| | Technische Information / technical information | |
|---|---|---|
| Netz-Dioden-Modul<br>Rectifier Diode Module | **DD180N16S** | Infineon Technologies Bipolar GmbH & Co. KG |

## Key Parameters

| | |
|---|---|
| $V_{RRM}$ | 1600V |
| $I_{FAVM}$ | 226A ($T_C$ = 85°C) |
| $I_{FSM}$ | 5750A |
| $V_{T0}$ | 0,85V |
| $r_T$ | 0,95mΩ |
| $R_{thJC}$ | 0,14K/W |
| Base plate | 34mm |
| Weight | 165g |


For type designation please refer to actual short form catalog

http://www.ifbip.com/catalog

## Merkmale

- Löt-Bond Technologie
- Industrie-Standard-Gehäuse
- Elektrisch isolierte Bodenplatte

## Features

- Solder-Bond Technology
- Industrial standard package
- Electrically insulated base plate

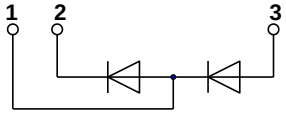
## Typische Anwendungen

- Gleichrichter für Antriebsapplikationen
- Gleichrichter für UPS
- Batterieladegleichrichter

## Typical Applications

- Rectifier for drives applications
- Rectifiers for UPS
- Battery chargers

| | | |
|---|---|---|
| content of customer DMX code | DMX code digit | DMX code digit quantity |
| type designation | 1..18 | 18 |
| serial number | 19..23 | 5 |
| internal production order number | 24..31 | 8 |
| material number | 32..41 | 10 |
| date code (YY/WW) | 42..45 | 4 |
| add on for date code | 46 | 1 |

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**Elektrische Eigenschaften / Electrical properties**

Höchstzulässige Werte / Maximum rated values

| | | | | |
|---|---|---|---|---|
| Periodische Spitzensperrspannung<br>repetitive peak reverse voltages | $T_{vj}$ = -40°C... $T_{vj\,max}$ | $V_{RRM}$ | 1600 | V |
| Stoßspitzensperrspannung<br>non-repetitive peak reverse voltage | $T_{vj}$ = +25°C... $T_{vj\,max}$ | $V_{RSM}$ | 1700 | V |
| Durchlaßstrom-Grenzeffektivwert<br>maximum RMS on-state current | | $I_{FRMSM}$ | 275 | A |
| Dauergrenzstrom<br>average on-state current | $T_C$ = 85°C<br>$T_C$ = 100°C | $I_{FAVM}$ | 226<br>174 | A<br>A |
| Stoßstrom-Grenzwert<br>surge current | $T_{vj}$ = 25°C, $t_P$ = 10ms<br>$T_{vj}$ = $T_{vj\,max}$, $t_P$ = 10ms | $I_{FSM}$ | 5750<br>5000 | A<br>A |
| Grenzlastintegral<br>I²t-value | $T_{vj}$ = 25°C, $t_P$ = 10ms<br>$T_{vj}$ = $T_{vj\,max}$, $t_P$ = 10ms | I²t | 165313<br>125000 | A²s<br>A²s |

Charakteristische Werte / Characteristic values

| | | | | | |
|---|---|---|---|---|---|
| Durchlaßspannung<br>on-state voltage | $T_{vj}$ = $T_{vj\,max}$ , $i_F$ = 500A | $v_F$ | max. | 1,39 | V |
| Schleusenspannung<br>threshold voltage | $T_{vj}$ = $T_{vj\,max}$ | $V_{(TO)}$ | max. | 0,85 | V |
| Ersatzwiderstand<br>slope resistance | $T_{vj}$ = $T_{vj\,max}$ | $r_T$ | max. | 0,95 | mΩ |
| Sperrstrom<br>reverse current | $T_{vj}$ = $T_{vj\,max}$ , $v_R$ = $V_{RRM}$ | $i_R$ | max. | 1 | mA |
| Isolations-Prüfspannung<br>insulation test voltage | RMS, f = 50Hz, t = 1 sec<br>RMS, f = 50Hz, t = 1 min | $V_{ISOL}$ | | 3,6<br>3 | kV<br>kV |

