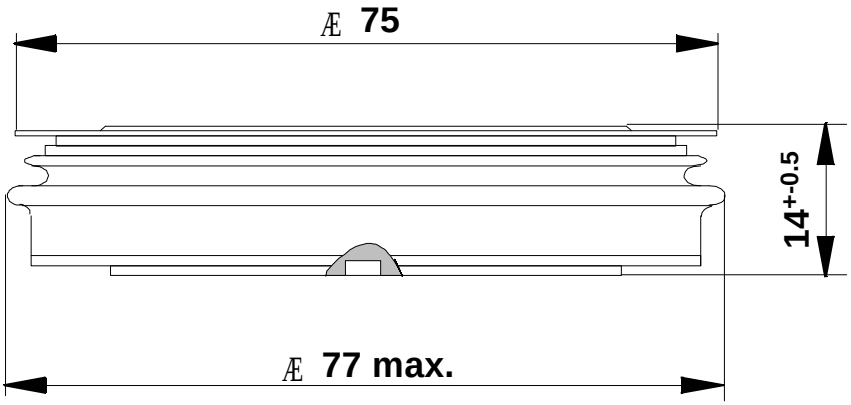
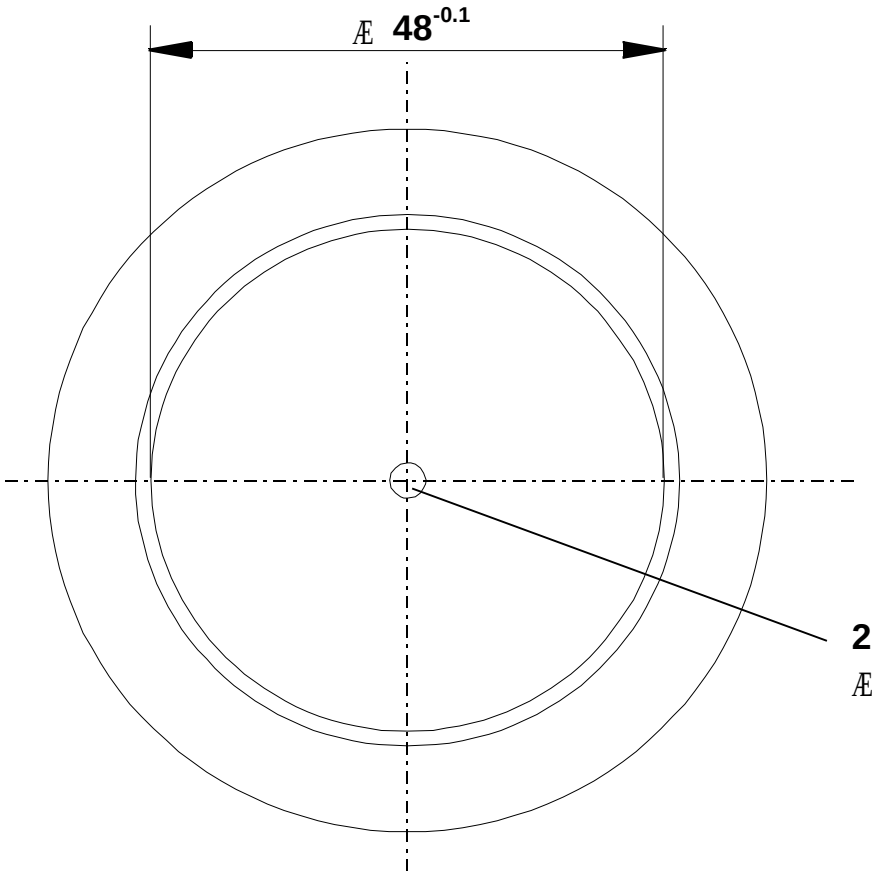
European Power-
Semiconductor and
Electronics Company

