

**TYPES SN54AS2640, SN54AS2645
SN74AS2640, SN74AS2645
OCTAL BUS TRANSCEIVER/MOS DRIVER**
DECEMBER 1983

- Bidirectional Octal Bus Transceivers For Driving MOS Devices
- I/O Ports Have 25 Ohm Series Resistors So No External Resistors Are Required
- Choice of True or Inverting Logic
- Dependable Texas Instruments Quality and Reliability

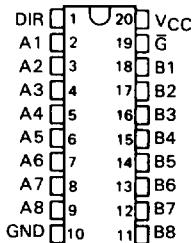
description

These octal bus transceivers are designed to drive the capacitive input characteristics of MOS devices and allow asynchronous two-way communication between data buses. The control function implementation allows for maximum flexibility in timing.

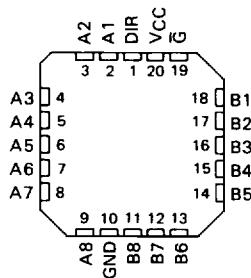
The devices transmit data from the A bus to the B bus or from the B bus to the A bus depending upon the level at the direction control (DIR) input. The enable input (\bar{G}) can be used to disable the device so the buses are effectively isolated.

The SN54AS' family is characterized for operation over the full military temperature range of -55°C to 125°C . The SN74AS' family is characterized for operation from 0°C to 70°C .

**SN54AS' . . . J PACKAGE
SN74AS' . . . N PACKAGE**
(TOP VIEW)



**SN54AS' . . . FH PACKAGE
SN74AS' . . . FN PACKAGE**
(TOP VIEW)



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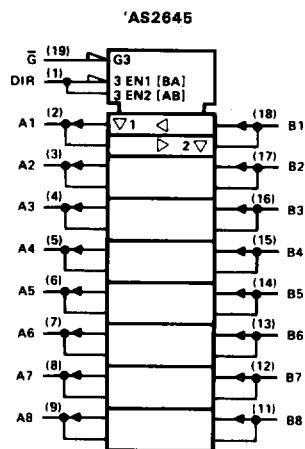
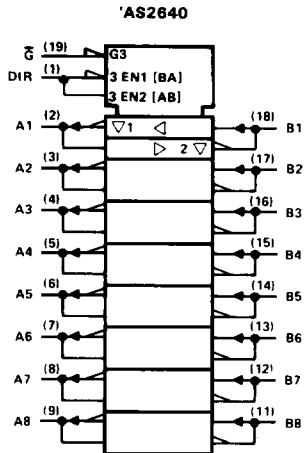
ALS AND AS CIRCUITS

FUNCTION TABLE

| CONTROL INPUTS | | OPERATION | |
|----------------|-----|-------------------------|-----------------|
| | | 'AS2640 | 'AS2645 |
| G | DIR | | |
| L | L | \bar{B} data to A bus | B data to A bus |
| L | H | \bar{A} data to B bus | A data to B bus |
| H | X | Isolation | Isolation |

**TYPES SN54AS2640, SN54AS2645
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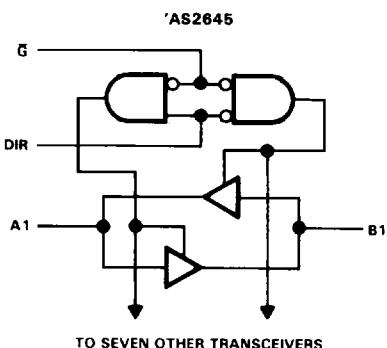
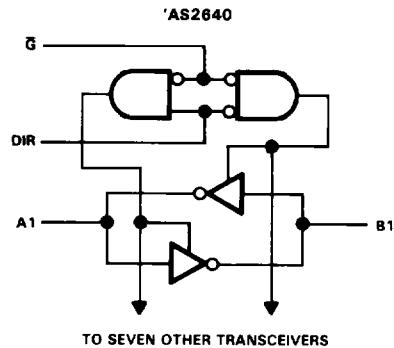
logic symbols



functional block diagrams (positive logic)

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ALS AND AS CIRCUITS



Pin numbers shown are for J and N packages.

