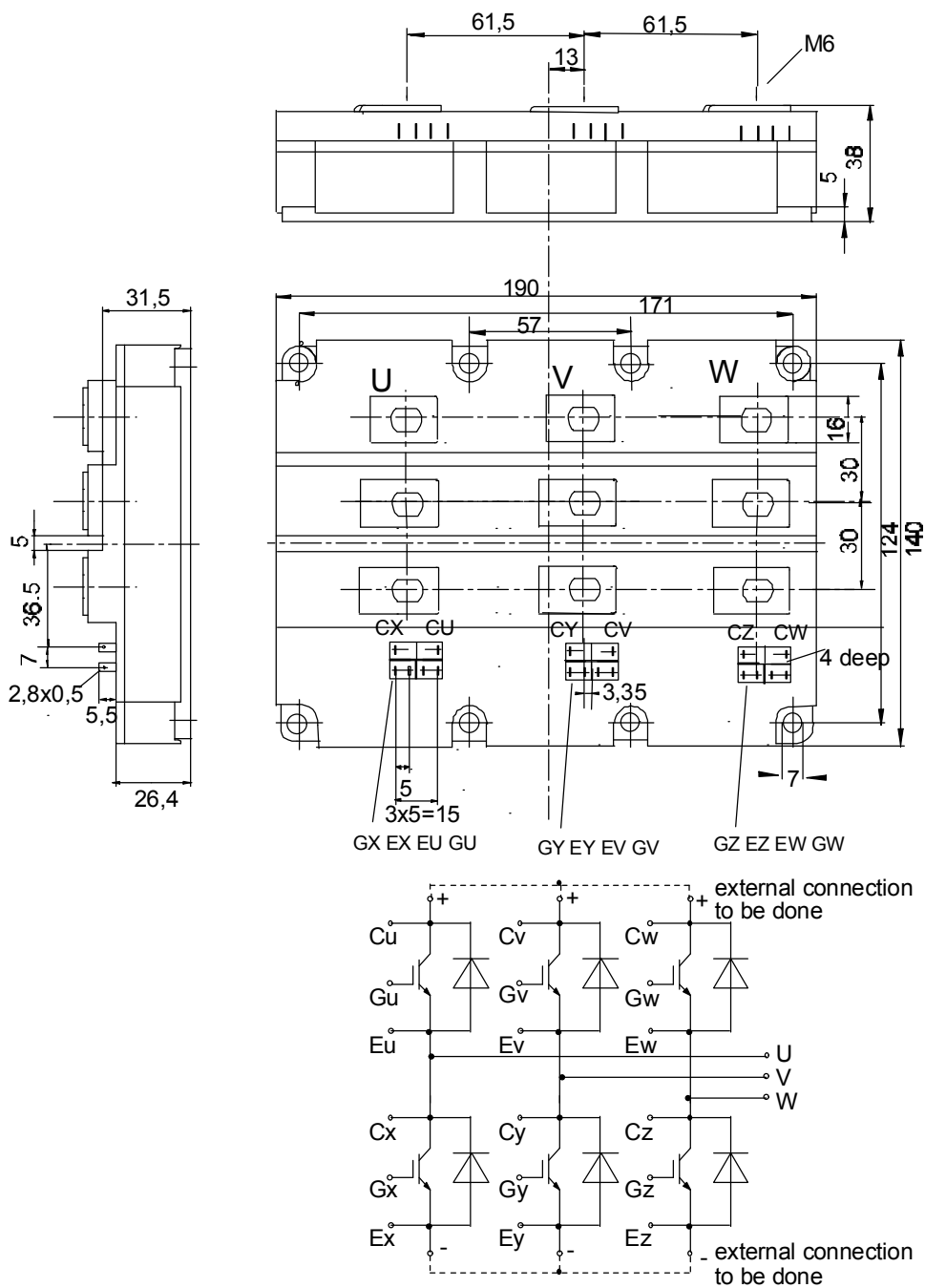


European Power-Semiconductor and Electronics Company

Marketing Information

FS 400 R 12 KF4



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

Charakteristische Werte / Characteristic values: Transistor

Kollektor-Emitter Sättigungsspannung	collector-emitter saturation voltage	$i_C = 400 \text{ A}$, $v_{GE} = 15 \text{ V}$, $T_{vj} = 25^\circ\text{C}$	$V_{CE \text{ sat}}$	min. -	typ. 2,7	max. 3,2 V
		$i_C = 400 \text{ A}$, $v_{GE} = 15 \text{ V}$, $T_{vj} = 125^\circ\text{C}$		-	3,4	4 V
Gate-Emitter Schwellenspannung	gate-emitter threshold voltage	$i_C = 16 \text{ mA}$, $v_{CE} = v_{GE}$, $T_{vj} = 25^\circ\text{C}$	$V_{GE(TO)}$	4,5	5,5	6,5 V
Eingangskapazität	input capacity	$f_0 = 1 \text{ MHz}$, $T_{vj} = 25^\circ\text{C}$, $v_{CE} = 25 \text{ V}$, $v_{GE} =$	C_{ies}	-	27	- nF
Kollektor-Emitter Reststrom	collector-emitter cut-off current	$v_{CE} = 1200 \text{ V}$, $v_{GE} = 0 \text{ V}$, $T_{vj} = 25^\circ\text{C}$	i_{CES}	-	8	- mA
		$v_{CE} = 1200 \text{ V}$, $v_{GE} = 0 \text{ V}$, $T_{vj} = 125^\circ\text{C}$		-	40	- mA
Gate-Emitter Reststrom	gate leakage current	$v_{CE} = 0 \text{ V}$, $v_{GE} = 20 \text{ V}$, $T_{vj} = 25^\circ\text{C}$	i_{GES}	-	-	400 nA
Emitter-Gate Reststrom	gate leakage current	$v_{CE} = 0 \text{ V}$, $v_{EG} = 20 \text{ V}$, $T_{vj} = 25^\circ\text{C}$	i_{EGS}	-	-	400 nA
