

Vacuum fluorescent display driver

NE/SA594

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.

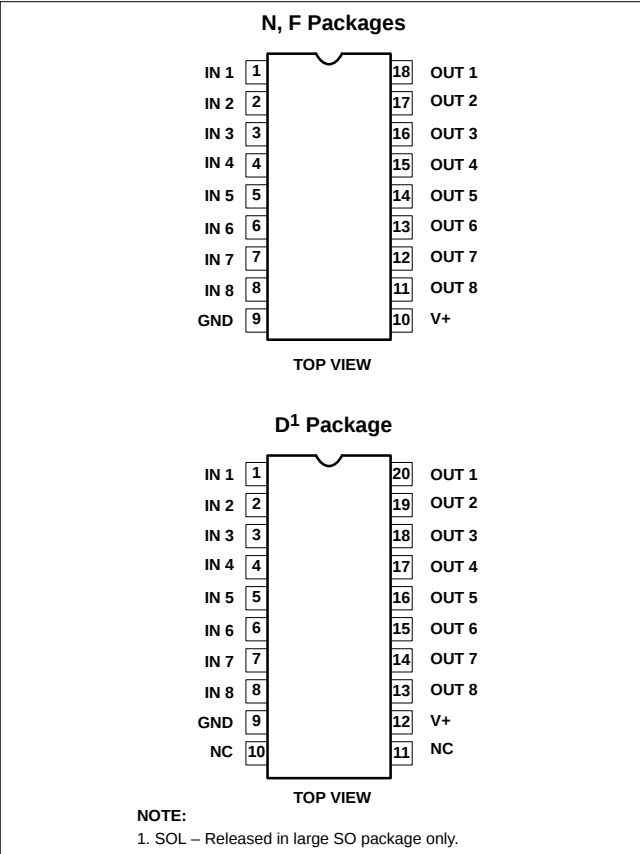
FEATURES

- 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

PIN CONFIGURATIONS



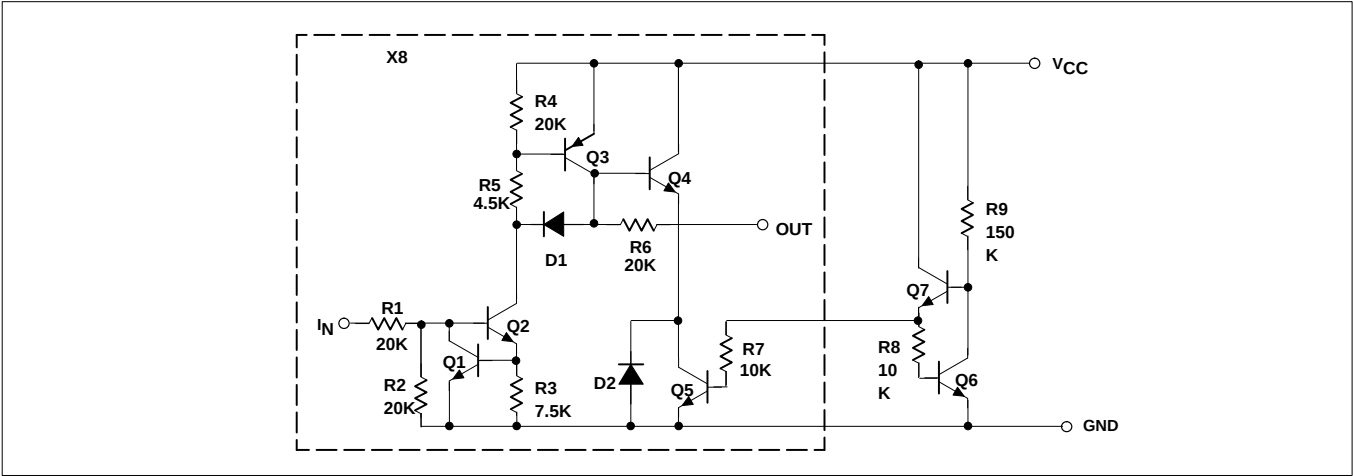
ORDERING INFORMATION

DESCRIPTION	TEMPERATURE RANGE	ORDER CODE	DWG #
18–Pin Plastic DIP	0 to +70°C	NE594N	0407A
18–Pin Ceramic DIP	0 to +70°C	NE594F	0583A
20–Pin Plastic SO	0 to +70°C	NE594D	0408B
18–Pin Plastic DIP	–40°C to +85°C	SA594N	0407A
18–Pin Ceramic DIP	–40°C to +85°C	SA594F	0583A
20–Pin Plastic SO	–40°C to +85°C	SA594D	0408B

Vacuum fluorescent display driver

NE/SA594

EQUIVALENT SCHEMATIC



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	50	mA
	All outputs	200	mA
P _D	Maximum power dissipation, T _A =25°C (still-air) ¹		
	F package	1500	mW
	N package	1690	mW
	D package	1390	mW
T _A	Operating ambient temperature range		
	NE594	0 to 70	°C
	SA594	−40 to +85	°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

NOTES:

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

Vacuum fluorescent display driver

NE/SA594

DC ELECTRICAL CHARACTERISTICS

 $V_{CC}=+4.75$ to $+40V$, $T_A=0$ to $70^{\circ}C$ (NE), $T_A=-40$ to $+85^{\circ}C$ (SA), unless otherwise stated.

