Technische Information / Technical Information

IGBT-Module
IGBT-Modules

FS 75 R 12 KS4

Vorläufige Daten
Preliminary data

Höchstzulässige Werte / Maximum rated values

Elektrische Eigenschaften / Electrical properties

Kollektor-Emitter-Sperrspannung collector-emitter voltage		V_{CES}	1200	V
Kollektor-Dauergleichstrom DC-collector current	T_C = 70°C T_C = 25 °C	$I_{C,nom.}$ I_C	75 100	A A
Periodischer Kollektor Spitzenstrom repetitive peak collector current	t_P = 1 ms, T_C = 80°C	I_{CRM}	150	A
Gesamt-Verlustleistung total power dissipation	T_C=25°C, Transistor	P_{tot}	500	W
Gate-Emitter-Spitzenspannung gate-emitter peak voltage		V_{GES}	+/- 20V	V
Dauergleichstrom DC forward current		I_F	75	A
Periodischer Spitzenstrom repetitive peak forw. current	t_P = 1 ms	I_{FRM}	150	A
Grenzlastintegral der Diode I^2t - value, Diode	V_R = 0V, t_p = 10ms, T_{vj} = 125°C	I^2t	2.450	A^2s
Isolations-Prüfspannung insulation test voltage	RMS, f = 50 Hz, t = 1 min.	V_{ISOL}	2.500	V

Charakteristische Werte / Characteristic values

Transistor / Transistor

			min.	typ.	max.	
Kollektor-Emitter Sättigungsspannung collector-emitter saturation voltage	I_C = 75A, V_{GE} = 15V, Tvj = 25°C I_C = 75A, V_{GE} = 15V, T_{vj} = 125°C	$V_{CE\ sat}$	- -	3,00 3,60	- -	V V
Gate-Schwellenspannung gate threshold voltage	I_C = 3 mA, V_{CE} = V_{GE}, T_{vj} = 25°C	$V_{GE(th)}$	4,5	5,5	6,5	V
Eingangskapazität input capacitance	f = 1MHz,T_{vj} = 25°C,V_{CE} = 25V, V_{GE} = 0V	C_{ies}	-	5,1	-	nF
Rückwirkungskapazität reverse transfer capacitance	f = 1MHz,T_{vj} = 25°C,V_{CE} = 25V, V_{GE} = 0V	C_{res}	-	t.b.d.	-	nF
Gateladung gate charge	V_{GE} = -15V ... + 15V, V_{CE} = 600V	Q_G	-	0,8	-	µC
Kollektor-Emitter Reststrom collector-emitter cut-off current	V_{CE} = 1200V, V_{GE} = 0V, T_{vj} = 25°C V_{CE} = 1200V, V_{GE} = 0V, T_{vj} = 125°C	I_{CES}	- -	50 t.b.d.	- -	µA mA
Gate-Emitter Reststrom gate-emitter leakage current	V_{CE} = 0V, V_{GE} = 20V, T_{vj} = 25°C	I_{GES}	-	-	400	nA

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Charakteristische Werte / Characteristic values

Transistor / Transistor			**min.**	**typ.**	**max.**	
Einschaltverzögerungszeit (ind. Last) turn on delay time (inductive load)	I_C = 75 A, V_{CC} = 600V					
	V_{GE} = ±15V, R_G = 13 Ω, T_{vj} = 25°C	$t_{d,on}$	-	100	-	ns
	V_{GE} = ±15V, R_G = 13 Ω, T_{vj} = 125°C		-	125	-	ns
Anstiegszeit (induktive Last) rise time (inductive load)	I_C = 75 A, V_{CC} = 600V					
	V_{GE} = ±15V, R_G = 13 Ω, T_{vj} = 25°C	t_r	-	90	-	ns
	V_{GE} = ±15V, R_G = 13 Ω, T_{vj} = 125°C		-	100	-	ns
Abschaltverzögerungszeit (ind. Last) turn off delay time (inductive load)	I_C = 75 A, V_{CC} = 600V					
	V_{GE} = ±15V, R_G = 13 Ω, T_{vj} = 25°C	$t_{d,off}$	-	530	-	ns
	V_{GE} = ±15V, R_G = 13 Ω, T_{vj} = 125°C		-	590	-	ns
Fallzeit (induktive Last) fall time (inductive load)	I_C = 75 A, V_{CC} = 600V					
	V_{GE} = ±15V, R_G = 13 Ω, T_{vj} = 25°C	t_f	-	60	-	ns
	V_{GE} = ±15V, R_G = 13 Ω, T_{vj} = 125°C		-	70	-	ns
Einschaltverlustenergie pro Puls turn-on energy loss per pulse	I_C = 75 A, V_{CC} = 600V, V_{GE} = 15V					
	R_G = 13 Ω, T_{vj} = 125°C, L_S = 70nH	E_{on}	-	7,1	-	mWs
Abschaltverlustenergie pro Puls turn-off energy loss per pulse	I_C = 75 A, V_{CC} = 600V, V_{GE} = 15V					
	R_G = 13 Ω, T_{vj} = 125°C, L_S = 70nH	E_{off}	-	6,0	-	mWs
Kurzschlußverhalten SC Data	$t_P \leq$ 10µsec, $V_{GE} \leq$ 15V					
	$T_{vj} \leq$125°C, V_{CC}= 900V, V_{CEmax}=V_{CES} -L_{sCE} ·dI/dt	I_{SC}	-	540	-	A
Modulinduktivität stray inductance module		L_{sCE}	-	28	-	nH
Modul-Leitungswiderstand, Anschlüsse - Chip lead resistance, terminals - chip		$R_{CC'+EE'}$	-	1,8	-	mΩ

