

Elektrische Eigenschaften

Electrical properties

Höchstzulässige Werte	Maximum rated values			
Periodische Vorwärts- und Rückwärts-Sperrspannung	repetitive peak forward off-state and reverse voltages	$t_{vj} = -40^{\circ}\text{C} \dots t_{vj\text{max}}$	$V_{\text{DRM}}, V_{\text{RRM}}$	800,1000 V 1100,1200 v 1300* v
Vorwärts-Stoßspitzen-sperrspannung	non repetitive peak forward off-state voltage	$t_{vj} = -40^{\circ}\text{C} \dots t_{vj\text{max}}$	$V_{\text{DSM}} = V_{\text{DRM}}$	
Rückwärts-Stoßspitzen-sperrspannung	non repetitive peak reverse voltage	$t_{vj} = +25^{\circ}\text{C} \dots t_{vj\text{max}}$	$V_{\text{RSM}} = V_{\text{RRM}}$	+100 v
Durchlaßstrom-Grenzeffektivwert	RMS on-state current	$t_{\text{C}} = 85^{\circ}\text{C}$	I_{TRMSM}	700 A
Dauergrenzstrom	average on-state current	$t_{\text{C}} = 62^{\circ}\text{C}$	I_{TAVM}	318 A 446 A
Stoßstrom-Grenzwert	surge current	$t_{vj} = 25^{\circ}\text{C}, t_p = 10\text{ ms}$ $t_{vj} = t_{vj\text{max}}, t_p = 10\text{ ms}$	I_{TSM}	6700 A 6000 A
Grenzlastintegral	I ² t-value	$t, = 25^{\circ}\text{C}, t_p = 10\text{ ms}$ $t_{vj} = t_{vj\text{max}}, t_p = 10\text{ ms}$	I^2t	224 kA ² s 180 kA ² s
Kritische Stromsteilheit	critical rate of rise of on-state current	$V_{\text{D}} \leq 67\%V_{\text{DRM}}, f = 50\text{ Hz}$ $i_{\text{GM}} = 1\text{ A}, di/dt = \text{A}/\mu\text{s}$	$(di/dt)_{\text{cr}}$	200 A/ μs
Kritische Spannungssteilheit	critical rate of rise of off-state voltage	$t_{vj} = t_{vj\text{max}}, V_{\text{D}} = 67\%V_{\text{DRM}}$	$(dv/dt)_{\text{cr}}$	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	$t_{vj} = t_{vj\text{max}}, i_{\text{T}} = 1200\text{ A}$	V_{T}	max. 2,25 V
Schleusenspannung	threshold voltage	$t_{vj} = t_{vj\text{max}}$	$V_{\text{T(TO)}}$	1,3 v
Ersatzwiderstand	slope resistance	$t_{vj} = t_{vj\text{max}}$	r_{T}	0,7 m Ω
Zündstrom	gate trigger current	$t_{vj} = 25^{\circ}\text{C}, V_{\text{D}} = 12\text{ V}$	I_{GT}	max. 250 mA
Zündspannung	gate trigger voltage	$t_{vj} = 25^{\circ}\text{C}, V_{\text{D}} = 12\text{ V}$	V_{GT}	max. 2,2 v
Nicht zündender Steuerstrom	gate non-trigger current	$t_{vj} = t_{vj\text{max}}, V_{\text{D}} = 12\text{ V}$	I_{GD}	max. 10 mA
Nicht zündende Steuerspannung	gate non-trigger voltage	$t_{vj} = t_{vj\text{max}}, V_{\text{D}} = 0,5 V_{\text{DRM}}$	V_{GD}	max. 0,25 V
Haltestrom	holding current	$t_{vj} = 25^{\circ}\text{C}, V_{\text{D}} = 12\text{ V}, R_{\text{AK}} = 10\ \Omega$	I_{H}	max. 250 mA
Einraststrom	latching current	$t_{vj} = 25^{\circ}\text{C}, V_{\text{D}} = 12\text{ V}, R_{\text{GK}} \geq 10\ \Omega$ $i_{\text{GM}} = 1\text{ A}, di_{\text{G}}/dt = 1\text{ Alpst}_{\text{G}} = 20\text{ ps}$	I_{L}	max. 1 A
Vorwärts- u. Rückwärts-Sperrstrom	forward off-state and reverse Currents	$t_{vj} = t_{vj\text{max}}, V_{\text{D}} = V_{\text{DRM}}, V_{\text{R}} = V_{\text{RRM}}$	$i_{\text{D}}, i_{\text{R}}$	max. 50 mA
Zündverzögerung	gate controlled delay time	$t_{vj} = 25^{\circ}\text{C}, i_{\text{GM}} = 1\text{ A}, di_{\text{G}}/dt = 1\text{ Alps}$	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	$\Theta = 180^{\circ}\text{ el, sin DC}$	R_{thJC}	max. 0,068 $^{\circ}\text{C/W}$ max. 0,065 $^{\circ}\text{C/W}$
für anodenseitige Kühlung	for anode-sided cooling	$\Theta = 180^{\circ}\text{ el, sin DC}$	$R_{\text{thJC(A)}}$	max. 0,113 $^{\circ}\text{C/W}$ max. 0,11 $^{\circ}\text{C/W}$
für kathodenseitige Kühlung	for cathode-sided cooling	$\Theta = 180^{\circ}\text{ el, sin DC}$	$R_{\text{thJC(K)}}$	max. 0,159 $^{\circ}\text{C/W}$ max. 0,156 $^{\circ}\text{C/W}$
Übergangswärmewiderstand	thermal resistance, case to heatsink	beidseitig/two-sided einseitig/one-sided	R_{thCK}	max. 0,01 $^{\circ}\text{C/W}$ max. 0,02 $^{\circ}\text{C/W}$
Höchstzul. Sperrschichttemperatur	max. junction temperature		$t_{vj\text{max}}$	125 $^{\circ}\text{C}$
Betriebstemperatur	Operating temperature		$t_{\text{c op}}$	-40 ... + 125 $^{\circ}\text{C}$
Lagertemperatur	storage temperature		t_{stg}	-40 ... + 140 $^{\circ}\text{C}$

