T 670 F

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}		1600, 1800 2000*	V 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}		+ 100	v
Durchlaßstrom-Grenzeffektivwert	RMS on-state current		I_{TRMSM}		1500	A
Dauergrenzstrom	average on-state current	tc = 85°C	I_{TAVM}		670	A
		tc = 57°C			960	A
Stoßstrom-Grenzwert	surge current	t, = 25°C, t_p = 10 ms	I_{TSM}		13	kA
		t_{vj} = $t_{vj\,max}$, t_p = 10 ms			11,5	kA
Grenzlastintegral	I²t-value	t_{vj} = 25°C, t_p = 10 ms	I^2t		845	kA^2s
		t_{vj} = $t_{vj\,max}$, t_p = 10 ms			661	kA^2s
Kritische Stromsteilheit	critical rate of rise of on-state current	$v_D \leq$ 67% v_{DRM}, f = 50 Hz i_{GM} = 1 A, di_G/dt = 1A/µs	$(di/dt)_{cr}$		200	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 = 3000 A	v_T	max.	2,8	V
Schleusenspannung	threshold voltage	t_{vj} = $t_{vj\,max}$	$V_{T(TO)}$		1,15	v
Ersatzwiderstand	slope resistance	t_{vj} = $t_{vj\,max}$	r_T		0,55	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 = 12 V	I_{GD}	max.	10	mA
Nicht zündende Steuerspannung	gate non-trigger voltage	t_{vj} = t_{vjmax}, v_D = 0,5 V_{DRM}	V_{GD}	max.	0,25	V
Haltestrom	holding current	t_{vj} = 25°C, v_D = 12 V, R_A = 10 62	I_H	max.	300	mA
Einraststrom	latching current	t_{vj} = 25°C, v_D = 12 V, $R_{GK} \geq$ 10 Ω i_{GM} = 1 A, di_G/dt = 1 Alps, t_g = 20 ps	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	µs
Freiwerdezeit	circuit commutated turn-off time	siehe Techn. Erl./see Techn. Inf.	t_q K:	max.	40	µs
			M:	max.	50	µs
			N:	max.	60	us

hermische Eigenschaften — Thermal properties

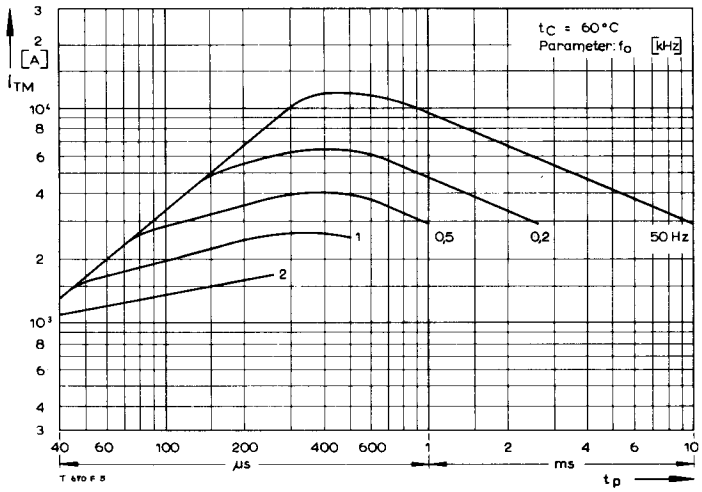
Innerer Wärmewiderstand	thermal resistance, junction to case				
für beidseitige Kühlung	for two-sided cooling	Θ = 180" el, sin	R_{thJC}	max.	0,029 °C/W
		DC		max.	0,028 °C/W
für anodenseitige Kühlung	for anode-sided cooling	Θ = 180" el, sin	$R_{thJC(A)}$	max.	0,043 °C/W
		DC		max.	0,042 °C/W
für kathodenseitige Kühlung	for cathode-sided cooling	Θ = 180° el, sin	$R_{thJC(K)}$	max.	0,085 °C/W
		DC		max.	0,084°C/W
Übergangswärmewiderstand	thermal resistance, case to heatsink	beidseitig/two-sided	R_{thCK}	max.	0,004°C/W
		einseitig/one-sided		max.	0,008°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

