



# HEF4894B

## 12-stage shift-and-store register LED driver

Rev. 11 — 13 August 2024

Product data sheet

### 1. General description

The HEF4894B is a 12-stage serial shift register. It has a storage latch associated with each stage for strobing data from the serial input (D) to the parallel LED driver outputs (QP0 to QP11). Data is shifted on positive-going clock (CP) transitions. The data in each shift register stage is transferred to the storage register when the strobe (STR) input is HIGH. Data in the storage register appears at the output whenever the output enable (OE) input signal is HIGH.

Two serial outputs (QS1 and QS2) are available for cascading a number of HEF4894B devices. Serial data is available at QS1 on positive-going clock edges to allow high-speed operation in cascaded systems with a fast clock rise time. The same serial data is available at QS2 on the next negative going clock edge. This is used for cascading HEF4894B devices when the clock has a slow rise time.

It operates over a recommended  $V_{DD}$  power supply range of 3 V to 15 V referenced to  $V_{SS}$  (usually ground). Unused inputs must be connected to  $V_{DD}$ ,  $V_{SS}$ , or another input.

### 2. Features and benefits

- Wide supply voltage range from 3.0 V to 15.0 V
- CMOS low power dissipation
- High noise immunity
- Fully static operation
- 5 V, 10 V, and 15 V parametric ratings
- Standardized symmetrical output characteristics
- Complies with JEDEC standard JESD 13-B
- ESD protection:
  - HBM: ANSI/ESDA/JEDEC JS-001 class 2 exceeds 2000 V
  - CDM: ANSI/ESDA/JEDEC JS-002 class C3 exceeds 1000 V
- Specified from -40 °C to +85 °C and from -40 °C to +125 °C

### 3. Ordering information

Table 1. Ordering information

| Type number                | Package           |         |                                                                           |                          |
|----------------------------|-------------------|---------|---------------------------------------------------------------------------|--------------------------|
|                            | Temperature range | Name    | Description                                                               | Version                  |
| <a href="#">HEF4894BT</a>  | -40 °C to +125 °C | SO20    | plastic small outline package; 20 leads;<br>body width 7.5 mm             | <a href="#">SOT163-1</a> |
| <a href="#">HEF4894BTT</a> | -40 °C to +125 °C | TSSOP20 | plastic thin shrink small outline package; 20 leads;<br>body width 4.4 mm | <a href="#">SOT360-1</a> |

