

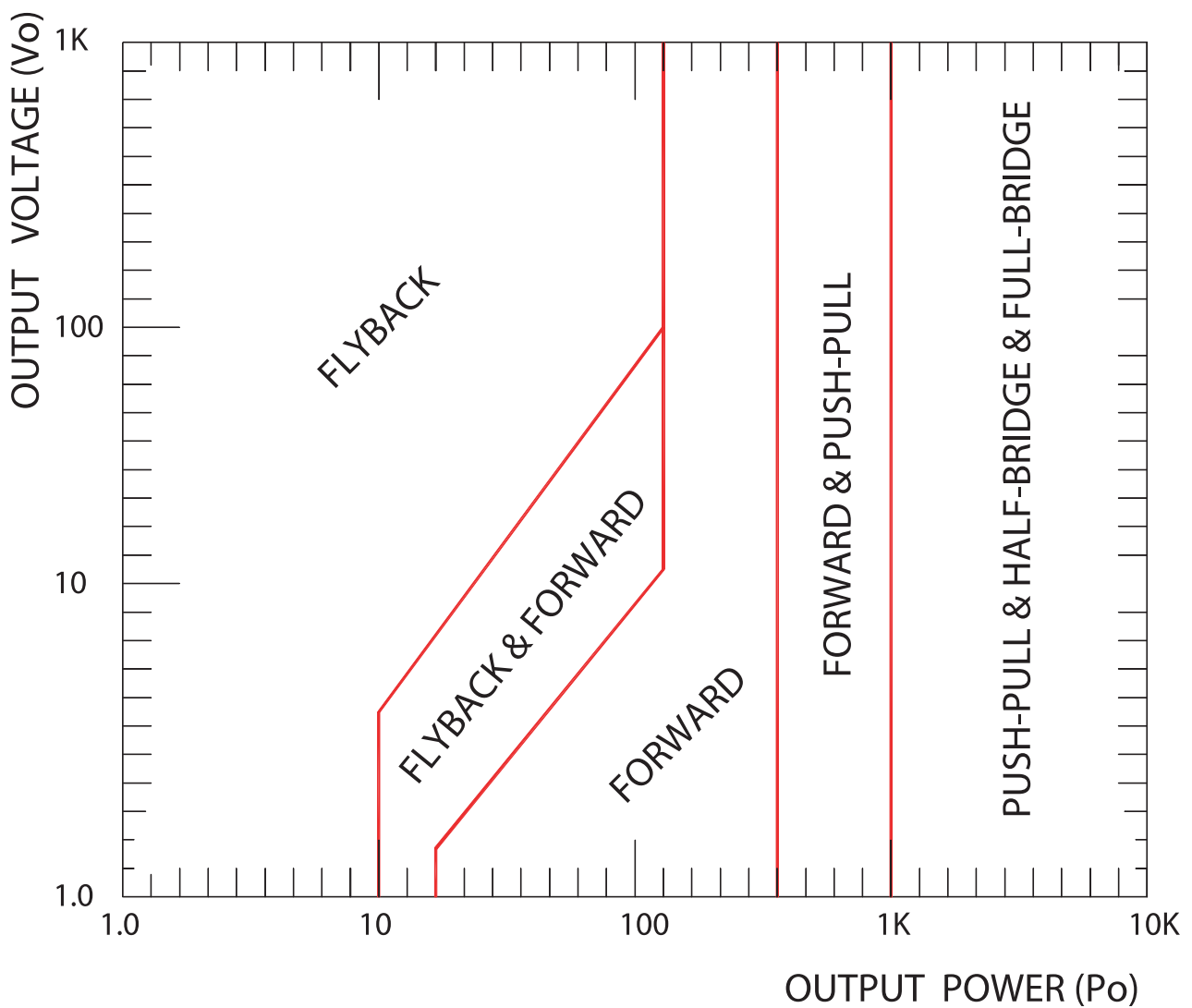
Power Transformers

OFF-LINE Switch Mode



APPLICATION NOTES

Converter circuit as a function of S.M.P.S. output voltage (V_o) and output power (P_o)



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APPLICATION NOTES

Power throughput of different transformer types operating at 100KHz switching frequency.

