

**Höchstzulässige Werte / Maximum rated values****Elektrische Eigenschaften / Electrical properties**

Kollektor-Emitter-Sperrspannung collector-emitter voltage		V_{CES}	1200	V
Kollektor-Dauergleichstrom DC-collector current	$T_C = 80^\circ\text{C}$ $T_C = 25^\circ\text{C}$	$I_{C,nom.}$ I_C	200 370	A A
Periodischer Kollektor Spitzenstrom repetitive peak collector current	$t_p = 1\text{ ms}$, $T_C = 80^\circ\text{C}$	I_{CRM}	400	A
Gesamt-Verlustleistung total power dissipation	$T_C = 25^\circ\text{C}$, Transistor	P_{tot}	1470	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	$t_p = 1\text{ ms}$	I_{FRM}	400	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	6,84	kA^2s
Isolations-Prüfspannung insulation test voltage	RMS, $f = 50\text{ Hz}$, $t = 1\text{ min.}$	V_{ISOL}	2,5	kV

Charakteristische Werte / Characteristic values**Transistor / Transistor**

min. typ. max.

Kollektor-Emitter Sättigungsspannung collector-emitter saturation voltage	$I_C = 200\text{A}$, $V_{GE} = 15\text{V}$, $T_{vj} = 25^\circ\text{C}$	$V_{CE\text{ sat}}$	-	2,1	2,6	V
	$I_C = 200\text{A}$, $V_{GE} = 15\text{V}$, $T_{vj} = 125^\circ\text{C}$		-	2,4	2,9	V
Gate-Schwellenspannung gate threshold voltage	$I_C = 8\text{mA}$, $V_{CE} = V_{GE}$, $T_{vj} = 25^\circ\text{C}$	$V_{GE(th)}$	4,5	5,5	6,5	V
Gateladung gate charge	$V_{GE} = -15\text{V} \dots +15\text{V}$	Q_G	-	2,1	-	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}	-	13	-	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}	-	0,85	-	nF
Kollektor-Emitter Reststrom collector-emitter cut-off current	$V_{GE} = 0\text{V}$, $T_{vj} = 25^\circ\text{C}$, $V_{CE} = 1200\text{V}$	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

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Charakteristische Werte / Characteristic values

Transistor / Transistor

min. typ. max.

Einschaltverzögerungszeit (ind. Last) turn on delay time (inductive load)	$I_C = 200A, V_{CC} = 600V$	$t_{d,on}$				
	$V_{GE} = \pm 15V, R_G = 4,7\Omega, T_{vj} = 25^\circ C$		-	0,09	-	μs
	$V_{GE} = \pm 15V, R_G = 4,7\Omega, T_{vj} = 125^\circ C$		-	0,09	-	μs
Anstiegszeit (induktive Last) rise time (inductive load)	$I_C = 200A, V_{CC} = 600V$	t_r				
	$V_{GE} = \pm 15V, R_G = 4,7\Omega, T_{vj} = 25^\circ C$		-	0,09	-	μs
	$V_{GE} = \pm 15V, R_G = 4,7\Omega, T_{vj} = 125^\circ C$		-	0,1	-	μs
Abschaltverzögerungszeit (ind. Last) turn off delay time (inductive load)	$I_C = 200A, V_{CC} = 600V$	$t_{d,off}$				
	$V_{GE} = \pm 15V, R_G = 4,7\Omega, T_{vj} = 25^\circ C$		-	0,54	-	μs
	$V_{GE} = \pm 15V, R_G = 4,7\Omega, T_{vj} = 125^\circ C$		-	0,59	-	μs
Fallzeit (induktive Last) fall time (inductive load)	$I_C = 200A, V_{CC} = 600V$	t_f				
	$V_{GE} = \pm 15V, R_G = 4,7\Omega, T_{vj} = 25^\circ C$		-	0,06	-	μs
	$V_{GE} = \pm 15V, R_G = 4,7\Omega, T_{vj} = 125^\circ C$		-	0,09	-	μs
Einschaltverlustenergie pro Puls turn-on energy loss per pulse	$I_C = 200A, V_{CC} = 600V, V_{GE} = 15V$ $R_G = 4,7\Omega, T_{vj} = 125^\circ C, L_\sigma = 90nH$	E_{on}	-	18	-	mJ
Abschaltverlustenergie pro Puls turn-off energy loss per pulse	$I_C = 200A, V_{CC} = 600V, V_{GE} = 15V$ $R_G = 4,7\Omega, T_{vj} = 125^\circ C, L_\sigma = 90nH$	E_{off}	-	25	-	mJ
Kurzschlußverhalten SC Data	$t_p \leq 10\mu sec, V_{GE} \leq 15V, R_G = 4,7\Omega$ $T_{vj} \leq 125^\circ C, V_{CC} = 900V, V_{CEmax} = V_{CES} - L_{\sigma CE} \cdot di/dt$	I_{SC}	-	1250	-	A
Modulinduktivität stray inductance module		$L_{\sigma CE}$	-	16	-	nH
Modul Leitungswiderstand, Anschlüsse – Chip module lead resistance, terminals – chip	$T_C = 25^\circ C$	R_{CC+EE}	-	0,5	-	m Ω

