N		Datenblatt / Data sheet	Infineon Technologies Bipolar GmbH & Co. KG
Netz-Dioden-Modul Rectifier Diode Module		**DD171N**	

DD171N **DD171N..K..-A** **DD171N..K..-K**

ND171N

Elektrische Eigenschaften / Electrical properties

Höchstzulässige Werte / Maximum rated values

Periodische Spitzensperrspannung repetitive peak reverse voltages	T_{vj} = -40°C... $T_{vj\,max}$	V_{RRM}	1200 1400 1600 1800	V V
Stoßspitzensperrspannung non-repetitive peak reverse voltage	T_{vj} = +25°C... $T_{vj\,max}$	V_{RSM}	1300 1500 1700 1900	V V
Durchlaßstrom-Grenzeffektivwert maximum RMS on-state current		I_{FRMSM}	270	A
Dauergrenzstrom average on-state current	T_C = 100°C	I_{FAVM}	171	A
Stoßstrom-Grenzwert surge current	T_{vj} = 25 °C, t_P = 10 ms T_{vj} = $T_{vj\,max}$, t_P = 10 ms	I_{FSM}	6.600 5.600	A A
Grenzlastintegral I^2t-value	T_{vj} = 25 °C, t_P = 10 ms T_{vj} = $T_{vj\,max}$, t_P = 10 ms	I^2t	218.000 157.000	A^2s A^2s

Charakteristische Werte / Characteristic values

Durchlaßspannung on-state voltage	T_{vj} = $T_{vj\,max}$, i_F = 500 A	v_F	max. 1,26	V
Schleusenspannung threshold voltage	T_{vj} = $T_{vj\,max}$	$V_{(TO)}$	0,75	V
Ersatzwiderstand slope resistance	T_{vj} = $T_{vj\,max}$	r_T	0,8	mΩ
Sperrstrom reverse current	T_{vj} = $T_{vj\,max}$, v_R = V_{RRM}	i_R	max. 20	mA
Isolations-Prüfspannung insulation test voltage	RMS, f = 50 Hz, t = 1 sec RMS, f = 50 Hz, t = 1 min	V_{ISOL}	3,0 2,5	kV kV

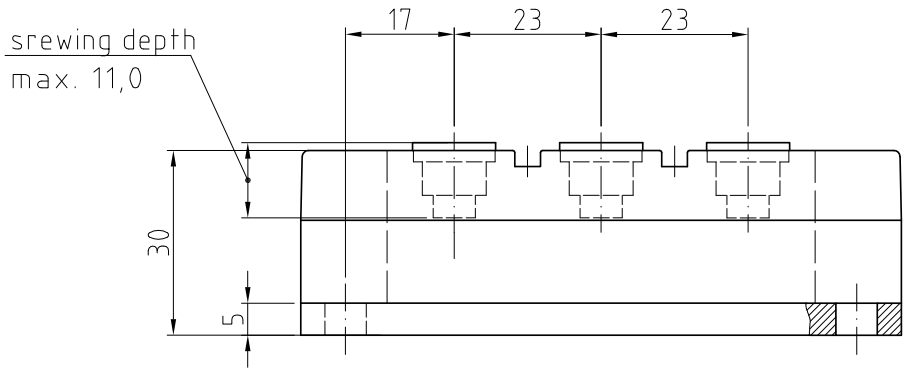
Thermische Eigenschaften / Thermal properties