Mechanische Eigenschaften

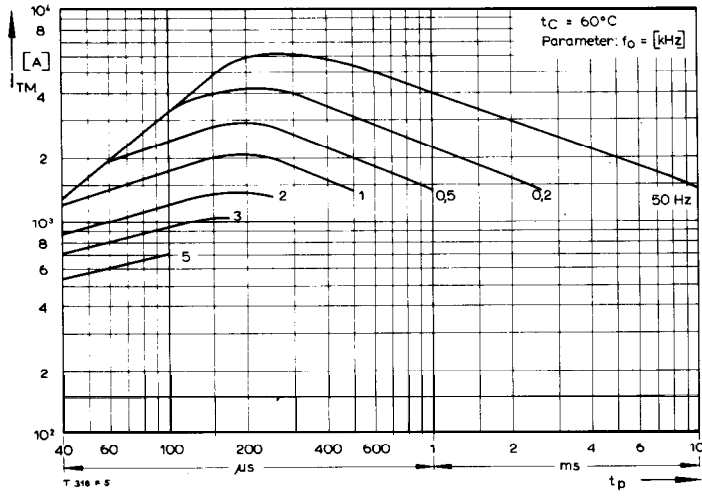
Mechanical properties

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

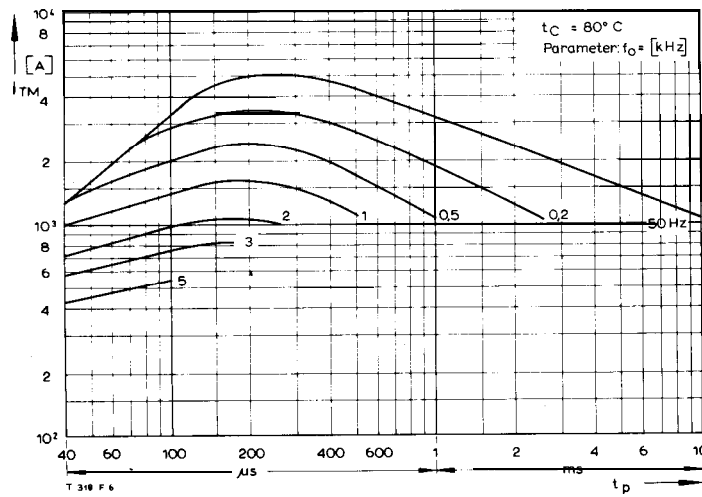
* Für größere Stückzahlen bitte Liefertermin erfragen/Delivery for larger quantities on request

