

PRODUCT SELECTOR GUIDE



ENABLING SMALL, LIGHTWEIGHT, COST-EFFECTIVE, AND ENERGY EFFICIENT POWER SUPPLIES FOR A BROAD RANGE OF APPLICATIONS

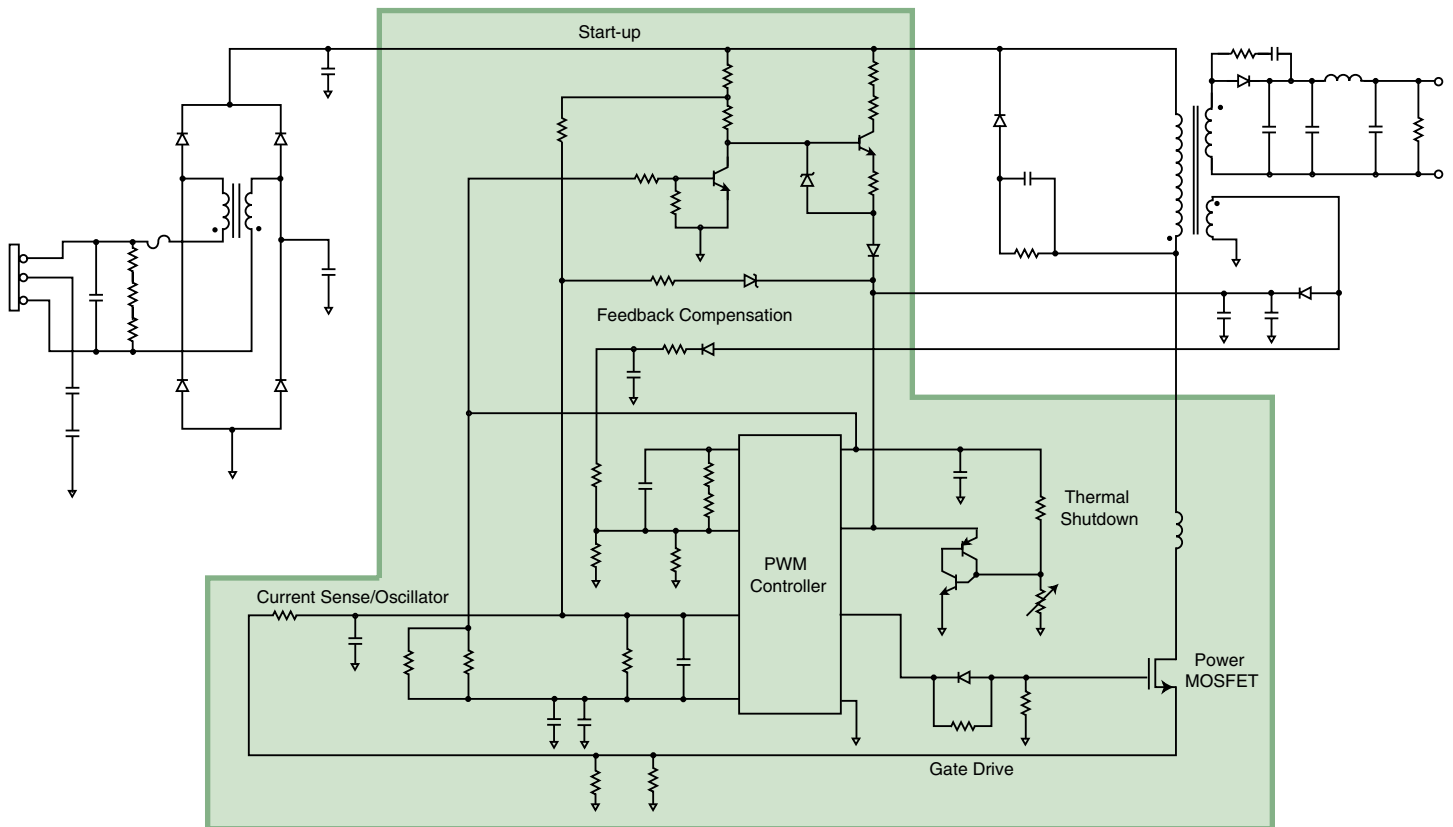
POWER[®]
INTEGRATIONS, INC.

