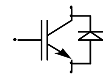


Höchstzulässige Werte / Maximum rated values

Elektrische Eigenschaften / Electrical properties

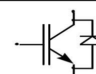
Kollektor-Emitter-Sperrspannung collector-emitter voltage		V_{CES}	1700	V
Kollektor-Dauergleichstrom DC-collector current	T_C = 80 °C T_C = 25 °C	$I_{C,nom.}$ I_C	200 400	A A
Periodischer Kollektor Spitzenstrom repetitive peak collctor current	t_P = 1 ms, T_C=80°C	I_{CRM}	400	A
Gesamt-Verlustleistung total power dissipation	T_C=25°C, Transistor	P_{tot}	1660	W
Gate-Emitter-Spitzenspannung gate-emitter peak voltage		V_{GES}	+/- 20V	V
Dauergleichstrom DC forward current		I_F	200	A
Periodischer Spitzenstrom repetitive peak forw. current	tp = 1 ms	I_{FRM}	400	A
Grenzlastintegral der Diode I^2t - value, Diode	V_R = 0V, t_p = 10ms, T_{Vj} = 125°C	I^2t	11.000	A^2s
Isolations-Prüfspannung insulation test voltage	RMS, f = 50 Hz, t = 1 min.	V_{ISOL}	3,4	kV

Charakteristische Werte / Characteristic values

Transistor / Transistor

			min.	typ.	max.	
Kollektor-Emitter Sättigungsspannung collector-emitter saturation voltage	I_C = 200A, V_{GE} = 15V, T_{vj} = 25°C I_C = 200A, V_{GE} = 15V, T_{vj} = 125°C	$V_{CE\,sat}$	- -	2,6 3,1	3,2 3,6	V V
Gate-Schwellenspannung gate threshold voltage	I_C = 9mA, V_{CE} = V_{GE}, T_{vj} = 25°C	$V_{GE(th)}$	4,5	5,5	6,5	V
Gateladung gate charge	V_{GE} = -15V ... +15V	Q_G	-	2,4	-	µC
Eingangskapazität input capacitance	f = 1MHz,T_{vj} = 25°C,V_{CE} = 25V, V_{GE} = 0V	C_{ies}	-	15	-	nF
Rückwirkungskapazität reverse transfer capacitance	f = 1MHz,T_{vj} = 25°C,V_{CE} = 25V, V_{GE} = 0V	C_{res}	-	0,7	-	nF
Kollektor-Emitter Reststrom collector-emitter cut-off current	V_{CE} = 1700V, V_{GE} = 0V, T_{vj} = 25°C V_{CE} = 1700V, V_{GE} = 0V, T_{vj} = 125°C	I_{CES}	- -	0,05 6	0,5	mA mA
Gate-Emitter Reststrom gate-emitter leakage current	V_{CE} = 0V, V_{GE} = 20V, T_{vj} = 25°C	I_{GES}	-	-	200	nA

prepared by: Regine Mallwitz	date of publication: 28.11.2000
approved by: Christoph Lübke; 28.11.2000	revision: 2 (Series)



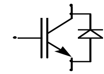
Charakteristische Werte / Characteristic values

