BSM10GP120

eupec

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°C	I_d	10	A
Stoßstrom Grenzwert surge forward current	t_P = 10 ms, T_{vj} = 25°C t_P = 10 ms, T_{vj} = 150°C	I_{FSM}	300 230	A A
Grenzlastintegral I^2t - value	t_P = 10 ms, T_{vj} = 25°C t_P = 10 ms, T_{vj} = 150°C	I^2t	450 260	A^2s A^2s

Transistor Wechselrichter/ Transistor Inverter

Kollektor-Emitter-Sperrspannung collector-emitter voltage		V_{CES}	1200	V
Kollektor-Dauergleichstrom DC-collector current	Tc = 80 °C T_C = 25 °C	$I_{C,nom.}$ I_C	10 20	A A
Periodischer Kollektor Spitzenstrom repetitive peak collector current	t_P = 1 ms, T_C = 80 °C	I_{CRM}	20	A
Gesamt-Verlustleistung total power dissipation	T_C = 25°C	P_{tot}	100	W
Gate-Emitter-Spitzenspannung gate-emitter peak voltage		V_{GES}	+/- 20V	V

Diode Wechselrichter/ Diode Inverter

Dauergleichstrom DC forward current	Tc = 80 °C	I_F	10	A
Periodischer Spitzenstrom repetitive peak forw. current	t_P = 1 ms	I_{FRM}	20	A
Grenzlastintegral I^2t - value	V_R = 0V, t_p = 10ms, T_{vj} = 125°C	I^2t	18	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 °C T_C = 25 °C	$I_{C,nom.}$ I_C	10 20	A A
Periodischer Kollektor Spitzenstrom repetitive peak collector current	t_P = 1 ms, T_C = 80°C	I_{CRM}	20	A
Gesamt-Verlustleistung total power dissipation	T_C = 25°C	P_{tot}	100	W
Gate-Emitter-Spitzenspannung gate-emitter peak voltage		V_{GES}	+/- 20V	V

Diode Brems-Chopper/ Diode Brake-Chopper

Dauergleichstrom DC forward current	Tc = 80 °C	I_F	10	A
Periodischer Spitzenstrom repetitive peak forw. current	t_P = 1 ms	I_{FRM}	20	A

prepared by: Andreas Schulz	date of publication:17.09.1999
approved by: M.Hierholzer	revision: 5

Modul Isolation/ Module Isolation

Isolations-Prüfspannung insulation test voltage	RMS, f = 50 Hz, t = 1 min. NTC connected to Baseplate	V_{ISOL}	2,5	kV

Elektrische Eigenschaften / Electrical properties

Charakteristische Werte / Characteristic values

Diode Gleichrichter/ Diode Rectifier

			min.	typ.	max.	
Durchlaßspannung forward voltage	T_{vj} = 150°C, I_F = 10 A	V_F	-	0,9	0,95	V
Schleusenspannung threshold voltage	T_{vj} = 150°C	$V_{(TO)}$	-	-	0,8	V
Ersatzwiderstand slope resistance	T_{vj} = 150°C	r_T	-	-	10,5	mΩ
Sperrstrom reverse current	T_{vj} = 150°C, V_R = 1600 V	I_R	-	2	-	mA
Modul Leitungswiderstand, Anschlüsse-Chip lead resistance, terminals-chip	T_C = 25°C	$R_{AA'+CC'}$	-	8	-	mΩ

