Elektrische Eigenschaften — Electrical properties

Höchstzulässige Werte — Maximum rated values

Periodische Vorwärts-Spitzensperrspannung	repetitive peak forward off-state voltage	t_{vj} = -40°C $t_{vj\,max}$	V_{DRM}	1800, 2000	V
Vorwärts-Stoßspitzenspannung	non repetitive peak forward off-state voltage	$t_{vj} = -40°C \ldots t_{vj\,max}$	$V_{DSM} = V_{DRM}$		
Periodische Rückwärts-Spitzensperrspannung	repetitive peak reverse voltage	$t_{vj} = -40°C \ldots t_{vj\,max}$	V_{RRM}	20	V
Periodische Rückwärts-Spitzensperrspannung nach der Kommutierung	repetitive peak reverse voltage after commutation	$t_{vj} = -40°C \ldots t_{vj\,max}, t_p$ = 1 ps	$V_{RRM(C)}$	25	V
Durchlaßstrom-Grenzeffektivwert	RMS on-state current		I_{TRMSM}	2200	A
Dauergrenzstrom	average on-state current	t_C = 85°C	I_{TAVM}	930	A
		t_C = 54°C		1400	A
Stoßstrom-Grenzwert	surge current	t_{vj} = 25°C, t_p = 10 ms	I_{TSM}	19	kA
		$t_{vj} = t_{vj\,max}, t_p$ = 10 ms		16	kA
Grenzlastintegral	$\int i^2dt$-value	t_{vj} = 25°C, t_p = 10 ms	$\int i^2dt$	1800	kA^2s
		$t_{vj} = t_{vj\,max}, t_p$ = 10 ms		1280	kA^2s
Kritische Stromsteilheit	critical rate of rise of on-state current	$v_D \leq 87\%\ v_{DRM}, f_o$ = 50 Hz; v_L = 10 V, i_{GM} = 4 A, di_G/dt = 8 A/µs	$(di/dt)_{cr}$	300	A/µs
Kritische Spannungssteilheit	critical rate of rise of off-state voltage	$t_{vj} = t_{vj\,max}$, v_D = 67% V_{DRM}	$(dv/dt)_{cr}$		
		5. Kennbuchstabe/5th letter F		1000	V/µs

Charakteristische Werte — Characteristic values

Durchlaßspannung	on-state voltage	$t_{vj} = t_{vj\,max}, i_T$ = 4200 A	v_T	max.	2,7	V
Schleusenspannung	threshold voltage	$t_{vj} = t_{vj\,max}$	$V_{T(TO)}$		1,35	v
Ersatzwiderstand	slope resistance	$t_{vj} = t_{vj\,max}$	r_T		0,3	mΩ
Zündstrom	gate trigger current	t_{vj} = 25°C, v_D = 12 V	I_{GT}	max.	300	mA
Zündspannung	gate trigger voltage	t_{vj} = 25°C, v_D = 12 v	V_{GT}	max.	2,5	V
Nicht zündender Steuerstrom	gate non-trigger current	$t_{vj} = t_{vj\,max}$, v_D = 12 V	I_{GD}	max.	40	mA
Nicht zündende Steuerspannung	gate non-trigger voltage	$t_{vj} = t_{vj\,max}$, v_D = 0,5 V_{DRM}	V_{GD}	max.	0,3	v
Haltestrom	holding current	t_{vj} = 25°C, v_D = 12 V, R_A = 4,7 Ω	I_H	max.	400	mA
Einraststrom	latching current	t_{vj} = 25°C, v_D = 12 V, $R_{GK} \geq$ 10 Ω; i_{GM} = 4 A, di_G/dt = 8 A/µs, t_g = 20 µs	I_L	max.	2	A
Vorwärts- u. Rückwärts-Sperrstrom	forward off-state and reverse currents	$t_{vj} = t_{vj\,max}$, $v_D = V_{DRM}$, $v_R = V_{RRM}$	i_D	max.	180	mA
			i_R	max.	1000	mA
Zündverzug	gate controlled delay time	t_{vj} = 25°C, i_{GM} = 4 A, di_G/dt = 8 Alps	t_{gd}	max.	1,5	µs
Freiwerdezeit	circuit commutated turn-off time	siehe Techn. Erl./see Techn. Inf.	t_q F:	max.	25	µs
			G:	max.	30	µs[1])

