CEP55xx

Secondary-Side Synchronous Rectifier

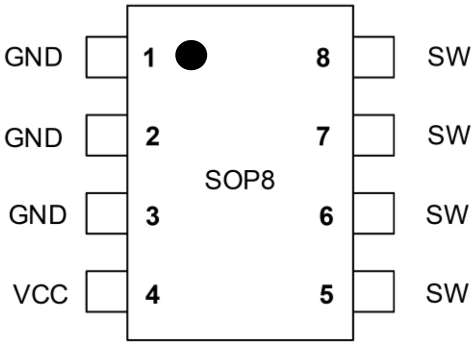
■ FEATURES

- ➢ Match DCM and Quasi Resonant(QR) fly-back converter
- ➢ Supports both High-side and Low-side rectification
- ➢ No need external power supply

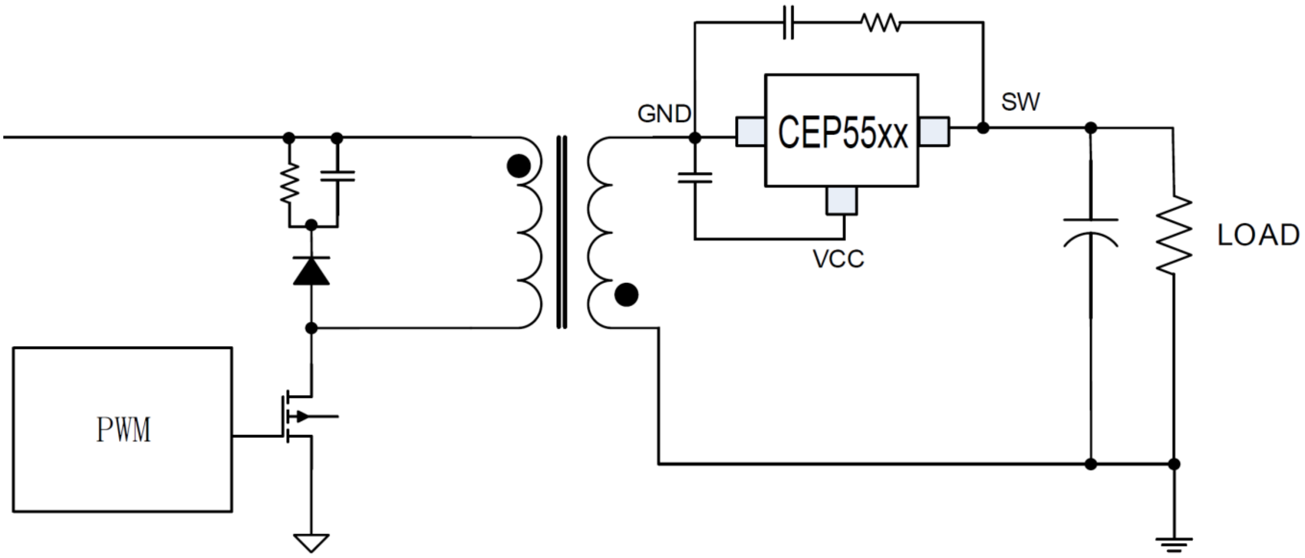
■ APPLICATIONS

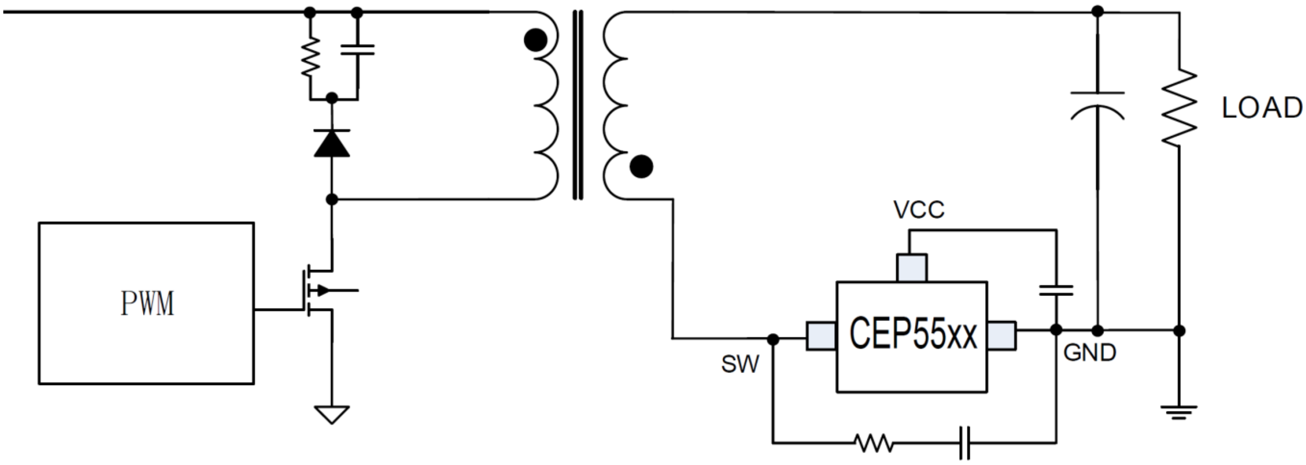
- ➢ Adapters/Chargers
- ➢ Fly-back converters

