

Höchstzulässige Werte / Maximum rated values

Elektrische Eigenschaften / Electrical properties

Kollektor-Emitter-Sperrspannung collector-emitter voltage		V_{CES}	600	V
Kollektor-Dauergleichstrom DC-collector current	T_C= 80°C T_C= 25°C	$I_{C,nom.}$ I_C	50 70	A A
Periodischer Kollektor Spitzenstrom repetitive peak collector current	t_P= 1ms, T_C= 80°C	I_{CRM}	100	A
Gesamt-Verlustleistung total power dissipation	T_C= 25°C, Transistor	P_{tot}	250	W
Gate-Emitter-Spitzenspannung gate-emitter peak voltage		V_{GES}	+/- 20V	V
Dauergleichstrom DC forward current		I_F	50	A
Periodischer Spitzenstrom repetitive peak forw. current	t_P= 1ms	I_{FRM}	100	A
Grenzlastintegral der Diode I^2t - value, Diode	V_R= 0V, t_P= 10ms, T_{Vj}= 125°C	I^2t	760	A^2s
Isolations-Prüfspannung insulation test voltage	RMS, f= 50Hz, t= 1min.	V_{ISOL}	2,5	kV

Charakteristische Werte / Characteristic values

Transistor / Transistor

			min.	typ.	max.	
Kollektor-Emitter Sättigungsspannung collector-emitter saturation voltage	I_C= 50A, V_{GE}= 15V, T_{vj}= 25°C I_C= 50A, V_{GE}= 15V, T_{vj}= 125°C	$V_{CE\ sat}$	- -	1,95 2,20	2,45 -	V V
Gate-Schwellenspannung gate threshold voltage	I_C= 1mA, 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}	-	2,2	-	nF
Rückwirkungskapazität reverse transfer capacitance	f= 1MHz, T_{vj}= 25°C, V_{CE}= 25V, V_{GE}= 0V	C_{res}	-	0,2	-	nF
Kollektor-Emitter Reststrom collector-emitter cut-off current	V_{CE}= 600V, V_{GE}= 0V, T_{vj}= 25°C V_{CE}= 600V, V_{GE}= 0V, T_{vj}= 125°C	I_{CES}	- -	1 1	500 -	µA mA
Gate-Emitter Reststrom gate-emitter leakage current	V_{CE}= 0V, V_{GE}= 20V, T_{vj}= 25°C	I_{GES}	-	-	400	nA

prepared by: Andreas Vetter	date of publication: 2000-04-26
approved by: Michael Hornkamp	revision: 1

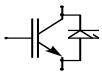


Charakteristische Werte / Characteristic values

Transistor / Transistor			min.	typ.	max.	
Einschaltverzögerungszeit (ind. Last) turn on delay time (inductive load)	I_C= 50A, V_{CC}= 300V V_{GE}= ±15V, R_G= 2,7Ω, T_{vj}= 25°C V_{GE}= ±15V, R_G= 2,7Ω, T_{vj}= 125°C	$t_{d,on}$	- -	40 42	- -	ns ns
Anstiegszeit (induktive Last) rise time (inductive load)	I_C= 50A, V_{CC}= 300V V_{GE}= ±15V, R_G= 2,7Ω, T_{vj}= 25°C V_{GE}= ±15V, R_G= 2,7Ω, T_{vj}= 125°C	t_r	- -	9 10	- -	ns ns
Abschaltverzögerungszeit (ind. Last) turn off delay time (inductive load)	I_C= 50A, V_{CC}= 300V V_{GE}= ±15V, R_G= 2,7Ω, T_{vj}= 25°C V_{GE}= ±15V, R_G= 2,7Ω, T_{vj}= 125°C	$t_{d,off}$	- -	120 130	- -	ns ns
Fallzeit (induktive Last) fall time (inductive load)	I_C= 50A, V_{CC}= 300V V_{GE}= ±15V, R_G= 2,7Ω, T_{vj}= 25°C V_{GE}= ±15V, R_G= 2,7Ω, T_{vj}= 125°C	t_f	- -	12 21	- -	ns ns
Einschaltverlustenergie pro Puls turn-on energy loss per pulse	I_C= 50A, V_{CC}= 300V, V_{GE}= 15V R_G= 2,7Ω, T_{vj}= 125°C, L_σ= 15nH	E_{on}	-	0,5	-	mJ
Abschaltverlustenergie pro Puls turn-off energy loss per pulse	I_C= 50A, V_{CC}= 300V, V_{GE}= 15V R_G= 2,7Ω, T_{vj}= 125°C, L_σ= 15nH	E_{off}	-	1,0	-	mJ
Kurzschlußverhalten SC Data	$t_P \leq$ 10µsec, $V_{GE} \leq$ 15V T_{Vj}≤125°C, V_{CC}=360V, V_{CEmax}=V_{CES} -$L_{\sigma CE}$ ·dI/dt	I_{SC}	-	225	-	A
Modulinduktivität stray inductance module		$L_{\sigma CE}$	-	60	-	nH
Modul-Leitungswiderstand, Anschlüsse - Chip lead resistance, terminals - chip	T_C= 25°C	$R_{CC'+EE'}$	-	8,0	-	mΩ

