Elektrische Eigenschaften — Electrical properties

Höchstzulässige Werte — Aaximum rated values

Periodische Vorwärts- und Rückwärts-Spitzensperrspannung	repetitive peak forward off-state and reverse voltages	$t_{vj} = -40°C \ldots t_{vj\,max}$	V_{DRM}, V_{RRM}		800, 1000	V
					1100, 1200	v
					1300, 1400*	v
Vorwärts-Stoßspitzen-sperrspannung	non repetitive peak forward off-state voltage	$t_{vj} = -40°C \ldots t_{vj\,max}$	$V_{DSM} = V_{DRM}$			
Rückwärts-Stoßspitzen-sperrspannung	non repetitive peak reverse voltage	$t_{vj} = +25°C \ldots t_{vj\,max}$	$V_{RSM} = V_{RRM}$		+ 100	v
Durchlaßstrom-Grenzeffektivwert	RMS on-state current		I_{TRMSM}		300	A
Dauergrenzstrom	average on-state current	$t_C = 85°C$	I_{TAVM}		128	A
		$t_C = 54°C$			191	A
Stoßstrom-Grenzwert	surge current	$t_{vj} = 25°C, t_p = 10$ ms	I_{TSM}		2800	A
		$t_{vj} = t_{vj\,max}, t_p = 10$ ms			2450	A
Grenzlastintegral	I^2t-value	$t_{vj} = 25°C, t_p = 10$ ms	I^2t		39200	A's
		$t_{vj} = t_{vj\,max}, t_p = 10$ ms			30000	A's
Kritische Stromsteilheit	critical rate of rise of on-state current	$v_D \leq 67\%\ V_{DRM}$, f = 50 Hz	$(di/dt)_{cr}$		160	A/µs
		$i_{GM} = 0{,}6$ A, $di_G/dt = 0{,}6$ A/µs			[1]	[2]
Kritische Spannungssteilheit	critical rate of rise of off-state voltage	$t_{vj} = t_{vj\,max}, v_D = 67\%\ V_{DRM}$	$(dv/dt)_{cr}$	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	$t_{vj} = t_{vj\,max}, i_T = 600$ A	v_T	max.	2,6	V
Schleusenspannung	threshold voltage	$t_{vj} = t_{vj\,max}$	$V_{T(TO)}$		1,28	V
Ersatzwiderstand	slope resistance	$t_{vj} = t_{vj\,max}$	r_T		2,15	mΩ
Zündstrom	gate trigger current	$t_j = 25°C, v_D = 12$ V	I_{GT}	max.	150	mA
Zündspannung	gate trigger voltage	$t_{vj} = 25°C, v_D = 12$ V	V_{GT}	max.	2	v
Nicht zündender Steuerstrom	gate non-trigger current	$t_{vj} = t_{vj\,max}, v_D = 12v$	I_{GD}	max.	10	mA
Nicht zündende Steuerspannung	gate non-trigger voltage	$t_{vj} = t_{vj\,max}, v_D = 0{,}5\ V_{DRM}$	V_{GD}	max.	0,25	V
Haltestrom	holding current	$t_j = 25°C, v_D = 12$ V, $R_A = 10\ \Omega$	I_H	max.	250	mA
Einraststrom	latching current	$t_j = 25°C, v_D = 12$ V, $R_{GK} \geq 10\ \Omega$	I_L	max.	1	A
		$i_{GM} = 0{,}6$ A, $di_G/dt = 0{,}6$ 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
Zündverzug	gate controlled delay time	$t_{vj} = 25°C, i_{GM} = 0{,}6$ A, $di_G/dt = 0{,}6$ A/µs	t_{gd}	max.	1,4	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

