

Step-up Controller For Capacitor Discharge Ignitor

Features

- 100V MOSFET integrated.
- Wide input voltage range
- VCC clamp circuit integrated
- Transformer saturate protection
- Thermal protection and under voltage lockout circuitry integrated
- SOP8 package

Applications

- Capacitor Discharge Ignitor
- Other Step-up applications

Description

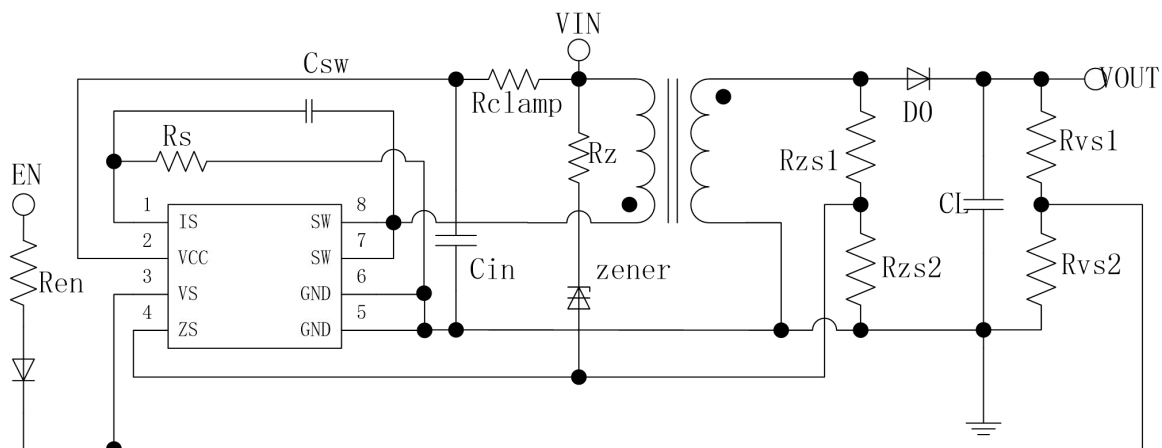
The MST2218 is a step-up transformer controller intended for building a capacitor discharge ignitor. The device can control a step-up transformer to charge a capacitor to an adjustable high voltage (DC) using battery voltage. The device has a power NMOS integrated, eliminating the need of external mosfets.

The MST2218 also integrated a current limit circuit with an external current sense resistor, and a voltage feedback to stop the oscillation when the voltage of the capacitor reaches the desired voltage.

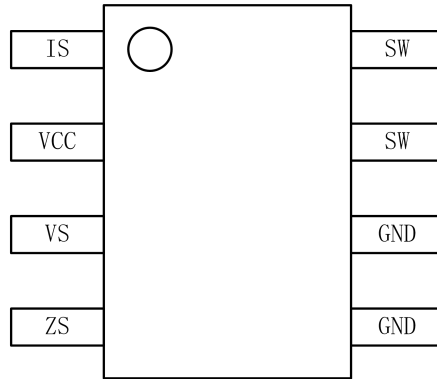
The MST2218 was designed to work in a quasi-resonance mode to speed up the charging process without increasing the space of the step-up transformer.

All input ports of the device have clamp diodes and ESD protections to ensure the robustness and reliability in the field.

Typical Application



Pin Configuration and Functions



Pin Functions

NO.	Name	Description
1	IS	The source of power nmos, current sense terminal
2	VCC	Power supply terminal
3	VS	Output voltage feedback terminal
4	ZS	Input of the zero-cross comparator.
5,6	GND	Ground.
7,8	SW	The drain of power nmos.



Absolute Maximum Ratings

ITEM	Parameter	Minimum	Maxmum	Unit
Voltage	VCC to GND ^(Note 1)	-0.3	15	V
	SW to GND	-0.3	100	V
	Input (VS\ZS\IS) to GND	-0.3	5.3	V
Current	IS peak current		4	A
Temperature	Operating Temperature	-40	85	°C
	Storage Temperature	-40	150	°C
Rthj-amb	SOP8		90	°C/W
Pdmax	SOP8		800	mW
ESD(HBM)	VCC/VS/ZS/GND pin		4	KV
Latch-up	VS/ZS/IS pin		200	mA

Note:

Apply voltage greater than VCCCLAMP to VCC pin may cause damage due to overheating. Take precaution methods to ensure the power dissipation within absolute maximum rating. Stresses beyond those listed under Absolute Maximum Ratings may cause permanent damage to the device. Exposure to absolute-maximum-rated conditions for extended periods may affect device reliability.

