Vorläufige Daten
preliminary data

IGBT-Wechselrichter / IGBT-inverter

Höchstzulässige Werte / maximum rated values

Kollektor-Emitter-Sperrspannung collector-emitter voltage	T_{vj} = 25°C T_{vj} = -25°C	V_{CES}	3300 3300	V
Kollektor-Dauergleichstrom DC-collector current	T_C = 80°C T_C = 25°C	$I_{C\ nom}$ I_C	200 330	A A
Periodischer Kollektor Spitzenstrom repetitive peak collector current	t_P = 1 ms, T_C = 80°C	I_{CRM}	400	A
Gesamt-Verlustleistung total power dissipation	T_C = 25°C	P_{tot}	2,20	kW
Gate-Emitter-Spitzenspannung gate-emitter peak voltage		V_{GES}	+/-20	V

Charakteristische Werte / characteristic values

			min.	typ.	max.	
Kollektor-Emitter Sättigungsspannung collector-emitter saturation voltage	I_C = 200 A, V_{GE} = 15 V, T_{vj} = 25°C I_C = 200 A, V_{GE} = 15 V, T_{vj} = 125°C	$V_{CE\ sat}$		3,40 4,30	4,25 5,00	V V
Gate-Schwellenspannung gate threshold voltage	I_C = 20,0 mA, V_{CE} = V_{GE}, T_{vj} = 25°C	V_{GEth}	4,2	5,1	6,0	V
Gateladung gate charge	V_{GE} = -15 V ... +15 V, V_{CE} = 1800V	Q_G		4,00		µC
Interner Gatewiderstand internal gate resistor	T_{vj} = 25°C	R_{Gint}		2,5		Ω
Eingangskapazität input capacitance	f = 1 MHz, T_{vj} = 25°C, V_{CE} = 25 V, V_{GE} = 0 V	C_{ies}		25,0		nF
Rückwirkungskapazität reverse transfer capacitance	f = 1 MHz, T_{vj} = 25°C, V_{CE} = 25 V, V_{GE} = 0 V	C_{res}		1,40		nF
Kollektor-Emitter Reststrom collector-emitter cut-off current	V_{CE} = 3300 V, V_{GE} = 0 V, T_{vj} = 25°C	I_{CES}			5,0	mA
Gate-Emitter Reststrom gate-emitter leakage current	V_{CE} = 0 V, V_{GE} = 20 V, T_{vj} = 25°C	I_{GES}			400	nA
Einschaltverzögerungszeit (ind. Last) turn-on delay time (inductive load)	I_C = 200 A, V_{CE} = 1800 V V_{GE} = ±15 V, R_{Gon} = 5,6 Ω, C_{GE} = 33,0 nF, T_{vj} = 25°C V_{GE} = ±15 V, R_{Gon} = 5,6 Ω, C_{GE} = 33,0 nF, T_{vj} = 125°C	$t_{d\ on}$		0,28 0,28		µs µs
Anstiegszeit (induktive Last) rise time (inductive load)	I_C = 200 A, V_{CE} = 1800 V V_{GE} = ±15 V, R_{Gon} = 5,6 Ω, C_{GE} = 33,0 nF, T_{vj} = 25°C V_{GE} = ±15 V, R_{Gon} = 5,6 Ω, C_{GE} = 33,0 nF, T_{vj} = 125°C	t_r		0,18 0,20		µs µs
Abschaltverzögerungszeit (ind. Last) turn-off delay time (inductive load)	I_C = 200 A, V_{CE} = 1800 V V_{GE} = ±15 V, R_{Goff} = 7,5 Ω, C_{GE} = 33,0 nF, T_{vj} = 25°C V_{GE} = ±15 V, R_{Goff} = 7,5 Ω, C_{GE} = 33,0 nF, T_{vj} = 125°C	$t_{d\ off}$		1,55 1,70		µs µs
Fallzeit (induktive Last) fall time (inductive load)	I_C = 200 A, V_{CE} = 1800 V V_{GE} = ±15 V, R_{Goff} = 7,5 Ω, C_{GE} = 33,0 nF, T_{vj} = 25°C V_{GE} = ±15 V, R_{Goff} = 7,5 Ω, C_{GE} = 33,0 nF, T_{vj} = 125°C	t_f		0,20 0,20		µs µs
Einschaltverlustenergie pro Puls turn-on energy loss per pulse	I_C = 200 A, V_{CE} = 1800 V, L_S = 70 nH V_{GE} = ±15 V, R_{Gon} = 5,6 Ω, C_{GE} = 33,0 nF, T_{vj} = 25°C V_{GE} = ±15 V, R_{Gon} = 5,6 Ω, C_{GE} = 33,0 nF, T_{vj} = 125°C	E_{on}		235 365		mJ mJ
Abschaltverlustenergie pro Puls turn-off energy loss per pulse	I_C = 200 A, V_{CE} = 1800 V, L_S = 70 nH V_{GE} = ±15 V, R_{Goff} = 7,5 Ω, C_{GE} = 33,0 nF, T_{vj} = 25°C V_{GE} = ±15 V, R_{Goff} = 7,5 Ω, C_{GE} = 33,0 nF, T_{vj} = 125°C	E_{off}		215 255		mJ mJ
Kurzschlußverhalten SC data	t_P ≤ 10 µs, V_{GE} ≤ 15 V T_{vj}≤125°C, V_{CC} = 2500 V, V_{CEmax} = V_{CES} -L_{sCE} ·di/dt	I_{SC}		1000		A
Innerer Wärmewiderstand thermal resistance, junction to case	pro IGBT per IGBT	R_{thJC}			57,0	K/kW
Übergangs-Wärmewiderstand thermal resistance, case to heatsink	pro IGBT / per IGBT λ_{Paste} = 1 W/(m·K) / λ_{grease} = 1 W/(m·K)	R_{thCH}		49,0		K/kW

