

Elektrische Eigenschaften

Electrical properties

Höchstzulässige Werte

Maximum rated values

Periodische Vorwärts- und Rückwärts-Sperrspannung	repetitive peak forward off-state and reverse voltages	$t_{vj} = -40^{\circ}\text{C} \dots t_{vj\text{ max}}$	$V_{\text{DRM}}, V_{\text{RRM}}$	200, 400 V 600 V
Vorwärts-Stoßsperrspannung	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-Stoßsperrspannung	non repetitive peak reverse voltage	$t_{vj} = +25^{\circ}\text{C} \dots t_{vj\text{ max}}$	$V_{\text{RSM}} = V_{\text{RRM}}$	+50 V
Durchlaßstrom-Grenzeffektivwert	RMS on-state current	$t_c = 85^{\circ}\text{C}$	I_{TRMSM}	1100 A
Dauergrenzstrom	average on-state current	$t_{vj} = 25^{\circ}\text{C}, t_p = 10\text{ ms}$	I_{TAVM}	698 A
Stoßstrom-Grenzwert	surge current	$t_{vj} = t_{vj\text{ max}}, t_p = 10\text{ ms}$	I_{TSM}	12,4 kA 11 kA
Grenzlastintegral	Pt-value	$t_i = 25^{\circ}\text{C}, t_p = 10\text{ ms}$	I^2t	769 kA ² s 605 kA ² s
Kritische Stromsteilheit	critical rate of rise of on-state current	$t_{vj} = t_{vj\text{ max}}, t_p = 10\text{ ms}$	$(di/dt)_{\text{cr}}$	300 A/μs
Kritische Spannungssteilheit	critical rate of rise of off-state voltage	$v_D \leq 67\% V_{\text{DRM}}, f = 50\text{ Hz}$ $i_{\text{GM}} = 0,8\text{ A}, di_G/dt = 0,8\text{ A}/\mu\text{s}$ $t_{vj} = t_{vj\text{ max}}, v_D = 67\% V_{\text{DRM}}$	$(dv/dt)_{\text{cr}}$	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	$t_{vj} = t_{vj\text{ max}}, I_T = 2000\text{ A}$	V_T	max. 1,65 V
Schleusenspannung	threshold voltage	$t_{vj} = t_{vj\text{ max}}$	$V_{T(\text{TO})}$	1,02 V
Ersatzwiderstand	slope resistance	$t_{vj} = t_{vj\text{ max}}$	r_T	0,32 mΩ
Zündstrom	gate trigger current	$t_{vj} = 25^{\circ}\text{C}, v_D = 8\text{ V}$	I_{GT}	max. 200 mA
Zündspannung	gate trigger voltage	$t_{vj} = 25^{\circ}\text{C}, v_D = 8\text{ V}$	V_{GT}	max. 2 V
Nicht zündender Steuerstrom	gate non-trigger current	$t_{vj} = t_{vj\text{ max}}, v_D = 6\text{ V}$	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	$t_{vj} = 25^{\circ}\text{C}, v_D = 6\text{ V}, R_{\text{GA}} = 5\ \Omega$	I_{H}	max. 200 mA
Einraststrom	latching current	$t_{vj} = 25^{\circ}\text{C}, v_D = 6\text{ V}, R_{\text{GK}} \geq 10\ \Omega$ $i_{\text{GM}} = 0,8\text{ A}, di_{\text{oldt}} = 0,8\text{ A}/\mu\text{s}, t_{\text{G}} = 20\ \mu\text{s}$	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. 50 mA
Zündverzögerung	gate controlled delay time	$t_{vj} = 25^{\circ}\text{C}, i_{\text{GM}} = 0,8\text{ A}, di_G/dt = 0,8\text{ A}/\mu\text{s}$ siehe Techn. Erl./see Techn. Inf.	t_{gd}	max. 1,4 μs
Freiwerdezeit			t_q	C*: max. 12 ps D: max. 15 ps E: max. 20 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. 0,05 °C/W max. 0,048 °C/W
für anodenseitige Kühlung	for anode-sided cooling	$\theta = 180^{\circ}\text{ el, sin}$ DC	$R_{\text{thJC(A)}}$	max. 0,082 °C/W max. 0,08 °C/W
für kathodenseitige Kühlung	for cathode-sided cooling	$\theta = 180^{\circ}\text{ el, sin}$ DC	$R_{\text{thJC(K)}}$	max. 0,12 °C/W max. 0,117 °C/W
Übergangswärmewiderstand	thermal resistance, case to heatsink	beidseitig/two-sided einseitig/one-sided	R_{thCK}	max. 0,01 °C/W max. 0,02 °C/W
Höchstzul. Sperrschichttemperatur	max. junction temperature		$t_{vj\text{ max}}$	140 °C
Betriebstemperatur	Operating temperature		$t_{c\text{ op}}$	-40 ... + 140 °C
Lagertemperatur	storage temperature		t_{stg}	-40 ... + 140 °C

