

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, 1400* 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	$t_c = 85^{\circ}\text{C}$	I_{TRMSM} 300 A
Dauergrenzstrom	average on-state current	$t_c = 54^{\circ}\text{C}$	I_{TAVM} 128 A 191 A
Stoßstrom-Grenzwert	surge current	$t_s = 25^{\circ}\text{C}, t_p = 10 \text{ ms}$ $t_{vj} = t_{vj\text{max}}, t_p = 10 \text{ ms}$	I_{TSM} 2800 A 2450 A
Grenzlastintegral	I ² t-value	$t_{vj} = 25^{\circ}\text{C}, t_p = 10 \text{ ms}$ $t_{vj} = t_{vj\text{max}}, t_p = 10 \text{ ms}$	I ² t 39200 A ² s 30000 A ² s
Kritische Stromsteilheit	critical rate of rise of on-state current	$V_D \leq 67\% V_{\text{DRM}}, f = 50 \text{ Hz}$ $I_{\text{GM}} = 0,6 \text{ A}, di_G/dt = 0,6 \text{ A}/\mu\text{s}$	$(di/dt)_{\text{crit}}$ 160 A/ μs
Kritische Spannungssteilheit	critical rate of rise of off-state voltage	$t_{vj} = t_{vj\text{max}}, V_D = 67\% V_{\text{DRM}}$	$(dv/dt)_{\text{cr}}$ B: 50 50 V/ μs C*: 500 500 V/ μs L: 500 500 V/ μs M*: 1000 500 V/ μs

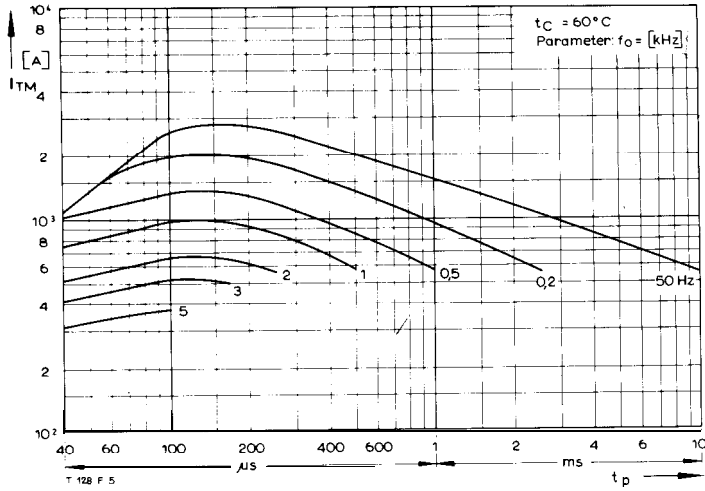
Charakteristische Werte		Characteristic values	
Durchlaßspannung	on-state voltage	$t_{vj} = t_{vj\text{max}}, I_T = 600 \text{ A}$	V_T max. 2,6 V
Schleusenspannung	threshold voltage	$t_{vj} = t_{vj\text{max}}$	$V_{T(TO)}$ 1,28 V
Ersatzwiderstand	slope resistance	$t_{vj} = t_{vj\text{max}}$	r_T 2,15 m Ω
Zündstrom	gate trigger current	$t_s = 25^{\circ}\text{C}, V_D = 12 \text{ V}$	I_{GT} max. 150 mA
Zündspannung	gate trigger voltage	$t_{vj} = 25^{\circ}\text{C}, V_D = 12 \text{ V}$	V_{GT} max. 2 v
Nicht zündender Steuerstrom	gate non-trigger current	$t_{vj} = t_{vj\text{max}}, V_D = 12 \text{ V}$	I_{GD} max. 10 mA
Nicht zündende Steuerspannung	gate non-trigger voltage	$t_{vj} = t_{vj\text{max}}, V_D = 0,5 V_{\text{DRM}}$	V_{GD} max. 0,25 V
Haltestrom	holding current	$t_s = 25^{\circ}\text{C}, V_D = 12 \text{ V}, R_A = 10 \Omega$	I_H max. 250 mA
Einraststrom	latching current	$t_s = 25^{\circ}\text{C}, V_D = 12 \text{ V}, R_{\text{GK}} \geq 10 \Omega$ $I_{\text{GM}} = 0,6 \text{ A}, di_G/dt = 0,6 \text{ A}/\mu\text{s}, t_g = 20 \mu\text{s}$	I_L max. 1 A
Vorwärts- u. Rückwärts-Sperrstrom	forward off-state and reverse Currents	$t_{vj} = t_{vj\text{max}}, V_D = V_{\text{DRM}}, V_R = V_{\text{RRM}}$	I_D, I_R max. 30 mA
Zündverzögerung	gate controlled delay time	$t_{vj} = 25^{\circ}\text{C}, I_{\text{GM}} = 0,6 \text{ A}, di_G/dt = 0,6 \text{ A}/\mu\text{s}$	t_{gd} max. 1,4 μs
Freiwerdzeit	circuit commutated turn-off time	siehe Techn. Erl./see Techn. Inf.	t_s 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	$\Theta = 180^{\circ}\text{el}, \text{sin}$ DC	R_{thJC} max. 0,163 $^{\circ}\text{C}/\text{W}$ max. 0,143 $^{\circ}\text{C}/\text{W}$
für anodenseitige Kühlung	for anode-sided cooling	$\Theta = 180^{\circ}\text{el}, \text{sin}$ DC	$R_{\text{thJC(A)}}$ max. 0,246 $^{\circ}\text{C}/\text{W}$ max. 0,226 $^{\circ}\text{C}/\text{W}$
für kathodenseitige Kühlung	for cathode-sided cooling	$\Theta = 180^{\circ}\text{el}, \text{sm}$ DC	$R_{\text{thJC(K)}}$ max. 0,406 $^{\circ}\text{C}/\text{W}$ max. 0,386 $^{\circ}\text{C}/\text{W}$
Übergangs-Wärmewiderstand	thermal resistance, case to heatsink	beidseitig/two-sided einseitig/one-sided	R_{thCK} max. 0,015 $^{\circ}\text{C}/\text{W}$ max. 0,03 $^{\circ}\text{C}/\text{W}$
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 $^{\circ}\text{C}$

