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Elektrische Eigenschaften

Electrical properties

Höchstzulässige Werte

Maximum rated values

Periodische Vorwärts- und Rückwärts-Sperrspannung	repetitive peak forward off-state and reverse voltages	$t_{vj} = -40^{\circ}\text{C} \dots t_{vj\text{ max}}$	$V_{\text{DRM}}, V_{\text{RRM}}$	600, 800 V 1000, 1200 V
Vorwärts-Stoßspitzen-sperrspannung	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-Stoßspitzen-sperrspannung	non repetitive peak reverse voltage	$t_{vj} = +25^{\circ}\text{C} \dots t_{vj\text{ max}}$	$V_{\text{RSM}} = V_{\text{RRM}}$	+ 100 V
Durchlaßstrom-Grenzeffektivwert	RMS on-state current	$t_c = 85^{\circ}\text{C}$	I_{TRMSM}	800 A
Dauergrenzstrom	average on-state current	$t_c = 57^{\circ}\text{C}$	I_{TAVM}	358 A 510 A
Stoßstrom-Grenzwert	surge current	$t_{vj} = 25^{\circ}\text{C}, t_p = 10\text{ ms}$	I_{TSM}	5800 A 5100 A
Grenzlastintegral	I^2t -value	$t_{vj} = t_{vj\text{ max}}, t_p = 10\text{ ms}$	I^2t	168000 A ² s 130000 A ² s
Kritische Stromsteilheit	critical rate of rise of on-state current	$t_{vj} = t_{vj\text{ max}}, t_p = 10\text{ ms}$	$(di/dt)_{\text{cr}}$	500 Alus
Kritische Spannungssteilheit	critical rate of rise of off-state voltage	$v_D \leq 67\% V_{\text{DRM}}, f = 50\text{ Hz}$ $i_{\text{GM}} = 1\text{ A}, di_{\text{G}}/dt = 1\text{ A}/\mu\text{s}$ $t_{vj} = t_{vj\text{ max}}, v_D = 67\% V_{\text{DRM}}$	$(dv/dt)_{\text{cr}}$	1) 50 V/ μs 2) 50 V/ μs B: 500 V/ μs L: 500 V/ μs M*: 1000 V/ μs

Charakteristische Werte

Characteristic values

Durchlaßspannung	on-state voltage	$t_{vj} = t_{vj\text{ max}}, i_T = 1500\text{ A}$	V_T	max. 2,95 V
Schleusenspannung	threshold voltage	$t_{vj} = t_{vj\text{ max}}$	$V_{T(\text{TO})}$	1,25 V
Ersatzwiderstand	slope resistance	$t_{vj} = t_{vj\text{ max}}$	r_T	1 m Ω
Zündstrom	gate trigger current	$t_{vj} = 25^{\circ}\text{C}, v_D = 12\text{ V}$	I_{GT}	max. 250 mA
Zündspannung	gate trigger voltage	$t = 25^{\circ}\text{C}, v_D = 12\text{ V}$	V_{GT}	max. 2,2 V
Nicht zündender Steuerstrom	gate non-trigger current	$t_{vj} = t_{vj\text{ max}}, v_D = 12\text{ V}$	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	$t_{vj} = 25^{\circ}\text{C}, v_D = 12\text{ V}, R_{\text{AK}} = 10\ \Omega$	I_{H}	max. 250 mA
Einraststrom	latching current	$t_{vj} = 25^{\circ}\text{C}, v_D = 12\text{ V}, R_{\text{GK}} \geq 10\ \Omega$ $i_{\text{GM}} = 1\text{ A}, di_{\text{G}}/dt = 1\text{ A}/\mu\text{s}, t_{\text{G}} = 20\text{ ps}$	I_{L}	max. 1 A
Vorwärts- u. Rückwärts-Sperrstrom	forward off-state and reverse current	$t_{vj} = t_{vj\text{ max}}, v_D = V_{\text{DRM}}, v_R = V_{\text{RRM}}$	$i_{\text{D}}, i_{\text{R}}$	max. 50 mA
Zündverzögerung	gate controlled delay time	$t_{vj} = 25^{\circ}\text{C}, i_{\text{GM}} = 1\text{ A}, di_{\text{G}}/dt = 1\text{ A}/\mu\text{s}$	t_{gd}	max. 1,2 μs
Freiwerdzeit	circuit commutated turn-off time	siehe Techn. Erl./see Techn. Inf.	t_{q}	C*: max. 12 μs D: max. 15 μs S: max. 18 μs 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. 0,053 $^{\circ}\text{C}/\text{W}$ max. 0,050 $^{\circ}\text{C}/\text{W}$
für anodenseitige Kühlung	for anode-sided cooling	$\theta = 180^{\circ}\text{ el, sin DC}$	$R_{\text{thJC(A)}}$	max. 0,088 $^{\circ}\text{C}/\text{W}$ max. 0,085 $^{\circ}\text{C}/\text{W}$
für kathodenseitige Kühlung	for cathode-sided cooling	$\theta = 180^{\circ}\text{ el, sin DC}$	$R_{\text{thJC(K)}}$	max. 0,123 $^{\circ}\text{C}/\text{W}$ max. 0,120 $^{\circ}\text{C}/\text{W}$
Übergangswärmewiderstand	thermal resistance, case to heatsink	beidseitig/two-sided einseitig/one-sided	R_{thCK}	max. 0,01 $^{\circ}\text{C}/\text{W}$ max. 0,02 $^{\circ}\text{C}/\text{W}$
Höchstzul. Sperrschichttemperatur	max. junction temperature		$t_{vj\text{ max}}$	125 $^{\circ}\text{C}$
Betriebstemperatur	Operating temperature		$t_{\text{c op}}$	-40 ... + 125 $^{\circ}\text{C}$
Lagertemperatur	storage temperature		t_{stg}	-40 ... + 140 $^{\circ}\text{C}$

