

**Elektrische Eigenschaften****Electrical properties****Höchstzulässige Werte****Maximum rated values**

Periodische Vorwärts- und Rückwärts-Spitzensperrspannung	repetitive peak forward off-state and reverse voltages	$t_{vj} = -40^{\circ}\text{C} \dots t_{vj\text{max}}$	$V_{\text{DRM}}, V_{\text{RRM}}$ 800, 1000 V 1100, 1200 V 1300* V
Vorwärts-Stoßspitzensperrspannung	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-Stoßspitzensperrspannung	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-Grenzwert	RMS on-state current	$t_c = 85^{\circ}\text{C}$	$I_{\text{TRMSM}}$ 550 A
Dauerstrom	average on-state current	$t_c = 73^{\circ}\text{C}$	$I_{\text{TAVM}}$ 290 A 350 A
Stoßstrom-Grenzwert	surge current	$t_{vj} = 25^{\circ}\text{C}, t_p = 10$ ms $t_{vj} = t_{vj\text{max}}, t_p = 10$ ms	$I_{\text{TSM}}$ 7200 A 6400 A
Grenzlastintegral	$I^2t$ -value	$t_{vj} = 25^{\circ}\text{C}, t_p = 10$ ms $t_{vj} = t_{vj\text{max}}, t_p = 10$ ms	$I^2t$ 260 $\text{kA}^2\text{s}$ 205 $\text{kA}^2\text{s}$
Kritische Stromsteilheit	critical rate of rise of on-state current	$v_D \leq 67\% V_{\text{DRM}}, f = 50$ Hz $I_{\text{GM}} = 1$ A, $di_G/dt = 1$ A/ $\mu\text{s}$	$(di/dt)_{\text{cr}}$ 200 A/ $\mu\text{s}$
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 $\text{V}/\mu\text{s}$ c*: 500 500 $\text{V}/\mu\text{s}$ L: 500 50 $\text{V}/\mu\text{s}$ M*: 1000 500 $\text{V}/\mu\text{s}$

**Charakteristische Werte****Characteristic values**

Durchlaßspannung	on-state voltage	$t_{vj} = t_{vj\text{max}}, I_T = 1000$ A	$V_T$ max. 2,1 v
Schleusenspannung	threshold voltage	$t_{vj} = t_{vj\text{max}}$	$V_{T(\text{TO})}$ 1,2 v
Ersatzwiderstand	slope resistance	$t_{vj} = t_{vj\text{max}}$	$r_T$ 0,75 $\text{m}\Omega$
Zündstrom	gate trigger current	$t_{vj} = 25^{\circ}\text{C}, v_D = 12$ V	$I_{\text{GT}}$ max. 250 mA
Zündspannung	gate trigger voltage	$t_{vj} = 25^{\circ}\text{C}, v_D = 12$ V	$V_{\text{GT}}$ max. 2,2 v
Nicht zündender Steuerstrom	gate non-trigger current	$t_{vj} = t_{vj\text{max}}, v_D = 12$ V	$I_{\text{GD}}$ max. 10 mA
Nicht zündende Steuerspannung	gate non-trigger voltage	$t_{vj} = t_{vj\text{max}}, v_D = 0,5 V_{\text{DRM}}$	$V_{\text{GD}}$ max. 0,25 V
Haltestrom	holding current	$t_{vj} = 25^{\circ}\text{C}, v_D = 12$ V, $R_A = 10$ $\Omega$	$I_H$ max. 250 mA
Einraststrom	latching current	$t_{vj} = 25^{\circ}\text{C}, v_D = 12$ V, $R_{\text{GK}} \geq 10$ $\Omega$ $I_{\text{GM}} = 1$ A, $di_G/dt = 1$ 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. 50 mA
Zündverzögerung	gate controlled delay time	$t_{vj} = 25^{\circ}\text{C}, I_{\text{GM}} = 1$ A, $di_G/dt = 1$ A/ $\mu\text{s}$	$t_{\text{gd}}$ max. 1,2 $\mu\text{s}$
Freiwerdezeit	circuit commutated turn-off time	siehe Techn. Erl./see Techn. Inf.	$t_q$ s: max. 18 $\mu\text{s}$ E: max. 20 $\mu\text{s}$ F: max. 25 $\mu\text{s}$

