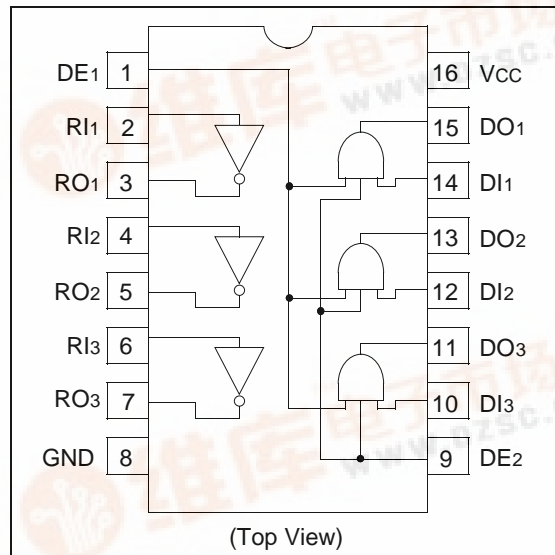


HD29468

Triple Line Drivers / Receivers

The HD29468 features line drivers and receivers for unbalanced transmissions, which meet the specs of IBM 360 and 370. This device has three drivers and receivers in one package. Input of driver and output of receiver are compatible with low power schottky TTL circuit and operates from a single 5 V power supply. The driver has two types of enable inputs. Spurious noise can be prevented by grounding either input when power supply is throw or cut off. The outputs are protected from short circuit and the wired logic is available due to emitter follower from for party line data bus applications. The device operates at high speed. Low to high level and high to low level propagation delay times difference are 10 ns max.

Pin Arrangement



Function Table

Driver

| DI | Input | | Output |
|----|-------|-----|--------|
| | DE1 | DE2 | DO |
| L | X | X | L |
| X | L | X | L |
| X | X | L | L |
| H | H | H | H |

Receiver

| Input | Output |
|-------|--------|
| RI | RO |
| L | H |
| H | L |

H : High level
L : Low level
X : Immaterial

Absolute Maximum Ratings

| Item | Symbol | Ratings | Unit |
|--------------------------------|------------------|----------------|-------------|
| Supply Voltage | VCC | +7 | V |
| Driver Input Voltage | V _{ID} | -0.5 to +7 | V |
| Driver Output Voltage | V _{OD} | -0.5 to +7 | V |
| Receiver Input Voltage | V _{IR} | -0.5 to +7 | V |
| Power Dissipation (Ta = 25 °C) | *1 DP | 1000 | mW |
| | FP | 785 | |
| Operating Temperature | T _a | 0 to +75 | °C |
| Storage Temperature | T _{stg} | -65 to +150 | °C |

Notes: 1. The above data were taken by the ΔV_{BE} method, mounting on a glass epoxy board (40 × 40 × 1.6 mm) of 10 % wiring density.

2. The absolute maximum ratings are values which must not individually be exceeded, and furthermore, no two of which may be realized at the same time.

Recommended Operating Conditions

| Item | Symbol | Min | Typ | Max | Unit |
|-----------------------|----------------|------------|------------|------------|-------------|
| Supply Voltage | Vcc | 4.75 | 5.00 | 5.25 | V |
| Operating Temperature | T _a | 0 | — | 75 | °C |

Electrical Characteristics

Driver (V_{CC} = 5.0 V ±5 %, T_a = 0 to +75°C)

| Item | Symbol | Conditions | Min | Max | Unit |
|------------------------------|-----------------|--|------|-------|------|
| High Level Input Voltage | V _{IH} | | 2.0 | — | V |
| Low Level Input Voltage | V _{IL} | | — | 0.8 | V |
| Input Clamp Voltage | V _{IK} | V _{CC} = 4.75 V, I _{IN} = -18 mA | — | -1.5 | V |
| High Level Output Voltage | V _{OH} | V _{CC} = 4.75 V, V _{IH} = 2.0 V I _{OH} = -59.3 mA (T _a = 25°C) | 3.11 | — | V |
| | | V _{CC} = 5.25 V, V _{IH} = 2.0 V I _{OH} = -78.1 mA | — | 4.1 | |
| Low Level Output Voltage | V _{OL} | V _{CC} = 5.25 V, V _{IL} = 0.8 V I _{OL} = -0.24 mA, V _{IH} = 4.5 V | — | 0.15 | V |
| High Level Input Current | D _I | V _{CC} = 5.25 V, V _{IH} = 2.7 V | — | 20 | μA |
| | DE | | — | 60 | |
| Low Level Input Current | D _I | V _{CC} = 5.25 V, V _{IL} = 0.4 V | — | -400 | μA |
| | DE | | — | -1200 | |
| High Level Output Current | I _{OH} | V _{CC} =4.75 V, V _{IL} = 0 V, V _{OH} = 5.0 V | — | 100 | μA |
| | | V _{CC} = 4.75 V, V _{IH} = 4.5 V, V _{OH} = 5.0 V | — | 100 | |
| Short Circuit Output Current | I _{OS} | V _{CC} = 5.25 V, V _{IH} = 4.5 V | — | -30 | mA |