Transistor / Transistor			min.	typ.	max.	
Einschaltverzögerungszeit (ind. Last) turn on delay time (inductive load)	I_C = 200A, V_{CE} = 900V					
	V_{GE} = ±15V, R_G = 7,5Ω, T_{vj} = 25°C	$t_{d,on}$	-	0,1	-	µs
	V_{GE} = ±15V, R_G = 7,5Ω, T_{vj} = 125°C		-	0,1	-	µs
Anstiegszeit (induktive Last) rise time (inductive load)	I_C = 200A, V_{CE} = 900V					
	V_{GE} = ±15V, R_G = 7,5Ω, T_{vj} = 25°C	t_r	-	0,1	-	µs
	V_{GE} = ±15V, R_G = 7,5Ω, T_{vj} = 125°C		-	0,1	-	µs
Abschaltverzögerungszeit (ind. Last) turn off delay time (inductive load)	I_C = 200A, V_{CE} = 900V					
	V_{GE} = ±15V, R_G = 7,5Ω, T_{vj} = 25°C	$t_{d,off}$	-	0,8	-	µs
	V_{GE} = ±15V, R_G = 7,5Ω, T_{vj} = 125°C		-	0,9	-	µs
Fallzeit (induktive Last) fall time (inductive load)	I_C = 200A, V_{CE} = 900V					
	V_{GE} = ±15V, R_G = 7,5Ω, T_{vj} = 25°C	t_f	-	0,03	-	µs
	V_{GE} = ±15V, R_G = 7,5Ω, T_{vj} = 125°C		-	0,03	-	µs
Einschaltverlustenergie pro Puls turn-on energy loss per pulse	I_C = 200A, V_{CE} = 900V, V_{GE} = 15V R_G = 7,5Ω, T_{vj} = 125°C, L_S = 60nH	E_{on}	-	90	-	mWs
Abschaltverlustenergie pro Puls turn-off energy loss per pulse	I_C = 200A, V_{CE} = 900V, V_{GE} = 15V R_G = 7,5Ω, T_{vj} = 125°C, L_S = 60nH	E_{off}	-	65	-	mWs
Kurzschlußverhalten SC Data	t_P ≤ 10µsec, V_{GE} ≤ 15V, R_G = 7,5Ω T_{Vj}≤125°C, V_{CC}=1000V, V_{CEmax}=V_{CES} -L_{sCE} ·dI/dt	I_{SC}	-	800	-	A
Modulinduktivität stray inductance module		L_{sCE}	-	30	-	nH
Modulleitungswiderstand, Anschlüsse - Chip module lead resistance, terminals - chip	pro Zweig / per arm	$R_{CC'+EE'}$	-	0,6	-	mΩ

Charakteristische Werte / Characteristic values

Diode / Diode			min.	typ.	max.	
Durchlaßspannung forward voltage	I_F = 200A, V_{GE} = 0V, T_{vj} = 25°C	V_F	-	2,1	2,5	V
	I_F = 200A, V_{GE} = 0V, T_{vj} = 125°C		-	2,1	2,5	V
Rückstromspitze peak reverse recovery current	I_F = 200A, - di_F/dt = 2300A/µsec					
	V_R = 900V, VGE = -10V, T_{vj} = 25°C	I_{RM}	-	160	-	A
	V_R = 900V, VGE = -10V, T_{vj} = 125°C		-	200	-	A
Sperrverzögerungsladung recovered charge	I_F = 200A, - di_F/dt = 2300A/µsec					
	V_R = 900V, VGE = -10V, T_{vj} = 25°C	Q_r	-	60	-	µAs
	V_R = 900V, VGE = -10V, T_{vj} = 125°C		-	105	-	µAs
Abschaltenergie pro Puls reverse recovery energy	I_F = 200A, - di_F/dt = 2300A/µsec					
	V_R = 900V, VGE = -10V, T_{vj} = 25°C	E_{rec}	-	25	-	mWs
	V_R = 900V, VGE = -10V, T_{vj} = 125°C		-	50	-	mWs

eupec



Thermische Eigenschaften / Thermal properties

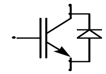
			min.	typ.	max.	
Innerer Wärmewiderstand thermal resistance, junction to case	Transistor / transistor, DC	R_{thJC}	-	-	0,075	K/W
	Diode/Diode, DC		-	-	0,15	K/W
Übergangs-Wärmewiderstand thermal resistance, case to heatsink	pro Modul / per Module $d_{Paste} \leq 50µm$ / $d_{grease} \leq 50µm$	R_{thCK}	-	-	0,012	K/W
Höchstzulässige Sperrschichttemperatur maximum junction temperature		T_{vj}	-	-	150	°C
Betriebstemperatur operation temperature		T_{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			Al_2O_3	
Kriechstrecke creepage distance			20	mm
Luftstrecke clearance			11	mm
CTI comperative tracking index				
Anzugsdrehmoment f. mech. Befestigung mounting torque		max.	5	Nm
Anzugsdrehmoment f. elektr. Anschlüsse terminal connection torque	terminals M6	max.	5	Nm
Gewicht weight		G	420	g