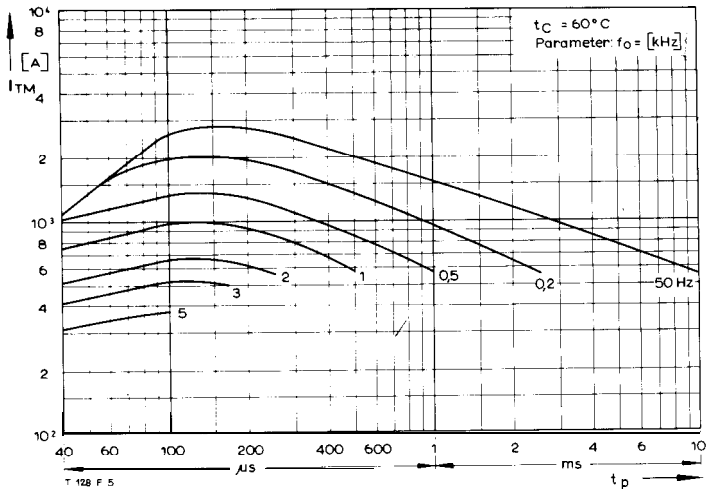
Innerer Wärmewiderstand	thermal resistance, junction to case				
für beidseitige Kühlung	for two-sided cooling	Θ = 180° el, sin	R_{thJC}	max.	0,163 °C/W
		DC		max.	0,143 °C/W
für anodenseitige Kühlung	for anode-sided cooling	Θ = 180° el, sin	$R_{thJC(A)}$	max.	0,246 °C/W
		DC		max.	0,226 °C/W
für kathodenseitige Kühlung	for cathode-sided cooling	Θ = 180° el, sm	$R_{thJC(K)}$	max.	0,406 °C/W
		DC		max.	0,386 °C/W
Übergangs-Wärmewiderstand	thermal resistance, case to heatsink	beidseitig/two-sided	R_{thCK}	max.	0,015 °C/W
		einseitig/one-sided		max.	0,03 °C/W
Höchstzul. Sperrschichttemperatur	max. junction temperature		$t_{vj\,max}$		125 °C
Betriebstemperatur	Operating temperature		$t_{c\,op}$		−40 ... + 125 °C
Lagertemperatur	storage temperature		t_{stg}		−40 ... + 140 °C

Mechanische Eigenschaften — Mechanical properties

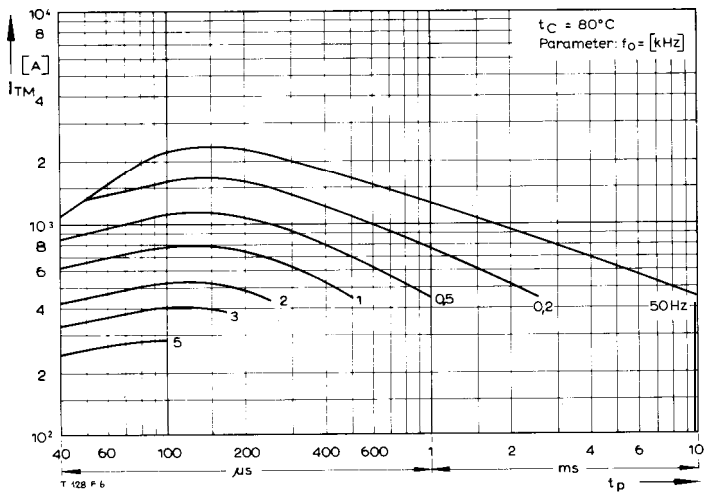
Si-Element mit Druckkontakt	Si-pellet with pressure contact				
Anpreßkraft	Clamping force		F		3 ... 6 kN
Gewicht	weight		G	typ.	70 g
Kriechstrecke	Creepage distance				17 mm
Feuchteklasse	humidity classification	DIN 40040			C
Schwingfestigkeit	Vibration resistance	f = 50 Hz			50 m/s²
Maßbild	outline	DIN 41814-151A4			Seitelpage 154

