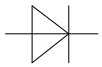
Technische Information / Technical Information

Netz Gleichrichterdiode
Rectifier Diode

D 3501 N 32 ... 42 T

eupec

N



Elektrische Eigenschaften / Electrical properties

Höchstzulässige Werte / Maximum rated values

Periodische Spitzensperrspannung repetitive peak reverse voltage	T_{vj} = -40°C ... $T_{vj\,max}$ f = 50Hz	V_{RRM}	$T_{vj\,min}$ = -40°C 3200 3600 4000 4200	0°C ...$T_{vj\,max}$ 3300 3700 4100 4300	V V V V
Durchlaßstrom-Grenzeffektivwert RMS forward current		I_{FRMSM}		8300	A
Dauergrenzstrom mean forward current	T_C = 100°C, f = 50Hz T_C = 60°C, f = 50Hz	I_{FAVM}		3700 5300	A A
Stoßstrom-Grenzwert surge forward current	T_{vj} = 25°C, t_p = 10ms T_{vj} = $T_{vj\,max}$, t_p = 10ms	I_{FSM}		70 56	kA kA
Grenzlastintegral I^2t-value	T_{vj} = 25°C, t_p = 10ms T_{vj} = $T_{vj\,max}$, t_p = 10ms	I^2t		$25,5 * 10^6$ $15,68 * 10^6$	A^2s A^2s

Charakteristische Werte / Characteristic values

Durchlaßspannung forward voltage	T_{vj} = $T_{vj\,max}$, i_F = 4000A	v_F	typ. 1,2	max. 1,27	V
Schleusenspannung threshold voltage	T_{vj} = $T_{vj\,max}$ i_F = 4000A	$V_{(TO)}$	typ. 0,701	max. 0,734	V
Ersatzwiderstand forward slope resistance	T_{vj} = $T_{vj\,max}$	r_T	typ. 0,126	max. 0,133	mΩ
Durchlaßrechenkennlinie 1500 A ≤ i_F ≤ 4000 A On-state characteristics for calculation $V_F = A + B \cdot i_F + C \cdot \ln(i_F + 1) + D \cdot \sqrt{i_F}$	T_{vj} = $T_{vj\,max}$	 A B C D	typ. 0,599447 2,8982E-05 -0,023767 0,010879	max. 0,597789 3,1577E-05 -0,0195376 0,0111385	
Sperrstrom reverse current	T_{vj} = $T_{vj\,max}$, v_R = V_{RRM}	i_R		100	mA
Sperrverzögerungsladung recovered charge	T_{vj} = $T_{vj\,max}$ I_{TM} = 1,5 kA, -di/dt = 5 A/µs V_R = 1000V, V_{RM} = 1800V, C = 4,7µF, R = 8,2Ω	Q_r		7,2	mAs
Rückstromspitze peak reverse recovery current	T_{vj} = $T_{vj\,max}$ I_{TM} = 1,5 kA, -di/dt = 5 A/µs V_R = 1000V, V_{RM} = 1800V, C = 4,7µF, R = 8,2Ω	I_{RM}		200	A

