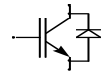


Technische Information / Technical Information

IGBT-Module
IGBT-Modules

FD 800 R 17 KF6C B2

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vorläufige Daten
preliminary data

Höchstzulässige Werte / Maximum rated values

Elektrische Eigenschaften / Electrical properties

Kollektor-Emitter-Sperrspannung collector-emitter voltage	$T_{vj} = 25^{\circ}\text{C}$	V_{CES}	1700	V
Kollektor-Dauergleichstrom DC-collector current	$T_C = 80^{\circ}\text{C}$ $T_C = 25^{\circ}\text{C}$	$I_{C,nom.}$ I_C	800 1300	A A
Periodischer Kollektor Spitzenstrom repetitive peak collector current	$t_p = 1\text{ ms}$, $T_C = 80^{\circ}\text{C}$	I_{CRM}	1600	A
Gesamt-Verlustleistung total power dissipation	$T_C = 25^{\circ}\text{C}$, Transistor	P_{tot}	6,25	kW
Gate-Emitter-Spitzenspannung gate-emitter peak voltage		V_{GES}	+/- 20V	V
Dauergleichstrom DC forward current		I_F	800	A
Periodischer Spitzenstrom repetitive peak forw. current	$t_p = 1\text{ ms}$	I_{FRM}	1600	A
Grenzlastintegral der Diode I^2t - value, Diode	$V_R = 0\text{V}$, $t_p = 10\text{ms}$, $T_{vj} = 125^{\circ}\text{C}$	I^2t	170	kA^2s
Isolations-Prüfspannung insulation test voltage	RMS, $f = 50\text{ Hz}$, $t = 1\text{ min.}$	V_{ISOL}	4	kV

Charakteristische Werte / Characteristic values

Transistor / Transistor

			min.	typ.	max.	
Kollektor-Emitter Sättigungsspannung collector-emitter saturation voltage	$I_C = 800\text{A}$, $V_{GE} = 15\text{V}$, $T_{vj} = 25^{\circ}\text{C}$ $I_C = 800\text{A}$, $V_{GE} = 15\text{V}$, $T_{vj} = 125^{\circ}\text{C}$	$V_{CE\text{ sat}}$		2,6 3,1	3,1 3,6	V V
Gate-Schwellenspannung gate threshold voltage	$I_C = 65\text{ mA}$, $V_{CE} = V_{GE}$, $T_{vj} = 25^{\circ}\text{C}$	$V_{GE(th)}$	4,5	5,5	6,5	V
Gateladung gate charge	$V_{GE} = -15\text{V} \dots +15\text{V}$	Q_G		9,6		μC
Eingangskapazität input capacitance	$f = 1\text{MHz}$, $T_{vj} = 25^{\circ}\text{C}$, $V_{CE} = 25\text{V}$, $V_{GE} = 0\text{V}$	C_{ies}		52		nF
Rückwirkungskapazität reverse transfer capacitance	$f = 1\text{MHz}$, $T_{vj} = 25^{\circ}\text{C}$, $V_{CE} = 25\text{V}$, $V_{GE} = 0\text{V}$	C_{res}		2,7		nF
Kollektor-Emitter Reststrom collector-emitter cut-off current	$V_{CE} = 1700\text{V}$, $V_{GE} = 0\text{V}$, $T_{vj} = 25^{\circ}\text{C}$	I_{CES}			5	mA
Gate-Emitter Reststrom gate-emitter leakage current	$V_{CE} = 0\text{V}$, $V_{GE} = 20\text{V}$, $T_{vj} = 25^{\circ}\text{C}$	I_{GES}			400	nA

prepared by: Alfons Wiesenthal date of publication: 04.07.2001

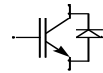
approved by: Christoph Lübke; 25.07.2001 revision: 1 (preliminary)

Technische Information / Technical Information

IGBT-Module
IGBT-Modules

FD 800 R 17 KF6C B2

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vorläufige Daten
preliminary data

Charakteristische Werte / Characteristic values

Transistor / Transistor

min. typ. max.

