Netz-Thyristor
Phase Control Thyristor

T1503N

Elektrische Eigenschaften / Electrical properties

Höchstzulässige Werte / Maximum rated values

Periodische Rückwärts-Spitzensperrspannung repetitive peak and reverse voltages	T_{vj} = -40°C... $T_{vj\,max}$	V_{RRM}	7500 8000	V V
Periodische Rückwärts-Spitzensperrspannung repetitive peak reverse voltages	T_{vj} = 0°C... $T_{vj\,max}$	V_{RRM}	7700 8200	V V
Durchlaßstrom-Grenzeffektivwert maximum RMS on-state current		I_{TRMSM}	3800	A
Dauergrenzstrom average on-state current	T_C = 85 °C T_C = 60 °C	I_{TAVM}	1760 2440	A A
Stoßstrom-Grenzwert surge current	T_{vj} = 25 °C, t_P = 10 ms T_{vj} = $T_{vj\,max}$, t_P = 10 ms	I_{TSM}	45000 40000	A A
Grenzlastintegral I²t-value	T_{vj} = 25 °C, t_P = 10 ms T_{vj} = $T_{vj\,max}$, t_P = 10 ms	I²t	10100 8000	10³ A²s 10³ A²s
Kritische Stromsteilheit critical rate of rise of on-state current	DIN IEC 60747-6 f = 50 Hz, P_{LM} = 40mW, t_{rise} = 0,5µs	$(di_T/dt)_{cr}$	300	A/µs
Kritische Spannungssteilheit critical rate of rise of off-state voltage	T_{vj} = $T_{vj\,max}$, v_D = 0,67 V_{DRM} 5.Kennbuchstabe / 5th letter H	$(dv_D/dt)_{cr}$	2000	V/µs

Charakteristische Werte / Characteristic values

Schutzzündspannung (statisch) Protective break over voltage	T_{vj} = 0°C … $T_{vj\,max}$	V_{BO}	min. 7500	V
Durchlaßspannung on-state voltage	T_{vj} = $T_{vj\,max}$, i_T = 4000A, v_D = 100V	v_T	typ. 2,8 max. 3,0	V V
Schleusenspannung threshold voltage	T_{vj} = $T_{vj\,max}$	$V_{(TO)}$	typ. 1,20 max. 1,24	V V
Ersatzwiderstand slope resistance	T_{vj} = $T_{vj\,max}$	r_T	typ. 0,4 max. 0,44	mΩ mΩ
Durchlaßkennlinie on-state characteristic $v_T = A + B \cdot i_T + C \cdot Ln(i_T + 1) + D \cdot \sqrt{i_T}$	T_{vj} = $T_{vj\,max}$	typ. max.	A 0,616 B 0,000219 C 0,0342 D 0,0161 A -0,0864 B 0,000343 C 0,2021 D 0,000614	
minimale Zündlichtleistung minimum gate trigger light power	T_{vj} = 25°C, v_D = 100V	I_{GT}	max. 40	mW
Haltestrom holding current	T_{vj} = 25°C	I_H	max. 100	mA
Einraststrom latching current	T_{vj} = 25°C, v_D = V, P_{LM} = 40mW, t_{rise} = 0,5µs	I_L	max. 1	A
Rückwärts-Sperrstrom reverse blocking current	T_{vj} = $T_{vj\,max}$ v_R = V_{RRM}	i_R	max. 600	mA
Zündverzug gate controlled delay time	DIN IEC 60747-6 T_{vj} = 25 °C, vD = 1000V , P_{LM} = 40mW, t_{rise} = 0,5µs	t_{gd}	max. 5	µs

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Elektrische Eigenschaften / Electrical properties
Charakteristische Werte / Characteristic values