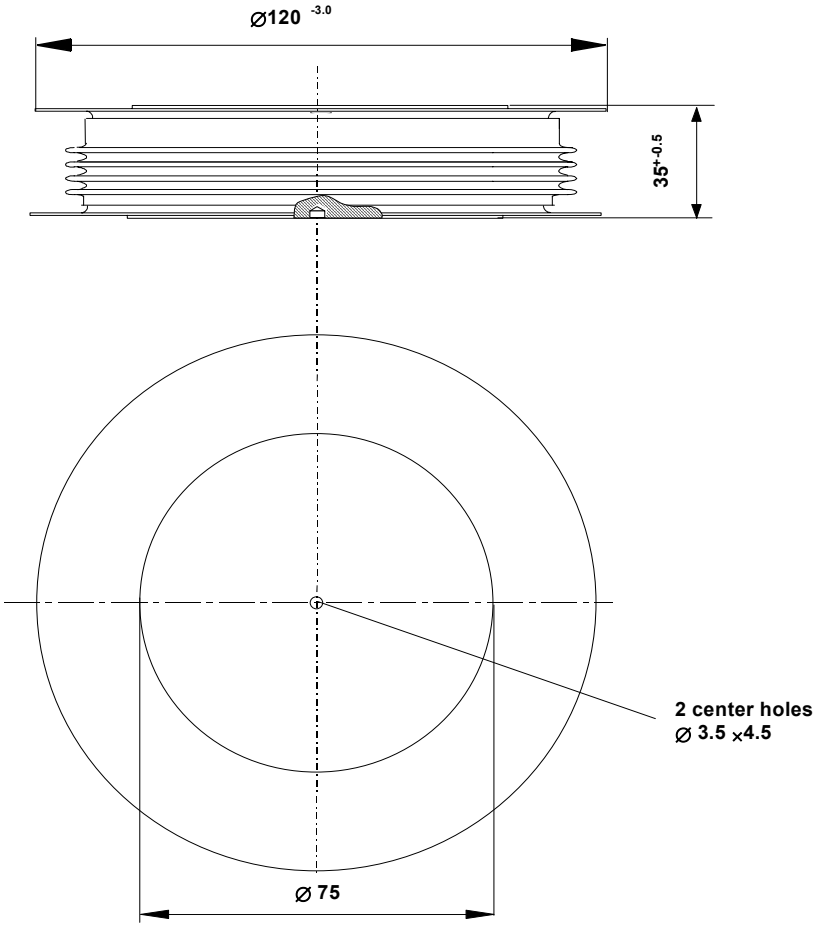
Thermische Eigenschaften / Thermal properties

Innerer Wärmewiderstand thermal resistance, junction to case	beidseitig / two-sided, DC Anode / anode, DC Kathode /cathode, DC	R_{thJC}	max max max	0,0085 °C/W 0,0149 °C/W 0,0196 °C/W
Übergangs-Wärmewiderstand thermal resistance, case to heatsink	Kühlfläche / cooling surface beidseitig / two-sided einseitig / single sided	R_{thCK}	max max	0,0025 °C/W 0,005 °C/W
Höchstzulässige Sperrschichttemperatur max. junction temperature		$t_{vj\ max}$		160 °C
Betriebstemperatur operating temperature		$t_{c\ op}$		-40...+160 °C
Lagertemperatur storage temperature		t_{stg}		-40...+160 °C

