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Höchstzulässige Werte / maximum rated values

Elektrische Eigenschaften / electrical properties

Kollektor Emitter Sperrspannung collector emitter voltage	T_{vj}= 25°C	V_{CES}	1200	V
Kollektor Dauergleichstrom DC collector current	T_c= 80°C T_c= 25°C	$I_{C, nom}$ I_C	800 1200	A A
Periodischer Kollektor Spitzenstrom repetitive peak collector current	t_p= 1ms, T_c= 80°C	I_{CRM}	1600	A
Gesamt Verlustleistung total power dissipation	T_c= 25°C; Transistor	P_{tot}	3,9	kW
Gate Emitter Spitzenspannung gate emitter peak voltage		V_{GES}	+/- 20	V
Dauergleichstrom DC forward current		I_F	800	A
Periodischer Spitzenstrom repetitive peak forward current	t_p= 1ms	I_{FRM}	1600	A
Grenzlastintegral I²t value	V_R= 0V, t_p= 10ms, T_{vj}= 125°C	I²t	140	k A²s
Isolations Prüfspannung insulation test voltage	RMS, f= 50Hz, t= 1min.	V_{ISOL}	2,5	kV

Charakteristische Werte / characteristic values

Transistor Wechselrichter / transistor inverter

			min.	typ.	max.	
Kollektor Emitter Sättigungsspannung collector emitter satration voltage	I_C= 800A, V_{GE}= 15V, T_{vj}= 25°C, I_C= 800A, V_{GE}= 15V, T_{vj}= 125°C,	V_{CEsat}	- -	1,7 2	2,15 t.b.d.	V V
Gate Schwellenspannung gate threshold voltage	I_C= 32mA, V_{CE}= V_{GE}, T_{vj}= 25°C,	$V_{GE(th)}$	5	5,8	6,5	V
Gateladung gate charge	V_{GE}= -15V...+15V; V_{CE}=...V	Q_G	-	7,7	-	µC
Eingangskapazität input capacitance	f= 1MHz, T_{vj}= 25°C, V_{CE}= 25V, V_{GE}= 0V	C_{ies}	-	57	-	nF
Rückwirkungskapazität reverse transfer capacitance	f= 1MHz, T_{vj}= 25°C, V_{CE}= 25V, V_{GE}= 0V	C_{res}	-	2,7	-	nF
Kollektor Emitter Reststrom collector emitter cut off current	V_{GE}= 0V, T_{vj}= 25°C, V_{CE}= 1200V	I_{CES}	-	-	5	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 Wechselrichter / transistor inverter

			min.	typ.	max.	
Einschaltverzögerungszeit (ind. Last) turn on delay time (inductive load)	I_C= 800A, V_{CC}= 600V					
	V_{GE}=±15V, R_{Gon}=3,3Ω, T_{vj}=25°C	$t_{d,on}$	-	0,60	-	µs
	V_{GE}=±15V, R_{Gon}=3,3Ω, T_{vj}= 125°C		-	0,66	-	µs
Anstiegszeit (induktive Last) rise time (inductive load)	I_C= 800A, V_{CC}= 600V					
	V_{GE}=±15V, R_{Gon}=3,3Ω, T_{vj}=25°C	t_r	-	0,23	-	µs
	V_{GE}=±15V, R_{Gon}=3,3Ω, T_{vj}= 125°C		-	0,22	-	µs
Abschaltverzögerungszeit (ind. Last) turn off delay time (inductive load)	I_C= 800A, V_{CC}= 600V					
	V_{GE}=±15V, R_{Goff}=0,39Ω, T_{vj}=25°C	$t_{d,off}$	-	0,82	-	µs
	V_{GE}=±15V, R_{Goff}=0,39Ω,T_{vj}= 125°C		-	0,96	-	µs
Fallzeit (induktive Last) fall time (inductive load)	I_C= 800A, V_{CC}= 600V					
	V_{GE}=±15V, R_{Goff}=0,39Ω, T_{vj}=25°C	t_f	-	0,15	-	µs
	V_{GE}=±15V, R_{Goff}=0,39Ω,T_{vj}= 125°C		-	0,18	-	µs
Einschaltverlustenergie pro Puls turn on energy loss per pulse	I_C= 800A, V_{CC}= 600V, L_σ= 90nH V_{GE}=±15V, R_{Gon}=3,3Ω, T_{vj}= 125°C	E_{on}	-	160	-	mJ
Ausschaltverlustenergie pro Puls turn off energy loss per pulse	I_C= 800A, V_{CC}= 600V, L_σ= 90nH V_{GE}=±15V, R_{Goff}=0,39Ω, T_{vj}= 125°C	E_{off}	-	125	-	mJ
Kurzschlussverhalten SC data	$t_P \leq$ 10µs, $V_{GE} \leq$ 15V, $T_{Vj} \leq$ 125°C V_{CC}= 900V, V_{CEmax}= V_{CES} - $L_{\sigma CE} \cdot \lvert di/dt \rvert$	I_{SC}	-	3200	-	A
Modulindiktivität stray inductance module		$L_{\sigma CE}$	-	20	-	nH
Leitungswiderstand, Anschluss-Chip lead resistance, terminal-chip	T_c= 25°C	$R_{CC'/EE'}$	-	0,18	-	mΩ