Marketing Information
D 841 S





VWK January

Elektrische Eigenschaften / Electrical properties

Höchstzulässige Werte / Maximum rated values

Periodische Spitzensperrspannung			3500 V, 4000 V
repetitive peak reverse voltage	t_{vj} = -40°C...125°C	V_{RRM}	4500 V
Stoßspitzensperrspannung			3600 V, 4100 V
non-repetitive peak reverse voltage	t_{vj} = +25°C...125°C	V_{RSM}	4600 V
Durchlaßstrom-Grenzeffektivwert / RMS forward current		I_{FRMSM}	1700 A
Dauergrenzstrom / mean forward current	t_C = 85°C	I_{FAVM}	840 A
	t_C = 67°C		1080 A
Stoßstrom-Grenzwert[1)]	t_{vj} = 25°C	I_{FSM}	16000 A
surge forward current[1)]	t_{vj} = 125°C		15000 A
Grenzlastintegral	t_{vj} = 25°C	I^2t	$1{,}3 \times 10^6$ A²s
I²t-value	t_{vj} = 125°C		$1{,}13 \times 10^6$ A²s
Kritische periodische Ausschaltstromsteilheit	t_{vj} = 125°C, I_{FM} = 2000 A, V_R = 3000 V	$(-di/dt)_{com}$	
critical repetitive rate of fall of on - state	C_S = 0,25 µF, R = 6Ω		500 A/µs

Charakteristische Werte / Characteristic values

Durchlaßspannung / forward voltage	t_{vj} = 125°C i_{FM} = 2500 A	V_F	3,5 V
Schleusenspannung / threshold voltage	t_{vj} = 125°C	$V_{(TO)}$	1,7 V
Ersatzwiderstand / forward slope resistance	t_{vj} = 125°C	r_T	0,69 mΩ
Sperrstrom / reverse current	t_{vj} = 125°C, v_R = 0,67 V_{RRM}	i_R	ca. 75 mA
	t_{vj} = 125°C, v_R = V_{RRM}		140 mA [1)]
Rückstromspitze / peak reverse recovery current	i_{FM} = 1000 A, -di/dt = 250 A/µs	I_{RM}	600 A
	t_{vj} = 125 °C; v_R = 1000 V;		
	C = 0,25 µF; R = 6Ω		
Sperrverzögerungsladung	i_{FM} = 1000 A, -di/dt = 250 A/µs	Q_{rr}	1700 µAs
recovered charge	t_{vj} = 125 °C; v_R = 1000 V;		
	C = 0,25 µF; R = 6Ω		

Thermische Eigenschaften / Thermal properties

Innerer Wärmewiderstand	Kühlfläche / cooling surface	R_{thJC}	
thermal resistance, junction to case	beidseitig / two-sided		0,014 K/W
	Anoden / anode		0,245 K/W
	Kathode / cathode		0,0325 K/W
Übergangs-Wärmewiderstand	Kühlfläche / cooling surface	R_{thCK}	
thermal resistance, case to heatsink	beidseitig / two-sided		0,005 K/W
	einseitig / single-sided		0,01 K/W
Höchstzul. Sperrschichttemperatur / max. junction temperat.		t_{vj}max	125 °C
Betriebstemperatur / operating temperature		t_c op	-40...+125 °C
Lagertemperatur / storage temperature		t_{stg}	-40...+150 °C

Mechanische Eigenschaften / Mechanical properties

Gehäuse, siehe Anlage / case, see appendix			Seite / page 1
Anpreßkraft /clamping force		F	15...36 kN
Gewicht / weight		G	ca. 350 g
Luftstrecke / air distance			ca. 10 mm
Kriechstrecke / creepage distance			16 mm
Feuchteklasse / humidity classification	DIN 40040		C
Schwingfestigkeit / vibration resistance	f = 50 Hz		50 m/s²

