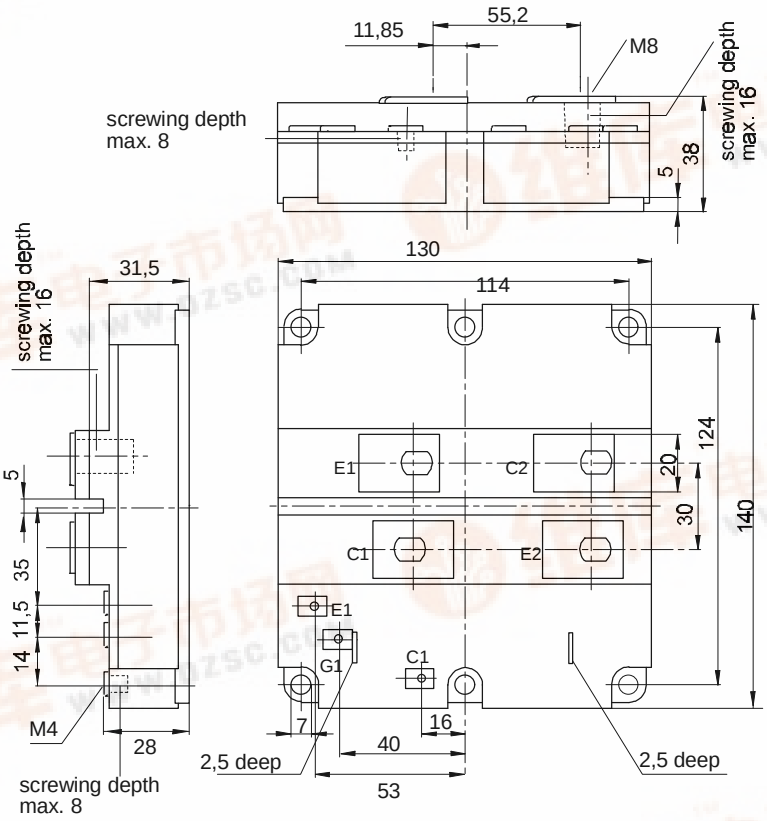
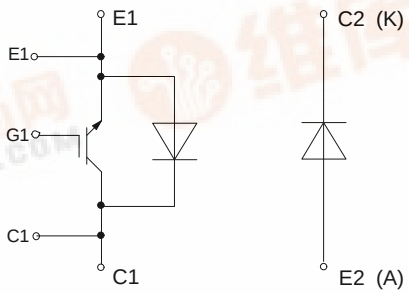
European Power-Semiconductor and Electronics Company GmbH + Co. KG

Marketing Information
FD 400 R 12 KF4





FD 400 R 12 KF 4

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}		2700 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=400A, v_{GE}=15V, t_{vj}=25°C	$v_{CE\ sat}$	-	2,7	3,2	V
		i_C=400A, v_{GE}=15V, t_{vj}=125°C		-	3,3	3,9	V
Gate-Schwellenspannung	gate threshold voltage	i_C=16mA, v_{CE}=v_{GE}, t_{vj}=25°C	$v_{GE(th)}$	4,5	5,5	6,5	V
Eingangskapazität	input capacity	f_O=1MHz,t_{vj}=25°C,v_{CE}=25V, v_{GE}=0V	C_{ies}	-	28	-	nF
Kollektor-Emitter Reststrom	collector-emitter cut-off current	v_{CE}=1200V, v_{GE}=0V, t_{vj}=25°C	i_{CES}	-	8	-	mA
		v_{CE}=1200V, v_{GE}=0V, t_{vj}=125°C		-	32	-	mA
Gate-Emitter Reststrom	gate leakage current	v_{CE}=0V, v_{GE}=20V, t_{vj}=25°C	i_{GES}	-	-	400	nA
Emitter-Gate Reststrom	gate leakage current	v_{CE}=0V, v_{EG}=20V, t_{vj}=25°C	i_{EGS}	-	-	400	nA
Einschaltzeit (induktive Last)	turn-on time (inductive load)	i_C=400A,v_{CE}=600V,v_L=±15V,R_G=3,6Ω ,t_{vj}= 25°C	t_{on}	-	0,7	-	µs
		i_C=400A,v_{CE}=600V,v_L=±15V,R_G=3,6Ω ,t_{vj}=125°C		-	0,8	-	µs
Speicherzeit (induktive Last)	storage time (inductive load)	i_C=400A,v_{CE}=600V,v_L=±15V,R_G=3,6Ω ,t_{vj}= 25°C	t_s	-	0,9	-	µs
		i_C=400A,v_{CE}=600V,v_L=±15V,R_G=3,6Ω ,t_{vj}=125°C		-	1,0	-	µs
Fallzeit (induktive Last)	fall time (inductive load)	i_C=400A,v_{CE}=600V,v_L=±15V,R_G=3,6Ω ,t_{vj}= 25°C	t_f	-	0,10	-	µs
		i_C=400A,v_{CE}=600V,v_L=±15V,R_G=3,6Ω ,t_{vj}=125°C		-	0,15	-	µs
Einschaltverlustenergie pro puls	turn-on energie per pulse	i_C=400A, v_{CE}=600V, L_s=70nH	E_{on}				
		v_L=±15V, R_G=3,6Ω , t_{vj}=125°C		-	70	-	mWs
Abschaltverlustenergie pro Puls	turn-off energie loss per pulse	i_C=400A, v_{CE}=600V, L_s=70nH	E_{off}				
		v_L=±15V, R_G=3,6Ω , t_{vj}=125°C		-	60	-	mWs