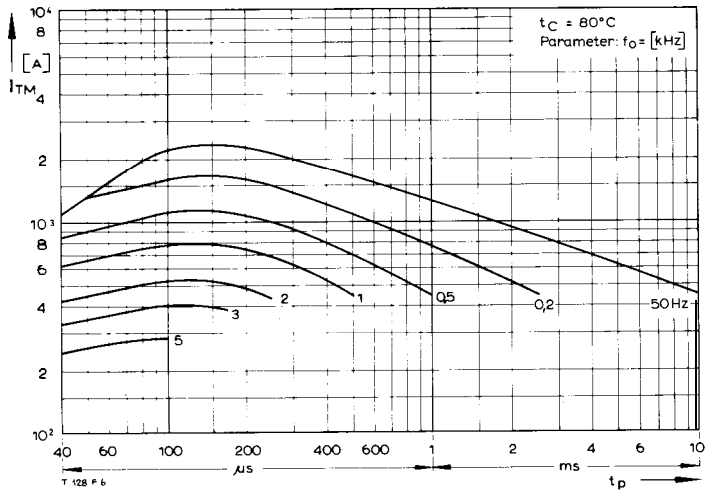
Mechanische Eigenschaften		Mechanical properties	
Si-Element mit Druckkontakt	Si-pellet with pressure contact		F 3... 6 kN
Anpreßkraft	Clamping force		G typ. 70 g
Gewicht	weight		17 mm
Kriechstrecke	Creepage distance		C
Feuchteklasse	humidity classification	DIN 40040	50 m/s ²
Schwingfestigkeit	Vibration resistance	f = 50 Hz	Seitelpage 154
Maßbild	outline	DIN 41814-151A4	