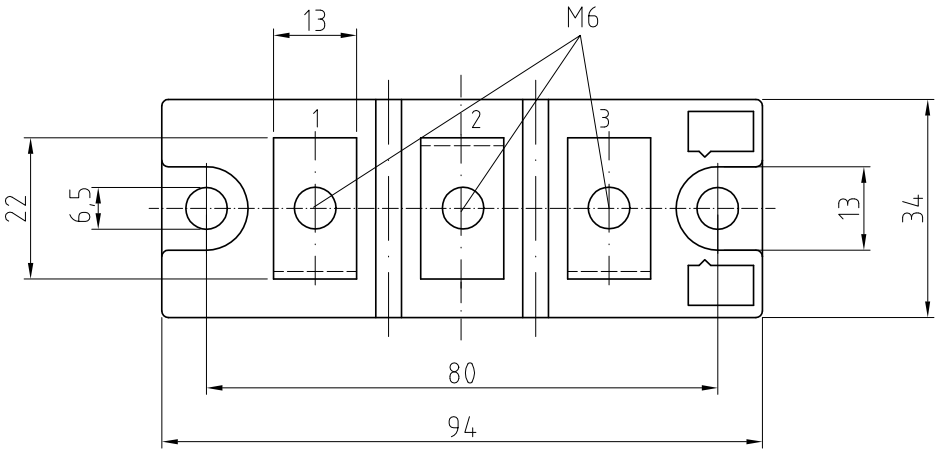
Innerer Wärmewiderstand thermal resistance, junction to case	pro Modul / per Module, Θ = 180° sin pro Zweig / per arm, Θ = 180° sin pro Modul / per Module, DC pro Zweig / per arm, DC	R_{thJC}	max. 0,130 max. 0,260 max. 0,126 max. 0,252	°C/W °C/W °C/W °C/W
Übergangs-Wärmewiderstand thermal resistance, case to heatsink	pro Modul / per Module pro Zweig / per arm	R_{thCH}	max. 0,03 max. 0,06	°C/W °C/W
Höchstzulässige Sperrschichttemperatur maximum junction temperature		$T_{vj\,max}$	150	°C
Betriebstemperatur operating temperature		$T_{c\,op}$	- 40...+150	°C
Lagertemperatur storage temperature		T_{stg}	- 40...+150	°C

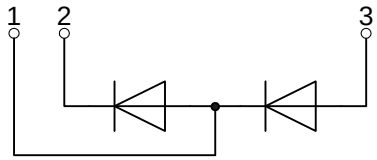
prepared by:	M.Stelte		date of publication:	2011-03-01
approved by:	M.Leifeld		revision:	3.0

Mechanische Eigenschaften / Mechanical properties

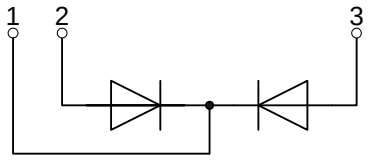
Gehäuse, siehe Anlage case, see annex			Seite 3 page 3	
Si-Element mit Druckkontakt Si-pellet with pressure contact				
Innere Isolation internal insulation			AlN	
Anzugsdrehmoment für mechanische Anschlüsse mounting torque	Toleranz ±15%	M1	6	Nm
Anzugsdrehmoment für elektrische Anschlüsse terminal connection torque	Toleranz ±10%	M2	6	Nm
Gewicht weight		G	typ. 310	g
Kriechstrecke creepage distance			15	mm
Schwingfestigkeit vibration resistance	f = 50 Hz		50	m/s²
	file-No.		E 83336	