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

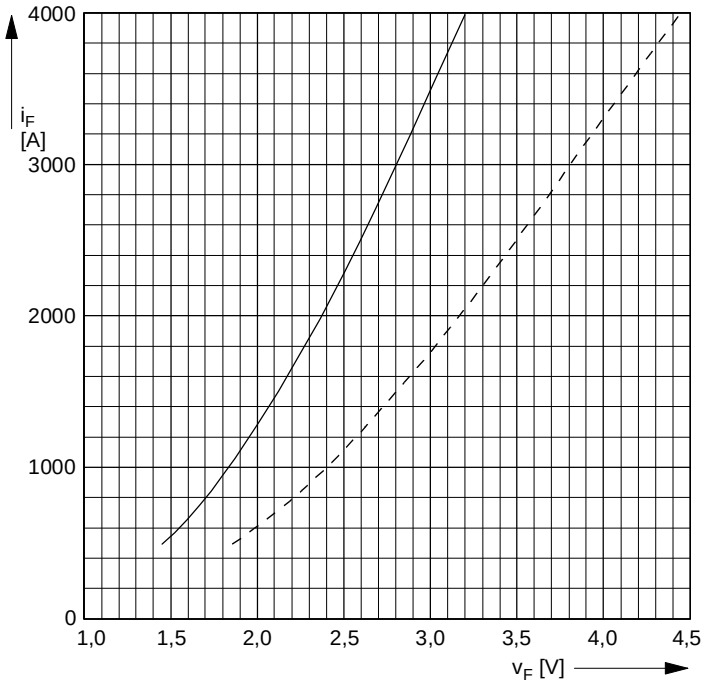


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Fig. 1
On-state characteristics $i_F = f(V_F)$
t_{vj} = 125°C

Upper limit of scatter range
Lower limit of scatter range

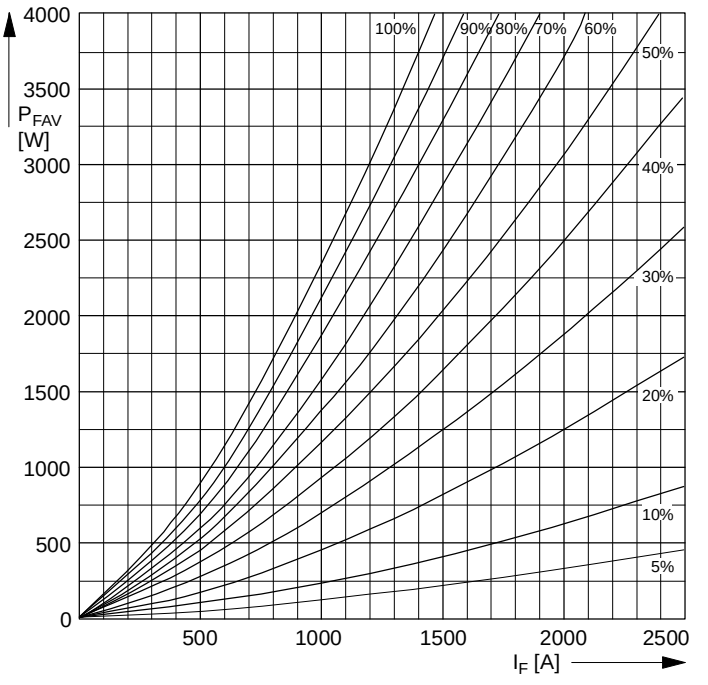

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Fig. 2
On-state losses (average values)
$I_F = f(P_{FAV})$

t_{vj} = 125 °C

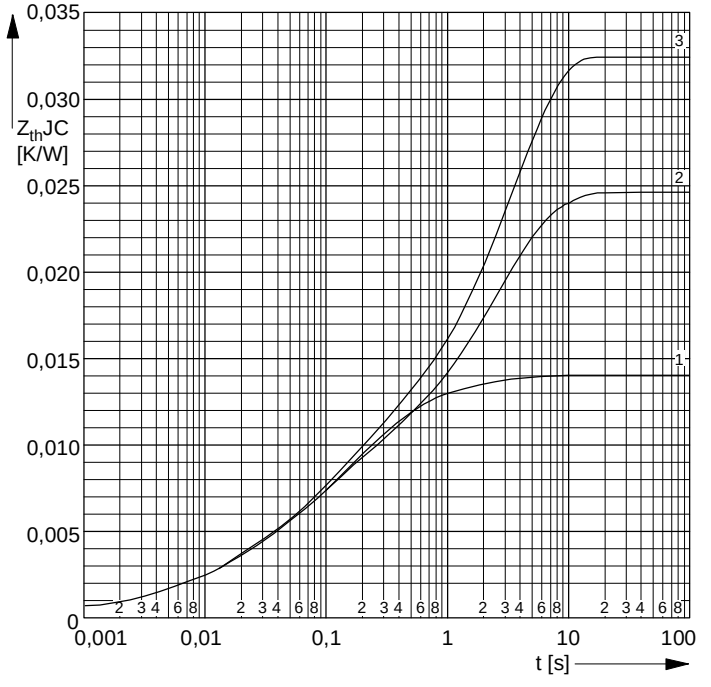

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Fig. 3
Transient thermal impedance $Z_{thJC} = f(t)$, DC
1 - Two-sided cooling
2 - Anode-sided cooling
3 - Cathode-sided cooling