Einschaltzeit (induktive Last)	turn-on time (inductive load)	$i_C = 400 \text{ A}$, $v_{CE} = 600 \text{ V}$	t_{on}			
		$v_L = \pm 15 \text{ V}$, $R_G = 2,4 \Omega$, $T_{vj} = 25^\circ\text{C}$		-	0,7	- μs
		$v_L = \pm 15 \text{ V}$, $R_G = 2,4 \Omega$, $T_{vj} = 125^\circ\text{C}$		-	0,8	- μs
Speicherzeit (induktive Last)	storage time (inductive load)	$i_C = 400 \text{ A}$, $v_{CE} = 600 \text{ V}$	t_s			
		$v_L = \pm 15 \text{ V}$, $R_G = 2,4 \Omega$, $T_{vj} = 25^\circ\text{C}$		-	0,9	- μs
		$v_L = \pm 15 \text{ V}$, $R_G = 2,4 \Omega$, $T_{vj} = 125^\circ\text{C}$		-	1	- μs
Fallzeit (induktive Last)	fall time (inductive load)	$i_C = 400 \text{ A}$, $v_{CE} = 600 \text{ V}$	t_f			
		$v_L = \pm 15 \text{ V}$, $R_G = 2,4 \Omega$, $T_{vj} = 25^\circ\text{C}$		-	0,1	- μs
		$v_L = \pm 15 \text{ V}$, $R_G = 2,4 \Omega$, $T_{vj} = 125^\circ\text{C}$		-	0,15	- μs
Einschaltverlustenergie pro Puls	turn-on energy loss per pulse	$i_C = 400 \text{ A}$, $v_{CE} = 600 \text{ V}$, $L_S = 70 \text{ nH}$	E_{on}			
		$v_L = \pm 15 \text{ V}$, $R_G = 2,4 \Omega$, $T_{vj} = 125^\circ\text{C}$		-	100	- mWs
Abschaltverlustenergie pro Puls	turn-off energy loss per pulse	$i_C = 400 \text{ A}$, $v_{CE} = 600 \text{ V}$, $L_S = 70 \text{ nH}$	E_{off}			
		$v_L = \pm 15 \text{ V}$, $R_G = 2,4 \Omega$, $T_{vj} = 125^\circ\text{C}$		-	55	- mWs

