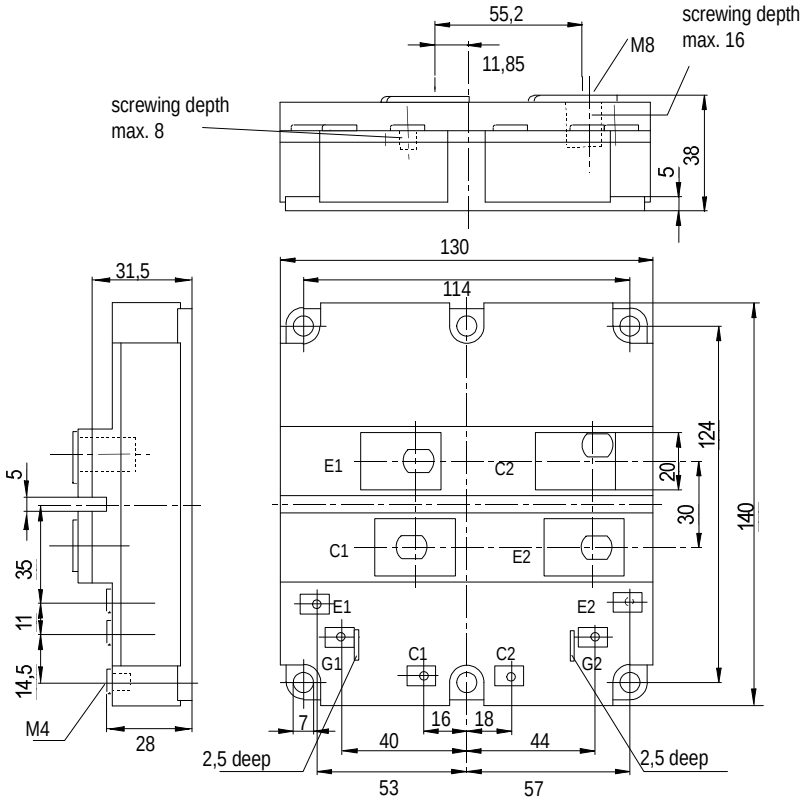
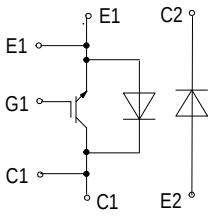
European Power-
Semiconductor and
Electronics Company

Marketing Information
FD 600 / 1200 R 17 KF6





06.07.1998

FD 600 / 1200 R 17 KF6

vorläufige Daten
preliminary data

Elektrische Eigenschaften / Electrical properties

Kollektor-Emitter-Sperrspannung	collector-emitter voltage		V_{CES}		1700	V
Kollektor-Dauergleichstrom	DC-collector current	T_C = 80°C	$I_{C,nom.}$		600	A
		T_C = 25°C	I_C		1200	A
Periodischer Kollektor Spitzenstrom	repetitive peak collector current	t_p = 1 ms, T_C = 80°C	I_{CRM}		1200	A
Gesamt-Verlustleistung	total power dissipation	T_C = 25°C, Transistor	P_{tot}		4,8	W
Gate-Emitter-Spitzenspannung	gate-emitter peak voltage		V_{GES}		± 20	V
Dauergleichstrom	DC forward current	Zweig 1 / arm 1	I_F		600	A
		Zweig 2 / arm 2			1200	A
Periodischer Spitzenstrom	repetitive peak forw. current	t_p = 1 ms; Zweig 1 / arm 1	I_{FRM}		1200	A
		t_p = 1 ms; Zweig 2 / arm 2			2400	
Grenzlastintegral der Diode	I^2t - value, Diode	V_R = 0V, t_p = 10ms; Zweig 1 / arm 1	I^2t		110	kA^2s
		Tvj = 125 °C; Zweig 2 / arm 2			440	kA^2s
Isolations-Prüfspannung	insulation test voltage	RMS, f = 50 Hz, t = 1 min.	V_{ISOL}		4	kV

