T 308 F

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°C $t_{vj\,max}$	V_{DRM}, V_{RRM}	200, 400 v 600 V
Vorwärts-Stoßspitzen-sperrspannung	non repetitive peak forward off-state voltage	t_{vj} = −40°C … $t_{vj\,max}$	V_{DSM} = V_{DRM}	
Rückwärts-Stoßspitzen-sperrspannung	non repetitive peak reverse voltage	t_{vj} = + 25°C … $t_{vj\,max}$	V_{RSM} = V_{RRM}	+50 v
Durchlaßstrom-Grenzeffektivwert	RMS on-state current		I_{TRMSM}	600 A
Dauergrenzstrom	average on-state current	tc = 85°C	I_{TAVM}	308 A
		tc = 71°C		382 A
Stoßstrom-Grenzwert	surge current	t_{vj} = 25°C, t_p = 10 ms	I_{TSM}	4600 A
		t_{vj} = $t_{vj\,max}$, t_p = 10 ms		4000 A
Grenzlastintegral	I^2t-value	t_{vj} = 25°C, t_p = 10 ms	I^2t	106 kA²s
		t_{vj} = $t_{vj\,max}$, t_p = 10 ms		80 kA²s
Kritische Stromsteilheit	critical rate of rise of on-state current	$v_D \leq$ 67% V_{DRM}, f = 50 Hz	$(di/dt)_{cr}$	300 A/µs
		I_{GM} = 0,8 A, di_G/dt = 0,8 Alps		1) 2)
Kritische Spannungssteilheit	critical rate of rise of off-state voltage	t_{vj} = $t_{vj\,max}$, v_D = 87% V_{DRM}	$(dv/dt)_{cr}$ 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_{vjmax}, i_T = 1000 A	v_T	max.	1,9 v
Schleusenspannung	threshold voltage	t_{vj} = $t_{vj\,max}$	$V_{T(TO)}$		1 v
Ersatzwiderstand	slope resistance	t_{vj} = $t_{vj\,max}$	r_T		0,7 mS2
Zündstrom	gate trigger current	t_{vj} = 25°C, v_D = 8 V	I_{GT}	max.	200 mA
Zündspannung	gate trigger voltage	t_{vj} = 25°C, v_D = 6 V	V_{GT}	max.	2 v
Nicht zündender Steuerstrom	gate non-trigger current	t_{vj} = $t_{vj\,max}$, v_D = 6 V	I_{GD}	max.	10 mA
Nicht zündende Steuerspannung		t_{vj} = $t_{vj\,max}$, v_D = 0,5 V_{DRM}	V_{GD}	max.	0,25 V
Haltestrom	holding current	t_{vj} = 25°C, v_D = 6 V, R_A = 5 Ω	I_H	max.	200 mA
Einraststrom	latching current	t, = 25°C, v_D = 6 V, $R_{GK} \geq$ 10 Ω	I_L	max.	1 A
		I_{GM} = 0,8 A, di_G/dt = 0,8 A/µs, t_g = 20 µs			
Vorwärts- u. Rückwärts-Sperrstrom	forward off-state and reverse Currents	t_{vj} = $t_{vj\,max}$, v_D = V_{DRM}, v_R = V_{RRM}	i_D, i_R	max.	30 mA
ündverzug	gate controlled delay time	t_{vj} = 25°C, i_{GM} = 0,8 A, di_G/dt = 0,8 A/µs	t_{gd}	max.	1,4 µs
Freiwerdezeit	circuit commutated turn-off time	siehe Techn. Erl./see Techn. Inf.	t_q C*:	max.	12 µs
			D:	max.	15 µs
			E:	max.	20 µs