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

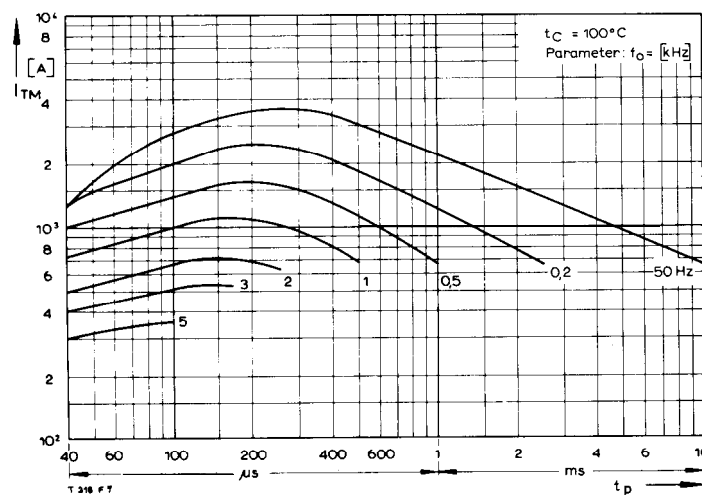
2) Unmittelbar nach der Freiwerdezeit, vgl. Meßbedingungen für t_{q} /Immediately after circuit commutated turn-off time, see Parameters t_{q}



BildFig. 1



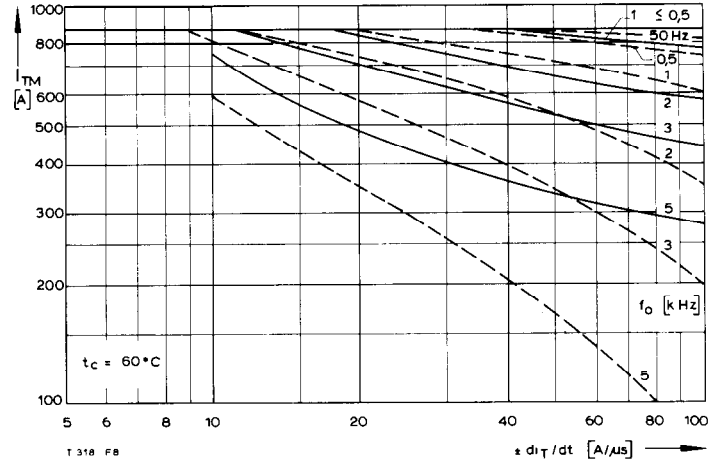
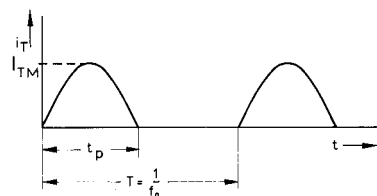
BildFig. 2



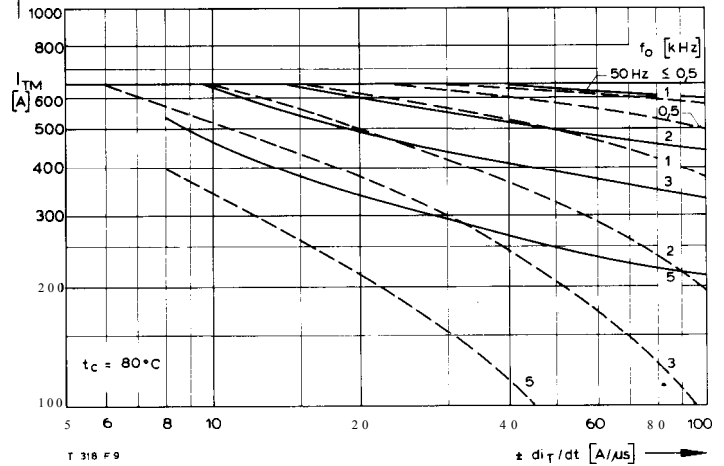
BildFig. 3

BildFig. 1, 2, 3
 Steuergenerator/pulse generator:
 $i_G = 1 \text{ A}$, $di_G/dt = 1 \text{ Alps}$