Charakteristische Werte / Characteristic values

Inversdiode / Inverse diode							
Durchlaßspannung	forward voltage	i_F=400A, v_{GE}=0V, t_{vj}=25°C	v_F	-	2,2	2,7	V
		i_F=400A, v_{GE}=0V, t_{vj}=125°C		-	2,0	2,5	V
Rückstromspitze	peak reverse recovery current	i_F=400A, v_{RM}=600V, v_{EG} = 10V	I_{RM}				
		-di_F/dt = 2,0 kA/µs, t_{vj} = 25°C		-	140	-	A
		-di_F/dt = 2,0 kA/µs, t_{vj} = 125°C		-	240	-	A
Sperrverzögerungsladung	recovered charge	i_F=400A, v_{RM}=600V, v_{EG} = 10V	Q_r				
		-di_F/dt = 3,0 kA/µs, t_{vj} = 25°C		-	18	-	µAs
		-di_F/dt = 3,0 kA/µs, t_{vj} = 125°C		-	50	-	µAs

Thermische Eigenschaften / Thermal properties

Innerer Wärmewiderstand	thermal resistance, junction to case	Transistor / transistor, DC	R_{thJC}		0,023 °C/W
		Transistor,DC,pro Zweig/per arm			0,046 °C/W
		Diode, DC, pro Modul/per module			0,044 °C/W
		Diode, DC, pro Zweig/per arm			0,088 °C/W
Übergangs-Wärmewiderstand	thermal resistance, case to heatsink	pro Modul / per Module	R_{thCK}		0,01 °C/W
		pro Zweig / per arm			0,02 °C/W
Höchstzul. Sperrschichttemperatur	max. junction temperature	pro Modul / per Module	$t_{vj\ max}$		150 °C
Betriebstemperatur	operating temperature	Transistor / transistor	$t_{c\ op}$		-40...+150 °C
Lagertemperatur	storage temperature		t_{stg}		-40...+125 °C

Mechanische Eigenschaften / Mechanical properties

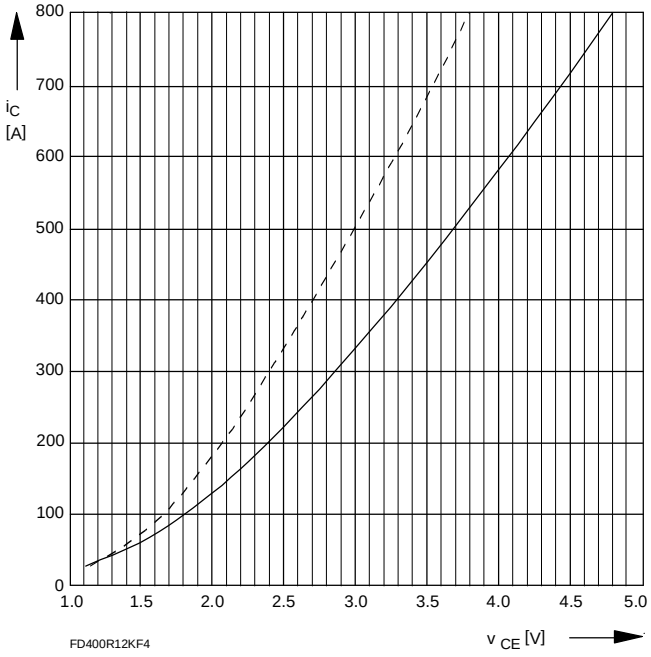
Gehäuse, siehe Anlage	case, see appendix			Seite / page	1
Innere Isolation	internal insulation				Al_2O_3
Anzugsdrehmoment f. mech. Befestigung	mounting torque	terminals M6 / tolerance +/-15%	M1		5 Nm
Anzugsdrehmoment f. elektr. Anschlüsse	terminal connection torque	terminals M4 / tolerance +/-15%	M2		2 Nm
		terminals M8			8...10 Nm
Gewicht	weight		G		ca. 1500 g