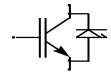
Einschaltverzögerungszeit (ind. Last) turn on delay time (inductive load)	$I_C = 800A, V_{CE} = 900V$	$t_{d,on}$			
	$V_{GE} = \pm 15V, R_G = 1,2\Omega, T_{vj} = 25^\circ C$			0,4	μs
	$V_{GE} = \pm 15V, R_G = 1,2\Omega, T_{vj} = 125^\circ C$			0,4	μs
Anstiegszeit (induktive Last) rise time (inductive load)	$I_C = 800A, V_{CE} = 900V$	t_r			
	$V_{GE} = \pm 15V, R_G = 1,2\Omega, T_{vj} = 25^\circ C$			0,14	μs
	$V_{GE} = \pm 15V, R_G = 1,2\Omega, T_{vj} = 125^\circ C$			0,14	μs
Abschaltverzögerungszeit (ind. Last) turn off delay time (inductive load)	$I_C = 800A, V_{CE} = 900V$	$t_{d,off}$			
	$V_{GE} = \pm 15V, R_G = 1,8\Omega, T_{vj} = 25^\circ C$			1,1	μs
	$V_{GE} = \pm 15V, R_G = 1,8\Omega, T_{vj} = 125^\circ C$			1,1	μs
Fallzeit (induktive Last) fall time (inductive load)	$I_C = 800A, V_{CE} = 900V$	t_f			
	$V_{GE} = \pm 15V, R_G = 1,8\Omega, T_{vj} = 25^\circ C$			0,13	μs
	$V_{GE} = \pm 15V, R_G = 1,8\Omega, T_{vj} = 125^\circ C$			0,14	μs
Einschaltverlustenergie pro Puls turn-on energy loss per pulse	$I_C = 800A, V_{CE} = 900V, V_{GE} = 15V$ $R_G = 1,2\Omega, T_{vj} = 125^\circ C, L_S = 60nH$	E_{on}		290	mWs
Abschaltverlustenergie pro Puls turn-off energy loss per pulse	$I_C = 800A, V_{CE} = 900V, V_{GE} = 15V$ $R_G = 1,8\Omega, T_{vj} = 125^\circ C, L_S = 60nH$	E_{off}		335	mWs
Kurzschlußverhalten SC Data	$t_p \leq 10\mu sec, V_{GE} \leq 15V$ $T_{vj} \leq 125^\circ C, V_{CC} = 1000V, V_{CEmax} = V_{CES} - L_{SCE} \cdot di/dt$	I_{SC}		3200	A
Modulinduktivität stray inductance module		L_{SCE}		20	nH
Modulleitungswiderstand, Anschlüsse - Chip module lead resistance, terminals - chip	pro Zweig / per arm	$R_{CC'+EE'}$		0,16	m Ω

Charakteristische Werte / Characteristic values

Diode / Diode

min. typ. max.

Durchlaßspannung forward voltage	$I_F = 800A, V_{GE} = 0V, T_{vj} = 25^\circ C$	V_F		2,1	2,5	V
	$I_F = 800A, V_{GE} = 0V, T_{vj} = 125^\circ C$			2,1	2,5	V
Rückstromspitze peak reverse recovery current	$I_F = 800A, -di_F/dt = 6300A/\mu sec$	I_{RM}				
	$V_R = 900V, V_{GE} = -10V, T_{vj} = 25^\circ C$			800		A
	$V_R = 900V, V_{GE} = -10V, T_{vj} = 125^\circ C$			900		A
Sperrverzögerungsladung recovered charge	$I_F = 800A, -di_F/dt = 6300A/\mu sec$	Q_r				
	$V_R = 900V, V_{GE} = -10V, T_{vj} = 25^\circ C$			170		μAs
	$V_R = 900V, V_{GE} = -10V, T_{vj} = 125^\circ C$			310		μAs
Abschaltenergie pro Puls reverse recovery energy	$I_F = 800A, -di_F/dt = 6300A/\mu sec$	E_{rec}				
	$V_R = 900V, V_{GE} = -10V, T_{vj} = 25^\circ C$			80		mWs
	$V_R = 900V, V_{GE} = -10V, T_{vj} = 125^\circ C$			170		mWs

vorläufige Daten
preliminary data

Thermische Eigenschaften / Thermal properties

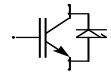
			min.	typ.	max.	
Innerer Wärmewiderstand thermal resistance, junction to case	Transistor / transistor, DC	R_{thJC}			0,02	K/W
	Diode/Diode, DC				0,034	K/W
Übergangs-Wärmewiderstand thermal resistance, case to heatsink	pro Modul / per module $\lambda_{paste} = 1 \text{ W/m}^2\text{K}$ / $\lambda_{grease} = 1 \text{ W/m}^2\text{K}$	R_{thCK}		0,008		K/W
Höchstzulässige Sperrschichttemperatur maximum junction temperature		T_{vj}			150	°C
Betriebstemperatur operation temperature		$T_{vj op}$	-40		125	°C
Lagertemperatur storage temperature		T_{stg}	-40		125	°C