SYMBOL	PARAMETER	TEST CONDITIONS	LIMITS			UNIT
			Min	Typ	Max	
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	$V_{IN}=3.5V$ $I_{OUT}=-25mA$ $T_A=25^{\circ}C$	$V_{CC}-1.5$	$V_{CC}-1.1$		V
		Over temp.	$V_{CC}-2$	$V_{CC}-1.3$		V
		V_{OUT} with respect to V_{CC}				
V_{OH}	Output high, no load voltage	$V_{IN}=3.5V$, $I_{OUT}=0$, $T_A=25^{\circ}C$, 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	$V_{CC}=35V$, $V_{IN}=3.5V$, $V_{OUT}=30V$, $T_A=25^{\circ}C$	-35			mA
I_{OUT}	Output pull-down current	$V_{CC}=V_{OUT}=35V$, Inputs open	100	200	400	μA
I_{CEX}	Output leakage current	$T_A=25^{\circ}C$, $V_{IN}=0.4V$ $V_{CC}=40V$, $V_{OUT}=0V$		-1 -1		μA

AC ELECTRICAL CHARACTERISTICS

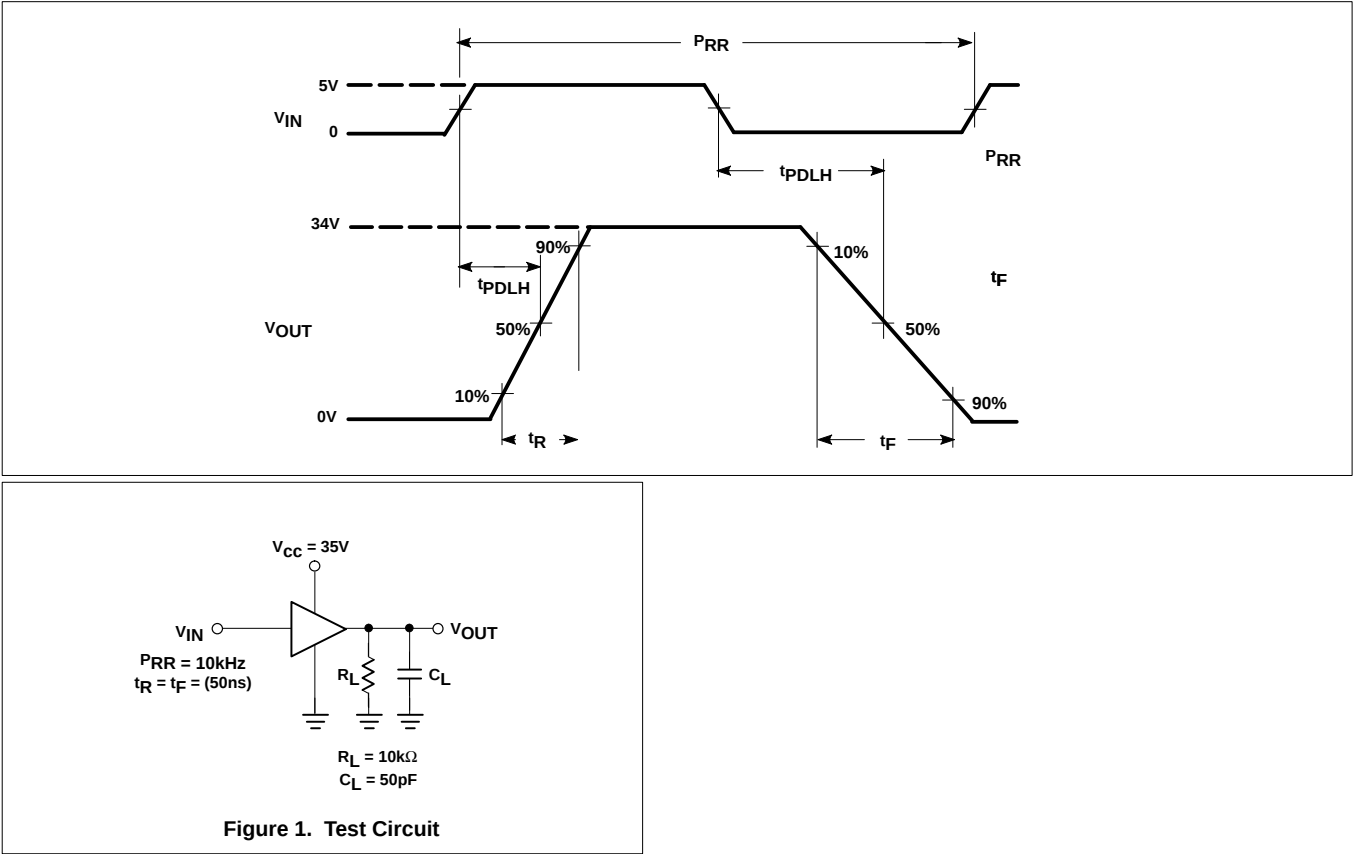
 $V_{CC}=35V$, $T_A=25^{\circ}C$

SYMBOL	PARAMETER	TEST CONDITIONS	LIMITS			UNIT
			Min	Typ	Max	
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

