Features

- Built-in 450V High Voltage Regulator for High voltage supply
- Operate at VAC 85V-265V or VDC 24V-450V
- Fixed Oscillation Frequency :Typ. 90KHz
- Output voltage external setting by FB pin
- FB pin threshold voltage 1.0V
- Built-in current limit circuit setting by external resistor
- PFM control @ duty ratio 0%-5%, PWM control @ duty ration 5%-85%
- Built-in soft start function

Applications

- Non-isolated Switching Mode Power Supply
- Home Appliances
- LED Light Belt
- Smart Plug
- AC/DC Power Converter for DC Motor

Description

The SMD911 is a monolithic high voltage switching regulator-controller with PWM/PFM control that is specifically designed to operate from a rectified 85-265 VAC line source.

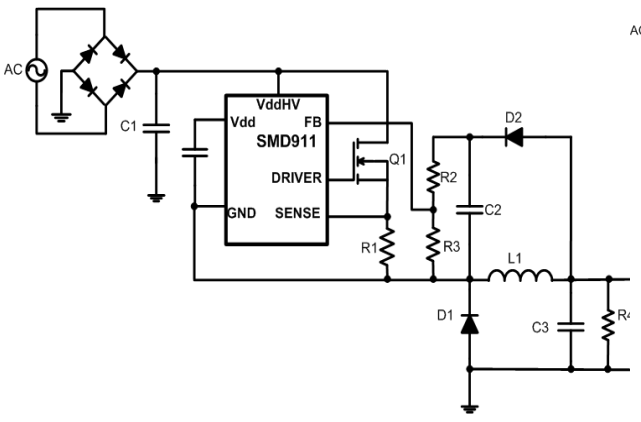
The building blocks of SMD911 include reference voltage source, oscillation circuit, error amplifier, phase compensation circuit, PWM control circuit, power supply 450V MOS-transistor, etc. The operation frequency is fixed at typical value of 90KHz.

SMD911 is a power switch for non-isolated power supply with low ripple, high efficiency and excellent transient characteristics. The PWM control circuit of SMD911 is capable of varying the duty cycle ratio from 0% to 89% in linearity.

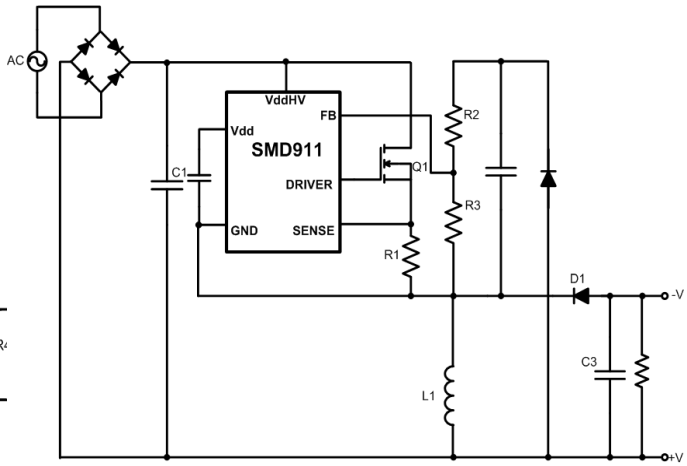
The PWM/PFM switching control circuit operates at 5% or higher duty ration in PWM mode and below 5% duty ratio in PFM mode to ensure high efficiency in all load ranges.

Application Circuit

Buck Converter :
The SMD911 provides a low cost, low component count solution to implement the constant output voltage buck converter. SMD911 regulates the output voltage by monitoring the output feedback voltage to the FB pin. And, the peak current is limited by SENSE pin by setting the external resistor

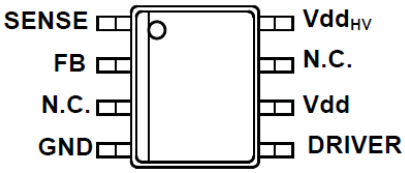


Buck-Boost Converter :
In the case to design the constant output voltage which is close to the input voltage, the buck-boost converter would be a good solution. For the output voltage that SMD911 Duty >70%, it is recommended to adopt the buck-boost converter.



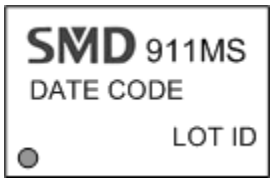
Notes: Pls contact our FAE for application design information.