Charakteristische Werte / Characteristic values

Diode / Diode			**min.**	**typ.**	**max.**	
Durchlaßspannung forward voltage	I_F = 75 A, V_{GE} = 0V, T_{vj} = 25°C	V_F	-	2,00	-	V
	I_F = 75 A, V_{GE} = 0V, T_{vj} = 125°C		-	1,70	-	V
Rückstromspitze peak reverse recovery current	I_F = 75 A, - di_F/dt = 800 A/µsec					
	V_R = 600V, VGE = -10V, T_{vj} = 25°C	I_{RM}	-	50	-	A
	V_R = 600V, VGE = -10V, T_{vj} = 125°C		-	85	-	A
Sperrverzögerungsladung recovered charge	I_F = 75 A, - di_F/dt = 800 A/µsec					
	V_R = 600V, VGE = -10V, T_{vj} = 25°C	Q_r	-	5,5	-	µAs
	V_R = 600V, VGE = -10V, T_{vj} = 125°C		-	15	-	µAs
Abschaltenergie pro Puls reverse recovery energy	I_F = 75 A, - di_F/dt = 800 A/µsec					
	V_R = 600V, VGE = -10V, T_{vj} = 25°C	E_{rec}	-	3	-	mWs
	V_R = 600V, VGE = -10V, T_{vj} = 125°C		-	7,1	-	mWs

Vorläufige Daten
Preliminary data

Thermische Eigenschaften / Thermal properties

			min.	typ.	max.	
Innerer Wärmewiderstand thermal resistance, junction to case	Transistor / transistor,DC , pro Modul / per module	R_{thJC}	-	-	0,042	K/W
	Transistor / transistor,DC , pro Zweig / per arm		-	-	0,250	K/W
	Diode / Diode, DC, pro Modul / per module		-	-	0,072	K/W
	Diode / Diode, DC, pro Zweig / per arm		-	-	0,430	K/W
Übergangs-Wärmewiderstand thermal resistance, case to heatsink	pro Modul / per module	R_{thCK}	-	0,009	-	K/W
	pro Zweig / per arm		-	0,054	-	K/W
	λ_{Paste} = 1 W/m*K / λ_{grease} = 1 W/m*K					
Höchstzulässige Sperrschichttemperatur maximum junction temperature		T_{vj}	-	-	150	°C
Betriebstemperatur operation temperature		T_{op}	-40	-	125	°C
Lagertemperatur storage temperature		T_{stg}	-40	-	150	°C

Mechanische Eigenschaften / Mechanical properties

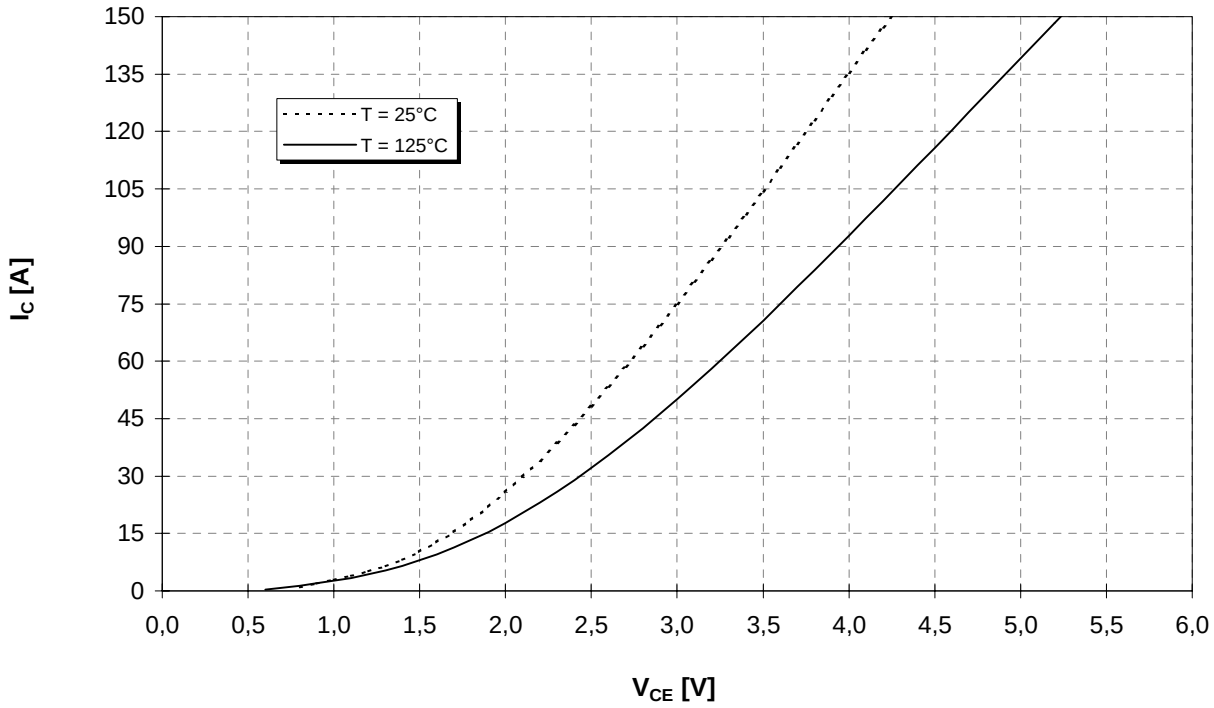
Gehäuse, siehe Anlage case, see appendix				
Material Modulgrundplatte material of module baseplate			Cu	
Innere Isolation internal insulation			Al_2O_3	
CTI comperative tracking index			225	
Anzugsdrehmoment f. mech. Befestigung mounting torque		M1	3 ... 6	Nm
Anzugsdrehmoment f. elektr. Anschlüsse terminal connection torque				
Gewicht weight		G	300	g