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	0,00460	0,67400	0,01510	2,90000	0,02310	2,60000
2	0,00090	0,21800	0,00090	0,21800	0,00090	0,21800
3	0,00660	0,07900	0,00660	0,07900	0,00660	0,07900
4	0,00120	0,00820	0,00120	0,00820	0,00120	0,00820
5	0,00070	0,00180	0,00070	0,00018	0,00070	0,00180
S	0,01400	-	0,02450	-	0,03250	-

Analytische Funktion / Analytical function:

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

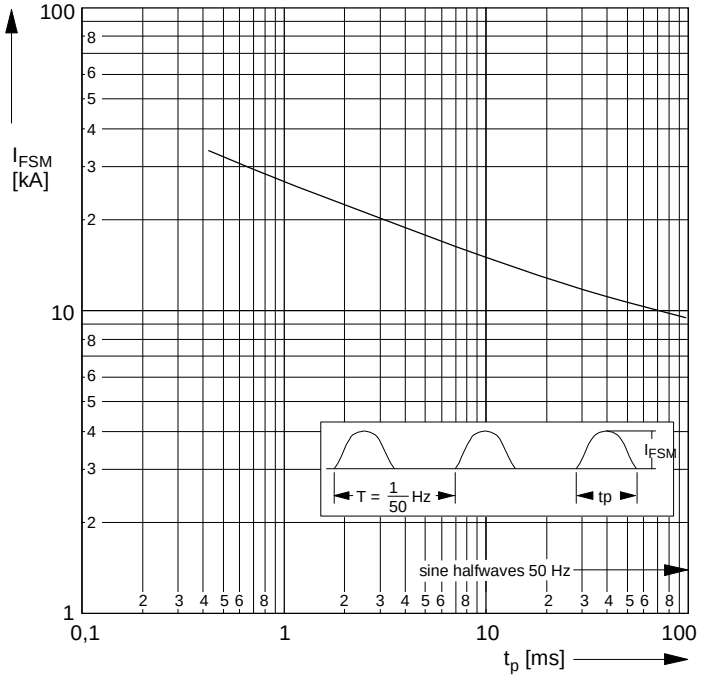

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Fig. 4
forward surge current: $I_{FSM} = f(t_p)$
$I_{FSM} = f(\text{sine halfwaves})$

$t_{vj} = 125°C$
$V_R = 0$

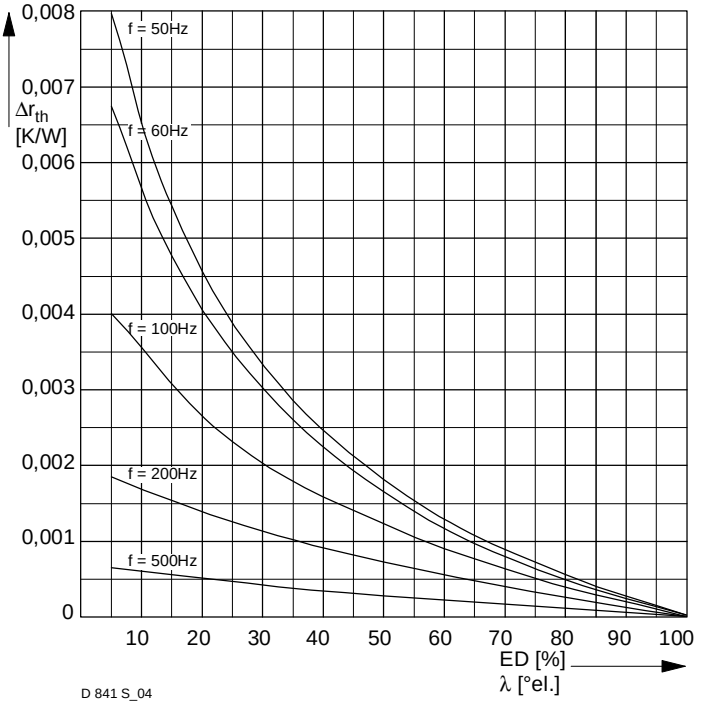

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Fig. 5
Δ rth = f(ED, frequency)

