

Höchstzulässige Werte / maximum rated values

Elektrische Eigenschaften / electrical properties

Kollektor Emitter Sperrspannung collector emitter voltage	$T_{vj} = 25^{\circ}\text{C}$	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	35 55	A A
Periodischer Kollektor Spitzenstrom repetitive peak collector current	$t_p = 1\text{ms}$, $T_c = 80^{\circ}\text{C}$	I_{CRM}	70	A
Gesamt Verlustleistung total power dissipation	$T_c = 25^{\circ}\text{C}$	P_{tot}	200	W
Gate Emitter Spitzenspannung gate emitter peak voltage		V_{GES}	± 20	V
Dauergleichstrom DC forward current		I_F	35	A
Periodischer Spitzenstrom repetitive peak forward current	$t_p = 1\text{ms}$	I_{FRM}	70	A
Grenzlastintegral I^2t value	$V_R = 0\text{V}$, $t_p = 10\text{ms}$, $T_{vj} = 125^{\circ}\text{C}$	I^2t	300	A^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 Wechselrichter / transistor inverter

			min.	typ.	max.	
Kollektor Emitter Sättigungsspannung collector emitter saturation voltage	$V_{GE} = 15\text{V}$, $T_{vj} = 25^{\circ}\text{C}$, $I_C = I_{C, nom}$ $V_{GE} = 15\text{V}$, $T_{vj} = 125^{\circ}\text{C}$, $I_C = I_{C, nom}$	V_{CESat}	- -	1,7 2,0	2,15 -	V V
Gate Schwellenspannung gate threshold voltage	$V_{CE} = V_{GE}$, $T_{vj} = 25^{\circ}\text{C}$, $I_C = 1,5\text{mA}$	$V_{GE(th)}$	5,0	5,8	6,5	V
Gateladung gate charge	$V_{GE} = -15\text{V} \dots +15\text{V}$	Q_G	-	0,33	-	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}	-	2,5	-	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}	-	0,09	-	nF
Kollektor Emitter Reststrom collector emitter cut off current	$V_{CE} = 1200\text{V}$, $V_{GE} = 0\text{V}$, $T_{vj} = 25^{\circ}\text{C}$	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

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Charakteristische Werte / characteristic values

Transistor Wechselrichter / transistor inverter

			min.	typ.	max.	
Einschaltverzögerungszeit (induktive Last) turn on delay time (inductive load)	$I_C = I_{C, nom}$, $V_{CC} = 600V$ $V_{GE} = \pm 15V$, $R_G = 27\Omega$, $T_{vj} = 25^\circ C$ $V_{GE} = \pm 15V$, $R_G = 27\Omega$, $T_{vj} = 125^\circ C$	$t_{d, on}$	-	85	-	ns
			-	90	-	ns
Anstiegszeit (induktive Last) rise time (inductive load)	$I_C = I_{C, nom}$, $V_{CC} = 600V$ $V_{GE} = \pm 15V$, $R_G = 27\Omega$, $T_{vj} = 25^\circ C$ $V_{GE} = \pm 15V$, $R_G = 27\Omega$, $T_{vj} = 125^\circ C$	t_r	-	30	-	ns
			-	45	-	ns
Abschaltverzögerungszeit (induktive Last) turn off delay time (inductive load)	$I_C = I_{C, nom}$, $V_{CC} = 600V$ $V_{GE} = \pm 15V$, $R_G = 27\Omega$, $T_{vj} = 25^\circ C$ $V_{GE} = \pm 15V$, $R_G = 27\Omega$, $T_{vj} = 125^\circ C$	$t_{d, off}$	-	420	-	ns
			-	520	-	ns
Fallzeit (induktive Last) fall time (inductive load)	$I_C = I_{C, nom}$, $V_{CC} = 600V$ $V_{GE} = \pm 15V$, $R_G = 27\Omega$, $T_{vj} = 25^\circ C$ $V_{GE} = \pm 15V$, $R_G = 27\Omega$, $T_{vj} = 125^\circ C$	t_f	-	65	-	ns
			-	90	-	ns
Einschaltverlustenergie pro Puls turn on energy loss per pulse	$I_C = I_{C, nom}$, $V_{CC} = 600V$, $L_\sigma = 70nH$ $V_{GE} = \pm 15V$, $R_G = 27\Omega$, $T_{vj} = 125^\circ C$	E_{on}	-	3,5	-	mJ
Ausschaltverlustenergie pro Puls turn off energy loss per pulse	$I_C = I_{C, nom}$, $V_{CC} = 600V$, $L_\sigma = 70nH$ $V_{GE} = \pm 15V$, $R_G = 27\Omega$, $T_{vj} = 125^\circ C$	E_{off}	-	4,8	-	mJ
Kurzschlussverhalten SC data	$t_P \leq 10\mu sec$, $V_{GE} \leq 15V$, $T_{vj} \leq 125^\circ C$ $V_{CC} = 900V$, $V_{CEmax} = V_{CES} - L_{\sigma CE} \cdot di/dt$	I_{SC}	-	140	-	A
Modulinduktivität stray inductance module		$L_{\sigma CE}$	-	19	-	nH
Leitungswiderstand, Anschluss-Chip lead resistance, terminal-chip	$T_c = 25^\circ C$	$R_{CC'/EE'}$	-	2,5	-	mΩ