Charakteristische Werte / characteristic values

Diode Wechselrichter / diode inverter

Durchlassspannung forward voltage	I_F= $I_{C,\,nom}$, V_{GE}= 0V, T_{vj}= 25°C	V_F	-	2,2	2,8	V
	I_F= $I_{C,\,nom}$, V_{GE}= 0V, T_{vj}= 125°C		-	2	-	V
Rückstromspitze peak reverse recovery current	I_F=$I_{C,nom}$, -di_F/dt= 3600A/µs					
	V_R= 600V, V_{GE}= -15V, T_{vj}= 25°C	I_{RM}	-	260	-	A
	V_R= 600V, V_{GE}= -15V, T_{vj}= 125°C		-	400	-	A
Sperrverzögerungsladung recoverred charge	I_F=$I_{C,nom}$, -di_F/dt= 3600A/µs					
	V_R= 600V, V_{GE}= -15V, T_{vj}= 25°C	Q_r	-	37	-	µC
	V_R= 600V, V_{GE}= -15V, T_{vj}= 125°C		-	90	-	µC
Ausschaltenergie pro Puls reverse recovery energy	I_F=$I_{C,nom}$, -di_F/dt= 3600A/µs					
	V_R= 600V, V_{GE}= -15V, T_{vj}= 25°C	E_{rec}	-	9	-	mJ
	V_R= 600V, V_{GE}= -15V, T_{vj}= 125°C		-	24	-	mJ

vorläufige Daten
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Thermische Eigenschaften / thermal properties

			min.	typ.	max.	
Innerer Wärmewiderstand thermal resistance, junction to case	Transistor, DC, pro Modul / per module	R_{thJC}	-	-	0,016	K/W
	Transistor, DC, pro Zweig / per arm		-	-	0,032	K/W
	Diode/Diode, DC, pro Modul / per module		-	-	0,032	K/W
	Diode/Diode, DC, pro Zweig / per arm		-	-	0,064	K/W
Übergangs Wärmewiderstand thermal resistance, case to heatsink	pro Modul / per module	R_{thCK}	-	0,006	-	K/W
	pro Zweig/ per arm $\lambda_{Paste}/\lambda_{grease}$ =1W/m*K		-	0,012	-	K/W
Höchstzulässige Sperrschichttemp. maximum junction temperature		$T_{vj\ max}$	-	-	150	°C
Betriebstemperatur operation temperature		$T_{vj\ op}$	-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				32		mm
Luftstrecke clearance				20		mm
CTI comperative tracking index				>400		
Anzugsdrehmoment, mech. Befestigung mounting torque	Schraube / screw M5	M	4,25	-	5,75	Nm
Anzugsdrehmoment, elektr. Anschlüsse terminal connection torque	Anschlüsse / terminal M4	M	1,7	-	2,3	Nm
	Anschlüsse / terminal M8	M	8	-	10	Nm
Gewicht weight		G		1500		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 with the belonging technical notes.