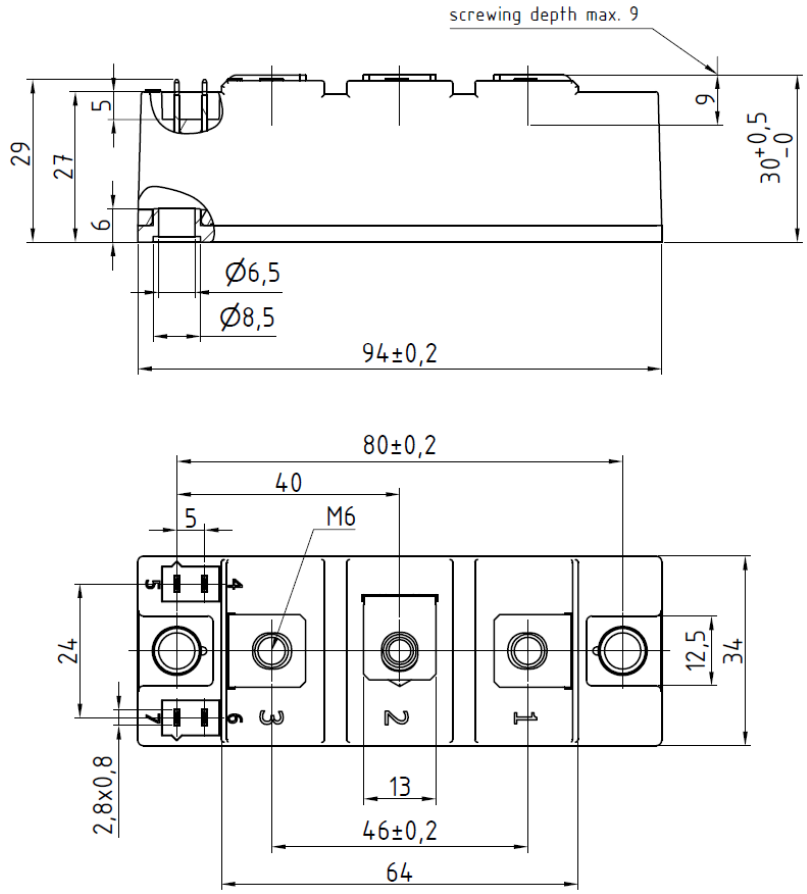
**Thermische Eigenschaften / Thermal properties**

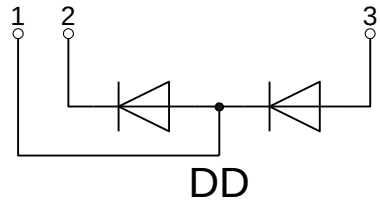
| | | | | | |
|---|---|---|---|---|---|
| Innerer Wärmewiderstand<br>thermal resistance, junction to case | pro Modul / per Module, Θ = 180° sin<br>pro Zweig / per arm, Θ = 180° sin<br>pro Modul / per Module, DC<br>pro Zweig / per arm, DC | $R_{thJC}$ | max.<br>max.<br>max.<br>max. | 0,08<br>0,16<br>0,07<br>0,14 | K/W<br>K/W<br>K/W<br>K/W |
| Übergangs-Wärmewiderstand<br>thermal resistance, case to heatsink | pro Modul / per Module<br>pro Zweig / per arm | $R_{thCH}$ | max.<br>max. | 0,04<br>0,08 | K/W<br>K/W |
| Höchstzulässige Sperrschichttemperatur<br>maximum junction temperature | | $T_{vj\,max}$ | | 135 | °C |
| Betriebstemperatur<br>operating temperature | | $T_{c\,op}$ | | - 40...+135 | °C |
| Lagertemperatur<br>storage temperature | | $T_{stg}$ | | - 40...+135 | °C |

| | | | | |
|---|---|---|---|---|
| prepared by: | AG | | date of publication: | 2017-08-24 |
| approved by: | MS | | revision: | 3.3 |

