN54BCT623 . . . . . − 55°C to 125°C
SN74BCT623 . . . . . 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

			SN54BCT623			SN74BCT623			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			−3	mA
		B port			−12			−15	
I_{OL}	Low-level output current	A port			20			24	mA
		B port			48			64	
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		SN54BCT623			SN74BCT623			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}	A port	V_{CC} = 4.5 V	I_{OH} = −1 mA	2.5	3.4		2.5	3.4		V
			I_{OH} = −3 mA	2.4	3.3		2.4	3.3		
	B port	V_{CC} = 4.5 V	I_{OH} = −3 mA	2.4	3.3		2.4	3.3		
			I_{OH} = −12 mA	2	3.2					
			I_{OH} = −15 mA				2	3.1		
V_{OL}	A port	V_{CC} = 4.5 V	I_{OL} = 20 mA		0.3	0.5				V
			I_{OL} = 24 mA					0.35	0.5	
	B port	V_{CC} = 4.5 V	I_{OL} = 48 mA		0.38	0.55				
			I_{OL} = 64 mA					0.42	0.55	
I_I	A or B port	V_{CC} = 5.5 V,	V_I = 5.5 V			1			1	mA
	OEAB or $\overline{OEBA}$					0.1			0.1	
I_{IH}‡	A or B port	V_{CC} = 5.5 V,	V_I = 2.7 V			70			70	µA
	OEAB or $\overline{OEBA}$					20			20	
I_{IL}‡	A or B port	V_{CC} = 5.5 V,	V_I = 0.5 V			−0.65			−0.65	mA
	OEAB or $\overline{OEBA}$					−0.6			−0.6	
I_{OS}§	A port	V_{CC} = 5.5 V,	V_O = 0	−60		−150	−60		−150	mA
	B port			−100		−225	−100		−225	
I_{CCL}	A to B	V_{CC} = 5.5 V			58	92		58	92	mA
I_{CCH}	A to B	V_{CC} = 5.5 V			33	53		33	53	mA
I_{CCZ}		V_{CC} = 5.5 V			6	11		6	11	mA
C_i	OEAB or $\overline{OEBA}$	V_{CC} = 5 V,	V_I = 2.5 V or 0.5 V		5			5		pF
C_{io}	A to B	V_{CC} = 5 V,	V_O = 2.5 V or 0.5 V		9			9		pF
	B to A				12			12		

† 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.

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
			′BCT623			SN54BCT623		SN74BCT623		
			MIN	TYP	MAX	MIN	MAX	MIN	MAX	
t_{PLH}	A	B	0.5	3.1	4.7	0.5	5.3	0.5	5.2	ns
t_{PHL}			1.7	4.9	6.9	1.7	7.6	1.7	7.4	
t_{PLH}	B	A	0.9	4.1	5.9	0.9	6.8	0.9	6.7	ns
t_{PHL}			1.8	5.3	7.6	1.8	8.3	1.8	8	
t_{PZH}	$\overline{OEBA}$	A	3.1	6.8	9.1	3.1	10.7	3.1	10.6	ns
t_{PZL}			3.3	7.2	9.6	3.3	11.3	3.3	10.7	
t_{PHZ}	$\overline{OEBA}$	A	1.9	6.1	8.3	1.9	10.6	1.9	9.8	ns
t_{PLZ}			1.1	4.6	7	1.1	8.1	1.1	7.8	
t_{PZH}	OEAB	B	2	5	6.8	2	7.8	2	7.6	ns
t_{PZL}			2.7	6.2	8	2.7	9.3	2.7	8.9	
t_{PHZ}	OEAB	B	1.1	4.6	6.5	1.1	8	1.1	7.7	ns
t_{PLZ}			0.3	3.2	6.3	0.3	7.2	0.3	7.1	

† 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.

