

Elektrische Eigenschaften

Electrical properties

Höchstzulässige Werte	Maximum rated values			
Periodische Vorwärts- und Rückwärts-Sperrspannung	repetitive peak forward off-state and reverse voltages	$t_{vj} = -40^{\circ}\text{C} \dots t_{vj\text{max}}$	$V_{\text{DRM}}, V_{\text{RRM}}$	800, 1000 V 1100, 1200 V
Vorwärts-Stoßsperrspannung	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-Stoßsperrspannung	non repetitive peak reverse voltage	$t_r = +25^{\circ}\text{C} \ t_{r\text{max}}$	$V_{\text{RSM}} = V_{\text{RRM}}$	+ 100 V
Durchlaßstrom-Grenzeffektivwert	RMS on-state current	$t_c = 85^{\circ}\text{C}$	I_{TRMSM}	1500 A
Dauerrenzstrom	average on-state current	$t_c = 22^{\circ}\text{C}$	I_{TAVM}	510 A
Stoßstrom-Grenzwert	surge current	$t_{vj} = 25^{\circ}\text{C}, t_p = 10 \text{ ms}$	I_{TSM}	9500 A
Grenzlastintegral	I^2t -value	$t_{vj} = t_{vj\text{max}}, t_p = 10 \text{ ms}$		8400 A
Kritische Stromsteilheit	critical rate of rise of on-state current	$t_{vj} = 25^{\circ}\text{C}, t_p = 10 \text{ ms}$	I^2t	451 kA^2s
Kritische Spannungssteilheit	critical rate of rise of off-state voltage	$t_{vj} = t_{vj\text{max}}, t_p = 10 \text{ ms}$	$(di/dt)_{\text{cr}}$	353 kA^2s
		$V_D \leq 67\% V_{\text{DRM}}, f = 50 \text{ Hz}$		500 $\text{A}/\mu\text{s}$
		$I_{\text{GM}} = 1 \text{ A}, di/dt = 1 \text{ Alps}$	$(dv/dt)_{\text{cr}}$	B: 50 50 $\text{V}/\mu\text{s}$
		$t_{vj} = t_{vj\text{max}}, V_D = 67\% V_{\text{DRM}}$		c*: 500 500 $\text{V}/\mu\text{s}$
				L: 500 50 $\text{V}/\mu\text{s}$
				M*: 1000 500 $\text{V}/\mu\text{s}$

Charakteristische Werte

Characteristic values

Durchlaßspannung	on-state voltage	$t_{vj} = t_{vj\text{max}}, I_T = 2,5 \text{ kA}$	V_T	max.	3,05 V
Schleusenspannung	threshold voltage	$t_{vj} = t_{vj\text{max}}$	$V_{T(\text{TO})}$		1,3 V
Ersatzwiderstand	slope resistance	$t_{vj} = t_{vj\text{max}}$	r_T		0,65 $\text{m}\Omega$
Zündstrom	gate trigger current	$t_{vj} = 25^{\circ}\text{C}, V_D = 12 \text{ V}$	I_{GT}	max.	250 mA
Zündspannung	gate trigger voltage	$t_r = 25^{\circ}\text{C}, V_D = 12 \text{ V}$	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	$t_r = 25^{\circ}\text{C}, V_D = 12 \text{ V}, R_{\text{GA}} = 10 \Omega$	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_{L}	max.	1,5 A
		$I_{\text{GM}} = 1 \text{ A}, di/dt = 1 \text{ Alps}, t_g = 20 \text{ ps}$			
Vorwärts- u. Rückwärts-Sperrstrom	forward off-state and reverse currents	$t_{vj} = t_{vj\text{max}}, V_D = V_{\text{DRM}}, V_R = V_{\text{RRM}}$	i_D, i_R	max.	100 mA
Zündverzögerung	gate controlled delay time	$t_{vj} = 25^{\circ}\text{C}, I_{\text{GM}} = 1 \text{ A}, di/dt = 1 \text{ A}/\mu\text{s}$	t_{gd}	max.	1,2 μs
Freiwerdezeit	circuit commutated turn-off time	siehe Techn. Erl./see Techn. Inf.	$t_r, C^{*3)}$	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.	0,038 $^{\circ}\text{C}/\text{W}$
für anodenseitige Kühlung	for anode-sided cooling	$\Theta = 180^{\circ}\text{el, sin}$ DC	$R_{\text{thJC(A)}}$	max.	0,0675 $^{\circ}\text{C}/\text{W}$
für kathodenseitige Kühlung	for cathode-sided cooling	$\Theta = 180^{\circ}\text{el, sin}$ DC	$R_{\text{thJC(K)}}$	max.	0,082 $^{\circ}\text{C}/\text{W}$
Übergangswärmewiderstand	thermal resistance, case to heatsink	beidseitig/two-sided einseitig/one-sided	R_{thCK}	max.	0,005 $^{\circ}\text{C}/\text{W}$ max. 0,01 $^{\circ}\text{C}/\text{W}$
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 ... + 150 $^{\circ}\text{C}$