Charakteristische Werte / Characteristic values

Diode / Diode

min. typ. max.

Durchlaßspannung forward voltage	$I_F = 200A, V_{GE} = 0V, T_{vj} = 25^\circ C$	V_F	-	1,8	2,3	V
	$I_F = 200A, V_{GE} = 0V, T_{vj} = 125^\circ C$		-	1,7	2,2	V
Rückstromspitze peak reverse recovery current	$I_F = 200A, -di_F/dt = 2100A/\mu sec$	I_{RM}				
	$V_R = 600V, V_{GE} = -15V, T_{vj} = 25^\circ C$		-	180	-	A
	$V_R = 600V, V_{GE} = -15V, T_{vj} = 125^\circ C$		-	240	-	A
Sperrverzögerungsladung recovered charge	$I_F = 200A, -di_F/dt = 2100A/\mu sec$	Q_r				
	$V_R = 600V, V_{GE} = -15V, T_{vj} = 25^\circ C$		-	24	-	μC
	$V_R = 600V, V_{GE} = -15V, T_{vj} = 125^\circ C$		-	43	-	μC
Abschaltenergie pro Puls reverse recovery energy	$I_F = 200A, -di_F/dt = 2100A/\mu sec$	E_{rec}				
	$V_R = 600V, V_{GE} = -15V, T_{vj} = 25^\circ C$		-	7	-	mJ
	$V_R = 600V, V_{GE} = -15V, T_{vj} = 125^\circ C$		-	16	-	mJ

**Thermische Eigenschaften / Thermal properties**

			min.	typ.	max.	
Innerer Wärmewiderstand thermal resistance, junction to case	Transistor / transistor, DC	R_{thJC}	-	-	0,085	K/W
	Diode/Diode, DC		-	-	0,15	K/W
Übergangs-Wärmewiderstand thermal resistance, case to heatsink	pro Modul / per module $\lambda_{Paste} = 1 \text{ W/m} \cdot \text{K}$ / $\lambda_{grease} = 1 \text{ W/m} \cdot \text{K}$	R_{thCK}	-	0,010	-	K/W
Höchstzulässige Sperrschichttemperatur maximum junction temperature		T_{vjmax}	-	-	150	°C
Betriebstemperatur operation temperature		T_{vjop}	-40	-	125	°C
Lagertemperatur storage temperature		T_{stg}	-40	-	125	°C

Mechanische Eigenschaften / Mechanical properties

			min.	typ.	max.	
Gehäuse, siehe Anlage case, see appendix						
Innere Isolation internal insulation				AL ₂ O ₃		
Kriechstrecke creepage distance				20		mm
Luftstrecke clearance				11		mm
CTI comperative tracking index				225		
Anzugsdrehmoment f. mech. Befestigung mounting torque	screw M5	M1	3	-	6	Nm
Anzugsdrehmoment f. elektr. Anschlüsse terminal connection torque	terminals M6	M2	2,5	-	5,0	Nm
	terminals M4		1,1	-	2,0	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.

