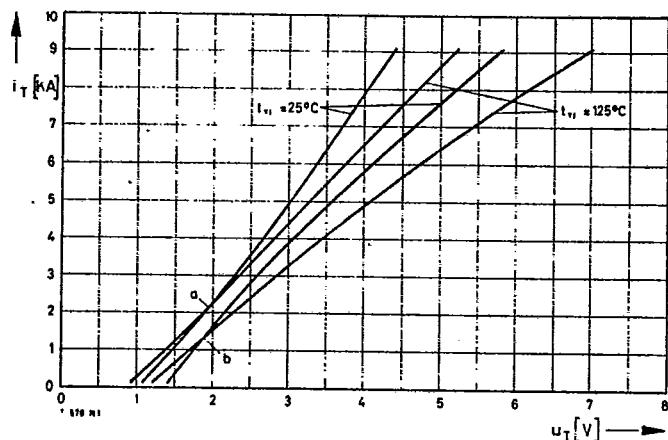
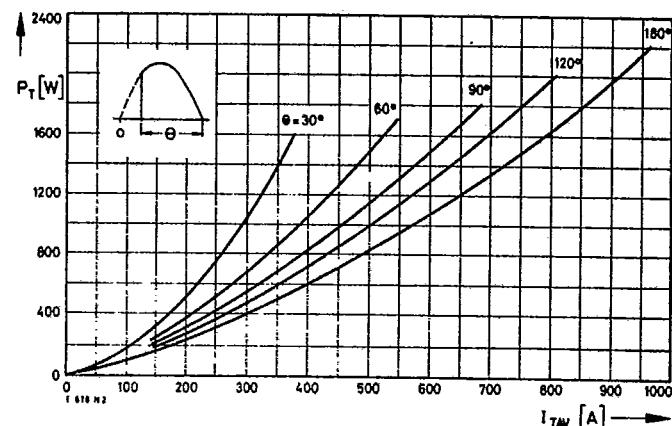