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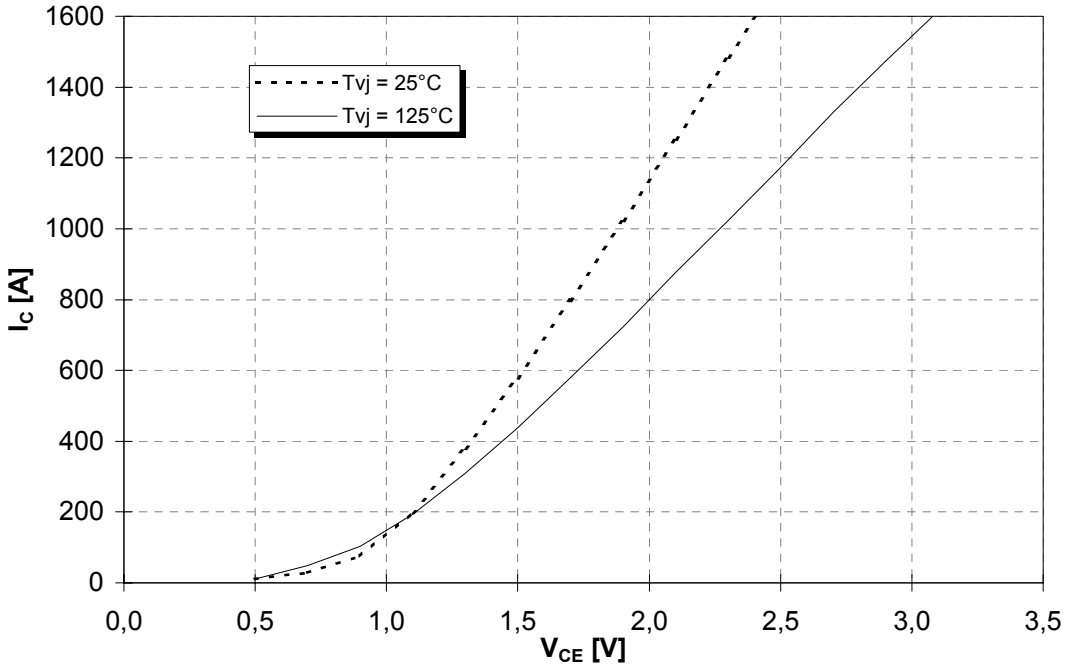
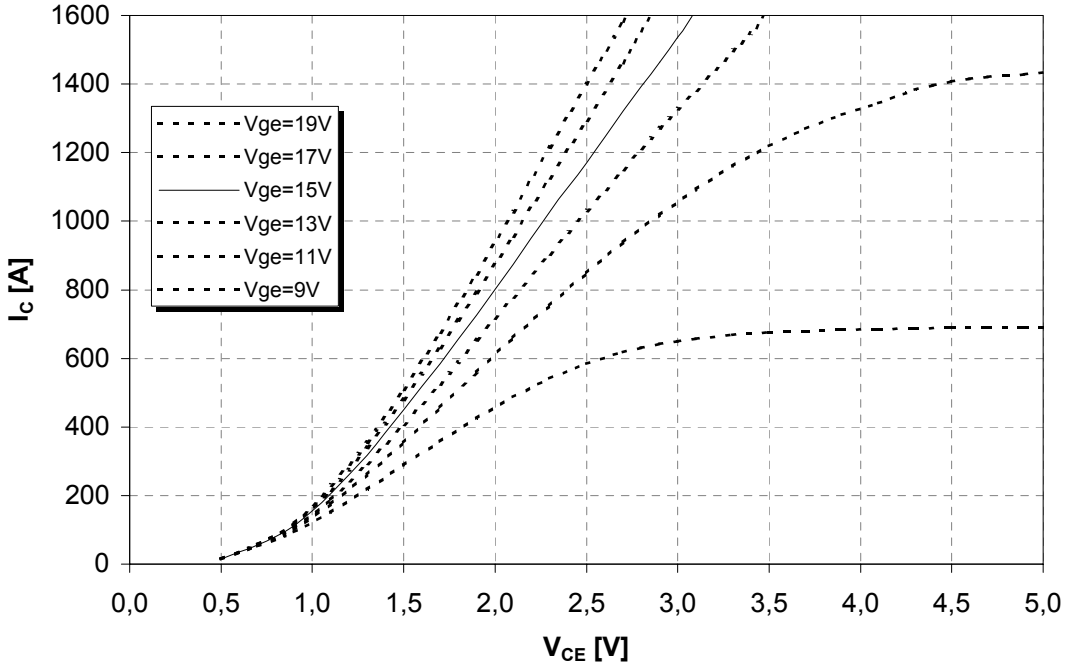
Ausgangskennlinie (typisch) $I_C = f(V_{CE})$
output characteristic (typical) $V_{GE} = 15V$



