

## Advance Information

### High Voltage EL Lamp Driver

#### Features

- ❑ Processed with HVCMOS® technology
- ❑  $V_{DD}$  voltage range = 2.7 to 5.5V DC
- ❑ Output load up to 70nF (20 in<sup>2</sup> for 3.5nF/ in<sup>2</sup> lamp)
- ❑ Adjustable DC-DC converter frequency
- ❑ Continuous output voltage regulation control (from 50V to 200V)

#### Application

- ❑ Electronic Organizers
- ❑ Handheld Portable Computers
- ❑ Display Signs
- ❑ Portable Instrumentation Equipment

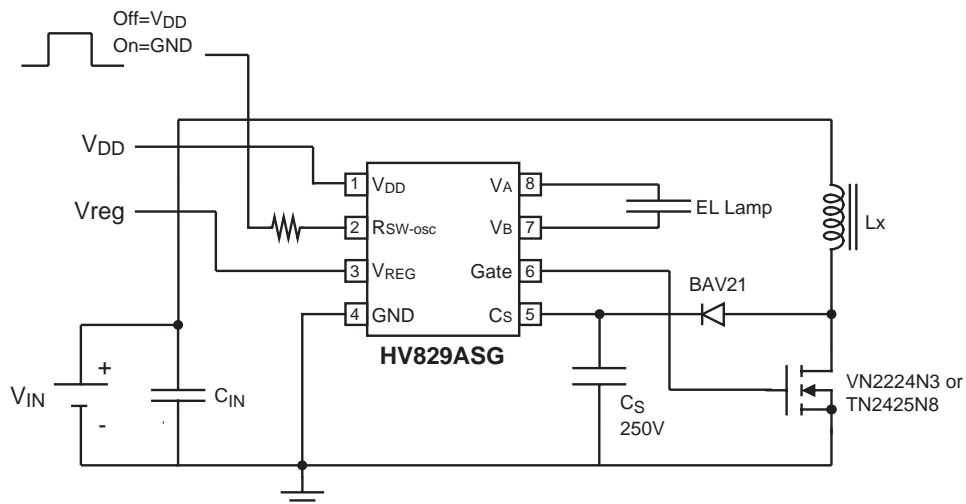
#### General Description

The Supertex HV829A/B are high voltage EL lamp driver integrated circuits designed for driving EL lamps of up to 70nF at 1000Hz. The input supply voltage range is from 2.7V to 5.5V. These devices use a single inductor, a high voltage switching FET and a minimum number of passive components. The HV829A/B will supply the EL lamp with an AC square wave with a peak-to-peak voltage of two times the set regulated DC voltage.

The HV829A/B has one internal oscillator and a high voltage EL lamp driver. The frequency for the external switching MOSFET is set by an external resistor connected between the  $R_{SW-osc}$  pin and GND. The EL frequency for the HV829A is equal to the switching frequency divided by 64 where the EL frequency for the HV829B is equal to the switching frequency divided by 128. Gate of the external MOSFET is connected to the Gate pin. An external inductor is connected between the Drain of external MOSFET and  $V_{DD}$  pin. A 0.01-2.5 $\mu$ F capacitor is connected between  $C_s$  and ground. The EL lamp is connected between  $V_A$  and  $V_B$ . The output voltage regulation level is controlled via the  $V_{REG}$  pin for dimming and/or conservation of power. The output voltage regulation can be controlled continuously between 50V and 200V depending on the voltage applied to  $V_{REG}$  pin (0.75V to 3V).

The switching MOSFET charges the external inductor and discharges it into the capacitor at  $C_s$ . The voltage at  $C_s$  will start to increase. Once the voltage at  $C_s$  reaches a nominal value chosen by the user, the switching MOSFET is turned OFF to conserve power. The outputs  $V_A$  and  $V_B$  are configured as an H bridge and are switching in opposite states to achieve the AC voltage of +/- VREG voltage across the EL lamp.

#### Typical Application Circuit



## Ordering Information

Device	Output EL Frequency	Package	
		SO-8 w/ Heat Slug	Die
HV829A	Sw oscillator / 64	HV829ASG	HV829AX
HV829B	Sw oscillator / 128	HV829BSG	HV829AX

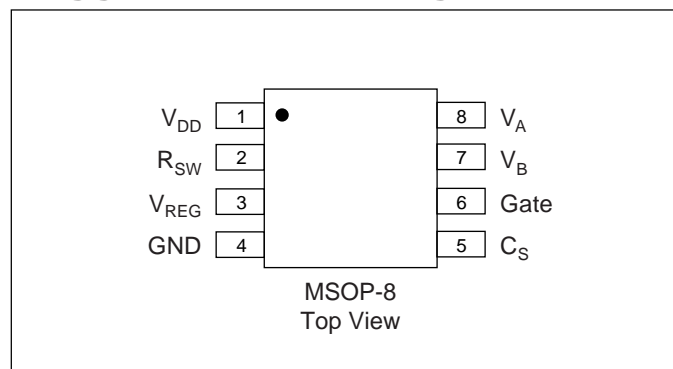
\*\* Mounted on FR4 board, 25mm x 25mm x 1.57mm.

