Netz-Dioden-Modul  
Rectifier Diode Module**DZ540N**

DZ540N

DZ540N...B01

**Elektrische Eigenschaften / Electrical properties**

Höchstzulässige Werte / Maximum rated values

|  |   |             |              |                      |  |
|--|---|-------------|--------------|----------------------|--|
| Periodische Spitzensperrspannung<br>repetitive peak reverse voltages | $T_{vj} = -40^{\circ}\text{C} \dots T_{vj \max}$  | $V_{RRM}$   | 2000<br>2400 | 2200<br>2600         | V<br>V                                       |
| Stoßspitzensperrspannung<br>non-repetitive peak reverse voltage      | $T_{vj} = +25^{\circ}\text{C} \dots T_{vj \max}$  | $V_{RSM}$   | 2100<br>2500 | 2300<br>2700         | V<br>V                                       |
| Durchlaßstrom-Grenzeffektivwert<br>maximum RMS on-state current      |   | $I_{FRMSM}$ |              | 1150                 | A  |
| Dauergrenzstrom<br>average on-state current                          | $T_C = 100^{\circ}\text{C}$<br>$T_C = 73^{\circ}\text{C}$   | $I_{FAVM}$  |              | 540<br>732           | A<br>A                                       |
| Stoßstrom-Grenzwert<br>surge current                                 | $T_{vj} = 25^{\circ}\text{C}, t_p = 10 \text{ ms}$<br>$T_{vj} = T_{vj \max}, t_p = 10 \text{ ms}$ | $I_{FSM}$   |              | 16.500<br>14.000     | A<br>A                                       |
| Grenzlastintegral<br>$I^2t$ -value                                   | $T_{vj} = 25^{\circ}\text{C}, t_p = 10 \text{ ms}$<br>$T_{vj} = T_{vj \max}, t_p = 10 \text{ ms}$ | $I^2t$      |              | 1.360.000<br>980.000 | $\text{A}^2\text{s}$<br>$\text{A}^2\text{s}$ |

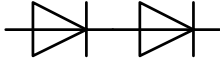
## Charakteristische Werte / Characteristic values


|  |  |            |      |            |            |
|--|--|------------|------|------------|------------|
| Durchlaßspannung<br>on-state voltage               | $T_{vj} = T_{vj \max}, I_F = 2200 \text{ A}$   | $V_F$      | max. | 1,64       | V          |
| Schleusenspannung<br>threshold voltage             | $T_{vj} = T_{vj \max}$   | $V_{(TO)}$ |      | 0,78       | V          |
| Ersatzwiderstand<br>slope resistance               | $T_{vj} = T_{vj \max}$   | $r_T$      |      | 0,31       | m $\Omega$ |
| Sperrstrom<br>reverse current                      | $T_{vj} = T_{vj \max}, V_R = V_{RRM}$  | $I_R$      | max. | 40         | mA         |
| Isolations-Prüfspannung<br>insulation test voltage | RMS, $f = 50 \text{ Hz}, t = 1 \text{ sec}$<br>RMS, $f = 50 \text{ Hz}, t = 1 \text{ min}$ | $V_{ISOL}$ |      | 3,6<br>3,0 | kV<br>kV   |

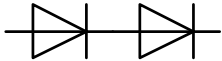
**Thermische Eigenschaften / Thermal properties**

|  |   |                    |      |                  |  |
|--|---|--------------------|------|------------------|--|
| Innerer Wärmewiderstand<br>thermal resistance, junction to case        | pro Modul / per Module, $\Theta = 180^{\circ} \sin$<br>pro Modul / per Module, DC | $R_{thJC}$         | max. | 0,0780<br>0,0745 | $^{\circ}\text{C}/\text{W}$<br>$^{\circ}\text{C}/\text{W}$ |
| Übergangs-Wärmewiderstand<br>thermal resistance, case to heatsink      | pro Modul / per Module  | $R_{thCH}$         | max. | 0,02             | $^{\circ}\text{C}/\text{W}$                                |
| Höchstzulässige Sperrschichttemperatur<br>maximum junction temperature |   | $T_{vj \max}$      |      | 150              | $^{\circ}\text{C}$   |
| Betriebstemperatur<br>operating temperature                            |   | $T_{c \text{ op}}$ |      | - 40...+150      | $^{\circ}\text{C}$   |
| Lagertemperatur<br>storage temperature                                 |   | $T_{stg}$          |      | - 40...+150      | $^{\circ}\text{C}$   |

|              |             |                      |          |
|--------------|-------------|----------------------|----------|
| prepared by: | C. Drilling | date of publication: | 11.05.06 |
| approved by: | M. Leifeld  | revision:            | 2        |