Charakteristische Werte / characteristic values

Diode Wechselrichter / diode inverter

Durchlassspannung forward voltage	$I_F = I_{C, nom}$, $V_{GE} = 0V$, $T_{vj} = 25^\circ C$ $I_F = I_{C, nom}$, $V_{GE} = 0V$, $T_{vj} = 125^\circ C$	V_F	-	1,65	2,15	V
			-	1,65	-	V
Rückstromspitze peak reverse recovery current	$I_F = I_{C, nom}$, $-di_F/dt = 1500A/\mu s$ $V_R = 600V$, $V_{GE} = -15V$, $T_{vj} = 25^\circ C$ $V_R = 600V$, $V_{GE} = -15V$, $T_{vj} = 125^\circ C$	I_{RM}	-	49	-	A
			-	51	-	A
Sperrverzögerungsladung recovered charge	$I_F = I_{C, nom}$, $-di_F/dt = 1500A/\mu s$ $V_R = 600V$, $V_{GE} = -15V$, $T_{vj} = 25^\circ C$ $V_R = 600V$, $V_{GE} = -15V$, $T_{vj} = 125^\circ C$	Q_r	-	3,7	-	μC
			-	6,8	-	μC
Ausschaltenergie pro Puls reverse recovery energy	$I_F = I_{C, nom}$, $-di_F/dt = 1500A/\mu s$ $V_R = 600V$, $V_{GE} = -15V$, $T_{vj} = 25^\circ C$ $V_R = 600V$, $V_{GE} = -15V$, $T_{vj} = 125^\circ C$	E_{rec}	-	1,4	-	mJ
			-	2,7	-	mJ

Charakteristische Werte / characteristic values

NTC-Widerstand / NTC-thermistor

			min.	typ.	max.	
Nennwiderstand rated resistance	$T_c = 25^\circ\text{C}$	R_{25}	-	5	-	k Ω
Abweichung von R_{100} deviation of R_{100}	$T_c = 100^\circ\text{C}$, $R_{100} = 493\Omega$	$\Delta R/R$	-5	-	5	%
Verlustleistung power dissipation	$T_c = 25^\circ\text{C}$	P_{25}	-	-	20	mW
B-Wert B-value	$R_2 = R_1 \exp[B(1/T_2 - 1/T_1)]$	$B_{25/50}$	-	3375	-	K

Thermische Eigenschaften / thermal properties

			-	-	0,60	K/W
			-	-	0,95	K/W
Übergangs Wärmewiderstand thermal resistance, case to heatsink	pro Modul / per module $\lambda_{\text{Paste}} = 1\text{W/m}^2\text{K}$ / $\lambda_{\text{grease}} = 1\text{W/m}^2\text{K}$	R_{thCK}	-	0,02	-	K/W
Höchstzulässige Sperrschichttemp. maximum junction temperature		$T_{vj\text{max}}$	-	-	150	$^\circ\text{C}$
Betriebstemperatur operation temperature			-40	-		

