

PeakSwitch™ Family

Enhanced, Energy-Efficient, Off-Line Switcher IC With Super Peak Power Performance



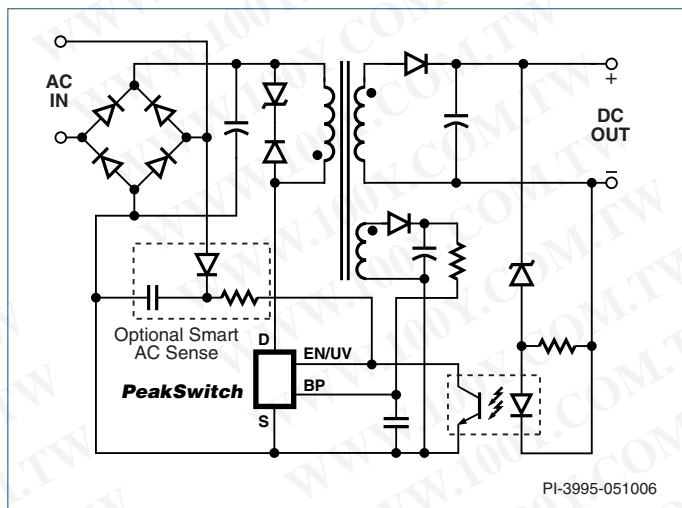
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[Http://www.100y.com.tw](http://www.100y.com.tw)



Typical Applications: Inkjet Printer, Data Storage, Audio Amplifier, DC Motor Drives

TYPICAL PEAK POWER APPLICATION



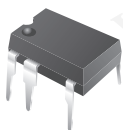
FEATURES & BENEFITS

HIGH PERFORMANCE AT LOW COST

- Ideal for large peak to continuous load ratio requirements (up to $3 \times P_{OUT(CONT.)}$)
- Programmable smart AC line sensing provides latching shutdown during short circuit, overload and open loop faults
- Adaptive current limit reduces output overload power
- Accurate hysteretic thermal shutdown with automatic recovery provides complete system level overload protection and eliminates need for manual reset
- Very low component count – higher reliability and single side printed circuit board
- Frequency jittering reduces EMI filter cost

EcoSmart® - EXTREMELY ENERGY EFFICIENT

- Surpasses California Energy Commission (CEC), ENERGY STAR, and EU requirements
- No-load consumption <200 mW at 265 VAC input
- Standby output power ≥ 0.6 W for 1 W input power
- Sleep mode power ≥ 2.4 W at 3 W input



P = DIP-8



Y = TO-220



F = TO-262

OUTPUT POWER TABLE

PRODUCT	230 VAC $\pm 15\%$		85-265 VAC	
	Adapter Cont.	Adapter Peak	Adapter Cont.	Adapter Peak
PKS603 P	13 W	32 W	9 W	25 W
PKS604 P	23 W	56 W	16 W	44 W
PKS604 Y/F	35 W	56 W	23 W	44 W
PKS605 P	31 W	60 W	21 W	44 W
PKS605 Y/F	46 W	79 W	30 W	58 W
PKS606 P	35 W	66 W	25 W	46 W
PKS606 Y/F	68 W	117 W	45 W	86 W

See Data Sheet for Additional Notes and Conditions.

PRODUCT HIGHLIGHTS

- Simple ON/OFF control – no loop compensation needed
- Delivers peak power of up to 3 times maximum continuous output power
- 277 kHz operation during peak power significantly reduces transformer size
- Tight I²f tolerances and negligible temperature variation of key parameters ease design and lower cost
- Adaptive switching cycle on-time extension increases low line peak output power, minimizing bulk capacitor size
- High bandwidth provides fast turn on with no overshoot and excellent transient load response



PeakSwitch™ Family Design Tools

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PeakSwitch PRODUCT & DESIGN COLLATERAL*