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

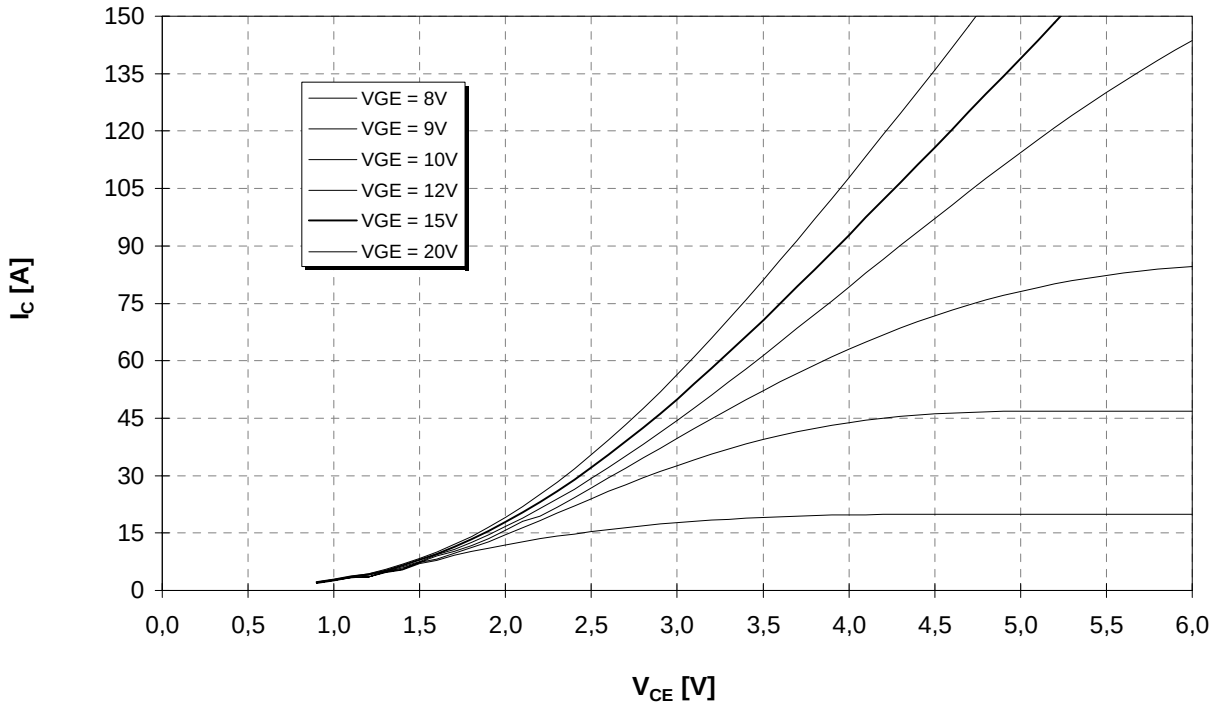
This technical information specifies semiconductor devices but promises no characteristics. It is valid in combination with the belonging technical notes.