**Thermische Eigenschaften****Thermal properties**

Innerer Wärmewiderstand	thermal resistance, junction to case	$\Theta = 180^{\circ}\text{el, sin}$ DC	$R_{\text{thJC}}$ max. 0,08 $^{\circ}\text{C}/\text{W}$ max. 0,077 $^{\circ}\text{C}/\text{W}$
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		$t_{\text{stg}}$ -40 ... + 150 $^{\circ}\text{C}$

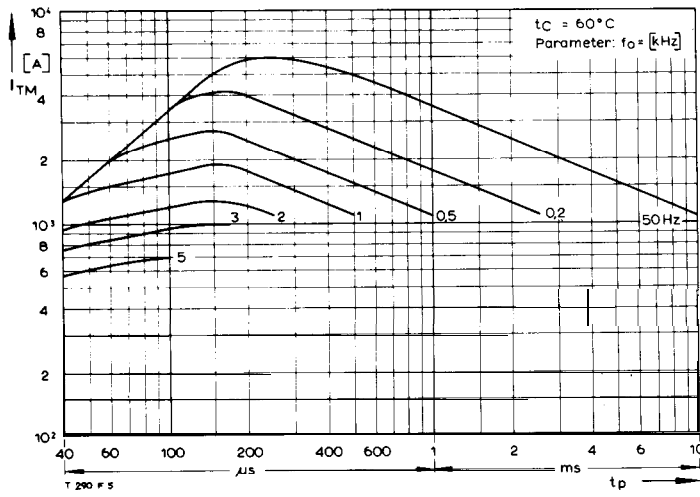
**Mechanische Eigenschaften****Mechanical properties**

<b>Si-Element</b> mit Druckkontakt	Si-pellet with pressure contact		F 5,5 kN
Anpreßkraft	Clamping force		G typ. 630 g
Gewicht	weight		14 mm
Kriechstrecke	Creepage distance		C
Feuchteklasse	humidity classification	DIN 40040	50 $\text{m}/\text{s}^2$
Schwingfestigkeit	Vibration resistance	f = 50 Hz	Seitelpage 154
Maßbild B	outline B	DIN 41894-224A4	

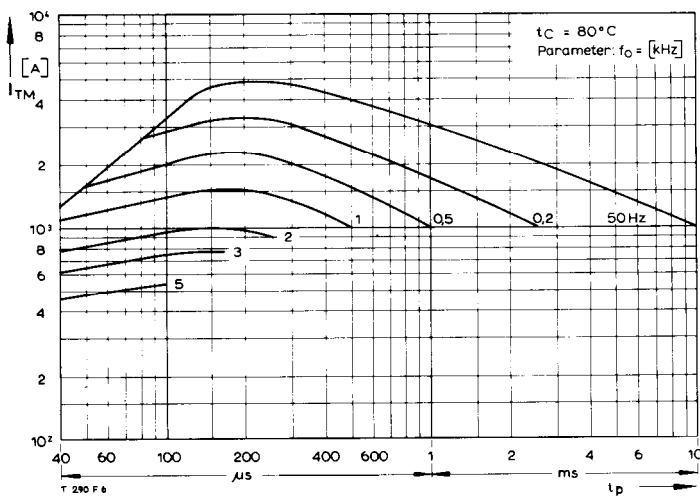
\* Für größere Stückzahlen bitte Liefertermin erfragen/Delivery for larger quantities on request

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

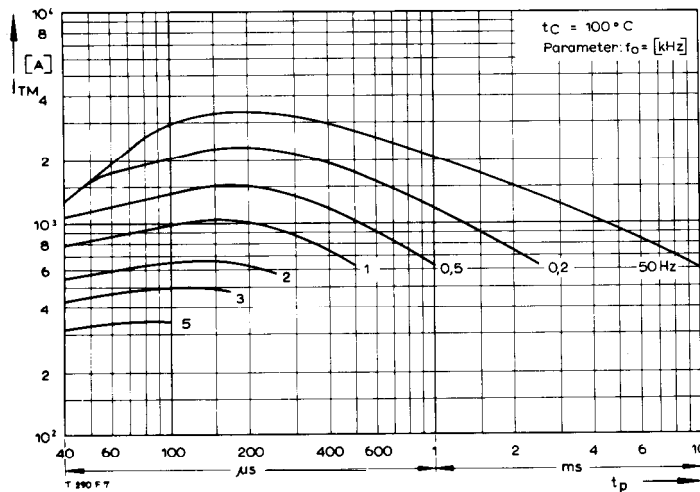
2) Unmittelbar nach der Freiwerdezeit, vgl. Meßbedingungen für  $t_q$ /Immediately after circuit commutated turn-off time, see Parameters  $t_q$