Transistor Wechselrichter/ Transistor Inverter

			min.	typ.	max.	
Kollektor-Emitter Sättigungsspannung collector-emitter saturation voltage	V_{GE} = 15V, T_{vj} = 25°C, I_C = 10 A V_{GE} = 15V, T_{vj} = 125°C, I_C = 10 A	$V_{CE\ sat}$	- -	2,4 2,75	2,85 -	V V
Gate-Schwellenspannung gate threshold voltage	V_{CE} = V_{GE}, T_{vj} = 25°C, I_C = 0,35 mA	$V_{GE(TO)}$	4,5	5,5	6,5	V
Eingangskapazität input capacitance	f = 1MHz, T_{vj} = 25°C V_{CE} = 25 V, V_{GE} = 0 V	C_{ies}	-	0,6	-	nF
Kollektor-Emitter Reststrom collector-emitter cut-off current	V_{GE} = 0V, T_{vj} = 25°C, V_{CE} = 1200 V V_{GE} = 0V, T_{vj} =125°C, V_{CE} = 1200 V	I_{CES}	- -	0,5 0,8	500 -	µA mA
Gate-Emitter Reststrom gate-emitter leakage current	V_{CE} = 0V, V_{GE} =20V, T_{vj} =25°C	I_{GES}	-	-	300	nA
Einschaltverzögerungszeit (ind. Last) turn on delay time (inductive load)	I_C = I_{Nenn}, V_{CC} = 600 V V_{GE} = ±15V, T_{vj} = 25°C, R_G = 82 Ohm V_{GE} = ±15V, T_{vj} = 125°C, R_G = 82 Ohm	$t_{d,on}$	 - -	 40 45	 - -	 ns ns
Anstiegszeit (induktive Last) rise time (inductive load)	I_C = I_{Nenn}, V_{CC} = 600 V V_{GE} = ±15V, T_{vj} = 25°C, R_G = 82 Ohm V_{GE} = ±15V, T_{vj} = 125°C, R_G = 82 Ohm	t_r	 - -	 45 40	 - -	 ns ns
Abschaltverzögerungszeit (ind. Last) turn off delay time (inductive load)	I_C = I_{Nenn}, V_{CC} = 600 V V_{GE} = ±15V, T_{vj} = 25°C, R_G = 82 Ohm V_{GE} = ±15V, T_{vj} = 125°C, R_G = 82 Ohm	$t_{d,off}$	 - -	 255 285	 - -	 ns ns
Fallzeit (induktive Last) fall time (inductive load)	I_C = I_{Nenn}, V_{CC} = 600 V V_{GE} = ±15V, T_{vj} = 25°C, R_G = 82 Ohm V_{GE} = ±15V, T_{vj} = 125°C, R_G = 82 Ohm	t_f	 - -	 40 60	 - -	 ns ns
Einschaltverlustenergie pro Puls turn-on energy loss per pulse	I_C = I_{Nenn}, V_{CC} = 600 V V_{GE} = ±15V, T_{vj} = 125°C, R_G = 82 Ohm L_S = 75 nH	E_{on}	-	1,2	-	mWs
Abschaltverlustenergie pro Puls turn-off energy loss per pulse	I_C = I_{Nenn}, V_{CC} = 600 V V_{GE} = ±15V, T_{vj} = 125°C, R_G = 82 Ohm L_S = 75 nH	E_{off}	-	1,1	-	mWs
Kurzschlußverhalten SC Data	t_P ≤ 10µs, V_{GE} ≤ 15V, R_G = 82 Ohm T_{vj}≤125°C, V_{CC} = 720 V dI/dt = 800 A/µs	I_{SC}	-	45	-	A

Elektrische Eigenschaften / Electrical properties

Charakteristische Werte / Characteristic values

			min.	typ.	max.	
Modulinduktivität stray inductance module		$L_{\sigma CE}$	-	-	100	nH
Modul Leitungswiderstand, Anschlüsse-Chip lead resistance, terminals-chip	T_C = 25°C	$R_{CC'+EE'}$	-	11	-	mΩ

Diode Wechselrichter/ Diode Inverter			min.	typ.	max.	
Durchlaßspannung forward voltage	V_{GE} = 0V, T_{vj} = 25°C, I_F = 10 A V_{GE} = 0V, T_{vj} = 125°C, I_F = 10 A	V_F	- -	2,2 2,1	2,55 -	V V
Rückstromspitze peak reverse recovery current	I_F=I_{Nenn}, - di_F/dt = 400A/µs V_{GE} = -10V, T_{vj} = 25°C, V_R = 600 V V_{GE} = -10V, T_{vj} = 125°C, V_R = 600 V	I_{RM}	- -	11 13	- -	A A
Sperrverzögerungsladung recovered charge	I_F=I_{Nenn}, - di_F/dt = 400A/µs V_{GE} = -10V, T_{vj} = 25°C, V_R = 600 V V_{GE} = -10V, T_{vj} = 125°C, V_R = 600 V	Q_r	- -	0,84 1,5	- -	µAs µAs
Abschaltenergie pro Puls reverse recovery energy	I_F=I_{Nenn}, - di_F/dt = 400A/µs V_{GE} = -10V, T_{vj} = 25°C, V_R = 600 V V_{GE} = -10V, T_{vj} = 125°C, V_R = 600 V	E_{RQ}	- -	0,3 0,54	- -	mWs mWs