Mechanische Eigenschaften

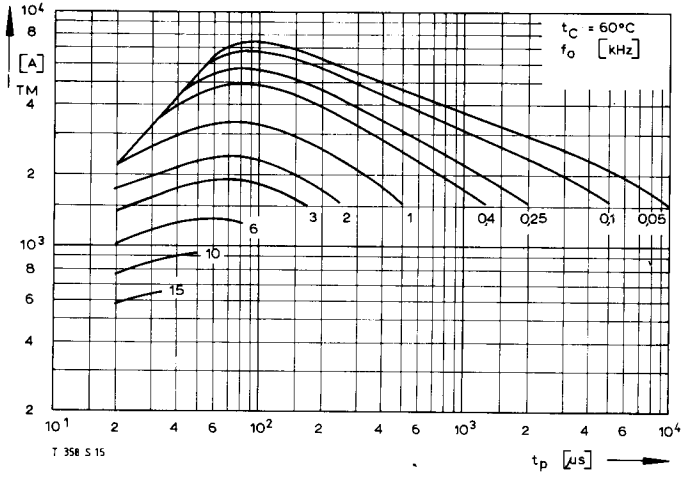
Mechanical properties

Si-Element mit Druckkontakt	Si-pellet with pressure contact		F	4,5 ... 9 kN
Anpreßkraft	Clamping force		G	typ. 110 g
Gewicht	weight			17 mm
Kriechstrecke	Creepage distance			C
Feuchtklasse	humidity classification	DIN 40040		50 m/s ²
Schwingfestigkeit	Vibration resistance	f = 50 Hz		Seitelpage 154
Maßbild	outline	DIN 41814-151A4		

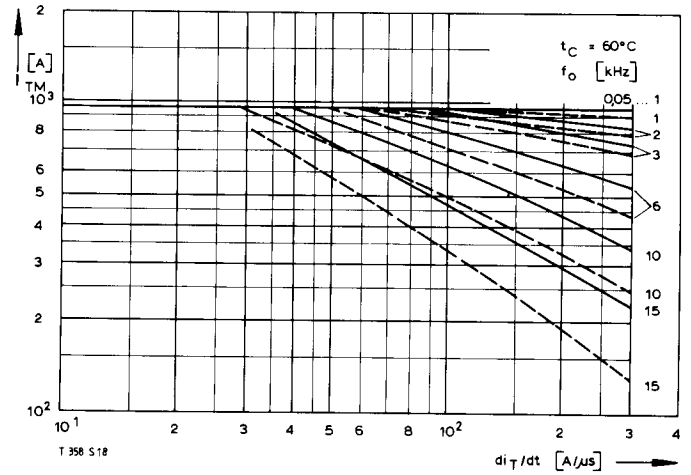
* Für größere Stückzahlen bitte Liefertermin erfragen/Delivery for larger quantities on request

