

Netz-Dioden-Modul  
Rectifier Diode Module**DD350N**

DD350N

DD350N..K..-K

**Elektrische Eigenschaften / Electrical properties**

Höchstzulässige Werte / Maximum rated values

Periodische Spitzensperrspannung repetitive peak reverse voltages	$T_{vj} = -40^{\circ}\text{C} \dots T_{vj\text{ max}}$	$V_{RRM}$	1200 1600	1400 1800	V V
Stoßspitzensperrspannung non-repetitive peak reverse voltage	$T_{vj} = +25^{\circ}\text{C} \dots T_{vj\text{ max}}$	$V_{RSM}$	1300 1700	1500 1900	V V
Durchlaßstrom-Grenzeffektivwert maximum RMS on-state current		$I_{FRMSM}$		550	A
Dauergrenzstrom average on-state current	$T_C = 100^{\circ}\text{C}$	$I_{FAVM}$		350	A
Stoßstrom-Grenzwert surge current	$T_{vj} = 25^{\circ}\text{C}, t_p = 10\text{ ms}$ $T_{vj} = T_{vj\text{ max}}, t_p = 10\text{ ms}$	$I_{FSM}$		13.000 11.000	A A
Grenzlastintegral $I^2t$ -value	$T_{vj} = 25^{\circ}\text{C}, t_p = 10\text{ ms}$ $T_{vj} = T_{vj\text{ max}}, t_p = 10\text{ ms}$	$I^2t$		845.000 605.000	$\text{A}^2\text{s}$ $\text{A}^2\text{s}$

## Charakteristische Werte / Characteristic values

Durchlaßspannung on-state voltage	$T_{vj} = T_{vj\text{ max}}, i_F = 1000\text{ A}$	$v_F$	max.	1,28	V
Schleusenspannung threshold voltage	$T_{vj} = T_{vj\text{ max}}$	$V_{(TO)}$		0,75	V
Ersatzwiderstand slope resistance	$T_{vj} = T_{vj\text{ max}}$	$r_T$		0,4	$\text{m}\Omega$
Sperrstrom reverse current	$T_{vj} = T_{vj\text{ max}}, V_R = V_{RRM}$	$i_R$	max.	30	$\text{mA}$
Isolations-Prüfspannung insulation test voltage	RMS, $f = 50\text{ Hz}, t = 1\text{ sec}$ RMS, $f = 50\text{ Hz}, t = 1\text{ min}$	$V_{ISOL}$		3,6 3,0	$\text{kV}$ $\text{kV}$

**Thermische Eigenschaften / Thermal properties**

Innerer Wärmewiderstand thermal resistance, junction to case	pro Modul / per Module, $\Theta = 180^{\circ}\text{ sin}$ pro Zweig / per arm, $\Theta = 180^{\circ}\text{ sin}$ pro Modul / per Module, DC pro Zweig / per arm, DC	$R_{thJC}$	max.	0,065 0,130 0,062 0,124	$^{\circ}\text{C/W}$ $^{\circ}\text{C/W}$ $^{\circ}\text{C/W}$ $^{\circ}\text{C/W}$
Übergangs-Wärmewiderstand thermal resistance, case to heatsink	pro Modul / per Module pro Zweig / per arm	$R_{thCH}$	max.	0,02 0,04	$^{\circ}\text{C/W}$ $^{\circ}\text{C/W}$
Höchstzulässige Sperrschichttemperatur maximum junction temperature		$T_{vj\text{ max}}$		150	$^{\circ}\text{C}$
Betriebstemperatur operating temperature		$T_{c\text{ op}}$		- 40...+150	$^{\circ}\text{C}$
Lagertemperatur storage temperature		$T_{stg}$		- 40...+150	$^{\circ}\text{C}$


prepared by:	C. Drilling	date of publication:	06.05.03
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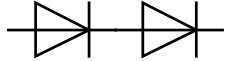


