

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-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}	750 A
Dauerstrom	average on-state current	$t_c = 76^{\circ}\text{C}$	I_{TAVM}	408 A 477 A
Stoßstrom-Grenzwert	surge current	$t_s = 25^{\circ}\text{C}, t_p = 10 \text{ ms}$	I_{TSM}	7200 A 6400 A
Grenzlastintegral	I ² t-value	$t_{vj} = t_{vj\text{max}}, p = 10 \text{ ms}$	I^2t	280 kA ² s 205 kA ² s
Kritische Stromsteilheit	critical rate of rise of on-state current	$t_{vj} = 25^{\circ}\text{C}, t_p = 10 \text{ ms}$	$(di/dt)_{\text{cr}}$	200 A/μs
Kritische Spannungssteilheit	critical rate of rise of off-state voltage	$t_{vj} = t_{vj\text{max}}, t_p = 10 \text{ ms}$ $v_D \leq 67\% V_{\text{DRM}}, f = 50 \text{ Hz}$ $i_{\text{GM}} = 1 \text{ A}, di_{\text{G}}/dt = 1 \text{ Alps}$ $t_{vj} = t_{vj\text{max}}, v_D = 67\% V_{\text{DRM}}$	$(dv/dt)_{\text{cr}}$	1) 2) 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	$t_{vj} = t_{vj\text{max}}, I_T = 1400 \text{ A}$	V_T	max.	2,2 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		0,63 mΩ
Zündstrom	gate trigger current	$t_{vj} = 25^{\circ}\text{C}, v_D = 12 \text{ V}$	I_{GT}	max.	250 mA
Zündspannung	gate trigger voltage	$t_{vj} = 25^{\circ}\text{C}, v_D = 12 \text{ V}$	V_{GT}	max.	2,2 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	$t_{vj} = 25^{\circ}\text{C}, v_D = 12 \text{ V}, R_{\text{GK}} \geq 10 \text{ } \Omega$ $i_{\text{GM}} = 1 \text{ A}, di_{\text{G}}/dt = 1 \text{ A}/\mu\text{s}, t_{\text{G}} = 20 \text{ ps}$	I_L	max.	1 A
Vorwärts- u. Rückwärts-Sperrstrom	forward off-state and reverse Currents	$t_{vj} = t_{vj\text{max}}, v_D = V_{\text{D}}, v_R = V_{\text{RRM}}$	$i_{\text{D}}, i_{\text{R}}$	max.	50 mA
Zündverzögerung	gate controlled delay time	$t_{vj} = 25^{\circ}\text{C}, i_{\text{GM}} = 1 \text{ A}, di_{\text{G}}/dt = 1 \text{ A}/\mu\text{s}$	t_{gd}	max.	1,2 μs
Freiwerdezeit	circuit commutated turn-off time	siehe Techn. Erl./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.	0,053 °C/W 0,05 °C/W
für anodenseitige Kühlung	for anode-sided cooling	$\Theta = 180^{\circ} \text{ el, sin DC}$	$R_{\text{thJC(A)}}$	max.	0,088 °C/W 0,085 °C/W
für kathodenseitige Kühlung	for cathode-sided cooling	$\Theta = 180^{\circ} \text{ el, sin DC}$	$R_{\text{thJC(K)}}$	max.	0,123 °C/W 0,12 °C/W
Übergangswärmewiderstand	thermal resistance, case to heatsink	beidseitig/two-sided einseitig/one-sided	R_{thCK}	max.	0,01 °C/W 0,02 °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

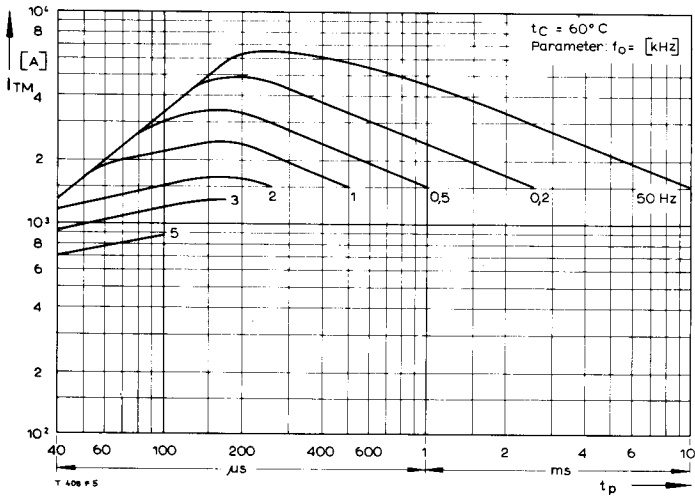
Mechanische Eigenschaften Mechanical properties

