Signetics

NE/SA594
Vacuum Fluorescent Display Driver

Product Specification

Linear Products

DESCRIPTION

The NE/SA594 is a display driver interface for vacuum fluorescent displays. The device is comprised of 8 drivers and a bias network, and is capable of driving the digits and/or segments of most vacuum fluorescent displays.

The inputs are designed to be compatible with TTL, DTL, NMOS, PMOS or CMOS output circuitry.

There is an active pull-down circuit on each output so that display ghosting is minimized and no external components are required for most fluorescent display applications.

FEATURES

- **Digit and/or segment drivers**
- **Active output pull-down circuitry**
- **High output breakdown voltage**
- **Low supply voltage**
- **Input compatible with all logic outputs**

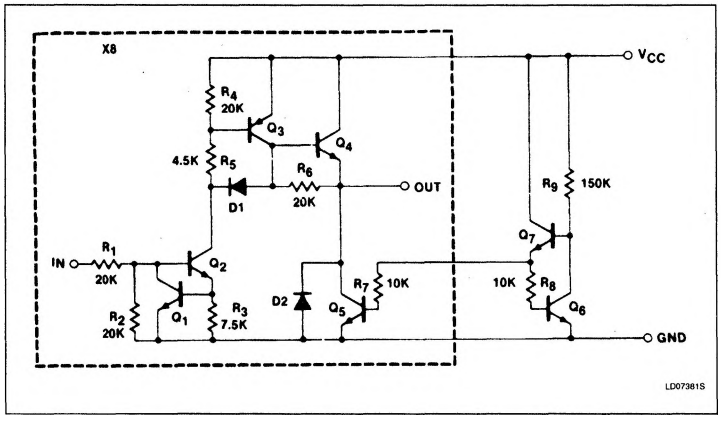
APPLICATIONS

- **Digital clocks**
- **Dashboard displays**
- **Panel displays**

ORDERING INFORMATION

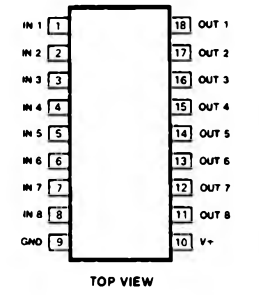
DESCRIPTION	TEMPERATURE RANGE	ORDER CODE
18-Pin Plastic DIP	0 to +70°C	NE594N
18-Pin Ceramic DIP	0 to +70°C	NE594F
20-Pin Plastic SO	0 to +70°C	NE594D
18-Pin Plastic DIP	-40°C to +85°C	SA594N
18-Pin Ceramic DIP	-40°C to +85°C	SA594F

EQUIVALENT SCHEMATIC

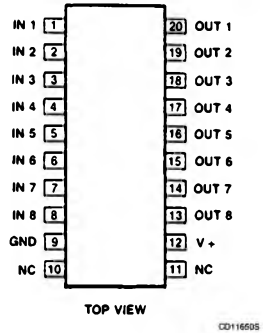


PIN CONFIGURATIONS

N, F Packages



D Package[1]



NOTE:
1. SOL - Released in large SO package only.

ABSOLUTE MAXIMUM RATINGS (at 25°C unless otherwise noted)

SYMBOL	PARAMETER	RATING	UNIT
V_{CC}	Supply voltage	45	V
V_{OUT}	Output voltage	V_{CC}	
V_{IN}	Input voltage	−0.3, +20	V
I_{OUT}	Output current Each output All outputs	 50 200	 mA mA
P_D	Maximum power dissipation, T_A = 25°C (still-air)[1] F package N package D package	 1500 1690 1390	 mW mW mW
T_A	Operating ambient temperature range NE594 SA594	 0 to 70 −40 to +85	 °C °C
T_{STG}	Storage temperature range	+65 to +150	°C
T_J	Maximum junction temperature	−150	°C
T_{SOLD}	Lead soldering temperature (10sec max)	300	°C

NOTE:

1. Derate above 25°C, at the following rates:
   F package at 12.0mW/°C
   N package at 13.5mW/°C
   D package at 11.1mW/°C

DC ELECTRICAL CHARACTERISTICS

V_{CC} = +4.75 to +40V, T_A = 0 to 70°C (NE), T_A = −40 to +85°C (SA), unless otherwise stated.

