Elektrische Eigenschaften — Electrical properties

Höchstzulässige Werte — Maximum rated values

Periodische Vorwärts- und Rückwärts-Spitzensperrspannung	repetitive peak forward off-state and reverse voltages	$t_{vj} = -40°C \ldots t_{vj\,max}$	V_{DRM}, V_{RRM}	1600, 1800 2000*		V V
Vorwärts-Stoßspitzen-sperrspannung	non repetitive peak forward off-state voltage	$t_{vj} = -40°C \ldots t_{vj\,max}$	$V_{DSM} = V_{DRM}$			
Rückwärts-Stoßspitzen-sperrspannung	non repetitive peak reverse voltage	t_{vj} = + 25°C $t_{vj\,max}$	$V_{RSM} = V_{RRM}$	+ 100		V
Durchlaßstrom-Grenzeffektivwert	RMS on-state current		I_{TRMSM}	1300		A
Dauergrenzstrom	average on-state current	t_C = 85°C	I_{TAVM}	470		A
		t_C = 33°C		830		A
Stoßstrom-Grenzwert	surge current	t_{vj} = 25°C t_p = 10 ms	I_{TSM}	9,3		kA
		$t_{vj} = t_{vj\,max}, t_p$ = 10 ms		8,3		kA
Grenzlastintegral	Pt-value	t_{vj} = 25°C, t_p = 10 ms	I^2t	433		kA^2s
		$t_{vj} = t_{vj\,max}, t_p$ = 10 ms		345		kA^2s
Kritische Stromsteilheit	critical rate of rise of on-state current	$v_D \leq$ 67% v_{DRM}, f = 50 Hz	$(di/dt)_{cr}$	300		Alus
		i_{GM} = 1 A, di_G/dt = 1 A/µs			1)	2)
Kritische Spannungssteilheit	critical rate of rise of Off-state voltage	$t_{vj} = t_{vj\,max}$, v_D = 67% V_{DRM}	$(dv/dt)_{cr}$ B:	50	50	V/µs
			c*:	500	500	V/µs
			L:	500	50	V/µs
			M*:	1000	500	V/µs

Charakteristische Werte — characteristic values

Durchlaßspannung	on-state voltage	$t_{vj} = t_{vj\,max}, i_T$ = 2500 A	v_T	max.	3,35	v
Schleusenspannung	threshold voltage	$t_{vj} = t_{vj\,max}$	$V_{T(TO)}$		1,3	v
Ersatzwiderstand	slope resistance	$t_{vj} = t_{vj\,max}$	r_T		0,72	mΩ
Zündstrom	gate trigger current	t_{vj} = 25°C, v_D = 12 V	I_{GT}	max.	250	mA
Zündspannung	gate trigger voltage	t_{vj} = 25°C, v_D = 12 V	V_{GT}	max.	2,2	v
Nicht zündender Steuerstrom	gate non-trigger current	$t_{vj} = t_{vj\,max}$, v_D = 12v	I_{GD}	max.	10	mA
Nicht zündende Steuerspannung	gate non-trigger voltage	$t_{vj} = t_{vj\,max}$, v_D = 0,5 V_{DRM}	V_{GD}	max.	0,25	v
	holding current	t_{vj} = 25°C, v_D = 12 V, R_A = 10 Ω	I_H	max.	300	mA
Einraststrom	current	t_{vj} = 25°C, v_D = 12 V, $R_{GK} \geq$ 10 Ω i_{GM} = 1 A, di_G/dt = 1 A/µs, t_g = 20 µs	I_L	max.	1,5	A
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	us
Freiwerdezeit	circuit commutated turn-off time	siehe Techn. Erl./see Techn. Inf.	t_q, N:	max.	60	µs
			T:	max.	80	µs
			u:	max.	120	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.	0,04	°C/W
		DC		max.	0,038	°C/W
für anodenseitige Kühlung	for anode-sided cooling	Θ = 180° el, sin	$R_{thJC(A)}$	max.	0,078	°C/W
		DC		max.	0,069	°C/W
für kathodenseitige Kühlung	for cathode-sided cooling	Θ = 180° el, sin	$R_{thJC(K)}$	max.	0,088	°C/W
		DC		max.	0,086	°C/W
Übergangswärmewiderstand	thermal resistance, case to heatsink	beidseitig/two-sided	R_{thCK}	max.	0,005	°C/W
		einseitiglone-sided		max.	0,01	°C/W
Höchstzul. Sperrschichttemperatur	max. junction temperature		$t_{vj\,max}$		125	°C
Betriebstemperatur	Operating temperature		$t_{c\,op}$		−40 ... + 125	°C
Lagertemperatur	Storage temperature		t_{stg}		−40 ... + 150	°C