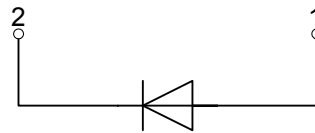
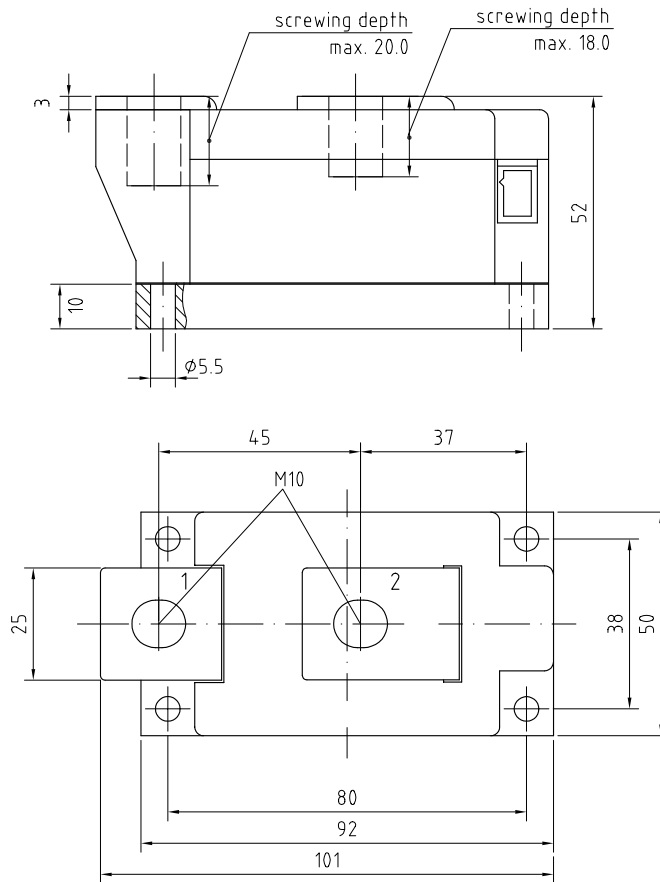
**N****Datenblatt / Data sheet**power electronics in motion  
**eupec****Netz-Dioden-Modul  
Rectifier Diode Module****DZ540N****Mechanische Eigenschaften / Mechanical properties**

|   |               |    |                   |                  |
|---|---------------|----|-------------------|------------------|
| Gehäuse, siehe Anlage<br>case, see annex  |               |    | Seite 3<br>page 3 |                  |
| Si-Element mit Druckkontakt<br>Si-pellet with pressure contact                    |               |    |                   |                  |
| Innere Isolation<br>internal insulation   |               |    | AIN               |                  |
| Anzugsdrehmoment für mechanische Anschlüsse<br>mounting torque                    | Toleranz ±15% | M1 | 5                 | Nm               |
| Anzugsdrehmoment für elektrische Anschlüsse<br>terminal connection torque         | Toleranz ±10% | M2 | 12                | Nm               |
| Gewicht<br>weight   |               | G  | typ. 900          | g                |
| Kriechstrecke<br>creepage distance  |               |    | 15                | mm               |
| Schwingfestigkeit<br>vibration resistance   | f = 50 Hz     |    | 50                | m/s <sup>2</sup> |
|  | file-No.      |    | E 83336           |                  |

