

Elektrische Eigenschaften / Electrical properties

Höchstzulässige Werte / Maximum rated values

Diode Gleichrichter/ Diode Rectifier

Periodische Rückw. Spitzensperrspannung repetitive peak reverse voltage		V_{RRM}	1600	V
Durchlaßstrom Grenzeffektivwert RMS forward current per chip		I_{FRMSM}	40	A
Dauergleichstrom DC forward current	$T_C = 80^\circ\text{C}$	I_d	35	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	500 340	A^2s A^2s

Transistor Wechselrichter/ Transistor Inverter

Kollektor-Emitter-Sperrspannung collector-emitter voltage		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 45	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}	230	W
Gate-Emitter-Spitzenspannung gate-emitter peak voltage		V_{GES}	+/- 20V	V

Diode Wechselrichter/ Diode Inverter

Dauergleichstrom DC forward current	$T_C = 80^\circ\text{C}$	I_F	35	A
Periodischer Spitzenstrom repetitive peak forw. 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	310	A^2s

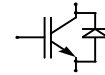
Transistor Brems-Chopper/ Transistor Brake-Chopper

Kollektor-Emitter-Sperrspannung collector-emitter voltage		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	17,5 35	A A
Periodischer Kollektor Spitzenstrom repetitive peak collector current	$t_p = 1\text{ ms}, T_C = 80^\circ\text{C}$	I_{CRM}	35	A
Gesamt-Verlustleistung total power dissipation	$T_C = 25^\circ\text{C}$	P_{tot}	180	W
Gate-Emitter-Spitzenspannung gate-emitter peak voltage		V_{GES}	+/- 20V	V

Diode Brems-Chopper/ Diode Brake-Chopper

Dauergleichstrom DC forward current	$T_C = 80^\circ\text{C}$	I_F	10	A
Periodischer Spitzenstrom repetitive peak forw. current	$t_p = 1\text{ ms}$	I_{FRM}	20	A

prepared by: Andreas Schulz	date of publication:29.03.2001
approved by: Robert Severin	revision: 5



Elektrische Eigenschaften / Electrical properties

Charakteristische Werte / Characteristic values

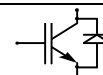
		min.	typ.	max.			
Modulinduktivität stray inductance module		L_{GCE}	-	-	100 nH		
Modul Leitungswiderstand, Anschlüsse-Chip lead resistance, terminals-chip	$T_C = 25^\circ\text{C}$	$R_{\text{CC}'+\text{EE}'}$	-	7	- mΩ		
Diode Wechselrichter/ Diode Inverter		min.		typ.		max.	
Durchlaßspannung forward voltage	$V_{\text{GE}} = 0\text{V}, T_{\text{vj}} = 25^\circ\text{C}, I_{\text{F}} = 35\text{ A}$ $V_{\text{GE}} = 0\text{V}, T_{\text{vj}} = 125^\circ\text{C}, I_{\text{F}} = 35\text{ A}$	V_{F}	-	1,95	2,45	V	
Rückstromspitze peak reverse recovery current	$I_{\text{F}}=I_{\text{Nenn}}, -di_{\text{F}}/dt = 1400\text{A}/\mu\text{s}$ $V_{\text{GE}} = -10\text{V}, T_{\text{vj}} = 25^\circ\text{C}, V_{\text{R}} = 600\text{ V}$ $V_{\text{GE}} = -10\text{V}, T_{\text{vj}} = 125^\circ\text{C}, V_{\text{R}} = 600\text{ V}$	I_{RM}	-	40	-	A	
Sperrverzögerungsladung recovered charge	$I_{\text{F}}=I_{\text{Nenn}}, -di_{\text{F}}/dt = 1400\text{A}/\mu\text{s}$ $V_{\text{GE}} = -10\text{V}, T_{\text{vj}} = 25^\circ\text{C}, V_{\text{R}} = 600\text{ V}$ $V_{\text{GE}} = -10\text{V}, T_{\text{vj}} = 125^\circ\text{C}, V_{\text{R}} = 600\text{ V}$	Q_{r}	-	3,5	-	μAs	
Abschaltenergie pro Puls reverse recovery energy	$I_{\text{F}}=I_{\text{Nenn}}, -di_{\text{F}}/dt = 1400\text{A}/\mu\text{s}$ $V_{\text{GE}} = -10\text{V}, T_{\text{vj}} = 25^\circ\text{C}, V_{\text{R}} = 600\text{ V}$ $V_{\text{GE}} = -10\text{V}, T_{\text{vj}} = 125^\circ\text{C}, V_{\text{R}} = 600\text{ V}$	E_{RO}	-	1,3	-	mWs	
Transistor Brems-Chopper/ Transistor Brake-Chopper		min.		typ.		max.	
Kollektor-Emitter Sättigungsspannung collector-emitter saturation voltage	$V_{\text{GE}} = 15\text{V}, T_{\text{vj}} = 25^\circ\text{C}, I_{\text{C}} = 17,5\text{ A}$ $V_{\text{GE}} = 15\text{V}, T_{\text{vj}} = 125^\circ\text{C}, I_{\text{C}} = 17,5\text{ A}$	$V_{\text{CE sat}}$	-	2,3	2,75	V	
Gate-Schwellenspannung gate threshold voltage	$V_{\text{CE}} = V_{\text{GE}}, T_{\text{vj}} = 25^\circ\text{C}, I_{\text{C}} = 0,6\text{mA}$	$V_{\text{GE(TO)}}$	4,5	5,5	6,5	V	
Eingangskapazität input capacitance	$f = 1\text{MHz}, T_{\text{vj}} = 25^\circ\text{C}$ $V_{\text{CE}} = 25\text{ V}, V_{\text{GE}} = 0\text{ V}$	C_{ies}	-	1,0	-	nF	
Kollektor-Emitter Reststrom collector-emitter cut-off current	$V_{\text{GE}} = 0\text{V}, T_{\text{vj}} = 25^\circ\text{C}, V_{\text{CE}} = 1200\text{ V}$ $V_{\text{GE}} = 0\text{V}, T_{\text{vj}} = 125^\circ\text{C}, V_{\text{CE}} = 1200\text{ V}$	I_{CES}	-	1,0	500	μA	
Gate-Emitter Reststrom gate-emitter leakage current	$V_{\text{CE}} = 0\text{V}, V_{\text{GE}} = 20\text{V}, T_{\text{vj}} = 25^\circ\text{C}$	I_{GES}	-	-	300	nA	
Diode Brems-Chopper/ Diode Brake-Chopper		min.		typ.		max.	
Durchlaßspannung forward voltage	$T_{\text{vj}} = 25^\circ\text{C}, I_{\text{F}} = 17,5\text{ A}$ $T_{\text{vj}} = 125^\circ\text{C}, I_{\text{F}} = 17,5\text{ A}$	V_{F}	-	2,7	3,05	V	
NTC-Widerstand/ NTC-Thermistor		min.		typ.		max.	
Nennwiderstand rated resistance	$T_C = 25^\circ\text{C}$	R_{25}	-	5	-	kΩ	
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	

