

**Vorläufige Daten
preliminary data**

IGBT-Wechselrichter / IGBT-inverter

Höchstzulässige Werte / maximum rated values

Kollektor-Emitter-Sperrspannung collector-emitter voltage	$T_{vj} = 25^{\circ}\text{C}$	V_{CES}	1200	V
Kollektor-Dauergleichstrom DC-collector current	$T_C = 80^{\circ}\text{C}$ $T_C = 25^{\circ}\text{C}$	$I_{C\text{ nom}}$ I_C	15 25	A A
Periodischer Kollektor Spitzenstrom repetitive peak collector current	$t_p = 1\text{ ms}, T_C = 80^{\circ}\text{C}$	I_{CRM}	30	A
Gesamt-Verlustleistung total power dissipation	$T_C = 25^{\circ}\text{C}$	P_{tot}	105	W
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	$I_C = 15\text{ A}, V_{GE} = 15\text{ V}, T_{vj} = 25^{\circ}\text{C}$ $I_C = 15\text{ A}, V_{GE} = 15\text{ V}, T_{vj} = 125^{\circ}\text{C}$	$V_{CE\text{ sat}}$		1,70 1,90	2,15	V V
Gate-Schwellenspannung gate threshold voltage	$I_C = 0,50\text{ mA}, V_{CE} = V_{GE}, T_{vj} = 25^{\circ}\text{C}$	V_{GEth}	5,0	5,8	6,5	V
Gateladung gate charge	$V_{GE} = -15\text{ V} \dots +15\text{ V}$	Q_G		0,15		μC
Interner Gatewiderstand internal gate resistor	$T_{vj} = 25^{\circ}\text{C}$	R_{Gint}		0,0		Ω
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}		1,10		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}		0,04		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}			5,0	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
Einschaltverzögerungszeit (ind. Last) turn-on delay time (inductive load)	$I_C = 15\text{ A}, V_{CE} = 600\text{ V}$ $V_{GE} = \pm 15\text{ V}, R_{Gon} = 75\ \Omega, T_{vj} = 25^{\circ}\text{C}$ $V_{GE} = \pm 15\text{ V}, R_{Gon} = 75\ \Omega, T_{vj} = 125^{\circ}\text{C}$	$t_{d\text{ on}}$		0,09 0,09		μs μs
Anstiegszeit (induktive Last) rise time (inductive load)	$I_C = 15\text{ A}, V_{CE} = 600\text{ V}$ $V_{GE} = \pm 15\text{ V}, R_{Gon} = 75\ \Omega, T_{vj} = 25^{\circ}\text{C}$ $V_{GE} = \pm 15\text{ V}, R_{Gon} = 75\ \Omega, T_{vj} = 125^{\circ}\text{C}$	t_r		0,03 0,05		μs μs
Abschaltverzögerungszeit (ind. Last) turn-off delay time (inductive load)	$I_C = 15\text{ A}, V_{CE} = 600\text{ V}$ $V_{GE} = \pm 15\text{ V}, R_{Goff} = 75\ \Omega, T_{vj} = 25^{\circ}\text{C}$ $V_{GE} = \pm 15\text{ V}, R_{Goff} = 75\ \Omega, T_{vj} = 125^{\circ}\text{C}$	$t_{d\text{ off}}$		0,42 0,52		μs μs
Fallzeit (induktive Last) fall time (inductive load)	$I_C = 15\text{ A}, V_{CE} = 600\text{ V}$ $V_{GE} = \pm 15\text{ V}, R_{Goff} = 75\ \Omega, T_{vj} = 25^{\circ}\text{C}$ $V_{GE} = \pm 15\text{ V}, R_{Goff} = 75\ \Omega, T_{vj} = 125^{\circ}\text{C}$	t_f		0,07 0,09		μs μs
Einschaltverlustenergie pro Puls turn-on energy loss per pulse	$I_C = 15\text{ A}, V_{CE} = 600\text{ V}, L_s = 45\text{ nH}$ $V_{GE} = \pm 15\text{ V}, R_{Gon} = 75\ \Omega, T_{vj} = 25^{\circ}\text{C}$ $V_{GE} = \pm 15\text{ V}, R_{Gon} = 75\ \Omega, T_{vj} = 125^{\circ}\text{C}$	E_{on}		1,50 2,10		mJ mJ
Abschaltverlustenergie pro Puls turn-off energy loss per pulse	$I_C = 15\text{ A}, V_{CE} = 600\text{ V}, L_s = 45\text{ nH}$ $V_{GE} = \pm 15\text{ V}, R_{Goff} = 75\ \Omega, T_{vj} = 25^{\circ}\text{C}$ $V_{GE} = \pm 15\text{ V}, R_{Goff} = 75\ \Omega, T_{vj} = 125^{\circ}\text{C}$	E_{off}		1,10 1,30		mJ mJ
Kurzschlußverhalten SC data	$t_p \leq 10\ \mu\text{s}, V_{GE} \leq 15\text{ V}$ $T_{vj} \leq 125^{\circ}\text{C}, V_{CC} = 900\text{ V}, V_{CEmax} = V_{CES} - L_{sCE} \cdot di/dt$	I_{SC}		60		A
Innerer Wärmewiderstand thermal resistance, junction to case	pro IGBT per IGBT	R_{thJC}			1,20	K/W

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**Vorläufige Daten
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Diode-Wechselrichter / diode-inverter

Höchstzulässige Werte / maximum rated values

Periodische Spitzensperrspannung repetitive peak reverse voltage	$T_{vj} = 25^{\circ}\text{C}$	V_{RRM}	1200	V
Dauergleichstrom DC forward current		I_F	15	A
Periodischer Spitzenstrom repetitive peak forward current	$t_p = 1\text{ ms}$	I_{FRM}	30	A
Grenzlastintegral I^2t - value	$V_R = 0\text{ V}, t_p = 10\text{ ms}, T_{vj} = 125^{\circ}\text{C}$	I^2t	60,0	A ² s