**Mechanische Eigenschaften / Mechanical properties**

| | | | | |
|---|---|---|---|---|
| Gehäuse, siehe Anlage<br>case, see annex | | | Seite 4<br>page 4 | |
| Innere Isolation<br>internal insulation | Basisisolierung (Schutzklasse 1, EN 61140)<br>Basic insulation (class 1, IEC 61140) | | $Al_2O_3$ | |
| Anzugsdrehmoment für mechanische Anschlüsse<br>mounting torque | Toleranz ±15% | M1 | 5 | Nm |
| Anzugsdrehmoment für elektrische Anschlüsse<br>terminal connection torque | Toleranz ±10% | M2 | 5 | Nm |
| Gewicht<br>weight | | G | typ. 165 | g |
| Kriechstrecke<br>creepage distance | | | 10 | mm |
| Schwingfestigkeit<br>vibration resistance | f = 50Hz | | 50 | $m/s^2$ |
| | file-No. | | E 83335 | |


screwing depth max. 9
29
27
5
6
9
30+0,5 -0
Ø6,5
Ø8,5
94±0,2
80±0,2
40
5
M6
24
12,5
34
2,8x0,8
13
46±0,2
64
1
2
3
4
5
6
7

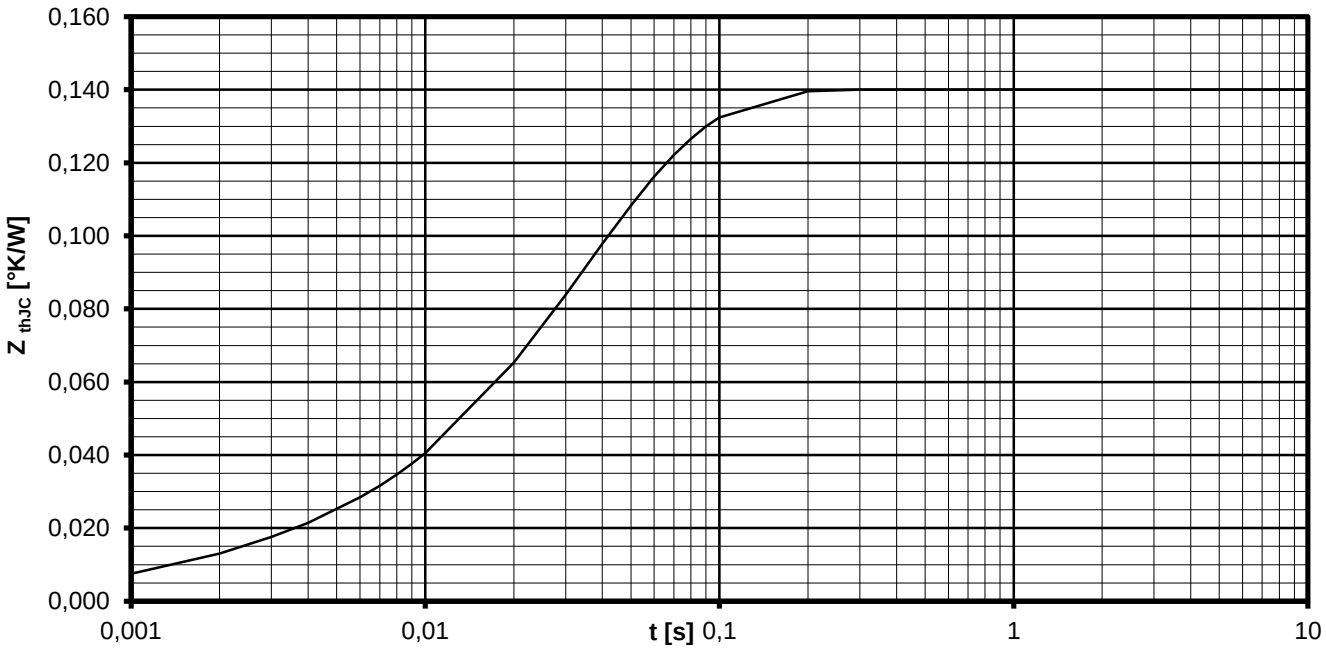

1
2
3
DD

**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 |
|---|---|---|---|---|---|---|---|
| $R_{thn}$ [K/W] | 0,0624 | 0,0024648 | 0,0674976 | 0,0076896 | | | |
| $\tau_n$ [s] | 0,035107 | 0,035092 | 0,034917 | 0,001473 | | | |

Analytische Funktion / Analytical function:

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



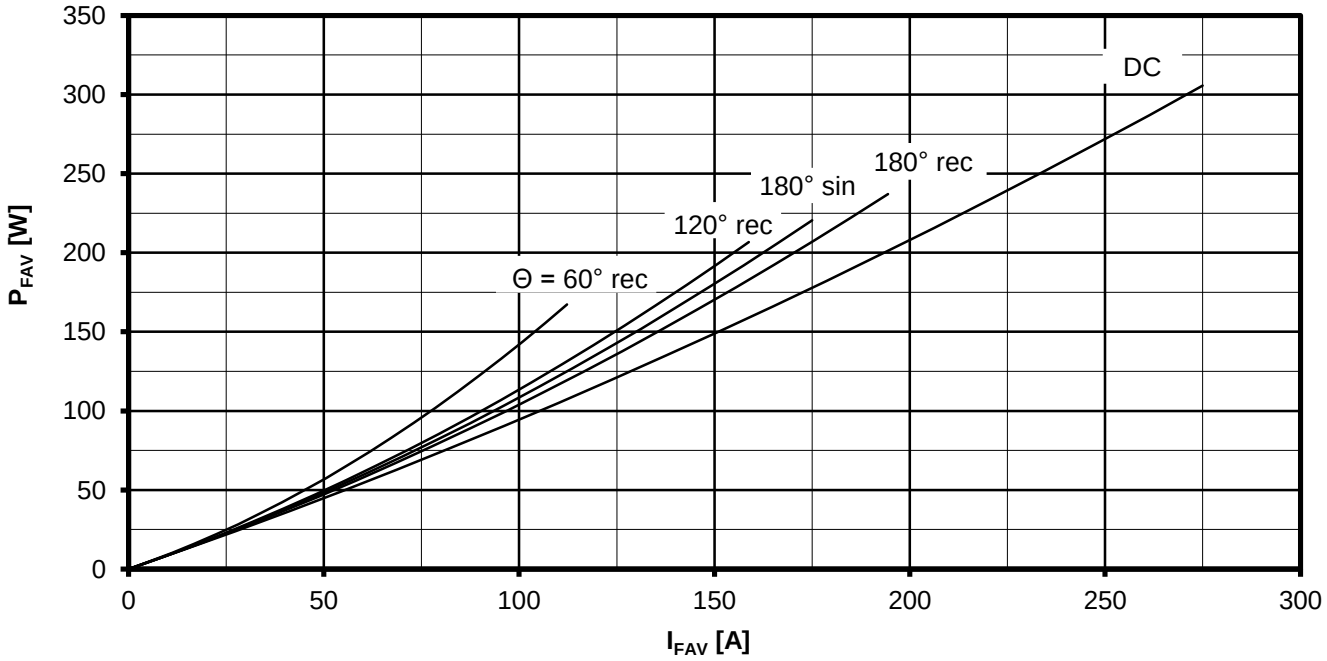

**Transienter innerer Wärmewiderstand je Zweig / Transient thermal impedance per arm $Z_{thJC}$ = f(t)**

Parameter: Stromflußwinkel Θ / Current conduction angle Θ

**Erhöhung des $Z_{th\ DC}$ bei Sinus und Rechteckströmen mit unterschiedlichen Stromflusswinkeln Θ**
**Rise of $Z_{th\ DC}$ for sinewave and rectangular current with different current conduction angles Θ**
**$\Delta Z_{th\ \Theta\ rec}$ / $\Delta Z_{th\ \Theta\ sin}$**

