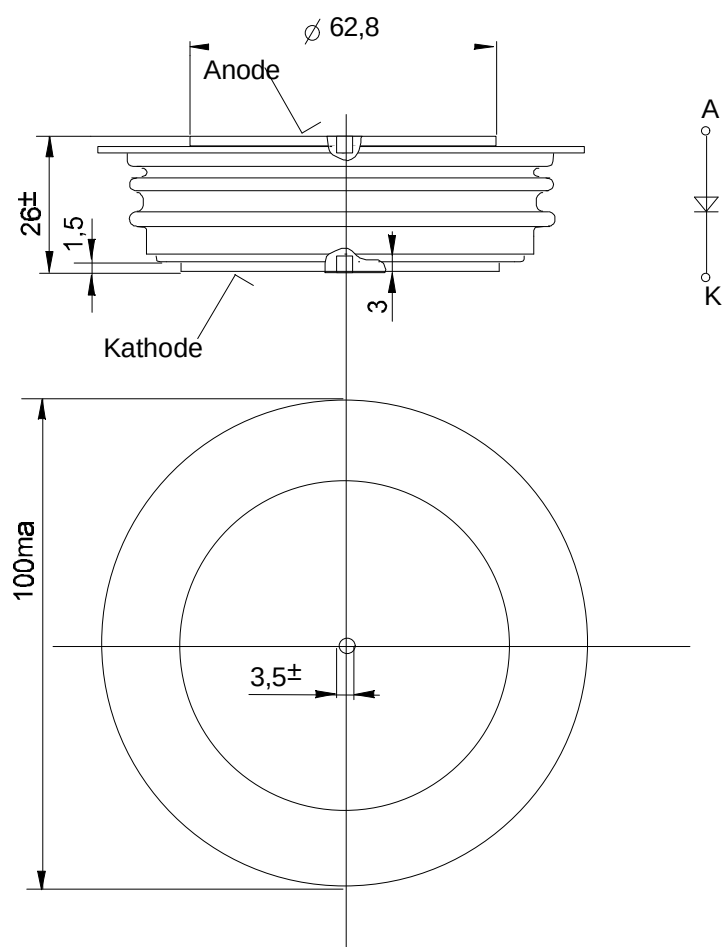




European Power-Semiconductor and Electronics Company

Marketing Information

D 921 S 45 T



Elektrische Eigenschaften / Electrical properties

Höchstzulässige Werte / Maximum rated values

Periodische Spitzensperrspannung repetitive peak reverse voltage	$t_{vj} = -40^{\circ}\text{C} \dots 140^{\circ}\text{C}$	V_{RRM}	4500 V
Stoßspitzensperrspannung non-repetitive peak reverse voltage	$t_{vj} = +25^{\circ}\text{C} \dots 140^{\circ}\text{C}$	V_{RSM}	4600 V
Durchlaßstrom-Grenzeffektivwert / RMS forward current		I_{FRMSM}	2560 A
Dauergrenzstrom / mean forward current	$t_C = 85^{\circ}\text{C}$	I_{FAVM}	1380 A
	$t_C = 52^{\circ}\text{C}$		1630 A
Stoßstrom-Grenzwert ¹⁾ surge forward current ¹⁾	$t_{vj} = 25^{\circ}\text{C}, t_b = 10 \text{ ms}, \psi_R = 0\text{V}$ $t_{vj} = 140^{\circ}\text{C}, t_b = 10 \text{ ms}, \psi_R = 0\text{V}$	I_{FSM}	A 23000 A
Grenzlastintegral I^2t -value	$t_{vj} = 25^{\circ}\text{C}, t_b = 10 \text{ ms}, \psi_R = 0\text{V}$ $t_{vj} = 140^{\circ}\text{C}, t_b = 10 \text{ ms}, \psi_R = 0\text{V}$	I^2t	A ² s 2650000 A ² s
Kritische periodische Ausschaltstromsteilheit critical repetitive rate of fall of on - state	$I_{FM} = 3000 \text{ A}, \psi_R = 0,67 V_{DRM}$ $C_S = 0,3 \mu\text{F}, R_S = \tau/C_S$	$(-di/dt)_{com}$	500 A/ μs