Charakteristische Werte / characteristic values

			min.	typ.	max.	
Durchlassspannung forward voltage	$I_F = 15\text{ A}, V_{GE} = 0\text{ V}, T_{vj} = 25^{\circ}\text{C}$ $I_F = 15\text{ A}, V_{GE} = 0\text{ V}, T_{vj} = 125^{\circ}\text{C}$	V_F		1,65 1,65	2,15	V V
Rückstromspitze peak reverse recovery current	$I_F = 15\text{ A}, -di_F/dt = 400\text{ A}/\mu\text{s}$ $V_R = 600\text{ V}, V_{GE} = -15\text{ V}, T_{vj} = 25^{\circ}\text{C}$ $V_R = 600\text{ V}, V_{GE} = -15\text{ V}, T_{vj} = 125^{\circ}\text{C}$	I_{RM}		16,0 15,0		A A
Sperrverzögerungsladung recovered charge	$I_F = 15\text{ A}, -di_F/dt = 400\text{ A}/\mu\text{s}$ $V_R = 600\text{ V}, V_{GE} = -15\text{ V}, T_{vj} = 25^{\circ}\text{C}$ $V_R = 600\text{ V}, V_{GE} = -15\text{ V}, T_{vj} = 125^{\circ}\text{C}$	Q_r		1,80 3,00		μC μC
Abschaltenergie pro Puls reverse recovery energy	$I_F = 15\text{ A}, -di_F/dt = 400\text{ A}/\mu\text{s}$ $V_R = 600\text{ V}, V_{GE} = -15\text{ V}, T_{vj} = 25^{\circ}\text{C}$ $V_R = 600\text{ V}, V_{GE} = -15\text{ V}, T_{vj} = 125^{\circ}\text{C}$	E_{rec}		0,55 1,10		mJ mJ
Innerer Wärmewiderstand thermal resistance, junction to case	pro Diode per diode	R_{thJC}			1,50	K/W

Diode-Gleichrichter / diode-rectifier

Höchstzulässige Werte / maximum rated values

Periodische Rückw. Spitzensperrspannung repetitive peak reverse voltage	$T_{vj} = 25^{\circ}\text{C}$	V_{RRM}	1600	V
Durchlassstrom Grenzeffektivwert pro Dio. forward current RMS maximum per diode	$T_C = 80^{\circ}\text{C}$	I_{FRMSM}	50	A
Gleichrichter Ausgang Grenzeffektivstrom maximum RMS current at Rectifier output	$T_C = 80^{\circ}\text{C}$	I_{RMSM}	60	A
Stoßstrom Grenzwert surge forward current	$t_p = 10\text{ ms}, T_{vj} = 25^{\circ}\text{C}$ $t_p = 10\text{ ms}, T_{vj} = 150^{\circ}\text{C}$	I_{FSM}	315 260	A A
Grenzlastintegral I^2t - value	$t_p = 10\text{ ms}, T_{vj} = 25^{\circ}\text{C}$ $t_p = 10\text{ ms}, T_{vj} = 150^{\circ}\text{C}$	I^2t	495 340	A ² s A ² s

Charakteristische Werte / characteristic values

			min.	typ.	max.	
Durchlassspannung forward voltage	$T_{vj} = 150^{\circ}\text{C}, I_F = 15\text{ A}$	V_F		0,90		V
Sperrstrom reverse current	$T_{vj} = 150^{\circ}\text{C}, V_R = 1600\text{ V}$	I_R		2,00		mA
Innerer Wärmewiderstand thermal resistance, junction to case	pro Diode per diode	R_{thJC}			1,00	K/W

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**IGBT-Brems-Chopper / IGBT-brake-chopper
Höchstzulässige Werte / maximum rated values**

Kollektor-Emitter-Sperrspannung collector-emitter voltage	$T_{vj} = 80^{\circ}\text{C}$	V_{CES}	1200	V
Kollektor-Dauergleichstrom DC-collector current	$T_c = 80^{\circ}\text{C}$ $T_c = 25^{\circ}\text{C}$	I_{Cnom} I_C	10 18	A A
Periodischer Kollektor Spitzenstrom repetitive peak collector current	$t_p = 1 \text{ ms}, T_c = 80^{\circ}\text{C}$	I_{CRM}	20	A
Gesamt-Verlustleistung total power dissipation	$T_c = 25^{\circ}\text{C}$	P_{tot}	83,5	W
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	$I_C = 10 \text{ A}, V_{GE} = 15 \text{ V}, T_{vj} = 25^{\circ}\text{C}$ $I_C = 10 \text{ A}, V_{GE} = 15 \text{ V}, T_{vj} = 125^{\circ}\text{C}$	$V_{CE sat}$		1,85 2,15	2,45	V V
Gate-Schwellenspannung gate threshold voltage	$I_C = 0,30 \text{ mA}, V_{CE} = V_{GE}, T_{vj} = 25^{\circ}\text{C}$	V_{GEth}	5,0	5,8	6,5	V
Gateladung gate charge	$V_{GE} = -15 \text{ V} \dots +15 \text{ V}$	Q_G		0,10		μC
Interner Gatewiderstand internal gate resistor		R_{Gint}		0,00		Ω
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}		0,60		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}		0,026		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}			5,0	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
Einschaltverzögerungszeit (ind. Last) turn-on delay time (inductive load)	$I_C = 10 \text{ A}, V_{CE} = 600 \text{ V}$ $V_{GE} = \pm 15 \text{ V}, R_{Gon} = 100 \Omega, T_{vj} = 25^{\circ}\text{C}$ $V_{GE} = \pm 15 \text{ V}, R_{Gon} = 100 \Omega, T_{vj} = 125^{\circ}\text{C}$	$t_{d on}$		0,09 0,09		μs μs
Anstiegszeit (induktive Last) rise time (inductive load)	$I_C = 10 \text{ A}, V_{CE} = 600 \text{ V}$ $V_{GE} = \pm 15 \text{ V}, R_{Gon} = 100 \Omega, T_{vj} = 25^{\circ}\text{C}$ $V_{GE} = \pm 15 \text{ V}, R_{Gon} = 100 \Omega, T_{vj} = 125^{\circ}\text{C}$	t_r		0,03 0,05		μs μs
Abschaltverzögerungszeit (ind. Last) turn-off delay time (inductive load)	$I_C = 10 \text{ A}, V_{CE} = 600 \text{ V}$ $V_{GE} = \pm 15 \text{ V}, R_{Goff} = 100 \Omega, T_{vj} = 25^{\circ}\text{C}$ $V_{GE} = \pm 15 \text{ V}, R_{Goff} = 100 \Omega, T_{vj} = 125^{\circ}\text{C}$	$t_{d off}$		0,42 0,52		μs μs
Fallzeit (induktive Last) fall time (inductive load)	$I_C = 10 \text{ A}, V_{CE} = 600 \text{ V}$ $V_{GE} = \pm 15 \text{ V}, R_{Goff} = 100 \Omega, T_{vj} = 25^{\circ}\text{C}$ $V_{GE} = \pm 15 \text{ V}, R_{Goff} = 100 \Omega, T_{vj} = 125^{\circ}\text{C}$	t_f		0,07 0,09		μs μs
Einschaltverlustenergie pro Puls turn-on energy loss per pulse	$I_C = 10 \text{ A}, V_{CE} = 600 \text{ V}$ $V_{GE} = \pm 15 \text{ V}, R_{Gon} = 100 \Omega, T_{vj} = 25^{\circ}\text{C}$ $V_{GE} = \pm 15 \text{ V}, R_{Gon} = 100 \Omega, T_{vj} = 125^{\circ}\text{C}$	E_{on}		1,00 1,40		mJ mJ
Abschaltverlustenergie pro Puls turn-off energy loss per pulse	$I_C = 10 \text{ A}, V_{CE} = 600 \text{ V}$ $V_{GE} = \pm 15 \text{ V}, R_{Goff} = 100 \Omega, T_{vj} = 25^{\circ}\text{C}$ $V_{GE} = \pm 15 \text{ V}, R_{Goff} = 100 \Omega, T_{vj} = 125^{\circ}\text{C}$	E_{off}		0,90 1,00		mJ mJ
Kurzschlußverhalten SC data	$t_p \leq 10 \mu\text{sec}, V_{GE} \leq 15 \text{ V}$ $T_{vj} \leq 125^{\circ}\text{C}, V_{CC} = 900 \text{ V}, V_{CEmax} = V_{CES} - L_{sCE} \cdot di/dt$	I_{SC}		40		A
Innerer Wärmewiderstand thermal resistance, junction to case	pro IGBT per IGBT	R_{thJC}			1,50	K/W