Mechanische Eigenschaften

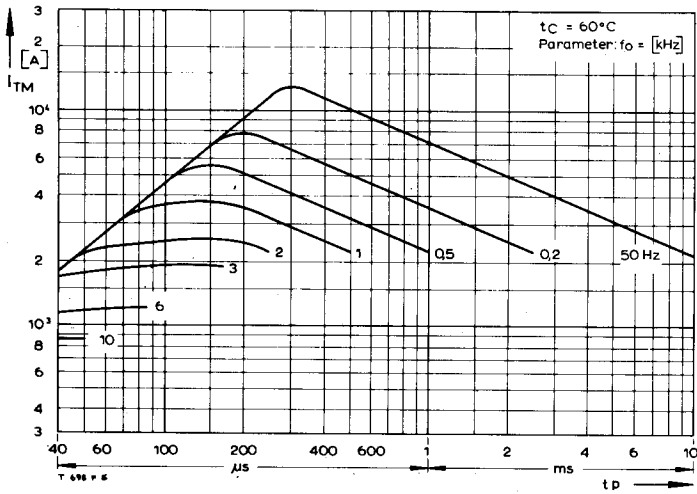
Mechanical properties

Si-Element mit Druckkontakt	Si-pellet with pressure contact		F	5,5... 11 kN
Anpreßkraft	Clamping force		G	typ. 100 g
Gewicht	weight			8 mm
Kriechstrecke	Creepage distance			C
Feuchteklasse	humidity classification	DIN 40040		50 m/s ²
Schwingfestigkeit	Vibration resistance	f = 50 Hz		
ßbild	outline	DIN 41814-152A4		

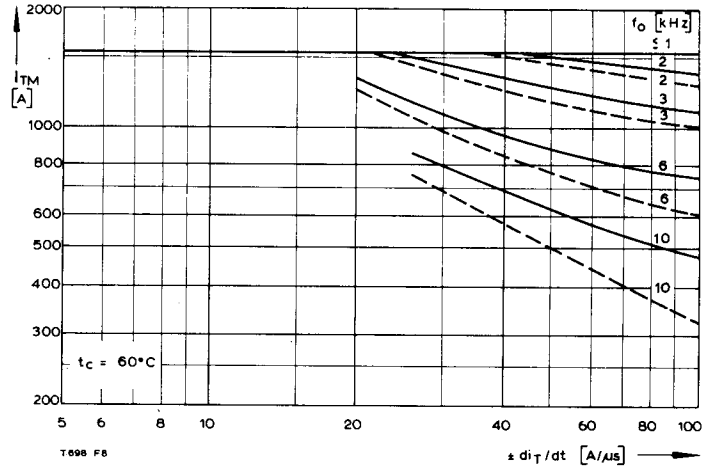
Für größere Stückzahlen bitte Liefertermin erfragen/Delivery for larger quantities on request