Vacuum fluorescent display driver

NE/SA594

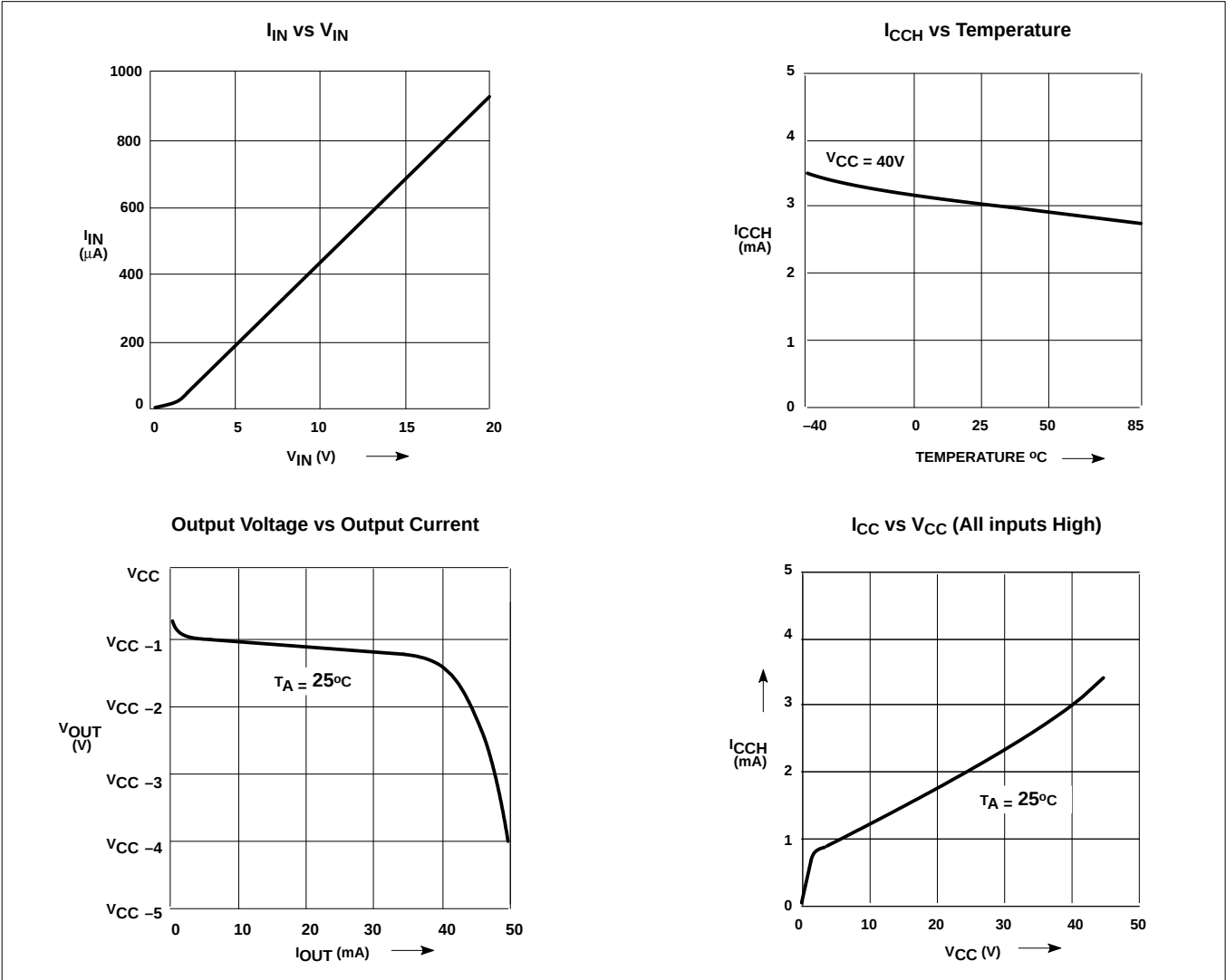
SWITCHING TIMES OF DRIVERS



Vacuum fluorescent display driver

NE/SA594