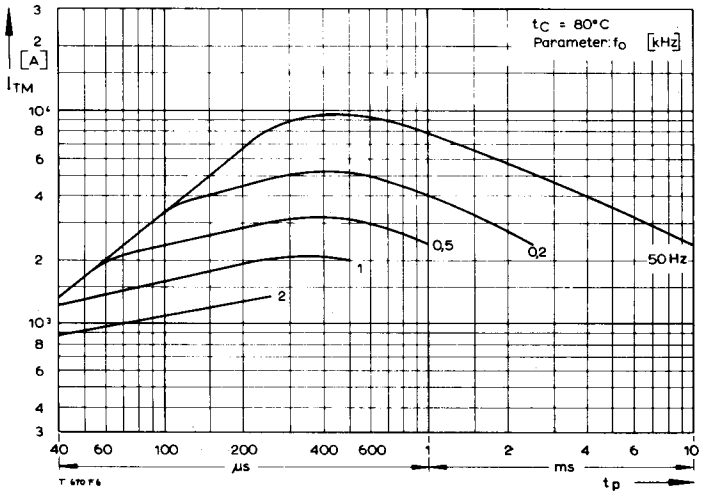
Si-Element mit Druckkontakt	Si-pellet with pressure contact				
Anpreßkraft	Clamping force		F		12 ... 24 kN
Gewicht	weight		G	typ.	600 g
Kriechstrecke	Creepage distance				30 mm
Feuchteklasse	humidity classification	DIN 40040			C
Schwingfestigkeit	Vibration resistance	f = 50 Hz			50 m/s²
Maßbild	outline	DIN 41814-155B4			Seitelpage 155

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

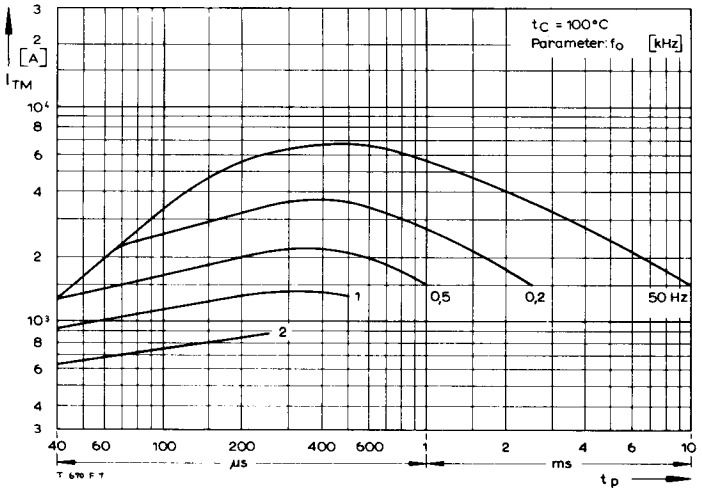
1) Werte nach DIN IEC 747-6 (ohne vorausgehende Kommutierung)/Values to DIN IEC 747-6 (without prior commutation)
2) Unmittelbar nach der Freiwerdezeit, vgl. Meßbedingungen für t_q/Immediately after circuit commutated turn-off time, see Parameters t_q