Technische Information / Technical Information

IGBT-Module
IGBT-Modules

BSM35GP120

eupec

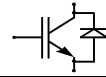


Thermische Eigenschaften / Thermal properties

			min.	typ.	max.	
Innerer Wärmewiderstand thermal resistance, junction to case	Gleicher. Diode/ Rectif. Diode	R_{thJC}	-	-	1	K/W
	Trans. Wechr./ Trans. Inverter		-	-	0,55	K/W
	Diode Wechr./ Diode Inverter		-	-	0,8	K/W
	Trans. Bremse/ Trans. Brake		-	-	0,7	K/W
	Diode Bremse/ Diode Brake		-	-	2,3	K/W
Übergangs-Wärmewiderstand thermal resistance, case to heatsink	Gleicher. Diode/ Rectif. Diode	R_{thCK}	-	0,08	-	K/W
	Trans. Wechr./ Trans. Inverter	$\lambda_{paste}=1W/m^2K$	-	0,04	-	K/W
	Diode Wechr./ Diode Inverter	$\lambda_{grease}=1W/m^2K$	-	0,08	-	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

Innere Isolation internal insulation				Al_2O_3	
CTI comperative tracking index				225	
Anzugsdrehmoment f. mech. Befestigung mounting torque		M		3 $\pm 10\%$	Nm
Gewicht weight		G		180	g

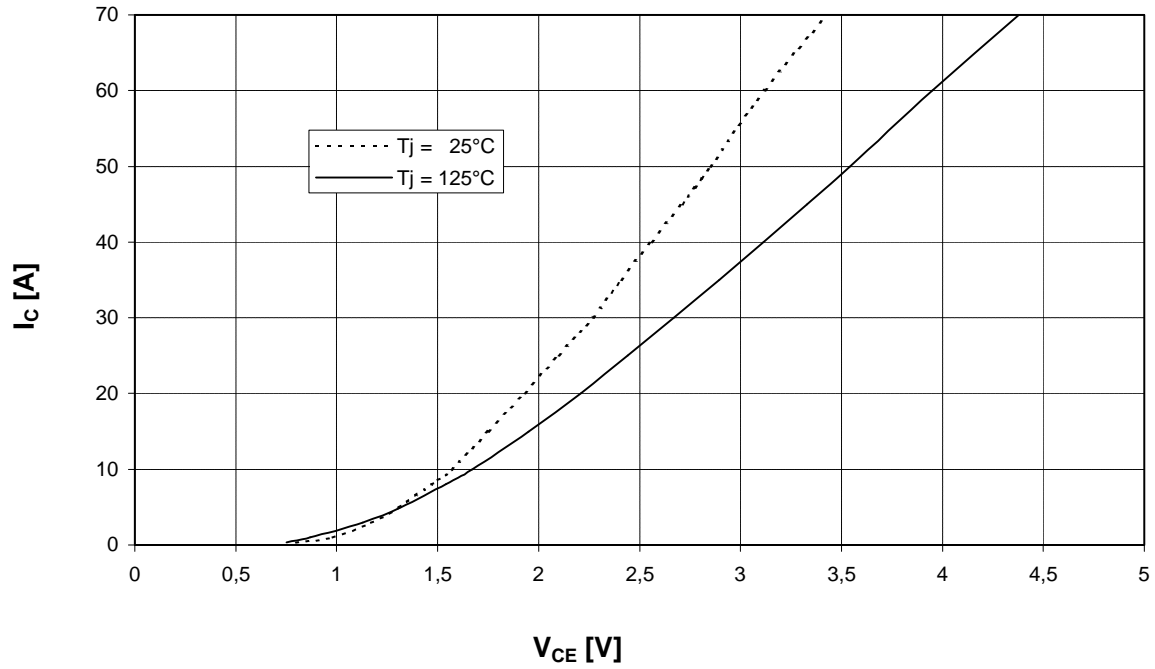


Ausgangskennlinienfeld Wechselr. (typisch)

$I_C = f(V_{CE})$

Output characteristic Inverter (typical)