T700 N
T709 N

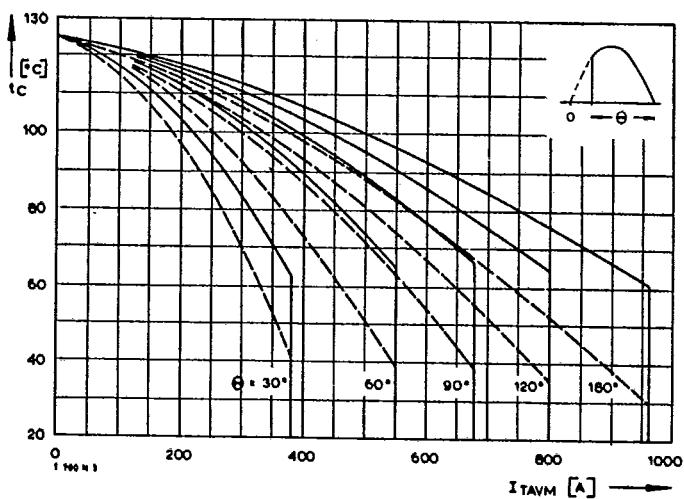
Type Series/Type range	T700 N T709 N	2000	2200	2400	2600*
Electrical Properties					
Highest Permissible Values					
U_{DRM} , U_{RRM}	Periodic Forward and Reverse Peak Spikes	repetitive peak forward off-state and reverse voltages			2000...2600 V
I_{TRMSM}	Effective Reverse Current	RMS on-state current			1500 A
I_{AVM}	Average Reverse Current	average on-state current	$t_c = 85^\circ\text{C}$		700 A
			$t_c = 61^\circ\text{C}$		960 A
I_{TRM}	Periodic Spike Current	repetitive peak on-state current			9,1 kA
I_{SM}	Surge Current	surge current	$t = 10 \text{ ms}, t_d \leq 45^\circ\text{C}$		14,5 kA
			$t = 10 \text{ ms}, t_d = 125^\circ\text{C}$		13 kA
$\int I^2 dt$	Gating Power Integral	$\int I^2 dt$ -value	$t = 10 \text{ ms}, t_d \leq 45^\circ\text{C}$		845 $\text{kA}^2 \text{s}$
			$t = 10 \text{ ms}, t_d = 125^\circ\text{C}$		850 $\text{kA}^2 \text{s}$
$(di/dt)_{cr}$	Critical Current Rate	Critical rate of rise of on-state current	nicht periodisch/non repetitive		250 $\text{A}/\mu\text{s}$
			Dauerbetrieb/continuous operation, $I_M = 2,5 \text{ kA}$		50 $\text{A}/\mu\text{s}$
			Steuergenerator/pulse generator: $U_L = 10 \text{ V}, I_G = 1,5 \text{ A}, di_G/dt = 1,5 \text{ A}/\mu\text{s}$		
			$U_D = 67\% U_{DRM}, t_d = 125^\circ\text{C}$		
$(du/dt)_{cr}$	Critical Voltage Rate	Critical rate of rise of off-state voltage	5. Kennbuchstabe/5th letter C		400 $\text{V}/\mu\text{s}$
			5. Kennbuchstabe/5th letter F		1000 $\text{V}/\mu\text{s}$
Characteristic Values					
U_T	Forward On-state Voltage	max. on-state voltage	$t_d = 25^\circ\text{C}, I_T = 3 \text{ kA}$		2,6 V
$U_{(TO)}$	Threshold Voltage	threshold voltage	$t_d = 125^\circ\text{C}$		1,05 V
r_T	Slope Resistance	slope resistance	$t_d = 125^\circ\text{C}$		0,53 mΩ
U_{GT}	Gate Trigger Voltage	max. gate trigger voltage	$t_d = 25^\circ\text{C}, U_D = 6 \text{ V}, R_A = 5 \Omega$		1,5 V
I_{GT}	Gate Trigger Current	max. gate trigger current	$t_d = 25^\circ\text{C}, U_D = 6 \text{ V}, R_A = 5 \Omega$		300 mA
I_{ZT}	Minimum Gate Trigger Current	min. gate trigger current	$t_d = 125^\circ\text{C}, U_D = 6 \text{ V}, R_A = 5 \Omega$		10 mA
I_H	Oberer Haltestrom	max. holding current	$t_d = 25^\circ\text{C}, U_D = 6 \text{ V}, R_A = 5 \Omega$		600 mA
I_L	Oberer Einraststrom	max. latching current	$t_d = 25^\circ\text{C}, U_D = 6 \text{ V}, R_{GK} \geq 10 \Omega$		2 A
			Steuergenerator/pulse generator: $I_G = 1,5 \text{ A}, di_G/dt = 1,5 \text{ A}/\mu\text{s}, t_d = 50 \mu\text{s}$		
			$t_d = 125^\circ\text{C}, U_D = U_{DRM} (U_R = U_{RRM})$		
I_D, I_R	Forward and Reverse Spillover Current	max. forward and reverse currents			100 mA
t_{gd}	Oberer Zündverzug	max. gate controlled delay time	Steuergenerator/pulse generator: $I_G = 1,5 \text{ A}, di_G/dt = 3 \text{ A}/\mu\text{s}$		5,5 μs
t_q	Typische Freiwerdezeit	typical turn-off time	Prüfbedingungen Seite/test conditions page 21		300 μs
C_{null}	Typische Nullkapazität	typical zero capacitance	$t_d = 25^\circ\text{C}, f = 10 \text{ kHz}$		8 nF
Thermal Properties					
R_{thJC}	Innerer Wärmewiderstand für beidseitige Kühlung	thermal resistance, junction to case for two-sided cooling	$\Theta = 180^\circ\text{el}, \sinus$		$\leq 0,029^\circ\text{C}/\text{W}$
			DC		$\leq 0,028^\circ\text{C}/\text{W}$
$R_{thJC(A)}$	für anodenseitige Kühlung	for anode-sided cooling	$\Theta = 180^\circ\text{el}, \sinus$		$\leq 0,043^\circ\text{C}/\text{W}$
			DC		$\leq 0,042^\circ\text{C}/\text{W}$
$R_{thJC(K)}$	für kathodenseitige Kühlung	for cathode-sided cooling	$\Theta = 180^\circ\text{el}, \sinus$		$\leq 0,085^\circ\text{C}/\text{W}$
			DC		$\leq 0,084^\circ\text{C}/\text{W}$
R_{thCK}	Wärmewiderstand für einen Übergang zwischen Gehäuse und Kühlkörper	single sided thermal resistance, case to heatsink			0,008°C/W
	Betriebstemperatur	operating temperature			-40°C...+125°C
	Lagertemperatur	storage temperature			-40°C...+150°C
Mechanical Properties					
G	Gewicht	weight T700 N/T709 N			600/540 g
F	Anpreßkraft	clamping force			14...20 kN
	Maßbilder	outlines T700 N/T709 N			Seite/page 236
	Kriechstrecke	creepage distance T700 N/T709 N			25 mm/32 mm
	Feuchtekategorie	humidity classification			C
	Schüttelfestigkeit	vibration resistance	DIN 40040		5x9,81 m/s ²
			$f = 50 \text{ Hz}$		



