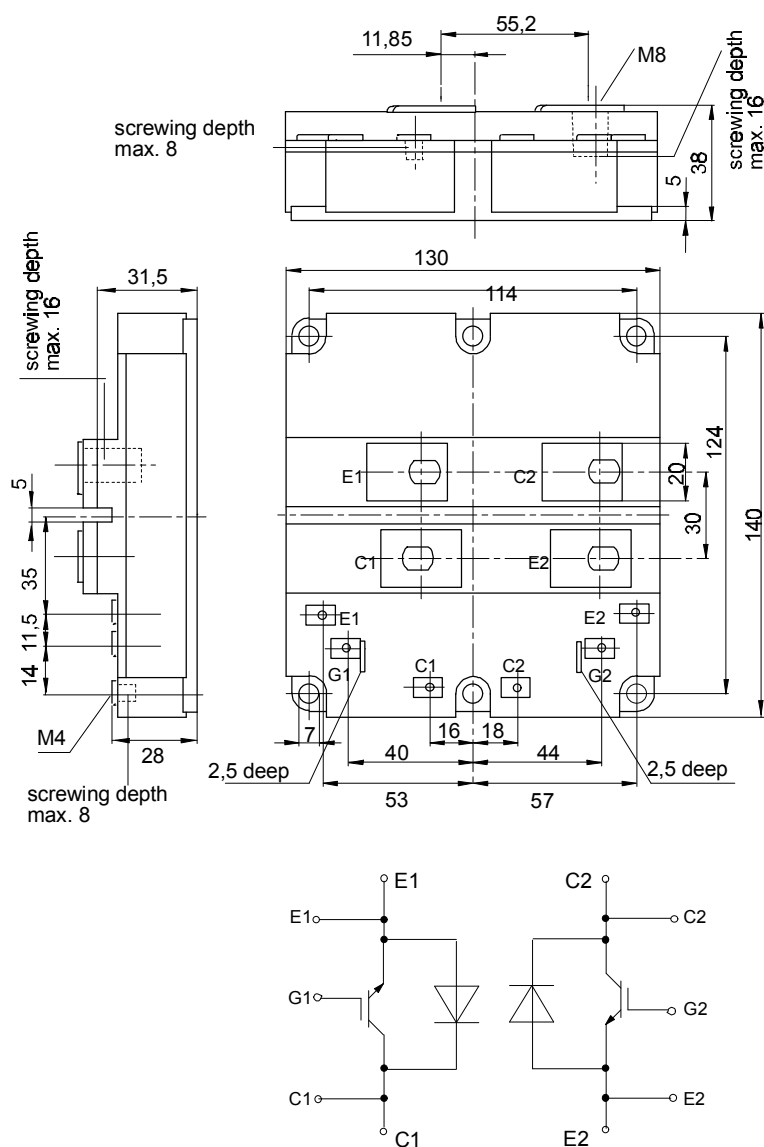




European Power-Semiconductor and Electronics Company

Marketing Information

FF 600 R 16 KF4



IGBT-Module

FF 600 R 16 KF4

Höchstzulässige Werte / Maximum rated values

Elektrische Eigenschaften / Electrical properties

Kollektor-Emitter-Sperrspannung	collector-emitter voltage		V_{CES}	1600 V
Kollektor-Dauergleichstrom	DC-collector current		I_C	600 A
Periodischer Kollektor Spitzenstrom	repetitive peak collector current	$t_p=1\text{ ms}$	I_{CRM}	1200 A
Gesamt-Verlustleistung	total power dissipation	$t_C=25^\circ\text{C}$, Transistor /transistor	P_{tot}	3900 W
Gate-Emitter-Spitzenspannung	gate-emitter peak voltage		V_{GE}	$\pm 20\text{ V}$
Dauergleichstrom	DC forward current		I_F	600 A
Periodischer Spitzenstrom	repetitive peak forw. current	$t_p=1\text{ms}$	I_{FRM}	1200 A
Isolations-Prüfspannung	insulation test voltage	RMS, f=50 Hz, t= 1 min.	V_{ISOL}	3,4 kV

