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}		800,1000	V
					1100,1200	v
					1300*	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	$t_{vj} = +25°C \ldots t_{vj\,max}$	$V_{RSM} = V_{RRM}$		+IOO	v
Durchlaßstrom-Grenzeffektivwert	RMS on-state current		I_{TRMSM}		700	A
Dauergrenzstrom	average on-state current	$t_C = 85°C$	I_{TAVM}		318	A
		tc = 62°C			446	A
Stoßstrom-Grenzwert	surge current	$t_{vj} = 25°C$, t_p = 10 ms	I_{TSM}		6700	A
		$t_{vj} = t_{vj\,max}$, t_p = 10ms			6000	A
Grenzlastintegral	I^2t-value	t, = 25°C, t_p = 10 ms	I^2t		224	kA^2s
		$t_{vj} = t_{vj\,max}$, t_p = 10 ms			180	kA^2s
Kritische Stromsteilheit	critical rate of rise of on-state current	$v_D \leq 67\% v_{DRM}$, f = 50 Hz	$(di/dt)_{cr}$		200	A/µs
		i_{GM} = 1 A, dioldt = 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 = 1200 A	V_T	max.	2,25	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		0,7	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	$t_{vj} = t_{vj\,max}$, 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 Ω	I_H	max.	250	mA
Einraststrom	latching current	$t_{vj} = 25°C$, v_D = 12 V, $R_{GK} \geq 10\,\Omega$	I_L	max.	1	A
		i_{GM} = 1 A, di_G/dt = 1 Alps 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, iR	max.	50	mA
Zündverzug	gate controlled delay time	$t_{vj} = 25°C$, i_{GM} = 1 A, di_G/dt = 1 Alps	t_{gd}	max.	1,2	µs
Freiwerdezeit	circuit commutated turn-off time	siehe TechnErl./see Techn. Inf.	t_q s:	max.	18	µs
			E:	max.	20	µs
			F:	max.	25	µs

Thermische Eigenschaften — Thermal Properties

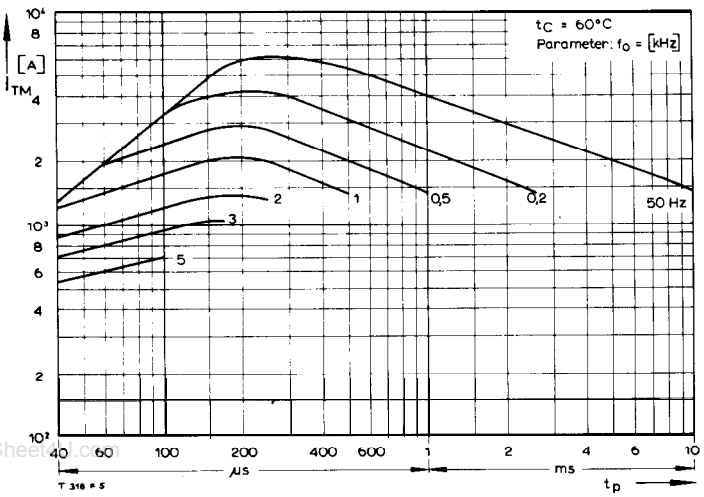
Innerer Wärmewiderstand für beidseitige Kühlung	thermal resistance, junction to case for two-sided cooling	Θ = 180" el, sin	R_{thJC}	max.	0,068 °C/W
		DC		max.	0,065 °C/W
für anodenseitige Kühlung	for anode-sided cooling	Θ = 180" el, sin	$R_{thJC(A)}$	max.	0,113 °C/W
		DC		max.	0,11 °C/W
für kathodenseitige Kühlung	for cathode-sided cooling	Θ = 180° el, sin	$R_{thJC(K)}$	max.	0,159 °C/W
		DC		max.	0,156°C/W
Übergangswärmewiderstand	thermal resistance, case to heatsink	beidseitig/two-sided	R_{thCK}	max.	0,01 °C/W
		einseitig/one-sided		max.	0,02 °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... + 140°C