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**Rectifier Diode Module**

**DD350N**

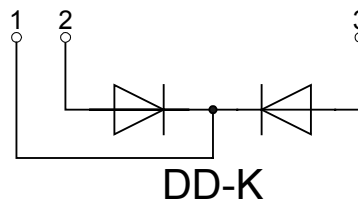
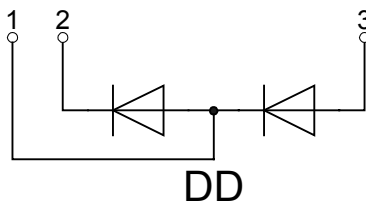
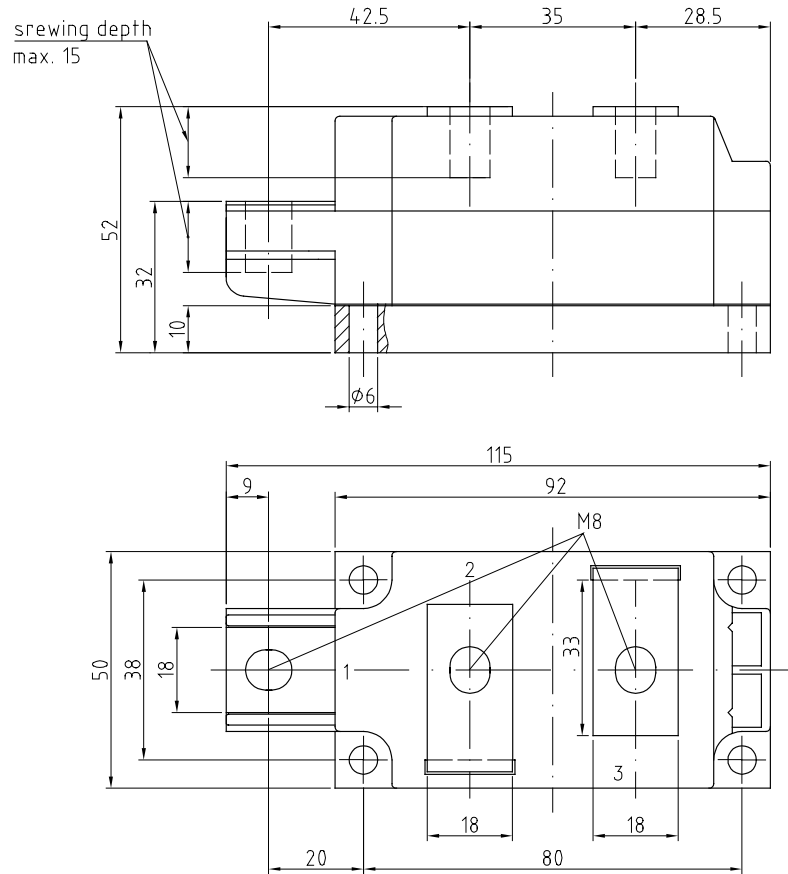
**Mechanische Eigenschaften / Mechanical properties**

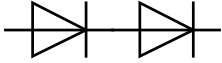
Gehäuse, siehe Anlage case, see annex			Seite 3 page 3	
Si-Element mit Druckkontakt Si-pellet with pressure contact				
Innere Isolation internal insulation			AIN	
Anzugsdrehmoment für mechanische Anschlüsse mounting torque	Toleranz $\pm 15\%$	M1	5	Nm
Anzugsdrehmoment für elektrische Anschlüsse terminal connection torque	Toleranz $\pm 10\%$	M2	12	Nm
Gewicht weight		G	typ. 800	g
Kriechstrecke creepage distance			17	mm
Schwingfestigkeit vibration resistance	f = 50 Hz		50	m/s <sup>2</sup>
	file-No.		E 83336	