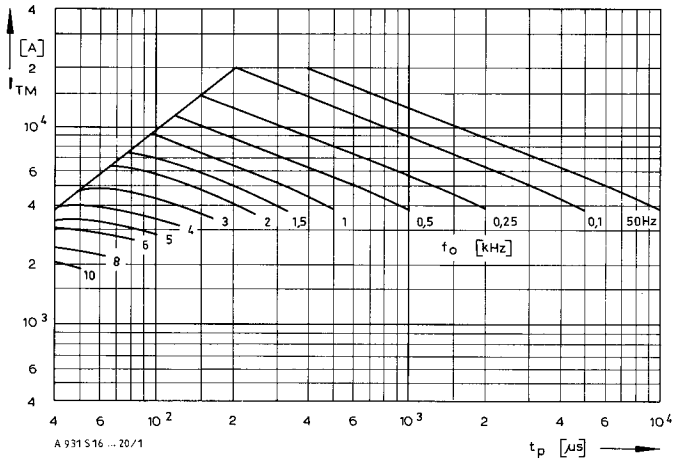
thermische Eigenschaften — Thermal properties

Innerer Wärmewiderstand für beidseitige Kühlung	thermal resistance, junction to case for two-sided cooling	Θ = 180° el, sin	R_{thJC}	max.	0,0212 °C/W
		DC		max.	0,0200 °C/W
Übergangswärmewiderstand	thermal resistance, case to heatsink	beidseitigltwo-sided	R_{thCK}	max.	0,005 °C/W
		einseitiglone-sided		max.	0,010 °C/W
Höchstzul. Sperrschichttemperatur	max. junction temperature		$t_{vj\,max}$		125°C
Betriebstemperatur	Operating temperature		$t_{c\,op}$		−40 ... + 125°C
Lagertemperatur	Storage temperature		t_{stg}		−40 ... + 140°C

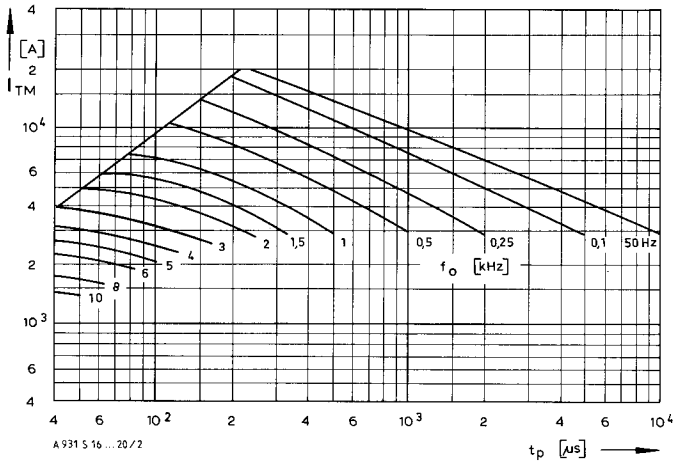
Mechanische Eigenschaften — Mechanical properties

Si-Elemente mit Druckkontakt	Si-pellets with pressure contact				
Anpreßkraft	Clamping force		F		13,5 ... 24 kN
Gewicht	weight		G	typ.	550 g
Kriechstrecke	Creepage distance				25 mm
Feuchteklasse	humidity classification	DIN 40040			C
Schwingfestigkeit	Vibration resistance	f = 50 Hz			50 m/s^2
Maßbild	outline				Seitelpage 155

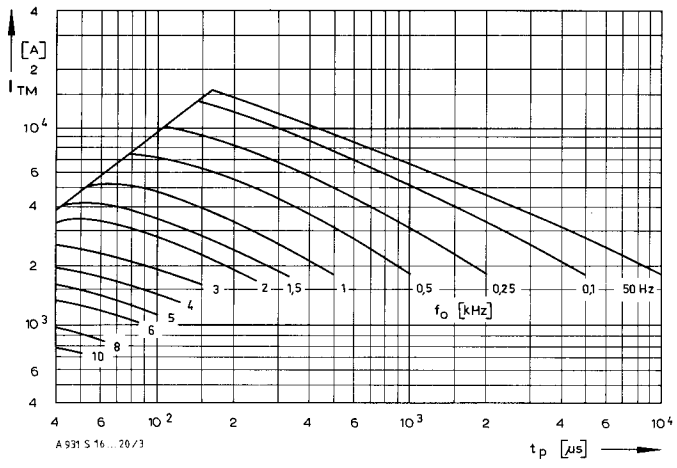
1) mit antiparalleler Diode/with inverse paralleled diode