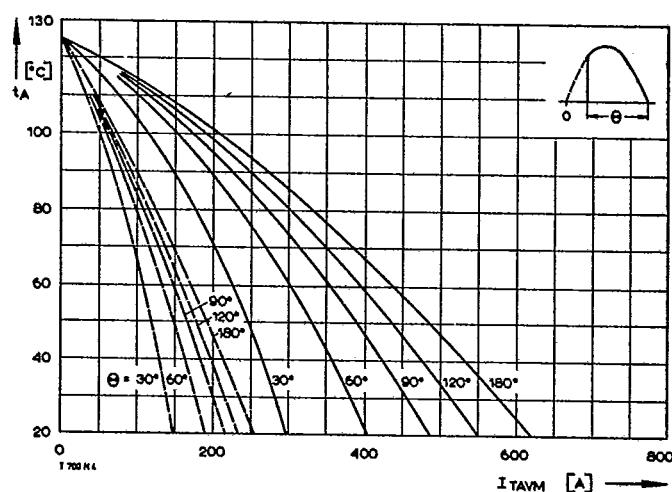
Bild/Fig. 1
Durchlaßkennlinien/On-state characteristics
a - Typische Kennlinien/typical characteristics
b - Grenzkennlinien/limiting characteristics



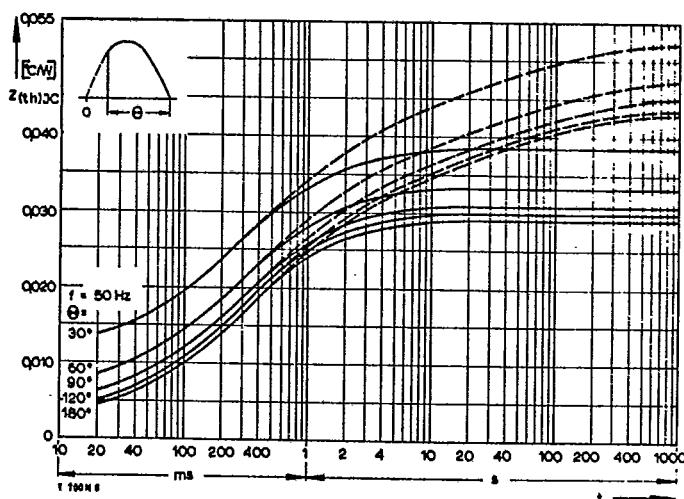
Bild/Fig. 2
Durchlaßverlustleistung P_T /On-state power loss P_T
Parameter: Stromflußwinkel Θ /current conduction angle Θ



