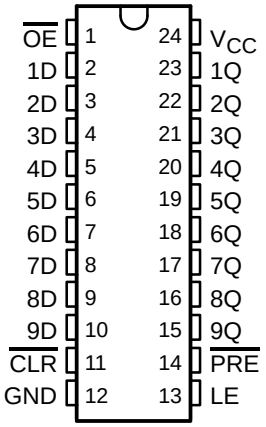
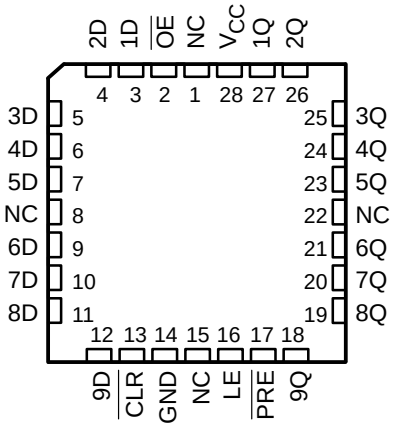
- **State-of-the-Art *EPIC*-II*B*™ BiCMOS Design Significantly Reduces Power Dissipation**
- **Latch-Up Performance Exceeds 500 mA Per JEDEC Standard JESD-17**
- **Typical $V_{OLP}$ (Output Ground Bounce) < 1 V at $V_{CC}$ = 5 V, $T_A$ = 25°C**
- **High-Drive Outputs (–32-mA $I_{OH}$, 64-mA $I_{OL}$)**
- **Package Options Include Plastic Small-Outline (DW) and Shrink Small-Outline (DB) Packages, Ceramic Chip Carriers (FK), Ceramic Flat (W) Package, and Plastic (NT) and Ceramic (JT) DIPs**

**SN54ABT843 . . . JT OR W PACKAGE**
**SN74ABT843 . . . DB, DW, OR NT PACKAGE**
**(TOP VIEW)**




**SN54ABT843 . . . FK PACKAGE**
**(TOP VIEW)**




NC – No internal connection

## description

The ’ABT843 9-bit latches are designed specifically for driving highly capacitive or relatively low-impedance loads. They are particularly suitable for implementing buffer registers, I/O ports, bidirectional bus drivers, and working registers.

The nine transparent D-type latches provide true data at the outputs.

A buffered output-enable ($\overline{OE}$) input can be used to place the nine outputs in either a normal logic state (high or low logic levels) or a high-impedance state. The outputs are also in the high-impedance state during power-up and power-down conditions. The outputs remain in the high-impedance state while the device is powered down. In the high-impedance state, the outputs neither load nor drive the bus lines significantly. The high-impedance state and increased drive provide the capability to drive bus lines without need for interface or pullup components.

$\overline{OE}$ does not affect the internal operations of the latch. Previously stored data can be retained or new data can be entered while the outputs are in the high-impedance state.

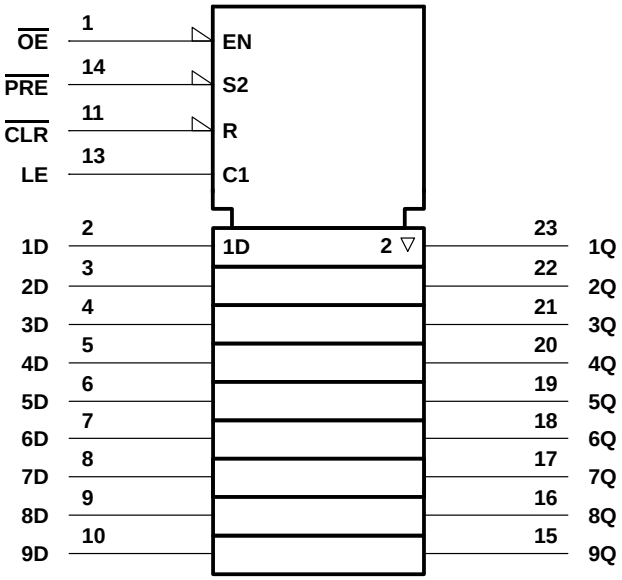
To ensure the high-impedance state during power up or power down, $\overline{OE}$ should be tied to $V_{CC}$ through a pullup resistor; the minimum value of the resistor is determined by the current-sinking capability of the driver.

The SN54ABT843 is characterized for operation over the full military temperature range of –55°C to 125°C. The SN74ABT843 is characterized for operation from –40°C to 85°C.