Charakteristische Werte / Characteristic values

Durchlaßspannung	forward voltage	
Rückstromspitze	peak reverse recovery current	
Sperrverzögerungsladung	recovered charge	

Inversdiode / Inverse diode

$I_F = 400 \text{ A}$, $v_{GE} = 0 \text{ V}$, $T_{vj} = 25^\circ\text{C}$	V_F	-	2,2	2,7 V
$I_F = 400 \text{ A}$, $v_{GE} = 0 \text{ V}$, $T_{vj} = 125^\circ\text{C}$		-	2,0	2,5 V
$I_F = 400 \text{ A}$, $-di_F/dt = 2 \text{ kA}/\mu\text{s}$	I_{RM}			
$V_{RM} = 600 \text{ V}$, $v_{EG} = 10 \text{ V}$, $T_{vj} = 25^\circ\text{C}$		-	125	- A
$V_{RM} = 600 \text{ V}$, $v_{EG} = 10 \text{ V}$, $T_{vj} = 125^\circ\text{C}$		-	200	- A
$I_F = 400 \text{ A}$, $-di_F/dt = 2 \text{ kA}/\mu\text{s}$	Q_r			
$V_{RM} = 600 \text{ V}$, $v_{EG} = 10 \text{ V}$, $T_{vj} = 25^\circ\text{C}$		-	13	- μAs
$V_{RM} = 600 \text{ V}$, $v_{EG} = 10 \text{ V}$, $T_{vj} = 125^\circ\text{C}$		-	45	- μAs

Thermische Eigenschaften / Thermal properties

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

Mechanische Eigenschaften / Mechanical properties

Innere Isolation	internal insulation			Al_2O_3
Anzugsdrehmoment f. mech. Befestigung	mounting torque	terminals M6 / tolerance $\pm 15\%$	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

$t_{iq} = 10 \mu\text{s}$	$V_{CC} = 750 \text{ V}$
$v_i = \pm 15 \text{ V}$	$V_{CFM} = 900 \text{ V}$
$R_{GE} = R_{GS} = 2,4 \Omega$	$i_{CMK1} \approx 2500 \text{ A}$
$T_{vj} = 125^\circ\text{C}$	$i_{CMK2} \approx 2200 \text{ A}$

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

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.

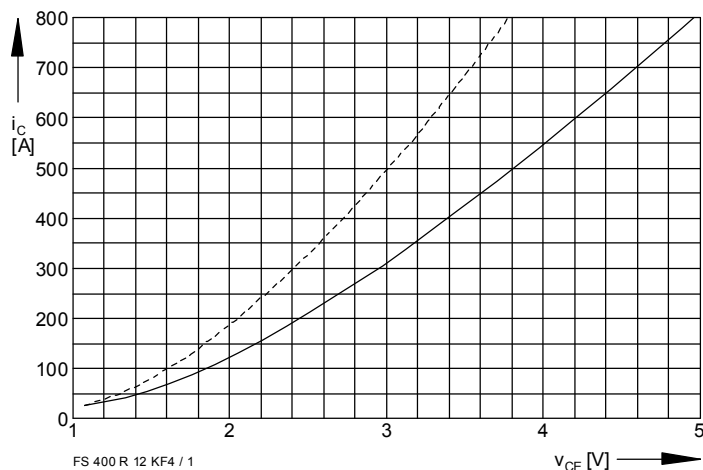


Bild / Fig. 1
Kollektor-Emitter-Spannung im Sättigungsbereich (typisch) /
Collector-emitter-voltage in saturation region (typical)
 $V_{GE} = 15 \text{ V}$
----- $T_{vj} = 25^\circ\text{C}$
———— $T_{vj} = 125^\circ\text{C}$

