Elektrische Eigenschaften **Electrical properties**

Höchstzulässige Werte Maximum rated values

Periodische Vorwärts- und Rückwärts-Spitzensperrspannung	repetitive peak forward off-state and reverse voltages	t_{vj} = -40°C . . . $t_{vj\,max}$	V_{DRM}, V_{RRM}	800,900		V
Vorwärts-Stoßspitzen-sperrspannung	non repetitive peak forward off-state voltage	t_{vj} = –40°C ... $t_{vj\,max}$	V_{DSM} = V_{DRM}			
Rückwärts-Stoßspitzen-sperrspannung	non repetitive peak reverse voltage	t_{vj} = + 25 °C . . . $t_{vj\,max}$	V_{RSM} = V_{RRM}	+IOO		v
Durchlaßstrom-Grenzeffektivwert	RMS on-state current		I_{TRMSM}	1200		A
Dauergrenzstrom	average on-state current	t_C = 85°C	I_{TAVM}	500		A
		tc = 52°C		765		A
Stoßstrom-Grenzwert	surge current	t_{vj} = 25°C, t_p = 10 ms	I_{TSM}	7,62		kA
		t_{vj} = $t_{vj\,max}$, t_p = 10 ms		7		kA
Grenzlastintegral	I^2t-value	t_{vj} = 25°C, t_p = 10 ms	I^2t	290		kA^2s
		t_{vj} = $t_{vj\,max}$, t_p = 10 ms		245		kA^2s
Kritische Stromsteilheit	critical rate of rise of on-state current	$v_D \leq$ 67% v_{DRM}, f = 50 Hz	$(di/dt)_{cr}$	400		A/µs
		i_{GM} = 1,5 A, di_G/dt = 2 A/µs		[1]	[2]	
Kritische Spannungssteilheit	critical rate of rise of Off-state voltage	t_{vj} = $t_{vj\,max}$, v_D = 67% V_{DRM}	$(dv/dt)_{cr}$ L:	500	50	V/µs

Charakteristische Werte Characteristic values

Durchlaßspannung	on-state voltage	t_{vj} = $t_{vj\,max}$, i_T = 2300 A	v_T	max.	2,85	V
Schleusenspannung	threshold voltage	t_{vj} = $t_{vj\,max}$	$V_{T(TO)}$		1,5	v
Ersatzwiderstand	slope resistance	t_{vj} = $t_{vj\,max}$	r_T		0,52	mΩ
Zündstrom	gate trigger current	t_{vj} = 25°C, v_D = 6 V	I_{GT}	max.	300	mA
Zündspannung	gate trigger voltage	t_{vj} = 25°C, v_D = 6 V	V_{GT}	max.	2,5	V
Nicht zündender Steuerstrom	gate non-trigger current	t_{vj} = $t_{vj\,max}$, v_D = 6 V	I_{GD}	max.	40	mA
Nicht zündende Steuerspannung	gate non-trigger voltage	t_{vj} = $t_{vj\,max}$, v_D = 095 V_{DRM}	V_{GD}	max.	0,3	v
Haltestrom	holding current	t_{vj} = 25°C, v_D = 6 V, R_A = 5 Ω	I_H	max.	250	mA
Einraststrom	latching current	t_{vj} = 25°C, v_D = 6 V, $R_{GK} \geq$ 10 Ω	I_L	max.	2	A
		i_{GM} = 1 A, di_G/dt = 1 A/µs, t_g = 20 ps				
Vorwärts- u. Rückwärts-Sperrstrom	forward off-state and reverse currents	t_{vj} = $t_{vj\,max}$, v_D = V_{DRM}, v_R = V_{RRM}	i_D, i_R	max.	100	mA
Zündverzug	gate controlled delay time	t_{vj} = 25°C, i_{GM} = 1 A, di_G/dt = 1 A/µs	t_{gd}	max.	1,5	µs
Freiwerdezeit	circuit commutated turn-Off time	siehe Techn. Erl./see Techn. Inf.	t_q 13):	max.	10	µs
			23):	max.	12	µs