**FUNCTION TABLE**

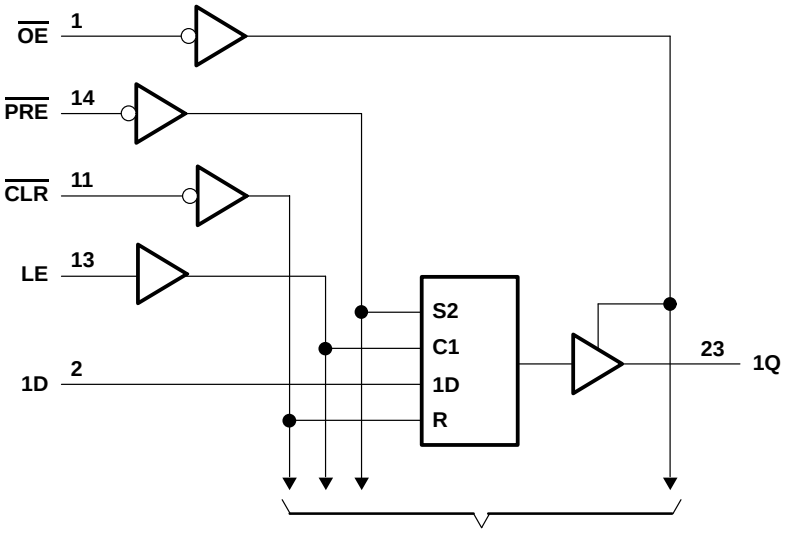
| INPUTS | | | | | OUTPUT |
|---|---|---|---|---|---|
| $\overline{PRE}$ | $\overline{CLR}$ | $\overline{OE}$ | LE | D | Q |
| L | X | L | X | X | H |
| H | L | L | X | X | L |
| H | H | L | H | L | L |
| H | H | L | H | H | H |
| H | H | L | L | X | $Q_0$ |
| X | X | H | X | X | Z |

## logic symbol†




† This symbol is in accordance with ANSI/IEEE Std 91-1984 and IEC Publication 617-12.
Pin numbers shown are for the DB, DW, JT, NT, and W packages.

## logic diagram (positive logic)




Pin numbers shown are for the DB, DW, JT, NT, and W packages.

## 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, $V_I$ (see Note 1) . . . . . –0.5 V to 7 V
Voltage range applied to any output in the high or power-off state, $V_O$ . . . . . –0.5 V to 5.5 V
Current into any output in the low state, $I_O$: SN54ABT843 . . . . . 96 mA
SN74ABT843 . . . . . 128 mA
Input clamp current, $I_{IK}$ ($V_I < 0$) . . . . . –18 mA
Output clamp current, $I_{OK}$ ($V_O < 0$) . . . . . –50 mA
Package thermal impedance, $\theta_{JA}$ (see Note 2): DB package . . . . . 104°C/W
DW package . . . . . 81°C/W
NT package . . . . . 67°C/W
Storage temperature range, $T_{stg}$ . . . . . –65°C to 150°C

† Stresses beyond those listed under “absolute maximum ratings” may cause permanent damage to the device. This is a stress rating only, and functional operation of the device at these or any other conditions beyond those indicated in the “recommended operating conditions” section of this specification is not implied. Exposure to absolute-maximum-rated conditions for extended periods may affect device reliability.

NOTES: 1. The input and output negative-voltage ratings may be exceeded if the input and output clamp-current ratings are observed.
2. The package thermal impedance is calculated in accordance with EIA/JEDEC Std JESD51, except for through-hole packages, which use a trace length of zero.

## recommended operating conditions (see Note 3)

| | | SN54ABT843 | | SN74ABT843 | | UNIT |
|---|---|---|---|---|---|---|
| | | MIN | MAX | MIN | MAX | |
| $V_{CC}$ | Supply voltage | 4.5 | 5.5 | 4.5 | 5.5 | V |
| $V_{IH}$ | High-level input voltage | 2 | | 2 | | V |
| $V_{IL}$ | Low-level input voltage | | 0.8 | | 0.8 | V |
| $V_I$ | Input voltage | 0 | $V_{CC}$ | 0 | $V_{CC}$ | V |
| $I_{OH}$ | High-level output current | | –24 | | –32 | mA |
| $I_{OL}$ | Low-level output current | | 48 | | 64 | mA |
| $\Delta t/\Delta v$ | Input transition rise or fall rate | | 5 | | 5 | ns/V |
| $T_A$ | Operating free-air temperature | –55 | 125 | –40 | 85 | °C |

NOTE 3: Unused inputs must be held high or low to prevent them from floating.