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

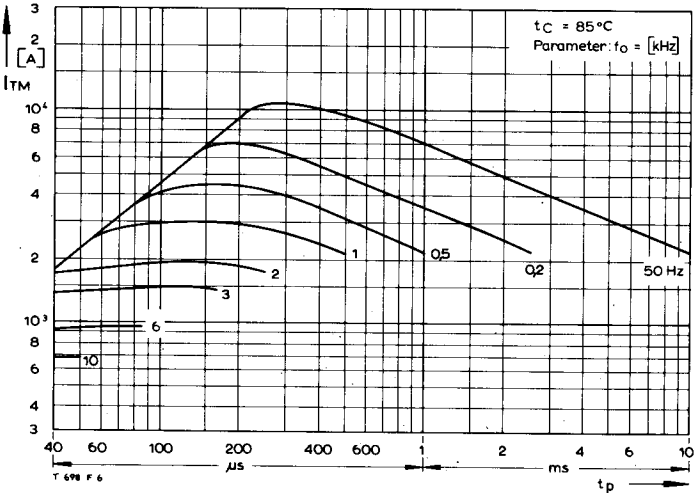
2) Unmittelbar nach der Freiwerdezeit, vgl. Meßbedingungen für t_q /Immediately after circuit commutated turn-off time, see Parameters t_q