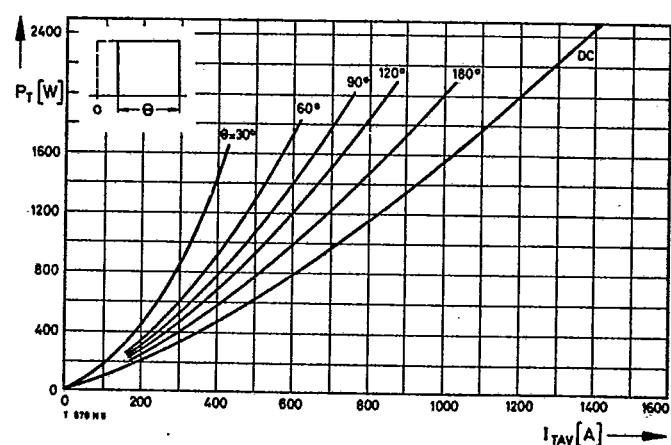
Bild/Fig. 3
Höchstzulässige Gehäusetemperatur t_C
Maximum allowable case temperature t_C
— anodenseitige Kühlung/anode sided cooling
— beidseitige Kühlung/two-sided cooling



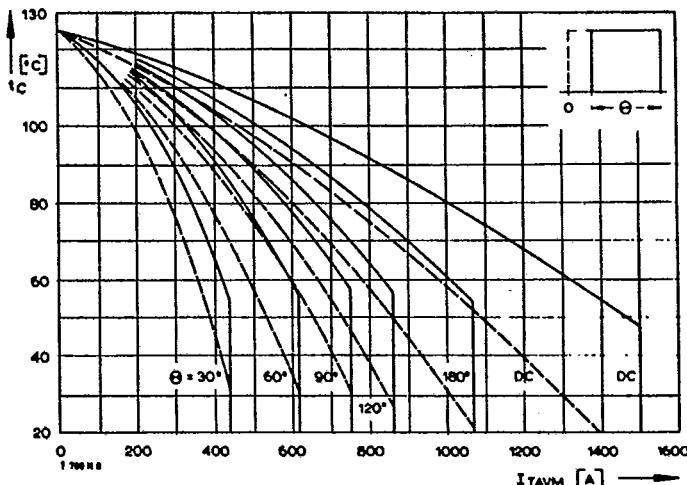
Bild/Fig. 4
Höchstzulässige Kühlmitteltemperatur t_A bei Betrieb auf Kühlkörper K0,05 F.
Maximum allowable cooling medium temperature t_A , heatsink type K0,05 F.
— Luftselbstkühlung/natural cooling
— verstärkte Luftkühlung/forced cooling, $V_L = 120 \text{ l/s}$



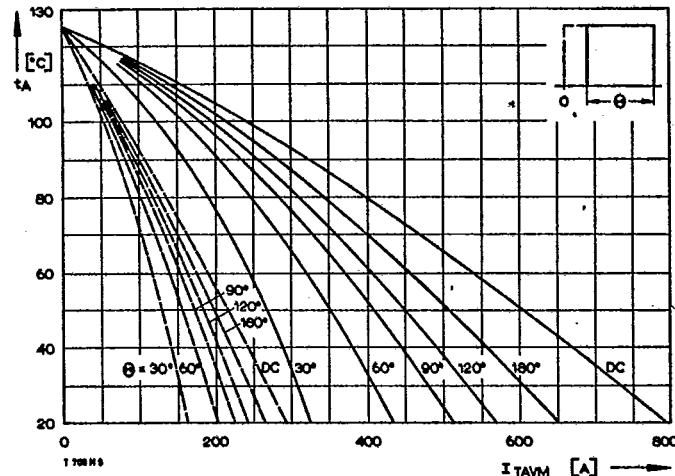
Bild/Fig. 5
Transienter innerer Wärmewiderstand Z_{thJC}
Transient thermal impedance, junction to case, Z_{thJC} , at two-sided cooling
— anodenseitige Kühlung/anode sided cooling
— beidseitige Kühlung/two-sided cooling