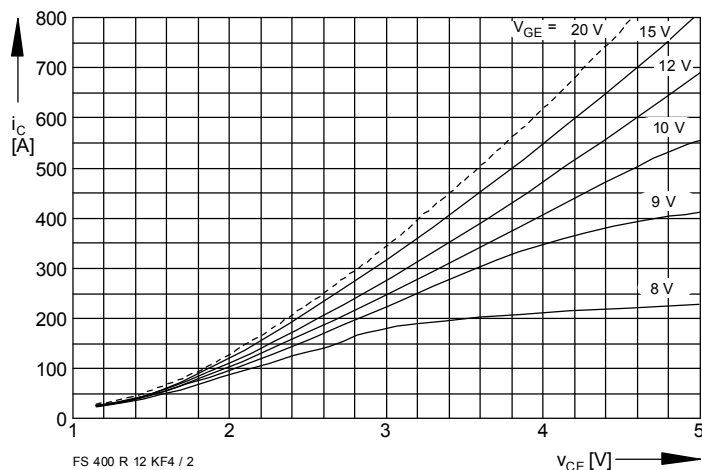


Bild / Fig. 2
Kollektor-Emitter-Spannung im Sättigungsbereich (typisch) /
Collector-emitter-voltage in saturation region (typical)
 $T_{vj} = 125^\circ\text{C}$

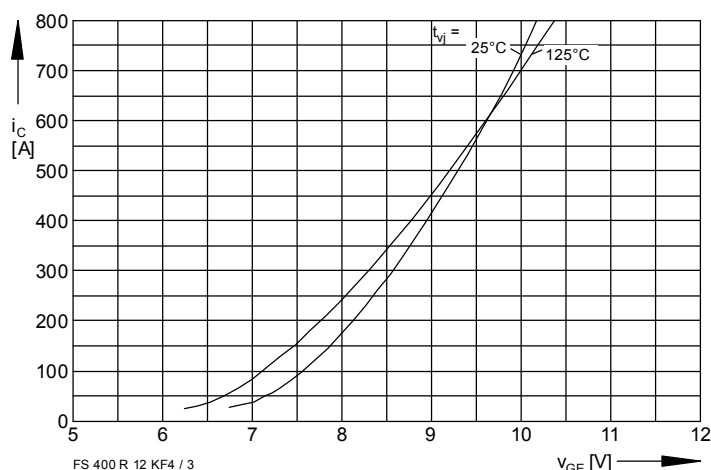


Bild / Fig. 3
Übertragungscharakteristik (typisch) /
Transfer characteristic (typical)
 $V_{CE} = 20 \text{ V}$

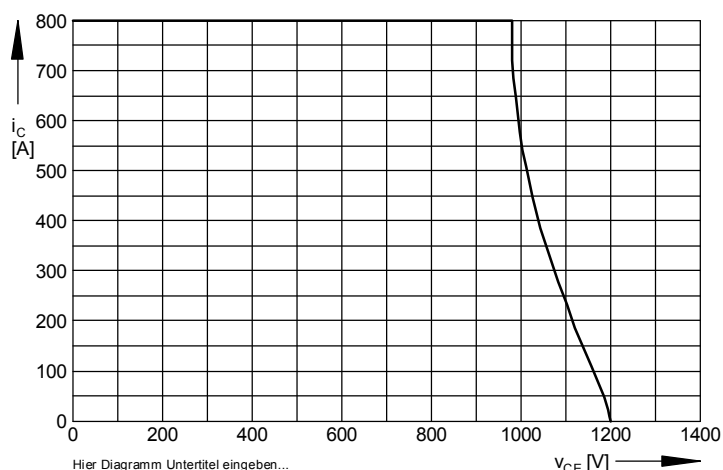


Bild / Fig. 4
Rückwärts-Arbeitsbereich /
Reverse biased safe operating area
 $T_{vj} = 125^\circ\text{C}$
 $V_{LF} = V_{LR} = 15 \text{ V}$
 $R_G = 2,4 \Omega$