Freiwerdezeit circuit commutated turn-off time	$T_{vj} = T_{vj\,max}$, $i_{TM} = I_{TAVM}$ v_{RM} = 100 V, v_{DM} = 0,67 V_{DRM} dv_D/dt = 20 V/µs, $-di_T/dt$ = 10 A/µs 4.Kennbuchstabe / 4th letter O	t_q	typ. 550	µs
Sperrverzögerungsladung recovered charge	$T_{vj} = T_{vj\,max}$ $i_{TM} = I_{TAVM}$, $-di_T/dt$ = 10 A/µs $V_R = 0{,}5V_{RRM}$, $V_{RM} = 0{,}8V_{RRM}$	Q_r	max. 15	mAs
Rückstromspitze peak reverse recovery current	$T_{vj} = T_{vj\,max}$ $i_{TM} = I_{TAVM}$, $-di_T/dt$ = 10 A/µs $V_R = 0{,}5V_{RRM}$, $V_{RM} = 0{,}8V_{RRM}$	I_{RM}	max. 350	A

Thermische Eigenschaften / Thermal properties

Innerer Wärmewiderstand thermal resistance, junction to case	Kühlfläche / cooling surface beidseitig / two-sided, θ = 180°sin beidseitig / two-sided, DC Anode / anode, DC Kathode / cathode, DC	R_{thJC}	max. 0,0063 max. 0,0060 max. 0,0106 max. 0,0138	°C/W °C/W °C/W °C/W
Übergangs-Wärmewiderstand thermal resistance, case to heatsink	Kühlfläche / cooling surface beidseitig / two-sided einseitig / single-sided	R_{thCH}	max. 0,0015 max. 0,003	°C/W °C/W
Höchstzulässige Sperrschichttemperatur maximum junction temperature		$T_{vj\,max}$	120	°C
Betriebstemperatur operating temperature		$T_{c\,op}$	-40...+120	°C
Lagertemperatur storage temperature		T_{stg}	-40...+150	°C

Mechanische Eigenschaften / Mechanical properties

Gehäuse, siehe Anlage case, see annex			Seite 3 page 3	
Si-Element mit Druckkontakt Si-pellet with pressure contact				
Anpresskraft clamping force		F	63...91	kN
Gewicht weight		G	typ. 3200	g
Kriechstrecke creepage distance			49	mm
Schwingfestigkeit vibration resistance	f = 50 Hz		50	m/s²

Mit diesem Datenblatt werden Halbleiterbauelemente spezifiziert, jedoch keine Eigenschaften zugesichert. Sie gilt in Verbindung mit den zugehörigen technischen Erläuterungen.

This data sheet specifies semiconductor devices, but promises no characteristics. It is valid in combination with the belonging technical notes.