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

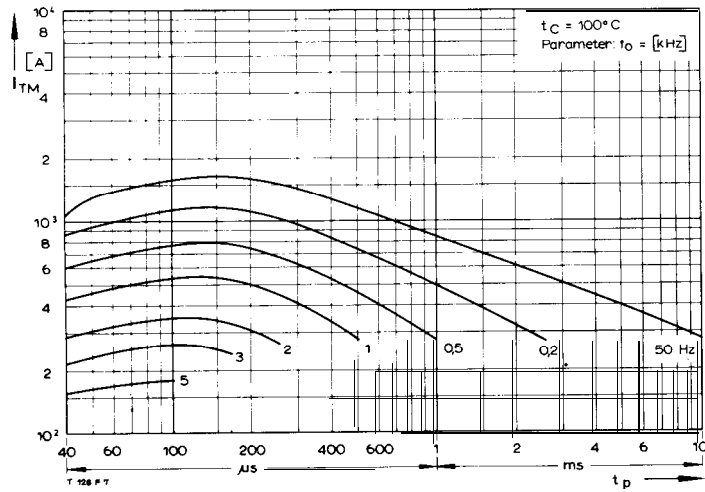
- 1) Werte nach DIN IEC 747-6 (ohne vorausgehende Kommutierung)/Values to DIN IEC 747-6 (without prior commutation)
- 2) Unmittelbar nach der Freiwerdzeit, vgl. Meßbedingungen für t_q /Immediately after circuit commutated turn-off time, see Parameters t_q



Bild/Fig. 1



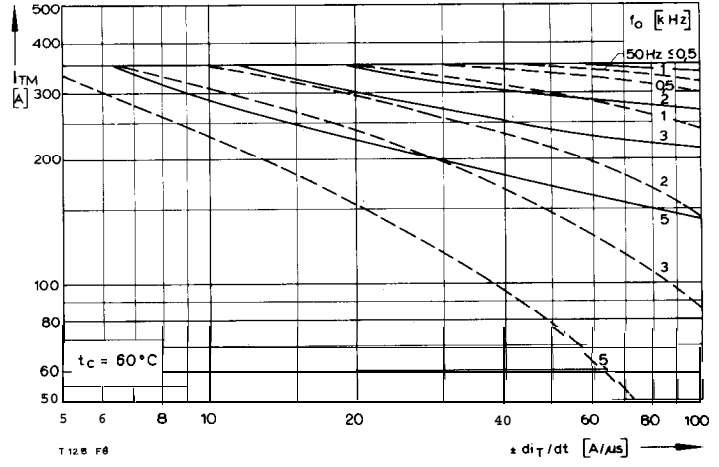
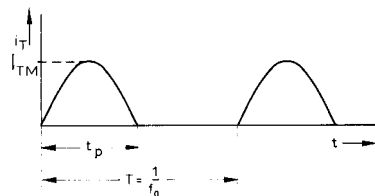
Bild/Fig. 2



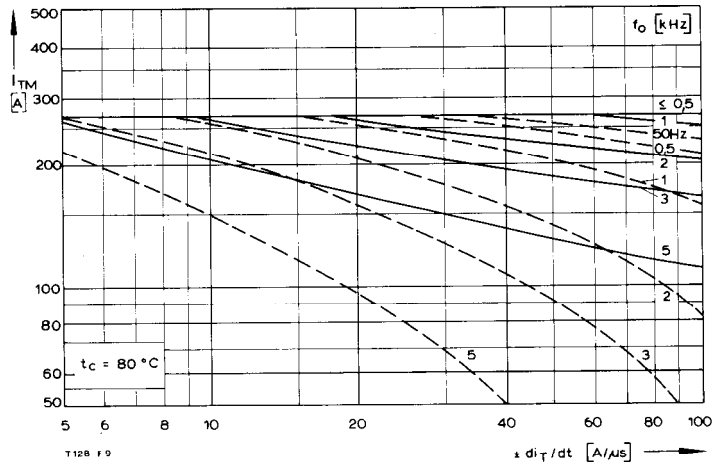
Bild/Fig. 3

Bild/Fig. 1, 2, 3
Steuergenerator/pulse generator:
 $I_G = 0,6 \text{ A}$, $di_G/dt = 0,6 \text{ A}/\mu\text{s}$