4. Functional diagram

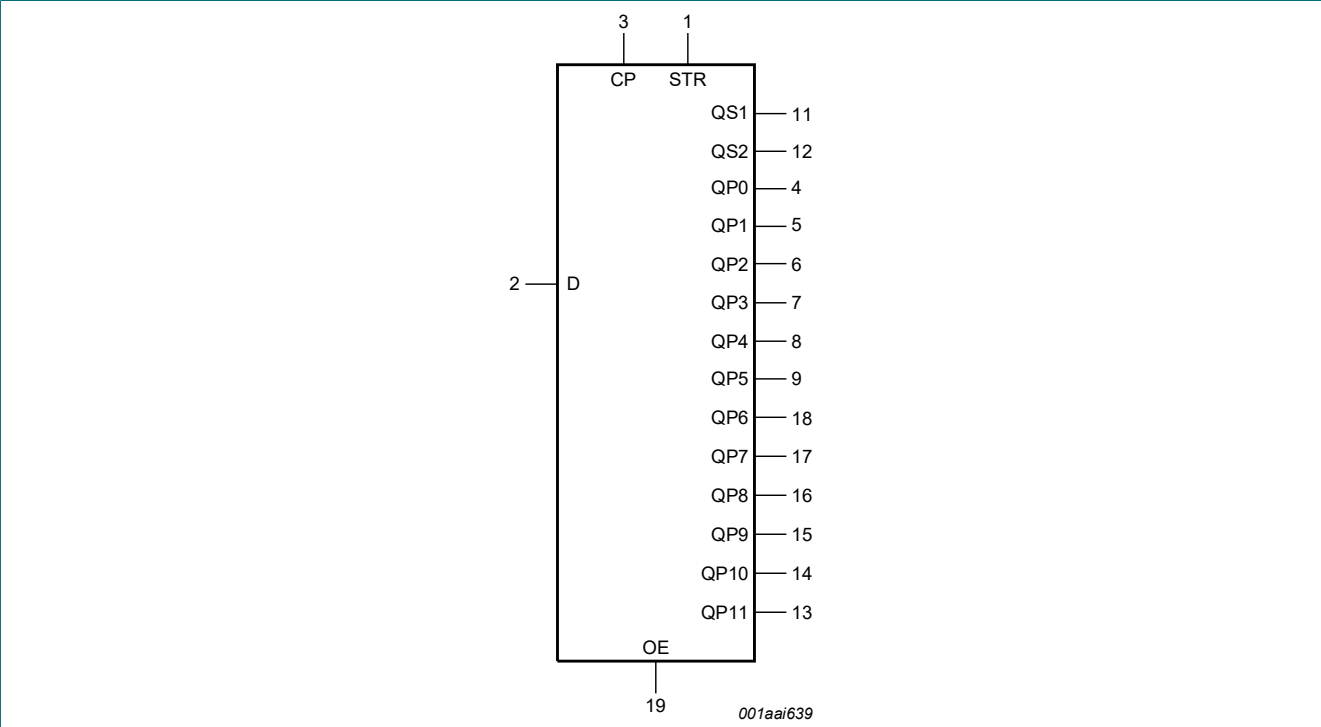


Fig. 1. Logic Symbol

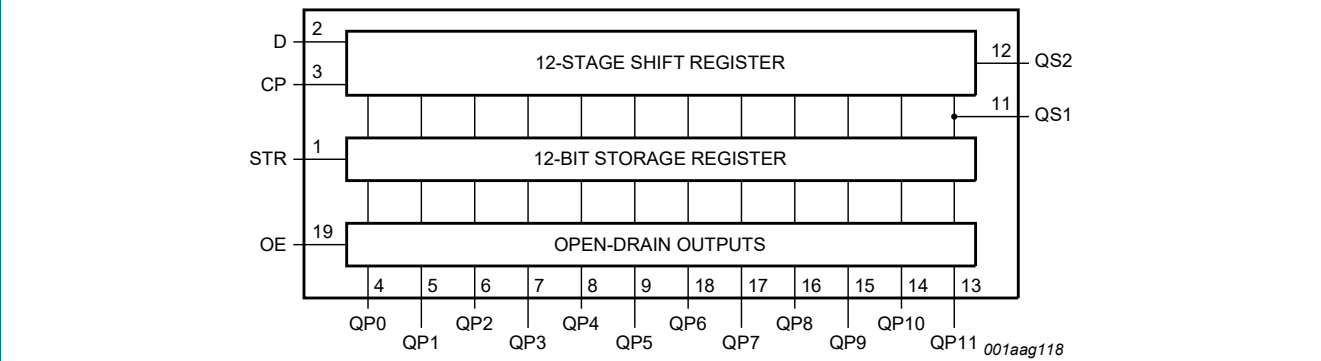
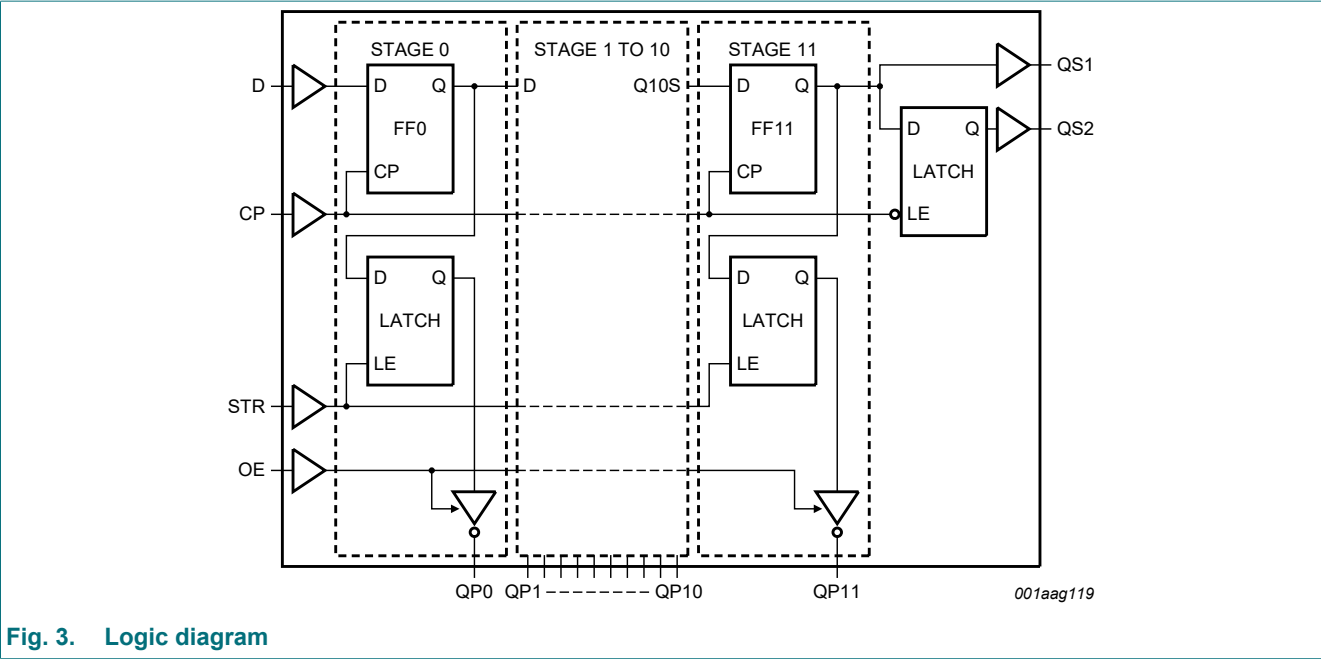
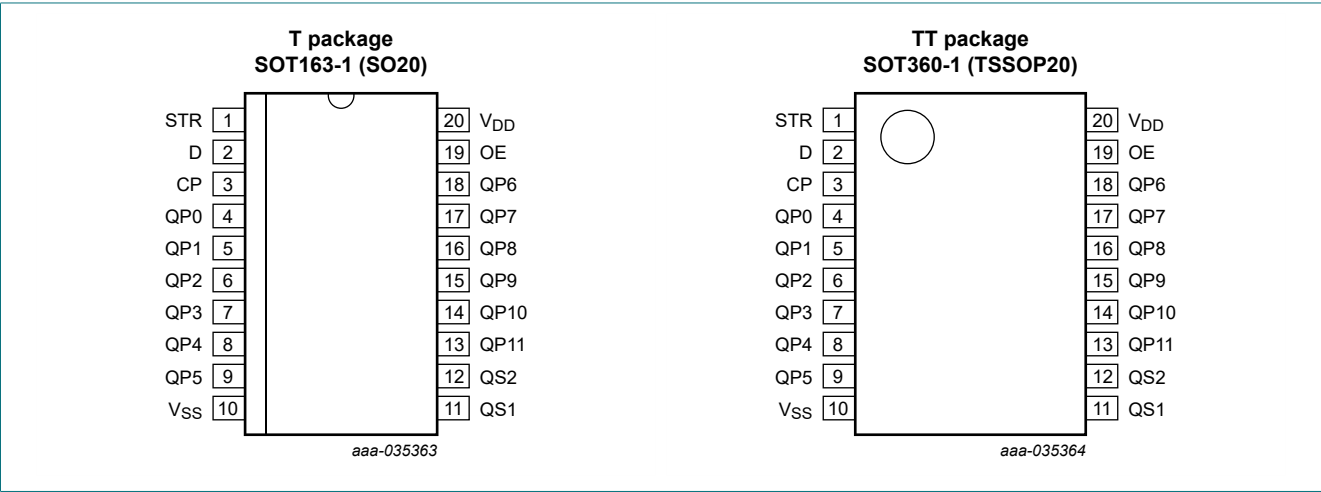


Fig. 2. Functional diagram



5. Pinning information

5.1. Pinning



5.2. Pin description

Table 2. Pin description

| Symbol          | Pin                                      | Description         |
|-----------------|------------------------------------------|---------------------|
| D               | 2                                        | serial input        |
| QP0 to QP11     | 4, 5, 6, 7, 8, 9, 18, 17, 16, 15, 14, 13 | parallel output     |
| QS1             | 11                                       | serial output       |
| QS2             | 12                                       | serial output       |
| CP              | 3                                        | clock input         |
| STR             | 1                                        | strobe input        |
| OE              | 19                                       | output enable input |
| V <sub>DD</sub> | 20                                       | supply voltage      |
| V <sub>SS</sub> | 10                                       | ground (0 V)        |

6. Functional description

Table 3. Function table

H = HIGH voltage level; L = LOW voltage level; X = don't care; ↑ = LOW-to-HIGH clock transition;  
↓ = HIGH-to-LOW clock transition; Z = high-impedance OFF-state.  
At the LOW-to-HIGH clock transition, the information in the 10<sup>th</sup> register stage is transferred to the 11<sup>th</sup> register stage and the QS output.

| Control |    |     | Input | Parallel output |           | Serial output |           |
|---------|----|-----|-------|-----------------|-----------|---------------|-----------|
| CP      | OE | STR | D     | QP0             | QPn       | QS1[1]        | QS2[2]    |
| ↑       | L  | X   | X     | Z               | Z         | Q10S          | no change |
| ↓       | L  | X   | X     | Z               | Z         | no change     | Q11S      |
| ↑       | H  | L   | X     | no change       | no change | Q10S          | no change |
| ↑       | H  | H   | L     | Z               | QPn - 1   | Q10S          | no change |
| ↑       | H  | H   | H     | L               | QPn - 1   | Q10S          | no change |
| ↓       | H  | H   | H     | no change       | no change | no change     | Q11S      |

[1] Q10S = the data in register stage 10 before the LOW-to-HIGH clock transition.  
[2] Q11S = the data in register stage 11 before the HIGH-to-LOW clock transition.