Receiver (T_a = 0 to +75°C)

| Item | Symbol | Conditions | Min | Max | Unit |
|-------------------------------------|-----------------------------|---|------|-------|------|
| High Level Output Threshold Voltage | V _{O_{TH}} | V _{CC} = 4.75 V, V _{IL} = 1.15 V I _{OH} = -400 μA | 2.7 | — | V |
| Low Level Output Threshold Voltage | V _{O_TL} | V _{CC} = 5.25 V, V _{IH} = 1.55 V I _{OL} = 8 mA | — | 0.5 | V |
| High Level Output Voltage | V _{OH} | V _{CC} = 4.75 V, V _{IN} : Open I _{OH} = -400 μA | 2.7 | — | V |
| Low Level Output Voltage | V _{OL} | V _{CC} = 4.75 V, I _{OL} = 8 mA | — | 0.5 | V |
| | | V _{IH} = 1.55 V, I _{OL} = 4 mA | — | 0.4 | |
| Input Resistance | R _{IN} | V _{CC} = 0 V | 7.4 | 20 | kΩ |
| High Level Input Current | I _{IH} | V _{CC} = 4.75 V, V _{IH} = 3.11 V | — | 0.42 | mA |
| Low Level Input Current | I _{IL} | V _{CC} = 5.25 V, V _{IL} = 0.15 V | 0.04 | -0.24 | mA |
| Short Circuit Output Current | I _{OS} | V _{CC} = 5.25 V, V _{IL} = 0 V | -20 | -100 | mA |

Driver / Receiver (Ta = 0 to +75 °C)

| Item | Symbol | Conditions | Min | Max | Unit |
|----------------|--------|---------------------------|-----|-----|------|
| Supply Voltage | ICCH | VCC = 5.25 V, VIH = 4.5 V | — | 37 | mA |
| | ICCL | VCC = 5.25 V, VIL = 0 V | — | 55 | |

Switching Characteristics

Driver (VCC = 5.0 V, Ta = 25 °C)

| Item | Symbol | Conditions | Min | Max | Unit |
|---|--------|-------------|-----|------|------|
| Rise Propagation Delay Time | tPLH | RL = 47.5 Ω | 6.5 | 18.5 | ns |
| Fall Propagation Delay Time | tPHL | | 6.5 | 18.5 | ns |
| Propagation Delay Time Difference ^{*1} | ΔtPD | | — | 10 | ns |

Note: 1. $\Delta t_{PD} = |t_{PLH} - t_{PHL}|$

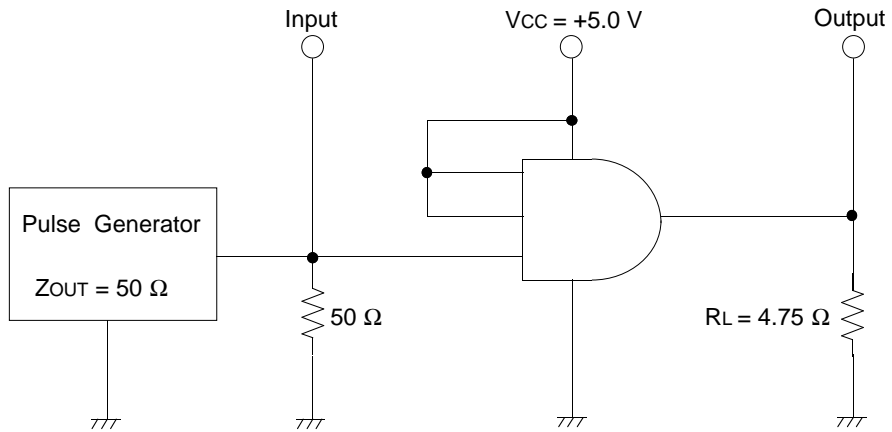
Receiver (VCC = 5.0 V, Ta = 25 °C)

| Item | Symbol | Conditions | Min | Max | Unit |
|---|--------|----------------------|-----|------|------|
| Rise Propagation Delay Time | tPLH | RL = 2 kΩ, CL = 15pF | 7.5 | 19.5 | ns |
| Fall Propagation Delay Time | tPHL | | 7.5 | 19.5 | ns |
| Propagation Delay Time Difference ^{*1} | ΔtPD | | — | 10 | ns |

