T 509 S
T 510 S

T-25-20

Typenreihe/Type range	600	800	1000	1100	1200

Elektrische Eigenschaften / Electrical properties

Höchstzulässige Werte / Maximum permissible values

V_{DRM}	600...1200		V
V_{RRM}	600...1200		V
I_{TRMSM}	1500		A
I_{TAVM}	t_C = 85°C	510	A
	t_C = 22°C	960	A
I_{TSM}	t = 10 ms, t_{vj} = 45°C	9500	A
	t = 10 ms, t_{vj} = $t_{vj\,max}$	8400	A
$\int i^2dt$	t = 10 ms, t_{vj} = 45°C	451	kA^2s
	t = 10 ms, t_{vj} = $t_{vj\,max}$	353	kA^2s
$(di/dt)_{cr}$	nicht per./non rep.	1500	A/µs
	per./rep., i_{TM} = 2,5 kA	500	A/µs
	i_G = 1 A, di_G/dt = 1 A/µs		
$(dv/dt)_{cr}$	v_D = 67% V_{DRM}, t_{vj} = $t_{vj\,max}$	[1]	[2]
	B:	50	50 V/µs
	C*:	400	400 V/µs
	L:	400	50 V/µs
	M*:	1000	400 V/µs

Charakteristische Werte / Characteristic values

v_T	t_{vj} = $t_{vj\,max}$, i_T = 2,5 kA	3,05	V
$V_{(TO)}$	t_{vj} = $t_{vj\,max}$	1,3	V
r_T	t_{vj} = $t_{vj\,max}$	0,65	mΩ
V_{GT}	t_{vj} = 25°C, v_D = 6 V, R_A = 5 Ω	2,2	V
I_{GT}	t_{vj} = 25°C, v_D = 6 V, R_A = 5 Ω	250	mA
	t_{vj} = $t_{vj\,max}$, v_D = 6 V, R_A = 5 Ω	10	mA
I_H	t_{vj} = 25°C, v_D = 6 V, R_A = 5 Ω	250	mA
I_L	t_{vj} = 25°C, v_D = 6 V, R_{GK} ≥ 10 Ω	1,5	A
	i_G = 1 A, di_G/dt = 1 A/µs, t_g = 20 µs		
i_D	t_{vj} = $t_{vj\,max}$, v_D = V_{DRM}	100	mA
i_R	t_{vj} = $t_{vj\,max}$, v_R = V_{RRM}	100	mA
t_{gd}	i_G = 1 A, di_G/dt = 1 A/µs	1,2	µs
t_q	Prüfbedingungen siehe 3.4.3.2/ test conditions see 3.4.3.2		
	C*:	12	µs
	D:	15	µs
	S:	18	µs
	E:	20	µs
Q_s	t_{vj} = $t_{vj\,max}$, i_{TM} = 800 A, $-di_T/dt$ = 20 A/µs	80	µAs
C_{null}	t_{vj} = 25°C, f = 10 kHz	8,5	nF

Thermische Eigenschaften / Thermal properties

R_{thJC}	Θ = 180°el, sinus	≤ 0,038 °C/W
	DC	≤ 0,036 °C/W
$R_{thJC(A)}$	Θ = 180°el, sinus	≤ 0,0675°C/W
	DC	≤ 0,065 °C/W
$R_{thJC(K)}$	Θ = 180°el, sinus	≤ 0,082 °C/W
	DC	≤ 0,08 °C/W
R_{thCK}		0,01 °C/W
$t_{vj\,max}$		125°C
$t_{vj\,op}$		– 40°C...+125°C
t_{stg}		– 40°C...+150°C

