T 102 F

Elektrische Eigenschaften / Electrical properties

Höchstzulässige Werte / Maximum rated values

Höchstzulässige Werte	Maximum rated values	Bedingung	Symbol	Wert	Einheit
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}	200,400	V
				600,800	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	$t_{vj} = +25°C \ldots t_{vj\,max}$	$V_{RSM} = V_{RRM}$	+ 50	V
Durchlaßstrom-Grenzeffektivwert	RMS on-state current		I_{TRMSM}	220	A
Dauergrenzstrom	average on-state current	$t_C = 85°C$	I_{TAVM}	102	A
		$t_C = 64°C$		140	A
Stoßstrom-Grenzwert	surge current	$t_{vj} = 25°C$, $t_p = 10$ ms	I_{TSM}	3200	A
		$t_{vj} = t_{vj\,max}$, $t_p = 10$ ms		2750	A
Grenzlastintegral	Pt-value	$t_{vj} = 25°C$, $t_p = 10$ ms	I^2t	51000	A's
		$t_{vj} = t_{vj\,max}$, $t_p = 10$ ms		37800	A^2s
Kritische Stromsteilheit	critical rate of rise of on-state current	$v_D \leq 67\%\ V_{DRM}$, f = 50 Hz	$(di/dt)_{cr}$	200	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

Charakteristische Werte	Characteristic values	Bedingung	Symbol		Wert	Einheit
Durchlaßspannung	on-state voltage	$t_{vj} = t_{vj\,max}$, $i_T = 500$ A	v_T	max.	1,95	V
Schleusenspannung	threshold voltage	$t_{vj} = t_{vj\,max}$	$V_{T(TO)}$		1,2	V
Ersatzwiderstand	slope resistance	$t_{vj} = t_{vj\,max}$	r_T		1,4	mΩ
Zündstrom	gate trigger current	$t_{vj} = 25°C$, $v_D = 6$ V	I_{GT}	max.	150	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, $R_A = 5\ \Omega$	I_H	max.	250	mA
	latching current	$t_{vj} = 25°C$, $v_D = 6$ V, $R_{GK} \geq 10\ \Omega$	I_L	max.	750	mA
		$i_{GM} = 0,6$ 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		siehe Techn. Erl./see Techn. Inf.	t_q B*:	max.	10	µs
			D:	max.	15	µs

Thermische Eigenschaften / Thermal properties

Thermische Eigenschaften	Thermal properties	Bedingung	Symbol		Wert
Innerer Wärmewiderstand	thermal resistance, junction to case	Θ = 180° el, sin	R_{thJC}	max.	0,26 °C/W
		DC		max.	0,24 °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 ... + 150 °C

Mechanische Eigenschaften / Mechanical properties

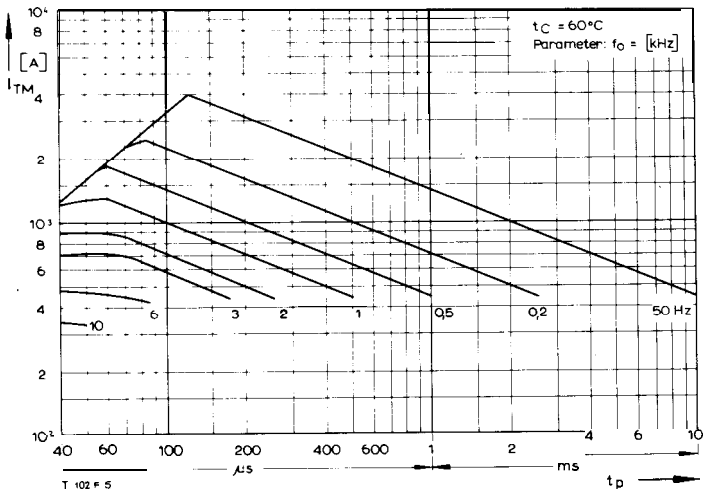
Mechanische Eigenschaften	Mechanical properties	Bedingung	Symbol		Wert
Si-Element mit Druckkontakt	Si-pellet with pressure contact				
Anzugsdrehmoment	tightening torque		M		20 Nm
Gewicht	weight		G	typ.	150g
Kriechstrecke	Creepage distance				8mm
Feuchteklasse	humidity classification	DIN 40040			C
Schwingfestigkeit	Vibration resistance	f = 50 Hz			50 m/s²
Maßbild B	outline B	DIN 41892-20483			Seite/page 154

