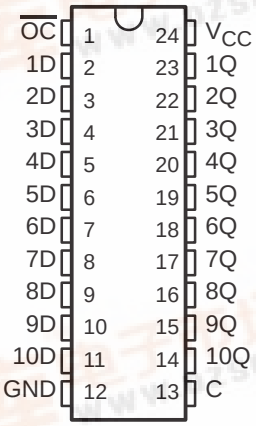
- 3-State Buffer-Type Outputs Drive Bus-Lines Directly
- Bus-Structured Pinout
- Provide Extra Bus Driving Latches Necessary for Wider Address/Data Paths or Buses with Parity
- Buffered Control Inputs to Reduce DC Loading
- Power-Up High-Impedance State
- Package Options Include Plastic Small Outline Packages, Both Plastic and Ceramic Chip Carriers, and Standard Plastic and Ceramic 300-mil DIPs
- Dependable Texas Instruments Quality and Reliability

## description

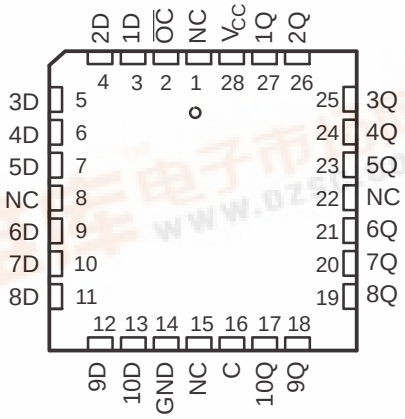
These 10-bit latches feature 3-state outputs designed specifically for driving highly-capacitive or relatively low-impedance loads. They are particularly suitable for implementing buffer registers, I/O ports, bidirectional bus drivers, and working registers.

The ten latches are transparent D-type. The ’ALS841 and ’AS841 have noninverting data (D) inputs. The ’ALS842 and ’AS842 have inverting $\overline{D}$ inputs.

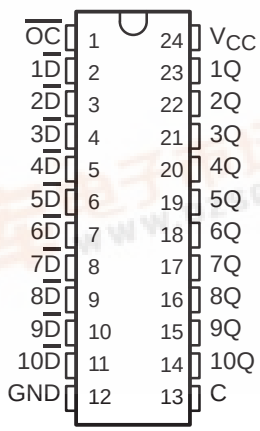
**SN54ALS841, SN54AS841 . . . JT PACKAGE**
**SN74ALS841, SN74AS841 . . . DW OR NT PACKAGE**
**(TOP VIEW)**



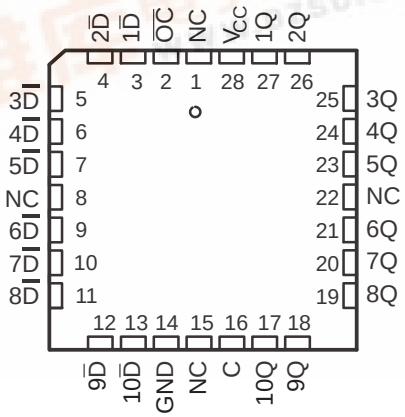

**SN54ALS841, SN54AS841 . . . FK PACKAGE**
**SN74ALS841, SN74AS841 . . . FN PACKAGE**
**(TOP VIEW)**




**SN54ALS842, SN54AS842 . . . JT PACKAGE**
**SN74ALS842, SN74AS842 . . . DW OR NT PACKAGE**
**(TOP VIEW)**




**SN54ALS842, SN54AS842 . . . FK PACKAGE**
**SN74ALS842, SN74AS842 . . . FN PACKAGE**
**(TOP VIEW)**



## description (continued)

A buffered output control ($\overline{OC}$) input can be used to place the ten outputs in either a normal logic state (high or low levels) or a high-impedance state. 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 the bus lines in a bus-organized system without need for interface or pullup components.

The output control does not affect the internal operation of the latches. Old data can be retained or new data can be entered while the outputs are off.

The -1 versions of the SN74ALS841 and SN74ALS842 parts are identical to the standard versions except that the recommended maximum $I_{OL}$ is increased to 48 mA. There are no -1 versions of the SN54ALS841 and SN54ALS842.

The SN54ALS841, SN54AS841, SN54ALS842, and SN54AS842 are characterized for operation over the full military temperature range of –55°C to 125°C. The SN74ALS841, SN74AS841, SN74ALS842, and SN74AS842 are characterized for operation from 0°C to 70°C.