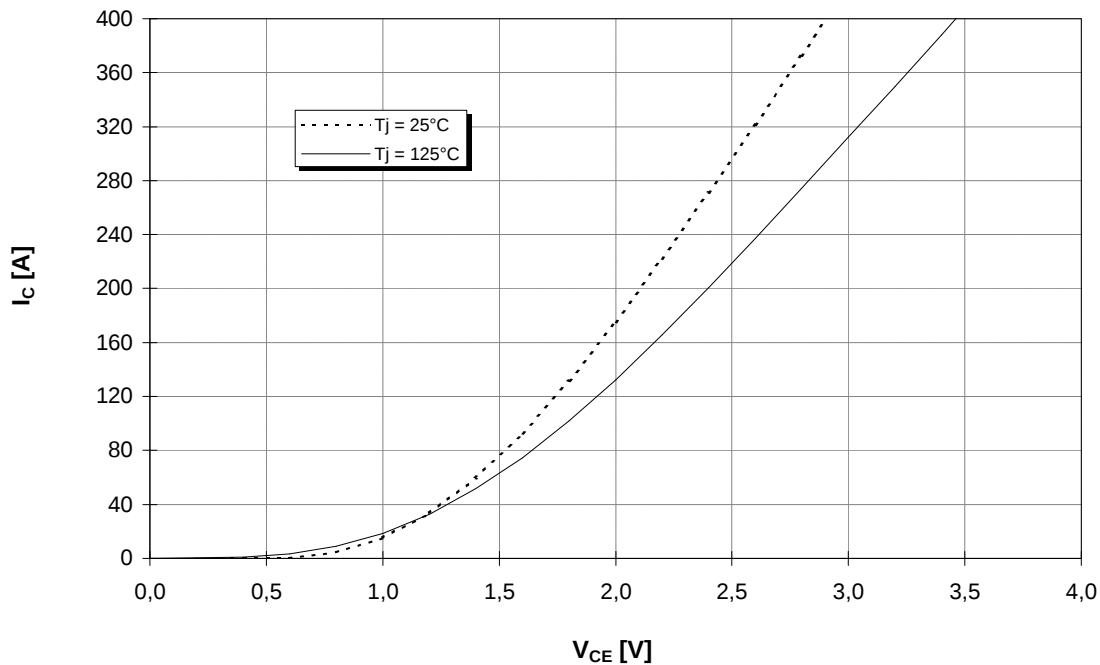
This technical information specifies semiconductor devices but promises no characteristics. It is
valid in combination with the belonging technical notes.



Ausgangskennlinie (typisch)
Output characteristic (typical)