1) Werte nach DIN IEC 747-8 (ohne vorausgehende Kommutierung)/Values to DIN IEC 747-6 (without prior commutation)

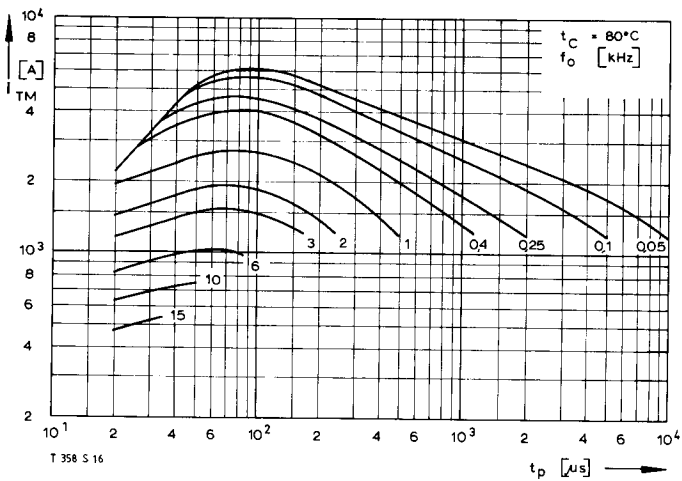
2) Unmittelbar nach der Freiwerdzeit, vgl. Meßbedingungen für t_{q} /Immediately after circuit commutated turn-off time, see Parameters t_{q}