Mechanische Eigenschaften / Mechanical properties

G		270 g
M		
F		12...15 kN
		25 mm
Case	DIN 41814–153 C 4	Seite/page 198

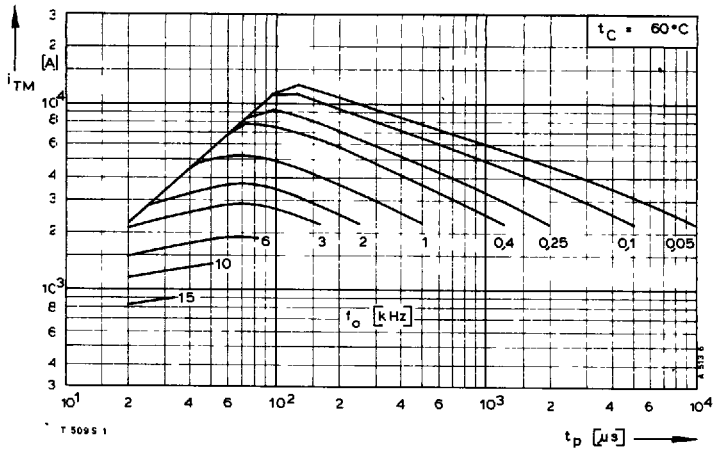
* Für größere Stückzahlen bitte Liefertermin erfragen/ Delivery for larger quantities on request

1) Werte nach DIN 41787 (ohne vorausgehende Kommutierung)/ Values to DIN 41787 (without prior commutation)

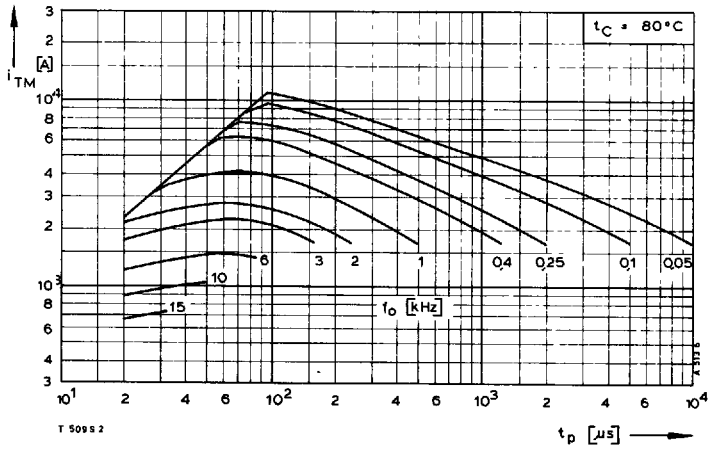
2) Unmittelbar nach der Freiwerdezeit/Immediately after turn-off time

3) Mit offener Hilfselektrode/Auxiliary electrode not connected

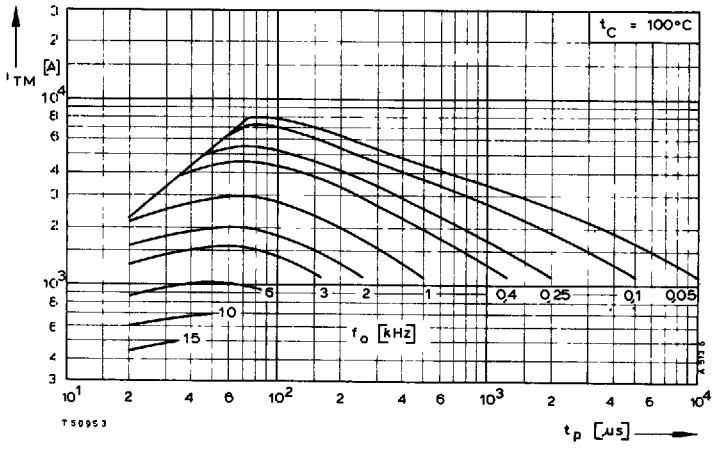
4) Hilfselektrode HT zur Freiwerdezeit-Verkürzung angeschlossen, $-i_H$ = 2 A/ Auxiliary electrode HT for reduction of turn-off time connected, $-i_H$ =2 A