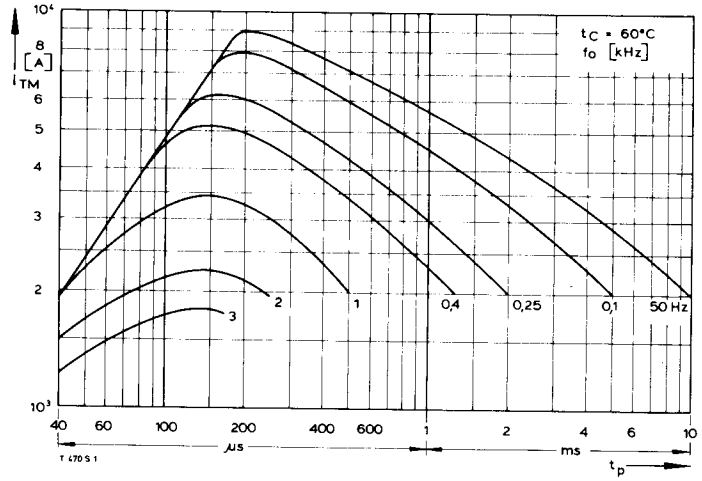
Mechanische Eigenschaften — Mechanical properties

Si-Element mit Druckkontakt	Si-pellet with pressure contact				
Anpreßkraft	Clamping force		F		7 ... 15 kN
Gewicht	weight		G	typ.	160g
Kriechstrecke	Creepage distance				17 mm
Feuchteklasse	humidity classification	DIN 40040			C
Schwingfestigkeit	Vibration resistance	f = 50 Hz			50 m/s²
Maßbild	outline	DIN 41814-153D4			Seite/page 154

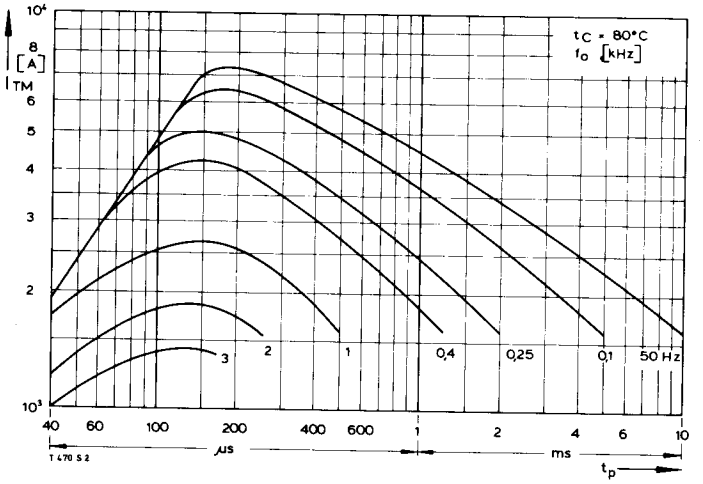
Für größere Stückzahlen bitte Liefertermin erfragen/Delivery for larger quantities on request

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

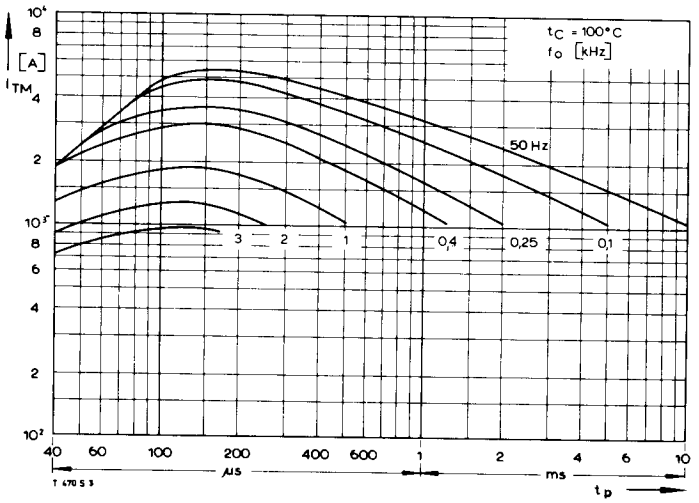
2) Unmittelbar nach der Freiwerdezeit, vgl. Meßbedingungen für t_q/Immediately after circuit commutated turn-off time, see Parameters t_q



