National Semiconductor

April 1990

DS9643
Dual TTL to MOS/CCD Driver

General Description

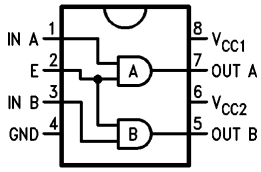
The DS9643 is a dual positive logic "AND" TTL-to-MOS driver. The DS9643 is a functional replacement for the SN75322 with one important exception: the two external PNP transistors are no longer needed for operation. The DS9643 is also a functional replacement for the 75363 with the important exception 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.

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



TL/F/9646–1

Top View

Order Number DS9643N
See NS Package Number N08E

Truth Table

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

Absolute Maximum Ratings (Note 1)

If Military/Aerospace specified devices are required, please 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	$I_{OH} = -400\ \mu A$		$V_{CC2} - 0.5$	$V_{CC2} - 0.2$		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

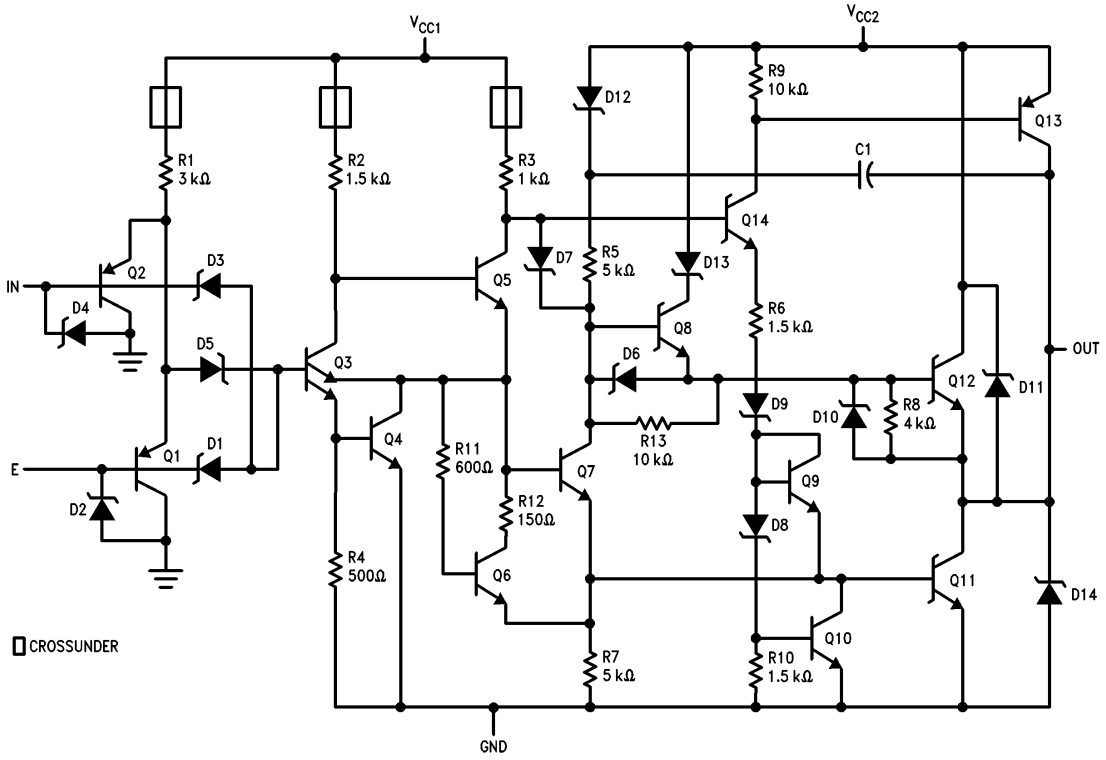
Note 1: "Absolute Maximum Ratings" are those values beyond which the safety of the device cannot be guaranteed. They are not meant to imply that the devices should be operated at these limits. The tables of "Electrical Characteristics" provide conditions for actual device operation.

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.

