National Semiconductor

T-52-11

DS9643/μA9643
Dual TTL to MOS/CCD Driver

General Description

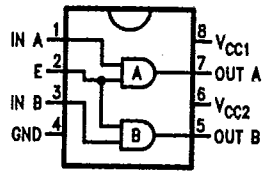
The DS9643/μA9643 is a dual positive logic "AND" TTL-to-MOS driver. The DS9643/μA9643 is a functional replacement for the SN75322 with one important exception: the two external PNP transistors are no longer needed for operation. The DS9643/μA9643 is also a functional replacement for the 75363 with the important exception that the V_{CC3} supply is not needed. The lead connections normally used for the external PNP transistors are purposely not internally connected to the DS9643/μA9643.

Features

- Satisfies CCD memory and delay line requirements
- Dual positive logic TTL to MOS driver
- Operates from standard bipolar and MOS supply voltages
- High speed switching
- TTL and DTL compatible inputs
- Separate drivers address inputs with common strobe
- V_{OH} and V_{OL} compatible with popular MOS RAMs
- Does not require external PNP transistors or V_{CC3}
- V_{OH} minimum is $V_{CC2} - 0.5V$

Connection Diagram

8-Lead DIP



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Top View

Order Number DS9643N/μA9643TC
See NS Package Number N08E

Truth Table

Input	Enable	Output
L	L	L
L	H	L
H	L	L
H	H	H

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Absolute Maximum Ratings (Note 1)

If Military/Aerospace specified devices are required, contact the National Semiconductor Sales Office/ Distributors for availability and specifications.

Storage Temperature Range	−65°C to +150°C
Operating Temperature Range	0°C to +70°C
Lead Temperature	
Molded DIP (soldering, 10 sec.)	265°C
Maximum Power Dissipation* at 25°C	
Molded Package	930 mW
Supply Voltage	
Range of V_{CC1}	−0.5V to +7.0V
Range of V_{CC2}	−0.5V to +15V
Input Voltage	5.5V

*Derate molded DIP package 7.5 mW/°C above 25°C.

Recommended Operating Conditions

	Min	Typ	Max	Units
Supply Voltage (V_{CC1})	4.75	5.0	5.25	V
Supply Voltage (V_{CC2})	11.4	12	12.6	V
Operating Temperature (T_A)	0	25	70	°C

Electrical Characteristics

over recommended operating temperatures and V_{CC1}, V_{CC2} ranges, unless otherwise specified (Notes 2 and 3)

Symbol	Parameter	Conditions		Min	Typ	Max	Units
V_{IH}	Input Voltage HIGH			2.0			V
V_{IL}	Input Voltage LOW					0.8	V
V_{OH}	Output Voltage HIGH	I_{OH} = −400 μA		V_{CC2} − 0.5	V_{CC2} − 0.2		V
V_{OL}	Output Voltage LOW	I_{OL} = 10 mA			0.4	0.5	V
		I_{OL} = 1.0 mA			0.2	0.3	
I_I	Input Current at Maximum Input Voltage	V_{CC1} = 5.25V, V_{CC2} = 11.4V V_I = 5.25V				0.1	mA
I_{IH}	Input Current HIGH	V_I = 2.4V	A Inputs			40	μA
			E Inputs			80	
I_{IL}	Input Current LOW	V_I = 0.4V	A Inputs			−0.5	mA
			E Inputs			−1.0	
$I_{CC1(L)}$	Supply Current from V_{CC1} All Outputs LOW	V_{CC1} = 5.25V, V_{CC2} = 12.6V			15	19	mA
$I_{CC2(L)}$	Supply Current from V_{CC2} All Outputs LOW	V_{CC1} = 5.25V, V_{CC2} = 12.6V			5.5	9.5	mA
$I_{CC1(H)}$	Supply Current from V_{CC1} All Outputs HIGH	V_{CC1} = 5.25V, V_{CC2} = 12.6V			9.0	13	mA
$I_{CC2(H)}$	Supply Current from V_{CC2} All Outputs HIGH	V_{CC1} = 5.25V, V_{CC2} = 12.6V			5.5	9.5	mA

Note 1: "Absolute Maximum Ratings" are those values beyond which the safety of the device cannot be guaranteed. They are not meant to imply that the devices should be operated at these limits. The tables of "Electrical Characteristics" provide conditions for actual device operation.

Note 2: Unless otherwise specified Min/Max limits apply across the 0°C to +70°C range for the DS9643. All typicals are given for V_{CC1} = 5V, V_{CC2} = 12V and T_A = 25°C.

Note 3: All currents into the device pins are positive; all currents out of the device pins are negative. All voltages are reference to ground unless otherwise specified.