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

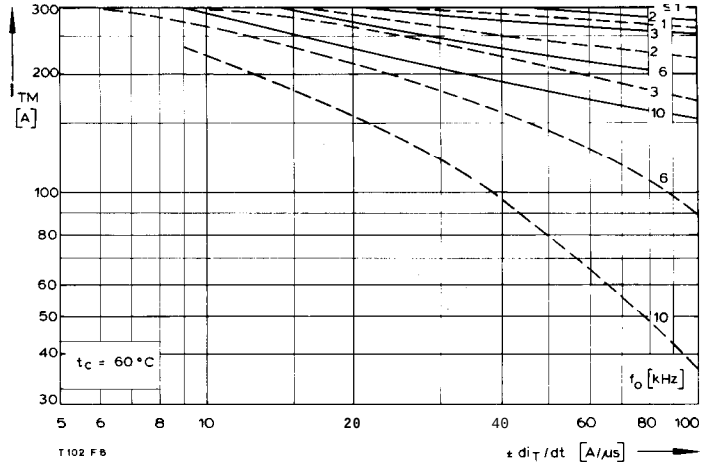
1) Werte nach DIN IEC 747-6 (ohne vorausgehende Kommutierung)/Values to DIN IEC 747-6 (without prior commutation)

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

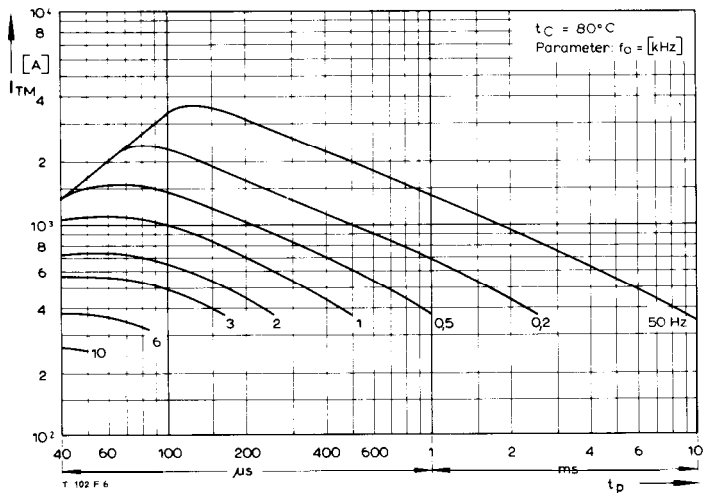
circuit commutated turn-off time



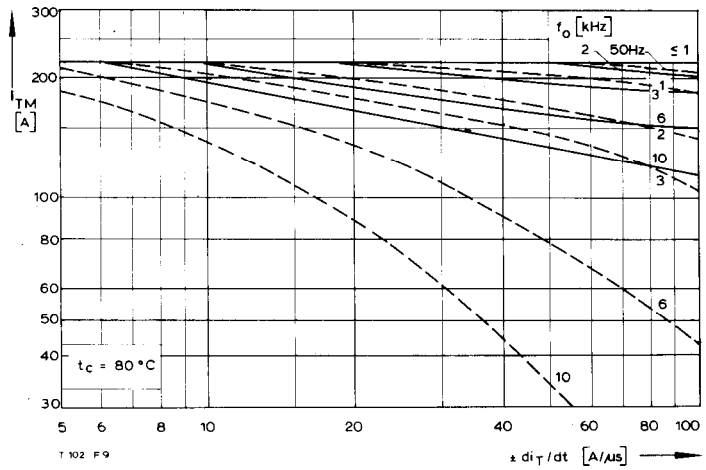
BildlFig. 1



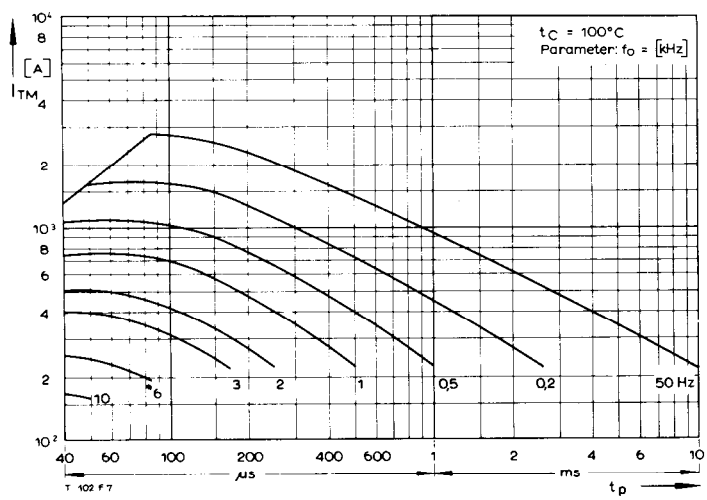