Bedingung für den Kurzschlußschutz / Conditions for short-circuit protection

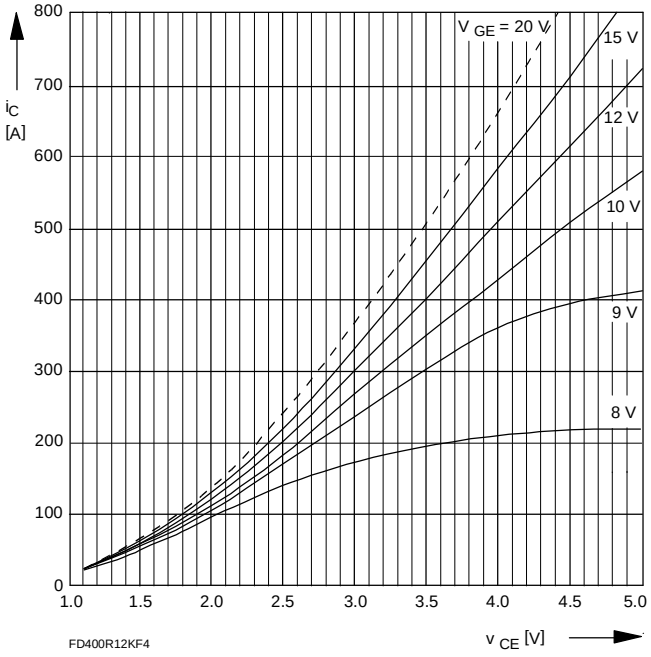
t_{fg} = 10 µs	V_{CC} = 750 V
v_L = ±15 V	v_{CEM} = 900 V
R_{GF} = R_{GR} = 3,6Ω	i_{CMK1} » 3500 A
t_{vj} = 125°C	i_{CMK2} » 3000 A

Unabhängig davon gilt bei abweichenden Bedingungen / with regard to other conditions $v_{CEM} = V_{CES}$ - 20nH x $|di_C/dt|$

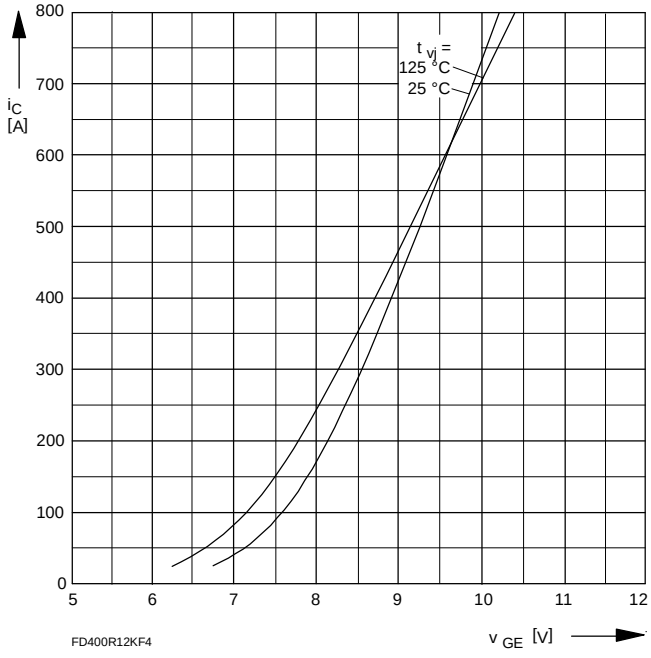
Mit dieser technischen Information werden Halbleiterbauelemente spezifiziert, jedoch keine Eigenschaften zugesichert. Sie gilt in Verbindung mit den zugehörigen Technischen Erläuterungen. This technical information specifies semiconductor devices but promises no characteristics. It is valid in combination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



