

# PHILIPS

## Application Guide Book: Compact AC-DC

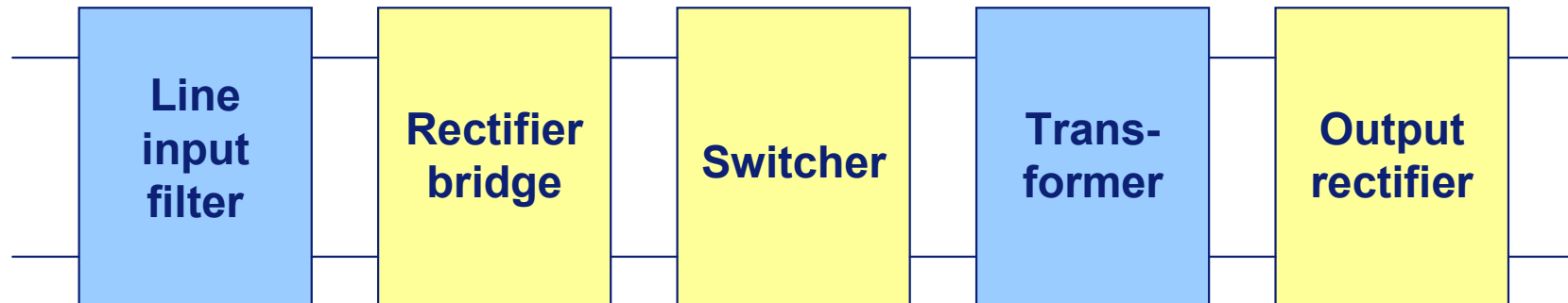
Discretes and MultiMarket ICs

DMI – BL Power

07/08/2002

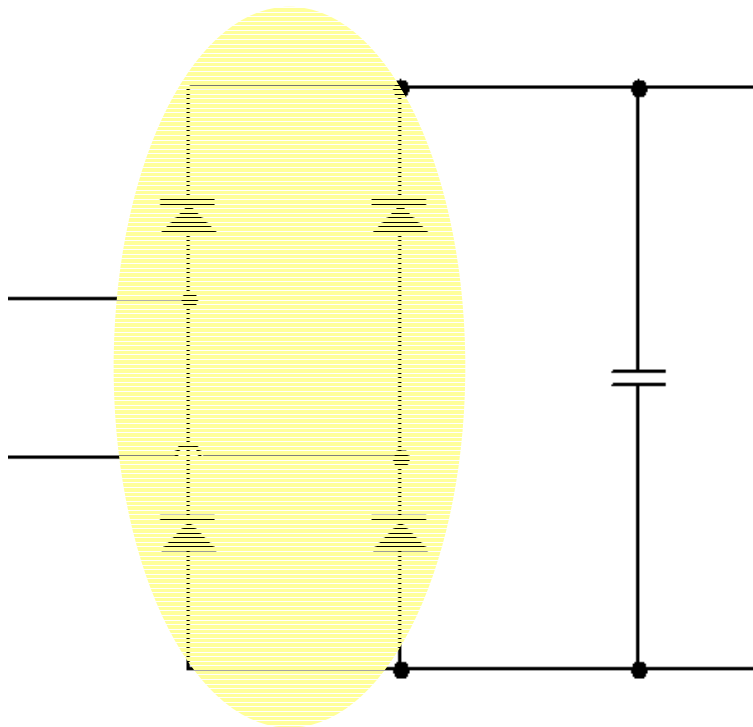
# Compact AC-DC

- Power supplies from some 5 to 80W
- Main use:
  - Laptop/notebook computers
  - PC peripheral
  - Networking components
  - LCD monitors
- Generally universal mains input:
  - 100 - 240 VAC (90 - 264 VAC)
  - 50 - 60 Hz
- Generally single voltage output ranging from some 5 to 48V