INNOVATION IN POWER CONVERSION

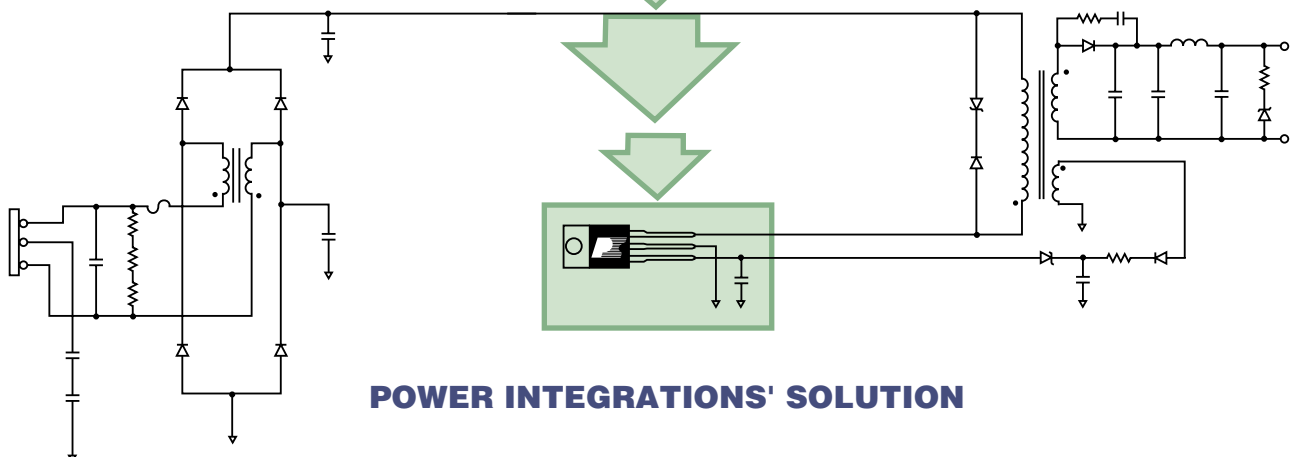
Sept. 2002

Design Simplification

- Eliminates up to 50 discrete components
- Integrated functions include high-voltage MOSFET switch, controller, high-voltage start-up, short-circuit and