Thermische Eigenschaften / Thermal properties

Innerer Wärmewiderstand	thermal resistance, junction to case				
für beidseitige Kühlung	for two-sided cooling	Θ = 180° el, sin	R_{thJC}	max.	0,108 °C/W
		DC		max.	0,099 °C/W
für anodenseitige Kühlung	for anode-sided cooling	Θ = 180° el, sin	$R_{thJC(A)}$	max.	0,189 °C/W
		DC		max.	0,18 °C/W
für kathodenseitige Kühlung	for cathode-sided cooling	Θ = 180" el, sin	$R_{thJC(K)}$	max.	0,232 °C/W
		DC		max.	0,22 °C/W
Übergangswärmewiderstand	thermal resistance, case to heatsink	beidseitig/two-sided	R_{thCK}	max.	0,015 °C/W
		einseitiglone-sided		max.	0,03 °C/W
Höchstzul. Sperrschichttemperatur	max. junction temperature		$t_{vj\,max}$		140°C
Betriebstemperatur	Operating temperature		$t_{c\,op}$		−40 … + 140°C
Lagertemperatur	storage temperature		t_{stg}		−40 … + 140°C

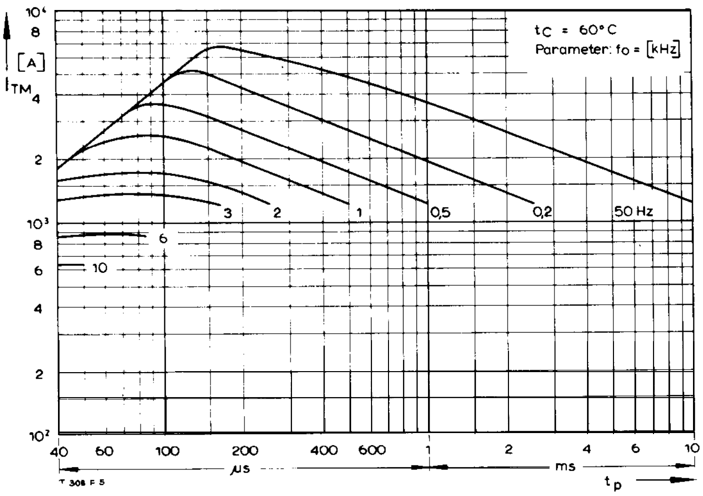
Mechanische Eigenschaften / Mechanical properties

Si-Element mit Druckkontakt	Si-pellet with pressure contact				
Anpreßkraft	Clamping force		F		2,5 … 5 kN
Gewicht	weight		G	typ.	70 g
Kriechstrecke	Creepage distance				17 mm
Feuchteklasse	humidity classification	DIN 40040			C
Schwingfestigkeit	Vibration resistance	f = 50 Hz			50 m/s²
Maßbild	outline	DIN 41814-151A4			Seite/page 154

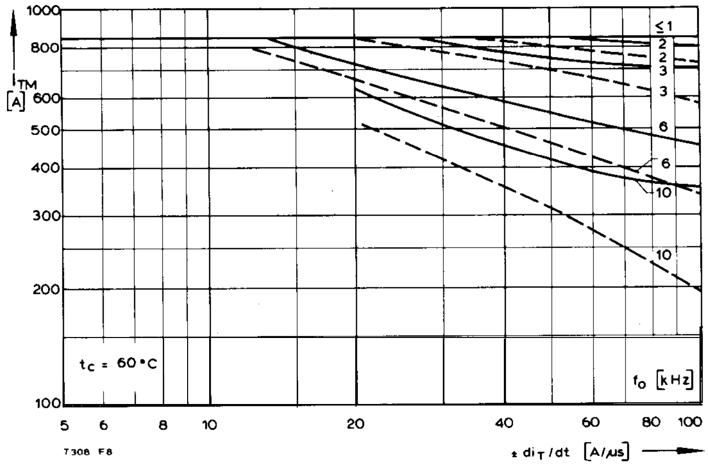
* Für größere Stückzahlen bitte Liefertermin erfragen/Delivery for larger quantities on request

