

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

- Support Discontinuous Current Mode (DCM) and Quasi-Resonant Mode
- Integrated 15mΩ 45V Power MOSFET
- Internal Power Supply
- Support High-side and Low-side Rectification
- Max./Min. Turn-on Time Limit
- Protection for Overlap of Primary Switch and SR Switch
- Package: SOP-8

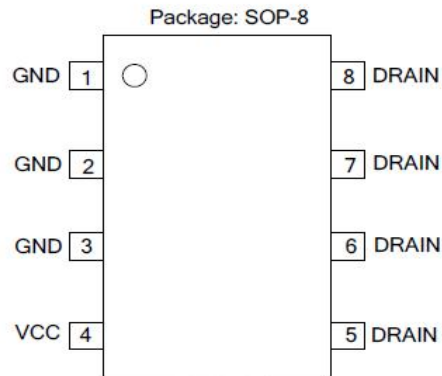
Application

- Flyback Adaptors
- Flyback Chargers



Figure 1. Package

Pin Description



Pin Num.	Pin Name	Function
1、2、3	GND	IC Ground
4	VCC	IC VCC Power Supply
5、6、7、8	DRAIN	Drain Pole of Internal Power MOSFET

Table 1. Pin Description

Function Block

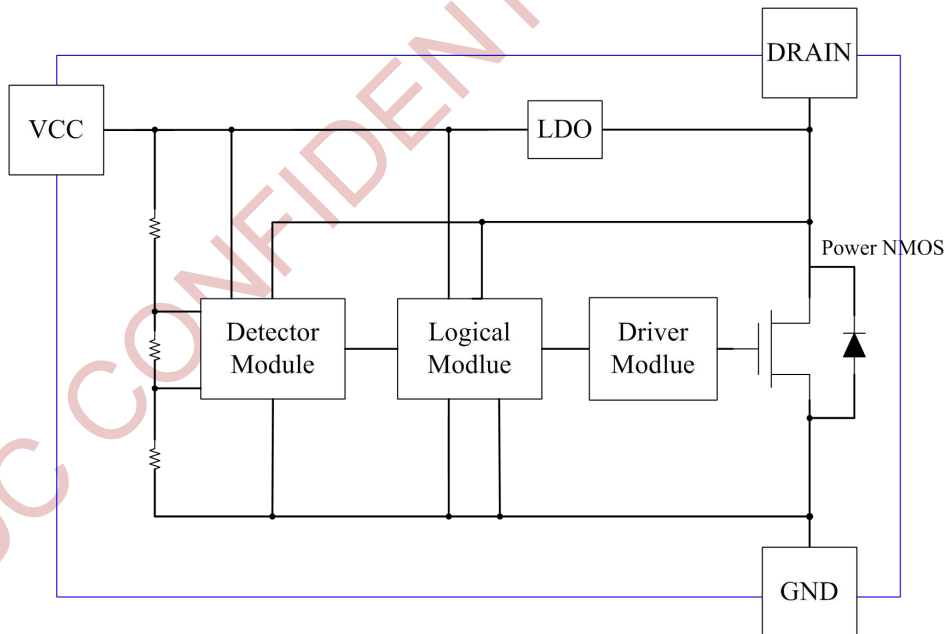
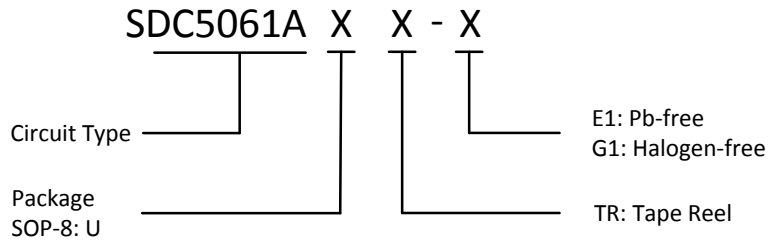


Figure 2. Block Diagram

Order Information



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

SDC CONFIDENTIAL DOCUMENT

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	V _{DRAIN}	45	V
VCC to GND	VCC	11	V
Value of switch continuous current	I _{CONTI}	14	A
Peak value of switch current	I _{PK}	19	A
Operating junction temperature T _J	T _{Jmax}	150	°C
Storage temperature T _{STG}	T _{STG}	-55~150	°C
Lead temperature (Soldering, 10sec)	T _{LEAD}	260	°C

Table 2. Absolute Maximum Ratings

Recommended Operating Conditions

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

Table 3. Recommended Operating Conditions

Electrical Characteristics ($T_a=25^{\circ}\text{C}$, $V_{CC}=8\text{V}$, V_{CC} cap:100nF/25V, unless otherwise specified)

Parameter	Symbol	Condition	Min.	Typ.	Max.	Unit
Power Supply Section						
V _{CC} Start-up Current	I _{ST}	V _{CC} =4V	-	-	150	μA
Operation Current	I _{OP}	V _{CC} =7.5V			300	μA
Start-up Voltage	V _{ST}	-		5		V
UVLO	-	-		4		V
V _{CC} Clamping Voltage	V _{CC_clamp}		-	10	-	V
CS Sample Section						
Turn-on Threshold	V _{THON}	-	-50	-	0	mV
Turn-off Threshold	V _{THOFF}	-	-20	-12.5	-5	mV
Turn-on Delay	t _{DON}		-	130		ns
Turn-off Delay	t _{DOFF}		-	100		ns
Protection Section						
Max. Turn-on Time	T _{on_max}		-	72	-	μs
MOSFET Section						
V _{DS} Stress	V _{DSS(BR)}	V _{GS} =0V, I _D =0.25mA	60	-	-	V
Conduction Resistance	R _{DS(ON)}	V _{GS} =10V, I _D =15A	-	15		mΩ

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.