Charakteristische Werte / Characteristic values

Gleichsperrspannung / cont. direct reverse voltage	$t_C = -25^{\circ}\text{C} \dots +85^{\circ}\text{C}$	$V_{R(D)}$	typ. 2600 V
Durchlaßspannung / forward voltage	$t_{vj} = 140^{\circ}\text{C}, I_F = 2500 \text{ A}$	V_F	max 2,6 V
Schleusenspannung / threshold voltage	$t_{vj} = 140^{\circ}\text{C}$	$V_{(TO)}$	1,4 V
Ersatzwiderstand / forward slope resistance	$t_{vj} = 140^{\circ}\text{C}$	r_T	0,48 m Ω
Sperrstrom / reverse current	$t_{vj} = 140^{\circ}\text{C}, \psi_R = 0,67 V_{RRM}$	i_R	mA
	$t_{vj} = 140^{\circ}\text{C}, \psi_R = V_{RRM}$		max. 100 mA
Rückstromspitze / peak reverse recovery current	$i_{FM} = 1000 \text{ A}, -di/dt = 250 \text{ A}/\mu\text{s}$ $V_R = 1000 \text{ V}; D_S = D291S45T$ $C = 0,3 \mu\text{F}; R = \tau/C_S$	I_{RM}	max. 800 A
Sperrverzögerungsladung recovered charge	$i_{FM} = 1000 \text{ A}, -di/dt = 250 \text{ A}/\mu\text{s}$	Q_{rr}	2800 μAs
	$V_R = 1000 \text{ V}; D_S = D291S45T$ $C = 0,3 \mu\text{F}; R = \tau/C_S$		
Sanftheit Softness	$i_{FM} = 1000 \text{ A}, -di/dt = 250 \text{ A}/\mu\text{s}$	SR	typ. 0,002 μAs
	$V_R = 1000 \text{ V}; D_S = D291S45T$ $C = 0,3 \mu\text{F}; R = \tau/C_S$		

Thermische Eigenschaften / Thermal properties

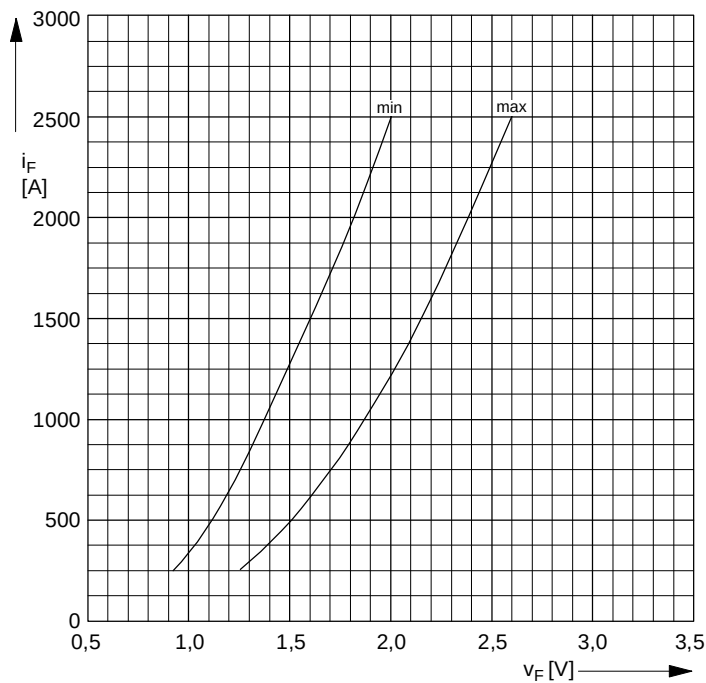
Innerer Wärmewiderstand thermal resistance, junction to case	Kühlfläche / cooling surface	R_{thJC}	
	beidseitig / two-sided		0,0125 K/W
	Anoden / anode		0,0228 K/W
	Kathode / cathode		0,0277 K/W
Übergangs-Wärmewiderstand thermal resistance, case to heatsink	Kühlfläche / cooling surface	R_{thCK}	
	beidseitig / two-sided		max. 0,003 K/W
	einseitig / single-sided		max. 0,006 K/W
Höchstzul. Sperrschichttemp. / max. junction temperat.		t_{vjmax}	140 $^{\circ}\text{C}$
Betriebstemperatur / operating temperature		$t_C \text{ op}$	-40...+140 $^{\circ}\text{C}$
Lagertemperatur / storage temperature		t_{stg}	-40...+150 $^{\circ}\text{C}$