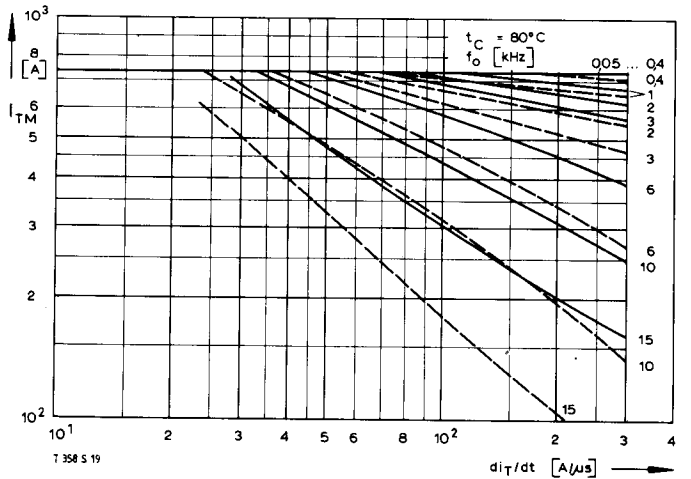
Bild/Fig. 1



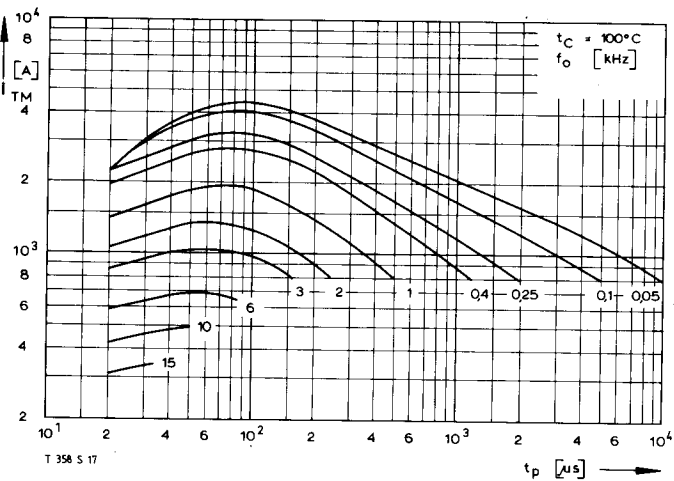
Bild/Fig. 4



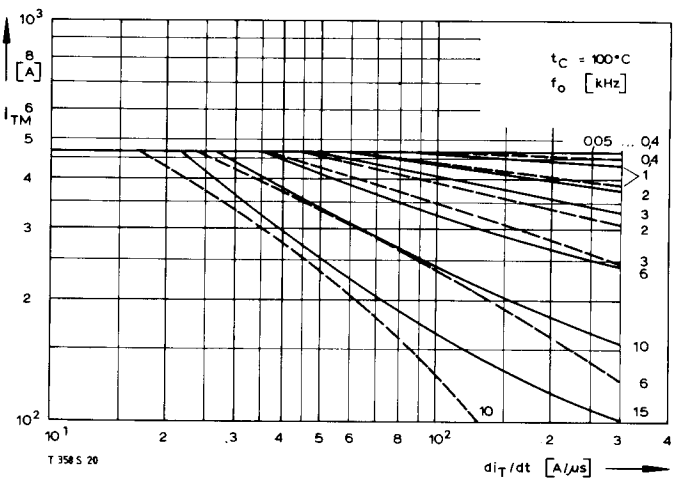
Bild/Fig. 2



Bild/Fig. 5



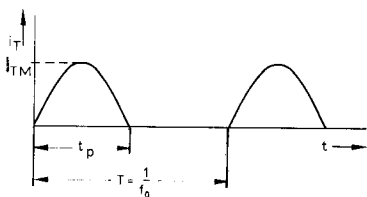
Bild/Fig. 3



Bild/Fig. 6

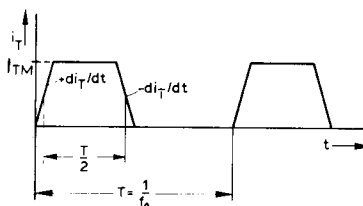
Bild/ Fig. 1, 2, 3
Steuergenerator/pulse generator:
 $I_G = 1 \text{ A}$, $di_G/dt = 1 \text{ A}/\mu\text{s}$

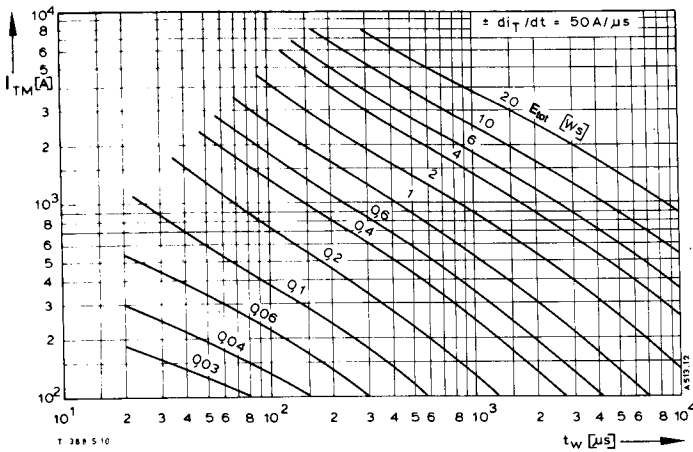
RC-Glied/RC-network:
 $R [\Omega] \geq 0,02 V_{DM} [V]$
 $C \leq 0,22 \mu\text{F}$
 $V_{DM} \leq 0,67 V_{DRM}$