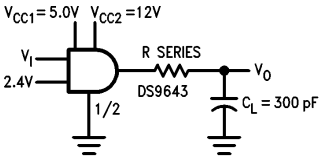
Switching Characteristics $V_{CC1} = 5.0V, V_{CC2} = 12V, T_A = 25°C$

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	$R_{SERIES} = 10\Omega$	$C_L = 300$ 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



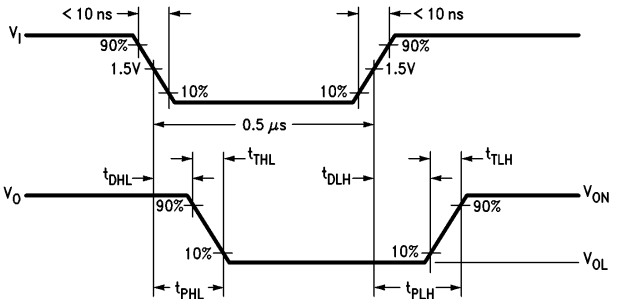
TL/F/9646–2

FIGURE 1. Equivalent Circuit (½ of Circuit)



TL/F/9646–3

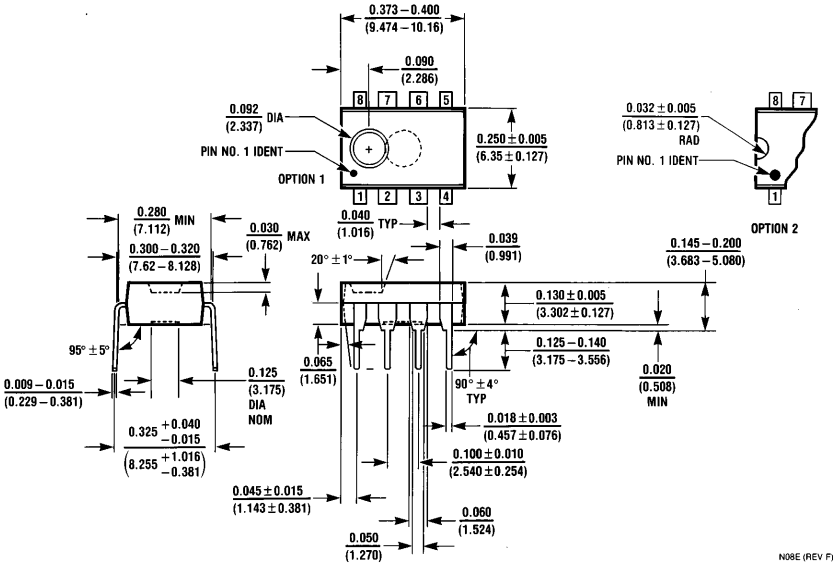
Note: The pulse generator has the following characteristics:
PRR = 1.0 MHz, Z_0 = 50Ω
C_L includes strobe and jig capacitance.



TL/F/9646–4

FIGURE 2. AC Test Circuit and Waveforms

Physical Dimensions inches (millimeters)



Molded Dual-In-Line Package (N)
Order Number DS9643N
NS Package Number N08E

LIFE SUPPORT POLICY

NATIONAL'S PRODUCTS ARE NOT AUTHORIZED FOR USE AS CRITICAL COMPONENTS IN LIFE SUPPORT DEVICES OR SYSTEMS WITHOUT THE EXPRESS WRITTEN APPROVAL OF THE PRESIDENT OF NATIONAL SEMICONDUCTOR CORPORATION. As used herein:

1. Life support devices or systems are devices or systems which, (a) are intended for surgical implant into the body, or (b) support or sustain life, and whose failure to perform, when properly used in accordance with instructions for use provided in the labeling, can be reasonably expected to result in a significant injury to the user.
2. A critical component is any component of a life support device or system whose failure to perform can be reasonably expected to cause the failure of the life support device or system, or to affect its safety or effectiveness.

National Semiconductor Corporation
1111 West Bardin Road
Arlington, TX 76017
Tel: 1(800) 272-9959
Fax: 1(800) 737-7018

National Semiconductor Europe
Fax: (+49) 0-180-530 85 86
Email: cnjwge@tevm2.nsc.com
Deutsch Tel: (+49) 0-180-530 85 85
English Tel: (+49) 0-180-532 78 32
Français Tel: (+49) 0-180-532 93 58
Italiano Tel: (+49) 0-180-534 16 80

National Semiconductor Hong Kong Ltd.
13th Floor, Straight Block,
Ocean Centre, 5 Canton Rd.
Tsimshatsui, Kowloon
Hong Kong
Tel: (852) 2737-1600
Fax: (852) 2736-9960

National Semiconductor Japan Ltd.
Tel: 81-043-299-2309
Fax: 81-043-299-2408