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}	600, 800 1000, 1100 1200, 1300*	V v V
Vorwärts-Stoßspitzenspannung	non repetitive peak forward off-state voltage	$t_{vj} = -40°C ... t_{vj\,max}$	$V_{DSM} = V_{DRM}$		
Periodische Rückwärts-Spitzensperrspannung	repetitive peak reverse voltage	$t_{vj} = -40°C ... t_{vj\,max}$	V_{RRM}	15	v
Periodische Rückwärts-Spitzensperrspannung nach der Kommutierung	repetitive peak reverse voltage after commutation	$t_{vj} = -40°C ... t_{vj\,max}, t_p$ = 1 ps	$V_{RRM(C)}$	50	v
Durchlaßstrom-Grenzeffektivwert	RMS on-state current		I_{TRMSM}	900	A
Dauergrenzstrom	average on-state current	t_C = 05°C	I_{TAVM}	438	A
		t_C = 56°C		573	A
Stoßstrom-Grenzwert	surge current	t_{vj} = 25°C, t_p = 10 ms	I_{TSM}	6,2	kA
		$t_{vj} = t_{vj\,max}$, t_p = 10 ms		5,5	kA
Grenzlastintegral	$\int i^2dt$-value	t_{vj} = 25°C, t_p = 10 n-s	$\int i^2dt$	192	kA^2s
		$t_{vj} = t_{vj\,max}$, t_p = 10 ms		151	kA^2s
Kritische Stromsteilheit	critical rate of rise of on-state current	$v_D \leq$ 67% V_{DRM}, f_o = 50 Hz v_L = 10 V, i_{GM} = 1,2 A, di_G/dt = 1,2 A/µs	$(di/dt)_{cr}$	500	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 C		500	V/µs
		5. Kennbuchstabe/5th letter F		1000	V/µs

Charakteristische Werte — Characteristic values

Durchlaßspannung	on-state voltage	$t_{vj} = t_{vj\,max}$, i_T = 1500 A	v_T	max.	2,1	v
Schleusenspannung	threshold voltage	$t_{vj} = t_{vj\,max}$	$V_{T(TO)}$		1,1	v
Ersatzwiderstand	slope resistance	$t_{vj} = t_{vj\,max}$	r_T		0,6	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.	2,7	V
Nicht zündender Steuerstrom	gate non-trigger current	$t_{vj} = t_{vj\,max}$, v_D = 12 v	I_{GD}	max.	10	mA
Nicht zündende Steuerspannung	gate non-trigger voltage	$t_{vj} = t_{vj\,max}$, v_D = 0,5 V_{DRM}	V_{GD}	max.	0,25	V
Haltestrom	holding current	t_{vj} = 25°C, v_D = 12 V, R_A = 10 Ω	I_H	max.	300	mA
Einraststrom	latching current	t_{vj} = 25°C, v_D = 12 V, $R_{GK} \geq$ 10 Ω I_{GM} = 1,2 A, di_G/dt = 1,2 Alps, t_g = 20 µs	I_L	max.	1,2	A
Vorwärts- u. Rückwärts-Sperrstrom	forward off-state and reverse Currents	$t_{vj} = t_{vj\,max}$, v_D = VORM. $v_R = V_{RRM}$	i_D	max.	50	mA
			i_R	max.	250	mA
Zündverzug	gate controlled delay time	t_{vj} = 25°C, i_{GM} = 1,2 A, di_G/dt = 1,2 A/µs	t_{gd}	max.	1,4	µs
Freiwerdezeit	circuit commutated turn-off time	siehe Techn. Erl./see Techn. Inf.	t_q D:	max.	15	µs[1]
			E:	max.	20	µs[1]
			F:	max.	25	µs[1]