Si-Element mit Druckkontakt	Si-pellet with pressure contact		F		5 ... 10 kN
Anpreßkraft	Clamping force		G	typ.	100 g
Gewicht	weight				17mm
Kriechstrecke	Creepage distance				C
Feuchteklasse	humidity classification	DIN 40040			50 m/s ²
Schwingfestigkeit	Vibration resistance	f = 50 Hz			Seite/page 154
Maßbild	outline	DIN 41814-152A4			

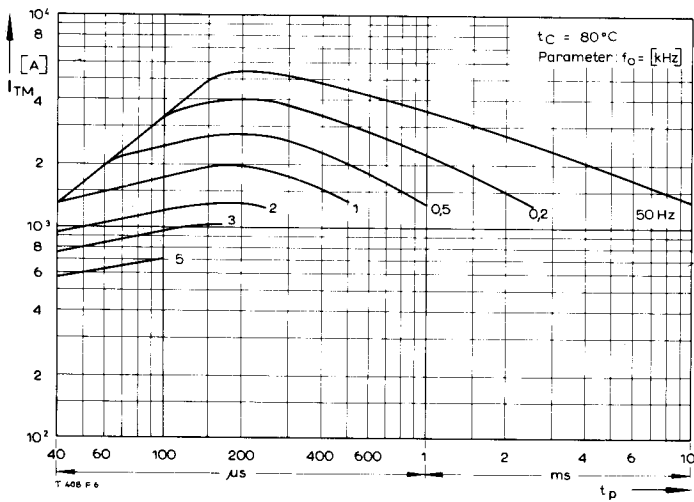
* Für größere Stückzahlen bitte Liefertermin erfragen/Delivery for larger quantities on request

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

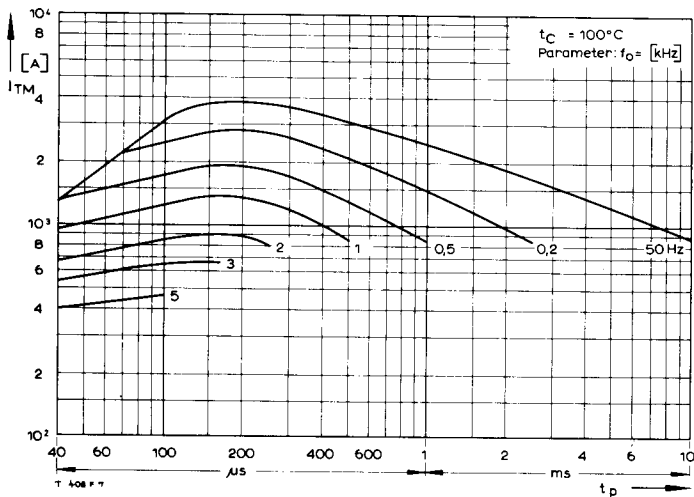
2) Unmittelbar nach der Freiwerdezeit, vgl. Meßbedingungen für t_{q} /Immediately after circuit commutated turn-off time, see Parameters t_{q}



Bild/Fig. 1



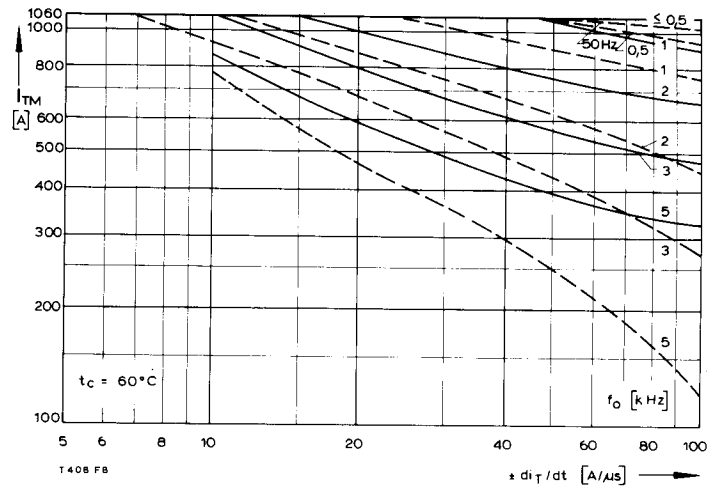
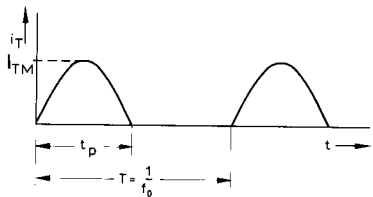
Bild/Fig. 2