open-loop protection, programmable current limit, line under-voltage/overvoltage protection, thermal shutdown, soft-start, feedback compensation, and remote on/off on a single chip

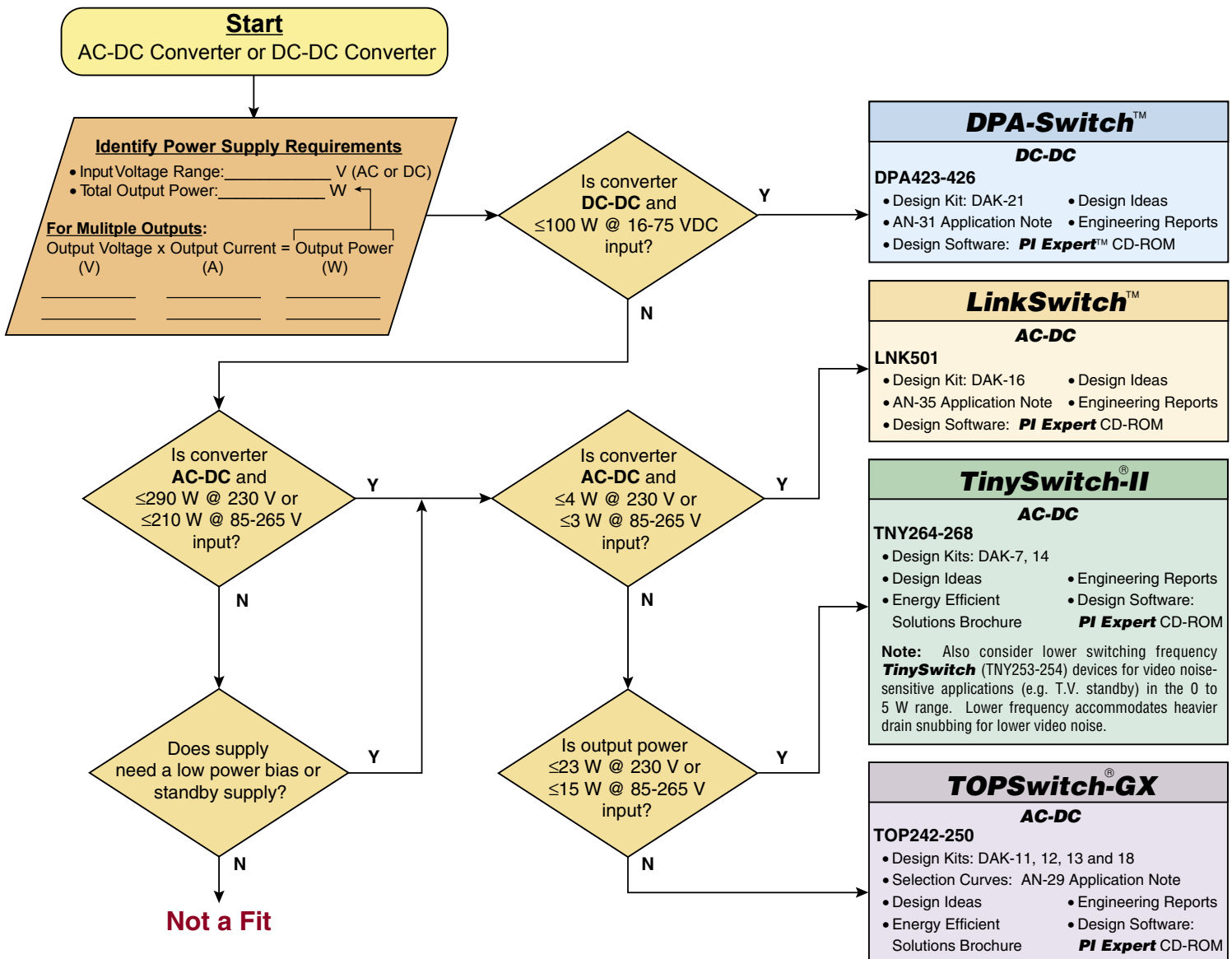
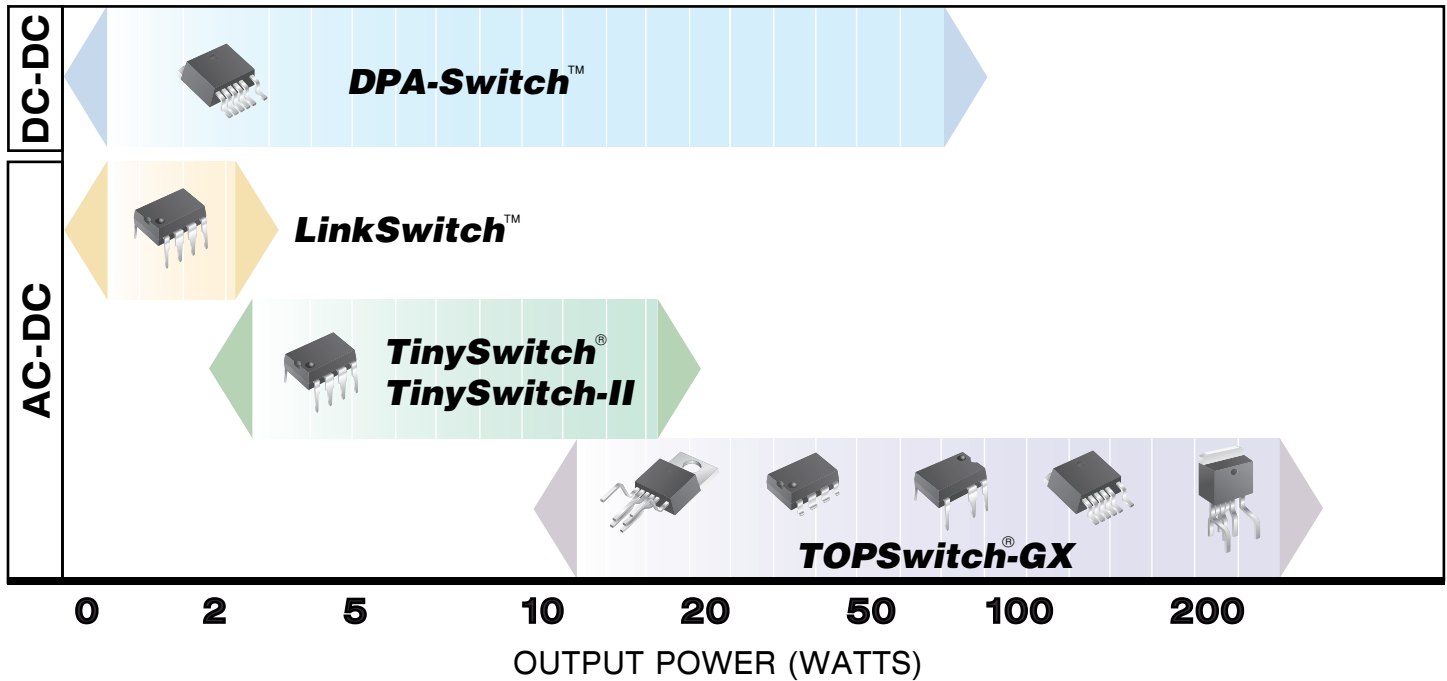


