Elektrische Eigenschatten — Electrical properties

Höchstzulässige Werte — Maximum rated values

Periodische Vorwärts- und Rückwärts-Spitzensperrspannung	repetitive peak forward off-state and reverse voltages	$t_{vj} = -40°C \dots t_{vj\,max}$	V_{DRM}, V_{RRM}		200, 400 600		v V
Vorwärts-Stoßspitzen-sperrspannung	non repetitive peak forward off-state voltage	$t_{vj} = -40°C \dots t_{vj\,max}$	$V_{DSM} = V_{DRM}$				
Rückwärts-Stoßspitzen-sperrspannung	non repetitive peak reverse voltage	$t_{vj} = +25°C \dots t_{vj\,max}$	$V_{RSM} = V_{RRM}$		+50		V
Durchlaßstrom-Grenzeffektivwert	RMS on-state current		I_{TRMSM}		1100		A
Dauergrenzstrom	average on-state current	t_c = 85°C	I_{TAVM}		698		A
Stoßstrom-Grenzwert	surge current	t_{vj} = 25°C, t_p = 10 ms	I_{TSM}		12,4		kA
		$t_{vj} = t_{vj\,max}$, t_p = 10 ms			11		kA
Grenzlastintegral	Pt-value	t_{vj} = 25°C, t_p = 10 ms	I^2t		769		kA^2s
		$t_{vj} = t_{vj\,max}$, t_p = 10 ms			605		kA^2s
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 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 = 2000 A	v_T	max.	1,65	V
Schleusenspannung	threshold voltage	$t_{vj} = t_{vj\,max}$	$V_{T(TO)}$		1,02	v
Ersatzwiderstand	slope resistance	$t_{vj} = t_{vj\,max}$	r_T		0,32	mΩ
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 = 8 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	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_{vj} = 25°C, v_D = 6 V, R_A = 5 Ω	I_H	max.	200	mA
Einraststrom	latching current	t_{vj} = 25°C, v_D = 6 V, $R_{GK} \geq$ 10 Ω	I_L	max.	1	A
		i_{GM} = 0,8 A, diodt = 0,8 Alps, 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.	50	mA
Zündverzug	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		siehe Techn. Erl./see Techn. Inf.	t_q C*:	max.	12	ps
			D:	max.	15	ps
			E:	max.	20	µs

Thermische Eigenschatten — Thermal properties

Innerer Wärmewiderstand	thermal resistance, junction to case				
für beidseitige Kühlung	for two-sided cooling	Θ = 180° el, sin	R_{thJC}	max.	0,05 °C/W
		DC		max.	0,048 °C/W
für anodenseitige Kühlung	for anode-sided cooling	Θ = 180° el, sin	$R_{thJC(A)}$	max.	0,082 °C/W
		DC		max.	0,08 °C/W
für kathodenseitige Kühlung	for cathode-sided cooling	Θ = 180° el, sin	$R_{thJC(K)}$	max.	0,12 °C/W
		DC		max.	0,117°C/W
Übergangswärmewiderstand	thermal resistance, case to heatsink	beidseitig/two-sided	R_{thCK}	max.	0,01 °C/W
		einseitiglone-sided		max.	0,02 °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

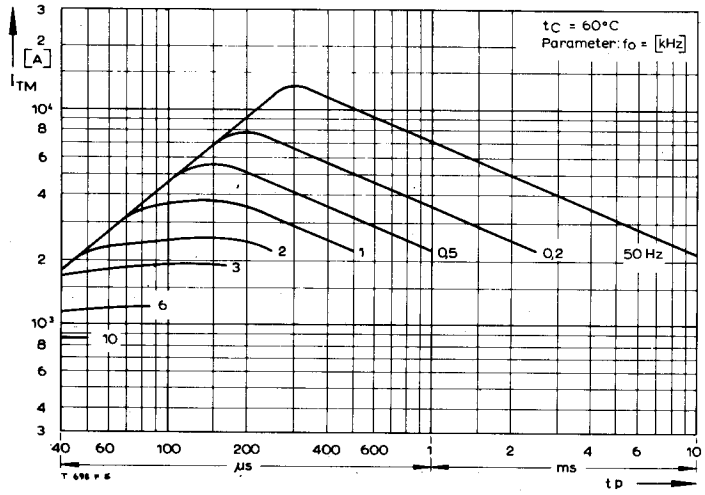
Mechanische Eigenschaften — Mechanical properties