Bild/Fig. 1



Bild/Fig. 2

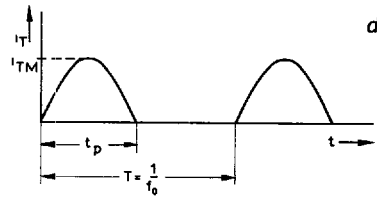


Bild/Fig. 3

Steuergenerator:
i_G = 1 A, t_a = 1 µs,
RC-Glied: R [Ω] ≥ 0,02 v_{DM} [V],
C ≤ 0,22 µF

pulse generator:
i_G = 1 A, t_a = 1 µs,
RC network: R [Ω] ≥ 0.02 v_{DM} [V],
C ≤ 0.22 µF

dv_R/dt ≤ 600 V/µs



T 509 S
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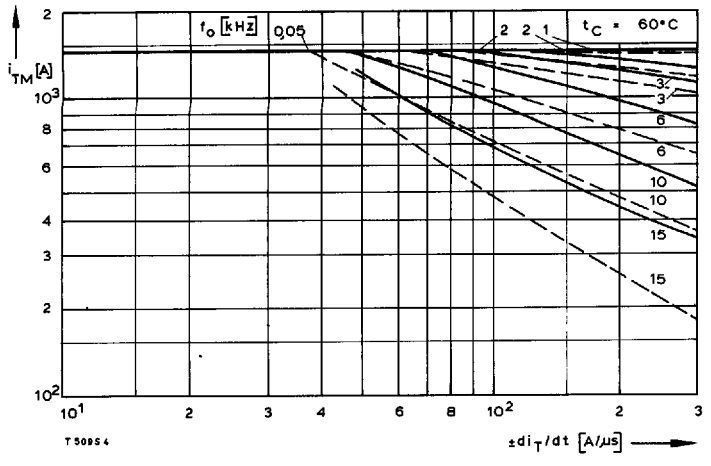
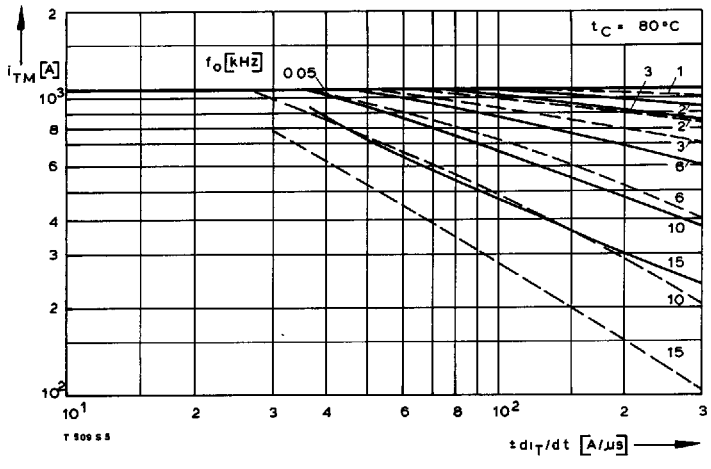
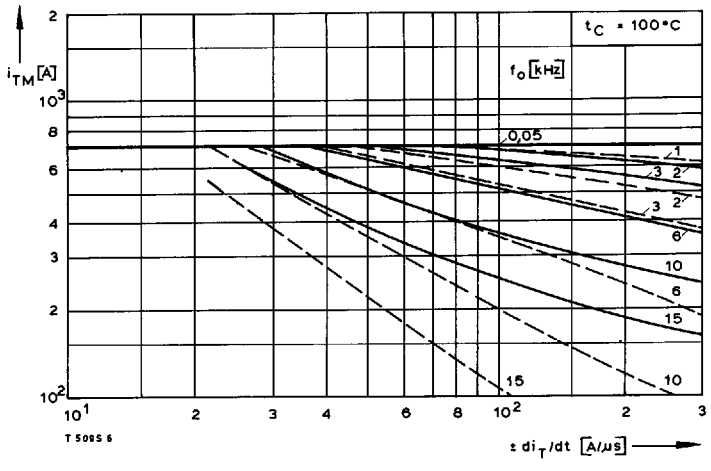