Two-sided-cooling
Current wave form: square wave
Parameter: frequency

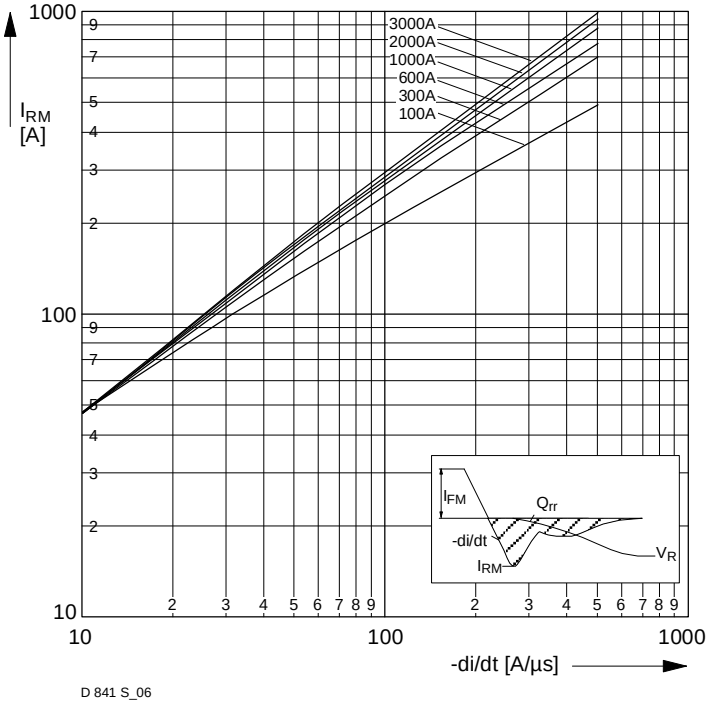

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Fig. 6
Reverse recovery current (upper-limit, ca. 98% values)
Application: GTO-freewheeling diode
Parameter: I_{FM}
$t_{vj} \leq 125°C$; $C_S \geq 4\mu F$
$R_S = 0\ \Omega$; $V_R > 2000$ V ... 3000 V

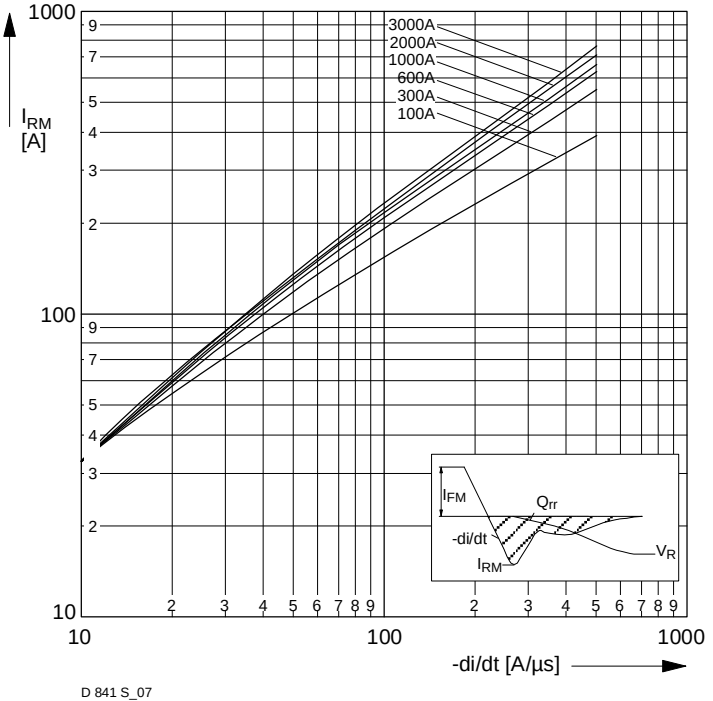

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Fig. 7
Reverse recovery current (lower-limit, ca. 2% values)
Application: GTO-freewheeling diode
Parameter: I_{FM}
$t_{vj} \leq 125°C$; $C_S \geq 4\mu F$, Diode D291S
$R_S = 0\ \Omega$; $V_R > 2000$ V ... 3000 V