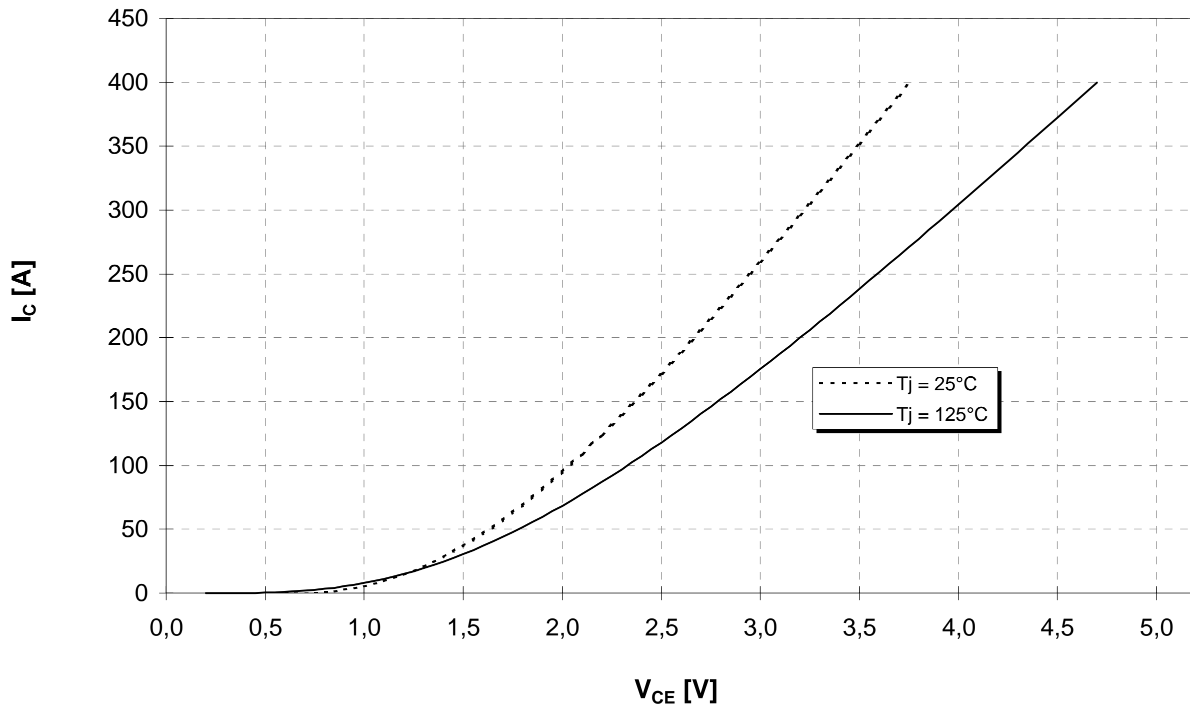
Mit dieser technischen Information werden Halbleiterbauelemente spezifiziert, jedoch keine Eigenschaften zugesichert. Sie gilt in Verbindung mit den zugehörigen Technischen Erläuterungen.

