

Elektrische Eigenschaften

Electrical properties

Höchstzulässige Werte

Maximum rated values

Periodische Vorwärts-Spitzensperrspannung	repetitive peak forward off-state voltage	$t_{vj} = -40^{\circ}\text{C} \dots t_{vj\text{max}}$	V_{DRM}	600, 800 V 1000, 1100 v 1200, 1300* v
Vorwärts-Stoßspitzensperrspannung	non repetitive peak forward off-state voltage	$t_{vj} = -40^{\circ}\text{C} \dots t_{vj\text{max}}$	$V_{\text{DSM}} = V_{\text{DRM}}$	
Periodische Rückwärts-Spitzensperrspannung	repetitive peak reverse voltage	$t_{vj} = -40^{\circ}\text{C} \dots t_{vj\text{max}}$	V_{RRM}	15 v
Periodische Rückwärts-Spitzensperrspannung nach der Kommutierung	repetitive peak reverse voltage after commutation	$t_{vj} = -40^{\circ}\text{C} \dots t_{vj\text{max}}, t_p = 1 \mu\text{s}$	$V_{\text{RRM(C)}}$	50 V
Durchlaßstrom-Grenzeffektivwert	RMS on-state current	$t_c = 85^{\circ}\text{C}$	I_{TRMSM}	400 A
Dauergrenzstrom	average on-state current	$t_c = 49^{\circ}\text{C}$	I_{TAVM}	158 A 254 A
Stoßstrom-Grenzwert	surge current	$t_{vj} = 25^{\circ}\text{C}, t_p = 10 \text{ ms}$ $t_{vj} = t_{vj\text{max}}, t_p = 10 \text{ ms}$	I_{TSM}	2,8 kA 2,45 kA
Grenzlastintegral	$\int i^2 dt$ -value	$t_{vj} = 25^{\circ}\text{C}, t_p = 10 \text{ ms}$ $t_{vj} = t_{vj\text{max}}, t_p = 10 \text{ ms}$	$\int i^2 dt$	39,2 kA ² s 30 kA ² s
Kritische Stromsteilheit	critical rate of rise of on-state current	$v_D \leq 67\% V_{\text{DRM}}, f_o = 50 \text{ Hz}$	$(di/dt)_{\text{cr}}$	400 A/ μs
Kritische Spannungssteilheit	critical rate of rise of off-state voltage	$v_L = 10 \text{ V}, i_{\text{GM}} = 1,2 \text{ A}, di_G/dt = 1,2 \text{ A}/\mu\text{s}$ $t_{vj} = t_{vj\text{max}}, v_D = 67\% V_{\text{DRM}}$ 5. Kennbuchstabe/5th letter C 5. Kennbuchstabe/5th letter F	$(dv/dt)_{\text{cr}}$	500 V/ μs 1000 V/ μs

Charakteristische Werte

Characteristic values

Durchlaßspannung	on-state voltage	$t_i = t_{vj\text{max}}, i_T = 600 \text{ A}$	v_T	max. 2,6 V
Schleusenspannung	threshold voltage	$t_{vj} = t_{vj\text{max}}$	$V_{\text{T(TO)}}$	1,3 v
Ersatzwiderstand	slope resistance	$t_{vj} = t_{vj\text{max}}$	r_T	2 m Ω
Zündstrom	gate trigger current	$t_i = 25^{\circ}\text{C}, v_D = 12 \text{ V}$	I_{GT}	max. 300 mA
Zündspannung	gate trigger voltage	$t_{vj} = 25^{\circ}\text{C}, v_D = 12 \text{ V}$	V_{GT}	max. 2,7 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	$t_{vj} = 25^{\circ}\text{C}, v_D = 12 \text{ V}, R_A = 10 \Omega$	I_H	max. 300 mA
Einraststrom	latching current	$t_i = 25^{\circ}\text{C}, v_D = 12 \text{ V}, R_{\text{GK}} \geq 10 \Omega$ $i_{\text{GM}} = 1,2 \text{ A}, di_G/dt = 1,2 \text{ A}/\mu\text{s}, t_g = 20 \text{ ps}$	I_L	max. 1,2 A
Vorwärts- u. Rückwärts-Sperrstrom	forward off-state and reverse Currents	$t_{vj} = t_{vj\text{max}}, v_D = V_{\text{ORM}}, v_R = V_{\text{RRM}}$	i_D	max. 30 mA
Zündverzögerung	gate controlled delay time	$t_{vj} = 25^{\circ}\text{C}, i_{\text{GM}} = 1,2 \text{ A}, di_G/dt = 1,2 \text{ A}/\mu\text{s}$	i_R	max. 150 mA
Freiwerdezeit	circuit commutated turn-off time	siehe Techn. Erl./see Techn. Inf.	t_{gd}	max. 1,4 μs
			t_q A:	max. 8 (μs^2)
			B:	max. 10 (μs^2)
			C:	max. 12 (μs^2)
			D:	max. 15 (μs^2)