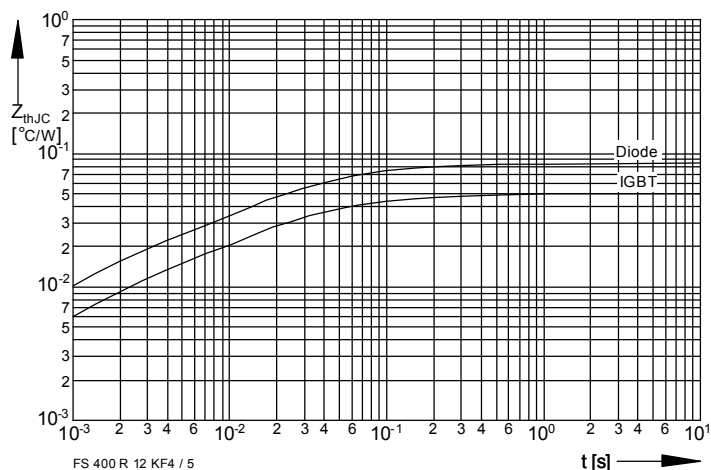


Bild / Fig. 5
Transienter Wärmewiderstand je Zweig (DC) /
Transient thermal impedance per arm (DC)

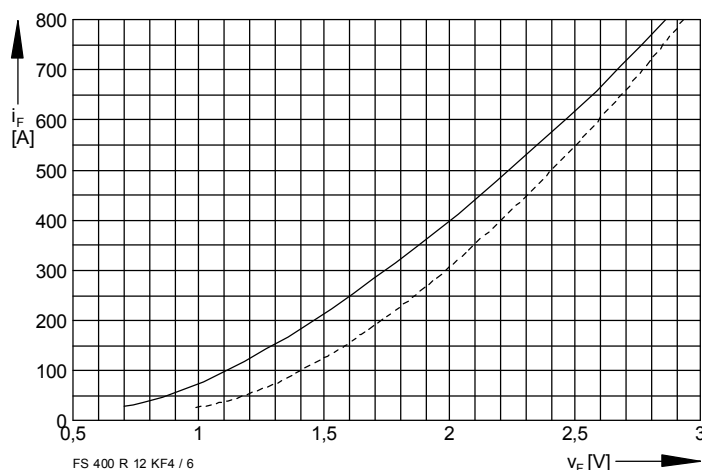


Bild / Fig. 6
Durchlaßkennlinien der Inversdiode (typisch) /
Forward characteristics of the inverse diode (typical)
----- $T_{vj} = 25^\circ\text{C}$
———— $T_{vj} = 125^\circ\text{C}$

Terms & Conditions of Usage

Attention

The present product data is exclusively subscribed to technically experienced staff. This Data Sheet is describing the specification of the products for which a warranty is granted exclusively pursuant the terms and conditions of the supply agreement. There will be no guarantee of any kind for the product and its specifications. Changes to the Data Sheet are reserved.

You and your technical departments will have to evaluate the suitability of the product for the intended application and the completeness of the product data with respect to such application. Should you require product information in excess of the data given in the Data Sheet, please contact your local Sales Office via "www.eupec.com / sales & contact".

Warning

Due to technical requirements the products may contain dangerous substances. For information on the types in question please contact your local Sales Office via "www.eupec.com / sales & contact".