Charakteristische Werte / Characteristic values: Transistor

				min.	typ.	max.	
Kollektor-Emitter Sättigungsspannung	collector-emitter saturation voltage	I_C = 600A, V_{GE} = 15V, T_{vj} = 25°C	$v_{CE\ sat}$	-	2,7	3,3	V
		I_C = 600A, V_{GE} = 15V, T_{vj} = 125°C		-	3,2	-	V
Gate-Schwellenspannung	gate threshold voltage	I_C = 40mA, V_{CE} = V_{GE}, T_{vj} = 25°C	$v_{GE(th)}$	4,5	5,5	6,5	V
Eingangskapazität	input capacitance	f = 1MHz,T_{vj} = 25°C,V_{CE} = 25V, V_{GE} = 0V	C_{ies}	-	40	-	nF
Kollektor-Emitter Reststrom	collector-emitter cut-off current	V_{CE} = 1700V, V_{GE} = 0V, T_{vj} = 25°C	I_{CES}	-	0,2	1,2	mA
		V_{CE} = 1700V, V_{GE} = 0V, T_{vj} = 125°C		-	20	-	mA
Gate-Emitter Reststrom	gate-emitter leakage current	V_{CE} = 0V, V_{GE} = 20V, T_{vj} = 25°C	I_{GES}	-	-	400	nA
Einschaltverzögerungszeit (induktive Last)	turn-on delay time (inductive load)	I_C = 600A, V_{CE} = 900V	$t_{d,on}$				
		V_{GE} = ±15V, R_G = 2,4Ω, T_{vj} = 25°C		-	0,36	-	µs
		V_{GE} = ±15V, R_G = 2,4Ω, T_{vj} = 125°C		-	0,37	-	µs
Anstiegszeit (induktive Last)	rise time (inductive load)	I_C = 600A, V_{CE} = 900V	t_r				
		V_{GE} = ±15V, R_G = 2,4Ω, T_{vj} = 25°C		-	0,15	-	µs
		V_{GE} = ±15V, R_G = 2,4Ω, T_{vj} = 125°C		-	0,15	-	µs
Abschaltverzögerungszeit (ind. Last)	turn off delay time (inductive load)	I_C = 600A, V_{CE} = 900V	$t_{d,off}$				
		V_{GE} = ±15V, R_G = 2,4Ω, T_{vj} = 25°C		-	0,95	-	µs
		V_{GE} = ±15V, R_G = 2,4Ω, T_{vj} = 125°C		-	1,05	-	µs
Fallzeit (induktive Last)	fall time (inductive load)	I_C = 600A, V_{CE} = 900V	t_f				
		V_{GE} = ±15V, R_G = 2,4Ω, T_{vj} = 25°C		-	0,13	-	µs
		V_{GE} = ±15V, R_G = 2,4Ω, T_{vj} = 125°C		-	0,14	-	µs
Einschaltverlustenergie pro Puls	turn-on energy loss per pulse	I_C = 600A, V_{CE} = 900V, V_{GE} = 15V	E_{on}				
		R_G = 2,4Ω, T_{vj} = 125°C, L_S = 60nH		-	270	-	mWs
Abschaltverlustenergie pro Puls	turn-off energy loss per pulse	I_C = 600A, V_{CE} = 900V, V_{GE} = 15V	E_{off}				
		R_G = 2,4Ω, T_{vj} = 125°C, L_S = 60nH		-	220	-	mWs
Kurzschlußverhalten	SC Data	t_P ≤ 10µsec, V_{GE} ≤ 15V, R_G = 2,4Ω	I_{SC}				
		T_{Vj}≤125°C, V_{CC}=1000V		-	2400	-	A
		V_{CEmax}=V_{CES} -L_{sCE} x dI/dt					
Modulinduktivität	stray inductance module		L_{sCE}	-	20	-	nH