Switching Characteristics V_{CC1} = 5.0V, V_{CC2} = 12V, T_A = 25°C

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Symbol	Parameter	Conditions		Min	Typ	Max	Units
t_{DLH}	Delay Time		C_L = 300 pF	5.0	9.0	17	ns
t_{DHL}	Delay Time			5.0	9.0	17	ns
t_{TLH}	Rise Time	R_{SERIES} = 0	C_L = 300 pF	6.0	11	17	ns
t_{THL}	Fall Time			6.0	11	17	ns
t_{TLH}	Rise Time	R_{SERIES} = 10Ω	C_L = 300 pF	8.0	14	20	ns
t_{THL}	Fall Time			8.0	14	20	ns
$t_{PLH_A} - t_{PLH_B}$ $t_{PHL_A} - t_{PHL_B}$	Skew between Outputs A and B				0.5		ns

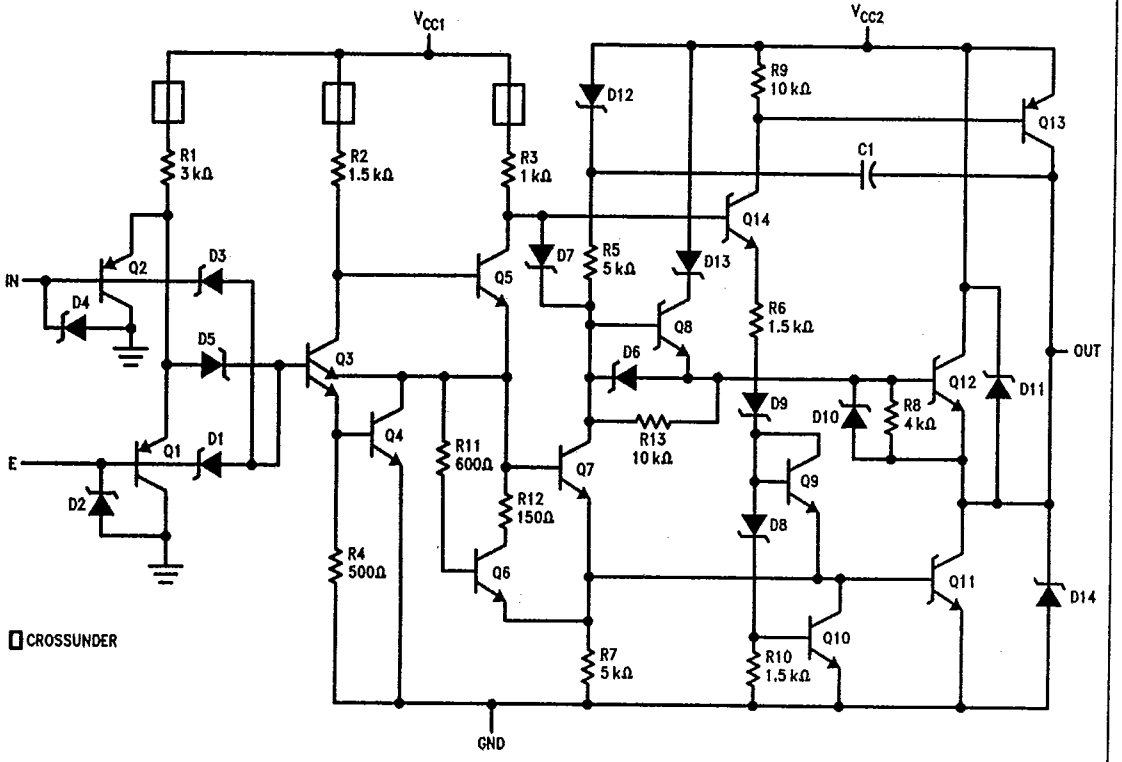

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FIGURE 1. Equivalent Circuit (½ of Circuit)

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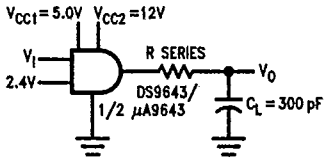

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Note: The pulse generator has the following characteristics:
PRR = 1.0 MHz, Z_O = 50Ω
C_L includes strobe and jig capacitance.

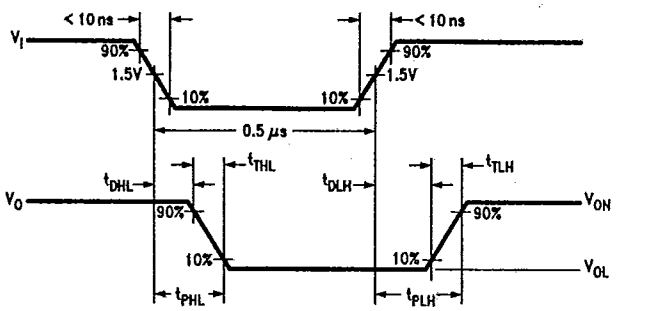

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FIGURE 2. AC Test Circuit and Waveforms