Thermische Eigenschaften **Thermal properties**

Innerer Wärmewiderstand	thermal resistance, junction to case					
für beidseitige Kühlung	for two-sided cooling	Θ = 180° el, sin	R_{thJC}	max.	0,0384	°C/W
		DC		max.	0,035o	°C/W
für anodenseitige Kühlung	for anode-sided cooling	Θ = 180° el, sin	$R_{thJC(A)}$	max.	0,0694	°C/W
		DC		max.	0,066O	°C/W
für kathodenseitige Kühlung	for cathode-sided cooling	Θ = 180° el, sin	$R_{thJC(K)}$	max.	0,0779	°C/W
		DC		max.	0,0745	°C/W
Übergangswärmewiderstand	thermal resistance, case to heatsink	beidseitig/two-sided	R_{thCK}	max.	0,006	°C/W
		einseitiglone-sided		max.	0,012	°C/W
Höchstzul. Sperrschichttemperatur	max. junction temperature		$t_{vj\,max}$		125	°C
Betriebstemperatur	Operating temperature		$t_{c\,op}$		-4O... + 125	°C
Lagertemperatur	Storage temperature		t_{stg}		-4o... + 150	°C

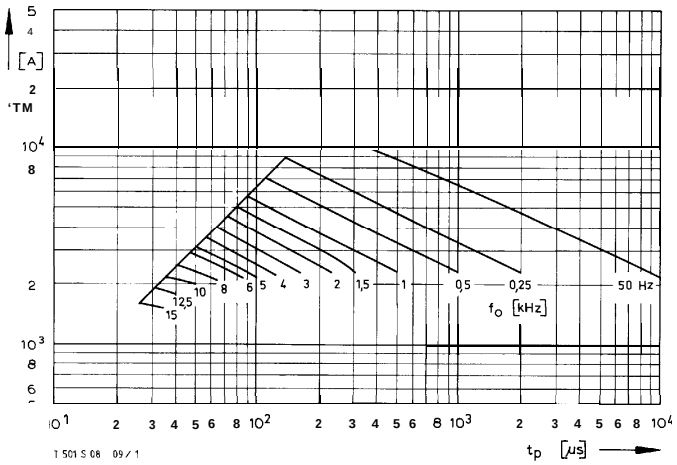
Mechanische Eigenschaften **Mechanical properties**

Si-Element mit Druckkontakt	Si-pellet with pressure contact				
Anpreßkraft	Clamping force		F		9... 13 kN
Gewicht	weight		G	typ.	150g
Kriechstrecke	Creepage distance				14 mm
Feuchteklasse	humidity classification	DIN 40040			C
Schwingfestigkeit	Vibration resistance	f = 50 Hz			50 m/s^2
Maßbild	outline	DIN 41814-151A4			Seite/page 155

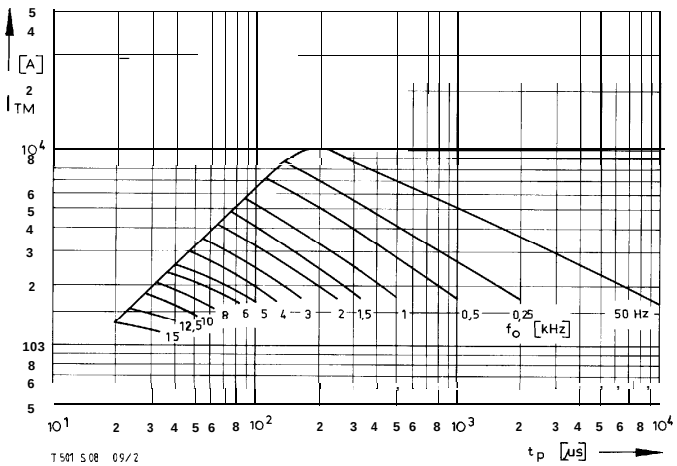
1) Werte nach DIN IEC 747-6 (ohne vorausgehende Kommutierung)/Values to DIN IEC 747-6 (without Prior commutation)

2) Unmittelbar nach der Freiwerdezeit, vgl. Meßbedingungen für t_q/Immediately after circuit commutated turn-Off time, see Parameters t_q