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**Diode-Brems-Chopper / Diode-brake-chopper
Höchstzulässige Werte / maximum rated values**

Periodische Spitzensperrspannung repetitive peak reverse voltage	$T_{vj} = 80^{\circ}\text{C}$	V_{RRM}	1200	V
Dauergleichstrom DC forward current		I_F	10	A
Periodischer Spitzenstrom repetitive peak forw. current	$t_p = 1 \text{ ms}$	I_{FRM}	20	A
Grenzlastintegral I^2t - value	$V_R = 0 \text{ V}, t_p = 10 \text{ ms}, T_{vj} = 125^{\circ}\text{C}$	I^2t	20,0	A ² s

Charakteristische Werte / characteristic values

			min.	typ.	max.	
Durchlaßspannung forward voltage	$I_F = 10 \text{ A}, V_{GE} = 0 \text{ V}, T_{vj} = 25^{\circ}\text{C}$ $I_F = 10 \text{ A}, V_{GE} = 0 \text{ V}, T_{vj} = 125^{\circ}\text{C}$	V_F		1,80 1,85	2,25	V V
Rückstromspitze peak reverse recovery current	$I_F = 10 \text{ A}, -di_F/dt = 400 \text{ A}/\mu\text{s}$ $V_R = 600 \text{ V}, V_{GE} = -15 \text{ V}, T_{vj} = 25^{\circ}\text{C}$ $V_R = 600 \text{ V}, V_{GE} = -15 \text{ V}, T_{vj} = 125^{\circ}\text{C}$	I_{RM}		14,0 15,0		A A
Sperrverzögerungsladung recovered charge	$I_F = 10 \text{ A}, -di_F/dt = 400 \text{ A}/\mu\text{s}$ $V_R = 600 \text{ V}, V_{GE} = -15 \text{ V}, T_{vj} = 25^{\circ}\text{C}$ $V_R = 600 \text{ V}, V_{GE} = -15 \text{ V}, T_{vj} = 125^{\circ}\text{C}$	Q_r		1,00 1,80		μC μC
Abschaltenergie pro Puls reverse recovery energy	$I_F = 10 \text{ A}, -di_F/dt = 400 \text{ A}/\mu\text{s}$ $V_R = 600 \text{ V}, V_{GE} = -15 \text{ V}, T_{vj} = 25^{\circ}\text{C}$ $V_R = 600 \text{ V}, V_{GE} = -15 \text{ V}, T_{vj} = 125^{\circ}\text{C}$	E_{rec}		0,26 0,56		mJ mJ
Innerer Wärmewiderstand thermal resistance, junction to case	pro Diode per diode	R_{thJC}			2,30	K/W

NTC-Widerstand / NTC-thermistor

Charakteristische Werte / characteristic values

			min.	typ.	max.	
Nennwiderstand rated resistance	$T_C = 25^{\circ}\text{C}$	R_{25}		5,00		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}			20,0	mW
B-Wert B-value	$R_2 = R_{25} \exp [B_{25}/50(1/T_2 - 1/(298,15 \text{ K}))]$	$B_{25}/50$		3375		K

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Technische Information / technical information

