20-Channel Serial-Input Vacuum-Fluorescent Display Driver for Anode/Grid

Ordering Information

Device	Package Options			
	28 Pin Plastic DIP	28 Pin Plastic Chip Carrier	SOW-28	Die
HV5812	HV5812P	HV5812PJ	HV5812WG	HV5812X

Features

- ❑ Operating voltage of to up to 80V
- ❑ HVCMOS® technology for high performance
- ❑ High speed source driver
- ❑ Up to 3.3MHz data input rate
- ❑ 5.0V CMOS logic circuitry
- ❑ Excellent noise immunity
- ❑ Flexible high voltage supplies

General Description

The Supertex HV5812 is a 20-channel serial input vacuum fluorescent display driver. It combines a 20-bit CMOS shift register, data latches, and control circuitry with high voltage MOSFET outputs. The HV5812 is primarily designed for vacuum-fluorescent displays.

The CMOS shift register and latches allow direct interfacing with microprocessor-based systems. Data input rates are typically over 5.0MHz with 5V logic supply. Especially useful for inter-digit blanking, the BLANKING input disables the output source drives and turns on the sink drivers. Use with TTL may require external pull-up resistors to ensure an input logic high.

Absolute Maximum Ratings[1]

V_{DD} logic power supply voltage		-0.5V to +7.5V
V_{PP} positive high voltage supply		-0.5V to +90V
Logic input voltages		-0.3V to V_{DD} +0.3V
Operating junction temperature range		-40°C to +150°C
Storage temperature		-55°C to +150°C
Power dissipation	28-pin PLCC	1.9 Watt
	SOW-28	1.7 Watt
	28-pin DIP	2.0 Watt

Notes:

1. All voltages are referenced to ground. Absolute maximum ratings are those values at which damage to the device may occur. Functional operation under these conditions is not implied. Continuous operation of the device at the absolute rating level may affect device reliability.

Electrical Characteristics

DC Characteristics (Over recommended operating conditions, T_A = 25°C, unless otherwise noted)

Symbol	Parameter		Min	Typ	Max	Units	Conditions
I_{DSS}	Output leakage current			-5.0	-15	μA	V_{OUT} = 0V, T_A = +70°C
HV_{OH}	Output voltage		78	78.5		V	I_{OUT} = -25mA, V_{PP} = 80V T_A = +25°C
HV_{OH}	Output Voltage		77	78		V	I_{OUT} = -25mA, V_{PP} = 80V T_A = +125°C
HV_{OL}	Output Voltage	V_{DD} = 5V		1.5	3.0	V	I_{OUT} = 1.0mA, T_A = +25°C
HV_{OL}	Output Voltage	V_{DD} = 5V		2.3	4.0	V	I_{OUT} = 1.0mA, T_A = +125°C
I_{SINK}	Output pull-down current	V_{DD} = 5V	2.0	3.5		mA	V_{OUT} = 5.0V to V_{PP}
V_{IH}	Logic input voltage	V_{DD} = 5V	3.5		5.3	V	
V_{IL}	Logic input voltage		-0.3		0.8	V	
I_{IH}	Logic input current	V_{DD} = 5V		0.05	0.5	μA	V_{IN} = V_{DD}
I_{IL}	Logic input current	V_{DD} = 5V		-0.05	-0.5	μA	V_{IN} = 0.8V
V_{OH}	Serial data out	V_{DD} = 5V	4.5	4.7		V	I_{OUT} = -200μA
V_{OL}	Serial data out	V_{DD} = 5V		200	250	mV	I_{OUT} = 200μA
f_{CLK}	Maximum clock frequency	V_{DD} = 5V		8.0		MHz	T_J = +25°C
		V_{DD} = 5V		5.0		MHz	T_J = +125°C
I_{DDQ}	Supply current	V_{DD} = 5V		100	300	μA	All outputs high
		V_{DD} = 5V		100	300	μA	All outputs low
I_{PPQ}	Supply current			10	100	μA	Outputs high, no Load
				10	100	μA	Outputs low, no Load

Recommended Operating Conditions

Symbol	Parameter	Min	Nom	Max	Units
V_{DD}	Supply voltage	4.5		5.5	V
V_{PP}	Supply voltage	20		80	V
T_J	Operating junction temperature	-40		+125	°C