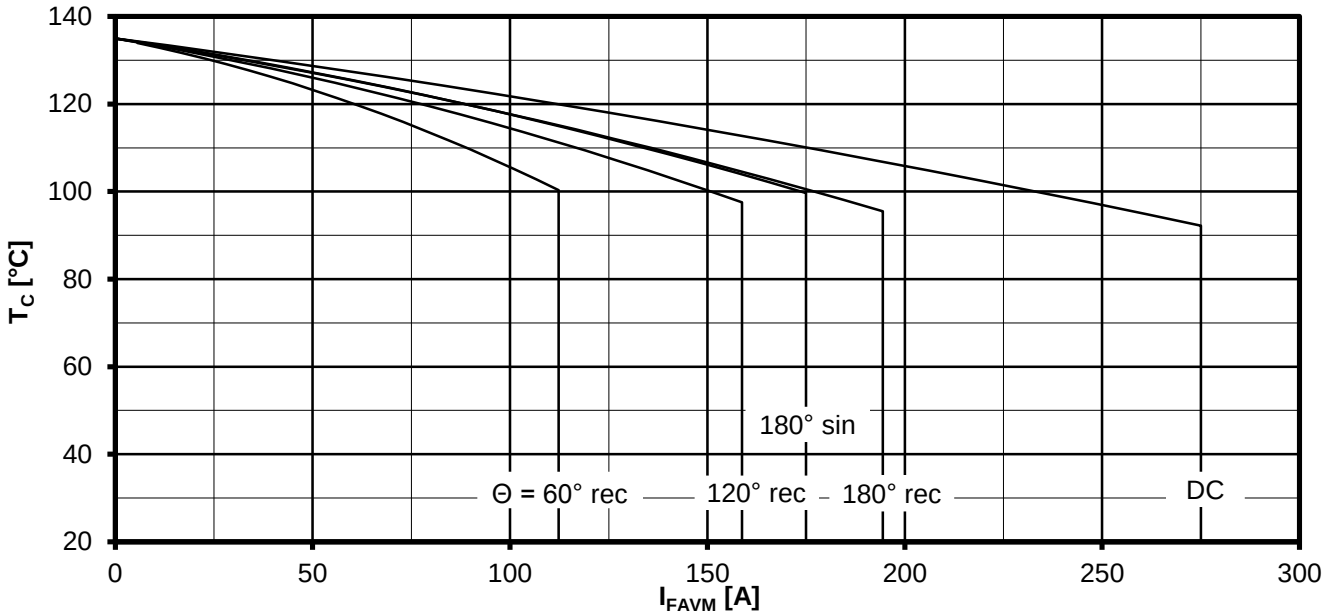
| | Θ = 180° | Θ = 120° | Θ = 90° | Θ = 60° | Θ = 30° |
|---|---|---|---|---|---|
| $\Delta Z_{th\ \Theta\ rec}$ [K/W] | 0,02645 | 0,04099 | 0,05159 | 0,06706 | 0,09217 |
| $\Delta Z_{th\ \Theta\ sin}$ [K/W] | 0,02007 | 0,0323 | 0,04668 | 0,06381 | 0,09023 |

$$Z_{th\ \Theta\ rec} = Z_{th\ DC} + \Delta Z_{th\ \Theta\ rec}$$
$$Z_{th\ \Theta\ sin} = Z_{th\ DC} + \Delta Z_{th\ \Theta\ sin}$$




