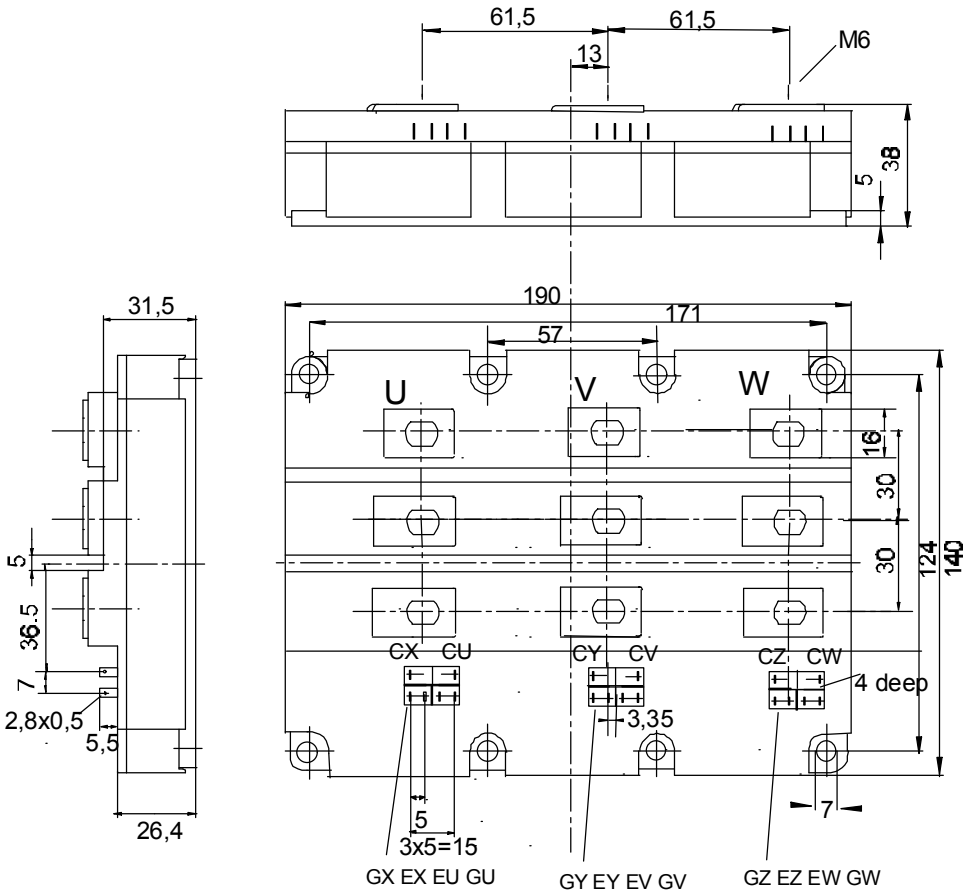
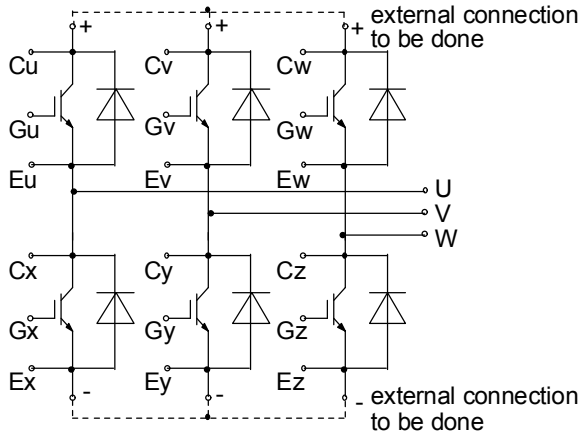
European Power-
Semiconductor and
Electronics Company

Marketing Information
FS 400 R 12 KF4





18.03.1998

FS 400 R 12 KF4

Höchstzulässige Werte / Maximum rated values
Elektrische Eigenschaften / Electrical properties

Kollektor-Emitter-Sperrspannung	collector-emitter voltage		V_{CES}		1200	V
Kollektor-Dauergleichstrom	DC-collector current		I_C		400	A
Periodischer Kollektor Spitzenstrom	repetitive peak collctor current	t_p = 1 ms	I_{CRM}		800	A
Gesamt-Verlustleistung	total power dissipation	T_C = 25°C, Transistor / Transistor	P_{tot}		2500	W
Gate-Emitter-Spitzenspannung	gate-emitter peak voltage		V_{GE}		± 20	V
Dauergleichstrom	DC forward current		I_F		400	A
Periodischer Spitzenstrom	repetitive peak forw. current	t_p = 1ms	I_{FRM}		800	A
Isolations-Prüfspannung	insulation test voltage	RMS, f = 50 Hz, t = 1 min	V_{ISOL}		2,5	kV