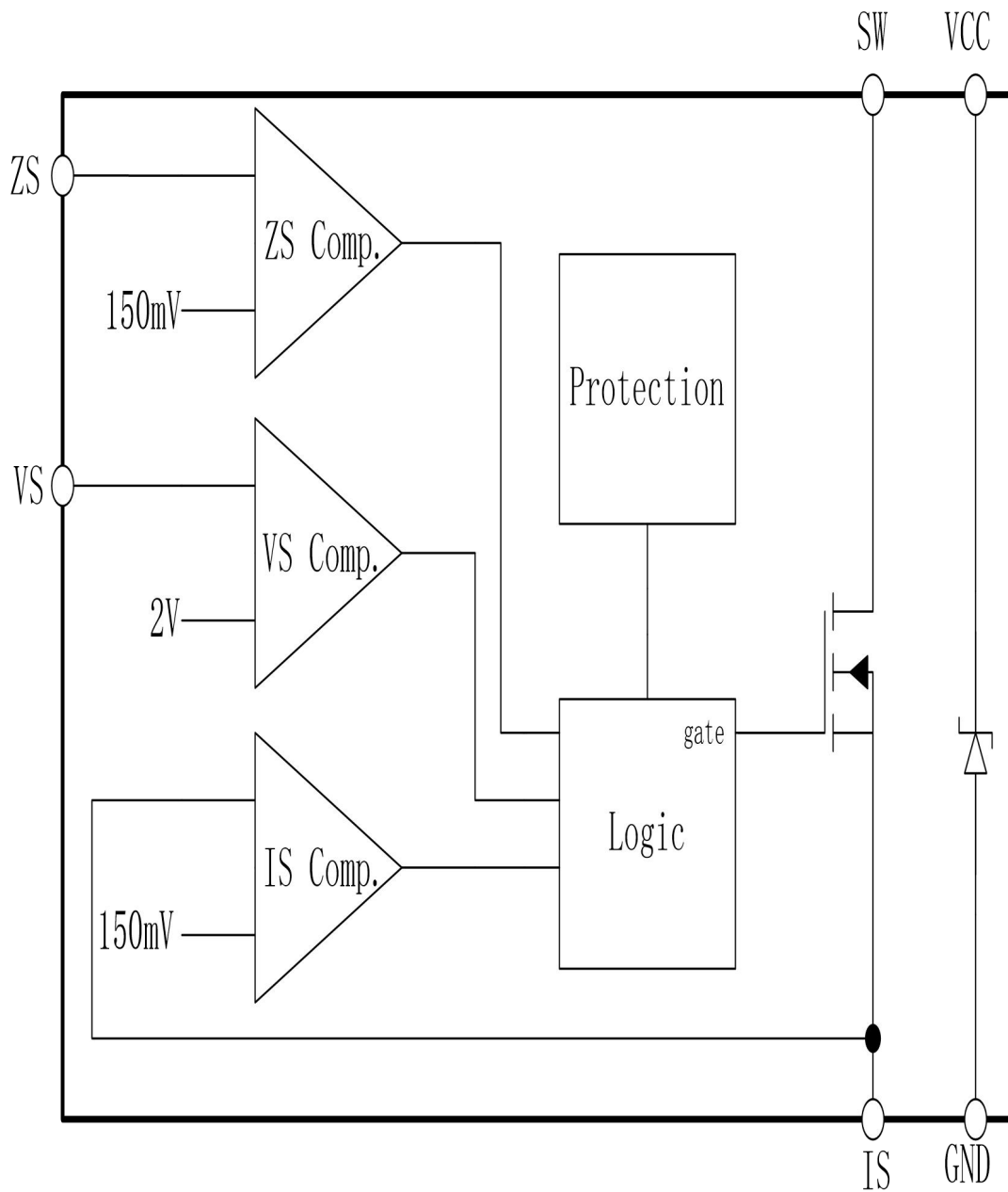
Electrical Characteristics

(VCC = 8V, T_A = 25°C unless otherwise specified)