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

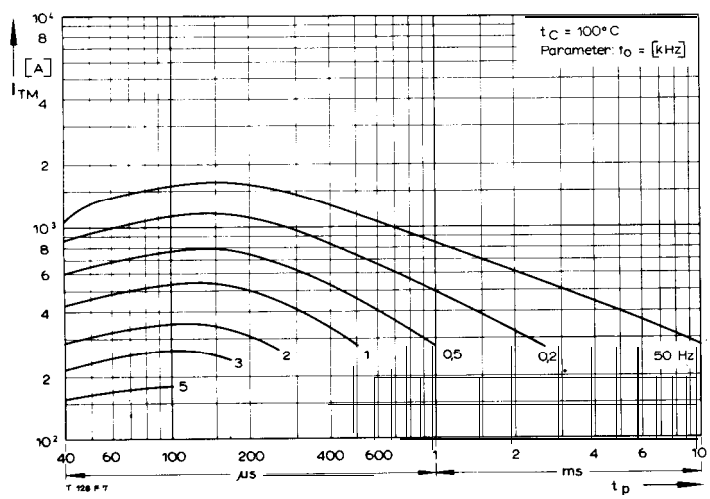
1) Werte nach DIN IEC 747-6 (ohne vorausgehende Kommutierung)/Values to DIN IEC 747-6 (without prior commutation)
2) Unmittelbar nach der Freiwerdezeit, vgl. Meßbedingungen für t_q/Immediately after circuit commutated turn-off time, see Parameters t_q