$V_{GE} = 15\text{ V}$

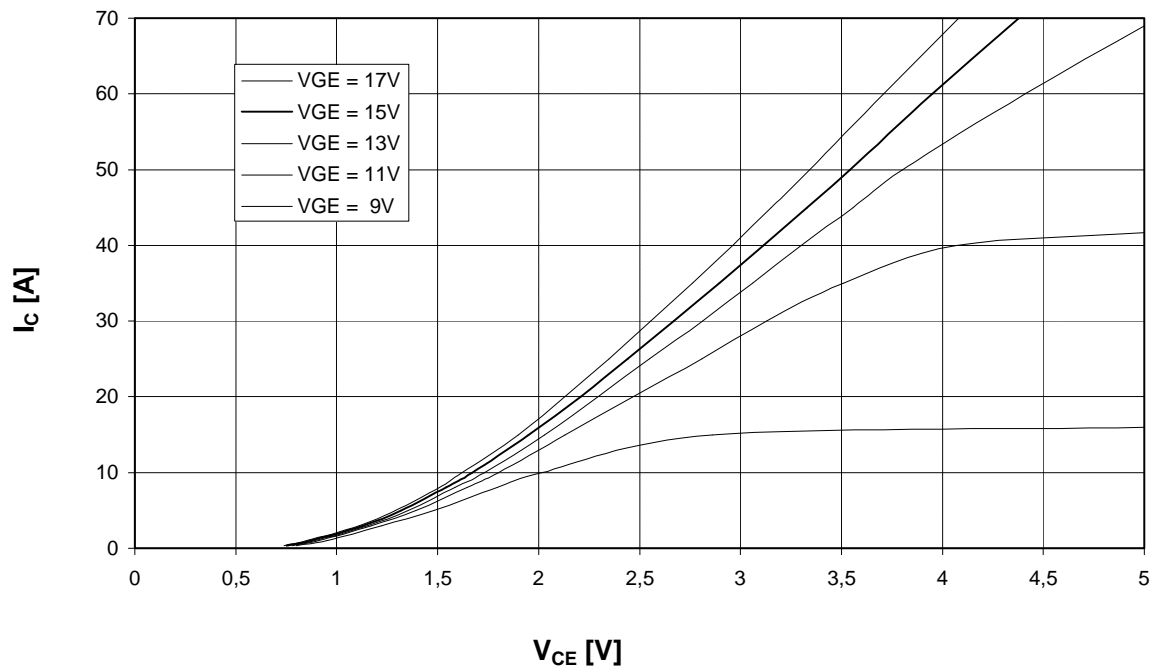


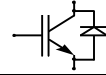
Ausgangskennlinienfeld Wechselr. (typisch)

$I_C = f(V_{CE})$

Output characteristic Inverter (typical)

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



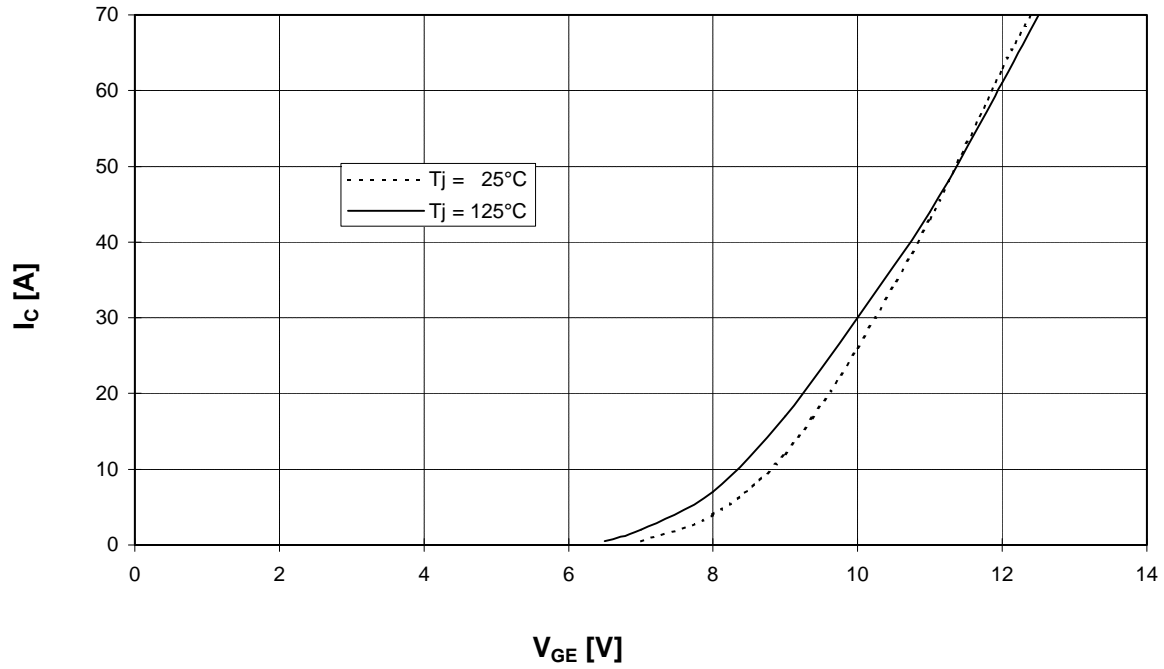


Übertragungscharakteristik Wechselr. (typisch)

$I_C = f(V_{GE})$

Transfer characteristic Inverter (typical)