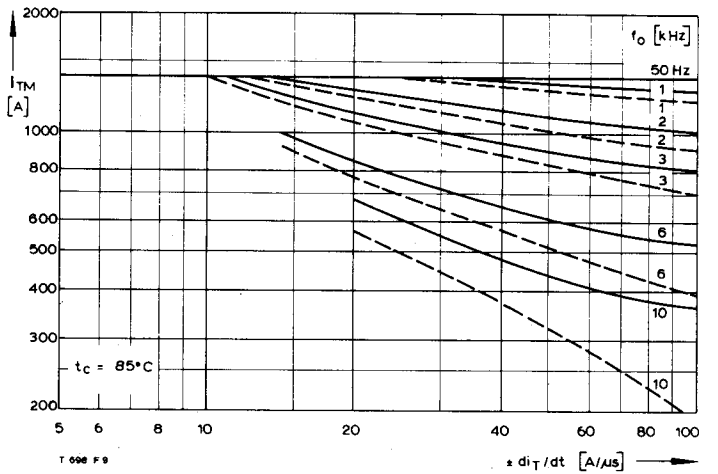
Bild/Fig. 1



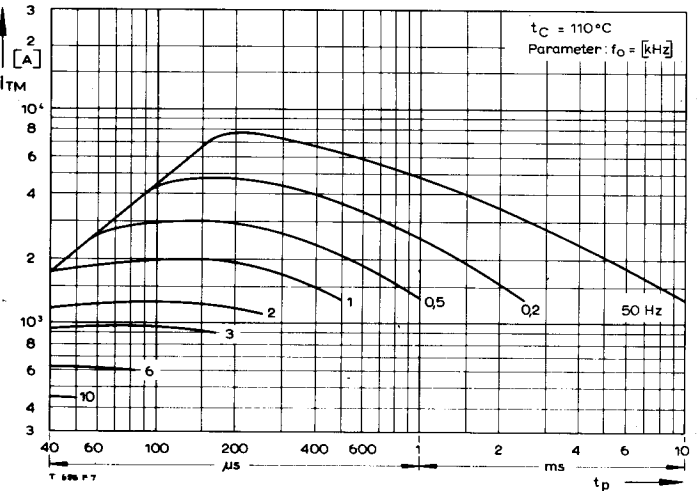
Bild/Fig. 4



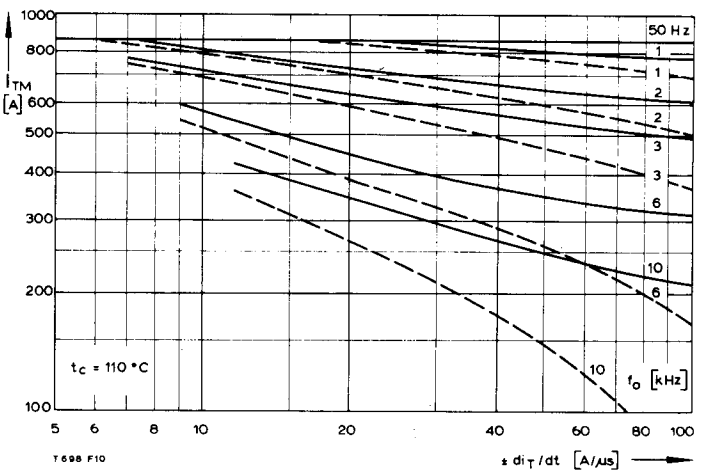
Bild/Fig. 2



Bild/Fig. 5



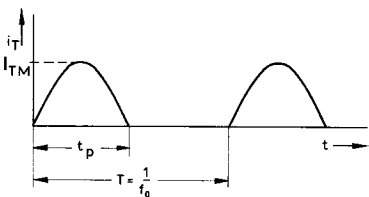
Bild/Fig. 3



Bild/Fig. 6

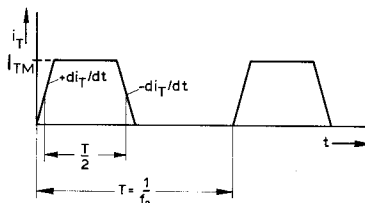
Bild/Fig. 1, 2, 3
Steuergenerator/pulse generator:
 $i_G = 0,8 \text{ A}$, $di_G/dt = 0,8 \text{ A}/\mu\text{s}$

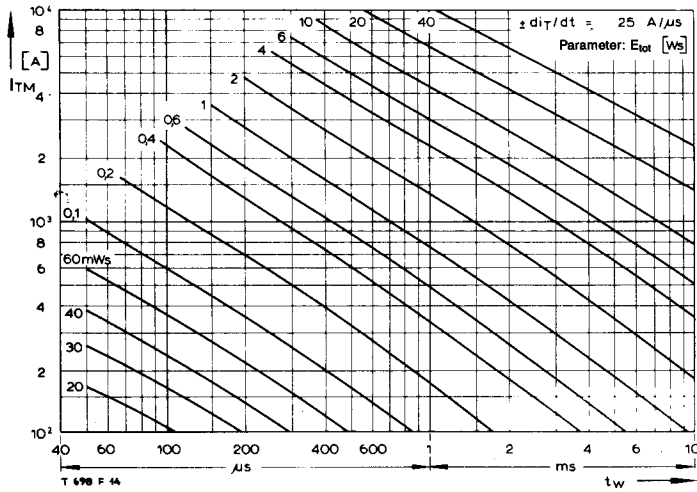
RC-Glied/RC-network:
 $R [\Omega] \geq 0,02 V_{DM} [V]$
 $C \leq 0,22 \mu\text{F}$
 $V_{DM} \leq 0,67 V_{DRM}$



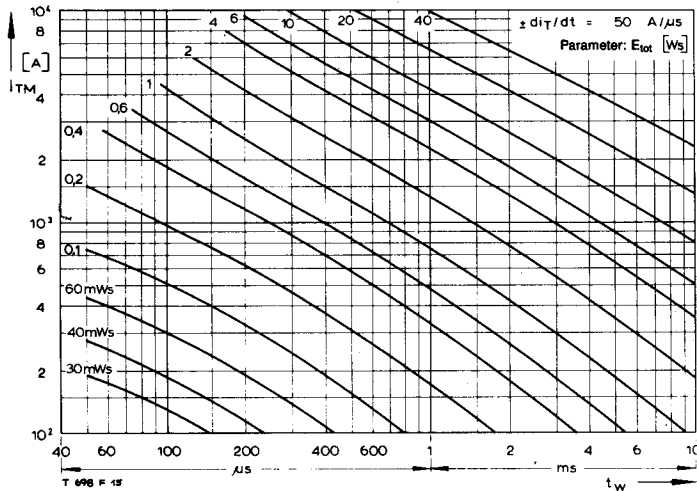
Bild/Fig. 4, 5, 6
Steuergenerator/pulse generator:
 $i_G = 0,8 \text{ A}$, $di_G/dt = 0,8 \text{ A}/\mu\text{s}$