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

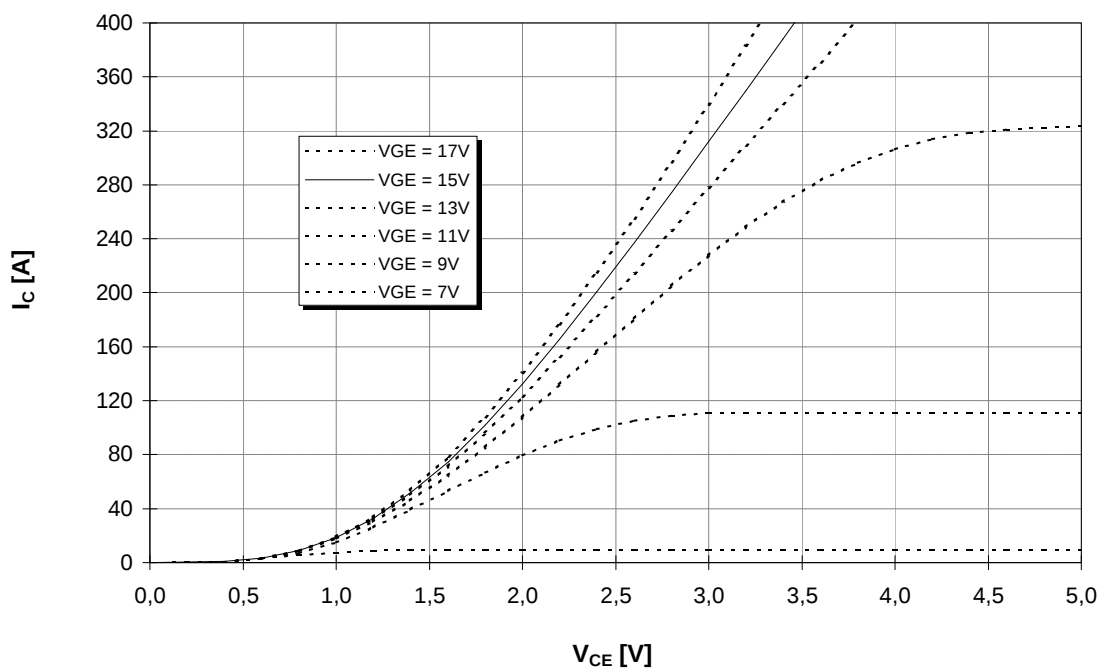
$$V_{GE} = 15V$$



Ausgangskennlinienfeld (typisch)
Output characteristic (typical)

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

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

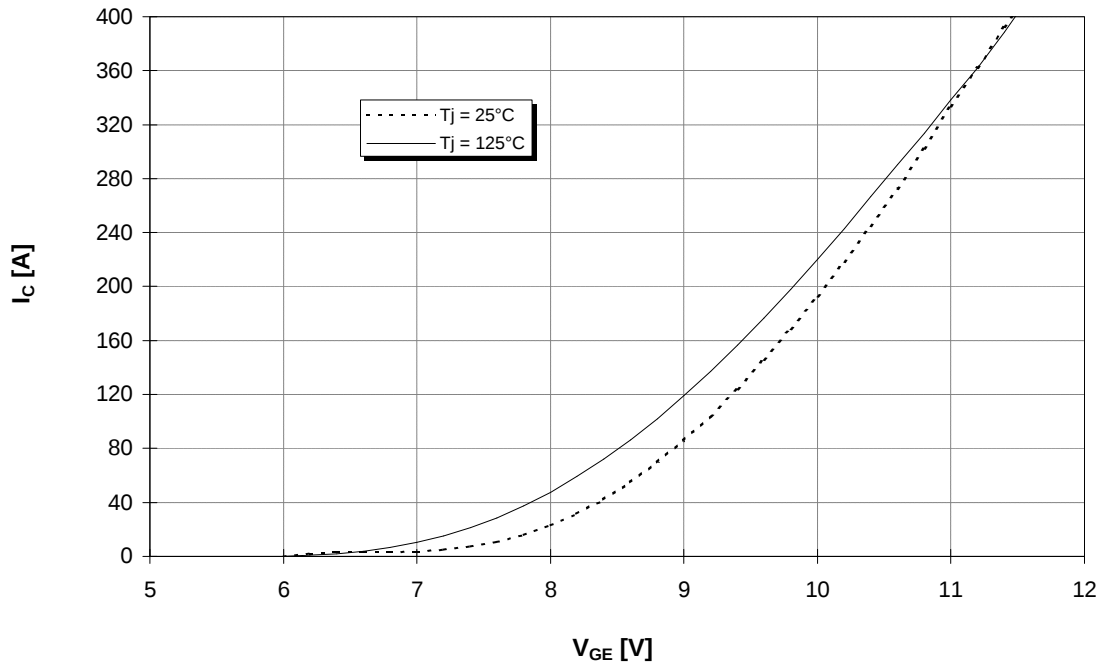




Übertragungscharakteristik (typisch)
Transfer characteristic (typical)