Mechanische Eigenschaften — Mechanical properties

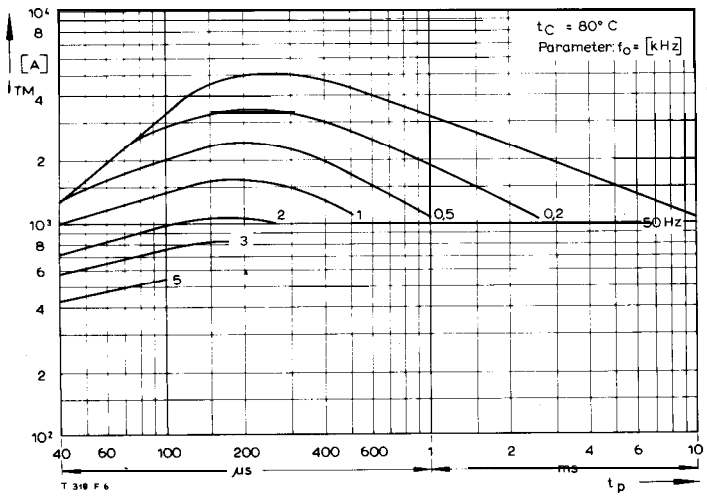
Si-Element mit Druckkontakt	**Si-pellet with pressure contact**				
Anpreßkraft	Clamping force		F		5,5... 10 kN
Gewicht	weight		G	typ.	110 g
Kriechstrecke	Creepage distance				17 mm
Feuchteklasse	humidity classification	DIN 40040			C
Schwingfestigkeit	Vibration resistance	f = 50 Hz			50 m/s^2
Maßbild	outline	DIN41814-151A4			Seitelpage 154

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

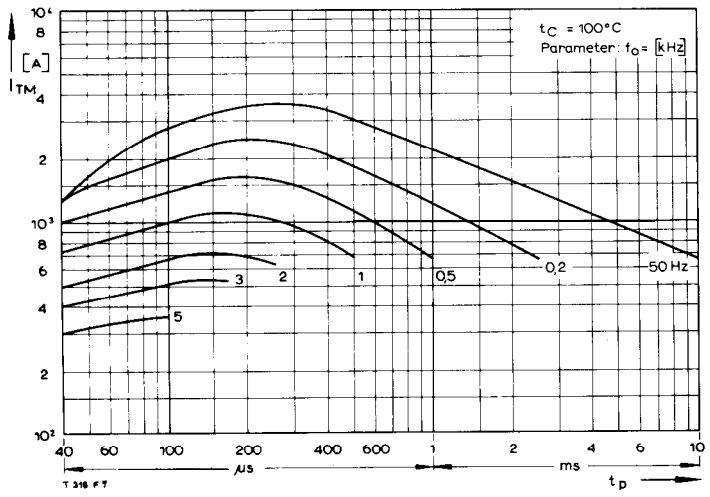
1) Werte nach DIN IEC 747-6 (ohne vorausgehende Kommutierung)/Values to DIN IEC 747-6 (without prior commutation)
2) Unmittelbar nach der Freiwerdezeit, vgl. Meßbedingungen für t_q/Immediately after circuit commutated turn-off time, see Parameters t_q



