

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}	400 A
Dauergrenzstrom	average on-state current	$t_{\text{C}} = 64^{\circ}\text{C}$	I_{TAVM}	188 A 254 A
Stoßstrom-Grenzwert	surge current	$t_{vj} = 25^{\circ}\text{C}, t_p = 10 \text{ ms}$	I_{TSM}	3300 A 2900 A
Grenzlastintegral	I ² t-value	$t_{vj} = t_{vj\text{max}}, t_p = 10 \text{ ms}$ $t_{vj} = 25^{\circ}\text{C}, t_p = 10 \text{ ms}$	I^2t	54500 A ² s 42000 A ² s
Kritische Stromsteilheit	critical rate of rise of on-state current	$t_{vj} = t_{vj\text{max}}, t_p = 10 \text{ ms}$ $V_D \leq 67\% V_{\text{DRM}}, f = 50 \text{ Hz}$	$(di/dt)_{\text{cr}}$	160 A/μs
Kritische Spannungssteilheit	critical rate of rise of off-state voltage	$i_{\text{GM}} = 0,6 \text{ A}, di_{\text{G}}/dt = 0,6 \text{ A}/\mu\text{s}$ $t_{vj} = t_{vj\text{max}}, V_D = 67\% V_{\text{DRM}}$	$(dv/dt)_{\text{cr}}$	B: 50 50 V/μs C*: 500 500 V/μs L: 500 50 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. 2,44 V
Schleusenspannung	threshold voltage	$t_{vj} = t_{vj\text{max}}$	$V_{T(\text{TO})}$	1,2 V
Ersatzwiderstand	slope resistance	$t_{vj} = t_{vj\text{max}}$	r_T	1,35 mΩ
Zündstrom	gate trigger current	$t_{vj} = 25^{\circ}\text{C}, V_D = 12 \text{ V}$	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	$t_{vj} = 25^{\circ}\text{C}, V_D = 12 \text{ V}, R_A = 10 \Omega$	I_H	max. 250 mA
Einraststrom	latching current	$t_{vj} = 25^{\circ}\text{C}, V_D = 12 \text{ V}, R_{\text{GK}} \geq 10 \Omega$ $i_{\text{GM}} = 0,6 \text{ A}, di_{\text{G}}/dt = 0,6 \text{ A}/\mu\text{s}, t_{\text{G}} = 20 \mu\text{s}$	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	$t_{vj} = 25^{\circ}\text{C}, i_{\text{GM}} = 0,6 \text{ A}, di_{\text{G}}/dt = 0,6 \text{ A}/\mu\text{s}$	t_{gd}	max. 1,4 μs
Freiwerdezeit	circuit commutated turn-off time	siehe Techn. Erl./see Techn. Inf.	t_{f}	s: max. 18 μs E: max. 20 μs F: max. 25 μs

Thermische Eigenschaften

Thermal properties

Innere Wärmewiderstand für beidseitige Kühlung	thermal resistance, junction to case for two-sided cooling	$\Theta = 180^{\circ}\text{el, sin}$ DC	R_{thJC}	max. 0,117 °C/W max. 0,103 °C/W
für anodenseitige Kühlung	for anode-sided cooling	$\Theta = 180^{\circ}\text{el, sin}$ DC	$R_{\text{thJC(A)}}$	max. 0,18 °C/W max. 0,166 °C/W
für kathodenseitige Kühlung	for cathode-sided cooling	$\Theta = 160^{\circ}\text{el, sin}$ DC	$R_{\text{thJC(K)}}$	max. 0,28 °C/W max. 0,266 °C/W
Übergangswärmewiderstand	thermal resistance, case to heatsink	beidseitig/two-sided einseitig/one-sided	R_{thCK}	max. 0,015 °C/W max. 0,03 °C/W
Höchstzul. Sperrschichttemperatur	max. junction temperature		$t_{vj\text{max}}$	125 °C
Betriebstemperatur	Operating temperature		$t_{\text{C op}}$	-40 ... + 125 °C
Lagertemperatur	storage temperature		t_{stg}	-40 ... + 140 °C