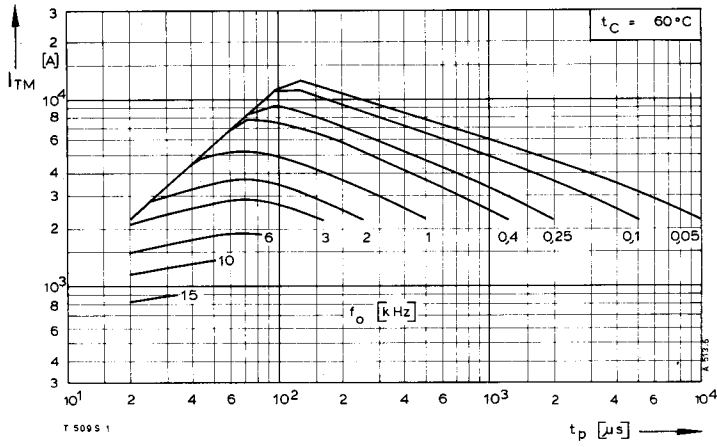
Mechanische Eigenschaften

Mechanical properties

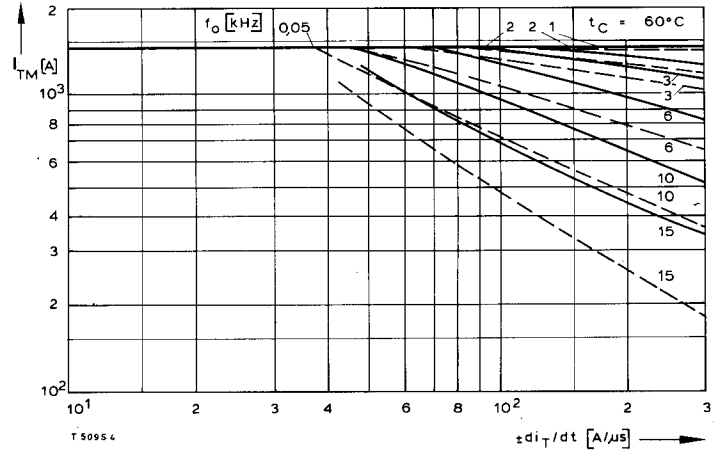
Si-Element mit Druckkontakt	Si-pellet with pressure contact		F		7 ... 15 kN
Anpreßkraft	Clamping force		G	typ.	270 g
Gewicht	weight				30 mm
Kriechstrecke	Creepage distance				C
Feuchteklasse	humidity classification	DIN 40040			50 m/s^2
Schwingfestigkeit	Vibration resistance	f = 50 Hz			Seite/page 155
Maßbild	outline	DIN 41814-153C4			

