Description

SDC5061A is a synchronous rectifier for Flyback converters. It integrates a 45V power MOSFET that can replace Schottky diode for high efficiency.

SDC5061A is powered by its internal high-voltage current source. Its self-supply enables its rectification on both high-side and low side, and simplifies its external circuits.

Features

ÿ Support Discontinuous Current Mode (DCM) and Quasi-Resonant Mode

ÿ Integrated 15mÿ 45V Power MOSFET

ÿ Internal Power Supply

ÿ Support High-side and Low-side Rectification

ÿ Max./Min. Turn-on Time Limit

ÿ Protection for Overlap of Primary Switch and SR Switch

ÿ PackageÿSOP-8

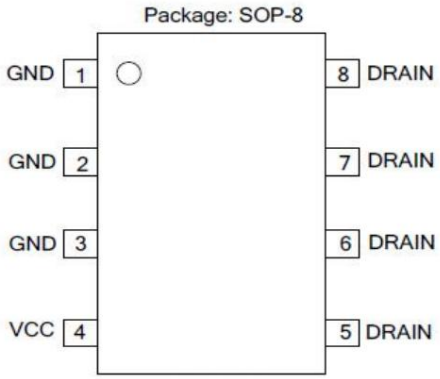
Application

ÿ Flyback Adaptors

ÿ Flyback Chargers

Figure 1. Package

Pin Description



Pin Num.	Pin Name	Function
1ÿ2ÿ3	GND	IC Ground
4	VCC	IC VCC Power Supply
5ÿ6ÿ7ÿ8	DRAIN	Drain Pole of Internal Power MOSFET

Table 1. Pin Description

Function Block

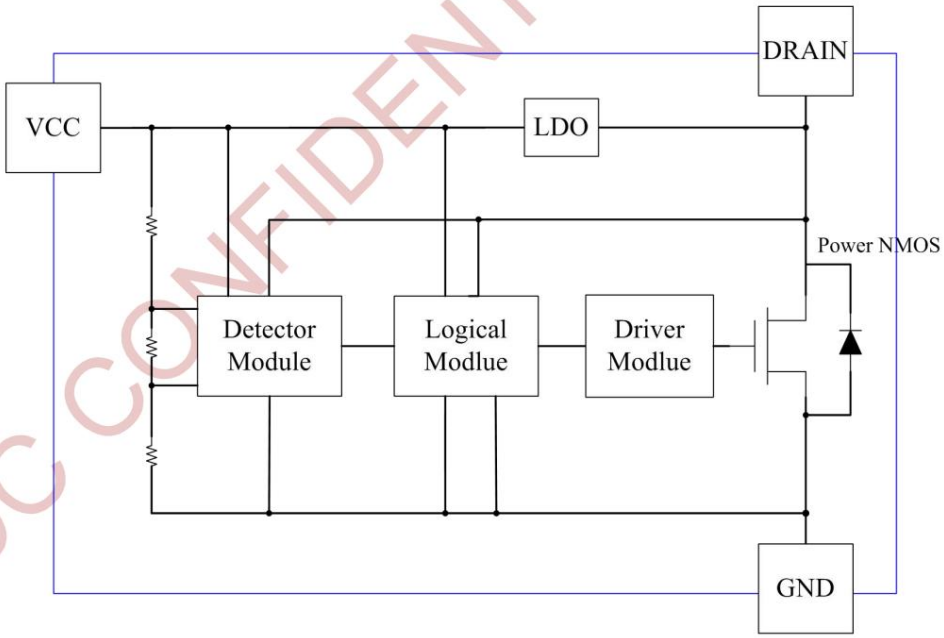
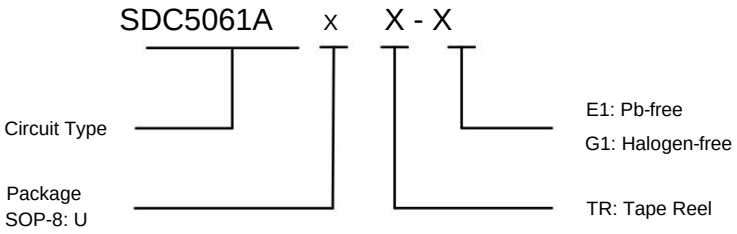


Figure 2. Block Diagram

Order Information



Package	Temp. Range	Part Number		Marking ID		Packing Type
		Pb-free	Halogen-free	Pb-free	Halogen-free	
SOP-8	-40~85ÿ	SDC5061AUTR-E1	SDC5061AUTR-G1	5061A	5061AG	Tape Reel

Absolute Maximum Ratings

(NOTE: Stresses greater than those listed under Absolute Maximum Ratings may cause permanent damage to the device.)