Mechanische Eigenschaften

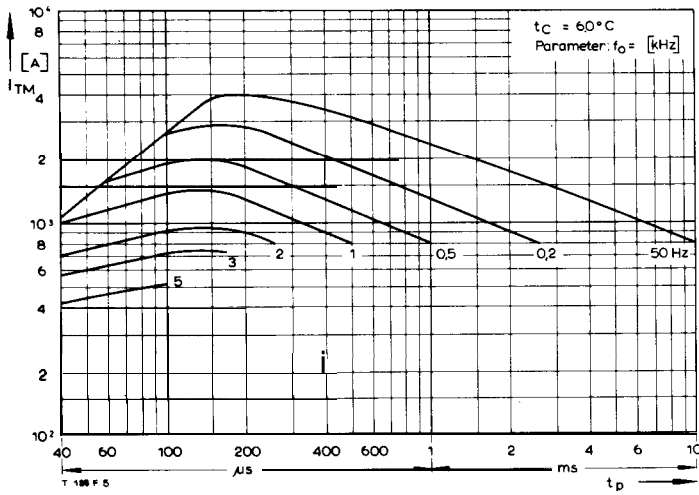
Mechanical properties

Si-Element mit Druckkontakt	Si-pellet with pressure contact		F	3...6 kN
Anpreßkraft	Clamping force		G	typ. 70 g
Gewicht	weight			17mm
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		

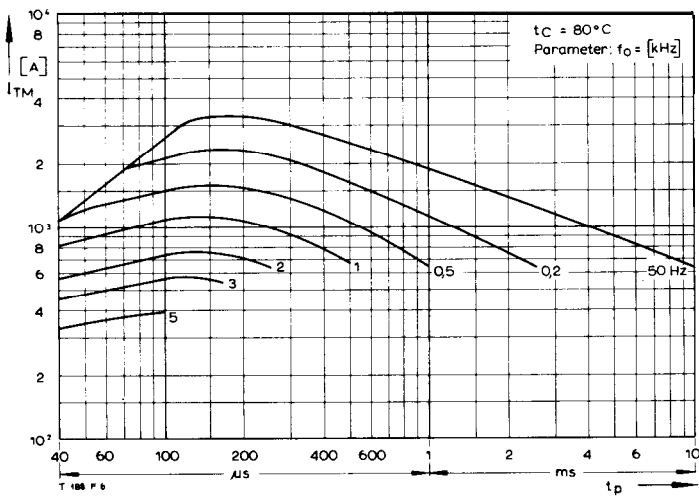
• Für größere Stückzahlen bitte Liefertermin erfragen/Delivery for larger quantities on request

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

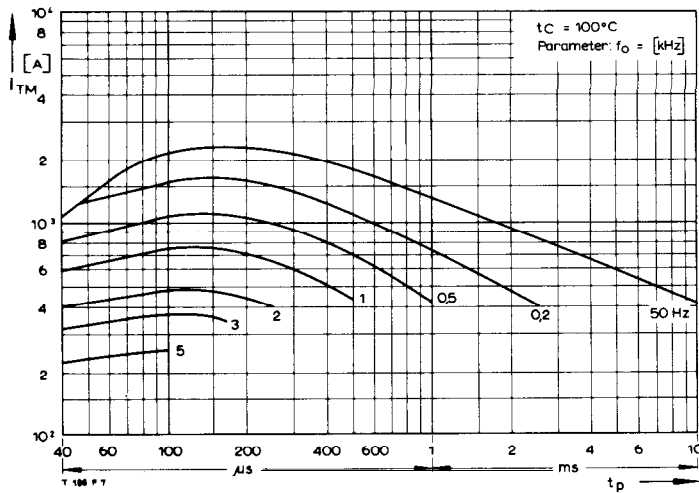
2) Unmittelbar nach der Freiwerdezeit, vgl. Meßbedingungen für t_{q} /Immediately after circuit commutated turn-off time, see Parameters t_{q}