Charakteristische Werte / Characteristic values: Transistor

				min.	typ.	max.
Kollektor-Emitter Sättigungsspannung	collector-emitter saturation voltage	$i_C=600\text{A}$, $v_{GE}=15\text{V}$, $t_{vj}=25^\circ\text{C}$	$V_{CE\text{ sat}}$	-	3,5	3,9 V
		$i_C=600\text{A}$, $v_{GE}=15\text{V}$, $t_{vj}=125^\circ\text{C}$		-	4,6	5 V
Gate-Schwellenspannung	gate threshold voltage	$i_C=40\text{mA}$, $v_{CE}=v_{GE}$, $t_{vj}=25^\circ\text{C}$	$v_{GE(TO)}$	4,5	5,5	6,5 V
Eingangskapazität	input capacity	$f_O=1\text{MHz}$, $t_{vj}=25^\circ\text{C}$, $v_{CE}=25\text{V}$, $v_{GE}=0\text{V}$	C_{ies}	-	90	- nF
		$v_{CE}=1600\text{V}$, $v_{GE}=0\text{V}$, $t_{vj}=25^\circ\text{C}$	i_{CES}	-	4	- mA
Kollektor-Emitter Reststrom	collector-emitter cut-off current	$v_{CE}=1600\text{V}$, $v_{GE}=0\text{V}$, $t_{vj}=125^\circ\text{C}$		-	40	- mA
		$v_{CE}=0\text{V}$, $v_{GE}=20\text{V}$, $t_{vj}=25^\circ\text{C}$	i_{GES}	-	-	400 nA
Gate-Emitter 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)	$i_C=600\text{A}$, $v_{CE}=900\text{V}$, $v_L=\pm 15\text{V}$	t_{on}			
		$v_L=\pm 15\text{V}$, $R_G=3,3\Omega$, $t_{vj}=25^\circ\text{C}$		-	0,8	- μs
		$v_L=\pm 15\text{V}$, $R_G=3,3\Omega$, $t_{vj}=125^\circ\text{C}$		-	1	- μs
		$i_C=600\text{A}$, $v_{CE}=900\text{V}$, $v_L=\pm 15\text{V}$	t_s			
Speicherzeit (induktive Last)	storage time (inductive load)	$v_L=\pm 15\text{V}$, $R_G=3,3\Omega$, $t_{vj}=25^\circ\text{C}$		-	1,1	- μs
		$v_L=\pm 15\text{V}$, $R_G=3,3\Omega$, $t_{vj}=125^\circ\text{C}$		-	1,3	- μs
		$i_C=600\text{A}$, $v_{CE}=900\text{V}$, $v_L=\pm 15\text{V}$	t_f			
		$v_L=\pm 15\text{V}$, $R_G=3,3\Omega$, $t_{vj}=25^\circ\text{C}$		-	0,25	- μs
Fallzeit (induktive Last)	fall time (inductive load)	$v_L=\pm 15\text{V}$, $R_G=3,3\Omega$, $t_{vj}=125^\circ\text{C}$		-	0,3	- μs

Charakteristische Werte / Characteristic values

Transistor / Transistor						
Einschaltverlustenergie pro Puls	turn-on energy loss per pulse	$i_C=600\text{A}$, $v_{CE}=900\text{V}$, $v_L=\pm 15\text{V}$	E_{on}			
		$R_G=3,3\Omega$, $t_{vj}=125^\circ\text{C}$, $L_S=70\text{nH}$		-	240	- mWs
Abschaltverlustenergie pro Puls	turn-off energy loss per pulse	$i_C=600\text{A}$, $v_{CE}=900\text{V}$, $v_L=\pm 15\text{V}$	E_{off}			
		$R_G=3,3\Omega$, $t_{vj}=125^\circ\text{C}$, $L_S=70\text{nH}$		-	140	- mWs
Inversdiode / Inverse diode						
Durchlaßspannung	forward voltage	$i_F=600\text{A}$, $v_{GE}=0\text{V}$, $t_{vj}=25^\circ\text{C}$	v_F	-	2,4	2,8 V
		$i_F=600\text{A}$, $v_{GE}=0\text{V}$, $t_{vj}=125^\circ\text{C}$		-	2,2	- V
Rückstromspitze	peak reverse recovery current	$i_F=600\text{A}$, $-di_F/dt=3\text{kA}/\mu\text{s}$	I_{RM}			
		$v_{RM}=900\text{V}$, $v_{EG}=10\text{V}$, $t_{vj}=25^\circ\text{C}$		-	230	- A
Sperrverzögerungsladung	recovered charge	$v_{RM}=900\text{V}$, $v_{EG}=10\text{V}$, $t_{vj}=125^\circ\text{C}$		-	320	- A
		$i_F=600\text{A}$, $-di_F/dt=3\text{kA}/\mu\text{s}$	Q_r			
		$v_{RM}=900\text{V}$, $v_{EG}=10\text{V}$, $t_{vj}=25^\circ\text{C}$		-	50	- μAs
		$v_{RM}=900\text{V}$, $v_{EG}=10\text{V}$, $t_{vj}=125^\circ\text{C}$		-	110	- μAs