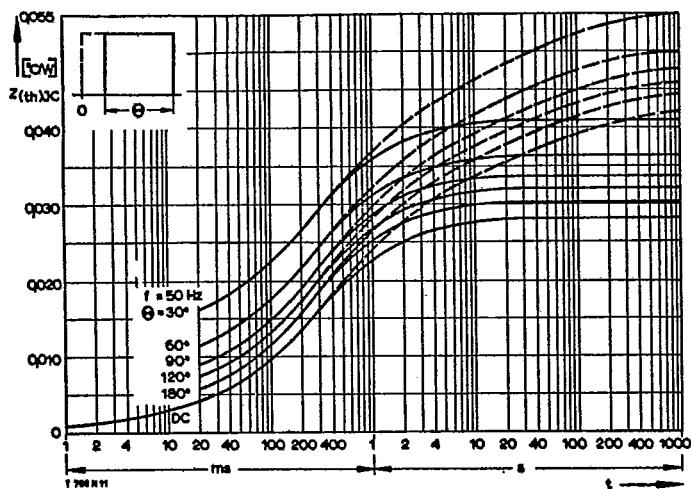
Bild/Fig. 6
Durchlaßverlustleistung P_T /On-state power loss P_T
Parameter: Stromflußwinkel Θ /current conduction angle Θ

T 700 N
T 709 N

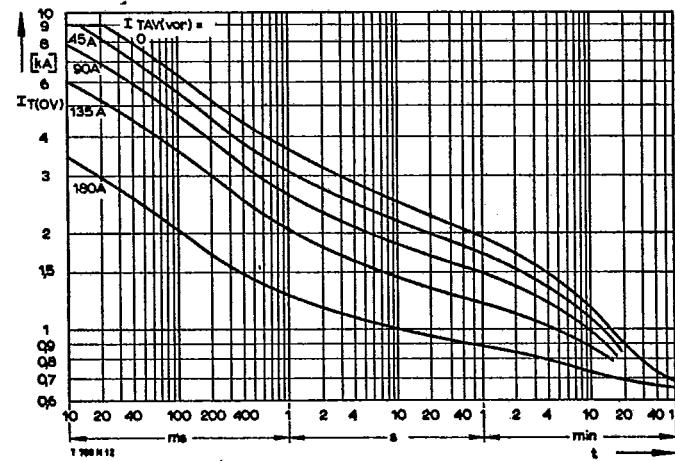
Bild/Fig. 7
Höchstzulässige Gehäusetemperatur t_c
Maximum allowable case temperature t_c .
--- anodenseitige Kühlung/anode sided cooling
— beidseitige Kühlung/two-sided cooling



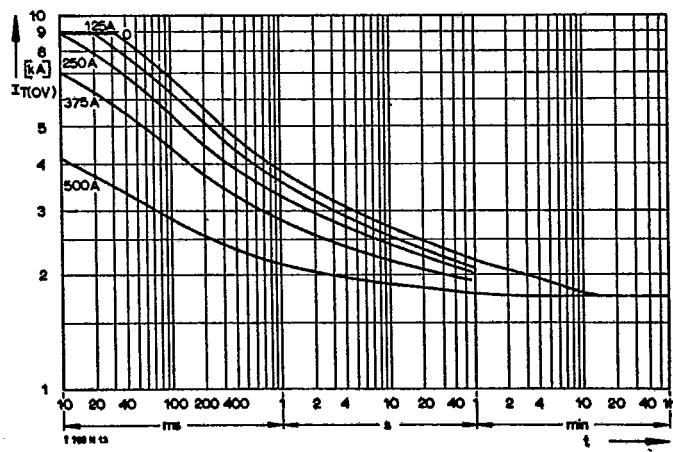
Bild/Fig. 8
Höchstzulässige Kühlmittelttemperatur t_A bei Betrieb auf Kühlkörper K0,05 F.
Maximum allowable cooling medium temperature t_A , heatsink type K0.05 F.
--- Luftselbstkühlung/natural cooling
— verstärkte Luftkühlung/forced cooling, $V_L = 120 \text{ l/s}$