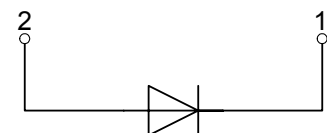


**Netz-Dioden-Modul  
Rectifier Diode Module**

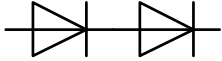
**DZ540N**



**DZ**



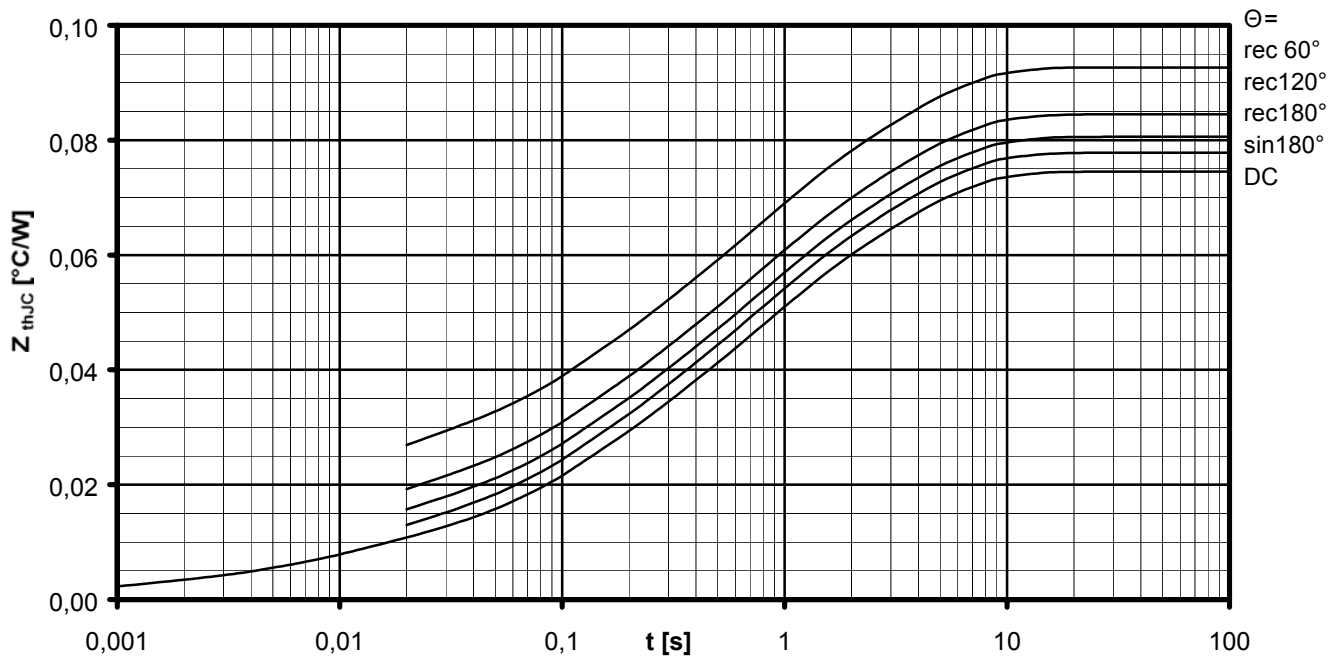
**DZ...B01**

Netz-Dioden-Modul  
Rectifier Diode Module**DZ540N**
**Analytische Elemente des transienten Wärmewiderstandes  $Z_{thJC}$  für DC**  
**Analytical elements of transient thermal impedance  $Z_{thJC}$  for DC**

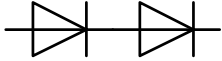
| Pos. n           | 1        | 2       | 3       | 4      | 5      | 6 | 7 |
|------------------|----------|---------|---------|--------|--------|---|---|
| $R_{thn}$ [°C/W] | 0,00194  | 0,00584 | 0,01465 | 0,0254 | 0,0267 |   |   |
| $T_n$ [s]        | 0,000732 | 0,00824 | 0,108   | 0,57   | 3      |   |   |

Analytische Funktion / Analytical function:

$$Z_{thJC} = \sum_{n=1}^{n_{max}} R_{thn} \left( 1 - e^{-\frac{t}{\tau_n}} \right)$$


 Transienter innerer Wärmewiderstand je Zweig / Transient thermal impedance per arm  $Z_{thJC} = f(t)$ 

 Parameter: Stromflußwinkel  $\Theta$  / Current conduction angle  $\Theta$

Netz-Dioden-Modul  
Rectifier Diode Module**DZ540N**

Natürliche Kühlung / Natural cooling  
3 Module pro Kühler / 3 modules per heatsink  
Kühler / Heatsink type: KM17 (120W)

**Analytische Elemente des transienten Wärmewiderstandes  $Z_{thCA}$**   
**Analytical elements of transient thermal impedance  $Z_{thCA}$**

| Pos. n           | 1       | 2      | 3     | 4 | 5 | 6 | 7 |
|------------------|---------|--------|-------|---|---|---|---|
| $R_{thn}$ [°C/W] | 0,01176 | 0,0412 | 0,717 |   |   |   |   |
| $T_n$ [s]        | 3,19    | 28,3   | 1370  |   |   |   |   |