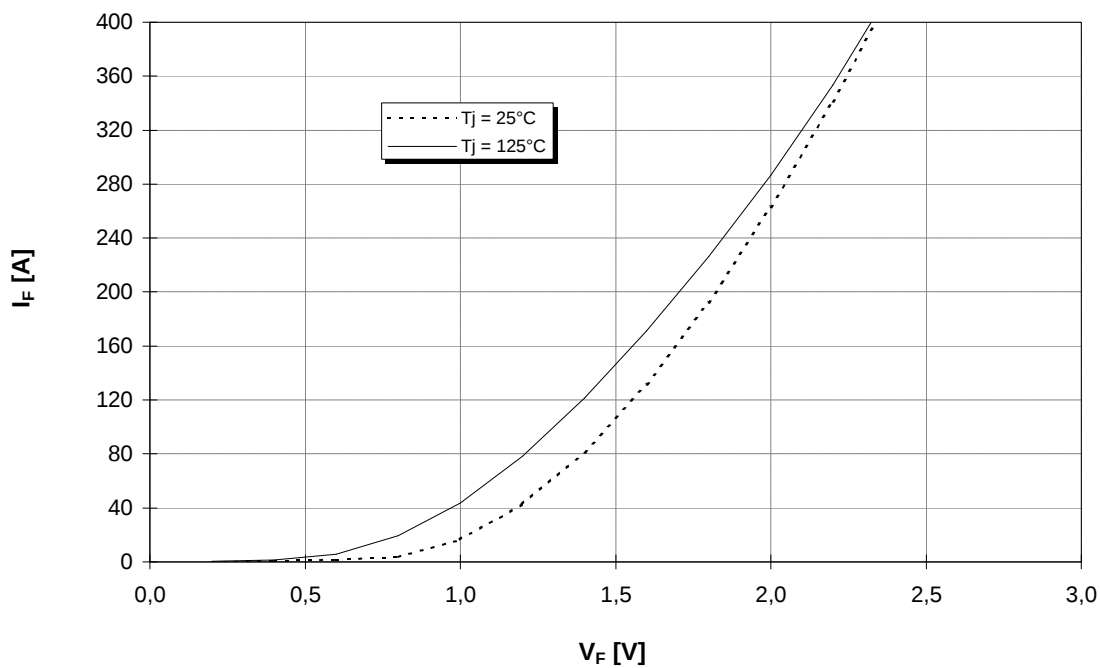
$$I_C = f(V_{GE})$$

$V_{CE} = 20V$



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

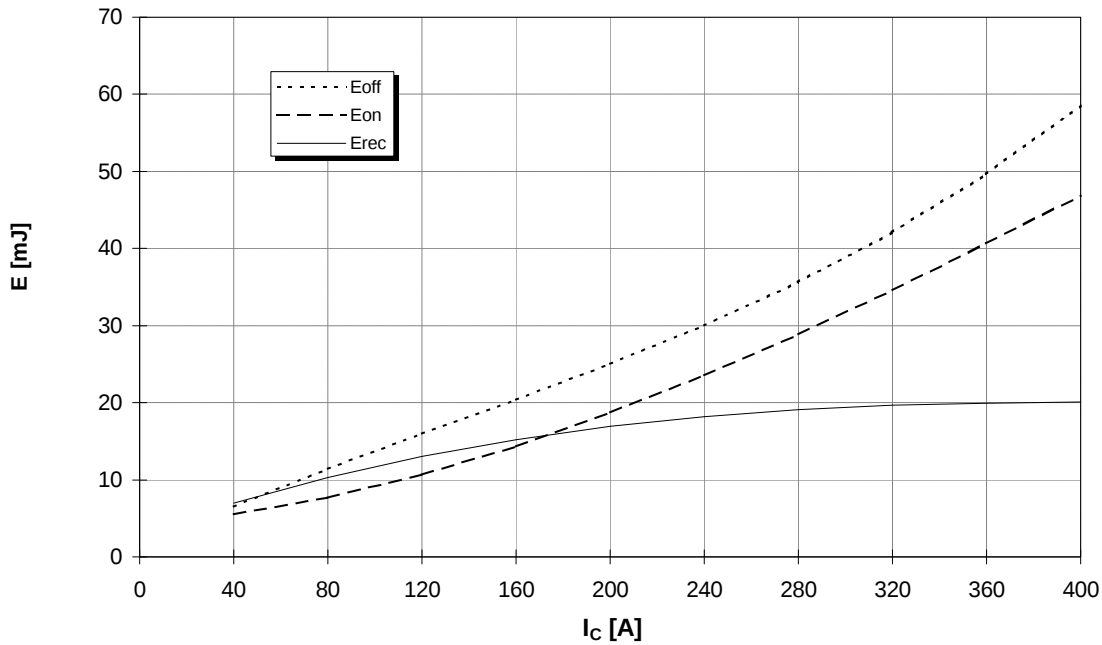
$$I_F = f(V_F)$$





Schaltverluste (typisch) $E_{on} = f(I_C)$, $E_{off} = f(I_C)$, $E_{rec} = f(I_C)$