Mechanische Eigenschaften / Mechanical properties

Gehäuse, siehe Anlage case, see appendix				
Innere Isolation internal insulation			AlN	
Kriechstrecke creepage distance			15	mm
Luftstrecke clearance			10	mm
CTI comperative tracking index		min.	275	
Anzugsdrehmoment f. mech. Befestigung mounting torque		M1	5	Nm
Anzugsdrehmoment f. elektr. Anschlüsse terminal connection torque	terminals M4	M2	2	Nm
	terminals M8		8 - 10	Nm
Gewicht weight		G	1050	g

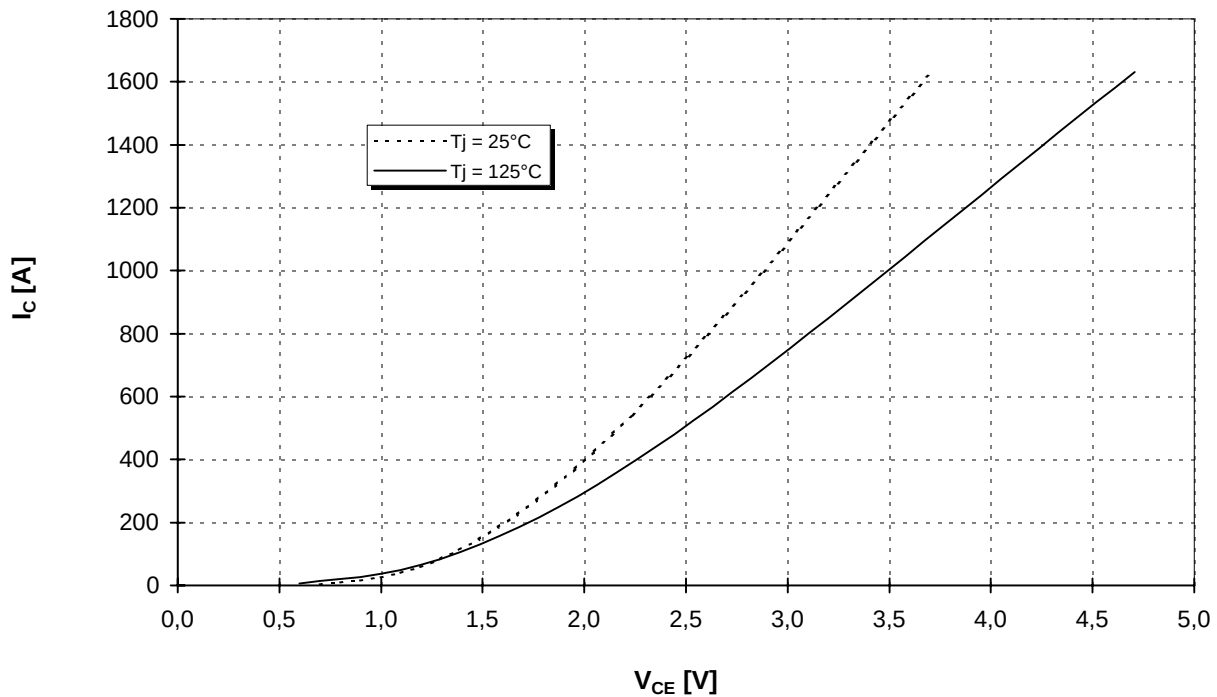
Mit dieser technischen Information werden Halbleiterbauelemente spezifiziert, jedoch keine Eigenschaften zugesichert.
Sie gilt in Verbindung mit den zugehörigen Technischen Erläuterungen.

This technical information specifies semiconductor devices but promises no characteristics. It is
valid in combination with the belonging technical notes.

vorläufige Daten
preliminary dataAusgangskennlinie (typisch)
Output characteristic (typical)