IGBT-Module
IGBT-modules

FP15R12KT3

power electronics in motion
eupec

Vorläufige Daten preliminary data

Modul / module

Isolations-Prüfspannung insulation test voltage	RMS, f = 50 Hz, t = 1 min	V _{ISOL}	2,5		kV
Material Modulgrundplatte material of module baseplate			Cu		
Material für innere Isolation material for internal insulation			Al ₂ O ₃		
Kriechstrecke creepage distance	Kontakt - Kühlkörper / terminal to heatsink Kontakt - Kontakt / terminal to terminal		10,0		mm
Luftstrecke clearance distance	Kontakt - Kühlkörper / terminal to heatsink Kontakt - Kontakt / terminal to terminal		7,50		mm
Vergleichszahl der Kriechwegbildung comparative tracking index		CTI	> 225		
			min.	typ.	max.
Übergangs-Wärmewiderstand thermal resistance, case to heatsink	pro Modul / per module $\lambda_{\text{Paste}} = 1 \text{ W}/(\text{m}\cdot\text{K}) / \lambda_{\text{grease}} = 1 \text{ W}/(\text{m}\cdot\text{K})$	R _{thCH}		0,02	K/W
Modulinduktivität stray inductance module		L _{sCE}		60	nH
Modulleitungswiderstand, Anschlüsse - Chip module lead resistance, terminals - chip	T _C = 25°C, pro Schalter / per switch	R _{CC'+EE'} R _{AA'+CC'}		4,00 3,00	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 M5	M	3,00	-	6,00 Nm
Gewicht weight		G		180	g

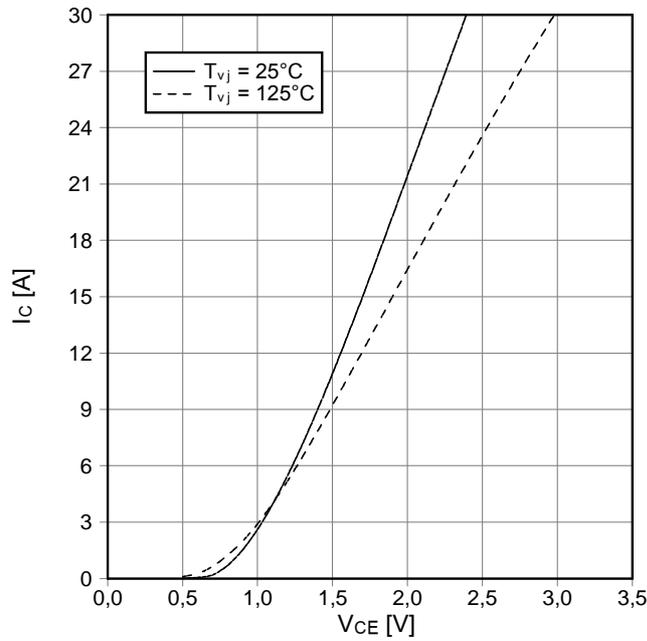
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This technical information specifies semiconductor devices but guarantees no characteristics. It is valid with the appropriate technical explanations.

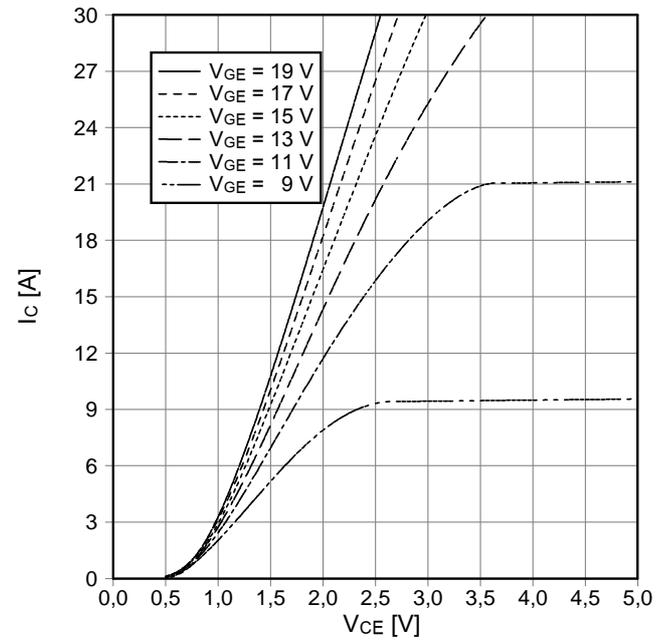
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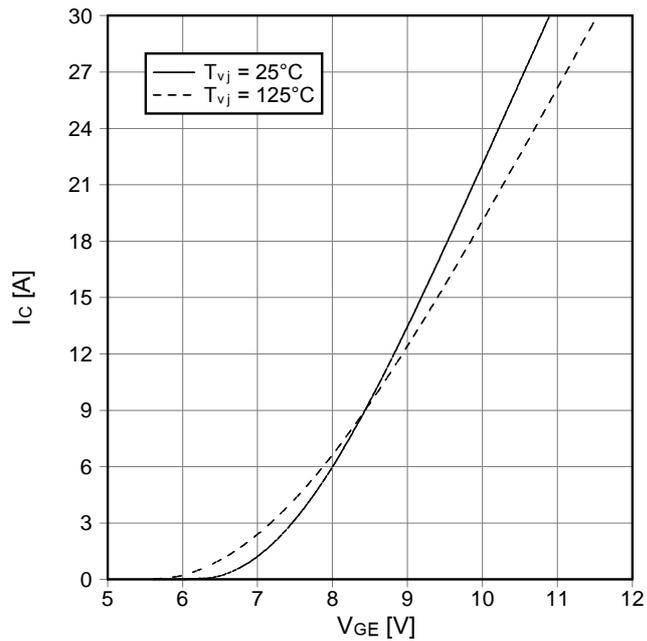
Ausgangskennlinie IGBT-Wechselr. (typisch)
output characteristic IGBT-inverter (typical)
 $I_c = f(V_{CE})$
 $V_{GE} = 15\text{ V}$