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



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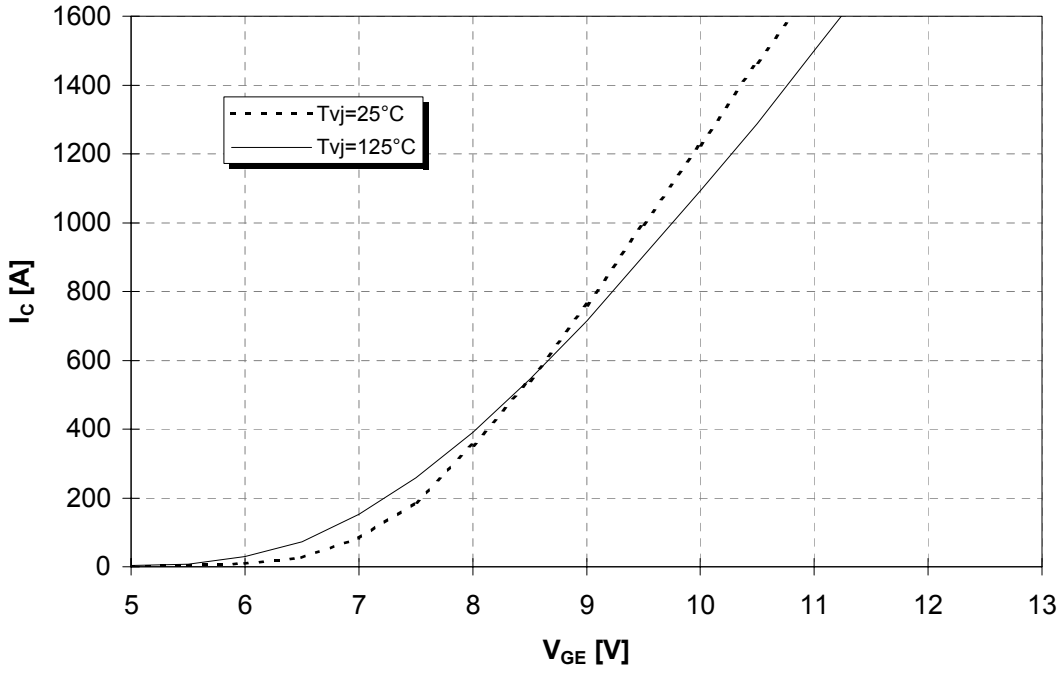
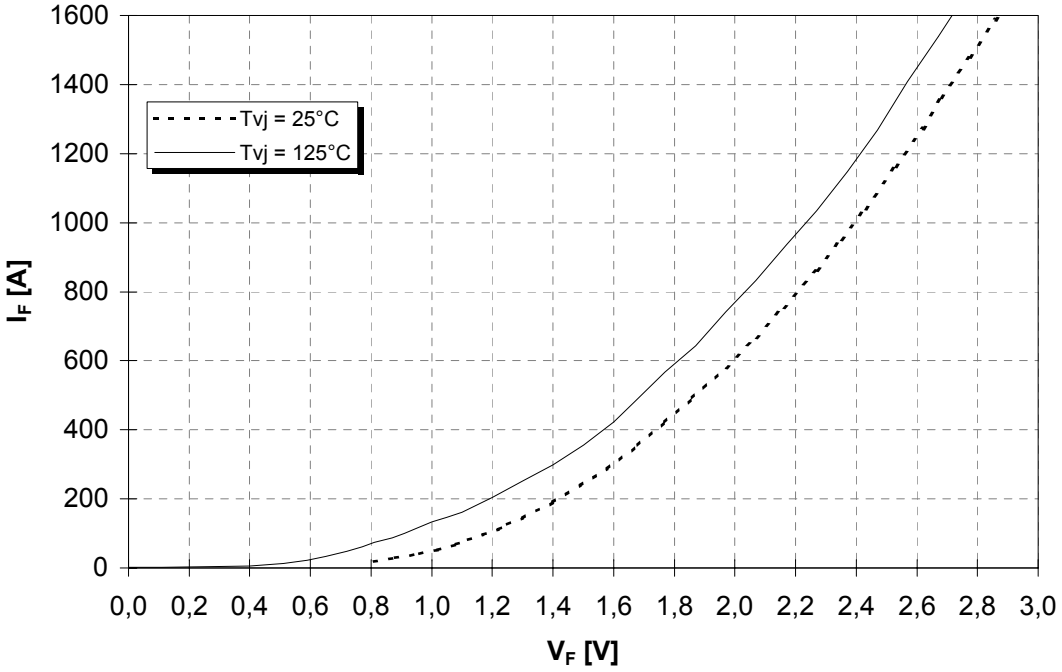
Übertragungscharakteristik (typisch) $I_C = f(V_{GE})$
transfer characteristic (typical) $V_{CE} = 20V$