Thermische Eigenschaften / Thermal properties

Innerer Wärmewiderstand	thermal resistance, junction to case	Transistor, DC, pro Modul / per module	R_{thJC}	0,016 $^\circ\text{C}/\text{W}$
		Transistor, DC, pro Zweig / per arm		0,032 $^\circ\text{C}/\text{W}$
		Diode /diode, DC, pro Modul / per module		0,04 $^\circ\text{C}/\text{W}$
		Diode /diode, DC, pro Zweig / per arm		0,08 $^\circ\text{C}/\text{W}$
Übergangs-Wärmewiderstand	thermal resistance, case to heatsink	pro Module / per Module	R_{thCK}	0,008 $^\circ\text{C}/\text{W}$
		pro Zweig / per arm		0,016 $^\circ\text{C}/\text{W}$
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 $\pm 10\%$	M1	3 Nm
Anzugsdrehmoment f. elektr. Anschlüsse / terminal connection torque		terminals M4 / tolerance $\pm 5\%$ -10%	M2	2 Nm
		terminals M8		8...10 Nm
Gewicht	weight		G	ca. 1500 g

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.

Bedingung für den Kurzschlußschutz / Conditions for short-circuit protection

$t_{g} = 10\text{ }\mu\text{s}$	$V_{CC} = 1000\text{ V}$
$v_L = \pm 15\text{V}$	$V_{CEM} = 1300\text{ V}$
$R_{GF} = R_{GR} = 3,3\text{ }\Omega$	$i_{CMK1} = 6000\text{ A}$
$t_{vj} = 125^\circ\text{C}$	$i_{CMK2} = 4500\text{ A}$

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

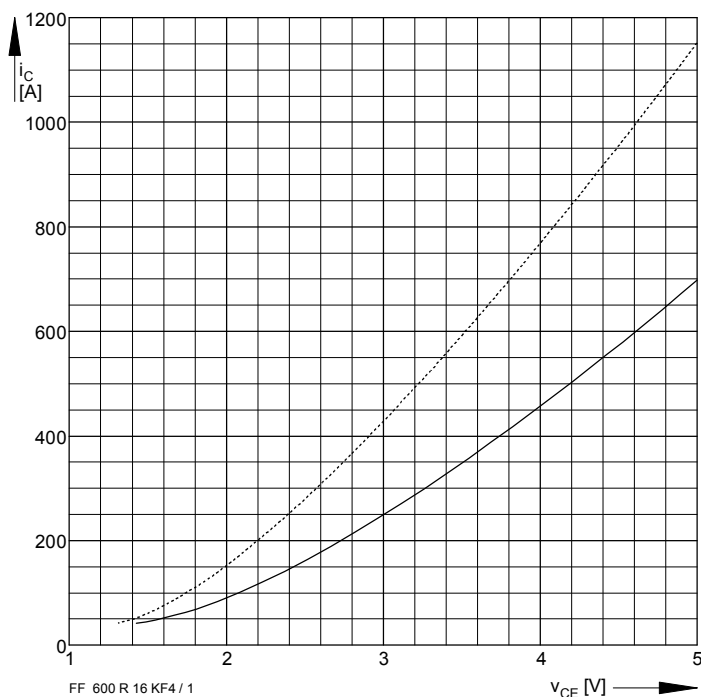


Bild / Fig. 1
Kollektor-Emitter-Spannung im Sättigungsbereich (typisch) /
Collector-emitter-voltage in saturation region (typical)
 $V_{GE} = 15 \text{ V}$
..... $t_{vj} = 25^\circ\text{C}$
———— $t_{vj} = 125^\circ\text{C}$