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

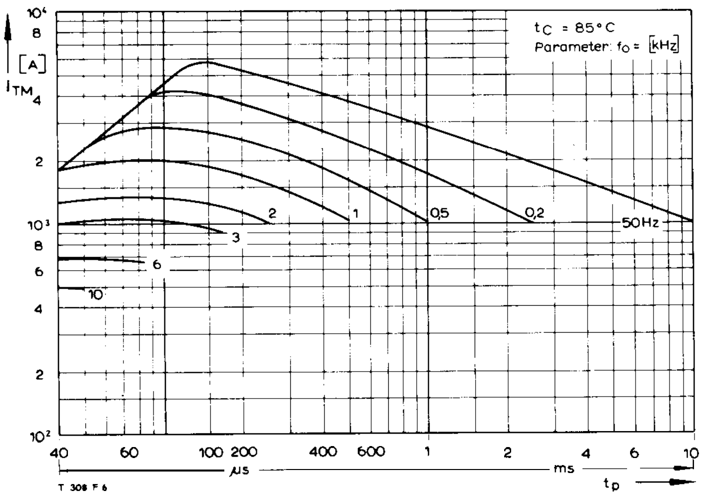
Gate non-trigger voltage



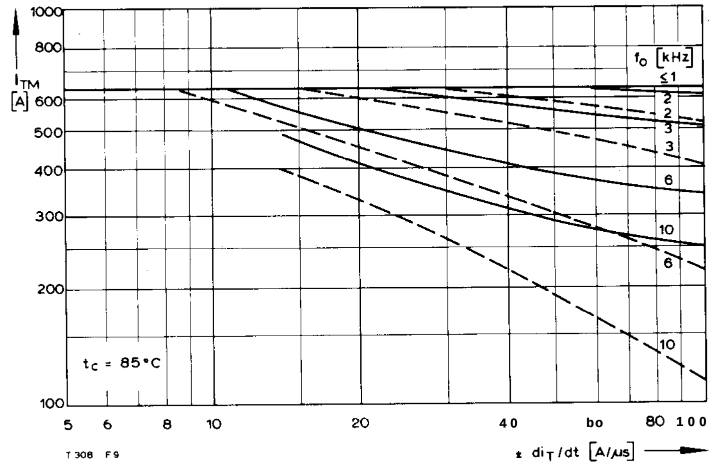
BildlFig. 1



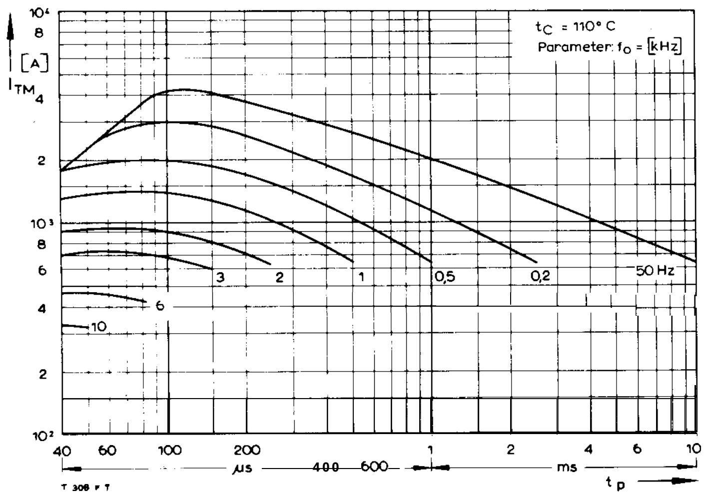
Bild/Fig. 4



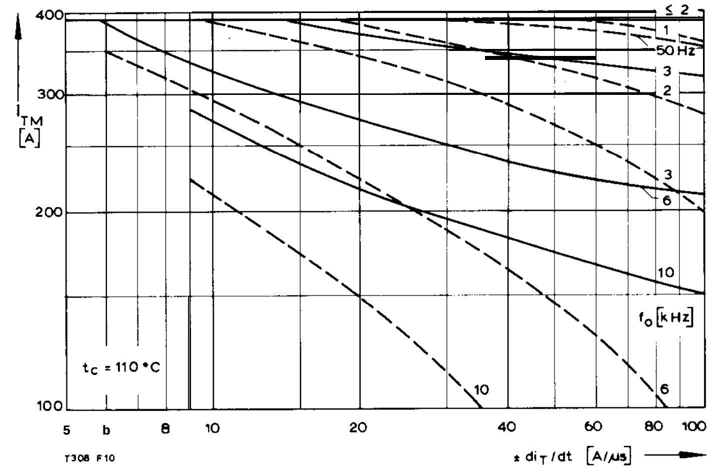
Bild/Fig. 2



Bild/Fig. 5



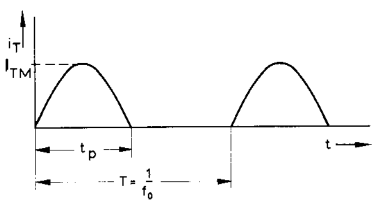
Bild/Fig. 3



Bild/Fig. 6