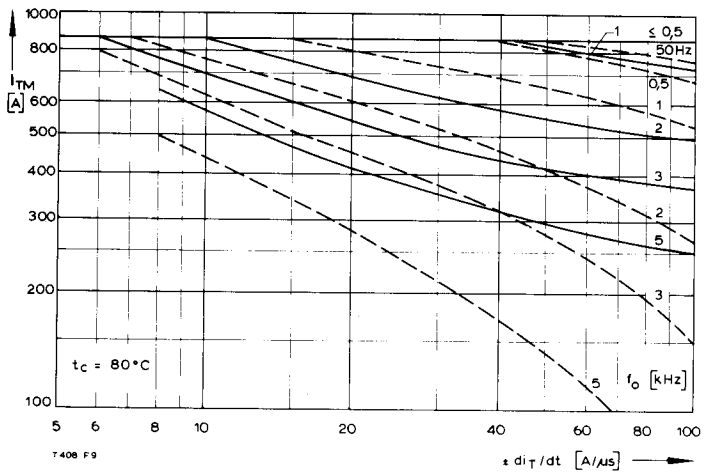
Bild/Fig. 3

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

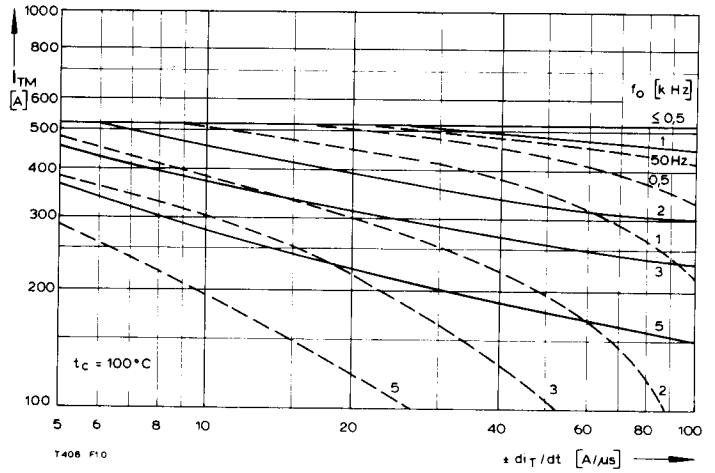
RC-Glied/RC-network:
 $R [\Omega] \geq 0,02 V_{DM} [V]$
 $C \leq 0,22 \mu\text{F}$
 $V_{DM} \leq 0,67 V_{DRM}$



