
Netz-Gleichrichterdiode
Rectifier Diode
D4810N
Elektrische Eigenschaften / Electrical properties

Höchstzulässige Werte / maximum rated values

Periodische Spitzensperrspannung repetitive peak reverse voltages	$T_{vj} = -40^{\circ}\text{C} \dots T_{vj \text{ max}}$	V_{RRM}	2200 2400	2600 2800	V V
Durchlaßstrom-Grenzeffektivwert maximum RMS on-state current		I_{FRMSM}		8400	A
Dauergrenzstrom average on-state current	$T_C = 100^{\circ}\text{C}$	I_{FAVM}		4810	A
Dauergrenzstrom average on-state current	$T_C = 55^{\circ}\text{C}, \theta = 180^{\circ}\text{sin}, t_p = 10 \text{ ms}$	I_{FAVM}		6940	A
Durchlaßstrom-Effektivwert RMS on-state current		I_{FRMS}		10900	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_{FSM}		80000 60000	A A
Grenzlastintegral I^2t -value	$T_{vj} = 25^{\circ}\text{C}, t_p = 10 \text{ ms}$ $T_{vj} = T_{vj \text{ max}}, t_p = 10 \text{ ms}$	I^2t		32000 18000	$10^3\text{A}^2\text{s}$ $10^3\text{A}^2\text{s}$

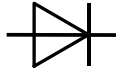
Charakteristische Werte / Characteristic values

Durchlaßspannung on-state voltage	$T_{vj} = T_{vj \text{ max}}, i_F = 10 \text{ kA}$ $T_{vj} = T_{vj \text{ max}}, i_F = 4 \text{ kA}$	V_F	max. max.	1,450 1,078	V V
Schleusenspannung threshold voltage	$T_{vj} = T_{vj \text{ max}}$	$V_{(TO)}$		0,83	V
Ersatzwiderstand slope resistance	$T_{vj} = T_{vj \text{ max}}$	r_r		0,062	m Ω
Durchlaßkennlinie on-state characteristic $i_F = 1500 \text{ A} \leq i_F \leq 20000 \text{ A}$ $v_F = A + B \cdot i_F + C \cdot \ln(i_F + 1) + D \cdot \sqrt{i_F}$	$T_{vj} = T_{vj \text{ max}}$	A= B= C= D=		1,181E+00 1,391E-05 -9,794E-02 1,031E-02	
Sperrstrom reverse current	$T_{vj} = T_{vj \text{ max}}, V_R = V_{RRM}$	i_R	max.	200	mA

Thermische Eigenschaften / Thermal properties

Innerer Wärmewiderstand thermal resistance, junction to case	<u>Kühlfläche / cooling surface</u> beidseitig / two-sided, $\theta = 180^{\circ}\text{sin}$ beidseitig / two-sided, DC Anode / anode, $\theta = 180^{\circ}\text{sin}$ Anode / anode, DC Kathode / cathode, $\theta = 180^{\circ}\text{sin}$ Kathode / cathode, DC	R_{thJC}	max. max. max. max. max. max.	0,0080 0,0073 0,0147 0,0136 0,0174 0,0160	$^{\circ}\text{C/W}$ $^{\circ}\text{C/W}$ $^{\circ}\text{C/W}$ $^{\circ}\text{C/W}$ $^{\circ}\text{C/W}$ $^{\circ}\text{C/W}$
Übergangs-Wärmewiderstand thermal resistance, case to heatsink	<u>Kühlfläche / cooling surface</u> beidseitig / two-sided einseitig / single-sided	R_{thCH}	max. max.	0,0025 0,0050	$^{\circ}\text{C/W}$ $^{\circ}\text{C/W}$
Höchstzulässige Sperrschichttemperatur maximum junction temperature		$T_{vj \text{ max}}$		160	$^{\circ}\text{C}$
Betriebstemperatur operating temperature		$T_{c \text{ op}}$		-40...+150	$^{\circ}\text{C}$
Lagertemperatur storage temperature		T_{stg}		-40...+150	$^{\circ}\text{C}$

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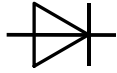


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Mechanische Eigenschaften / Mechanical properties