srewing depth
max. 11,0
17
23
23
30
5

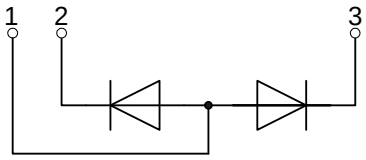

13
M6
1
2
3
22
6,5
13
34
80
94


1
2
3

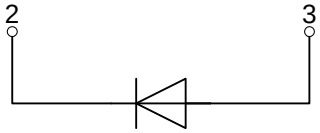
DD


1
2
3

DD-K


1
2
3

DD-A


2
3

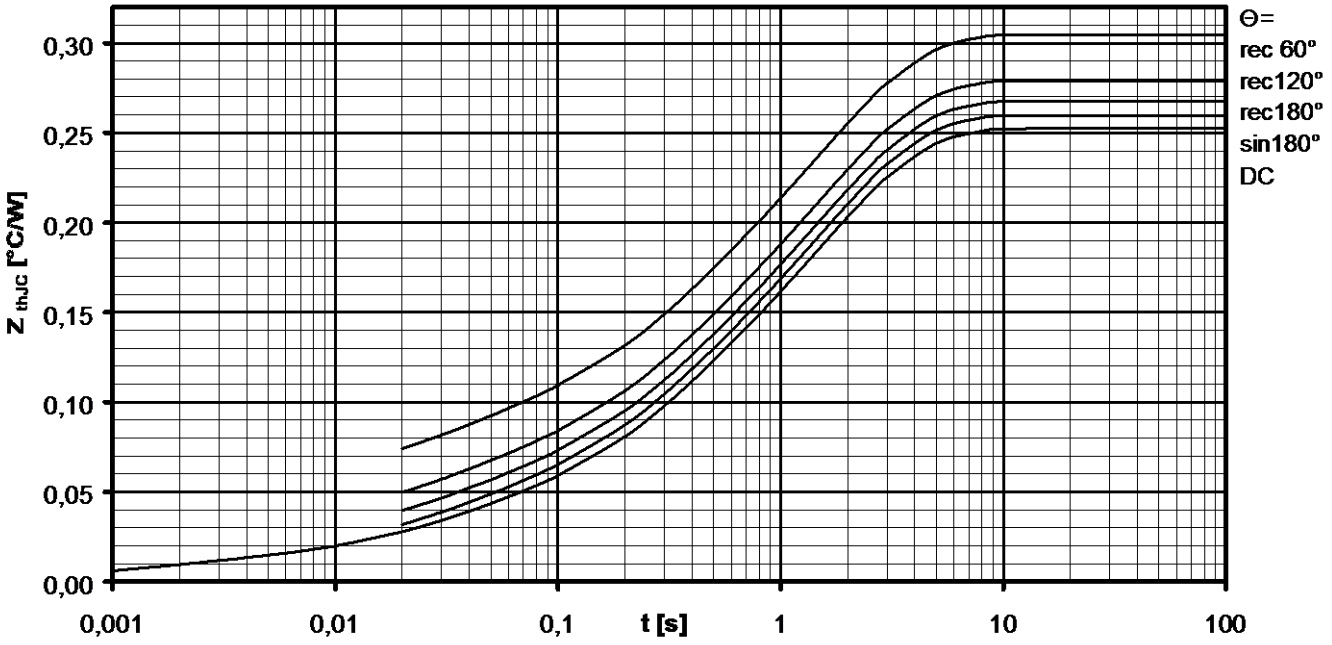
ND

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]	0,0094	0,0224	0,0586	0,162			
T_n [s]	0,0014	0,0253	0,267	1,68			

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)

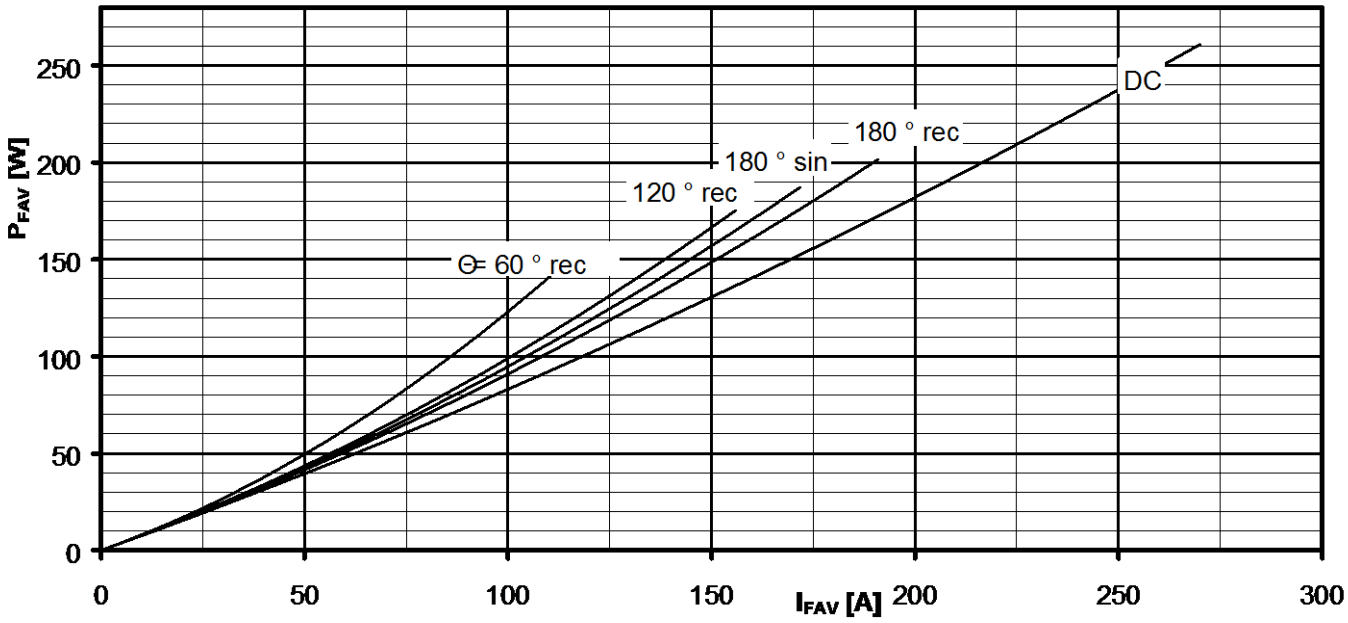
Parameter: Stromflußwinkel Θ / Current conduction angle Θ