**Function Tables**

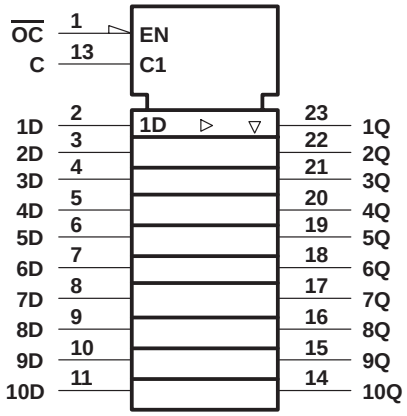
**'ALS841, 'AS841**

| INPUTS | | | OUTPUT |
|---|---|---|---|
| $\overline{OC}$ | C | D | Q |
| L | H | H | H |
| L | H | L | L |
| L | L | X | $Q_0$ |
| H | X | X | Z |

**'ALS842, 'AS842**

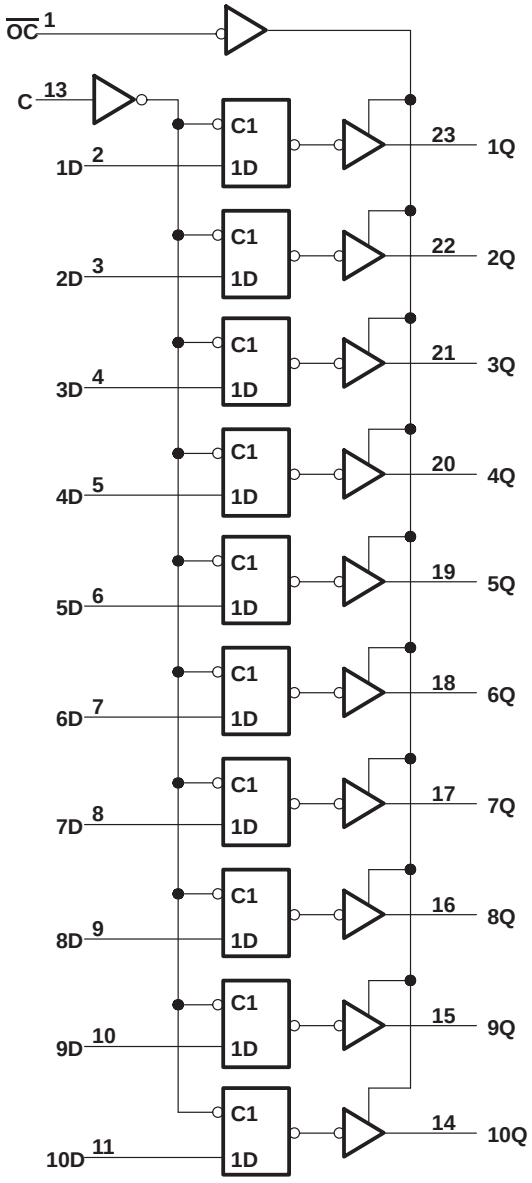
| INPUTS | | | OUTPUT |
|---|---|---|---|
| $\overline{OC}$ | C | $\overline{D}$ | Q |
| L | H | H | L |
| L | H | L | H |
| L | L | X | $Q_0$ |
| H | X | X | Z |

### ’ALS841, ’AS841 logic symbol†



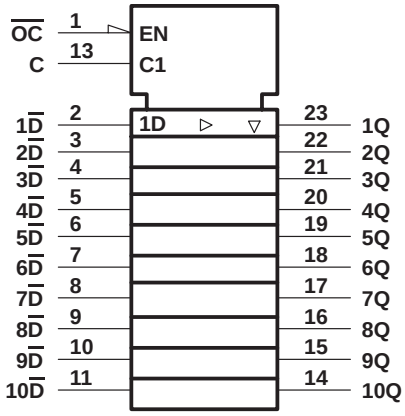

† This symbol is in accordance with ANSI/IEEE Std 91-1984 and EC Publication 617-12.