Transformer TYPE	POWER RANGE (W)							
	< 5	5 ~ 10	10 ~ 20	20 ~ 50	50 ~ 100	100 ~ 200	200 ~ 500	500 ~ 1K
EI	EI12.5	EI16	EI19	EI25	EI40		EI50	EI60
EE	EE13	EE16	EE19	EE25	EE40	EE42	EE55	EE65
EF	EF12.6	EF16	EF20	EF25	EF30	EF32		
EFD		EFD12	EFD15	EFD20	EFD25	EFD30		
EPC		EPC13	EPC17	EPC19	EPC25	EPC30		
EER	EER9.5	EER11	EER14.5	EER28	EER35	EER42	EER49	
ETD				ETD29	ETD34	ETD44	ETD49	ETD54
EP	EP10	EP13	EP17	EP20				
RM	RM4	RM5	RM6	RM10	RM12	RM14		
POT	POT1107	POT1408	POT1811	POT2213	POT3019	POT3622	POT4229	
PQ				PQ2016	PQ2625	PQ3230	PQ3535	PQ4040
EC						EC35	EC41	EC70

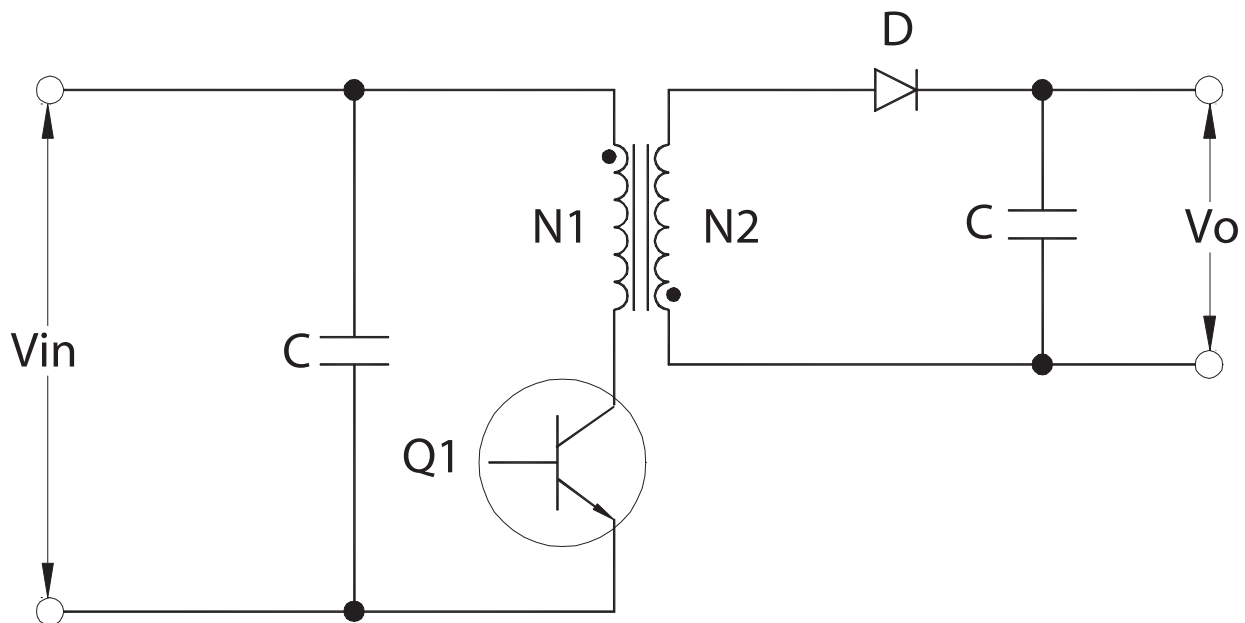
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APPLICATION NOTES

Flyback converter typical circuit diagram.