Natürliche Kühlung / Natural cooling 3 Module pro Kühler / 3 modules per heatsink Kühler / Heatsink type: KM17 (60W)							
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]	0,0505	0,1235	1,616				
T_n [s]	2,97	21,4	1180				

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]	0,026	0,119	0,515				
T_n [s]	2,41	13,6	354				

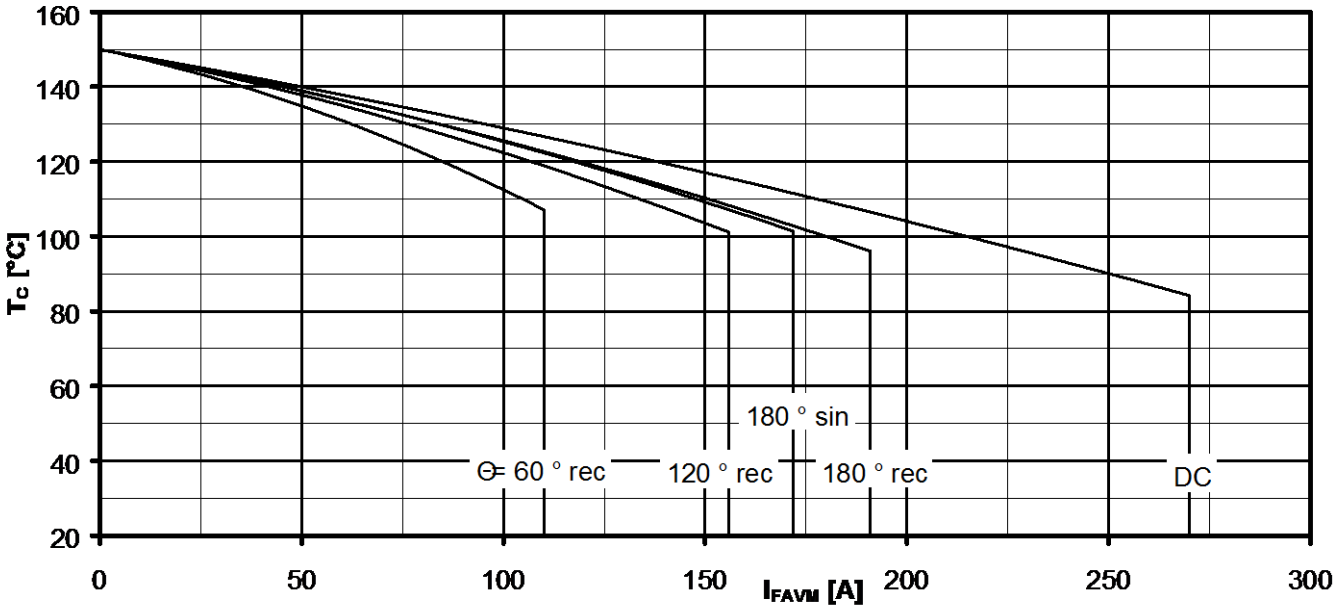
Analytische Funktion / Analytical function:

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



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

Parameter: Stromflußwinkel / Current conduction angle Θ

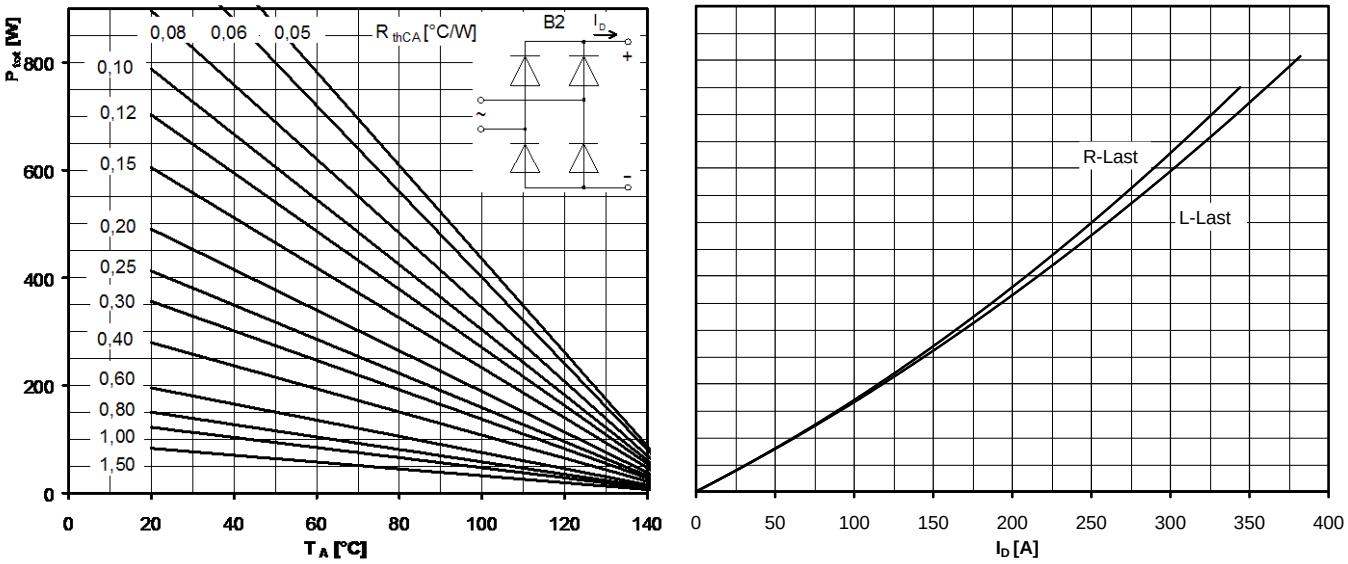


Höchstzulässige Gehäusetemperatur / Maximum allowable case temperature $T_C = f(I_{FAVM})$