Bild/Fig. 1



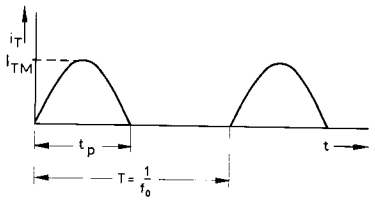
Bild/Fig. 2

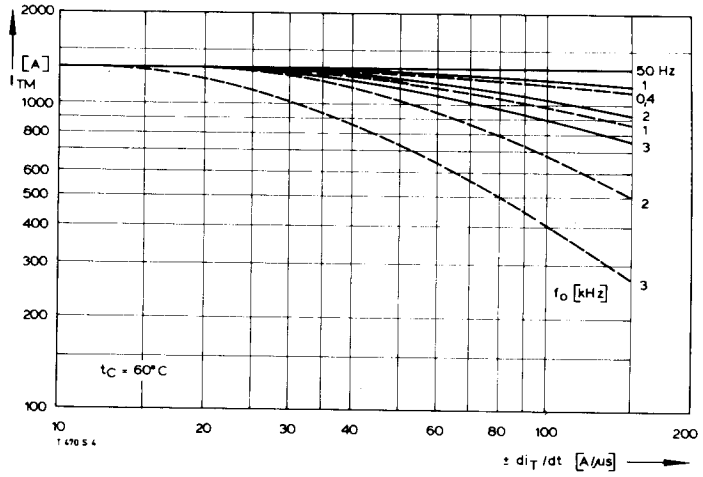


Bild/Fig. 3

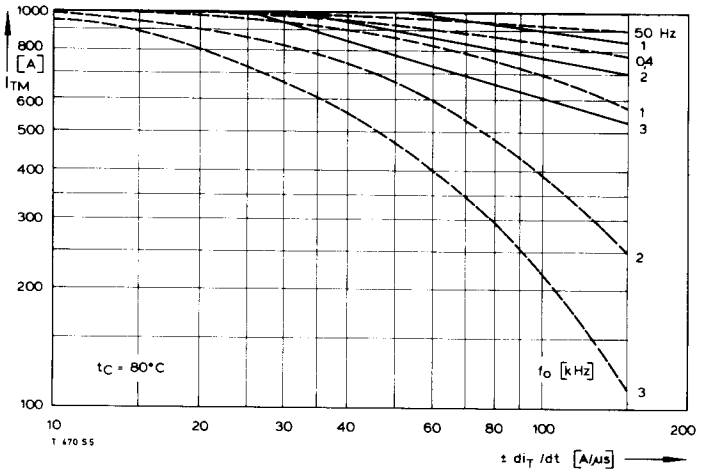
Bild/Fig. 1, 2, 3
Steuergenerator/pulse generator:
i_G = 1 A, di_G/dt = 1 A/µs