Transistor Brems-Chopper/ Transistor Brake-Chopper			min.	typ.	max.	
Kollektor-Emitter Sättigungsspannung collector-emitter saturation voltage	V_{GE} = 15V, T_{vj} = 25°C, I_C = 10,0 A V_{GE} = 15V, T_{vj} = 125°C, I_C = 10,0 A	$V_{CE\ sat}$	- -	2,4 2,75	2,85 -	V V
Gate-Schwellenspannung gate threshold voltage	V_{CE} = V_{GE}, T_{vj} = 25°C, I_C = 0,35mA	$V_{GE(TO)}$	4,5	5,5	6,5	V
Eingangskapazität input capacitance	f = 1MHz, T_{vj} = 25°C V_{CE} = 25 V, V_{GE} = 0 V	C_{ies}	-	0,6	-	nF
Kollektor-Emitter Reststrom collector-emitter cut-off current	V_{GE} = 0V, T_{vj} = 25°C, V_{CE} = 1200 V V_{GE} = 0V, T_{vj} = 125°C, V_{CE} = 1200 V	I_{CES}	- -	0,5 0,8	500 -	µA mA
Gate-Emitter Reststrom gate-emitter leakage current	V_{CE} = 0V, V_{GE} = 20V, T_{vj} = 25°C	I_{GES}	-	-	300	nA

Diode Brems-Chopper/ Diode Brake-Chopper			min.	typ.	max.	
Durchlaßspannung forward voltage	T_{vj} = 25°C, I_F = 10,0 A T_{vj} = 125°C, I_F = 10,0 A	V_F	- -	2,2 2,1	2,55 -	V V

NTC-Widerstand/ NTC-Thermistor			min.	typ.	max.	
Nennwiderstand rated resistance	T_C = 25°C	R_{25}	-	5	-	kΩ
Abweichung von R_{100} deviation of R_{100}	T_C = 100°C, R_{100} = 493 Ω	ΔR/R	-5		5	%
Verlustleistung power dissipation	T_C = 25°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

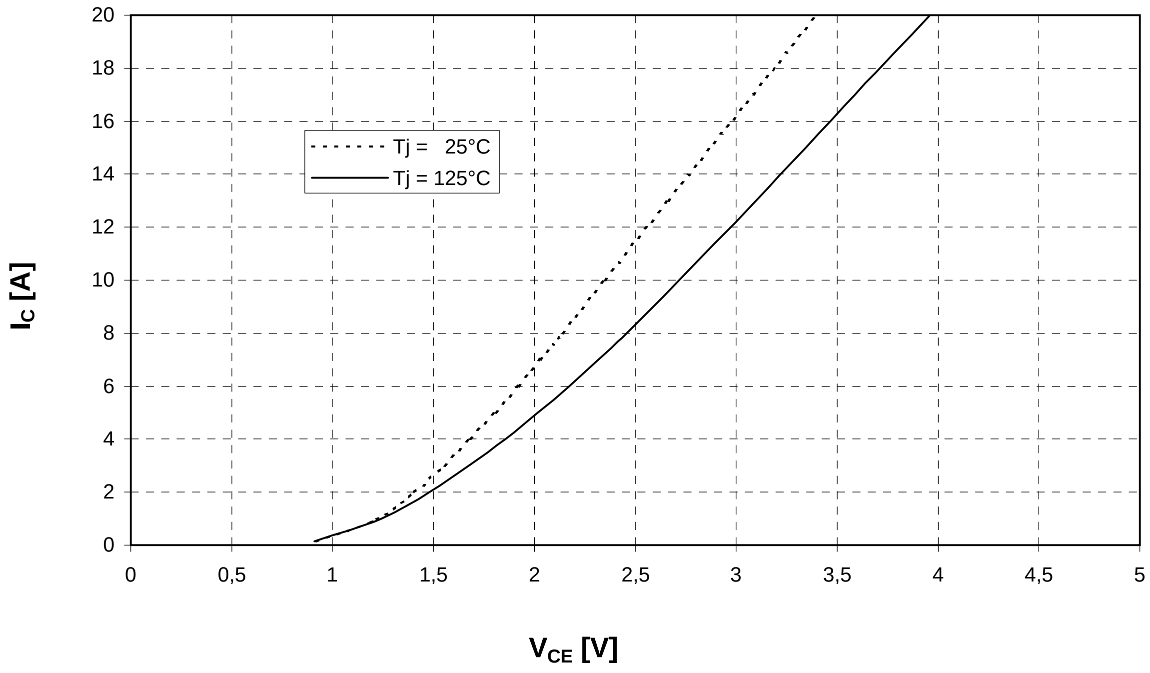
Thermische Eigenschaften / Thermal properties