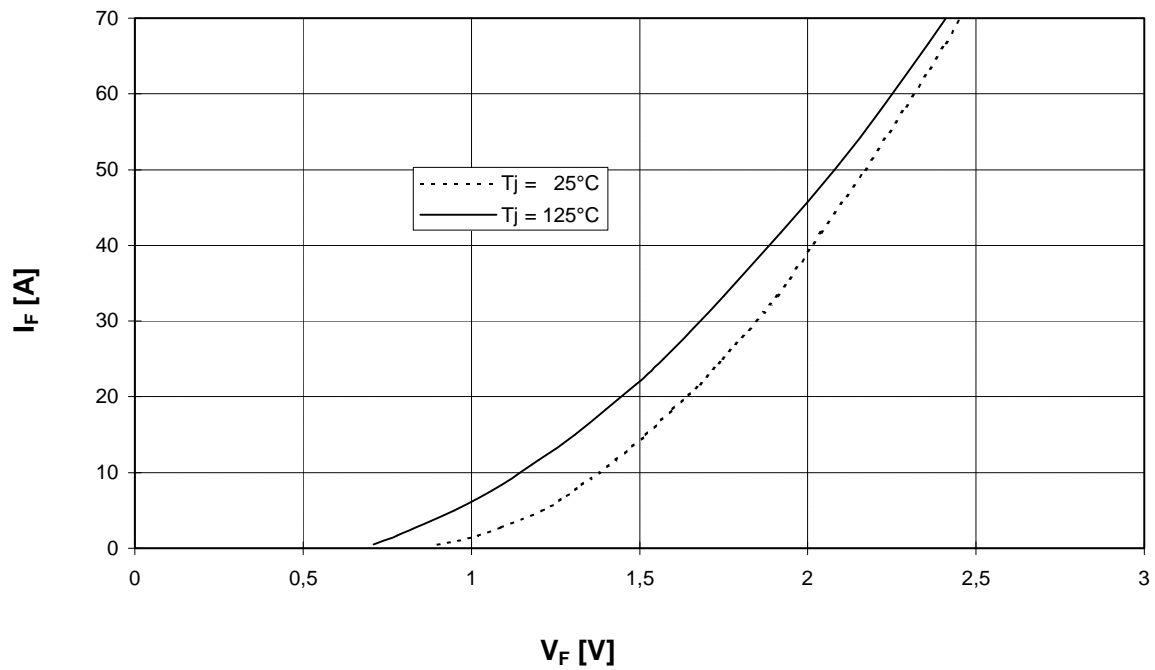
$V_{CE} = 20\text{ V}$

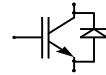


Durchlaßkennlinie der Freilaufdiode Wechselr. (typisch)

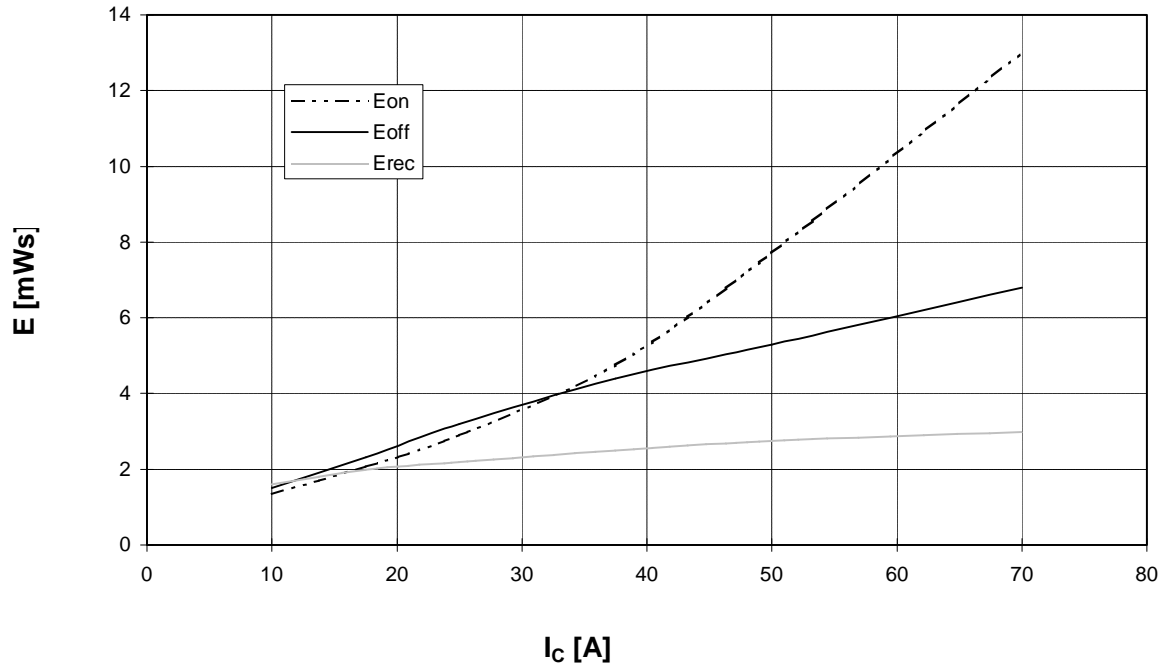
$I_F = f(V_F)$

Forward characteristic of FWD Inverter (typical)