■ PACKAGE and SIMPLIFIED APPLICATION DIAGRAM



Pin No.	Pin Name	I/O	Description
1,2,3	GND	P	IC ground pin.
4	VCC	P	IC power supply pin.
5,6,7,8	SW		Drain of SR MOSFET





GENERAL DESCRIPTION

CEP55xx is a high performance secondary side switch for synchronous rectification (SR) in DCM operation fly-back.

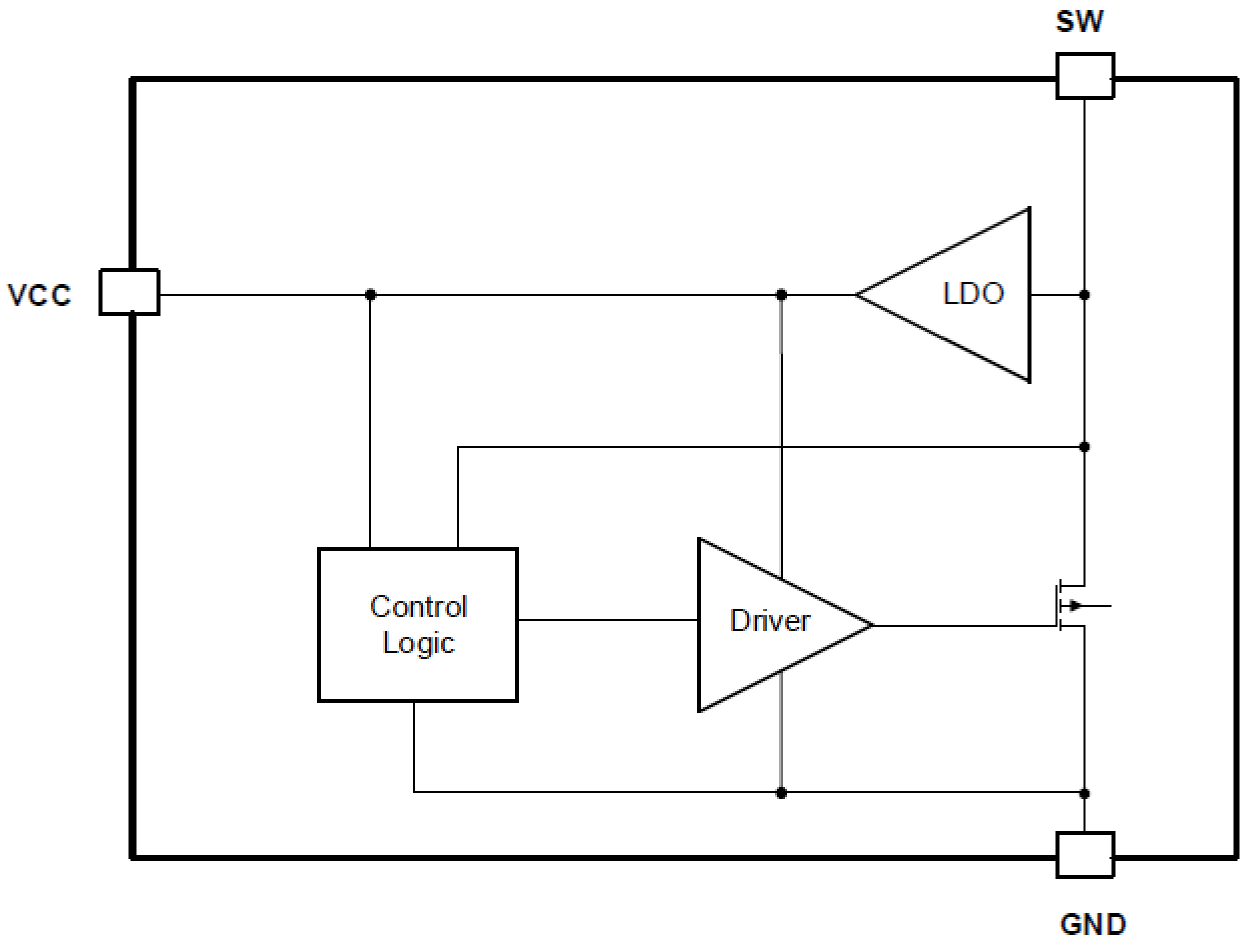
Using CEP55xx to replace diode can effectively reduce the secondary side rectifier power dissipation and increase efficiency for system.