*The yellow blocks contain power semiconductors*

# Rectifier bridge



## Rectifier bridge diodes

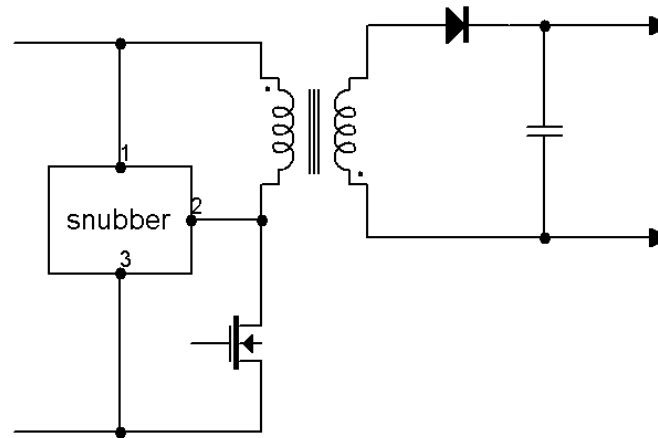
### *Philips Diodes*

- BYD13J 600V, 1A, SOD81
- 1N4005ID 600V, 1A, SOD81
- BYD17J 600V, 1A, SOD87
- S1J 600V, 1A, SMA (SOD124)
- BYG50J 600V, 2.1A, SOD106
- BYW54 600V, 1,8A, SOD57

## Remarks

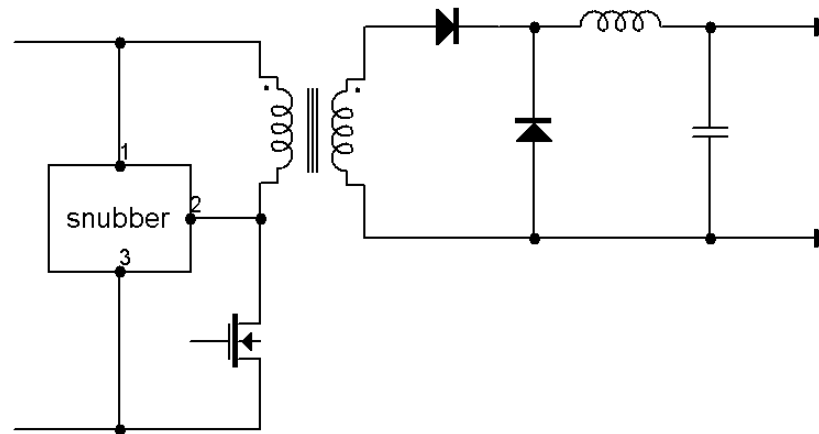
- 1A diodes will generally suffice for the full range of Compact AC-DC converters
- A 4-diodes-in-1 assembly is generally preferred

# Main general topologies



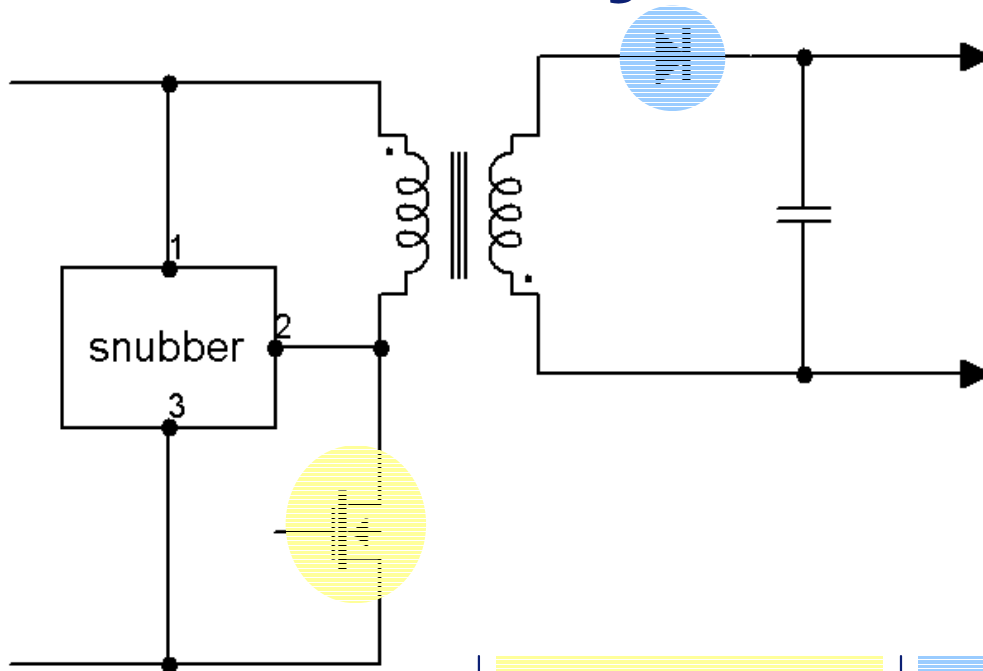
is only an option  
for the lower  
power range