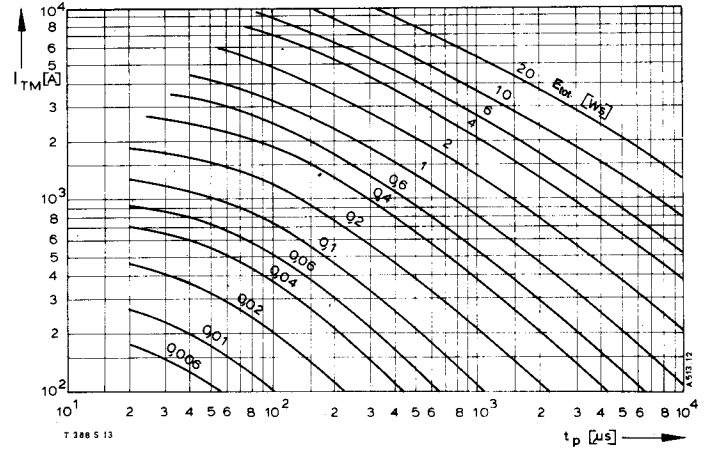
Bild/ Fig. 4, 5, 6
Steuergenerator/pulse generator:
 $I_G = 1 \text{ A}$, $di_G/dt = 1 \text{ A}/\mu\text{s}$

RC-Glied/RC-network:
 $R [\Omega] \geq 0,02 V_{DM} [V]$
 $C \leq 0,33 \mu\text{F}$
 $V_{DM} \leq 0,67 V_{DRM}$
 $dv_R/dt \leq 600 \text{ V}/\mu\text{s}$
 $V_{RM} \leq 0,67 V_{RRM}$

