

SN54S436, SN74S436 LINE DRIVER/MEMORY DRIVER CIRCUITS

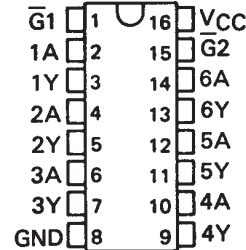
SDLS211 – JANUARY 1981 – REVISED MARCH 1988

MOS MEMORY INTERFACE

- Can Drive High-Impedance Loads
- Interchangeable with National DS16149 DS16179 Drivers
- High-Speed Switching
- Minimum Input Current Required
- Damping Output Resistor Reduces Transients

SN54S436 . . . J OR W PACKAGE
SN74S436 . . . D OR N PACKAGE

(TOP VIEW)



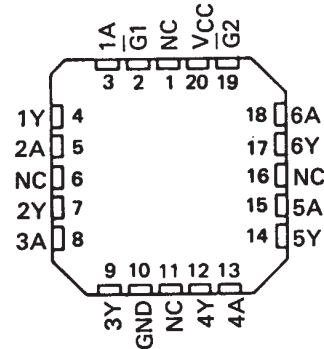
description

The SN54S436 and SN74S436 are monolithic integrated TTL-to-MOS drivers and interface circuits. The p-n-p input transistors use minimum current allowing increased fan-out to these drivers. Schottky-clamped transistor logic permits high-speed operation, minimum propagation time.

The small series damping resistor has been included in the design of the 'S436 to eliminate undesired output transient overshoot. Either enable, \bar{G} , when high, sets the outputs to the high level for MOS RAM refresh applications.

SN54S436 . . . FK PACKAGE

(TOP VIEW)



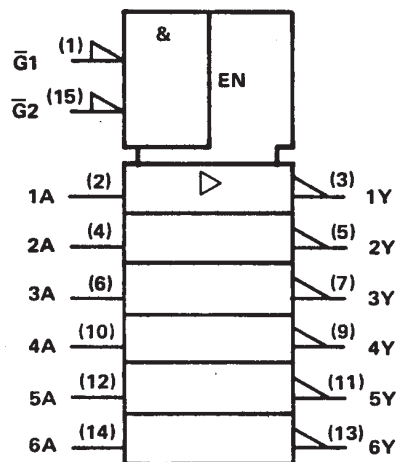
NC - No internal connection

FUNCTION TABLE

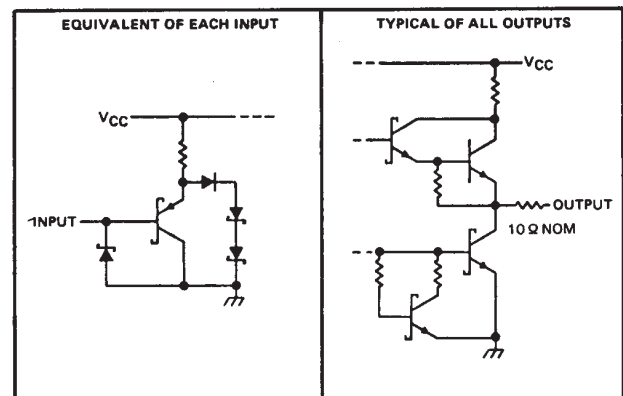
| ENABLE INPUTS | | INPUT | OUTPUT |
|---------------|------------|-------|--------|
| $\bar{G}1$ | $\bar{G}2$ | | |
| L | L | L | H |
| L | L | H | L |
| X | H | X | H |
| H | X | X | H |

H = high level, L = low level, X = irrelevant

logic symbol†



schematics of inputs and outputs



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

Pin numbers shown are for D, J, N, and W packages.