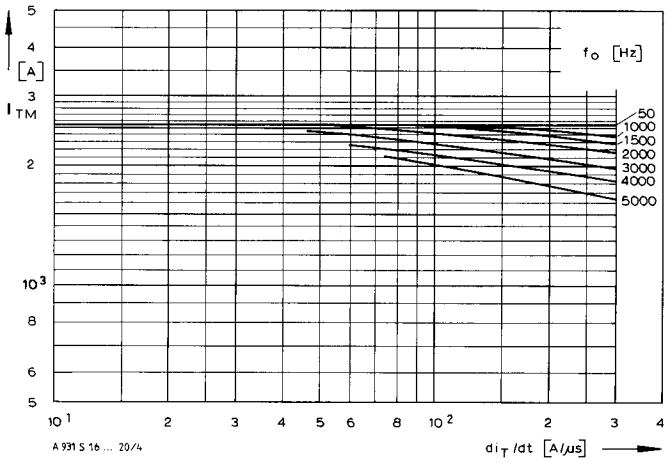
Bild/Fig. 1



Bild/Fig. 2



Bild/Fig. 3



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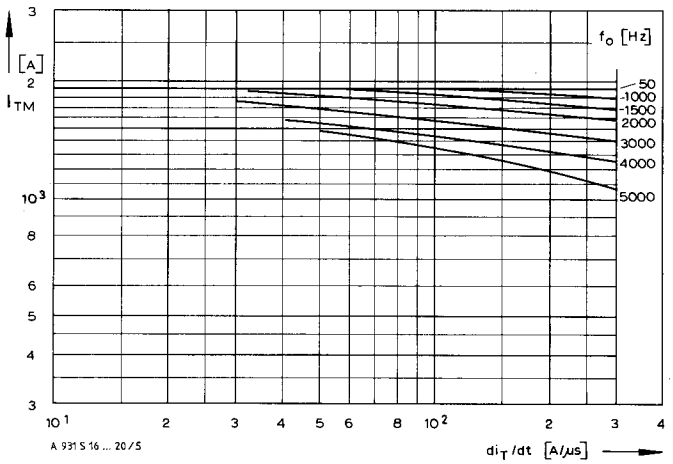

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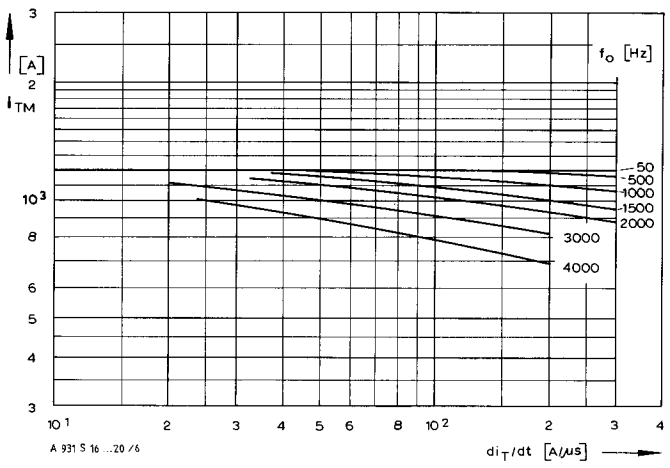
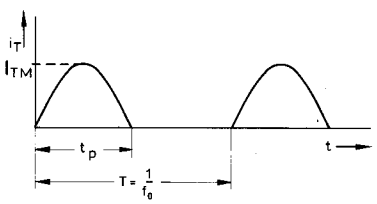


Bild/Fig. 6

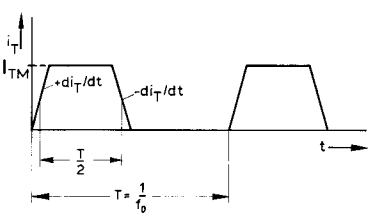
Bild/Fig. 1, 2, 3
Steuergenerator/pulse generator:
i_G = 4 A, di_G/dt = 8 A/µs

