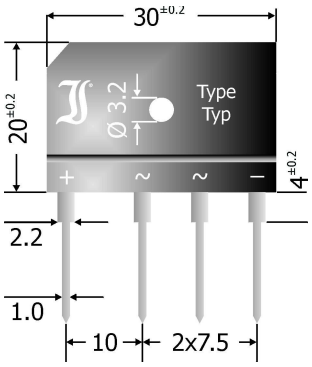
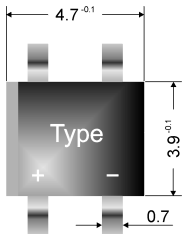
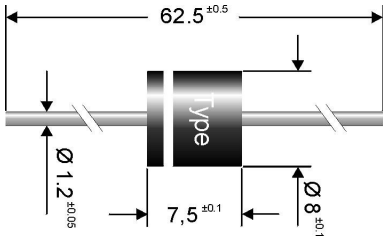
Version 2007-08-21

Diotec Products for White Goods

Washing Machines, Dishwashers, Refrigerators, Microwave Ovens, Vacuum Cleaners







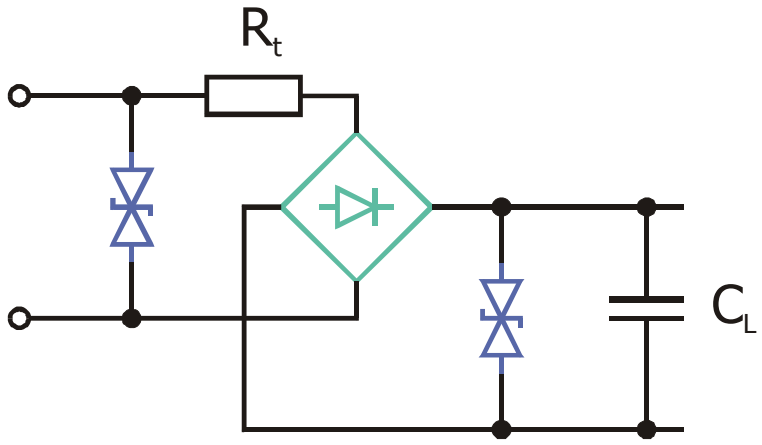
Rectifier Stage / Protection

Discrete Rectifiers, Bridge Rectifiers, Parts for PFC
High Voltage Rectifiers, TVS-Diodes

Auxiliary Power Supply / Signal Processing

SMD Bridge Rectifiers, Fast to Ultrafast Rectifiers,
Schottky-, Zener-Diodes

Input Rectification



TVS-Diodes

AC side: protect the whole unit against voltage spikes from the mains, caused by lightning, electrostatic discharge (ESD), fast switching transients, etc.
DC side: protect the rectifier bridge against voltage spikes caused by fast switching transients of the following inverter stage
Dimensioning: the maximum occuring peak input voltage resp. the DC voltage must not exceed the stand-off voltage of the device; it may be necessary to switch devices in series to achieve higher voltage rating.

Axial leaded: BZW04-..., P4KE..., BZW06-..., P6KE..., 1.5KE... , 5KP...; (400 to 5000 W)
SMD: TGL34-... , TGL41-..., P4SMA..., P6SMB..., 1.5SMC... ; (150 to 1500 W, up to 550V!)

Bridge Rectifiers

Available as complete device but can also be formed by four single devices (see next page). Recommended values for protective resistor Rt and load capacitor CL are given within the datasheet. Rt includes also series resistance of transformer and leads, at small powers an additional device is therefore often not necessary.

Medium Power (6 to 25 A)
Single In-line: GBU6...12 G...M; KBU6...12 G...M; GBI10...25 G...M (8 ... 25 A, 400 ... 1000 V)
Square / wire leads: KBPC604...610, KBPC804...810, PB1004...1010(S) (6 ... 10 A, 400 ... 1000 V)

High Power (10 to 35 A)
Square, Fast-on terminals: KBPC1004FP ... KBPC3516FP (10 ... 35 A, 400 ... 1600 V)
Square, Wire leads: KBPC1004WP ... KBPC3516WP/I (10 ... 35 A, 400 ... 1600 V)

Single Rectifiers

Axial Leaded: 1N5404K...08K, 1N5404...08, BY252...55, BY550-200...1000,
P600G...M, P1000G...M, P1200G (3 to 12 A, 400 ... 1000 V)