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

| | |
|---|----------------|
| Supply voltage, V_{CC} (see Note 1) | 7 V |
| Input voltage range | -1.5 to 7 V |
| Continuous total dissipation at (or below) 25°C free-air temperature (see Note 2) | |
| J package | 1375 mW |
| N package | 1150 mW |
| W package | 1000 mW |
| Operating free-air temperature range: SN54S436 | -55°C to 125°C |
| SN74S436 | 0°C to 70°C |
| Storage temperature range | -65°C to 150°C |

- NOTES: 1. All voltage values are with respect to network ground terminal.
 2. For operation above 25°C free-air temperature, derate as follows: J package, 11.0 mW/°C, N package, 9.2 mW/°C, W package, 8.0 mW/°C.

recommended operating conditions

| | | SN54S436 | | | SN74S436 | | | UNIT | | |
|----------|--------------------------------|----------|-----|-----|----------|-----|------|------|----|----|
| | | MIN | NOM | MAX | MIN | NOM | MAX | | | |
| V_{CC} | Supply voltage | 4.5 | 5 | 5.5 | 4.75 | 5 | 5.25 | V | | |
| V_{IH} | High-level input voltage | 2 | | | 2 | | | V | | |
| V_{IL} | Low-level input voltage | 0.8 | | | 0.8 | | | V | | |
| 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 | SN54S436 | | | SN74S436 | | | UNIT |
|-----------|---|--------------|------|------|--------------|------|------|---------------|
| | | MIN | TYP† | MAX | MIN | TYP† | MAX | |
| V_{IK} | $V_{CC} = \text{MIN}, I_I = -18 \text{ mA}$ | -0.75 | -1.2 | | -0.75 | -1.2 | | V |
| V_{OH} | $V_{CC} = \text{MIN}, I_{OH} = -10 \mu\text{A}$ | 3.4 | 4.3 | | 3.5 | 4.3 | | V |
| | $V_{CC} = \text{MIN}, I_{OH} = -1 \text{ mA}$ | 'S436 2.4 | 3.5 | | 'S436 2.6 | 3.5 | | |
| V_{OL} | $V_{CC} = \text{MIN}, I_{OL} = 10 \mu\text{A}$ | | 0.25 | 0.4 | | 0.25 | 0.35 | V |
| | $V_{CC} = \text{MIN}, I_{OL} = 20 \text{ mA}$ | 'S436 0.6 | 1.1 | | 'S436 0.6 | 1 | | |
| | | 'S437 0.4 | 0.5 | | 'S437 0.4 | 0.5 | | |
| I_{OL} | $V_{CC} = \text{MIN}, V_O = 4.5 \text{ V}, V_I = 2 \text{ V}$ See Note 3 | | 150 | 200 | | 150 | 200 | mA |
| $I_{OS}‡$ | $V_{CC} = \text{MAX}, V_O = 0 \text{ V}$ | -100 | -250 | -400 | -100 | -250 | -400 | mA |
| I_I | $V_{CC} = \text{MAX}, V_{IH} = 5.5 \text{ V}$ | | | 1 | | | 1 | mA |
| I_{IH} | $V_{CC} = \text{MAX}, V_{IH} = 2.7 \text{ V}$ | | 0.1 | 50 | | 0.1 | 50 | μA |
| I_{IL} | $V_{CC} = \text{MAX}, V_{IL} = 0.5 \text{ V}$ | | -100 | -250 | | -100 | -250 | μA |
| I_{CC} | $V_{CC} = \text{MAX}, G$ inputs at 0 V, All other inputs at 4.5 V | | 33 | 60 | | 33 | 60 | mA |
| | $V_{CC} = \text{MAX},$ All inputs at 0 V | | 14 | 20 | | 14 | 20 | |

† All typical values are at $V_{CC} = 5 \text{ V}, T_A = 25^\circ\text{C}$.

‡ Not more than one output should be shorted at a time, and duration of the short-circuit should not exceed one second.