Thermische Eigenschaften — Thermal properties

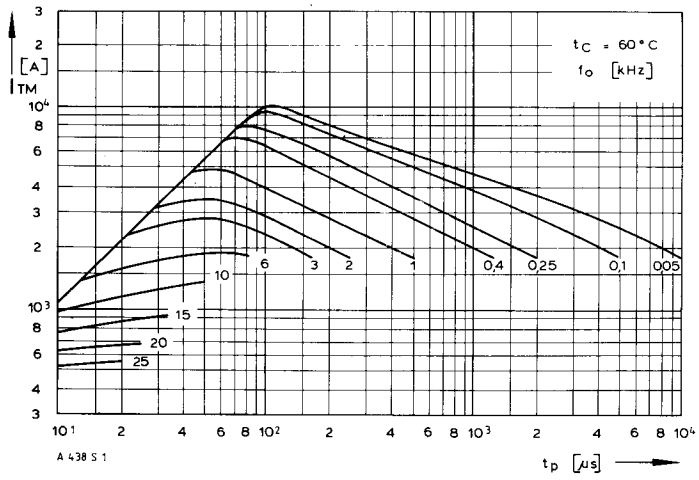
Innerer Wärmewiderstand für beidseitige Kühlung	thermal resistance, junction to case for two-sided cooling	θ = 180° el, sin	R_{thJC}	max.	0,053 °C/W
		DC		max.	0,05 °C/W
für anodenseitige Kühlung	for anode-sided cooling	θ = 180" el, sin	$R_{thJC(A)}$	max.	0,088 °C/W
		DC		max.	0,085 °C/W
für kathodenseitige Kühlung	for cathode-sided cooling	θ = 180" el, sin	$R_{thJC(K)}$	max.	0,123 °C/W
		DC		max.	0,12 °C/W
Übergangswärmewiderstand	thermal resistance, case to heatsink	beidseitig/two-sided	R_{thCK}	max.	0,01 °C/W
		einseitiglone-sided		max.	0,02 °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

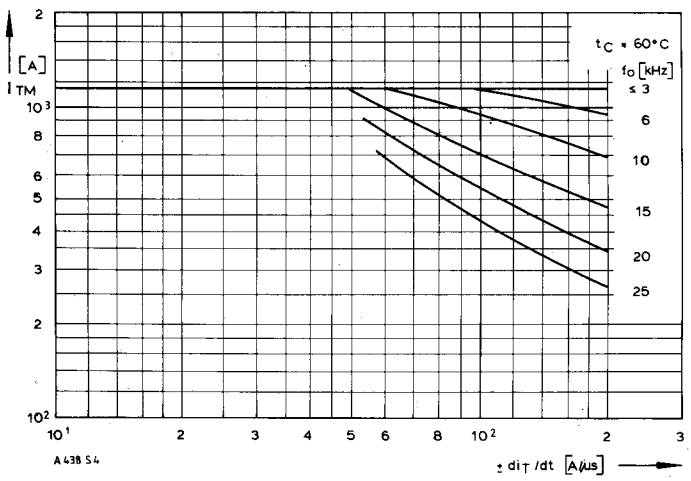
Si-Elemente mit Druckkontakt	Si-pellets with pressure contact				
Anpreßkraft	Clamping force		F		4,5 ... 9 kN
Gewicht	weight		G	typ.	100 g
Kriechstrecke	Creepage distance				17 mm
Feuchteklasse	humidity classification	DIN 40040			c
Schwingfestigkeit	Vibration resistance	f = 50 Hz			50 m/s²
Maßbild	outline	DIN 41814-152A4			Seite/page 154