Mechanische Eigenschaften / Mechanical properties

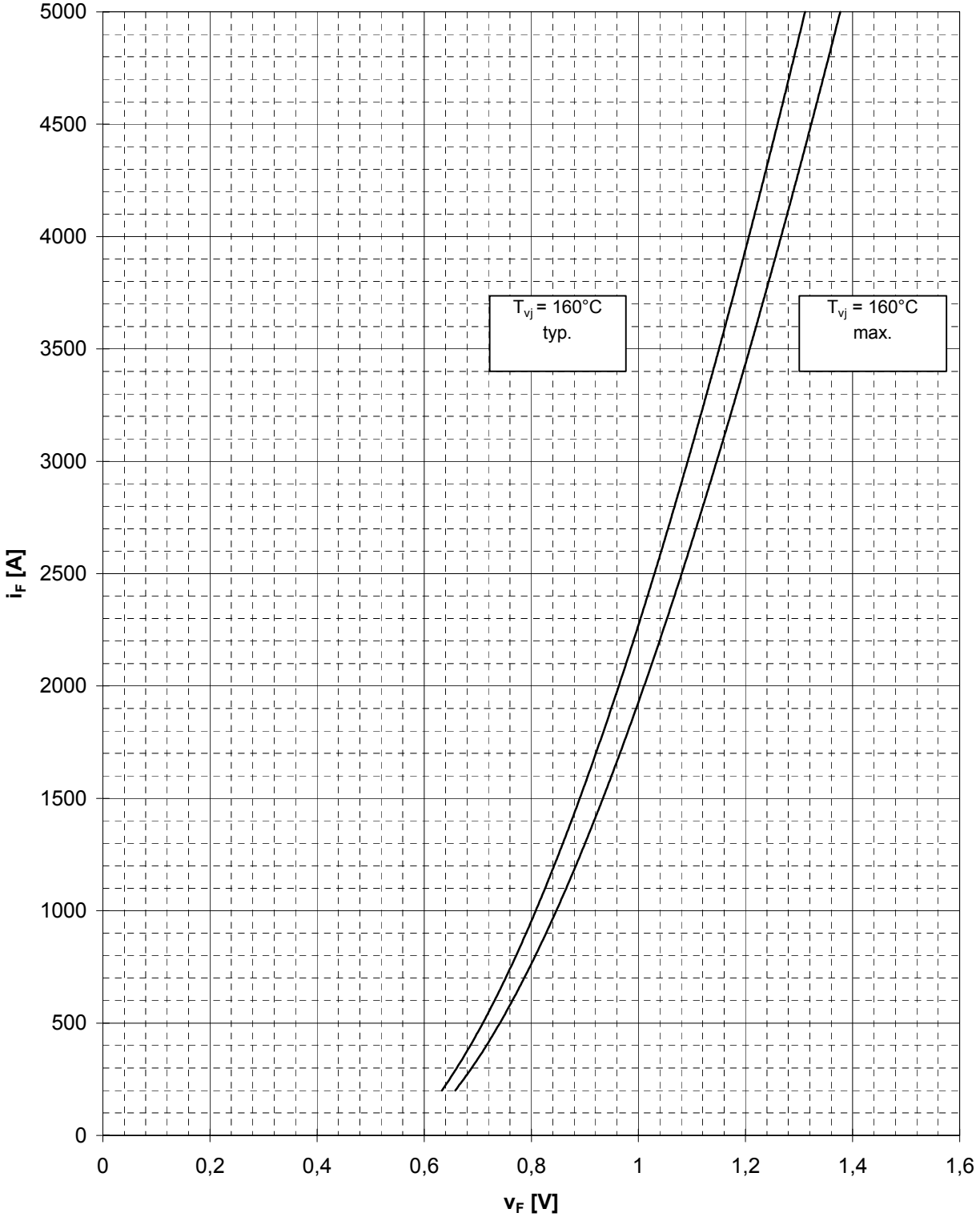
Gehäuse, siehe Anlage case, see appendix				Seite 3
Si - Element mit Druckkontakt Si - pellet with pressure contact				76DN42
Anpreßkraft clamping force		F		36...52 kN
Gewicht weight		G	typ	1700 g
Kriechstrecke creepage distance				40 mm
Luftstrecke air distance				30 mm
Feuchteklasse humidity classification	DIN 40040			C
Schwingfestigkeit vibration resistance	f = 50Hz			50 m/s^2