Charakteristische Werte / Characteristic values

Diode / Diode			min.	typ.	max.	
Durchlaßspannung forward voltage	I_F= 50A, V_{GE}= 0V, T_{vj}= 25°C I_F= 50A, V_{GE}= 0V, T_{vj}= 125°C	V_F	- -	1,25 1,20	1,6 -	V V
Rückstromspitze peak reverse recovery current	I_F= 50A, -di$_F$/dt= 2900A/µsec V_R= 300V, V_{GE}= -10V, T_{vj}= 25°C V_R= 300V, V_{GE}= -10V, T_{vj}= 125°C	I_{RM}	- -	88 92	- -	A A
Sperrverzögerungsladung recoverred charge	I_F= 50A, -di$_F$/dt= 2900A/µsec V_R= 300V, V_{GE}= -10V, T_{vj}= 25°C V_R= 300V, V_{GE}= -10V, T_{vj}= 125°C	Q_r	- -	3,4 5,6	- -	µC µC
Abschaltenergie pro Puls reverse recovery energy	I_F= 50A, -di$_F$/dt= 2900A/µsec V_R= 300V, V_{GE}= -10V, T_{vj}= 25°C V_R= 300V, V_{GE}= -10V, T_{vj}= 125°C	E_{rec}	- -	- 1,5	- -	mJ mJ



Thermische Eigenschaften / Thermal properties

			min.	typ.	max.	
Innerer Wärmewiderstand thermal resistance, junction to case	Transistor / transistor, DC Diode / diode, DC	R_{thJC}	- -	- -	0,50 0,80	K/W K/W
Übergangs-Wärmewiderstand thermal resistance, case to heatsink	pro Modul / per module λ_{Paste}= 1W/m*K / λ_{grease}= 1W/m*K	R_{thCK}	-	0,02	-	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