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. 0,117 $^{\circ}\text{C}/\text{W}$ max. 0,103 $^{\circ}\text{C}/\text{W}$
für anodenseitige Kühlung	for anode-sided cooling	$\Theta = 180^{\circ} \text{el, sin}$ DC	$R_{\text{thJC(A)}}$	max. 0,18 $^{\circ}\text{C}/\text{W}$ max. 0,166 $^{\circ}\text{C}/\text{W}$
für kathodenseitige Kühlung	for cathode-sided cooling	$\Theta = 180^{\circ} \text{el, sin}$ DC	$R_{\text{thJC(K)}}$	max. 0,28 $^{\circ}\text{C}/\text{W}$ max. 0,266 $^{\circ}\text{C}/\text{W}$
Übergangswärmewiderstand	thermal resistance, case to heatsink	beidseitig/two-sided einseitig/one-sided	R_{thCK}	max. 0,015 $^{\circ}\text{C}/\text{W}$ max. 0,03 $^{\circ}\text{C}/\text{W}$
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

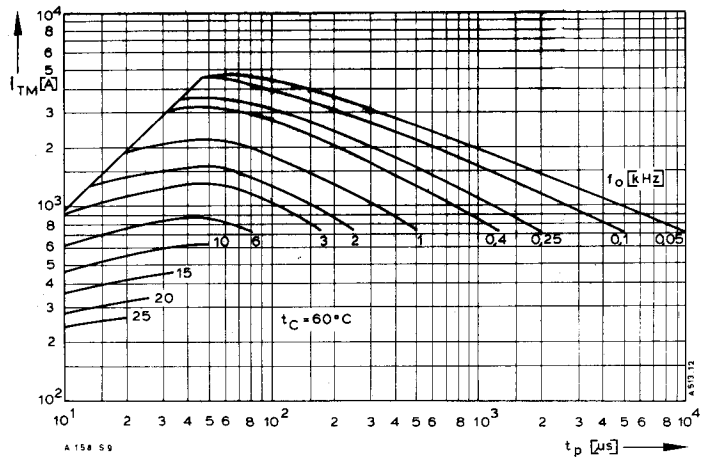
Mechanical properties

Si-Elemente mit Druckkontakt	Si-pellets with pressure contact		F	2,5 ... 4,5 kN
Anpreßkraft	Clamping force		G	typ. 70 g
Gewicht	weight			17 mm
Kriechstrecke	Creepage distance			C
Feuchteklasse	humidity classification	DIN 40040		50 m/s ²
Schwingfestigkeit	Vibration resistance	f=50Hz		Seite/page 154
Maßbild	outline	DIN 41814-151A4		

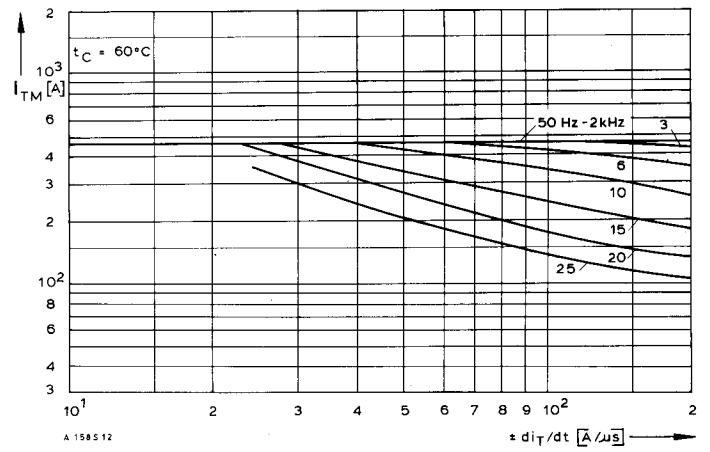
* Für größere Stückzahlen bitte Liefertermin erfragen/Delivery for larger quantities on request