Maßbild /Outline



Durchlaßkennlinie / On-State Characteristics $i_F = f(v_F)$

Limiting and typical on-state characteristic

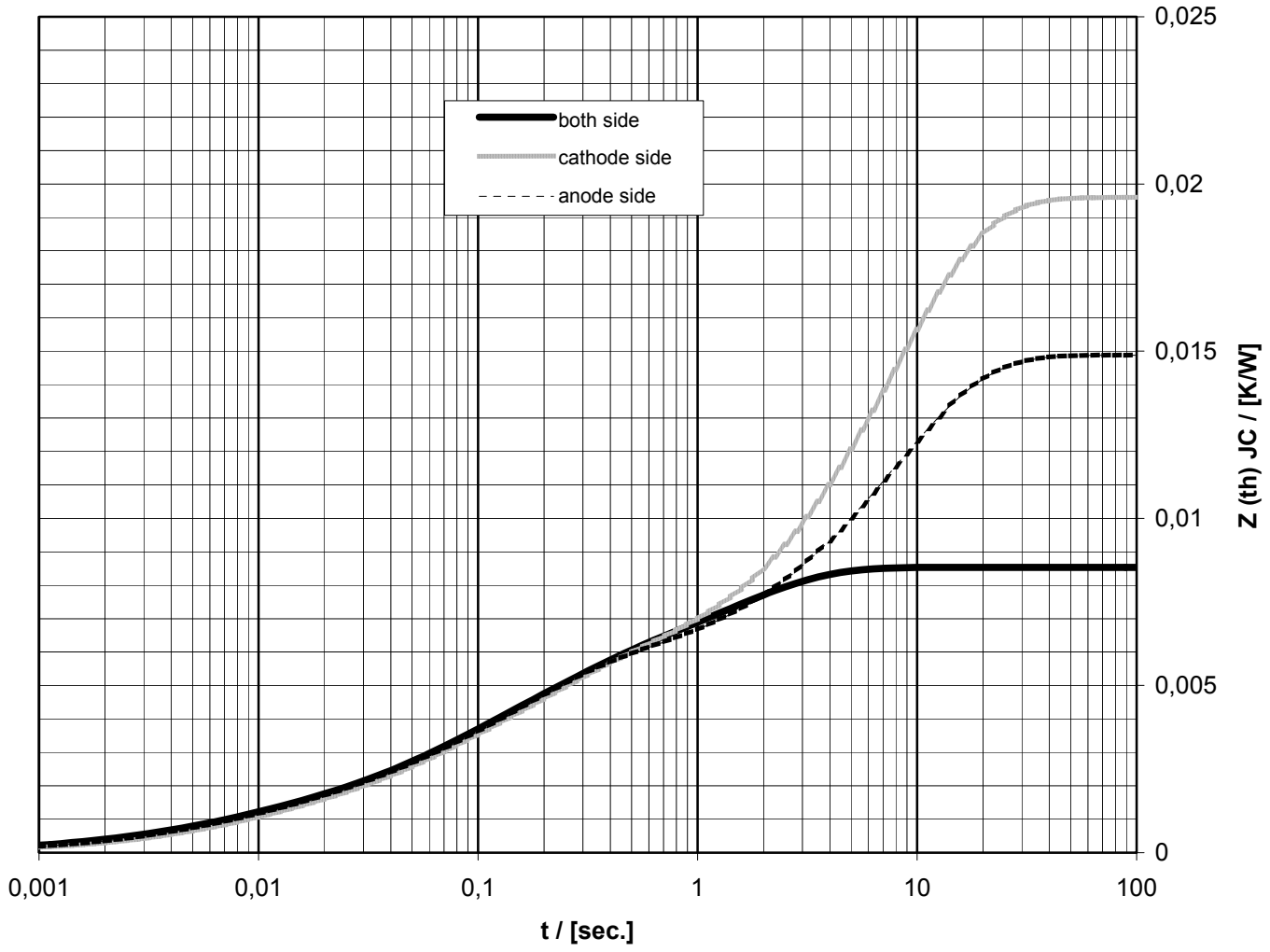


Transienter innerer Wärmewiderstand
Transient thermal impedance $Z_{(th)\,JC} = f(t)$

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

	Double side cooled		Cathode side cooled		Anode side cooled	
	r [K/W]	[s]	r [K/W]	[s]	r [K/W]	[s]
1	0,00321	1,47207	0,01438	7,72917	0,00926	7,78435
2	0,00279	0,18563	-0,00013	1,20471	0,00025	0,66320
3	0,00159	0,04885	0,00324	0,18047	0,00371	0,14870
4	0,00076	0,00706	0,00136	0,04084	0,00101	0,02443
5	0,00018	0,00202	0,00074	0,00658	0,00065	0,00484
Σ	0,0085	-	0,0196	-	0,0149	-