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



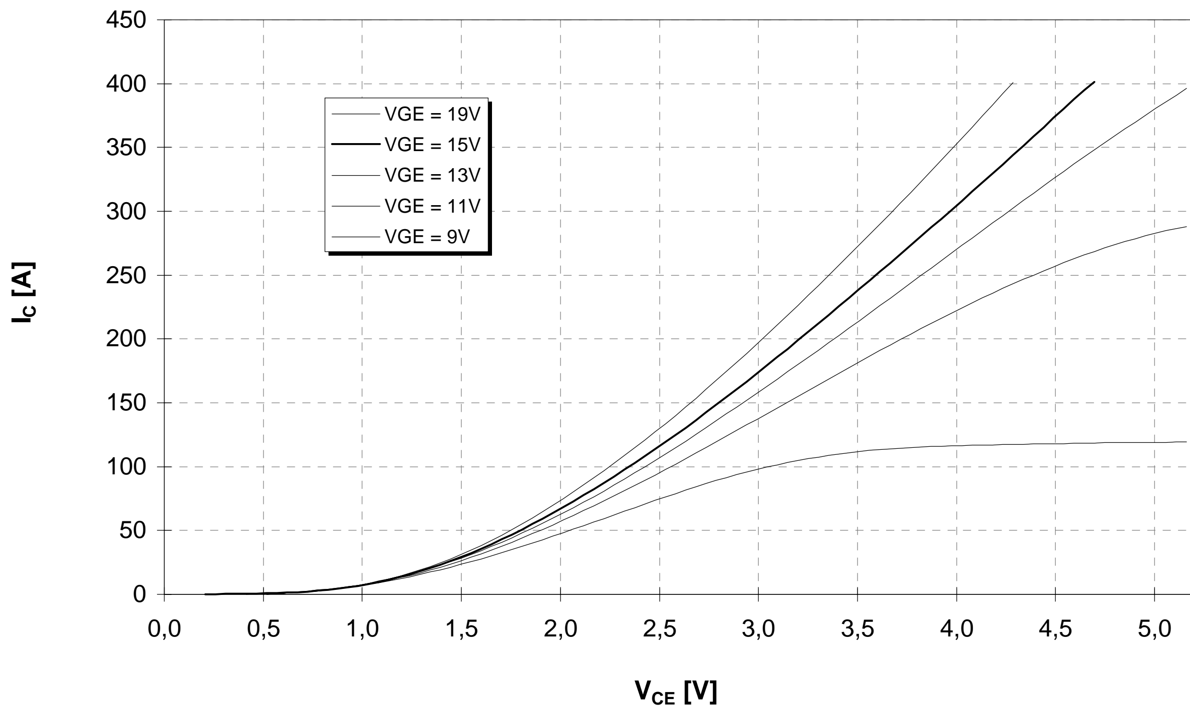
Ausgangskennlinie (typisch)
Output characteristic (typical)

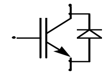
$I_C = f(V_{CE})$
$V_{GE} = 15V$



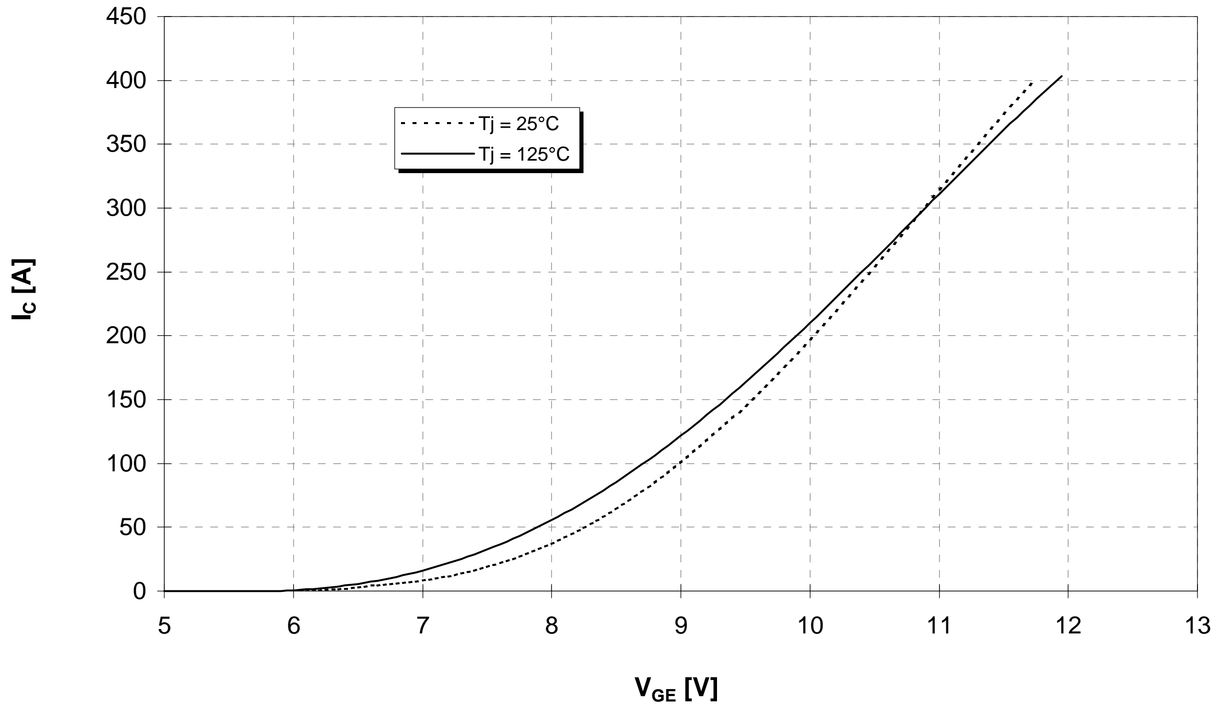
Ausgangskennlinienfeld (typisch)
Output characteristic (typical)