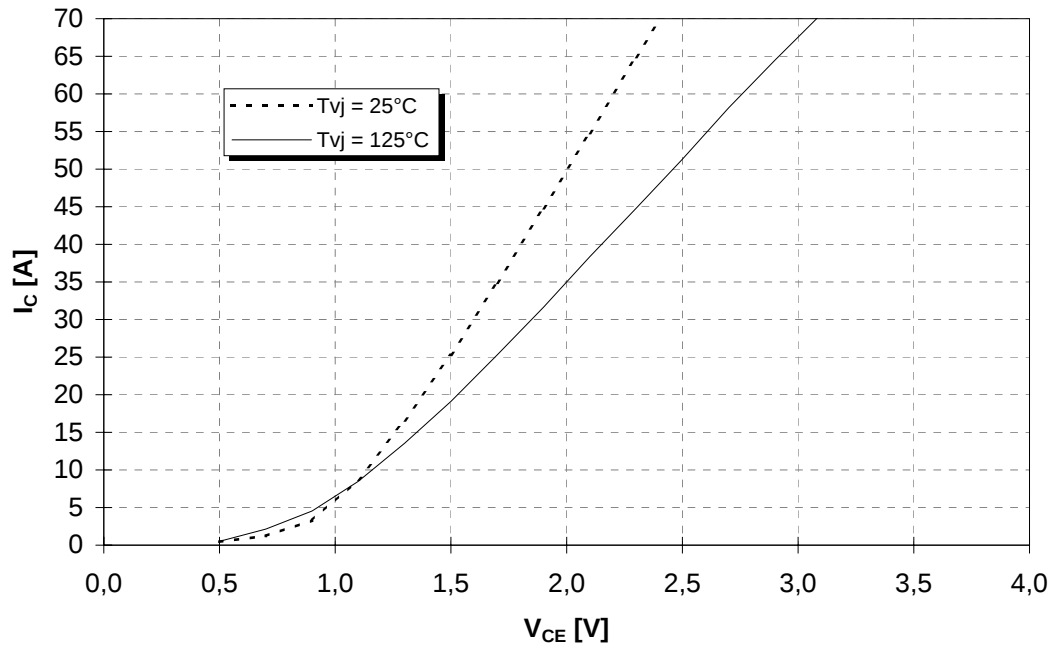
Gehäuse, siehe Anlage case, see appendix						
Innere Isolation internal insulation				Al_2O_3		
Kriechstrecke creepage distance				10		mm
Luftstrecke clearance				7,5		mm
CTI comperative tracking index				225		
	Schraube M 5 screw M 5	M	3	-	6	
Gewicht weight		G		180		g

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

Ausgangskennlinie (typisch) output characteristic (typical)

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

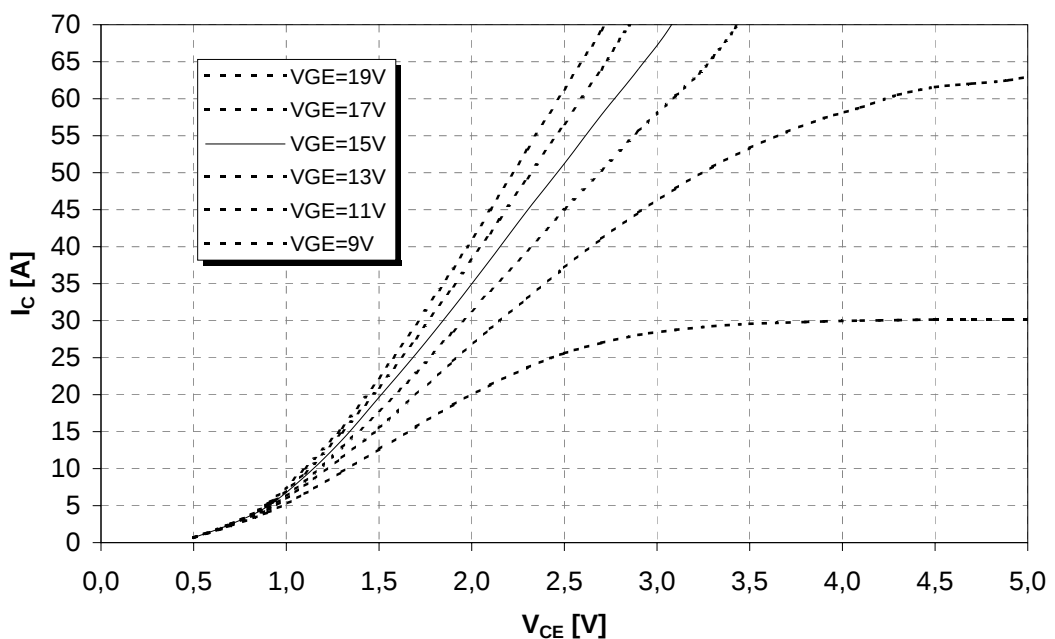
$$V_{GE} = 15V$$



Ausgangskennlinienfeld (typisch) output characteristic (typical)