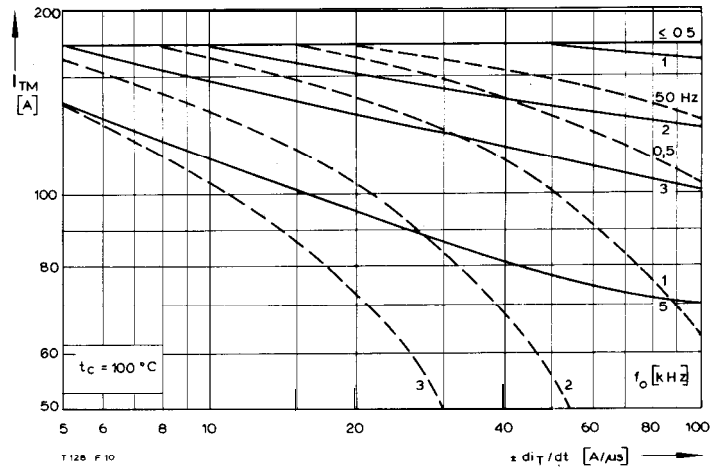
RC-Glied/RC-network:
 $Ft [\Omega] \geq 0,02 V_{DM} [V]$
 $C \leq 0,15 \mu\text{F}$
 $V_{DM} \leq 0,67 V_{DRM}$



Bild/Fig. 4



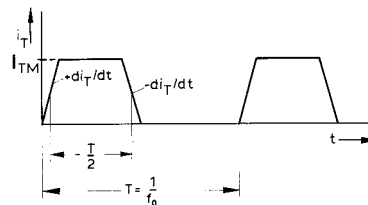
Bild/Fig. 5

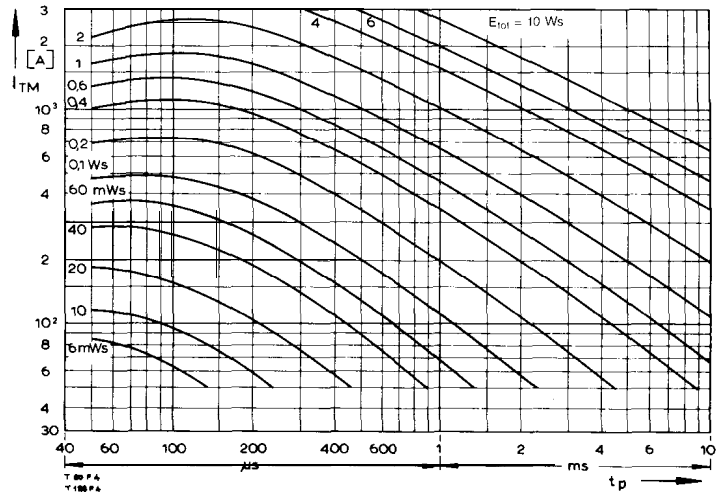
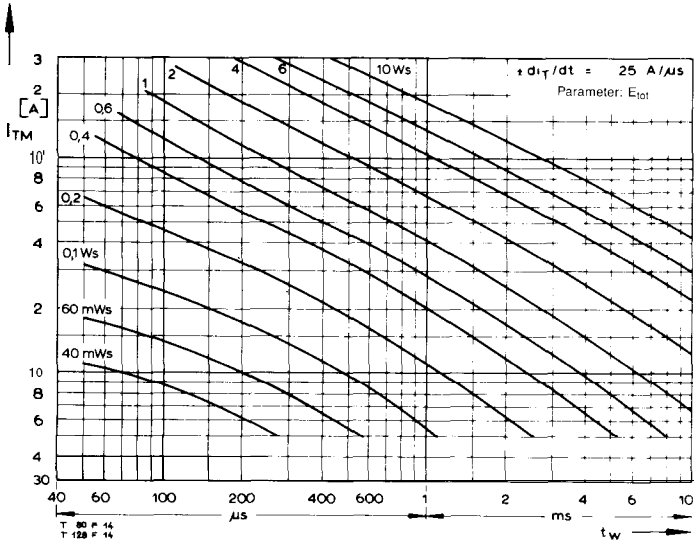