RC-Glied/RC-network:
R [Ω] ≥ 0,02 v_{DM} [V]
C ≤ 0,22 µF
v_{DM} ≤ 0,67 V_{DRM}

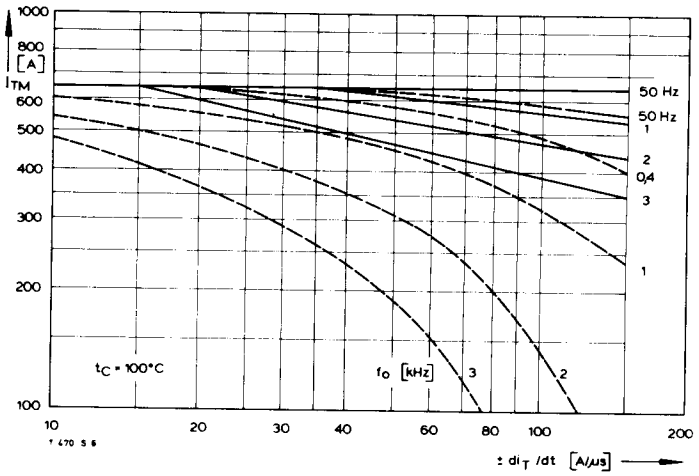




Bild/Fig. 4



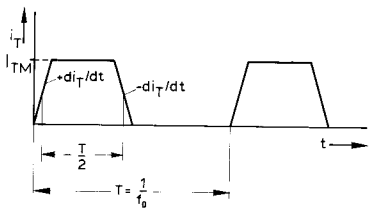
Bild/Fig. 5

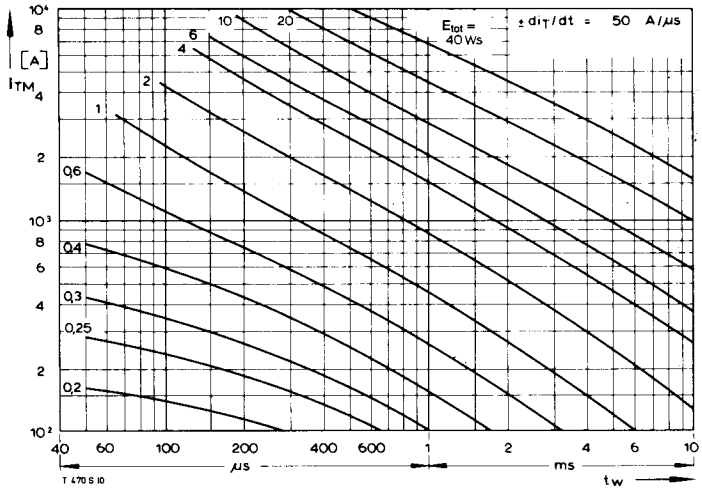


Bild/Fig. 6

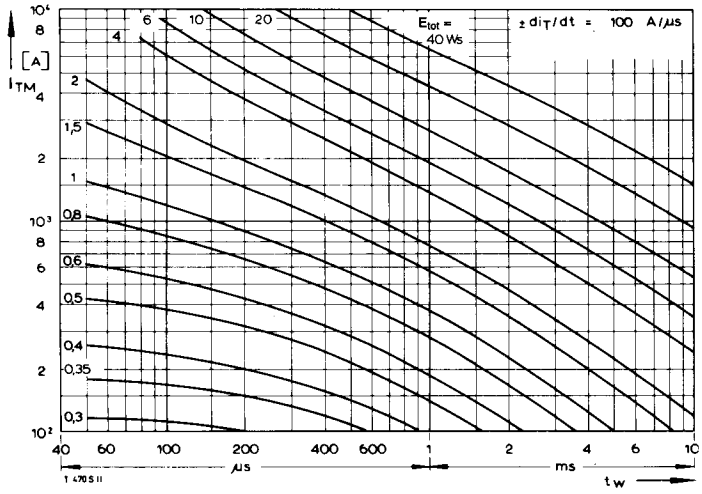
Bild/Fig. 4, 5, 6
Steuergenerator/pulse generator:
i_G = 1 A, di_G/dt = 1 A/µs

RC-Glied/RC-network:
R [Ω] ≥ 0,02 v_{DM} [V]
C ≤ 0,33 µF
v_{DM} ≤ 0,67 V_{DRM}
dv_R/dt ≤ 700 V/µs
v_{RM} ≤ 0,67 V_{RRM}