prepared by: Jürgen Biermann	date of publication: 2003-6-12
approved by: Christoph Lübke	revision: 2.0

Vorläufige Daten
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Diode-Wechselrichter / diode-inverter

Höchstzulässige Werte / maximum rated values

Periodische Spitzensperrspannung repetitive peak reverse voltage	T_{vj} = 25°C T_{vj} = -25°C	V_{RRM}	3300 3300	V
Dauergleichstrom DC forward current		I_F	200	A
Periodischer Spitzenstrom repetitive peak forward current	t_P = 1 ms	I_{FRM}	400	A
Grenzlastintegral I²t - value	V_R = 0 V, t_P = 10 ms, T_{vj} = 125°C	I²t	14,0	kA²s
Spitzenverlustleistung maximum power dissipation	T_{vj} = 125°C	P_{RQM}	400	kW
Mindesteinschaltdauer minimum turn-on time		$t_{Fon\ min}$	10,0	µs

Charakteristische Werte / characteristic values

			min.	typ.	max.	
Durchlassspannung forward voltage	I_F = 200 A, V_{GE} = 0 V, T_{vj} = 25°C I_F = 200 A, V_{GE} = 0 V, T_{vj} = 125°C	V_F		2,80 2,80	3,50 3,50	V V
Rückstromspitze peak reverse recovery current	I_F = 200 A, - di_F/dt = 1100 A/µs V_R = 1800 V, V_{GE} = -15 V, T_{vj} = 25°C V_R = 1800 V, V_{GE} = -15 V, T_{vj} = 125°C	I_{RM}		275 325		A A
Sperrverzögerungsladung recovered charge	I_F = 200 A, -di_F/dt = 1100 A/µs V_R = 1800 V, V_{GE} = -15 V, T_{vj} = 25°C V_R = 1800 V, V_{GE} = -15 V, T_{vj} = 125°C	Q_r		120 220		µC µC
Abschaltenergie pro Puls reverse recovery energy	I_F = 200 A, -di_F/dt = 1100 A/µs V_R = 1800 V, V_{GE} = -15 V, T_{vj} = 25°C V_R = 1800 V, V_{GE} = -15 V, T_{vj} = 125°C	E_{rec}		125 255		mJ mJ
Innerer Wärmewiderstand thermal resistance, junction to case	pro Diode per diode	R_{thJC}			110	K/kW
Übergangs-Wärmewiderstand thermal resistance, case to heatsink	pro Diode / per diode λ_{Paste} = 1 W/(m·K) / λ_{grease} = 1 W/(m·K)	R_{thCH}		93,0		K/kW