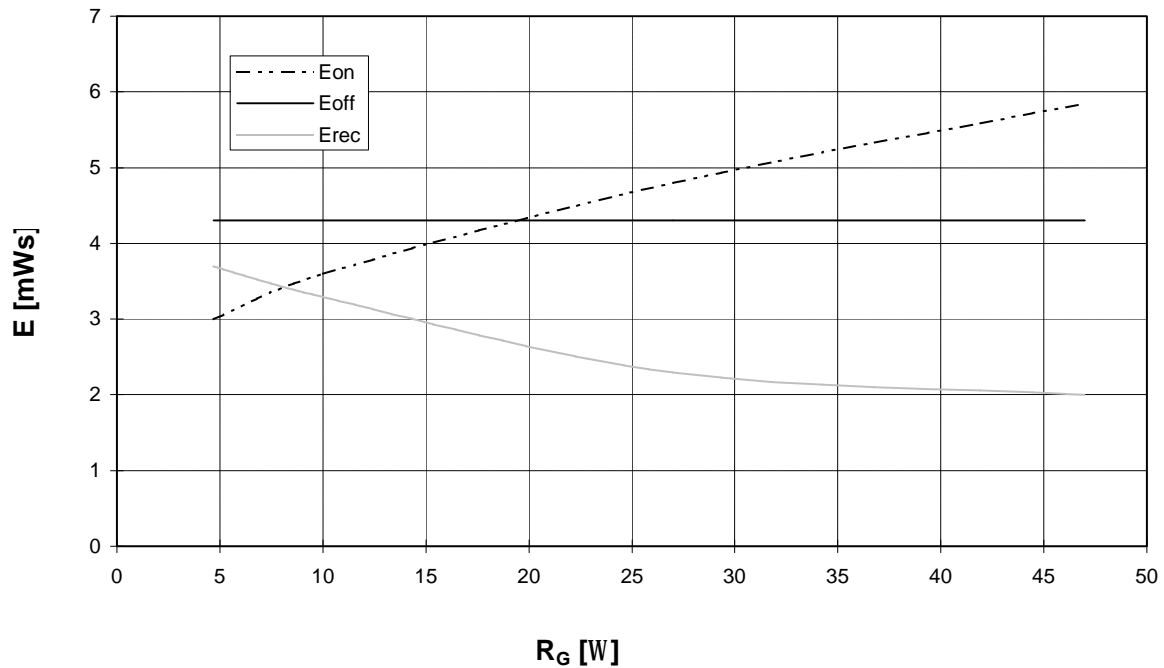


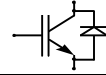


Schaltverluste Wechselr. (typisch) $E_{on} = f(I_C), E_{off} = f(I_C), E_{rec} = f(I_C)$ $V_{CC} = 600\text{ V}$
Switching losses Inverter (typical) $T_j = 125^\circ\text{C}, V_{GE} = \pm 15\text{ V}, R_{Gon} = R_{Goff} = 22\text{ Ohm}$



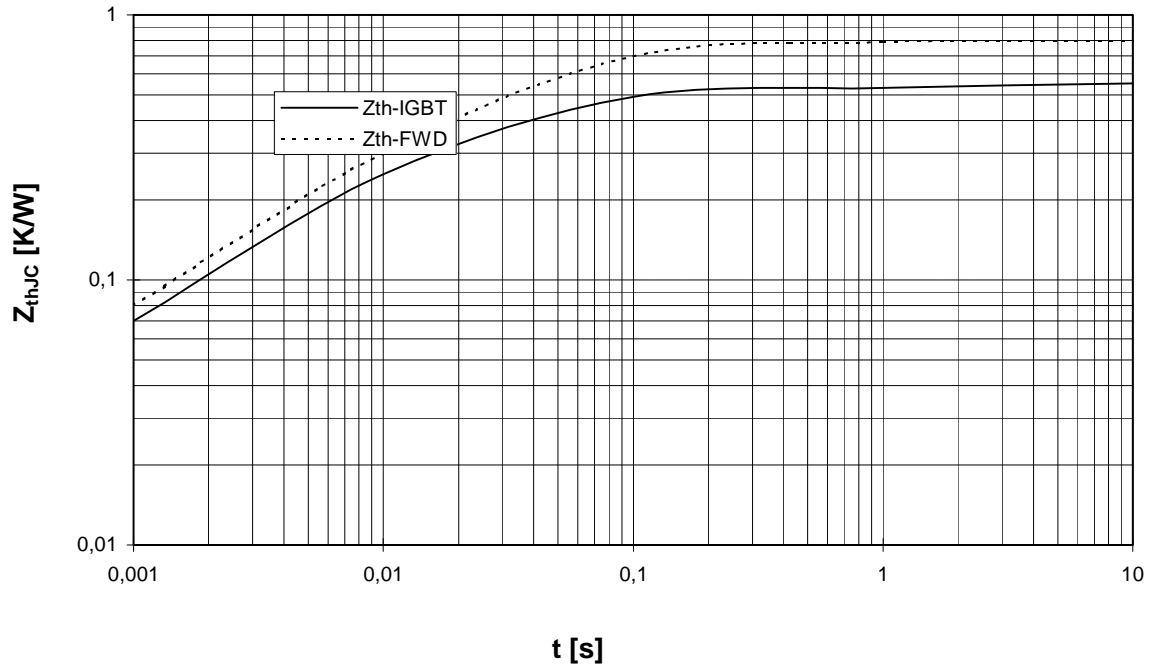
Schaltverluste Wechselr. (typisch) $E_{on} = f(R_G), E_{off} = f(R_G), E_{rec} = f(R_G)$
Switching losses Inverter (typical) $T_j = 125^\circ\text{C}, V_{GE} = \pm 15\text{ V}, I_c = I_{nenn}, V_{CC} = 600\text{ V}$