Gehäuse, siehe Anlage case, see annex			Seite 3 page 3	
Si-Element mit Druckkontakt Si-pellet with pressure contact				
Anpreßkraft clamping force		F	42...95	kN
Gewicht weight		G	typ. 1200	g
Kriechstrecke creepage distance			30	mm
Schwingfestigkeit vibration resistance	f = 50 Hz		50	m/s ²

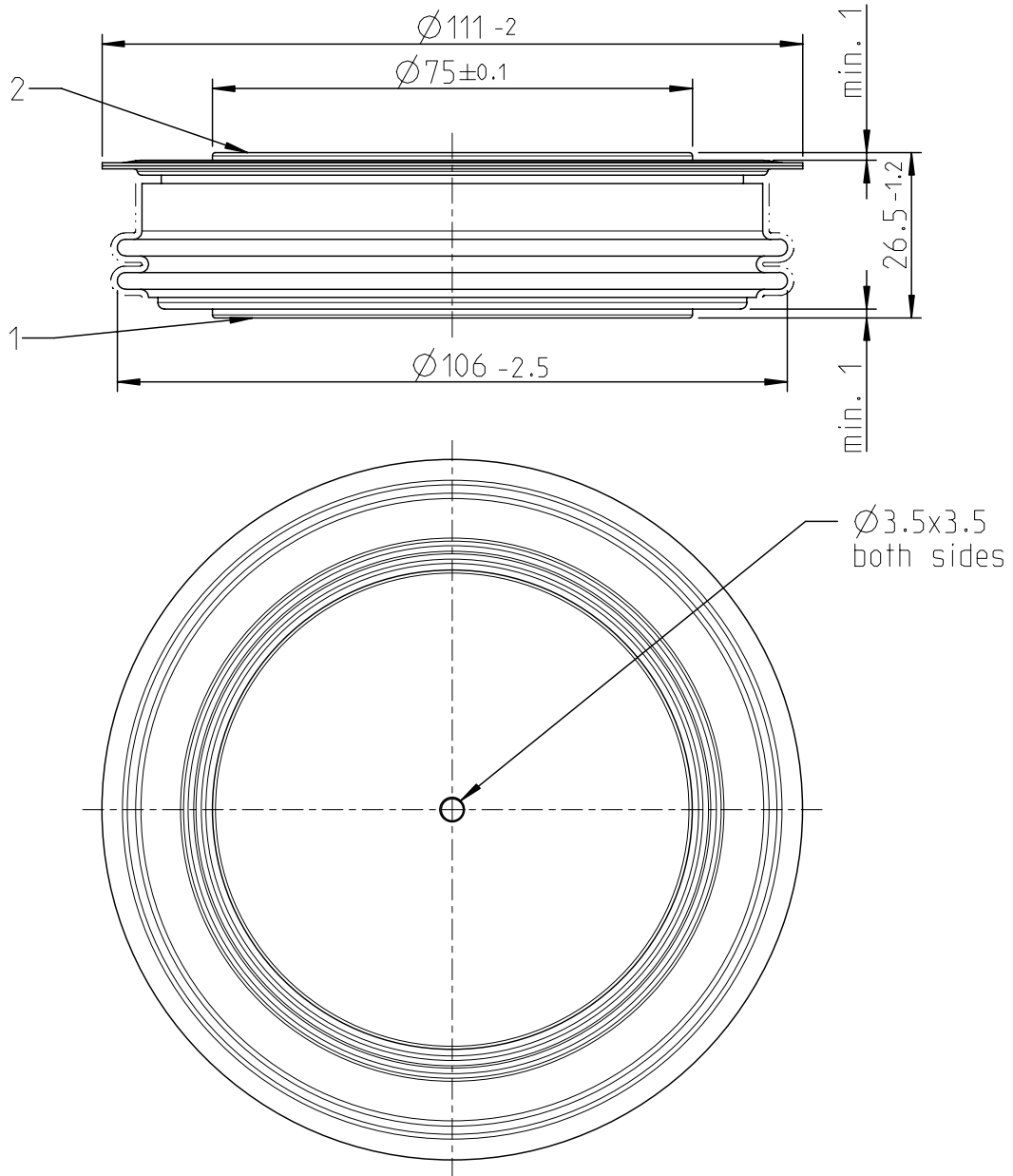
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Datenblatt / Data sheet