Mechanische Eigenschaften / Mechanical properties

Gehäuse, siehe Anlage / case, see appendix	Seite / page 1		
Anpreßkraft / clamping force	F		27...45 kN
Gewicht / weight	G		typ. 850 g
Luftstrecke / air distance			20 mm
Kriechstrecke / creepage distance			30 mm
Feuchteklasse / humidity classification	DIN 40040		C
Schwingfestigkeit / vibration resistance	f = 50 Hz		50 m/s ²

Mit dieser technischen Information werden Halbleiterbauelemente spezifiziert, jedoch keine Eigenschaften zugesichert. Sie gilt in Verbindung mit den zugehörigen Technischen Erläuterungen.
This technical information specifies semiconductor devices but promises no characteristics. It is valid in combination with the belonging technical notes.

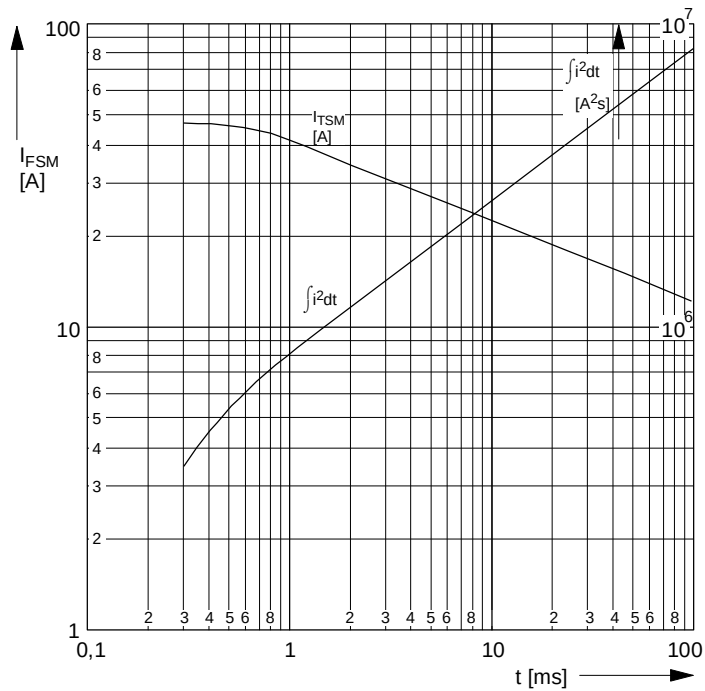
1) Richtwert für obere Streubereichsgrenze / Upper limit of scatter range (standart value)