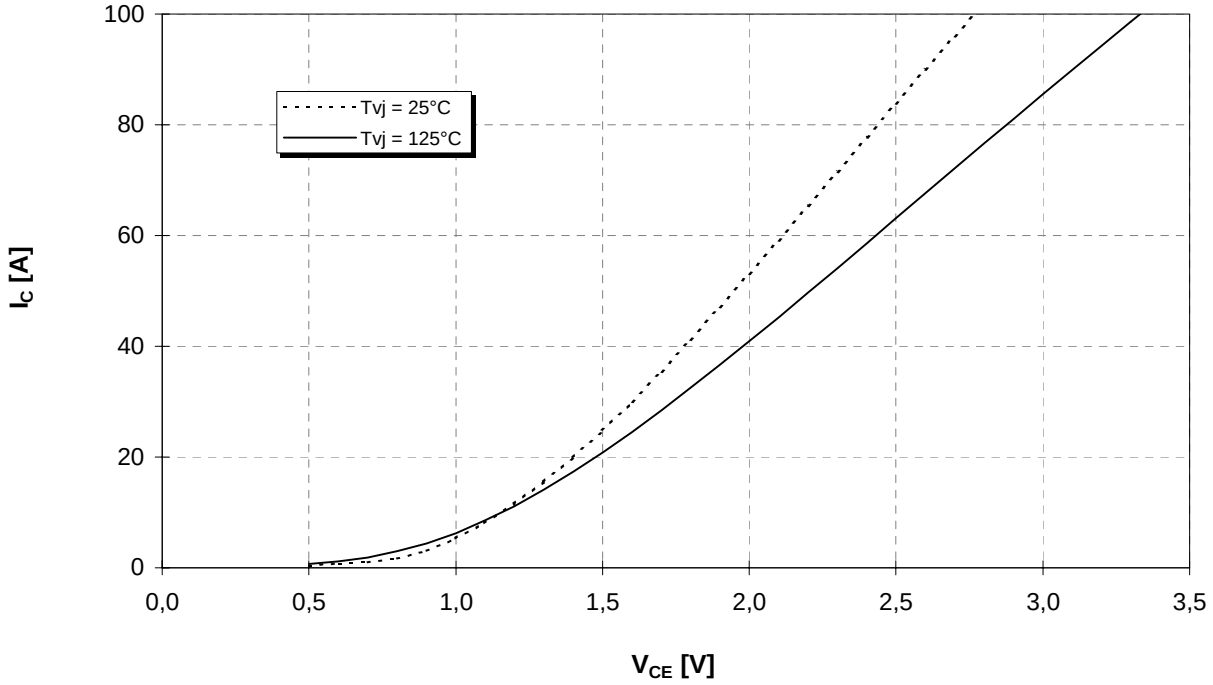
Mechanische Eigenschaften / Mechanical properties

Gehäuse, siehe Anlage case, see appendix						
Innere Isolation internal insulation				Al_2O_3		
CTI comperative tracking index				225		
Anzugsdrehmoment f. mech. Befestigung mounting torque		M	-15	4	+15	Nm %
Gewicht weight		G		180		g

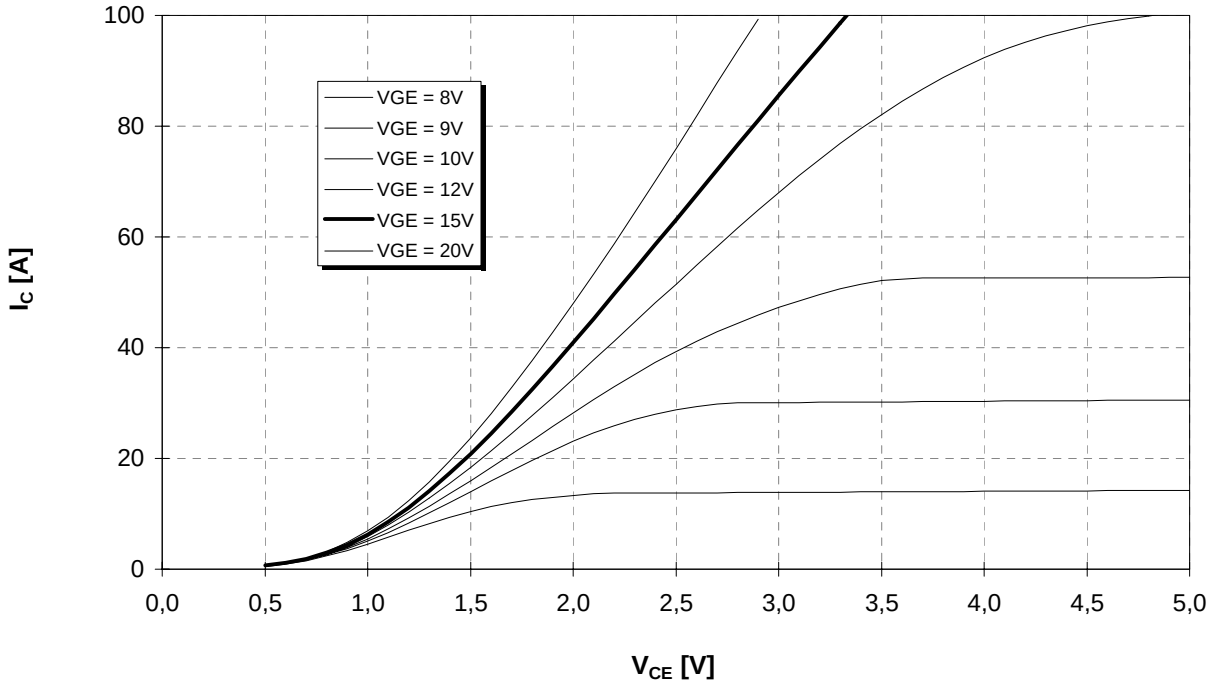
Mit dieser technischen Information werden Halbleiterbauelemente spezifiziert, jedoch keine Eigenschaften zugesichert.
Sie gilt in Verbindung mit den zugehörigen Technischen Erläuterungen.