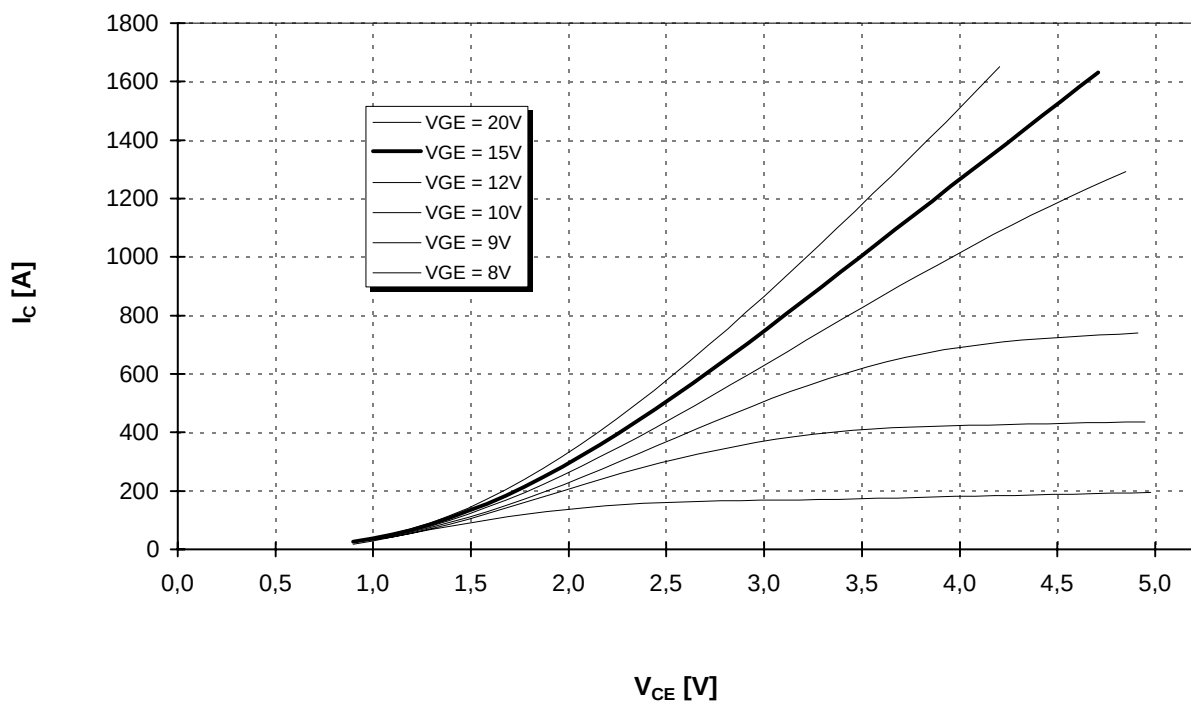
$$I_C = f(V_{CE})$$

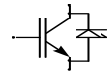
$$V_{GE} = 15V$$

Ausgangskennlinienfeld (typisch)
Output characteristic (typical)