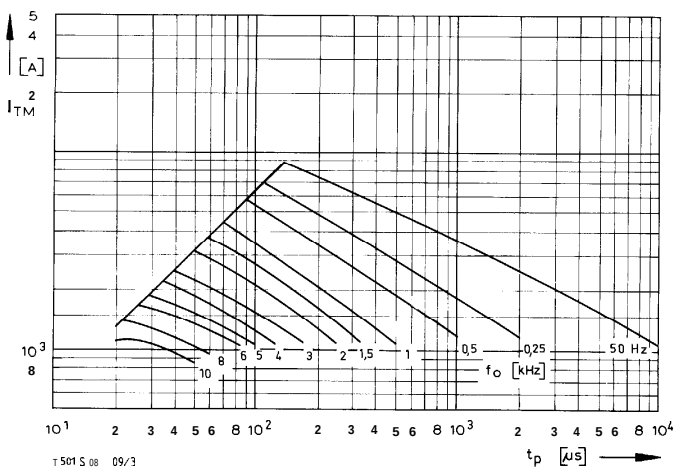
3) $-di_T/dt$ = 100 A/µs; dv_D/dt = 50 V/µs



Bild/Fig. 1 t_C = 60°C



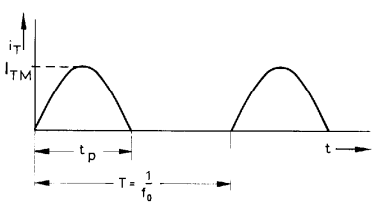
BildlFig. 2 t_C = 80°C

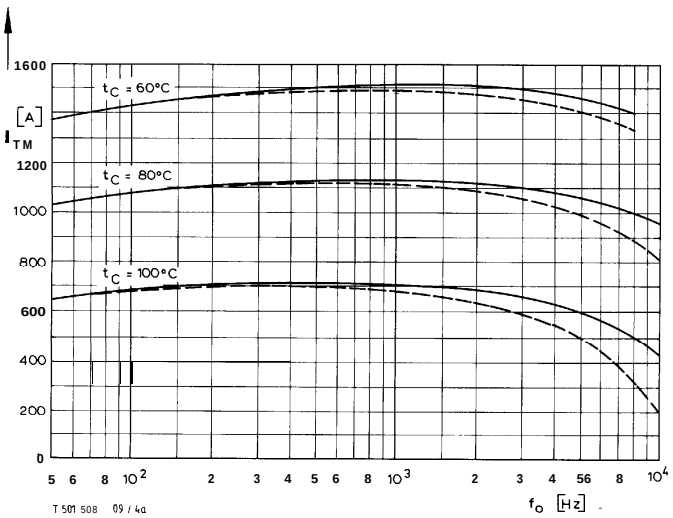


BildlFig. 3 t_C = 100°C

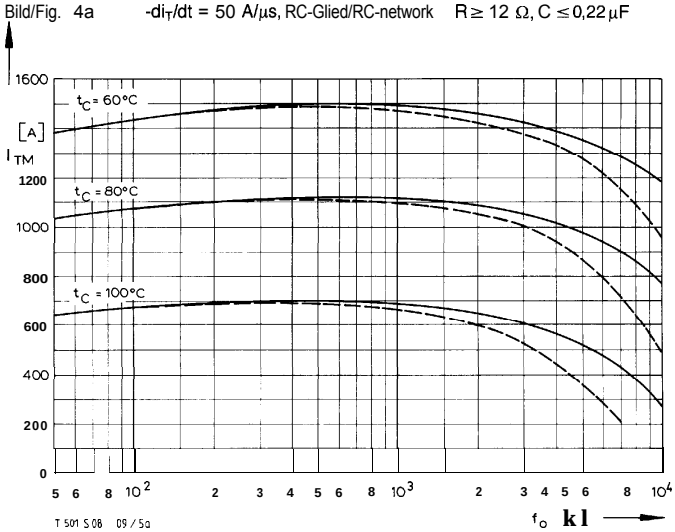
BildlFig. 1, 2, 3
Steuergenerator/pulse generator:
i_G = 1,5 A, di_G/dt = 2 A/µs