Data Sheet	PKS603-606	PeakSwitch Family Data Sheet
Application Note	AN-41	PeakSwitch Design Guide
Engineering Report	EPR-93	Application: 32 W Continuous, 81 W Peak Power Supply Using PKS606Y (90-265 VAC Input, 30 V, 1.07 A Continuous, 2.7 A Peak Output)
Design Idea	DI-93	Application: 32 W Continuous, 81 W Peak Power Supply Using PKS606Y (90-265 VAC Input, 30 V, 1.07 A Continuous, 2.7 A Peak Output)

* Downloadable from www.powerint.com

REFERENCE DESIGN (DAK-93)



DAKs include a reference design power supply, sample devices, unpopulated pcb, data sheet, comprehensive engineering report and other related documentation. Get more information at:

www.powerint.com/dak.htm

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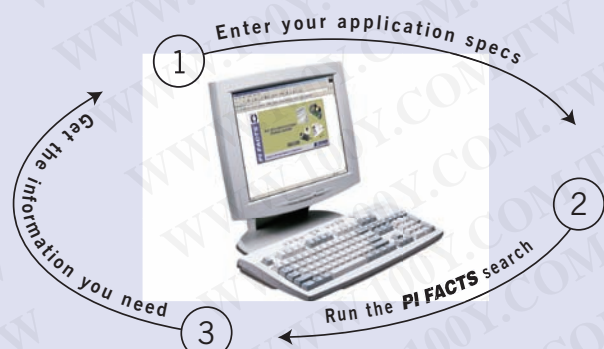
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PeakSwitch™ General Purpose 32 W Continuous (81 W Peak) Supply



Application	Device	Power Output	Input Voltage	Output Voltage	Topology
Inkjet Printer	PKS606Y	32 W / 81 W pk	90-265 VAC	30 V	Flyback

Design Highlights

- Delivers up to 2.5 times the full load power for 50 ms
- Uses a small EE25 core transformer
- Meets EPS active-mode efficiency specifications
- No-load input power <200 mW at 265 VAC
- High standby and sleep mode efficiency: > 66% and 75%

Operation

This supply is configured as a flyback converter. The ON/OFF controller integrated within the PeakSwitch IC (U1) has an internal oscillator frequency of 277 kHz. Feedback from the output causes the controller to skip MOSFET switching cycles to regulate the output voltage. The skipping of switching cycles adjusts the converter's effective switching frequency (F_{SW_EFF}) to meet the demands of the load. When delivering 32 W continuously, the F_{SW_EFF} is near 90 kHz. When the load demands peak power from the supply, the controller skips fewer switching cycles, raising the F_{SW_EFF} . This enables the supply to deliver peak power pulses of up to 81 W (for up to 50 ms), while keeping the output voltage in regulation.

PeakSwitch has three functions that interact with each other: auto-restart, conditional latching shutdown and smart AC line sense. Components D5, C7, R5 and R6 enable the smart AC line sense and the under-voltage lockout (UVLO) functions. When U1 does not skip any switching cycles for >30 ms, the auto-restart function activates. If AC line voltage is absent or insufficient for normal operation when auto-restart activates, latching shutdown is disabled, and normal operation will resume after the AC line voltage is restored. If AC line voltage is sufficient for normal operation when auto-restart activates, latching shutdown is enabled, and AC power must be removed and reapplied to reset the latch. The low value of C7 enables latch reset to occur quickly, once AC is removed.

The smart AC line sense components also enable the UVLO function. UVLO inhibits MOSFET switching until current into the EN/UV pin is >25 μ A. Resistor R16 supplies the 1 μ A threshold current that activates the UVLO and AC sense features, keeping those functions activated during brownouts and line sags.