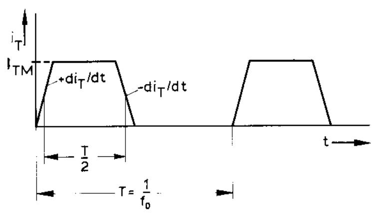
Bild/Fig. 1, 2, 3
Steuergeneratodpulse generator:
i_G = 0,8 A, di_G/dt = 0,8 A/µs

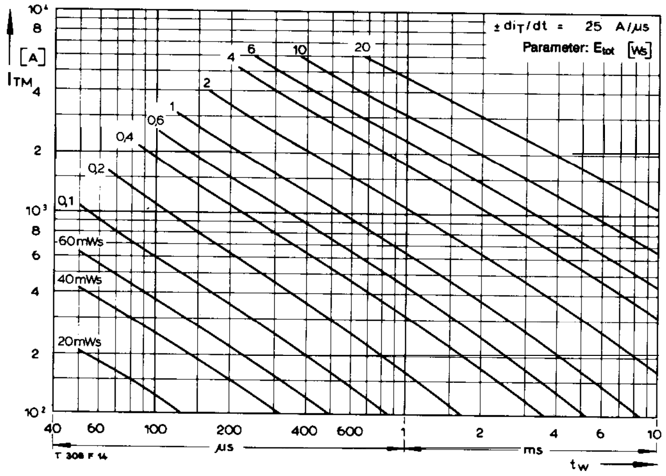
RC-Glied/RC-network:
R [Ω] ≥ 0,02 v_{DM} [V]
C ≤ 0,22 µF
VDM ≤ 0,67 V_{DRM}



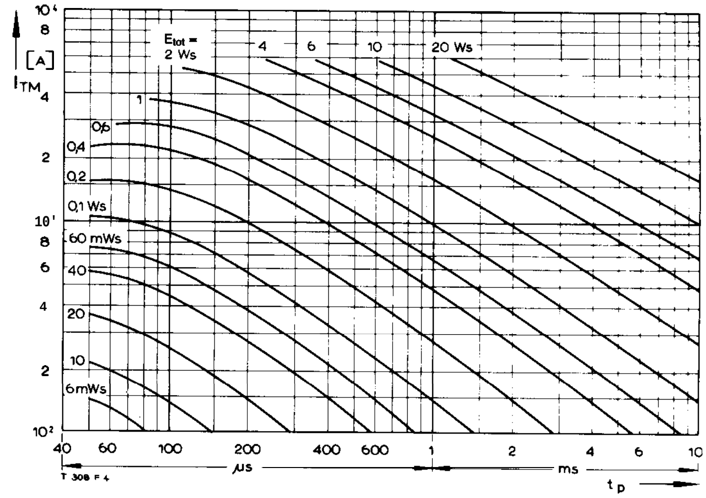
Bild/Fig. 4, 5, 6
Steuergenerator/pulse generator:
i_G = 0,8 A, di_G/dt = 0,8 A/µs