Bild/Fig. 1



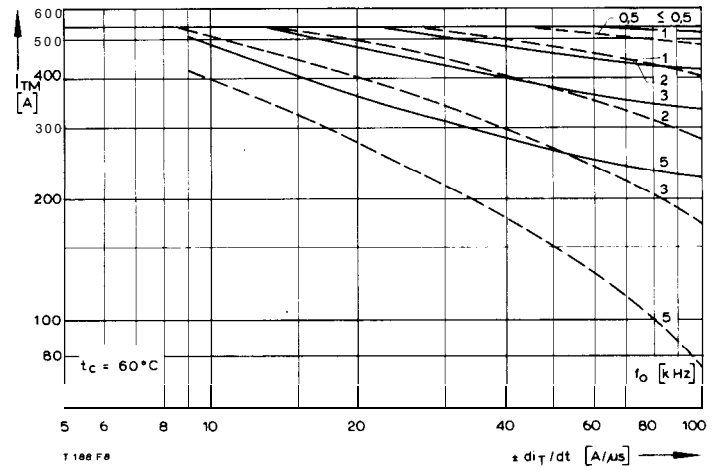
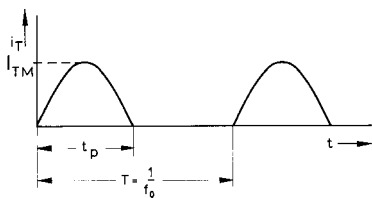
Bild/Fig. 2



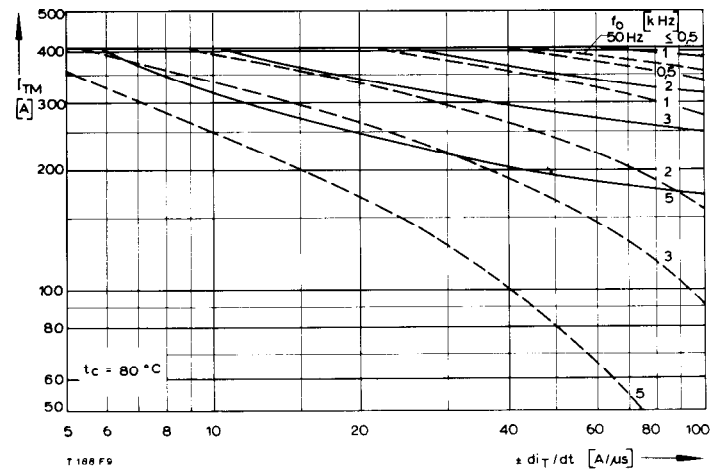
Bild/Fig 3

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

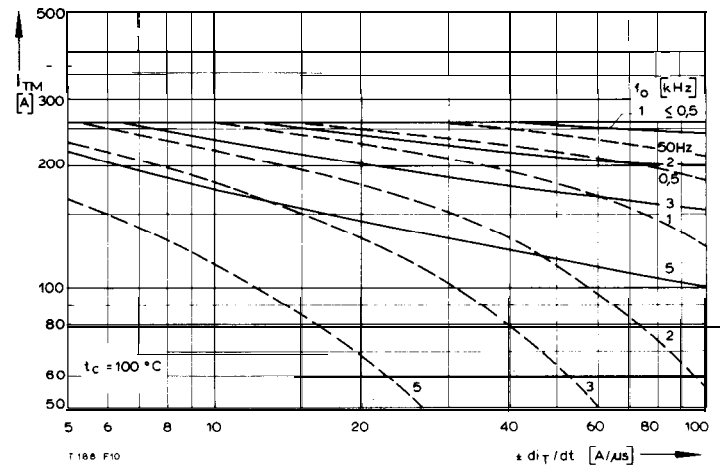
RC-Glied/RC-network:
 $R[\Omega] \geq 0,02 V_{DM} [\text{V}]$
 $C \leq 0,22 \mu\text{F}$
 $V_{DM} \leq 0,67 V_{DRM}$