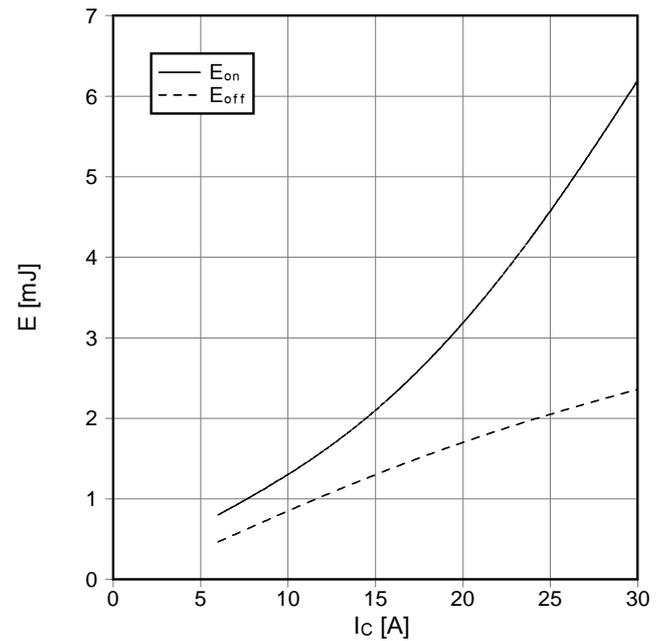
Ausgangskennlinienfeld IGBT-Wechselr. (typisch)
output characteristic IGBT-inverter (typical)
 $I_c = f(V_{CE})$
 $T_{vj} = 125^\circ\text{C}$



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



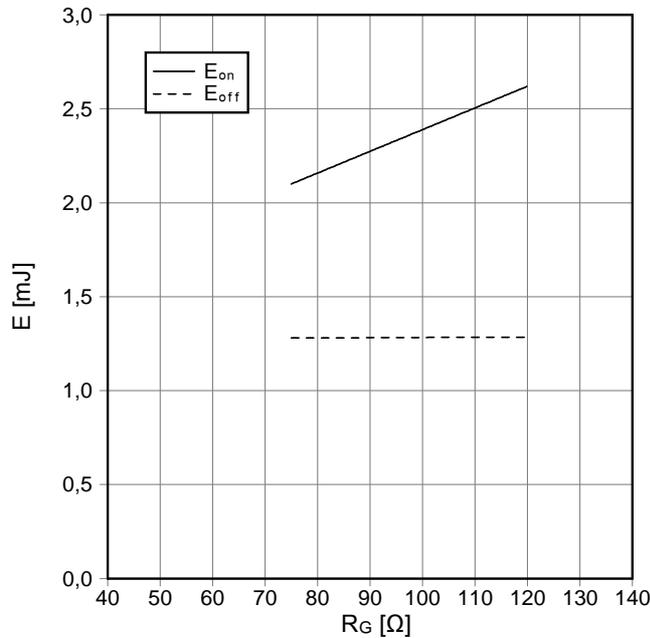
Schaltverluste IGBT-Wechselr. (typisch)
switching losses IGBT-inverter (typical)
 $E_{on} = f(I_c), E_{off} = f(I_c)$
 $V_{GE} = \pm 15\text{ V}, R_{Gon} = 75\ \Omega, R_{Goff} = 75\ \Omega, V_{CE} = 600\text{ V},$
 $T_{vj} = 125^\circ\text{C}$



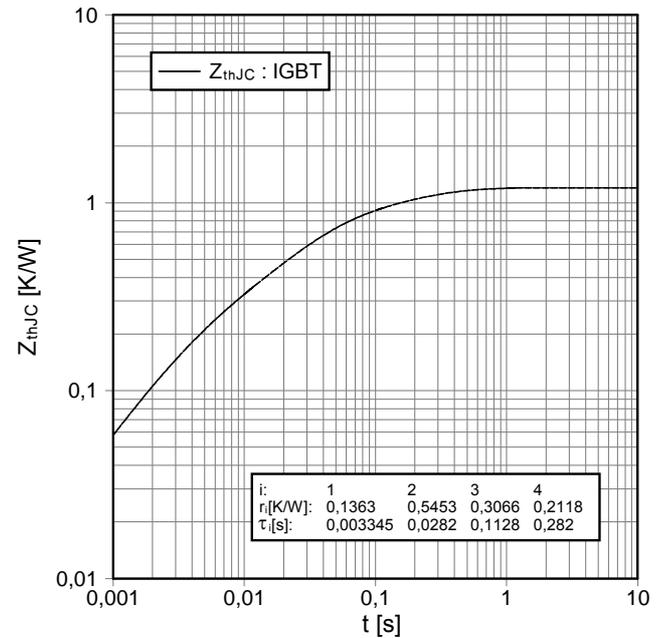
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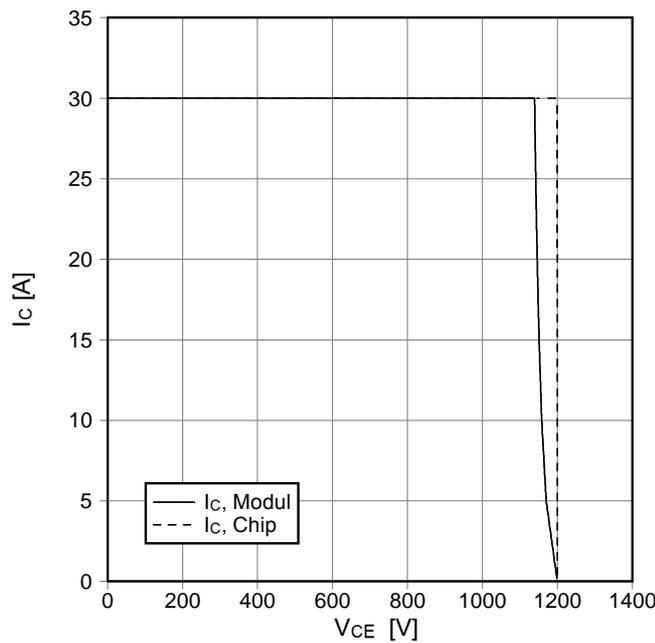
Schaltverluste IGBT-Wechselr. (typisch)
switching losses IGBT-inverter (typical)
 $E_{on} = f(R_G), E_{off} = f(R_G)$
 $V_{GE} = \pm 15\text{ V}, I_C = 15\text{ A}, V_{CE} = 600\text{ V}, T_{vj} = 125^\circ\text{C}$