RC-Glied/RC-network:
R [Ω] ≥ 0,02 v_{DM} [V]
C ≤ 0,33 µF
VDM ≤ 0,67 V_{DRM}
dv_R/dt ≤ 400 V/µs
V_{RM} ≤ 0,67 V_{RRM}

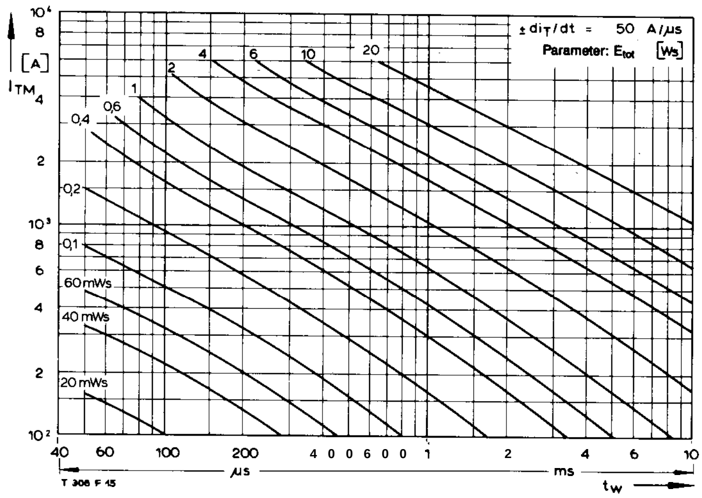




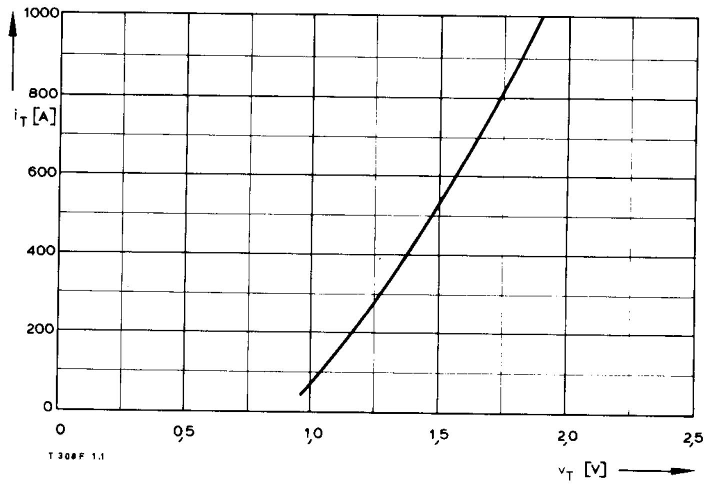
Bild/Fig. 10



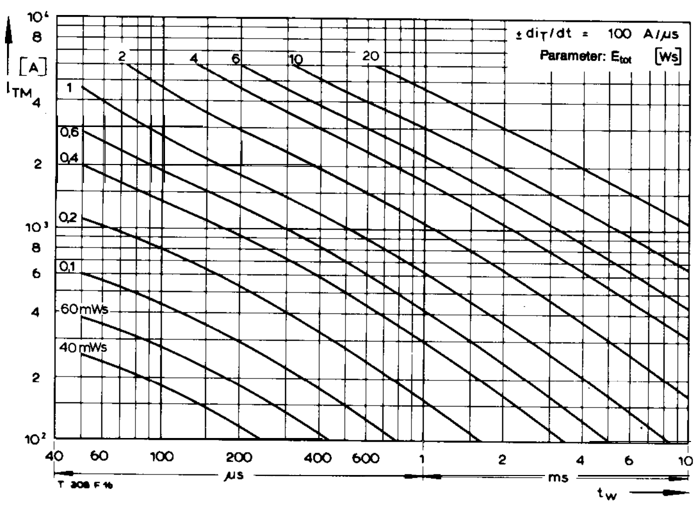
BildlFig. 13



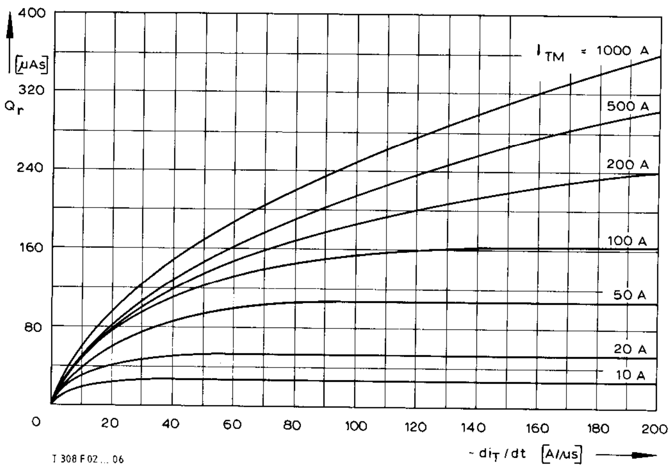
Bild/Fig. 11



BildlFig. 14



BildlFig. 12



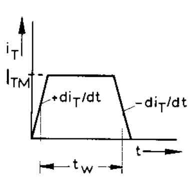
BildlFig. 15

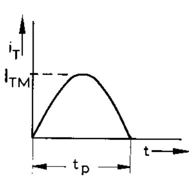