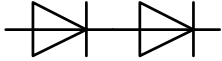
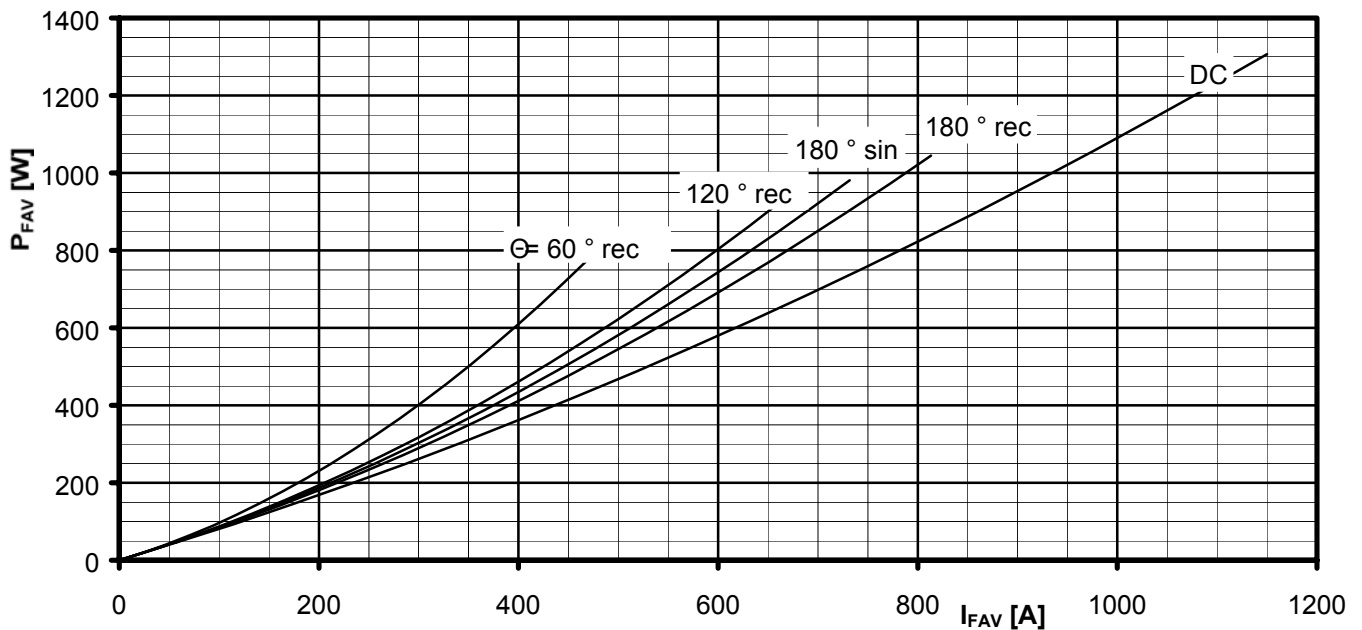
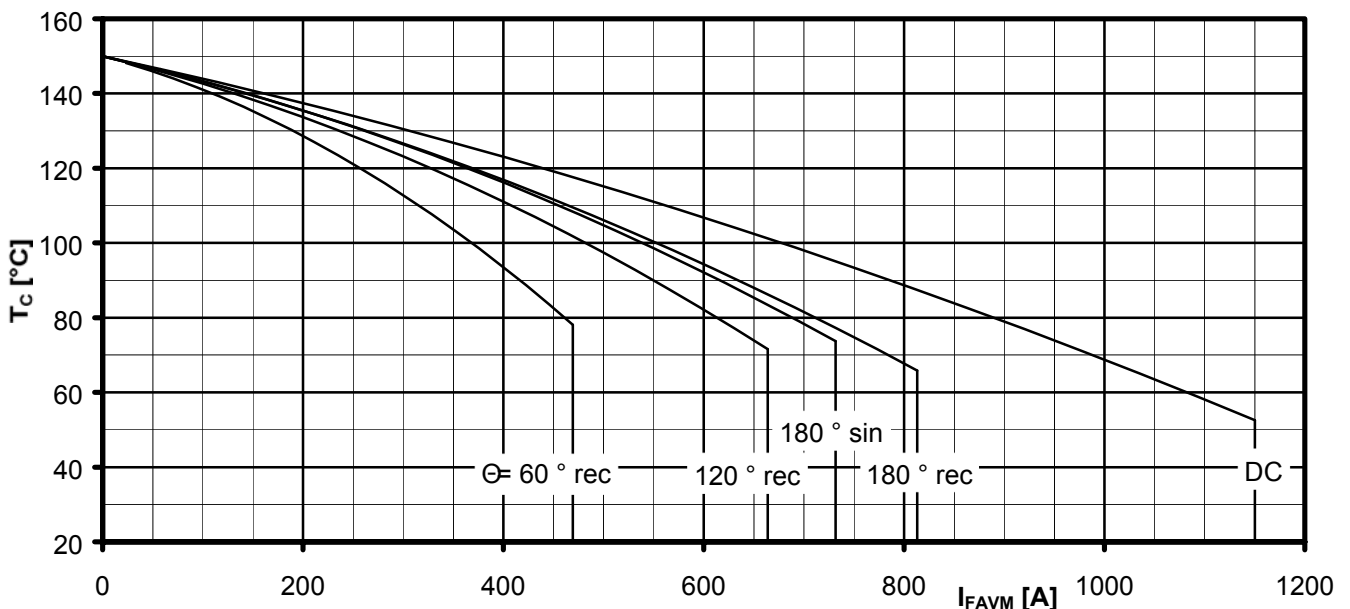
Verstärkte Kühlung / Forced cooling  
3 Module pro Kühler / 3 modules per heatsink  
Kühler / Heatsink type: KM17 (Papst 4650)

**Analytische Elemente des transienten Wärmewiderstandes  $Z_{thCA}$**   
**Analytical elements of transient thermal impedance  $Z_{thCA}$**

| Pos. n           | 1      | 2      | 3     | 4 | 5 | 6 | 7 |
|------------------|--------|--------|-------|---|---|---|---|
| $R_{thn}$ [°C/W] | 0,0075 | 0,0435 | 0,239 |   |   |   |   |
| $T_n$ [s]        | 6,4    | 31,8   | 497   |   |   |   |   |

Analytische Funktion / Analytical function:

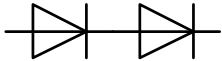
$$Z_{thCA} = \sum_{n=1}^{n_{max}} R_{thn} \left( 1 - e^{-\frac{t}{T_n}} \right)$$

Netz-Dioden-Modul  
Rectifier Diode Module**DZ540N**Durchlassverlustleistung je Zweig / On-state power loss per arm  $P_{FAV} = f(I_{FAV})$ Parameter: Stromflußwinkel / Current conduction angle  $\Theta$ Höchstzulässige Gehäusetemperatur / Maximum allowable case temperature  $T_C = f(I_{FAVM})$ 