				min.	typ.	max.	
Innerer Wärmewiderstand thermal resistance, junction to case	Gleichr. Diode/ Rectif. Diode		R_{thJC}	-	-	1	K/W
	Trans. Wechsr./ Trans. Inverter			-	-	1,2	K/W
	Diode Wechsr./ Diode Inverter			-	-	2,3	K/W
	Trans. Bremse/ Trans. Brake			-	-	1,2	K/W
	Diode Bremse/ Diode Brake			-	-	2,3	K/W
Übergangs-Wärmewiderstand thermal resistance, case to heatsink	Gleichr. Diode/ Rectif. Diode	λ_{Paste}=1W/m*K	R_{thCK}	-	0,08	-	K/W
	Trans. Wechsr./ Trans. Inverter	λ_{grease}=1W/m*K		-	0,04	-	K/W
	Diode Wechsr./ Diode Inverter			-	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

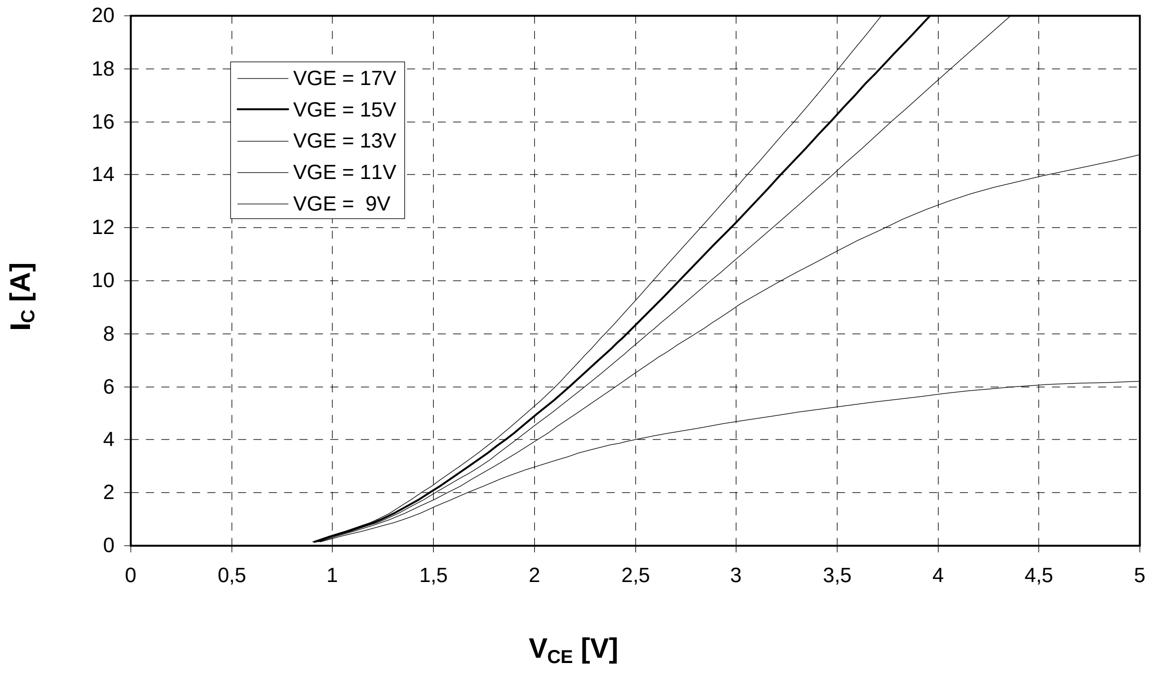
Mechanische Eigenschaften / Mechanical properties