**Durchlassverlustleistung je Zweig / On-state power loss per arm $P_{FAV} = f(I_{FAV})$**

Parameter: Stromflußwinkel / Current conduction angle Θ

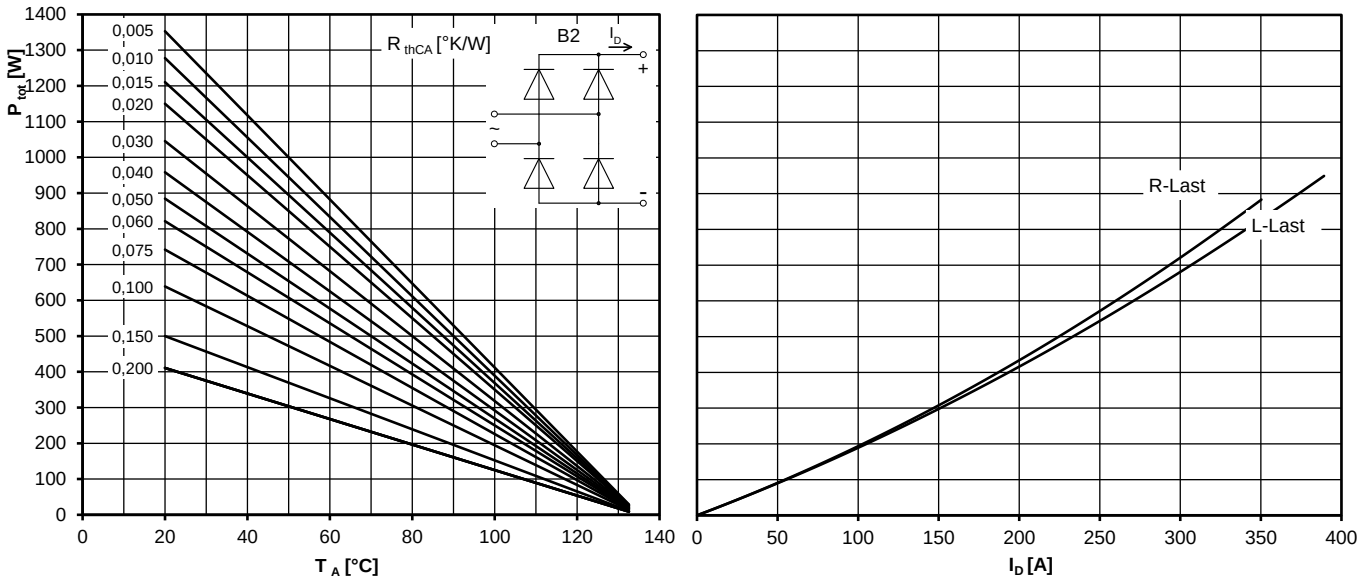



**Höchstzulässige Gehäusetemperatur / Maximum allowable case temperature $T_C = f(I_{FAVM})$**

Strombelastung je Zweig / Current load per arm

**Berechungsgrundlage $P_{TAV}$**
**Calculation base $P_{TAV}$**

Parameter: Stromflußwinkel Θ / Current conduction angle Θ