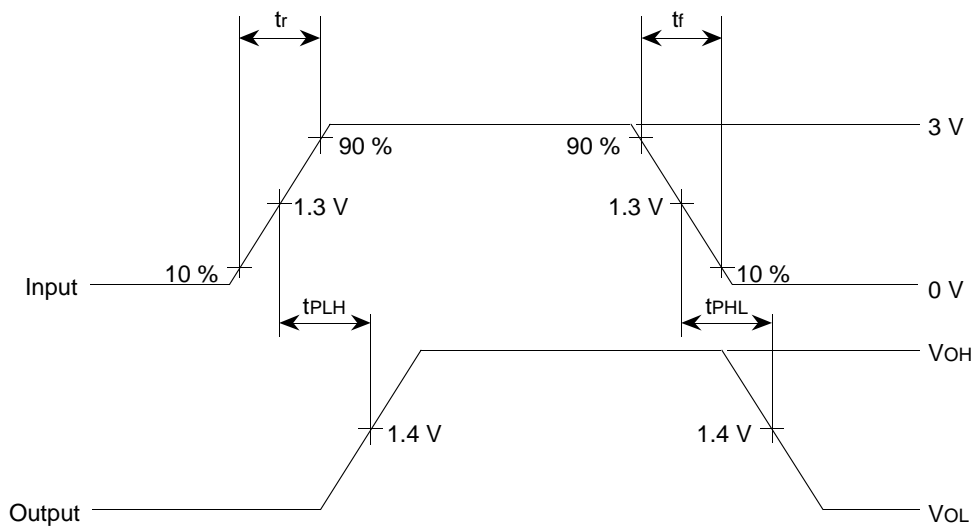
Note: 1. $\Delta t_{PD} = |t_{PLH} - t_{PHL}|$

Driver

Test Circuit



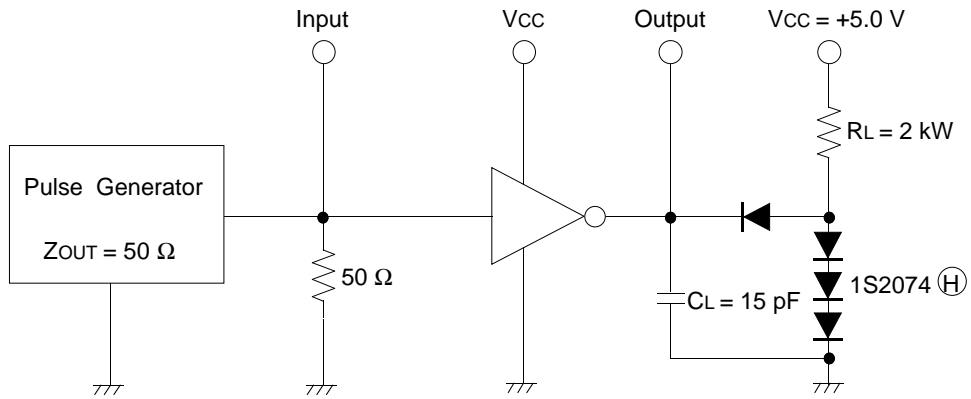
Waveforms



- Notes: 1. $t_r = 15 \text{ ns}$, $t_f = 6 \text{ ns}$
 2. Input waveforms : PRR = 1 MHz, duty cycle 50 %

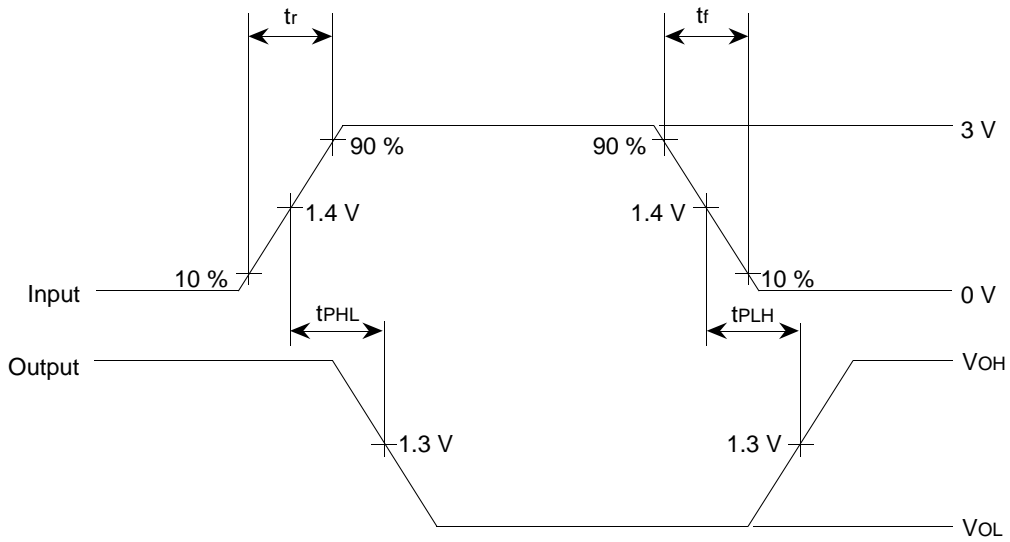
Driver

Test Circuit



Note: 1. CL includes probe and jig capacitance.

Waveforms



Notes: 1. $t_r = t_f = 10 \text{ ns}$
 2. Input waveforms : PRR = 1 MHz, duty cycle 50 %