Power-up sequence should be the following:

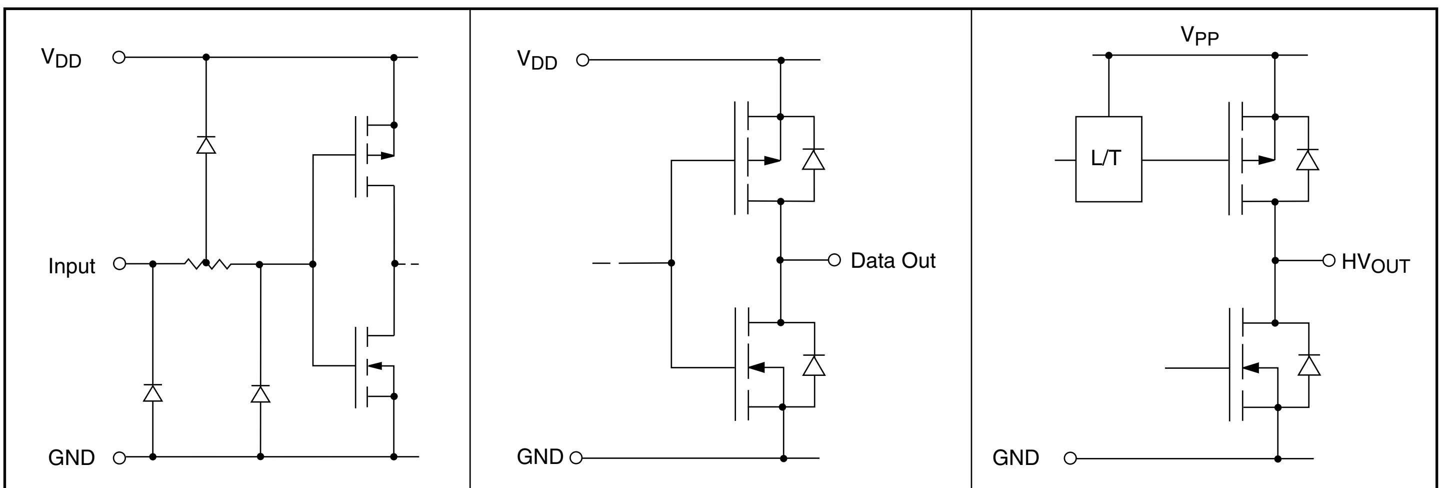
1. Connect ground.
2. Apply V_{DD}.
3. Set all inputs (Data, CLK, etc.) to a known state.
4. Apply V_{PP}.
5. The V_{PP} should not drop below V_{DD} or float during operation.

Power-down sequence should be the reverse of the above.

AC Characteristics (T_A = 25°C, over operating conditions unless otherwise noted)

Symbol	Parameter		Min	Typ	Max	Units	Conditions
t_{PHL}	Blanking to output delay	V_{DD} = 5V		2000		ns	C_L = 30pF, 50% to 50%
t_{PLH}	Blanking to output delay	V_{DD} = 5V		1000		ns	C_L = 30pF, 50% to 50%
t_f	Output fall time	V_{DD} = 5V		1450		ns	C_L = 30pF, 90% to 10%
t_r	Output rise time	V_{DD} = 5V		650		ns	C_L = 30pF, 10% to 90%
t_{su}	Data set-up time		75			ns	See timing diagram
t_h	Data hold time		75			ns	See timing diagram
t_{pwd}	Minimum data pulse width		150			ns	See timing diagram
t_{pwclk}	Minimum clock pulse width		150			ns	See timing diagram
t_{cks}	Minimum time between clock activation and strobe		300			ns	See timing diagram
t_{pws}	Minimum strobe pulse width		100			ns	See timing diagram
t_{sto}	Typical time between strobe activation and output transition			500		ns	See timing diagram