Vorläufige Daten
preliminary data

Modul / module

Isolations-Prüfspannung insulation test voltage	RMS, f = 50 Hz, t = 1 min.	V_{ISOL}		6,0		kV
Teilentladungs Aussetzspannung partial discharge extinction voltage	RMS, f = 50 Hz, Q_{PD} ≤ 10 pC (acc. to IEC 1287)	V_{ISOL}		2,6		kV
Kollektor-Emitter-Gleichsperrspannung DC stability	T_{vj} = 25°C, 100 fit	$V_{CE\ D}$		1800		V
Material Modulgrundplatte material of module baseplate				AlSiC		
Material für innere Isolation material for internal insulation				AlN		
Kriechstrecke creepage distance	Kontakt - Kühlkörper / terminal to heatsink Kontakt - Kontakt / terminal to terminal			32,0 32,0		mm
Luftstrecke clearance distance	Kontakt - Kühlkörper / terminal to heatsink Kontakt - Kontakt / terminal to terminal			19,0 19,0		mm
Vergleichszahl der Kriechwegbildung comparative tracking index		CTI		> 400		
			min.	typ.	max.	
Übergangs-Wärmewiderstand thermal resistance, case to heatsink	pro Modul / per module λ_{Paste} = 1 W/(m·K) / λ_{grease} = 1 W/(m·K)	R_{thCH}		16,0		K/kW
Modulinduktivität stray inductance module		L_{sCE}		58		nH
Modulleitungswiderstand, Anschlüsse - Chip module lead resistance, terminals - chip	T_C = 25°C, pro Zweig / per arm	$R_{CC'+EE'}$		0,78		mΩ
Höchstzulässige Sperrschichttemperatur maximum junction temperature		$T_{vj\ max}$			150	°C
Temperatur im Schaltbetrieb temperature under switching conditions		$T_{vj\ op}$	-40		125	°C
Lagertemperatur storage temperature		T_{stg}	-40		125	°C
Anzugsdrehmoment f. mech. Befestigung mounting torque	Schraube / screw M6	M	4,25	-	5,75	Nm
Anzugsdrehmoment f. elektr. Anschlüsse terminal connection torque	Schraube / screw M5	M	3,6	-	4,2	Nm
Gewicht weight		G		500		g

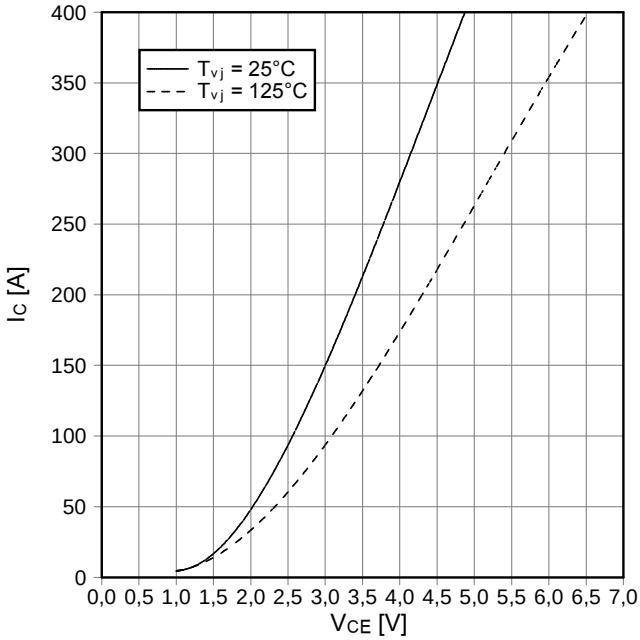
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This technical information specifies semiconductor devices but guarantees no characteristics. It is valid with the appropriate technical explanations.

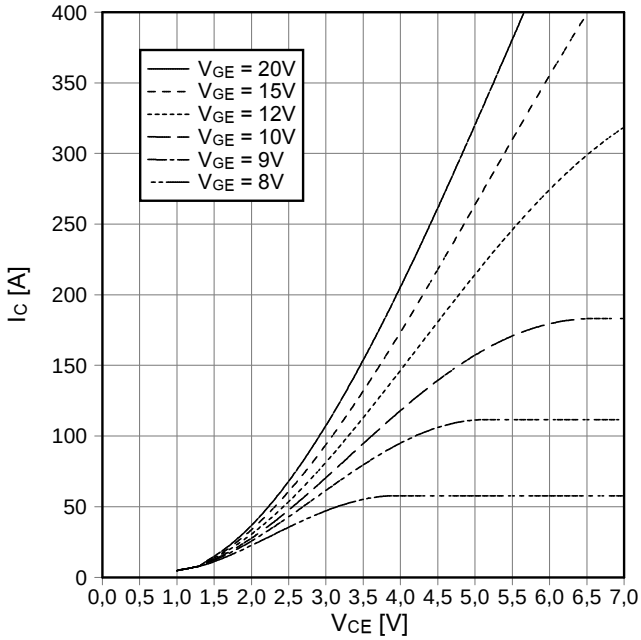
prepared by: Jürgen Biermann	date of publication: 2003-6-12
approved by: Christoph Lübke	revision: 2.0