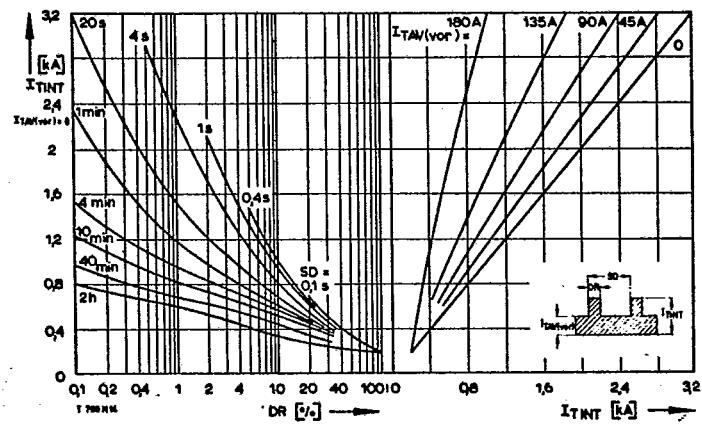
Bild/Fig. 9
Transienter innerer Wärmewiderstand $Z_{(th)JC}$
Transient thermal Impedance, junction to case, $Z_{(th)JC}$.
--- anodenseitige Kühlung/anode sided cooling
— beidseitige Kühlung/two-sided cooling



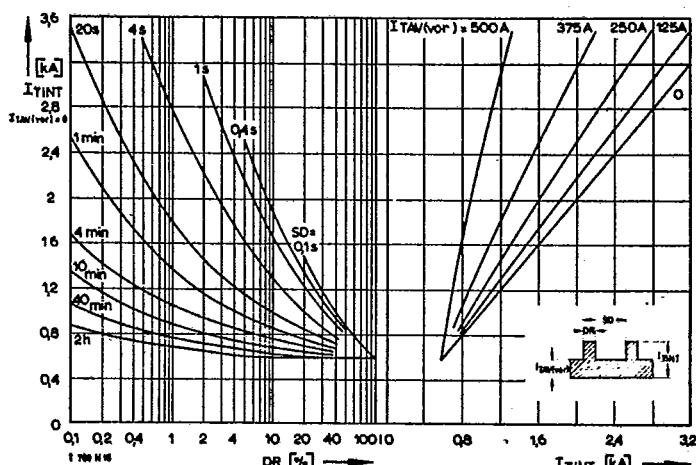
Bild/Fig. 10
Oberstrom $I_{T(OV)}$ bei Luftselbstkühlung, $t_A = 45^\circ\text{C}$, Kühlkörper K0,05 F.
Overload on-state current $I_{T(OV)}$ at natural cooling, $t_A = 45^\circ\text{C}$,
heatsink type K0.05 F.
Parameter: Vorlaststrom/pre-load current $I_{TAV(vor)}$



Bild/Fig. 11
Oberstrom $I_{T(OV)}$ bei verstärkter Luftkühlung, $t_A = 35^\circ\text{C}$,
Kühlkörper K0,05 F, $V_L = 120 \text{ l/s}$.
Overload on-state current $I_{T(OV)}$ at forced cooling, $t_A = 35^\circ\text{C}$,
heatsink type K0.05 F, $V_L = 120 \text{ l/s}$.
Parameter: Vorlaststrom/pre-load current $I_{TAV(vor)}$



Bild/Fig. 12
Höchstzulässiger Durchlaßstrom I_{TINT} bei Aussetzbetrieb und Luftselbstkühlung,
 $t_A = 45^\circ\text{C}$, Kühlkörper K0,05 F.
Limiting on-state current I_{TINT} during intermittent operation at natural cooling,
 $t_A = 45^\circ\text{C}$, heatsink type K0.05 F.
Parameter: Spieldauer/cycle duration SD
Vorlaststrom/pre-load current $I_{TAV(vor)}$