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

1) mit antiparalleler Diodelwith inverse paralleled diode



Bild/Fig. 1



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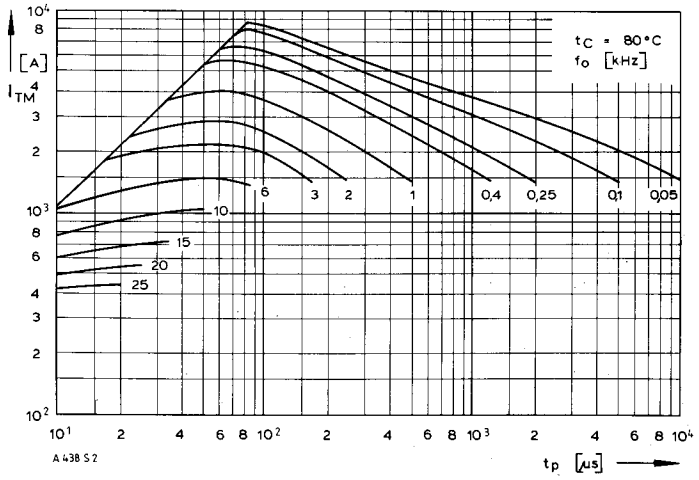
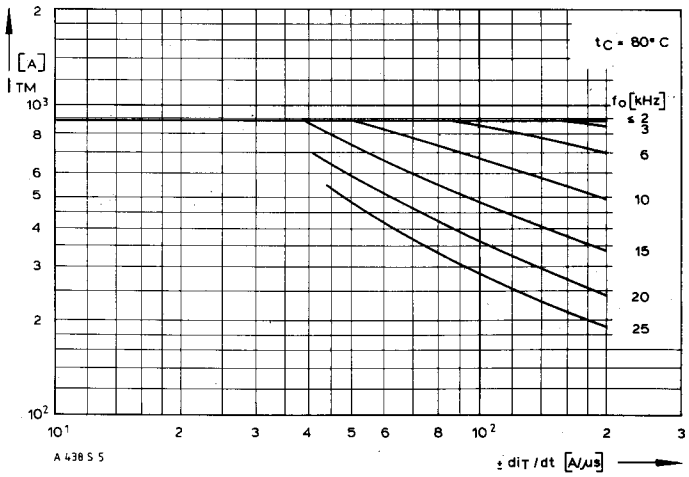
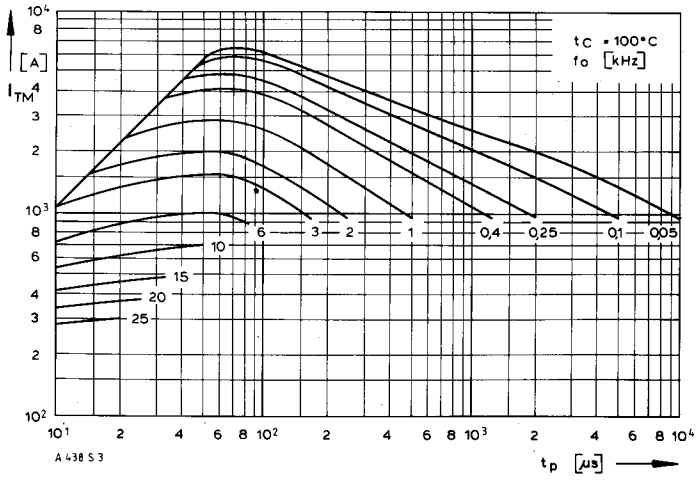


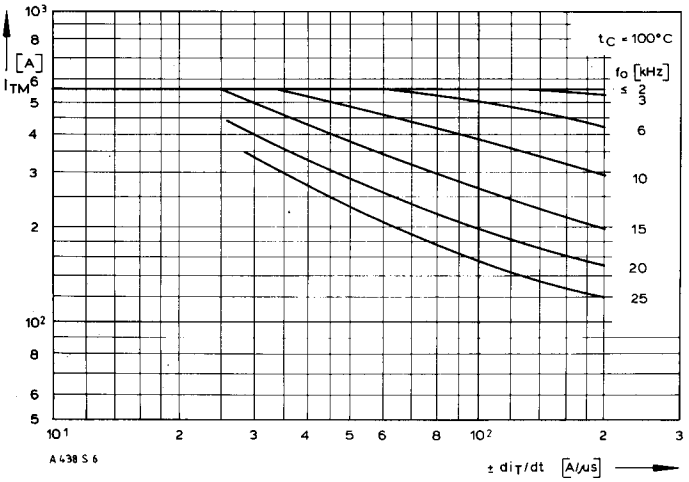
Bild/Fig. 2



Bild/Fig. 5



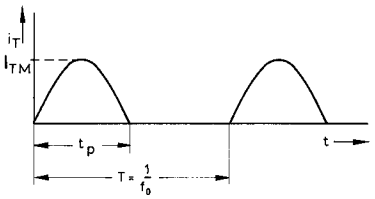
Bild/Fig. 3



Bild/Fig. 6

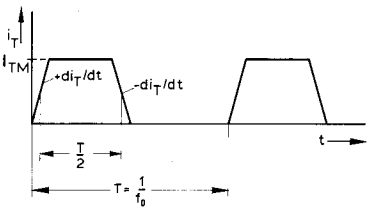
Bild/Fig. 1, 2, 3
Steuergenerator/pulse generator:
i_G = 2,4 A, di_G/dt = 2,4 A/µs