Charakteristische Werte / Characteristic values: Diode: Zweig 1 / arm 1

Durchlaßspannung	forward voltage	I_F = 600A, V_{GE} = 0V, T_{vj} = 25°C	V_F	-	2,2	2,6	V
		I_F = 600A, V_{GE} = 0V, T_{vj} = 125°C		-	2,05	-	V
		I_F = 600A, - di_F/dt = 3500A/µsec					
Rückstromspitze	peak reverse recovery current	T_{vj} = 25°C	I_{RM}	-	350	-	A
		T_{vj} = 125°C		-	500	-	A
Sperrverzögerungsladung	recovered charge	T_{vj} = 25°C	Q_r	-	80	-	µAs
		T_{vj} = 125°C		-	170	-	µAs
Abschaltenergie pro Puls	reverse recovery energy	T_{vj} = 25°C	E_{rec}	-	40	-	mWs
		T_{vj} = 125°C		-	85	-	mWs

Charakteristische Werte / Characteristic values: Diode: Zweig 2 / arm 2

Durchlaßspannung	forward voltage	I_F = 1200A, V_{GE} = 0V, T_{vj} = 25°C	V_F	-	2,2	2,6	V
		I_F = 1200A, V_{GE} = 0V, T_{vj} = 125°C		-	2,05	-	V
		I_F = 1200A, - di_F/dt = 7000A/µsec					
Rückstromspitze	peak reverse recovery current	T_{vj} = 25°C	I_{RM}	-	700	-	A
		T_{vj} = 125°C		-	1000	-	A
Sperrverzögerungsladung	recovered charge	T_{vj} = 25°C	Q_r	-	160	-	µAs
		T_{vj} = 125°C		-	340	-	µAs
Abschaltenergie pro Puls	reverse recovery energy	T_{vj} = 25°C	E_{rec}	-	80	-	mWs
		T_{vj} = 125°C		-	170	-	mWs

Thermische Eigenschaften / Thermal properties

Innerer Wärmewiderstand	thermal resistance, junction to case	Transistor / transistor, DC	R_{thJC}	-	-	0,026	K/W
		Diode / diode, DC; Zweig 1 / arm 1		-	-	0,05	K/W
		Zweig 2 / arm 2				0,025	K/W
Übergangs-Wärmewiderstand	thermal resistance, case to heatsink	pro Zweig / per arm	R_{thCK}				
		d_{Paste} ≤ 100µm / d_{grease} ≤ 100µm		-	-	0,016	K/W
Höchstzul. Sperrschichttemperatur	max. junction temperature		T_{vj}	-	-	150	°C
Betriebstemperatur	operating temperature		T_{op}	-40	-	125	°C
Lagertemperatur	storage temperature		T_{stg}	-40	-	125	°C

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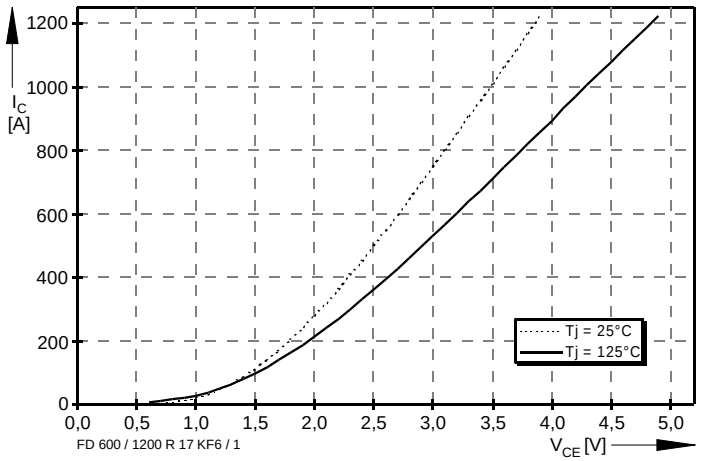