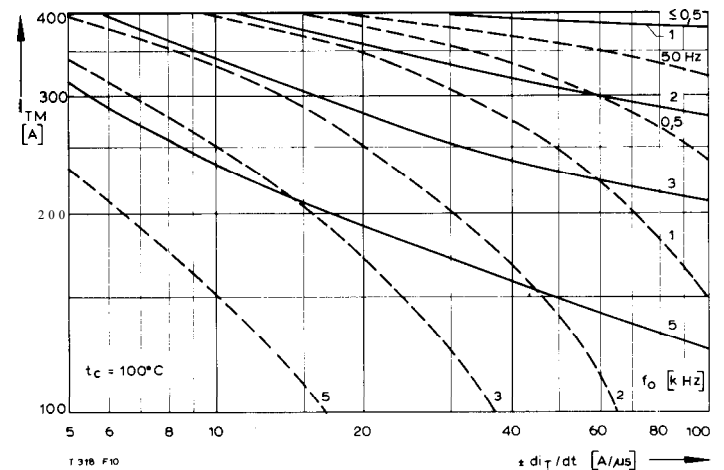
RC-Glied/RC-network:
 $R [\Omega] \geq 0,02 V_{DM} [V]$
 $C \leq 0,22 \text{ pF}$
 $V_{DM} \leq 0,67 V_{DRM}$



BildFig. 4



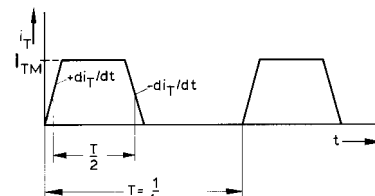
BildFig. 5

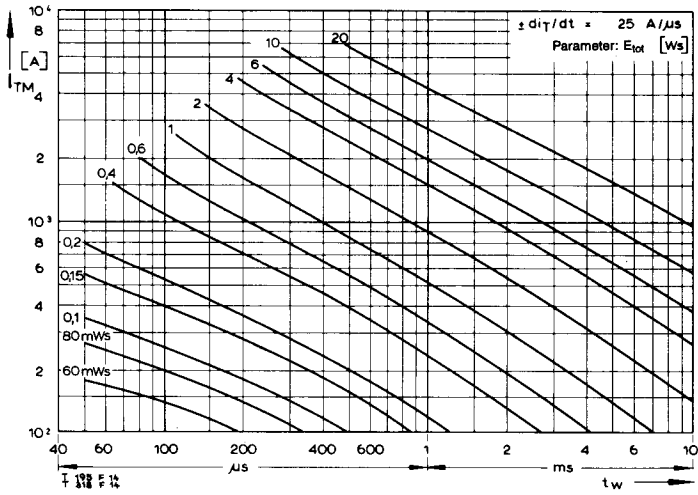


BildFig. 6

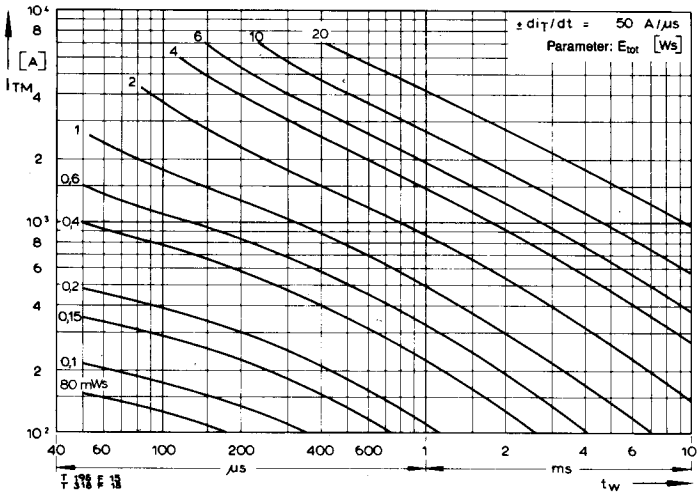
BildFig. 4, 5, 6
 Steuergenerator/pulse generator:
 $i_G = 1 \text{ A}$, $di_G/dt = 1 \text{ Alps}$