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

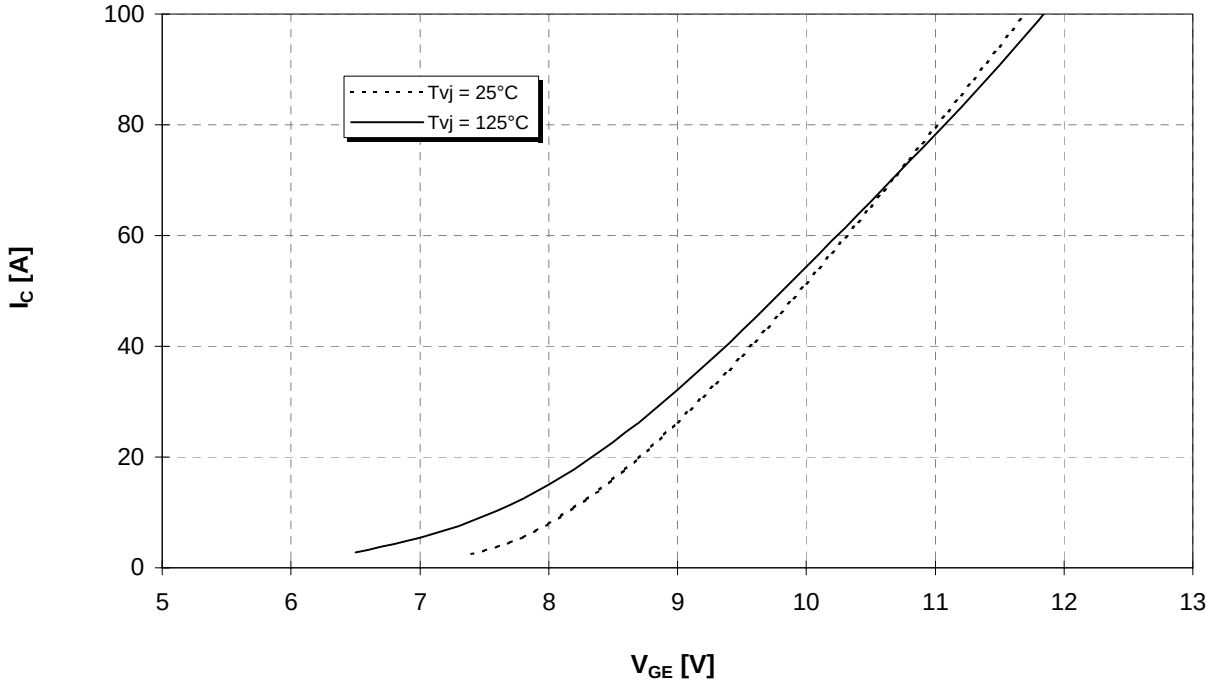
Ausgangskennlinie (typisch) $I_C = f(V_{CE})$
Output characteristic (typical) $V_{GE} = 15V$