1) mit antiparalleler Diode/with inverse paralleled diode

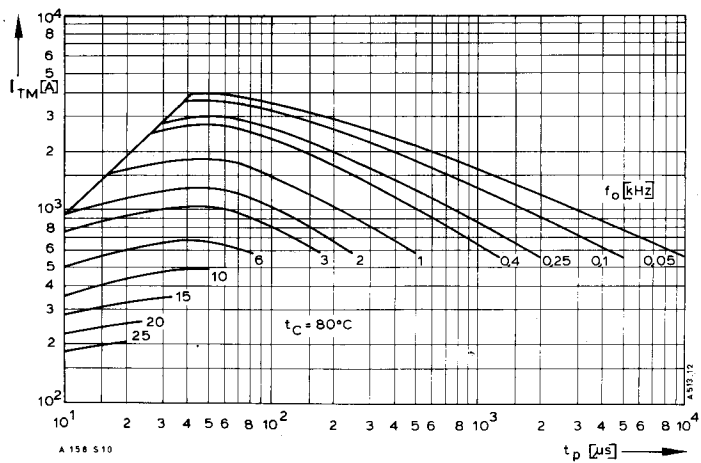
2) $V_{\text{DRM}} \leq 1000 \text{ v}$



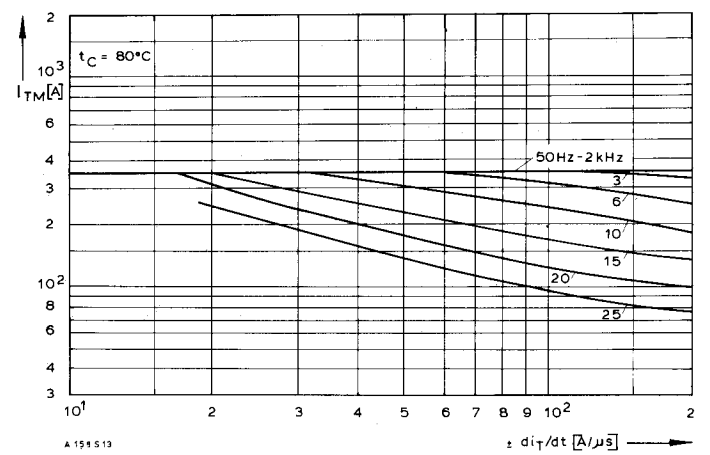
Bild/Fig. 1



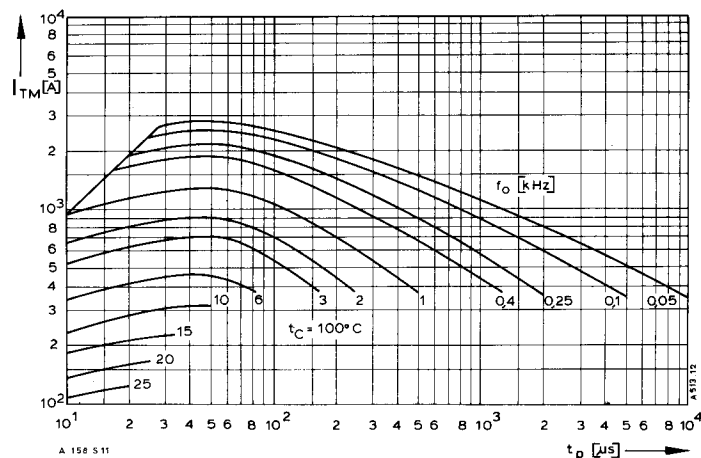
Bild/Fig. 4



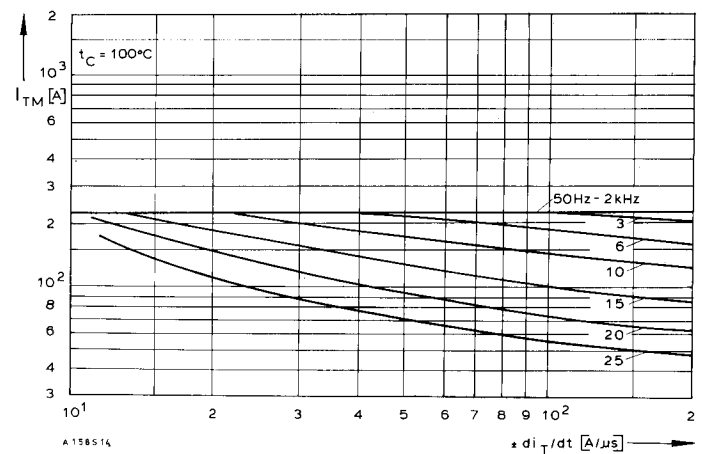
Bild/Fig. 2



Bild/Fig. 5



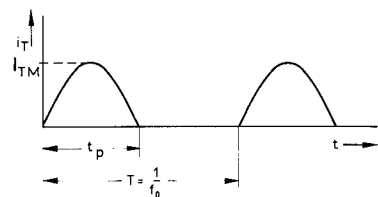
Bild/Fig. 3



Bild/Fig. 6

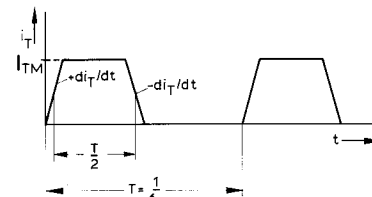