RC-Glied/RC-network:
 $R [\Omega] \geq 0,02 V_{DM} [V]$
 $C \leq 0,33 \text{ pF}$
 $V_{DM} \leq 0,67 V_{DRM}$
 $dv_p/dt \leq 600 \text{ V}/\mu\text{s}$
 $V_{RM} \leq 0,67 V_{RRM}$

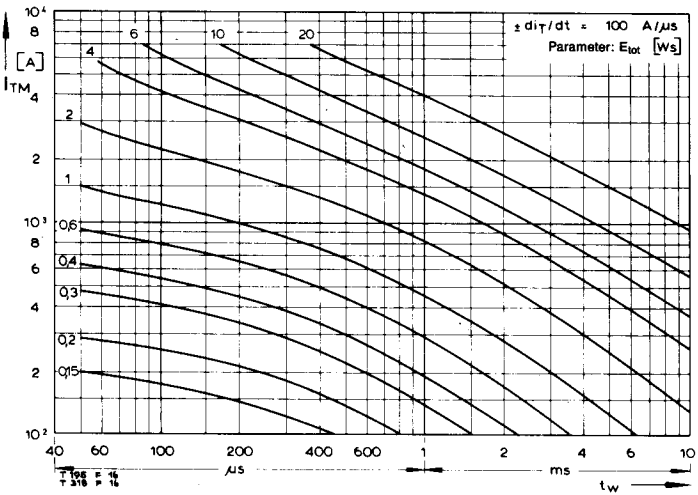




Bild/Fig. 10



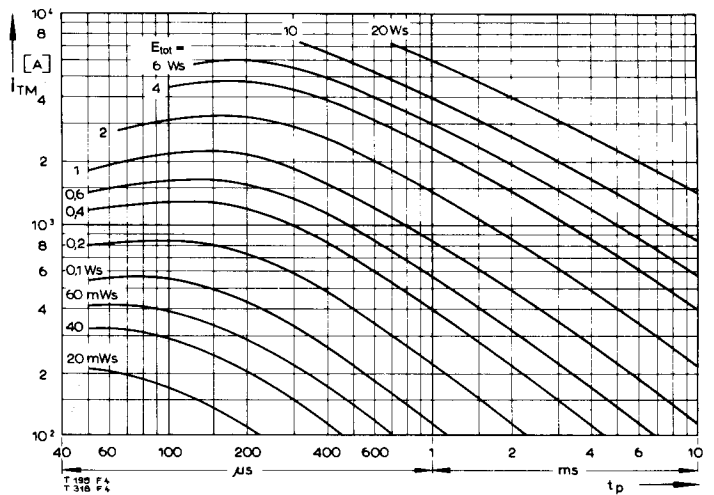
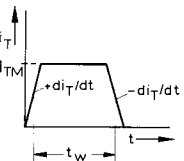
Bild/Fig. 11



