GENERAL DESCRIPTION

ZCC2362 is a highly integrated current mode PWM control IC optimized for high performance, low standby power and cost effective offline flyback converter applications.

At full loading, the IC operates in fixed frequency(65KHz) mode. When the loading goes low, it operates in Green mode with valley switching for high power conversion efficiency. When the load is very small, the IC operates in 'Extended Burst Mode' to minimize the standby power loss. As a result, high conversion efficiency can be achieved in the whole loading range.

VCC low startup current and low operating current contribute to a reliable power on startup and low standby design with ZCC2362.

ZCC2362 offers comprehensive protection coverage with auto-recovery including Cycle-by-Cycle current limiting (OCP), over load protection(OLP), VCC under voltage lockout (UVLO), over temperature protection (OTP), and over voltage protection (OVP). Excellent EMI performance is achieved with YT proprietary frequency shuffling technique.

The tone energy at below 23KHz is minimized in the design and audio noise is eliminated during operation.

ZCC2362 is offered in SOT23-6 package

APPLICATIONS

Offline AC/DC flyback converter for

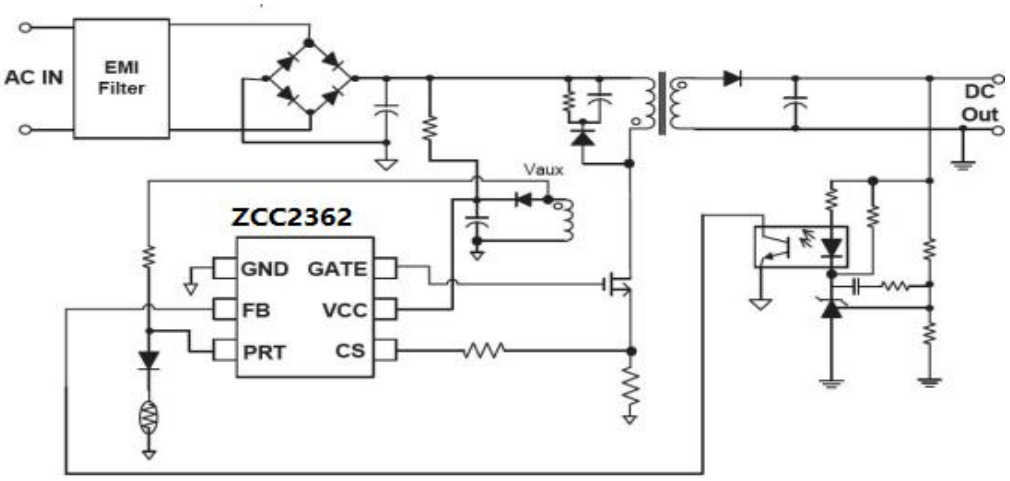
■ General power supply
■ Meet 75mW no load standby power standard
■ Power Adapter

FEATURES

■ Power on soft start reducing MOSFET Vds stress
■ Multi-Mode Operation 65KHz fix frequency mode @ Full Load Valley switching operation @ Green mode Burst Mode @ Light Load & No Load
■ Frequency shuffling for EMI
■ Extended burst mode control for improved efficiency and low standby power design
■ Audio noise free operation
■ Comprehensive protection coverage
  VCC Under Voltage Lockout with hysteresis (UVLO)
  VCC Over Voltage Protection (VCC OVP)
  Cycle-by-cycle over current threshold setting for constant output power limiting over universal input voltage range
  Over Load Protection (OLP) with auto-recovery
  External (if NTC resistor is connected at PRT pin)or internal Over Temperature Protection (OTP) with auto-recovery
  Output Over Voltage Protection(Output OVP) with auto-recovery, and the OVP triggered voltage can be adjusted by the resistor connected between auxiliary winding and PRT pin
  Output diode short protection with auto-recovery