Bild/Fig. 4



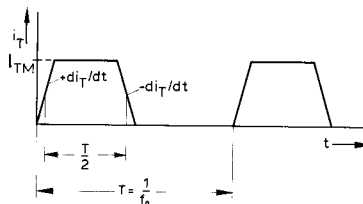
Bild/Fig. 5

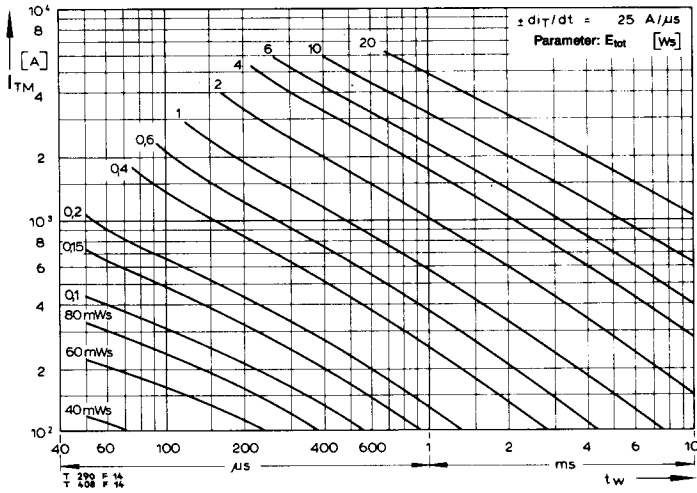


Bild/Fig. 6

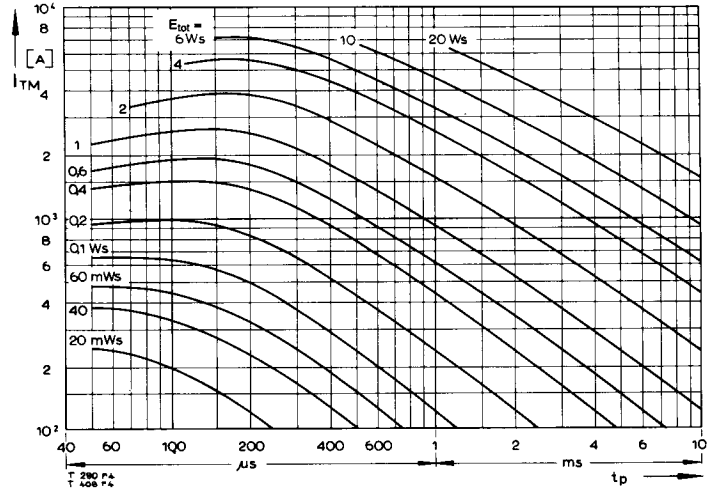
Bild/Fig. 4, 5, 6
Steuer-generator/pulse generator:
 $i_G = 1 \text{ A}$, $di_G/dt = 1 \text{ A}/\mu\text{s}$