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)
5962-9094001MRA	Active	Production	CDIP (J) | 20	20 | TUBE	No	SNPB	N/A for Pkg Type	-55 to 125	5962-9094001MR A SNJ54BCT623J
SNJ54BCT623J	Active	Production	CDIP (J) | 20	20 | TUBE	No	SNPB	N/A for Pkg Type	-55 to 125	5962-9094001MR A SNJ54BCT623J
SNJ54BCT623J.A	Active	Production	CDIP (J) | 20	20 | TUBE	No	SNPB	N/A for Pkg Type	-55 to 125	5962-9094001MR A SNJ54BCT623J

(1) **Status:** For more details on status, see our product life cycle.

(2) **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.

(3) **RoHS values:** Yes, No, RoHS Exempt. See the TI RoHS Statement for additional information and value definition.

(4) **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.

(5) **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.

(6) **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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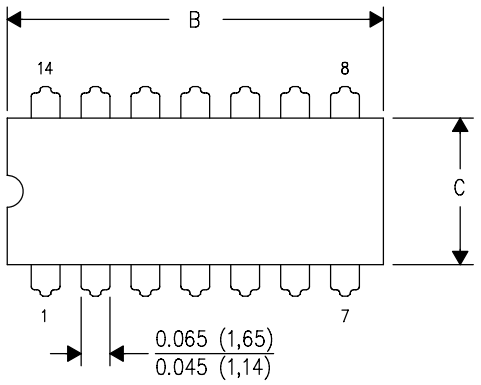
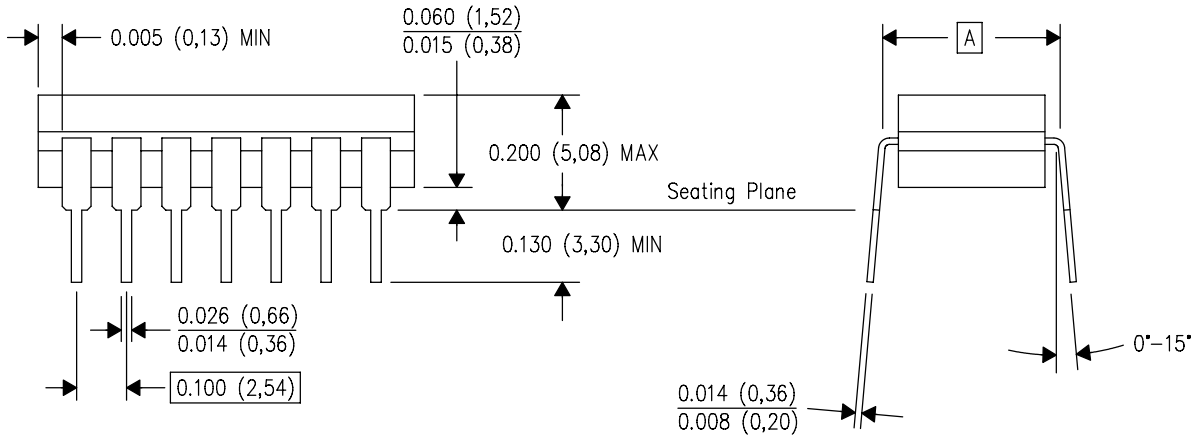
J (R–GDIP–T**)

14 LEADS SHOWN

CERAMIC DUAL IN–LINE PACKAGE



DIM \ PINS **	14	16	18	20
A	0.300 (7,62) BSC	0.300 (7,62) BSC	0.300 (7,62) BSC	0.300 (7,62) BSC
B MAX	0.785 (19,94)	.840 (21,34)	0.960 (24,38)	1.060 (26,92)
B MIN	—	—	—	—
C MAX	0.300 (7,62)	0.300 (7,62)	0.310 (7,87)	0.300 (7,62)
C MIN	0.245 (6,22)	0.245 (6,22)	0.220 (5,59)	0.245 (6,22)



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NOTES:
A. All linear dimensions are in inches (millimeters).
B. This drawing is subject to change without notice.
C. This package is hermetically sealed with a ceramic lid using glass frit.
D. Index point is provided on cap for terminal identification only on press ceramic glass frit seal only.
E. Falls within MIL STD 1835 GDIP1–T14, GDIP1–T16, GDIP1–T18 and GDIP1–T20.

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