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

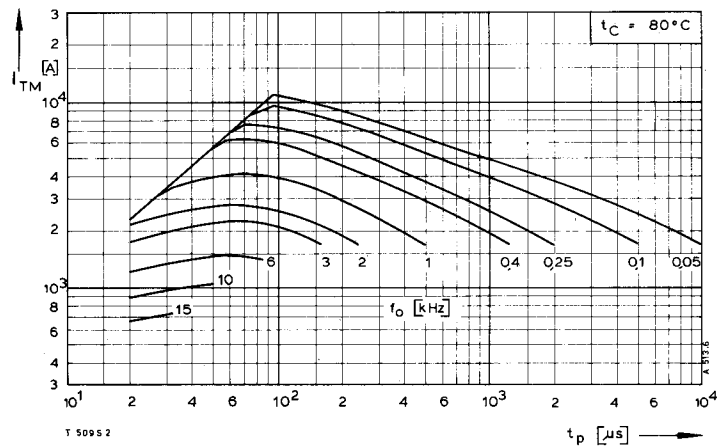
- 1) Werte nach DIN IEC 747-6 (ohne vorausgehende Kommutierung)/Values to DIN IEC 747-6 (without Prior commutation)
- 2) Unmittelbar nach der Freiwerdezeit, vgl. Meßbedingungen für t_q /Immediately after circuit commutated turn-off time, see Parameters t_q
- 3) $dv/dt = 50 \text{ V}/\mu\text{s}$ oder/ or $L = 50 \text{ V}/\mu\text{s}$