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

| PARAMETER | TEST CONDITIONS | | | $T_A$ = 25°C | | | SN54ABT843 | | SN74ABT843 | | UNIT |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | MIN | TYP† | MAX | MIN | MAX | MIN | MAX | |
| $V_{IK}$ | $V_{CC}$ = 4.5 V, | $I_I$ = –18 mA | | | | –1.2 | | –1.2 | | –1.2 | V |
| $V_{OH}$ | $V_{CC}$ = 4.5 V, | $I_{OH}$ = –3 mA | | 2.5 | | | 2.5 | | 2.5 | | V |
| | $V_{CC}$ = 5 V, | $I_{OH}$ = –3 mA | | 3 | | | 3 | | 3 | | |
| | $V_{CC}$ = 4.5 V | $I_{OH}$ = –24 mA | | | | | 2 | | | | |
| | | $I_{OH}$ = –32 mA | | 2* | | | | | 2 | | |
| $V_{OL}$ | $V_{CC}$ = 4.5 V | $I_{OL}$ = 48 mA | | | | | | 0.55 | | | V |
| | | $I_{OL}$ = 64 mA | | | | 0.55* | | | | 0.55 | |
| $V_{hys}$ | | | | | 100 | | | | | | mV |
| $I_I$ | $V_{CC}$ = 5.5 V, | $V_I$ = $V_{CC}$ or GND | | | | ±1 | | ±1 | | ±1 | µA |
| $I_{OZH}$‡ | $V_{CC}$ = 5.5 V, | $V_O$ = 2.7 V | | | | 10 | | 10 | | 10 | µA |
| $I_{OZL}$‡ | $V_{CC}$ = 5.5 V, | $V_O$ = 0.5 V | | | | –10 | | –10 | | –10 | µA |
| $I_{off}$ | $V_{CC}$ = 0, | $V_I$ or $V_O$ ≤ 4.5 V | | | | ±100 | | | | ±100 | µA |
| $I_{CEX}$ | $V_{CC}$ = 5.5 V, | $V_O$ = 5.5 V | Outputs high | | 50 | | | 50 | | 50 | µA |
| $I_O$§ | $V_{CC}$ = 5.5 V, | $V_O$ = 2.5 V | | –50 | –140 | –180 | –50 | –180 | –50 | –180 | mA |
| $I_{CC}$ | $V_{CC}$ = 5.5 V, $I_O$ = Open, $V_I$ = $V_{CC}$ or GND | | Outputs high | | 1 | 250 | | 250 | | 250 | µA |
| | | | Outputs low | | 24 | 34 | | 34 | | 34 | mA |
| | | | Outputs disabled | | 0.5 | 250 | | 250 | | 250 | µA |
| $\Delta I_{CC}$¶ | $V_{CC}$ = 5.5 V, One input at 3.4 V, Other inputs at $V_{CC}$ or GND | | | | | 1.5 | | 1.5 | | 1.5 | mA |
| $C_i$ | $V_I$ = 2.5 V or 0.5 V | | | | 4 | | | | | | pF |
| $C_o$ | $V_O$ = 2.5 V or 0.5 V | | | | 7 | | | | | | pF |

* On products compliant to MIL-PRF-38535, this parameter does not apply.
† All typical values are at $V_{CC}$ = 5 V.
‡ The parameters $I_{OZH}$ and $I_{OZL}$ include the input leakage current.
§ Not more than one output should be tested at a time, and the duration of the test should not exceed one second.
¶ This is the increase in supply current for each input that is at the specified TTL voltage level rather than $V_{CC}$ or GND.