Bild/Fig. 1



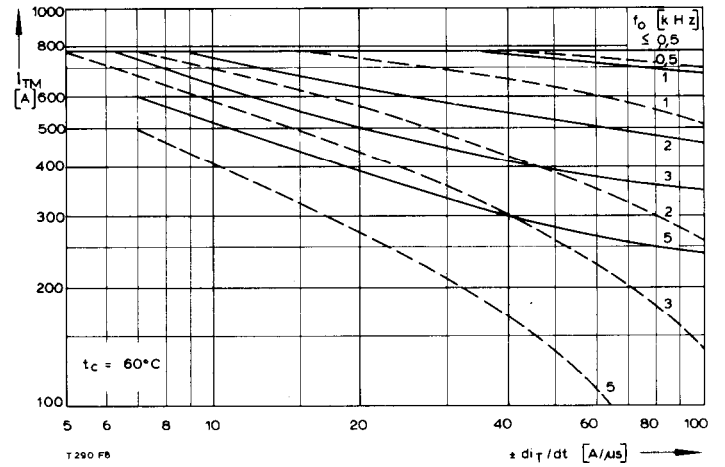
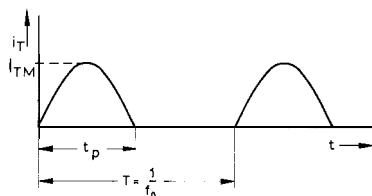
Bild/Fig. 2



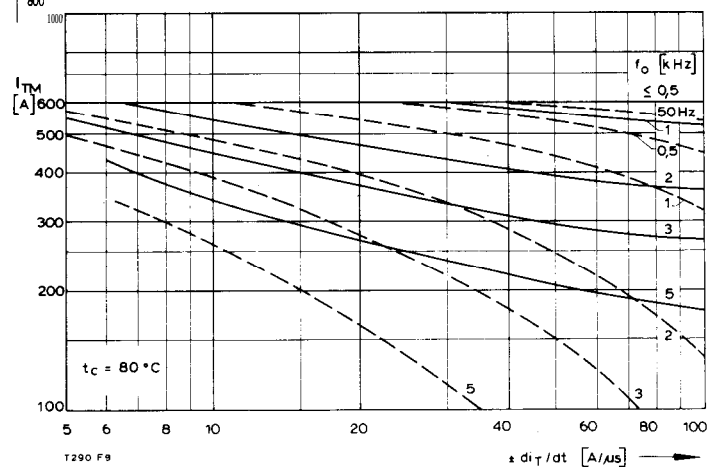
Bild/Fig. 3

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

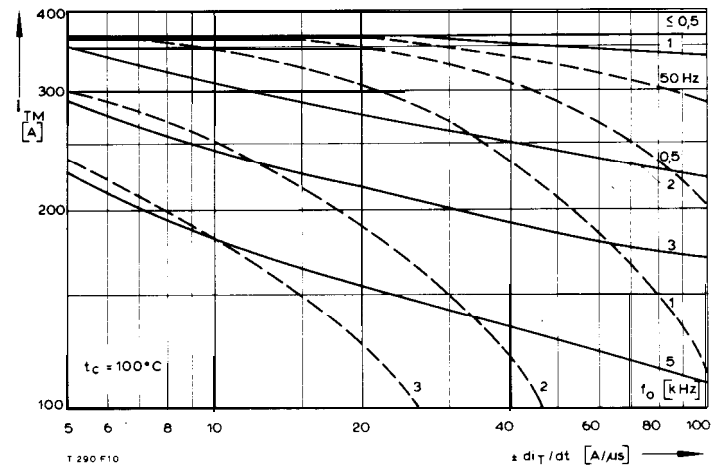
RC-Glied/RC-network:  
 $R[\Omega] \geq 0,02 \text{ VDM [V]}$   
 $C \leq 0,22 \mu\text{F}$   
 $V_{DM} \leq 0,67 \text{ V}_{DRM}$