D 921 S 45 T_01

Fig. 1
On-state characteristics

$t_{vj} = t_{vjmax}$

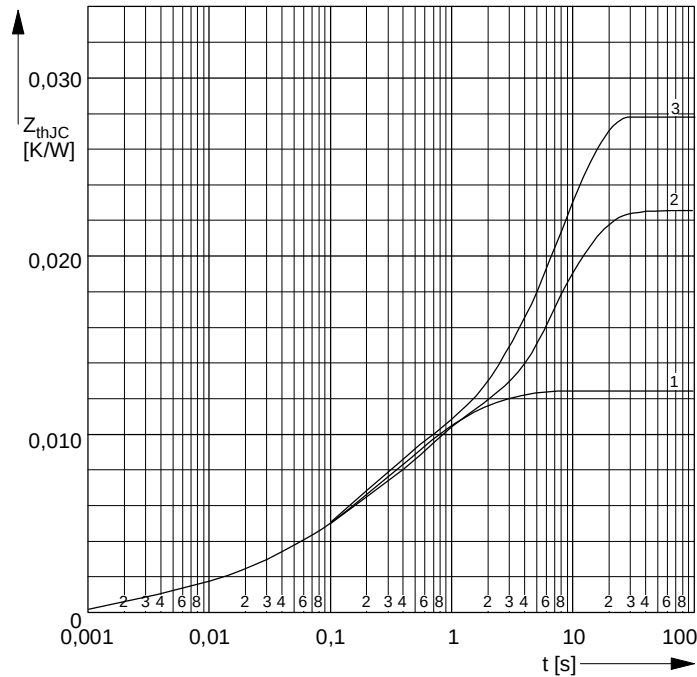


D 921 S 45 T_03

Fig. 2
Surge current $I_{TSM} = f(t_p)$

Sine halfwave $i^2 dt = f(t_p)$

$t_{vj} = t_{vjmax}$



D 921 S 45 T_02

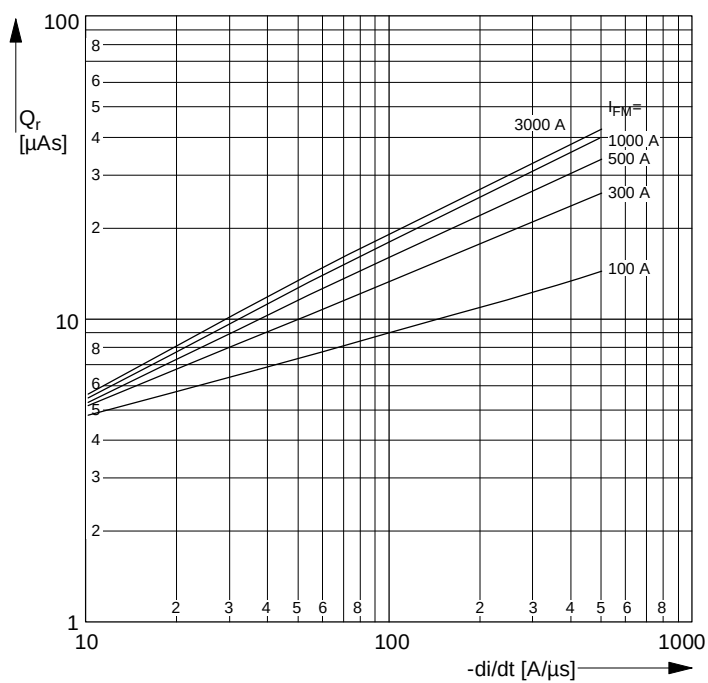
Fig. 3
Transient thermal impedance $Z_{thJC} = f(t)$, DC
1 - Two-sided cooling
2 - Anode-sided cooling
3 - Cathode-sided cooling

Analytical elements of transient thermal impedance Z_{thJC} for DC

	1. Z_{thJC}		2. Z_{thJC}		3. Z_{thJC}	
	r [K/W]	τ [s]	r [K/W]	τ [s]	r [K/W]	τ [s]
1	0,00430	1,70000	0,01460	8,00000	0,01950	7,30000
2	0,00610	0,16200	0,00610	0,16200	0,00610	0,16200
3	0,00060	0,04060	0,00060	0,04060	0,00060	0,04060
4	0,00100	0,00940	0,00100	0,00940	0,00100	0,00940
5	0,00050	0,00190	0,00050	0,00190	0,00050	0,00190
Σ	0,01250	-	0,02280	-	0,02770	-

Analytical function:

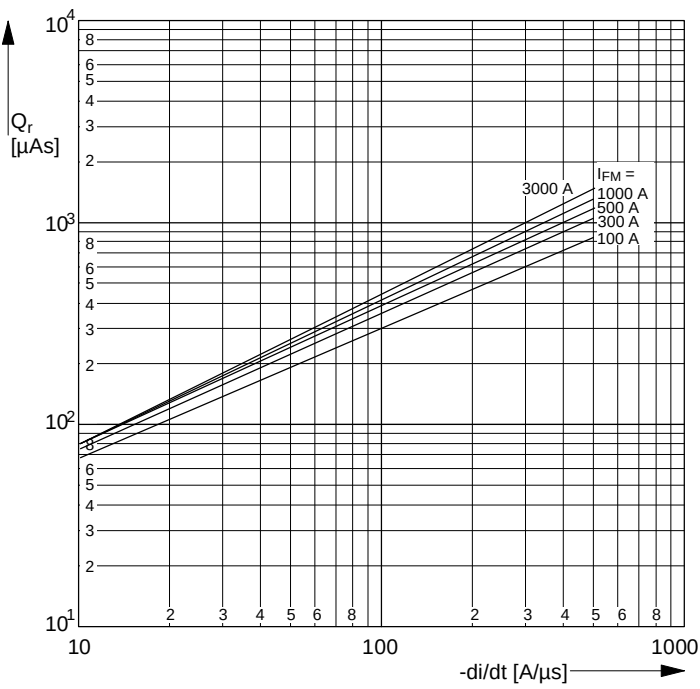
$$Z_{thJC} = \sum_{n=1}^{n_{max}} R_{thn} (1-EXP(-t/\tau_n))$$