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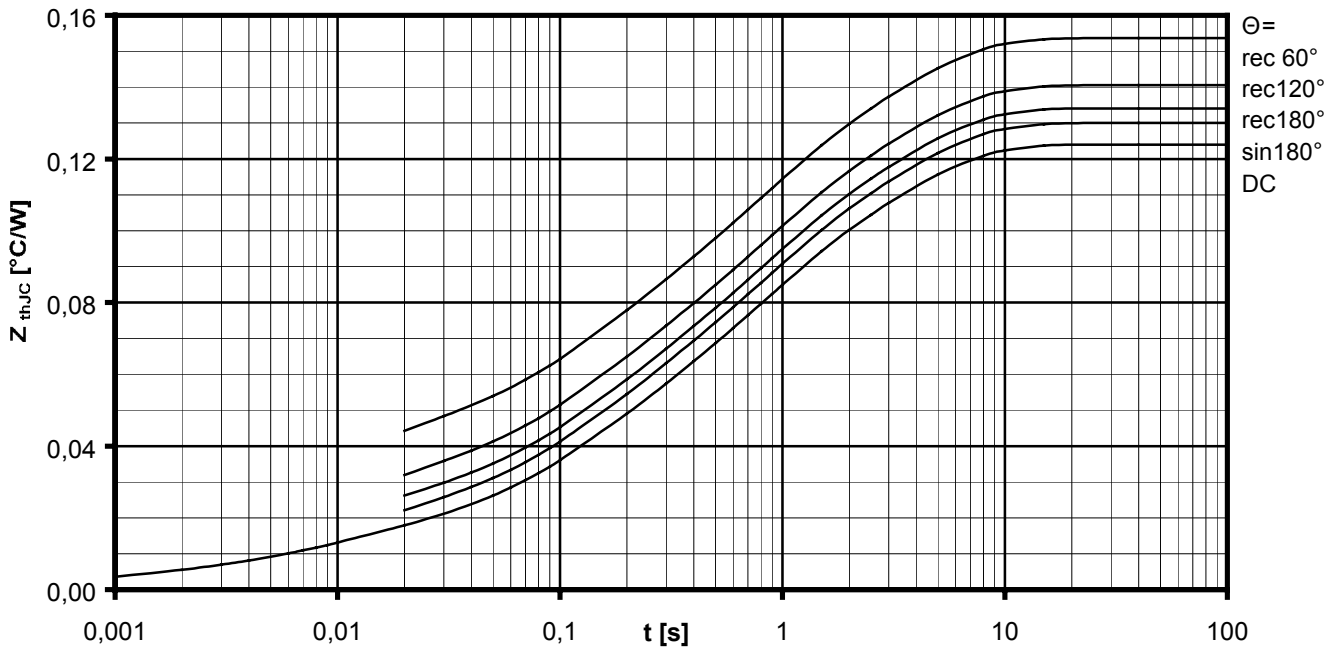


Netz-Dioden-Modul  
Rectifier Diode Module**DD350N**
**Analytische Elemente des transienten Wärmewiderstandes  $Z_{thJC}$  für DC**  
**Analytical elements of transient thermal impedance  $Z_{thJC}$  for DC**

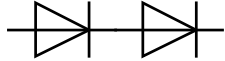
Pos. n	1	2	3	4	5	6	7
$R_{thn}$ [°C/W]	0,0031	0,0097	0,0257	0,0429	0,0426		
$T_n$ [s]	0,0009	0,008	0,11	0,61	3,06		

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  $\Theta$

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Rectifier Diode Module**DD350N**

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]	0,0205	0,07905	1,535				
$T_n$ [s]	2,04	36,4	1340				

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]	0,015	0,08	0,475				
$T_n$ [s]	4,11	40,4	458				

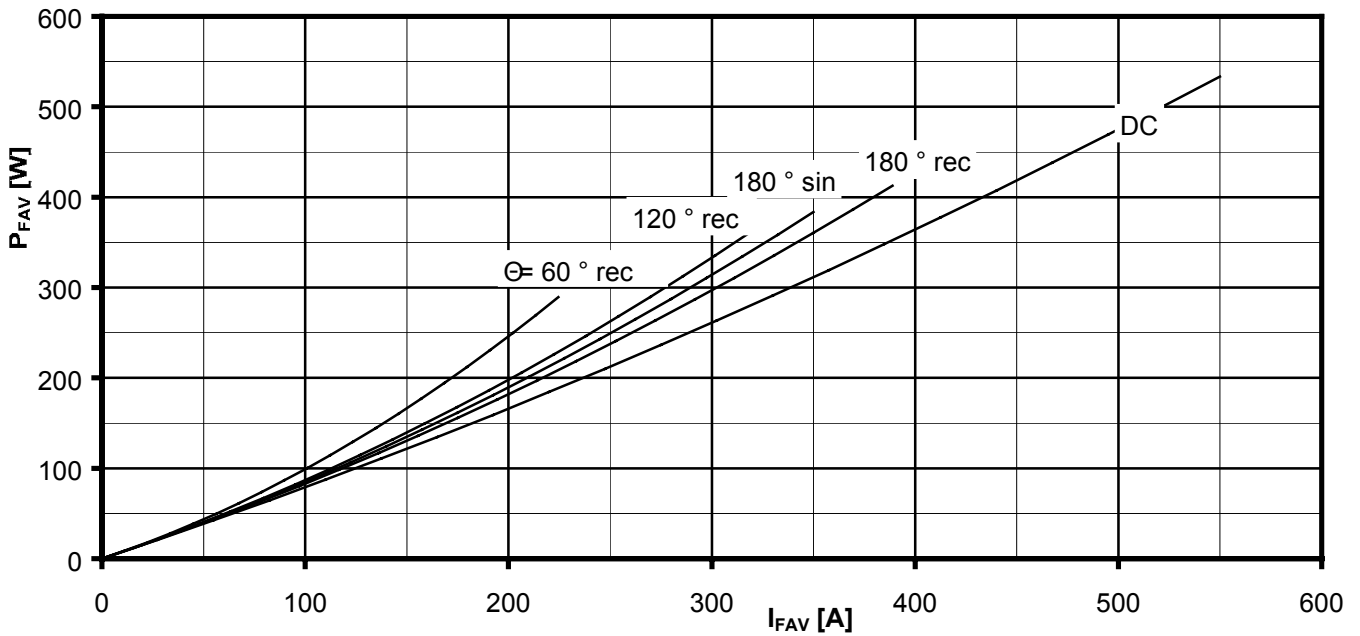
Analytische Funktion / Analytical function:

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



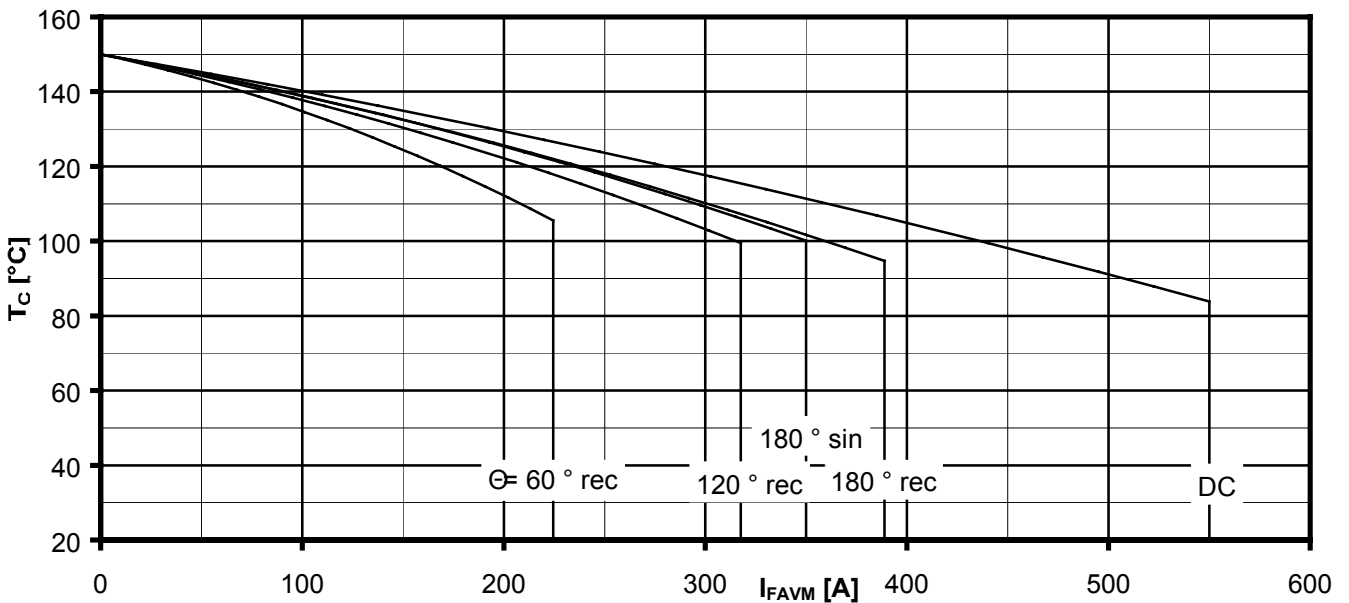
Netz-Dioden-Modul  
Rectifier Diode Module