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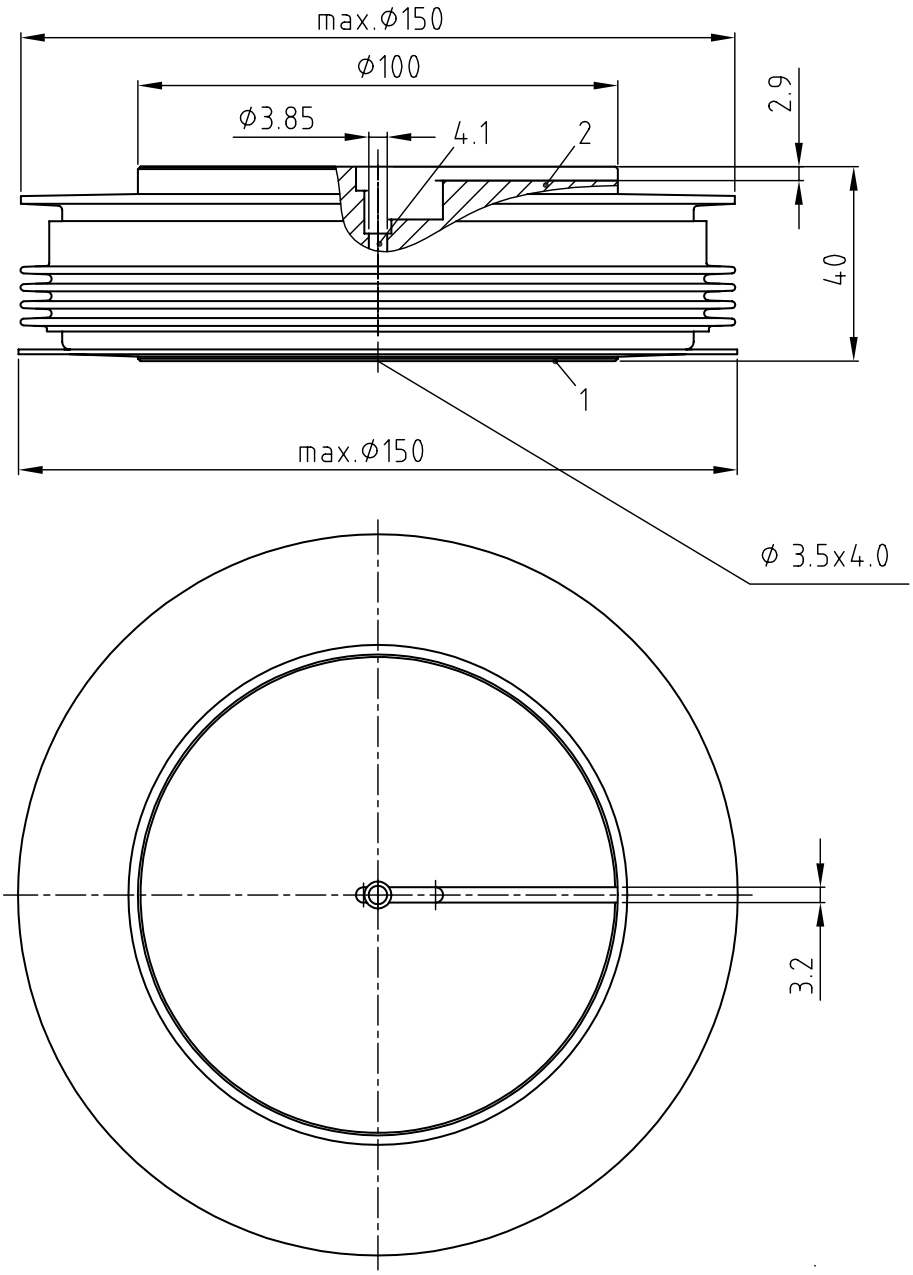