Si-Element mit Druckkontakt	Si-pellet with pressure contact				
Anpreßkraft	Clamping force		F		5,5 ... 11 kN
Gewicht	weight		G	typ.	100 g
Kriechstrecke	Creepage distance				8 mm
Feuchteklasse	humidity classification	DIN 40040			C
Schwingfestigkeit	Vibration resistance	f = 50 Hz			50 m/s²
ßbild	outline	DIN 41814-152A4			Seite/page 154

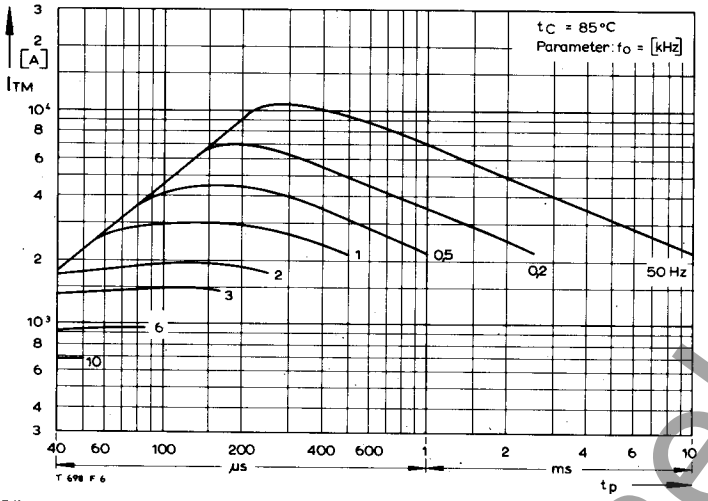
Für größere Stückzahlen bitte Liefertermin erfragen/Delivery for larger quantities on request