Package Reference



SOP-8

Top Marking



Ordering Information

Part Number	Package	Shipping	MOQ
SMD911MS	SOP-8	Tape & Reel	2,500

Pin Description

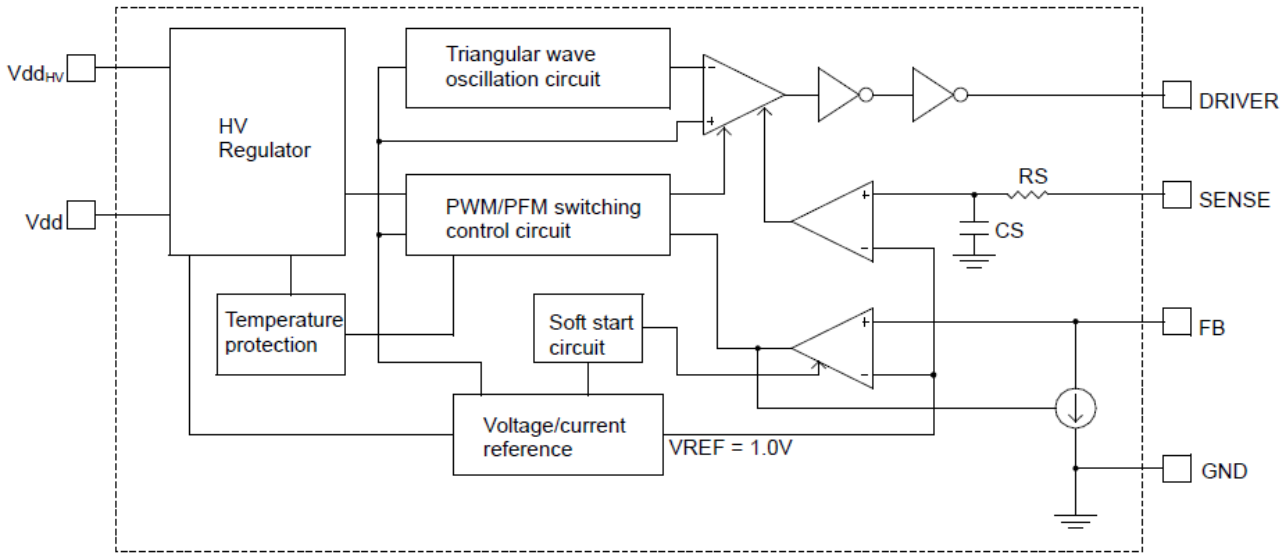
Pin	Name	Function
1	SENSE	Peak current limited setting by external resistor
2	FB	Regulator constant voltage feedback external setting
3, 7	NC	Not connected
4	GND	Ground
5	DRIVER	Power switch gate driver
6	Vdd	Internal low voltage supply
8	Vdd$_{HV}$	High voltage supply up to 450V

Absolute Maximum Rating (Note 1)

Item	Rating	Unit
Vdd pin voltage (Vdd)	-0.3 to 16	V
Vdd_{HV} pin voltage (Vdd_{HV})	-0.3 to 450	V
DRIVER pin voltage (V_{DRIVER})	-0.3 to 16	V
FB pin voltage (V_{FB})	-0.3 to 16	V
SENSE pin voltage (V_{SENSE})	-0.3 to 16	V
Operational ambient temperature (T_A)	-25 to +85	°C
Operational junction temperature (T_J)	150	°C
Storage temperature range (T_{STG})	-65 to 150	°C

Note 1: Exceeding these ratings could cause damage to the device. All voltages are with respect to ground.