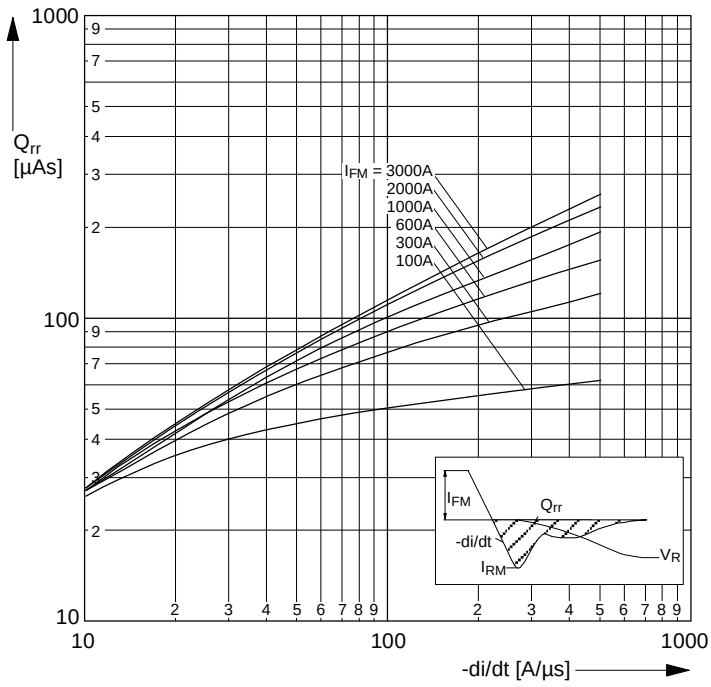

Fig. 8
Reverse recovery charge (upper limit, ca. 98% values)
Application: GTO-freewheeling diode
Parameter: I_{FM}
$t_{vj} \leq 125°C$; $C_S \geq 4\mu F$
$R_S = 0\ \Omega$; $V_R > 2000\ V$ ... $3000\ V$

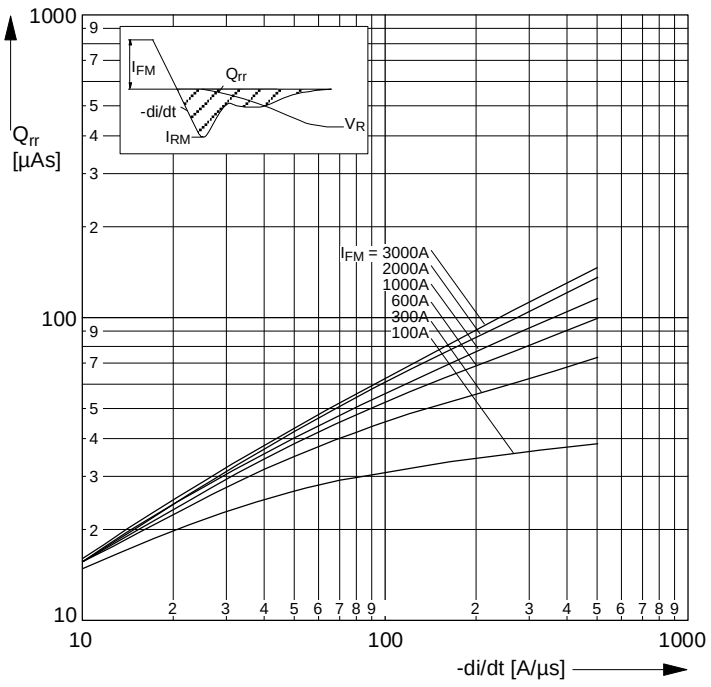

Fig. 9
Reverse recovery charge (lower limit, ca. 2% values)
Application: GTO-freewheeling diode
Parameter: I_{FM}
$t_{vj} \leq 125°C$; $C_S \geq 4\mu F$
$R_S = 0\ \Omega$; $V_R > 2000\ V$ ... $3000\ V$