Bild/Fig. 10, 11, 12
Steuergenerator/pulse generator:
i_G = 0,8 A, di_G/dt = 0,8 A/µs

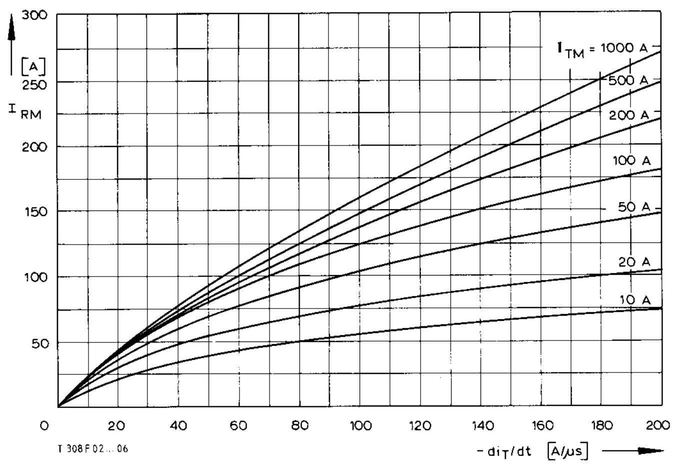
RC-GliedlRC-network:
R [Ω] ≥ 0,02 v_{DM} [V]
C ≤ 0,33 µF
$v_{DM} \leq 0{,}67\ V_{DRM}$
$dv_R/dt \leq 400$ V/µs
$v_{RM} \leq 0{,}67\ V_{RRM}$

(zu Bild/to Fig. 13)
Steuergenerator/pulse generator:
i_G = 0,8 A, di_G/dt = 0,8 A/µs

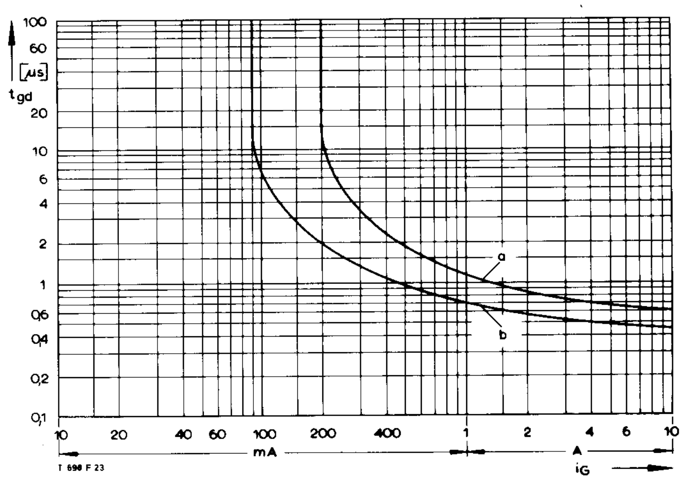
RC-GliedlRC-network:
R [Ω] ≥ 0,02 v_{DM} [V]
C ≤ 0.22 µF