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

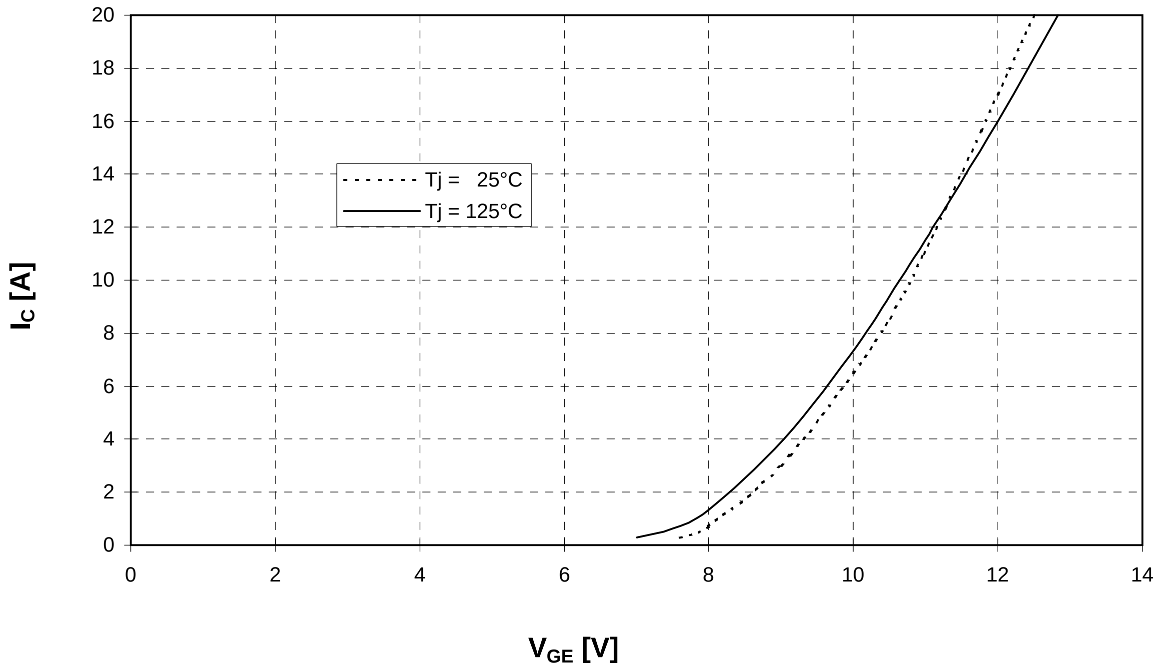
Ausgangskennlinienfeld Wechselr. (typisch) $I_C = f(V_{CE})$
Output characteristic Inverter (typical) $V_{GE} = 15\ V$



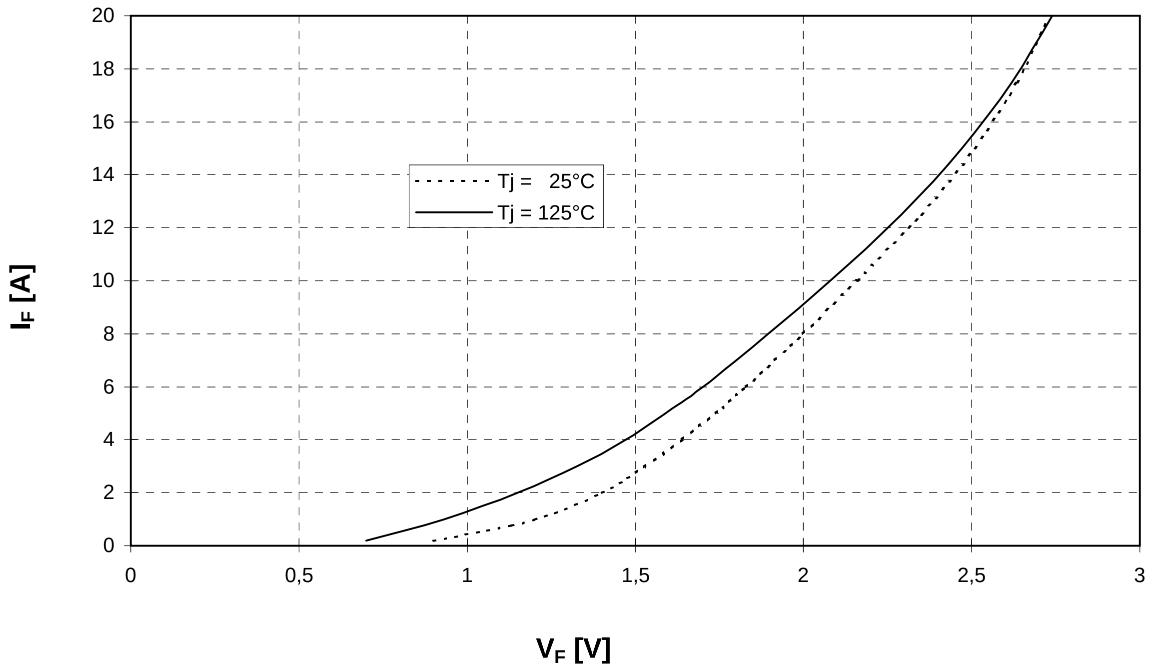
Ausgangskennlinienfeld Wechselr. (typisch) $I_C = f(V_{CE})$
Output characteristic Inverter (typical) $T_{vj} = 125°C$