BildlFig. 1



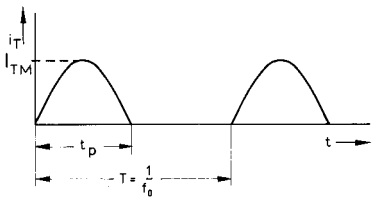
BildlFig. 2

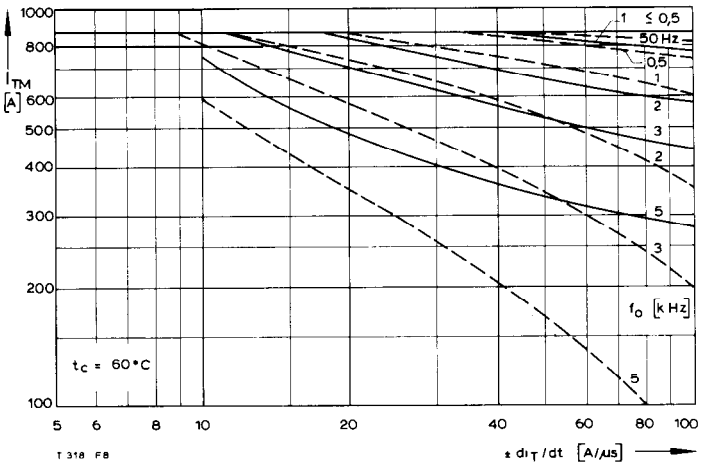


Bild/Fig. 3

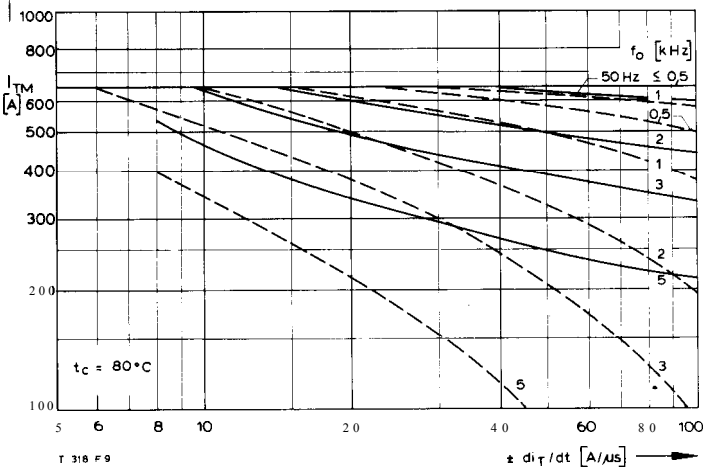
BildlFig. 1, 2, 3
Steuergenerator/pulse generator:
i_G = 1 A, di_G/dt = 1 Alps

RC-GliedlRC-network:
R [Ω] ≥ 0,02 v_{DM} [VI
C ≤ 0,22 pF
$v_{DM} \leq 0{,}67\ V_{DRM}$