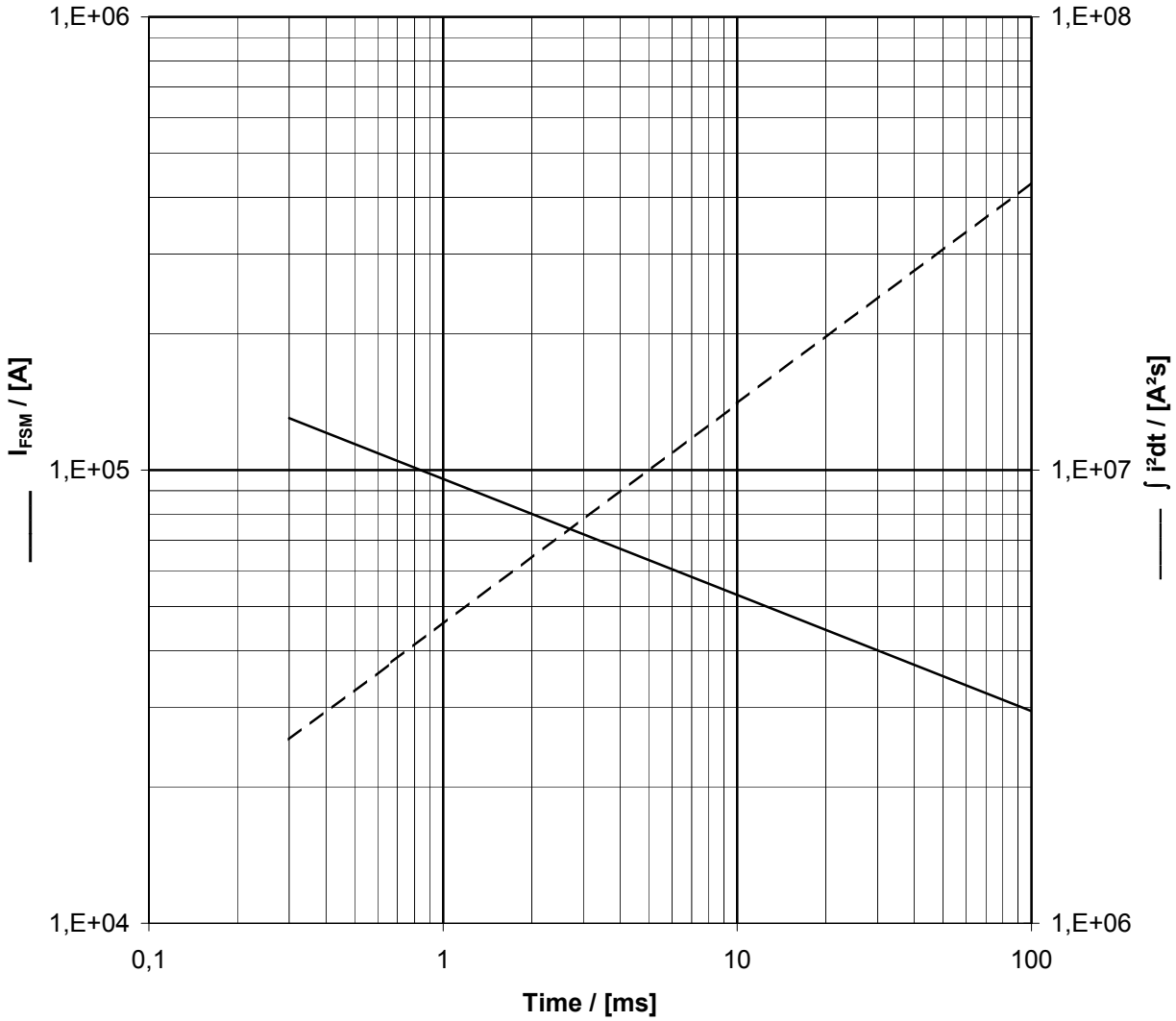
$Z_{th} = f(t)$
without heat sink



Stoßstrom / Grenzlastintegral Charakteristik
Surge Current / I^2t value Characteristics