$I_C = f(V_{CE})$
$T_{vj} = 125°C$

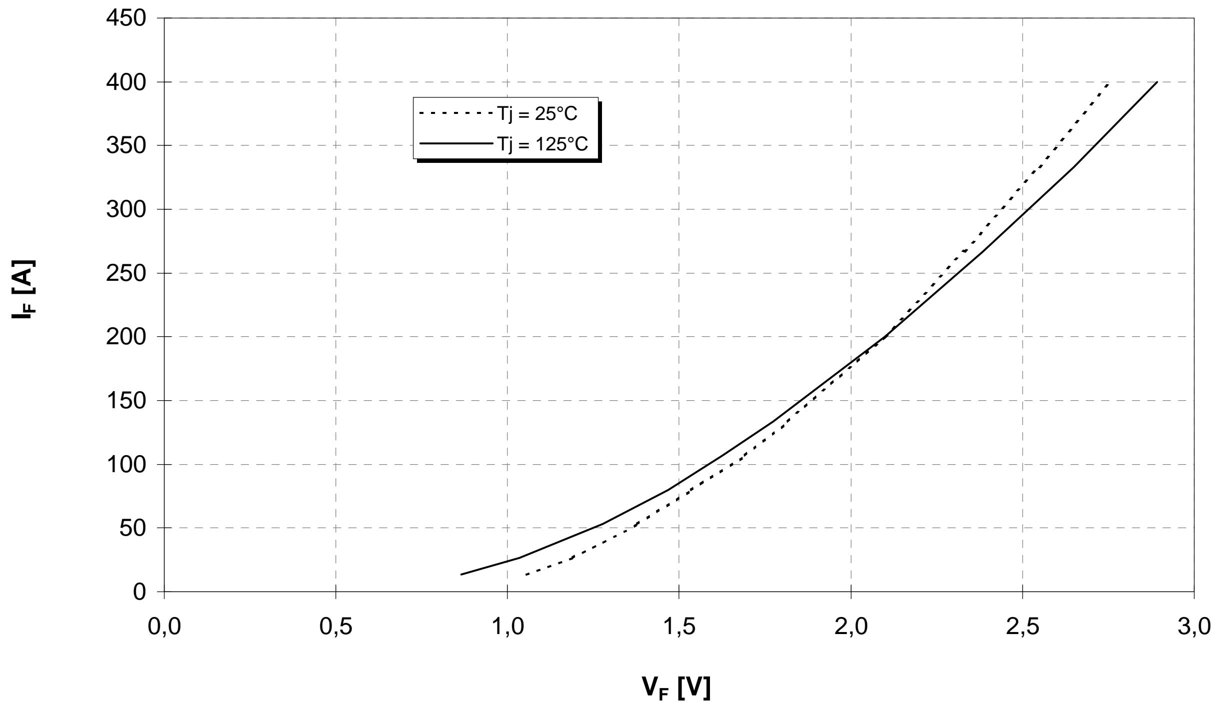


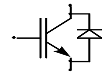


Übertragungscharakteristik (typisch) $I_C = f(V_{GE})$
Transfer characteristic (typical) $V_{CE} = 20V$