Durchlasskennlinie der Inversdiode (typisch) $I_F = f(V_F)$
forward caracteristic of inverse diode (typical)



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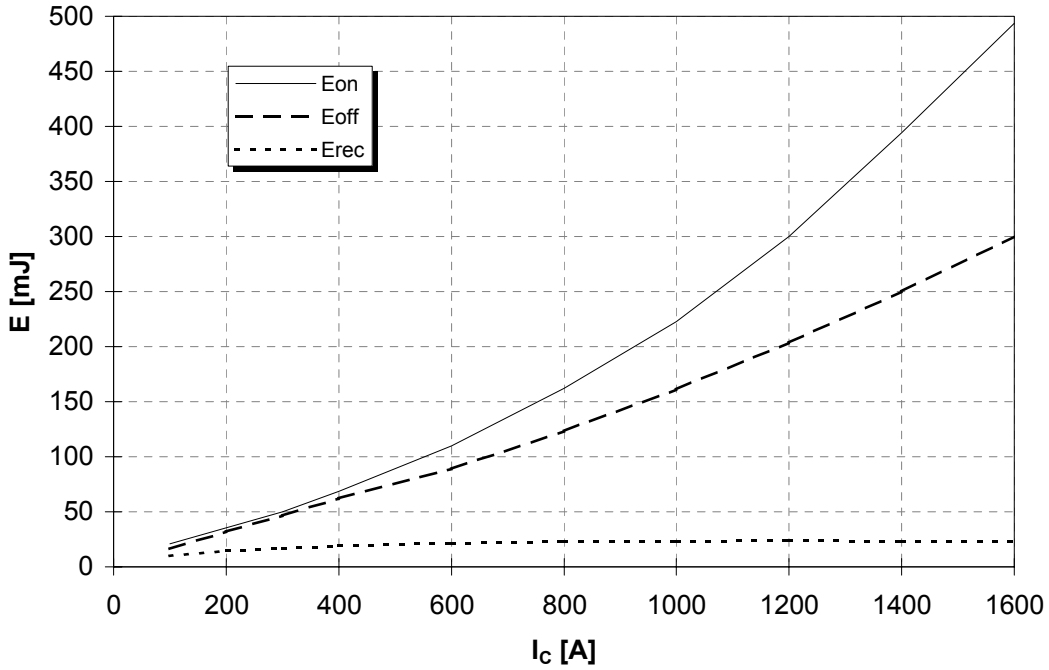
Schaltverluste (typisch)
Switching losses (typical)