Vorläufige Daten
Preliminary data

Ausgangskennlinie (typisch) $I_C = f(V_{CE})$
Output characteristic (typical) $V_{GE} = 15V$

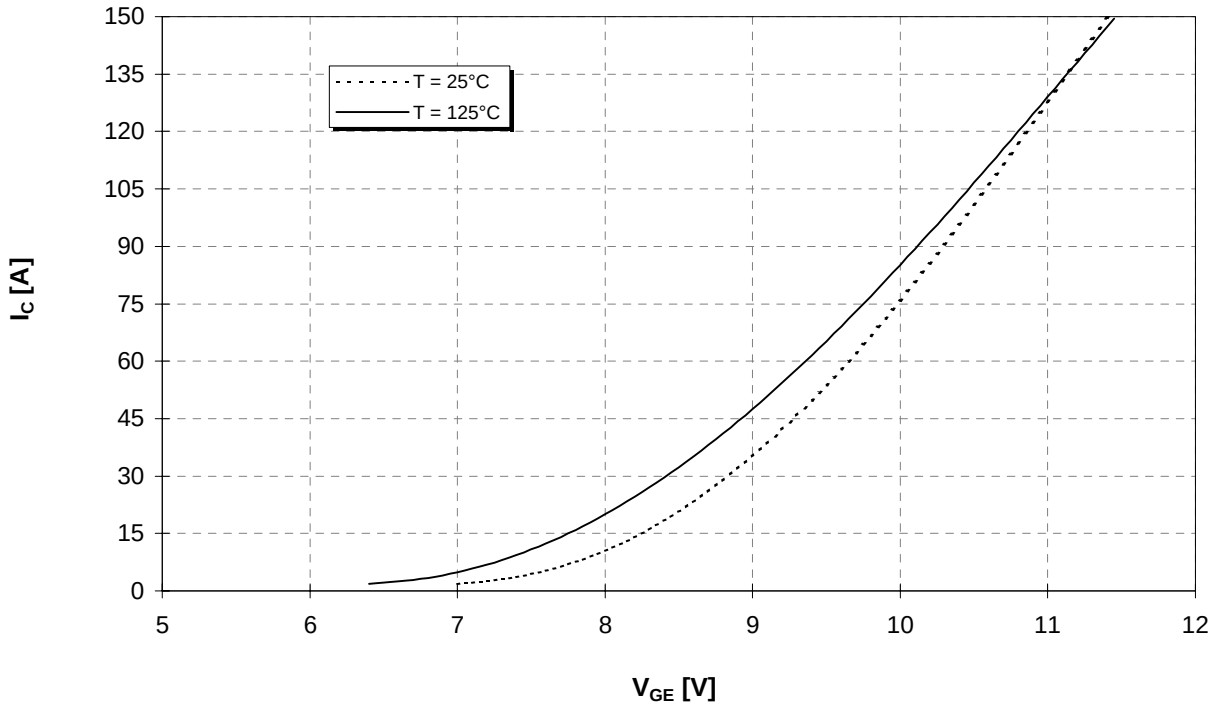


Ausgangskennlinienfeld (typisch) $I_C = f(V_{CE})$
Output characteristic (typical) $T_{vj} = 125°C$

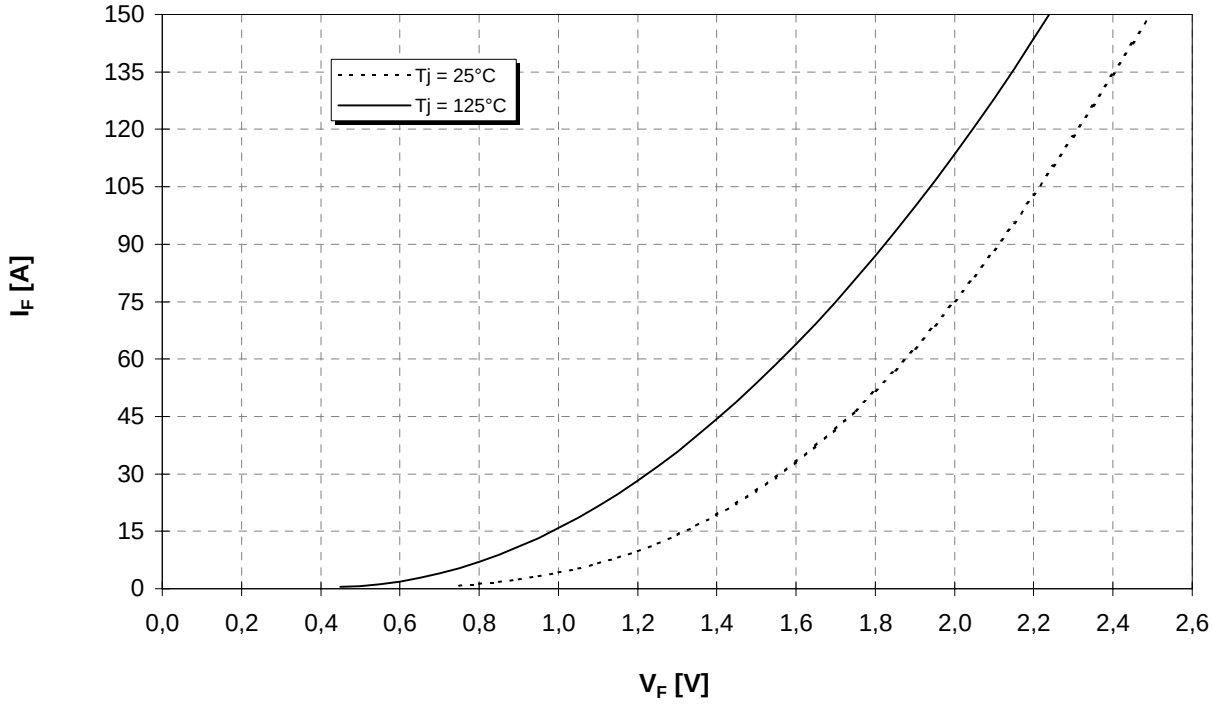


Vorläufige Daten
Preliminary data

Übertragungscharakteristik (typisch) $I_C = f(V_{GE})$
Transfer characteristic (typical) $V_{CE} = 20V$