Bild/Fig. 1, 2, 3
Steuer-generator/pulse generator:
 $i_G = 2,4 \text{ A}$, $di_G/dt = 2,4 \text{ A}/\mu\text{s}$

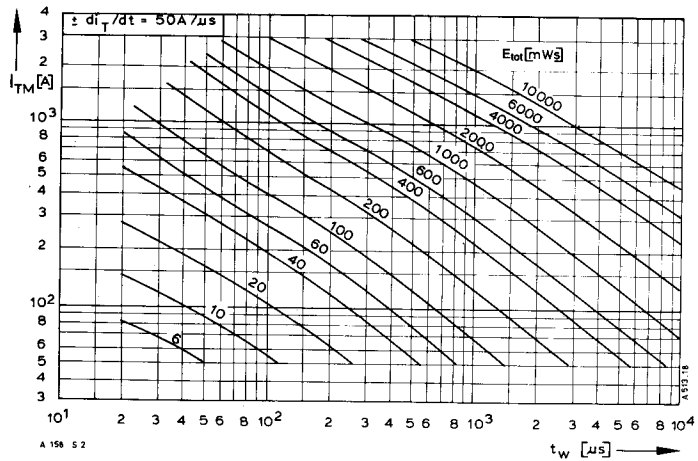
RC-Glied/RC-network:
 $R [\Omega] \geq 0,02 V_{DM} [V]$
 $C \leq 0,15 \mu\text{F}$
 $V_{DM} \leq 0,67 V_{DRM}$



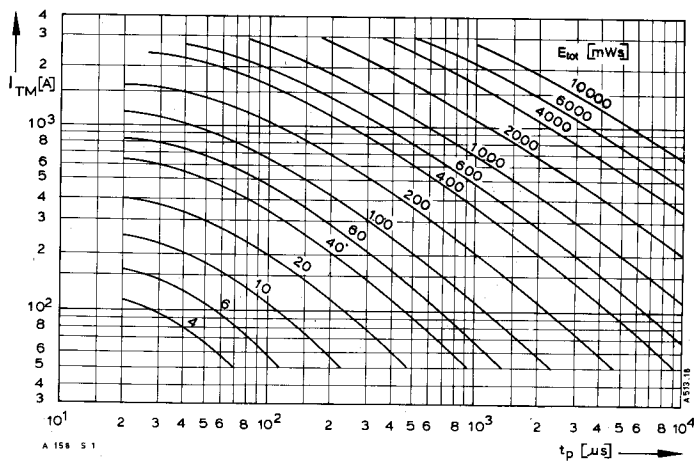
Bild/Fig. 4, 5, 6
Steuer-generator/pulse generator:
 $i_G = 2,4 \text{ A}$, $di_G/dt = 2,4 \text{ A}/\mu\text{s}$