Bild/Fig. 6

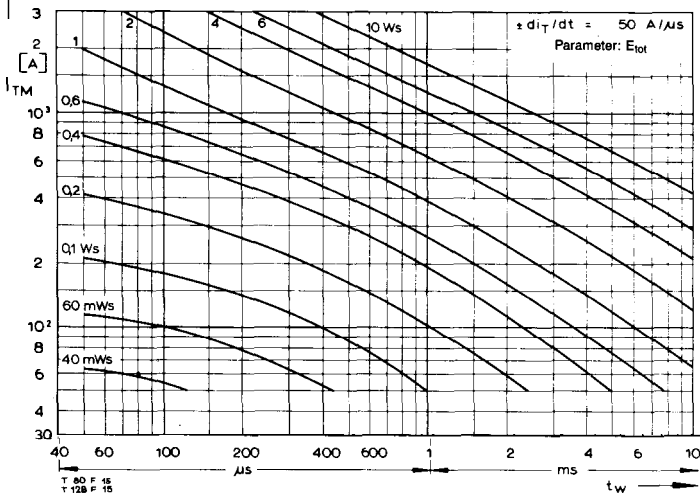
Bild/Fig. 4, 5, 6
Steuergenerator/pulse generator:
 $I_G = 0,6 \text{ A}$, $di_G/dt = 0,6 \text{ A}/\mu\text{s}$

RC-Glied/RC-network:
 $Ft [\Omega] \geq 0,02 V_{DM} [V]$
 $C \leq 0,22 \mu\text{F}$
 $V_{DM} \leq 0,67 V_{DRM}$
 $dv_T/dt \leq 600 \text{ V}/\mu\text{s}$
 $V_{RM} \leq 0,67 V_{RRM}$