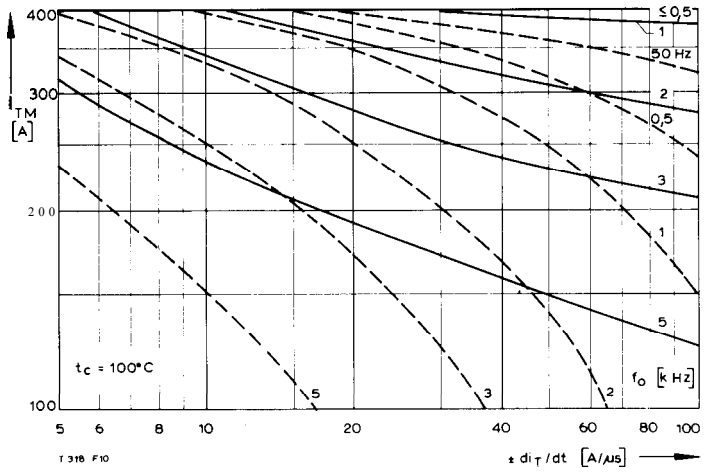




BildlFig. 4



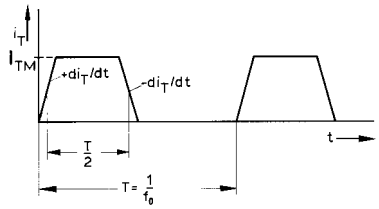
Bild/Fig. 5

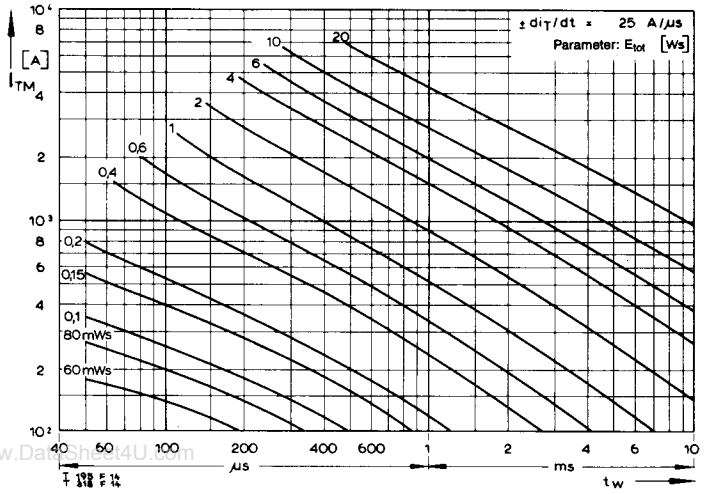


Bild/Fig. 6

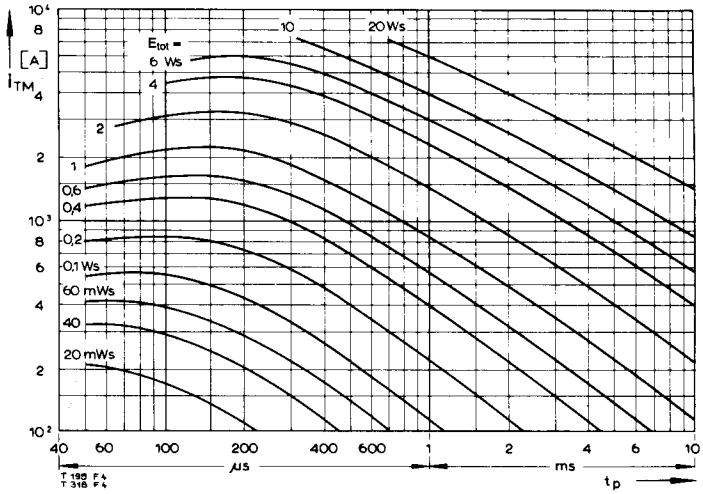
BildlFig. 4, 5, 6
Steuergenerator/pulse generator:
i_G = 1 A, di_G/dt = 1 Alps

RC-Glied/RC-network:
R [Ω] ≥ 0,02 v_{DM} [V]
C ≤ 0,33 pF
VDM ≤ 0,67 V_{DRM}
$dv_R/dt \leq 600$ V/µs
$v_{RM} \leq 0{,}67\ V_{RRM}$