Strombelastung je Zweig / Current load per arm

Berechungsgrundlage P_{TAV}
Calculation base P_{TAV}

Parameter: Stromflußwinkel Θ / Current conduction angle Θ

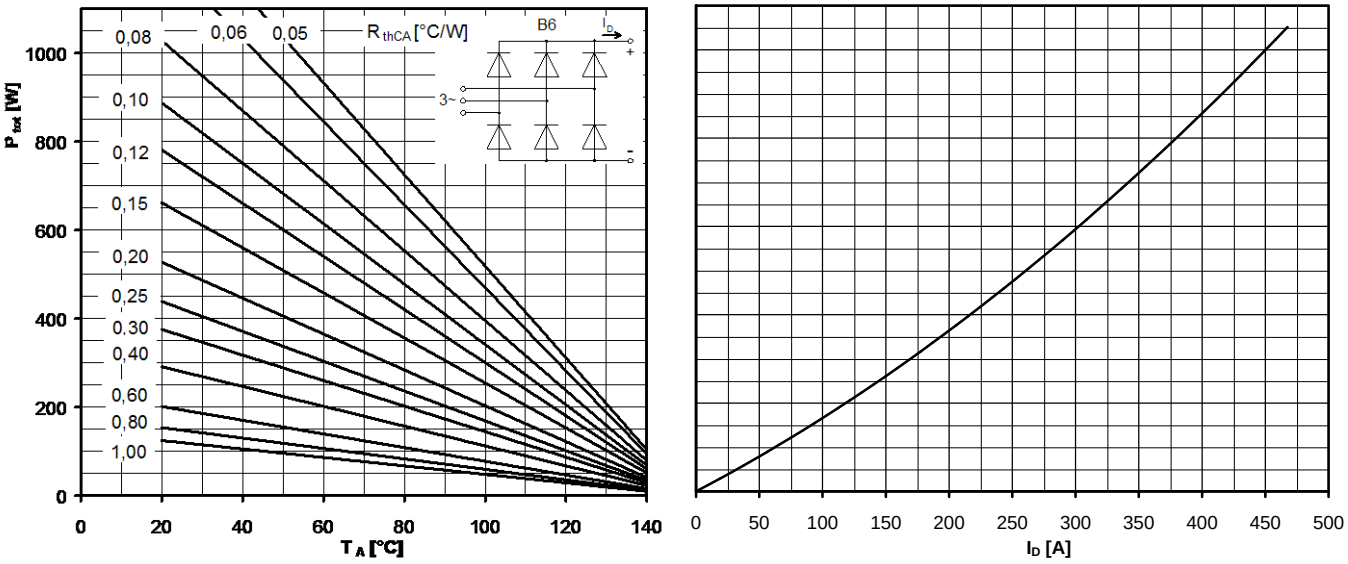


Höchstzulässiger Ausgangsstrom / Maximum rated output current I_D

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}

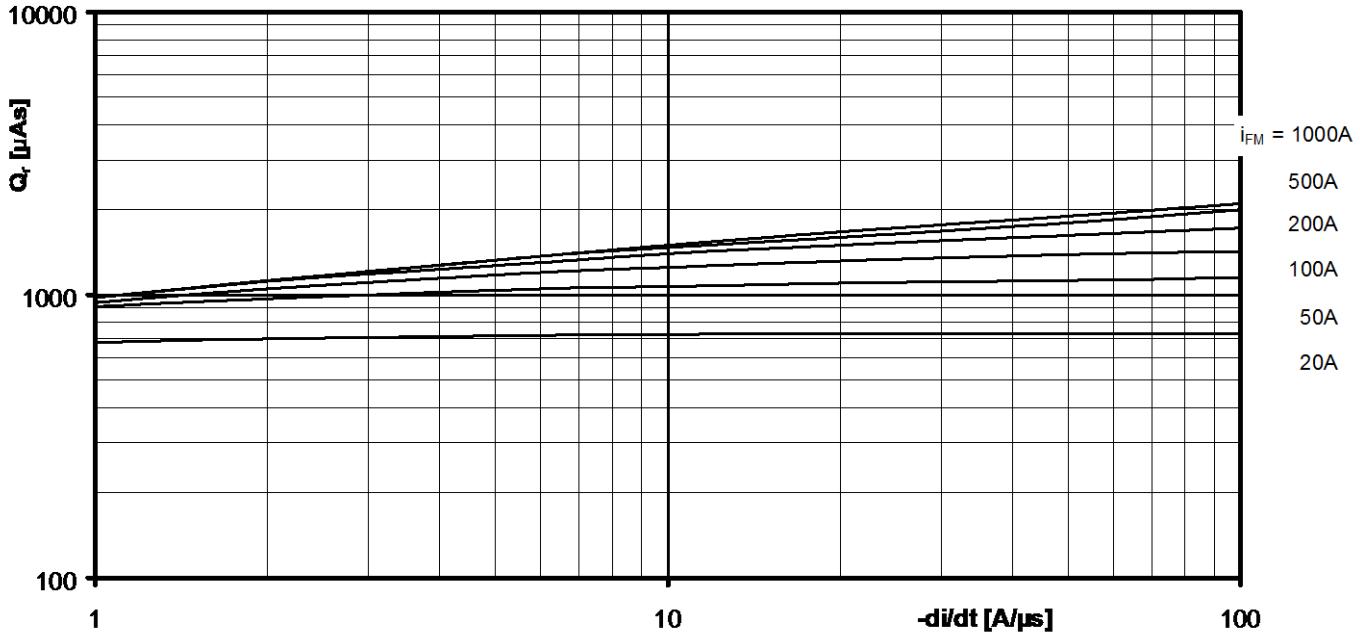