**DD350N**



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

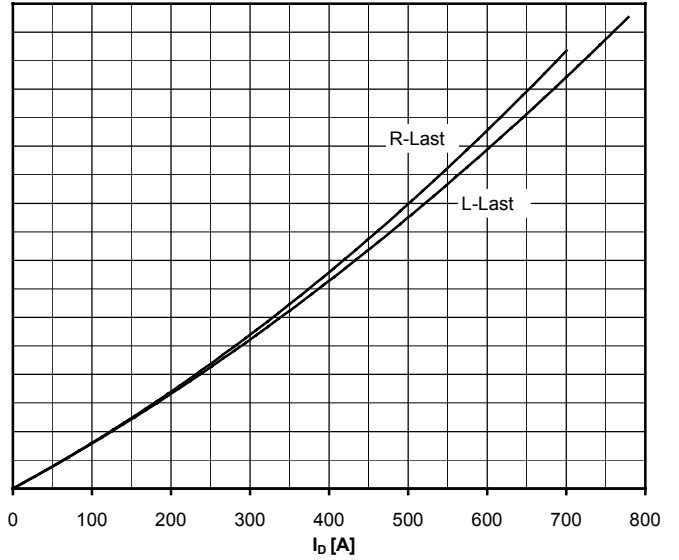
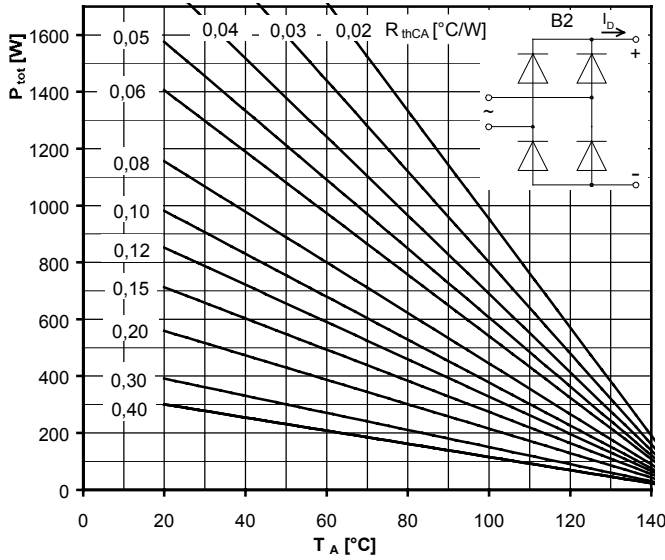
Berechnungsgrundlage  $P_{TAV}$   
Calculation base  $P_{TAV}$

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



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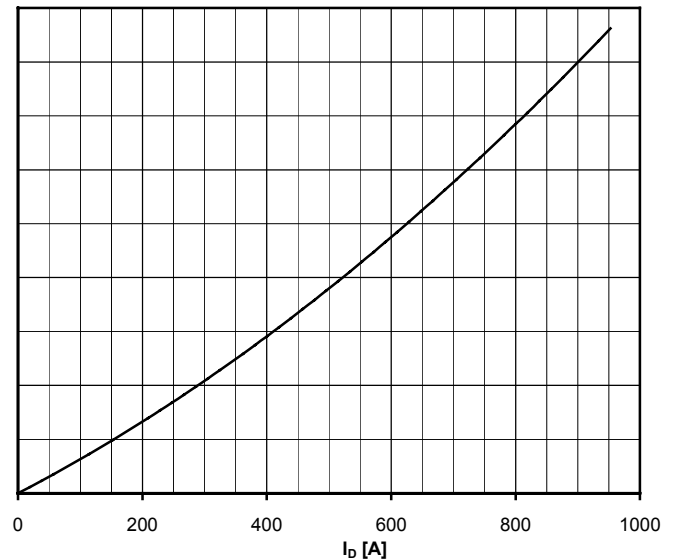
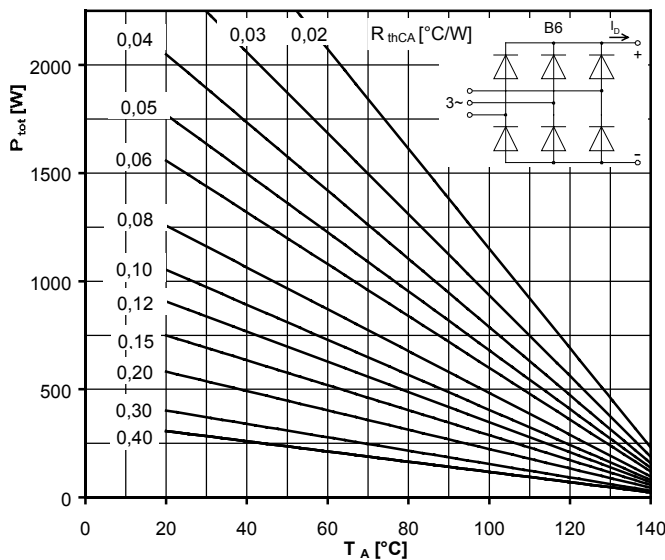
**Höchstzulässiger Ausgangsstrom / Maximum rated output current  $I_b$**