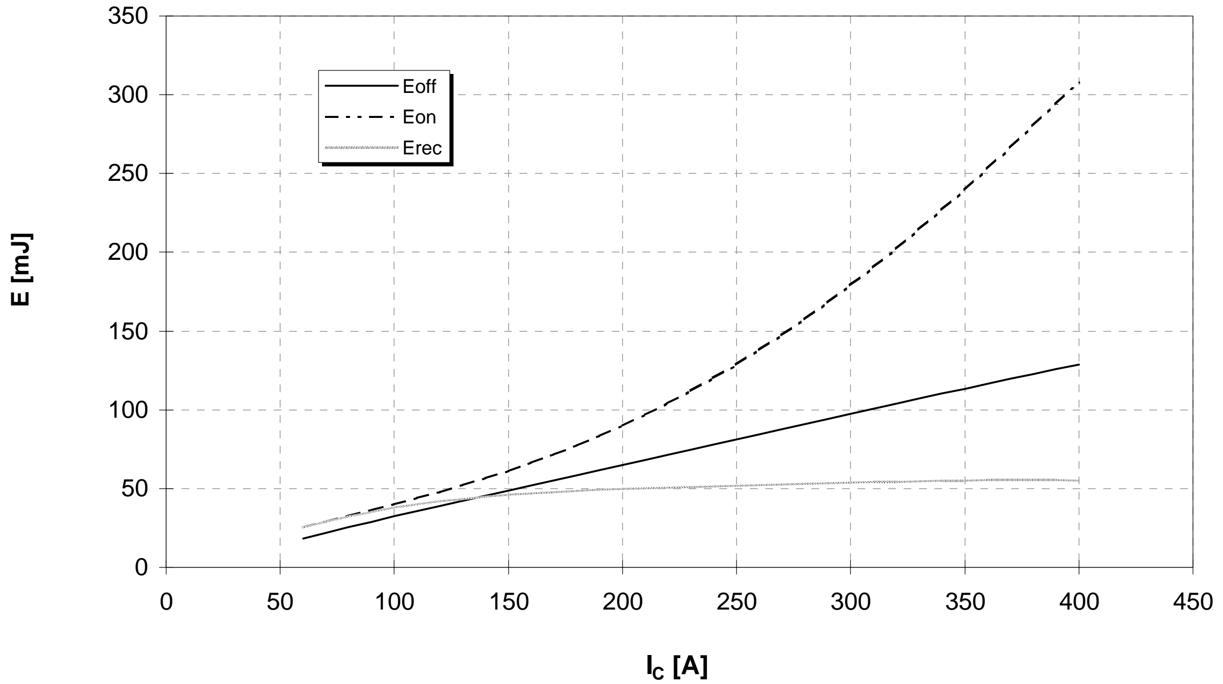


Durchlaßkennlinie der Inversdiode (typisch) $I_F = f(V_F)$
Forward characteristic of inverse diode (typical)