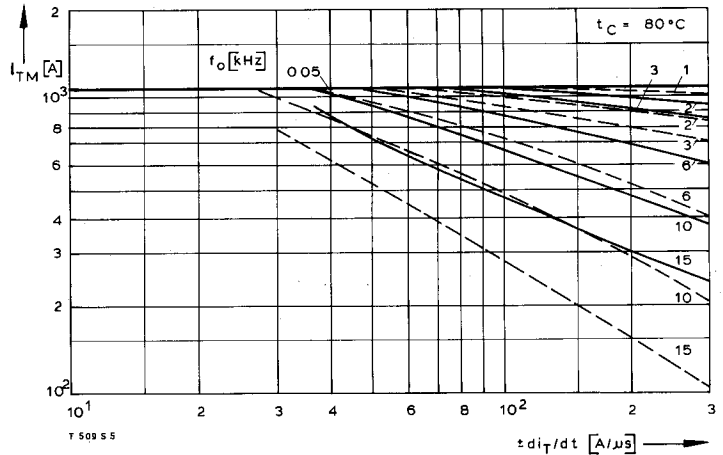
Bild/Fig. 1



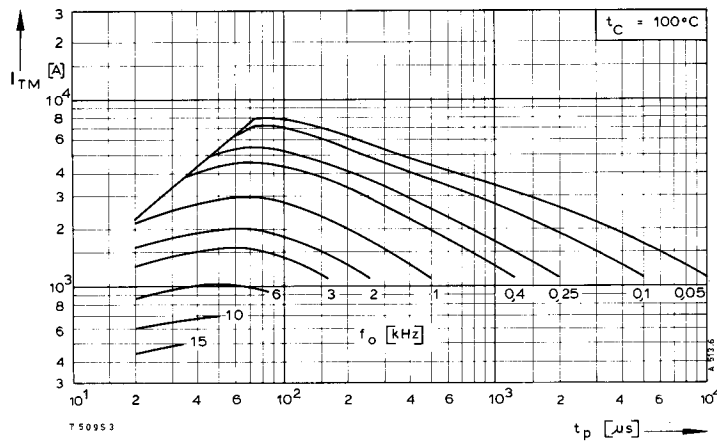
Bild/Fig. 4



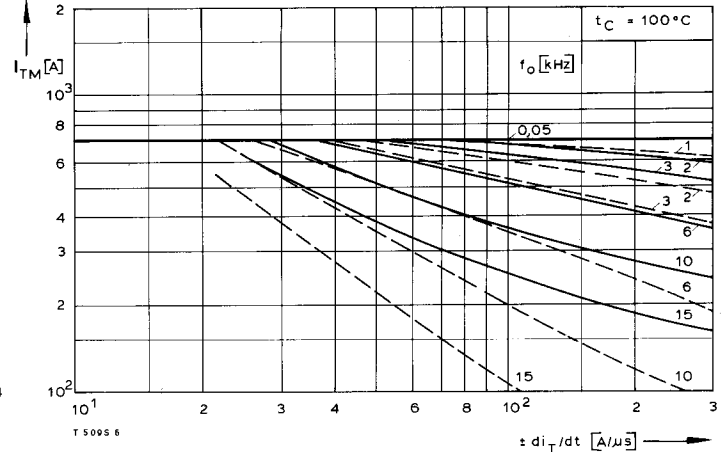
Bild/Fig. 2



Bild/Fig. 5



Bild/Fig. 3



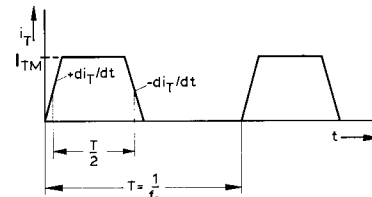
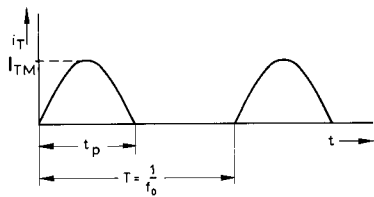
Bild/Fig. 6

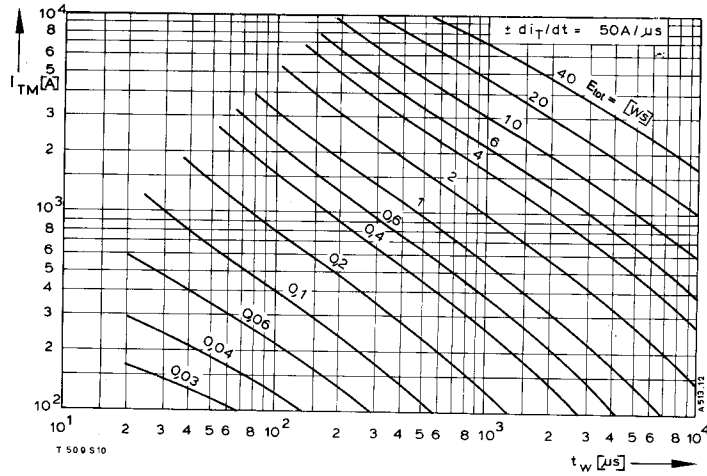
Bild/Fig. 1, 2, 3
Steuergenerator/pulse generator:
 $i_G = 1 \text{ A}$, $di_G/dt = 1 \text{ A}/\mu\text{s}$

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

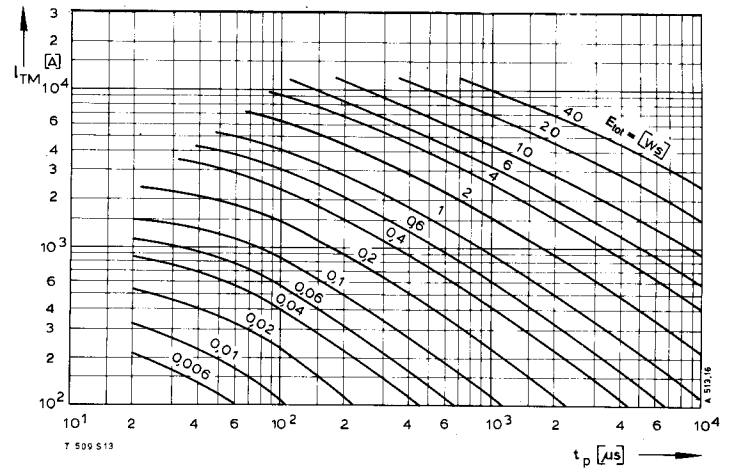
Bild/Fig. 4, 5, 6
Steuergenerator/pulse generator:
 $i_G = 1 \text{ A}$, $di_G/dt = 1 \text{ A}/\mu\text{s}$