Bild/Fig. 4



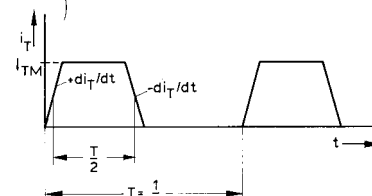
Bild/Fig. 5

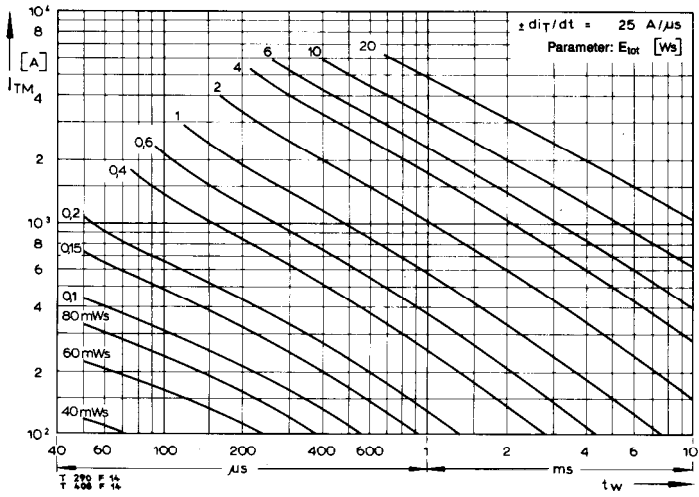


Bild/Fig. 6

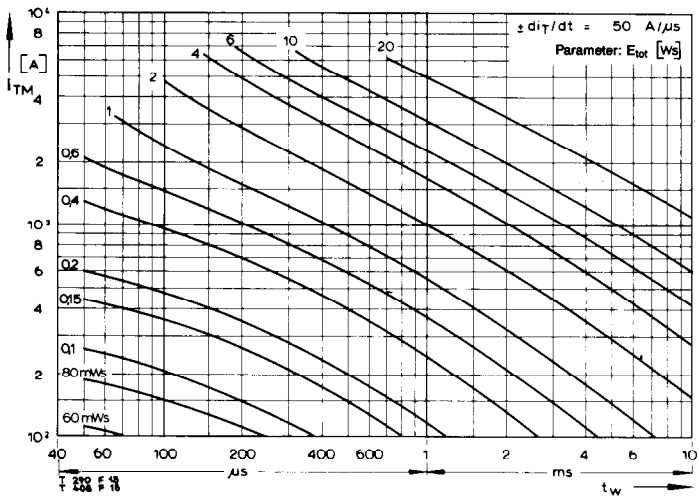
Bild/Fig. 4, 5, 6  
Steuergenerator/pulse generator:  
 $i_G = 1 \text{ A}$ ,  $di_G/dt = 1 \text{ A}/\mu\text{s}$

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

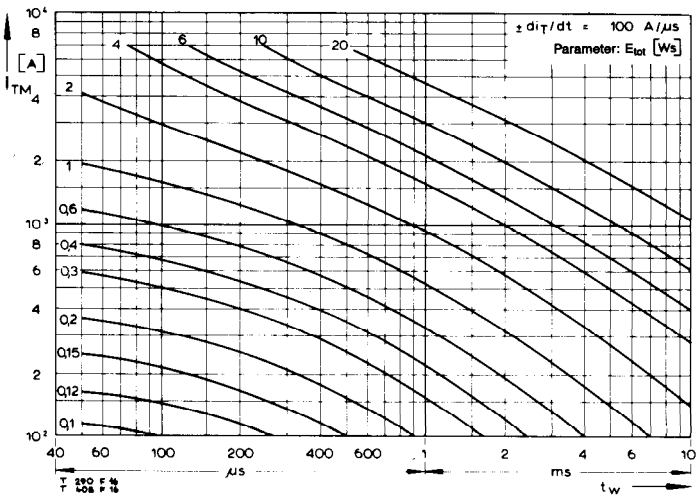




Bild/Fig. 10



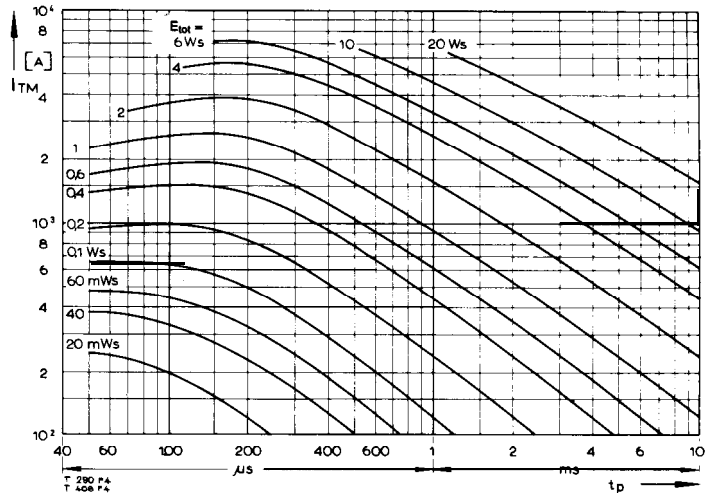
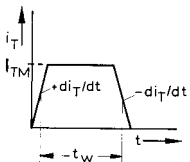
Bild/Fig. 11