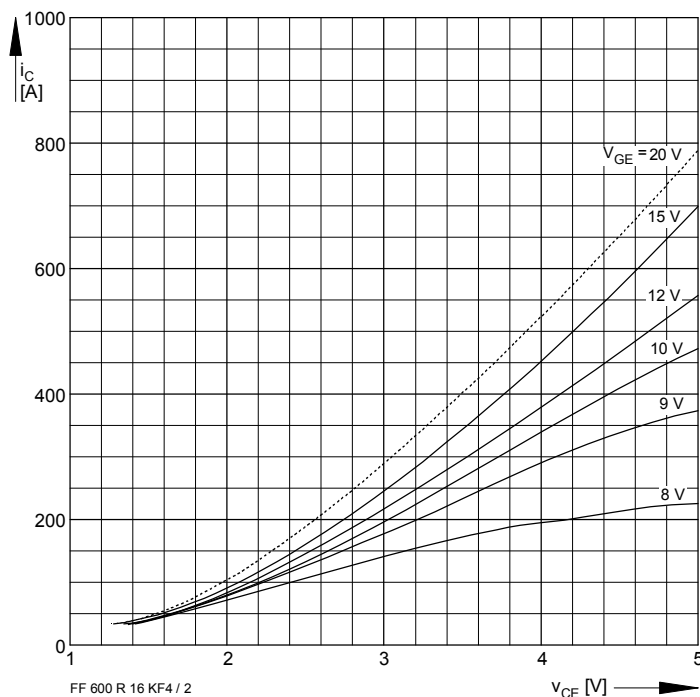


Bild / Fig. 2
Kollektor-Emitter-Spannung im Sättigungsbereich (typisch) /
Collector-emitter-voltage in saturation region (typical)
 $t_{vj} = 125^\circ\text{C}$

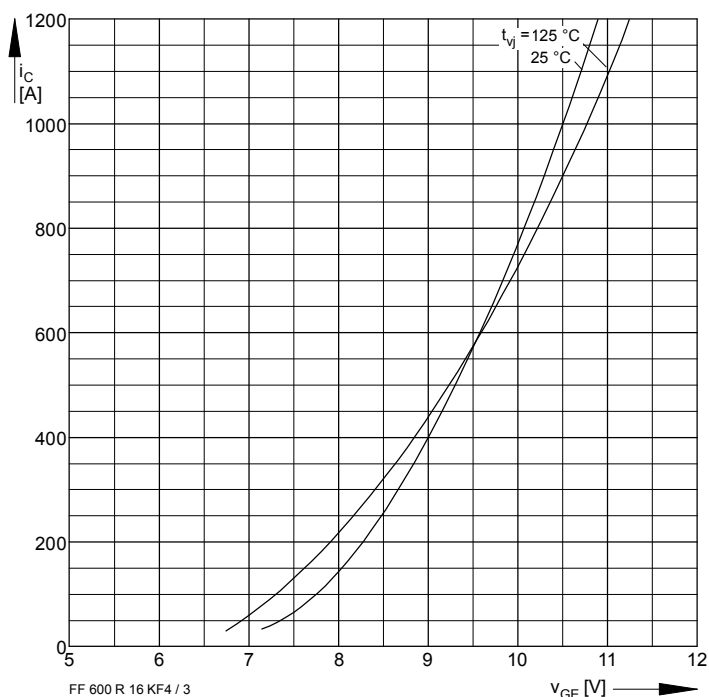


Bild / Fig. 3
Übertragungscharakteristik (typisch) /
Transfer characteristic (typical)
 $V_{CE} = 20 \text{ V}$

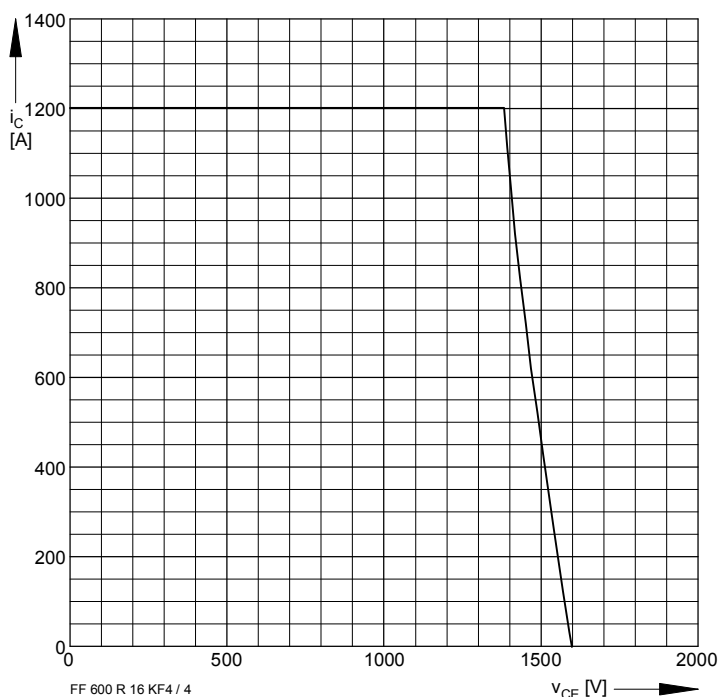


Bild / Fig. 4
Rückwärts-Arbeitsbereich /
Reverse biased safe operating area
 $t_{vj} = 125^\circ\text{C}$
 $v_{LF} = v_{LR} = 15 \text{ V}$
 $R_G = 3,3 \Omega$