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

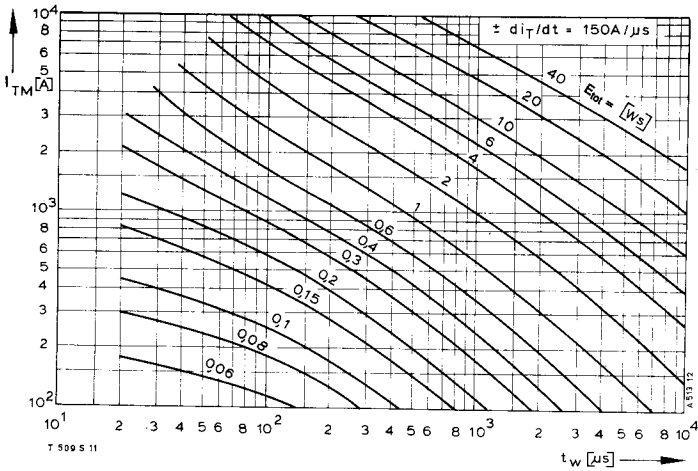




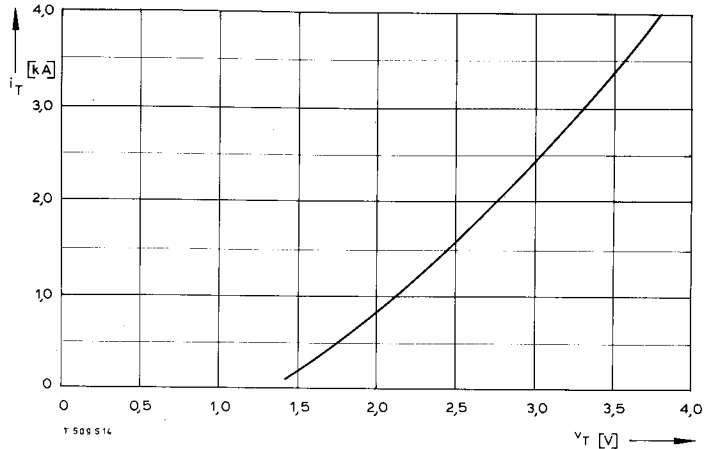
Bild/Fig. 10



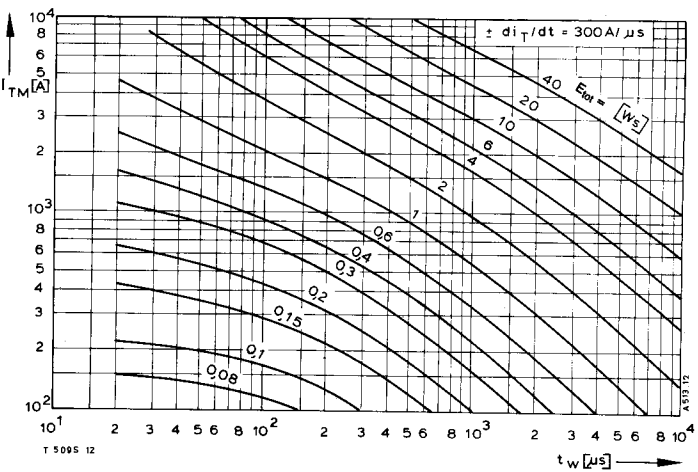
Bild/Fig. 13



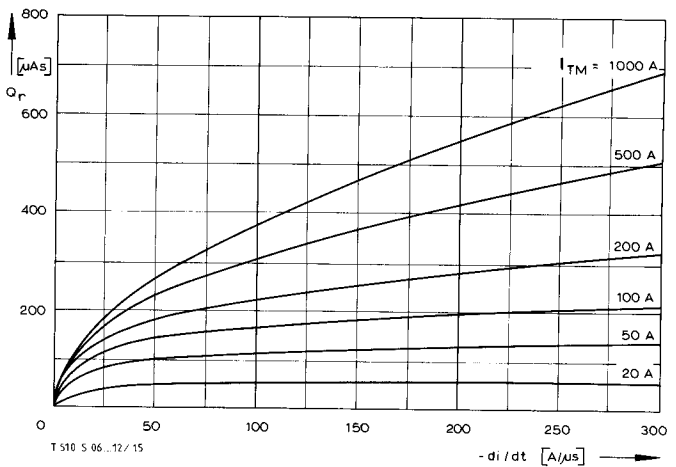
Bild/Fig. 11



Bild/Fig. 14



Bild/Fig. 12



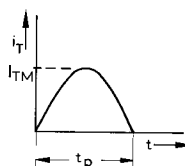
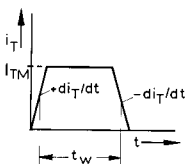