Strombelastung je Zweig / Current load per arm

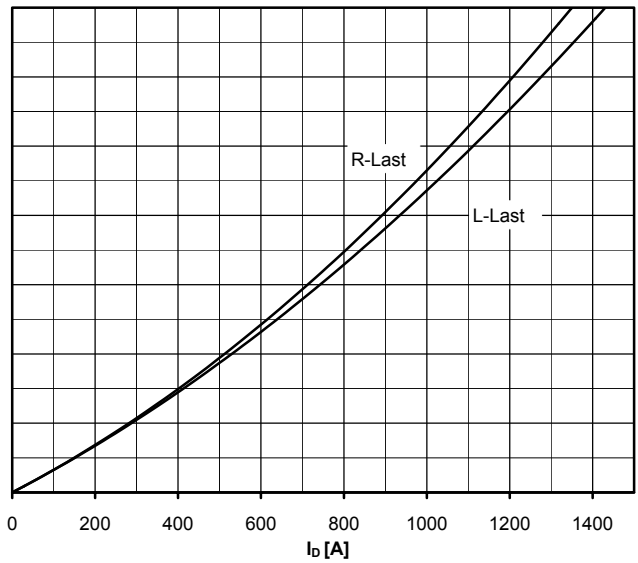
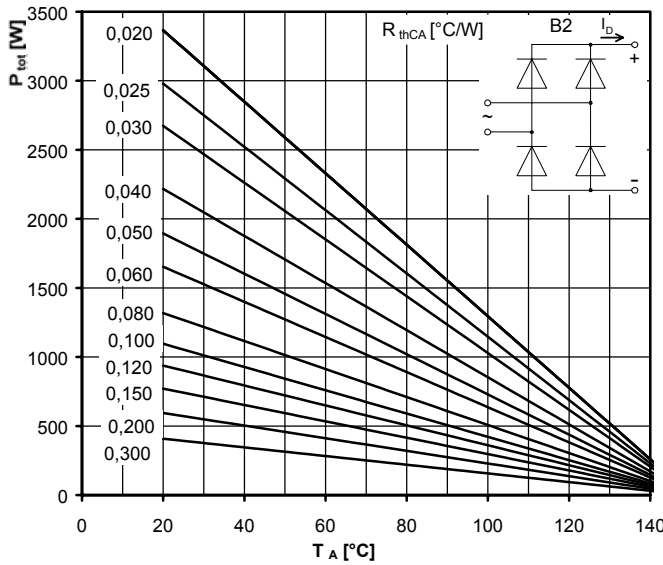
**Berechnungsgrundlage  $P_{TAV}$**  (Schaltverluste gesondert berücksichtigen)  
**Calculation base  $P_{TAV}$**  (switching losses should be considered separately)

Parameter: Stromflußwinkel  $\Theta$  / Current conduction angle  $\Theta$



**Netz-Dioden-Modul  
Rectifier Diode Module**

**DZ540N**



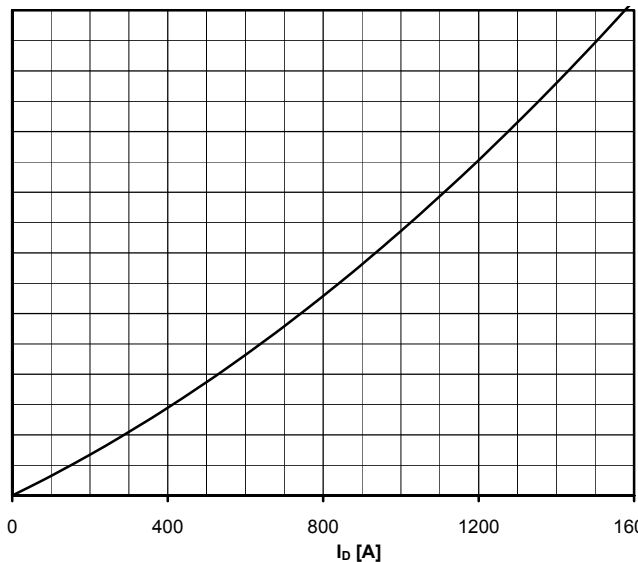
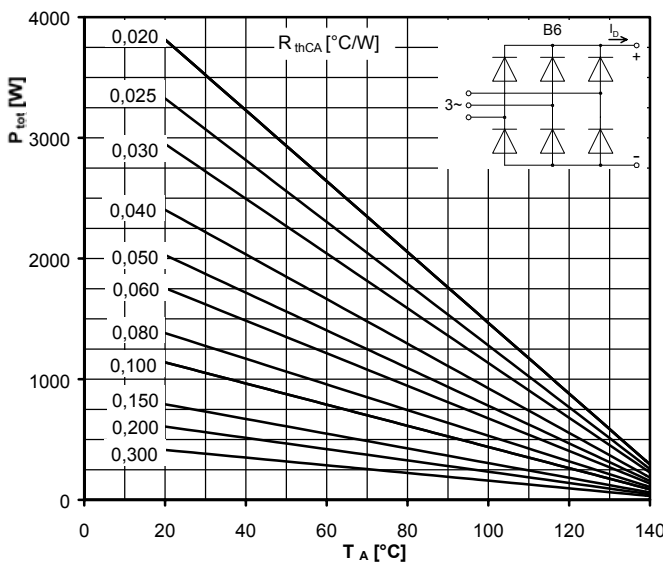
**Höchstzulässiger Ausgangsstrom / Maximum rated output current  $I_b$**