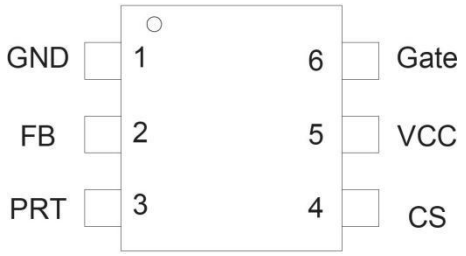
■Recommended power is less than 60W

TYPICALAPPLICATION



GENERAL INFORMATION

Pin Configuration



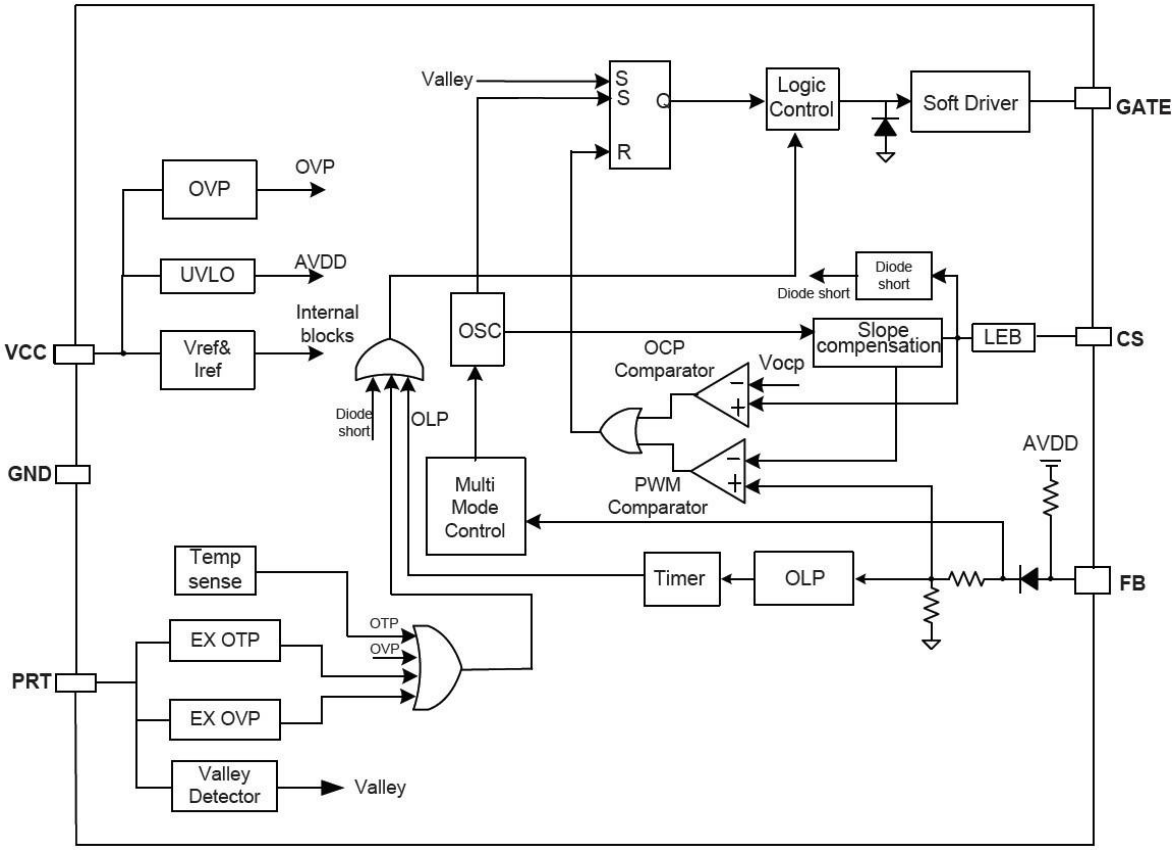
Absolute Maximum Ratings

Parameter	Value
VCC DC Supply Voltage	V_{OVP}-1V
FB Input Voltage	-0.3 to 7V
CS Input Voltage	-0.3 to 7V
PRT Input Voltage	-0.3 to 7V
Min/Max Operating Junction Temperature TJ	-40 to 150 ℃
Operating Ambient Temperature TA	-40 to 85 ℃
Min/Max Storage Temperature Tstg-	-55 to 150 ℃
Lead Temperature(Soldering, 10secs)	260 ℃