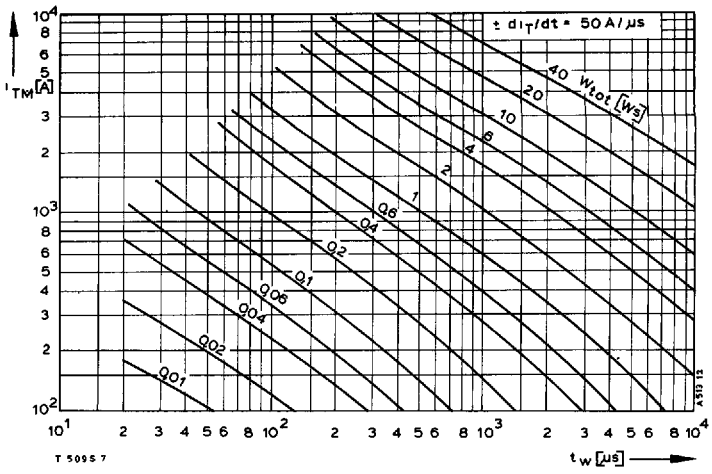
Bild/Fig. 4



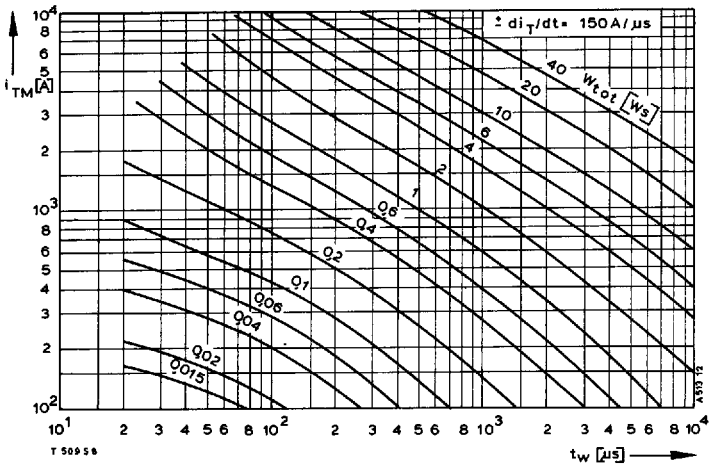
Bild/Fig. 5



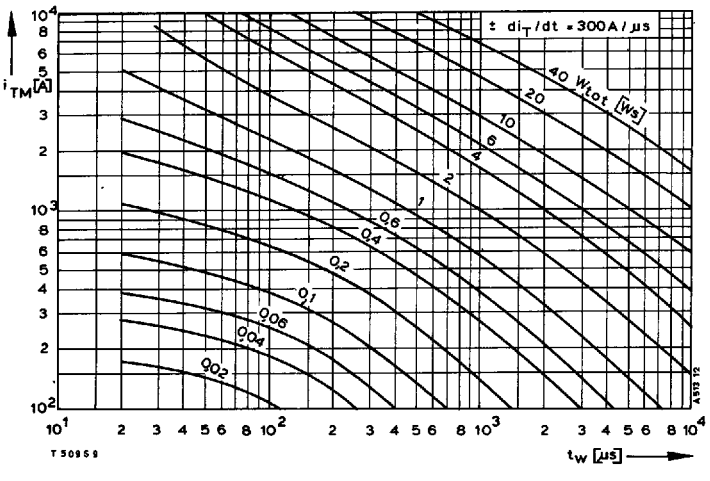
Bild/Fig. 6



Bild/Fig. 7



Bild/Fig. 8

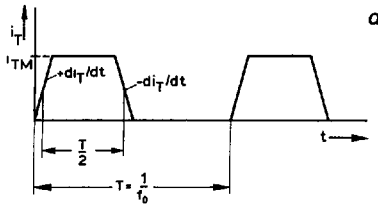


Bild/Fig. 9

Steuergenerator:
i_G = 1 A, t_a = 1 µs,
RC-Glied: R [Ω] ≥ 0,02 v_{DM} [V],
C ≤ 0,33 µF