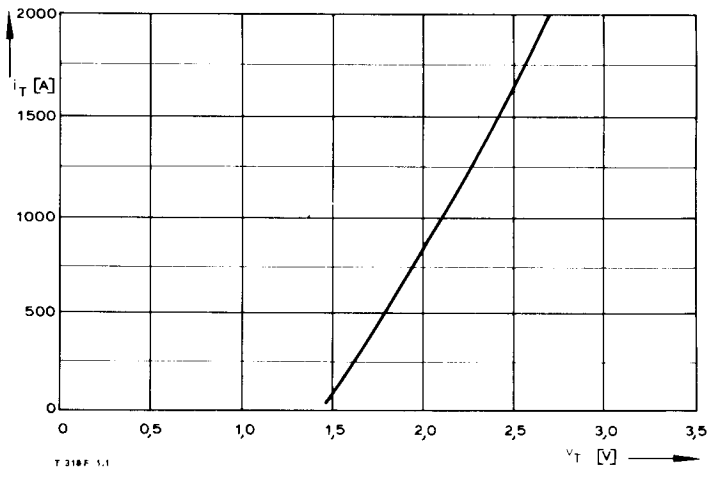
Bild/Fig. 12

Bild/Fig. 10, 11, 12
 Steuergenerator/pulse generator:
 $i_G = 1 \text{ A}$, $di_G/dt = 1 \text{ A}/\mu\text{s}$

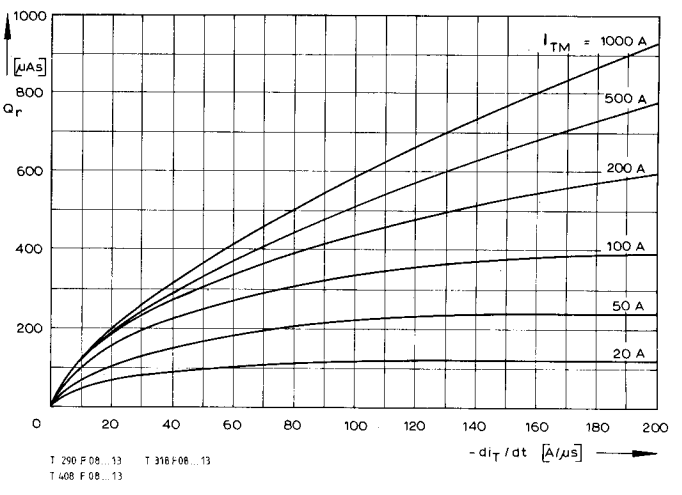
RC-Glied/RC-network:
 $R [\Omega] \geq 0,02 V_{DM} [V]$
 $C \leq 0,33 \mu\text{F}$
 $V_{DM} \leq 0,67 V_{DRM}$
 $dv_R/dt \leq 600 \text{ V}/\mu\text{s}$
 $V_{RM} \leq 0,67 V_{RRM}$