Vorläufige Daten
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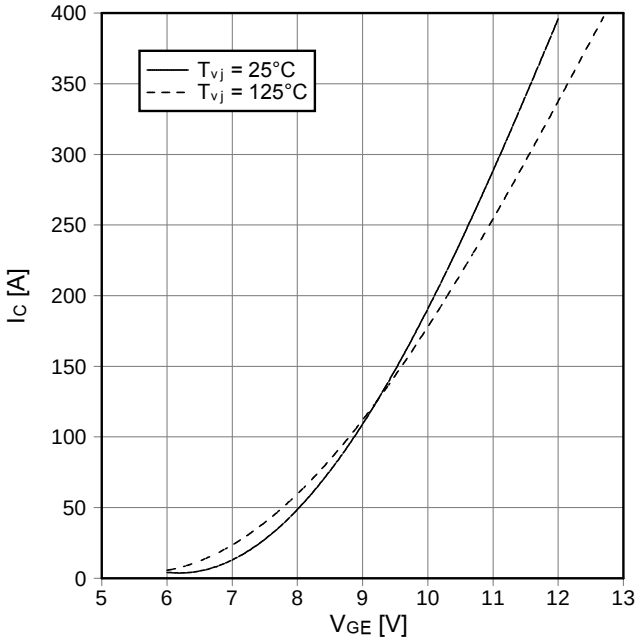
Ausgangskennlinie IGBT-Wechselr. (typisch)
output characteristic IGBT-inverter (typical)
$I_C = f(V_{CE})$
V_{GE} = 15 V



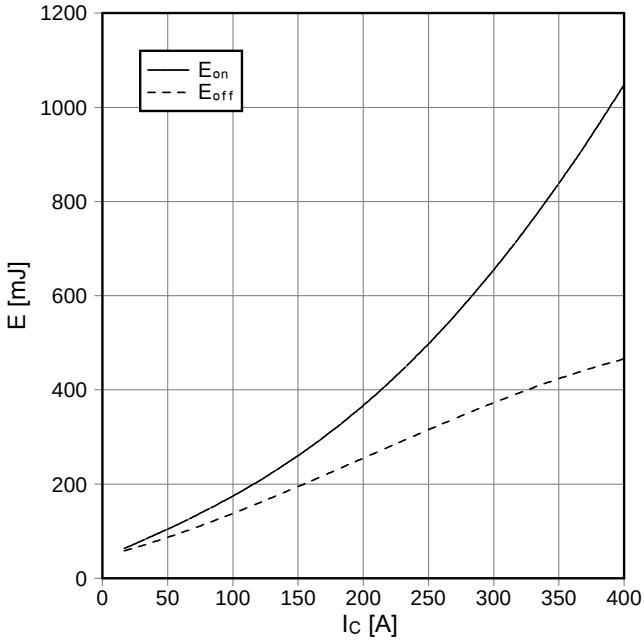
Ausgangskennlinienfeld IGBT-Wechselr. (typisch)
output characteristic IGBT-inverter (typical)
$I_C = f(V_{CE})$
T_{vj} = 125°C



Übertragungscharakteristik IGBT-Wechselr. (typisch)
transfer characteristic IGBT-inverter (typical)
$I_C = f(V_{GE})$
V_{CE} = 20 V