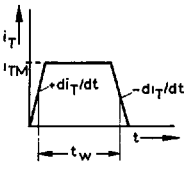
pulse generator:
i_G = 1 A, t_a = 1 µs,
RC network: R [Ω] ≥ 0.02 v_{DM} [V],
C ≤ 0.33 µF

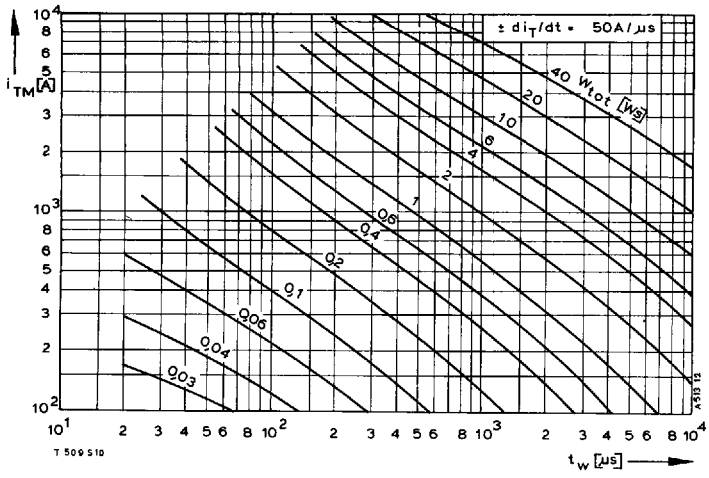
dv_R/dt ≤ 600 V/µs



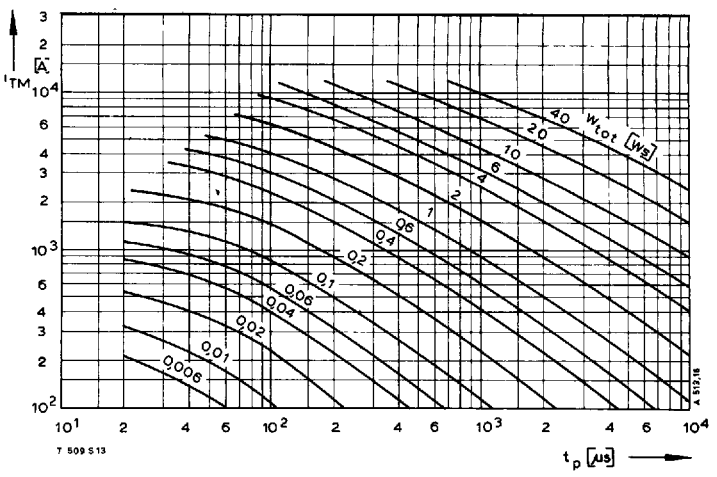
Steuergenerator:
i_G = 1 A, t_a = 1 µs,
RC-Glied: R [Ω] ≥ 0,02 v_{DM} [V],
C ≤ 0,33 µF

pulse generator:
i_G = 1 A, t_a = 1 µs,
RC network: R [Ω] ≥ 0.02 v_{DM} [V],
C ≤ 0.33 µF