TERMINALASSIGNMENTS

Pin Name	I/O	Description
VCC	P	Power Supply
CS	I	Current sense input
Gate	O	Totem-pole gate driver output for power MOSFET
GND	P	Ground
PRT	I	Multiple functions pin. Connecting a NTC resistor to ground for OTP detection. Connecting a resistor from Vaux can adjust OVP trigger voltage and detect transformer core demagnetization. If both OTP and OVP are needed, a diode should be connected between PRT pin and the NTC resistor.
FB	I	Feedback input pin. The PWM duty cycle and the current-sense signal at Pin CS.

FUNCTIONAL BLOCK DIAGRAM



ELECTRICAL CHARACTERISTICS
(TA = 25℃, VCC=18V, unless otherwise noted)

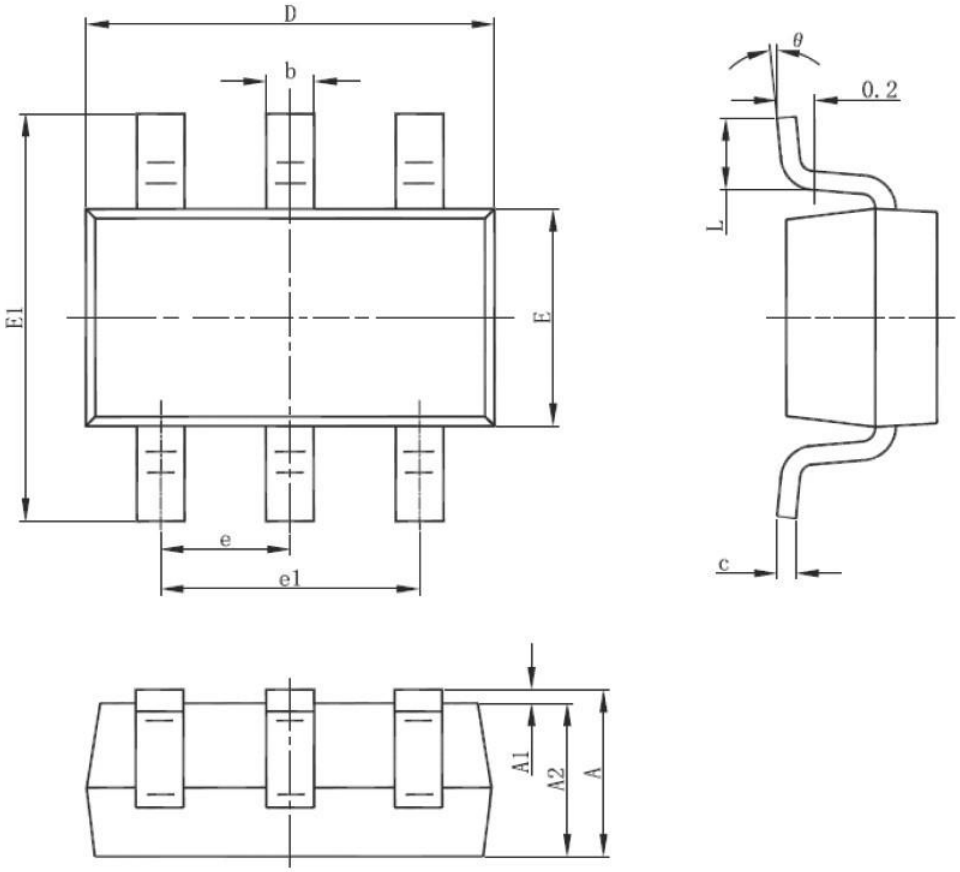
Symbol	Parameter	Test Conditions	Min	Typ.	Max	Unit
Supply Voltage (VDD)						
Istartup	VCC Start up Current	VCC=UVLO(OFF)-1V, measure leakage current into VCC		2	5	uA
I_VCC_Operation	Operation Current	VDD=18V,CS=4V, FB=3.5V,measure I(VCC)		2.5	3	mA
I_VCC_Burst	Burst Current	CS=0V,FB=0.5V,measure I(VCC)		0.6	0.7	mA
UVLO(ON)	VCC Under Voltage Lockout Enter		6.7	7.2	7.7	V
UVLO(OFF)	VCC Under Voltage Lockout Exit (Recovery)		14.8	15.8	16.8	V
Vpull-up	Pull-up PMOS active			10		V
OVP	VCC Over Voltage Protection threshold voltage	FB=3V,CS=0V. Slowly ramp VCC, until no gate switching.	26.5	28	29.5	V
Feedback Input Section(FB Pin)						
VFB_Open	VFB Open Loop Voltage			5.1		V
Avcs	PWM input gain ΔVFB/ΔVCS			3.5		V/V
Maximum duty cycle	Max duty cycle @ VCC=18V,VFB=3V,VCS=0V		77	80	83	%
Vref_green	The threshold enter green mode			2.1		V
Vref_burst_H	The threshold exits burst mode			1.33		V
Vref_burst_L	The threshold enters burst mode			1.23		V
IFB_Short	FB pin short circuit current	Short FB pin to GND and measure current		0.18		mA
VTH_OLP	Open loop protection, FB			4.4		V