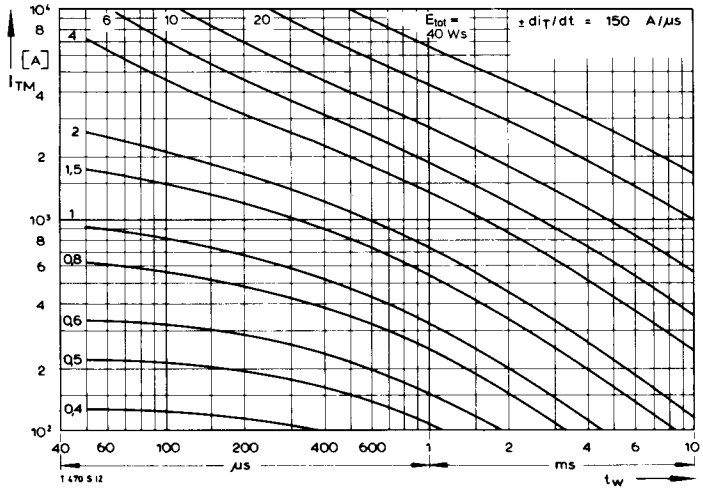




Bild/Fig. 10



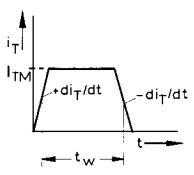
Bild/Fig. 11



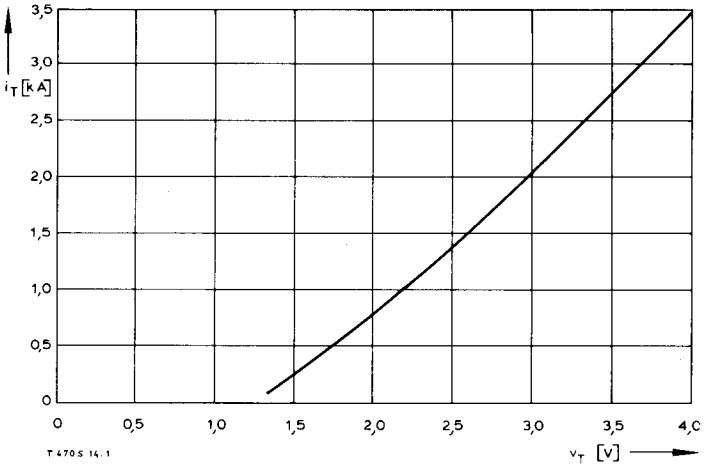
Bild/Fig. 12

Bild/Fig. 10, 11, 12
Steuergenerator/pulse generator:
i_G = 1 A, di_G/dt = 1 A/µs

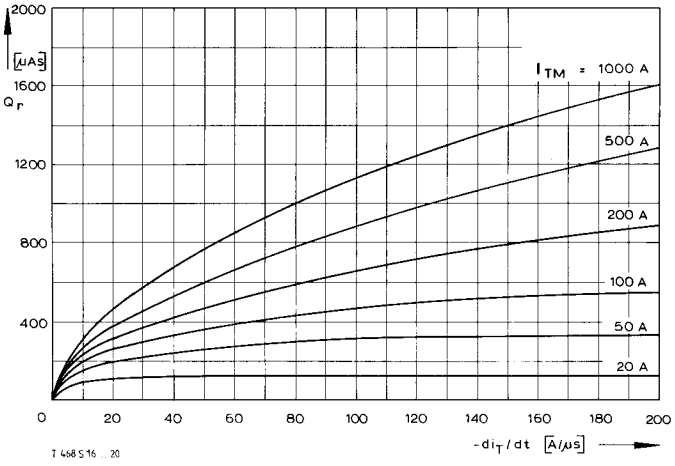
RC-Glied/RC-network:
R [Ω] ≥ 0,02 v_{DM} [V]
C ≤ 0,33 µF
$v_{DM} \leq 0{,}67\ V_{DRM}$
$dv_R/dt \leq 700$ V/µs
$v_{RM} \leq 0{,}67\ V_{RRM}$



Bild/Fig. 13



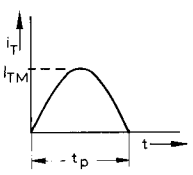
Bild/Fig. 14

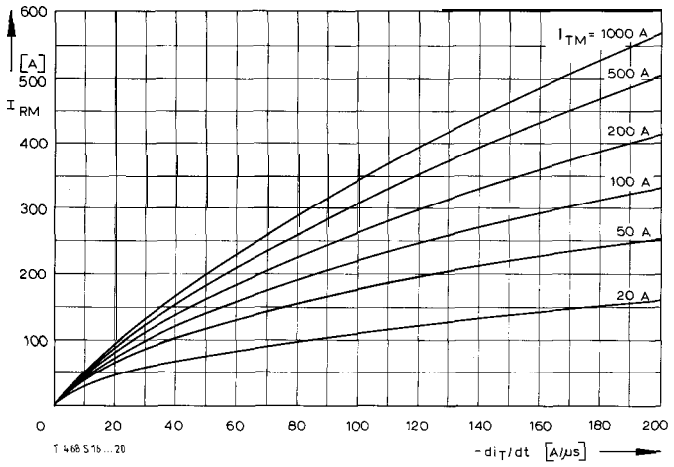


Bild/Fig. 15

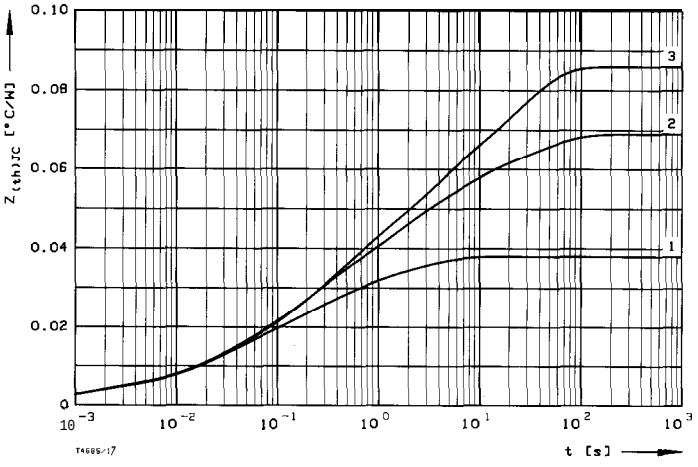
(zu Bild/to Fig. 13)
Steuergenerator/pulse generator:
i_G = 1 A, di_G/dt = 1 A/µs