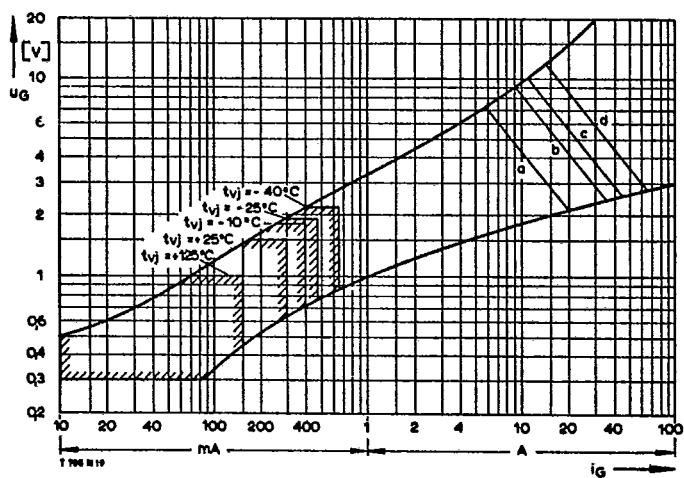


Bild/Fig. 13

Höchstzulässiger Durchlaßstrom I_{AV} bei Aussetzbetrieb und verstärkter Luftkühlung, $t_A = 35^\circ\text{C}$, Kühlkörper K0,05 F, $V_L = 120 \text{ l/s}$.

Limiting on-state current I_{AV} during intermittent operation at forced cooling, $t_A = 35^\circ\text{C}$, heatsink type K0.05 F, $V_L = 120 \text{ l/s}$.

Parameter: Spieldauer/cycle duration SD
Vorlaststrom/pre-load current $I_{AV\text{vor}}$

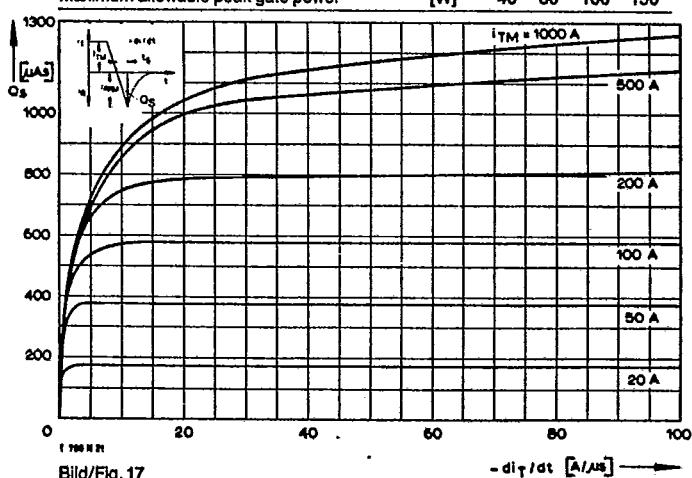


Bild/Fig. 15

Zündbereich und Spitzensteuerleistung bei $U_G \geq 6 \text{ V}$.

Gate characteristic and peak gate power dissipation at $U_G \geq 6 \text{ V}$.

Parameter:	a	b	c	d
Steuerimpulsdauer/Pulse duration t_g [ms]	10	1	0,5	0,1
Höchstzulässige Spitzensteuerleistung/ Maximum allowable peak gate power [W]	40	80	100	150

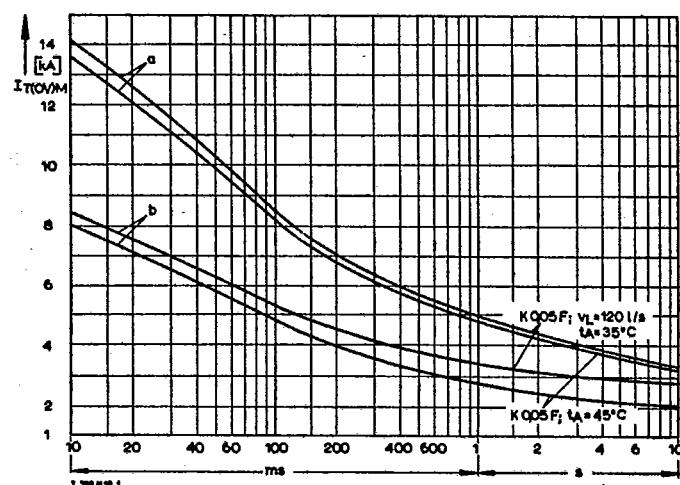


Bild/Fig. 17

Nachlaufladung Q_s in Abhängigkeit von der abkommunizierenden Stromsteilheit $-di_f/dt$ bei $t_J = 125^\circ\text{C}$.