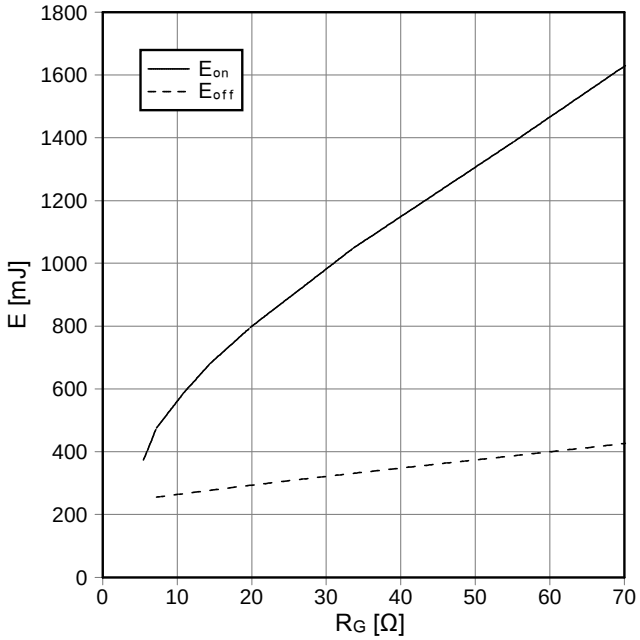
Schaltverluste IGBT-Wechselr. (typisch)
switching losses IGBT-inverter (typical)
$E_{on} = f(I_C)$, $E_{off} = f(I_C)$
V_{GE} = ±15 V, R_{Gon} = 5,6 Ω, R_{Goff} = 7,5 Ω, V_{CE} = 1800 V, T_{vj} = 125°C, C_{GE} = 33 nF



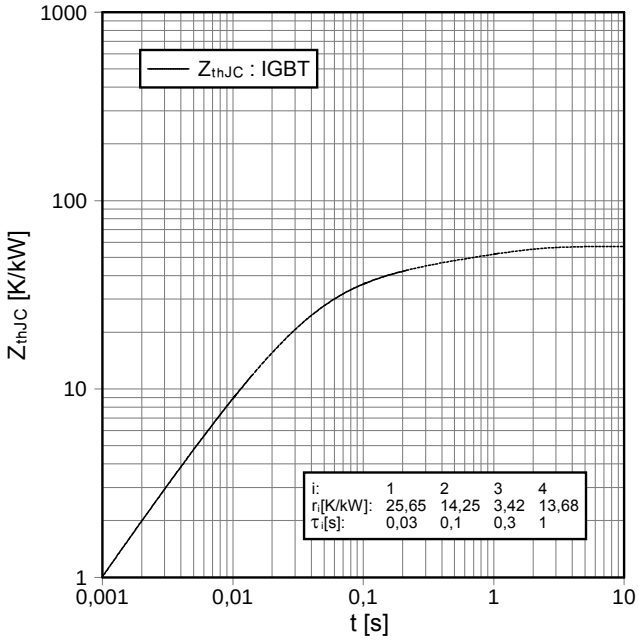
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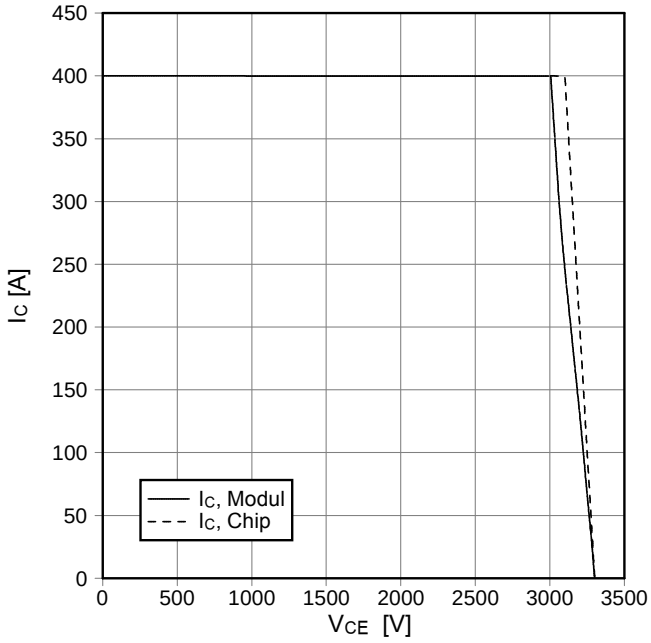
Schaltverluste IGBT-Wechselr. (typisch)
switching losses IGBT-Inverter (typical)
$E_{on} = f(R_G)$, $E_{off} = f(R_G)$
V_{GE} = ±15 V, I_C = 200 A, V_{CE} = 1800 V, T_{vj} = 125°C, C_{GE} = 33 nF