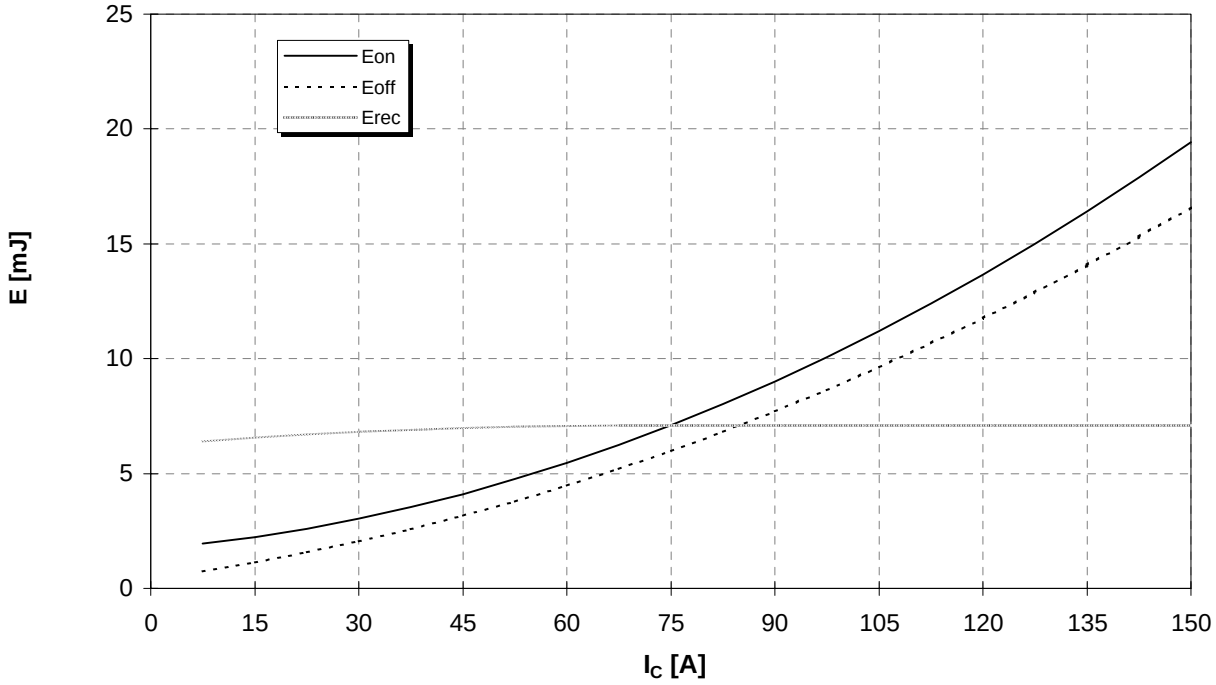


Durchlaßkennlinie der Inversdiode (typisch) $I_F = f(V_F)$
Forward characteristic of inverse diode (typical)