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

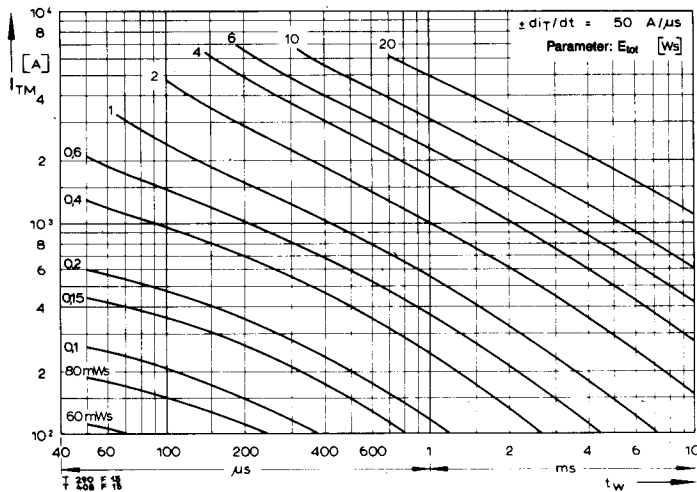




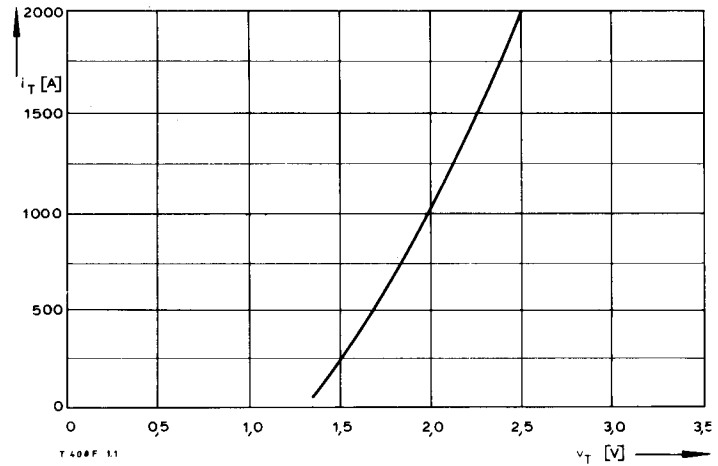
Bild/Fig. 10



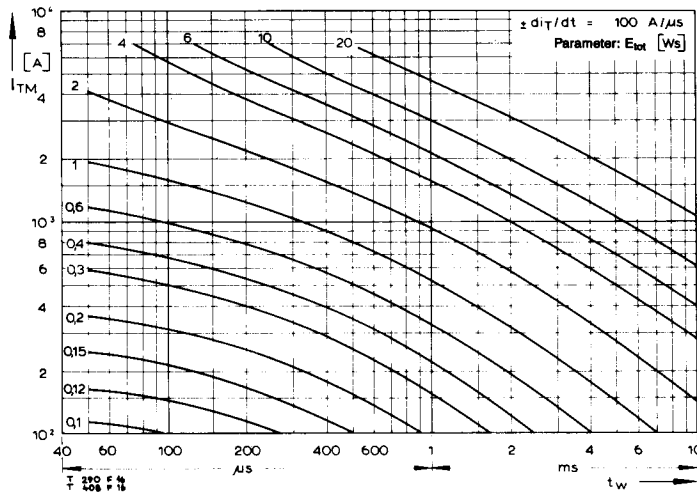
Bild/Fig. 13



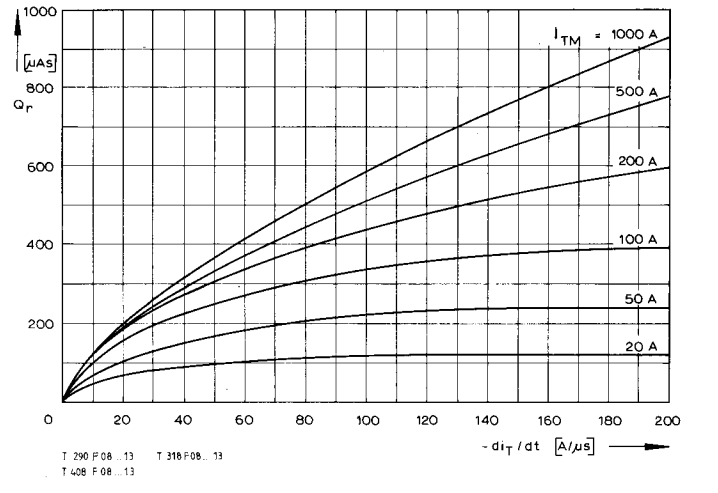
Bild/Fig. 11



Bild/Fig. 14



Bild/Fig. 12



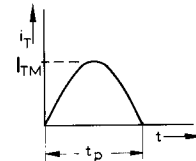
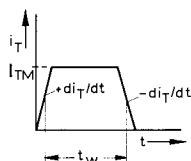
Bild/Fig. 15

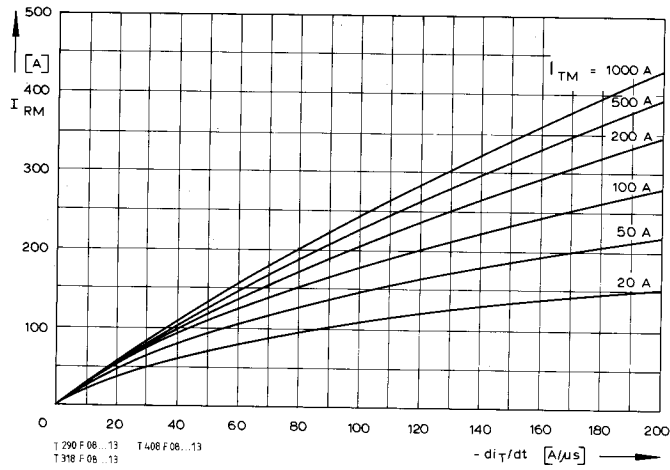
Bild/Fig. 10, 11, 12
 Steuergenerator/pulse generator:
 $i_G = 1 \text{ A}$, $di_G/dt = 1 \text{ A}/\mu\text{s}$