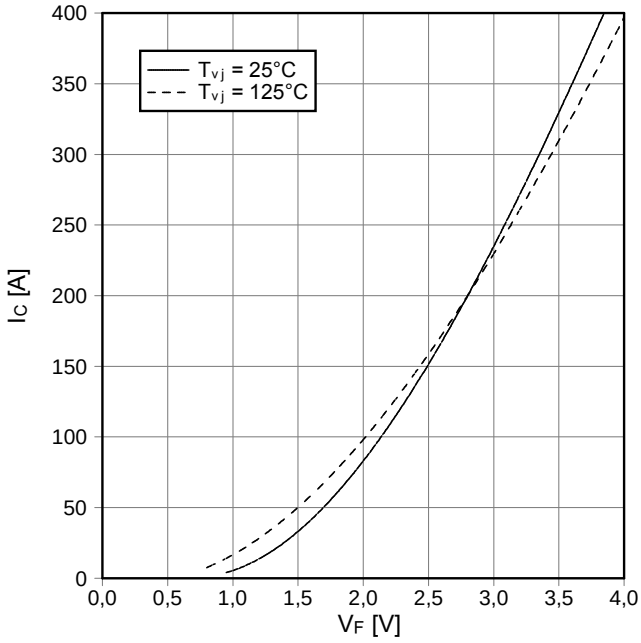
Transienter Wärmewiderstand IGBT-Wechselr.
transient thermal impedance IGBT-inverter
$Z_{thJC} = f(t)$



Sicherer Rückwärts-Arbeitsbereich IGBT-Wr. (RBSOA)
reverse bias safe operating area IGBT-inv. (RBSOA)
$I_C = f(V_{CE})$
V_{GE} = ±15 V, R_{Goff} = 7,5 Ω, T_{vj} = 125°C, C_{GE} = 33 nF



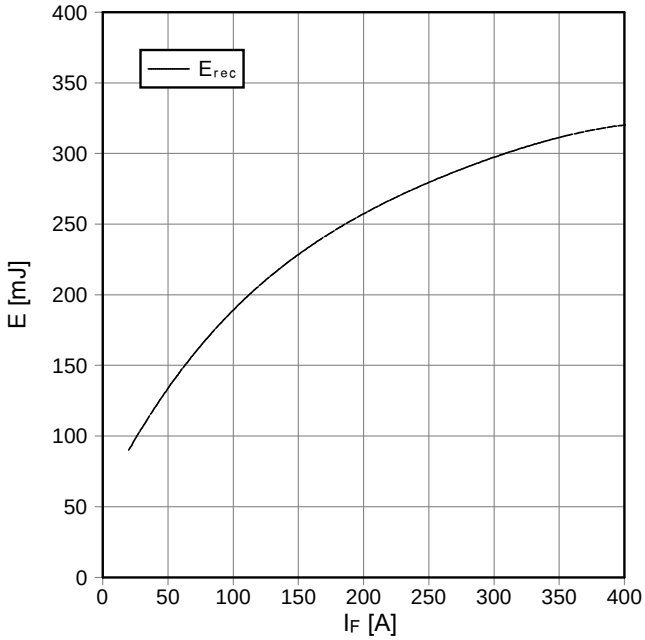
Durchlaßkennlinie der Diode-Wechselr. (typisch)
forward characteristic of diode-inverter (typical)
$I_F = f(V_F)$



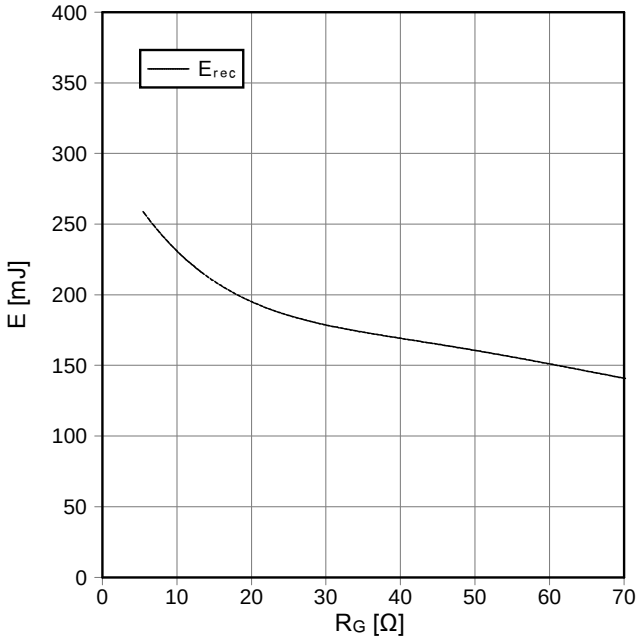
prepared by: Jürgen Biermann	date of publication: 2003-6-12
approved by: Christoph Lübke	revision: 2.0