RC-Glied/RC-network:
 $R [\Omega] \geq 0,02 V_{DM} [V]$
 $C \leq 0,33 \mu\text{F}$
 $V_{DM} \leq 0,67 V_{DRM}$
 $dV_R/dt \leq 400 \text{ V}/\mu\text{s}$
 $V_{RM} \leq 0,67 V_{RRM}$

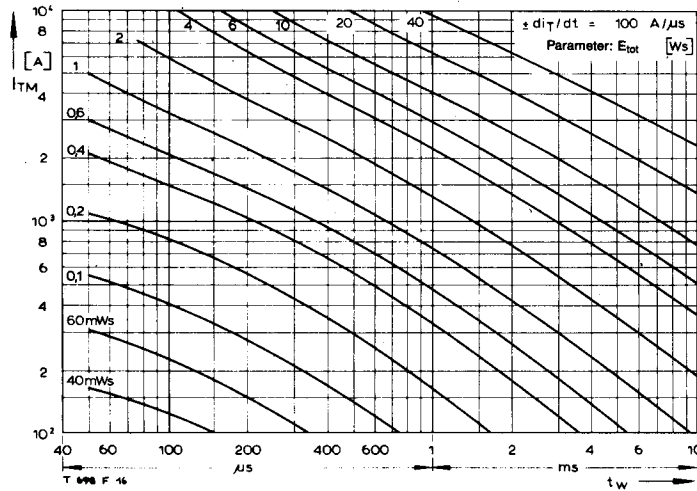




Bild/Fig. 10



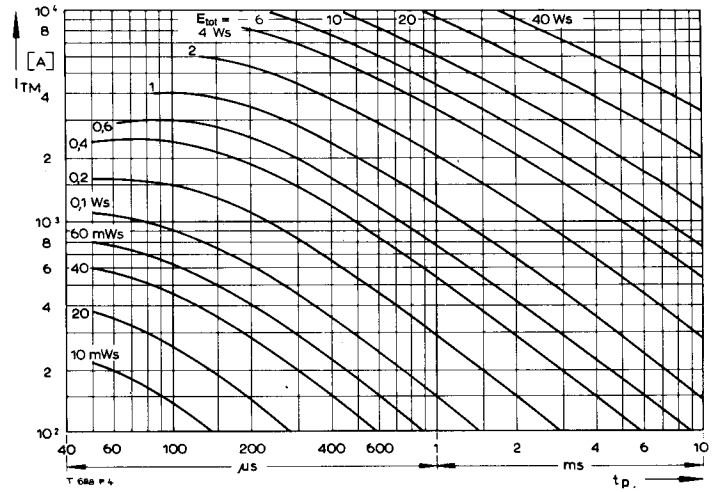
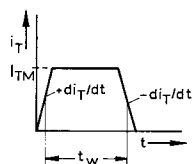
Bild/Fig. 11



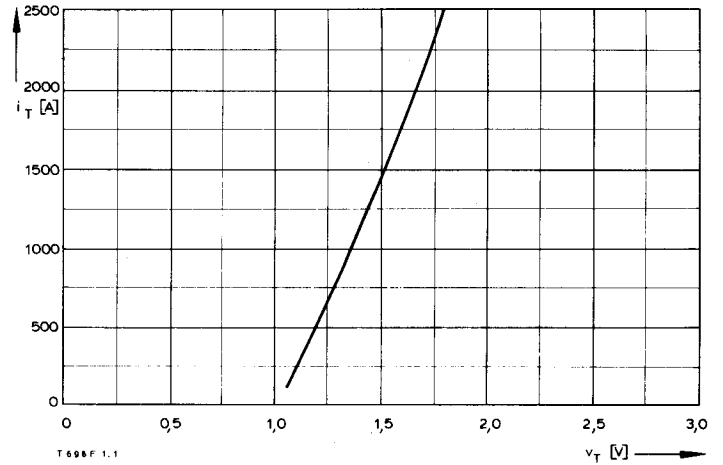
Bild/Fig. 12

Bild/Fig. 10, 11, 12
Steuergenerator/pulse generator:
 $i_G = 0,8 \text{ A}$, $di_G/dt = 0,8 \text{ A}/\mu\text{s}$