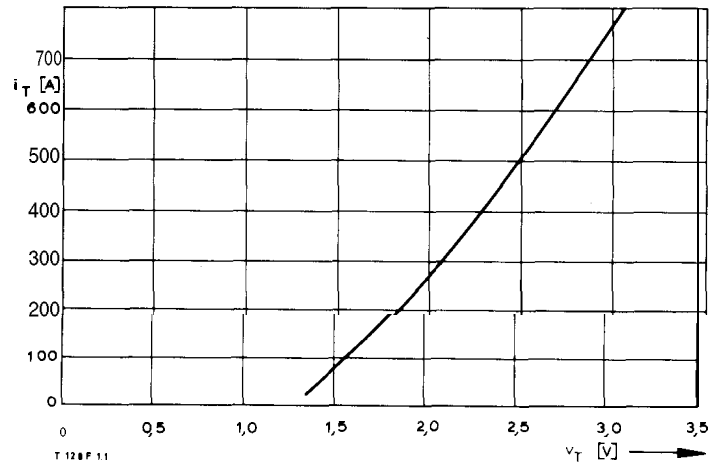




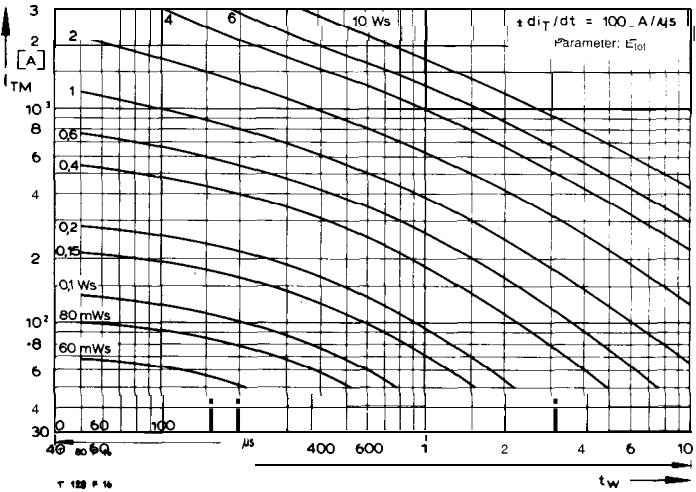
Bild/Fig. 10



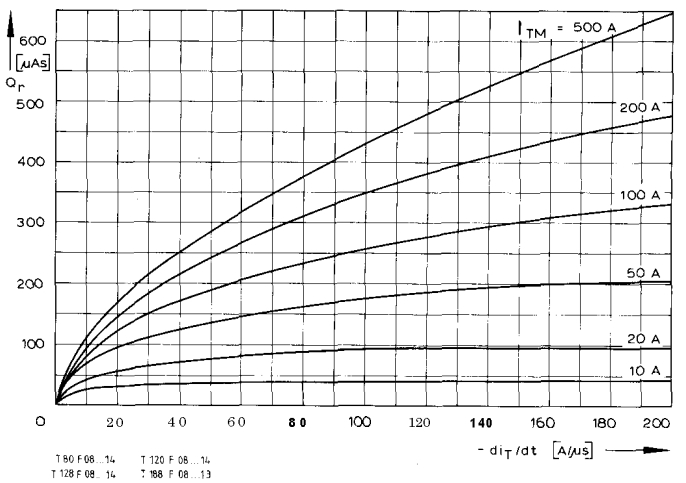
BildFig. 13



Bild/Fig. 11



BildFig. 14



Bild/Fig. 12

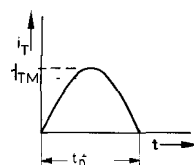
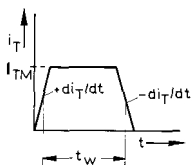
BildFig. 15

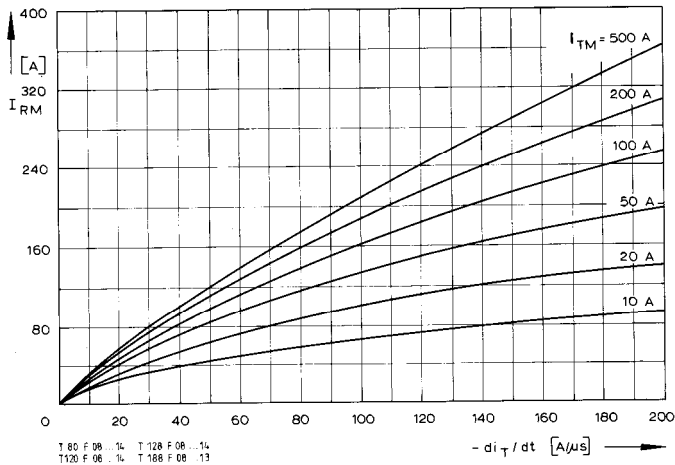
BildFig. 10, 11, 12
 Steuergenerator/pulse generator:
 $i_G = 0,6 \text{ A}$, $di_G/dt = 0,6 \text{ A}/\mu\text{s}$

RC-Glied/RC-network:
 $R [\Omega] \geq 0,02 v_{DM} [V]$
 $C \leq 0,22 \mu\text{F}$
 $v_{DM} \leq 0,67 v_{DRM}$
 $dv_R/dt \leq 600 \text{ V}/\mu\text{s}$
 $v_{RM} \leq 0,67 v_{RRM}$

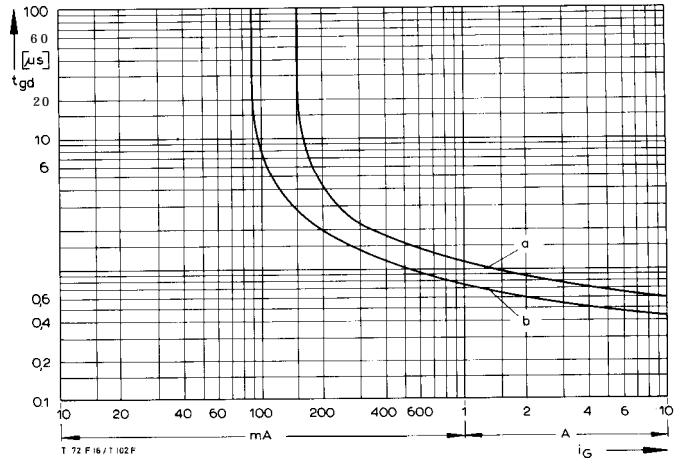
(zu Bild/to Fig. 13)
 Steuergenerator/pulse generator:
 $i_G = 0,6 \text{ A}$, $di_G/dt = 0,6 \text{ A}/\mu\text{s}$