Bild / Fig. 1
Ausgangskennlinie (typisch) /
Output characteristic (typical)
$I_C = f(V_{CE})$
$V_{GE} = 15V$

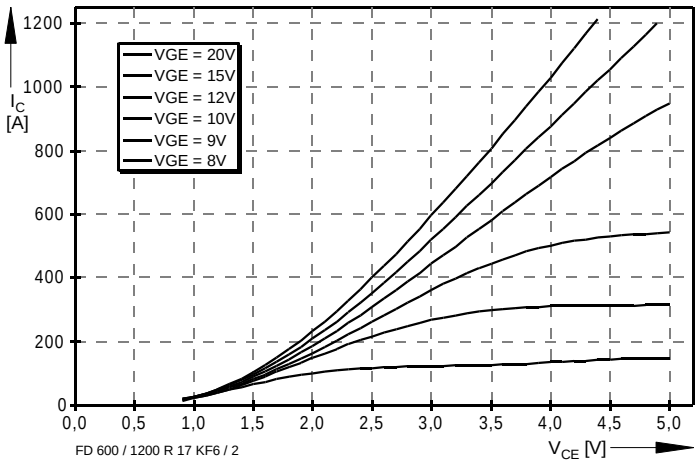

Bild / Fig. 2
Ausgangskennlinienfeld (typisch) /
Output characteristic (typical)
$I_C = f(V_{CE})$
$T_{vj} = 125°C$

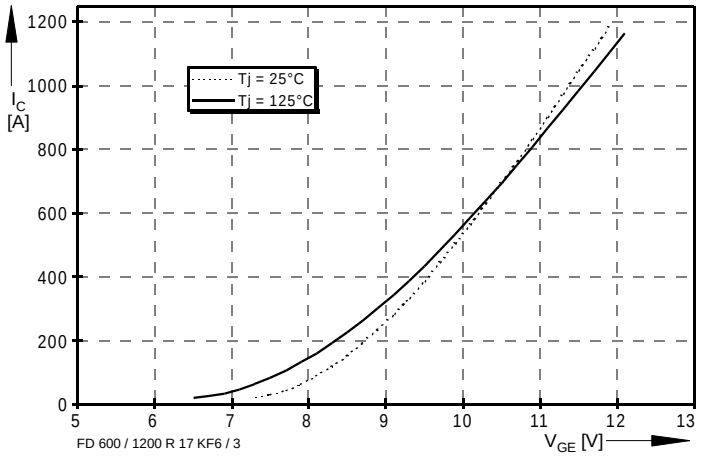

Bild / Fig. 3
Übertragungscharakteristic (typisch) /
Transfer characteristic (typical)
$I_C = f(V_{GE})$
$V_{CE} = 20V$

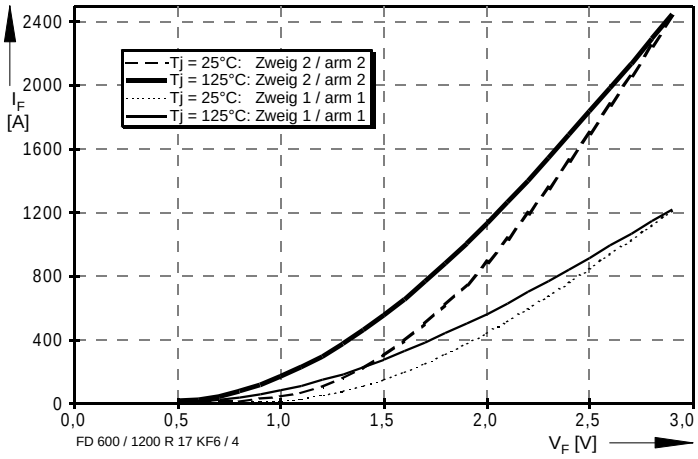

Bild / Fig. 4
Durchlaßkennlinie der Inversdiode (typisch) /
Forward characteristic of inverse diode (typical)
$I_F = f(V_F)$