Höchstzulässiger Ausgangsstrom / Maximum rated output current I_D

B6- Sechspuls-Brückenschaltung / Six-pulse bridge circuit

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

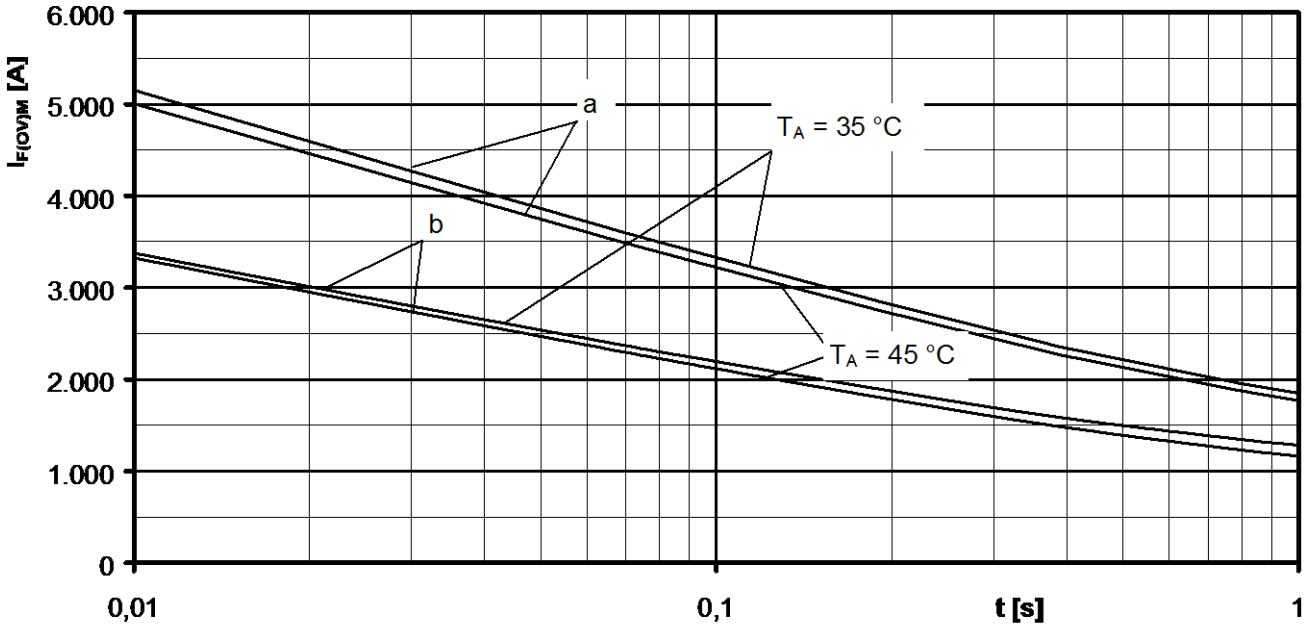
Parameter:
Wärmewiderstand zwischen den Gehäusen und Umgebung / Thermal resistance cases to ambient R_{thCA}