RC-Glied/RC-network:
R [Ω] ≥ 0,02 v_{DM} [V]
C ≤ 0,22 µF

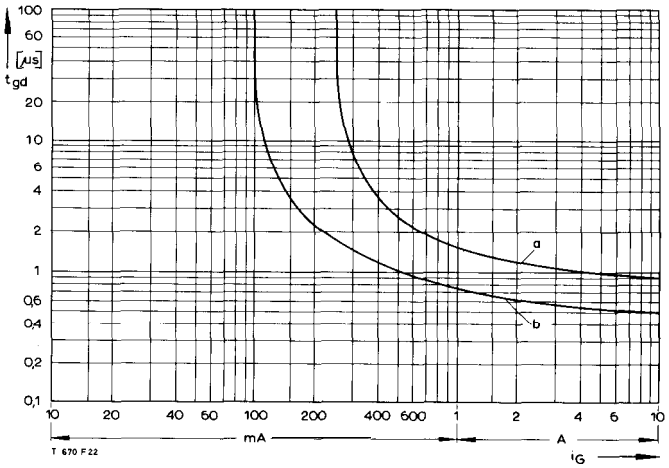




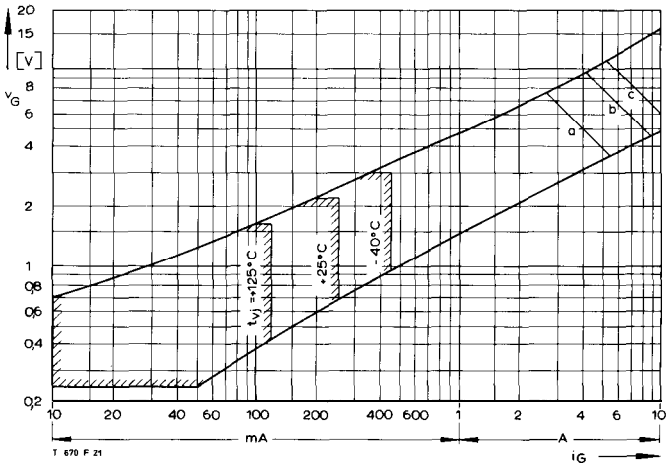
BildlFig. 16
Rückstromspitze $I_{RM} = f(-di/dt)$, $t_{vj} = t_{vj\,(max)}$, $v_R = 0{,}5\ V_{RRM}$, $v_{RM} = 0{,}8\ V_{RRM}$
Peak reverse recovery current $I_{RM} = f(-di/dt)$, $t_{vj} = t_{vj\,(max)}$, $v_R = 05\ V_{RRM}$, $v_{RM} = 0.8\ V_{RRM}$
Parameter: DurchlaßstromlOn-state current I_{TM}



BildlFig. 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 Kühlunglanode side cooling
3 Kathodenseitige Kühlunglcathode side cooling



Bild/Fig. 18
ZündverzuglGate controlled delay time $t_{gd} = f(i_{GM})$, $t_{vj} = 25°C$, $di_G/dt = i_{GM}/1\,\mu s$
a – Maximaler VerlauflLimiting Characteristic
b – Typischer VerlauflTypical Characteristic



BildlFig. 19
Steuercharakteristik mit Zündbereichen/Gate Characteristic with triggering areas
$v_G = f(i_G)$, Vo = 12 V

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]	20	40	60

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]	0,003551	0,000737	0,008319	0,007688	0,009637	0,008068	
two-sided	τ_n [s]	0,000999	0,011363	0,023882	0,104824	0,398978	2,395707	
anodenseitig	R_{thn} [°C/W]	0,00398	0,008684	0,016596	0,014534	0,01317	0,012078	
anode-sided	τ_n [s]	0,001153	0,024309	0,165421	1,101806	5,220734	37,643801	
kathodenseitig	R_{thn} [°C/W]	0,003866	0,008225	0,011664	0,015032	0,018689	0,028523	
cathode-sided	τ_n [s]	0,00113	0,022306	0,140609	0,515255	3,017335	25,452741	

Analytische Funktion/analytical function:

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