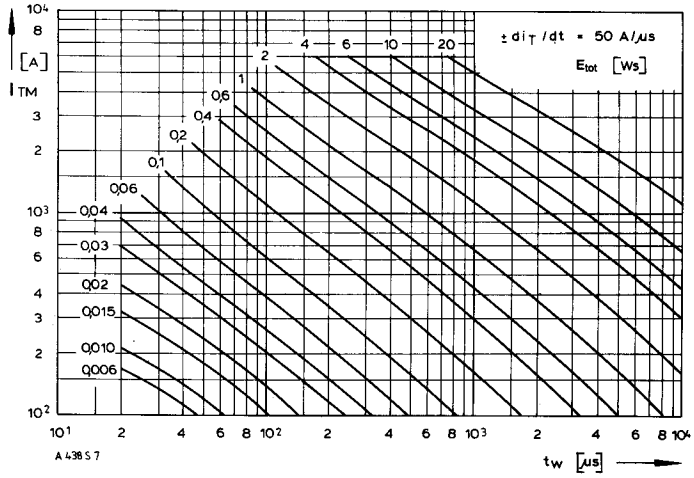
RC-Glied/RC-network:
R [Ω] ≥ 0,02 v_{DM} [V]
C ≤ 0,22 µF
v_{DM} ≤ 0,67 V_{DRM}



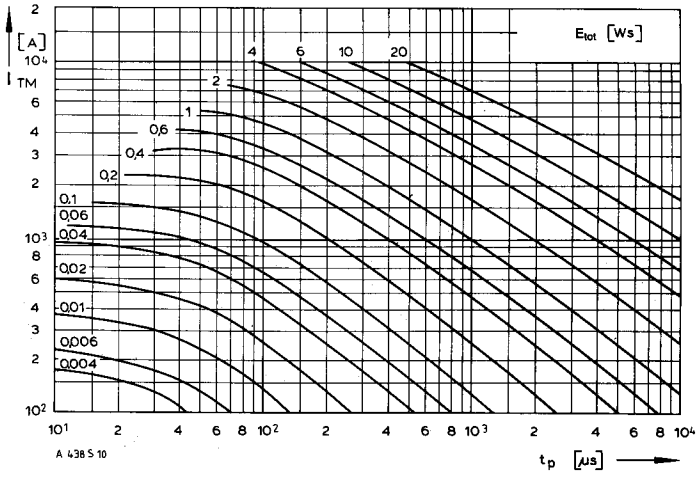
Bild/Fig. 4, 5, 6
Steuergenerator/pulse generator:
i_G = 2,4 A, di_G/dt = 2,4 A/µs