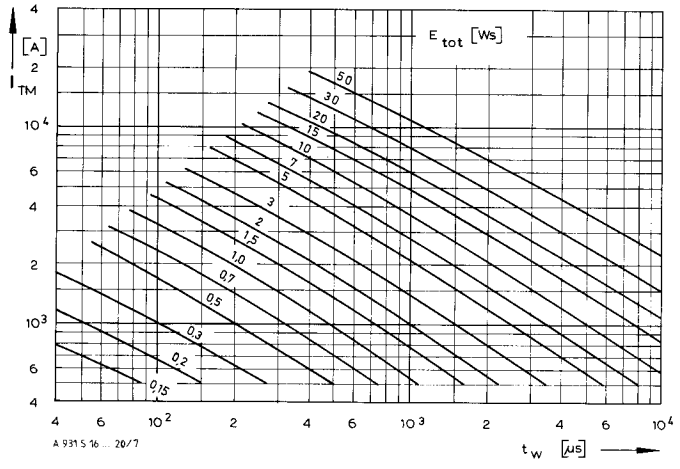
RC-Glied/RC-network:
R ≥ 10 Ω
C ≤ 1 µF
$v_{DM} \leq 0{,}67\ V_{DRM}$



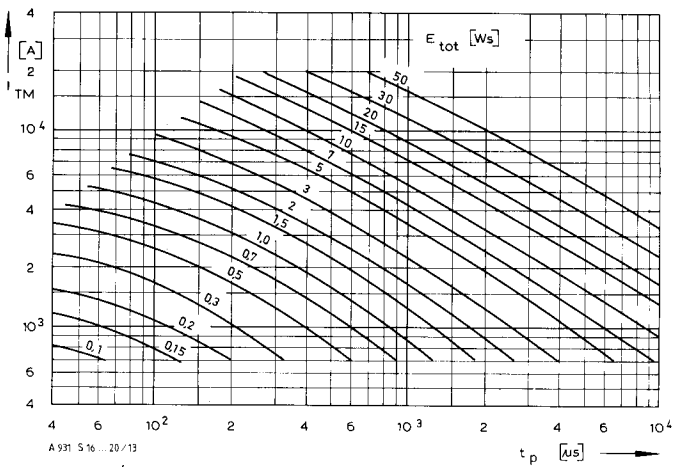
Bild/Fig. 4, 5, 6
Steuergenerator/pulse generator:
i_G = 4 A, di_G/dt = 8 A/µs