Bild/Fig. 13



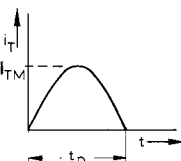
Bild/Fig. 14

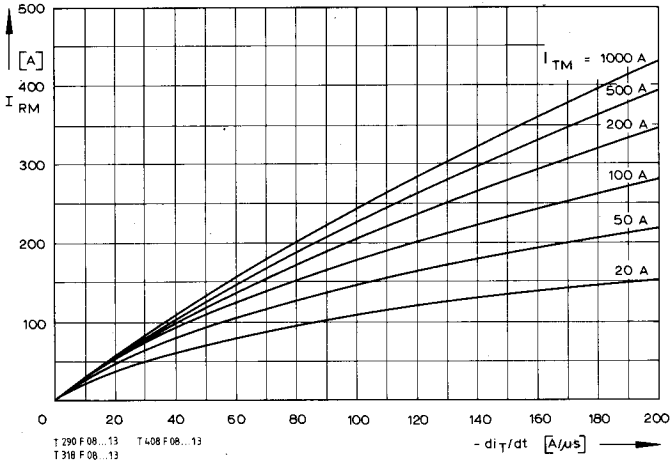


Bild/Fig. 15

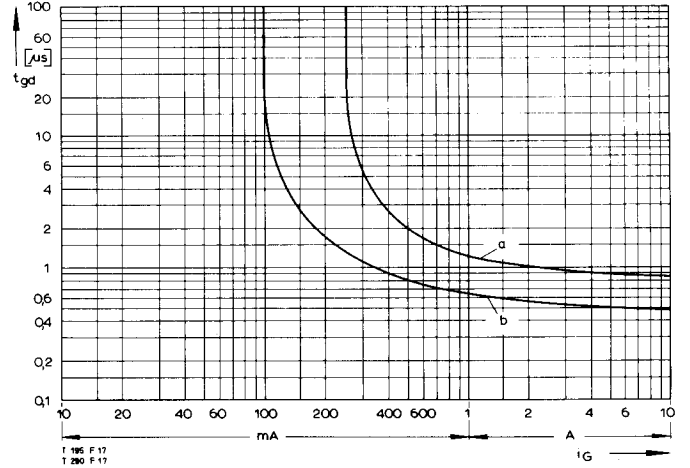
(zu Bild/to Fig. 13)
 Steuergenerator/pulse generator:
 $i_G = 1 \text{ A}$, $di_G/dt = 1 \text{ A}/\mu\text{s}$

RC-Glied/RC-network:
 $R [\Omega] \geq 0,02 V_{DM} [V]$
 $C \leq 0,22 \mu\text{F}$

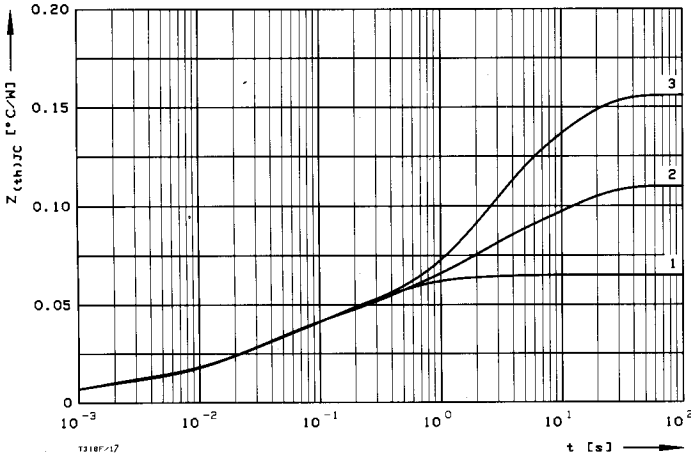




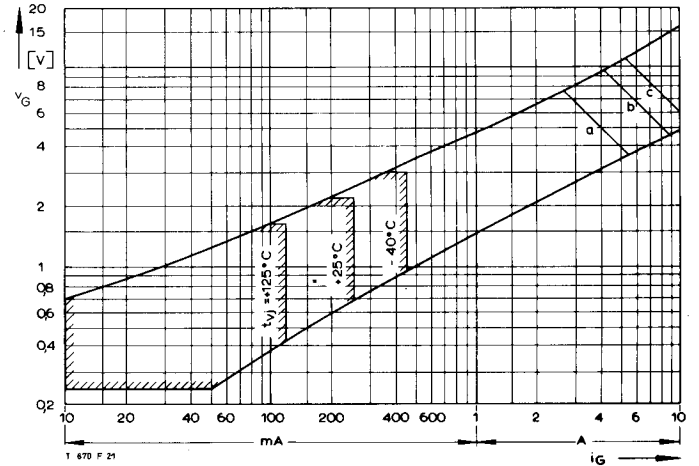
Bild/Fig. 16
 Rückstromspitze $I_{RM} = f(-di/dt)$, $t_{vj} = t_{vj(max)}$, $V_R = 0,5 V_{RRM}$, $V_{RM} = 0,8 V_{RRM}$
 Peak reverse recovery current $I_{RM} = f(-di/dt)$, $t_{vj} = t_{vj(max)}$, $V_R = 0,5 V_{RRM}$, $V_{RM} = 0,8 V_{RRM}$
 Parameter: Durchlaßstrom/On-state current I_{TM}



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



Bild/Fig. 17
 Transienter innerer Wärmewiderstand $Z_{c(th)JC} = f(t)$, DC
 Transient thermal impedance $Z_{c(th)JC} = f(t)$, 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
 $V_G = f(i_G)$, $V_D = 12 \text{ V}$
 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	Pos. n	1	2	3	4	5	6	7
beidseitig	R_{thn} [°C/W]	0,00832	0,0151	0,0181	0,0207	0,0286		
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:

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