RC-GliedlRC-network:
R ≥ 8,2 Ω
C ≤ 0,22 µF
$v_{DM} \leq 0{,}85\ V_{DRM}$

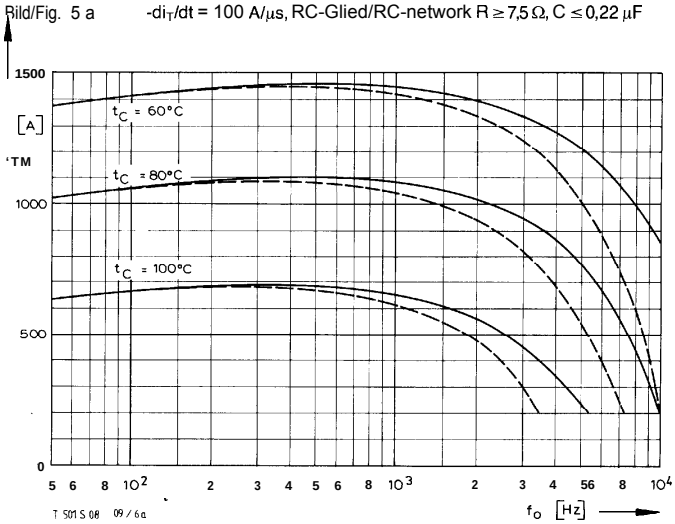




Bild/Fig. 4a $-di_T/dt$ = 50 A/µs, RC-Glied/RC-network R ≥ 12 Ω, C ≤ 0,22 µF



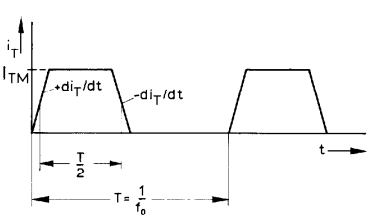
Bild/Fig. 5 a $-di_T/dt$ = 100 A/µs, RC-Glied/RC-network R ≥ 7,5 Ω, C ≤ 0,22 µF

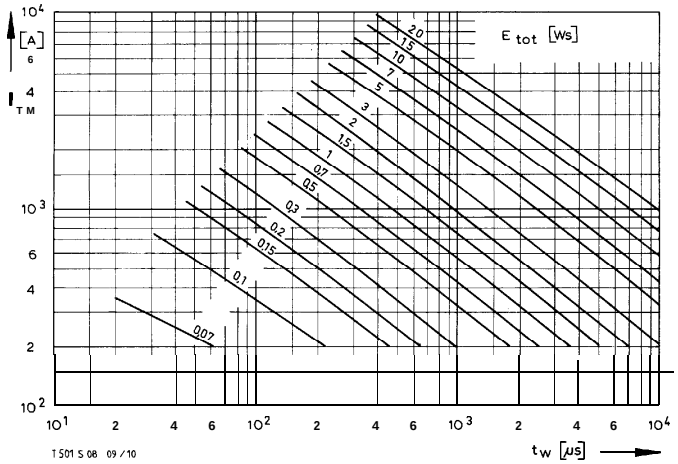


Bild/Fig. 6a $-di_T/dt$ = 200 A/µs, RC-GliedlRC-network R ≥ 8,2 Ω, C ≤ 0,22 µF

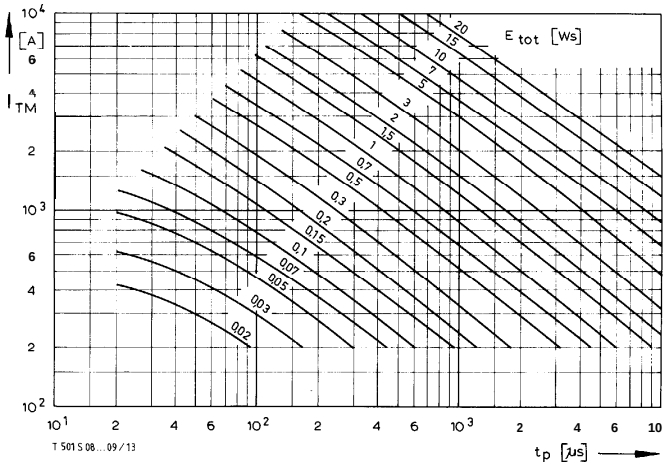
Bild/Fig. 4a, 5a, 6a
Steuergenerator/pulse generator:
i_G = 1,5 A, di_G/dt = 2 A/µs

$v_{DM} \leq 0{,}85\ V_{RM}$
$dv_R/dt \leq 600$ V/µs
$v_{RM} \leq 0{,}85\ V_{RRM}$