RC-Glied/RC-network:
R [Ω] ≥ 0,02 v_{DM} [V]
C ≤ 0,33 µF
v_{DM} ≤ 0,67 V_{DRM}

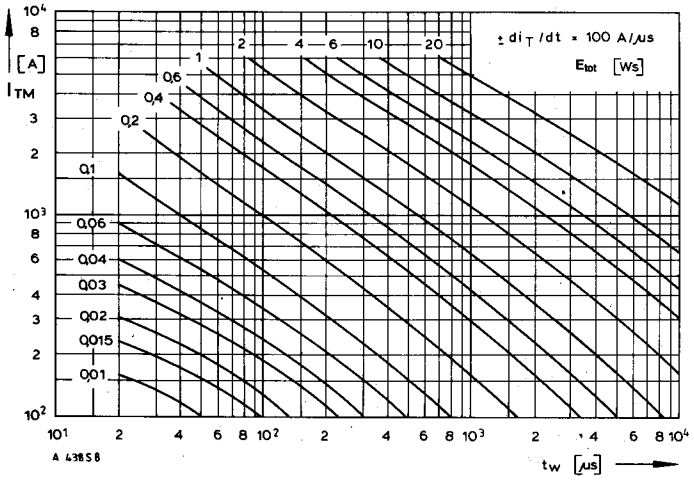




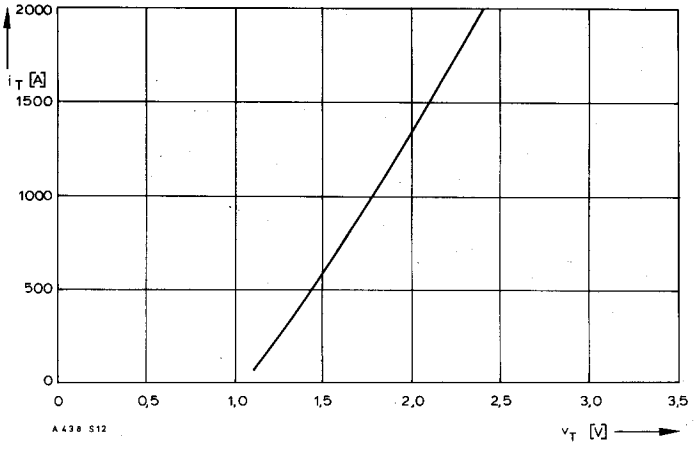
Bild/Fig. 7



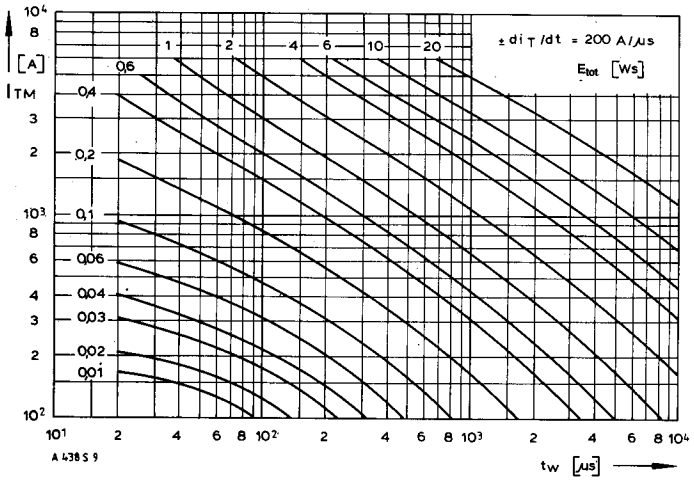
Bild/Fig. 13



Bild/Fig. 8



Bild/Fig. 14



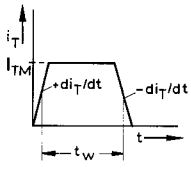
Bild/Fig. 9

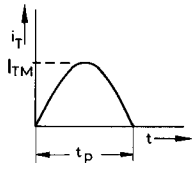
Bild/Fig. 7, 8, 9
Steuergenerator/pulse generator:
i_G = 2,4 A, di_G/dt = 2,4 A/µs

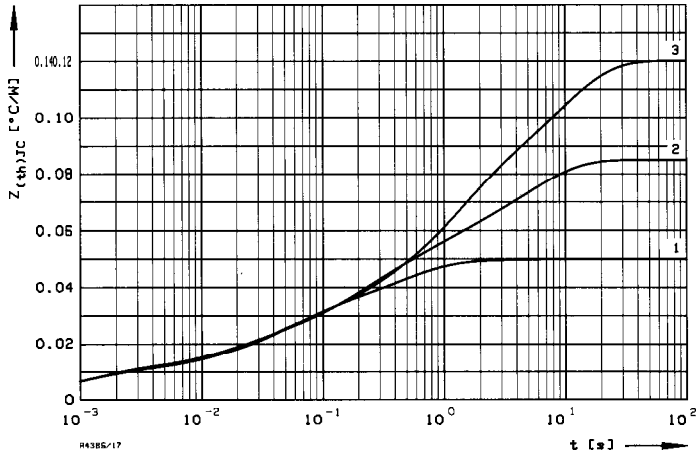
RC-Glied/RC-network:
R [Ω] ≥ 0,02 v_{DM} [V]
C ≤ 0,33 µF
$v_{DM} \leq 0{,}67\ V_{DRM}$