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

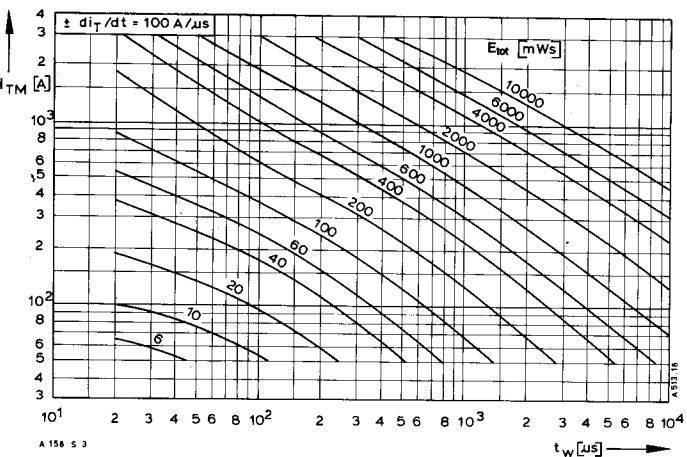




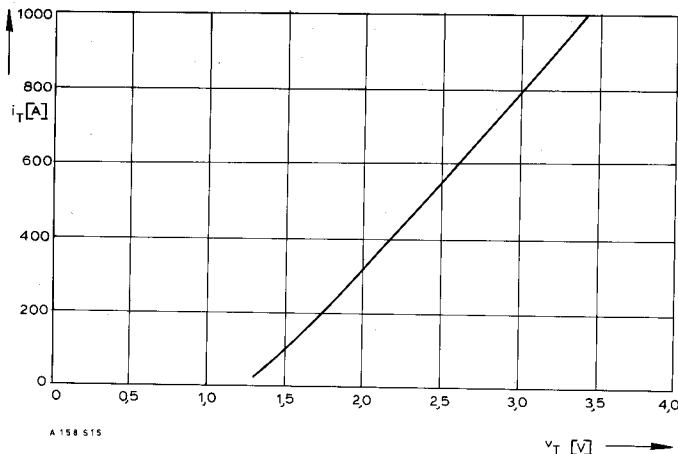
Bild/Fig. 7



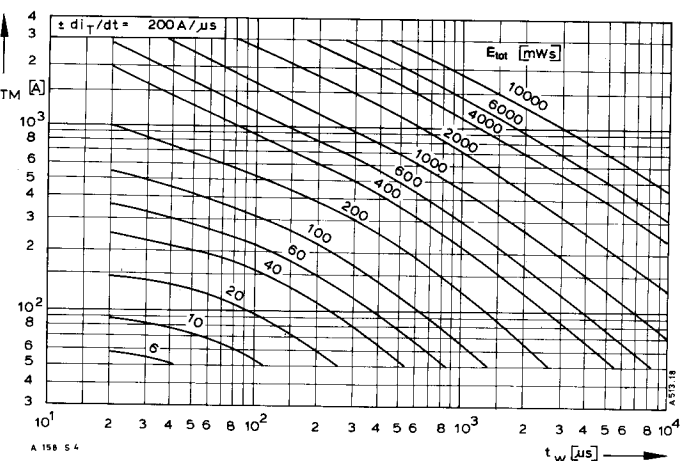
Bild/Fig. 13



Bild/Fig. 8



Bild/Fig. 14



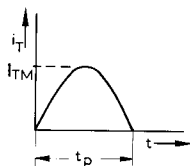
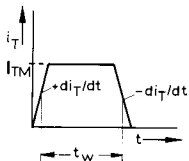
Bild/Fig. 9

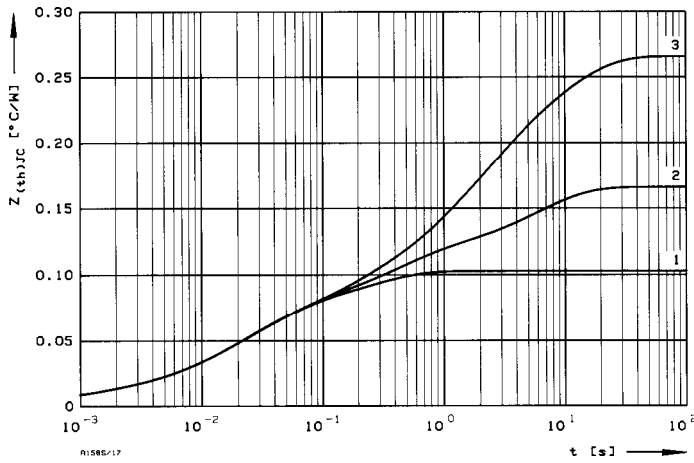
Bild/ Fig. 7, 8, 9
 Steuergenerator/pulse generator:
 $i_G = 2,4 \text{ A}$, $di_G/dt = 2,4 \text{ A}/\mu\text{s}$

