ACT512

Product Brief, 18-Feb-14

ActiveQR™ Quasi-Resonant PWM Controller

FEATURES

- **CCM and Quasi-Resonant Operation**
- **Adjustable up to 75kHz Switching Frequency**
- **OCP/OLP Protection**
- **Integrated Patented Frequency Foldback Technique**
- **Integrated Patented Line Compensation**
- **Built-in Soft-Start Circuit**
- **Line Under-Voltage, Thermal, Output Over-voltage, Output Short Protections**
- **Current Sense Resistor Short Protection**
- **Transformer Winding Short Protection**
- **100mW Standby Power**
- **Complies with Global Energy Efficiency and CEC Average Efficiency Standards**
- **Tiny SOT23-6 Packages**

APPLICATIONS

- **AC/DC Adaptors/Chargers for Cell Phones, Cordless Phone, PDAs, E-books**
- **Adaptors for Portable Media Player, DSCs, Set-top boxes, DVD players, records**
- **Linear Adapter Replacements**

GENERAL DESCRIPTION

The ACT512 is a high performance peak current mode PWM controller. ACT512 applies *ActiveQR™* and frequency foldback technique to reduce EMI and improve efficiency. ACT512's maximum design switching frequency is set at 75kHz. Very low standby power, good dynamic response and accurate voltage regulation is achieved with an opto-coupler and the secondary side control circuit.

The idle mode operation enables low standby power of 100mW with small output voltage ripple. By applying frequency foldback and *ActiveQR™* technology, ACT512 increases the average system efficiency compared to conventional solutions and exceeds the latest ES2.0 efficiency standard with good margin.

ACT512 integrates comprehensive protection. In case of over temperature, over voltage, winding short, current sense resistor short, open loop and overload conditions, it would enter into auto restart mode including Cycle-by-Cycle current limiting.

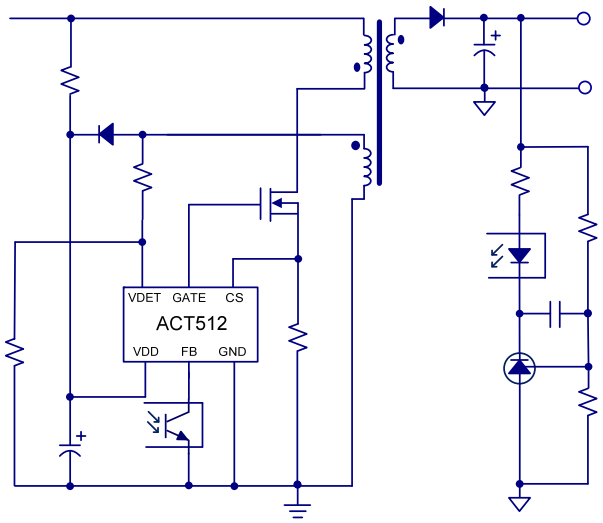
ACT512 is to achieve no overshoot and very short rise time even with a big capacitive load with the built-in fast and soft start process.

In full load condition, ACT512 is able to be designed to work in both CCM mode and DCM mode to meet different types of applications. Quasi-Resonant (QR) operation mode can improve efficiency during DCM operation, and reduce EMI and further reduce the components in input filter.

ACT512 is ideal for applications up to 60 Watts.

Figure 1:

Simplified Application Circuit

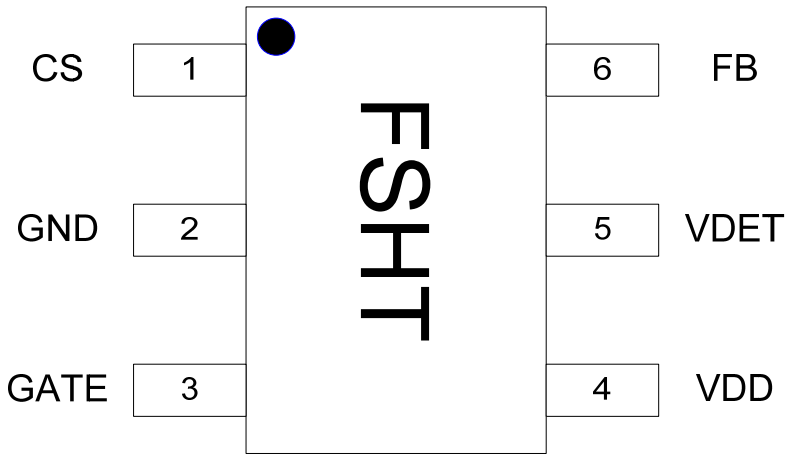


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ORDERING INFORMATION

PART NUMBER	TEMPERATURE RANGE	PACKAGE	PINS	PACKING METHOD	TOP MARK
ACT512US-T	-40°C to 85°C	SOT23-6	6	TUBE & REEL	FSHT

PIN CONFIGURATION



SOT23-6
ACT512US

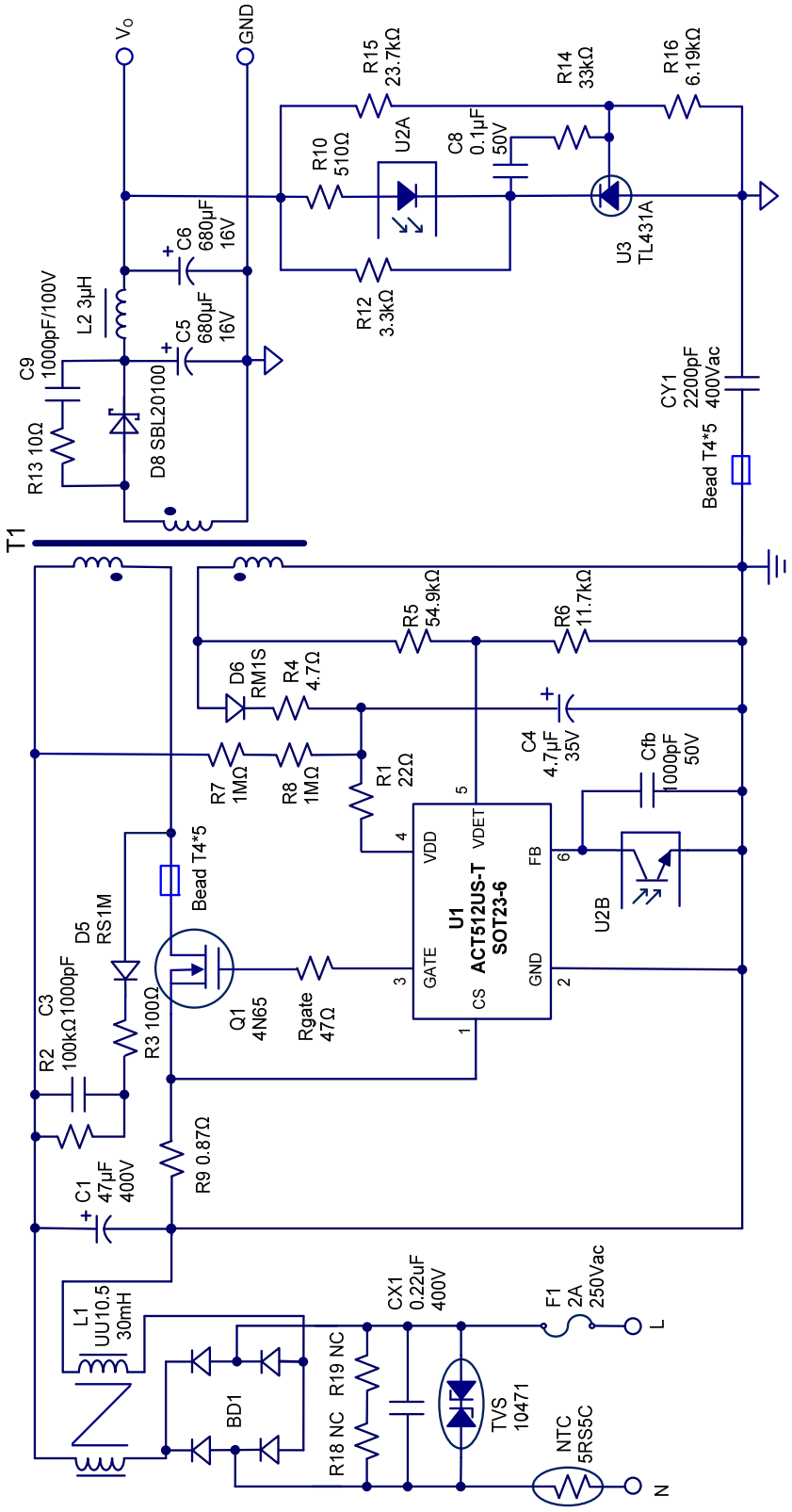
PIN DESCRIPTIONS

PIN	NAME	DESCRIPTION
1	CS	Current Sense Pin. Connect an external resistor (R_{CS}) between this pin and ground to set peak current limit for the primary switch.
2	GND	Ground.
3	GATE	Gate Drive. Gate driver for the external MOSFET transistor.
4	VDD	Power Supply. This pin provides bias power for the IC during startup and steady state operation.
5	VDET	Valley Detector Pin. Connect this pin to a resistor divider network from the auxiliary winding to detect zero-crossing points for valley turn on operation.
6	FB	Feedback Pin. Connect this pin to optocouplers's collector for output regulation.

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Figure 4:

Universal VAC Input, 12V/2A Output Adaptor



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Table 1:

ACT512 12V24W Bill of Materials

ITEM	REFERENCE	DESCRIPTION	QTY	MANUFACTURER
1	U1	IC, ACT512, SOT23-6	1	Active-Semi
2	C1	Capacitor, Electrolytic, 47μF/400V, 16 × 14mm	1	KSC
3	C3	Capacitor, Ceramic,1000pF/500V,0805,SMD	1	POE
4	C4	Capacitor, Electrolytic, 4.7μF/35V, 5 × 11mm	1	KSC
5	C5,C6	Capacitor, Electrolytic, 680μF/25V, 10 × 11.5mm	2	KSC