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

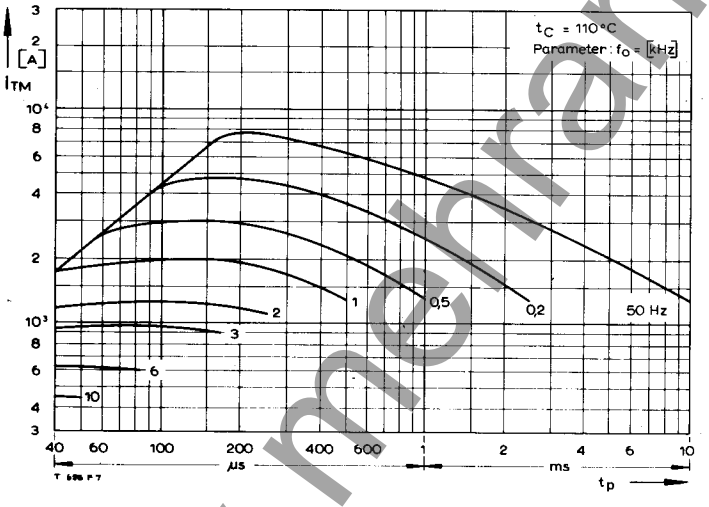
Ma cuit commutated turn-off time



Bild/Fig. 1



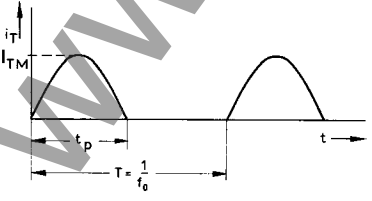
Bild/Fig. 2

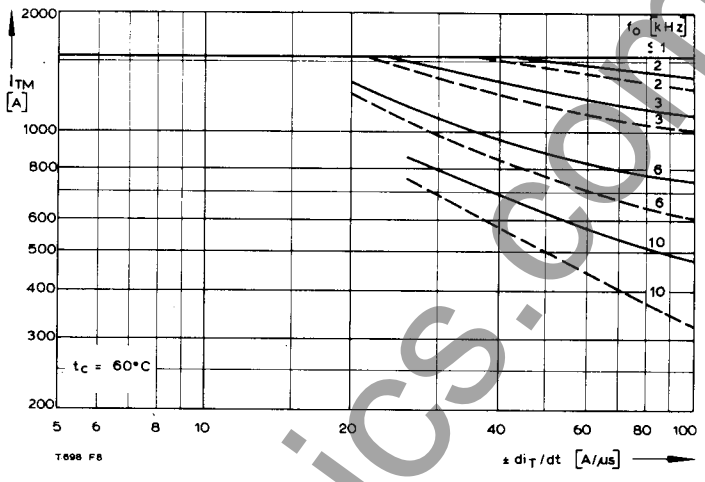


Bild/Fig. 3

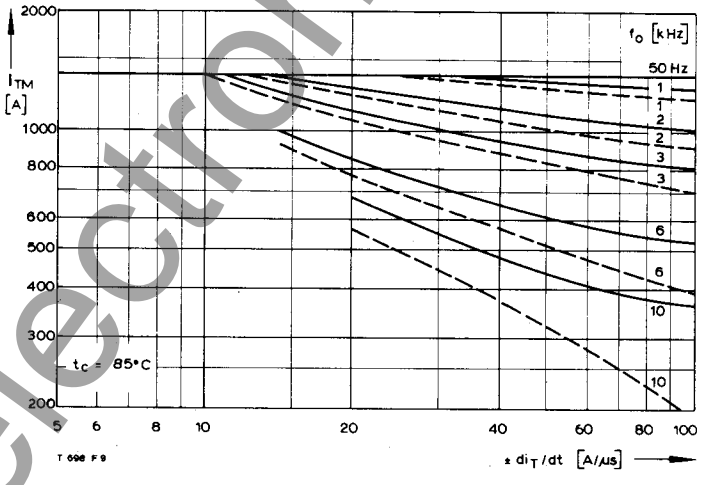
Bild/Fig. 1, 2, 3
Steuergenerator/pulse generator:
i_G = 0,8 A, di_G/dt = 0,8 A/µs