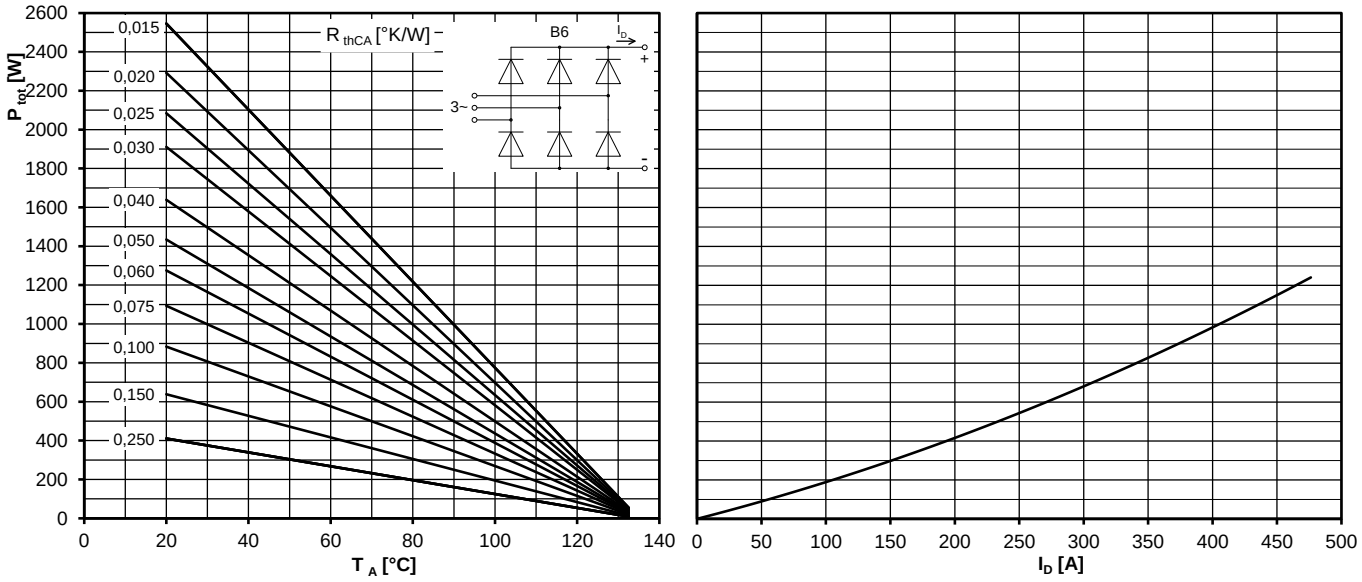



**Höchstzulässiger Ausgangsstrom / Maximum rated output current $I_D$**

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 $R_{thCA}$

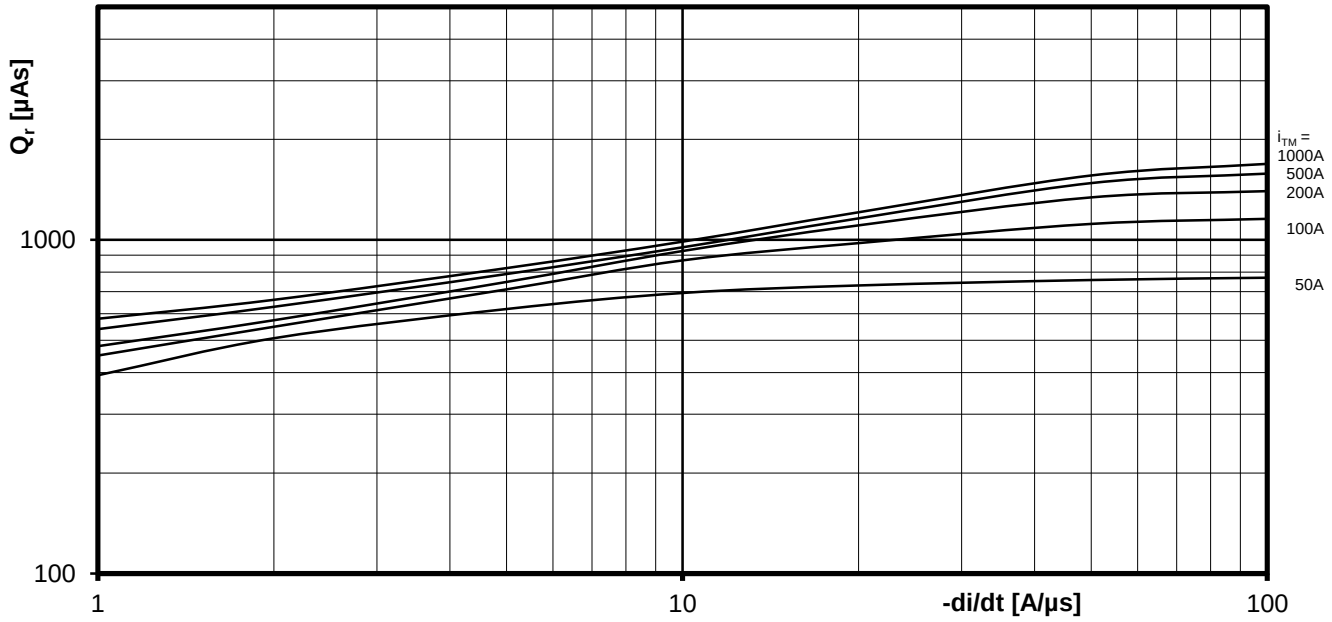



**Höchstzulässiger Ausgangsstrom / Maximum rated output current $I_D$**

B6- Sechspuls-Brückenschaltung / Six-pulse bridge circuit

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