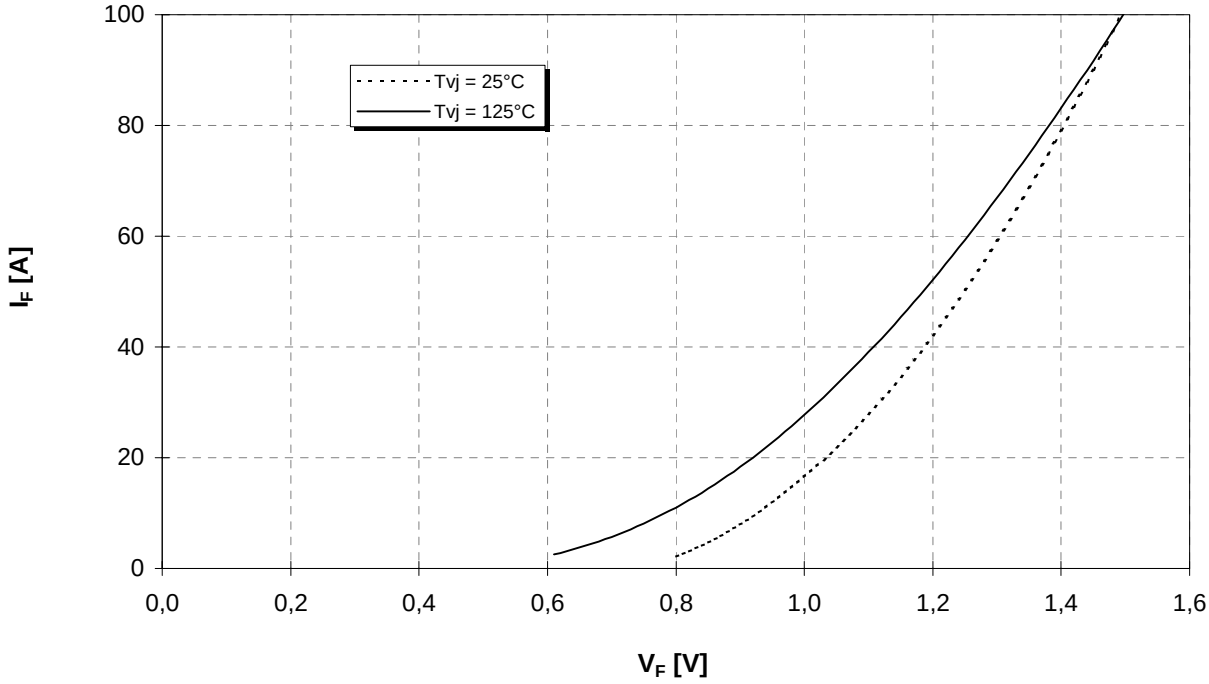
Ausgangskennlinienfeld (typisch) $I_C = f(V_{CE})$
Output characteristic (typical) $T_{vj} = 125°C$