Vorläufige Daten
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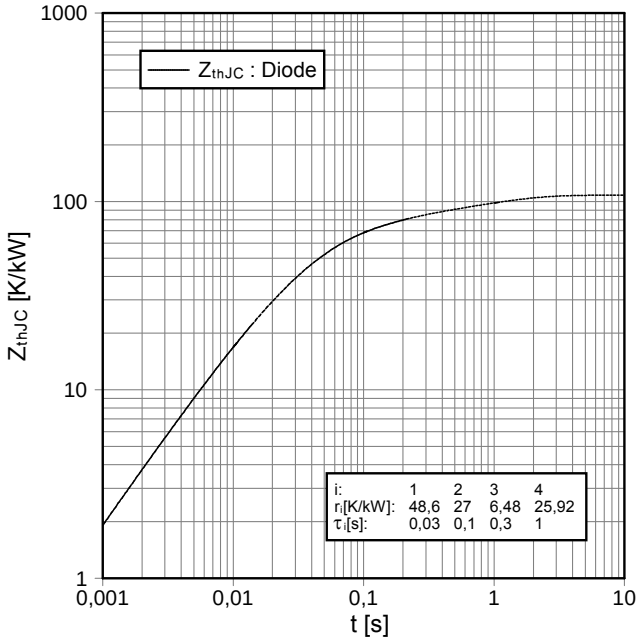
Schaltverluste Diode-Wechselr. (typisch)
switching losses diode-inverter (typical)
$E_{rec} = f(I_F)$
$R_{Gon} = 5{,}6\ \Omega$, $V_{CE} = 1800$ V, $T_{vj} = 125°C$



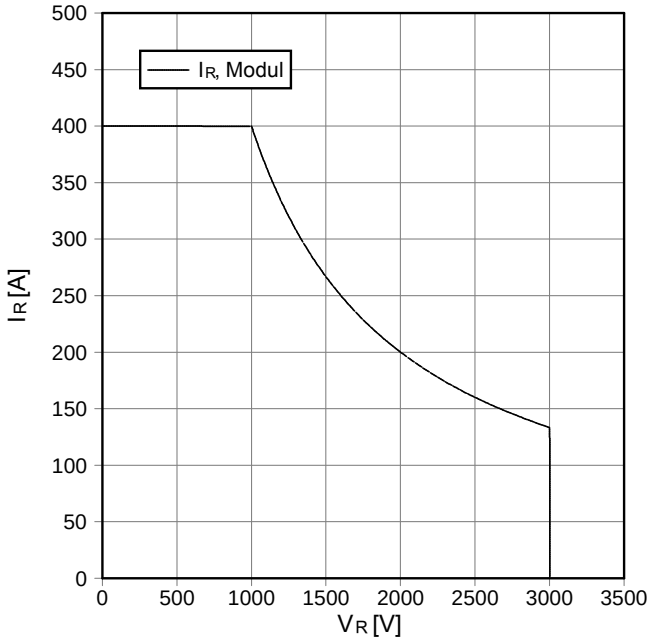
Schaltverluste Diode-Wechselr. (typisch)
switching losses diode-inverter (typical)
$E_{rec} = f(R_G)$
$I_F = 200$ A, $V_{CE} = 1800$ V, $T_{vj} = 125°C$



Transienter Wärmewiderstand Diode-Wechselr.
transient thermal impedance diode-inverter
$Z_{thJC} = f(t)$



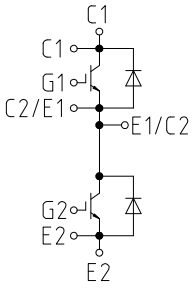
Sicherer Arbeitsbereich Diode-Wechselr. (SOA)
save operation area diode-inverter (SOA)
$I_R = f(V_R)$
$T_{vj} = 125°C$