RC-Glied/RC-network:
R ≥ 10 Ω
C ≤ 1 µF
$v_{DM} \leq 0{,}67\ V_{DRM}$

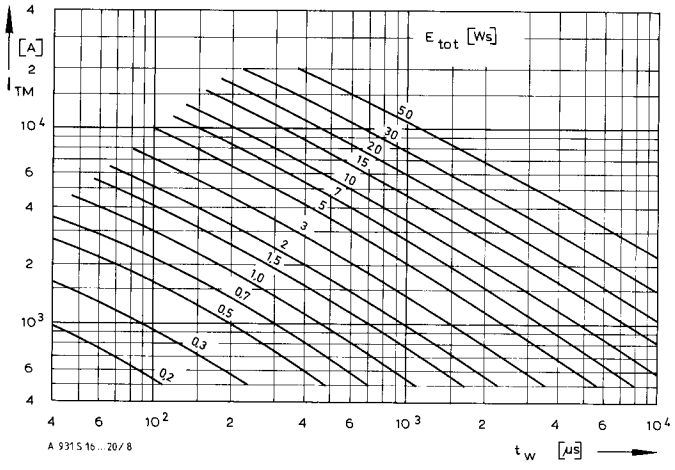




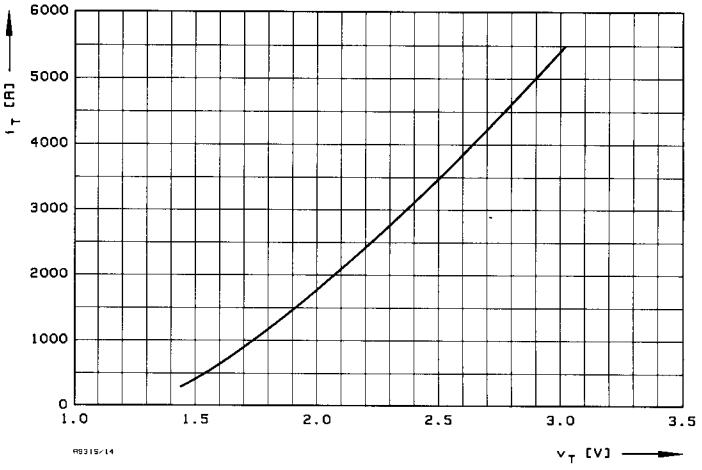
Bild/Fig. 7



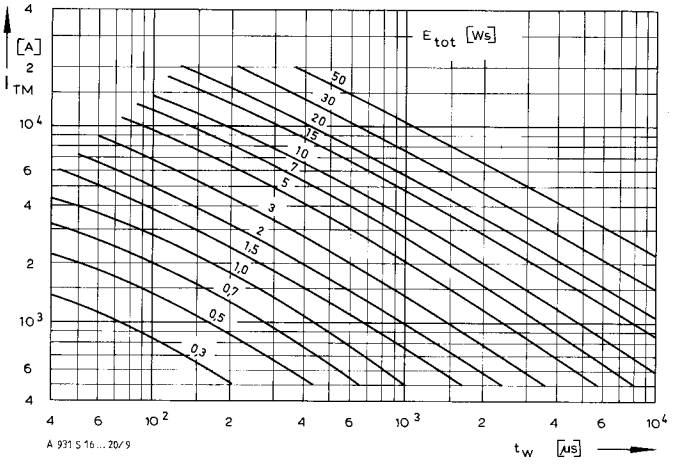
Bild/Fig. 13



Bild/Fig. 8



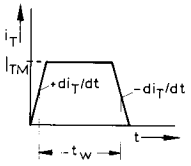
Bild/Fig. 14



Bild/Fig. 9

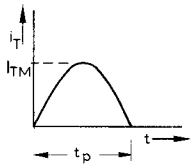
Bild/Fig. 7, 8, 9
Steuergenerator/pulse generator:
i_G = 4 A, di_G/dt = 8 A/µs

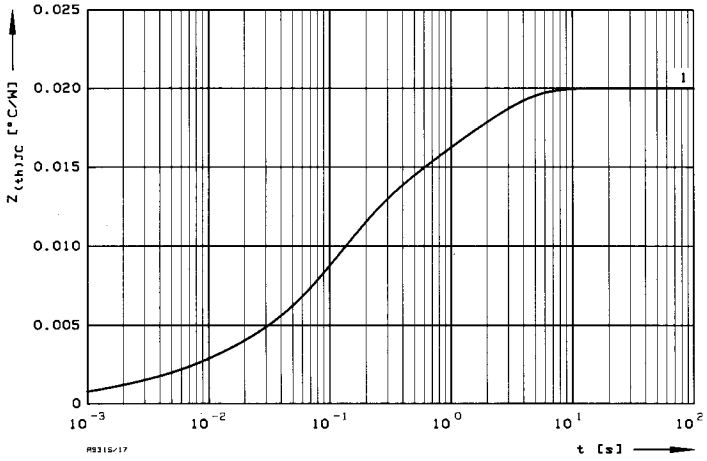
RC-Glied/RC-network:
R ≥ 10 Ω
C ≤ 1 µF
$v_{DM} \leq 0{,}67\ V_{DRM}$
$v_{RM} \leq 15$ V



(zu Bild/to Fig. 13)
Steuergenerator/pulse generator:
i_G = 4 A, di_G/dt = 8 A/µs

RC-Glied/RC-network:
R ≥ 10 Ω
C ≤ 1 µF
$v_{RM} \leq 15$ V





Bild/Fig. 17
Transienter innerer Wärmewiderstand $Z_{(th)JC} = f(t)$, DC
Transient thermal impedance $Z_{(th)JC} = f(t)$, DC
1 Beidseitige Kühlung/two-sided cooling

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	R_{thn} [°C/W]	0,0007	0,00175	0,0079	0,00375	0,0059		
two-sided	τ_n [s]	0,0009	0,0074	0,096	0,35	1,94		
anodenseitig	R_{thn} [°C/W]							
anode-sided	τ_n [s]							
kathodenseitig	R_{thn} [°C/W]							
cathode-sided	τ_n [s]							

Analytische Funktion/analytical function:

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