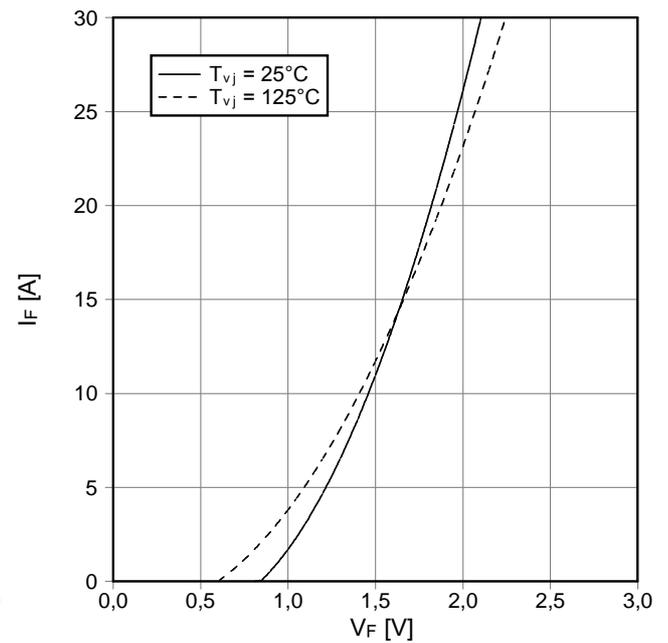
Transienter Wärmewiderstand IGBT-Wechselr.
transient thermal impedance IGBT-inverter
 $Z_{thJC} = f(t)$



Sicherer Rückwärts-Arbeitsbereich IGBT-Wr. (RBSOA)
reverse bias safe operating area IGBT-inv. (RBSOA)
 $I_C = f(V_{CE})$
 $V_{GE} = \pm 15\text{ V}, R_{Goff} = 75\ \Omega, T_{vj} = 125^\circ\text{C}$



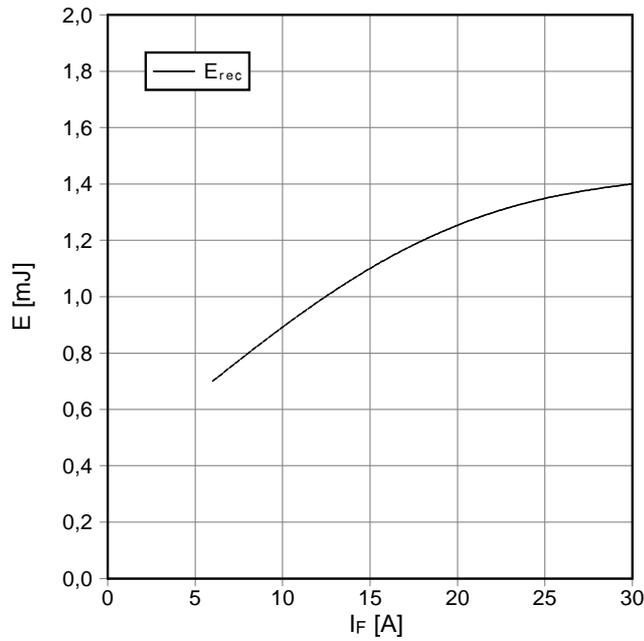
Durchlaßkennlinie der Diode-Wechselr. (typisch)
forward characteristic of diode-inverter (typical)
 $I_F = f(V_F)$



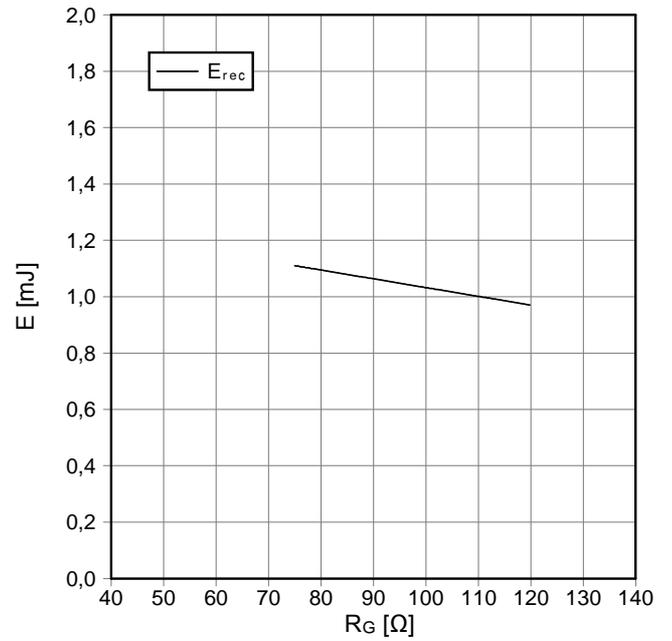
prepared by: Andreas Schulz	date of publication: 2003-12-2
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Vorläufige Daten
preliminary data

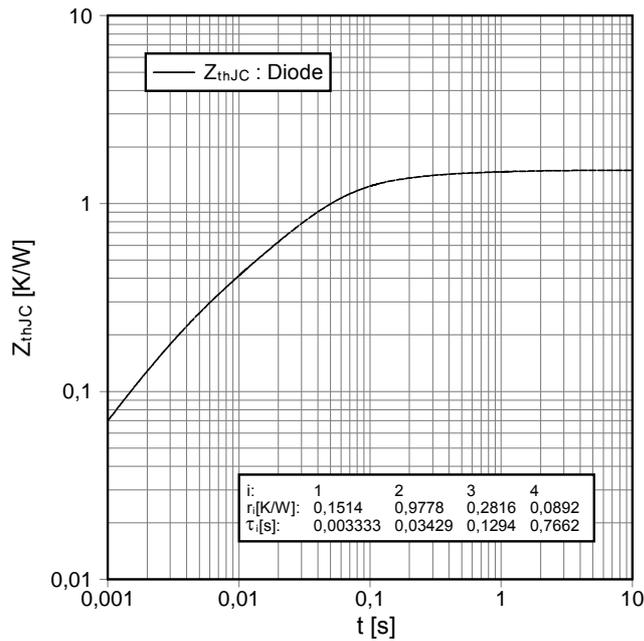
Schaltverluste Diode-Wechselr. (typisch)
switching losses diode-inverter (typical)
 $E_{rec} = f(I_F)$
 $R_{Gon} = 75 \Omega$, $V_{CE} = 600 V$, $T_{vj} = 125^\circ C$