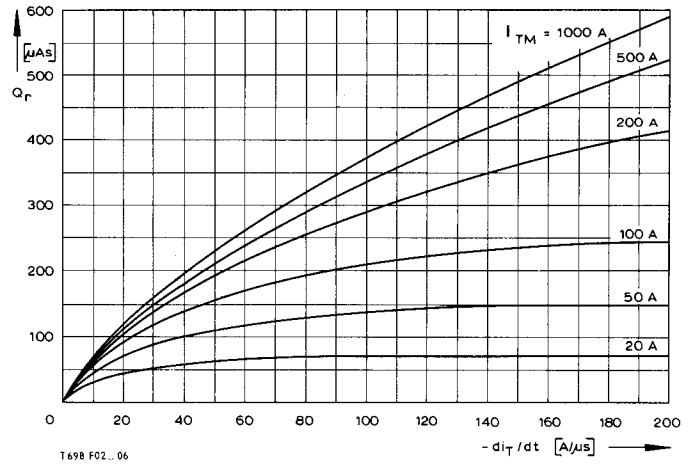
RC-Glied/RC-network:
 $R [\Omega] \geq 0,02 v_{DM} [V]$
 $C \leq 0,33 \mu\text{F}$
 $v_{DM} \leq 0,67 v_{DRM}$
 $dv_R/dt \leq 400 \text{ V}/\mu\text{s}$
 $v_{RM} \leq 0,67 v_{RRM}$



Bild/Fig. 13



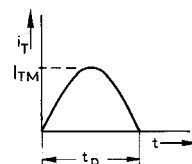
Bild/Fig. 14

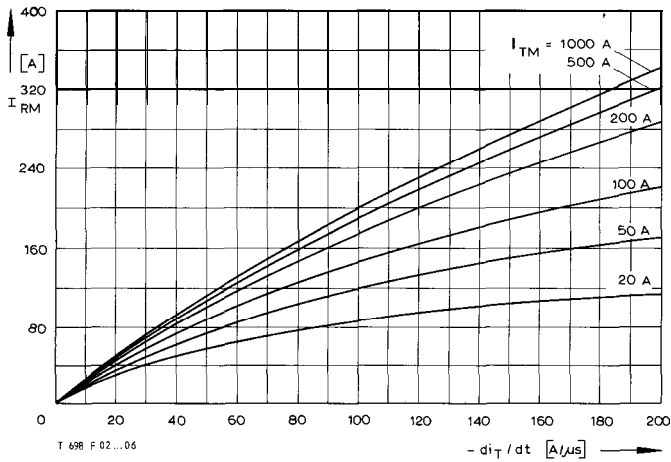


Bild/Fig. 15

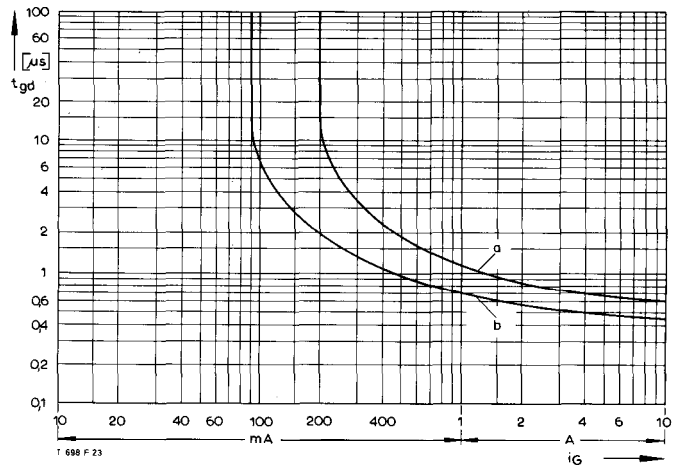
(zu Bild/to Fig. 13)
Steuergenerator/pulse generator:
 $i_G = 0,8 \text{ A}$, $di_G/dt = 0,8 \text{ A}/\mu\text{s}$