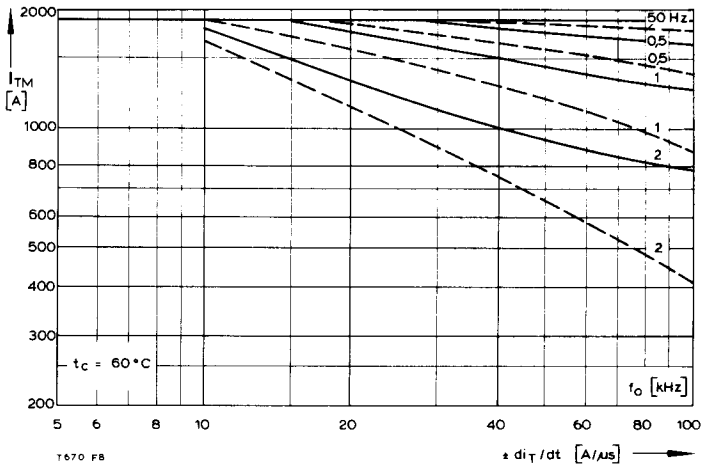
Bild/Fig. 1



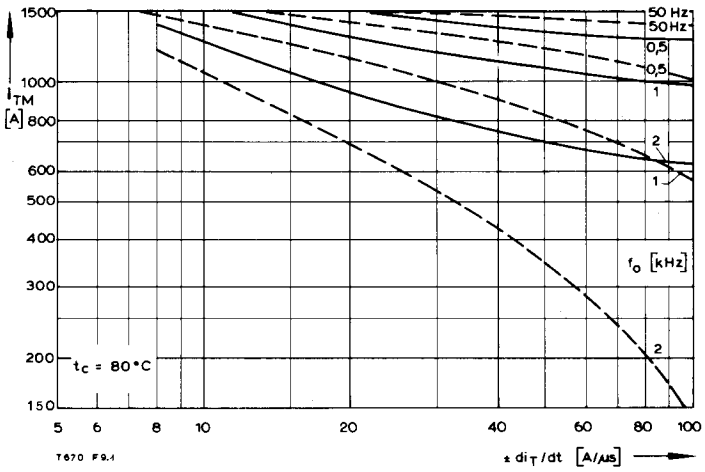
Bild/Fig. 2



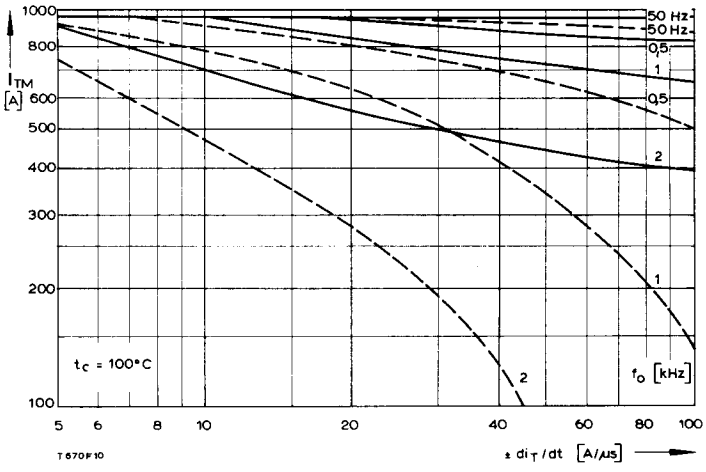
Bild/Fig. 3



Bild/Fig. 4



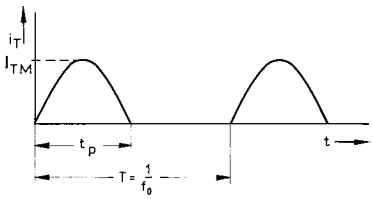
Bild/Fig. 5



Bild/Fig. 6

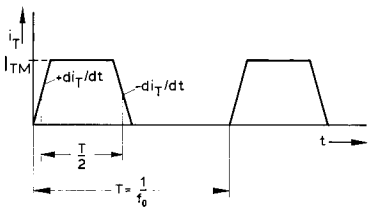
Bild/Fig. 1, 2, 3
Steuergenerator/pulse generator:
i_G = 1 A, di_G/dt = 1 A/µs

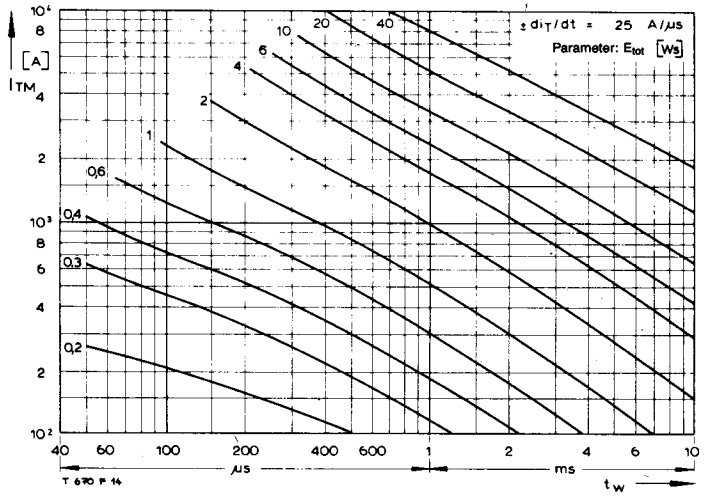
RC-Glied/RC-network:
R [Ω] ≥ 0,02 v_{DM} [V]
C ≤ 0,33 µF
v_{DM} ≤ 0,67 V_{DRM}