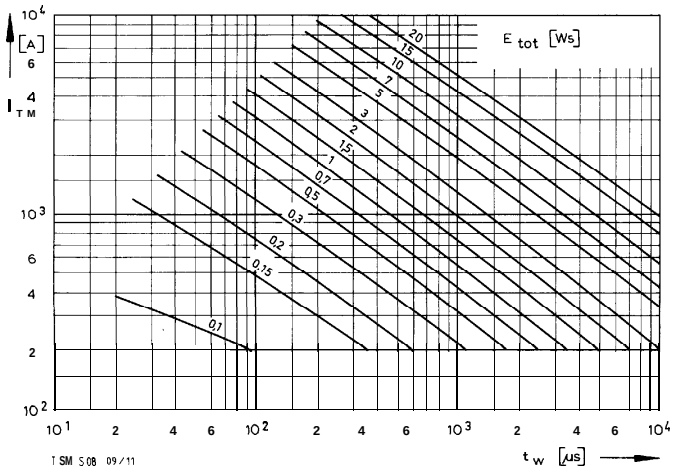




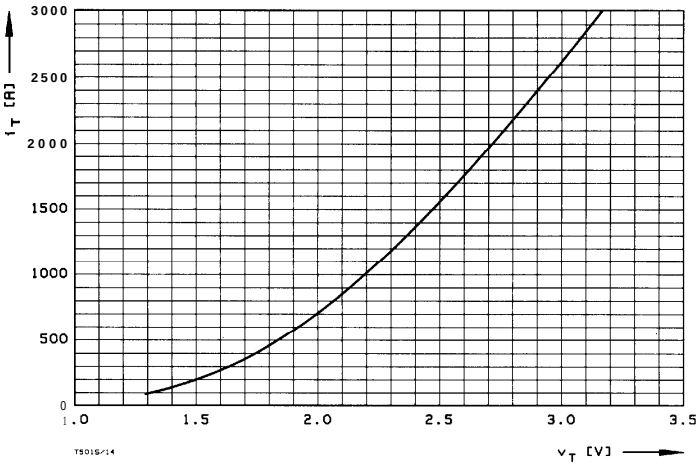
Bild/Fig. 10 $-di_T/dt$ = 50 A/µs, RC-Glied/RC-network R ≥ 12 Ω, C ≤ 0,22 µF



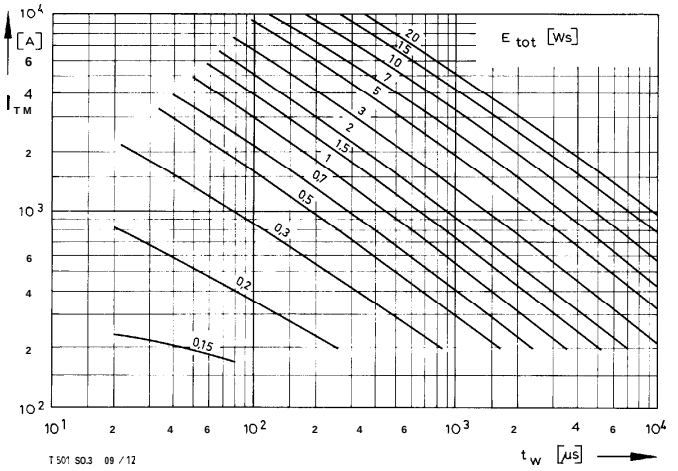
Bild/Fig. 13



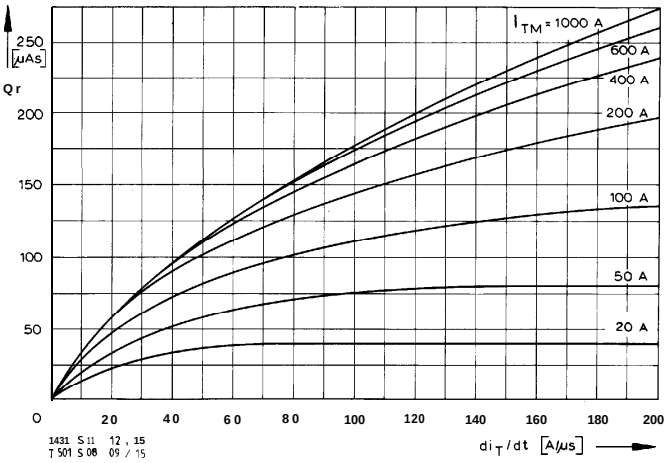
BildlFig 11 $-di_T/dt$ = 100 A/µs, RC-Glied/RC-network R ≥ 7,5 Ω, C ≤ 0,22 µF