Bild/Fig. 4



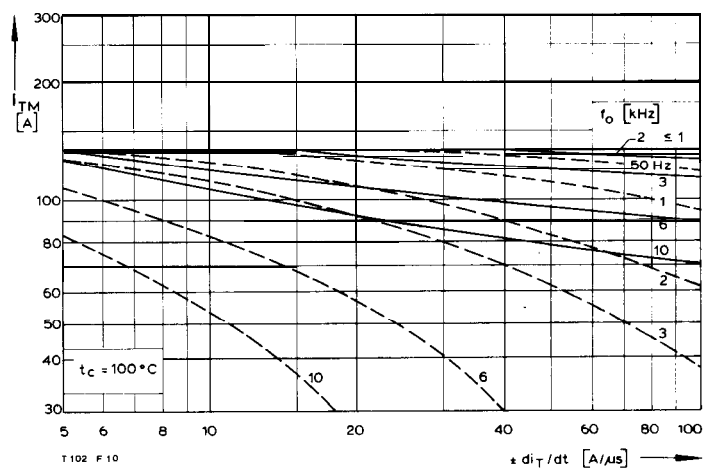
Bild/Fig. 2



BildlFig. 5



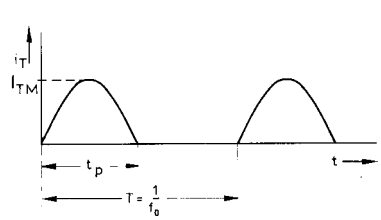
Bild/Fig. 3



Bild/Fig. 6

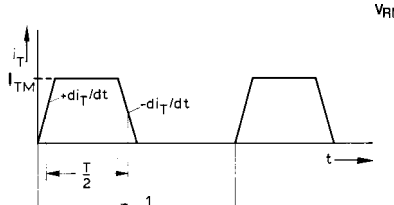
BildlFig. 1, 2, 3
Steuergenerator/pulse generator:
i_G = 0,6 A, di_G/dt = 0,6 A/µs

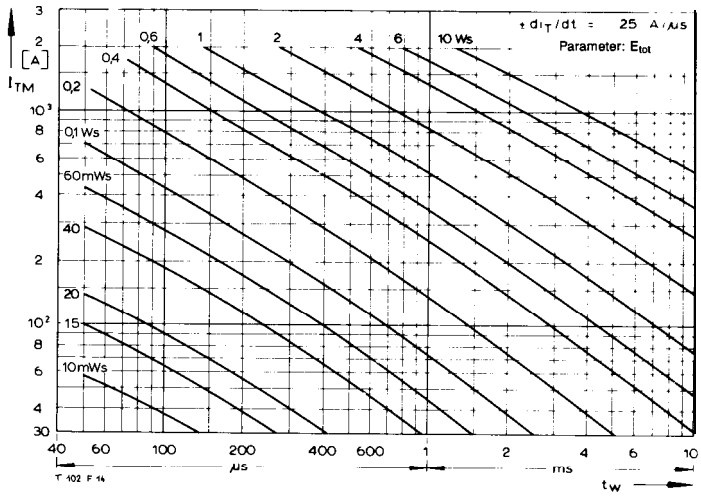
RC-Glied/RC-network:
R [Ω] ≥ 0,02 v_{DM} [V]
C ≤ 0,15 µF
v_{DM} ≤ 0,67 V_{DRM}



