- **3-State True Outputs**
- **Back-to-Back Registers for Storage**
- **Package Options Include Plastic Small-Outline and Shrink Small-Outline Packages and Standard Plastic 300-mil DIPs**

**DB, DW, OR NT PACKAGE**
**(TOP VIEW)**

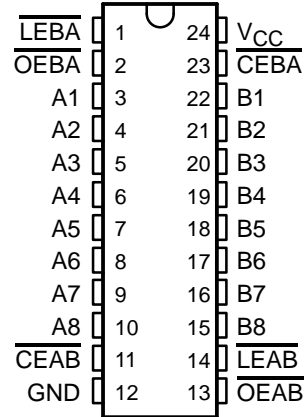| | | | | |
|---|---|---|---|---|
| $\overline{\text{LEBA}}$ | 1 | | 24 | $V_{CC}$ |
| $\overline{\text{OEBA}}$ | 2 | | 23 | $\overline{\text{CEBA}}$ |
| A1 | 3 | | 22 | B1 |
| A2 | 4 | | 21 | B2 |
| A3 | 5 | | 20 | B3 |
| A4 | 6 | | 19 | B4 |
| A5 | 7 | | 18 | B5 |
| A6 | 8 | | 17 | B6 |
| A7 | 9 | | 16 | B7 |
| A8 | 10 | | 15 | B8 |
| $\overline{\text{CEAB}}$ | 11 | | 14 | $\overline{\text{LEAB}}$ |
| GND | 12 | | 13 | $\overline{\text{OEAB}}$ |

### description

The SN74F543 octal transceiver contains two sets of D-type latches for temporary storage of data flowing in either direction. Separate latch-enable ($\overline{\text{LEAB}}$ or $\overline{\text{LEBA}}$) and output enable ($\overline{\text{OEAB}}$ or $\overline{\text{OEBA}}$) inputs are provided for each register to permit independent control in either direction of data flow. The A outputs are characterized to sink 24 mA while the B outputs are characterized to sink 64 mA.

The A-to-B enable ($\overline{\text{CEAB}}$) input must be low in order to enter data from A or to output data from B. Having $\overline{\text{CEAB}}$ low and $\overline{\text{LEAB}}$ low makes the A-to-B latches transparent; a subsequent low-to-high transition of $\overline{\text{LEAB}}$ puts the A latches in the storage mode. With $\overline{\text{CEAB}}$ and $\overline{\text{OEAB}}$ both low, the 3-state B outputs are active and reflect the data present at the output of the A latches. Data flow from B to A is similar, but requires using the $\overline{\text{CEBA}}$, $\overline{\text{LEBA}}$, and $\overline{\text{OEBA}}$ inputs.

The SN74F543 is available in TI's shrink small-outline package (DB), which provides the same I/O pin count and functionality of standard small-outline packages in less than half the printed-circuit-board area.

The SN74F543 is characterized for operation from 0°C to 70°C.

**FUNCTION TABLE†**

| INPUTS | | | | OUTPUT |
|---|---|---|---|---|
| $\overline{\text{CEAB}}$ | $\overline{\text{LEAB}}$ | $\overline{\text{OEAB}}$ | A | B |
| H | X | X | X | Z |
| X | X | H | X | Z |
| L | H | L | X | $B_0$‡ |
| L | L | L | L | L |
| L | L | L | H | H |

† A-to-B data flow is shown; B-to-A flow control is the same except that it uses $\overline{\text{CEBA}}$, $\overline{\text{LEBA}}$, and $\overline{\text{OEBA}}$.
‡ Output level before the indicated steady-state input conditions were established.

**TEXAS INSTRUMENTS**

## logic symbol†



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

## logic diagram (positive logic)



**To Seven Other Channels**

TEXAS
INSTRUMENTS

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## 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, $V_I$ (excluding I/O ports) (see Note 1) ................................. −1.2 V to 7 V
Input current range, $I_{IK}$ ............................................................. −30 mA to 5 mA
Voltage range applied to any output in the disabled or power-off state ...................... −0.5 V to 5.5 V
Voltage range applied to any output in the high state ...................................... −0.5 V to $V_{CC}$
Current into any output in the low state:  A1−A8 ............................................ 48 mA
　　　　　　　　　　　　　　　　　　　　B1−B8 ........................................... 128 mA
Operating free-air temperature range ..................................................... 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-voltage ratings may be exceeded provided the input-current ratings are observed.

## recommended operating conditions

| | | | MIN | NOM | MAX | UNIT |
|---|---|---|---|---|---|---|
| $V_{CC}$ | Supply voltage | | 4.5 | 5 | 5.5 | V |
| $V_{IH}$ | High-level input voltage | | 2 | | | V |
| $V_{IL}$ | Low-level input voltage | | | | 0.8 | V |
| $I_{IK}$ | Input clamp current | | | | −18 | mA |
| $I_{OH}$ | High-level output current | A1−A8 | | | −3 | mA |
| | | B1−B8 | | | −15 | |
| $I_{OL}$ | Low-level output current | A1−A8 | | | 24 | mA |
| | | B1−B8 | | | 64 | |
| $T_A$ | Operating free-air temperature | | 0 | | 70 | °C |

