National Semiconductor

DS75322 Dual TTL-MOS Driver
DS3622 Dual Fail-Safe TTL-MOS Driver

General Description

The DS75322 is a dual TTL-MOS high speed driver. The input structure of the device is TTL and DTL compatible. A common strobe input is provided for gating the outputs to the low state. The outputs provide high current and high voltage levels ideal for driving MOS circuits. The DS75322 specifically meets the requirements for driving N-channel RAMs where low power dissipation is desirable when the driver is in the low state.

The DS3622 provides output fail-safe protection. Powering down V_{CC1} activates the fail-safe circuit, forcing the outputs to the low state. The fail-safe feature eliminates output glitches that may occur in systems that power down V_{CC1}. Functionally, the DS3622 and the DS75322 are identical.

The DS75322, DS3622 require 2 external PNP transistors per package.

The DS75322, DS3622 are characterized for operation from 0°C to +70°C.

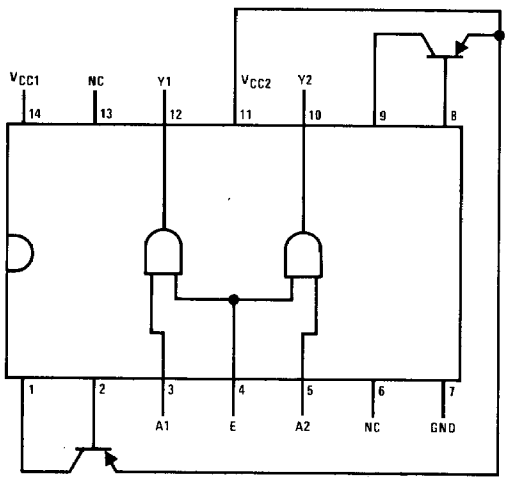
The DS75322 and the DS3622 are ideal for driving the UPD411D, MM5280 and the MM5270 4k RAMs.

Features

- Dual positive-logic and TTL-MOS driver
- TTL and DTL compatible inputs
- High voltage/current outputs
- Operates from standard bipolar and MOS supplies
- High speed switching
- Input and output clamping diodes
- Separate driver address inputs with common strobe
- V_{OH} and V_{OL} compatible with 4k RAMs and other popular MOS RAMs
- No current (leakage only) when outputs are in low state (DS75322)
- Outputs forced to low state with loss of V_{CC1} (DS3622)

Connection Diagram

Dual-In-Line Package



Positive Logic Y = AE
Recommended PNP Transistors
2N5910, 2N5771

TOP VIEW

Order Number DS75322J, DS3622J,
DS75322N or DS3622N
See NS Package J14A or N14A

Absolute Maximum Ratings (Note 1)

Supply Voltage	
V_{CC1}	−0.5 to 7V
V_{CC2}	−0.5 to 15V
Input Voltage	5.5V
Inter-Input Voltage (Note 4)	5.5V
Storage Temperature Range	−65°C to +150°C
Operating Free-Air Temperature Range	0°C to +70°C
Power Dissipation (P_D)	
Cavity Package	1160 mW
Molded Package	1000 mW
Lead Temperature (Soldering, 10 seconds)	300°C

Operating Conditions

	MIN	MAX	UNITS
Supply Voltage			
V_{CC1}	4.75	5.25	V
V_{CC2}	4.75	15	V
Operating Free-Air Temperature (T_A)	0	70	°C

Electrical Characteristics (Notes 2 and 3)

PARAMETER		CONDITIONS			MIN	TYP	MAX	UNITS
V_{IH}	High Level Input Voltage				2.0			V
V_{IL}	Low Level Input Voltage						0.8	V
V_{OH}	High Level Output Voltage	V_{IH} = 2V, I_{OH} = −400 μA			V_{CC2}−0.5	V_{CC2}−0.25		V
V_{OL}	Low Level Output Voltage	V_{CC2} = 11.4V, V_{IN} = 0.8V, I_{OL} = 10 mA				0.23	0.5	V
V_{OL}(F.S.)	Low Level Output Voltage in Fail-Safe Mode (DS3622 Only)	V_{CC1} = 0V, V_{CC2} = 11.4V, I_{OL} = 1.6 mA, V_I = 2.4V					0.5	V
I_I	Input Current at Maximum Input Voltage	V_{CC1} = 5.25V, V_{CC2} = 11.4V, V_I = 5.25V					1	mA
I_{IH}	High Level Input Current	V_I = 2.4V	A Inputs				40	μA
			E Input				80	
I_{IL}	Low Level Input Current	V_I = 0.4V	A Inputs			−1	−1.6	mA
			E Input			−2	−3.2	
$I_{CC1(L)}$	Supply Current from V_{CC1}, All Outputs Low	V_{CC1} = 5.25V, V_{CC2} = 12.6V, V_I = 0V, No Load		DS75322		15.0	20	mA
				DS3622		16.0	21	
$I_{CC2(L)}$	Supply Current from V_{CC2}, All Outputs Low	V_{CC1} = 4.75V, V_{CC2} = 12.6V, V_I = 0V, No Load		DS75322		0.01	0.5	mA
				DS3622		1	4	
$I_{CC1(H)}$	Supply Current from V_{CC1}, All Outputs High	V_{CC1} = 5.25V, V_{CC2} = 12.6V, V_I = 5V, No Load		DS75322		24	34	mA
				DS3622		25	35	
$I_{CC2(H)}$	Supply Current from V_{CC2}, All Outputs High	V_{CC1} = 4.75V, V_{CC2} = 12.6V, V_I = 5V, No Load		DS75322		9.5	13	mA
				DS3622		10	14	
I_{CC2}(F.S.)	Supply Current from V_{CC2} In Fail-Safe Mode (DS3622 Only)	V_{CC1} = 0V, V_{CC2} = 12.6V, V_I = 5V, No Load				1	4	mA