Input and Output Equivalent Circuits

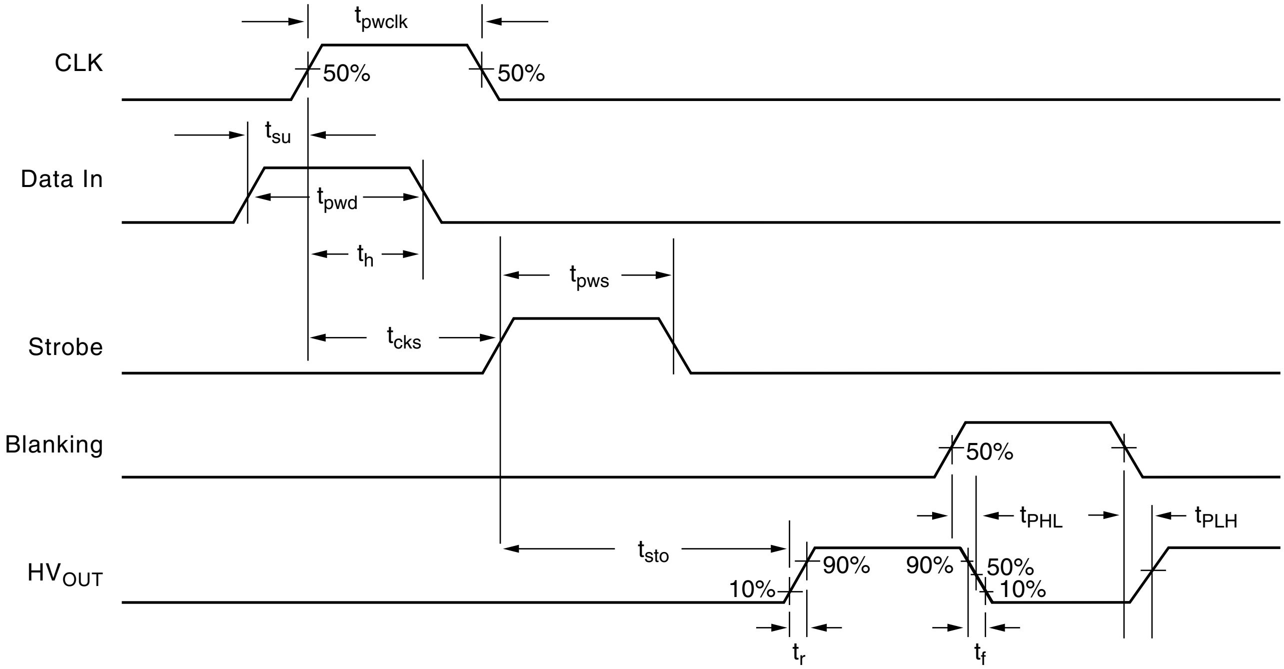


Logic Inputs

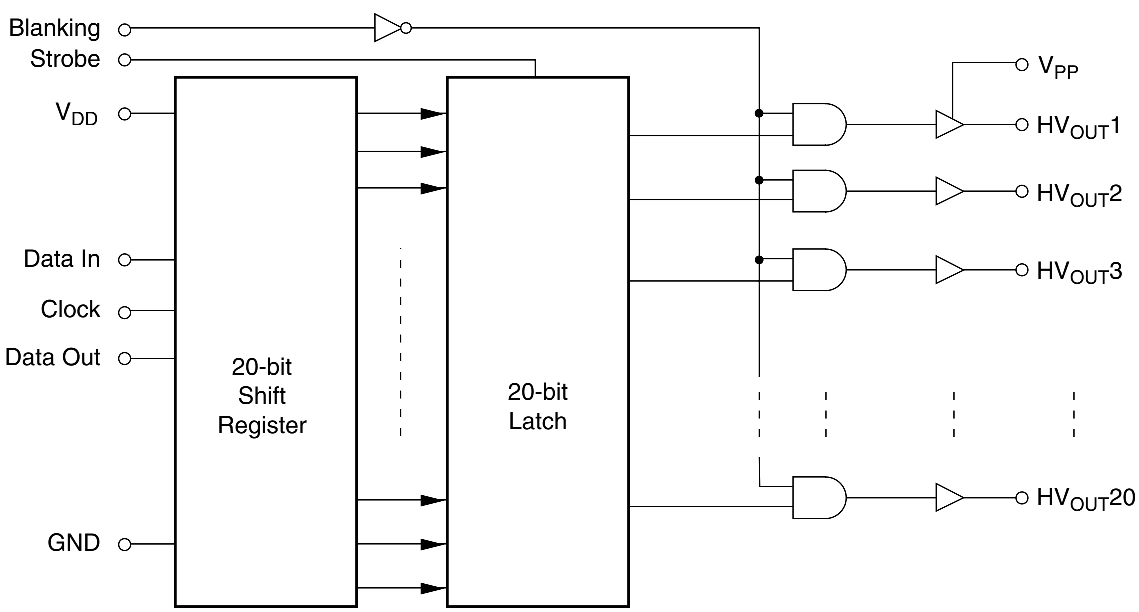
Logic Data Output

High Voltage Outputs

Timing Diagram



Block Diagram



Function Table

Serial Data Input	Clock Input	Shift Register Contents I_1 I_2 I_3 ... I_{N-1} I_N	Serial Data Output	Strobe Input	Latch Content I_1 I_2 I_3 ... I_{N-1} I_N	Blanking	Output Content I_1 I_2 I_3 ... I_{N-1} I_N
H	L to H	H R_1 R_2 ... R_{N-2} R_{N-1}	R_{N-1}				
L	L to H	L R_1 R_2 ... R_{N-2} R_{N-1}	R_{N-1}				
X	H to L	R_1 R_2 R_3 ... R_{N-1} R_N	R_N				
		X X X ... X X	X	L	R_1 R_2 R_3 ... R_{N-1} R_N		
		P_1 P_2 P_3 ... P_{N-1} P_N	P_N	H	P_1 P_2 P_3 ... P_{N-1} P_N	L	P_1 P_2 P_3 ... P_{N-1} P_N
					X X X ... X X	H	L L L ... L L