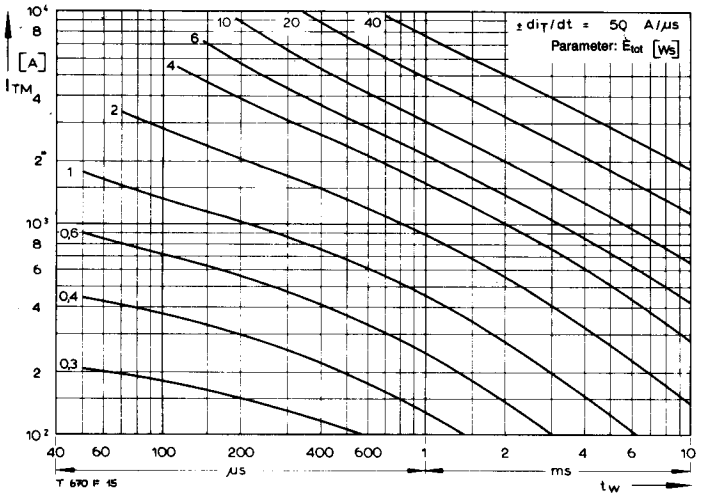
Bild/Fig. 4, 5, 6
Steuergenerator/pulse generator:
i_G = 1 A, di_G/dt = 1 A/µs

RC-Glied/RC-network:
R [Ω] ≥ 0,02 v_{DM} [V]
C ≤ 0,47 µF
v_{DM} ≤ 0,67 V_{DRM}
dv_R/dt ≤ 700 V/µs
v_{RM} ≤ 0,67 V_{RRM}