Charakteristische Werte / Characteristic values: Transistor

				min.	typ.	max.	
Kollektor-Emitter Sättigungsspannung	collector-emitter saturation voltage	i_C = 400 A, v_{GE} = 15 V, T_{vj} = 25°C	$v_{CE\ sat}$	-	2,7	3,2	V
		i_C = 400 A, v_{GE} = 15 V, T_{vj} = 125°C		-	3,4	4	V
Gate-Emitter Schwellenspannung	gate-emitter threshold voltage	i_C = 16 mA, v_{CE} = v_{GE}, T_{vj} = 25°C	$v_{GE(TO)}$	4,5	5,5	6,5	V
Eingangskapazität	input capacity	f_O = 1 MHz, T_{vj} = 25°C, v_{CE} = 25 V, v_{GE} =	C_{ies}	-	27	-	nF
Kollektor-Emitter Reststrom	collector-emitter cut-off current	v_{CE} = 1200 V, v_{GE} = 0V, T_{vj} = 25°C	i_{CES}	-	8	-	mA
		v_{CE} = 1200 V, v_{GE} = 0V, T_{vj} = 125°C		-	40	-	mA
Gate-Emitter Reststrom	gate leakage current	v_{CE} = 0 V, v_{GE} = 20 V, T_{vj} = 25°C	i_{GES}	-	-	400	nA
Emitter-Gate Reststrom	gate leakage current	v_{CE} = 0 V, v_{EG} = 20 V, T_{vj} = 25°C	i_{EGS}	-	-	400	nA
Einschaltzeit (induktive Last)	turn-on time (inductive load)	i_C = 400 A, v_{CE} = 600 V	t_{on}				
		v_L = ±15 V, R_G = 2,4 Ω, T_{vj} = 25°C		-	0,7	-	µs
		v_L = ±15 V, R_G = 2,4 Ω, T_{vj} = 125°C		-	0,8	-	µs
Speicherzeit (induktive Last)	storage time (inductive load)	i_C = 400 A, v_{CE} = 600 V	t_s				
		v_L = ±15 V, R_G = 2,4 Ω, T_{vj} = 25°C		-	0,9	-	µs
		v_L = ±15 V, R_G = 2,4 Ω, T_{vj} = 125°C		-	1	-	µs
Fallzeit (induktive Last)	fall time (inductive load)	i_C = 400 A, v_{CE} = 600 V	t_f				
		v_L = ±15 V, R_G = 2,4 Ω, T_{vj} = 25°C		-	0,1	-	µs
		v_L = ±15 V, R_G = 2,4 Ω, T_{vj} = 125°C		-	0,15	-	µs
Einschaltverlustenergie pro Puls	turn-on energy loss per pulse	i_C = 400 A, v_{CE} = 600 V, L_S = 70 nH	E_{on}				
		V_L = ±15 V, R_G = 2,4 Ω, T_{vj} = 125°C		-	100	-	mWs
Abschaltverlustenergie pro Puls	turn-off energy loss per pulse	i_C = 400 A, v_{CE} = 600 V, L_S = 70 nH	E_{off}				
		V_L = ±15 V, R_G = 2,4 Ω, T_{vj} = 125°C		-	55	-	mWs

Charakteristische Werte / Characteristic values — Inversdiode / Inverse diode

Durchlaßspannung	forward voltage	i_F = 400 A, v_{GE} = 0V, T_{vj} = 25°C	v_F	-	2,2	2,7	V
		i_F = 400 A, v_{GE} = 0V, T_{vj} = 125°C		-	2,0	2,5	V
Rückstromspitze	peak reverse recovery current	i_F = 400 A, -di_F/dt = 2 kA/µs	I_{RM}				
		v_{RM} = 600 V, v_{EG} = 10 V, T_{vj} = 25°C		-	125	-	A
		v_{RM} = 600 V, v_{EG} = 10 V, T_{vj} = 125°C		-	200	-	A
Sperrverzögerungsladung	recovered charge	i_F = 400 A, -di_F/dt = 2 kA/µs	Q_r				
		v_{RM} = 600 V, v_{EG} = 10 V, T_{vj} = 25°C		-	13	-	µAs
		v_{RM} = 600 V, v_{EG} = 10 V, T_{vj} = 125°C		-	45	-	µAs