Der angegebene Verlauf wird von 90% aller Thyristoren nicht überschritten.

Lag charge Q_s versus the rate of decay of the forward on-state current $-di_f/dt$ at $t_J = 125^\circ\text{C}$. These curves are valid for 90% of all thyristors.

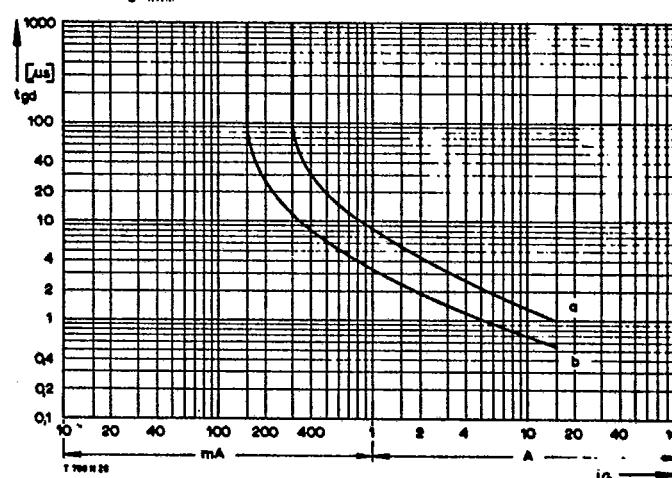


Bild/Fig. 14

Grenzstrom I_{AVM} bei Luftselselbstkühlung und verstärkter Luftkühlung, Kühlkörper K0,05 F, $U_{PM} = 0,8 U_{AVM}$.

Limiting overload on-state current I_{AVM} at natural and forced cooling, heatsink type K0.05 F, $U_{PM} = 0,8 U_{AVM}$.

- a – Belastung aus Leerlauf/current surge under no-load conditions
- b – Belastung im Anschluß an Betrieb mit Dauergrenzstrom I_{AVM} /current surge occurs during operation at limiting mean on-state current rating I_{AVM}



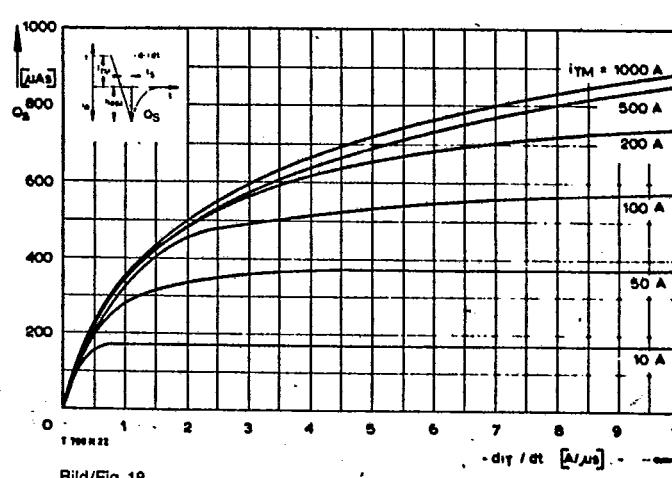
Bild/Fig. 16

Zündverzug t_g bei $I_{AV} = 100 \text{ A}$, $t_J = 25^\circ\text{C}$.

Gate controlled delay time t_g at $I_{AV} = 100 \text{ A}$, $t_J = 25^\circ\text{C}$.

a – äußerster Verlauf/limiting characteristic

b – typischer Verlauf/typical characteristic



Bild/Fig. 18

Ausschnitt aus Bild 17/Detail of fig. 17.