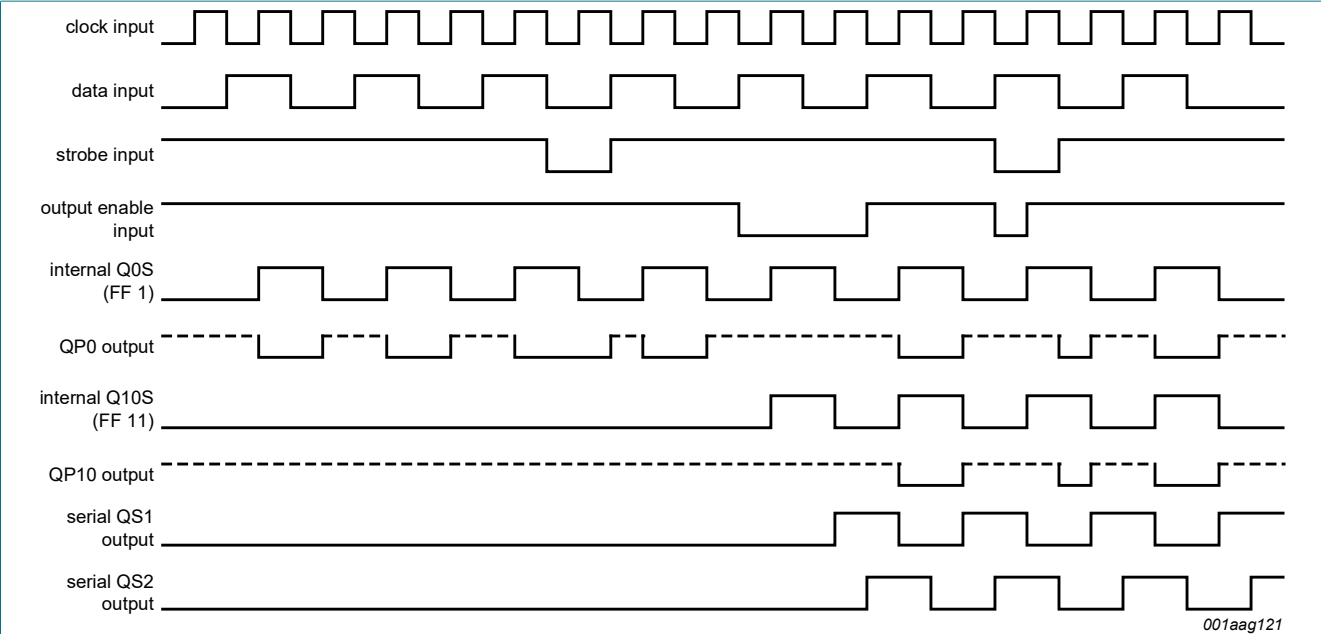


Fig. 4. Timing diagram

## 7. Limiting values

Table 4. Limiting values

In accordance with the Absolute Maximum Rating System (IEC 60134).

| Symbol    | Parameter               | Conditions                                                          | Min  | Max            | Unit |
|-----------|-------------------------|---------------------------------------------------------------------|------|----------------|------|
| $V_{DD}$  | supply voltage          |                                                                     | -0.5 | +18            | V    |
| $I_{IK}$  | input clamping current  | $V_I < -0.5\text{ V}$ or $V_I > V_{DD} + 0.5\text{ V}$              | -    | $\pm 10$       | mA   |
| $V_I$     | input voltage           |                                                                     | -0.5 | $V_{DD} + 0.5$ | V    |
| $I_{OK}$  | output clamping current | QSn outputs; $V_O < -0.5\text{ V}$ or $V_O > V_{DD} + 0.5\text{ V}$ | -    | $\pm 10$       | mA   |
|           |                         | QPn outputs; $V_O < 0.5\text{ V}$                                   | -    | 40             | mA   |
| $I_I$     | input leakage current   |                                                                     | -    | $\pm 10$       | mA   |
| $I_O$     | output current          | QSn outputs                                                         | -    | $\pm 10$       | mA   |
|           |                         | QPn outputs                                                         | -    | 40             | mA   |
| $T_{stg}$ | storage temperature     |                                                                     | -65  | +150           | °C   |
| $T_{amb}$ | ambient temperature     |                                                                     | -40  | +125           | °C   |
| $P_{tot}$ | total power dissipation | $T_{amb} = -40\text{ °C to }+125\text{ °C}$ [1]                     | -    | 500            | mW   |
| P         | power dissipation       | per output                                                          | -    | 100            | mW   |

[1] For SOT163-1 (SO20) package:  $P_{tot}$  derates linearly with 12.3 mW/K above 109 °C.  
For SOT360-1 (TSSOP20) package:  $P_{tot}$  derates linearly with 10.0 mW/K above 100 °C.

## 8. Recommended operating conditions

Table 5. Recommended operating conditions

| Symbol    | Parameter           | Conditions  | Min | Typ | Max      | Unit |
|-----------|---------------------|-------------|-----|-----|----------|------|
| $V_{DD}$  | supply voltage      |             | 3   | -   | 15       | V    |
| $V_I$     | input voltage       |             | 0   | -   | $V_{DD}$ | V    |
| $T_{amb}$ | ambient temperature | in free air | -40 | -   | +125     | °C   |

| Symbol              | Parameter                           | Conditions             | Min | Typ | Max  | Unit            |
|---------------------|-------------------------------------|------------------------|-----|-----|------|-----------------|
| $\Delta t/\Delta V$ | input transition rise and fall rate | $V_{DD} = 5\text{ V}$  | -   | -   | 3.75 | $\mu\text{s/V}$ |
|                     |                                     | $V_{DD} = 10\text{ V}$ | -   | -   | 0.5  | $\mu\text{s/V}$ |
|                     |                                     | $V_{DD} = 15\text{ V}$ | -   | -   | 0.08 | $\mu\text{s/V}$ |

9. Static characteristics

Table 6. Static characteristics

$V_{SS} = 0\text{ V}$ ;  $V_I = V_{SS}$  or  $V_{DD}$ ; unless otherwise specified.