Bild/Fig. 15

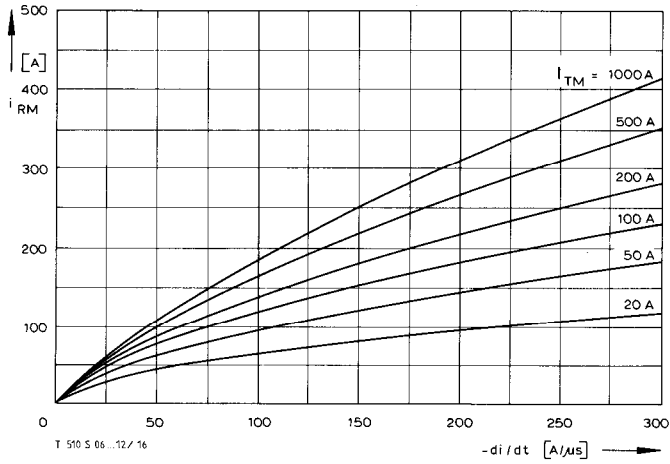
Bild/Fig. 10, 11, 12
 Steuergenerator/pulse generator:
 $i_G = 1 \text{ A}$, $di_G/dt = 1 \text{ A}/\mu\text{s}$

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

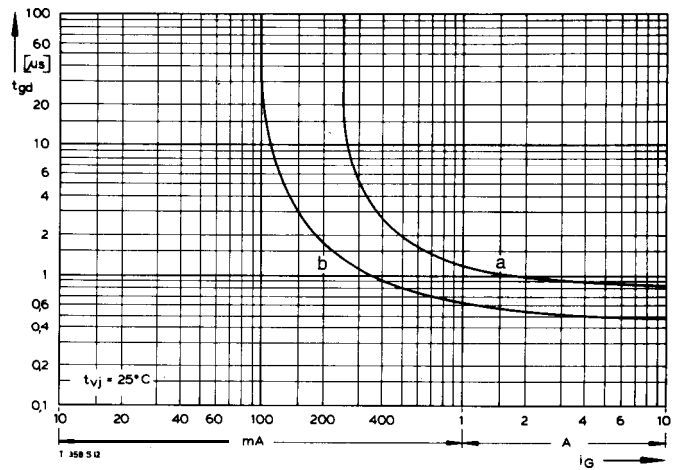
(zu Bild/ Fig. 13)
 Steuergenerator/pulse generator:
 $i_G = 1 \text{ A}$, $di_G/dt = 1 \text{ A}/\mu\text{s}$