B2- Zweipuls-Brückenschaltung / Two-pulse bridge circuit

Gesamtverlustleistung der Schaltung / Total power dissipation at circuit  $P_{tot}$

Parameter:

Wärmewiderstand zwischen den Gehäusen und Umgebung / Thermal resistance cases to ambient  $R_{thCA}$



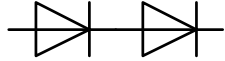
**Höchstzulässiger Ausgangsstrom / Maximum rated output current  $I_b$**

B6- Sechspuls-Brückenschaltung / Six-pulse bridge circuit

Gesamtverlustleistung der Schaltung / Total power dissipation at circuit  $P_{tot}$

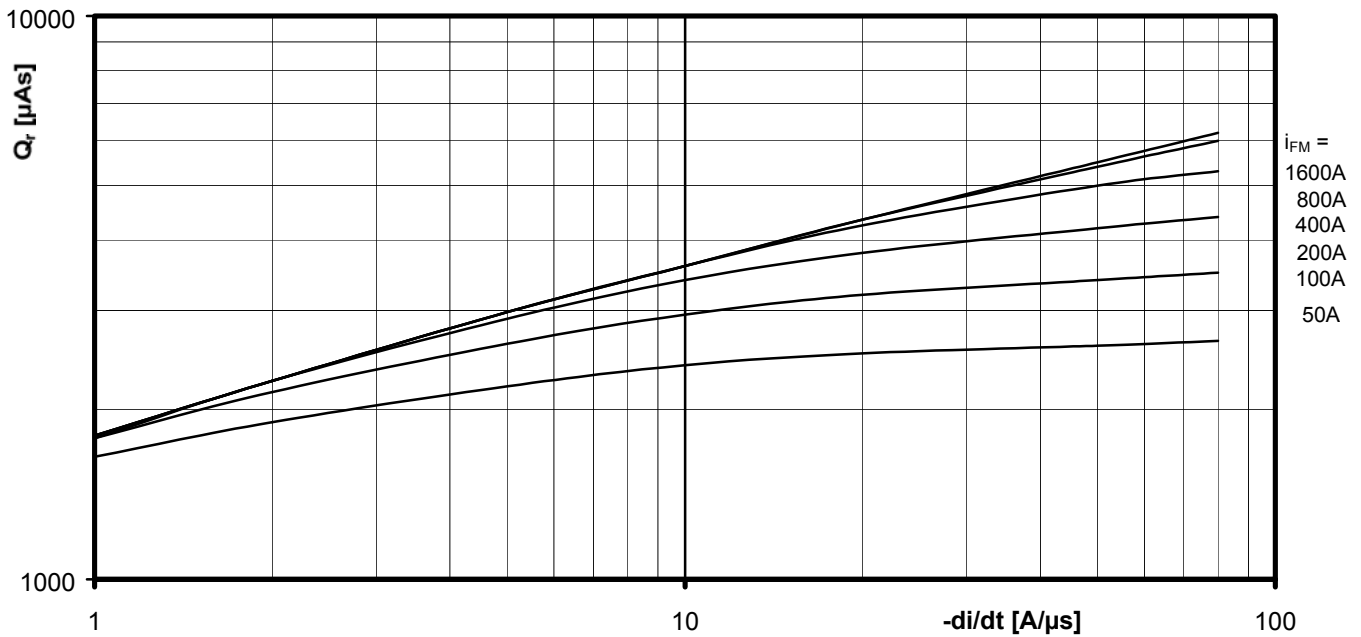
Parameter:

Wärmewiderstand zwischen den Gehäusen und Umgebung / Thermal resistance cases to ambient  $R_{thCA}$



