1.0 General Description

IW7707C is a synchronous rectifier for Flyback converters. It integrates a 60V power MOSFET that can replace Schottky diode for high efficiency. It turns on the internal MOSFET if the V_{SW}<-500mV and turns it off before the current from GND to SW is lower than zero.

Features

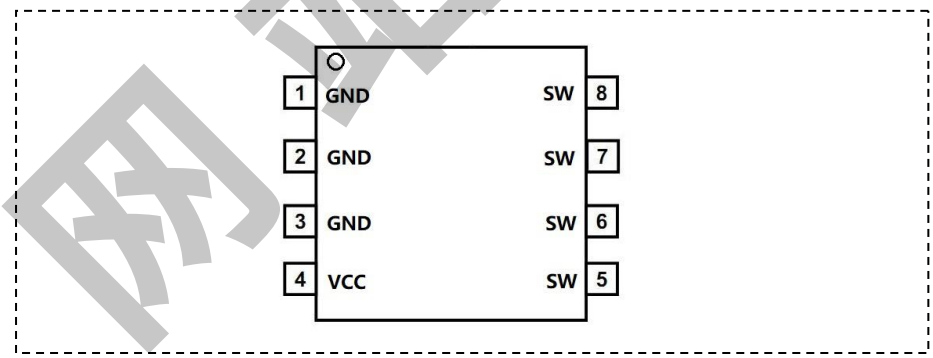
- ◆ Supports DCM and Quasi-Resonant Flyback converter
- ◆ Supports High-side and Low-side ectification
- ◆ Integrated 13mΩ 60V Power MOSFET
- ◆ No need external power supply

Applications

- Flyback converters
- Adaptors

2.0 Products Information

2.1 Pin configuration



IW7707C（8 Lead SOIC-8 Package）

Pin#	Name	Description
1、2、3	GND	Ground.
4	VCC	Power supply, Bypass a capacitor between VCC and GND.
5、6、7、8	SW	Inernal Power MOSFET Drain.

2.2 Marking Information

Part Number	Marking Information
IW7707C	KAAXXX

2.3 Table of Standard Tape and Reel Configurations

Part Number	Package Description	Quantity/Reel
IW7707C	SOP8，Halogen-free，T&R	4000 pcs