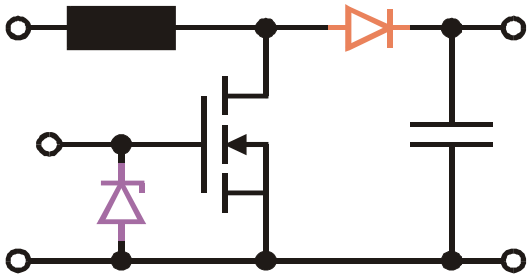
SMD:
SM5404...08, S1G...M, S2G...M, S3G...G, S5G...M; (3 to 5 A, 400...1000V)

HV Rectifiers

EMI tests using burst pulses up to 2 kV are a big challenge for rectifiers used in 230 V power supplies. Instead of switching two devices in series, single rectifiers having 1200 to 2000 V can be used.
Special high voltage rectifiers allow usage at medium to high voltages.

Axial Leaded:
EM513...EM518, BY255...BY2000, P600S; (1 to 6 A; 1200 to 2000 V)
BV4...6, BY4...16; (0.1 to 1 A; 4 to 16 kV)
HV1.5, HV2 (500 mA, 1.5 to 2 kV Fast); HV3, HV5 (200 mA, 3 to 5 kV Fast)
DD300 ... DD1800 (20 mA, 3kV to 18 kV Fast)
SMD:
SM513...SM2000, S1T...S1Y, S2T...S2Y, S3T...S3Y; (1 ... 3 A, 1300 ... 2000 V)
FR2T...YSMA, SA261...SA265 (Fast); (2 A, 1200 ... 2000 V)

Power Factor Correction (PFC)



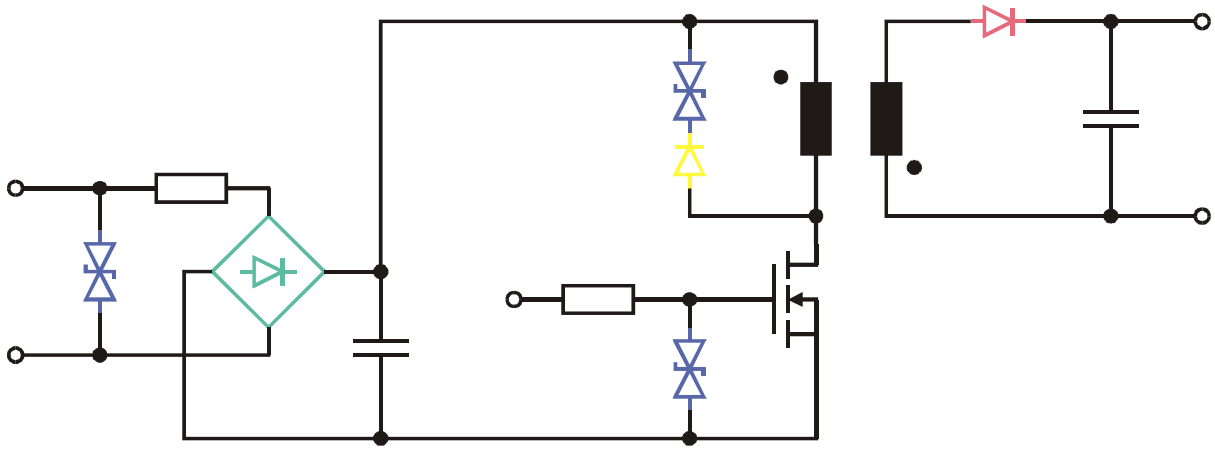
Ultrafast Diodes for boost stage
Operation frequencies are normally high, for reduction of power losses in the switch (affected highly by reverse recovery behaviour of the diode!) the boost diode must be ultrafast. At 230 VRMS mains, minimum a 600 V type should be used, at 110 VRMS a 400 V type.

Axial Leaded: UF4004...4007, UF5404...5408, UF600G...M; (1 to 6 A)
SMD: SUF4004...4007, US1G...M, US2G...M, US3G...M; (1 to 3 A)

Zenerdiodes/TVS-Diodes for Gate protection
To provide protection against both negative and positive voltage spikes two zener diodes can be switched in series or a single bidirectional TVS diode (Suffix "B" or "C") can be used.