| Symbol   | Parameter                 | Conditions                                     | $V_{DD}$ | $T_{\text{amb}} = -40\text{ }^{\circ}\text{C}$ |           | $T_{\text{amb}} = +25\text{ }^{\circ}\text{C}$ |           | $T_{\text{amb}} = +85\text{ }^{\circ}\text{C}$ |           | $T_{\text{amb}} = +125\text{ }^{\circ}\text{C}$ |           | Unit          |
|----------|---------------------------|------------------------------------------------|----------|------------------------------------------------|-----------|------------------------------------------------|-----------|------------------------------------------------|-----------|-------------------------------------------------|-----------|---------------|
|          |                           |                                                |          | Min                                            | Max       | Min                                            | Max       | Min                                            | Max       | Min                                             | Max       |               |
| $V_{IH}$ | HIGH-level input voltage  | $ I_O  < 1\text{ }\mu\text{A}$                 | 5 V      | 3.5                                            | -         | 3.5                                            | -         | 3.5                                            | -         | 3.5                                             | -         | V             |
|          |                           |                                                | 10 V     | 7.0                                            | -         | 7.0                                            | -         | 7.0                                            | -         | 7.0                                             | -         | V             |
|          |                           |                                                | 15 V     | 11.0                                           | -         | 11.0                                           | -         | 11.0                                           | -         | 11.0                                            | -         | V             |
| $V_{IL}$ | LOW-level input voltage   | $ I_O  < 1\text{ }\mu\text{A}$                 | 5 V      | -                                              | 1.5       | -                                              | 1.5       | -                                              | 1.5       | -                                               | 1.5       | V             |
|          |                           |                                                | 10 V     | -                                              | 3.0       | -                                              | 3.0       | -                                              | 3.0       | -                                               | 3.0       | V             |
|          |                           |                                                | 15 V     | -                                              | 4.0       | -                                              | 4.0       | -                                              | 4.0       | -                                               | 4.0       | V             |
| $V_{OH}$ | HIGH-level output voltage | QSn outputs;<br>$ I_O  < 1\text{ }\mu\text{A}$ | 5 V      | 4.95                                           | -         | 4.95                                           | -         | 4.95                                           | -         | 4.95                                            | -         | V             |
|          |                           |                                                | 10 V     | 9.95                                           | -         | 9.95                                           | -         | 9.95                                           | -         | 9.95                                            | -         | V             |
|          |                           |                                                | 15 V     | 14.95                                          | -         | 14.95                                          | -         | 14.95                                          | -         | 14.95                                           | -         | V             |
| $V_{OL}$ | LOW-level output voltage  | QSn outputs;<br>$ I_O  < 1\text{ }\mu\text{A}$ | 5 V      | -                                              | 0.05      | -                                              | 0.05      | -                                              | 0.05      | -                                               | 0.05      | V             |
|          |                           |                                                | 10 V     | -                                              | 0.05      | -                                              | 0.05      | -                                              | 0.05      | -                                               | 0.05      | V             |
|          |                           |                                                | 15 V     | -                                              | 0.05      | -                                              | 0.05      | -                                              | 0.05      | -                                               | 0.05      | V             |
|          |                           | QPn outputs;<br>$ I_O  < 20\text{ mA}$         | 5 V      | -                                              | 0.75      | -                                              | 0.75      | -                                              | 1.5       | -                                               | 1.5       | V             |
|          |                           |                                                | 10 V     | -                                              | 0.75      | -                                              | 0.75      | -                                              | 1.5       | -                                               | 1.5       | V             |
|          |                           |                                                | 15 V     | -                                              | 0.75      | -                                              | 0.75      | -                                              | 1.5       | -                                               | 1.5       | V             |
| $I_{OH}$ | HIGH-level output current | QSn outputs                                    |          |                                                |           |                                                |           |                                                |           |                                                 |           |               |
|          |                           | $V_O = 2.5\text{ V}$                           | 5 V      | -                                              | -1.7      | -                                              | -1.4      | -                                              | -1.1      | -                                               | -1.1      | mA            |
|          |                           | $V_O = 4.6\text{ V}$                           | 5 V      | -                                              | -0.64     | -                                              | -0.5      | -                                              | -0.36     | -                                               | -0.36     | mA            |
|          |                           | $V_O = 9.5\text{ V}$                           | 10 V     | -                                              | -1.6      | -                                              | -1.3      | -                                              | -0.9      | -                                               | -0.9      | mA            |
|          |                           | $V_O = 13.5\text{ V}$                          | 15 V     | -                                              | -4.2      | -                                              | -3.4      | -                                              | -2.4      | -                                               | -2.4      | mA            |
| $I_{OL}$ | LOW-level output current  | QSn outputs                                    |          |                                                |           |                                                |           |                                                |           |                                                 |           |               |
|          |                           | $V_O = 0.4\text{ V}$                           | 5 V      | 0.64                                           | -         | 0.5                                            | -         | 0.36                                           | -         | 0.36                                            | -         | mA            |
|          |                           | $V_O = 0.5\text{ V}$                           | 10 V     | 1.6                                            | -         | 1.3                                            | -         | 0.9                                            | -         | 0.9                                             | -         | mA            |
|          |                           | $V_O = 1.5\text{ V}$                           | 15 V     | 4.2                                            | -         | 3.2                                            | -         | 2.4                                            | -         | 2.4                                             | -         | mA            |
| $I_I$    | input leakage current     |                                                | 15 V     | -                                              | $\pm 0.1$ | -                                              | $\pm 0.1$ | -                                              | $\pm 1.0$ | -                                               | $\pm 1.0$ | $\mu\text{A}$ |
| $I_{OZ}$ | OFF-state output current  | QPn output is HIGH;<br>$V_O = 15\text{ V}$     | 5 V      | -                                              | 2         | -                                              | 2         | -                                              | 15        | -                                               | 15        | $\mu\text{A}$ |
|          |                           |                                                | 10 V     | -                                              | 2         | -                                              | 2         | -                                              | 15        | -                                               | 15        | $\mu\text{A}$ |
|          |                           |                                                | 15 V     | -                                              | 2         | -                                              | 2         | -                                              | 15        | -                                               | 15        | $\mu\text{A}$ |
| $I_{DD}$ | supply current            | $I_O = 0\text{ A}$                             | 5 V      | -                                              | 5         | -                                              | 5         | -                                              | 150       | -                                               | 150       | $\mu\text{A}$ |
|          |                           |                                                | 10 V     | -                                              | 10        | -                                              | 10        | -                                              | 300       | -                                               | 300       | $\mu\text{A}$ |
|          |                           |                                                | 15 V     | -                                              | 20        | -                                              | 20        | -                                              | 600       | -                                               | 600       | $\mu\text{A}$ |
| $C_I$    | input capacitance         |                                                | -        | -                                              | -         | -                                              | 7.5       | -                                              | -         | -                                               | -         | pF            |

## 10. Dynamic characteristics

**Table 7. Dynamic characteristics**

$V_{SS} = 0\text{ V}$ ;  $T_{amb} = 25\text{ °C}$  unless otherwise specified. For test circuit see [Fig. 9](#).