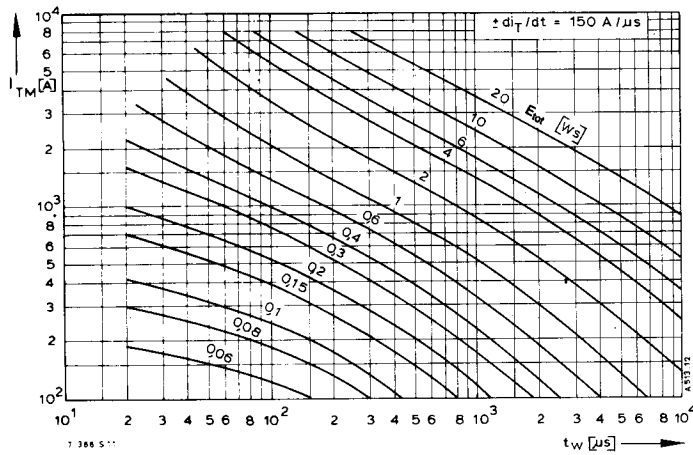




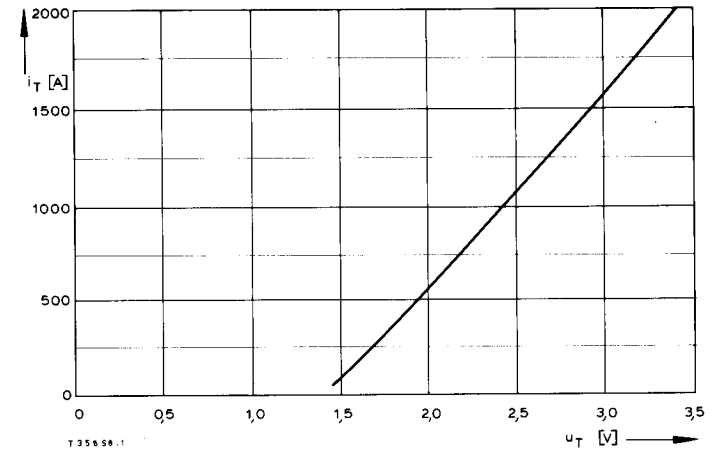
Bild/Fig. 10



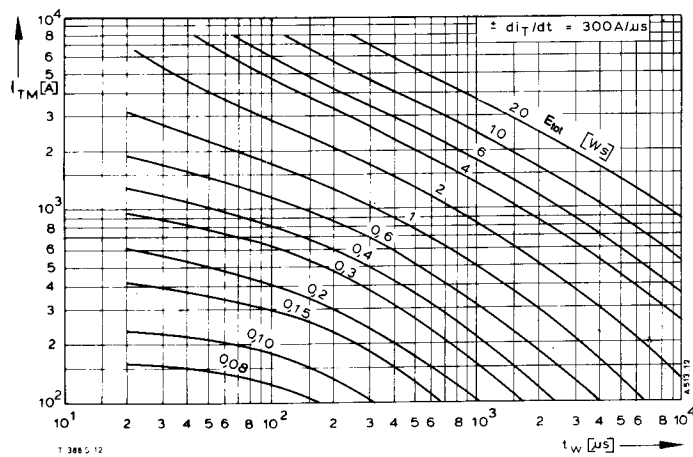
Bild/Fig. 13



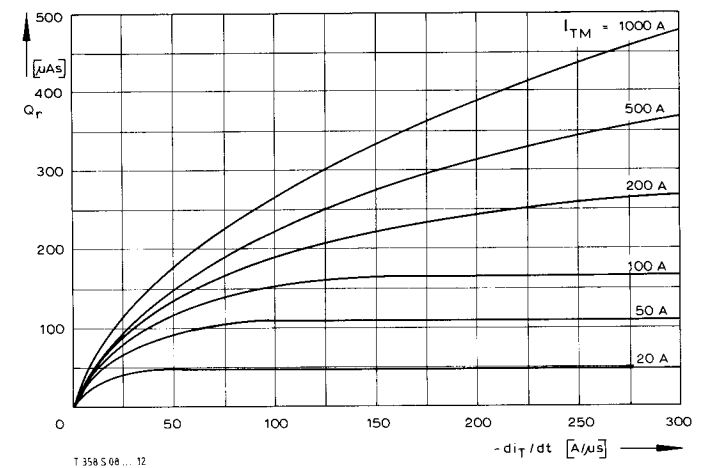
Bild/Fig. 11



Bild/Fig. 14



Bild/Fig. 12



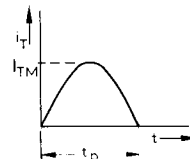
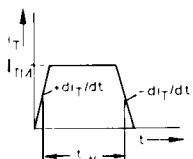
Bild/Fig. 15

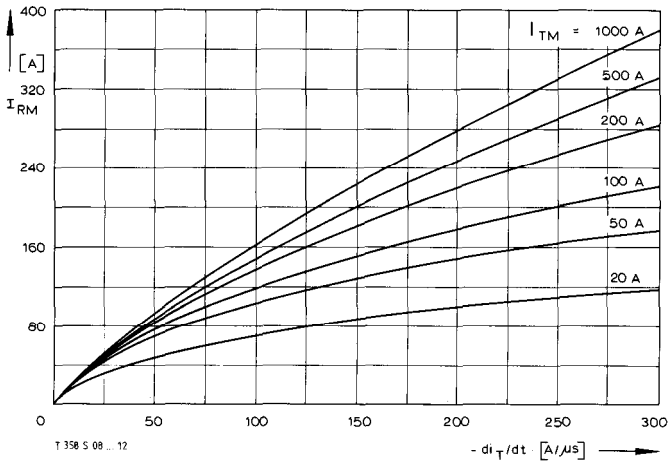
Bild/Fig. 10, 11, 12
 Steuergenerator/pulse generator:
 $i_G = 1 \text{ A}$, $di_G/dt = 1 \text{ A}/\mu\text{s}$

RC-Glied/RC-network:
 $R [\Omega] \geq 0,02 V_{DM} [V]$
 $C \leq 0,33 \mu\text{F}$
 $V_{DM} \leq 0,67 V_{RRM}$
 $dv_R/dt \leq 600 \text{ V}/\mu\text{s}$
 $V_{RM} \leq 0,67 V_{RRM}$

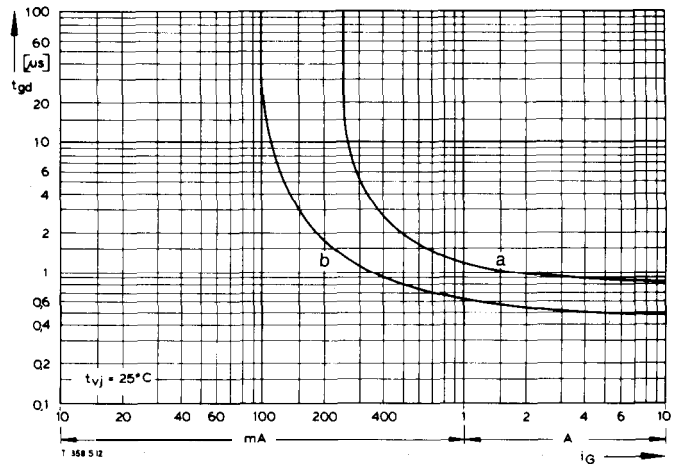
(zu Bild/to Fig. 13)
 Steuergenerator/pulse generator:
 $i_G = 1 \text{ A}$, $di_G/dt = 1 \text{ A}/\mu\text{s}$