Block Diagram



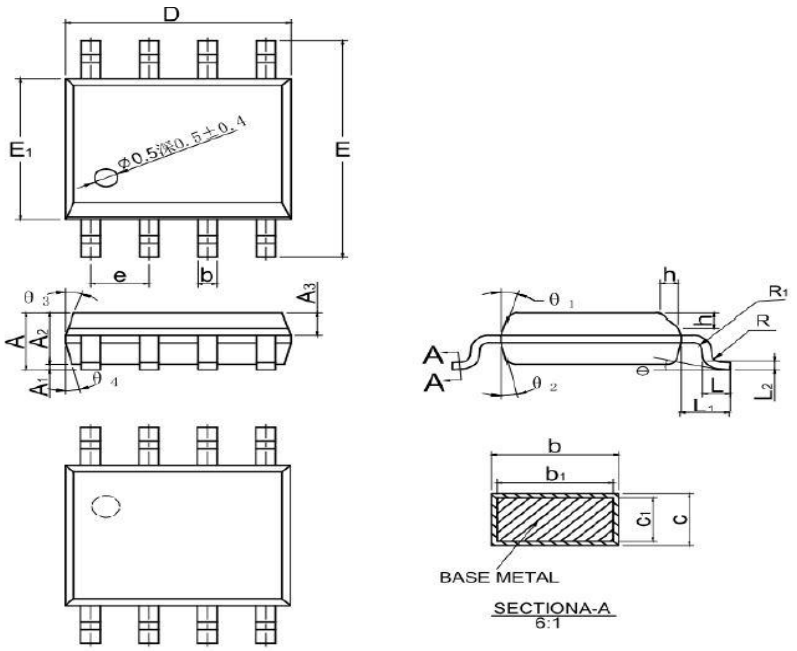
Electrical Characteristics

Unless otherwise specified, T_A=25°C~85°C, Vdd_{HV}=120V_{DC}

Parameter	Test Conditions	Symbol	Min	Typ	Max	Unit
Output resistance at low level output voltage	I_{OL}=20mA	R_{OL}	4.4	6.5	16	Ω
Output resistance at high	I_{OH}=-20mA	R_{OH}	13	16	30	Ω
Minimum supply voltage		V_{HMIN}		22	30	V
Current consumption in static mode	I_{FB}=0.25mA	I_{CC1}	0.3	0.61	1.0	mA
Current consumption without load		I_{CC2}	0.4	0.67	1.0	mA
Current consumption with load	1nF output load on Pin 5	I_{CC3}	1.2	1.72	2.2	mA
Operating frequency		f_{OSC}	80	90	100	kHz
Maximum duty ratio	I_{FB}=1uA	d_{max}	77	81	89	%
PWM/PFM switch duty ratio		d_{min}		5		%
Duty ratio	I_{FB}=0.1mA	d_{01mA}		32		%
Maximum control current at FB pin	Duty cycle=0%	I_{FBmax}		140	200	uA
FB pin voltage	Switching phase, I_{FB}=0.1mA	V_{FB}	0.96		1.04	V
Load regulation	I_{FB}=0.02mA~0.25mA	Δ V_{FB1}		25	40	mV
Input bias current	Through pin 1	I_{B-CS}	-4.0	0	4.0	uA
Threshold at current detector input		V_{CS-TH}	0.9	0.98	1.05	V
Output voltage fall time	C_{DRIVER}=1nF, from 90% down to 10% of output signal	t_f			250	ns
Output voltage rise time	C_{DRIVER}=1nF, from 10% up to 90% of current signal	t_r			250	ns
Soft-start time	From appearance pulses at DRIVER pin to increase Duty Cycle more than 50%	t_{ss}	4	9	15	ms
Start up voltage at Vdd pin		$V_{startup}$	12.2	13	13.4	V
Over voltage protection threshold		V_{OVP}	14.4	15.4	16	V
Thermal Shutdown		T_{OTP}	120Note	150		°C

Note: Chip by Chip manufacture testing @ Silicon heated 120°C, guarantee minimum junction temperature.

Package Outline Drawing



DIMENSIONS IN MUILLIMETERS

SYMBOL	MIN	NOM	MAX
A	1.35	1.55	1.75
A_1	0.10	——	0.25
A_2	1.25	1.40	1.65
A_3	0.50	0.60	0.70
b	0.39	——	0.49
b_1	0.28	——	0.48
c	0.10	——	0.25
c_1	0.10	——	0.23
D	4.80	4.90	5.00
E	5.80	6.00	6.20
E_1	3.80	3.90	4.00
e	1.27BSC		
L	0.45	——	1.00
L_1	1.04REF		
L_2	0.25BSC		
R	0.07	——	——
R_1	0.07	——	——
h	0.3	0.4	0.5
θ	0°	——	8°
θ_1	11°	17°	19°
θ_2	11°	13°	15°
θ_3	15°	17°	19°
θ_4	11°	13°	15°

NOTES:
1. DIMENSIONS IN MILLIMETERS (ANGLES IN DEGREES).
2. ALL DIMENSIONS DO NOT INCLUDE MOLD FLASH OR PROTRUSIONS.
3. ALL DIMENSIONS MEET JEDEC STANDRAD MS-012F