Advantages

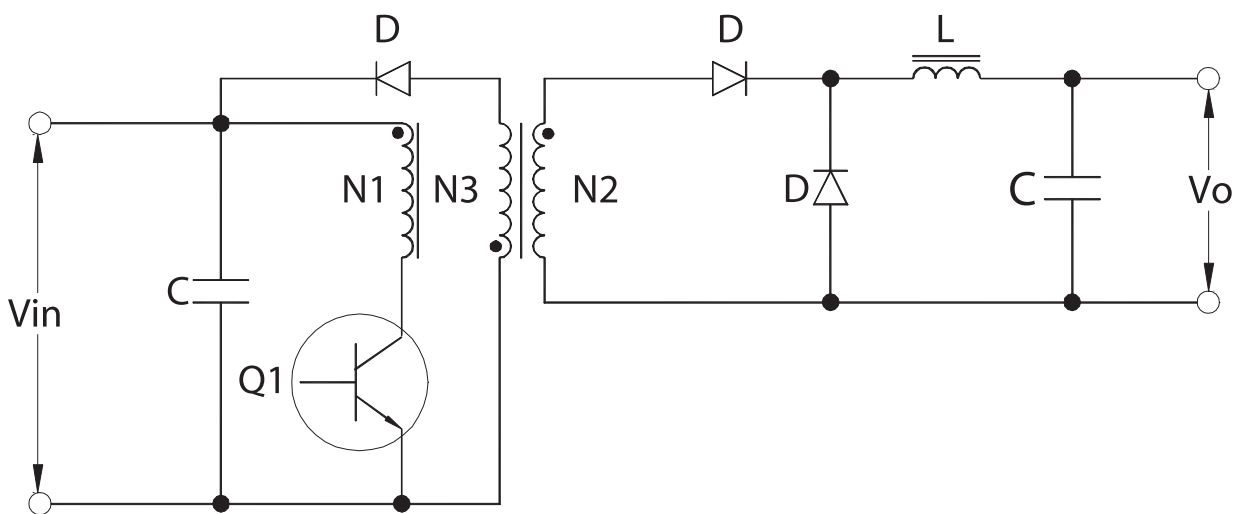
1. Simple circuit and less component count.
2. Only one inductive component.
3. Low leakage loss.
4. More options of simple regulation circuit.
5. Collector current reduced by turn ratio of transformer.

Disadvantages

1. Big output capacitor is required to reduce ripple current.
2. High isolation requirement for close coupling of primary and secondary sides.
3. High eddy current loss in the air gap area.
4. Large transformer core with air gap may restrict applications.
5. Average radio interference.
6. Exacting requirements on components, including the transformer.

APPLICATION NOTES

Forward converter typical circuit diagram.



Advantages

1. Higher power range than flyback converter.
2. Simple circuit and less component count. (Compared to other topologies at the applicable power range)
3. High efficiency.
4. Multiple outputs are possible.
5. Low ripple current. (Small output capacitor)
6. Collector current adjustable by turn ratio of $N2/N1$.

Disadvantages

1. High component requirement, particularly with multiple regulated outputs.
2. Poor transient response.
3. Large choke is required.

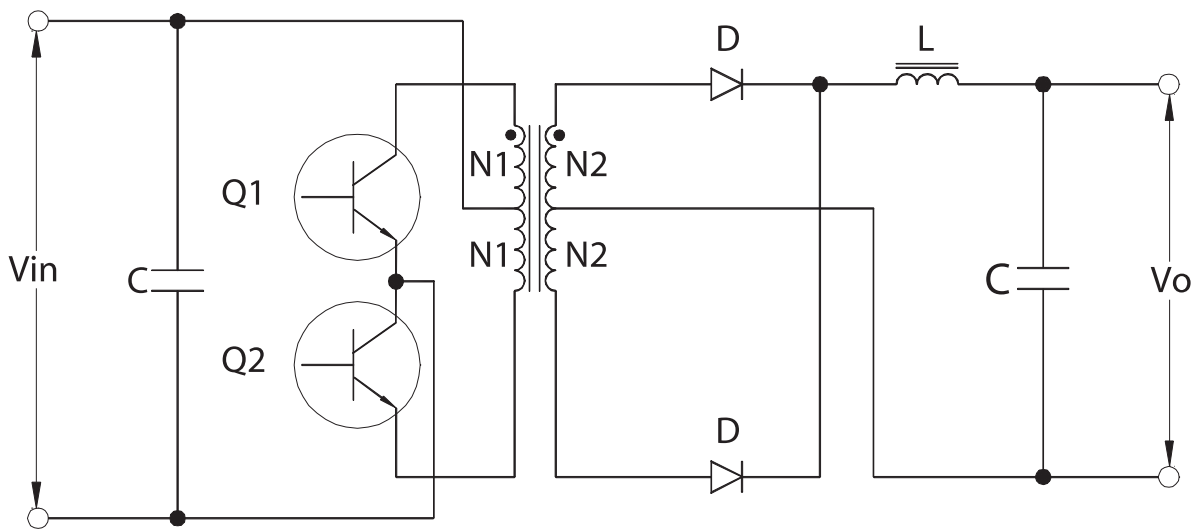
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APPLICATION NOTES

Push-pull converter typical circuit diagram .