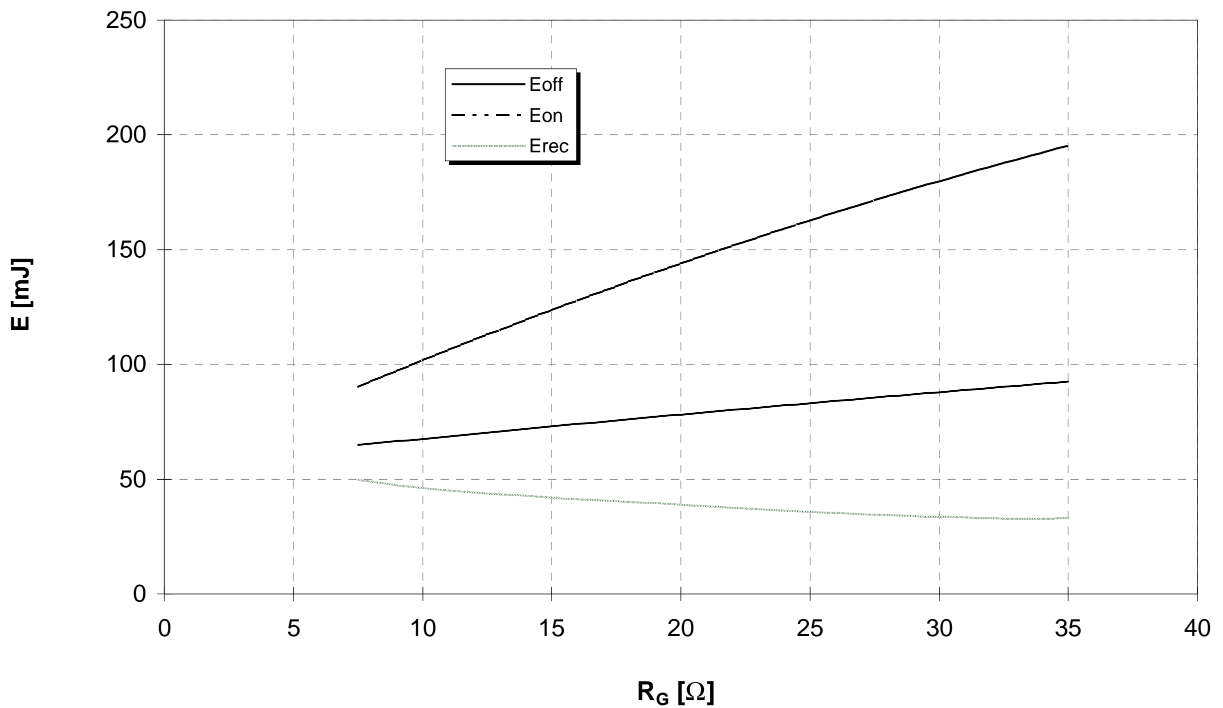


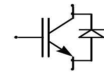


Schaltverluste (typisch) $E_{on} = f(I_C)$, $E_{off} = f(I_C)$, $E_{rec} = f(I_C)$
Switching losses (typical) $R_{gon} = R_{goff} = 7{,}5\Omega$, $V_{CE} = 900V$, $T_j = 125°C$

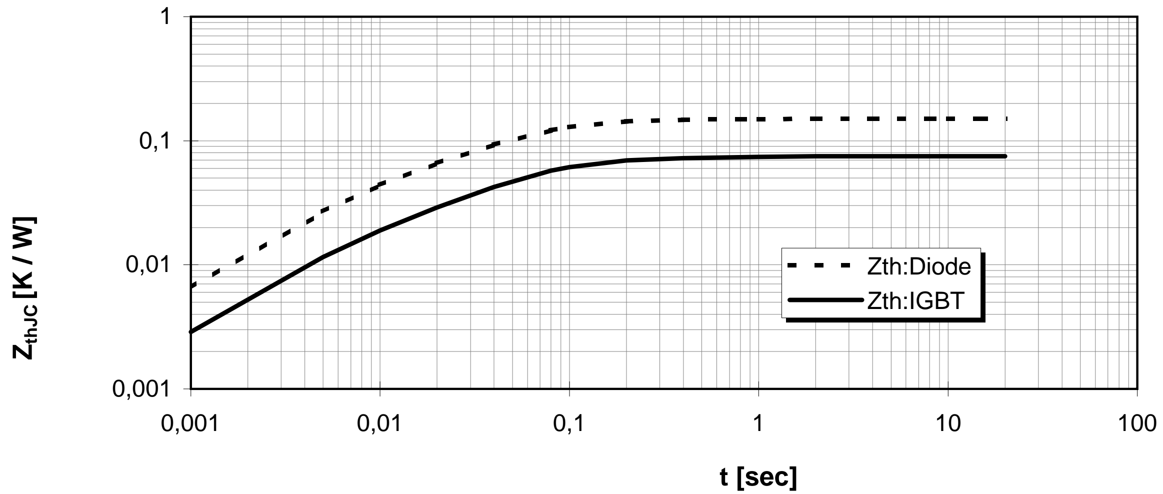


Schaltverluste (typisch) $E_{on} = f(R_G)$, $E_{off} = f(R_G)$, $E_{rec} = f(R_G)$
Switching losses (typical) $I_C = 200A$, $V_{CE} = 900V$, $T_j = 125°C$