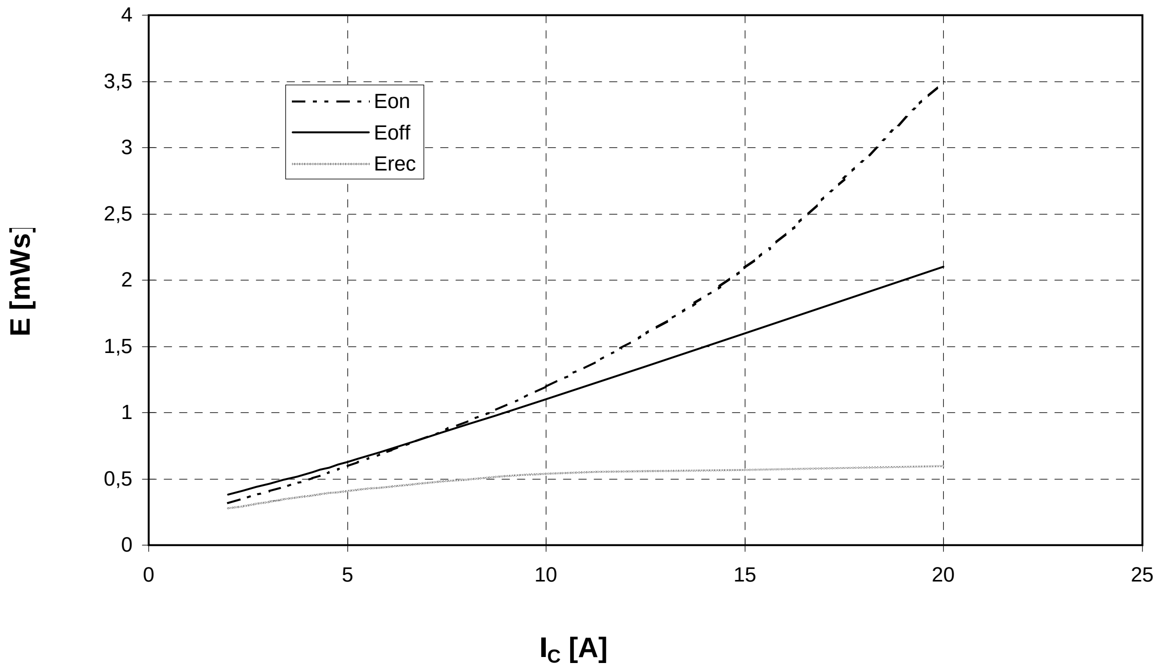
Übertragungscharakteristik Wechselr. (typisch) **$I_C = f(V_{GE})$**
Transfer characteristic Inverter (typical) **V_{CE} = 20 V**