Advantages

1. Powers range up to the KW achievable.
2. Simple circuit.
3. Low radio interference suppression complexity.
4. High efficiency.
5. Small choke required.
6. Collector current adjustable as a function of $N2/N1$.

Disadvantages

1. High component requirement, particularly with multiple regulated outputs.
2. Poor transient response.

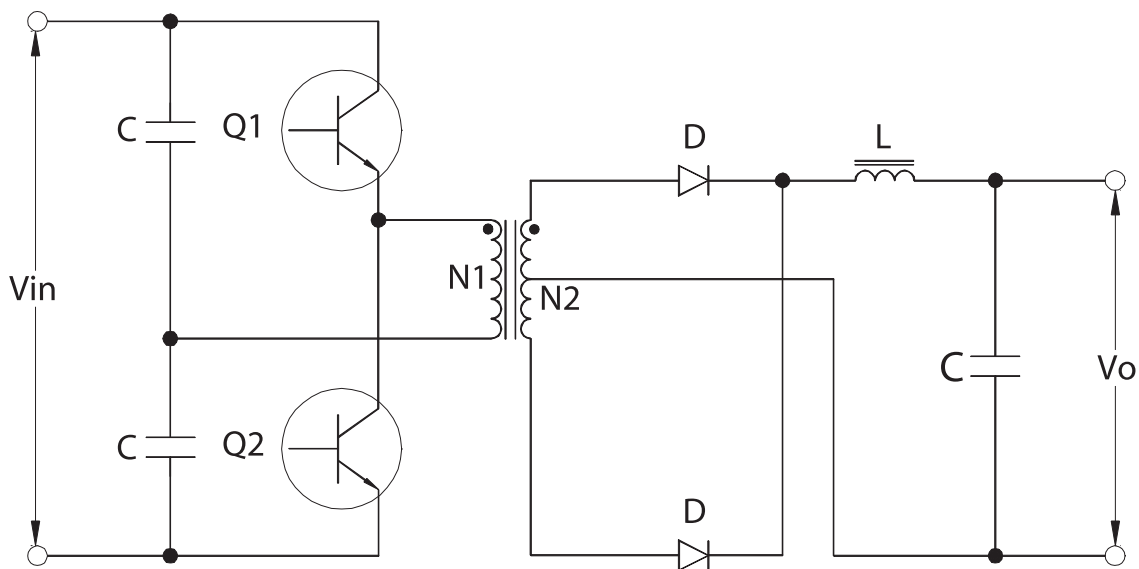
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APPLICATION NOTES

Half-bridge push-pull converter typical circuit diagram.



Advantages

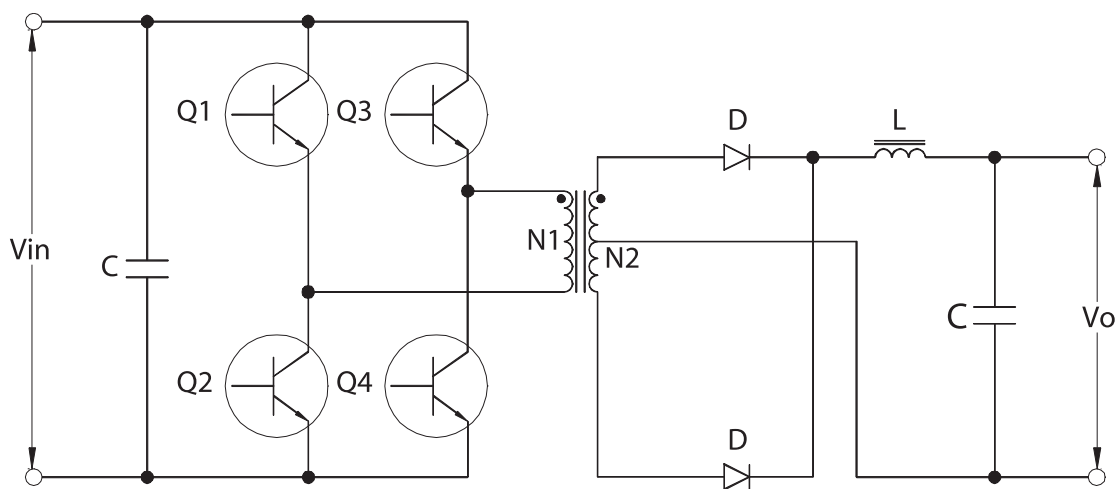
1. Powers range up to the KW achievable.
2. Simple circuit.
3. Transistors rated at V_{in} .
4. High efficiency.
5. Small choke required.
6. Collector current adjustable by turn ratio of $N2/N1$.