6	C8	Capacitor, Ceramic, 0.1μF/50V,0805,SMD	1	POE
7	C9	Capacitor, Ceramic,1000pF/100V,0805,SMD	1	POE
8	Cfb	Capacitor, Ceramic,1000pF/50V,0805,SMD	1	POE
9	D1-D4	Diode, Rectifier ,1000V2A, RL207, DO-41	4	Good-Ark
10	D5,D6	Diode, Ultra Fast, FR107,1000V/1.0A, DO-41	2	Good-Ark
11	D8	Diode, Schottky, 100V/20A, SBL20100, DO-220	1	Good-Ark
12	L1	CM Inductor, 30mH, UU10.5	1	SoKa
13	Bead1,2	T6*2*3, R5	2	SoKa
14	L3	DM Inductor, 3μH, R5	1	SoKa
15	Q1	Mosfet Transisor, 4N65, TO-220F	1	ST
16	PCB1	PCB, L*W*T = 48.5x29x1.6mm, Cem-1, Rev:A	1	Jintong
17	F1	Fusible, 2A/250V	1	TY-OHM
18	R12	Chip Resistor, 3.3kΩ, 0805, 5%	1	TY-OHM
19	R2	Carbon Resistor, 100kΩ, 2W, 5%	1	TY-OHM
20	R3	Chip Resistor, 100Ω, 0805, 5%	1	TY-OHM
21	R4	Chip Resistor, 4.7Ω, 0805, 5%	1	TY-OHM
22	R5	Chip Resistor, 54.9kΩ, 0805, 1%	1	TY-OHM
23	R6	Chip Resistor, 11.7kΩ, 0805, 1%	1	TY-OHM
24	R7,R8	Chip Resistor, 1MΩ, 0805, 5%	2	TY-OHM
25	R9	Chip Resistor, 0.87Ω,1W, 1%	1	TY-OHM
26	R10	Chip Resistor, 510Ω, 0805, 5%	1	TY-OHM
27	R14	Chip Resistor, 300kΩ, 0805, 5%	1	TY-OHM
28	R15	Chip Resistor, 23.7kΩ, 0805, 1%	1	TY-OHM
29	R16	Chip Resistor, 6.19kΩ, 0805, 1%	1	TY-OHM
30	Rgate	Chip Resistor, 47Ω, 0805, 5%	1	TY-OHM
31	T1	Transformer, L_P = 0.8mH, RM8	1	
32	NTC	Thermistor, SC053	1	TY-OHM
33	TVS	Varistor, 10471	1	TY-OHM
34	CX1	X capacitance, 0.22μF/400V,X1	2	
35	CY1	Y capacitance, 2200pF/400V,Y1	1	SEC
36	U2	Opto-coupler, PC817C CTR = 200%	1	Sharp
37	U3	Voltage Regulator, TL431A, V_{REF} = 2.5V	1	ST

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