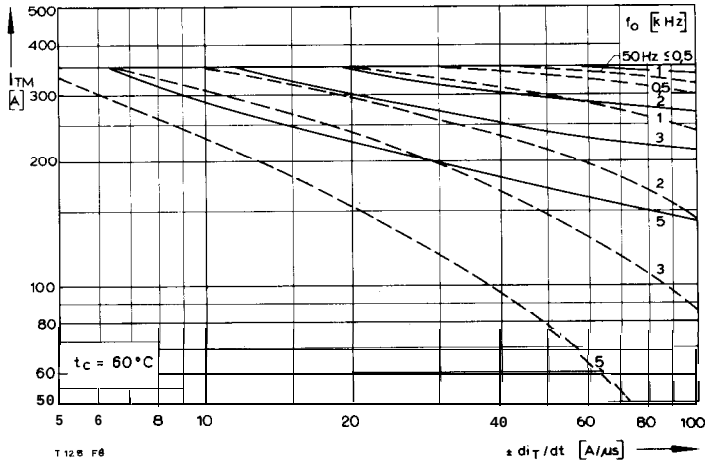
BildFig. 1



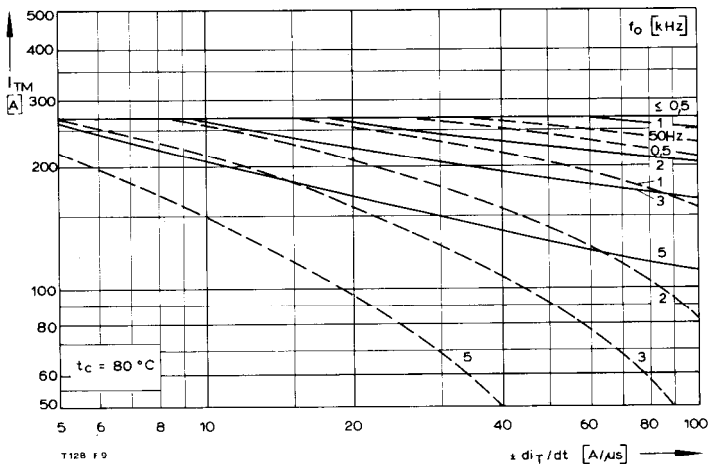
Bild/Fig. 2



Bild/Fig 3



Bild/Fig. 4



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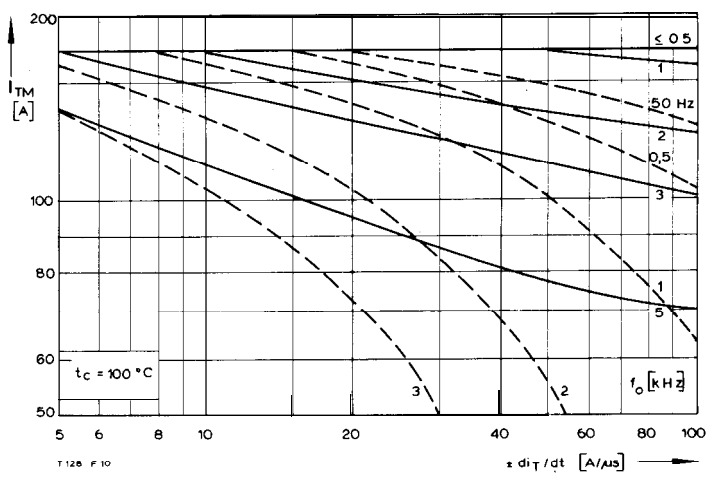
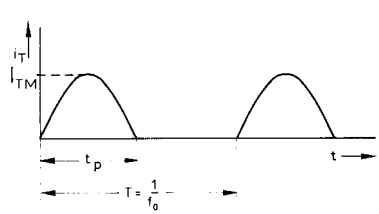


Bild/Fig. 6

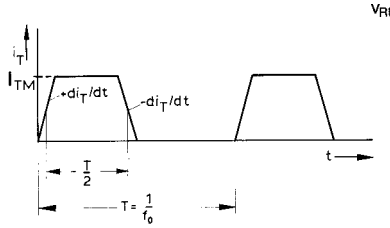
Bild/Fig. 1, 2, 3
Steuergenerator/pulse generator:
I_G = 0,6 A, di_G/dt = 0,6 A/µs

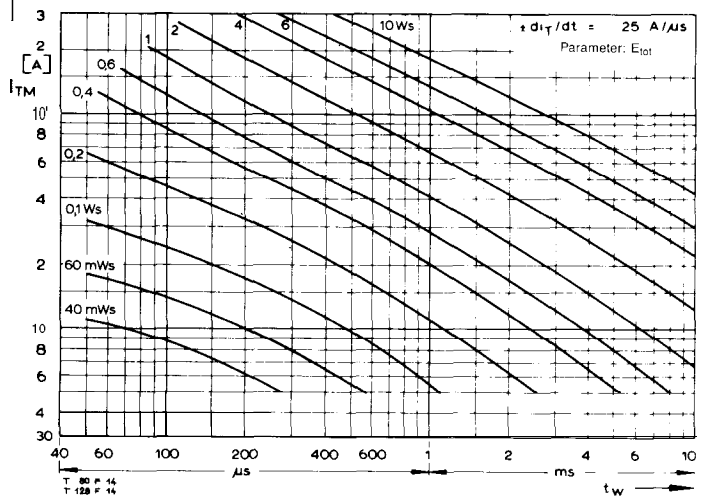
RC-Glied/RC-network:
Ft [Ω] ≥ 0,02 v_{DM} [V]
C ≤ 0,15 µF
$v_{DM} \leq 0{,}67\ V_{DRM}$



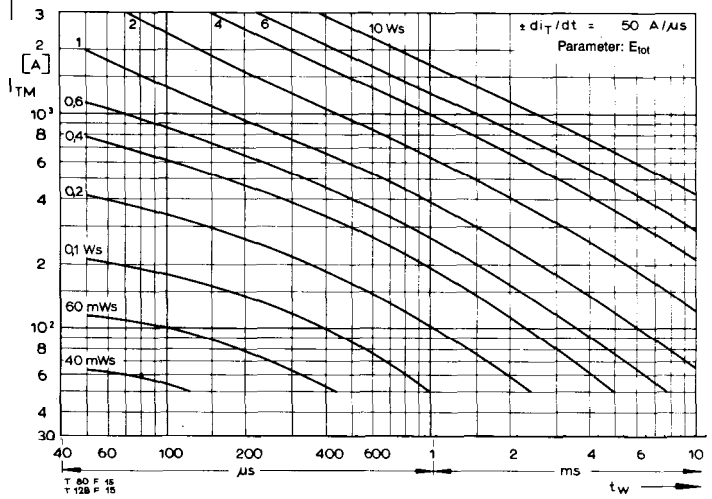
Bild/Fig. 4, 5, 6
Steuergenerator/pulse generator:
i_G = 0,6 A, di_G/dt = 0,6 A/µs