$$I_C = f(V_{CE})$$

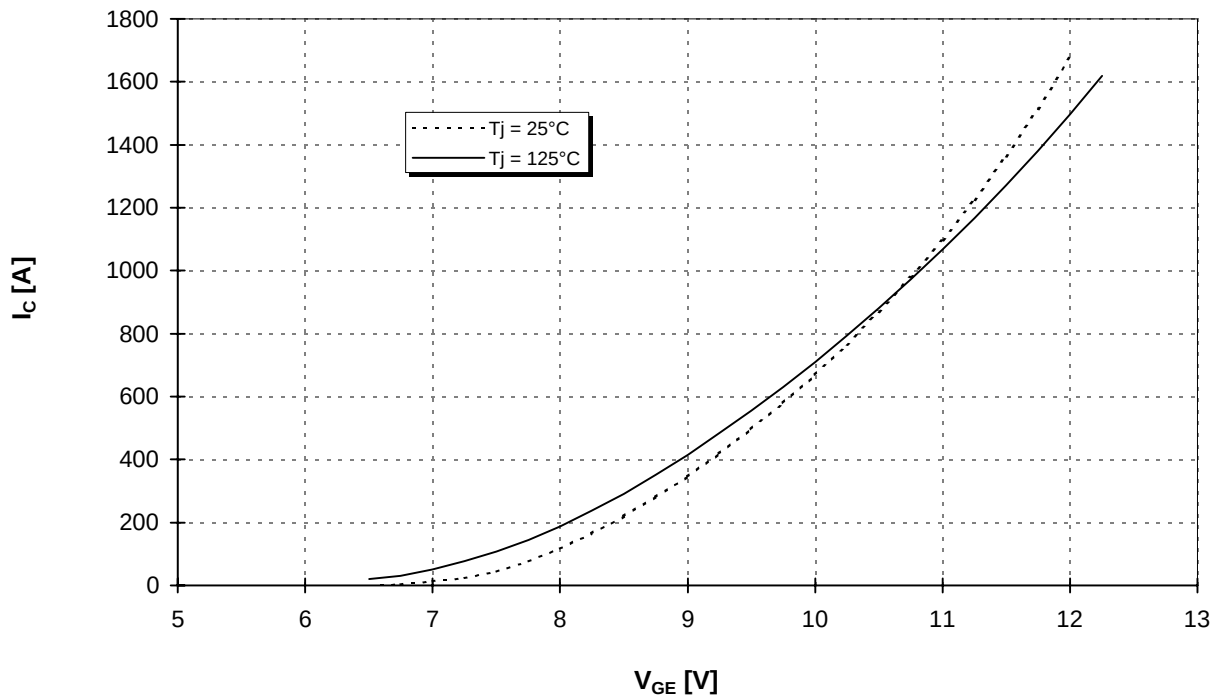
$$T_{vj} = 125^\circ C$$



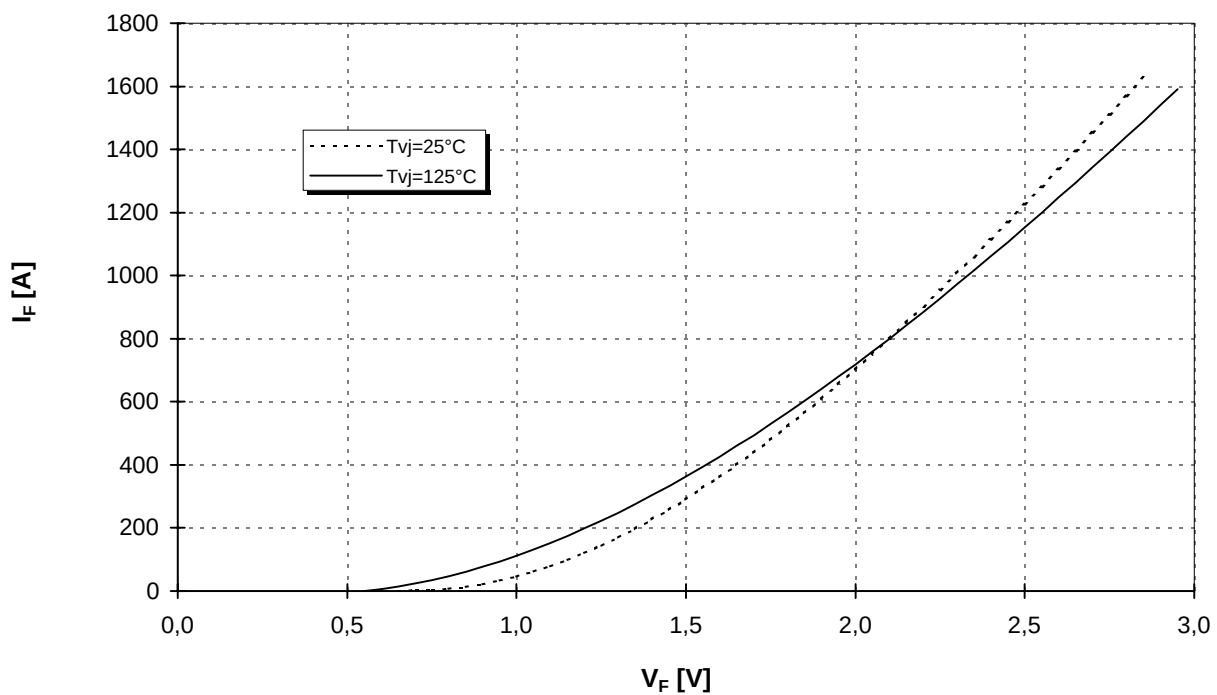
vorläufige Daten
preliminary dataÜbertragungscharakteristik (typisch)
Transfer characteristic (typical)