**timing requirements over recommended ranges of supply voltage and operating free-air temperature (unless otherwise noted) (see Figures 1 and 2)**

| | | | | $V_{CC}$ = 5 V, $T_A$ = 25°C | | SN54ABT843 | | SN74ABT843 | | UNIT |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | MIN | MAX | MIN | MAX | MIN | MAX | |
| $t_w$ | Pulse duration | $\overline{CLR}$ low | | 5.5 | | 5.5 | | 5.5 | | ns |
| | | $\overline{PRE}$ low | | 4.5 | | 4.5 | | 4.5 | | |
| | | LE low | | 3.3 | | 3.3 | | 3.4 | | |
| $t_{su}$ | Setup time | Data before LE↓ | Low | 2.5 | | 2.5 | | 2.5 | | ns |
| | | | High | 3 | | 3 | | 3 | | |
| | | $\overline{PRE}$ inactive | | 1.6 | | 1.6 | | 1.6 | | |
| | | $\overline{CLR}$ inactive | | 2 | | 2 | | 2 | | |
| $t_h$ | Hold time, data after LE↓ | High | | 1 | | 1 | | 1 | | ns |
| | | Low | | 1.5† | | 2.3† | | 1.5† | | |

† This data sheet limit may vary among suppliers.

**switching characteristics over recommended ranges of supply voltage and operating free-air temperature, $C_L$ = 50 pF (unless otherwise noted) (see Figures 1 and 2)**

| PARAMETER | FROM (INPUT) | TO (OUTPUT) | $V_{CC}$ = 5 V, $T_A$ = 25°C | | | SN54ABT843 | | SN74ABT843 | | UNIT |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | MIN | TYP | MAX | MIN | MAX | MIN | MAX | |
| $t_{PLH}$ | D | Q | 1.2† | 3.8 | 5.2 | 1.2† | 7.8 | 1.2† | 6.7† | ns |
| $t_{PHL}$ | | | 1.5† | 3.4 | 6.3 | 1.5† | 7.3 | 1.5† | 7.2 | |
| $t_{PLH}$ | LE | Q | 1.7† | 4.4 | 5.6 | 1.7† | 8.3 | 1.7† | 7.2† | ns |
| $t_{PHL}$ | | | 1.9† | 4.1 | 6.3 | 1.3† | 7.2 | 1.9† | 6.9 | |
| $t_{PLH}$ | $\overline{PRE}$ | Q | 2.2 | 5 | 6.2 | 2.2 | 8.3 | 2.2 | 7.4 | ns |
| $t_{PHL}$ | | | 2.1† | 4.1 | 6.5 | 2.1† | 7.5 | 2.1† | 7.2 | |
| $t_{PLH}$ | $\overline{CLR}$ | Q | 2† | 4.4 | 6.3 | 2† | 7.6 | 2† | 7.1 | ns |
| $t_{PHL}$ | | | 1.9† | 4.5 | 6.8 | 1.9† | 8.1 | 1.9† | 8 | |
| $t_{PZH}$ | $\overline{OE}$ | Q | 1 | 3.4 | 4.5† | 1 | 6.4 | 1 | 5.7† | ns |
| $t_{PZL}$ | | | 2 | 4.3 | 5.7† | 2 | 6.6 | 2 | 6.5 | |
| $t_{PHZ}$ | $\overline{OE}$ | Q | 2.4† | 4.9 | 6.2 | 2.4† | 7.3 | 2.4† | 6.8 | ns |
| $t_{PLZ}$ | | | 1.5† | 4.2 | 6.3 | 1.5† | 7 | 1.5† | 5.9† | |

† This data sheet limit may vary among suppliers.

**recovery-time waveform**

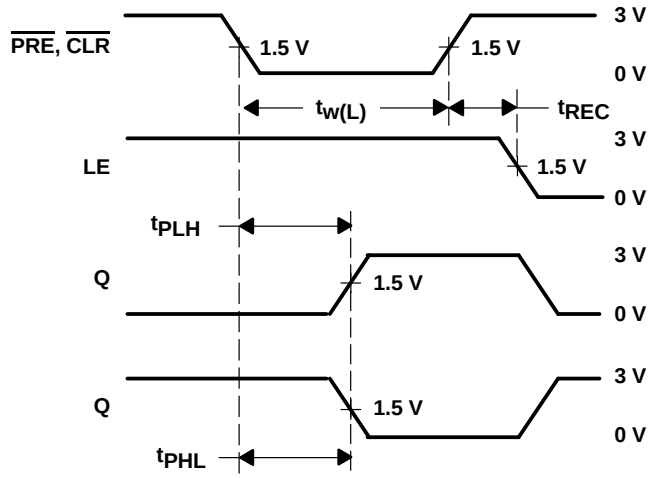
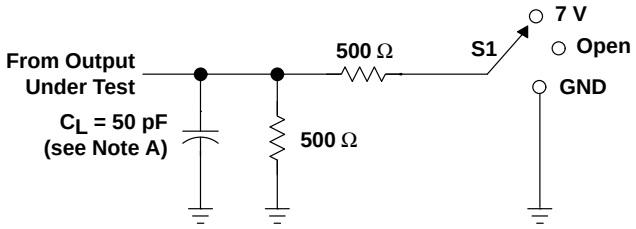