(zu Bild/to Fig. 13)
Steuergenerator/pulse generator:
i_G = 2,4 A, di_G/dt = 2,4 A/µs

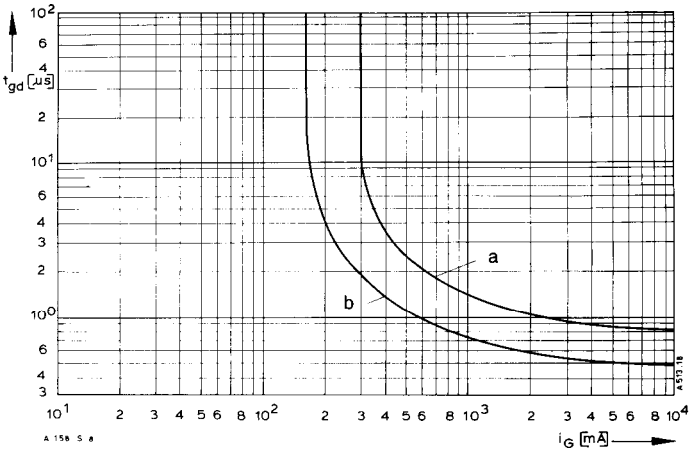
RC-Glied/RC-network:
R [Ω] ≥ 0,02 v_{DM} [V]
C ≤ 0,22 µF



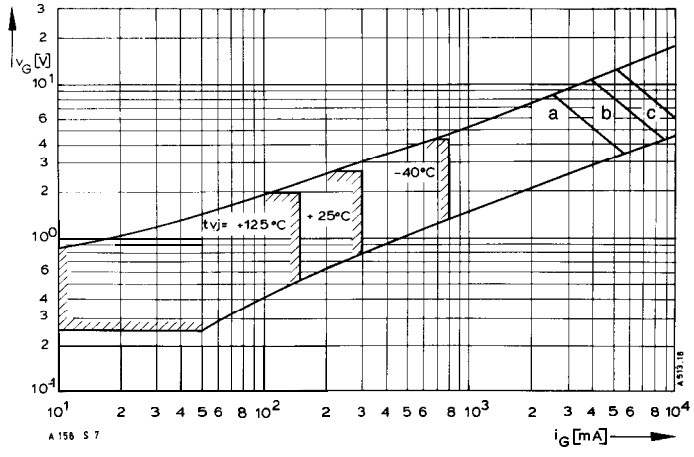




Bild/Fig. 17
Transienter innerer Wärmewiderstand $Z_{(th)JC} = f(t)$, DC
Transient thermal impedance $Z_{(th)JC} = f(t)$, DC
1 Beidseitige Kühlung/two-sided cooling
2 Anodenseitige Kühlunglanode side cooling
3 Kathodenseitige Kühlunglcathode side cooling



BildlFig. 16
ZündverzuglGate controlled delay time $t_{9,,} = f(i_{GM})$, $t_{vj} = 25°C$, $di_G/dt = i_{GM}/1\,\mu s$
a – Maximaler Verlauf/Limiting Characteristic
b – Typischer Verlauf/Typical Characteristic



Bild/Fig. 19
Steuercharakteristik mit **Zündbereichen/Gate** Characteristic with triggering areas
$v_G = f(i_G)$, $V_D = 12$ 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	R_{thn} [°C/W]	0,0105	0,00283	0,0167	0,0188	0,00116		
two-sided	τ_n [s]	0,00113	0,0255	0,0511	0,429	2,49		
anodenseitig	R_{thn} [°C/W]	0,0094	0,00974	0,0182	0,0161	0,0316		
anode-sided	τ_n [s]	0,000984	0,017	0,15	0,6	5,0		
kathodenseitig	R_{thn} [°C/W]	0,00928	0,0145	0,00868	0,0401	0,0475		
cathode-sided	τ_n [s]	0,000939	0,0285	0,156	1,12	9,1		

Analytische **Funktion/analytical function:**

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

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