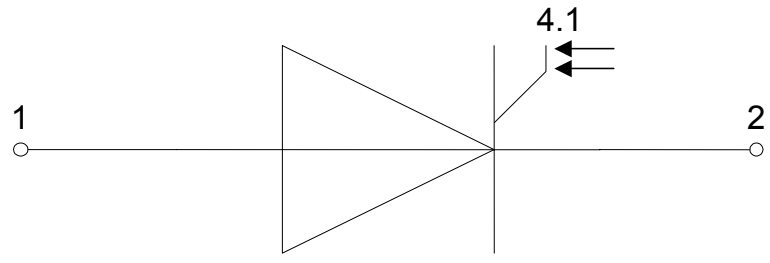

1: Anode/Anode

2: Kathode/Cathode

4.1: Gate

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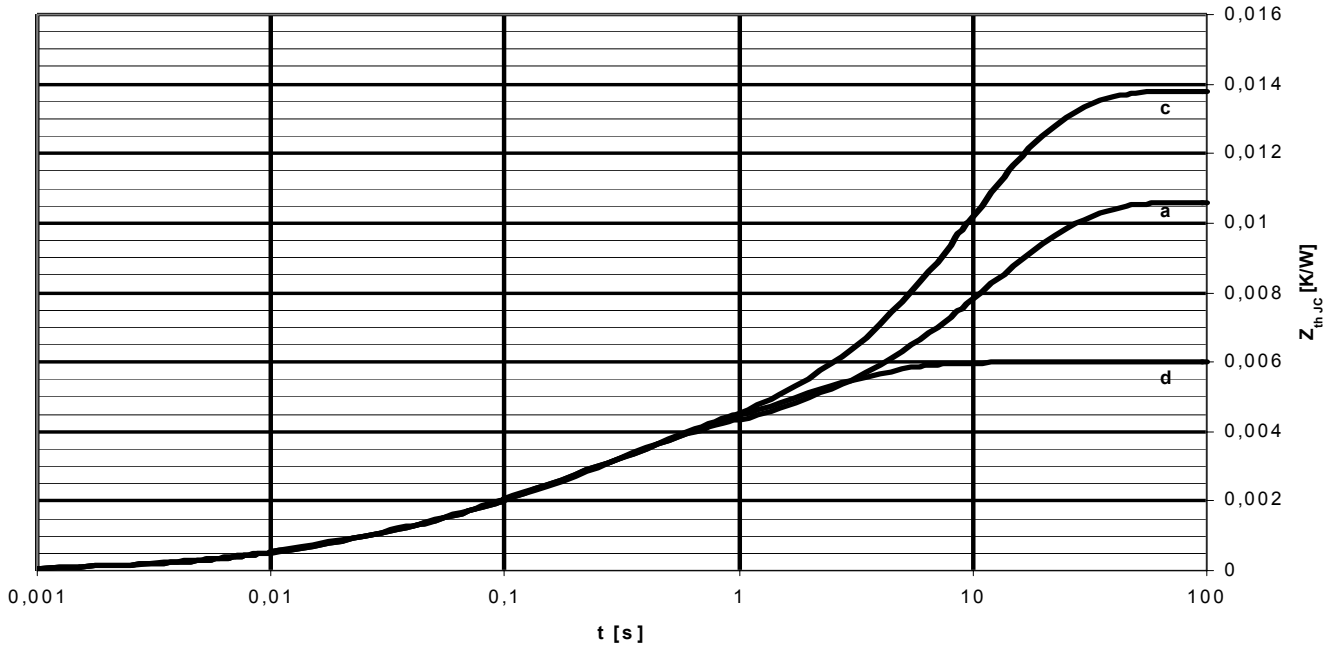
Analytische Elemente des transienten Wärmewiderstandes Z_{thJC}
Analytical elements of transient thermal impedance Z_{thJC}

	Pos. n	1	2	3	4	5	6	7
beidseitig two-sided	R_{thn} [°C/W]	0,00238	0,00202	0,00110	0,0005	0		
	τ_n [s]	2,06	0,301	0,0674	0,0122	1		
anodenseitg anode-sided	R_{thn} [°C/W]	0,00662	0,00043	0,00248	0,00081	0,00026		
	τ_n [s]	11,6	0,946	0,219	0,0310	0,00761		
kathodenseitig cathode-sided	R_{thn} [°C/W]	0,0102	0,00224	0,00092	0,00044	0		
	τ_n [s]	9,62	0,268	0,0532	0,0107	1		

Analytische Funktion / Analytical function:

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



Transienter innerer Wärmewiderstand für DC/ Transient thermal impedance Z_{thJC} = f(t) for DC