Disadvantages

1. High component requirement, particularly with multiple regulated outputs.
2. Poor transient response.
3. Requires auxiliary power supply for control circuits.

APPLICATION NOTES

Full-bridge push-pull converter typical circuit diagram.



Advantages

1. Powers range up to the 10KW achievable.
2. Transistor rated at as low as V_{in} is applicable.
3. Collector current adjustable by turn ratio of $N2/N1$.

Disadvantages

1. High component requirement, particularly with multiple regulated outputs.
2. Poor transient response.
3. Requires auxilliary power supply for control circuits.

Power Transformers

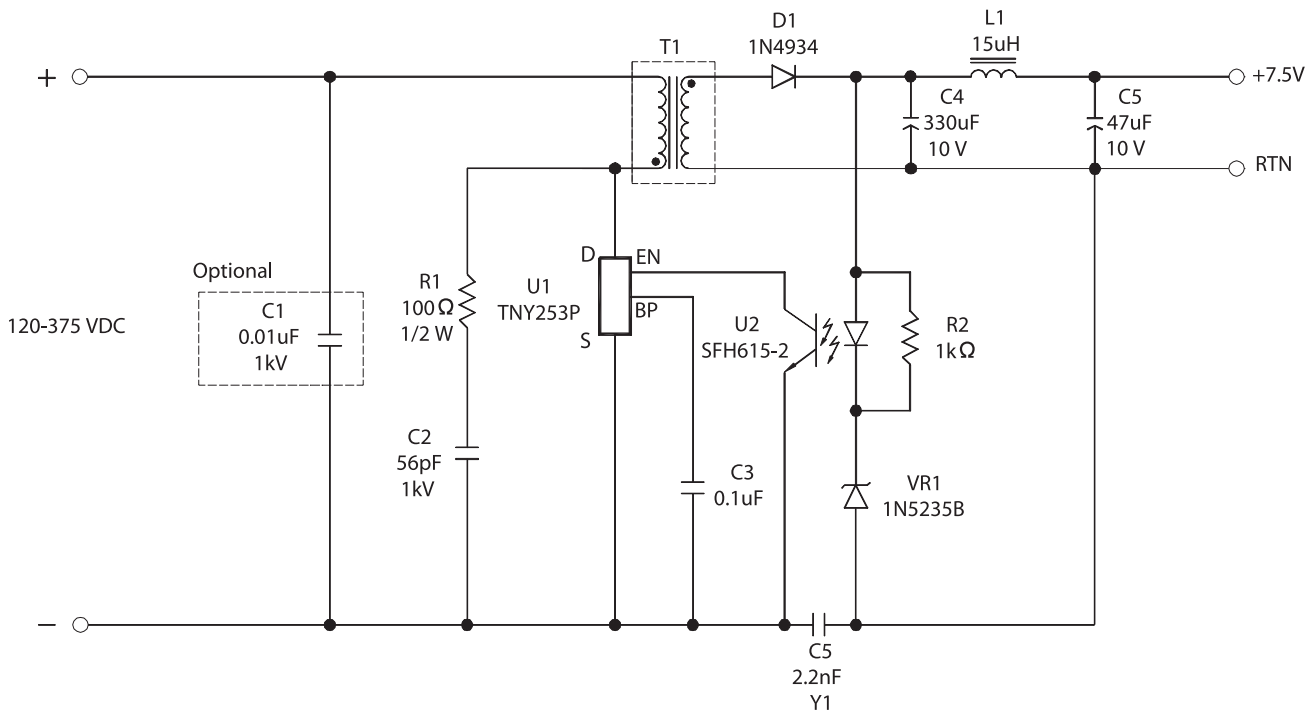
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APPLICATION NOTES

Example power supply circuit-Tinyswitch Family (1.3W TV Standby).