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

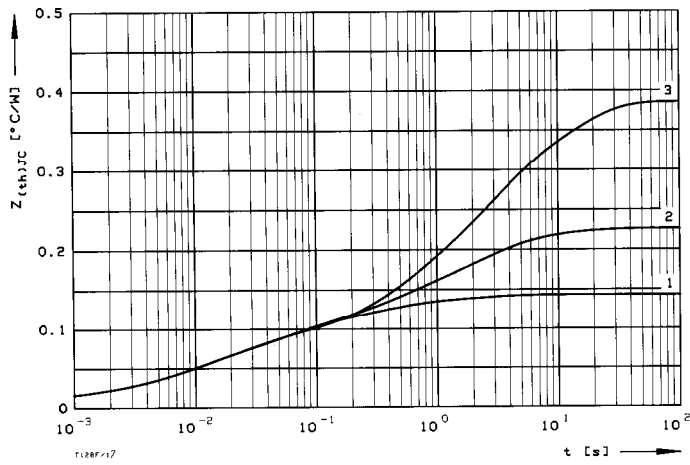




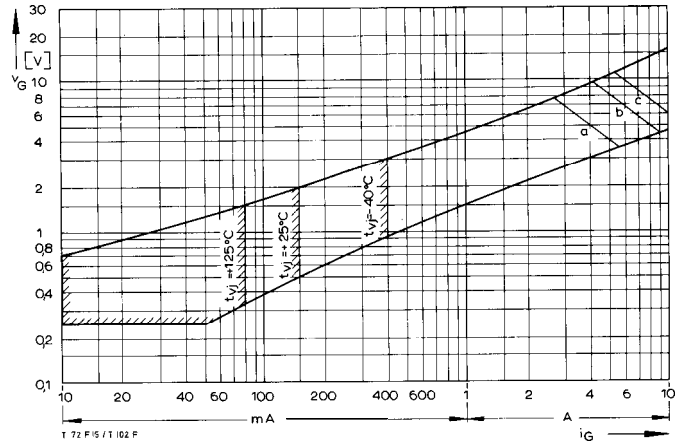
Bild/Fig. 16
 Rückstromspitze $I_{RM} = f(-di/dt)$, $t_{vj} = t_{vj(max)}$, $V_R = 0,5 V_{RRM}$, $V_{RM} = 0,8 V_{RRM}$
 Peak reverse recovery current $I_{RM} = f(-di/dt)$, $t_{vj} = t_{vj(max)}$, $V_R = 0,5 V_{RRM}$, $V_{RM} = 0,8 V_{RRM}$
 Parameter: Durchlaßstrom/On-state current I_{TM}



Bild/Fig. 18
 Zündverzögerung/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 $Z_{thJC} = f(t)$, DC
 Transient thermal impedance $Z_{thJC} = f(t)$, 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 p u 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/two-sided	R_{thn} [$^\circ\text{C}/\text{W}$]	0,011	0,00585	0,0342	0,0485	0,0312	0,0122	
	τ_n [s]	0,000458	0,00578	0,00807	0,0483	0,292	1,864	
anodenseitig/anode-sided	R_{thn} [$^\circ\text{C}/\text{W}$]	0,0109	0,00798	0,034	0,0428	0,0399	0,0702	0,02
	τ_n [s]	0,000455	0,00497	0,00899	0,047	0,366	2,14	9,1
kathodenseitig/cathode-sided	R_{thn} [$^\circ\text{C}/\text{W}$]	0,0106	0,0216	0,0503	0,0578	0,133	0,112	
	τ_n [s]	0,000439	0,00514	0,0213	0,394	2,3	12	

Analytische Funktion/analytical function:

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