Switching Characteristics V_{CC1} = 5V, V_{CC2} = 12V, T_A = 25°C

PARAMETER		CONDITIONS	MIN	TYP	MAX	UNITS
t_{DLH}	Delay Time, Low-to-High Level Output	C_L = 300 pF		14	21	ns
t_{DHL}	Delay Time, High-to-Low Level Output			16	24	ns
t_{TLH}	Transition Time, Low-to-High Level Output			11	17	ns
t_{THL}	Transition Time, High-to-Low Level Output			13	20	ns
t_{PLH}	Propagation Delay Time, Low-to-High Level Output		12	25	38	ns
t_{PHL}	Propagation Delay Time, High-to-Low Level Output		14	29	44	ns

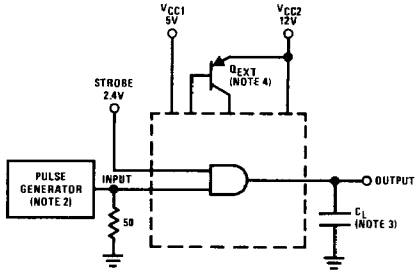
Note 1: "Absolute Maximum Ratings" are those values beyond which the safety of the device cannot be guaranteed. Except for "Operating Temperature Range" they are not meant to imply that the devices should be operated at these limits. The table of "Electrical Characteristics" provides conditions for actual device operation.

Note 2: All typicals are given for V_{CC1} = 5V, V_{CC2} = 12V and T_A = 25°C.

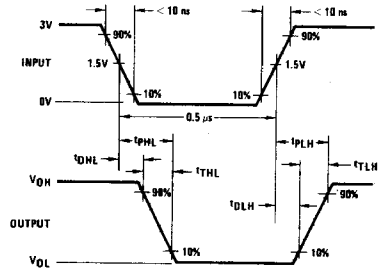
Note 3: All currents into device pins shown as positive, out of device pins as negative, all voltages referenced to ground unless otherwise noted. All values shown as max or min on absolute value basis.

Note 4: This rating applies between any 2 inputs of any one of the gates.

AC Test Circuit (Note 1)



Switching Time Waveforms



Note 1: Recommended minimum load 200 pF.

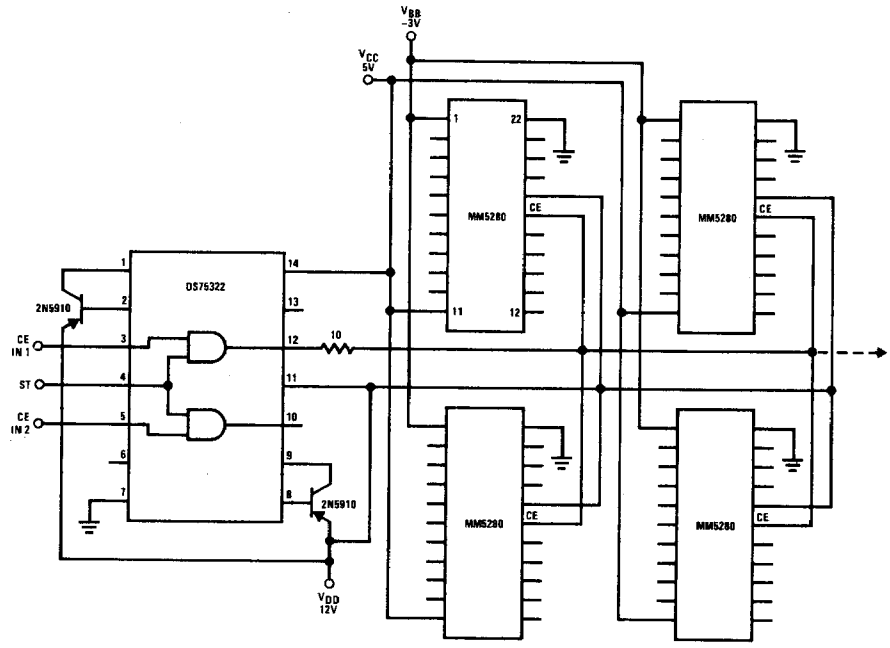
Note 2: The pulse generator has the following characteristics: PRR = 1 MHz, $Z_{OUT} = 50\Omega$, $t_r = t_f \leq 10$ ns.

Note 3: C_L includes probe and jig capacitance.

Note 4: Recommended external PNP transistors: 2N5771 (plastic), 2N5910 (plastic).

Typical Application

DS75322 Driving the MM5280 Memory-Only Four MM5280's Shown



Note. External PNP transistor should be located as close as possible to the DS75322.
Recommended minimum load: 200 pF