The TinySwitch TV standby power supply generates an isolated output voltage from a high voltage DC input. The circuit is designed to replace conventional linear supplies and self-oscillating ringing choke converters (RCC) at lower cost and component count. The example shown delivers 7.5V at 0.18A. Input voltage range is 120-375VDC.



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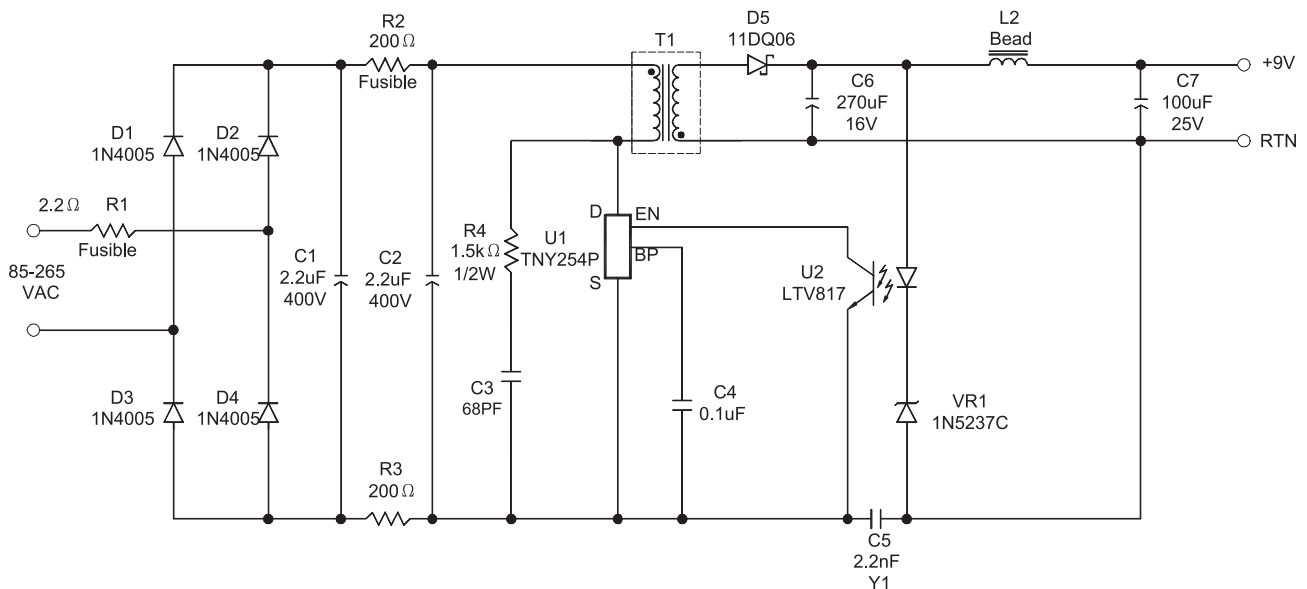


APPLICATION NOTES

Example power supply circuit-Tinyswitch Family (1.5W AC Adapter).

The TinySwitch flyback supply generates a single isolated output voltage from a universal range AC input. Typical applications are wall mount AC adapters and other applications requiring extremely low system cost and small size. The circuit is designed to replace conventional linear supplies, offering universal input range, smaller size, and high efficiency at a competitive cost.

The example shown below delivers 9 V at 170mA. Input voltage range is 85-265 VAC.