| Symbol    | Parameter                          | Conditions                                                       | $V_{DD}$ | Extrapolation formula                          | Min | Typ | Max | Unit |
|-----------|------------------------------------|------------------------------------------------------------------|----------|------------------------------------------------|-----|-----|-----|------|
| $t_{PHL}$ | HIGH to LOW propagation delay      | CP to QS1; see <a href="#">Fig. 5</a>                            | 5 V      | [1] $132\text{ ns} + (0.55\text{ ns/pF})C_L$   | -   | 160 | 320 | ns   |
|           |                                    |                                                                  | 10 V     | $53\text{ ns} + (0.23\text{ ns/pF})C_L$        | -   | 65  | 130 | ns   |
|           |                                    |                                                                  | 15 V     | $37\text{ ns} + (0.16\text{ ns/pF})C_L$        | -   | 45  | 90  | ns   |
|           |                                    | CP to QS2; see <a href="#">Fig. 5</a>                            | 5 V      | $92\text{ ns} + (0.55\text{ ns/pF})C_L$        | -   | 120 | 240 | ns   |
|           |                                    |                                                                  | 10 V     | $39\text{ ns} + (0.23\text{ ns/pF})C_L$        | -   | 50  | 100 | ns   |
|           |                                    |                                                                  | 15 V     | $32\text{ ns} + (0.16\text{ ns/pF})C_L$        | -   | 40  | 80  | ns   |
| $t_{PLH}$ | LOW to HIGH propagation delay      | CP to QS1; see <a href="#">Fig. 5</a>                            | 5 V      | [1] $102\text{ ns} + (0.55\text{ ns/pF})C_L$   | -   | 130 | 260 | ns   |
|           |                                    |                                                                  | 10 V     | $44\text{ ns} + (0.23\text{ ns/pF})C_L$        | -   | 55  | 110 | ns   |
|           |                                    |                                                                  | 15 V     | $32\text{ ns} + (0.16\text{ ns/pF})C_L$        | -   | 40  | 80  | ns   |
|           |                                    | CP to QS2; see <a href="#">Fig. 5</a>                            | 5 V      | $102\text{ ns} + (0.55\text{ ns/pF})C_L$       | -   | 130 | 260 | ns   |
|           |                                    |                                                                  | 10 V     | $49\text{ ns} + (0.23\text{ ns/pF})C_L$        | -   | 60  | 120 | ns   |
|           |                                    |                                                                  | 15 V     | $37\text{ ns} + (0.16\text{ ns/pF})C_L$        | -   | 45  | 90  | ns   |
| $t_{PZL}$ | OFF-state to LOW propagation delay | CP to QPn; see <a href="#">Fig. 5</a>                            | 5 V      |                                                | -   | 240 | 480 | ns   |
|           |                                    |                                                                  | 10 V     |                                                | -   | 80  | 160 | ns   |
|           |                                    |                                                                  | 15 V     |                                                | -   | 55  | 110 | ns   |
|           |                                    | STR to QPn; see <a href="#">Fig. 6</a>                           | 5 V      |                                                | -   | 140 | 280 | ns   |
|           |                                    |                                                                  | 10 V     |                                                | -   | 70  | 140 | ns   |
|           |                                    |                                                                  | 15 V     |                                                | -   | 55  | 110 | ns   |
| $t_{PLZ}$ | LOW to OFF-state propagation delay | CP to QPn; see <a href="#">Fig. 5</a> and <a href="#">Fig. 6</a> | 5 V      |                                                | -   | 170 | 340 | ns   |
|           |                                    |                                                                  | 10 V     |                                                | -   | 75  | 150 | ns   |
|           |                                    |                                                                  | 15 V     |                                                | -   | 60  | 120 | ns   |
|           |                                    | STR to QPn; see <a href="#">Fig. 6</a>                           | 5 V      |                                                | -   | 100 | 200 | ns   |
|           |                                    |                                                                  | 10 V     |                                                | -   | 40  | 100 | ns   |
|           |                                    |                                                                  | 15 V     |                                                | -   | 35  | 70  | ns   |
| $t_{en}$  | enable time                        | OE to QPn; see <a href="#">Fig. 7</a>                            | 5 V      | [2]                                            | -   | 100 | 200 | ns   |
|           |                                    |                                                                  | 10 V     |                                                | -   | 55  | 110 | ns   |
|           |                                    |                                                                  | 15 V     |                                                | -   | 50  | 100 | ns   |
| $t_{dis}$ | disable time                       | OE to QPn; see <a href="#">Fig. 7</a>                            | 5 V      | [2]                                            | -   | 80  | 160 | ns   |
|           |                                    |                                                                  | 10 V     |                                                | -   | 40  | 80  | ns   |
|           |                                    |                                                                  | 15 V     |                                                | -   | 30  | 60  | ns   |
| $t_t$     | transition time                    | QS1, QS2; see <a href="#">Fig. 5</a>                             | 5 V      | [1][3] $35\text{ ns} + (1.00\text{ ns/pF})C_L$ | -   | 85  | 170 | ns   |
|           |                                    |                                                                  | 10 V     | $19\text{ ns} + (0.42\text{ ns/pF})C_L$        | -   | 40  | 80  | ns   |
|           |                                    |                                                                  | 15 V     | $16\text{ ns} + (0.28\text{ ns/pF})C_L$        | -   | 30  | 60  | ns   |
| $t_W$     | pulse width                        | CP; LOW and HIGH; see <a href="#">Fig. 5</a>                     | 5 V      |                                                | 60  | 30  | -   | ns   |
|           |                                    |                                                                  | 10 V     |                                                | 30  | 15  | -   | ns   |
|           |                                    |                                                                  | 15 V     |                                                | 24  | 12  | -   | ns   |
|           |                                    | STR; HIGH; see <a href="#">Fig. 6</a>                            | 5 V      |                                                | 80  | 40  | -   | ns   |
|           |                                    |                                                                  | 10 V     |                                                | 60  | 30  | -   | ns   |
|           |                                    |                                                                  | 15 V     |                                                | 24  | 12  | -   | ns   |

## 12-stage shift-and-store register LED driver

| Symbol                | Parameter               | Conditions                          | V <sub>DD</sub> | Extrapolation formula | Min | Typ | Max | Unit |
|-----------------------|-------------------------|-------------------------------------|-----------------|-----------------------|-----|-----|-----|------|
| t <sub>su</sub>       | set-up time             | D to CP; see <a href="#">Fig. 8</a> | 5 V             |                       | 60  | 30  | -   | ns   |
|                       |                         |                                     | 10 V            |                       | 20  | 10  | -   | ns   |
|                       |                         |                                     | 15 V            |                       | 15  | 5   | -   | ns   |
| t <sub>h</sub>        | hold time               | D to CP; see <a href="#">Fig. 8</a> | 5 V             |                       | +5  | -15 | -   | ns   |
|                       |                         |                                     | 10 V            |                       | 20  | 5   | -   | ns   |
|                       |                         |                                     | 15 V            |                       | 20  | 5   | -   | ns   |
| f <sub>clk(max)</sub> | maximum clock frequency | CP; see <a href="#">Fig. 5</a>      | 5 V             |                       | 5   | 10  | -   | MHz  |
|                       |                         |                                     | 10 V            |                       | 11  | 22  | -   | MHz  |
|                       |                         |                                     | 15 V            |                       | 14  | 28  | -   | MHz  |

[1] The typical values of the propagation delay and transition times are calculated from the extrapolation formulas shown ( $C_L$  in pF).

[2]  $t_{\text{en}}$  is the same as  $t_{\text{PZL}}$  and  $t_{\text{dis}}$  is the same as  $t_{\text{PLZ}}$ .