RC-Glied/RC-network:
Fl [Ω] ≥ 0,02 v_{DM} [V]
C ≤ 0,22 µF
$v_{DM} \leq 0{,}67\ V_{DRM}$
$dv_R/dt \leq 600$ V/µs
$v_{RM} \leq 0{,}67\ V_{RRM}$

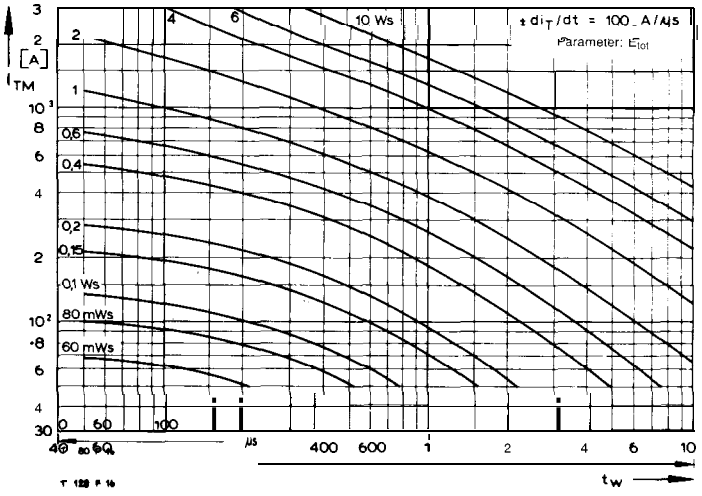




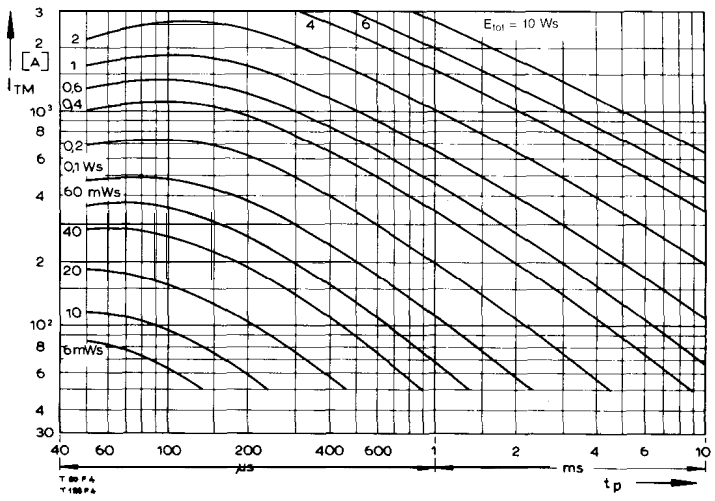
Bild/Fig. 10



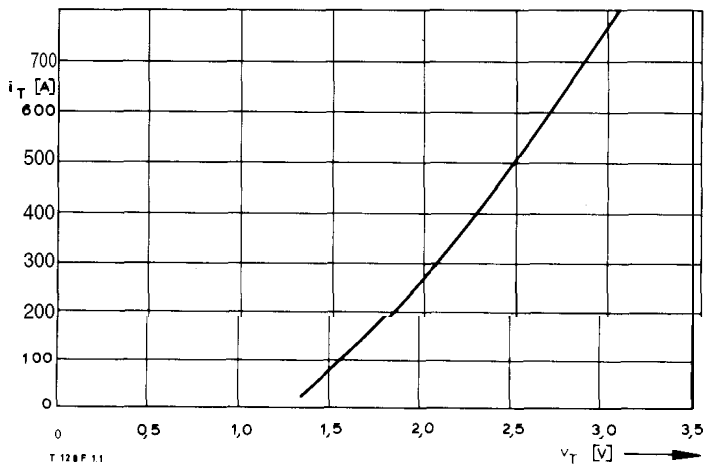
Bild/Fig. 11



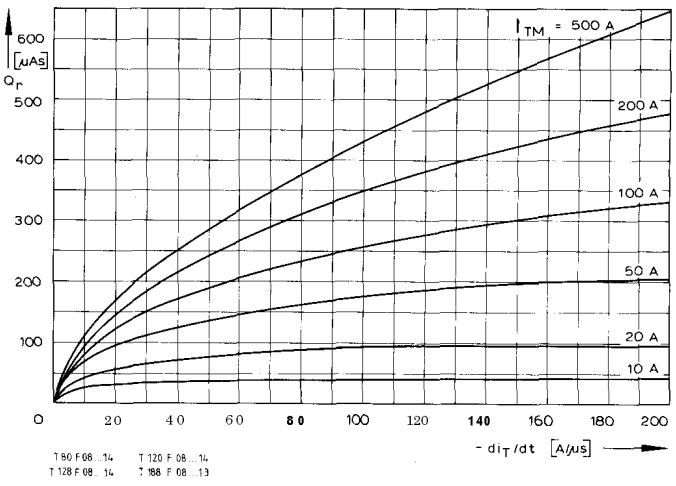
Bild/Fig. 12



BildlFig. 13



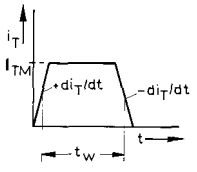
BildlFig. 14



BildlFig. 15