	Threshold Voltage					
Td_OLP	Open loop protection, Debounce Time			60		ms
ZFB_IN	Input Impedance			30		KΩ
Sense Input(CS Pin)						
SST_CS	Soft start time for CS peak			2		ms
T_blanking	Leading edge blanking time			300		ns
Td_OC	Over Current Detection and Control Delay	From Over Current Occurs till the Gate driver output start to turn off		90		ns
VTH_OC	Internal Current Limiting Threshold Voltage with zero duty cycle		0.43	0.45	0.47	V
VTH_OC_ Clamp	OCP CS voltage clamper			0.72		V
PRT pin						
IRT	Output current for external OTP detection			98		uA
VOTP	Threshold voltage for external OTP		0.95	1	1.05	V
Ioutput_ovp	Current threshold for adjustable output OVP		170	180	190	uA
Td_output_ ovp	Output OVP debounce time			5		Cycl es
In-chip OTP						
OTP enter				150		℃
OTP exit				120		℃
Oscillator						
FOSC	Normal Oscillation Frequency	VDD=18V,FB= 3V, CS=0V	63	68	73	KHz
△f_OSC	Frequency jittering			+/-6		%
F_shuffling	Shuffling frequency			32		Hz
△f_Temp	Frequency Temperature Stability			1		%
△f_VCC	Frequency Voltage Stability			1		%
F_Burst	Burst Mode Switch Frequency			23		KHz
Gate driver						

VOL	Output low level @ VDD=18V,Io=5mA				1	V
VOH	Output high level @ VCC=18V,Io=20mA		6			V
V_clamping	Output clamp voltage			12		V
T_r	Output rising time 1.2V ~ 10.8V @ CL=1000pF			100		ns
T_f	Output falling time 10.8V ~ 1.2V @ CL=1000pF			30		ns

PACKAGE MECHANICAL DATA

SOT-23-6L PACKAGE OUTLINE DIMENSIONS



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	1.000	1.450	0.039	0.057
A1	0.000	0.150	0.000	0.006
A2	0.900	1.300	0.035	0.051
b	0.300	0.500	0.012	0.020
c	0.080	0.220	0.003	0.009
D	2.800	3.020	0.110	0.119
E	1.500	1.726	0.059	0.068
E1	2.600	3.000	0.102	0.118
e	0.950 (BSC)		0.037 (BSC)	
e1	1.800	2.000	0.071	0.079
L	0.300	0.600	0.012	0.024
θ	0°	8°	0°	8°