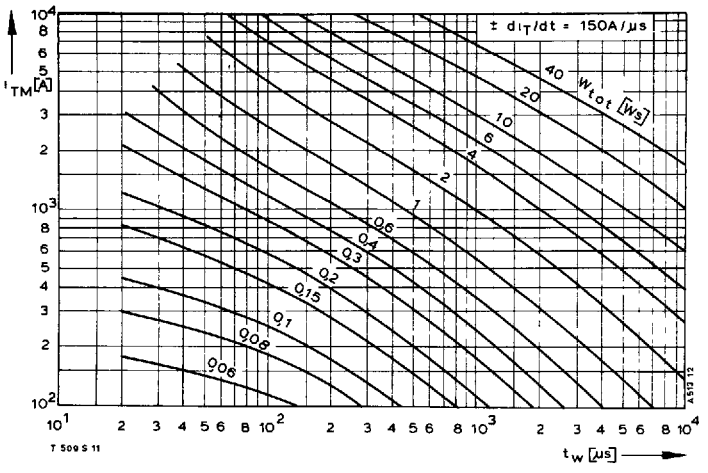




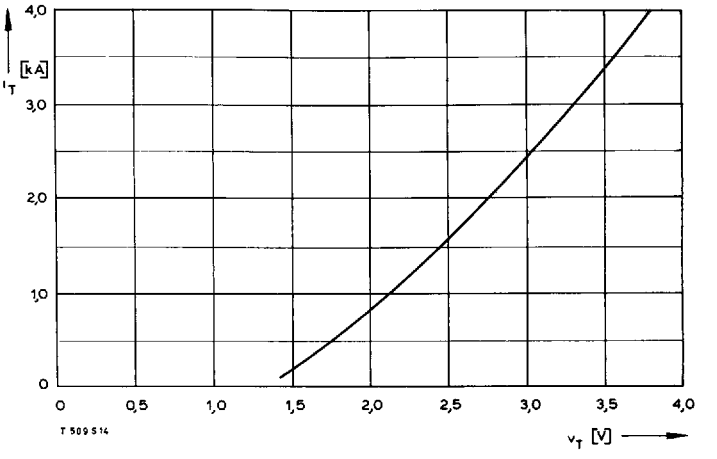
Bild/Fig. 10



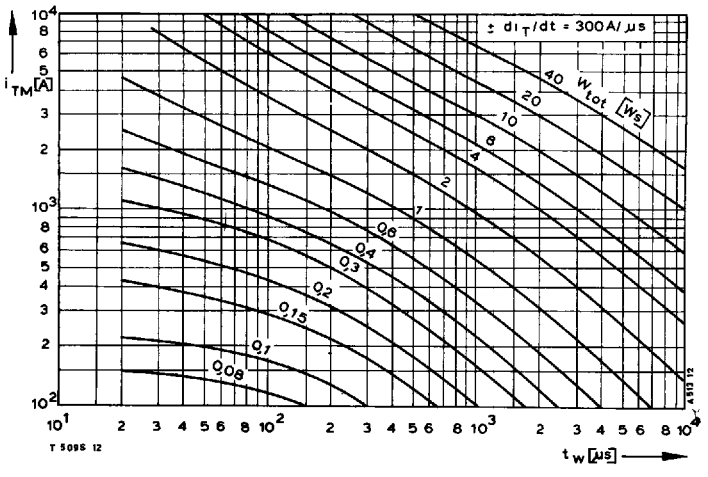
Bild/Fig. 13



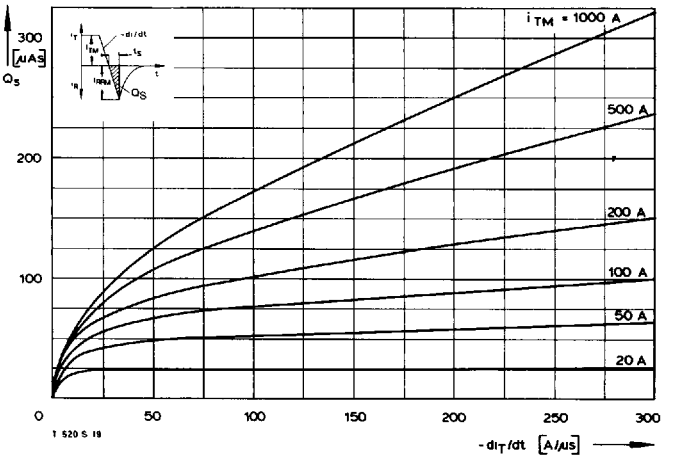
Bild/Fig. 11



Bild/Fig. 14



Bild/Fig. 12

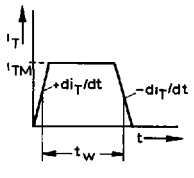


Bild/Fig. 15

Steuergenerator:
i_G = 1 A, t_a = 1 µs,
RC-Glied: R [Ω] ≥ 0,02 v_{DM} [V],
C ≤ 0,33 µF

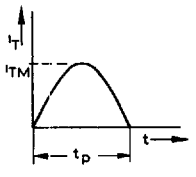