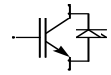
$$I_C = f(V_{GE})$$

$$V_{CE} = 20V$$

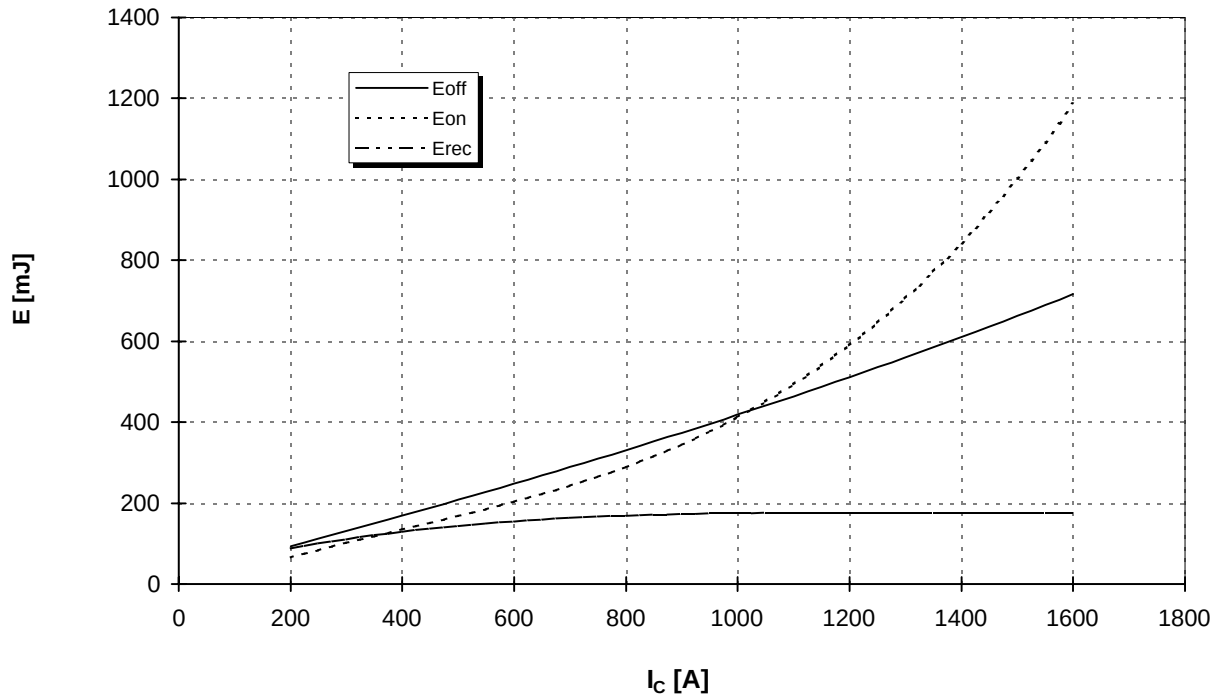
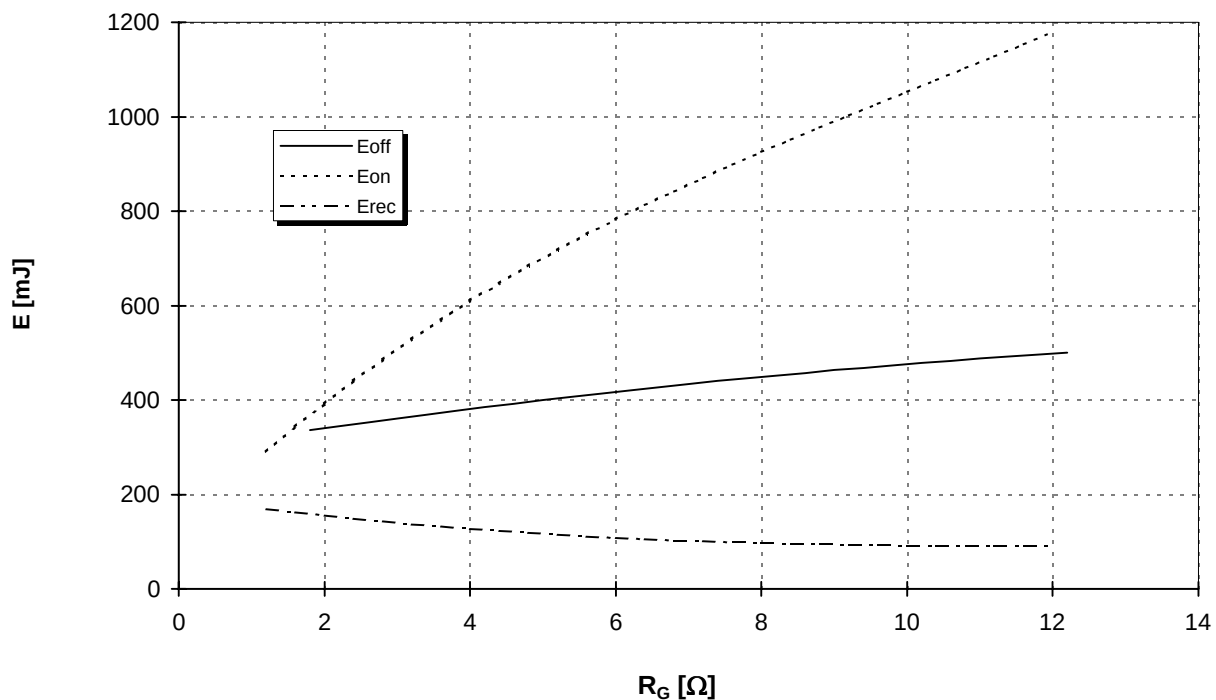
Durchlaßkennlinie der Inversdiode (typisch)
Forward characteristic of inverse diode (typical)

$$I_F = f(V_F)$$



vorläufige Daten
preliminary dataSchaltverluste (typisch) $E_{on} = f(I_C)$, $E_{off} = f(I_C)$, $E_{rec} = f(I_C)$