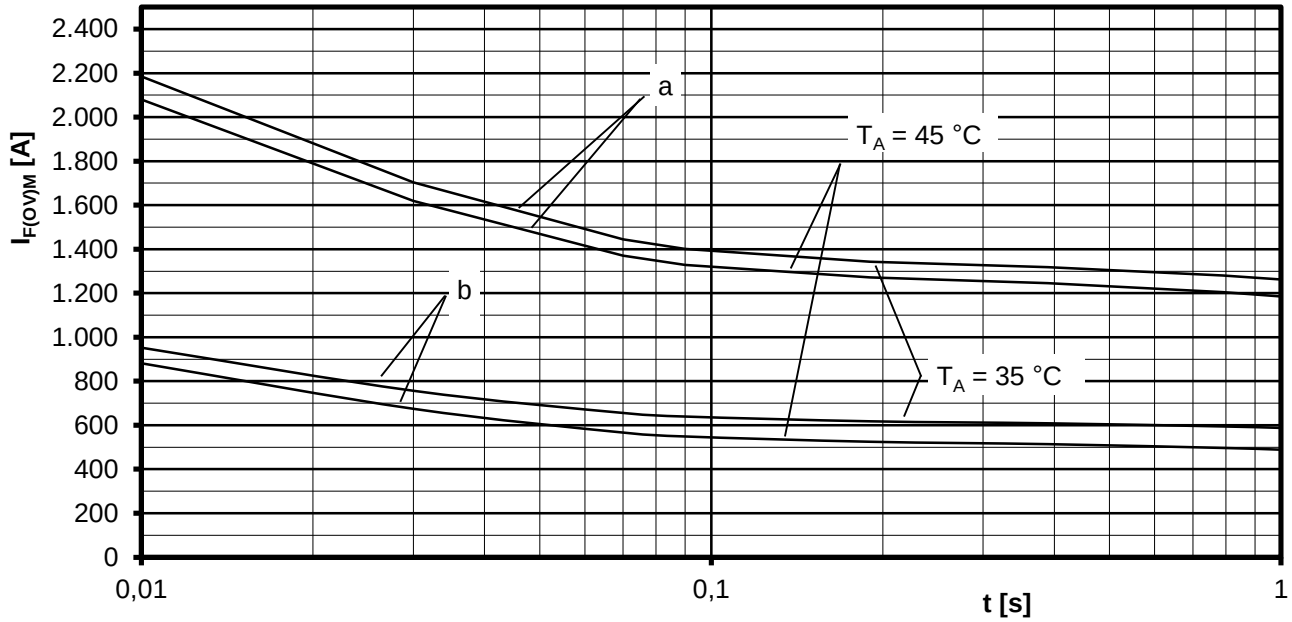
Parameter:
Wärmewiderstand zwischen den Gehäusen und Umgebung / Thermal resistance cases to ambient $R_{thCA}$




**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°C, verstärkte Luftkühlung / Forced air cooling  Kühlkörper / Heatsink type: KM17 (Papst 4650)

$T_a$ = 45°C, natürliche Luftkühlung / Natural air cooling  Kühlkörper / Heatsink type: KM17 (60W)