### ’ALS841, ’AS841 logic diagram (positive logic)



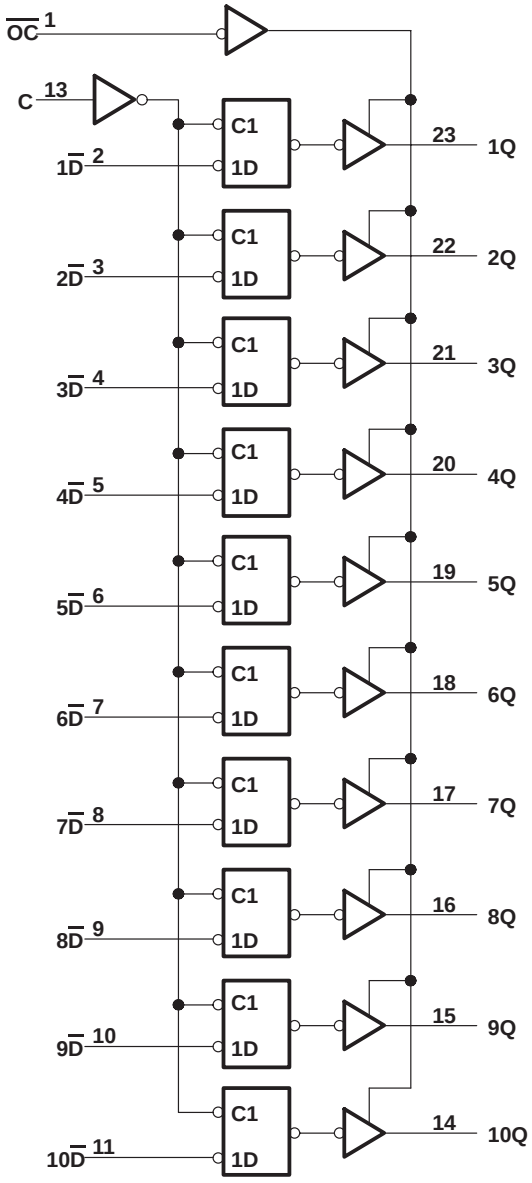

Pin numbers shown are for DW, JT, and NT packages.

### ’ALS842, ’AS842 logic symbol†




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

### ’ALS842, ’AS842 logic diagram (positive logic)




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

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

Supply voltage, $V_{CC}$ . . . . . 7 V
Input voltage . . . . . 7 V
Voltage applied to a disabled 3-state output . . . . . 5.5 V
Operating free-air temperature range:
SN54ALS841, SN54AS841, SN54ALS842, SN54AS842 . . . . . –55°C to 125°C
SN74ALS841, SN74AS841, SN74ALS842, SN74AS842 . . . . . 0°C to 70°C
Storage temperature range . . . . . –65°C to 150°C

## recommended operating conditions

| | | SN54ALS841 | | | SN74ALS841 | | | 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 | | | 0.7 | | | 0.8 | V |
| $I_{OH}$ | High-level output current | | | –1 | | | –2.6 | mA |
| $I_{OL}$ | Low-level output current | | | 12 | | | 24 | mA |
| | | | | | | | 48† | |
| $t_w$ | Pulse duration, C high | 25 | | | 20 | | | ns |
| $t_{su}$ | Setup time, data before C↓ | 16 | | | 10 | | | ns |
| $t_h$ | Hold time,, data after C↓ | 7 | | | 5 | | | ns |
| $T_A$ | Operating free-air temperature | –55 | | 125 | 0 | | 70 | °C |

† The 48-mA limit applies only to the -1 versions and only if $V_{CC}$ is maintained between 4.75 V and 5.25 V.