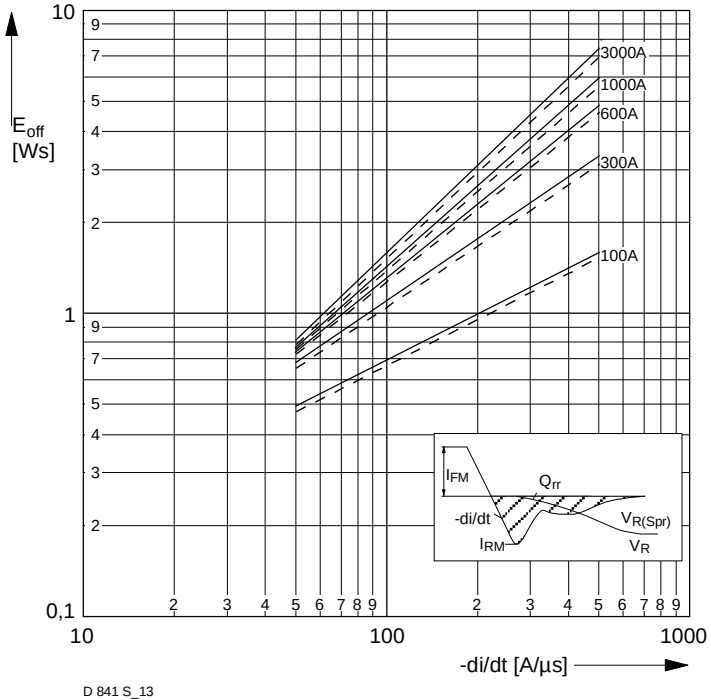

Fig. 10
Turn-off-losses $E_{off} = f(di/dt)$
diodes with $V_F$max
Application: GTO-freewheeling diode
Parameter:I_{FM}; Snubberdiode D 291 S
t_{vj} = 125°C; C_S = 5 µF für $v_R \leq V_{RM}$
C_S = 30 µF für $v_R \geq V_{RM}$
L_S = 0,2 µH
——— $V_{R(Spr)}$ = 3000 V
- - - $V_{R(Spr)}$ = 2000 V

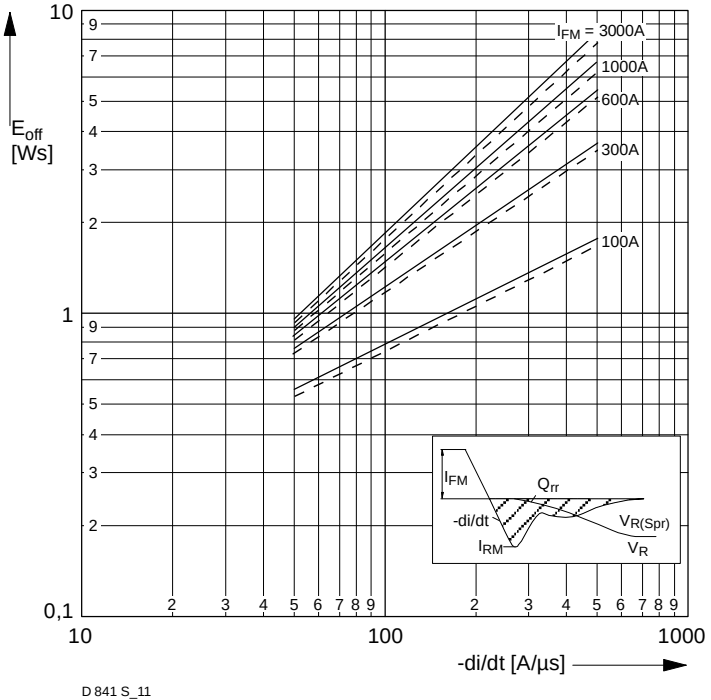

Fig. 11
Turn-off-losses $E_{off} = f(di/dt)$
diodes with $V_F$max
Application: GTO-freewheeling diode
Parameter:I_{FM}; Snubberdiode D 291 S
t_{vj} = 125°C; C_S = 4 µF für $v_R \leq V_{RM}$
C_S = 24 µF für $v_R \geq V_{RM}$
L_S = 0,2 µH
——— $V_{R(Spr)}$ = 3000 V
- - - $V_{R(Spr)}$ = 2000 V