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

| PARAMETER | | TEST CONDITIONS | | MIN | TYP† | MAX | UNIT |
|---|---|---|---|---|---|---|---|
| $V_{IK}$ | | $V_{CC}$ = 4.5 V, | $I_I$ = – 18 mA | | | –1.2 | V |
| $V_{OH}$ | A1–A8 | $V_{CC}$ = 4.5 V | $I_{OH}$ = – 1 mA | 2.5 | 3.4 | | V |
| | | | $I_{OH}$ = – 3 mA | 2.4 | 3.3 | | |
| | B1–B8 | | $I_{OH}$ = – 3 mA | 2.4 | 3.3 | | |
| | | | $I_{OH}$ = – 15 mA | 2 | 3.1 | | |
| | Any output | $V_{CC}$ = 4.75 V, | $I_{OH}$ = – 1 mA to –3 mA | 2.7 | | | |
| $V_{OL}$ | A1–A8 | $V_{CC}$ = 4.5 V | $I_{OL}$ = 24 mA | | 0.3 | 0.5 | V |
| | B1–B8 | | $I_{OL}$ = 64 mA | | 0.42 | 0.55 | |
| $I_I$ | $\overline{OE}$, $\overline{LE}$, and $\overline{CE}$ | $V_{CC}$ = 5.5 V | $V_I$ = 7 V | | | 0.1 | mA |
| | A and B ports | | $V_I$ = 5.5 V | | | 1 | |
| $I_{IH}$‡ | $\overline{OE}$, $\overline{LE}$, and $\overline{CE}$ | $V_{CC}$ = 5.5 V, | $V_I$ = 2.7 V | | | 20 | µA |
| | A and B ports | | | | | 70 | |
| $I_{IL}$‡ | $\overline{OE}$, $\overline{LE}$, and $\overline{CE}$ | $V_{CC}$ = 5.5 V, | $V_I$ = 0.5 V | | | –1.2 | mA |
| | A and B ports | | | | | –0.65 | |
| $I_{OS}$§ | A1–A8 | $V_{CC}$ = 5.5 V, | $V_O$ = 0 | –60 | | –150 | mA |
| | B1–B8 | | | –100 | | –225 | |
| $I_{CCH}$ | | $V_{CC}$ = 5.5 V | | | 67 | 100 | mA |
| $I_{CCL}$ | | $V_{CC}$ = 5.5 V | | | 83 | 125 | mA |
| $I_{CCZ}$ | | $V_{CC}$ = 5.5 V | | | 83 | 125 | 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.
§ Not more than one output should be shorted at a time, and the duration of the short circuit should not exceed one second.

## timing requirements

| | | | $V_{CC}$ = 5 V, $T_A$ = 25°C | | $V_{CC}$ = 4.5 V to 5.5 V, $T_A$ = MIN to MAX¶ | | UNIT |
|---|---|---|---|---|---|---|---|
| | | | MIN | MAX | MIN | MAX | |
| $t_w$ | Pulse duration | | 5 | | 5 | | ns |
| $t_{su}$ | Setup time, data before latch enable | High or low | 3 | | 3.5 | | ns |
| $t_h$ | Hold time, data after latch enable | High or low | 3 | | 3.5 | | ns |

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

## switching characteristics (see Note 2)

| PARAMETER | FROM (INPUT) | TO (OUTPUT) | $V_{CC}$ = 5 V, $C_L$ = 50 pF, $R_L$ = 500 $\Omega$, $T_A$ = 25°C | | | $V_{CC}$ = 4.5 V to 5.5 V, $C_L$ = 50 pF, $R_L$ = 500 $\Omega$, $T_A$ = MIN to MAX† | | UNIT |
|---|---|---|---|---|---|---|---|---|
| | | | MIN | TYP | MAX | MIN | MAX | |
| $t_{PLH}$ | A or B | B or A | 2.2 | 5.1 | 7.5 | 2.2 | 8.5 | ns |
| $t_{PHL}$ | | | 2.2 | 4.6 | 6.5 | 2.2 | 7.5 | |
| $t_{PLH}$ | $\overline{LEBA}$ | A | 3.7 | 8.1 | 11 | 4.1 | 12.5 | ns |
| $t_{PHL}$ | | | 3.7 | 8.1 | 11 | 4.1 | 12.5 | |
| $t_{PLH}$ | $\overline{LEAB}$ | B | 3.7 | 8.1 | 11 | 4.1 | 12.5 | ns |
| $t_{PHL}$ | | | 3.7 | 8.1 | 11 | 4.1 | 12.5 | |
| $t_{PZH}$ | $\overline{OE}$ or $\overline{CE}$ | A or B | 2.2 | 6.6 | 9 | 2.2 | 10 | ns |
| $t_{PZL}$ | | | 3.2 | 7.1 | 10.5 | 3.2 | 12 | |
| $t_{PHZ}$ | $\overline{OE}$ or $\overline{CE}$ | A or B | 1.7 | 5.6 | 8 | 1.7 | 9 | ns |
| $t_{PLZ}$ | | | 1.7 | 5.1 | 7.5 | 1.7 | 8.5 | |

† For conditions shown as MIN or MAX, use the appropriate value specified under recommended operating conditions.
NOTE 2:   Load circuits and waveforms are shown in Section 1.

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