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  $P_{tot}$

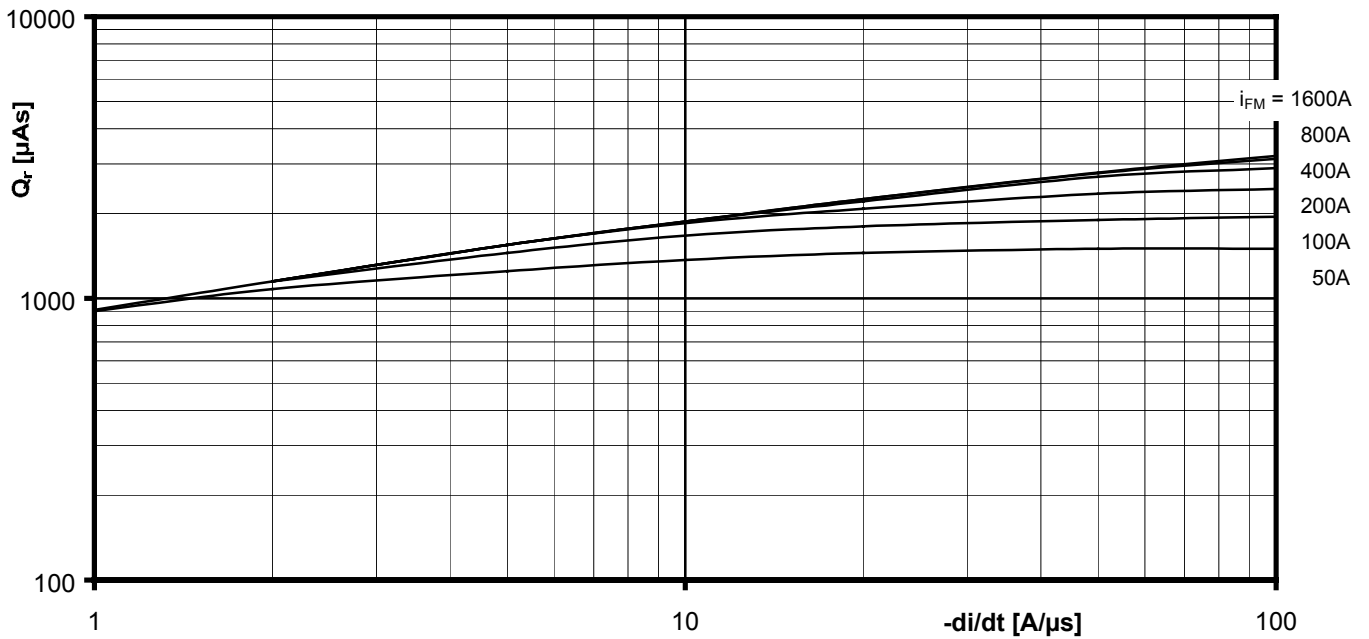
Parameter:

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



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Rectifier Diode Module

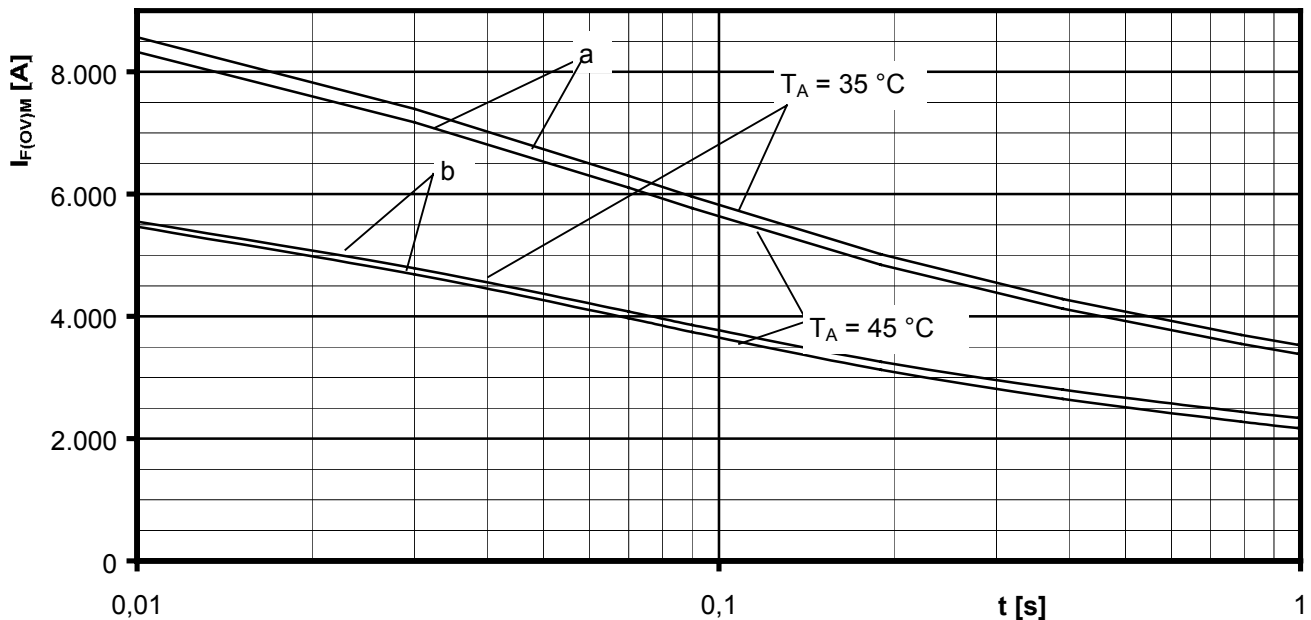
**DD350N**



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)

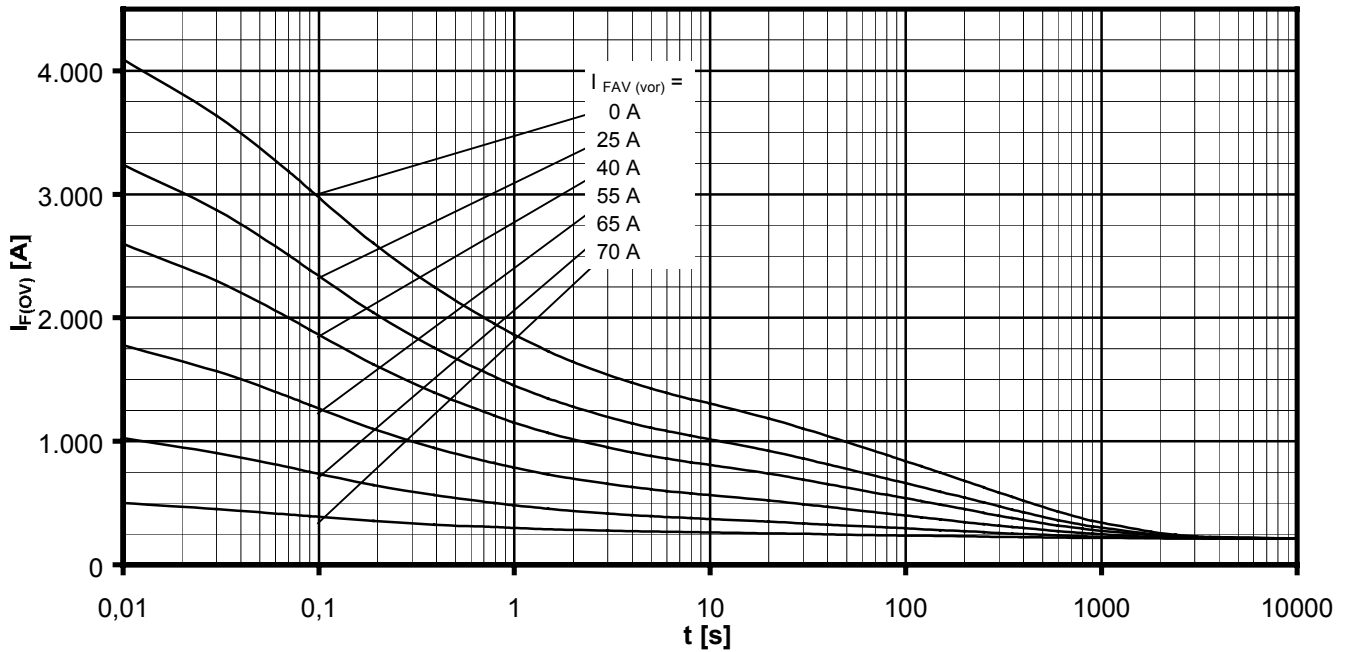
$T_a = 45^\circ\text{C}$ , natürliche Luftkühlung / Natural air cooling    Kühlkörper / Heatsink type: KM17 (60W)