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

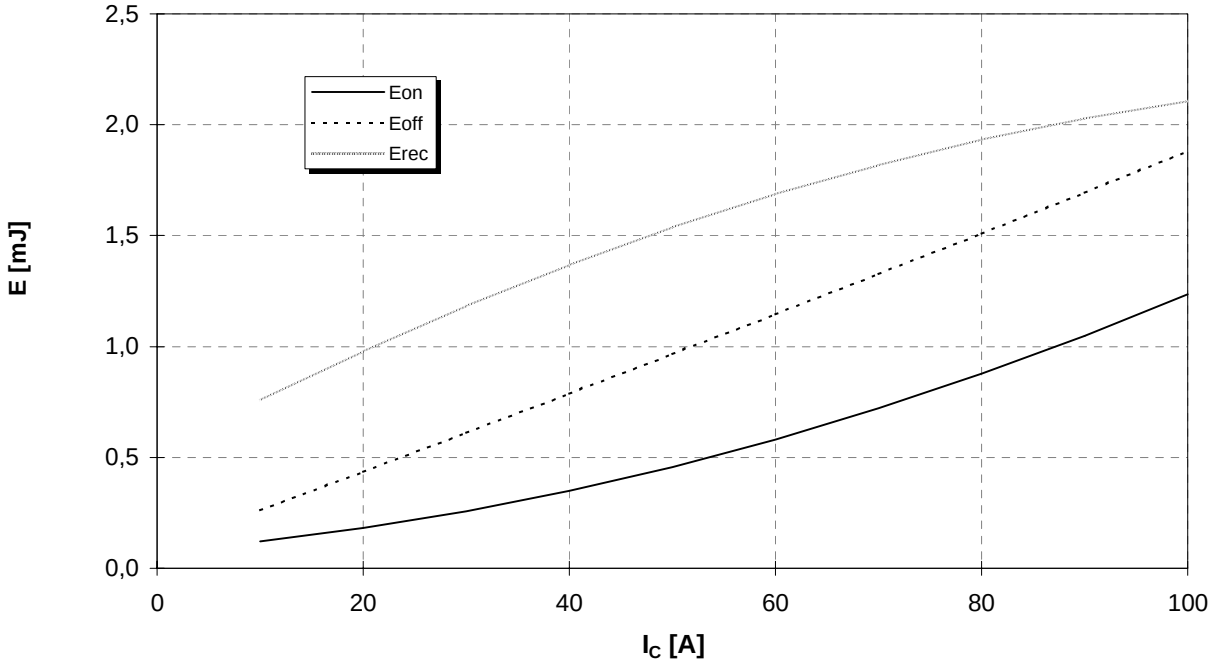


Durchlaßkennlinie der Inversdiode (typisch) $I_F = f(V_F)$
Forward characteristic of inverse diode (typical)



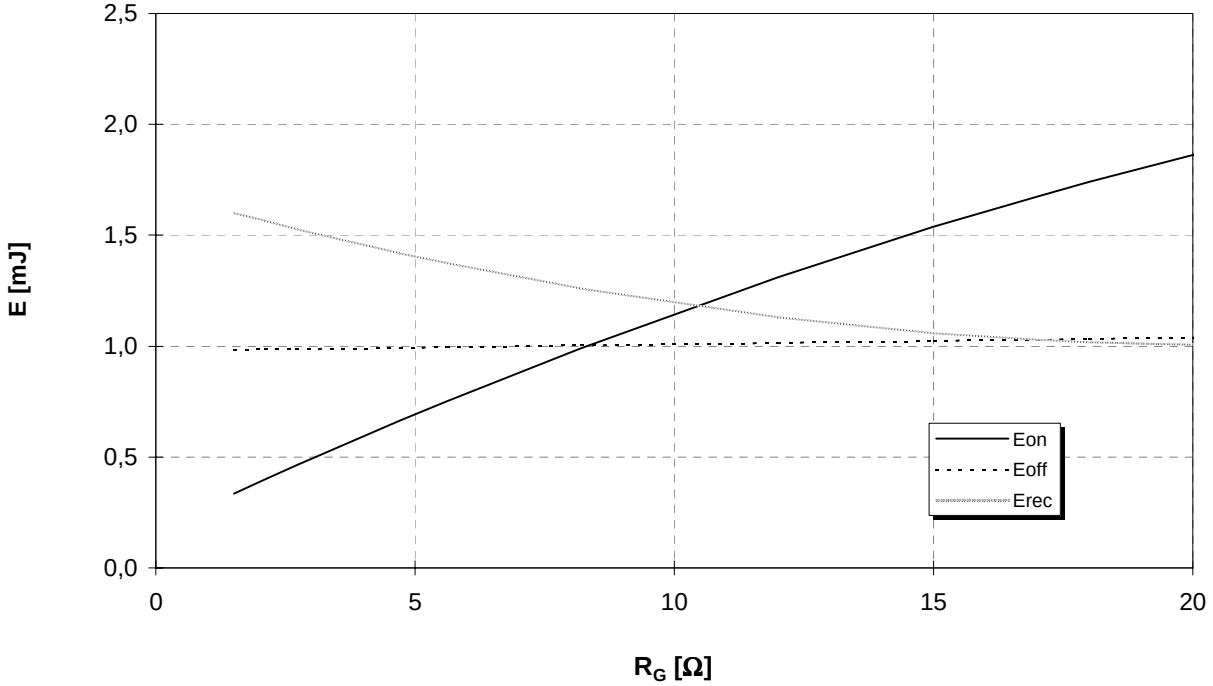
Schaltverluste (typisch)
Switching losses (typical)

$E_{on} = f(I_C)$, $E_{off} = f(I_C)$, $E_{rec} = f(I_C)$
$R_{G,on}$= 2,7Ω, $R_{G,off}$= 2,7Ω, V_{CC}= 300V, T_{vj}= 125°C