Thermische Eigenschaften / Thermal properties

Innerer Wärmewiderstand	thermal resistance, junction to case	Transistor, DC, pro Modul / per module	R_{thJC}		0,008	°C/W
		Transistor, DC, pro Zweig / per arm			0,05	°C/W
		Diode, DC, pro Modul / per module			0,014	°C/W
		Diode, DC, pro Zweig / per arm			0,084	°C/W
Übergangs-Wärmewiderstand	thermal resistance, case to heatsink	pro Modul / per module	R_{thCK}		typ. 0,006	°C/W
		pro Zweig / per arm			typ. 0,036	°C/W
Höchstzul. Sperrschichttemperatur	max. junction temperature		$T_{vj\ max}$		150	°C
Betriebstemperatur	operating temperature		$T_{c\ op}$		-40...+125	°C
Lagertemperatur	storage temperature		T_{stg}		-40...+125	°C

Mechanische Eigenschaften / Mechanical properties

Innere Isolation	internal insulation				Al_2O_3	
Anzugsdrehmoment f. mech. Befestigung	mounting torque	terminals M6 / tolerance ±15%	M1		5	Nm
Anzugsdrehmoment f. elektr. Anschlüsse	terminal connection torque	terminals M6	M2		5...6	Nm
Gewicht	weight		G		ca. 2300	g

Bedingung für den Kurzschlußschutz / Conditions for short-circuit protection

t_{fq} = 10 µs	V_{CC} = 750 V
v_i = ±15 V	v_{CEM} = 900 V
R_{GE} = R_{GB} = 2,4 Ω	i_{CMK1} ≈ 2500 A
Tvj = 125°C	i_{CMK2} ≈ 2200 A

Unabhängig davon gilt bei abweichenden Bedingungen / with regard to other conditions $v_{CEM} = V_{CES}$ - 15nH x |di_c/dt|

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.

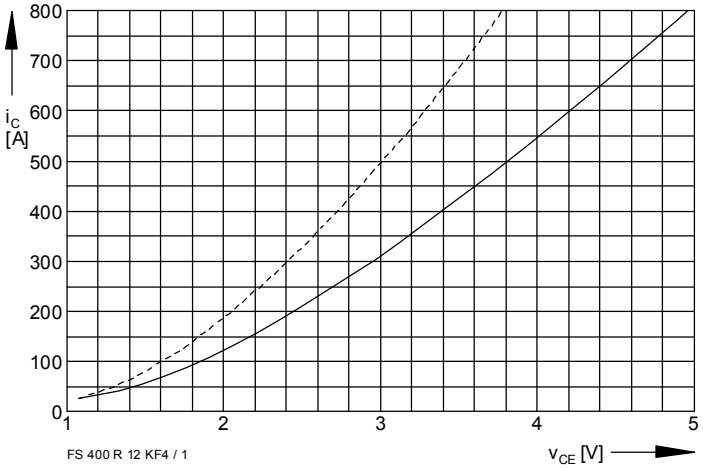


Bild / Fig. 1
Kollektor-Emitter-Spannung im Sättigungsbereich (typisch) /
Collector-emitter-voltage in saturation region (typical)
V_{GE} = 15 V
------ T_{vj} = 25°C
——— T_{vj} = 125°C

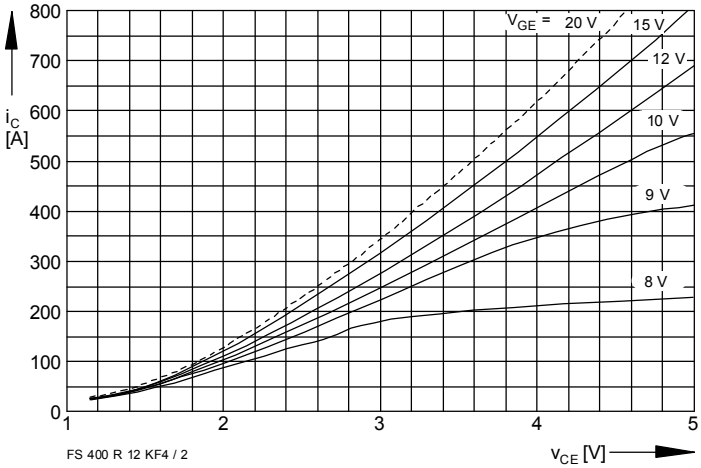


Bild / Fig. 2
Kollektor-Emitter-Spannung im Sättigungsbereich (typisch) /
Collector-emitter-voltage in saturation region (typical)
T_{vj} = 125°C

