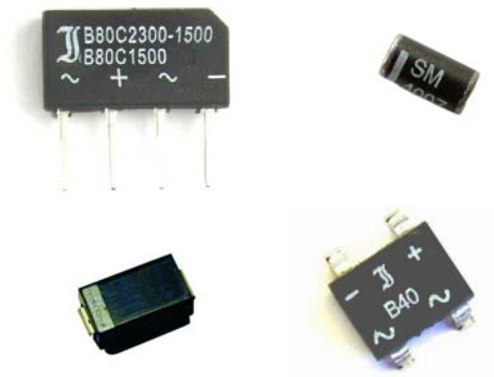


Diotec Products for *Power Supplies*

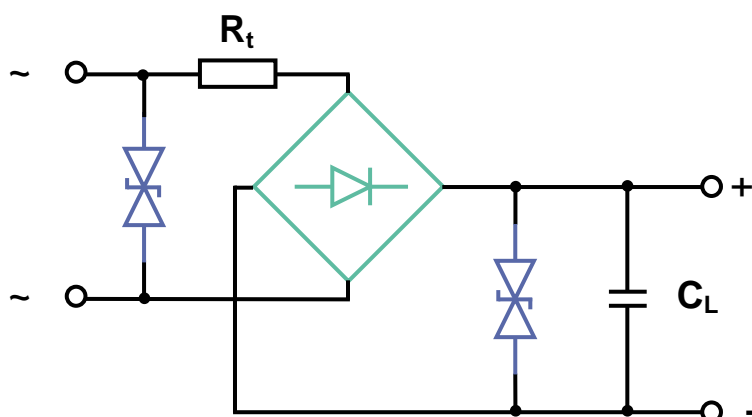
Typical Applications:

AC/DC-, DC/DC-Converters, Battery Chargers, Off-Line PS



Line Protection	➔	TVS-Diodes
Input Rectification	➔	Bridge Rectifiers, Standard-/Fast Rectifiers
Voltage Regulation	➔	Zener Diodes
Boost-Diode for PFC	➔	Superfast-/Ultrafast Rectifiers
Gate Protection (MOS)	➔	Zener-Diodes, TVS-Diodes
Clamping Network (Flyback)	➔	Fast-Diodes, TVS-Diodes
Demagnetization (Forward)	➔	Fast-Diodes
Output Rectification	➔	Schottky Diodes, Superfast-/Ultrafast Rectifiers
OR-ing Diodes	➔	Schottky Diodes, Standard Rectifiers

Input Rectification (Front End)



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 occurring 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.

Types¹

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. Recommended values for protective resistor R_t and load capacitor C_L are given within the datasheet. R_t includes also series resistance of transformer and leads, at small powers an additional device is therefore often not necessary.

Types¹

Small power (0.5 to 1 A)

SMD: **MYS40**...**380**, **MS40**...**500**, **S40**...**500**, **B40**...**500S**, B40...380FS (Fast), CS10...50S (Schottky)
trough hole: **B40**...**500D**, B40...380FD (Fast recovery), CS10...50D (Schottky)

Medium Power (1.5 to 25 A)

Single In-line: B..C1500, **B..C2300-1500**; GBS4 A...M; **B..C3200-2200 to B..C7000-4000**; GBS4
GBU4 to GBU12; **KBU4 to KBU12**; GBI10 A...M to GBI25 A...M

Square with wire leads: KBPC600, KBPC800, PB1000, PB1000S

High Power (10 to 50 A)

Square, Fast-on terminals: KBPC1000FP, **KBPC1500FP to KBPC5000FP**

Square, Wire leads: KBPC1000WP, **KBPC1500WP to KBPC5000WP**, KBPC2500I to KBPC3500I

3~ Bridges (6 to 35 A)

Single In-line: DBI 6-... to DBI 25-...

Square, Fast-on terminals: **DB15**-... to **DB35**-...

¹ Preferred types are **bold**; colours according to Diotec Selection Guide. Datasheets see www.diotec.com, "Products".

Single Rectifiers 1200 V to 24 kV

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.

Types¹

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)

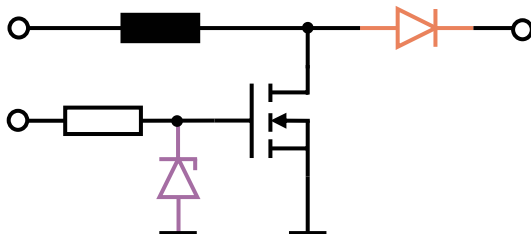
HV1.5, **HV2 (500 mA, 1.5 to 2 kV Fast)**; **HV3**, **HV5 (200 mA, 3 to 5 kV Fast)**
DD300 ... DD1800 (20 mA, 3kV to 18 kV Fast)

SMD: **SM513...SM2000**, **S1T...S1Y**, **S2T...S2Y**, **S3T...S3Y**; **SA261...SA265 (Fast)**; (1 to 3 A)

Special package "Hockey Puck"²:

Si-A1125/500-6, **Si-A3000/1350-2.5**, **Si-A7500/3300-3.2**, **Si-A8000/3600-1.8**; (7.7 to 1.8 A; 3.2 to 24 kV)

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 V_{RMS} mains, minimum a 600 V type should be used, at 110 V_{RMS} a 400 V type.