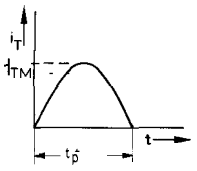
BildlFig. 10, 11, 12
Steuergeneratodpulse generator:
i_G = 0,6 A, di_G/dt = 0,6 A/µs

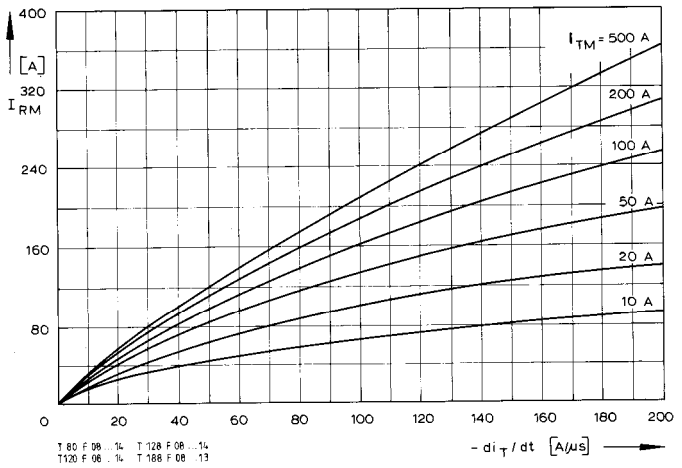
RC-Glied/RC-network:
R [Ω] ≥ 0,02 v_{DM} [V]
C ≤ 0,22 µF
$v_{DM} \leq 0{,}67\ V_{DRM}$
$dv_R/dt \leq 600\ V/\mu s$
$v_{RM} \leq 0{,}67\ V_{RRM}$



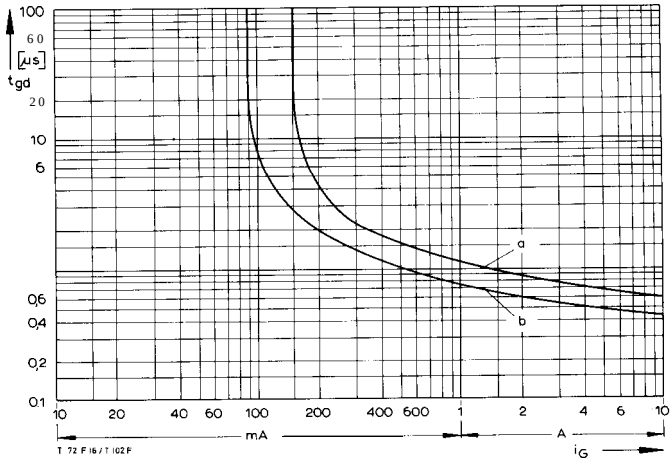
(zu Bild/to Fig. 13)
Steuergenerator/pulse generator:
i_G = 0,6 A, di_G/dt = 0,6 A/µs