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

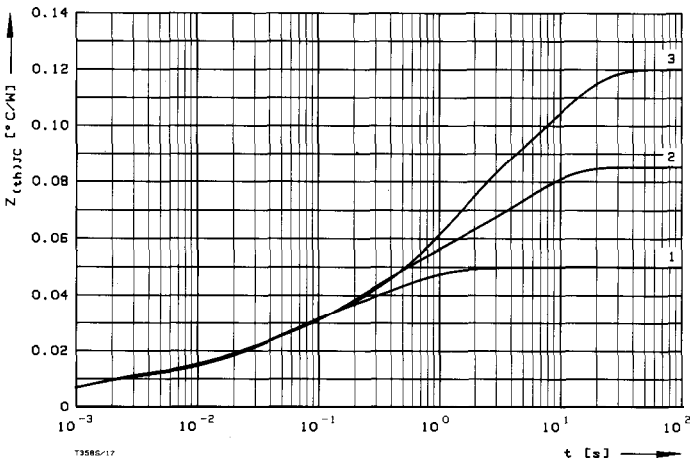




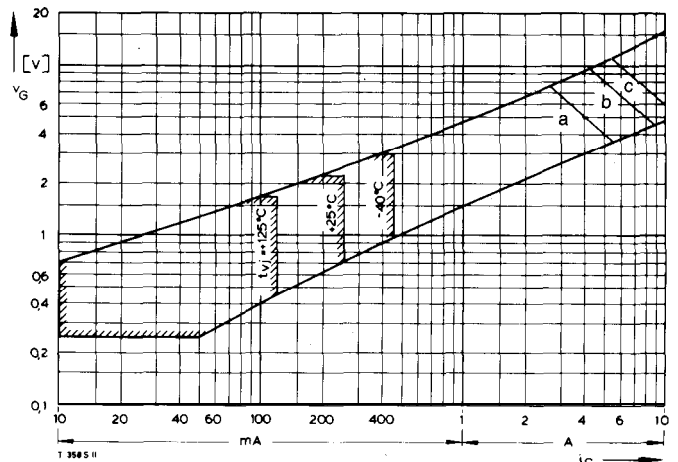
BildFig. 16
 Rückstromspitze $I_{RM} = f(-di/dt), t_{vj} = t_{vj(max)}, V_R = 0,5 V_{RRM}, V_{RM} = 0,8 V_{RRM}$
 Peak reverse recovery current $I_{RM} = f(-di/dt), t_{vj} = t_{vj(max)}, V_R = 0,5 V_{RRM}, V_{RM} = 0,8 V_{RRM}$
 Parameter: Durchlaßstrom/on-state current I_{TM}



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
 Instanter 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



BildFig. 19
 Steuercharakteristik mit Zündbereichen/Gate Characteristic with triggering areas
 $V_G = f(i_G), V_D = 12 \text{ V}$

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} [$^\circ\text{C}/\text{W}$]	0,0105	0,00283	0,0167	0,0188	0,00116		
	τ_n [s]	0,00113	0,0255	0,0511	0,429	2,49		
anodenseitig/anode-sided	R_{thn} [$^\circ\text{C}/\text{W}$]	0,0094	0,00974	0,0182	0,0161	0,0316		
	τ_n [s]	0,000984	0,017	0,15	0,6	5,0		
kathodenseitig/cathode-sided	R_{thn} [$^\circ\text{C}/\text{W}$]	0,00928	0,0145	0,00868	0,0401	0,0475		
	τ_n [s]	0,000939	0,0285	0,156	1,12	9,1		

Analytische Funktion/analytical function:

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