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

| PARAMETER | TEST CONDITIONS | | SN54ALS841 | | | SN74ALS841 | | | 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, | $I_{OH}$ = –0.4 mA | $V_{CC}$–2 | | | $V_{CC}$–2 | | | V |
| | $V_{CC}$ = 4.5 V, | $I_{OH}$ = –1 mA | 2.4 | 3.3 | | | | | |
| | $V_{CC}$ = 4.5 V, | $I_{OH}$ = –2.6 mA | | | | 2.4 | 3.2 | | |
| $V_{OL}$ | $V_{CC}$ = 4.5 V, | $I_{OL}$ = 12 mA | | 0.25 | 0.4 | | 0.25 | 0.4 | V |
| | $V_{CC}$ = 4.5 V, | $I_{OL}$ = 24 mA | | | | | 0.35 | 0.5 | |
| | $V_{CC}$ = 4.75 V, | $I_{OL}$ = 48 mA (–1 versions) | | | | | 0.35 | 0.5 | |
| $I_{OZH}$ | $V_{CC}$ = 5.5 V, | $V_O$ = 2. 7 V | | | 20 | | | 20 | µA |
| $I_{OZL}$ | $V_{CC}$ = 5.5 V, | $V_O$ = 0.4 V | | | –20 | | | –20 | µA |
| $I_I$ | $V_{CC}$ = 5.5 V, | $V_I$ = 7 V | | | 0.1 | | | 0.1 | mA |
| $I_{IH}$ | $V_{CC}$ = 5.5 V, | $V_O$ = 2.7 V | | | 20 | | | 20 | µA |
| $I_{IL}$ | $V_{CC}$ = 5.5 V, | $V_I$ = 0 .4 V | | | –0.1 | | | –0.1 | mA |
| $I_O$§ | $V_{CC}$ = 5.5 V, | $V_O$ = 2.25 V | –30 | | –112 | –30 | | –112 | mA |
| $I_{CC}$ | $V_{CC}$ = 5.5 V | Outputs high | | 19 | 30 | | 19 | 30 | mA |
| | | Outputs low | | 38 | 62 | | 38 | 62 | |
| | | Outputs disabled | | 23 | 40 | | 23 | 40 | |

‡ All typical values are at $V_{CC}$ = 5 V, $T_A$ = 25°C.
§ The output conditions have been chosen to produce a current that closely approximates one half of the true short-circuit output current, $I_{OS}$.

## ’ALS841 switching characteristics (see Note 1)

| PARAMETER | FROM (INPUT) | TO (OUTPUT) | $V_{CC}$ = 5 V, $C_L$ = 50 pF, $R_1$ = 500 Ω, $R_2$ = 500 Ω, $T_A$ = 25°C | | | $V_{CC}$ = 4.5 V to 5.5 V, $C_L$ = 50 pF, $R_1$ = 500 Ω, $R_2$ = 500 Ω, $T_A$ = MIN to MAX† | | | | UNIT |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | ′ALS841 | | | SN54ALS841 | | SN74ALS841 | | |
| | | | MIN | TYP | MAX | MIN | MAX | MIN | MAX | |
| $t_{PLH}$ | D | Q | | 8.5 | 11 | 2 | 15 | 2 | 13 | ns |
| $t_{PHL}$ | | | | 8.5 | 11 | 2 | 15 | 2 | 13 | |
| $t_{PLH}$ | C | Q | | 14 | 18 | 7 | 25 | 7 | 21 | ns |
| $t_{PHL}$ | | | | 17 | 23 | 8 | 30 | 8 | 26 | |
| $t_{PZH}$ | $\overline{OC}$ | Q | | 7.5 | 10 | 2 | 14 | 2 | 12 | ns |
| $t_{PZL}$ | | | | 7.5 | 10 | 2 | 14 | 2 | 12 | |
| $t_{PHZ}$ | $\overline{OC}$ | Q | | 6 | 8 | 2 | 12 | 2 | 10 | ns |
| $t_{PLZ}$ | | | | 7 | 9 | 2 | 14 | 2 | 12 | |

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

## recommended operating conditions

| | | SN54ALS842 | | | SN74ALS842 | | | 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 | | | 0.7 | | | 0.8 | V |
| $I_{OH}$ | High-level output current | | | –1 | | | –2.6 | mA |
| $I_{OL}$ | Low-level output current | | | 12 | | | 24 | mA |
| | | | | | | | 48† | |
| $t_w$ | Pulse duration, C high | 25 | | | 20 | | | ns |
| $t_{su}$ | Setup time, data before C↓ | 16 | | | 10 | | | ns |
| $t_h$ | Hold time,, data after C↓ | 7 | | | 5 | | | ns |
| $T_A$ | Operating free-air temperature | –55 | | 125 | 0 | | 70 | °C |

† The 48-mA limit applies only to the –1 versions and only if $V_{CC}$ is maintained between 4.75 V and 5.25 V.

