- Bi-directional Bus Transceiver in a High-Density 20-Pin Package
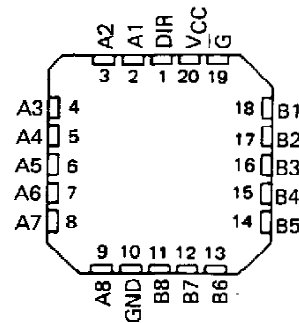- 3-State Outputs Drive Bus Lines Directly
- PNP Inputs Reduce D-C Loading on Bus Lines
- Hysteresis at Bus Inputs Improve Noise Margins
- Typical Propagation Delay Times, Port-to-Port . . . 8 ns

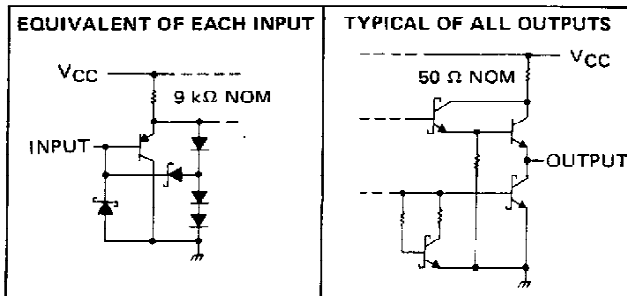| TYPE	I_{OL} (SINK CURRENT)	I_{OH} (SOURCE CURRENT)
SN54LS245	12 mA	-12 mA
SN74LS245	24 mA	-15 mA

description

These octal bus transceivers are designed for asynchronous two-way communication between data buses. The control function implementation minimizes external timing requirements.

The devices allow data transmission from the A bus to the B bus or from the B bus to the A bus depending upon the logic level at the direction control (DIR) input. The enable input (G) can be used to disable the device so that the buses are effectively isolated.

The SN54LS245 is characterized for operation over the full military temperature range of −55°C to 125°C. The SN74LS245 is characterized for operation from 0°C to 70°C.

SN54LS245 . . . J OR W PACKAGE
SN74LS245 . . . DW OR N PACKAGE
(TOP VIEW)

```
        DIR  1      20  VCC
        A1   2      19  G
        A2   3      18  B1
        A3   4      17  B2
        A4   5      16  B3
        A5   6      15  B4
        A6   7      14  B5
        A7   8      13  B6
        A8   9      12  B7
        GND  10     11  B8
```

SN54LS245 . . . FK PACKAGE
(TOP VIEW)

```
        A2  A1  DIR  VCC  G
         3   2   1   20  19
    A3  4              18  B1
    A4  5              17  B2
    A5  6              16  B3
    A6  7              15  B4
    A7  8              14  B5
         9  10  11  12  13
        A8 GND B8  B7  B6
```

schematics of inputs and outputs

EQUIVALENT OF EACH INPUT	TYPICAL OF ALL OUTPUTS

FUNCTION TABLE

ENABLE G	DIRECTION CONTROL DIR	OPERATION
L	L	B data to A bus
L	H	A data to B bus
H	X	Isolation

H = high level, L = low level, X = irrelevant

TEXAS INSTRUMENTS

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logic symbol†

logic diagram (positive logic)
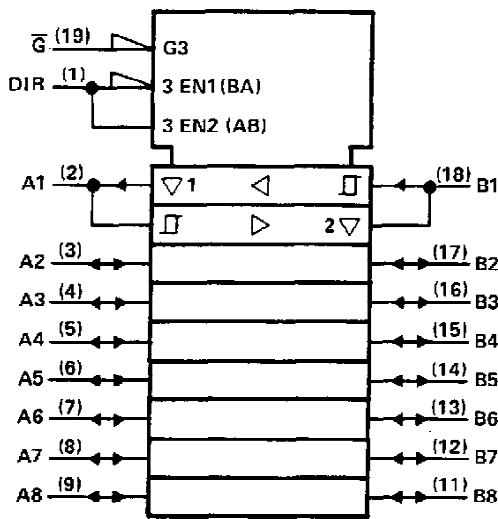
†This symbol is in accordance with ANSI/IEEE Std. 91-1984 and
IEC Publication 617-12.
Pin numbers shown are for DW, J, N, and W packages.
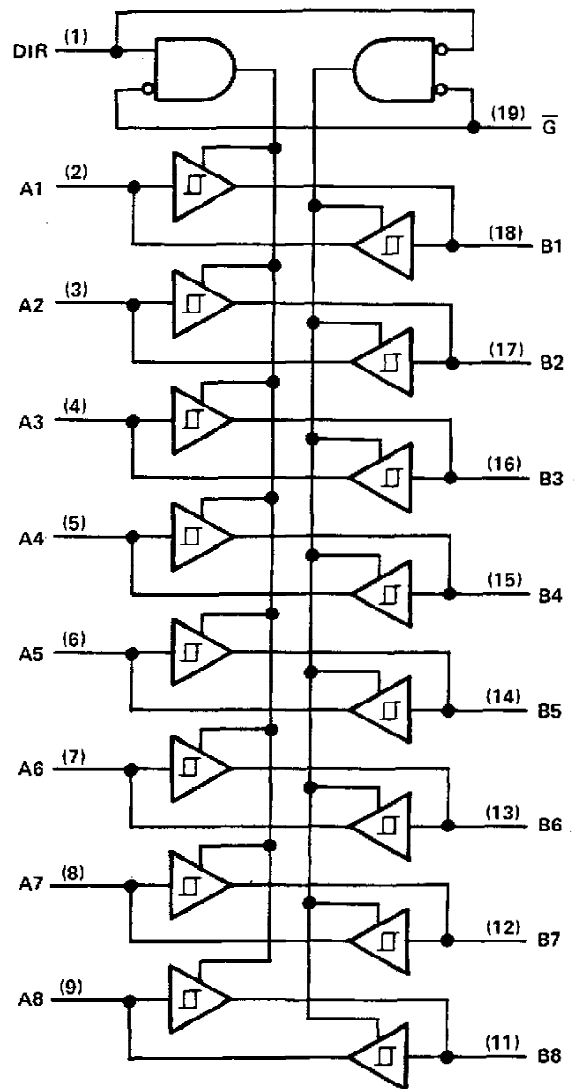
absolute maximum ratings over operating free-air temperature range (unless otherwise noted)