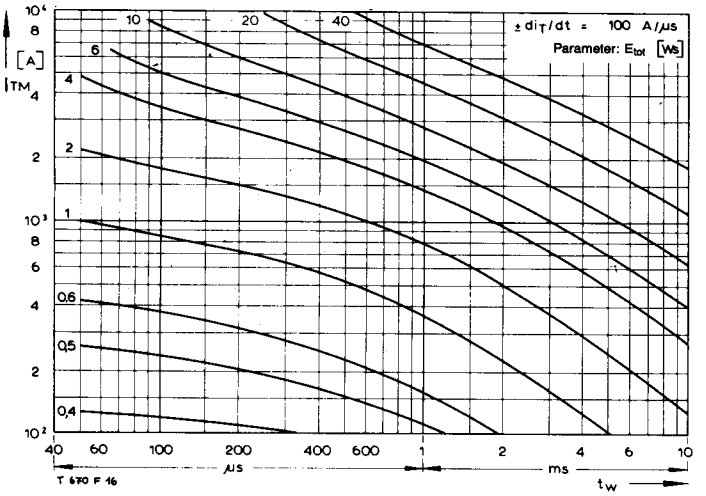




Bild/Fig. 10



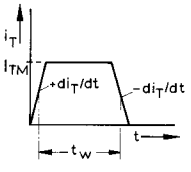
Bild/Fig. 11

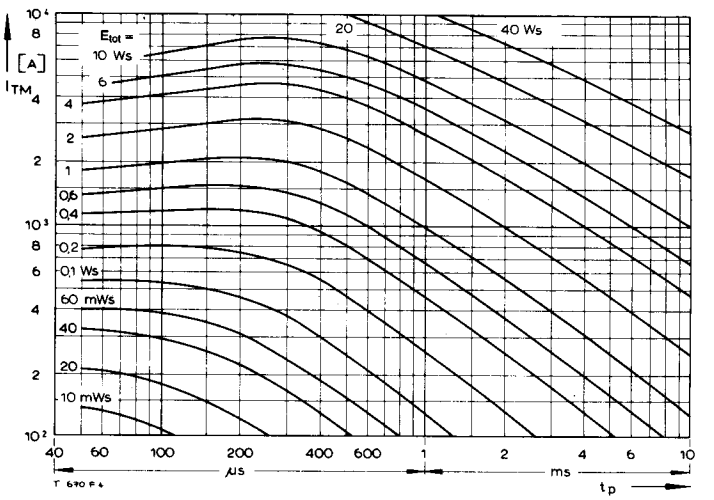


Bild/Fig. 12

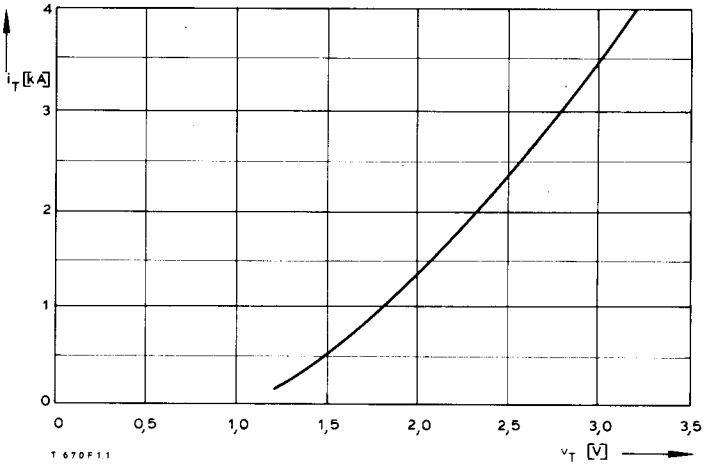
Bild/Fig. 10, 11, 12
Steuergenerator/pulse generator:
i_G = 1 A, di_G/dt = 1 A/µs

RC-Glied/RC-network:
R [Ω] ≥ 0,02 v_{DM} [V]
C ≤ 0,47 µF
$v_{DM} \leq 0{,}67\ V_{DRM}$
$dv_R/dt \leq 700$ V/µs
$v_{RM} \leq 0{,}67\ V_{RRM}$

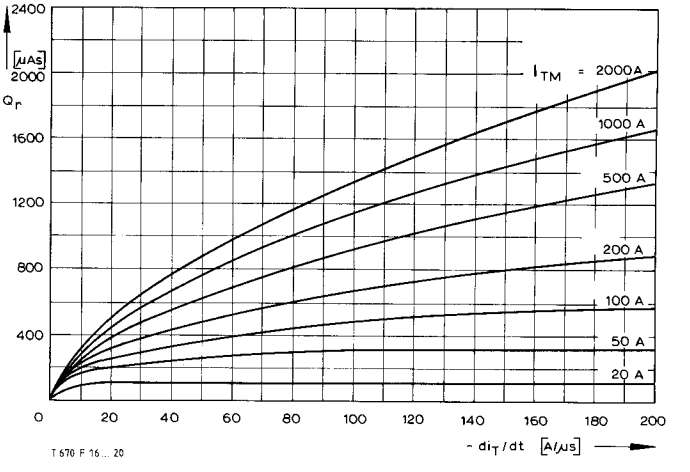




Bild/Fig. 13



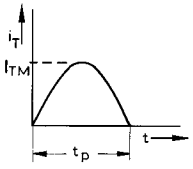
Bild/Fig. 14

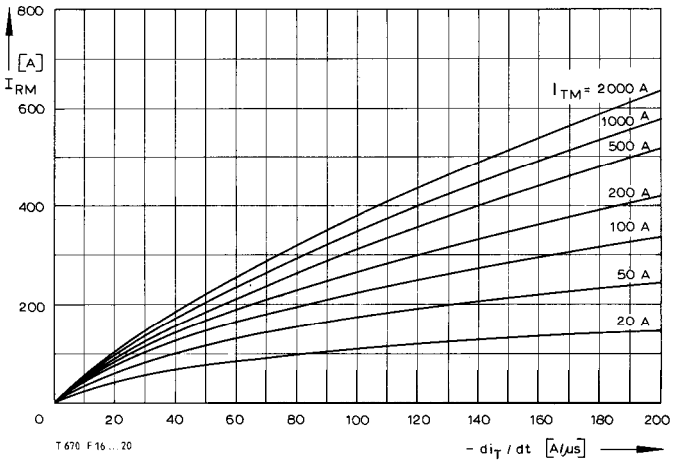


Bild/Fig. 15

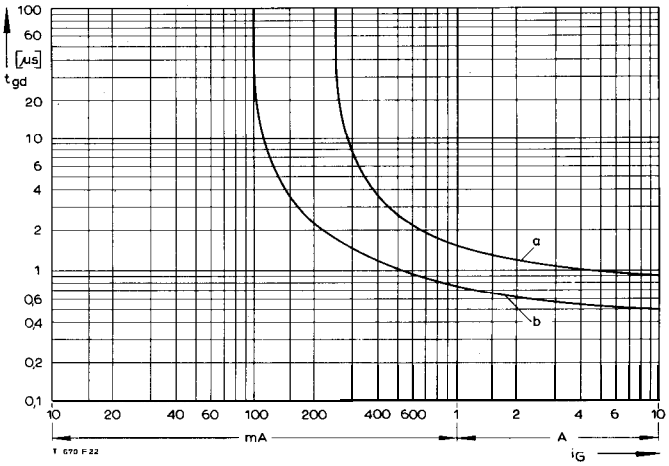
(zu Bild/to Fig. 13)
Steuergenerator/pulse generator:
i_G = 1 A, di_G/dt = 1 A/µs