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

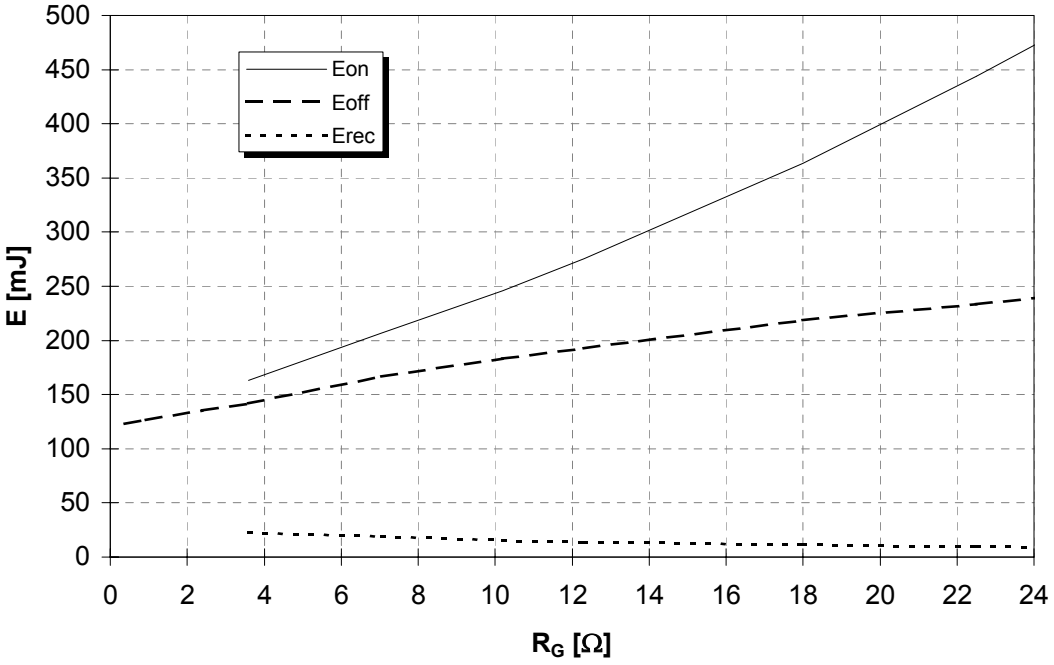
V_{GE}=±15V, R_{gon}=3,3Ω, R_{goff}=0,39Ω, V_{CE}=600V, T_{vj}=125°C



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=800A, V_{CE}=600V, T_{vj}=125°C



vorläufige Daten
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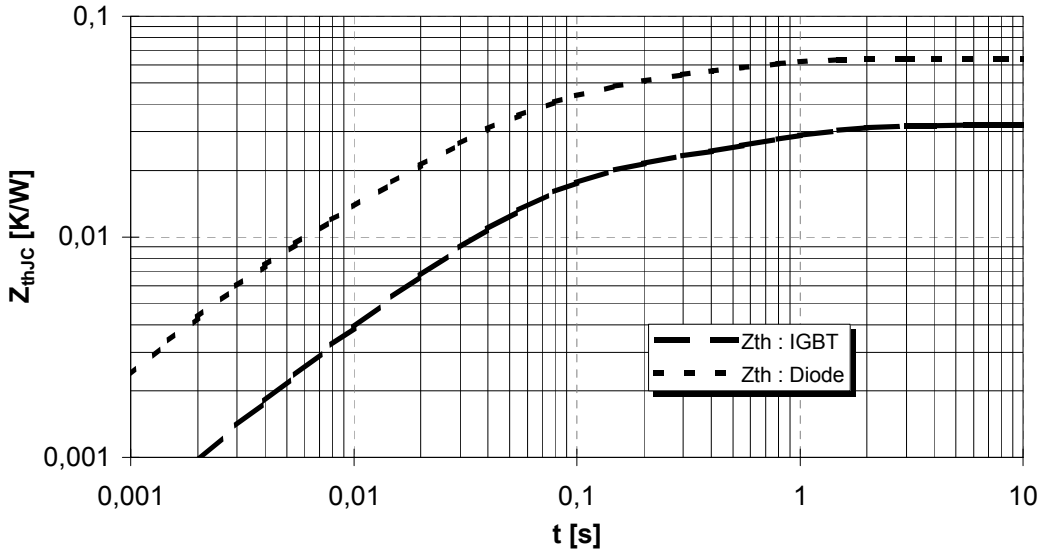
Transienter Wärmewiderstand
Transient thermal impedance