TYPICAL PERFORMANCE CHARACTERISTICS



Vacuum fluorescent display driver

NE/SA594

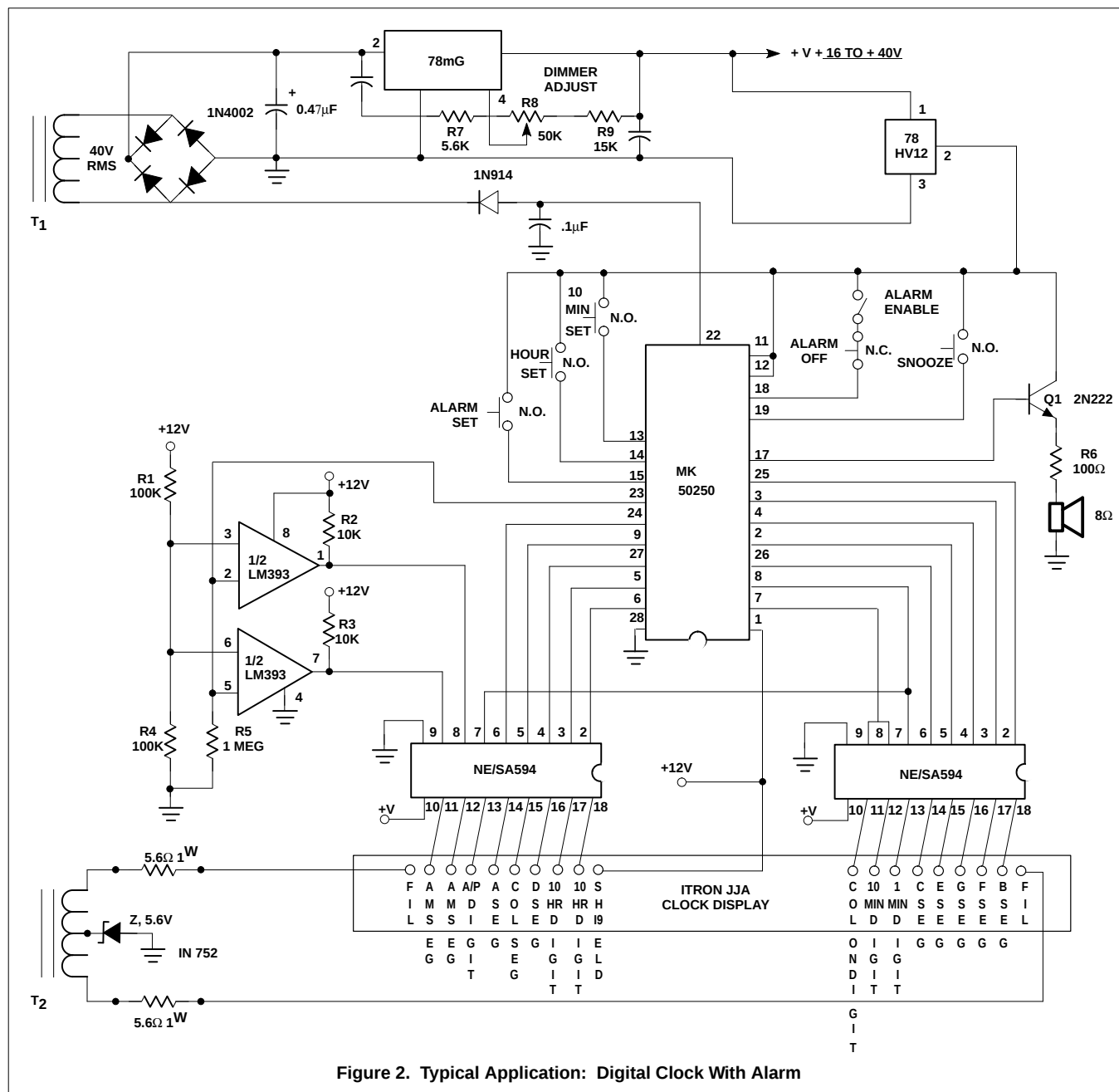


Figure 2. Typical Application: Digital Clock With Alarm