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

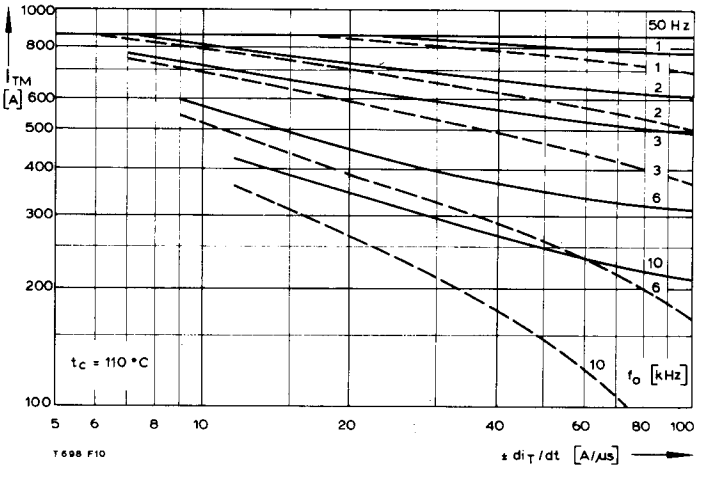




Bild/Fig. 4



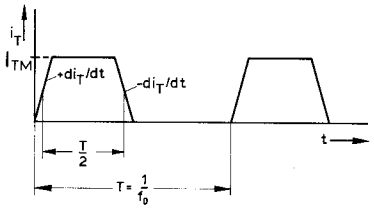
Bild/Fig. 5

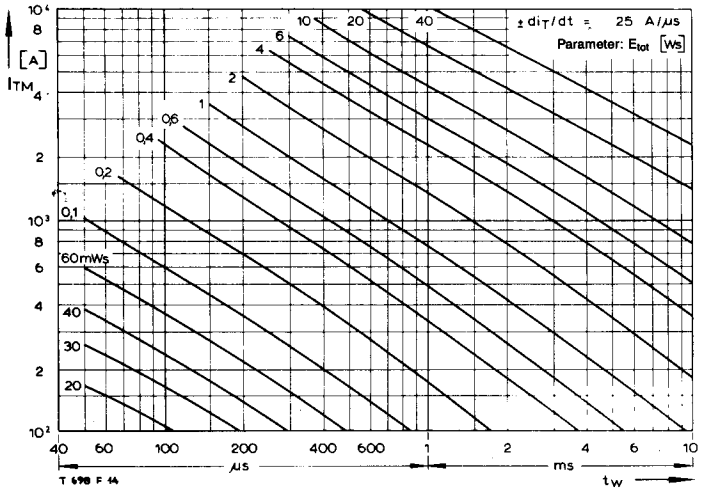


Bild/Fig. 6

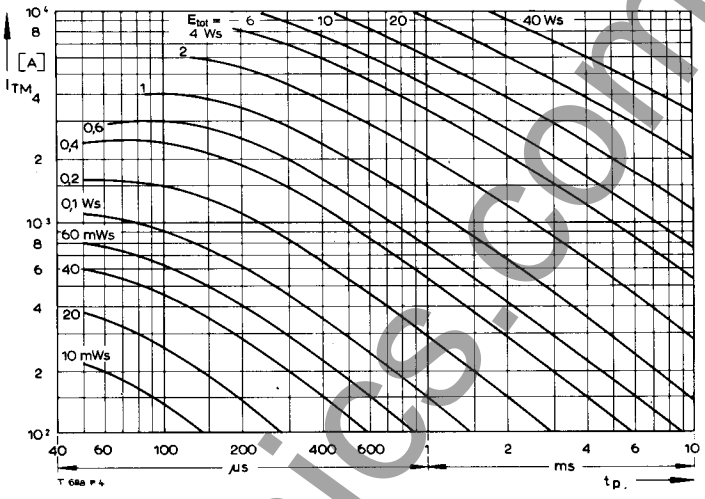
Bild/Fig. 4, 5, 6
Steuergenerator/pulse generator:
i_G = 0,8 A, di_G/dt = 0,8 A/µs