TYPICAL DISCRETE PWM IMPLEMENTATION



POWER INTEGRATIONS' SOLUTION

Product Selector Guide



Product Selector Guide

I. HIGH POWER AC-DC POWER CONVERSION (UP TO 290 W)

Product ^{1,5}	Continuous Output Power			Continuous Output Power		HV-FET Rating	Switching Frequency (kHz)	Control Method	Self-Powered ⁴	Soft-Start (Y=Yes; N.R.=Not Required)	Adjustable Current Limit	Auto Restart	Thermal Shutdown	Frequency Jitter	Power Limiting	Line UV Detection	Line OV Detection	Remote ON/OFF	EcoSmart® Low Standby/ No-Load Power Consumption	Max. Duty Cycle % (DC _{MAX})	Simultaneous Line Sensing and Current Limit
	Adapter ²	Open Frame ³		Adapter ²	Open Frame ³																
TOPSwitch-GX	230 VAC ± 15%			85-265 VAC																	
TOP242 P or G	9 W	15 W		6.5 W	10 W	700 V	132	PWM		Y	Y	Y	Hys.	Y	Y	Y	Y	Y	Y	78	
TOP242 R	21 W	22 W		11 W	14 W	700 V	132/66	PWM		Y	Y	Y	Hys.	Y	Y	Y	Y	Y	Y	78	Y
TOP242 Y or F	10 W	22 W		7 W	14 W	700 V	132/66	PWM		Y	Y	Y	Hys.	Y	Y	Y	Y	Y	Y	78	Y
TOP243 P or G	13 W	25 W		9 W	15 W	700 V	132	PWM		Y	Y	Y	Hys.	Y	Y	Y	Y	Y	Y	78	
TOP243 R	29 W	45 W		17 W	23 W	700 V	132/66	PWM		Y	Y	Y	Hys.	Y	Y	Y	Y	Y	Y	78	Y
TOP243 Y or F	20 W	45 W		15 W	30 W	700 V	132/66	PWM		Y	Y	Y	Hys.	Y	Y	Y	Y	Y	Y	78	Y
TOP244 P or G	16 W	30 W		11 W	20 W	700 V	132	PWM		Y	Y	Y	Hys.	Y	Y	Y	Y	Y	Y	78	
TOP244 R	34 W	50 W		20 W	28 W	700 V	132/66	PWM		Y	Y	Y	Hys.	Y	Y	Y	Y	Y	Y	78	Y
TOP244 Y or F	30 W	65 W		20 W	45 W	700 V	132/66	PWM		Y	Y	Y	Hys.	Y	Y	Y	Y	Y	Y	78	Y
TOP245 R	37 W	57 W		23 W	33 W	700 V	132/66	PWM		Y	Y	Y	Hys.	Y	Y	Y	Y	Y	Y	78	Y
TOP245 Y or F	40 W	85 W		26 W	60 W	700 V	132/66	PWM		Y	Y	Y	Hys.	Y	Y	Y	Y	Y	Y	78	Y
TOP246 R	40 W	64 W		26 W	38 W	700 V	132/66	PWM		Y	Y	Y	Hys.	Y	Y	Y	Y	Y	Y	78	Y
TOP246 Y or F	60 W	125 W		40 W	90 W	700 V	132/66	PWM		Y	Y	Y	Hys.	Y	Y	Y	Y	Y	Y	78	Y
TOP247 R	42 W	70 W		28 W	43 W	700 V	132/66	PWM		Y	Y	Y	Hys.	Y	Y	Y	Y	Y	Y	78	Y
TOP247 Y or F	85 W	165 W		55 W	125 W	700 V	132/66	PWM		Y	Y	Y	Hys.	Y	Y	Y	Y	Y	Y	78	Y
TOP248 R	43 W	75 W		30 W	48 W	700 V	132/66	PWM		Y	Y	Y	Hys.	Y	Y	Y	Y	Y	Y	78	Y
TOP248 Y or F	105 W	205 W		70 W	155 W	700 V	132/66	PWM		Y	Y	Y	Hys.	Y	Y	Y	Y	Y	Y	78	Y
TOP249 R	44 W	79 W		31 W	53 W	700 V	132/66	PWM		Y	Y	Y	Hys.	Y	Y	Y	Y	Y	Y	78	Y
TOP249 Y or F	120 W	250 W		80 W	180 W	700 V	132/66	PWM		Y	Y	Y	Hys.	Y	Y	Y	Y	Y	Y	78	Y
TOP250 R	45 W	82 W		32 W	55 W	700 V	132/66	PWM		Y	Y	Y	Hys.	Y	Y	Y	Y	Y	Y	78	Y
TOP250 Y or F	135 W	290 W		90 W	210 W	700 V	132/66	PWM		Y	Y	Y	Hys.	Y	Y	Y	Y	Y	Y	78	Y

II. LOW POWER AC-DC POWER CONVERSION (UP TO 23 W)

TinySwitch-II	230 VAC ± 15%			85-265 VAC																	
TNY264 P or G	5.5 W	9 W		4 W	6 W	700 V	132	ON/OFF	Y	N.R.		Y	Hys.	Y	Y	Y		Y	Y	65	
TNY266 P or G	10 W	15 W		6 W	9.5 W	700 V	132	ON/OFF	Y	N.R.		Y	Hys.	Y	Y	Y		Y	Y	65	
TNY267 P or G	13 W	19 W		8 W	12 W	700 V	132	ON/OFF	Y	N.R.		Y	Hys.	Y	Y	Y		Y	Y	65	
TNY268 P or G	16 W	23 W		10 W	15 W	700 V	132	ON/OFF	Y	N.R.		Y	Hys.	Y	Y	Y		Y	Y	65	
TinySwitch	230 VAC ± 15%			85-265 VAC																	
TNY253 P or G	4 W			2 W		700 V	44	ON/OFF	Y	N.R.			Hys.		Y			Y	Y	68	
TNY254 P or G	5 W			4 W		700 V	44	ON/OFF	Y	N.R.			Hys.		Y			Y	Y	68	
TNY255 P or G	10 W			6.5 W		700 V	130	ON/OFF	Y	N.R.			Hys.		Y			Y	Y	68	

III. VERY LOW POWER AC-DC LINEAR TRANSFORMER REPLACEMENT (≤4 W)

LinkSwitch	230 VAC ± 15%			85-265 VAC																	
LNK501 P or G	4 W			3 W		700 V	42	PWM		Y		Y	Hys.		Y				Y	77	

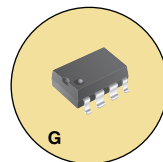
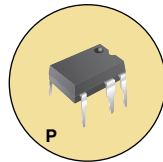
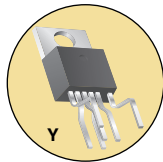
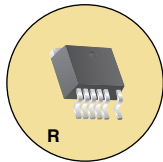
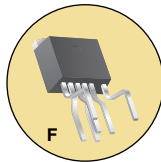
Product Selector Guide

IV. 24 V/48 V DC-DC POWER CONVERSION (UP TO 100 W)

Product ^{1,5}	Device Total Power Dissapation ⁶					Max Output Power																		
	0.5 Watts	1 Watt	2.5 Watts	4 Watts	6 Watts		HV-FET Rating	Switching Frequency (kHz)	Synchronizable to Lower External Clock Frequency	Control Method	Soft-Start (Y=Yes; N.R.=Not Required)	Fully Integrated Current Sensing	Adjustable Current Limit	Auto Restart	Thermal Shutdown	Power Limiting	Line UV Detection	Line OV Detection	Remote ON/OFF	EcoSmart® Low Standby/ No-Load Power Consumption	Max. Duty Cycle % (DC _{max})	Simultaneous Line Sensing and Current Limit		
	36-75 VDC INPUT ^{7,8}																							
	DPA423R	12 W	16 W	—	—		—	18 W	200 V	400/300	Y	PWM	Y	Y	Y	Y	Hys.	Y	Y	Y	Y	Y	75	Y
	DPA424R	16 W	23 W	35 W	—		—	35 W	200 V	400/300	Y	PWM	Y	Y	Y	Y	Hys.	Y	Y	Y	Y	Y	75	Y
	DPA425R	23 W	32 W	50 W	62 W		—	70 W	200 V	400/300	Y	PWM	Y	Y	Y	Y	Hys.	Y	Y	Y	Y	Y	75	Y
	DPA426R	25 W	35 W	55 W	70 W		83 W	100 W	200 V	400/300	Y	PWM	Y	Y	Y	Y	Hys.	Y	Y	Y	Y	Y	75	Y