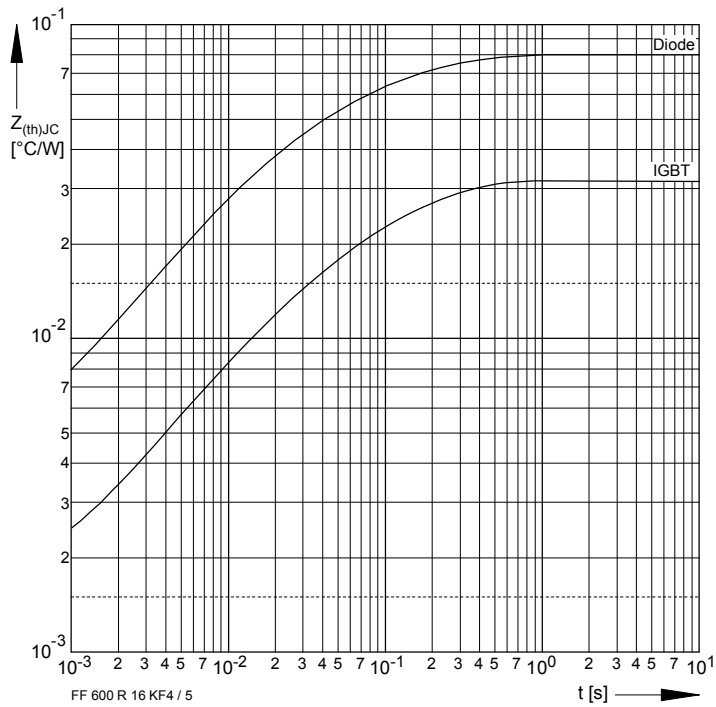


Bild / Fig. 5
 Transienter innerer Wärmewiderstand (DC) /
 Transient thermal impedance (DC)

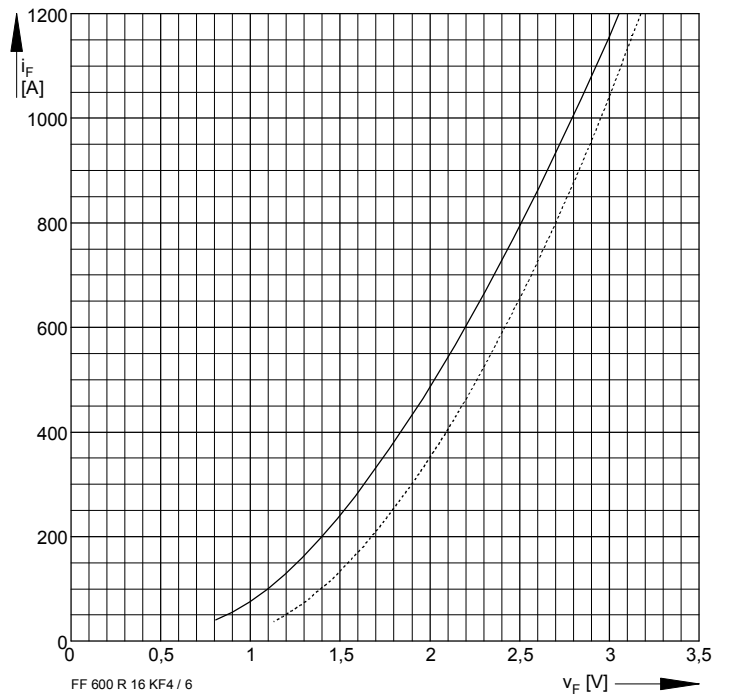


Bild / Fig. 6
 Durchlaßkennlinie der Inversdiode (typisch) /
 Forward characteristic of the inverse diode (typical)
 $t_{vj} = 25^{\circ}C$
 ——— $t_{vj} = 125^{\circ}C$

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