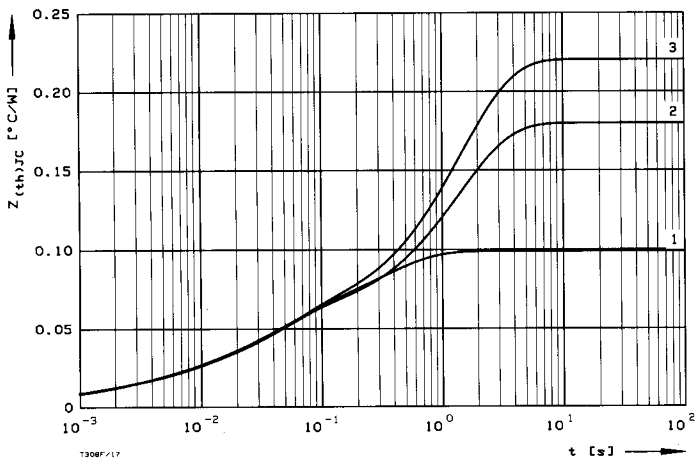




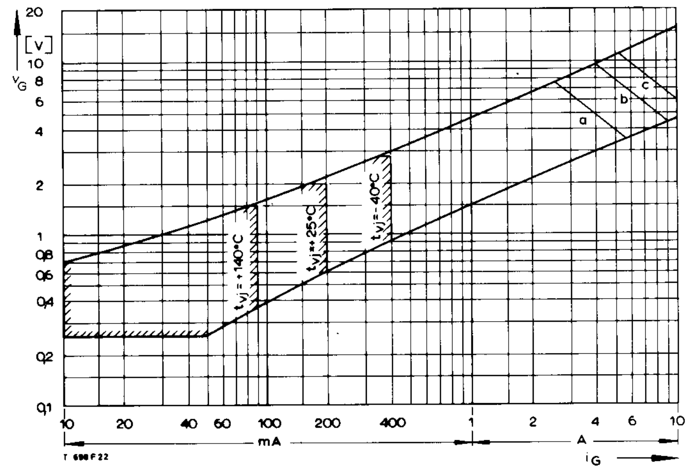
Bild/Fig. 16
Rückstromspitze $I_{RM} = f(-di/dt)$, $t_{vj} = t_{vj\,(max)}$, $V_R = 0{,}5\ V_{RRM}$, $V_{RM} = 0{,}8\ V_{RRM}$
Peak reverse recovery current $I_{RM} = f(-di/dt)$, $t_{vj} = t_{vj\,(max)}$, $V_R = 0.5\ V_{RRM}$, $V_{RM} = 0.8\ V_{RRM}$
Parameter: Durchlaßstrom/On-state current I_{TM}



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



Bild/Fig. 17
Transienter innerer Wärmewiderstand $Z_{(th)JC} = f(t)$, DC
Transient thermal impedance $Z_{(th)JC} = f(t)$, 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
$v_G = f(i_G)$, $V_D = 6$ 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	R_{thn} [°C/W]	0,0078	0,0115	0,0368	0,0429			
two-sided	τ_n [s]	0,00064	0,00593	0,0427	0,325			
anodenseitig	R_{thn} [°C/W]	0,0006	0,0072	0,011	0,0392	0,122		
anode-sided	τ_n [s]	0,000140	0,000750	0,00570	0,038	1,4		
kathodenseitig	R_{thn} [°C/W]	0,00445	0,0134	0,0406	0,162			
cathode-sided	τ_n [s]	0,000368	0,00347	0,0426	1,462			

Analytische Funktion/analytical function:

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