Switching losses (typical)

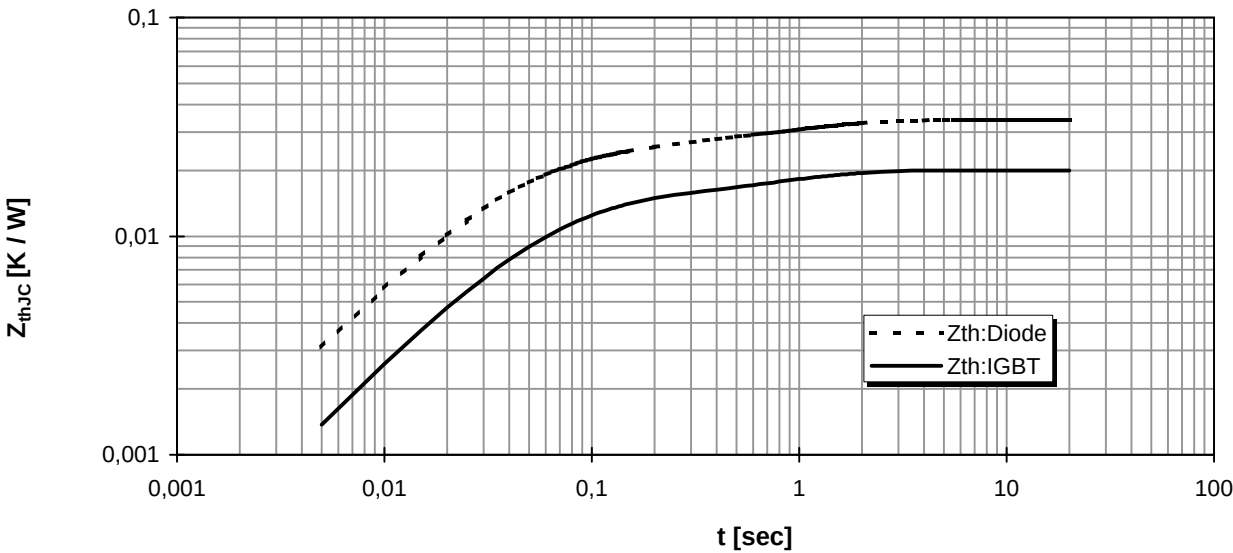
 $R_{gon} = 1,2 \Omega$; $R_{goff} = 1,8 \Omega$, $V_{CE} = 900V$, $T_J = 125^\circ C$, $V_{GE} = \pm 15V$ Schaltverluste (typisch)
Switching losses (typical) $E_{on} = f(R_G)$, $E_{off} = f(R_G)$, $E_{rec} = f(R_G)$ $I_C = 800A$, $V_{CE} = 900V$, $T_J = 125^\circ C$, $V_{GE} = \pm 15V$ 