Notes:

1. Packages: P—Plastic DIP, G—Surface Mount DIP, Y—TO-220, R—TO-263, F—TO-262. 2. Typical continuous power in a non-ventilated encased adapter with minimal heat sinking, measured at an ambient of 50 °C. 3. Maximum continuous power in an open frame with adequate heat sinking, measured at an ambient of 50 °C. 4. No bias winding needed. 5. Shipping quantities per package: Tubes: F and Y- 50 pc., P and G - 50 pc. Tape and reel: G-TL- 1000 pc., R-TL- 750 pc. R-package is available in tape and reel only. 6. For example, in a 55 W output design, the DPA426R will dissipate a worst case total of 2.5 W. 7. See data sheet for power capability at 16 VDC and 24 VDC input. 8. Power based on forward converter configuration with diode rectification assuming worst case $R_{DS(ON)}$ @ $T_J=100$ °C. Up to 5% higher output power possible using synchronous rectification.



Features and Benefits

ALL PRODUCTS

- **Lower System Cost**
 - Features eliminate or reduce cost of external components
 - Reduced EMI filter cost
 - Reduced board, layout, and assembly cost
 - Reduced packaging and inventory cost
 - Higher production yields
- **Higher System Reliability**
 - Built-in system level fault protection
 - Fewer discrete components
- **Tight Tolerances for High Performance and Reliability**
- **Saves Design Time for Quicker Time-to-Market**
- **Broad Product Offering—Power Scalability Without Major Redesign**
- **EcoSmart® Energy Efficiency Reduces "No-load" and Standby Energy Waste**
 - Enables conformance with government guidelines (e.g. Energy Star, U.S. 1 Watt Standby Presidential Executive Order, European Commission "Code of Conduct")
 - Reduces user energy cost

DC-DC CONVERSION PRODUCTS

- **Extremely Simple Solution**
 - Simplifies complex designs
 - Fully integrates all primary functions
 - Dramatically reduces external parts count and board size
- **Targeted at Distributed Power Architectures (16 VDC to 75 VDC Input)**

AC-DC CONVERSION PRODUCTS

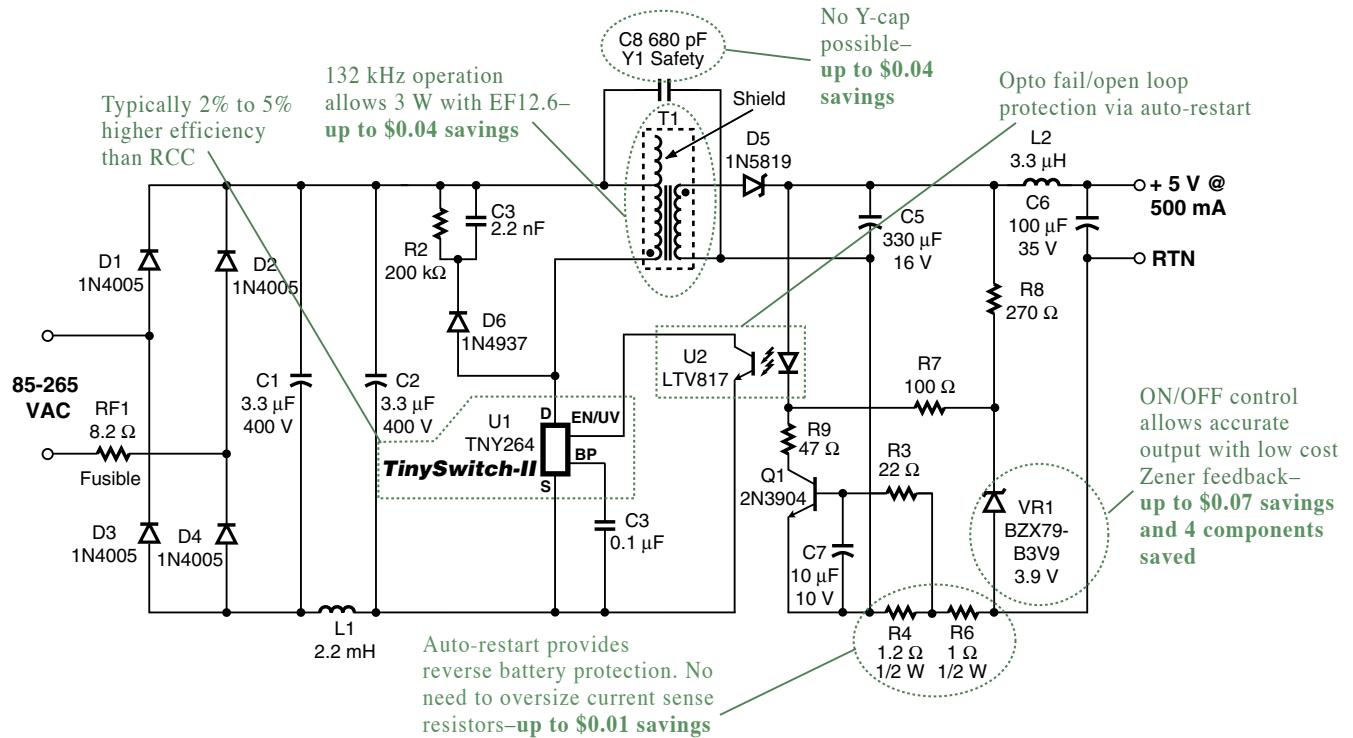
- **Smaller Size and Lighter Weight**
- **Universal Input Operation (85 VAC to 265 VAC)**
- **Lowest Cost Solution**