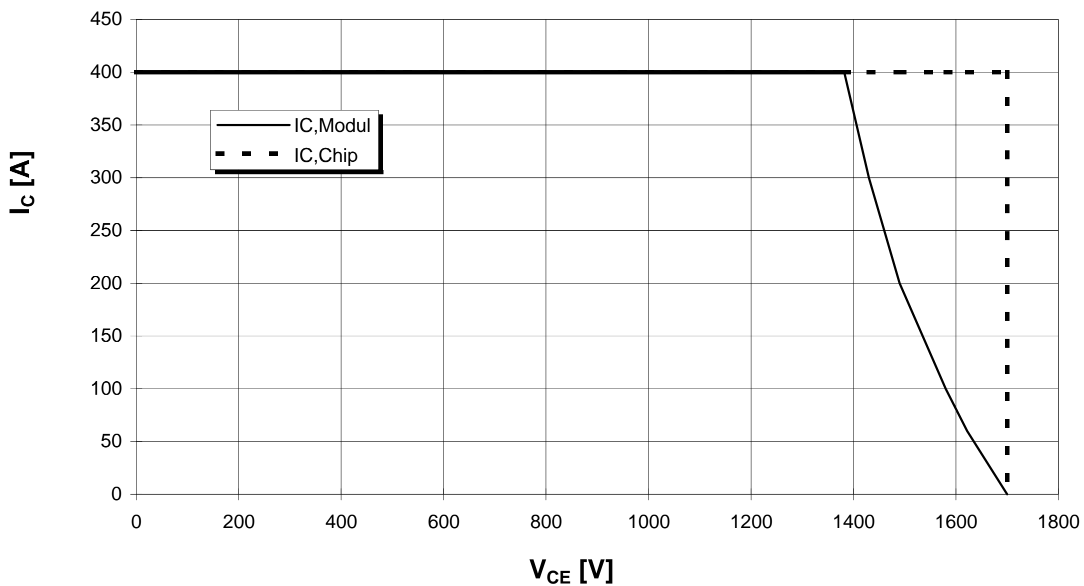


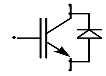
Transienter Wärmewiderstand $Z_{thJC} = f(t)$
Transient thermal impedance

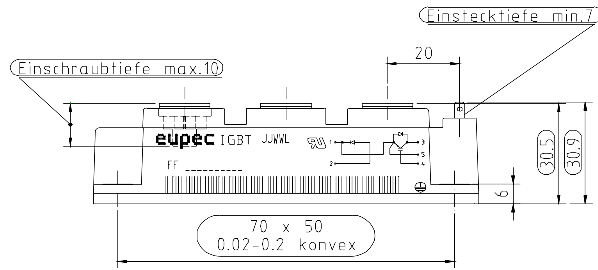


i		1	2	3	4
r_i [K/kW]	: IGBT	8,37	24,21	36,07	6,35
τ_i [sec]	: IGBT	0,0047	0,0356	0,0613	0,4669
r_i [K/kW]	: Diode	27,92	55,32	55,32	11,45
τ_i [sec]	: Diode	0,0062	0,0473	0,0473	0,2322

Sicherer Arbeitsbereich (RBSOA)
Reverse bias safe operation area (RBSOA) R_g = 7,5 Ohm, T_{vj}= 125°C



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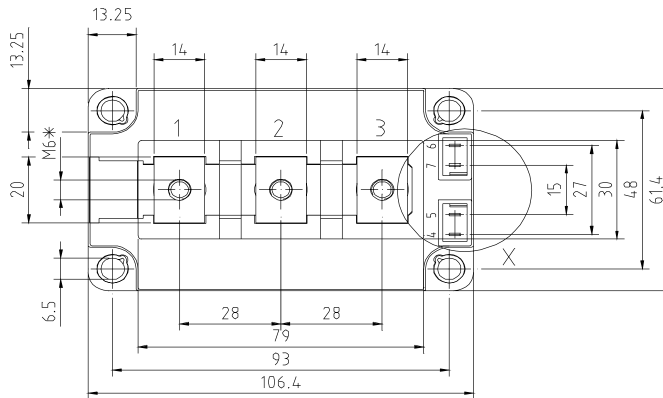
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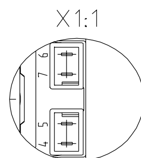
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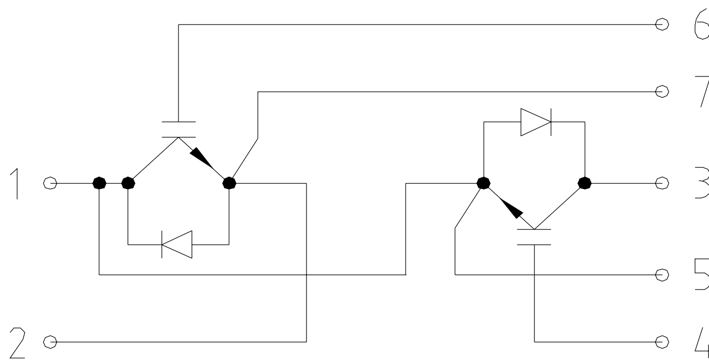
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