As shown in Figure3 , SDC5061A detects Drain voltage (Vd) of power MOSFET to achieve its turn-on and turn-off. When Vd is less than turn-on threshold V_{THON} , SDC5061A turns on internal power MOSFET after turn-on delay time (t_{DON}). 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 V_{THOFF} , SDC5061A turns off its internal power MOSFET after turn-off delay time (t_{DOFF}).

Min. Turn-on Time

After internal power MOSFET turns on, oscillation on Drain possibly makes Vd exceed V_{THOFF} . 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.

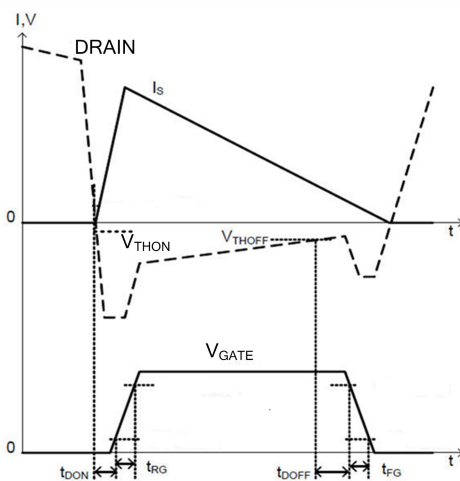
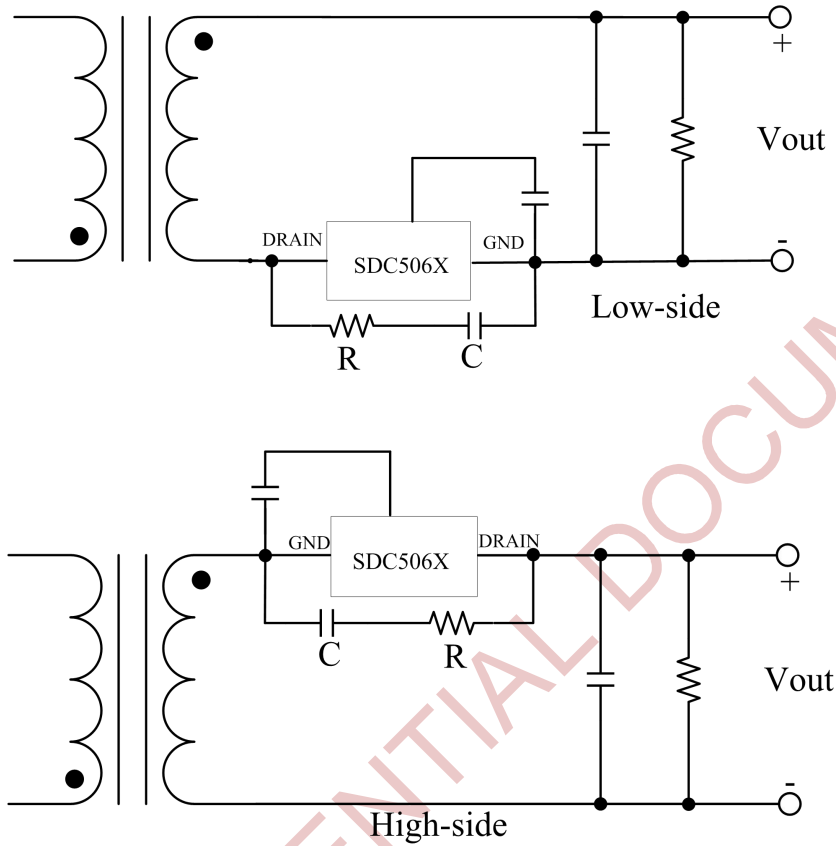
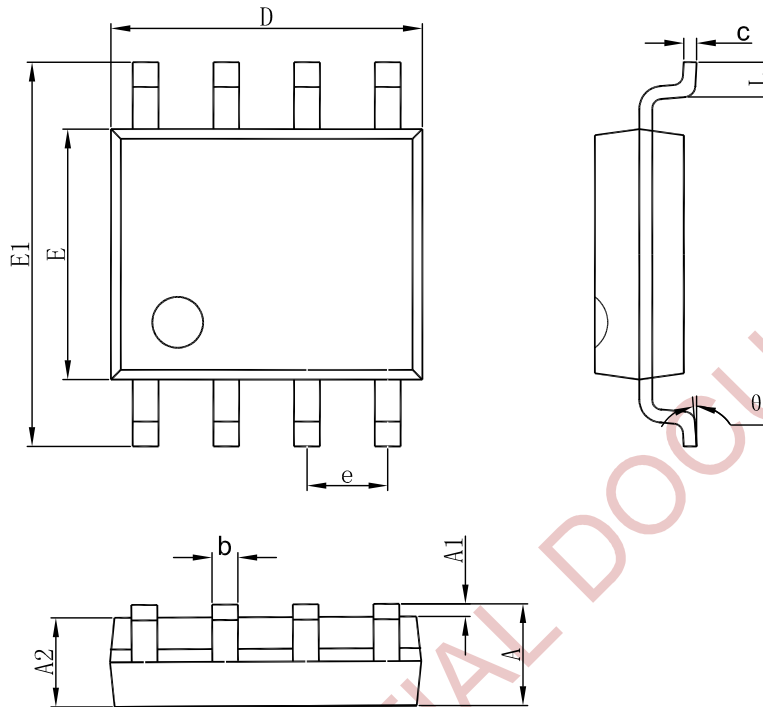


Figure 3. Vd,Is,Vg Waveforms

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
e	1.270 (BSC)		0.050 (BSC)	
E1	5.800	6.200	0.228	0.244
E	3.800	4.000	0.150	0.157
L	0.400	1.270	0.016	0.050
θ	0°	8°	0°	8°



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