Parameter	Symbol	Value	Unit
DRAIN to GND	VDRAIN	45	V
VCC to GND	VCC	11	V
Value of switch continuous current	COUNTS	14	A
Peak value of switch current	GPA	19	A
Operating junction temperature TJ	TJmax	150	ÿ
Storage temperature TSTG	TSTG	-55~150	ÿ
Lead temperature (Soldering, 10sec)	TLEAD	260	ÿ

Table 2. Absolute Maximum Ratings

Recommended Operating Conditions

Parameter	Min	Max	Unit
DRAIN to GND		50	V
Operating Temperature Range	-40	85	Facing

Table 3. Recommended Operating Conditions

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Electrical Characteristics (Ta=25ÿÿVCC=8VÿVCC cap:100nF/25V, unless otherwise specified)

Parameter	Symbol	Condition	Min.	Type.	Max.	Unit
Power Supply Section						
VCC Start-up Current	IS	VCC=4V			150	ÿA
Operation Current	IOP	VCC=7.5V			300	ÿA
Start-up Voltage	VST			5		V
UVLO	-			4		V
VCC Clamping Voltage	VCC_clamp			10		V
CS Sample Section						
Turn-on Threshold	VTHON		-50		0	mV
Turn-off Threshold	VTHOFF		-20	-12.5	-5	mV
Turn-on Delay	tDON			130		ns
Turn-off Delay	tDOFF			100		ns
Protection Section						
Max. Turn-on Time	Ton_max			72		ÿs
MOSFET Section						
VDS Stress	VDSS(BR)	VGS=0V,ID=0.25mA	60			V
Conduction Resistance	RDS(ON)	VGS=10V,ID=15A		15		mÿ

Function Description

SDC5061A is a synchronous rectifier that works under DCM and QR mode.

Internal Power Supply

SDC5061A has its internal power supply circuits to provide energy to internal circuits and MOSFET driver.
When the primary main switch turns on, an internal LDO starts to charge VCC capacitor. As soon as VCC voltage reaches start-up threshold (VST), SDC5061A begins working.

When AC input is cut or in case protections are triggered, internal power supply can't provide enough energy and Vcc drops gradually. After Vcc drops below UVLO, SDC5061A stops working.

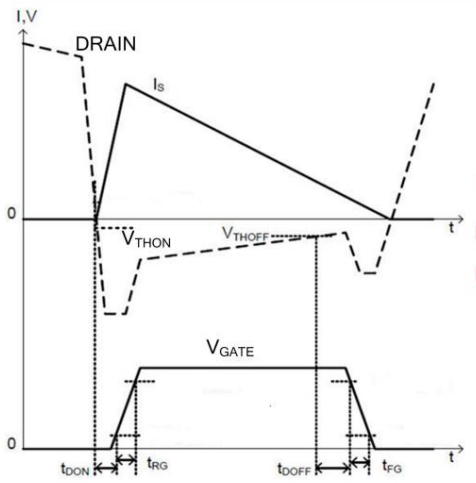


Figure 3. Vd,Is,Vg Waveforms

As shown in Figure3 ÿ SDC5061A detects Drain voltage (Vd) of power MOSFET to achieve its turn-on and turn-off. When Vd is less than turn-on threshold VTHON, SDC5061A turns on internal power MOSFET after turn-on delay time (tDON). Then secondary rectified current flows through power MOSFET, instead of its body diode.

When drain current falls near 0, Vd rises. As Vd reaches turn-off threshold VTHOFF, SDC5061A turns off its internal power MOSFET after turn-off delay time (tDOFF).