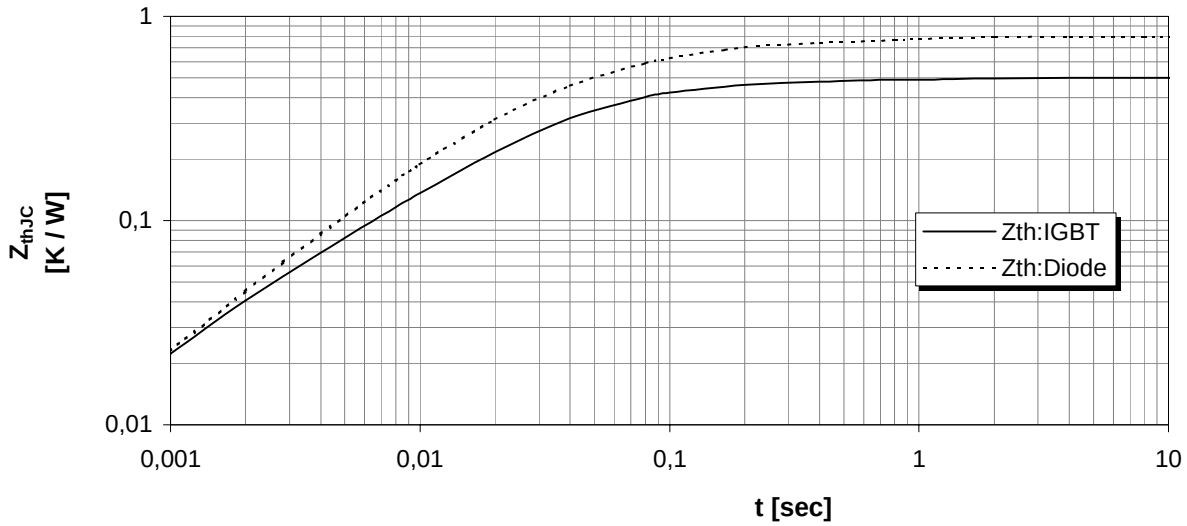


Schaltverluste (typisch)
Switching losses (typical)

$E_{on} = f(R_G)$, $E_{off} = f(R_G)$, $E_{rec} = f(R_G)$
I_C= 50A , V_{CE}= 300V , T_{vj} = 125°C