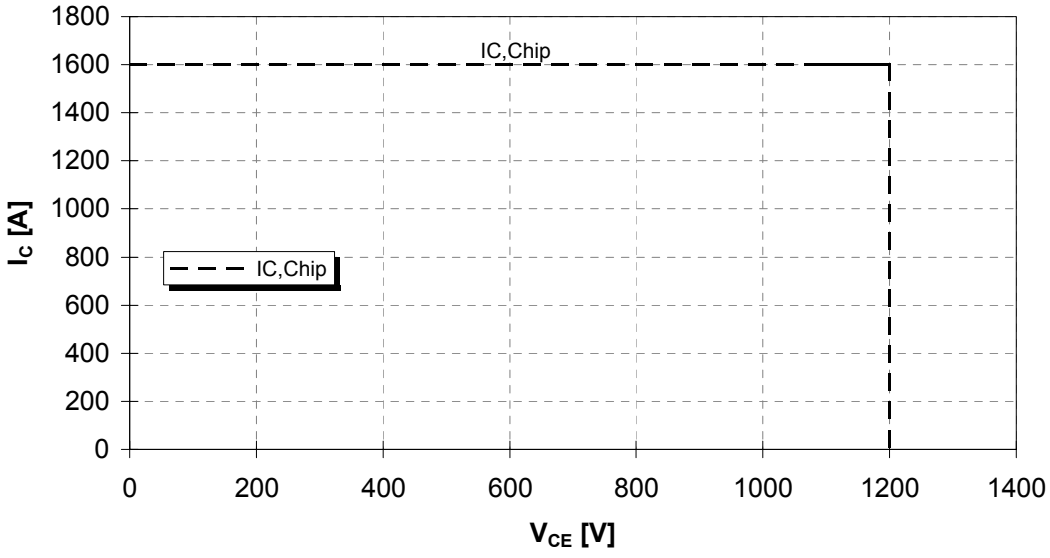
$Z_{thJC} = f(t)$



i	1	2	3	4
r_i [K/kW] : IGBT	13,45	16,12	1,83	0,60
τ_i [s] : IGBT	6,897E-01	5,634E-02	2,997E-02	3,820E-03
r_i [K/kW] : Diode	18,37	20,16	21,17	4,30
τ_i [s] : Diode	4,452E-01	7,451E-02	2,647E-02	2,850E-03

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

V_{GE}=±15V, T_{vj}=125°C



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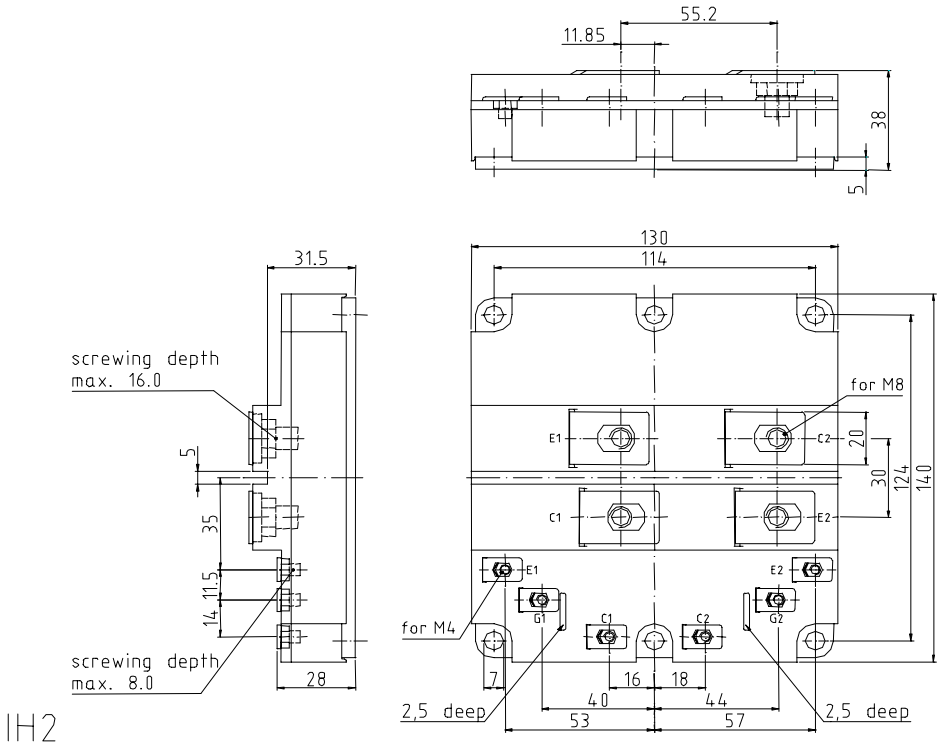
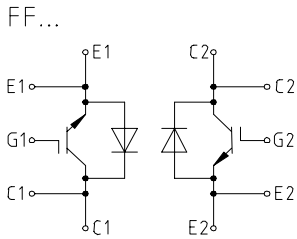
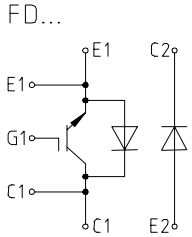
Gehäusemaße / Schaltbild
Package outline / Circuit diagram







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