Transienter Wärmewiderstand Wechsler.
Transient thermal impedance Inverter

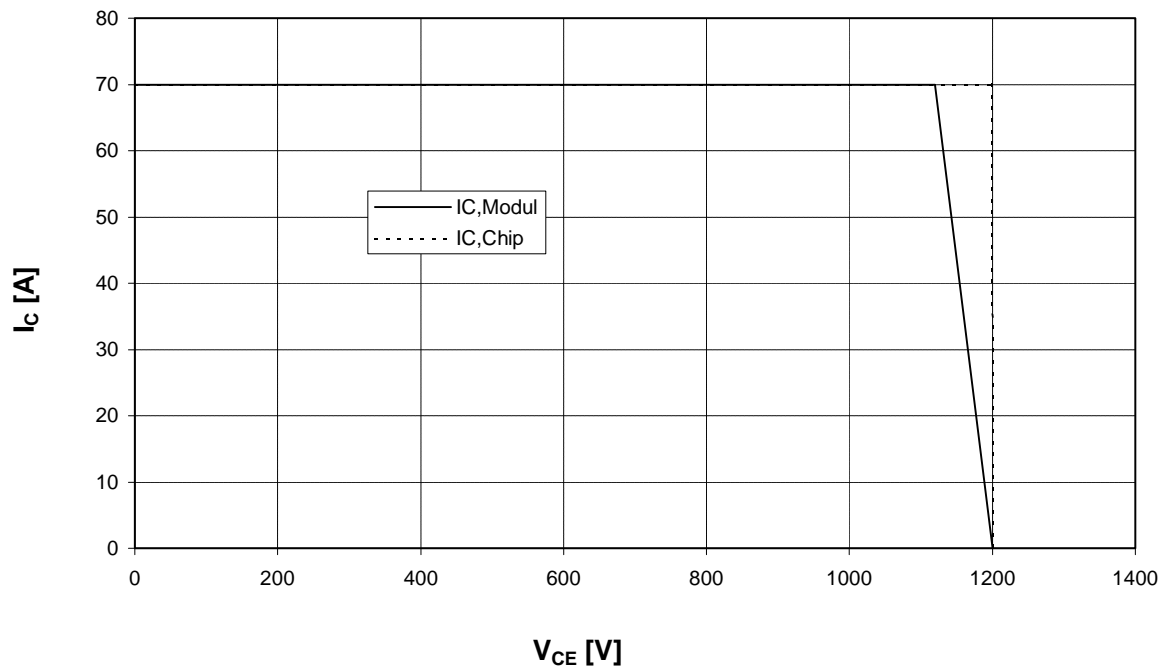
$Z_{thJC} = f(t)$

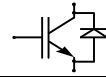


Sicherer Arbeitsbereich Wechsler. (RBSOA)

$I_C = f(V_{CE})$

Reverse bias safe operating area Inverter (RBSOA) $T_{vj} = 125^\circ\text{C}$, $V_{GE} = \pm 15\text{V}$, $R_G = 22 \text{ Ohm}$



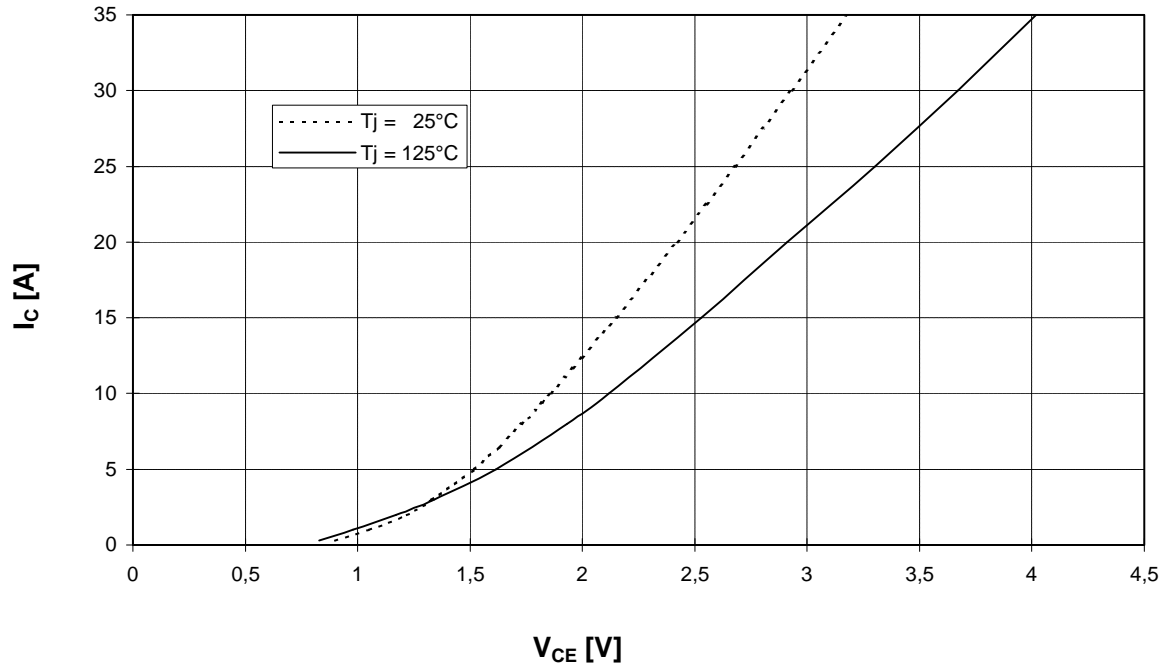


Ausgangskennlinienfeld Brems-Chopper-IGBT (typisch)

Output characteristic brake-chopper-IGBT (typical)