Bild/Fig. 4



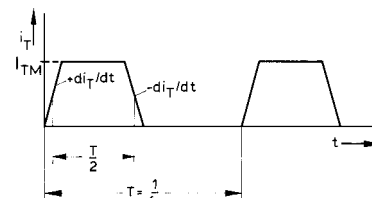
Bild/Fig. 5

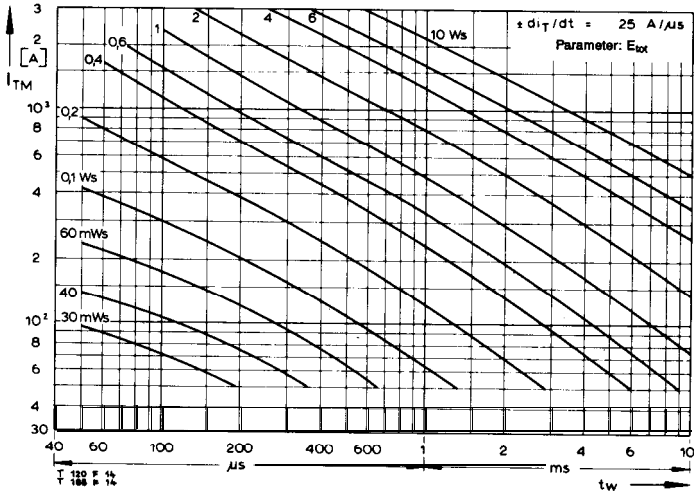


Bild/Fig. 6

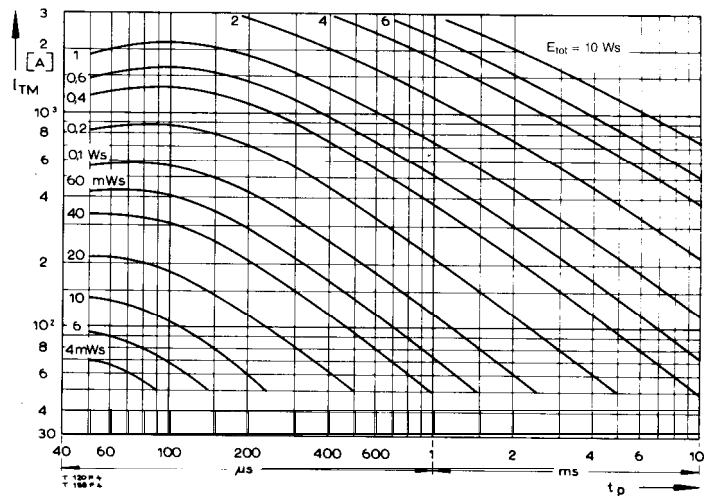
Bild/Fig. 4, 5, 6
Steuer-generator/pulse generator:
 $i_G = 0,6 \text{ A}$, $di_G/dt = 0,6 \text{ A}/\mu\text{s}$