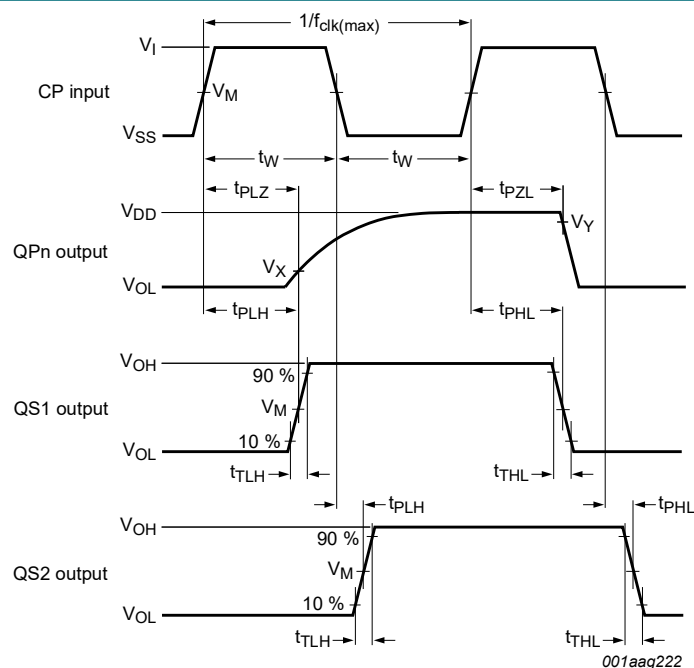
[3]  $t_t$  is the same as  $t_{THH}$  and  $t_{THL}$ .

### Table 8. Dynamic power dissipation

$P_D$  can be calculated from the formulas shown.  $V_{SS} = 0\text{ V}$ ;  $t_r = t_f \leq 20\text{ ns}$ ;  $T_{amb} = 25\text{ }^\circ\text{C}$ .

| Symbol         | Parameter                 | V <sub>DD</sub> | Typical formula                                                         | Where                                                                                                                                                  |
|----------------|---------------------------|-----------------|-------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------|
| P <sub>D</sub> | dynamic power dissipation | 5 V             | $P_D = 1200 \times f_i + \Sigma(f_o \times C_L) \times V_{DD}^2 \mu W$  | f <sub>i</sub> = input frequency in MHz;                                                                                                               |
|                |                           | 10 V            | $P_D = 5550 \times f_i + \Sigma(f_o \times C_L) \times V_{DD}^2 \mu W$  | f <sub>o</sub> = output frequency in MHz;                                                                                                              |
|                |                           | 15 V            | $P_D = 15000 \times f_i + \Sigma(f_o \times C_L) \times V_{DD}^2 \mu W$ | C <sub>L</sub> = output load capacitance in pF;<br>Σ(f <sub>o</sub> × C <sub>L</sub> ) = sum of the outputs;<br>V <sub>DD</sub> = supply voltage in V. |

### 10.1. Waveforms and test circuit



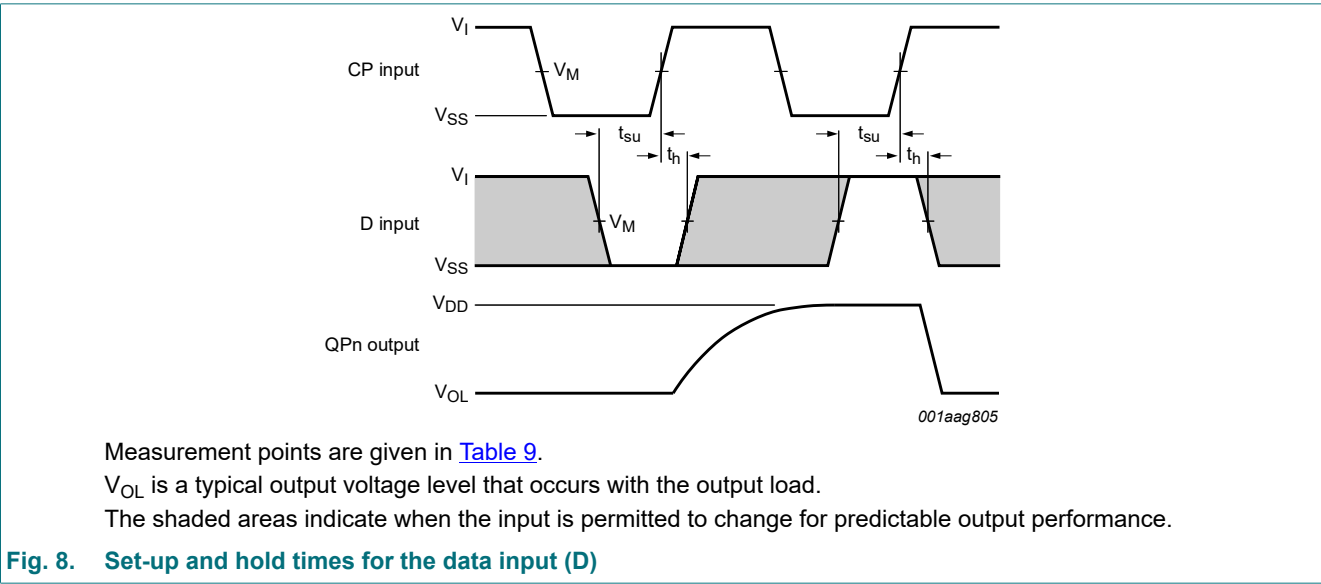
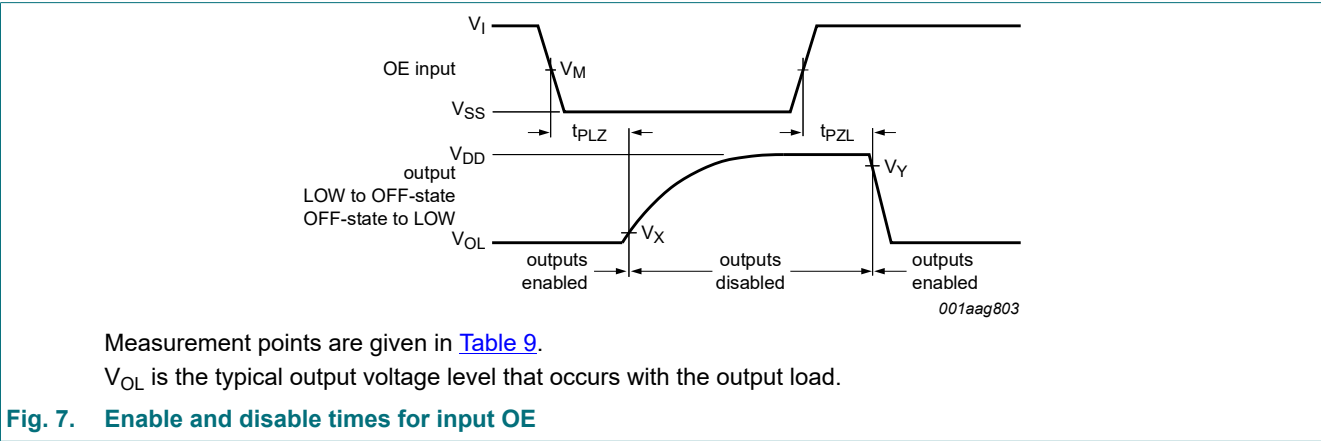
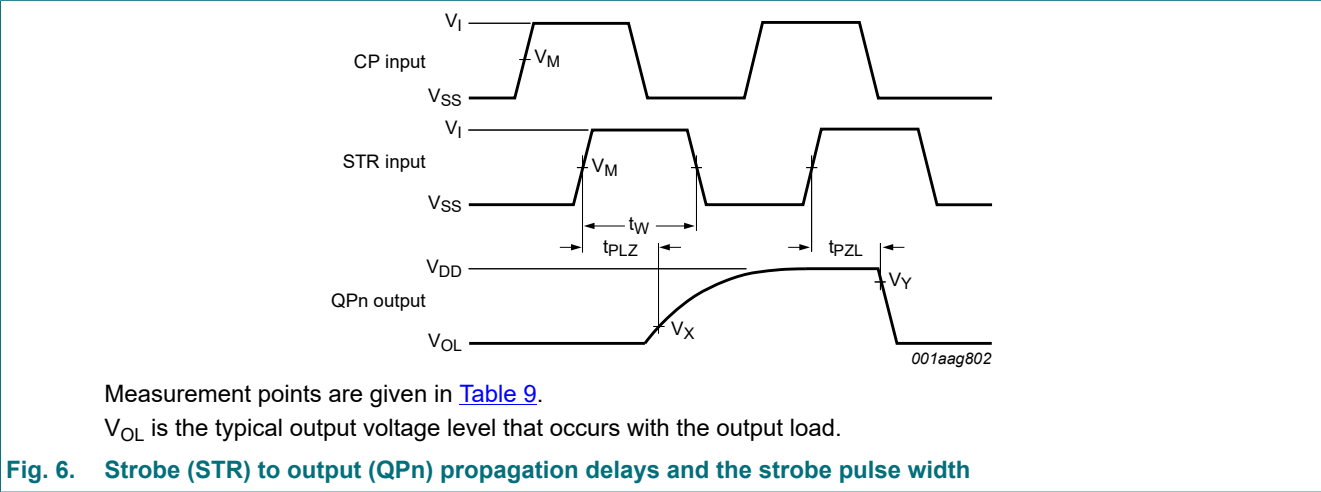
Measurement points are given in [Table 9](#).