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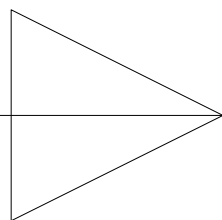
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strike distance: 20mm
creepage distance: 30mm

overall height based
on contact pressure

1

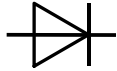


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**1: Anode/
Anode**

**2: Kathode/
Cathode**


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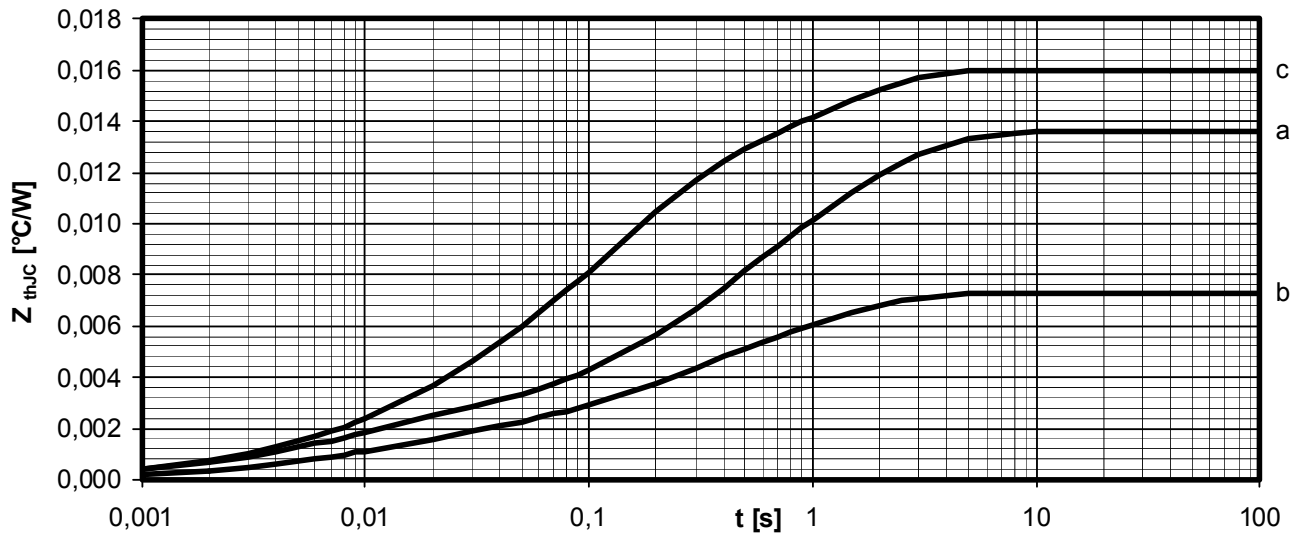
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Analytische Elemente des transienten Wärmewiderstandes Z_{thJC} für DC
Analytical elements of transient thermal impedance Z_{thJC} for DC

Kühlung / Cooling	Pos. n	1	2	3	4	5	6	7
beidseitig two-sided	R_{thn} [°C/W]	0,000030	0,000390	0,00120	0,00262	0,00306	-	-
	τ_n [s]	0,000055	0,003920	0,01520	0,20680	1,09140	-	-
anodenseitig anode-sided	R_{thn} [°C/W]	0,000009	0,000371	0,00190	0,00110	0,00404	0,00618	-
	τ_n [s]	0,000010	0,001820	0,00951	0,13500	0,34700	1,54000	-
kathodenseitig cathode-sided	R_{thn} [°C/W]	0,000032	0,000728	0,00292	0,00781	0,00451	-	-
	τ_n [s]	0,000035	0,003410	0,02150	0,13500	1,11000	-	-

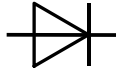
Analytische Funktion / Analytical function:

$$Z_{thJC} = \sum_{n=1}^{n_{max}} R_{thn} \left(1 - e^{-\frac{t}{\tau_n}} \right)$$


Transienter innerer Wärmewiderstand für DC / Transient thermal impedance for DC

$$Z_{thJC} = f(t)$$

- a - Anodenseitige Kühlung / Anode-sided cooling
 b - Beidseitige Kühlung / Two-sided cooling
 c - Kathodenseitige Kühlung / Cathode-sided cooling