Switching losses (typical) $V_{GE}=15V$, $R_{gon} = R_{goff} = 4,7 \text{ } \Omega$, $V_{CE} = 600V$, $T_j = 125^\circ C$

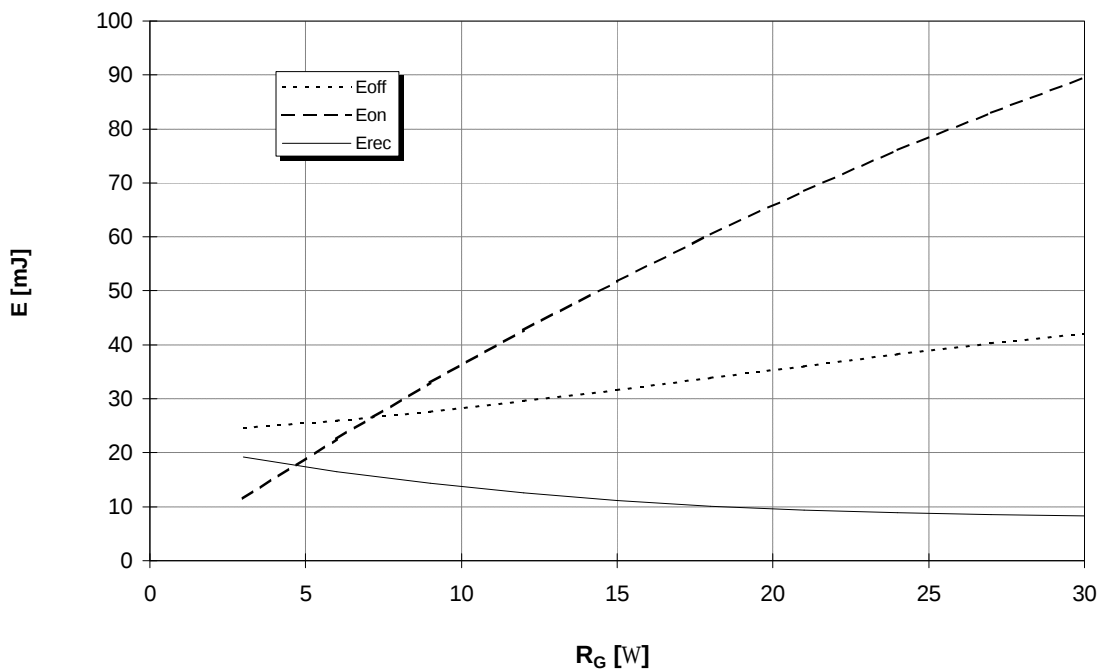


Schaltverluste (typisch)

$E_{on} = f(R_G)$, $E_{off} = f(R_G)$, $E_{rec} = f(R_G)$

Switching losses (typical)