RC-Glied/RC-network:
R [Ω] ≥ 0,02 v_{DM} [V]
C ≤ 0,33 µF

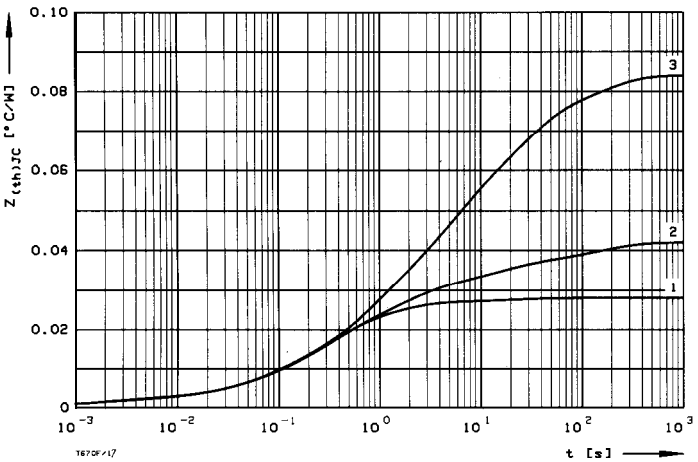




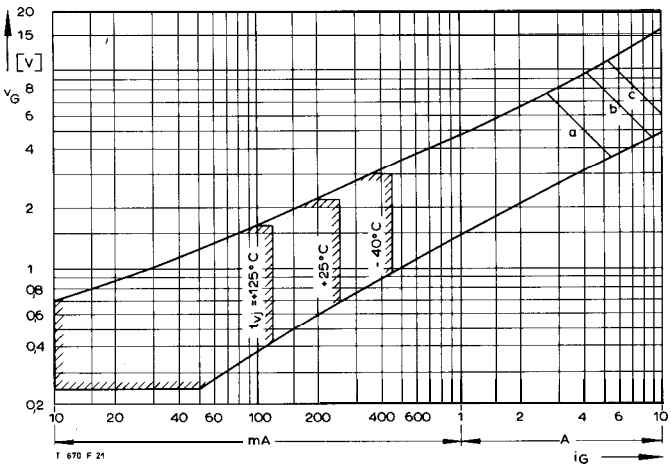
BildlFig. 16
Rückstromspitze $I_{RM} = f(-di/dt), t_{vj} = t_{vj\,(max)}, v_R = 0{,}5\ V_{RRM}, v_{RM} = 0{,}8\ V_{RRM}$
Peak reverse recovery current $I_{RM} = f(-di/dt), t_{vj} = t_{vj\,(max)}, v_R = 0.5\ V_{RRM}, v_{RM} = 0.6\ V_{RRM}$
Parameter: Durchlaßstrom/On-state current I_{TM}



BildlFig. 18
Zündverzug/Gate controlled delay time $t_{gd} = f(i_{GM}), t_{vj} = 25°C, di_G/dt = i_{GM}/1\ \mu s$
a – Maximaler Verlauf/Limiting characteristic
b – Typischer Verlauf/Typical Characteristic



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



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

Parameter:		a	b	c
Steuerimpulsdauer/Trigger pulse duration t_g	[ms]	10	1	0,5
Höchstzulässige Spitzensteuerverlustleistung/ Max. rated peak aate power dissioation 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]	0,0016	0,0026	0,0146	0,0079	0,0013		
two-sided	τ_n [s]	0,00141	0,0343	0,255	1,15	17,9		
anodenseitig	R_{thn} [°C/W]	0,00159	0,00326	0,0126	0,0119	0,00665	0,0060	
anode-sided	τ_n [s]	0,00141	0,0408	0,253	1,44	12,2	144	
kathodenseitig	R_{thn} [°C/W]	0,00190	0,0066	0,0158	0,0224	0,0253	0,012	
cathode-sided	7" [s]	0,0017	0,0784	0,635	3.69	21,6	144	

Analytische Funktion/analytical function:

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