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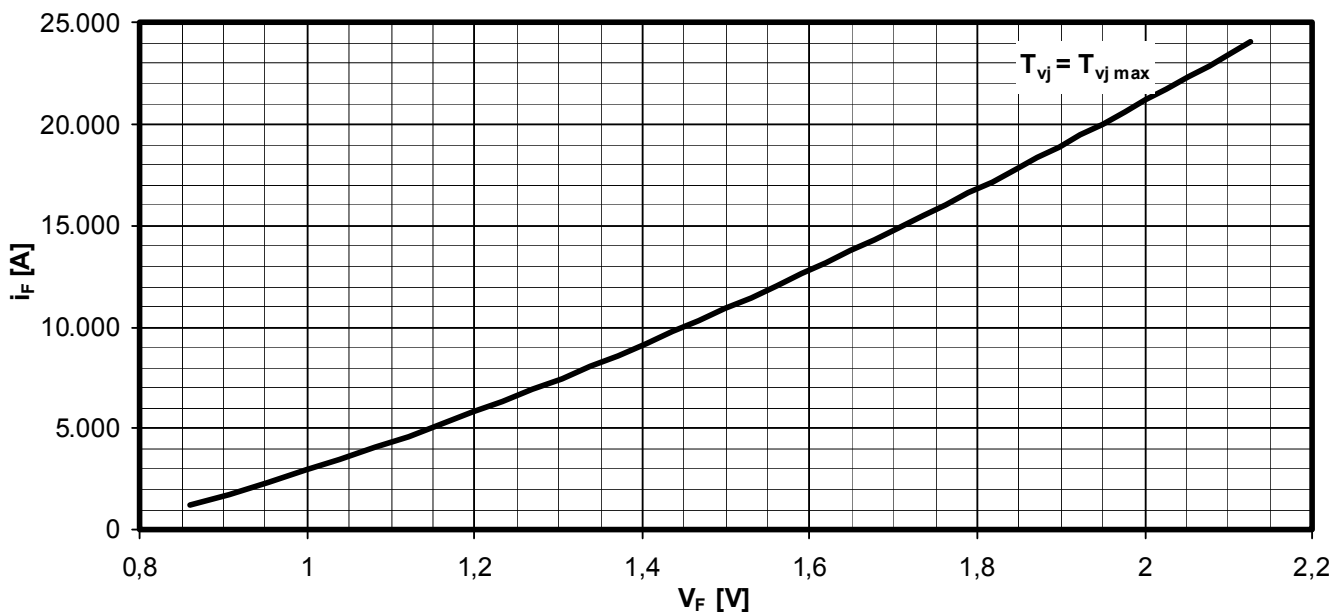
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 Erhöhung des $Z_{th DC}$ bei sinus- und rechteckförmigen Strömen für unterschiedliche Stromflusswinkel Θ
 Rise of $Z_{th DC}$ for sinewave and rectangular current for different current conduction angles Θ
 $\Delta Z_{th \Theta rec} / \Delta Z_{th \Theta sin}$

Kühlung / Cooling		$\Theta = 180^\circ$	$\Theta = 120^\circ$	$\Theta = 90^\circ$	$\Theta = 60^\circ$	$\Theta = 30^\circ$
beidseitig two-sided	$\Delta Z_{th \Theta rec}$ [°C/W]	0,00082	0,00128	0,00159	0,00198	0,00256
	$\Delta Z_{th \Theta sin}$ [°C/W]	0,00068	0,00091	0,00118	0,00153	0,00205
anodenseitig anode-sided	$\Delta Z_{th \Theta rec}$ [°C/W]	0,00166	0,00226	0,00286	0,00369	0,00490
	$\Delta Z_{th \Theta sin}$ [°C/W]	0,00110	0,00152	0,00206	0,00287	0,00423
kathodenseitig cathode-sided	$\Delta Z_{th \Theta rec}$ [°C/W]	0,00166	0,00256	0,00317	0,00393	0,00499
	$\Delta Z_{th \Theta sin}$ [°C/W]	0,00141	0,00187	0,00242	0,00316	0,00424

$$Z_{th \Theta rec} = Z_{th DC} + \Delta Z_{th \Theta rec}$$

$$Z_{th \Theta sin} = Z_{th DC} + \Delta Z_{th \Theta sin}$$


 Grenzdurchlasskennlinie / Limiting on-state characteristic $i_F = f(V_F)$

$$T_{vj} = T_{vj max}$$