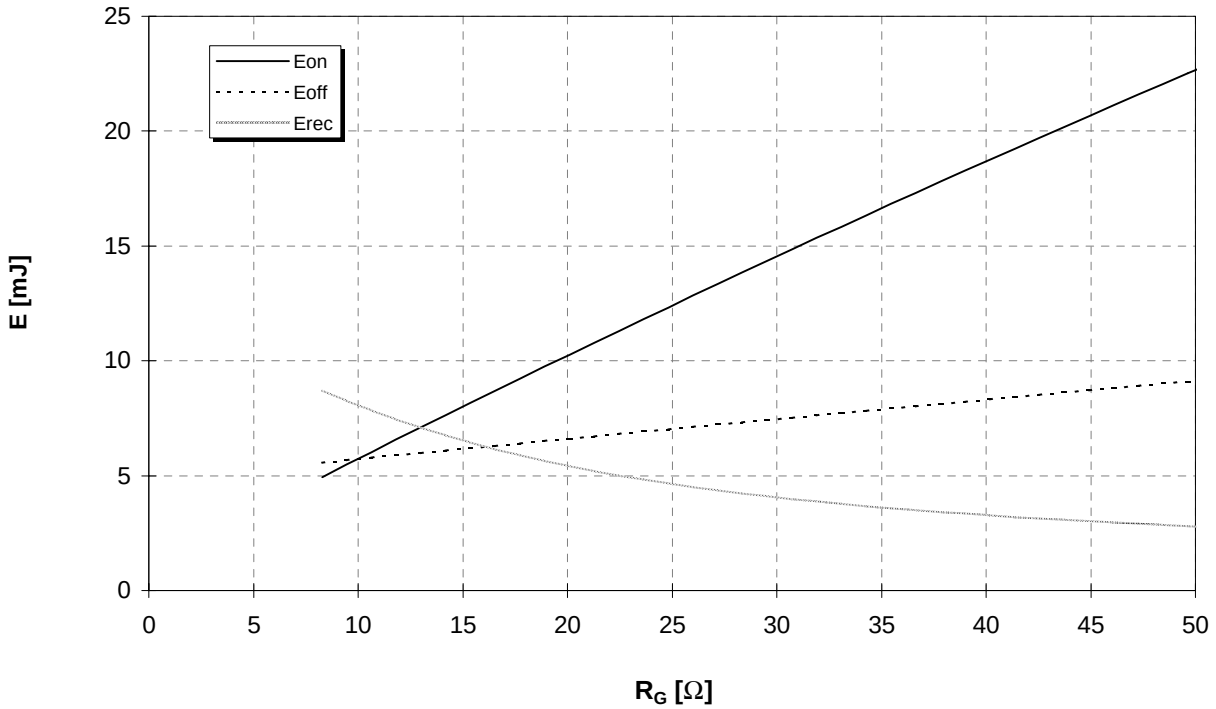


Vorläufige Daten
Preliminary data

Schaltverluste (typisch) $E_{on} = f(I_C)$, $E_{off} = f(I_C)$, $E_{rec} = f(I_C)$
Switching losses (typical) $R_{G,on} = 13\ \Omega$, $R_{G,off} = 13\ \Omega$, $V_{CE} = 600V$, $T_j = 125°C$



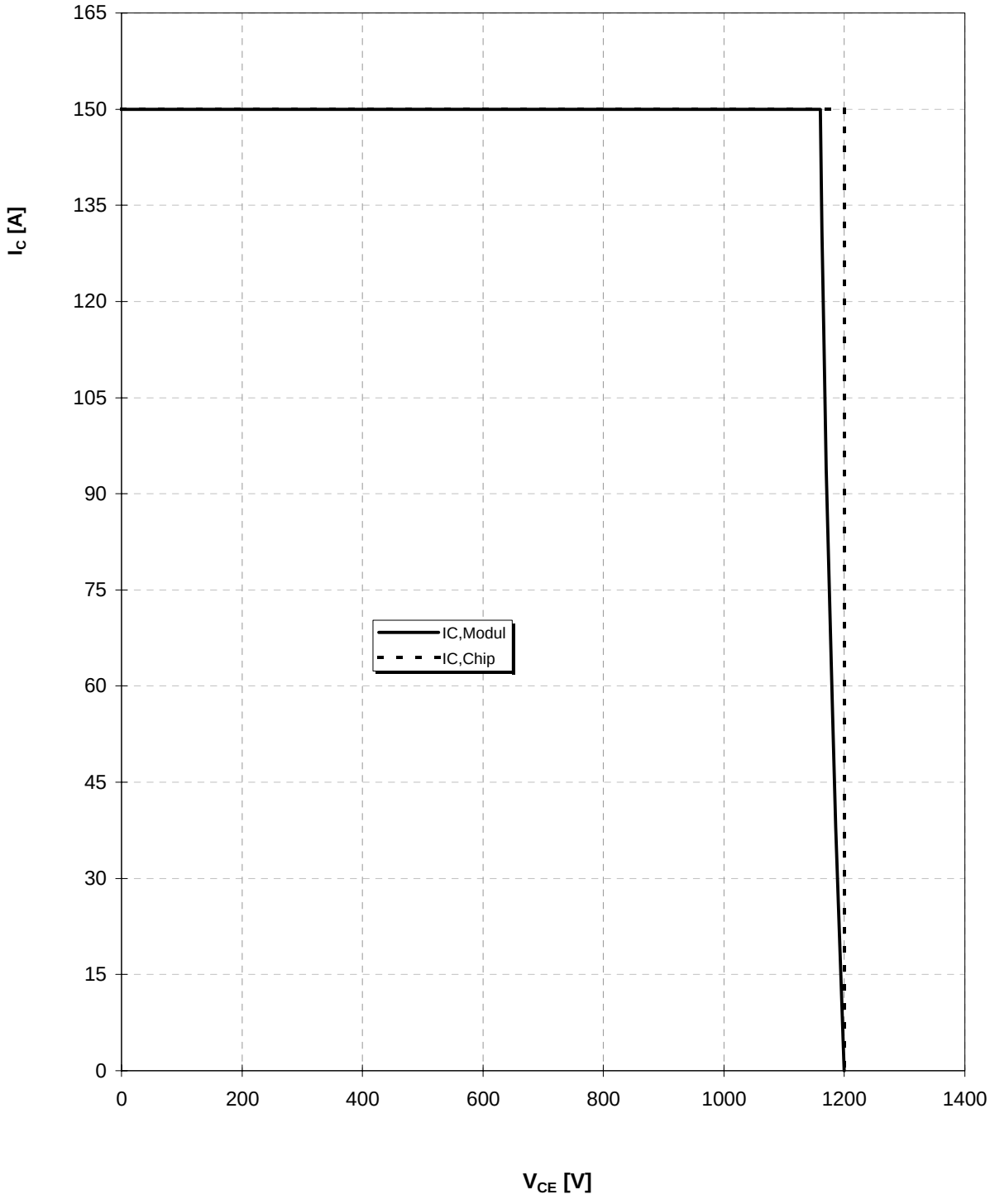
Schaltverluste (typisch) $E_{on} = f(R_G)$, $E_{off} = f(R_G)$, $E_{rec} = f(R_G)$
Switching losses (typical) $I_C = 75\ A$, $V_{CE} = 600V$, $T_j = 125°C$