Bild/Fig. 14



BildlFig 12 $-di_T/dt$ = 200 A/µs, RC-GliedlRC-network R ≥ 8,2 Ω, C ≤ 0,22 µF



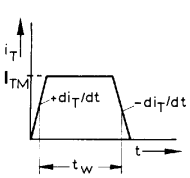
Bild/Fig. 15

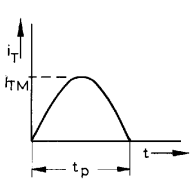
BildlFig. 10, 11, 12
Steuergenerator/pulse generator:
i_G = 1,5 A, di_G/dt = 2 A/µs

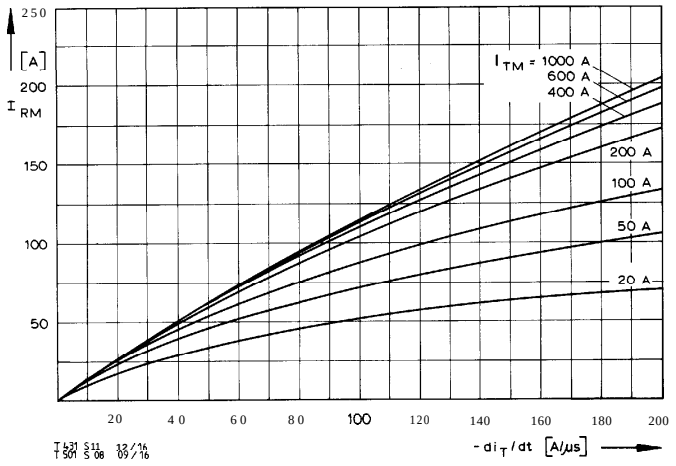
$v_{DM} \leq 0{,}85\,V_{DRM}$
$dv_R/dt \leq 600$ V/µs
$v_{RM} \leq 0{,}85\,V_{RRM}$

zu Bild/to Fig. 13
Steuergenerator/puls generator:
i_G = 1,5 A, di_G/dt = 2 A/µs
$v_{DM} \leq 0{,}85\,V_{DRM}$
$dv_R/dt \leq 100$ V/µs
$v_{RM} \leq 50$ V

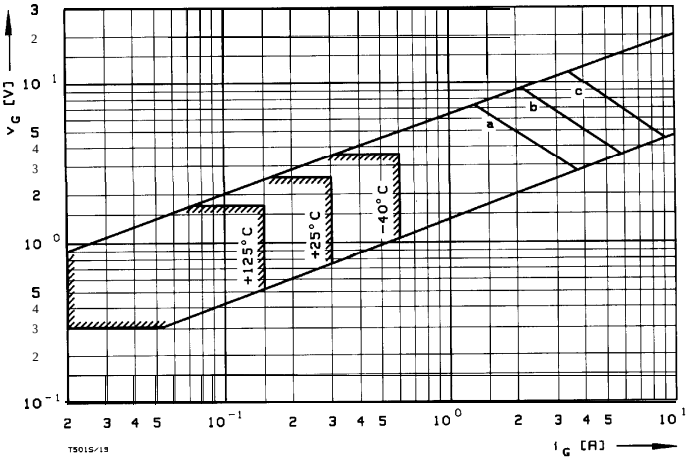
RC-GliedlRC-network:
R ≥ 8,2 Ω
C ≤ 0,22 µF