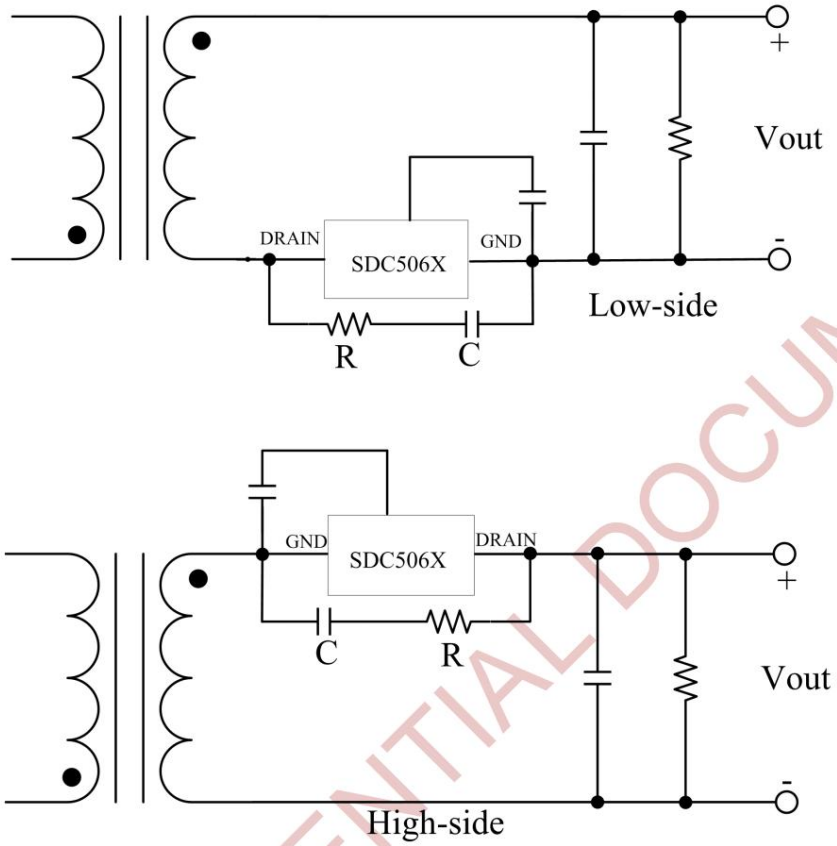
Min. Turn-on Time

After internal power MOSFET turns on, oscillation on Drain possibly makes Vd exceed VTHOFF. Power MOSFET has a risk of turning off much earlier.
SDC5061A has a limit of Minimum turn-on time to avoid oscillation noise on Drain.

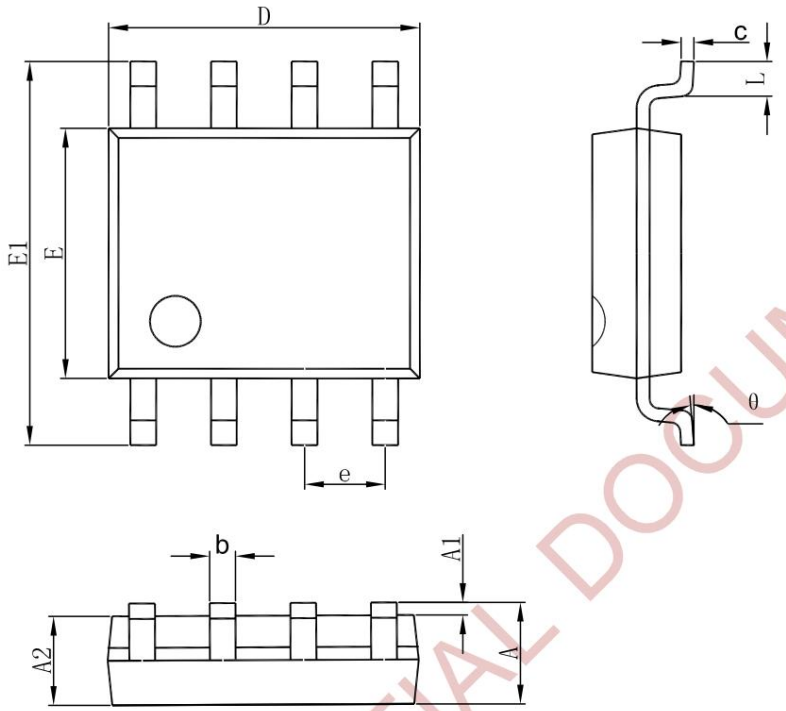
Max. Turn-on Time

When Flyback converters power on or output is short it takes much longer time to demagnetize transformer. The overlap of main switch and SR switch has a risk of damaging the converters. Maximum turn-on time reduces the chance of overlap to protect the converters.

Typical Application



Package



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	1.350	1.750	0.053	0.069
A1	0.100	0.250	0.004	0.010
A2	1.350	1.550	0.053	0.061
b	0.330	0.510	0.013	0.020
c	0.170	0.250	0.007	0.010
D	4.700	5.100	0.185	0.201
and	1.270(BSC)		0.050(BSC)	
E1	5.800	6.200	0.228	0.244
AND	3.800	4.000	0.150	0.157
L	0.400	1.270	0.016	0.050
i	0°	8°	0°	8°

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