Netz-Dioden-Modul  
Rectifier Diode Module

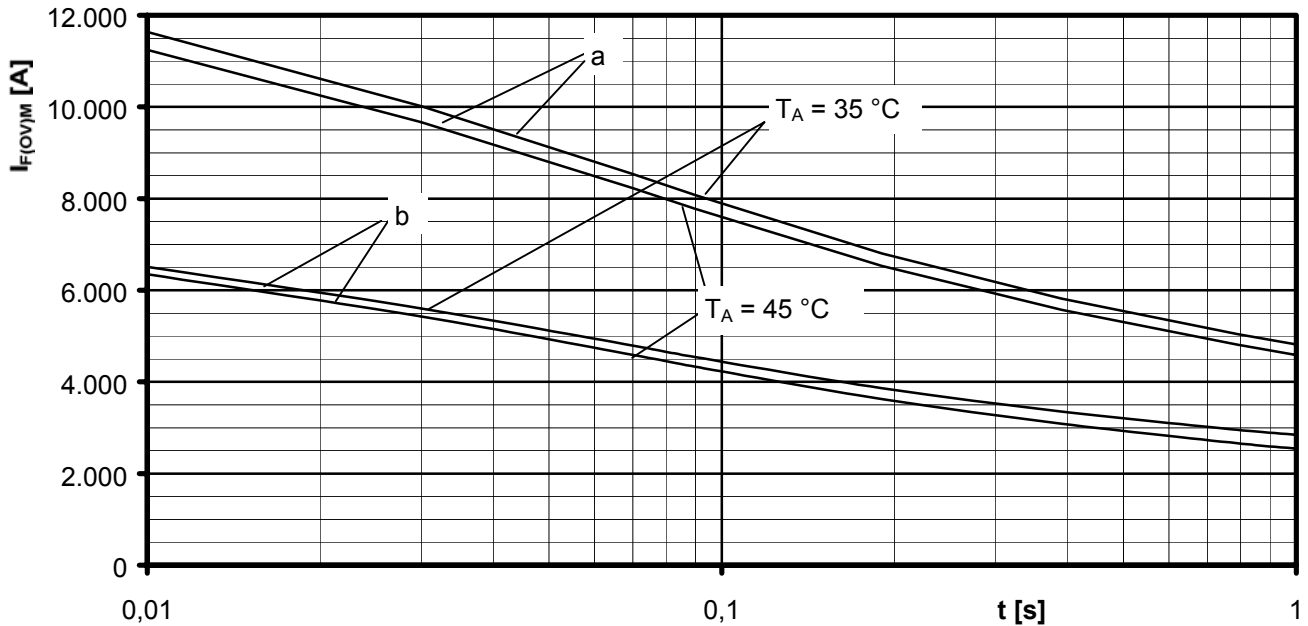
**DZ540N**



Sperrverzögerungsladung / Recovered charge  $Q_r = f(-di/dt)$

$$T_{vj} = T_{vjmax}, V_R \leq 0,5 V_{RRM}, V_{RM} = 0,8 V_{RRM}$$

Parameter: Durchlaßstrom / On-state current  $i_{FM}$



Grenzstrom je Zweig / Maximum overload on-state current per arm  $I_{F(OV)M} = f(t), V_{RM} = 0,8 V_{RRM}$

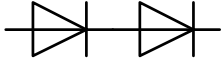
a: Leerlauf / No-load conditions

b: Vorlaststrom je Zweig / Pre-load current per arm  $I_{FAV(vor)} = I_{FAVM}$

$T_A = 35^\circ\text{C}$ , verstärkte Luftkühlung / Forced air cooling    Kühlkörper / Heatsink type: KM17 (Papst 4650)

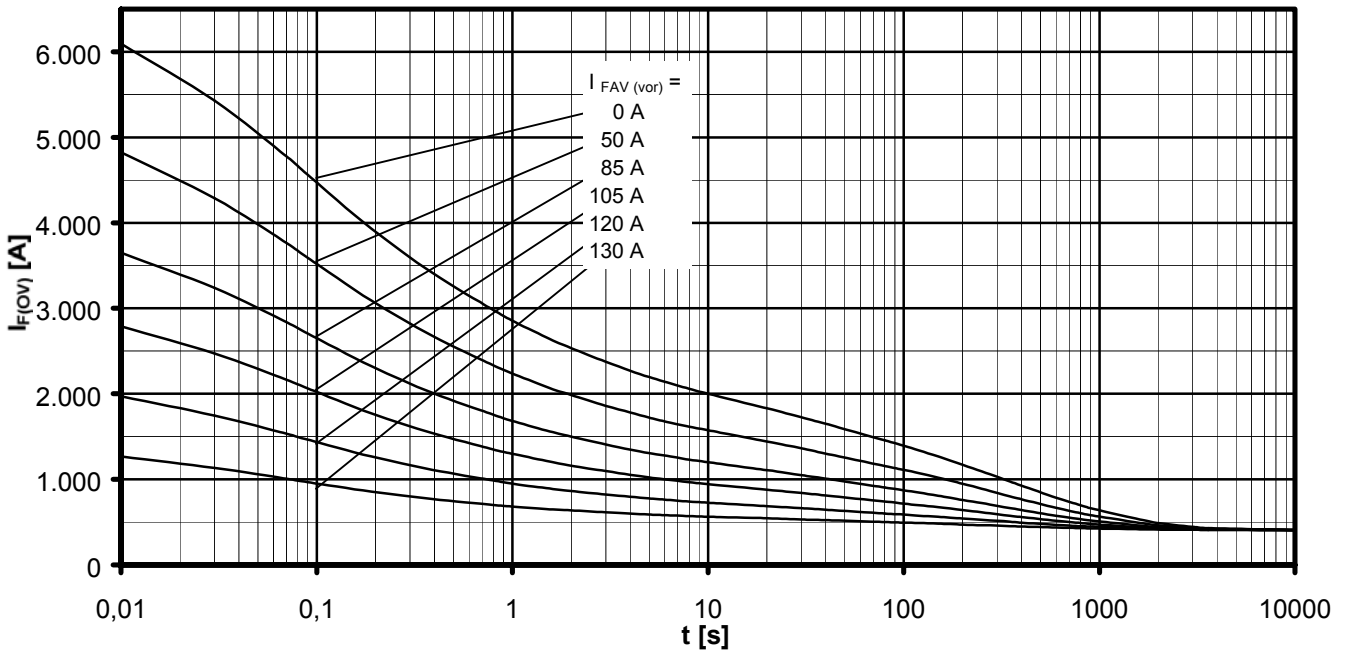
$T_A = 45^\circ\text{C}$ , natürliche Luftkühlung / Natural air cooling    Kühlkörper / Heatsink type: KM17 (120W)