2.4 Block diagram

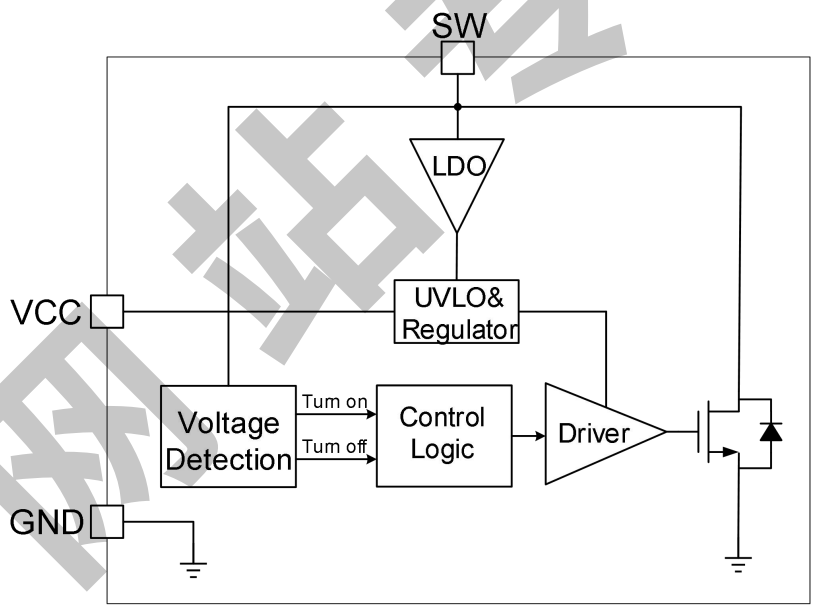


Figure2.1 IW7707C Functional Block Diagram

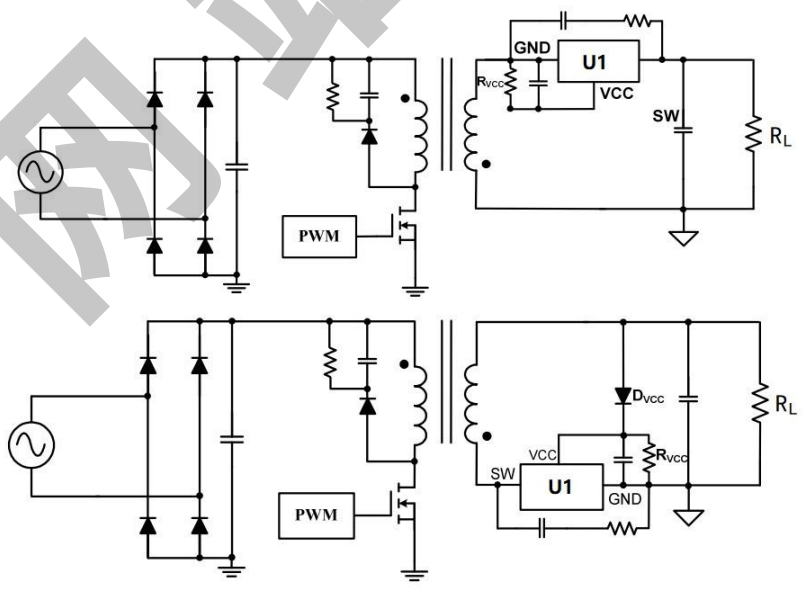
3.0 Performance

Absolute Maximum Rating	Symbol	Value	Units
SW PIN	V_{DRAIN}	60	V
Continuous Drain Current at Tc=25℃	$I_{D(DC)}$	58	A
Continuous Drain Current at Tc=100℃	$I_{D(DC)}$	41	A
Pulsed Drain Current note1	$I_{DM(pluse)}$	120	A
VCC PIN	VCC_{max}	15	V
Maximum Power Dissipation		2.5	W
Junction Temperature	T_{JMAX}	150	℃
Lead Temperature	T_{LEAD}	260	℃
Storage Temperature	T_{STG}	-65 to 150	℃
ESD Susceptibility（Human Body Mode）		2000	V
Recommended Operating Conditions	**Symbol**	**Value**	**Units**
SW PIN	SW	20 to 55	V
VCC PIN	VCC	7 to 9	V
Operation Junction Temp.	T_J	-40 to 125	℃
Thermal Performance	**Symbol**	**Value**	**Units**
Thermal resistance junction-to-ambient	$R_{\theta-JA}$	95	℃/W
Thermal resistance junction-to-case	$R_{\theta-JC}$	45	℃/W

Note1：Repetitive Rating：Pulse width limited by maximum junction temperature

4.0 Typical Application

The IW7707C contains a controller for a flyback circuit.



Note1：R_{VCC} is recommended in case IC is damaged in CCM.

Note2：D_{VCC} is recommended if VCC voltage is too low in light load.

5.0 Electrical Characteristics

(TA = 25℃, unless otherwise noted)

Symbol	Parameter	Test Conditions	Min	Typ	Max	Unit
VCC SECTION						
V_{CC}	VCC Voltage	SW=40V，VCC with 0.1uF	7.4	7.8	8.1	V
V_{CC_ST}	VCC startup voltage		3.6	3.8	4.0	V
V_{CC_UVLO}	VCC UVLO		3.5	3.65	3.8	V
I_Q	Quiescent Current	VCC=6V,C_{VCC}=0.1uF	70	85	100	uA
Internal MOS Section						
R_{DSON}	Internal MOS Rdson	VCC=10V，I_{SW}=20A		13	17	mΩ
I_{PEAK}	Maximum Peak Current	T_J = 25℃		58		A
T_B	Turn on Blanking Time			500		nS
T_{ON_DELAY}	Internal MOS turn on delay			24		nS
T_{OFF_DELAY}	Internal MOS turn off delay			10		nS
T_{ON_MIN}	MOS Minimum on time			1		uS
T_{OFF_MIN}	MOS Minimum off time			3		uS
SW SECTION						
V_{TURNON}	Internal MOS turn on Threshold			-0.5		V
$V_{(BR)DSS}$	Drain to Source Breakdown Voltage	VCC=9V，I_{SW}=250uA	60			V

6. Theory of Operation

6.1 Operation

IW7707C is a synchronous rectifier, it can replace the Schottky to improve the efficiency in Flyback converters. It supports operation in DCM and Quasi-Resonant Flyback converters. It can power itself through the internal LDO during the turn-off period, a 0.1uF capacitor is needed between VCC and GND.

6.2 Startup and Under-Voltage Lockout (UVLO)

During the startup period, when the VCC is increases to V_{CC_ST}, the chip starts to work.When the VCC is below UVLO threshold, the internal MOSFET is turned off and the current flows though body diode until the VCC exceeds the startup voltage.

6.3 Turn-on Blanking Time

The control circuitry contains a blanking function. When the internal power MOSFET is turned on, it at least last for some time, the turn on blanking time is about 500ns. During the turn on blanking period, the turn off threshold is not totally blanked, but changes the threshold current. This assures that the internal MOSFET can always be turned off even during the blanking period.

6.4 Turn On Phase

The switch current first flows through the body diode of integrate power MOSFET, which generates a negative V_{SW}. When the V_{SW} is higher than 0.7V and then V_{SW} is lower than V_{TURNON}, it turns on the integrate MOSFET after 100ns delay.