CEP55xx is offered in SOP8 package.

Ordering Information

Part Number	Top Mark	Rdson	Package	Tape & Reel
CEP5525SP8	C5525 YYWW XX	15mΩ	SOP8	Yes
CEP5530SP8	C5530 YYWW XX	10mΩ	SOP8	Yes
CEP5535SP8	C5535 YYWW XX	7mΩ	SOP8	Yes

Block Diagram



■ **Absolute Maximum Ratings** (Note 1)

Parameter		Value	Unit
SW DC Supply Voltage		45	V
VCC DC Voltage		10	V
Package Thermal Resistance (SOP8)	θｊａ	184	℃/W
	θｊｃ	85	
Maximum Junction Temperature		150	℃
Operating Temperature Range		-40 to 85	℃
Storage Temperature Range		-65 to 150	℃
Lead Temperature (Soldering, 10sec.)		300	℃
ESD Capability, HBM (Human Body Model)		2	kV
ESD Capability, MM (Machine Model)		250	V

■ **Recommended Operation Conditions** (Note 2)

Parameter	Value	Unit
Supply Voltage, VCC	7 to 9	V
Operating Ambient Temperature	-40 to 85	℃

Note 1. Stresses beyond those listed under **“**Absolute Maximum Ratings**”** may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated in the operational sections of the specifications is not implied. Exposure to absolute maximum rating conditions for extended periods may affect device reliability.

Note 2. The device is not guaranteed to function outside its operating conditions.

■ ELECTRICAL CHARACTERISTICS

(TA = 25℃, VCC=8V, if not otherwise noted)

Symbol	Parameter		Test Conditions	Min	Typ	Max	Unit
I_Startup	VCC Start up Current		VCC=UVLO(OFF)-0.5V		50		uA
I_VDD_Op	Operation Current		VFB=3.2V, GATE=1nF		150		uA
UVLO(OFF)	VDD Under Voltage Lockout Exit (Startup)				3.8		V
UVLO(ON)	VDD Under Voltage Lockout Enter				3.6		V
VDD	VDD Operation Voltage		SW=40V, CVCC=0.1uF		8		V
VMOS_ON	MOS turn on threshold				-0.15		V
TON_D	MOS turn on delay				100		ns
TOFF_D	MOS turn off delay				10		ns
TLEB	MOS on leading edge blanking time				500		ns
TOFF_min	MOS minimum off time				2.5		us
Rdson	Internal MOS Rdson	CEP5525			15		mΩ
		CEP5530			10		
		CEP5535			7		

■ OPERATION DESCRIPTION

CEP55xx can replace Schottky diode to improve the efficiency in DCM fly-back converters. A power supply capacitor is connected between VCC and GND. An internal LDO circuit is adopted for its power supply during the primary switch on time.

➢ UVLO and Startup Operation

When the primary switch turns on, the power start from SW pin through LDO to VCC pin. When VCC voltage achieve UVLO(OFF), the SR circuit start to work. And when the VCC voltage drop below UVLO(ON), the SR circuit enter into restart mode.

➢ Operation Mode

When the secondary current first flows through the body diode of SR MOSFET, the voltage of SW pin will be lower than VMOS_ON, the SR MOSFET turns on and the conduction loss reduce, until the current through SR MOSFET decrease near to 0, which means the voltage of SW recovers to internal MOSFET turn off threshold, the SR MOSFET turns off. As shown in figure 1.