## Absolute Maximum Ratings\*

Input Voltage to the external Inductor	+18V
$V_{DD}$	+7.0V
Output voltage, $V_{CS}$	-0.05V to +250V
Operating Temperature	-25°C to +85°C
Storage Temperature	-65°C to +150°C
Power Dissipation	1.5W

\*Absolute Maximum Ratings are those values beyond 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. All voltages are referenced to device ground.

## Suggested Pin Configuration



## Electrical Characteristics

### DC Characteristics (Over recommended operating conditions unless otherwise specified, $T_A=25^\circ\text{C}$ ).

Symbol	Parameter	Min	Typ	Max	Units	Conditions
$V_{CS}$	Max. output regulation voltage ( $V_{DD}=2.7$ to $5.5\text{V}$ , No load)	42	50	58	V	$V_{REG} = 0.75\text{V}$
		90	100	110		$V_{REG} = 1.5\text{V}$
		135	150	165		$V_{REG} = 2.25\text{V}$
		180	200	220		$V_{REG} = 3.0\text{V}$
$f_{sw}$	Inductor switching frequency	20	25	30	KHz	$V_{CS} = 150\text{V}$ , $C_L = 57\text{nF}$ , $R_{SW-OSC} = 1\text{M}$ , See Figure 1.
$I_{DDQ}$	Quiescent $V_{DD}$ supply current			400	nA	
$I_{DD}$	Input current going into the $V_{DD}$ pin			400	$\mu\text{A}$	
$I_{IN}$	Input current including inductor current			195	mA	
$I_{INQ}$	Quiescent supply current (no load)			200	$\mu\text{A}$	$V_{CS} = 150\text{V}$ , $R_{SW-OSC}=1\text{M}$
				100	$\mu\text{A}$	
$V_A - V_B$	Differential output voltage across the lamp	84	100	116	V	$V_{REG} = 0.75\text{V}$
		180	200	220		$V_{REG} = 1.5\text{V}$
		270	300	330		$V_{REG} = 2.25\text{V}$
		380	400	440		$V_{REG} = 3.0\text{V}$

### Recommended Operating Conditions

$f_{sw}$	Inductor switching frequency	51.2	64	76.8	KHz	$R_{SW-osc}=400$ , $C_L=70\text{nF}$
$f_{EL}$	Output drive frequency	0.8	1.0	1.2		
$t_R$	Output rise time	235	300	365	$\mu\text{s}$	$V_{CS}=200\text{V}$ , $R_{SW-osc}=400$ , $C_L=70\text{nF}$ , $f_{EL}=1\text{KHz}$
$t_F$	Output fall time	235	300	365		
$t_{r-Gate}$	Gate rise time		150		ns	$C_G=2500\text{pF}$ Gate to GND
$t_{f-Gate}$	Gate fall time		50			