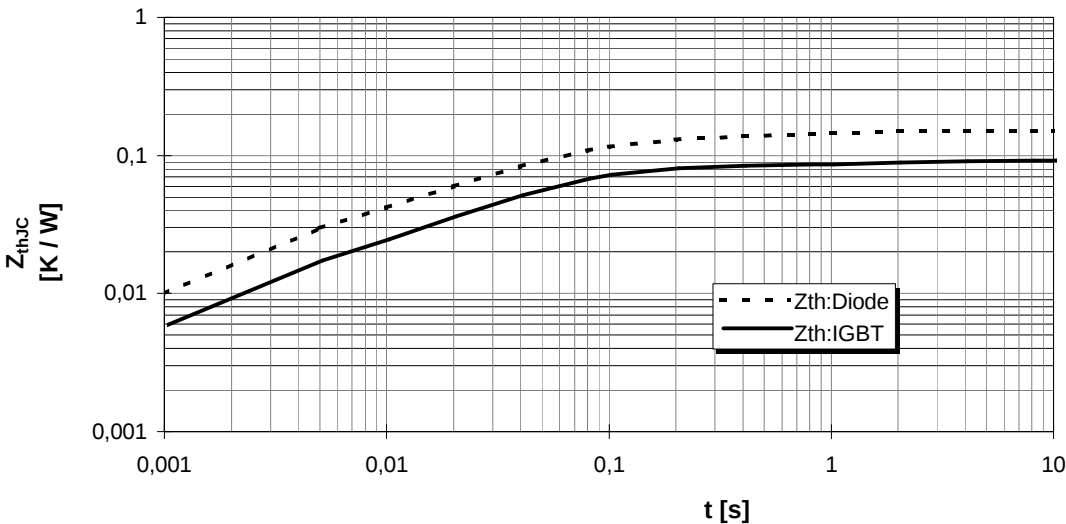
$V_{GE}=15V$, $I_C = 200A$, $V_{CE} = 600V$, $T_j = 125^\circ C$





Transienter Wärmewiderstand
Transient thermal impedance

$Z_{thJC} = f(t)$

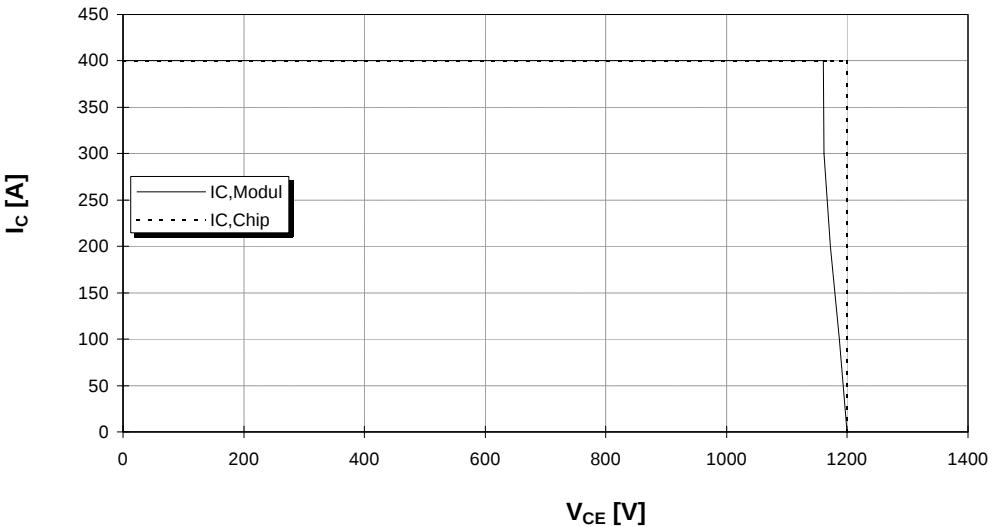


i	1	2	3	4
r_i [K/kW] : IGBT	9,51	28,77	37,49	9,23
τ_i [s] : IGBT	0,00002	0,004	0,048	0,500
r_i [K/kW] : Diode	19,63	51,99	56,73	21,65
τ_i [s] : Diode	0,002	0,03	0,072	0,682

Sicherer Arbeitsbereich (RBSOA)

Reverse bias safe operation area (RBSOA)