Netz-Dioden-Modul  
Rectifier Diode Module

**DZ540N**

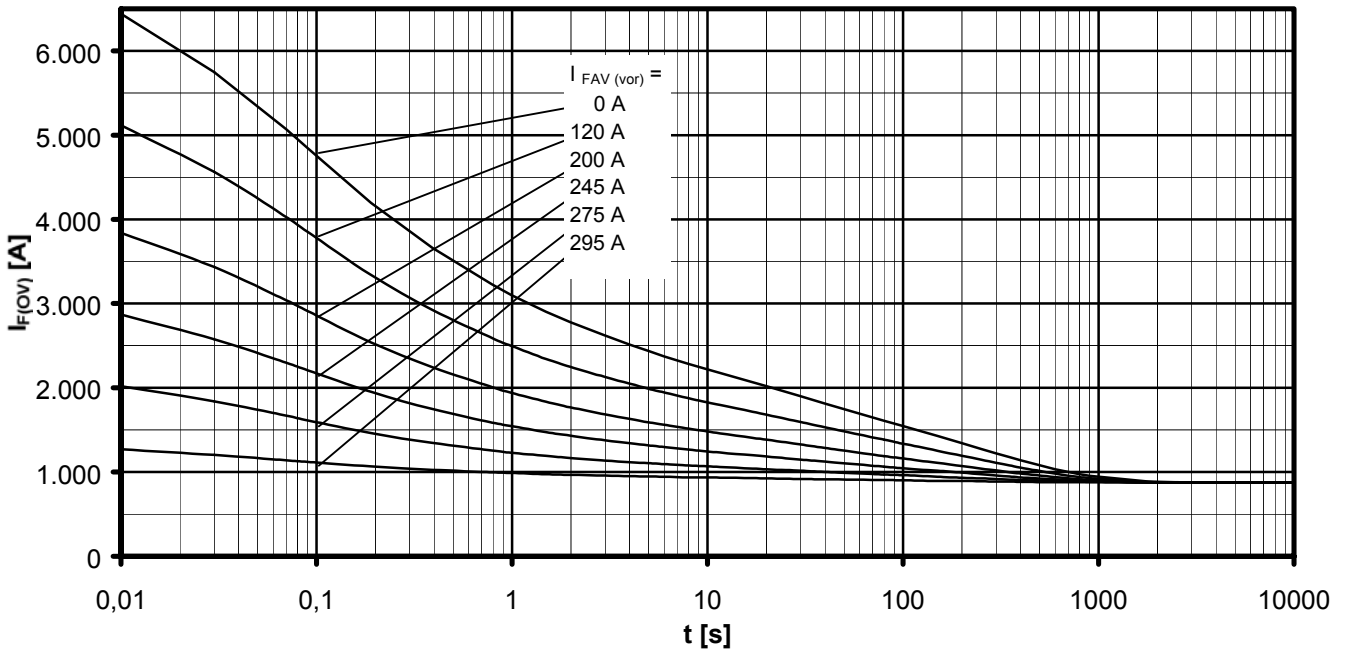


Überstrom je Zweig / Overload on-state current  $I_{F(ov)}$

B6- Sechspuls-Brückenschaltung, 120° Rechteck / Six-pulse bridge circuit, 120° rectangular

Kühlkörper / Heatsink type KM17 (120W) Natürliche Kühlung bei / Natural cooling at  $T_A = 45^\circ\text{C}$

Parameter: Vorlaststrom je Zweig / Pre-load current per arm  $I_{FAV(vor)}$



Überstrom je Zweig / Overload on-state current  $I_{F(ov)}$

B6- Sechspuls-Brückenschaltung, 120° Rechteck / Six-pulse bridge circuit 120° rectangular

Kühlkörper / Heatsink type KM17 (Papst 4650) Verstärkte Kühlung bei / Forced cooling at  $T_A = 35^\circ\text{C}$

Parameter: Vorlaststrom je Zweig / Pre-load current per arm  $I_{FAV(vor)}$