6.5 Turn Off Phase

The IW7707C senses the current of the internal MOSFET I_{SW}, before I_{SW} is lower than Internal MOS turn off threshold, the driver voltage of the switch is pulled down to zero after 10ns delay.

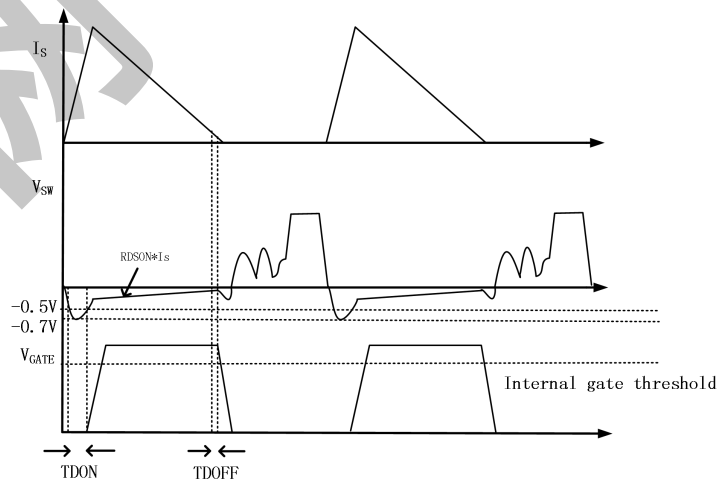


Figure6.1 Turn on and turn off dalay

6.7 RC Snubber Circuit

In some applications (output short circuit protection), the inductor current may go into slight CCM condition. To avoid the voltage spike across the synchronous rectifier, we suggest RC snubber should be placed between SW and GND, and a resistor should be paralleled with VCC capacitor.

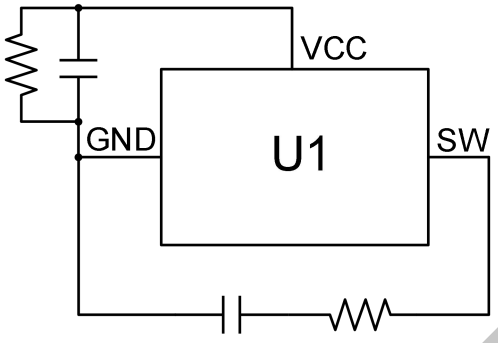


Figure6.2 RC Snubber circuit

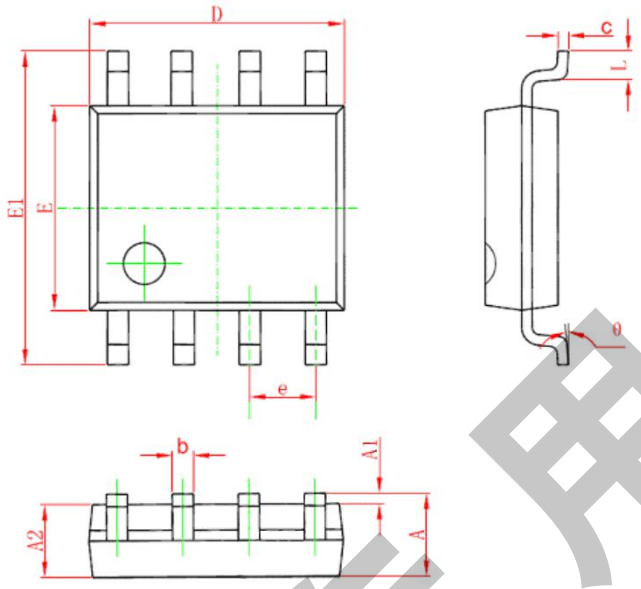
6.8 PCB Layout Guidelines

The VCC pin must be locally bypassed with a capacitor.

7. Package Information

SOP8

8-Pin Plastic SOP



Symbol	Dimension in Millimeters		Dimensions in Inches	
	Min	Max	Min	Max
A	1.350	1.750	0.053	0.069
A1	0.050	0.250	0.002	0.010
A2	1.250	1.650	0.049	0.065
b	0.310	0.510	0.012	0.020
c	0.100	0.250	0.004	0.010
D	4.700	5.150	0.185	0.203
E	3.800	4.000	0.150	0.157
E1	5.800	6.200	0.228	0.244
e	1.270(BSC)		0.050(BSC)	
L	0.400	1.270	0.016	0.050
θ	0°	8°	0°	8°

Data and specifications subject to change without notice.
This product has been designed and qualified for Industrial Level and Lead-Free.
Qualification Standards can be found on GS's Web site.
Global Semiconductor HEADQUARTERS:
Scotia Centre，4th Floor，P.O.Box 2804，George Town， Grand Cayman KY1-1112，Cayman
Visit us at www.globalsemi-group.com for sales contact information.