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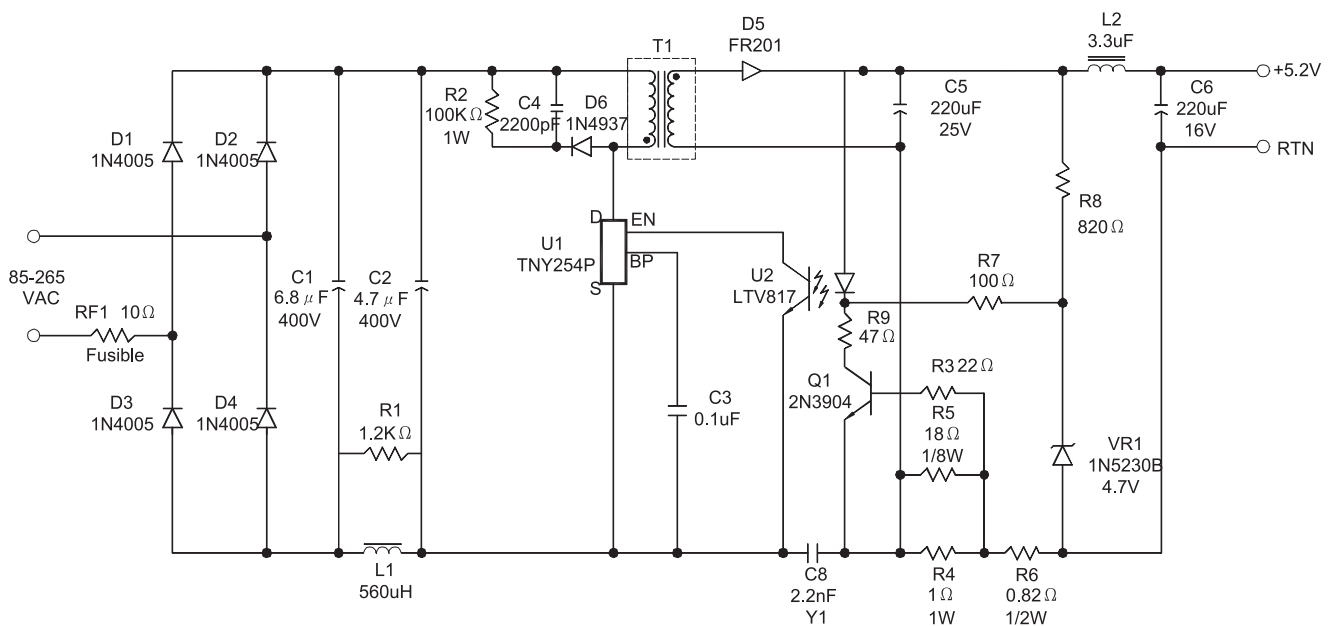
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APPLICATION NOTES

Example power supply circuit-Tinyswitch Family (3.6W Cellular Phone Adapter).

The TinySwitch flyback converter generates a regulated voltage with current limit for charging cellular phone batteries (Li-Ion, NiMH, NiCd).



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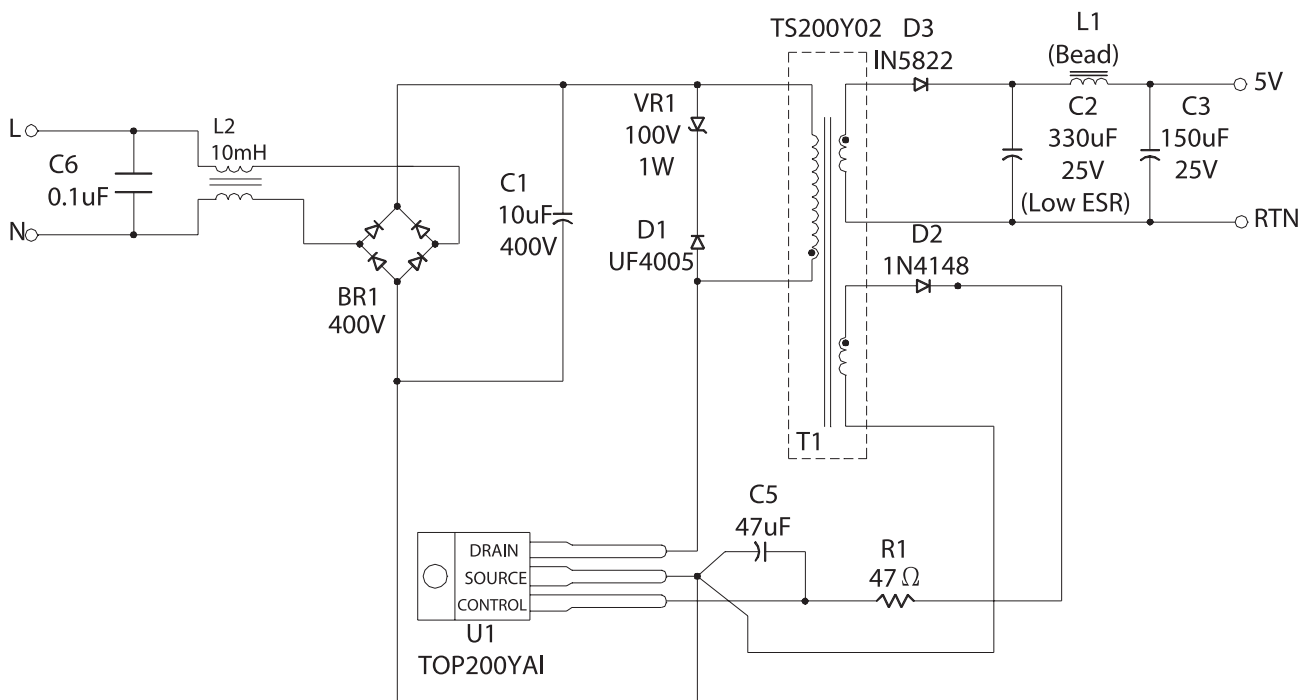
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APPLICATION NOTES