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}

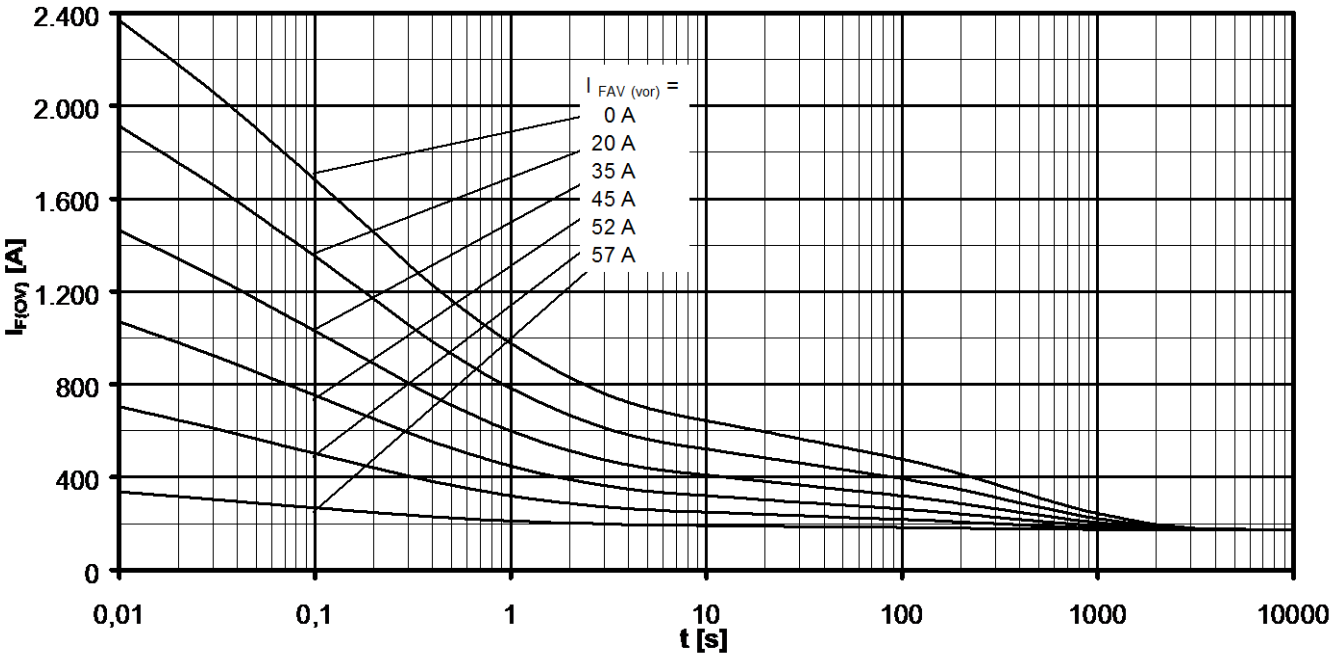


Grenzstrom je Zweig / Maximum overload on-state current per arm $I_{F(OV)M} = f(t)$, $v_{RM} = 0{,}8\ V_{RRM}$

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)

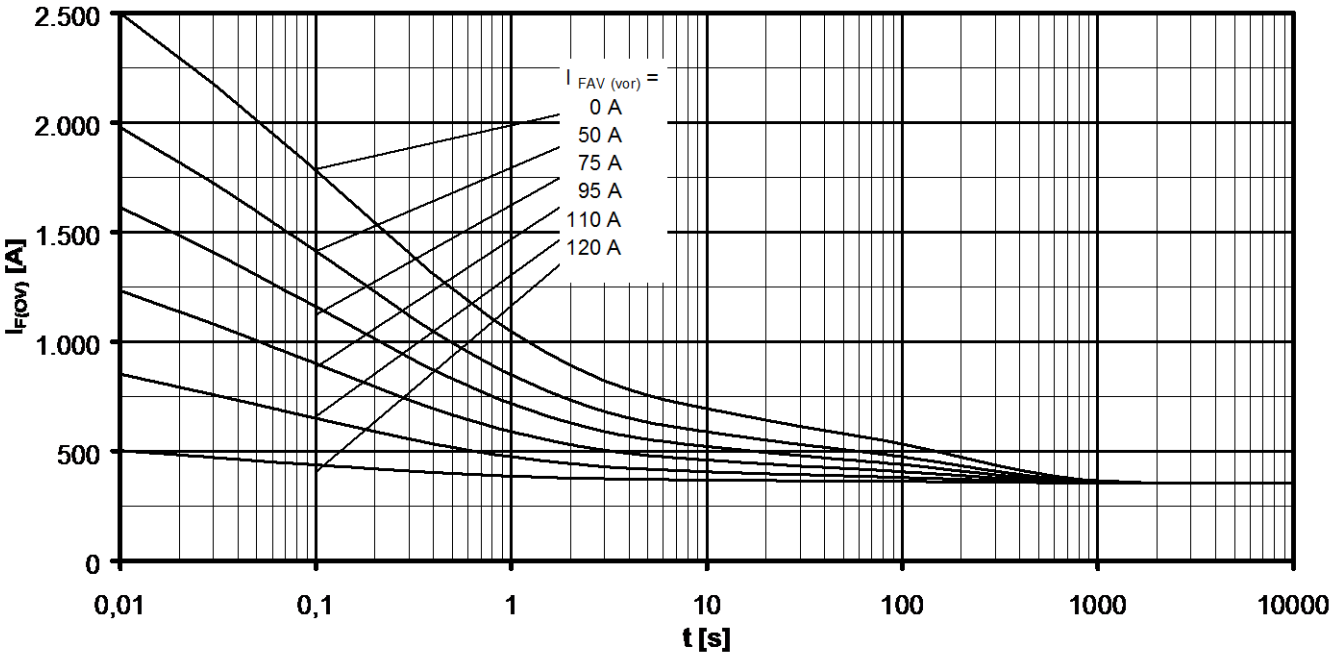


Überstrom je Zweig / Overload on-state current $I_{F(OV)}$

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

Kühlkörper / Heatsink type KM17 (60W) Natürliche Kühlung bei / Natural cooling at T_A = 45°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°C

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