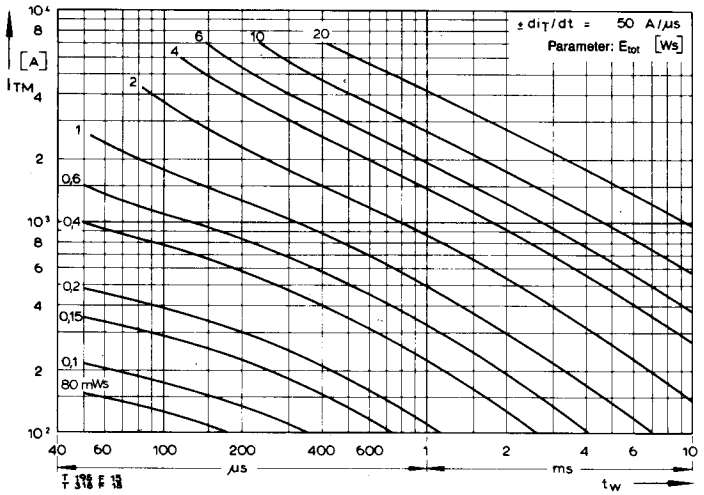




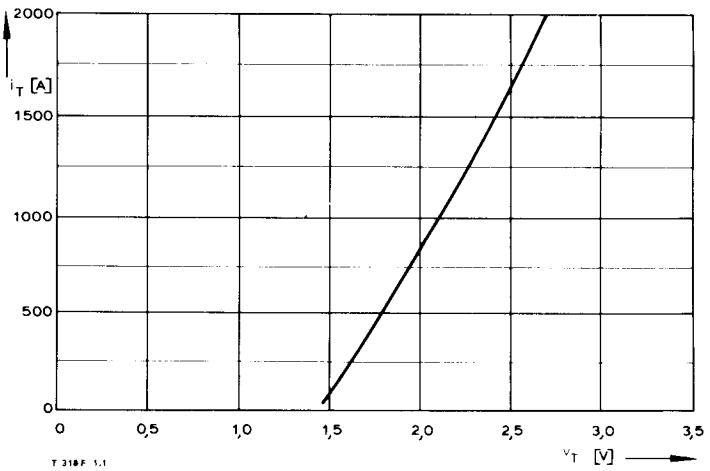
Bild/Fig. 10



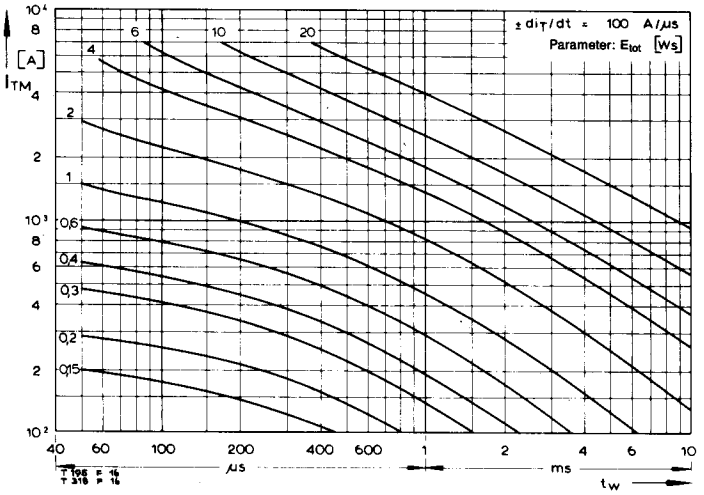
Bild/Fig. 13



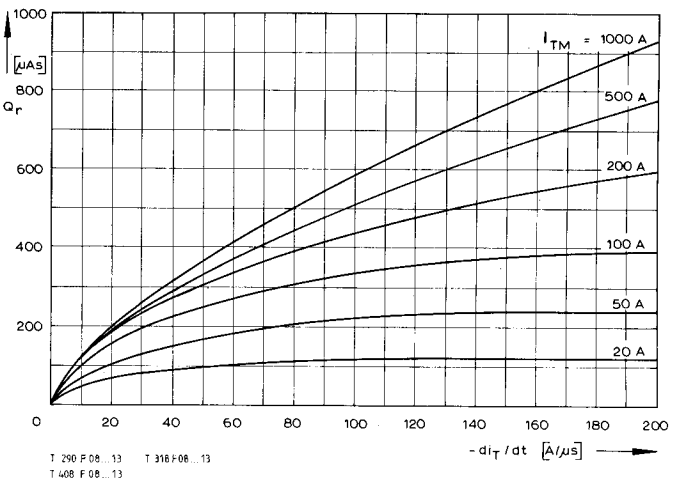
Bild/Fig. 11



Bild/Fig. 14



Bild/Fig. 12



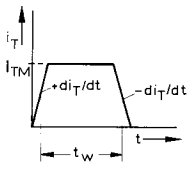
Bild/Fig. 15

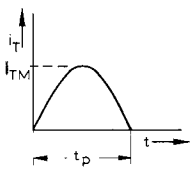
Bild/Fig. 10, 11, 12
Steuergenerator/pulse generator:
i_G = 1 A, di_G/dt = 1 A/µs

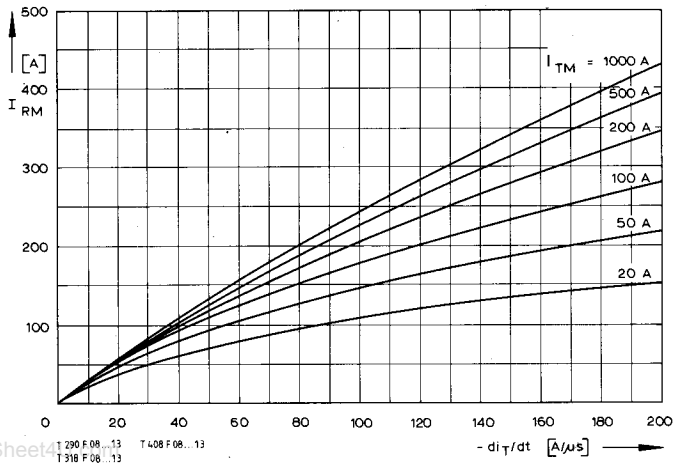
RC-Glied/RC-network:
R [Ω] ≥ 0,02 v_{DM} [V]
C ≤ 0,33 µF
$v_{DM} \leq 0{,}67\ V_{DRM}$
$dv_R/dt \leq 600$ V/µs
$v_{RM} \leq 0{,}67\ V_{RRM}$