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

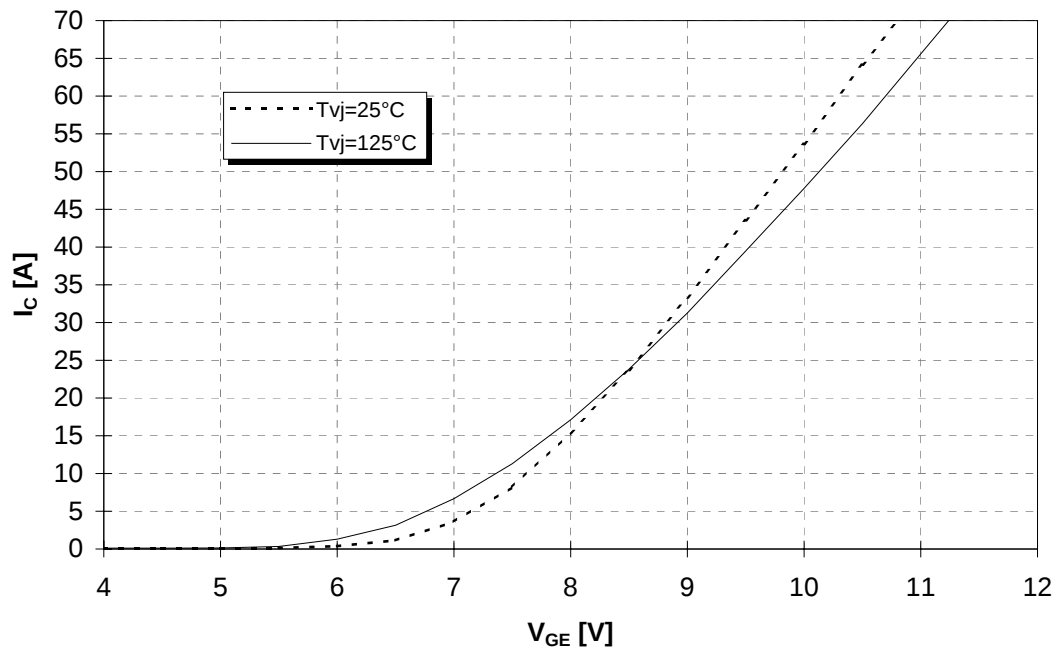
$$T_{Vj} = 125^\circ\text{C}$$



Übertragungscharakteristik (typisch) transfer characteristic (typical)