Beidseitige Kühlung / Two-sided cooling

Anodenseitige Kühlung / Anode-sided cooling

Kathodenseitige Kühlung / Cathode-sided cooling

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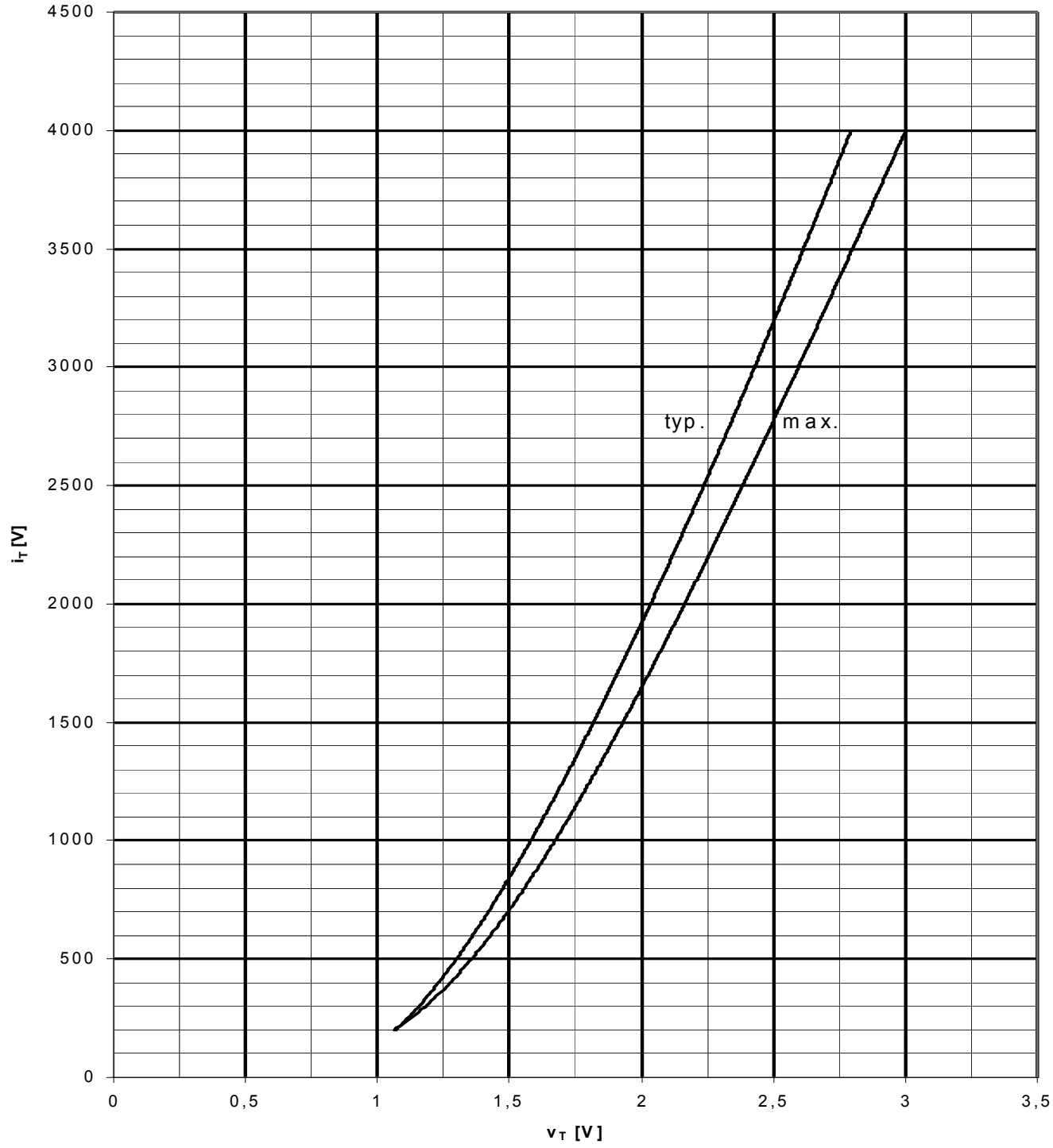
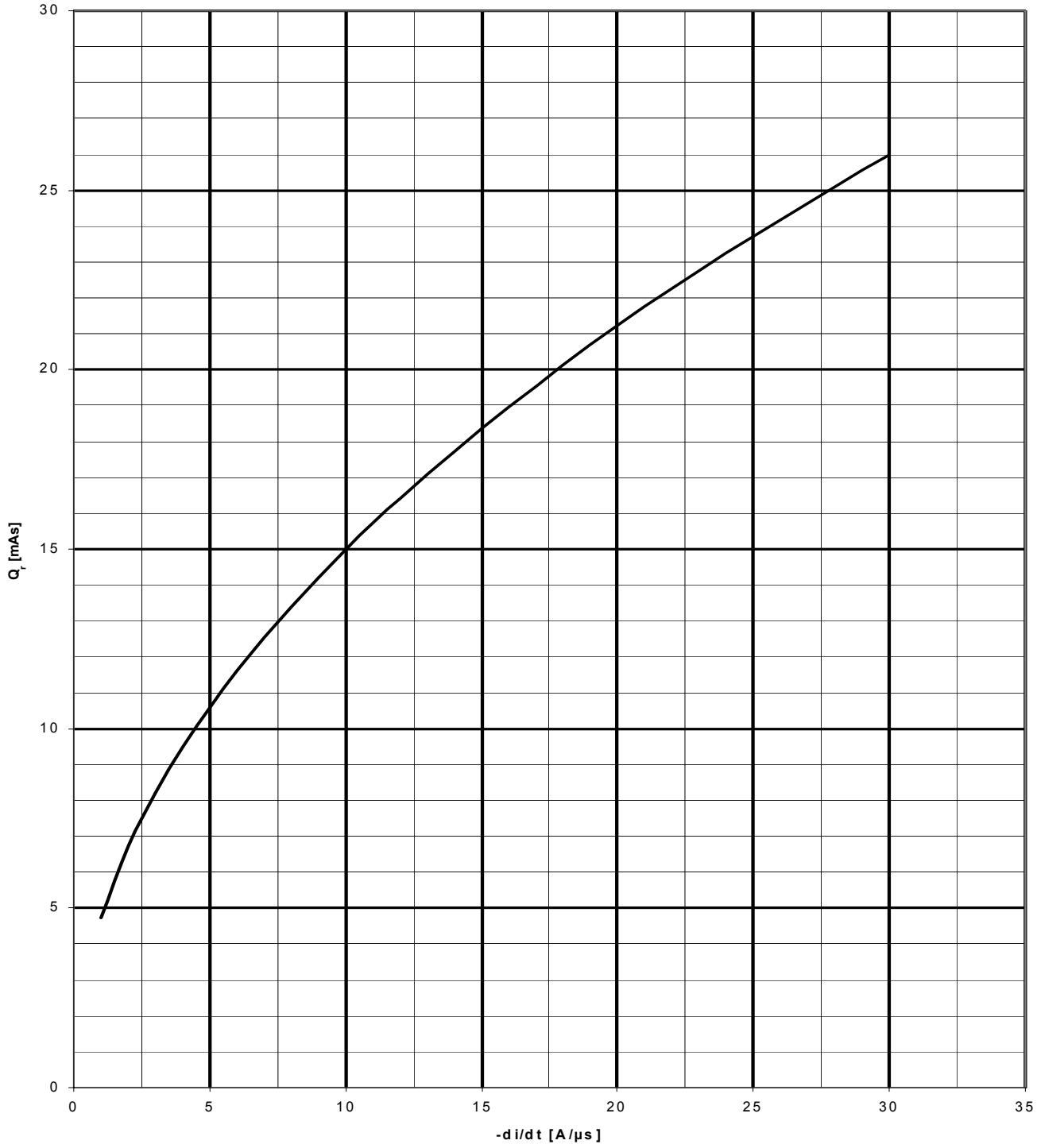