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

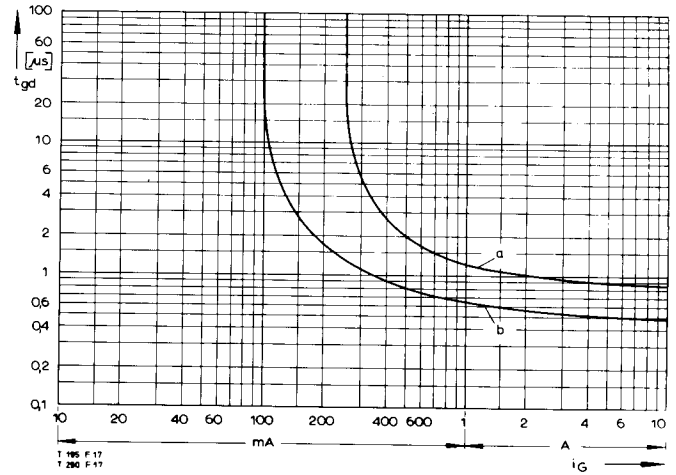
(zu Bild/to Fig. 13)
 Steuergenerator/pulse generator:
 $i_G = 1 \text{ A}$, $di_G/dt = 1 \text{ A}/\mu\text{s}$

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

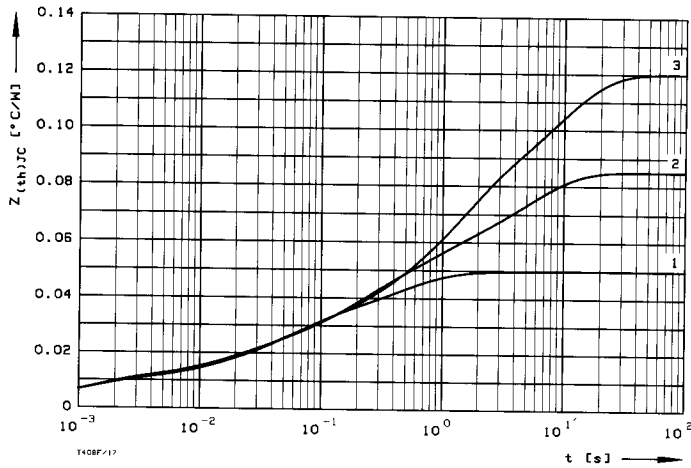




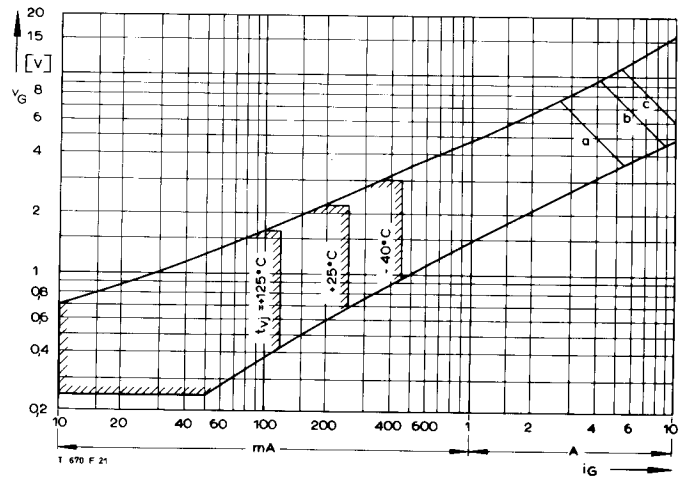
Bild/Fig. 16
 Rückstromspitze $I_{RM} = f(-di/dt)$, $t_{vj} = t_{vj(max)}$, $V_R = 0,5 V_{RRM}$, $V_{RM} = 0,8 V_{RRM}$
 Peak reverse recovery current $I_{RM} = f(-di/dt)$, $t_{vj} = t_{vj(max)}$, $V_R = 0,5 V_{RRM}$, $V_{RM} = 0,8 V_{RRM}$
 Parameter: Durchlaßstrom/On-state current I_{TM}



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



Bild/Fig. 17
 Transienter innerer Wärmewiderstand $Z_{thJC} = f(t)$, 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
 $V_G = f(i_G)$, $V_D = 12 V$

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 two-sided	R_{thn} [°C/W]	0,0105	0,00283	0,0167	0,0188	0,00116		
	τ_n [s]	0,0113	0,0255	0,0511	0,429	2,49		
anodenseitig anode-sided	R_{thn} [°C/W]	0,0094	0,00974	0,0182	0,0161	0,0316		
	τ_n [s]	0,000984	0,017	0,15	0,6	5,0		
kathodenseitig cathode-sided	R_{thn} [°C/W]	0,00928	0,0145	0,00868	0,0401	0,0475		
	τ_n [s]	0,000939	0,0285	0,156	1,12	9,1		

Analytische Funktion/analytical function:

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