Example power supply circuit-Topswitch Family.

The example shown below is a simple 5V, 5W isolated bias supply using TOP200YAI that operates from a universal AC input with minimum part count.



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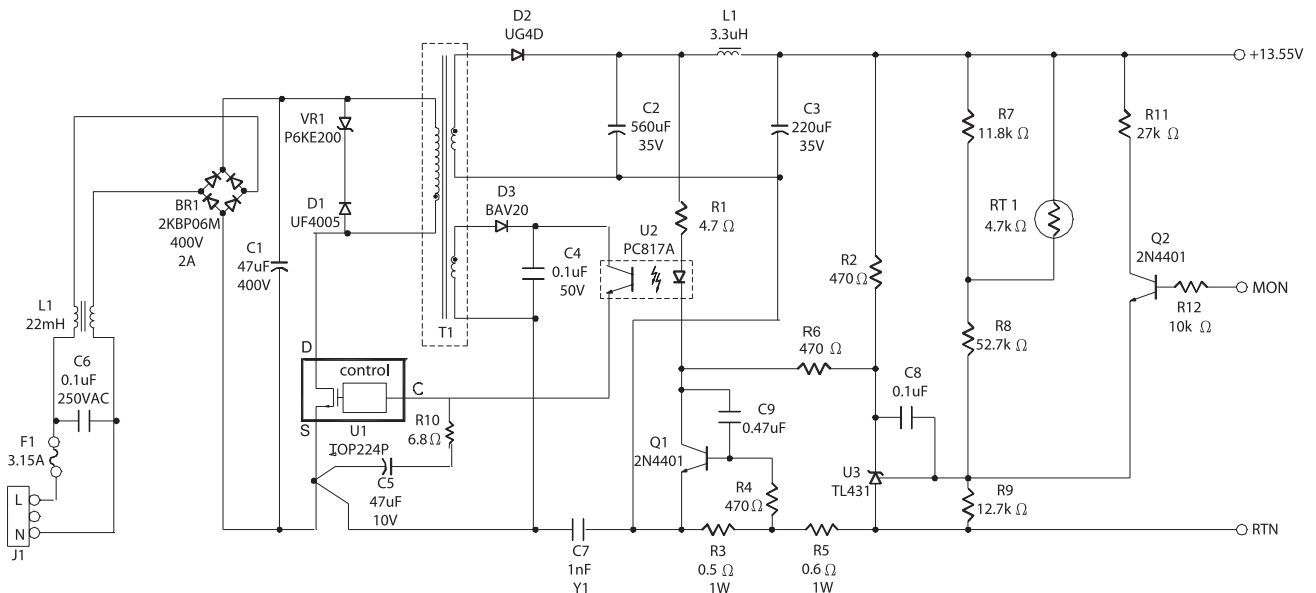
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APPLICATION NOTES

Example power supply circuit-Topswitch Family.

The TOPSwitch shown below generates a single isolated output voltage from a rectified AC input. This output can be used to charge a lead acid battery in applications such as fire/burglar alarm or emergency lighting.



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APPLICATION NOTES

Example power supply circuit-Topswitch Family.

The TOPSwitch-FX supply provides 35W of output power for Set-top Box application. Five outputs are generated: 3.3V at 3A & 5V at 2.5A , 18V at 550mA , 30V at 100mA , -5V at 100mA.