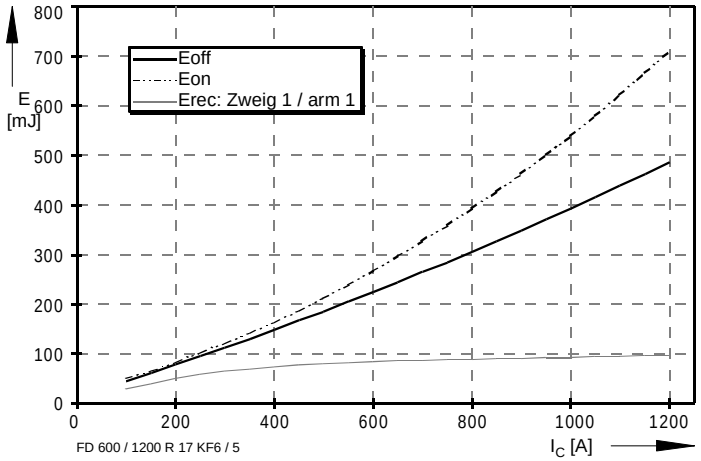

Bild / Fig. 5
Schaltverluste (typisch) /
Switching losses (typical)
$E_{on} = f(I_C)$, $E_{off} = f(I_C)$, $E_{rec} = f(I_C)$
$R_{gon} = R_{goff} = 2,4\Omega$, $V_{CE} = 900V$, $T_j = 125°C$

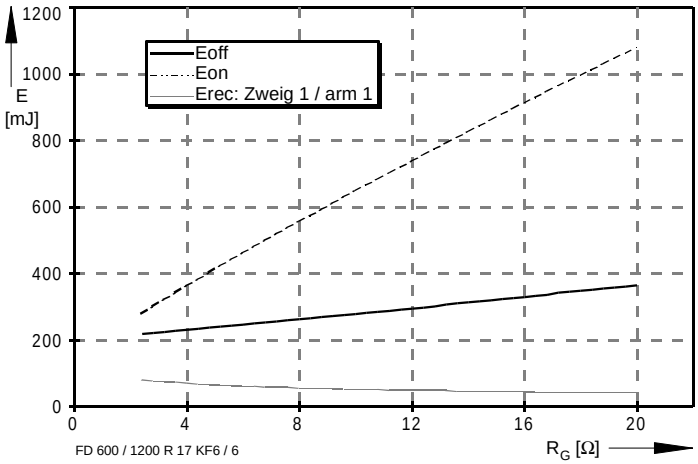

Bild / Fig. 6
Schaltverluste (typisch) /
Switching losses (typical)
$E_{on} = f(R_G)$, $E_{off} = f(R_G)$, $E_{rec} = f(R_G)$
$I_C = 600A$, $V_{CE} = 900V$, $T_j = 125°C$

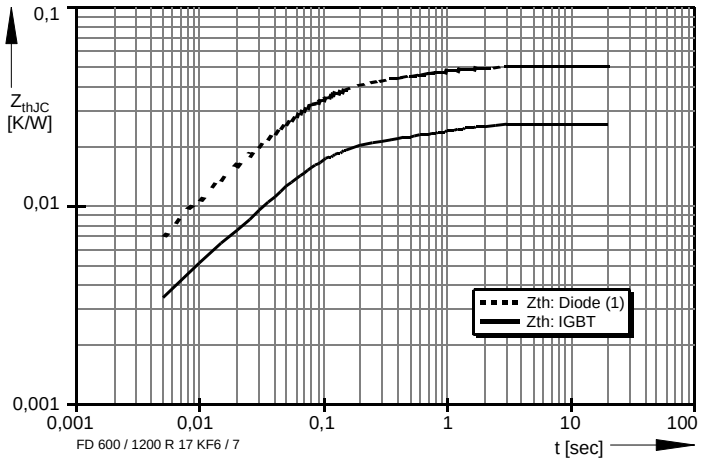

Bild / Fig. 7
Tranienter Wärmewiderstand /
Transient thermal impedance
$Z_{thJC} = f(t)$