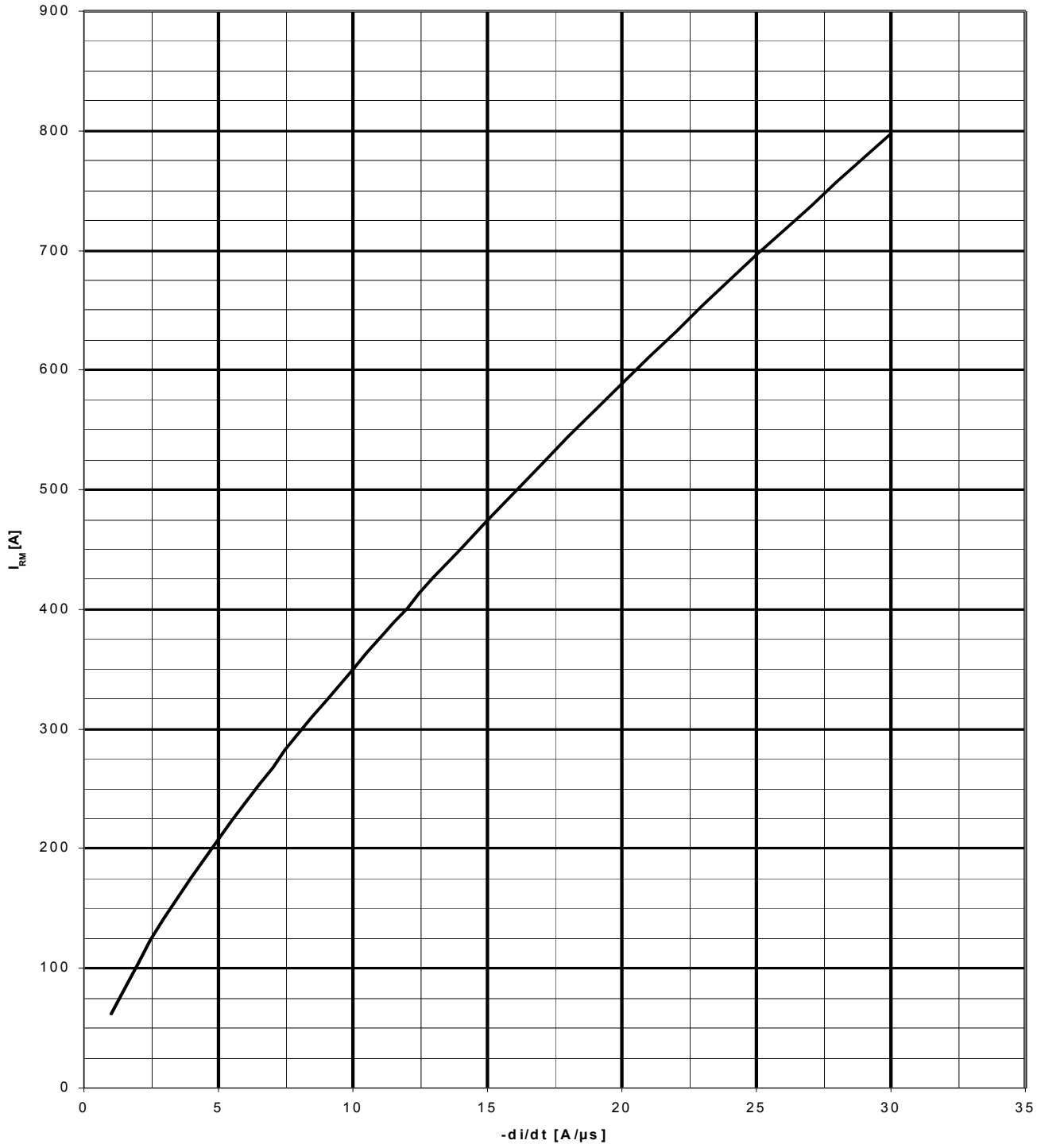
Grenzdurchlaßkennlinie / Limiting on-state characteristic $i_T = f(v_T)$

$T_{vj} = T_{vj\ max}$



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

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



Rückstromspitze / Peak reverse recovery current I_{RM} = f(-di/dt)

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

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