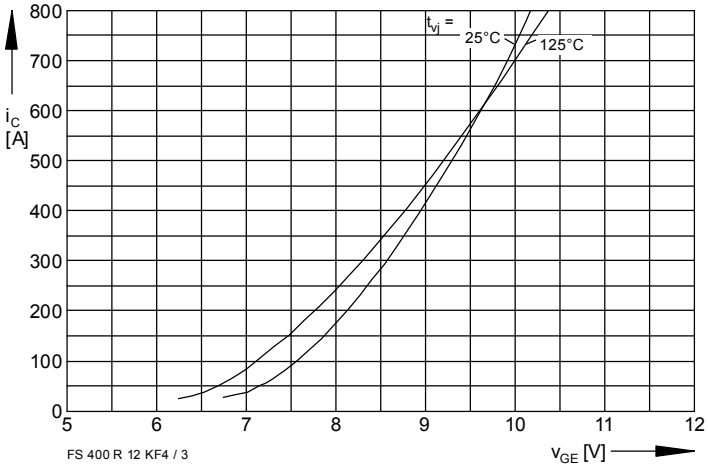


Bild / Fig. 3
Übertragungscharakteristik (typisch) /
Transfer characteristic (typical)
V_{CE} = 20 V

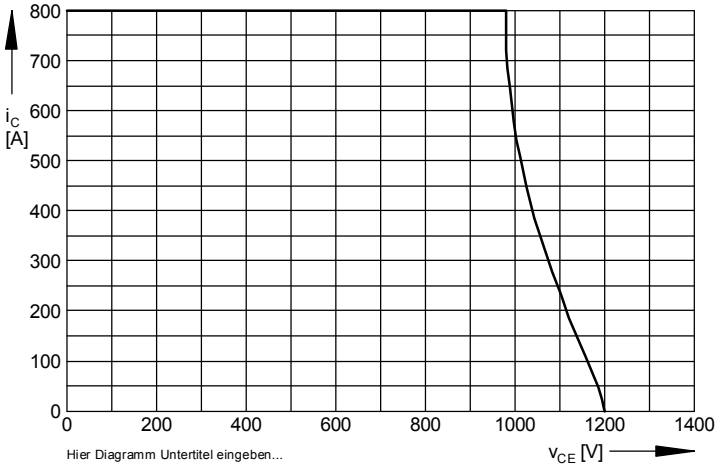


Bild / Fig. 4
Rückwärts-Arbeitsbereich /
Reverse biased safe operating area
T_{vj} = 125°C
v_{LF} = v_{LR} = 15 V
R_G = 2,4 Ω

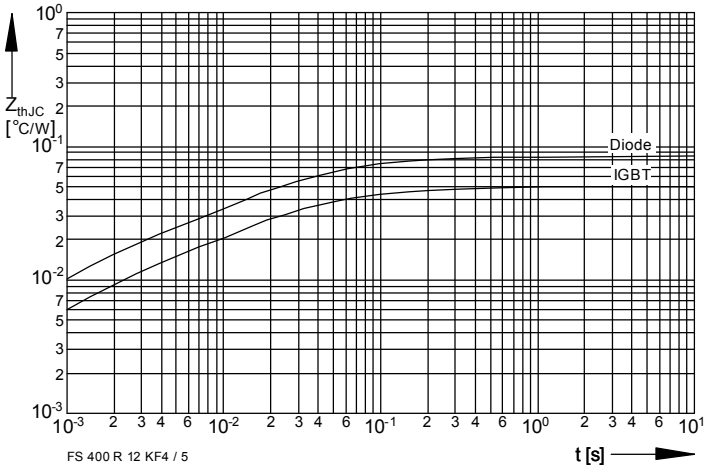


Bild / Fig. 5
Transienter Wärmewiderstand je Zweig (DC) /
Transient thermal impedance per arm (DC)

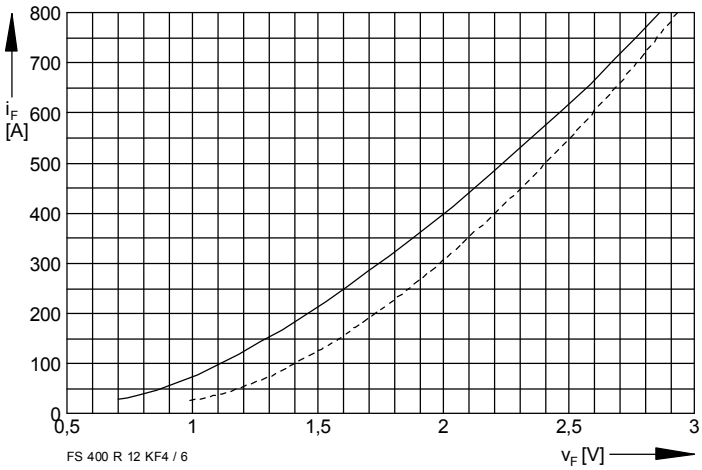


Bild / Fig. 6
Durchlaßkennlinien der Inversdiode (typisch)
Forward characteristics of the inverse diode (typical)
------ T_{vj} = 25°C
——— T_{vj} = 125°C