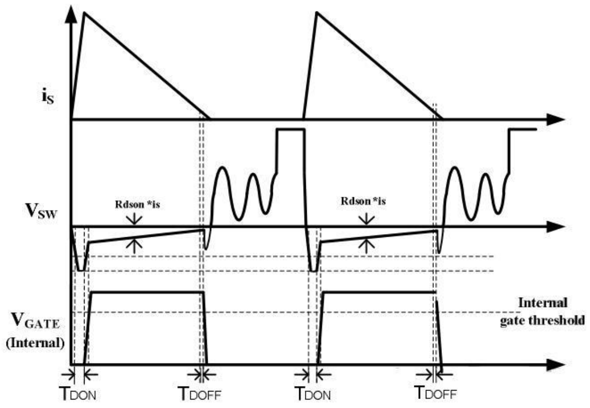


Fig.1 SR turn on and off waveform

➢ Turn-on Blanking Time

The control circuitry contains a blanking function. When the internal 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.

➢ RC Snubber Circuit

In some applications such as startup, output short protection, the system may go into slight CCM condition. To suppress the reverse spike voltage across the SR MOSFET, a RC snubber circuit is suggested to be place between SW and GND. As shown in figure 2.

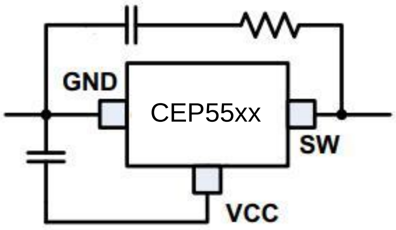
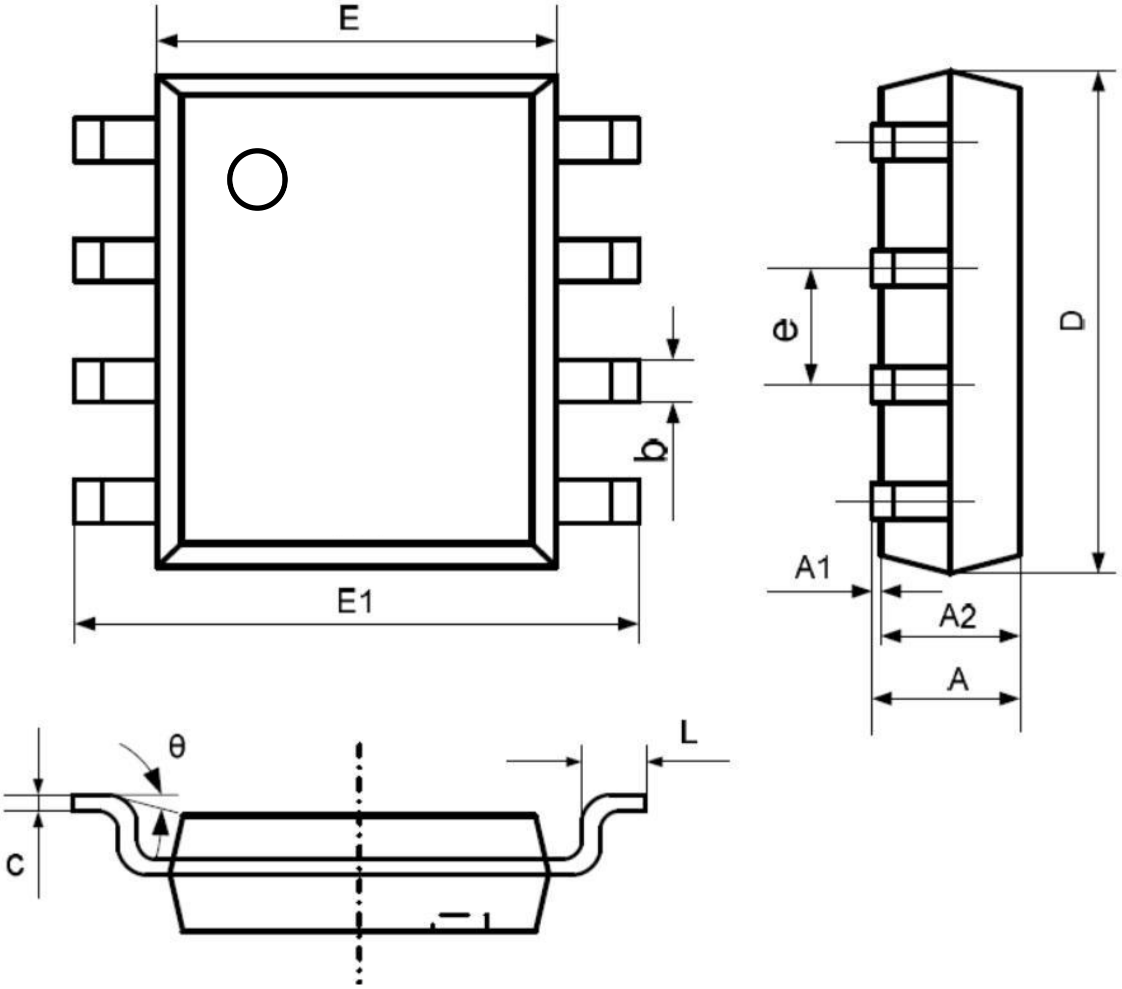