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

| PARAMETER | TEST CONDITIONS | | SN54ALS842 | | | SN74ALS842 | | | 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, | $I_{OH}$ = –0.4 mA | $V_{CC}$–2 | | | $V_{CC}$–2 | | | V |
| | $V_{CC}$ = 4.5 V, | $I_{OH}$ = –1 mA | 2.4 | 3.3 | | | | | |
| | $V_{CC}$ = 4.5 V, | $I_{OH}$ = –2.6 mA | | | | 2.4 | 3.2 | | |
| $V_{OL}$ | $V_{CC}$ = 4.5 V, | $I_{OL}$ = 12 mA | | 0.25 | 0.4 | | 0.25 | 0.4 | V |
| | $V_{CC}$ = 4.5 V, | $I_{OL}$ = 24 mA | | | | | 0.35 | 0.5 | |
| | $V_{CC}$ = 4.75 V, | $I_{OL}$ = 48 mA (-1 versions) | | | | | 0.35 | 0.5 | |
| $I_{OZH}$ | $V_{CC}$ = 5.5 V, | $V_O$ = 2. 7 V | | | 20 | | | 20 | µA |
| $I_{OZL}$ | $V_{CC}$ = 5.5 V, | $V_O$ = 0.4 V | | | –20 | | | –20 | µA |
| $I_I$ | $V_{CC}$ = 5.5 V, | $V_I$ = 7 V | | | 0.1 | | | 0.1 | mA |
| $I_{IH}$ | $V_{CC}$ = 5.5 V, | $V_O$ = 2.7 V | | | 20 | | | 20 | µA |
| $I_{IL}$ | $V_{CC}$ = 5.5 V, | $V_I$ = 0.4 V | | | –0.1 | | | –0.1 | mA |
| $I_O$§ | $V_{CC}$ = 5.5 V, | $V_O$ = 2.25 V | –30 | | –112 | –30 | | –112 | mA |
| $I_{CC}$ | $V_{CC}$ = 5.5 V | Outputs high | | 20 | 35 | | 20 | 35 | mA |
| | | Outputs low | | 48 | 74 | | 48 | 74 | |
| | | Outputs disabled | | 27 | 44 | | 27 | 44 | |

‡ All typical values are at $V_{CC}$ = 5 V, $T_A$ = 25°C.
§ The output conditions have been chosen to produce a current that closely approximates one half of the true short-circuit output current, $I_{OS}$.

## ’ALS842 switching characteristics (see Note 1)

| 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 |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | ’ALS842 | | | SN54ALS842 | | SN74ALS842 | | |
| | | | MIN | TYP | MAX | MIN | MAX | MIN | MAX | |
| $t_{PLH}$ | D | Q | | 11 | 15 | 4 | 22 | 4 | 18 | ns |
| $t_{PHL}$ | | | | 8 | 11 | 3 | 17 | 3 | 13 | |
| $t_{PLH}$ | C | Q | | 17 | 23 | 8 | 31 | 8 | 27 | ns |
| $t_{PHL}$ | | | | 13 | 18 | 6 | 24 | 6 | 20 | |
| $t_{PZH}$ | $\overline{OC}$ | Q | | 8 | 10 | 2 | 14 | 2 | 12 | ns |
| $t_{PZL}$ | | | | 8 | 11 | 2 | 14 | 2 | 12 | |
| $t_{PHZ}$ | $\overline{OC}$ | Q | | 6 | 8 | 1 | 12 | 1 | 10 | ns |
| $t_{PLZ}$ | | | | 7 | 9 | 2 | 14 | 2 | 12 | |

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

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

## recommended operating conditions

| | | SN54AS841 SN54AS842 | | | SN74AS841 SN74AS842 | | | 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 |
| $I_{OH}$ | High-level output current | | | –24 | | | –24 | mA |
| $I_{OL}$ | Low-level output current | | | 32 | | | 48 | mA |
| $t_w$ | Pulse duration, C high | 5 | | | 4 | | | ns |
| $t_{su}$ | Setup time, data before C↓ | 3.5 | | | 2.5 | | | ns |
| $t_h$ | Hold time,, data after C↓ | 3.5 | | | 2.5 | | | ns |
| $T_A$ | Operating free-air temperature | –55 | | 125 | 0 | | 70 | °C |