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

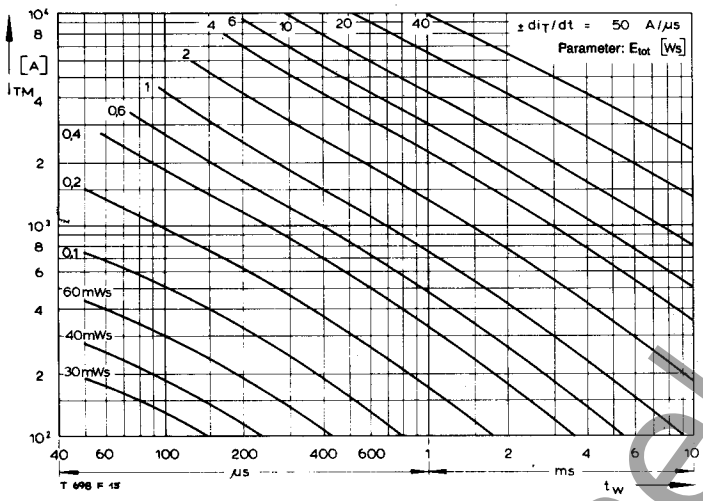




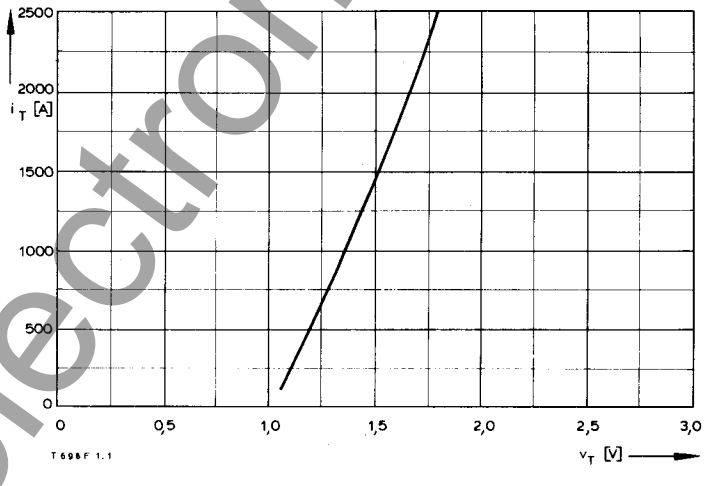
Bild/Fig. 10



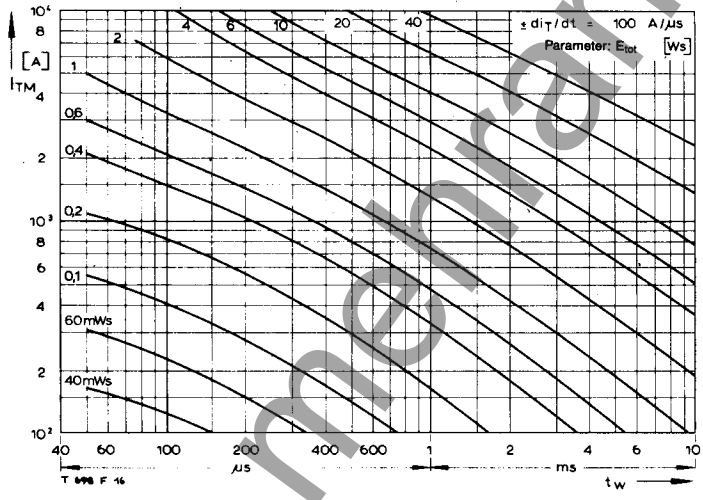
Bild/Fig. 13



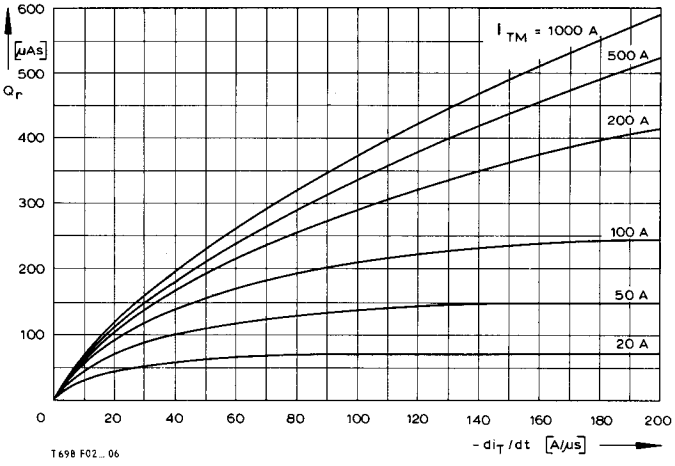
Bild/Fig. 11



Bild/Fig. 14



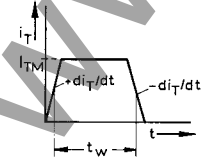
Bild/Fig. 12



Bild/Fig. 15

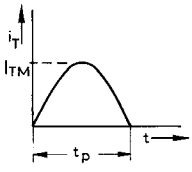
Bild/Fig. 10, 11, 12
Steuergenerator/pulse generator:
i_G = 0,8 A, di_G/dt = 0,8 A/µs

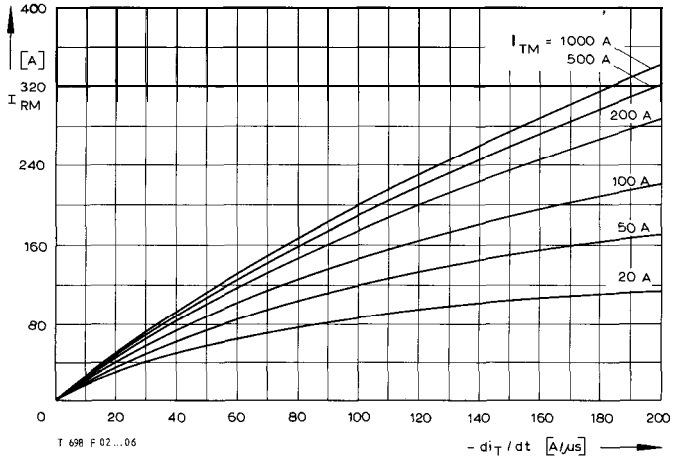
RC-Glied/RC-network:
R [Ω] ≥ 0,02 v_{DM} [V]
C ≤ 0,33 µF
$v_{DM} \leq 0{,}67\ V_{DRM}$
$dv_R/dt \leq 400$ V/µs
$v_{RM} \leq 0{,}67\ V_{RRM}$