$V_{OL}$  and  $V_{OH}$  are typical output voltage levels that occur with the output load.

**Fig. 5. Propagation delay clock (CP) to output (QPn, QS1, QS2), clock pulse width and maximum clock frequency**

Table 9. Measurement points

| Supply          | Input              | Output             |                   |                   |
|-----------------|--------------------|--------------------|-------------------|-------------------|
| V <sub>DD</sub> | V <sub>M</sub>     | V <sub>M</sub>     | V <sub>X</sub>    | V <sub>Y</sub>    |
| 5 V to 15 V     | 0.5V <sub>DD</sub> | 0.5V <sub>DD</sub> | 0.1V <sub>O</sub> | 0.9V <sub>O</sub> |



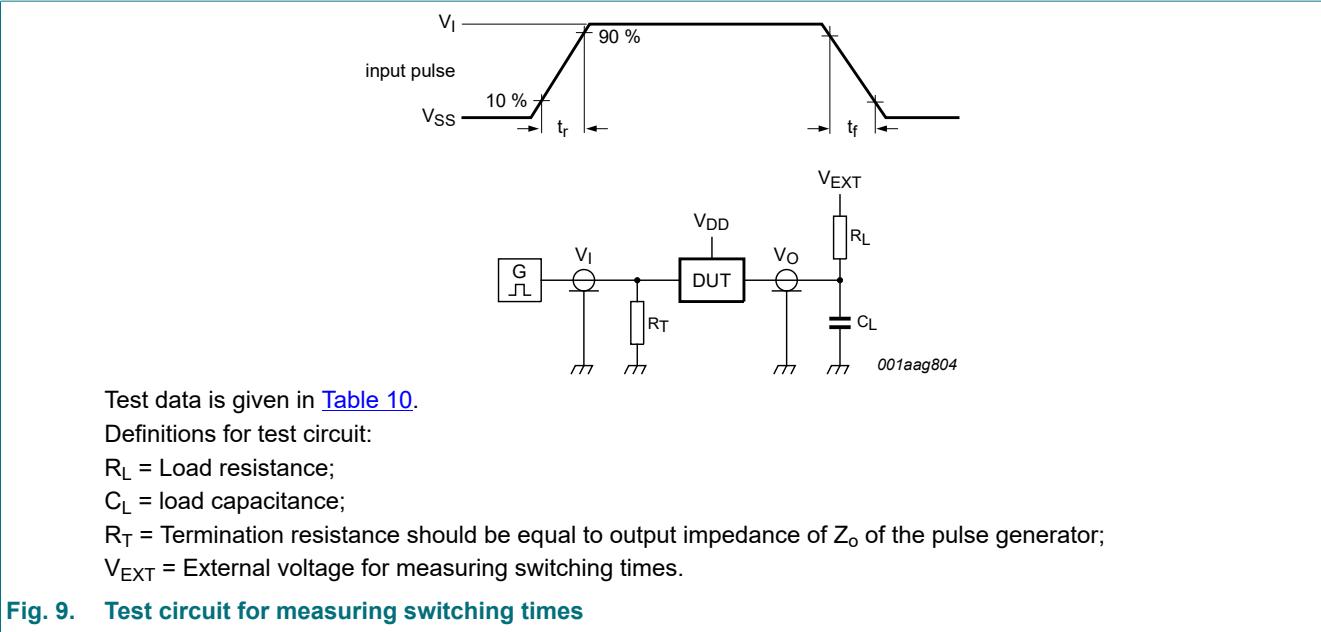
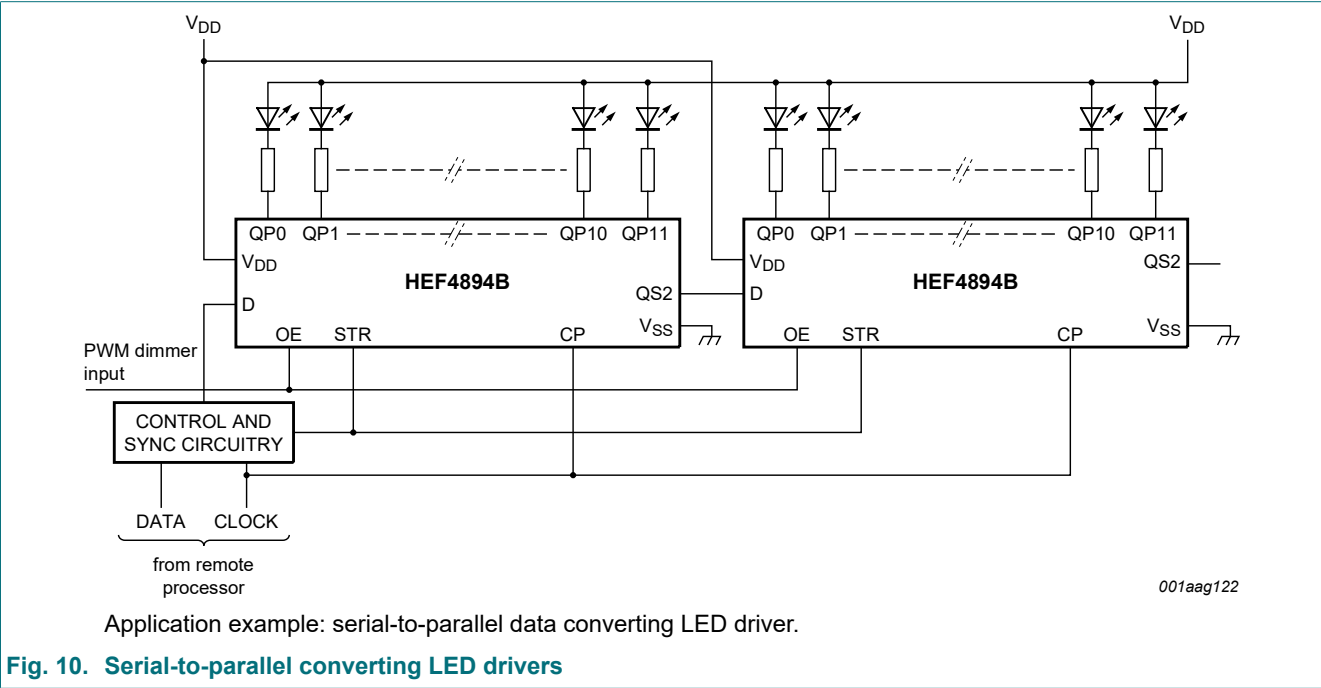