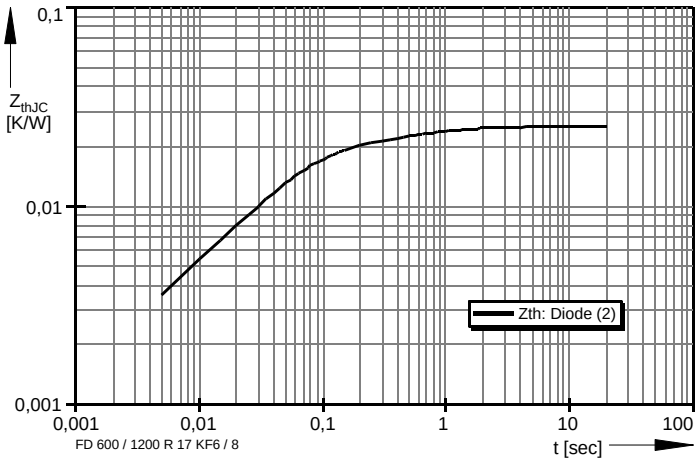

Bild / Fig. 8
Tranienter Wärmewiderstand /
Transient thermal impedance
$Z_{thJC} = f(t)$

i	1	2	3	4
r_i [K/kW] : IGBT	2,5	12,3	5,2	6
τ_i [sec] : IGBT	0,003	0,05	0,1	0,95
r_i [K/kW] : Diode (1)	4,92	26,8	9,14	9,14
τ_i [sec] : Diode (1)	0,003	0,045	0,45	0,75
r_i [K/kW] : Diode (2)	2,46	13,4	4,57	4,57
τ_i [sec] : Diode (2)	0,003	0,045	0,45	0,75

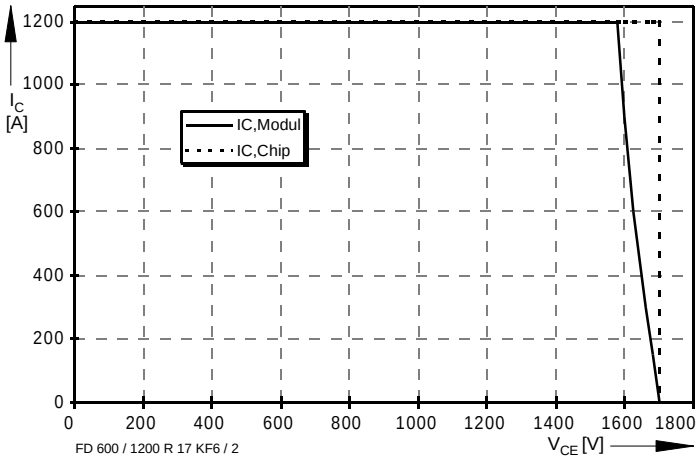

Bild / Fig. 9
Sicherer Arbeitsbereich (RBSOA) /
Reverse bias safe operation area (RBSOA)
$R_g = 2{,}4\Omega$, $T_{vj} = 125°C$

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Mechanische Eigenschaften / Mechanical properties

				vorläufige Daten preliminary data	
Innere Isolation	internal insulation			AlN	
Kriechstrecke	creepage distance			15	mm
Luftstrecke	clearance			10	mm
CTI	comperative tracking index			275	
Anzugsdrehmoment f. mech. Befestigung	mounting torque		M1	5	Nm
Anzugsdrehmoment f. elektr. Anschlüsse	terminal connection torque	terminals M4	M2	2	Nm
		terminals M6		8-10	Nm
Gewicht	weight		G	1500	g