Types¹

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.

Types¹

Leaded: **ZPY...**, **ZY...**, **3EZ...**, **1N53..B**; (1.3 to 5 W steady)

BZW04-...B, **P4KE...C**, **BZW06-...B**, **P6KE...C**, **1.5KE...C**, **5KP...C**; (400 to 5000 W peak)

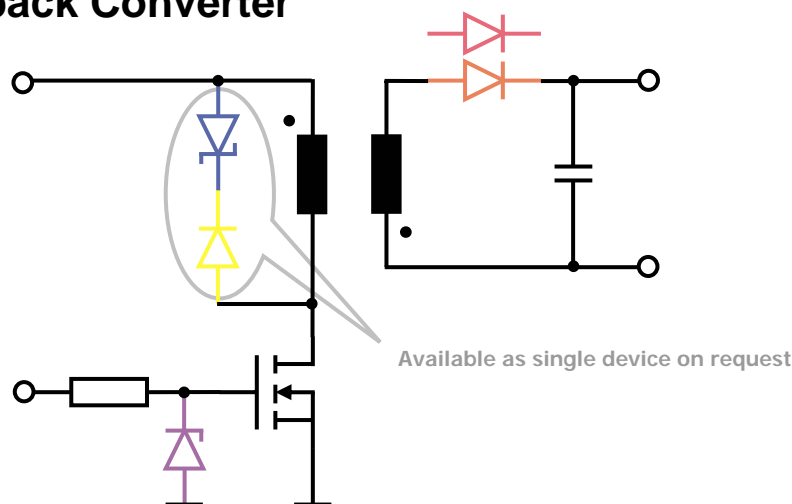
SMD: **ZMM...**, **ZMD...**, **ZMY...**, **SMZ1...**, **SZ3C...**, **Z1SMA**, **Z2SMB...**, **Z3SMC...**; (0.5 to 3 W steady)

TGL34-...C, **TGL41-...C**, **P4SMA...C**, **P6SMB...C**, **1.5SMC...C** (150 to 1500 W peak)

¹ Preferred types are **bold**; colours according to Diotec Selection Guide. Datasheets see www.diotec.com, "Products".

² On request

Flyback Converter



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.

Types¹

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

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.

Types¹

Leaded: ZPY..., ZY..., 3EZ..., BZV58C..., **1N53..B; (1.3 to 5 W steady)**

BZW04-...B, **P4KE...C**, BZW06-...B, **P6KE...C**, **1.5KE...C**, 5KP...C; (400 to 5000 W peak)

SMD: ZMM..., ZMD..., ZMY..., **SMZ1...**, SZ3C..., Z1SMA, Z2SMB..., Z3SMC...; (0.5 to 3 W steady)

TGL34-...C, TGL41-...C, P4SMA...C, P6SMB...C, 1.5SMC... C; (150 to 1500 W peak)

Output Rectification: Ultrafast or Schottky Diodes

Depending on output voltage either ultrafast (50...1000 V) or Schottky diodes (20...100 V) can be used. Blocking voltage must be larger than twice the output DC voltage!

Types¹

Leaded: **UF4001...4007, UF5400...5408, UF600A...M; (1 to 6 A)**

SB120...1100, SB220...2100, SB320...3100, SB520...5100, SB820...8100; (1 to 8 A!)

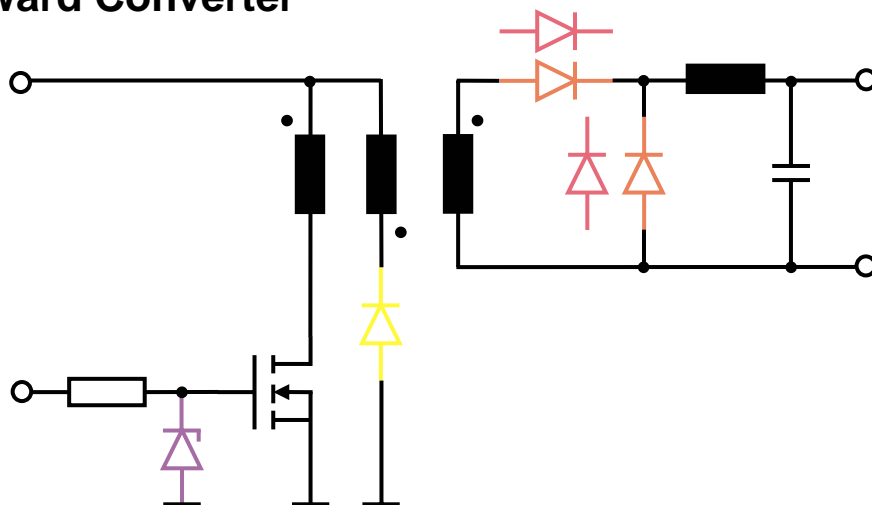
SMD: **EGL34A...G, EGL1A...G, SUF4001...4007, US1A...M, US2A...A, US3A...A; (0.5 to 3 A)**

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!)