Table 10. Test data

| Supply      | Input    |              | $V_{EXT}$          |                    | Load  |              |
|-------------|----------|--------------|--------------------|--------------------|-------|--------------|
| $V_{DD}$    | $V_I$    | $t_r, t_f$   | $t_{PLZ}, t_{PZL}$ | $t_{PLH}, t_{PHL}$ | $C_L$ | $R_L$        |
| 5 V to 15 V | $V_{DD}$ | $\leq 20$ ns | $V_{DD}$           | open               | 50 pF | 1 k $\Omega$ |

11. Application information



12. Package outline

SO20: plastic small outline package; 20 leads; body width 7.5 mm

SOT163-1



Fig. 11. Package outline SOT163-1 (SO20)

TSSOP20: plastic thin shrink small outline package; 20 leads; body width 4.4 mm

SOT360-1



Fig. 12. Package outline SOT360-1 (TSSOP20)

13. Abbreviations

Table 11. Abbreviations

| Acronym | Description                               |
|---------|-------------------------------------------|
| ANSI    | American National Standards Institute     |
| CMOS    | Complementary Metal-Oxide Semiconductor   |
| DUT     | Device Under Test                         |
| ESD     | ElectroStatic Discharge                   |
| ESDA    | ElectroStatic Discharge Association       |
| HBM     | Human Body Model                          |
| JEDEC   | Joint Electron Device Engineering Council |
| LED     | Light Emitting Diode                      |

14. Revision history

Table 12. Revision history

| Document ID      | Release date                                                                                                                                                                                                                                                                                                                                              | Data sheet status     | Change notice | Supersedes       |
|------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|---------------|------------------|
| HEF4894B v.11    | 20240813                                                                                                                                                                                                                                                                                                                                                  | Product data sheet    | -             | HEF4894B v.10    |
| Modifications:   | <ul style="list-style-type: none"><li>Section 2: ESD specification updated according to the latest JEDEC standard.</li></ul>                                                                                                                                                                                                                              |                       |               |                  |
| HEF4894B v.10    | 20211123                                                                                                                                                                                                                                                                                                                                                  | Product data sheet    | -             | HEF4894B v.9     |
| Modifications:   | <ul style="list-style-type: none"><li>The format of this data sheet has been redesigned to comply with the identity guidelines of Nexperia.</li><li>Legal texts have been adapted to the new company name where appropriate.</li><li>Section 2 updated.</li><li>Section 7: Derating values for P<sub>tot</sub> total power dissipation updated.</li></ul> |                       |               |                  |
| HEF4894B v.9     | 20160418                                                                                                                                                                                                                                                                                                                                                  | Product data sheet    | -             | HEF4894B v.8     |
| Modifications:   | <ul style="list-style-type: none"><li>Type number HEF4894BP (SOT146-1) removed.</li></ul>                                                                                                                                                                                                                                                                 |                       |               |                  |
| HEF4894B v.8     | 20111122                                                                                                                                                                                                                                                                                                                                                  | Product data sheet    | -             | HEF4894B v.7     |
| Modifications:   | <ul style="list-style-type: none"><li>Section Applications removed</li><li>Table 6: I<sub>OH</sub> minimum values changed to maximum</li></ul>                                                                                                                                                                                                            |                       |               |                  |
| HEF4894B v.7     | 20100813                                                                                                                                                                                                                                                                                                                                                  | Product data sheet    | -             | HEF4894B v.6     |
| HEF4894B v.6     | 20100408                                                                                                                                                                                                                                                                                                                                                  | Product data sheet    | -             | HEF4894B v.5     |
| HEF4894B v.5     | 20091222                                                                                                                                                                                                                                                                                                                                                  | Product data sheet    | -             | HEF4894B v.4     |
| HEF4894B v.4     | 20080827                                                                                                                                                                                                                                                                                                                                                  | Product data sheet    | -             | HEF4894B_CNV v.3 |
| HEF4894B_CNV v.3 | 19950101                                                                                                                                                                                                                                                                                                                                                  | Product specification | -             | HEF4894B_CNV v.2 |
| HEF4894B_CNV v.2 | 19950101                                                                                                                                                                                                                                                                                                                                                  | Product specification | -             | -                |

## 15. Legal information

### Data sheet status

| Document status [1][2]         | Product status [3] | Definition                                                                            |
|--------------------------------|--------------------|---------------------------------------------------------------------------------------|
| Objective [short] data sheet   | Development        | This document contains data from the objective specification for product development. |
| Preliminary [short] data sheet | Qualification      | This document contains data from the preliminary specification.                       |
| Product [short] data sheet     | Production         | This document contains the product specification.                                     |

- [1] Please consult the most recently issued document before initiating or completing a design.
- [2] The term 'short data sheet' is explained in section "Definitions".
- [3] The product status of device(s) described in this document may have changed since this document was published and may differ in case of multiple devices. The latest product status information is available on the internet at <https://www.nexperia.com>.

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Contents

1. General description..... 1

2. Features and benefits..... 1

3. Ordering information..... 1

4. Functional diagram..... 2

5. Pinning information..... 3

5.1. Pinning..... 3

5.2. Pin description..... 4

6. Functional description..... 4

7. Limiting values..... 5

8. Recommended operating conditions..... 5

9. Static characteristics..... 6

10. Dynamic characteristics..... 7

10.1. Waveforms and test circuit..... 8

11. Application information..... 10

12. Package outline..... 11

13. Abbreviations..... 13

14. Revision history..... 13

15. Legal information..... 14

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