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

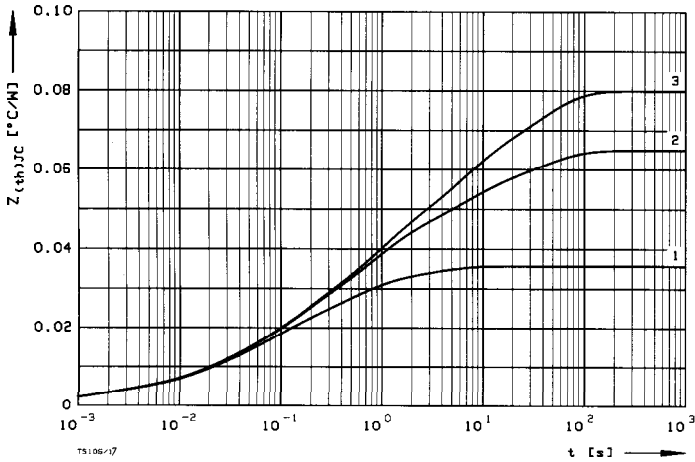




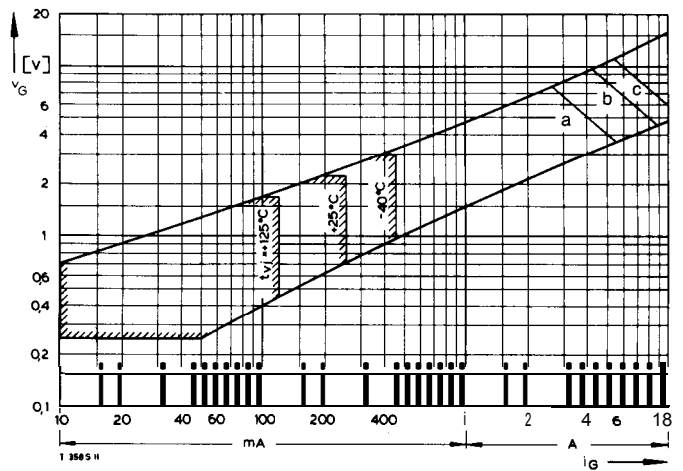
Bild/Fig. 16
 Rückstromspitze $I_{RM} = f(-di/dt)$, $t_{vj} = t_{vj(max)}$, $v_R = 0,5 V_{RRM}$, $v_{RM} = 0,8 V_{RRM}$
 Peak reverse recovery current $I_{RM} = f(-di/dt)$, $t_{vj} = t_{vj(max)}$, $v_R = 0,5 V_{RRM}$, $v_{RM} = 0,6 V_{RRM}$
 Parameter: Durchlaßstrom/on-state current I_{TM}



Bild/Fig. 16
 Zündverzugs/Gate controlled delay time $t_{gd} = f(i_{GM})$, $t_{vj} = 25^\circ C$. $di_G/dt = i_{GM}/1 \mu s$
 a – Maximaler Verlauf/Limiting Characteristic
 b – Typischer Verlauf/Typical Characteristic



Bild/Fig. 17
 Transienter innerer Wärmewiderstand $Z_{thJC} = f(t)$, DC
 Transient thermal impedance $Z_{thJC} = f(t)$, 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
 $V_G = f(i_G)$, $V_0 = 12 V$

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	Pos. n	1	2	3	4	5	6	7
beidseitig	R_{thn} [°C/W]	0,00308	0,00451	0,0111	0,01215	0,005		
two-sided	τ_n [s]	0,00114	0,0145	0,0716	0,453	2,8		
anodenseitig	R_{thn} [°C/W]	0,00315	0,00565	0,0131	0,0186	0,0128	0,0117	
anode-sided	τ_n [s]	0,00116	0,0169	0,1	0,69	5,0	36,0	
kathodenseitig	R_{thn} [°C/W]	0,00315	0,00565	0,0131	0,0186	0,0195	0,02	
cathode-sided	τ_n [s]	0,00116	0,0169	0,1	0,69	5,0	36,0	

Analytische Funktion/analytical function:

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