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

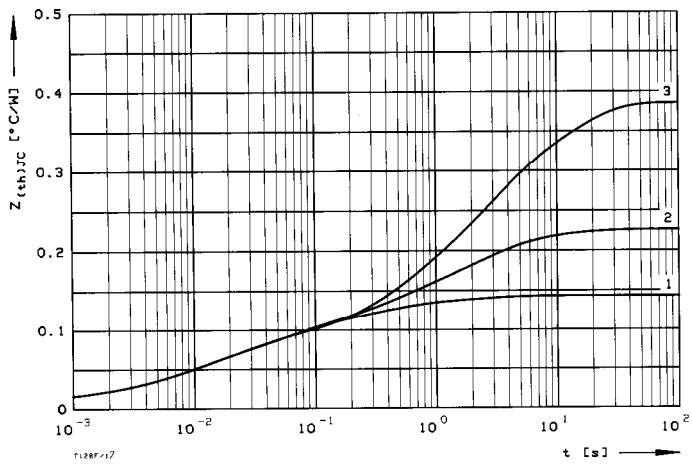




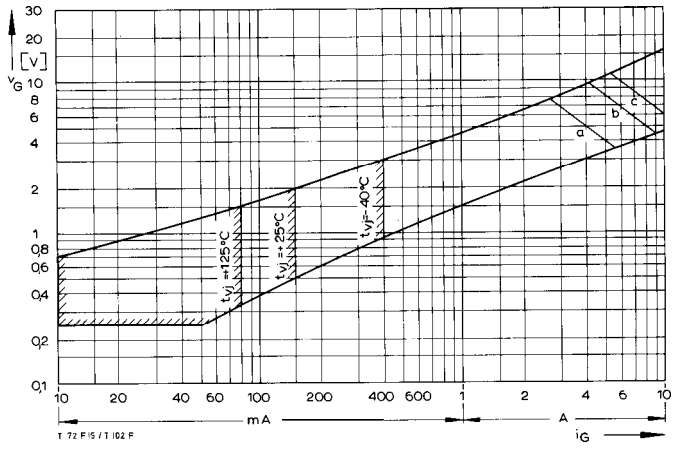
Bild/Flg 16
Rückstromspitze $I_{RM} = f(-di/dt), t_{vj} = t_{vj\,(max)}, v_R = 0{,}5\ V_{RRM}, v_{RM} = 0{,}8\ V_{RRM}$
Peak reverse recovery current $I_{RM} = f(-di/dt), t_{vj} = t_{vj\,(max)}, v_R = 0.5\ V_{RRM}, v_{RM} = 0.8\ V_{RRM}$
Parameter: Durchlaßstrom/On-state current I_{TM}



Blld/Flg. 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
$v_G = f(i_G), V_D = 12$ 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	R_{thn} [°C/W]	0,011	0,00585	0,0342	0,0485	0,0312	0,0122	
two-sided	τ_n [s]	0,000458	0,00578	0,00807	0,0483	0,292	1,864	
anodenseitig	R_{thn} [°C/W]	0,0109	0,00798	0,034	0,0428	0,0399	0,0702	0,02
anode-sided	τ_n [s]	0,000455	0,00497	0,00899	0,047	0,366	2,14	9,1
kathodenseitig	R_{thn} [°C/W]	0,0106	0,0216	0,0503	0,0578	0,133	0,112	
cathode-sided	τ_n [s]	0,000439	0,00514	0,0213	0,394	2,3	12	

Analytische Funktion/analytical functlon:

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