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

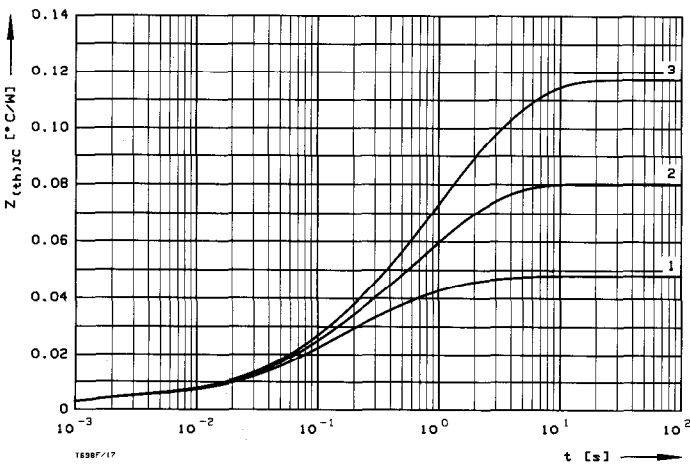




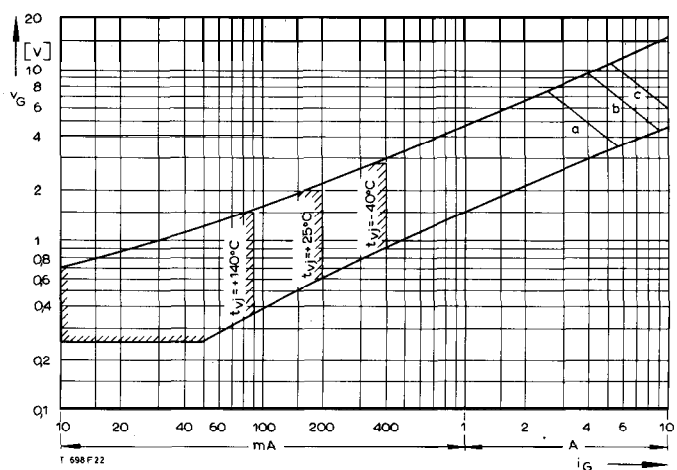
BildFig. 16
 Rückstromspitze $I_{RM} = f(-di/dt)$, $t_{vj} = t_{vj(max)}$, $V_R = 0,5 V_{RRM}$, $V_{RM} = 0,8 V_{RRM}$
 Peak reverse recovery current $I_{RM} = f(-di/dt)$, $t_{vj} = t_{vj(max)}$, $V_R = 0,5 V_{RRM}$, $V_{RM} = 0,8 V_{RRM}$
 Parameter: Durchlaßstrom/On-state current I_{TM}



BildFig. 18
 Zündverzugs/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



BildFig. 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



BildFig. 19
 Steuercharakteristik mit Zündbereichen/Gate Characteristic with triggering areas
 $V_G = f(i_G)$, $V_G = 6 \text{ V}$

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/cooling	Pos. n	1	2	3	4	5	6	7
beidseitig/two-sided	R_{thn} [°C/W]	0,00445	0,00823	0,0137	0,017	0,00481		
	τ_n [s]	0,0011	0,05	0,123	0,5	2,27		
anodenseitig/anode-sided	R_{thn} [°C/W]	0,00445	0,00823	0,0137	0,00141	0,017	0,0173	0,01827
	τ_n [s]	0,0011	0,05	0,123	0,273	0,5	1,05	2,27
kathodenseitig/cathode-sided	R_{thn} [°C/W]	0,00445	0,00823	0,0137	0,017	0,0278	0,02174	0,0245
	τ_n [s]	0,0011	0,05	0,123	0,5	0,803	2,54	4,33

Analytische Funktion/analytical function:

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