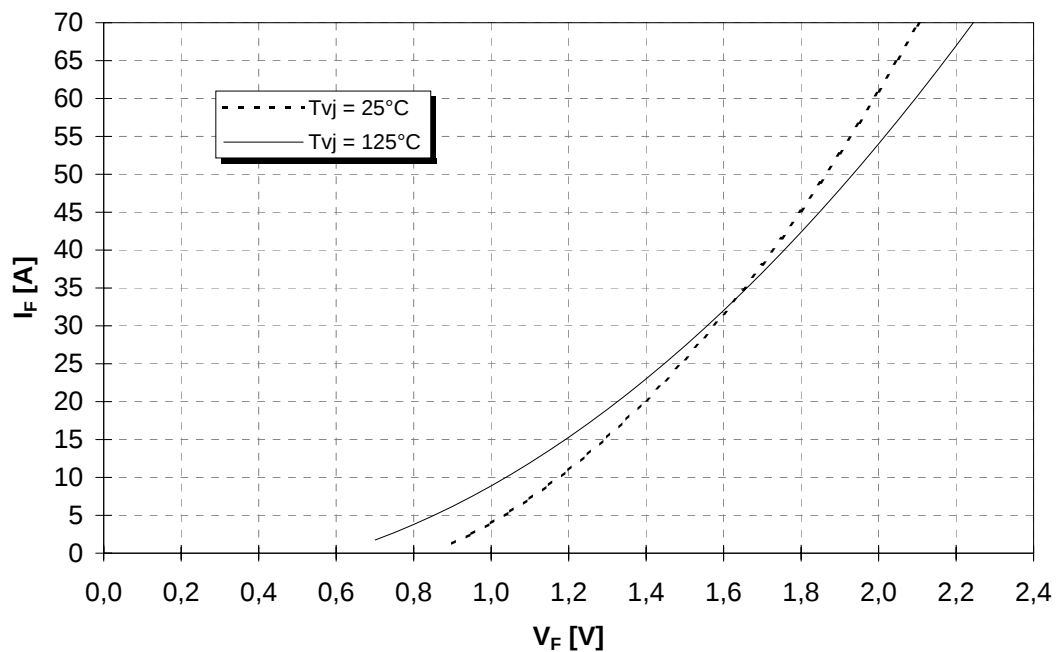
$$I_C = f(V_{GE})$$

$V_{CE} = 20V$



Durchlasskennlinie der Inversdiode (typisch) forward characteristic of inverse diode (typical)

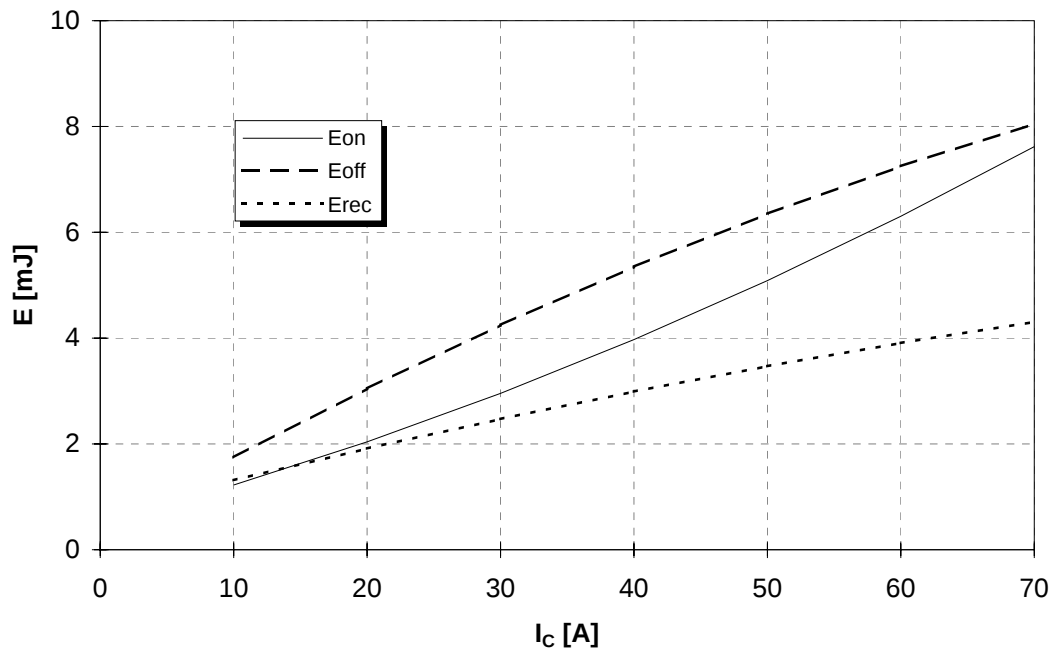
$$I_F = f(V_F)$$



Schaltverluste (typisch) Switching losses (typical)