Cost Savings

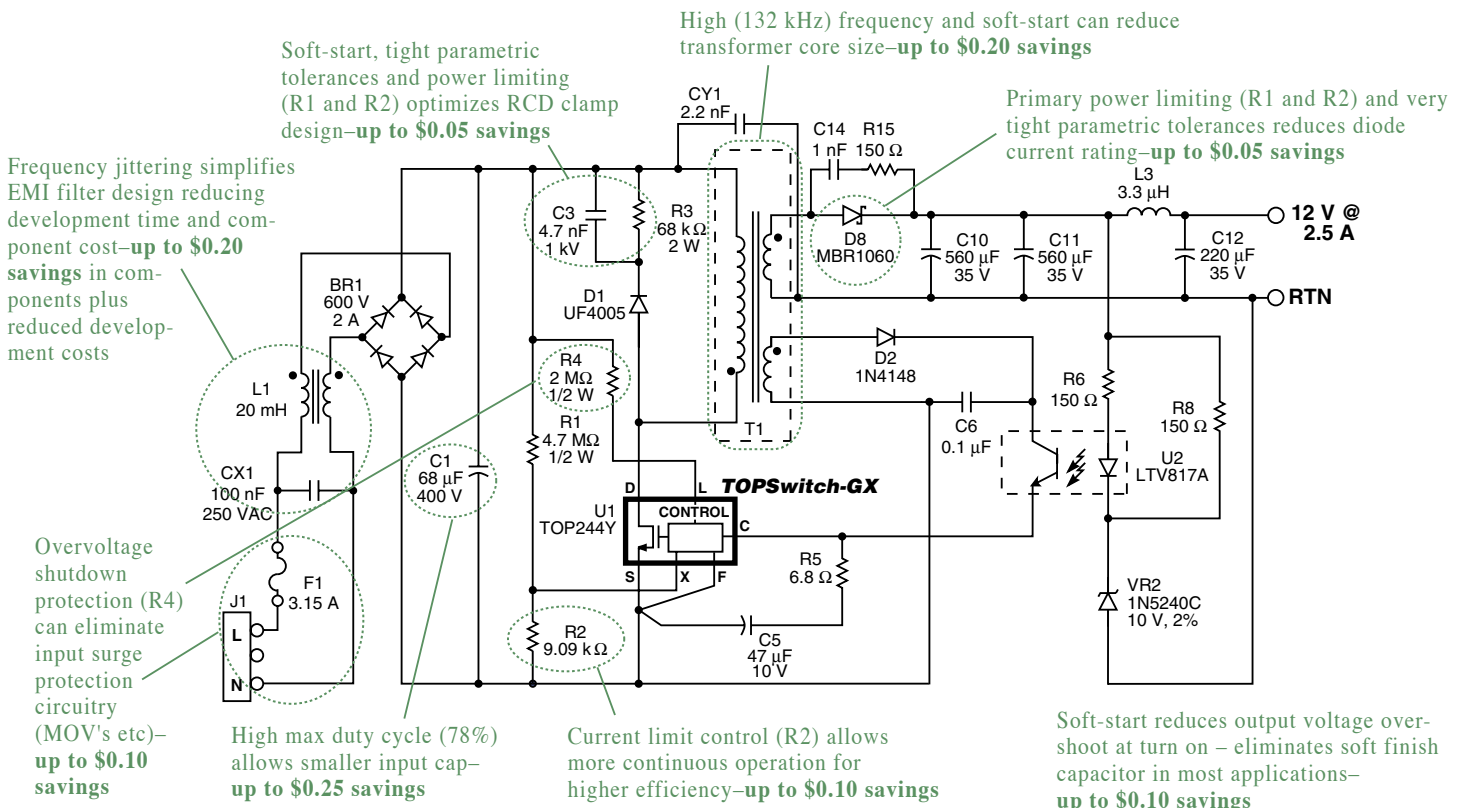
TinySwitch-II® vs. Discrete Design*

2.5 W, UNIVERSAL INPUT POWER SUPPLY



TOPSwitch-GX® vs. Discrete Design*

30 W, UNIVERSAL INPUT POWER SUPPLY

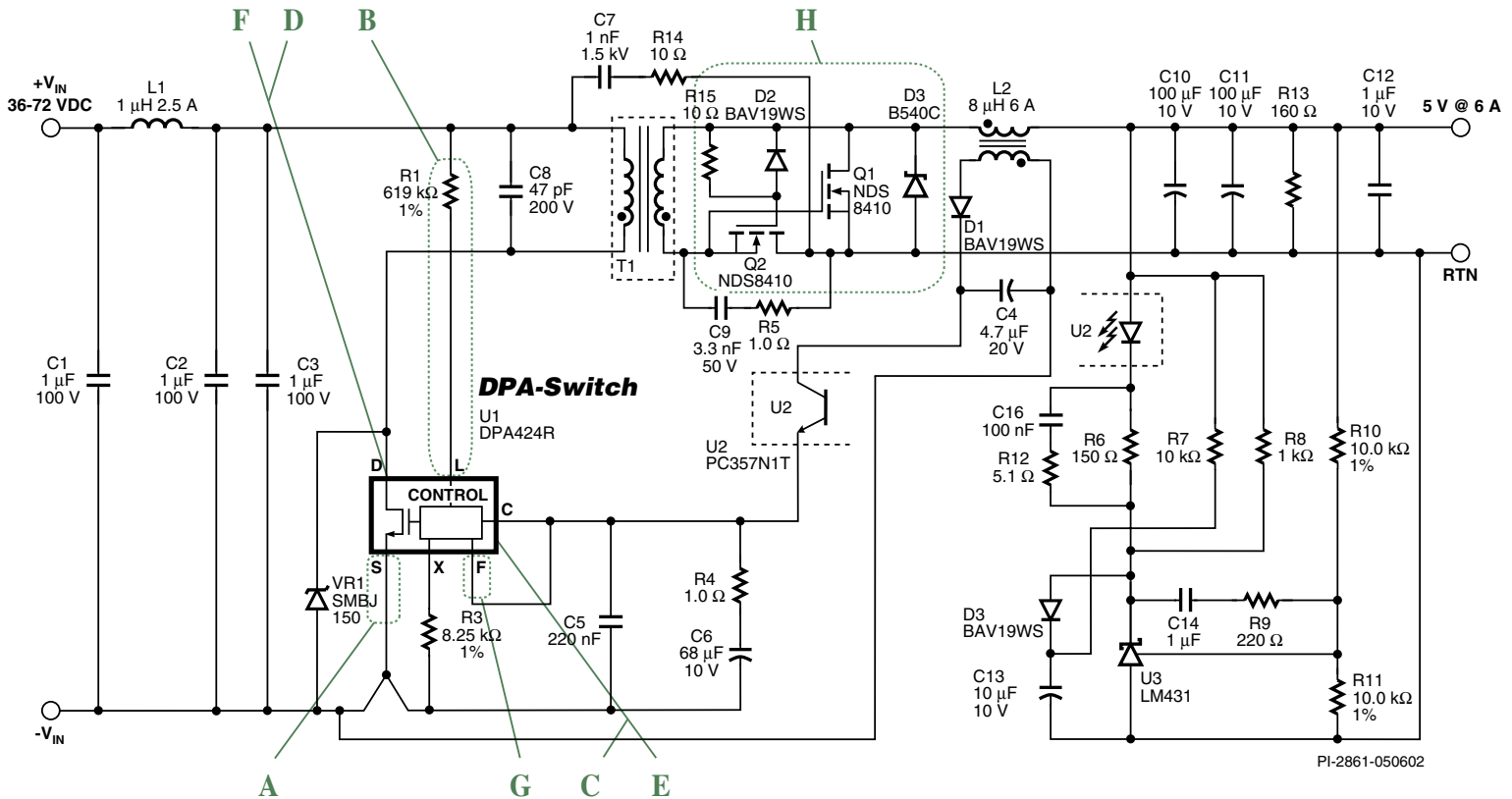


*Cost savings based on high volume quantities (>1 M/yr.). Higher savings possible at lower volumes.

Cost Savings

DPA-Switch™ vs. Discrete Design*

36-72 VDC INPUT, 5 V @ 6 A OUTPUT DC-DC CONVERTER POWER SUPPLY



A) Source Connected Tab

- Heat sink connected to source reduces EMI (electrically "quiet")
- Reduces EMI filter costs
- Up to \$0.20 Savings

B) Integrated Line Sense

- Accurate temperature stability
- Provide UV/OV
- Saves up to 10 components
- Up to \$0.20 Savings

C) Integrated Thermal Shutdown

- Directly senses power MOSFET temperature
- Hysteretic auto-restarting
- Wide hysteresis prevents high average temperatures
- Saves up to 4 components
- Up to \$0.15 Savings

D) Integrated Start-up

- Higher efficiency (no "bootstrap" losses)
- Saves up to 4 components
- Up to \$0.02 Savings

E) Integrated Voltage Mode Controller

- >50% duty cycle operation without requiring slope compensation
- Saves up to 10 components
- Up to \$0.15 Savings

F) Integrated Current Sense

- Tight tolerance and temperature compensated
- No current sense resistor (higher efficiency)
- No current sense transformer even for high power designs
- Programmable using X pin resistor
- Saves up to 6 components
- Up to \$0.25 Savings

G) Accurate Integrated Oscillator

- No external components
- Tight tolerance and temperature stable
- Selectable 300/400 kHz operation
- Saves up to 5 components
- Up to \$0.05 Savings