$I_C = f(V_{CE})$

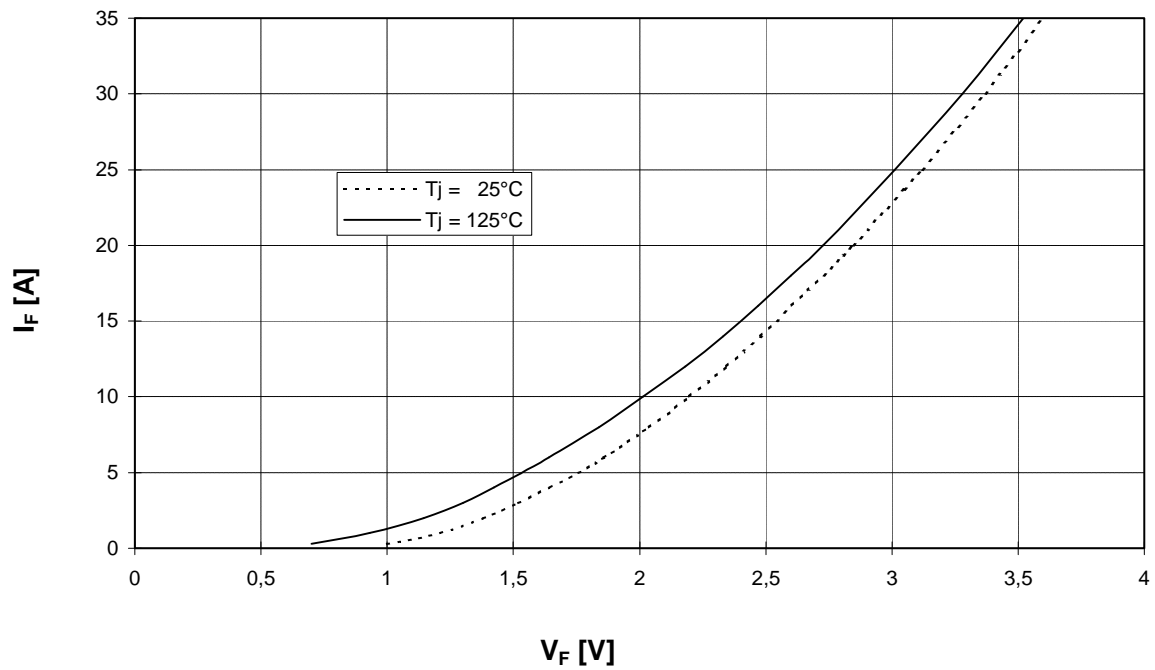
$V_{GE} = 15\text{ V}$

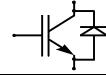


Durchlaßkennlinie der Brems-Chopper-Diode (typisch)

Forward characteristic of brake-chopper-FWD (typical)

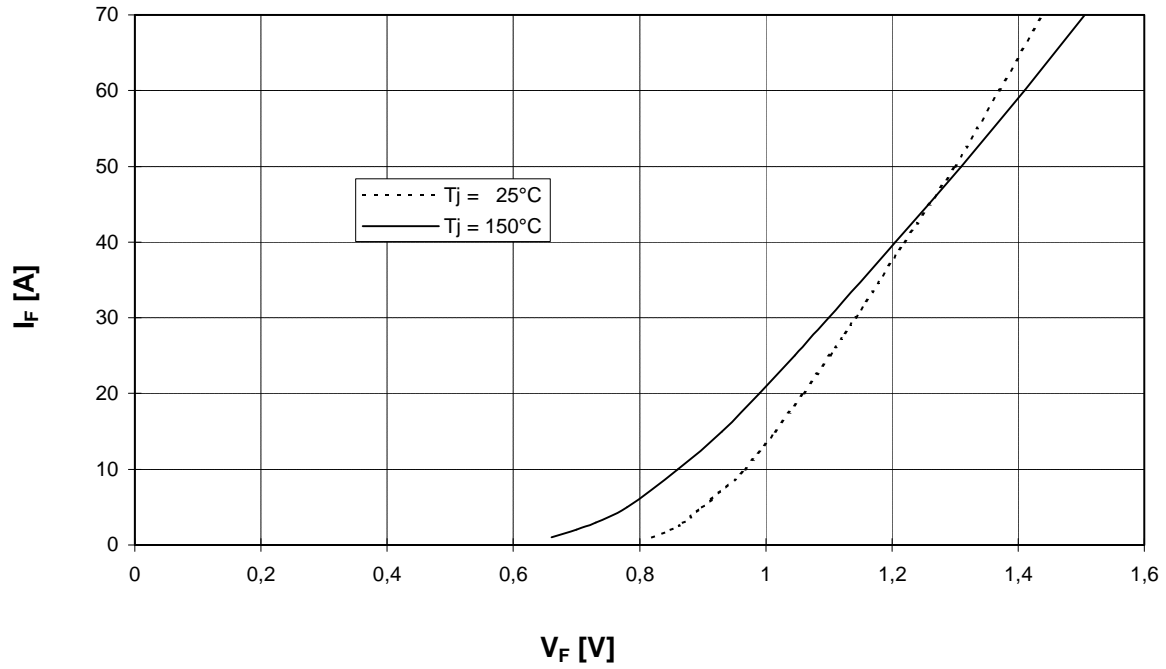
$I_F = f(V_F)$





Durchlaßkennlinie der Gleichrichterdiode (typisch)
Forward characteristic of Rectifier Diode (typical)

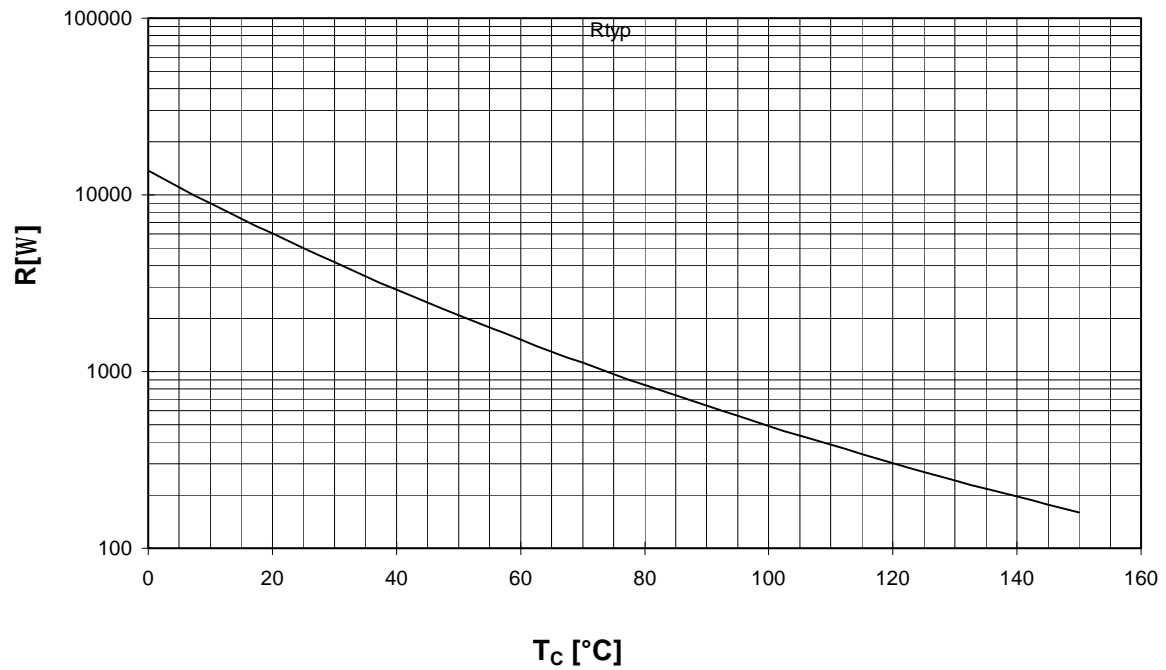
$I_F = f(V_F)$

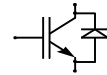


NTC- Temperaturkennlinie (typisch)