Note:
L = Low Logic Level H = High Logic Level X = Irrelevant P= Present State R = Previous State

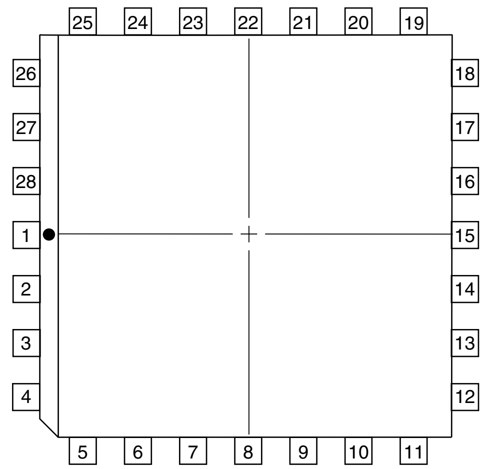
Pin Configuration

HV5812

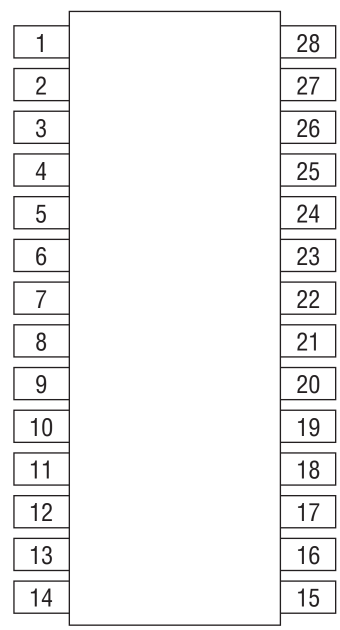
28-pin PLCC, 28-pin DIP, and SOW-28

Pad	Function
1	V_{PP}
2	Data Out
3	$HV_{OUT}20$
4	$HV_{OUT}19$
5	$HV_{OUT}18$
6	$HV_{OUT}17$
7	$HV_{OUT}16$
8	$HV_{OUT}15$
9	$HV_{OUT}14$
10	$HV_{OUT}13$
11	$HV_{OUT}12$
12	$HV_{OUT}11$
13	Blank
14	GND
15	Clock
16	Strobe
17	$HV_{OUT}10$
18	$HV_{OUT}9$
19	$HV_{OUT}8$
20	$HV_{OUT}7$
21	$HV_{OUT}6$
22	$HV_{OUT}5$
23	$HV_{OUT}4$
24	$HV_{OUT}3$
25	$HV_{OUT}2$
26	$HV_{OUT}1$
27	Data In
28	V_{DD}

Package Outlines



top view
28-pin PLCC



top view
28-pin DIP and SOW-28

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