Supply voltage, V_{CC} (see Note 1) . . . . 7 V
Input voltage . . . . 7 V
Off-state output voltage . . . . 5.5 V
Operating free-air temperature range: SN54LS245 . . . . −55°C to 125°C
                                        SN74LS245 . . . . 0°C to 70°C
Storage temperature range . . . . −65°C to 150°C

NOTE 1: Voltage values are with respect to network ground terminal.

recommended operating conditions

PARAMETER	SN54LS245			SN74LS245			UNIT
	MIN	NOM	MAX	MIN	NOM	MAX	
Supply voltage, V_{CC}	4.5	5	5.5	4.75	5	5.25	V
High-level output current, I_{OH}			−12			−15	mA
Low-level output current, I_{OL}			12			24	mA
Operating free-air temperature, T_A	−55		125	0		70	°C

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

PARAMETER		TEST CONDITIONS[†]		SN54LS245			SN74LS245			UNIT
				MIN	TYP[‡]	MAX	MIN	TYP[‡]	MAX	
V_{IH}	High-level input voltage			2			2			V
V_{IL}	Low-level input voltage					0.7			0.8	V
V_{IK}	Input clamp voltage	V_{CC} = MIN,	I_I = −18 mA			−1.5			−1.5	V
	Hysteresis $(V_{T+} - V_{T-})$A or B input	V_{CC} = MIN		0.2	0.4		0.2	0.4		V
V_{OH}	High-level output voltage	V_{CC} = MIN, V_{IH} = 2 V,	I_{OH} = −3 mA	2.4	3.4		2.4	3.4		V
		$V_{IL} = V_{IL}$ max	I_{OH} = MAX	2			2			
V_{OL}	Low-level output voltage	V_{CC} = MIN, V_{IH} = 2 V,	I_{OL} = 12 mA			0.4			0.4	V
		$V_{IL} = V_{IL}$ max	I_{OL} = 24 mA						0.5	
I_{OZH}	Off-state output current, high-level voltage applied	V_{CC} = MAX, $\overline{G}$ at 2 V	V_O = 2.7 V			20			20	μA
I_{OZL}	Off-state output current, low-level voltage applied		V_O = 0.4 V			−200			−200	
I_I	Input current at maximum input voltage	A or B	V_{CC} = MAX,	V_I = 5.5 V			0.1			0.1	mA
		DIR or $\overline{G}$		V_I = 7 V			0.1			0.1	
I_{IH}	High-level input current	V_{CC} = MAX,	V_{IH} = 2.7 V			20			20	μA
I_{IL}	Low-level input current	V_{CC} = MAX,	V_{IL} = 0.4 V			−0.2			−0.2	mA
I_{OS}	Short-circuit output current[§]	V_{CC} = MAX		−40		−225	−40		−225	mA
I_{CC}	Supply current — Total, outputs high	V_{CC} = MAX,	Outputs open		48	70		48	70	mA
	Total, outputs low				62	90		62	90	
	Outputs at Hi-Z				64	95		64	95	

[†]For conditions shown as MIN or MAX, use the appropriate value specified under recommended operating conditions.
[‡]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 duration of the short-circuit should not exceed one second.

switching characteristics, V_{CC} = 5 V, T_A = 25°C

PARAMETER		TEST CONDITIONS	MIN	TYP	MAX	UNIT
t_{PLH}	Propagation delay time, low-to-high-level output	C_L = 45 pF, R_L = 667 Ω, See Note 2		8	12	ns
t_{PHL}	Propagation delay time, high-to-low-level output			8	12	ns
t_{PZL}	Output enable time to low level			27	40	ns
t_{PZH}	Output enable time to high level			25	40	ns
t_{PLZ}	Output disable time from low level	C_L = 5 pF, R_L = 667 Ω, See Note 2		15	25	ns
t_{PHZ}	Output disable time from high level			15	28	ns

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

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