

# SN54S436, SN74S436 LINE DRIVER/MEMORY DRIVER CIRCUITS

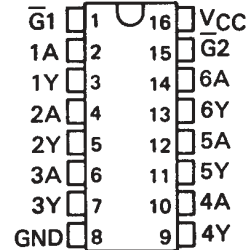
SDLS211 – JANUARY 1981 – REVISED MARCH 1988

## 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)



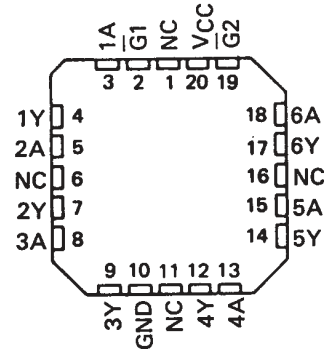
### description

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)



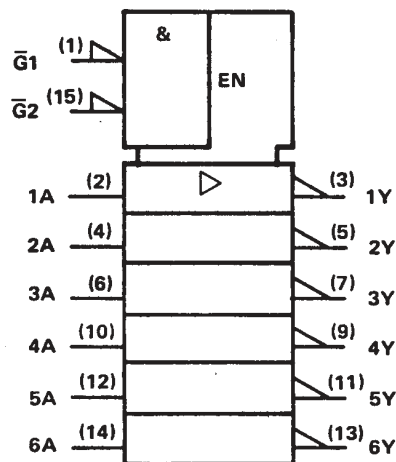
NC - No internal connection

FUNCTION TABLE

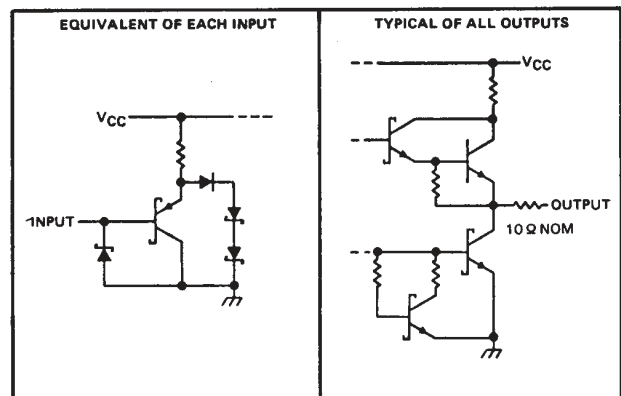
ENABLE INPUTS		INPUT	OUTPUT
$\bar{G}1$	$\bar{G}2$		
L	L	L	H
L	L	H	L
X	H	X	H
H	X	X	H

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
	$V_{CC} = \text{MIN}$ , $I_{OH} = -1 \text{ mA}$	2.4	3.5		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
	$V_{CC} = \text{MIN}$ , $I_{OL} = 20 \text{ mA}$		0.6	1.1		0.6	1	
			0.4	0.5		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	$\mu\text{A}$
$I_{IL}$	$V_{CC} = \text{MAX}$ , $V_{IL} = 0.5 \text{ V}$		-100	-250		-100	-250	$\mu\text{A}$
$I_{CC}$	$V_{CC} = \text{MAX}$ , 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
$t_{AHL}$	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		
$t_{ALY}$	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		
$t_{GHH}$	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
$t_{GLL}$	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

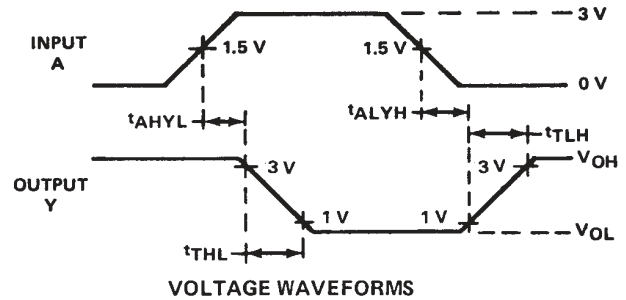
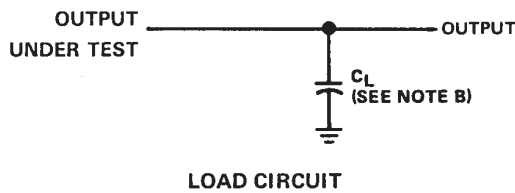


FIGURE 1

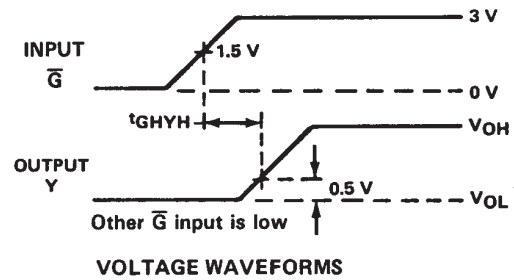
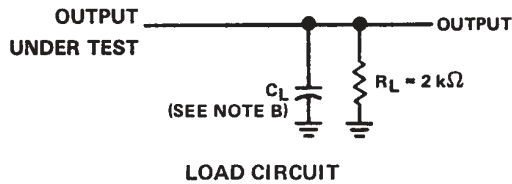


FIGURE 2

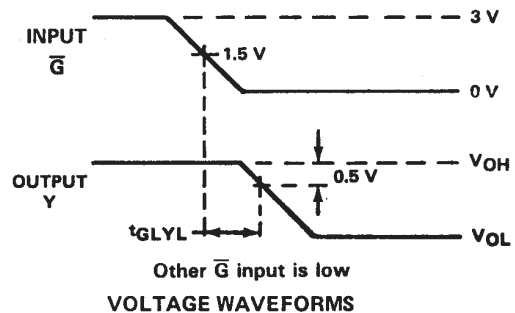
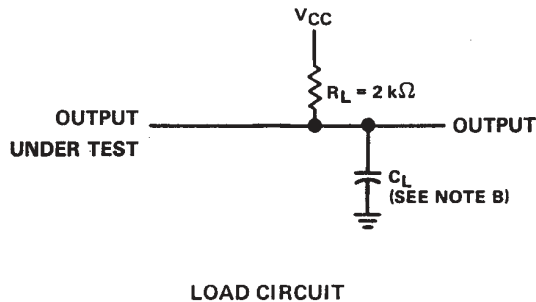


FIGURE 3

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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