Schaltverluste Diode-Wechselr. (typisch)
switching losses diode-inverter (typical)
 $E_{rec} = f(R_G)$
 $I_F = 15 A$, $V_{CE} = 600 V$, $T_{vj} = 125^\circ C$

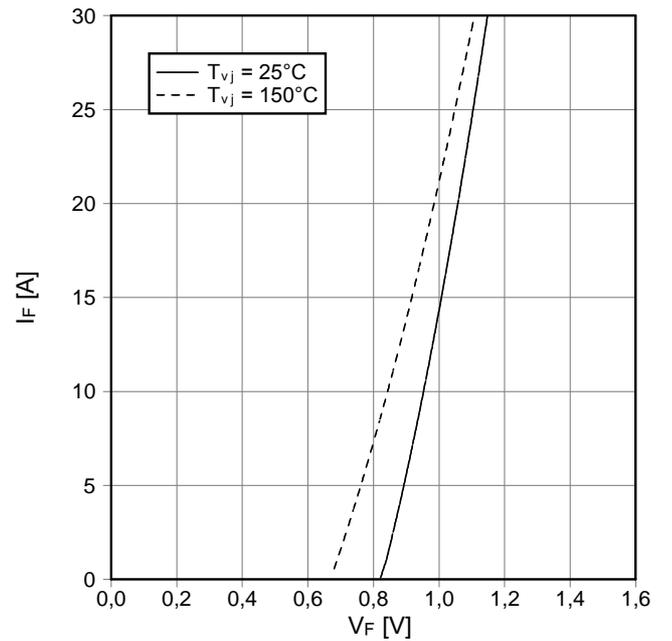


Transienter Wärmewiderstand Diode-Wechselr.
transient thermal impedance diode-inverter
 $Z_{thJC} = f(t)$



i:	1	2	3	4
r _i [K/W]:	0,1514	0,9778	0,2816	0,0892
τ _i [s]:	0,003333	0,03429	0,1294	0,7662

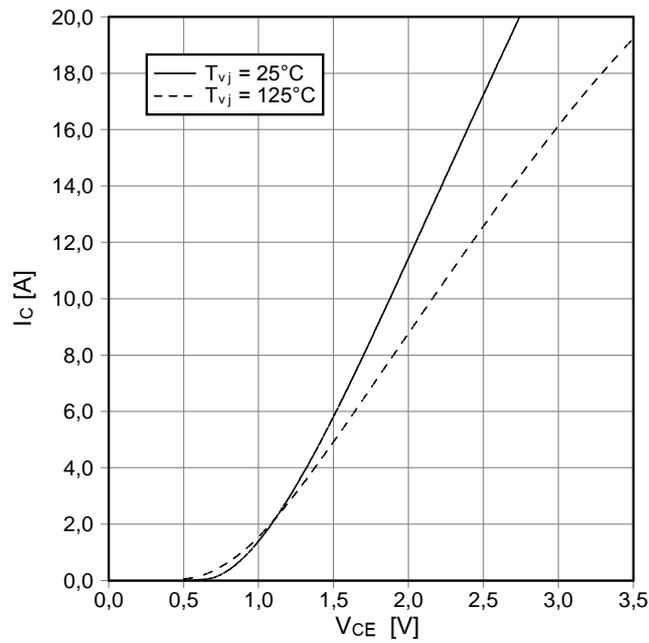
Durchlaßkennlinie der Diode-Gleichrichter (typisch)
forward characteristic of diode-rectifier (typical)
 $I_F = f(V_F)$



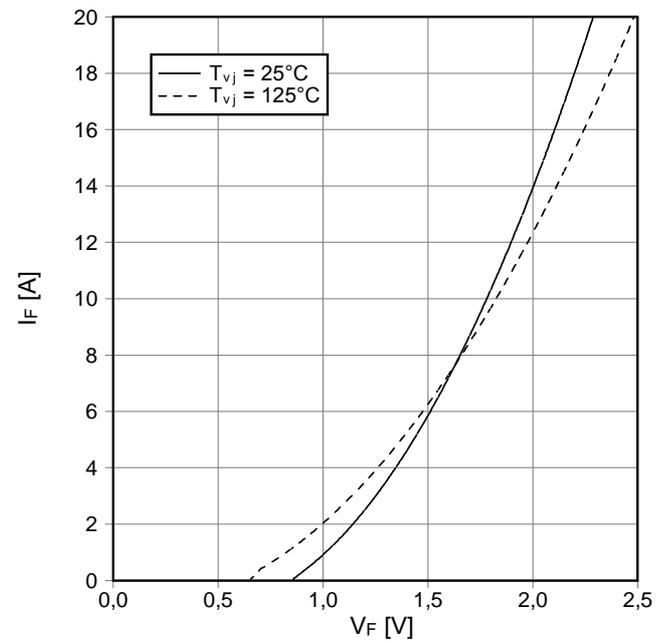
prepared by: Andreas Schulz	date of publication: 2003-12-2
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Vorläufige Daten
preliminary data

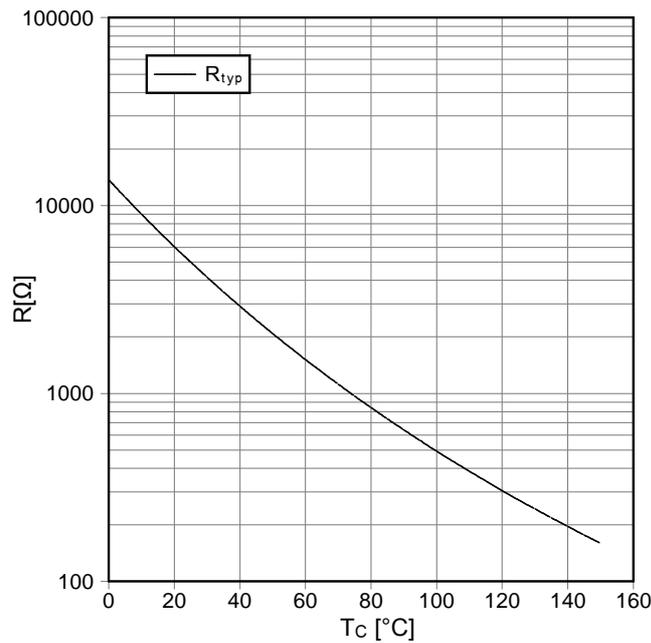
Ausgangskennlinie IGBT-Brems-Chopper (typisch)
output characteristic IGBT-brake-chopper (typical)
 $I_C = f(V_{CE})$
 $V_{GE} = 15\text{ V}$