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

| PARAMETER | | TEST CONDITIONS | | SN54AS841 SN54AS842 | | | SN74AS841 SN74AS842 | | | 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 |
| | | $V_{CC}$ = 4.5 V, | $I_{OH}$ = –15 mA | 2.4 | 3.2 | | 2.4 | 3.2 | | |
| | | $V_{CC}$ = 4.5 V, | $I_{OH}$ = –24 mA | 2 | | | 2 | | | |
| $V_{OL}$ | | $V_{CC}$ = 4.5 V, | $I_{OL}$ = 32 mA | | 0.25 | 0.5 | | | | V |
| | | $V_{CC}$ = 4.5 V, | $I_{OL}$ = 48 mA | | | | | 0.35 | 0.5 | |
| $I_{OZH}$ | | $V_{CC}$ = 5.5 V, | $V_O$= 2. 7 V | | | 50 | | | 50 | µA |
| $I_{OZL}$ | | $V_{CC}$ = 5.5 V, | $V_O$ = 0.4 V | | | –50 | | | –50 | µA |
| $I_I$ | | $V_{CC}$ = 5.5 V, | $V_I$ = 7 V | | | 0.1 | | | 0.1 | mA |
| $I_{IH}$ | | $V_{CC}$ = 5.5 V, | $V_O$ = 2.7 V | | | 20 | | | 20 | µA |
| $I_{IL}$ | | $V_{CC}$ = 5.5 V, | $V_I$ = 0 .4 V | | | –0.5 | | | –0.5 | mA |
| $I_O$‡ | | $V_{CC}$ = 5.5 V, | $V_O$ = 2.25 V | –30 | | –112 | –30 | | –112 | mA |
| $I_{CC}$ | ’AS841 | $V_{CC}$ = 5.5 V | Outputs high | | 36 | 60 | | 36 | 60 | mA |
| | | | Outputs low | | 58 | 94 | | 58 | 94 | |
| | | | Outputs disabled | | 56 | 92 | | 56 | 92 | |
| | ’AS842 | | Outputs high | | 38 | 62 | | 38 | 62 | |
| | | | Outputs low | | 60 | 97 | | 60 | 97 | |
| | | | Outputs disabled | | 58 | 95 | | 58 | 95 | |

† All typical values are at $V_{CC}$ = 5 V, $T_A$ = 25°C.
‡ The output conditions have been chosen to produce a current that closely approximates one half of the true short-circuit output current, $I_{OS}$.

## 'AS841 switching characteristics (see Note 1)

| PARAMETER | FROM (INPUT) | TO (OUTPUT) | $V_{CC}$ = 4.5 V to 5.5 V, $C_L$ = 50 pF, R1 = 500 Ω, R2 = 500 Ω, $T_A$ = MIN to MAX† | | | | UNIT |
|---|---|---|---|---|---|---|---|
| | | | SN54AS841 | | SN74AS841 | | |
| | | | MIN | MAX | MIN | MAX | |
| $t_{PLH}$ | D | Q | 1 | 8.5 | 1 | 6.5 | ns |
| $t_{PHL}$ | | | 1 | 10 | 1 | 9 | |
| $t_{PLH}$ | C | Q | 2 | 13 | 2 | 12 | ns |
| $t_{PHL}$ | | | 2 | 13 | 2 | 12 | |
| $t_{PZH}$ | $\overline{OC}$ | Q | 2 | 13.5 | 2 | 10.5 | ns |
| $t_{PZL}$ | | | 2 | 15 | 2 | 13.5 | |
| $t_{PHZ}$ | $\overline{OC}$ | Q | 1 | 10 | 1 | 8 | ns |
| $t_{PLZ}$ | | | 1 | 10 | 1 | 8 | |

## 'AS842 switching characteristics (see Note 1)

| PARAMETER | FROM (INPUT) | TO (OUTPUT) | $V_{CC}$ = 4.5 V to 5.5 V, $C_L$ = 50 pF, R1 = 500 Ω, R2 = 500 Ω, $T_A$ = MIN to MAX† | | | | UNIT |
|---|---|---|---|---|---|---|---|
| | | | SN54AS842 | | SN74AS842 | | |
| | | | MIN | MAX | MIN | MAX | |
| $t_{PLH}$ | D | Q | 1 | 11 | 1 | 8.5 | ns |
| $t_{PHL}$ | | | 1 | 10 | 1 | 9 | |
| $t_{PLH}$ | C | Q | 2 | 13 | 2 | 12 | ns |
| $t_{PHL}$ | | | 2 | 13 | 2 | 12 | |
| $t_{PZH}$ | $\overline{OC}$ | Q | 2 | 14.5 | 2 | 12 | ns |
| $t_{PZL}$ | | | 2 | 15 | 2 | 12.5 | |
| $t_{PHZ}$ | $\overline{OC}$ | Q | 1 | 10 | 1 | 8 | ns |
| $t_{PLZ}$ | | | 1 | 10 | 1 | 8 | |

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

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