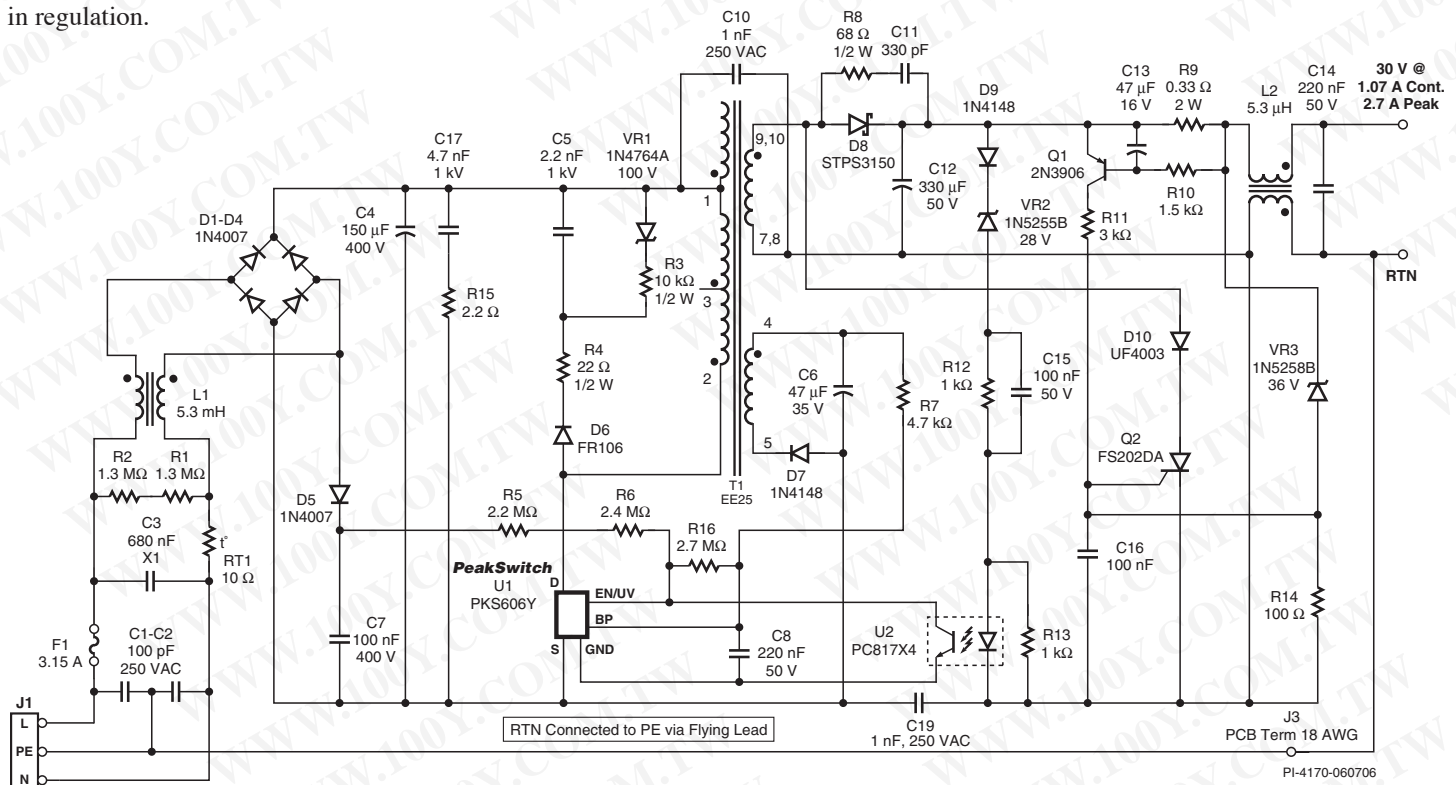


Figure 1. 32 W (Continuous), 81 W (Peak) Power Supply Using PKS606Y.

Ten components enable load overvoltage and over-current protection: C13, C16, D10, Q1, Q2, R9, R10, R11, R14 and VR3. They work with the latching shutdown function as follows:

- If the supply output voltage goes above 36 V, VR3 conducts and turns on Q2, which shorts the secondary winding of T1. After 30 ms of U1 receiving no feedback, the supply latches off.