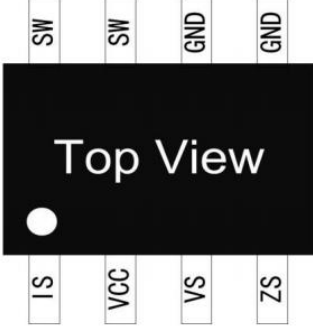
Parameter	Symbol	Condition	Min.	Typ.	Max.	Unit
Power Supply	V _{IN}		4.5	14	-	V
Clamp Voltage	V _{CCCLAMP}		10	13	16	V
Clamp Current	I _{CLAMP}	VCC=15V	30			mA
VCC supply current	I _{CC}	VCC=8V,switching@100kHz		500		uA
Feedback threshold voltage	V _S		1.92	2	2.08	V
VS blank time trigger voltage	V _{ssth}			2.5		V
ZS Output short-circuit protection threshold	V _{zssth}			1.5		V
VS Output short-circuit protection threshold	V _{vssth}	For 8 cycle continuous		0.15		V
Leading edge blocking time	T _{onmin}			1.3		uS
Minimum shutoff time	T _{offmin}			3		uS
Over current threshold voltage	V _{IS}			150		mV
Blank time	T _{protect}			1.5		mS
VCC under voltage lockout	V _{UVLO}			3.3	3.5	V
On resistance of power mos	R _{DSon}	VCC=10V,ID=3A(pulse test)		100		mΩ
Thermal shutdown temperature	T _{OFF}			140		°C
Thermal shutdown temperature hysteresis	T _{HYS}			20		°C

Note : (1) Dropout Voltage is the voltage difference between the input and the output at which the output voltage drops 2% below its nominal value.

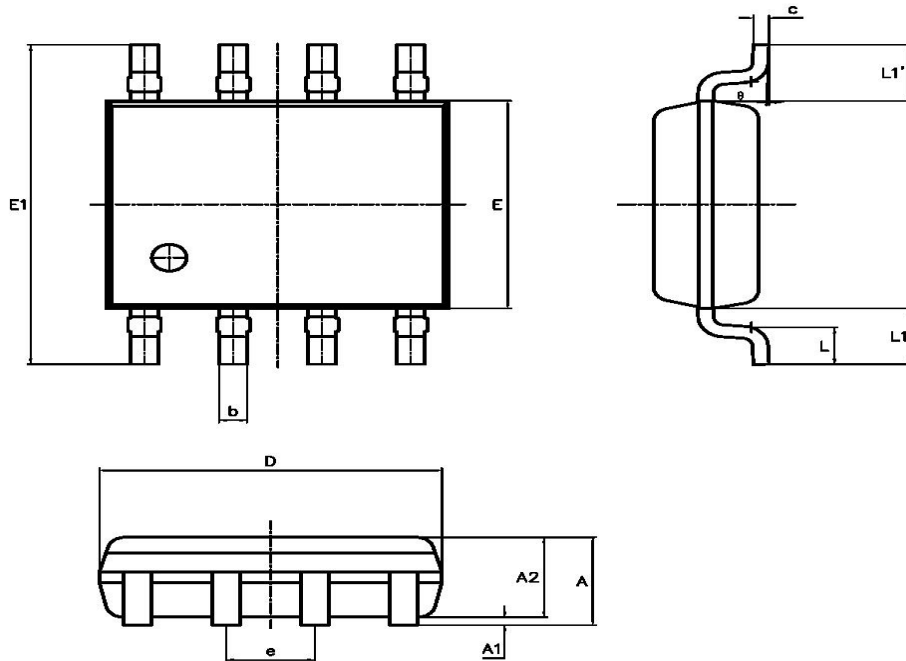
Functional Block Diagram



Ordering And Marking Information

Package/Order Information		
Order Part Number	Package Outline	 <p>Top View</p>
<p>MST2218KCD</p> <ul style="list-style-type: none"> D: Dual Die KC: SOP8 2218: Product Name MST: Company Name 		<p>Minimum Package</p> <p>SOP8 2500/Reel</p>
	Marking	<p>MST2218</p> <p>533X</p> <ul style="list-style-type: none"> 2218: Product Code X: Internal Code. Variable. 533: 5-2015; 33-the 33th week of this year MST: Company Code

Package Outline



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	1.595	1.775	0.063	0.070
A1	0.145	0.250	0.006	0.010
A2	1.350	1.550	0.053	0.061
b	0.375	0.425	0.015	0.017
c	0.170	0.250	0.007	0.010
D	4.700	5.100	0.185	0.200
E	3.875	3.925	0.153	0.155
E1	5.800	6.200	0.228	0.244
e	1.270(BSC)		0.050(BSC)	
L	0.615	0.765	0.024	0.030
L1	1.04REF		0.041REF	
L1-L1'	----	0.12	----	0.005
θ	0°	8°	0°	8°



Revision History and Checking Table

Version	Date	Revision Item	Modifier	Function & Spec Checking	Package & Tape Checking
1-0	2023-8-11		Xingxiaolin	Xingxiaolin	Xingxiaolin



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