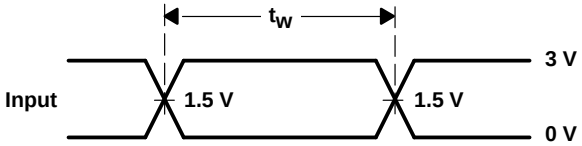

**Figure 1. $\overline{\text{CLR}}$ and $\overline{\text{PRE}}$ Pulse Duration, $\overline{\text{CLR}}$ and $\overline{\text{PRE}}$ to Output Delay, and $\overline{\text{CLR}}$ and $\overline{\text{PRE}}$ to Latch-Enable Recovery Time**

## PARAMETER MEASUREMENT INFORMATION

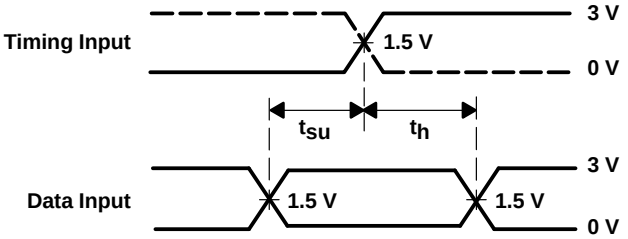



| TEST | S1 |
|---|---|
| $t_{PLH}/t_{PHL}$ | Open |
| $t_{PLZ}/t_{PZL}$ | 7 V |
| $t_{PHZ}/t_{PZH}$ | Open |

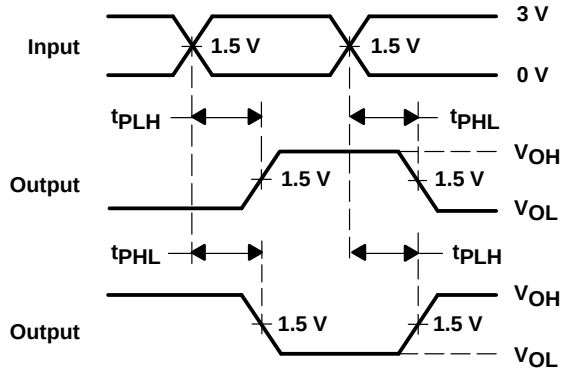
LOAD CIRCUIT



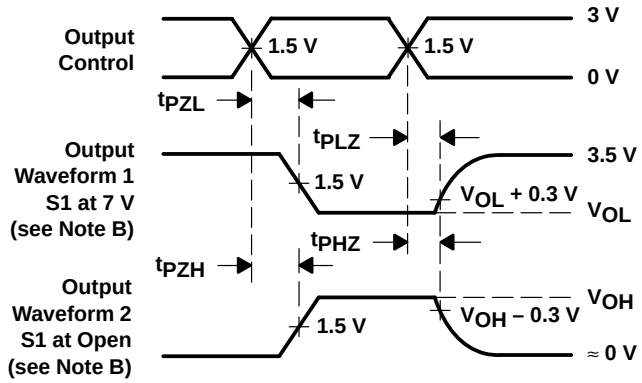

VOLTAGE WAVEFORMS
PULSE DURATION




VOLTAGE WAVEFORMS
SETUP AND HOLD TIMES




VOLTAGE WAVEFORMS
PROPAGATION DELAY TIMES
INVERTING AND NONINVERTING OUTPUTS




VOLTAGE WAVEFORMS
ENABLE AND DISABLE TIMES
LOW- AND HIGH-LEVEL ENABLING

NOTES: A. $C_L$ includes probe and jig capacitance.
B. Waveform 1 is for an output with internal conditions such that the output is low except when disabled by the output control. Waveform 2 is for an output with internal conditions such that the output is high except when disabled by the output control.
C. All input pulses are supplied by generators having the following characteristics: PRR ≤ 10 MHz, $Z_O$ = 50 Ω, $t_r$ ≤ 2.5 ns, $t_f$ ≤ 2.5 ns.
D. The outputs are measured one at a time with one transition per measurement.

**Figure 2. Load Circuit and Voltage Waveforms**

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