switching characteristics, $V_{CC} = 5\text{ V}$, $T_A = 25^\circ\text{C}$

| PARAMETER | | TEST CONDITIONS | | MIN | TYP | MAX | UNIT |
|------------|---|--|------------------------|-----|-----|-----|------|
| t_{AHYL} | Delay time from A high to Y starting low | See Figure 1 | $C_L = 50\text{ pF}$ | 4.5 | 7 | | ns |
| | | | $C_L = 500\text{ pF}$ | 12 | 16 | | |
| t_{ALYH} | Delay time from A low to Y starting high | See Figure 1 | $C_L = 50\text{ pF}$ | 5 | 8 | | ns |
| | | | $C_L = 500\text{ pF}$ | 11 | 16 | | |
| t_{GHYH} | Delay time from G high to Y starting high | $R_L = 2\text{ k}\Omega$ to Gnd, See Figure 2 | $C_L = 50\text{ pF}$, | 10 | 18 | | ns |
| t_{GLYL} | Delay time from G low to Y starting low | $R_L = 2\text{ k}\Omega$ to V_{CC} , See Figure 3 | $C_L = 50\text{ pF}$, | 11 | 18 | | ns |
| t_{THL} | Transition time, high-to-low-level output | See Figure 1 | $C_L = 50\text{ pF}$ | 5 | 8 | | ns |
| | | | $C_L = 500\text{ pF}$ | 15 | 30 | | |
| t_{TLH} | Transition time, low-to-high-level output | See Figure 1 | $C_L = 50\text{ pF}$ | 6 | 9 | | ns |
| | | | $C_L = 500\text{ pF}$ | 15 | 30 | | |

PARAMETER MEASUREMENT INFORMATION

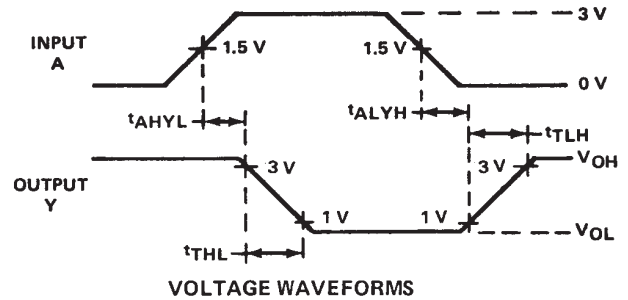
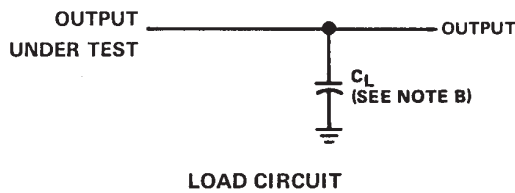


FIGURE 1

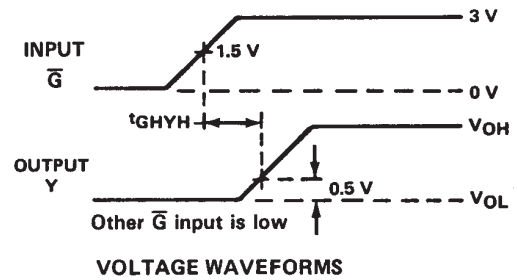
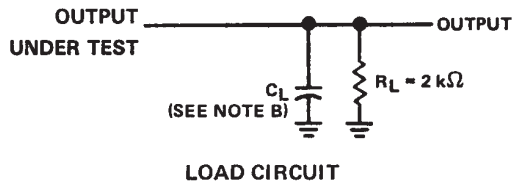


FIGURE 2

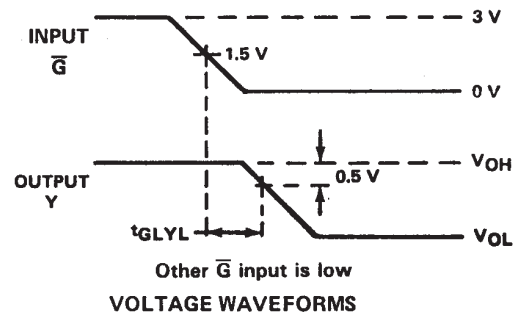
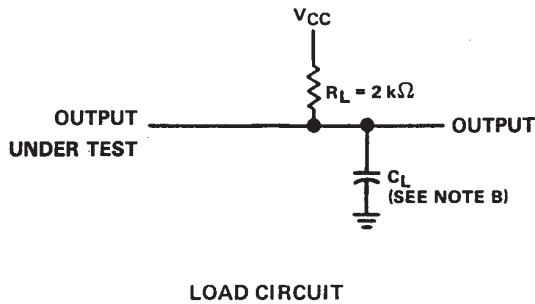


FIGURE 3

NOTES: A. Input pulses are supplied by a generator having the following characteristics: $PRR < 1\text{ MHz}$, $Z_{out} \approx 50\ \Omega$, $t_r < 5\text{ ns}$.
B. C_L includes probe and jig capacitance.

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