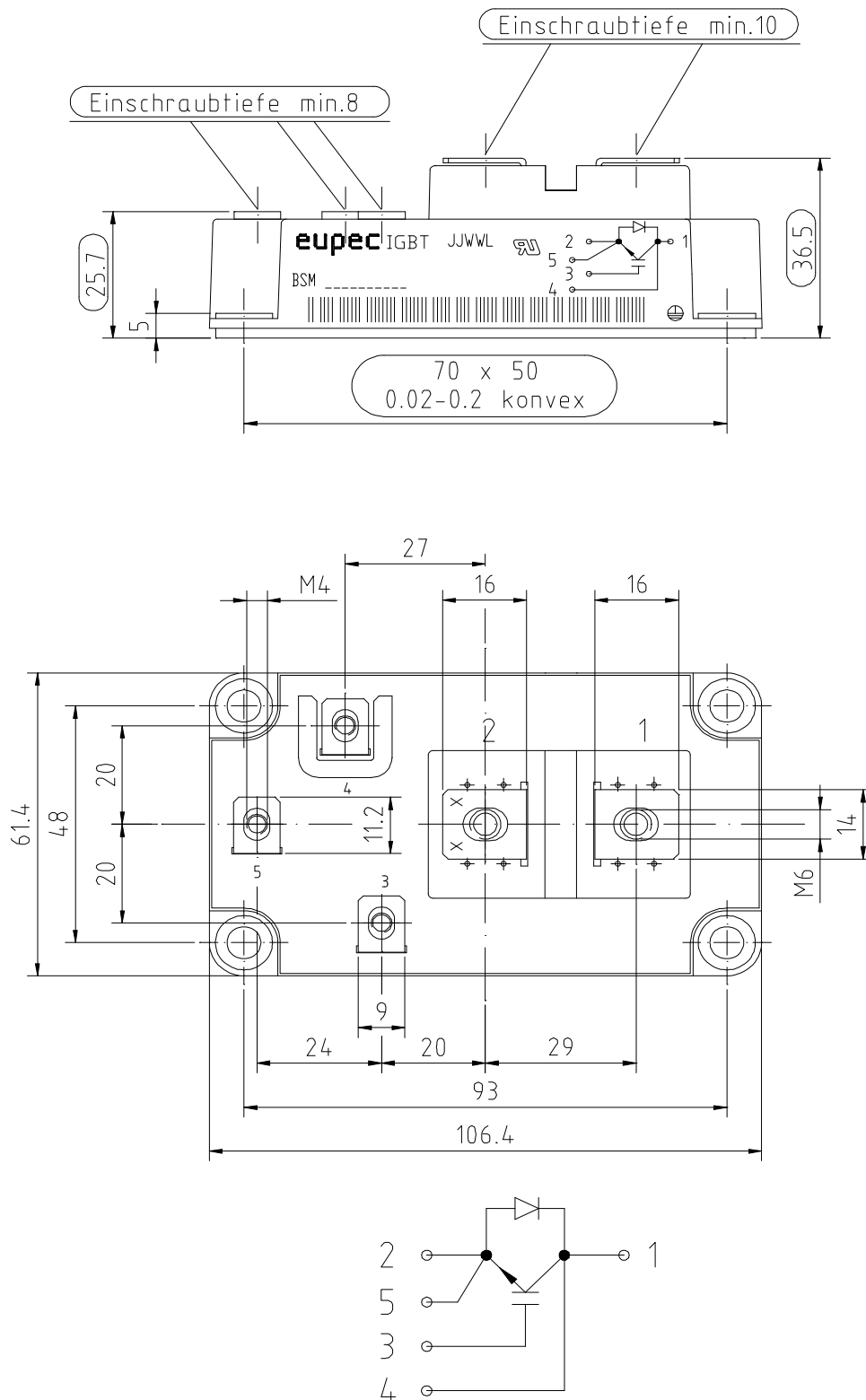
$V_{GE} = 15V, R_g = 4,7 \text{ Ohm}, T_{vj} = 125^\circ C$





Gehäusemaße / Schaltbild

Package outline / Circuit diagram





Anhang C-Serie
Appendix C-series

Gehäuse spezifische Werte
Housing specific values

typ.

Modulinduktivität stray inductance module		$L_{\sigma CE}$	16	nH
Modul Leitungswiderstand, Anschlüsse – Chip module lead resistance, terminals – chip	$T_c=25^{\circ}C$	R_{CC+EE}	0,6	mΩ

Gehäusemaße C-Serie
Package outline C-series