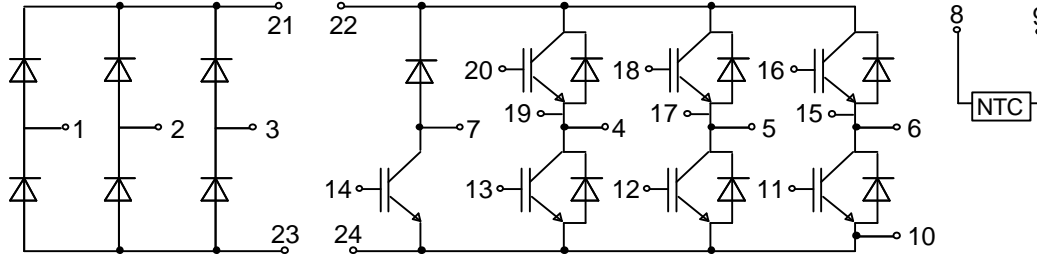
$R = f(T)$

NTC- temperature characteristic (typical)

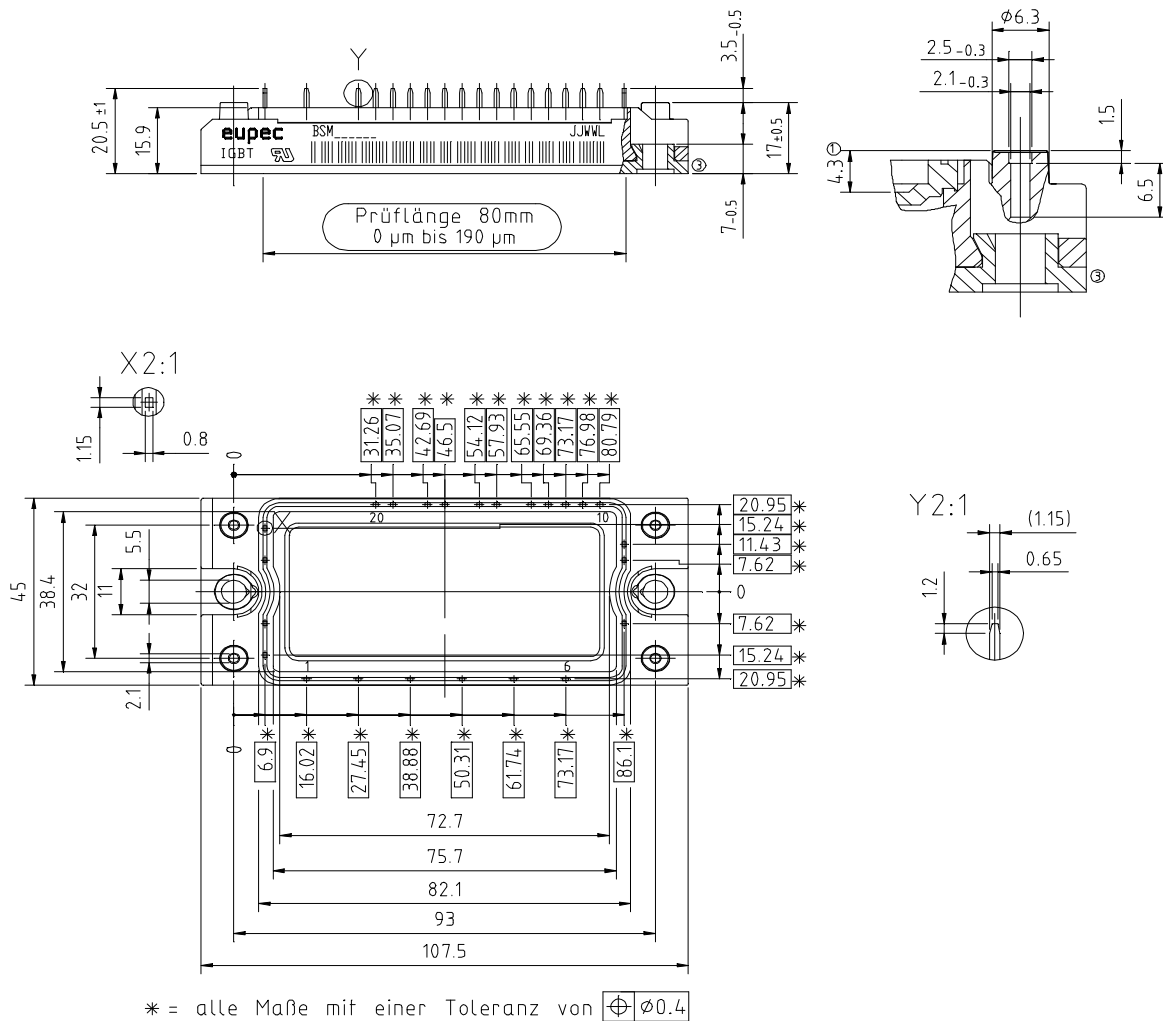




Schaltplan/ Circuit diagram



Gehäuseabmessungen/ Package outlines



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