pulse generator:
i_G = 1 A, t_a = 1 µs,
RC network: R [Ω] ≥ 0.02 v_{DM} [V],
C ≤ 0.33 µF

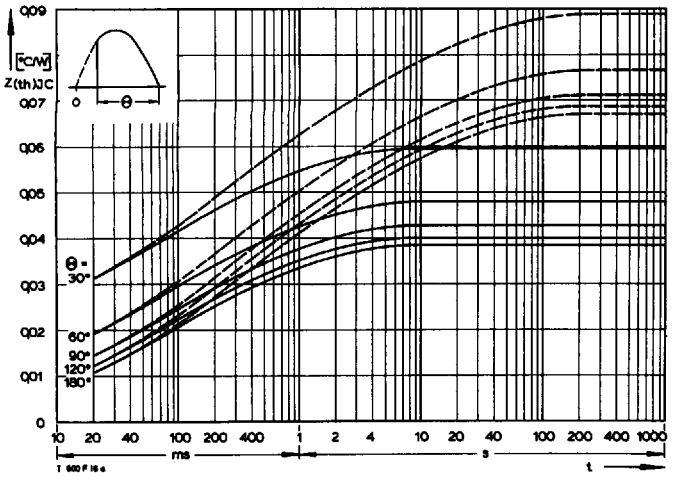
dv_R/dt ≤ 600 V/µs



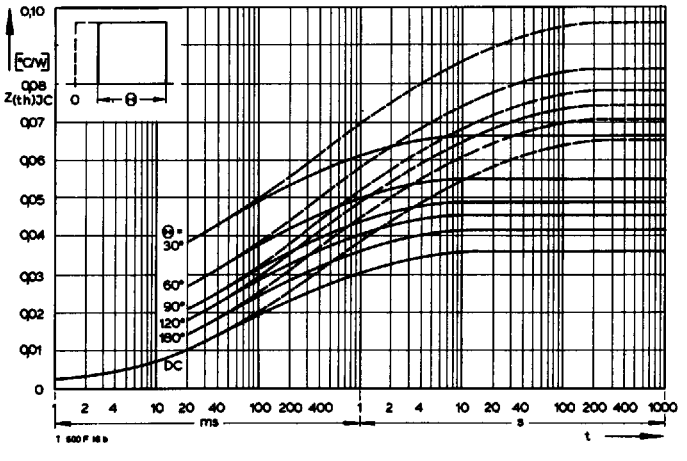
(zu Bild/to Fig. 13)
Steuergenerator:
i_G = 1 A, t_a = 1 µs,
RC-Glied: R [Ω] ≥ 0,02 v_{DM} [V],
C ≤ 0,22 µF

pulse generator:
i_G = 1 A, t_a = 1 µs,
RC network: R [Ω] ≥ 0.02 v_{DM} [V],
C ≤ 0.22 µF