$$I_{FSM} = f(t_p) / \int i^2\,dt = f(t_p)$$

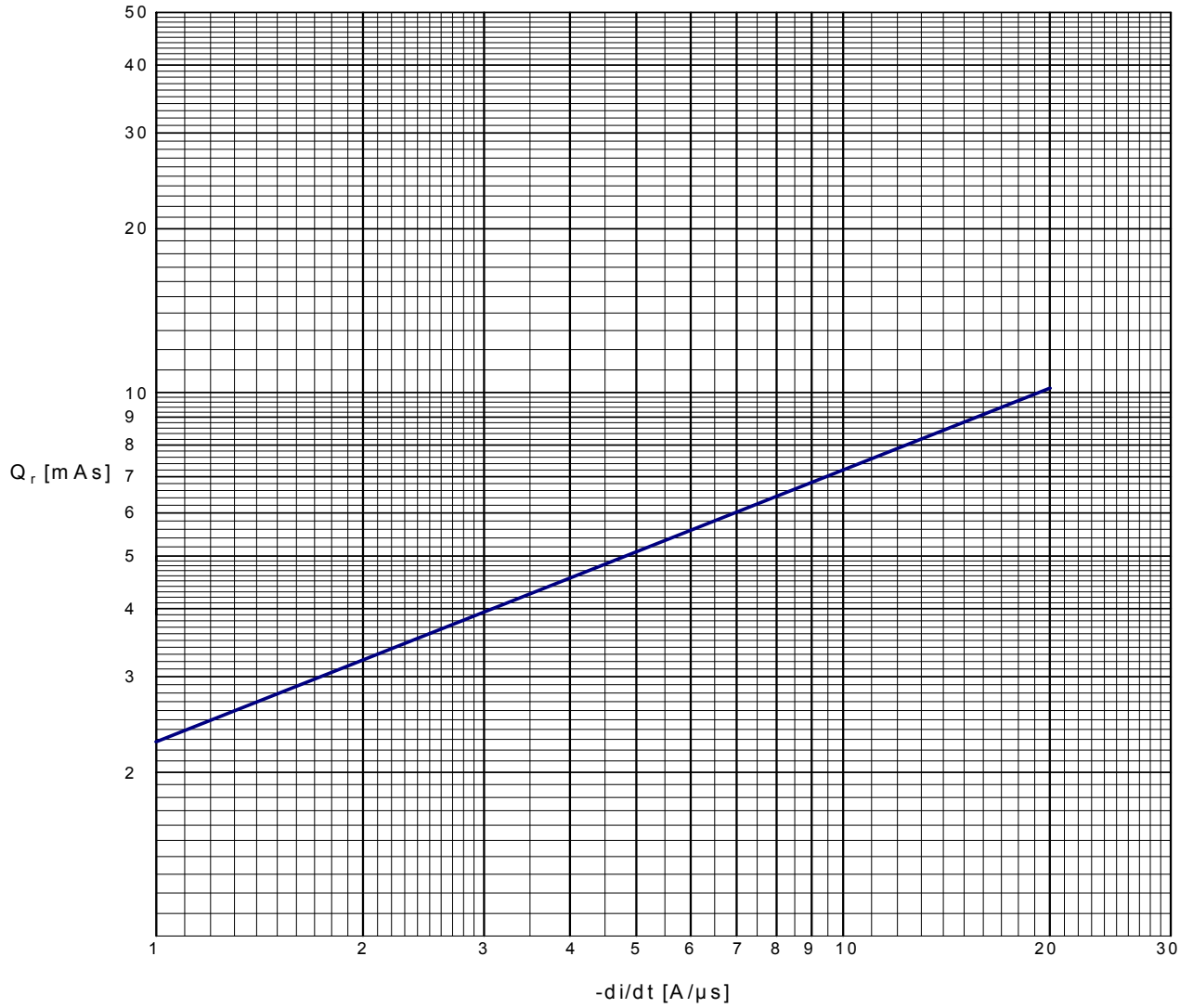
Sine half-wave, T_{vj} =160 ° C , v_R = 0



Sperrverzögerungsladung / recovered charge

$Q_r = f (- di/dt)$

T_{vj} = 160°C, I_{TM} = 1500A, v_R = 1000V, v_{RM} = 1800V, C = 4,7µF, R = 8,2Ω



Rückstromspitze / reverse recovery current

$I_{RM} = f(-di/dt)$

T_{vj} = 160°C, I_{TM} = 1000A, v_R = 1000V, v_{RM} = 1800V, C = 4,7µF, R = 8,2Ω