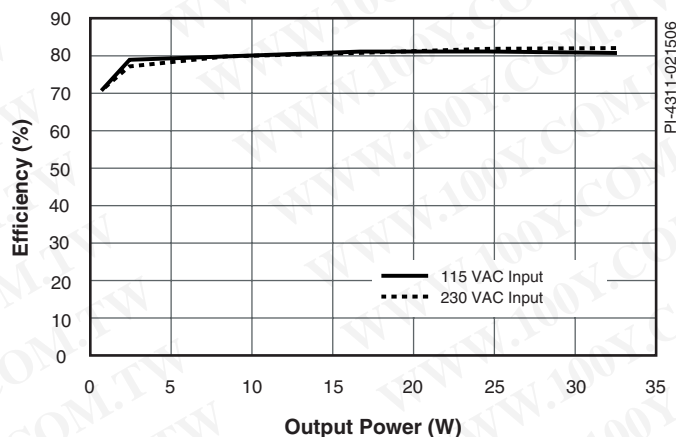


Figure 2. Active-Mode Efficiency Performance.

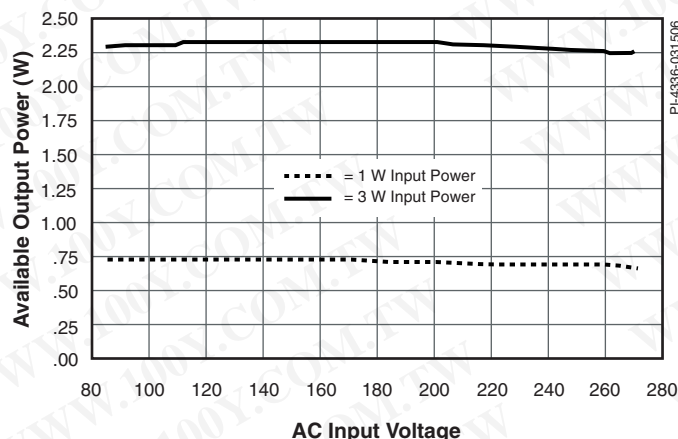


Figure 3. Available Output Power at 1 W and 3 W Input Power.

- If the load pulls peak current for longer than the RC time constant (≈ 60 ms) of C13 and R10, Q1 turns on, which turns Q2 on and shorts the secondary winding of T1. Again, after 30 ms of U1 receiving no feedback, the supply latches off.

Capacitor C17 attenuates differential-mode conducted EMI. Resistor R15 dampens high frequency ringing.

Key Design Points

- The value of C7 sets the reset time of the latched shutdown function, once the AC input is removed. Verify that the latch resets, within the time allowed, at the highest input voltage.
- For thermal considerations, the *PeakSwitch* IC, the output diode and their heatsinks, and the transformer core size depend on the continuous-to-peak power ratio, and the duration and frequency of the peak power pulses.
- Choose the values for R10 and C13 so that normal peak loads will not turn Q1 on. However, do not set the RC time constant so long that the supply does not latch off within the 60 seconds specified by IEC 60950-1, section 2.5, Table 2B (Limited Power Sources requirements).

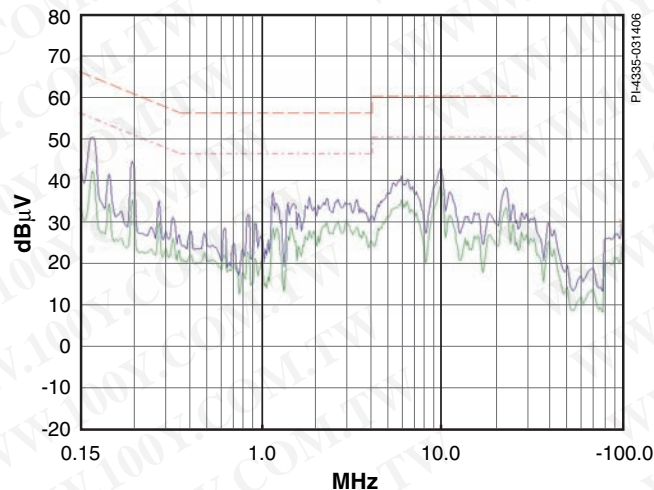


Figure 4. Conducted EMI to EN55022 B Limit, at Full Load, with 115 VAC, 60 Hz Input Voltage.

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