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

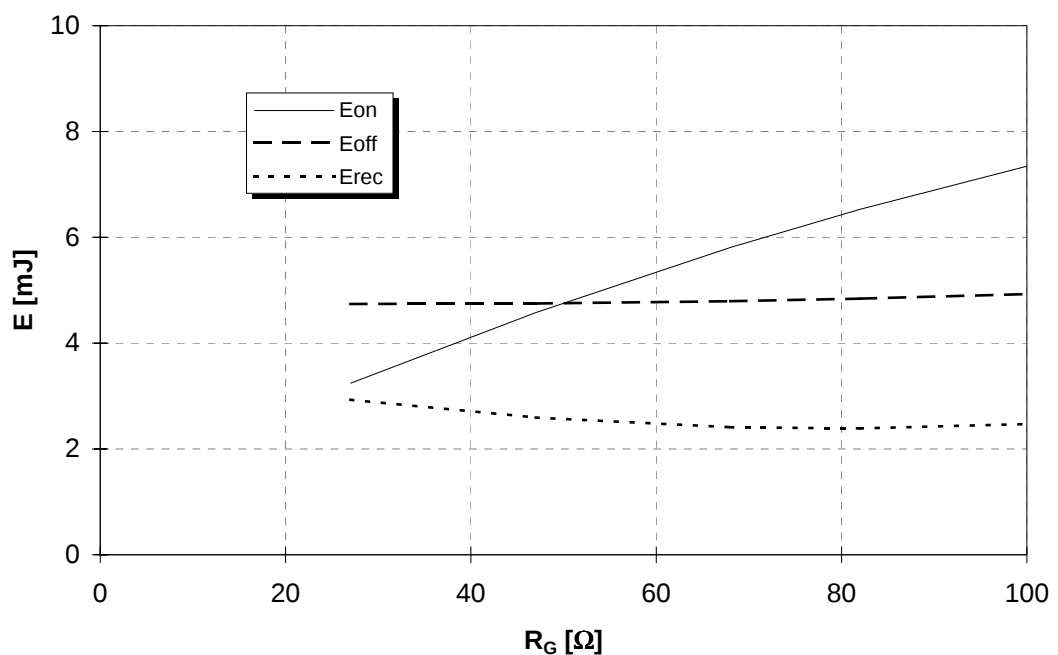
$$V_{GE} = 15V, R_{Gon} = R_{Goff} = 27\Omega, V_{CE} = 600V, T_{vi} = 125^\circ C$$



Schaltverluste (typisch) Switching losses (typical)

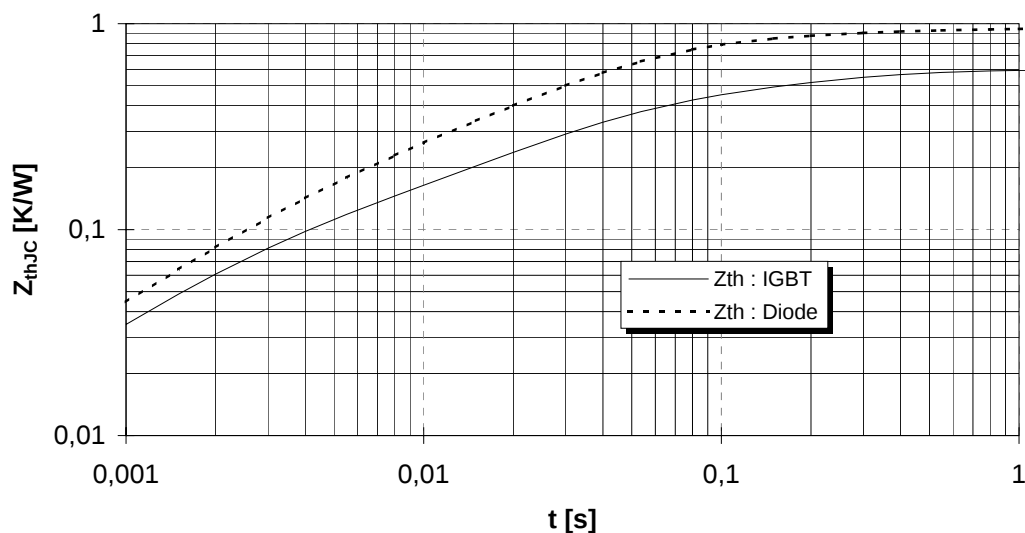
$$E_{on} = f(R_G), E_{off} = f(R_G), E_{rec} = f(R_G)$$