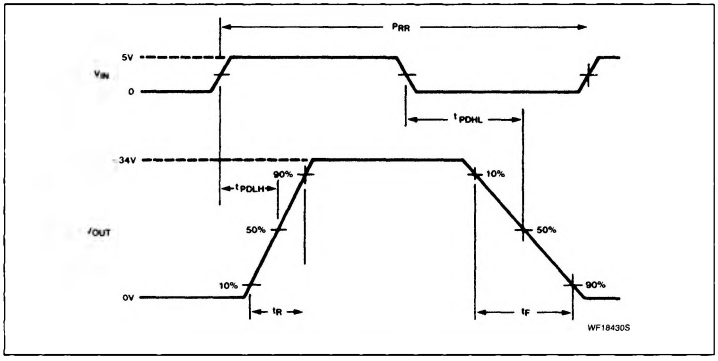
SYMBOL	PARAMETER	TEST CONDITIONS		LIMITS Min	LIMITS Typ	LIMITS Max	UNIT
V_{CC}	Supply voltage range			4.75	35	40	V
I_{CCH}	Supply current (all outputs high)	V_{CC} = 40V, V_{IN} = 3.5V			3	6	mA
I_{CCL}	Supply current (all outputs low)	V_{CC} = 40V, V_{IN} = 0.4V			0.4	1	mA
V_{IN}	Input voltage range			0		15	V
V_{IH}	Input voltage to ensure logic '1'			2.6			V
V_{IL}	Input voltage to ensure logic '0'					0.8	V
I_{IH}	Input current to ensure logic '1'			100			μA
I_{IL}	Input current to ensure logic '0'					10	μA
I_{IN}	Input current	V_{IN} = 2.6V			60	130	μA
		V_{IN} = 5.0V			180	330	μA
		V_{IN} = 15.0V			.68	1.3	mA
V_{OH}	Output high voltage	V_{IN} = 3.5V, I_{OUT} = −25mA, V_{OUT} with respect to V_{CC}	T_A = 25°C	V_{CC}−1.5	V_{CC}−1.1		V
			Over temp.	V_{CC}−2	V_{CC}−1.3		V
V_{OH}	Output high, no load voltage	V_{IN} = 3.5V, I_{OUT} = 0, T_A = 25°C, V_{OUT} with respect to V_{CC}		V_{CC}−1	V_{CC}−0.8		V
V_{OFF}	Output 'OFF' voltage level	V_{IN} = 0.8V, I_{OUT} = 0			10	200	mV
I_{OH}	Available output current	V_{CC} = 35V, V_{IN} = 3.5V, V_{OUT} = 30V, T_A = 25°C		−35			mA
I_{OUT}	Output pulldown current	V_{CC} = V_{OUT} = 35V, Inputs open		100	200	400	μA
I_{CEX}	Output leakage current	T_A = 25°C, V_{IN} = 0.4V			−1		μA
		V_{CC} = 40V, V_{OUT} = 0V			−1		

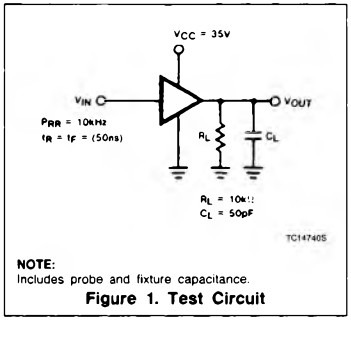
AC ELECTRICAL CHARACTERISTICS

V_{CC} = 35V, T_A = 25°C.

SYMBOL	PARAMETER	TEST CONDITIONS	LIMITS Min	LIMITS Typ	LIMITS Max	UNIT
t_{PLH}	Propagation delay — low-to-high output transition	50% V_{IN} to 50% V_{OUT}		1	5	μs
t_{PHL}	Propagation delay — high-to-low output transition	50% V_{IN} to 50% V_{OUT}		3	10	μs
t_R	Output rise time	10% V_{OUT} to 90% V_{OUT}		0.5	3	μs
t_F	Output fall time	90% V_{OUT} to 10% V_{OUT}		1.5	5	μs

SWITCHING TIMES OF DRIVERS



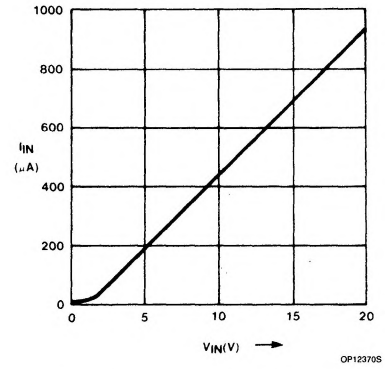


NOTE:
Includes probe and fixture capacitance.