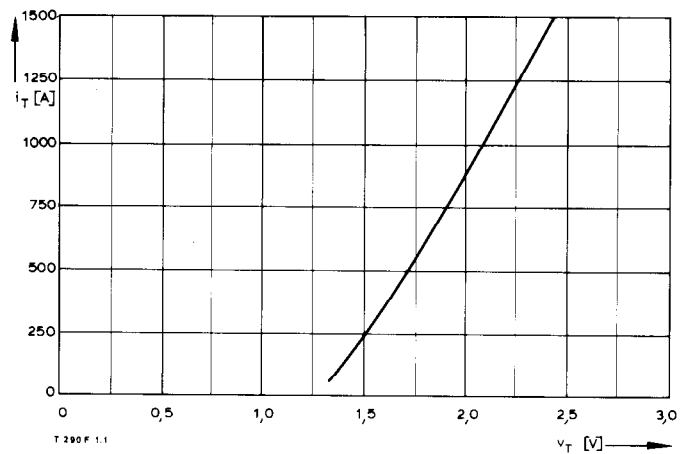
Bild/Fig. 12

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

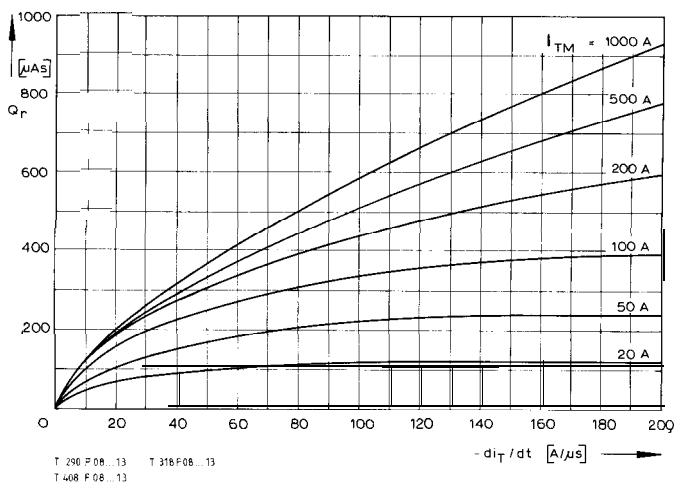
RC-Glied/RC-network:  
 $R [\Omega] \geq 0,02 v_{DM} [V]$   
 $C \leq 0,33 \mu\text{F}$   
 $v_{DM} \leq 0,67 v_{DRM}$   
 $dv_R/dt \leq 600 \text{ V}/\mu\text{s}$   
 $v_{RM} \leq 0,67 v_{RRM}$