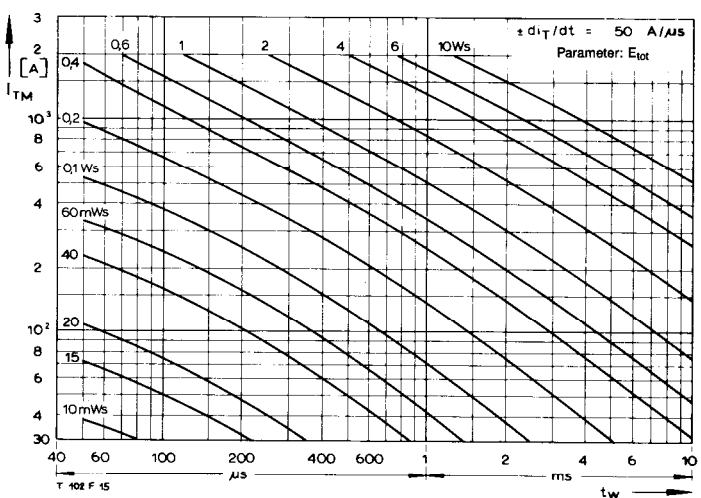
BildlFig. 4, 5, 6
Steuergenerator/pulse generator:
i_G = 0,6 A, di_G/dt = 0,6 A/µs

RC-Glied/RC-network:
R [Ω] ≥ 0,02 v_{DM} [V]
C ≤ 0,22 µF
v_{DM} ≤ 0,67 V_{DRM}
dv_R/dt ≤ 500 V/µs
v_{RM} ≤ 0,67 V_{RRM}