RC-Glied/RC-network:
 $R [\Omega] \geq 0,02 V_{DM} [V]$
 $C \leq 0,22 \mu\text{F}$
 $V_{DM} \leq 0,67 V_{DRM}$
 $V_{RM} \leq 15 \text{ V}$

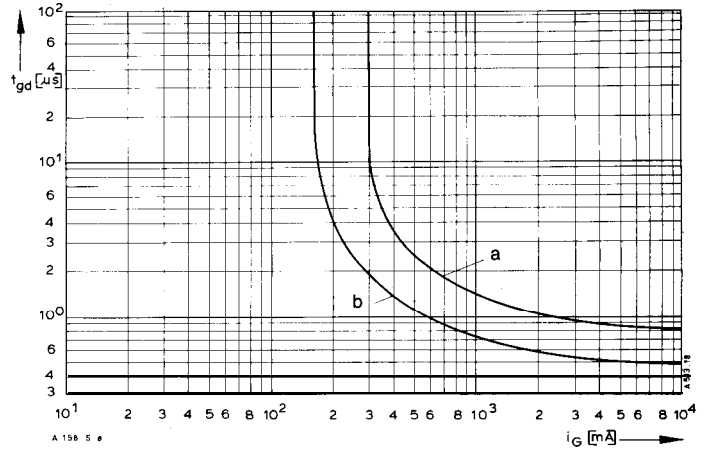
(zu Bild/to Fig. 13)
 Steuergenerator/pulse generator:
 $i_G = 2,4 \text{ A}$, $di_G/dt = 2,4 \text{ A}/\mu\text{s}$

RC-Glied/RC-network:
 $R [\Omega] \geq 0,02 V_{DM} [V]$
 $C \leq 0,15 \mu\text{F}$
 $V_{RM} \leq 15 \text{ V}$

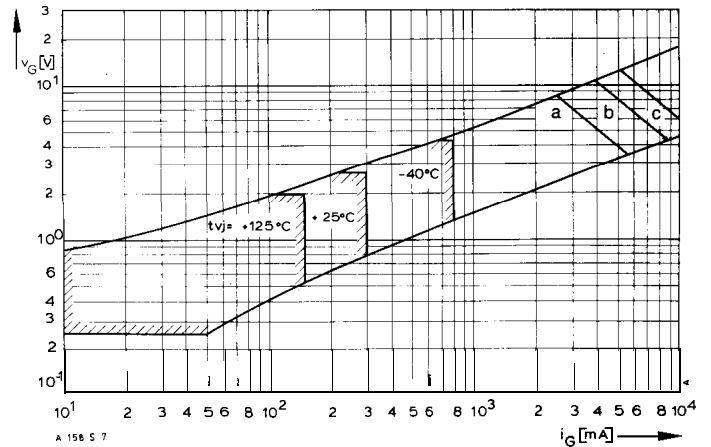




Bild/Fig. 17
 Transienter innerer Wärmewiderstand $Z_{thJC} = f(t)$, DC
 Transient thermal impedance $Z_{thJC} = f(t)$, DC
 1 Beidseitige Kühlung/two-sided cooling
 2 Anodenseitige Kühlung/anode side cooling
 3 Kathodenseitige Kühlung/cathode side cooling



Bild/Fig. 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. 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_n [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} [$^{\circ}C/W$]	0,007545	0,018999	0,046128	0,030328			
	τ_n [s]	0,000788	0,008775	0,032627	0,24167			
anodenseitig anode-sided	R_{thn} [$^{\circ}C/W$]	0,007705	0,022843	0,044024	0,040095	0,051333		
	τ_n [s]	0,000805	0,009796	0,036779	0,373654	5,973800		
kathodenseitig cathode-sided	R_{thn} [$^{\circ}C/W$]	0,007899	0,013758	0,038934	0,023269	0,028398	0,079099	0,074643
	τ_n [s]	0,000827	0,008751	0,022657	0,118979	0,577846	2,171151	9,760818

Analytische Funktion/analytical function:

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