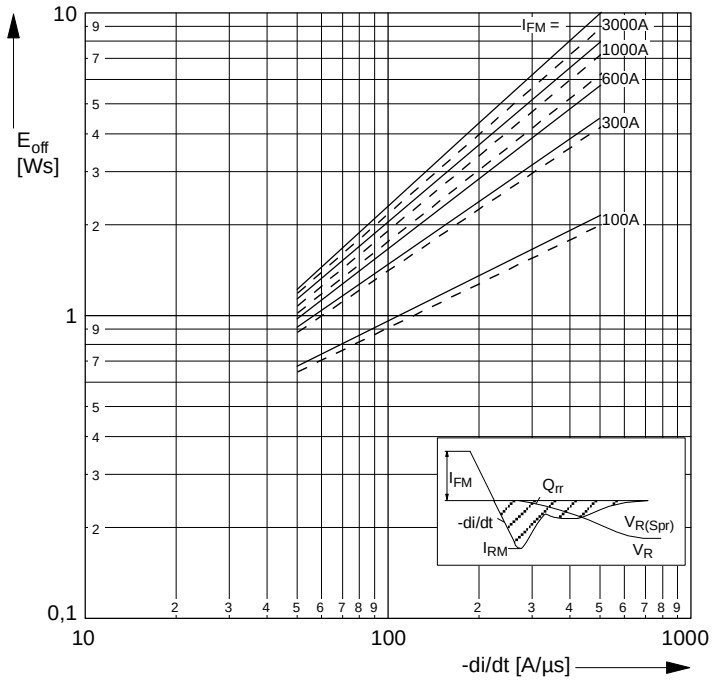

Fig. 12
Turn-off-losses E_{off} = f(di/dt)
diodes with $V_F$max
Application: GTO-freewheeling diode
Parameter:I_{FM}; Snubberdiode D 291 S
t_{vj} = 125°C; C_S = 4 µF für $v_R \le V_{RM}$
C_S = 24 µF für $v_R \ge V_{RM}$
L_S = 0,2 µH

——— $V_{R(Spr)}$ = 3000 V
- - - - $V_{R(Spr)}$ = 2000 V

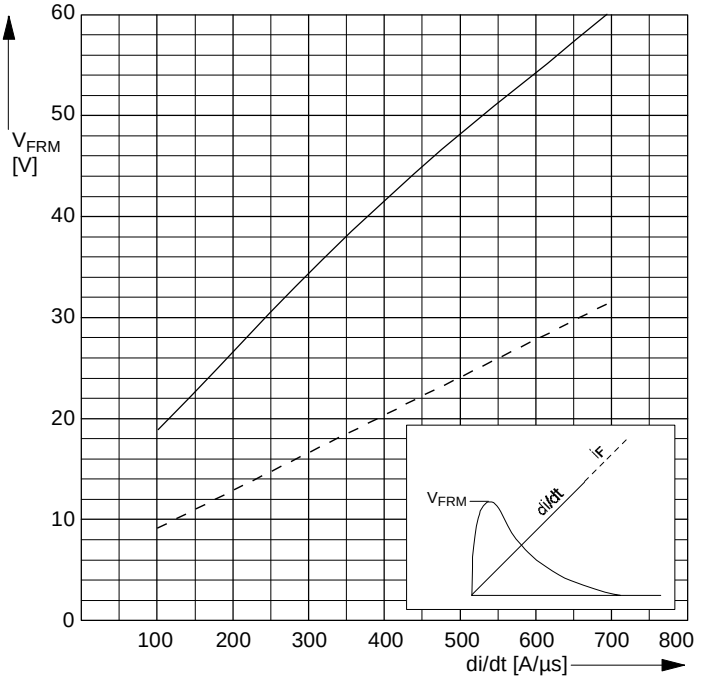

Fig. 13
Peak forward recovery voltage (typical values)
Parameter: t_{vj}

——— t_{vj} = 125°C
- - - - t_{vj} = 25°C