TYPES SN54AS2640, SN54AS2645 SN74AS2640, SN74AS2645 OCTAL BUS TRANSCEIVERS

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

| | |
|--|----------------|
| Supply voltage, V_{CC} | 7 V |
| Input voltage: All inputs | 7 V |
| I/O ports | 5.5 V |
| Operating free-air temperature range: SN54AS2640, SN54AS2645 | -55°C to 125°C |
| SN74AS2640, SN74AS2645 | 0°C to 70°C |
| Storage temperature range | -65°C to 150°C |

recommended operating conditions

| | | SN54AS2640 | | | SN74AS2640 | | | UNIT | |
|----------|--------------------------------|------------|-----|-----|------------|-----|-----|------|--|
| | | SN54AS2645 | | | SN74AS2645 | | | | |
| | | 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 | |
| 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 | SN54AS* | | | SN74AS* | | | 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 to 5.5 V, $I_{OH} = -2$ mA | $V_{CC}-2$ | | | $V_{CC}-2$ | | | V |
| V_{OL} | $V_{CC} = 4.5$ V, $I_{OL} = 1$ mA | | 0.15 | 0.4 | | 0.15 | 0.4 | V |
| | $V_{CC} = 4.5$ V, $I_{OL} = 12$ mA | | 0.35 | 0.7 | | 0.35 | 0.7 | V |
| I_I | Control inputs | $V_{CC} = 5.5$ V, $V_I = 7$ V | | | 0.1 | | 0.1 | |
| | A or B ports | $V_{CC} = 5.5$ V, $V_I = 5.5$ V | | | 0.1 | | 0.1 | mA |
| I_{IH} | Control inputs | $V_{CC} = 5.5$ V, $V_I = 2.7$ V | | | 20 | | 20 | |
| | A or B ports [‡] | | | | 50 | | 50 | μA |
| I_{IL} | Control inputs | $V_{CC} = 5.5$ V, $V_I = 0.4$ V | | -0.5 | | -0.5 | | |
| | A or B ports [‡] | | | -0.5 | | -0.5 | | mA |
| I_{OS} [§] | $V_{CC} = 5.5$ V, $V_O = 2.25$ V | -30 | -112 | -30 | -112 | | | mA |
| I_{OH} | $V_{CC} = 4.5$ V, $V_O = 2$ V | -35 | | -35 | | | | mA |
| I_{OL} | $V_{CC} = 4.5$ V, $V_O = 2$ V | 35 | | 35 | | | | mA |
| I_{CC} | 'AS2640 | Outputs high | | 37 58 | | 37 58 | | |
| | | Outputs low | | 78 123 | | 78 123 | | |
| | | Outputs disabled | | 51 80 | | 51 80 | | |
| | | Outputs high | | 58 95 | | 58 95 | | |
| | | Outputs low | | 95 155 | | 95 155 | | |
| | | Outputs disabled | | 73 119 | | 73 119 | | mA |

[†]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.

[§]The output conditions have been chosen to produce a current that closely approximates one half of the true short-circuit output current, I_{OS} .

**TYPES SN54AS2640, SN54AS2645
SN74AS2640, SN74AS2645
OCTAL BUS TRANSCEIVERS/MOS DRIVERS**

'AS2640 switching characteristics (see Note 1)

| PARAMETER | FROM (INPUT) | TO (OUTPUT) | $V_{CC} = 4.5 \text{ V to } 5.5 \text{ V},$ $C_L = 50 \text{ pF},$ $R1 = 500 \Omega,$ $R2 = 500 \Omega,$ $T_A = \text{MIN to MAX}$ | | | | UNIT | |
|-----------|-----------------|----------------|--|-----|------------|-----|------|--|
| | | | SN54AS2640 | | SN74AS2640 | | | |
| | | | MIN | MAX | MIN | MAX | | |
| t_{PLH} | A or B | B or A | 1 | 9.5 | 1 | 7.5 | ns | |
| t_{PHL} | | | 1 | 7 | 1 | 6.5 | | |
| t_{PZH} | \bar{G} | A or B | 2 | 11 | 2 | 9 | ns | |
| t_{PZL} | | | 2 | 12 | 2 | 10 | | |
| t_{PHZ} | \bar{G} | A or B | 1 | 8 | 1 | 7 | ns | |
| t_{PLZ} | | | 2 | 15 | 2 | 13 | | |

'AS2645 switching characteristics (see Note 1)

| PARAMETER | FROM (INPUT) | TO (OUTPUT) | $V_{CC} = 4.5 \text{ V to } 5.5 \text{ V},$ $C_L = 50 \text{ pF},$ $R1 = 500 \Omega,$ $R2 = 500 \Omega,$ $T_A = \text{MIN to MAX}$ | | | | UNIT | |
|-----------|-----------------|----------------|--|-----|------------|------|------|--|
| | | | SN54AS2645 | | SN74AS2645 | | | |
| | | | MIN | MAX | MIN | MAX | | |
| t_{PLH} | A or B | B or A | 1 | 12 | 1 | 10 | ns | |
| t_{PHL} | | | 1 | 11 | 1 | 9.5 | | |
| t_{PZH} | \bar{G} | A or B | 1 | 13 | 1 | 11.5 | ns | |
| t_{PZL} | | | 1 | 13 | 1 | 10.5 | | |
| t_{PHZ} | \bar{G} | A or B | 1 | 9 | 1 | 8 | ns | |
| t_{PLZ} | | | 1 | 13 | 1 | 12 | | |

NOTE 1: For load circuit and voltage waveforms, see page 1-12.