¹ Preferred types are **bold**; colours according to Diotec Selection Guide. Datasheets see www.diotec.com, "Products".

Forward Converter



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.

Types¹

Leaded: ZPY..., ZY..., 3EZ..., BZV58C..., **1N53..B**; (1.3 to 5 W steady)

BZW04-...B, **P4KE...C**, BZW06-...B, **P6KE...C**, **1.5KE...C**, 5KP...C; (400 to 5000 W peak)

SMD: ZMM..., **ZMD...**, ZMY..., **SMZ1...**, SZ3C..., Z1SMA, Z2SMB..., Z3SMC...; (0.5 to 3 W steady)
TGL34-...C, **TGL41-...C**, P4SMA...C, P6SMB...C, 1.5SMC... C; (150 to 1500 W peak)

Fast Diodes for transformer demagnetization

During turn-off phase of switch the stored inductive energy within the transformer is fed back to the input voltage source.

Types¹

Leaded: **BA157...159**, **BY396...BY399**, **BY500-...**, MR820...828; (1 to 5 A)

SMD: **RGL34...**, **RGL1...**, **SA154...160**, SA263...SA265 (2000 V!); **FR1...**, **FR2...**, **FR3...**; (0.5 to 3 A)

Output Rectification: Ultrafast or Schottky Diodes

Depending on output voltage either ultrafast (50...1000 V) or Schottky diodes (20...100 V) can be used.

Types¹

Leaded: **UF4001...4007**, **UF5400...5408**, UF600A...M; (1 to 6 A)

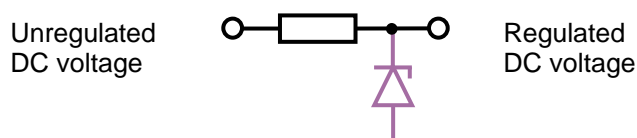
SB120...1100, **SB220...2100**, **SB320...3100**, **SB520...5100**, **SB820...8100**; (1 to 8 A!)

SMD: **EGL34A...G**, **EGL1A...G**, **SUF4001...4007**, **US1A...M**, **US2A...A**, **US3A...A**; (0.5 to 3 A)

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!)

¹ Preferred types are **bold**; colours according to Diotec Selection Guide. Datasheets see www.diotec.com, "Products".

Voltage Regulation



Zenerdiodes for simple voltage regulation

A simple method to provide stabilized voltages from an unregulated voltage source. The resistor has to be chosen so that maximum allowable zener current I_{Zmax} (see datasheet) at the maximum occurring input voltage and at no load at the output is not exceeded. If voltage source is formed by a transformer, the series resistance of the windings may be enough to provide this resistor. Power dissipation of below devices ranges up to 5 W (leaded) and 3 W (SMD) respectively. For higher power needs series connection of zenerdiodes can be used.

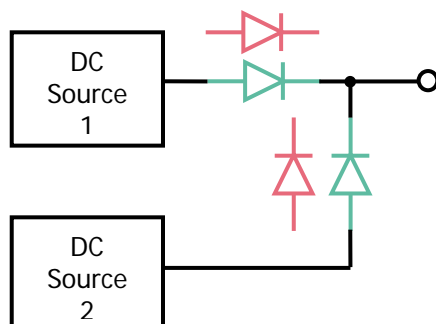
Tolerance is graded to E24 standard (approximately +/- 5%), if tighter limits are required parts with +/- 2% tolerance are available on request.

Types¹

Leaded: ZPY..., ZY..., 3EZ..., 1N53..B; (1.3 to 5 W)

SMD: ZMM..., ZMD..., ZMY..., SMZ1..., SZ3C..., Z1SMA, Z2SMB..., Z3SMC...; (0.5 to 3 W)

OR-ing Diodes



Decoupling of voltage sources: Standard or Schottky Diodes

If low power losses are required and DC voltage is below 100 V Schottky diodes can be used. Special diodes (on request) offer beside *low forward voltage drop* also *low leakage currents*. Standard diodes are suitable for higher voltages, for high current applications the usage of press-fit packages is possible. The D30V.. series is a **common cathode configuration** of standard diodes within a square bridge package.

Types¹

Leaded: 1N4001...7, 1N5391...99, 1N5400K...08K, 1N5400...08, BY251...55, BY550-..., P600..., P1000..., P1200...; (1 to 12 A)

SB120...1100, SB220...2100, SB320...3100, SB520...5100, SB820...8100; (1 to 8 A!)

SMD: GL34..., GL1..., SM4001...7, SM5059...63, SM5400...08, S1..., S2..., S3..., S5...; (0.5 to 5 A)
SMS120...1100, SMS220...2100, SMS320...3100, SK12...110, SK32SMA...310SMA, SK52...510, SK82...810; (1 to 8 A!)

Pressfit: BYP25..., BYP35..., BYP60..., KYW25..., KYW35..., KYZ25..., KYZ35...; (25 to 60 A)

Square with Fast-on or Wire leads: D30VC20...80; (2x15 A)

¹ Preferred types are **bold**; colours according to Diotec Selection Guide. Datasheets see www.diotec.com, "Products".