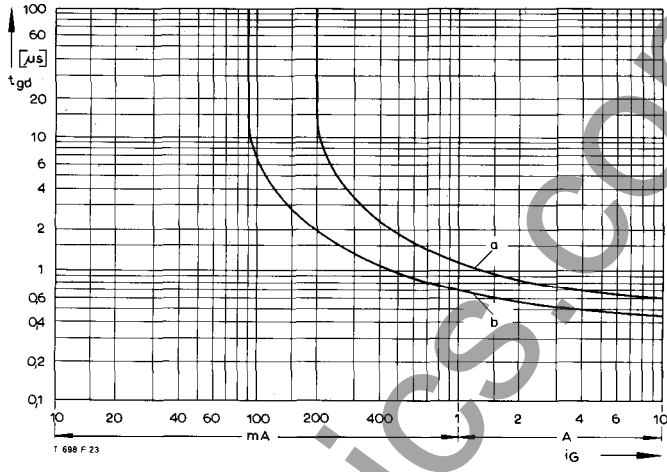
(zu Bild/to Fig. 13)
Steuergenerator/pulse generator:
i_G = 0,8 A, di_G/dt = 0,8 A/µs

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

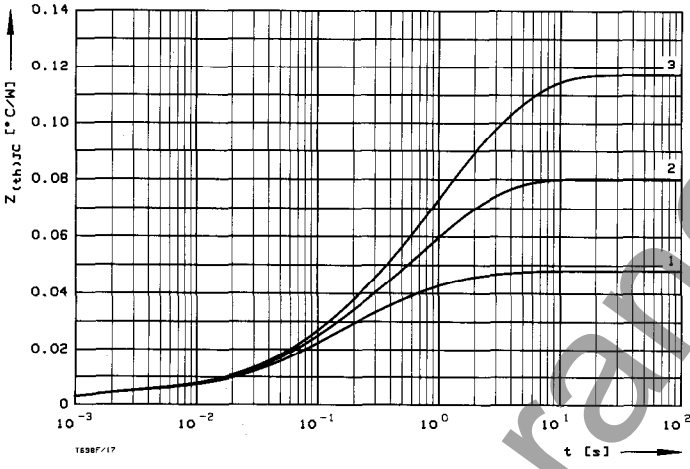




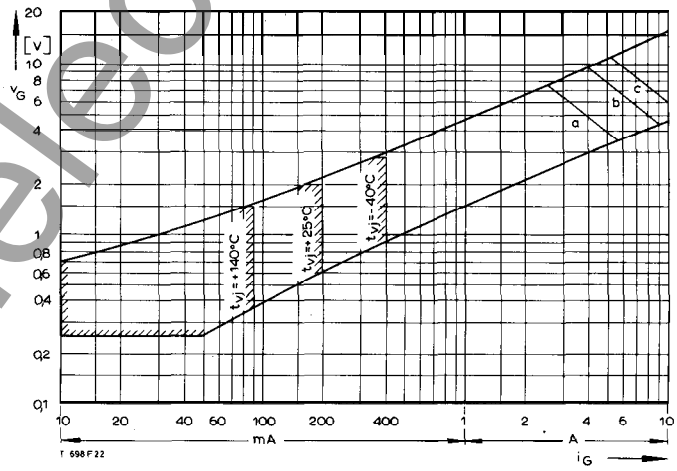
BildlFig. 16
Rückstromspitze $I_{RM} = f(-di/dt)$, $t_{vj} = t_{vj\,(max)}$, v_R = 05 V_{RRM}, v_{RM} = 0,8 V_{RRM}
Peak reverse recovery current $I_{RM} = f(-di/dt)$, $t_{vj} = t_{vj\,(max)}$, v_R = 0.5 V_{RRM}, v_{RM} = 0.8 V_{RRM}
Parameter: Durchlaßstrom/On-state current I_{TM}



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



BildlFig. 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 Kühlunganode side cooling
3 Kathodenseitige Kühlung/cathode side cooling



Bild/Fig. 19
Steuercharakteristik mit ZündbereichenlGate Characteristic with triggering areas
$v_G = f(i_G)$, V_D = 6 V

Parameter:		a	b	c
Steuerimpulsdauerflrigger 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]	0,00445	0,00823	0,0137	0,017	0,00481		
two-sided	τ_n [s]	0,0011	0,05	0,123	0,5	2,27		
anodenseitig	R_{thn} [°C/W]	0,00445	0,00823	0,0137	0,00141	0,017	0,0173	0,01827
anode-sided	τ_n [s]	0,0011	0,05	0,123	0,273	0,5	1,05	2,27
kathodenseitig	R_{thn} [°C/W]	0,00445	0,00823	0,0137	0,017	0,0278	0,02174	0,0245
cathode-sided	τ_n [s]	0,0011	0,05	0,123	0,5	0,803	2,54	4,33

Analytische Funktion/analytical function:

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

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