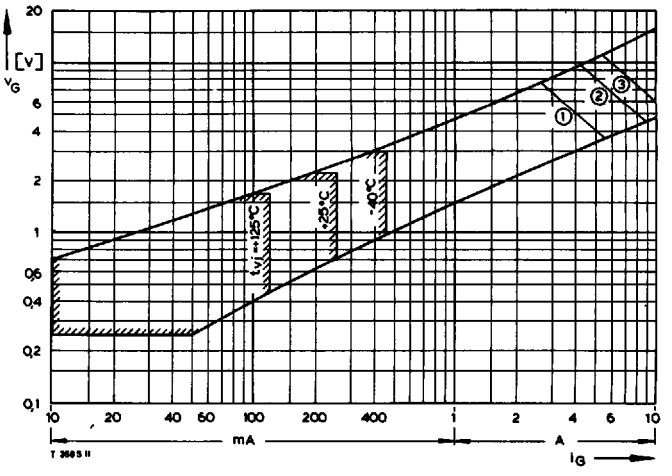




Bild/Fig. 16
Transienter innerer Wärmewiderstand $Z_{(th)JC}$
Transient thermal impedance, junction to case, $Z_{(th)JC}$
----- anodenseitige Kühlung/anode sided cooling
——— beidseitige Kühlung/two-sided cooling

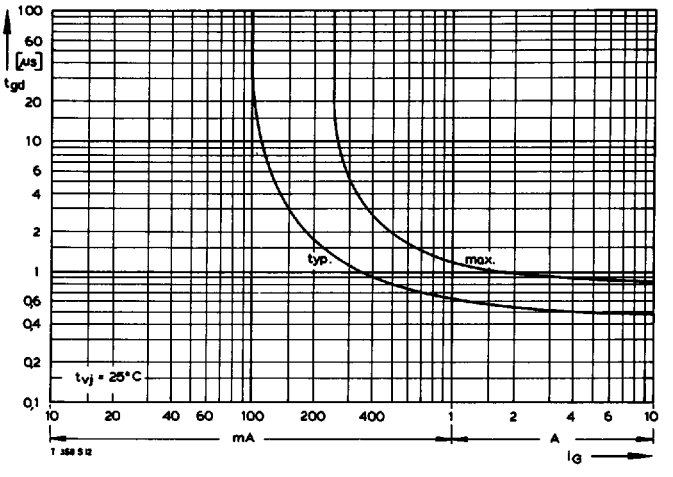


Bild/Fig. 17
Transienter innerer Wärmewiderstand $Z_{(th)JC}$
Transient thermal impedance, junction to case, $Z_{(th)JC}$
----- anodenseitige Kühlung/anode sided cooling
——— beidseitige Kühlung/two-sided cooling



Bild/Fig. 18
Zündbereich und Spitzensteuerleistung bei $v_D \geq 6$ V.
Gate characteristic and peak gate power dissipation at $v_D \geq 6$ V.

Parameter:		*1*	*2*	*3*
Steuerimpulsdauer/Pulse duration t_g	*[ms]*	*10*	*1*	*0,5*
Höchstzulässige Spitzensteuerleistung/ Maximum allowable peak gate power	*[W]*	*20*	*40*	*60*



Bild/Fig. 19
Zündverzug t_{gd}
Gate controlled delay time t_{gd}

Tabelle 1 – Größen des thermischen Ersatzschaltbildes, Konstantstrom

	i	1	2	3	4	5	6	7
Z_{thJC}	R_{thi} [°C/W]	0,00308	0,00451	0,0111	0,01215	0,005		
	τ_i [s]	0,00114	0,0145	0,0716	0,453	2,8		
$Z_{thJC(A)}$	R_{thi} [°C/W]	0,00315	0,00565	0,0131	0,0186	0,0128	0,0117	
	τ_i [s]	0,00116	0,0169	0,1	0,69	5,0	36,0	
$Z_{thJC(K)}$	R_{thi} [°C/W]	0,00315	0,00565	0,0131	0,186	0,0195	0,02	
	τ_i [s]	0,00116	0,0169	0,1	0,69	5,0	36,0	