Axial Leaded:
ZPY..., ZY..., 3EZ..., 1N53..B; (1.3 to 5 W Zener)
BZW04-...B, P4KE...C, BZW06-...B, P6KE...C, 1.5KE...C, 5KP...C; (400 to 5000 W peak TVS)
SMD:
ZMM..., ZMD..., ZMY..., SMZ1..., SZ3C..., Z1SMA, Z2SMB..., Z3SMC...; (0.5 to 3 W Zener)
TGL34-...C, TGL41-...C, P4SMA...C, P6SMB...C, 1.5SMC...C (150 to 1500 W peak TVS)

Auxiliary Power Supply



Input Bridge
SMD: MYS125…380, MS125…500, S125…500, B125…500S (0.5 ... 1 A, 250 ... 1000 V)
Trough Hole: B125…500D, B125...500R (1 ... 2 A, 250 ... 1000 V)

Clamping Network: TVS-/Fast-Diode
Necessary for three reasons: Leakage inductance of the transformer causes voltage spikes during turn-off of the switch. Current commutation from primary to secondary side needs a small time during that voltage across the switch is rising to high levels. If output voltage is not controlled and there is no load at the output, voltage may increase until rectifier diode breaks down.

Axial Leaded:
BZW04-..., P4KE..., BZW06-..., P6KE..., 1.5KE... , 5KP...; (400 to 5000 W)
BA157…159, BY396…BY399, BY500-..., MR820…828; (1 to 5 A)
SMD:
TGL34-... , TGL41-..., P4SMA..., P6SMB..., 1.5SMC...; (150 to 1500 W, up to 550 V!)
RGL34..., RGL1..., SA154…160, SA263…265 (2000 V!); FR1..., FR2..., FR3...; (0.5 to 3 A)

Zenerdiodes/TVS-Diodes for (Gate) Protection See Input/PFC stage.

Output Rectification: Ultrafast or Schottky Diodes
Depending on output voltage either ultrafast (50…400 V) or Schottky diodes (20…100 V) can be used. Blocking voltage must be larger than twice the output DC voltage!

Axial Leaded:
UF4001…4004, UF5400…5404, UF600A…G; (1 to 6 A, 50 ... 400 V)
SB120…1100, SB220…2100, SB320…3100, SB520…5100, SB820…8100; (1 to 8 A, 20 ... 100 V)
SMD:
EGL34A…G, EGL1A…G, SUF4001…4007, US1A…M, US2A…A, US3A…A; (0.5 to 3 A, 50 ... 400 V)
SGL34-20…100, SGL1-20…100, SMS120…1100, SMS220…2100, SMS320…3100,
SK12…110, SK32SMA…310SMA, SK52…510, SK82…810; (0.5 to 8 A, 20 ... 100 V)

Signal Processing and Control

Small Signal Diodes, Schottky Diodes, Zener-Diodes, Bipolar Transistors

Axial / THT:
1N4148...1N4151; BAV18...BAV21 (150 ... 200 mA, 50 ... 200 V)
SD101, SD103 (15 ... 200 mA, 20 ... 60 V)
ZPD.., ZPY.., ZY.. (500 mW... 2W)
BC327ff, BC546ff, MPSA05/06; MPSA55/66; MPSA42/43, MPSA92/93
(200 ... 800 mA, 25 ... 300 V)

SMD:
LL4148...LL4151, BAW56, BAV70, BAV99, BAV100...BAV103 (150 ... 200 mA, 50 ... 200 V)
LL101, LL103, BAS40, BAS70 (15 ... 200 mA, 20 ... 60 V)
ZMM.., BZX84C.., ZMD.., ZMY.., SMZ.. (500 mW... 2 W)
BC807ff; MMBTA05/06, MMBTA55/56; MMBTA42/43, MMBTA92/93
(500 ... 800 mA, 25 ... 300 V)

Customized Solutions

For assembly of axial leaded diodes the lead wires are bent in various ways. Lowest thermal resistance is achieved by bending the leads in a radial way, see picture in the middle. Diotec offers the service to supply devices with leads already bent, please contact your local Diotec Sales Office or Diotec distributor for more information.

New Power Diodes

PT800A...M (8A); PCT1600A...M (2x8A, common cathode), PST1600A...M (2x8A, half bridge)