Figure 2. RC snubber for SR

- **PACKAGE OUTLINE**

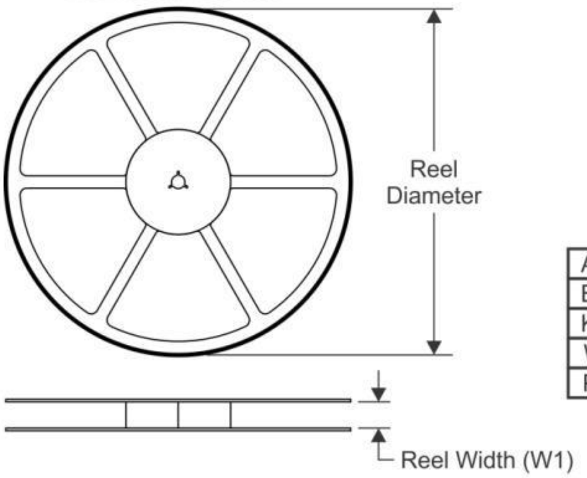
SOP-8



Symbol	Dimensions 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	0.170	0.250	0.006	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)		0.05 (BSC)	
L	0.400	1.270	0.016	0.050
θ	0º	8º	0º	8º

TAPE AND REEL INFORMATION

REEL DIMENSIONS



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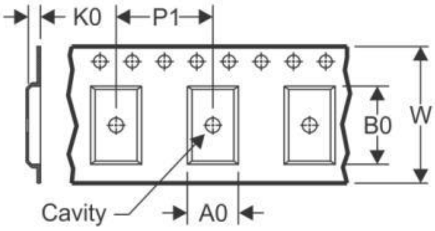
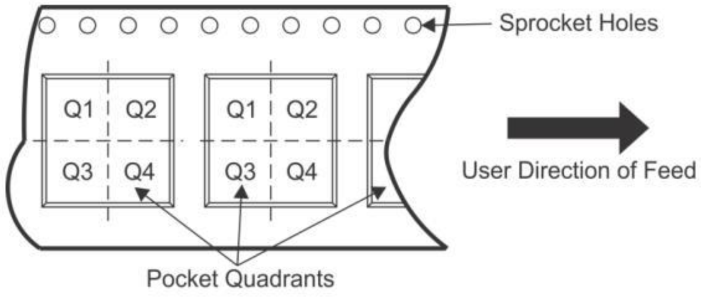


A0	Dimension designed to accommodate the component width
B0	Dimension designed to accommodate the component length
K0	Dimension designed to accommodate the component thickness
W	Overall width of the carrier tape
P1	Pitch between successive cavity centers

QUADRANT ASSIGNMENTS FOR PIN 1 ORIENTATION IN TAPE



***All dimensions are nominal**

Device	Package Type	Package Drawing	Pins	SPQ	Reel Diameter (mm)	Reel Width W1 (mm)	A0 (mm)	B0 (mm)	K0 (mm)	P1 (mm)	W (mm)
CEP5525SP8	SOP-8	C5525	8	2500	330.0	12.8	6.4	5.2	2.5	8.0	12.0
CEP5530SP8		C5530									
CEP5535SP8		C5535									