vorläufige Daten
preliminary data

Transienter Wärmewiderstand
Transient thermal impedance

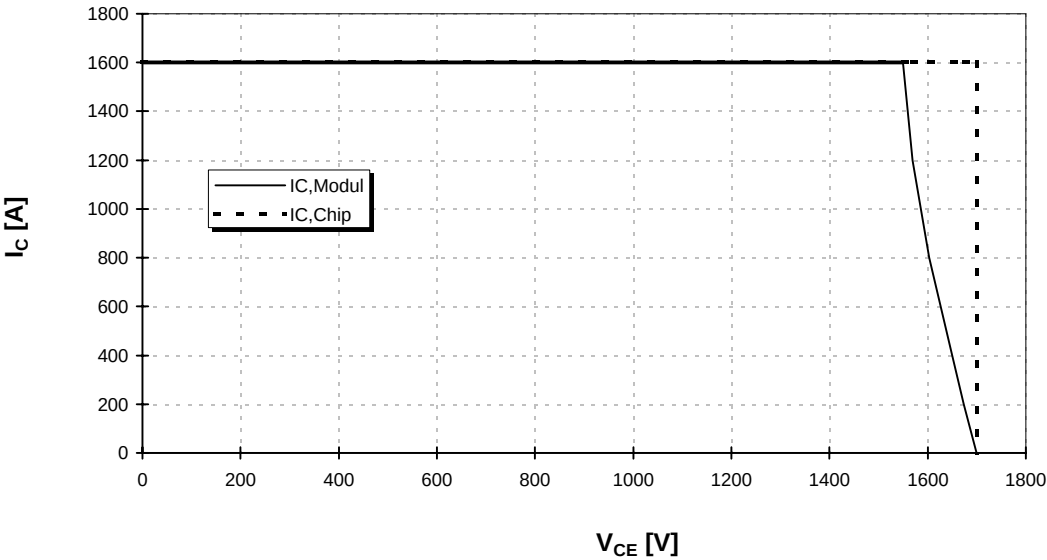
$Z_{thJC} = f(t)$

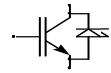


i	1	2	3	4
r_i [K/kW] : IGBT	1,88	9,43	2,85	5,84
τ_i [sec] : IGBT	0,027	0,052	0,09	0,838
r_i [K/kW] : Diode	15,7	7,05	2,24	9,05
τ_i [sec] : Diode	0,0287	0,0705	0,153	0,988

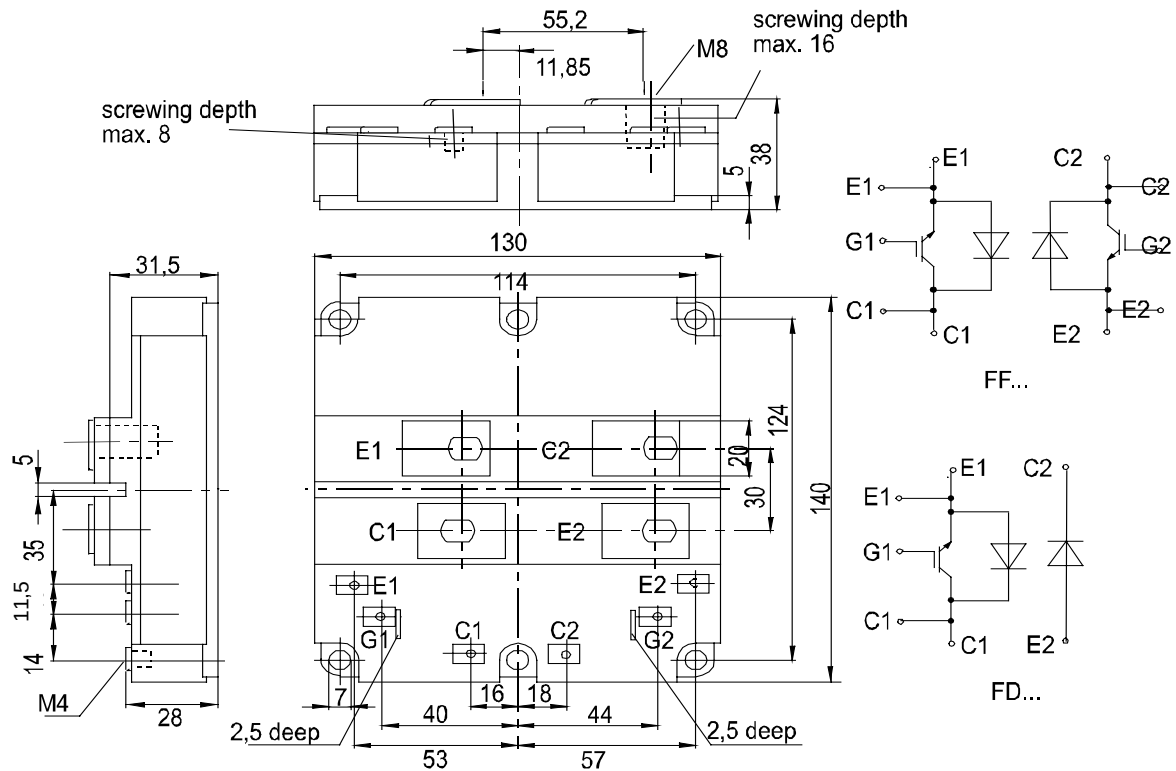
Sicherer Arbeitsbereich (RBSOA)
Reverse bias safe operation area (RBSOA)

$R_g = 1,8 \text{ Ohm}, T_{vj} = 125^\circ\text{C}$





Äußere Abmessungen / external dimensions



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