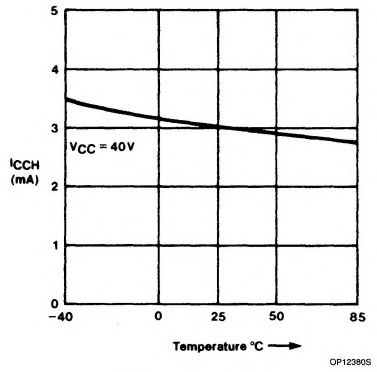
Figure 1. Test Circuit

TYPICAL PERFORMANCE CHARACTERISTICS

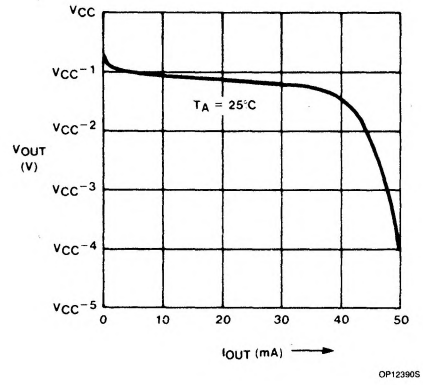
I_{IN} vs V_{IN}



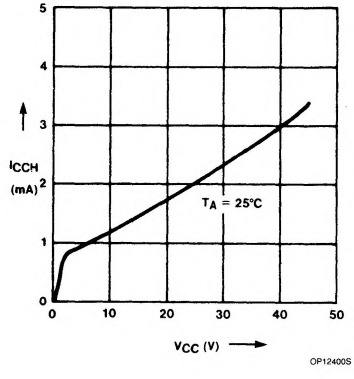
I_{CCH} vs Temperature



Output Voltage vs Output Current



I_{CC} vs V_{CC} (All inputs High)



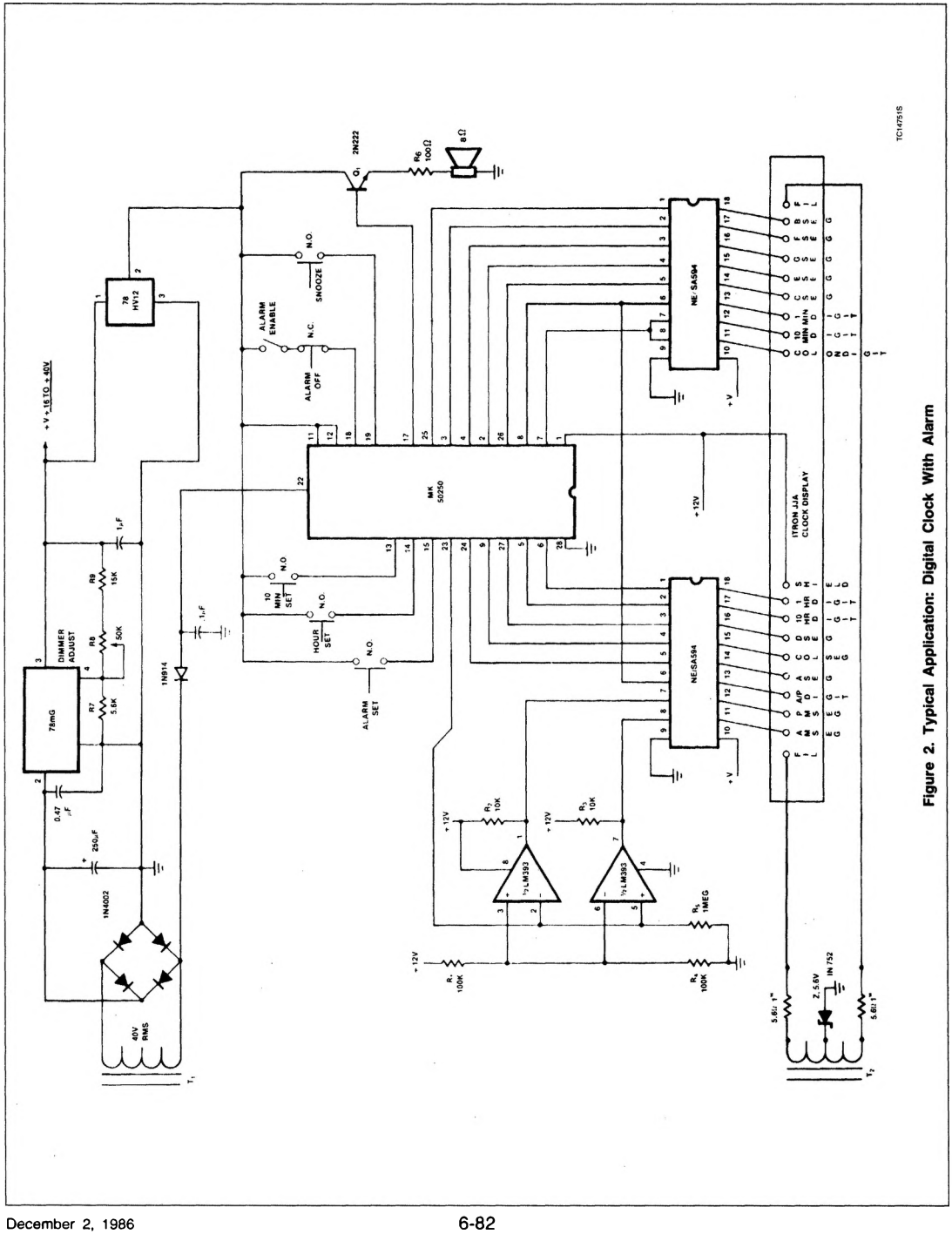


Figure 2. Typical Application: Digital Clock With Alarm