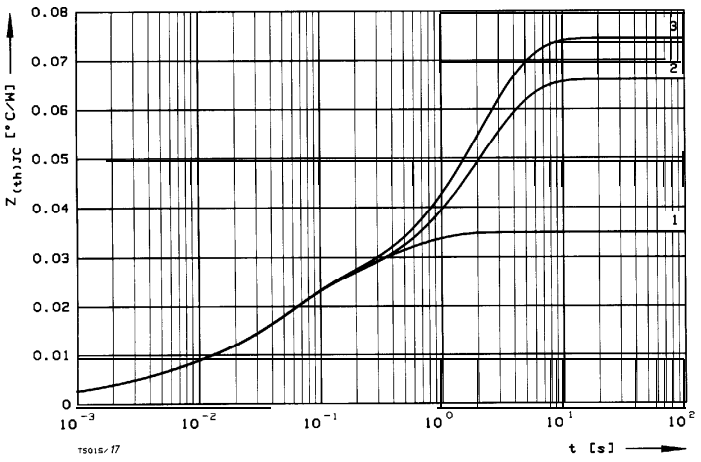


Bild/Fig. **16**
Rückstromspitze $I_{RM} = f(-di/dt), t_{vj} = t_{vj\,(max)}, v_R = 0{,}5\ V_{RRM}, v_{RM} = 0{,}8\ V_{RRM}$
Peak reverse recovery current $I_{RM} = f(-di/dt), t_{vj} = t_{vj\,(max)}, v_R = 0.5\ V_{RRM}, v_{RM} = 0.8\ V_{RRM}$
Parameter: Durchlaßstrom/On-state current I_{TM}

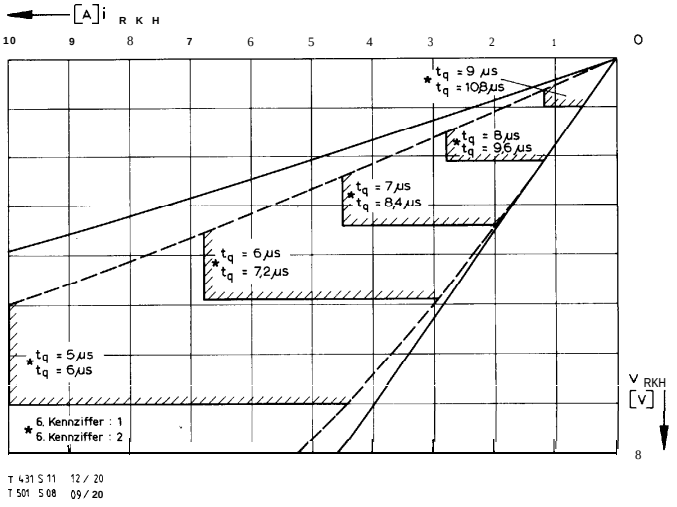


BildlFig. 19
Steuercharakteristik mit Zündbereichen/Gate characteristic with triggering areas vo=f(ie),Vo=6V

Parameter:		a	b	c
Steuerimpulsdauer/Trigger pulse duration t_g	[ms]	10	1	0,5
Höchstzulässige Spitzensteuerverlustleistung/ Max. rated peak gate power dissipation P_{GM}	[W]	10	20	40



Bild/Fig. 17
Transienter innerer Wärmewiderstand $Z_{(th)JC} = f(t)$, DC
Transient thermal impedance $Z_{(th)JC} = f(t)$, DC
1 Beidseitige Kühlung/two-sided cooling
2 Anodenseitige Kühlung/anode side cooling
3 Kathodenseitige Kühlung/cathode side cooling



Bild/Fig. 20
Steuercharakteristik $i_{RKH} = f(v_{RKH})$ zwischen Anschlüssen HK u. K in Rückwärtsrichtung
Gate characteristic $i_{RKH} = f(v_{RKH})$ between terminals HK and K in reverse direction
$I_{RKH\,RMS} = 5$ A, $P_{RKH\,AV} = 20$ W, $t_{RKH} = 14$ µs
Parameter: Freiwerdezeit/circuit commutated turn-off time t_q
——— $t_{vj} = t_{vj\,max}$
- - - - - $t_{vj} = 25$°C

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

Kühlung cooling	Pos. n	1	2	3	4	5	6	7
beidseitig	R_{thn} [°C/W]	0,0017	0,0043	0,0128	0,006	0,0102		
two-sided	τ_n [s]	0,00057	0,0043	0,044	0,105	0,457		
anodenseitig	R_{thn} [°C/W]	0,0017	0,0043	0,0128	0,005	0,0422		
anode-sided	τ_n [s]	0,00057	0,0043	0,044	0,074	2,15		
kathodenseitig	R_{thn} [°C/W]	0,0017	0,0043	0,0128	0,0047	0,0510		
cathode-sided	τ_n [s]	0,00057	0,0043	0,044	0,077	2,115		

Analytische Funktion/analytical function:

$$Z_{thJC} = \sum_{n=1}^{n_{max}} R_{thn}\,(1 - EXP\,(-t/\tau_n))$$