Durchlaßkennlinie der Diode-Brems-Chopper (typisch)
forward characteristic of diode-brake-chopper (typical)
 $I_F = f(V_F)$



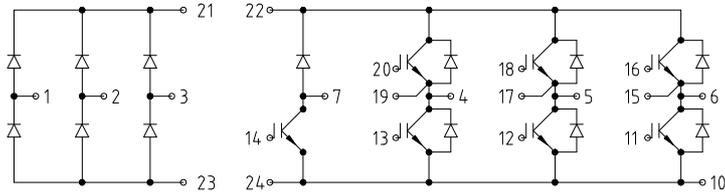
NTC-Temperaturkennlinie (typisch)
NTC-temperature characteristic (typical)
 $R = f(T)$



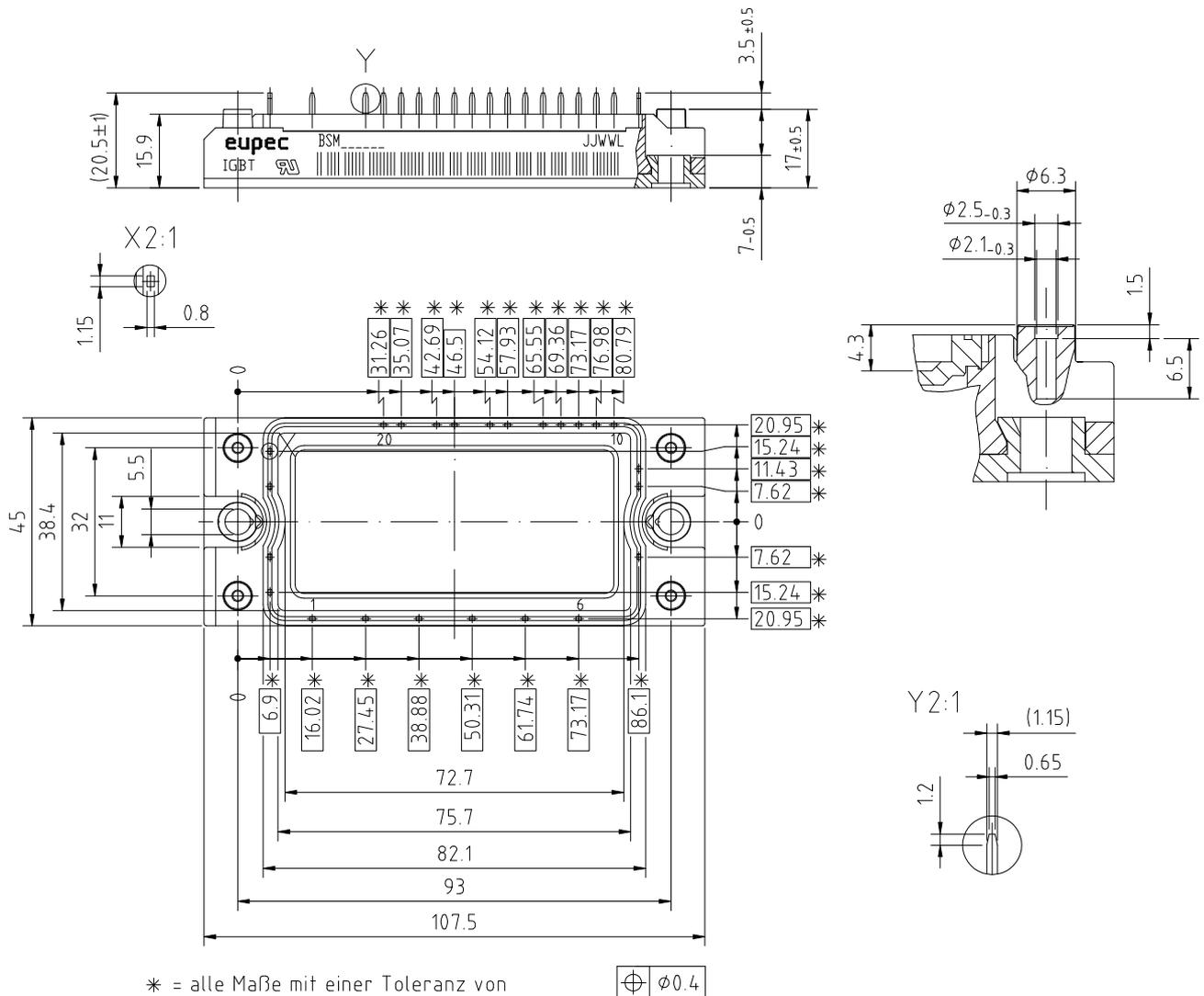
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Vorläufige Daten
preliminary data

Schaltplan / circuit diagram



Gehäuseabmessungen / package outlines



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- Поставка более 17-ти миллионов наименований электронных компонентов;
- Поставка сложных, дефицитных, либо снятых с производства позиций;
- Оперативные сроки поставки под заказ (от 5 рабочих дней);
- Экспресс доставка в любую точку России;
- Техническая поддержка проекта, помощь в подборе аналогов, поставка прототипов;
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- Лицензия ФСБ на осуществление работ с использованием сведений, составляющих государственную тайну;
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- Консультации по применению компонента;
- Поставка образцов и прототипов;
- Техническая поддержка проекта;
- Защита от снятия компонента с производства.



Как с нами связаться

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