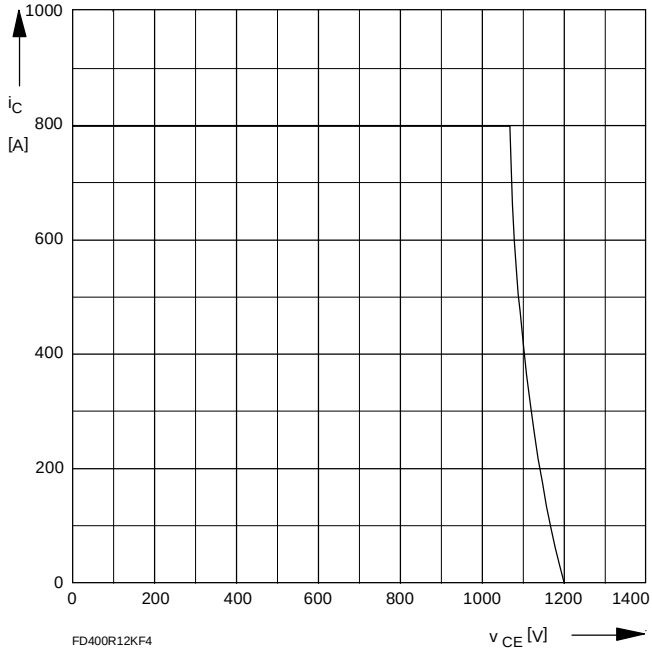
Bild/Fig. 1
Kollektor-Emitter-Spannung im Sättigungsbereich (typisch)
Collector-emitter-voltage in saturation region (typical)
V_{GE} = 15V
-----T_{vj} = 25 °C
——Tvj = 125 °C



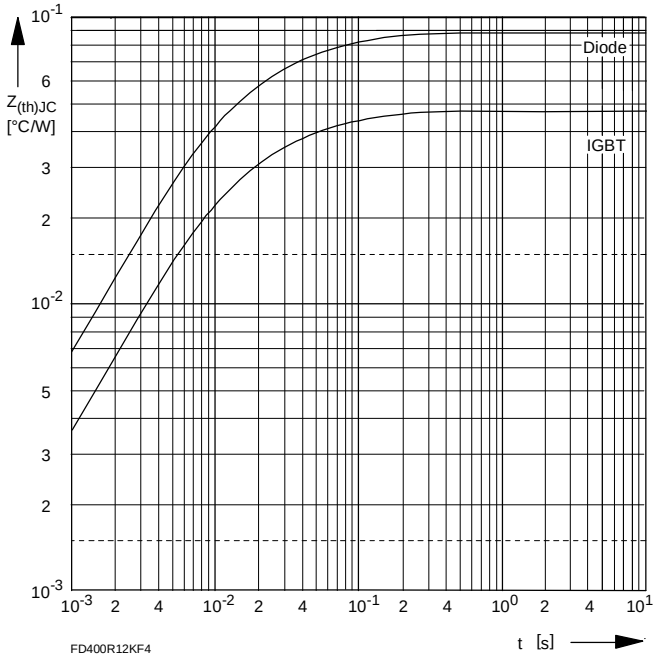
Bild/Fig. 2
Kollektor-Emitter-Spannung im Sättigungsbereich (typisch)
Collector-emitter-voltage in saturation region (typical)
t_{vj} = 125 °C



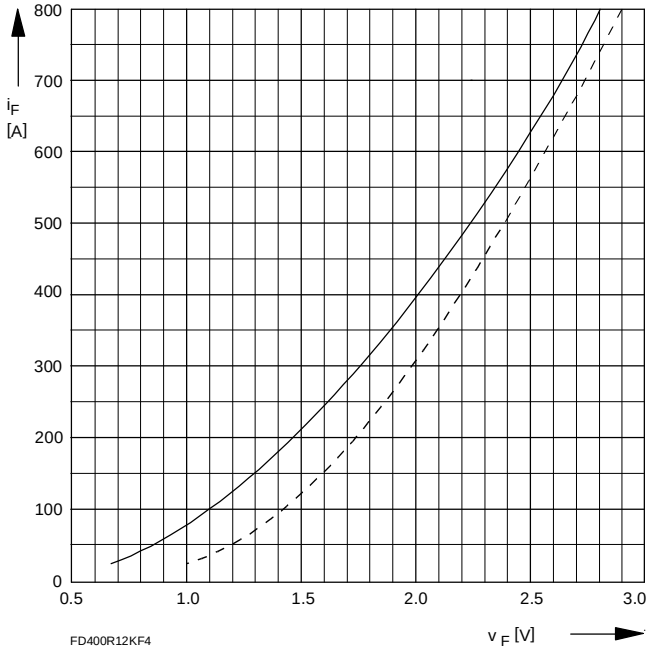
Bild/Fig. 3
Übertragungscharakteristik (typisch)
Transfer characteristic (typical)
V_{CE} = 20 V



Bild/Fig. 4
Rückwärts-Arbeitsbereich
Reverse biased safe operating area
t_{vj} = 125 °C, v_{LF} = v_{LR} = 15 V, R_G = 3,6 Ω



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



Bild/Fig. 6
Durchlaßkennlinie der Inversdiode (typisch)
Forward characteristic of the inverse diode (typical)
····· t_{vj} = 25 °C
— t_{vj} = 125 °C

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