Bild/Fig. 13



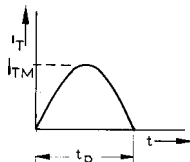
Bild/Fig. 14

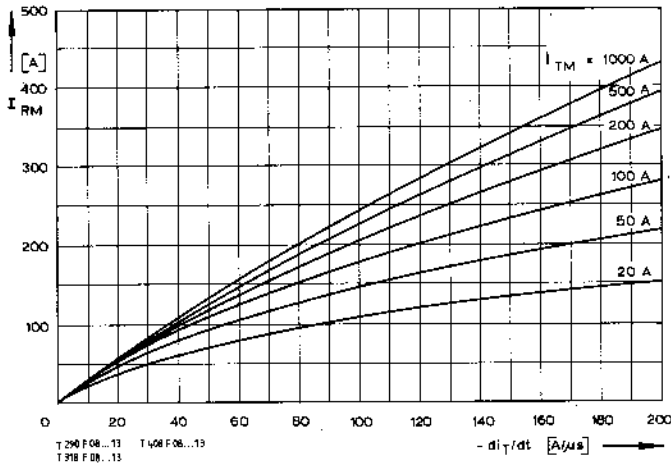


Bild/Fig. 15

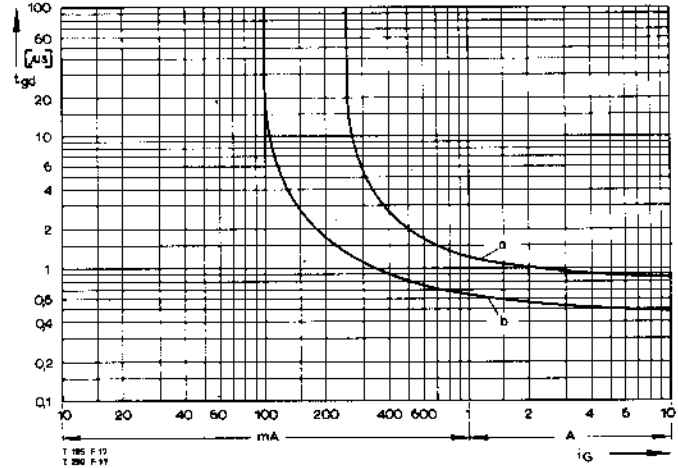
(zu Bild/to Fig. 13)  
Steuer-generator/pulse generator:  
 $i_G = 1 \text{ A}$ ,  $di_G/dt = 1 \text{ A}/\mu\text{s}$

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

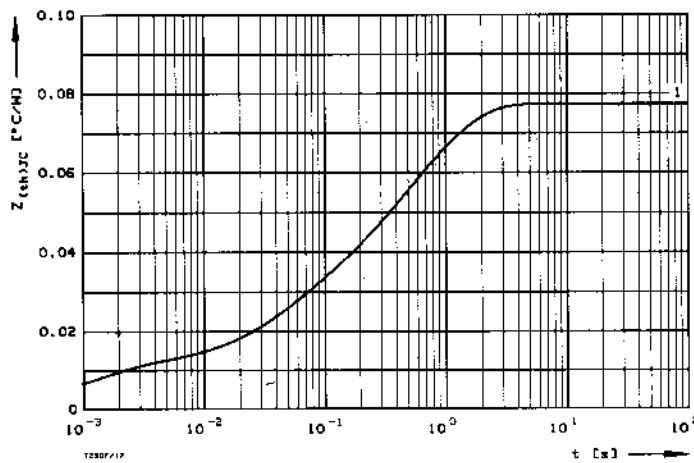




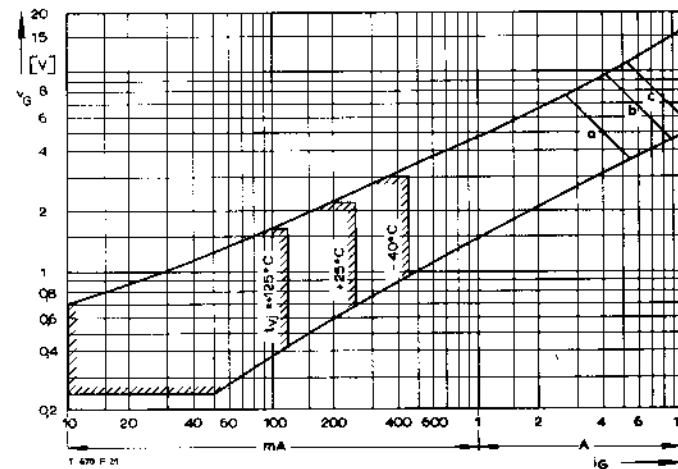
**Bild/Fig. 16**  
 Rückstromspitze  $I_{RM} = f(-di/dt)$ ,  $t_{vj} = t_{vj(max)}$ ,  $V_R = 0,5 V_{RRM}$ ,  $V_{RM} = 0,8 V_{RRM}$   
 Peak reverse recovery current  $I_{RM} = f(-di/dt)$ ,  $t_{vj} = t_{vj(max)}$ ,  $V_R = 0,5 V_{RRM}$ ,  $V_{RM} = 0,8 V_{RRM}$   
 Parameter: Durchlaßstrom/On-state 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  $Z_{thJC} = f(t)$ , DC  
 Transient thermal impedance  $Z_{thJC} = f(t)$ , DC  
 1 Beidseitige Kühlung/two-sided cooling



**Bild/Fig. 19**  
 Steuercharakteristik mit Zündbereichen/Gate characteristic with triggering areas  
 $V_G = f(I_G)$ ,  $V_G = 12 \text{ V}$

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

Pos. n	1	2	3	4	5	6	7
$R_{thn}$ [°C/W]	0,010579	0,014042	0,016802	0,035980			
$\tau_n$ [s]	0,001165	0,040454	0,222096	0,838218			

Analytische Funktion/analytical function:

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