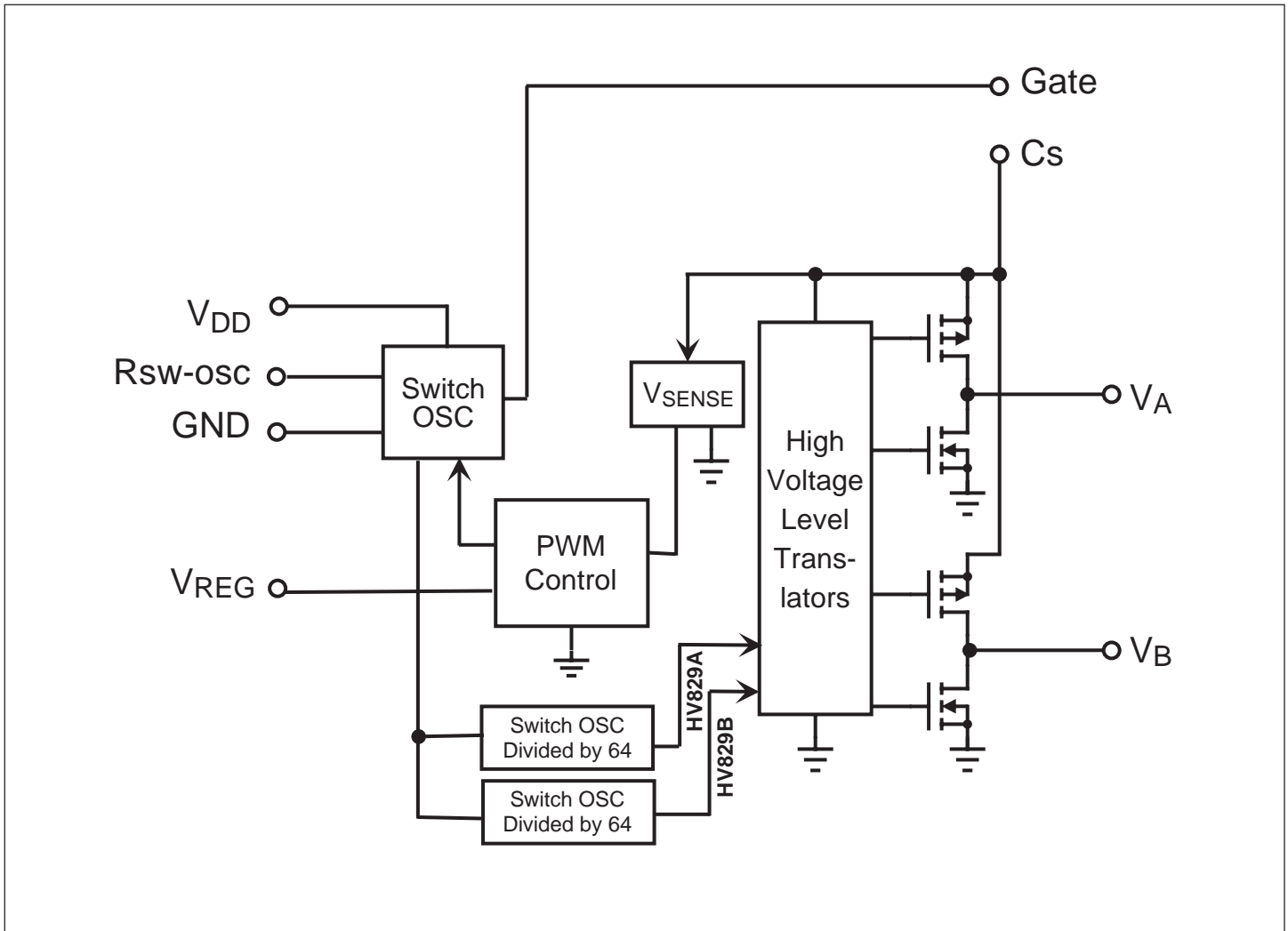
**Enable/Disable Function Table**

$V_{IN}$	Inductor voltage	3.0		12	V	
$V_{DD}$	device supply voltage	2.7		5.5		
$V_{GATE}$	Internal supply voltage	10	12	14		
$C_L$				70	nF	
$T_A$	Operating temperature	-25		85	° C	

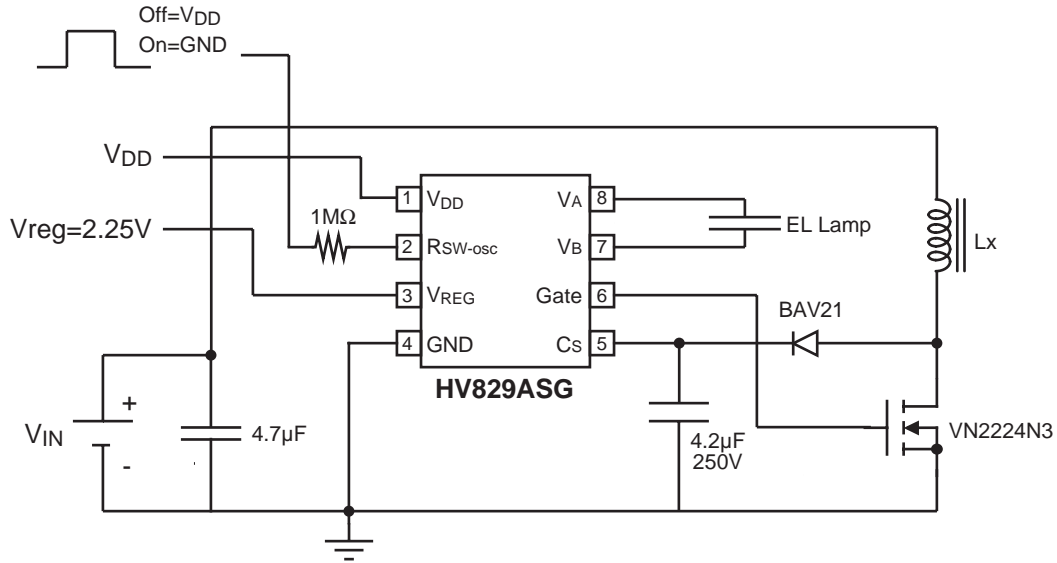
\* No  $L_X$  or  $C_S$  current when  $V_{DD}=0V$  or Hi-Z

Description	Input Voltage ( $V_{DD}$ )	$R_{SW-osc}$	Outputs $V_A$ and $V_B$	Gate
Output Disabled	Hi	$V_{DD}$	Hi-Z	0V
Output Enabled	Hi	GND	Oscillating	Oscillating
IC off	0V	—	Hi-Z	0V

**Functional Block Diagram**



**Figure 1: Typical Application/Test Circuit**



**Typical Performance**

Device	Lamp Size	V <sub>IN</sub>	I <sub>DD</sub>	V <sub>CS</sub>	f <sub>sw</sub>	f <sub>EL</sub>	Brightness
HV829A/BSG	20 in <sup>2</sup>	9.0V	195mA	153V	25KHz	390Hz	18.5ft-lm

\* The inductor used is a 330μH J.W. Miller, max. DC resistance of 1.15Ω, part #PM105-331K.