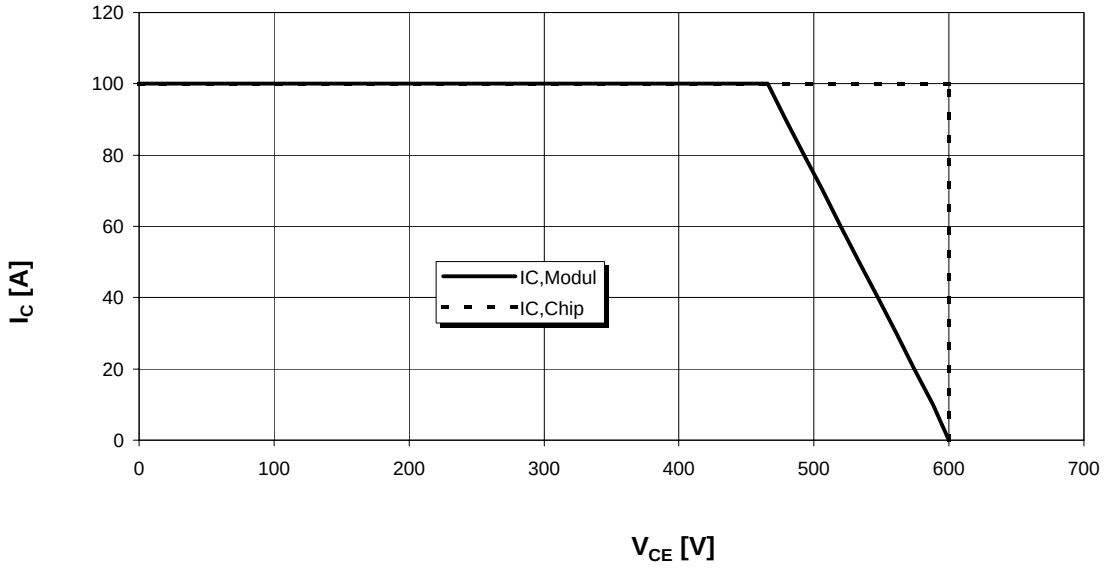


Transienter Wärmewiderstand $Z_{thJC} = f(t)$
Transient thermal impedance



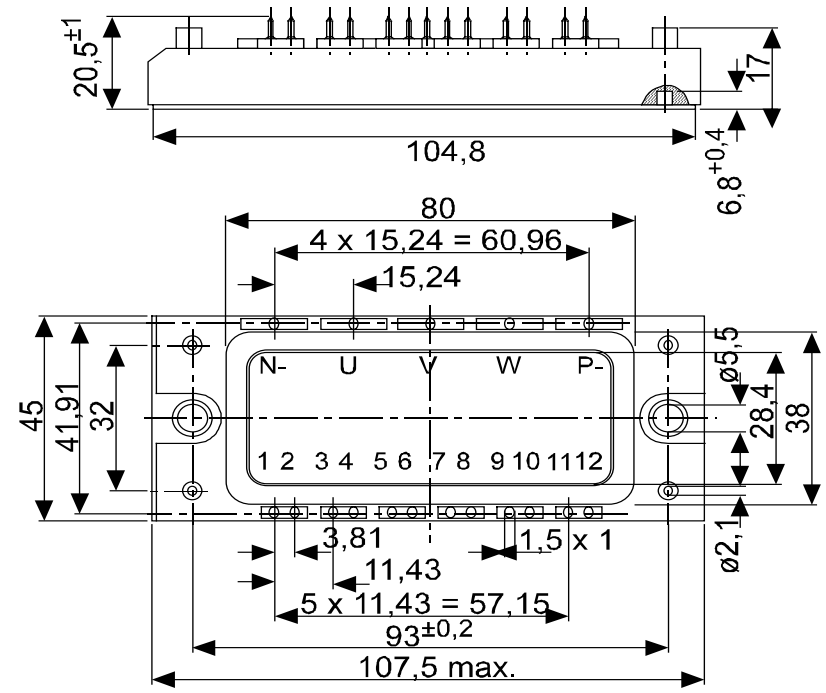
i	1	2	3	4
r_i [K/kW] : IGBT	21,2	262,0	176,2	40,6
τ_i [sec] : IGBT	0,0018	0,0240	0,0651	0,6626
r_i [K/kW] : Diode	281,9	270,4	169,8	77,9
τ_i [sec] : Diode	0,0487	0,0169	0,1069	0,9115

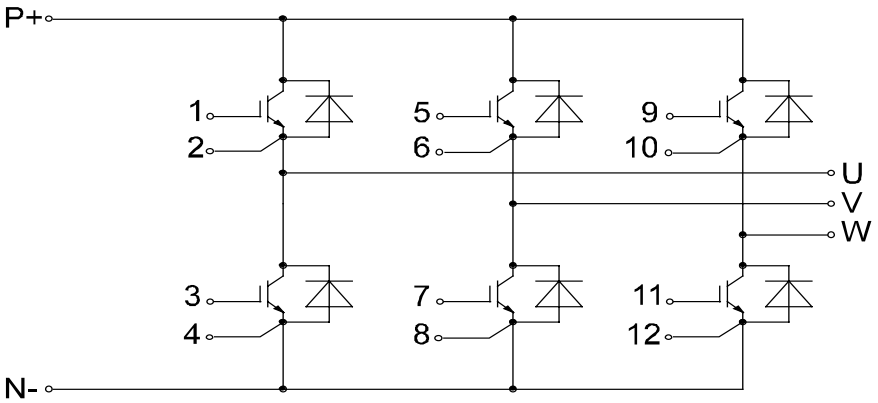
Sicherer Arbeitsbereich (RBSOA)
Reverse bias safe operation area (RBSOA) $R_{G,off}$= 2,7Ω, T_{vj}= 125°C



Gehäusemaße / Schaltbild
Package outline / Circuit diagram

Econo 2 (shortpin)





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