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

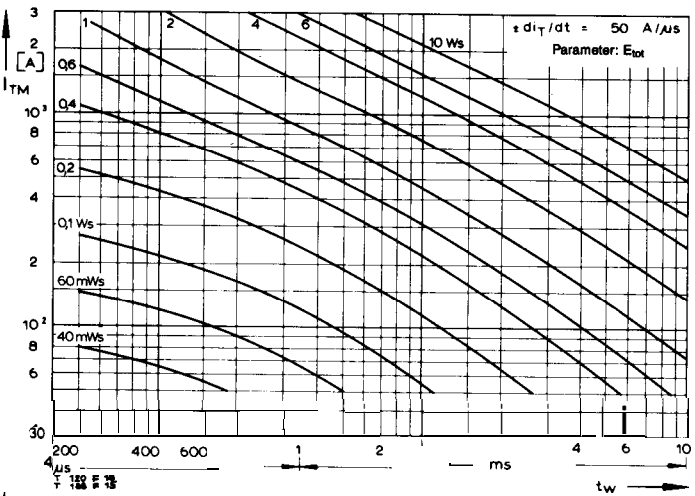




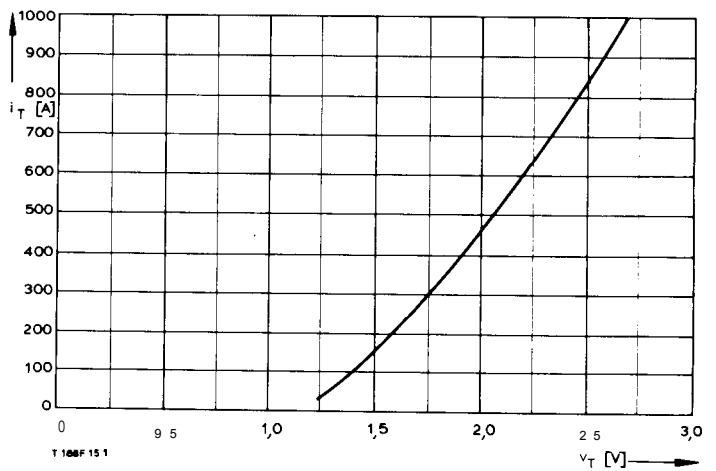
Bild/Fig. 10



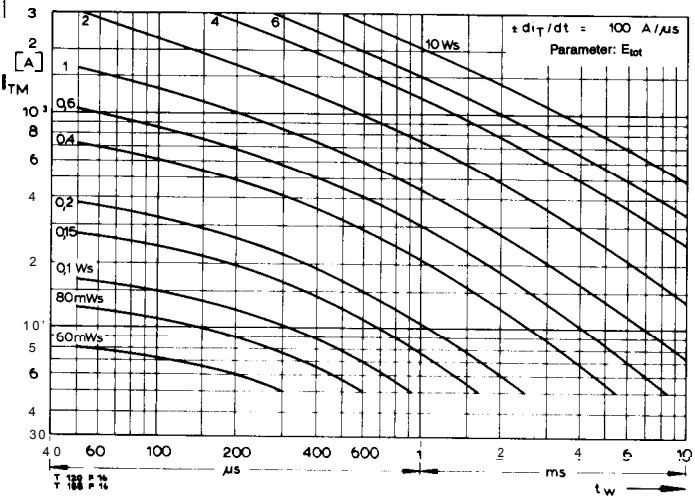
Bild/Fig. 13



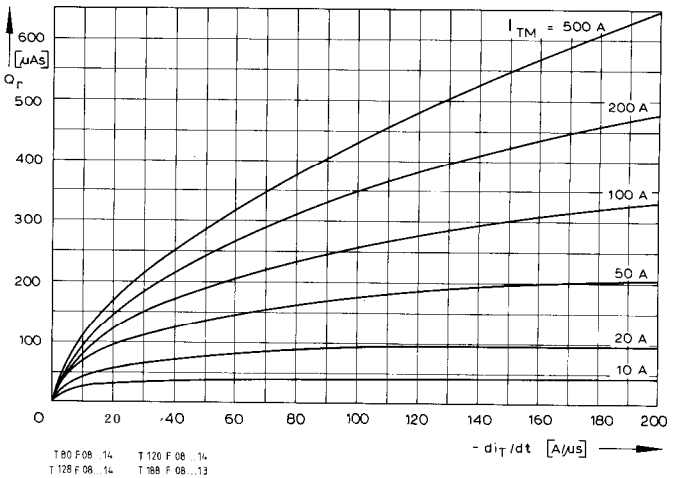
Bild/Fig. 11



Bild/Fig. 14



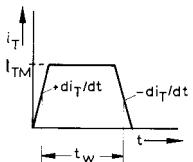
Bild/Fig. 12



Bild/Fig. 15

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

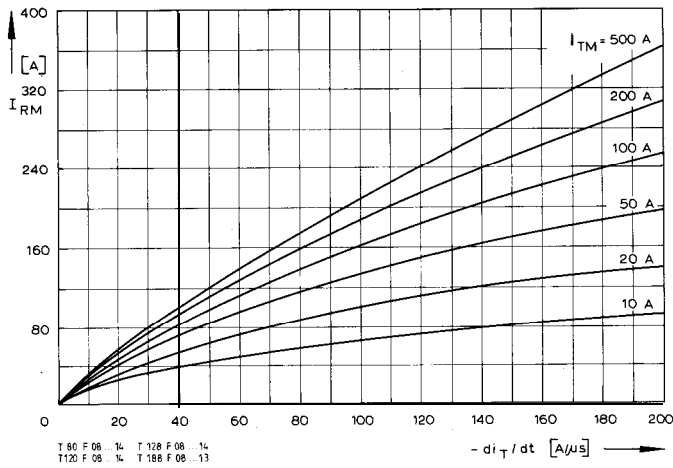
RC-Glied/RC-network:
 $R [\Omega] \geq 0,02 V_{DM} [V]$
 $C \leq 0,33 \mu\text{F}$
 $V_{DM} \leq 0,67 V_{D1}$
 $dV_R/dt \leq 600 \text{ V}/\mu\text{s}$
 $V_{RM} \leq 0,67 V_{RRM}$