*Single transistor primary switcher / flyback converter*



*Single transistor primary switcher / forward converter*

# Flyback converter



## Schottky output rectifier

|                       |                         |
|-----------------------|-------------------------|
| • 1N5817 .. 19        | 20 .. 40V, 1A, SOD81    |
| • PRL5817 .. 19       | 20 .. 40V, 1A, SOD87    |
| • PBYR325CTD          | 25V, 3A, DPAK (SOT428)  |
| • PBYR240CT           | 40V, 2A, SOT223         |
| • PBYR340CTD          | 40V, 3A, DPAK (SOT428)  |
| • PBYR245CT           | 45V, 2A, SOT223         |
| • PBYR345CTD          | 45V, 3A, DPAK (SOT428)  |
| • 1PS74SB43 / ...SB23 | 40 / 25V, 1A, SOT457    |
| • BAT720              | 40V, 0.5A, SOT23        |
| • BAT760              | 20V, 1A, SOD323 (SC-76) |
| • 1PS70SB20           | 40V, 0.5A, SOT323       |
| • PMEG2010EV          | 20V, 1A, SOT666         |

## Switch

### Philips MOSFETs

- none

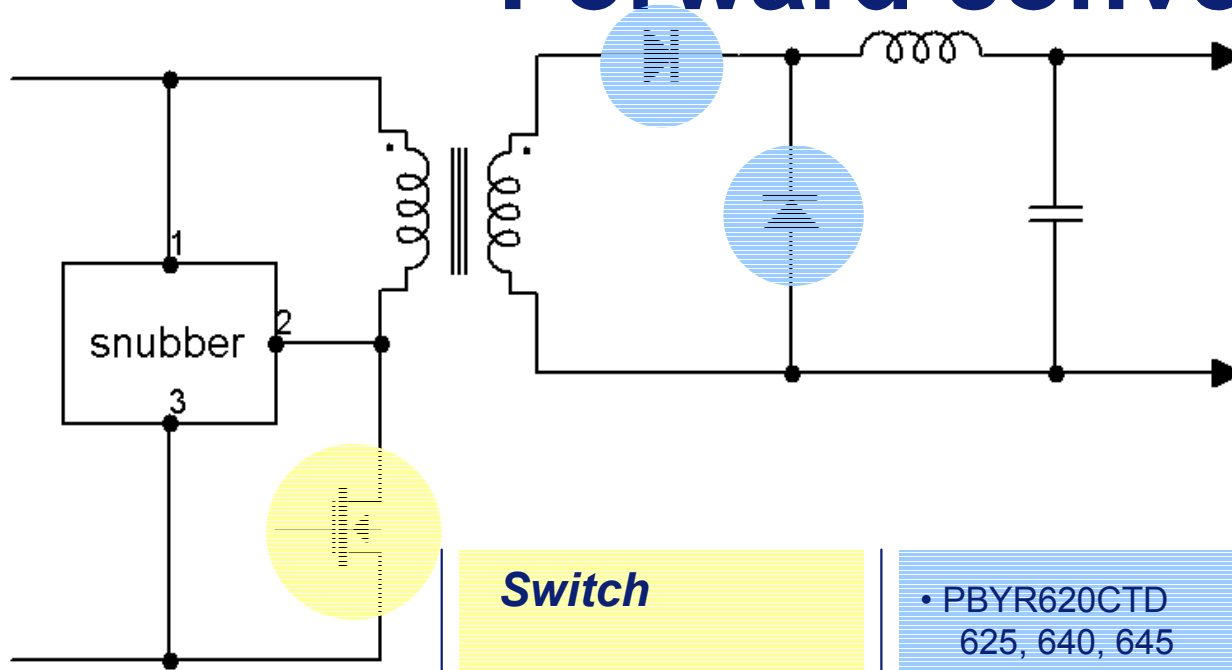
## Remarks

- Rule of thumb: use a 2A output rectifier for 1A rated maximum output current.
- In the absence of a good heatsink, often an output rectifier with a much higher rating are applied.
- Instead of a discrete switch, frequently an integrated controller+switch (like Philips Starplug) is applied on the primary side.

## Ultrafast / Hyperfast output rectifier

|                    |                                    |
|--------------------|------------------------------------|
| ES1A .. D          | 50 .. 200V, 1A, 25ns, SMA (SOD124) |
| • BYD73A .. D      | 50 .. 200V, 1.9A, 25ns, SOD81      |
| • BYD77A .. D      | 50 .. 200V, 1.9A, 25ns, SOD87      |
| • BYG80A .. D      | 50 .. 200V, 2.4A, 25ns, SOD106     |
| • BYV27-050 .. 200 | 50 .. 200V, 2.4A, 25ns, SOD57      |
| • BYV28-050 .. 200 | 50 .. 200V, 4.5A, SOD64            |
| • BYV1100          | 100V, 1.7A, 10ns, SOD81            |
| • BYD1100          | 100V, 1.7A, 10ns, SOD87            |
| • BYG85B           | 100V, 2.3A, 12.5ns, SOD106         |
| • BYV2100          | 100V, 2.3A, 12.5ns, SOD57          |
| • BYV4100          | 100V, 4.2A, 15ns, SOD64            |