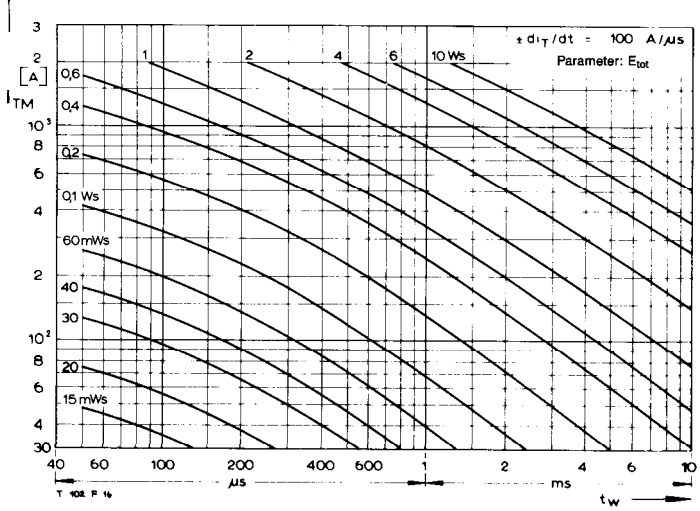




BildlFig. 10



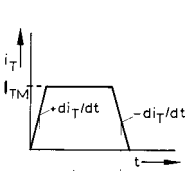
ild/Fig. 11

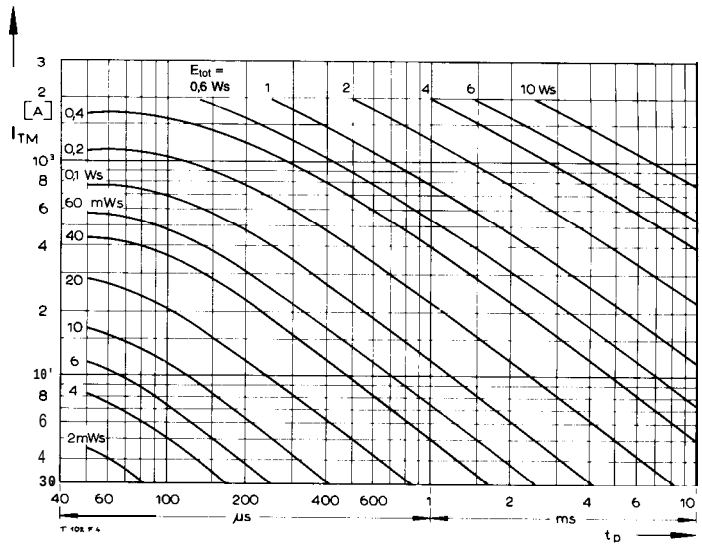


BildlFig. 12

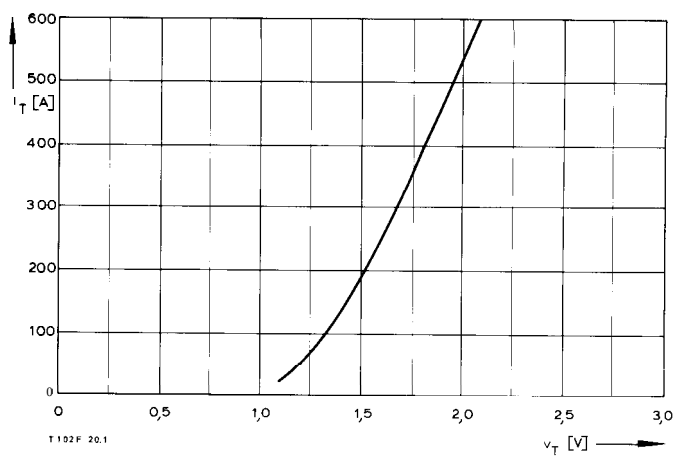
BildlFig. 10, 11, 12
Steuergenerator/pulse generator:
i_G = 0,6 A, di_G/dt = 0,6 A/µs

RC-Glied/RC-network:
R [Ω] ≥ 0,02 v_{DM} [V]
C ≤ 0,22 µF
v_{DM} ≤ 0,67 VD,,
dv_R/dt ≤ 500 V/µs
v_{RM} ≤ 0,67 V_{RRM}