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

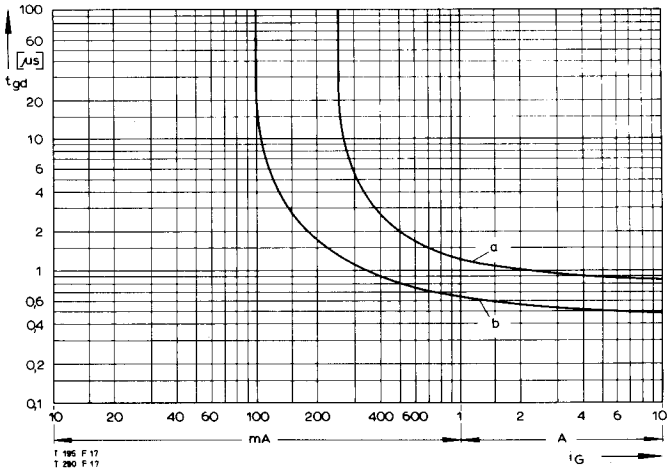
RC-Glied/RC-network:
R [Ω] ≥ 0,02 v_{DM} [V]
C ≤ 0,22 µF



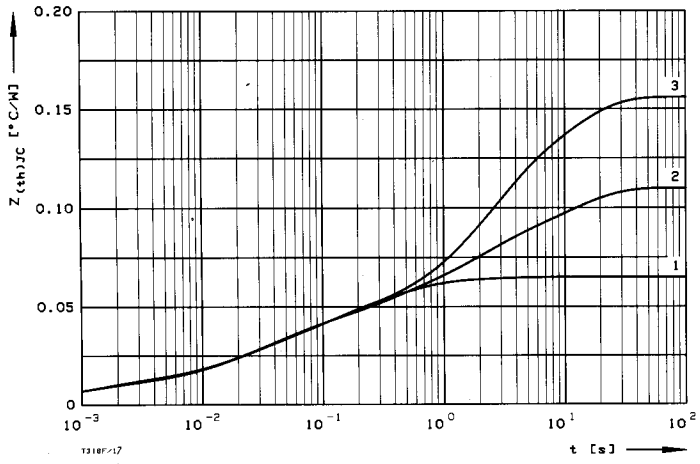




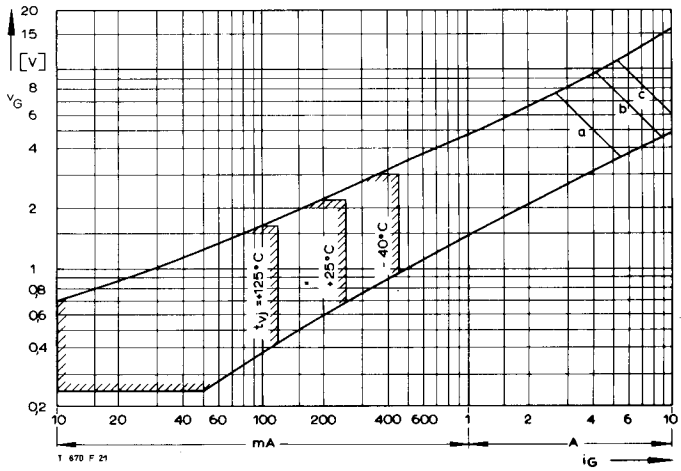
Bild/Fig. 16
Rückstromspitze $I_{RM} = f(-di/dt)$, $t_{vj} = t_{vj\,(max)}$, $v_R = 0{,}5\ V_{RRM}$, $v_{RM} = 0{,}8\ V_{RRM}$
Peak reverse recovery current $I_{RM} = f(-di/dt)$, $t_{vj} = t_{vj\,(max)}$, $v_R = 0.5\ V_{RRM}$, $v_{RM} = 0.8\ V_{RRM}$
Parameter: Durchlaßstrom/On-state current I_{TM}



Bild/Fig. 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



Bild/Fig. 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 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]	0,00832	0,0151	0,0181	0,0207	0,00286		
two-sided	τ_n [s]	0,000826	0,0166	0,0808	0,359	1,957		
anodenseitig	R_{thn} [°C/W]	0,00961	0,00543	0,0209	0,0142	0,0271	0,0328	
anode-sided	τ_n [s]	0,00104	0,0133	0,0364	0,23	1,52	10,5	
kathodenseitig	R_{thn} [°C/W]	0,0098	0,0186	0,0157	0,0617	0,0502		
cathode-sided	τ_n [s]	0,00106	0,0227	0,0994	2,04	10,2		

Analytische Funktion/analytical function:

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