# Forward converter



## Remarks

- Rule of thumb: use 1A output rectifiers for 1A rated maximum output current, two-in-one-package solution is preferred
- In the absence of a good heatsink, often output rectifiers with a much higher rating are applied

## Switch

### Philips MOSFETs

- none

## Schottky output rectifier

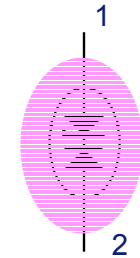
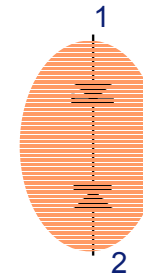
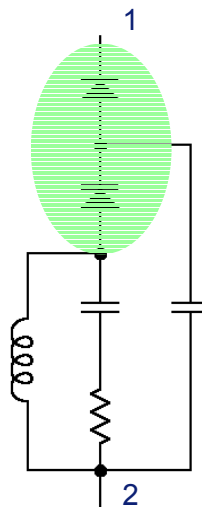
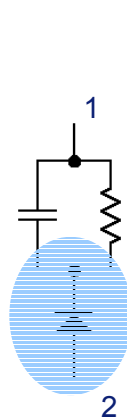
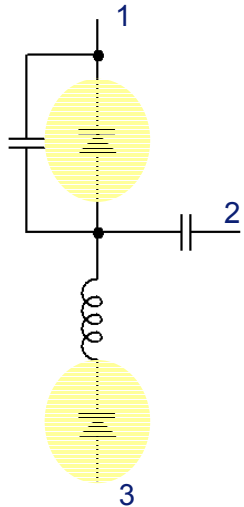
- 1PS74SB23 25V, 1A, SOT457
- 1PS74SB43 40V, 1A, SOT457
- BAT720 40V, 0.5A, SOT23
- BAT760 20V, 1A, SOD323
- 1PS70SB20 40V, 0.5A, SOT323
- PMEG2010EV 20V, 1A, SOT666

- PBYS620CTD 20V, 2\*3A DPAK  
625, 640, 645 25, 40, 45V
- PBYS725 25V, 7.5A DPAK / TO220AC /  
745 45V SOD100 / SOD113
- PBYS1025CTD 25V, 2\*5A DPAK  
1045 45V
- PBYSx1025 25V, 10A DPAK / D2PAK /  
1040, 1045, 40, 45, TO220AC / SOD113  
1060, 10100 60, 100V
- PBYSx1525 25V, 2\*7.5A D2PAK / TO220AB  
1545 45V
- PBYSx1620 20V, 16A D2PAK / TO220AC  
1625, 1645 25, 45V SOD100
- PBYS2040 40V 2\*10A D2PAK / TO220AB  
2045, 20100 45, 100V
- PBYSx2520 20V, 2\*12.5A TO220AB / D2PAK  
2525, 2545 25, 45V SOT186

## Ultrafast output rectifier

- BYQ28x-200 200V, 2\*5A
- BYQ30x-200 200V, 2\*8A
- BYW29x-100 .. 200 100 .. 200V, 8A
- BYV32x-100 .. 200 100 .. 200V, 2\*10A

# Some snubber circuit alternatives



## LCCDD

### Philips Diodes

- BYD33J .. M
- BYD37J .. M
- BYG70J .. M
- BYV26C .. E
- BYV36C .. E

## RCD

### Philips Diodes

- BYD33J .. M
- BYD37J .. M
- BYG70J .. M
- BYV26C .. E
- BYV36C .. E

## RLCDD

### Philips Diodes

- BYD33J .. M
- BYD37J .. M
- BYG70J .. M
- BYV26C .. E
- BYV36C .. E

## Double D

### Philips Diodes

- BYD33J .. M
- BYD37J .. M
- BYG70J .. M
- BYV26C .. E
- BYV36C .. E

### Philips TVS

- BZD23-Cxxx
- BZD27-Cxxx
- BZG04-Cxxx
- BZT03-Cxxx
- BZW03-Cxxx

## ZenBlock™

### Philips ZenBlock

- BZD142-xxx
- BZD142W-xxx
- BZG142-xxx
- BZT142-xxx
- BZW142-xxx