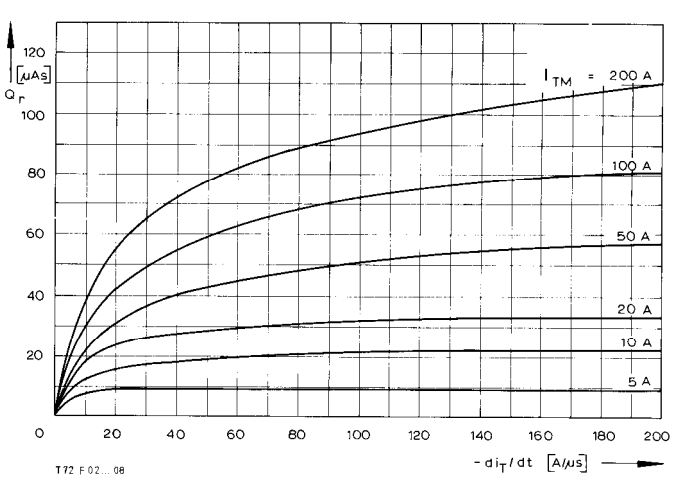




Bild/Fig. 13



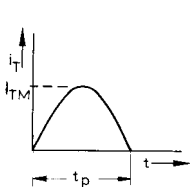
BildlFig. 14

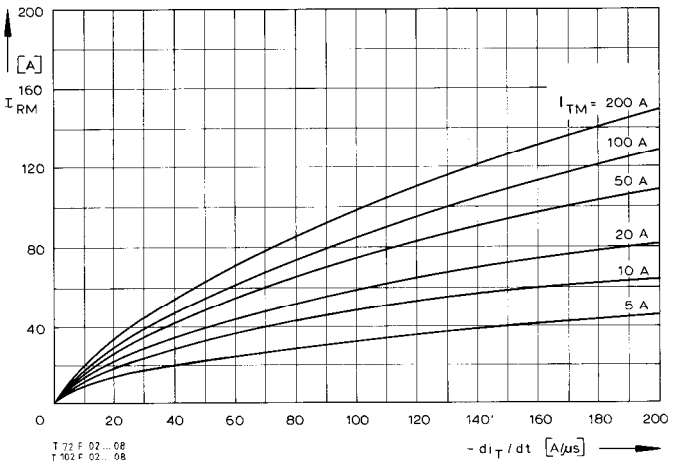


Bild/Fig. 15

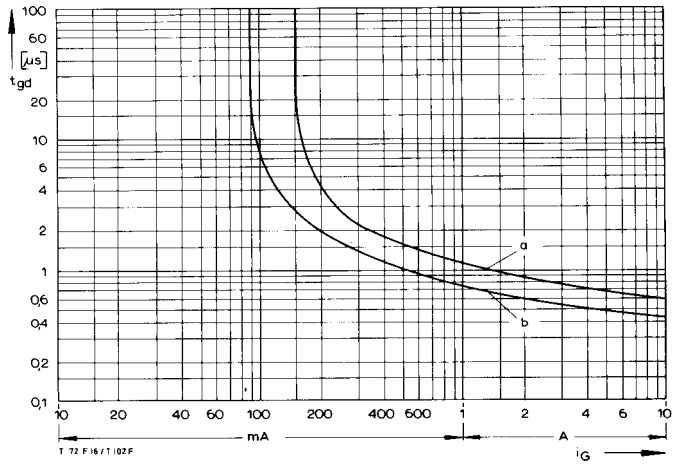
(zu Bild/to Fig. 13)
Steuergenerator/pulse generator:
i_G = 0,6 A, di_G/dt = 0,6 A/µs

RC-Glied/RC-network:
R [Ω] ≥ 0,02 v_{DM} [V]
C ≤ 0,15 µF

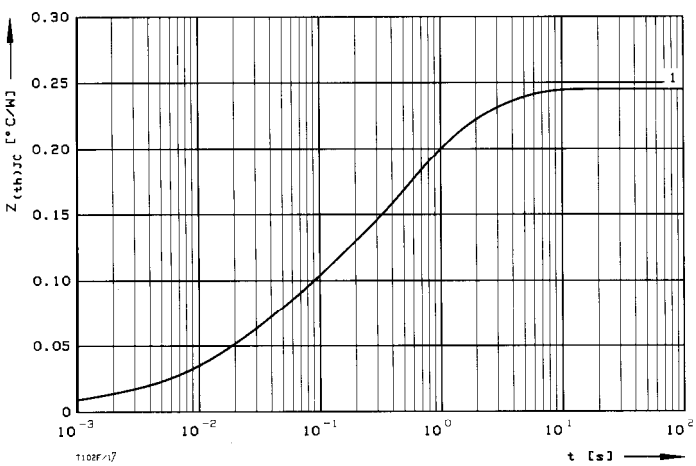




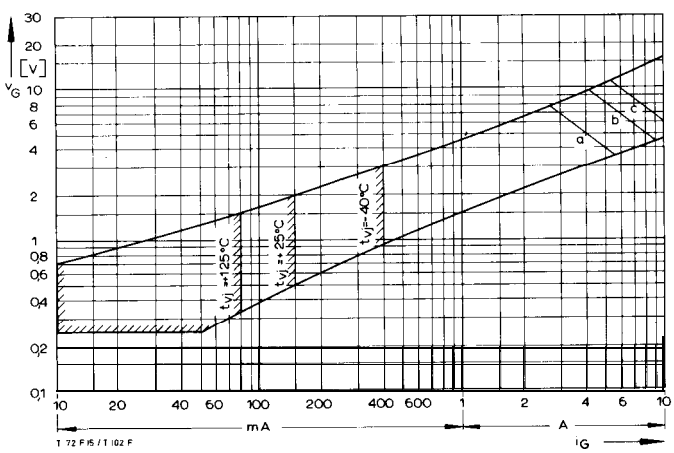
BildlFig. 16
Rückstromspitze $I_{RM} = f(-di/dt), t_{vj} = t_{vj\,(max)}, v_R = 0{,}5\ V_{RRM}, v_{RM} = 0{,}8\ V_{RRM}$
Peak reverse recovery current $I_{RM} = f(-di/dt), t_{vj} = t_{vj\,(max)}, v_R = 0.5\ V_{RRM}, v_{RM} = 0.8\ V_{RRM}$
Parameter: Durchlaßstrom/On-state current I_{TM}



BildlFig. 18
ZündverzuglGate 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



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

POS. n	1	2	3	4	5	6	7
R_{thn} [°C/W]	0,0081	0,033	0,054	0,1	0,05		
τ_n [s]	0,00081	0,014	0,066	0,5	2,3		

Analytische Funktion/analytical function:

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