$$V_{GE} = 15V, I_C = 35A, V_{CE} = 600V, T_{vi} = 125^\circ C$$



Transienter Wärmewiderstand Transient thermal impedance

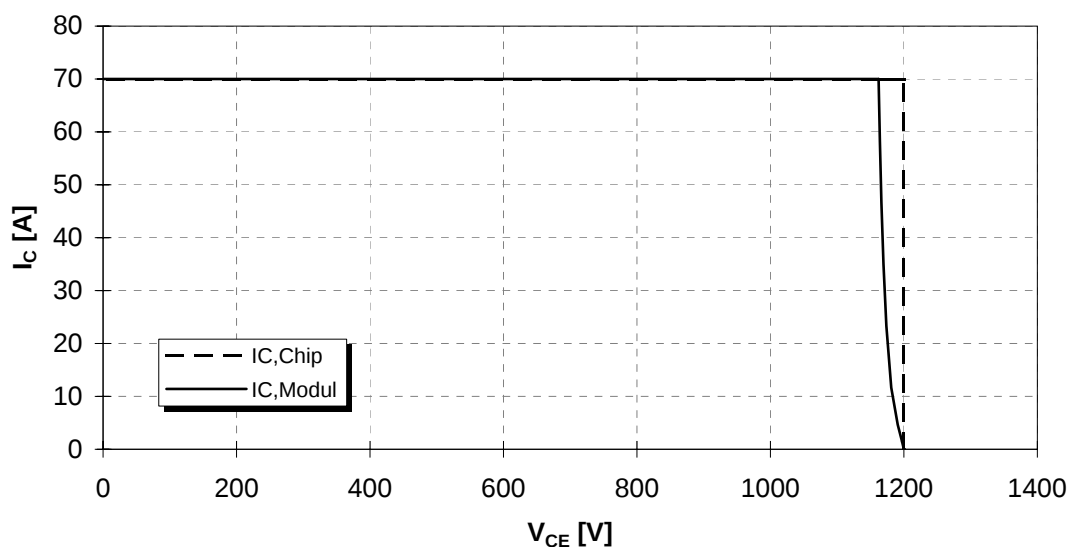
$$Z_{thJC} = f(t)$$



i	1	2	3	4
r_i [K/W] : IGBT	6,769E-02	1,052E-01	2,709E-01	1,523E-01
τ_i [s] : IGBT	2,345E-03	2,820E-01	2,820E-02	1,128E-01
r_i [K/W] : Diode	9,674E-02	6,249E-01	1,800E-01	5,701E-02
τ_i [s] : Diode	3,333E-03	3,429E-02	1,294E-01	7,662E-01

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

$$V_{GE}=15V, R_G=27\Omega, T_i=125^\circ C$$



Technical drawing of the eupec IGBT module 200A120-01. The drawing includes a top view, a side view, and a cross-section view. The top view shows the module's dimensions, including a length of 190 mm and a width of 45 mm. The side view shows the module's height and the position of the cooling fins. The cross-section view shows the internal structure of the module, including the IGBT chip and the cooling fins. The drawing also includes a detail view of the mounting holes and a table of dimensions for the cooling fins.

Top View Dimensions:

- Overall length: 190 mm
- Overall width: 45 mm
- Mounting hole diameter: $\varnothing 8$
- Mounting hole spacing: 11.5 mm
- Module width (excluding mounting holes): 38.4 mm
- Module width (including mounting holes): 45 mm
- Module width (including mounting holes, excluding cooling fins): 32 mm
- Module width (including mounting holes, excluding cooling fins, excluding mounting holes): 11 mm
- Module width (including mounting holes, excluding cooling fins, excluding mounting holes, excluding mounting holes): 2.1 mm

Side View Dimensions:

- Overall height: 17 mm
- Module height (excluding mounting holes): 7 mm
- Module height (including mounting holes): 17 mm
- Module height (including mounting holes, excluding cooling fins): 3.5 mm
- Module height (including mounting holes, excluding cooling fins, excluding mounting holes): 7 mm
- Module height (including mounting holes, excluding cooling fins, excluding mounting holes, excluding mounting holes): 3.5 mm

Cross-section View Dimensions:

- Overall width: 6.5 mm
- Module width (excluding mounting holes): 4.3 mm
- Module width (including mounting holes): 6.5 mm
- Module width (including mounting holes, excluding cooling fins): 4.3 mm
- Module width (including mounting holes, excluding cooling fins, excluding mounting holes): 6.5 mm
- Module width (including mounting holes, excluding cooling fins, excluding mounting holes, excluding mounting holes): 4.3 mm

Table of Dimensions for Cooling Fins:

Dimension	Value
16.02	19.83
27.45	31.26
38.88	42.69
50.31	61.74
65.55	73.17
76.98	86.1

Legend:

* = alle Maße mit einer Toleranz von ± 0.4