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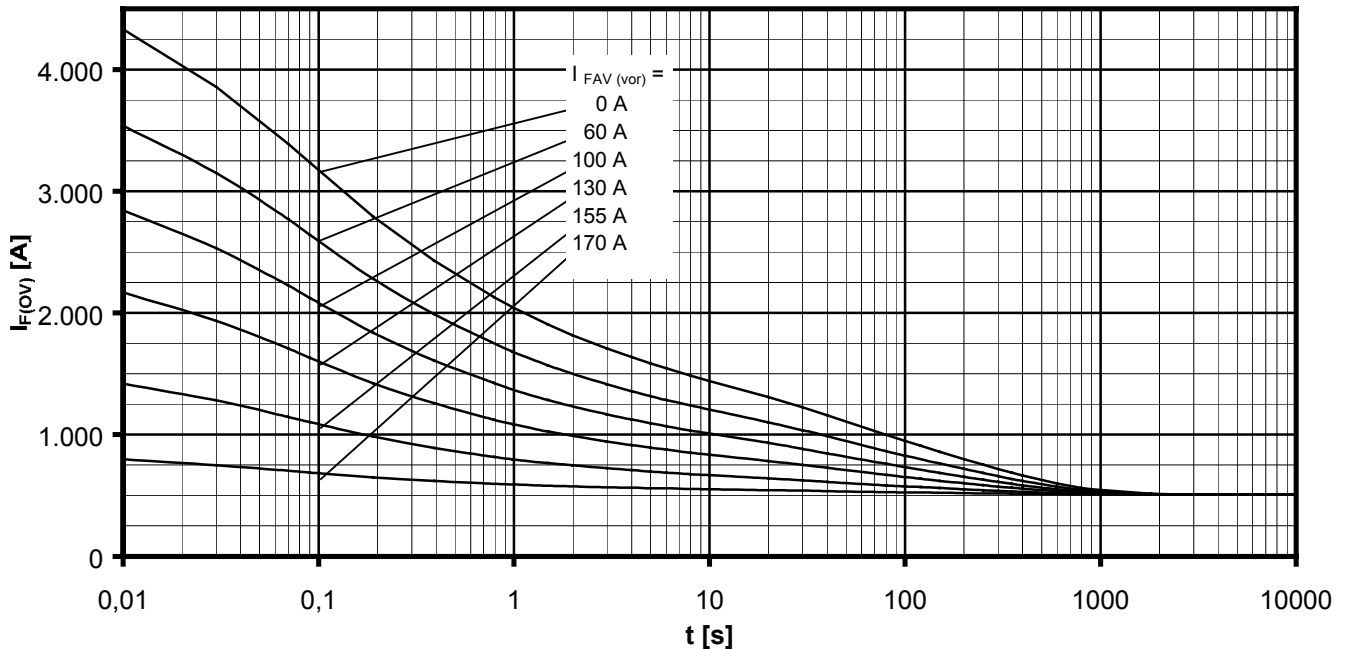


Überstrom je Zweig / Overload on-state current  $I_{F(ov)}$

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

Kühlkörper / Heatsink type KM17 (60W) Natürliche Kühlung bei / Natural cooling at  $T_A = 45^\circ\text{C}$

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  $I_{FAV(vor)}$

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