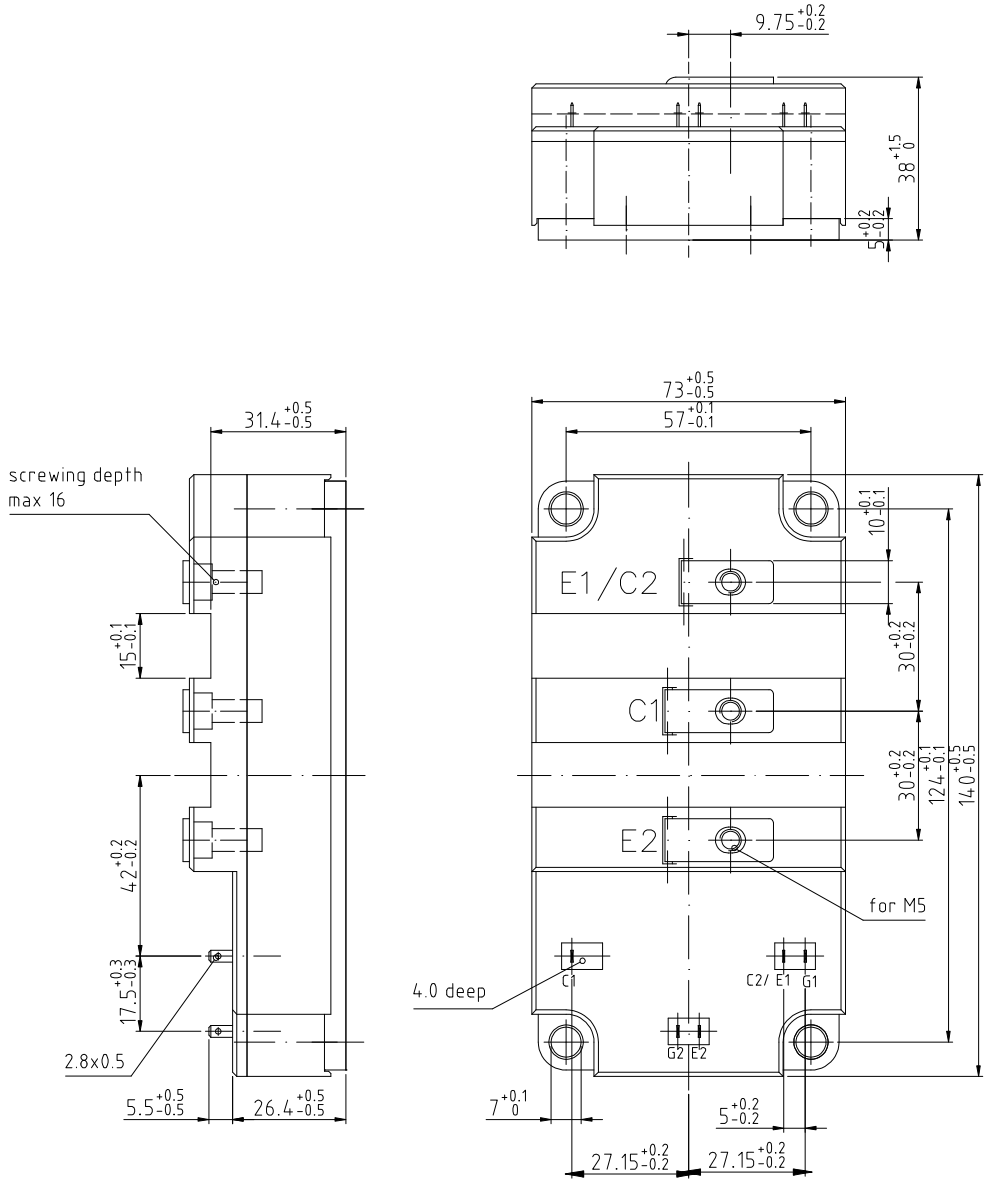
prepared by: Jürgen Biermann	date of publication: 2003-6-12
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Vorläufige Daten
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Schaltplan / circuit diagram



Gehäuseabmessungen / package outlines



prepared by: Jürgen Biermann	date of publication: 2003-6-12
approved by: Christoph Lübke	revision: 2.0

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