Vorläufige Daten
Preliminary data

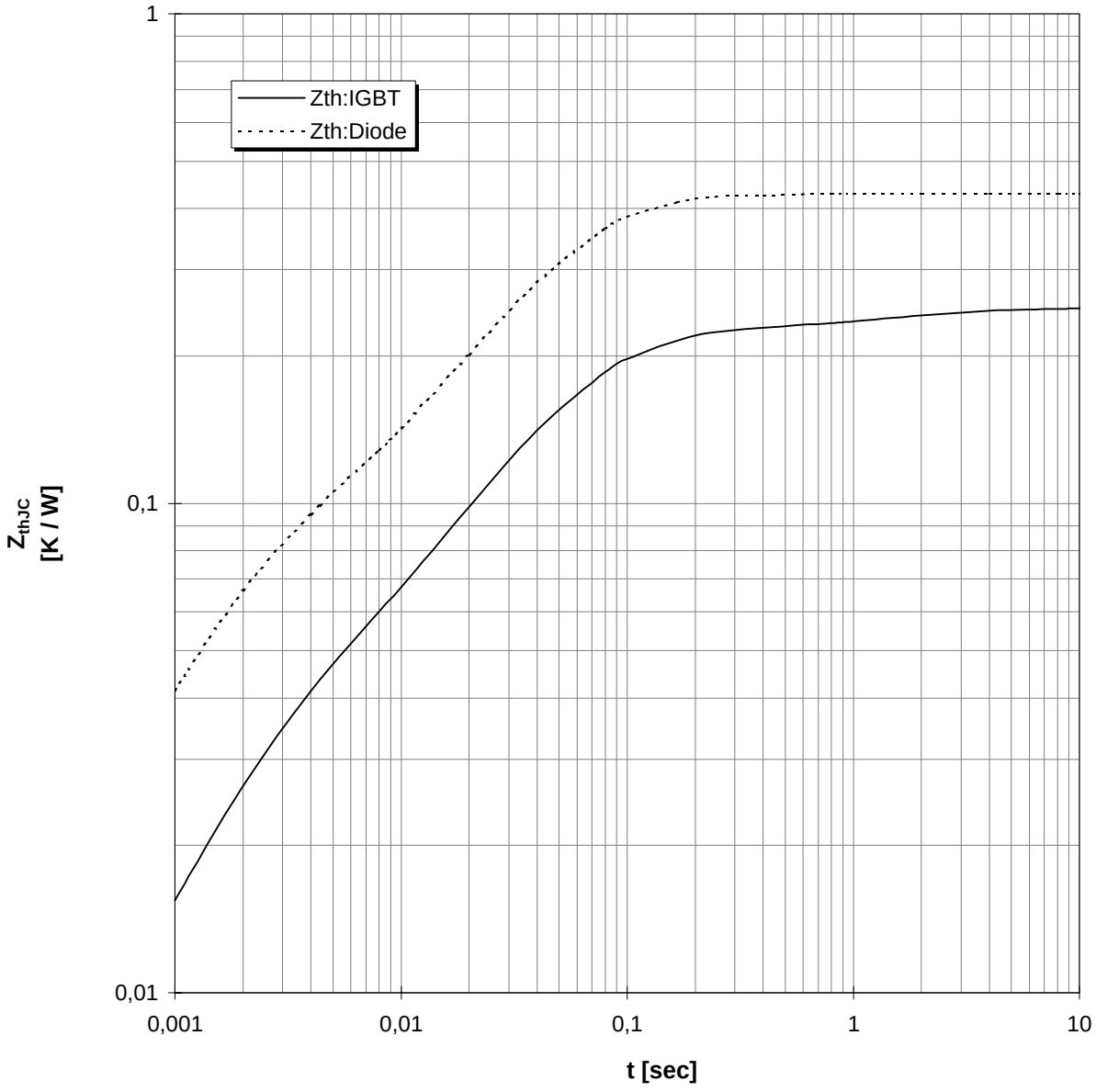
Sicherer Arbeitsbereich IGBT (RBSOA)
Reverse bias safe operation area IGBT (RBSOA)