D 921 S 45 T_04

Fig. 4
Reverse recovery charge (upper limit, ca. 98% values)
Parameter: I_{FM}

Conditions:
 $t_{vj} = 140^\circ\text{C}$; $C_S = 3 \mu\text{F}$
 $V_R \geq 1000 \text{ V}$; $D_S = \text{D 291 S 45 T}$



D 921 S 45 T_05

Fig. 5
Reverse recovery current (upper-limit, ca. 98% values)
Parameter: I_{FM}

Conditions:
 $t_{vj} = 140^\circ\text{C}$; $C_S = 3 \mu\text{F}$
 $V_R \geq 1000 \text{ V}$; $D_S = \text{D 291 S 45 T}$

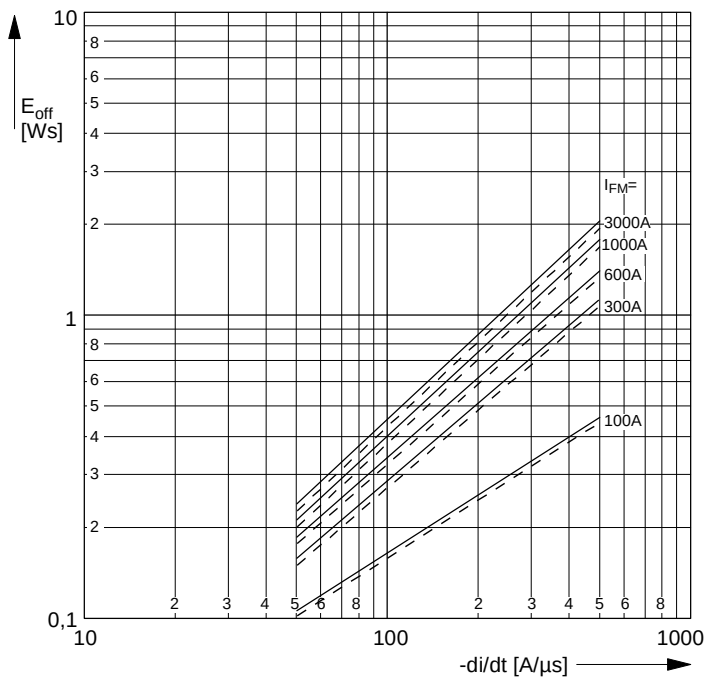
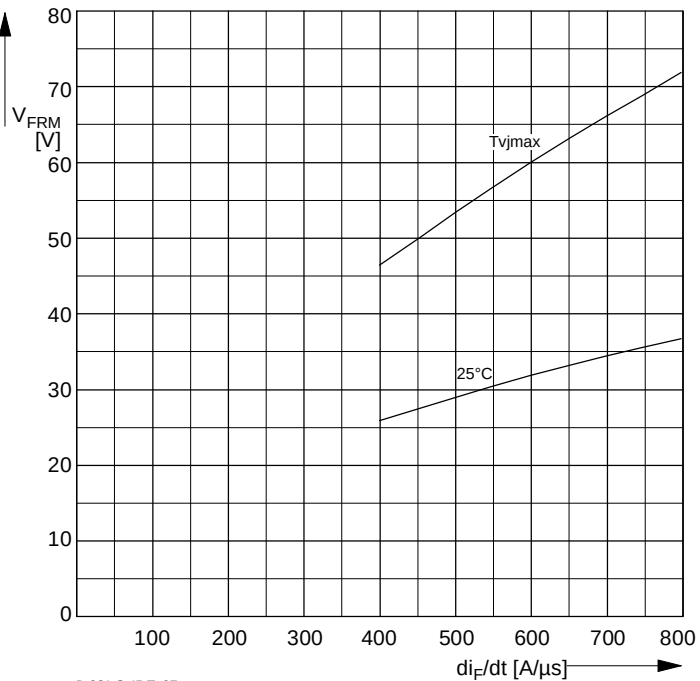


Fig. 6
Turn-off-losses $E_{off} = f(di/dt)$
diodes with V_{Fmax}

Parameter: I_{FM}
 $t_{vj} = 140^\circ\text{C}$; $C_S = 4 \mu\text{F}$
 $D_S = \text{D 291 S 45 T}$

— $V_{RM} = 3000 \text{ V}$
- - - $V_{RM} = 2000 \text{ V}$



D 921 S 45 T_07

Fig. 7
Peak Forward Recovery Voltage
(typical values)
Parameter: t_{vj}