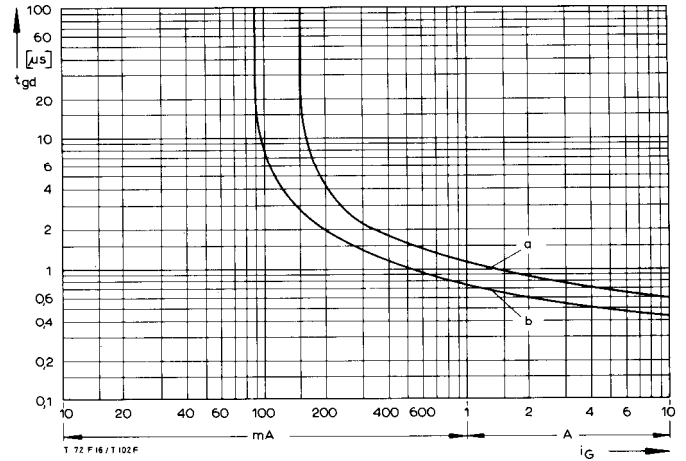
(zu Bild/to Fig. 13)
 Steuergeneratodpulse generator:
 $i_G = 0,6 \text{ A}$, $di_G/dt = 0,6 \text{ A}/\mu\text{s}$

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

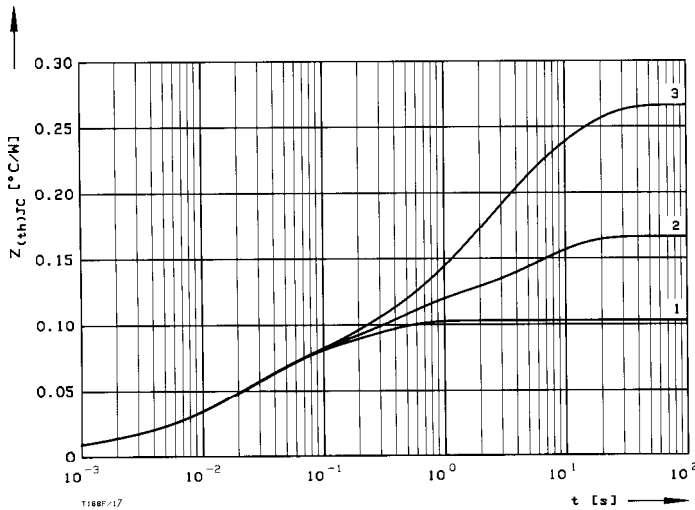




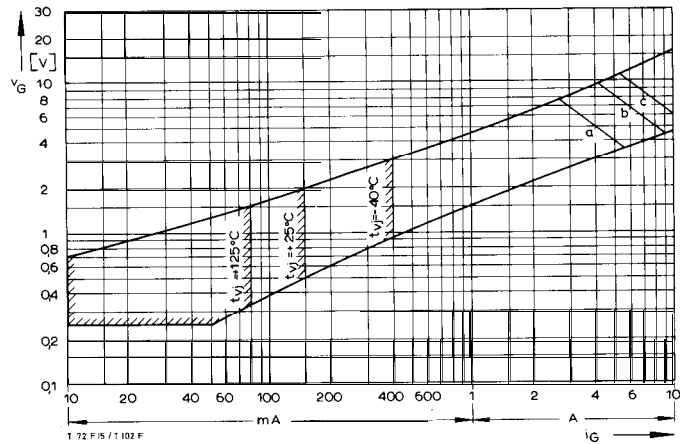
Bild/Fig. 16
 Rückstromspitze $I_{RM} = f(-di/dt)$, $t_{vj} = t_{vj(max)}$, $V_R = 0,5 V_{RRM}$, $V_{RM} = 0,8 V_{RRM}$
 Peak reverse recovery current $I_{RM} = f(-di/dt)$, $t_{vj} = t_{vj(max)}$, $V_R = 0,5 V_{RRM}$, $V_{RM} = 0,8 V_{RRM}$
 Parameter: Durchlaßstrom/On-state current I_{TM}



Bild/Fig. 16
 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 $Z_{thJC} = f(t)$, 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
Steuerimpulsdauern/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 two-sided	R_{thn} [$^\circ\text{C}/\text{W}$]	0,00755	0,019	0,0461	0,0303			
	τ_n [s]	0,000788	0,00877	0,0326	0,241			
anodenseitig anode-sided	R_{thn} [$^\circ\text{C}/\text{W}$]	0,0077	0,0228	0,044	0,04	0,0513		
	τ_n [s]	0,000805	0,0098	0,0368	0,373	5,97		
kathodenseitig cathode-sided	R_{thn} [$^\circ\text{C}/\text{W}$]	0,0079	0,0138	0,0389	0,0233	0,0284	0,0791	0,0746
	τ_n [s]	0,000827	0,00875	0,0226	0,118	0,577	2,17	9,76

Analytische Funktion/analytical function:

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