$R_{G,off}$ = 13 Ω, T_{vj}= 125°C



Vorläufige Daten
Preliminary data

Transienter Wärmewiderstand $Z_{thJC} = f(t)$
Transient thermal impedance

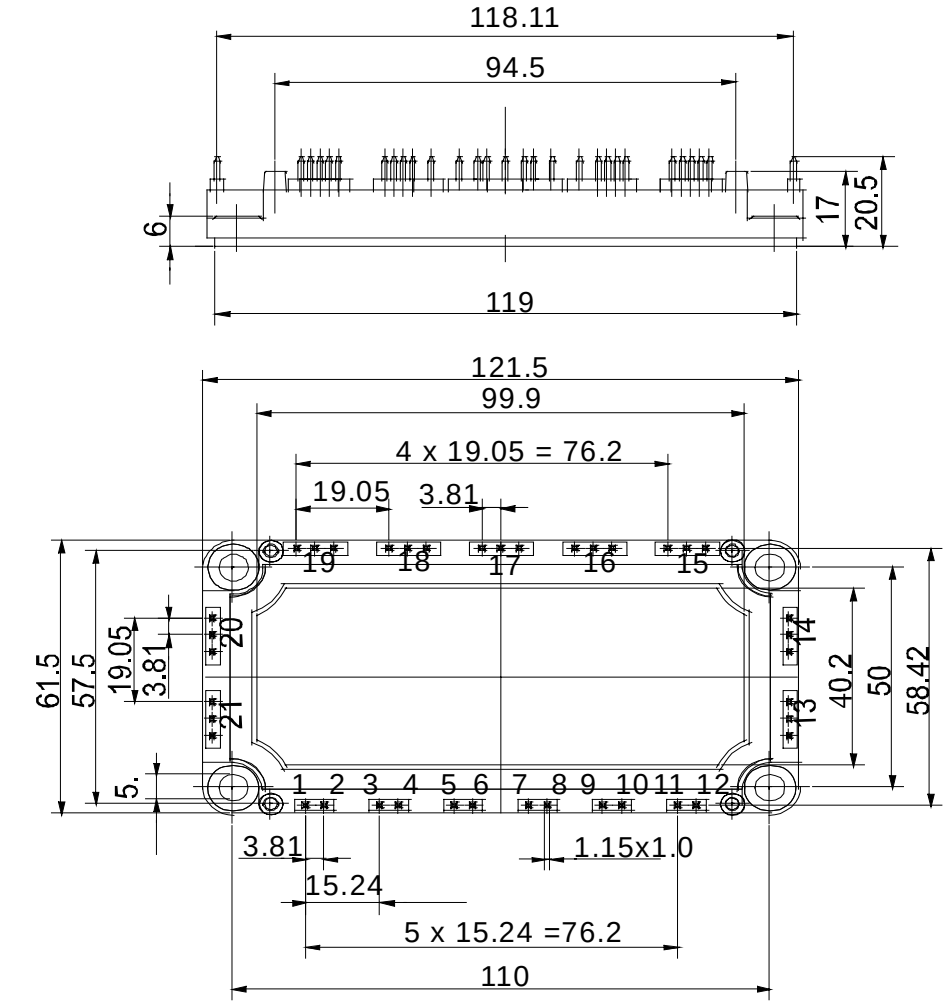


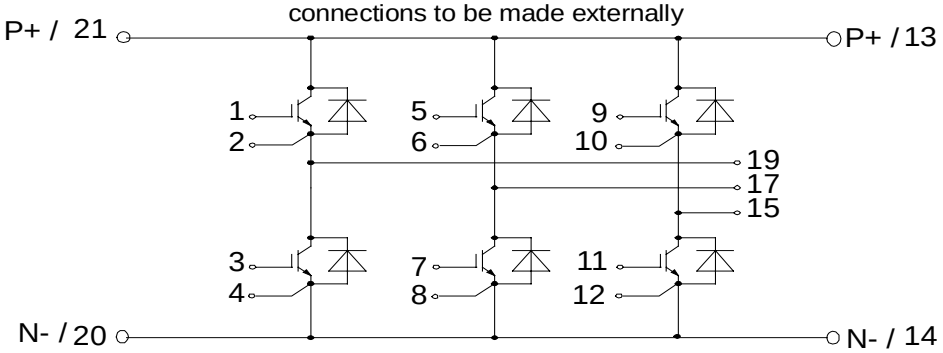
i		1	2	3	4
r_i [K/kW]	: IGBT	27,96	84,63	110,28	27,13
τ_i [sec]	: IGBT	0,0020	0,0300	0,0660	1,6550
r_i [K/kW]	: Diode	66,53	174,82	180,16	8,48
τ_i [sec]	: Diode	0,0015	0,0327	0,0561	0,3872

Vorläufige Daten
Preliminary data

Gehäusemaße / Schaltbild
Package outline / Circuit diagram

Econo 3





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