H) Simple Synchronous Rectification

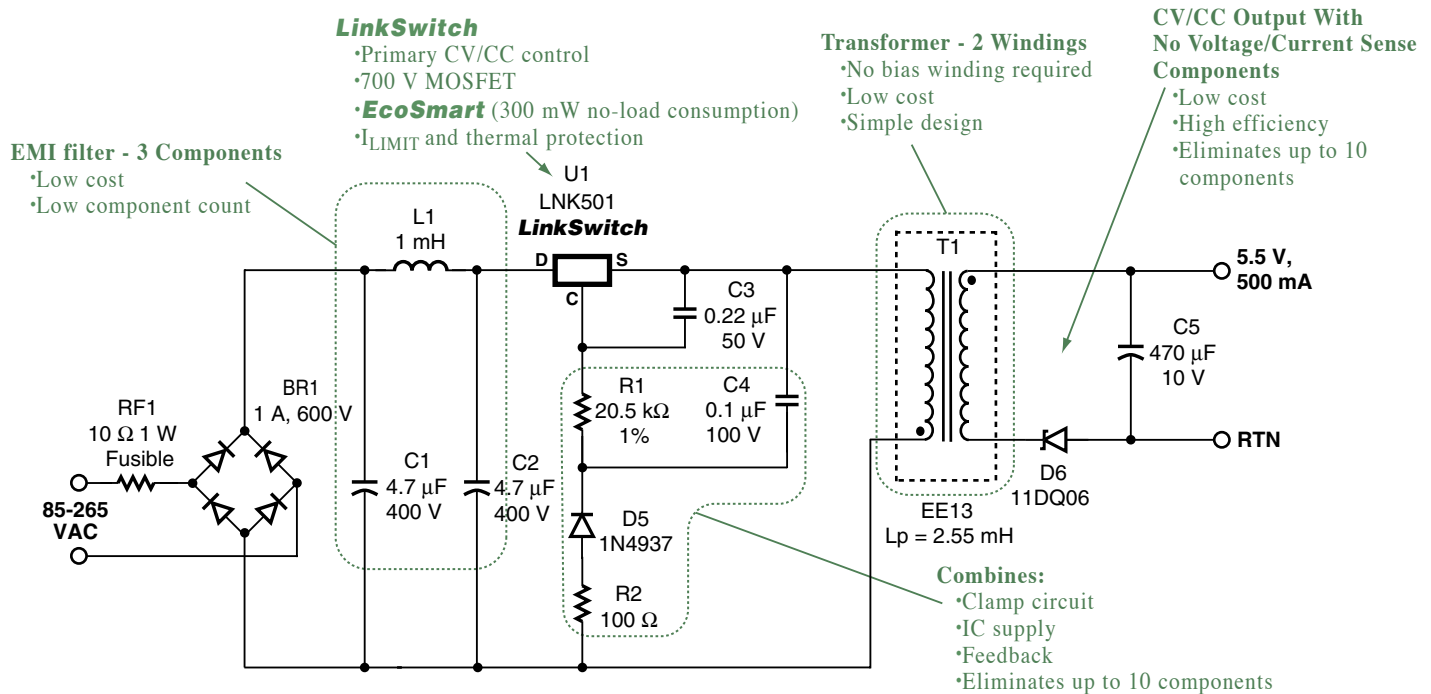
- DPA-Switch line UV/OV shutdown limits gate drive voltage range from transformer winding
- Up to \$0.05 Savings

*Cost savings based on high volume quantities (>1 M/yr.). Higher savings possible at lower volumes.

Switcher Benefits at Linear Cost

14 Components Total! Production Worthy Circuit.

2.75 W, UNIVERSAL INPUT POWER SUPPLY



Total component cost <\$0.65 at >1 million units per month (excluding cable, connectors and enclosure).

Design Tools

- **PI Expert™** A powerful software program that takes a designer's switching power supply requirements and determines the critical components needed to generate a working switch mode power supply. Auto design or manual control options. Design can be optimized for efficiency or cost.
- **Design Accelerator Kits** DAKs provide all the essential materials needed to demonstrate the advanced features of Power Integrations' ICs. Kits include a fully assembled and tested prototype power supply board, engineering report, product samples, unpopulated PCB, data sheet, and other related documentation.



Product Family	Power Supply Prototype Specifications	Order No.
<i>TinySwitch</i> and <i>TinySwitch-II</i>	12 V @ 1.2 W and 12 V/5 V @ 5 W (Home Appliance Supplies)	DAK-7
<i>TOPSwitch-GX</i>	19 V @ 70 W AC-DC Adapter	DAK-11
<i>TinySwitch-II</i> and <i>TOPSwitch-GX</i>	3.3 V @ 12 A, 5 V @ 15 A, 12 V @ 3 A, Forward Converter (145 W Continuous/160 Peak AC-DC Power Supply)	DAK-12
<i>TOPSwitch-GX</i>	3.3 V, 5 V, 12 V, 18 V, 30 V; 43 W Total (Multi-Output AC-DC Power Supply)	DAK-13
<i>TinySwitch-II</i>	9 V @ 3 W AC-DC Power Supply	DAK-14
<i>LinkSwitch</i>	5.5 V @ 2.75 W AC-DC Adapter	DAK-16
<i>TOPSwitch-GX</i>	3.3 V, 5 V, 30 V @ 10 W AC-DC Power Supply (Broadband Modem)	DAK-18
<i>DPA-Switch</i>	36 VDC to 75 VDC Input, 5 V @ 30 W Output, DC-DC Converter	DAK-21

- 2001/2002 Data Book and Design Guide
- **EcoSmart** Enabled Energy Efficient Solutions Brochure

- Application Notes
- Design Ideas