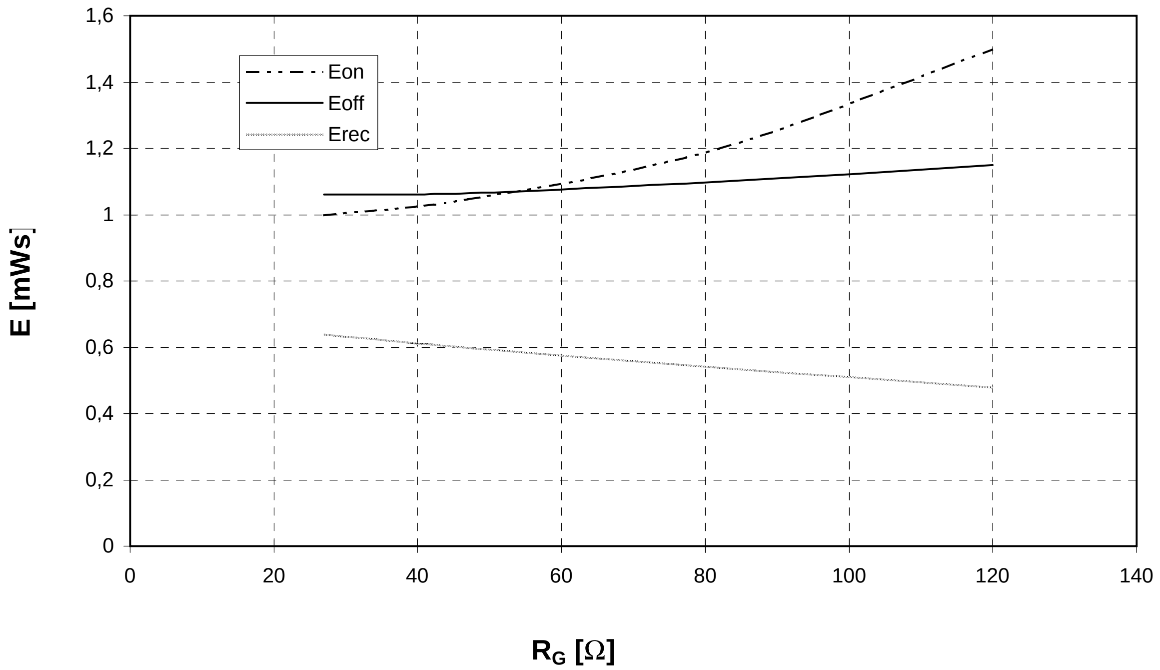
Durchlaßkennlinie der Freilaufdiode Wechselr. (typisch) **$I_F = f(V_F)$**
Forward characteristic of FWD Inverter (typical)



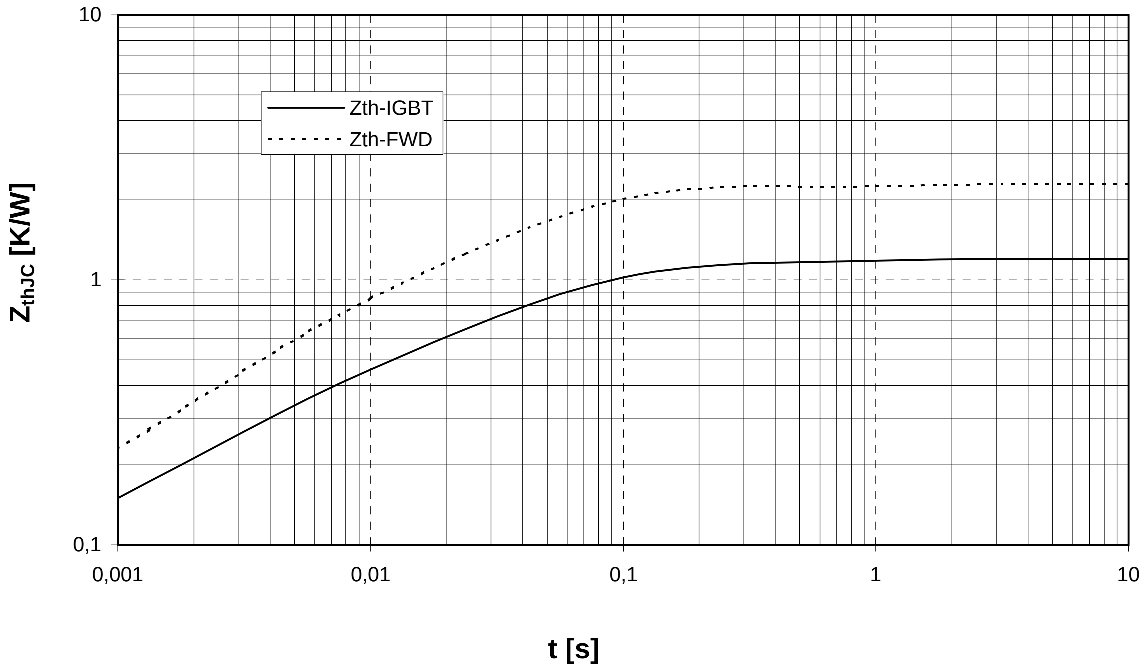
Schaltverluste Wechselr. (typisch) $E_{on} = f(I_C)$, $E_{off} = f(I_C)$, $E_{rec} = f(I_C)$ V_{CC} = 600 V
Switching losses Inverter (typical) $T_j = 125°C$, $V_{GE} = \pm 15$ V, $R_{Gon} = R_{Goff}$ = 82 Ohm



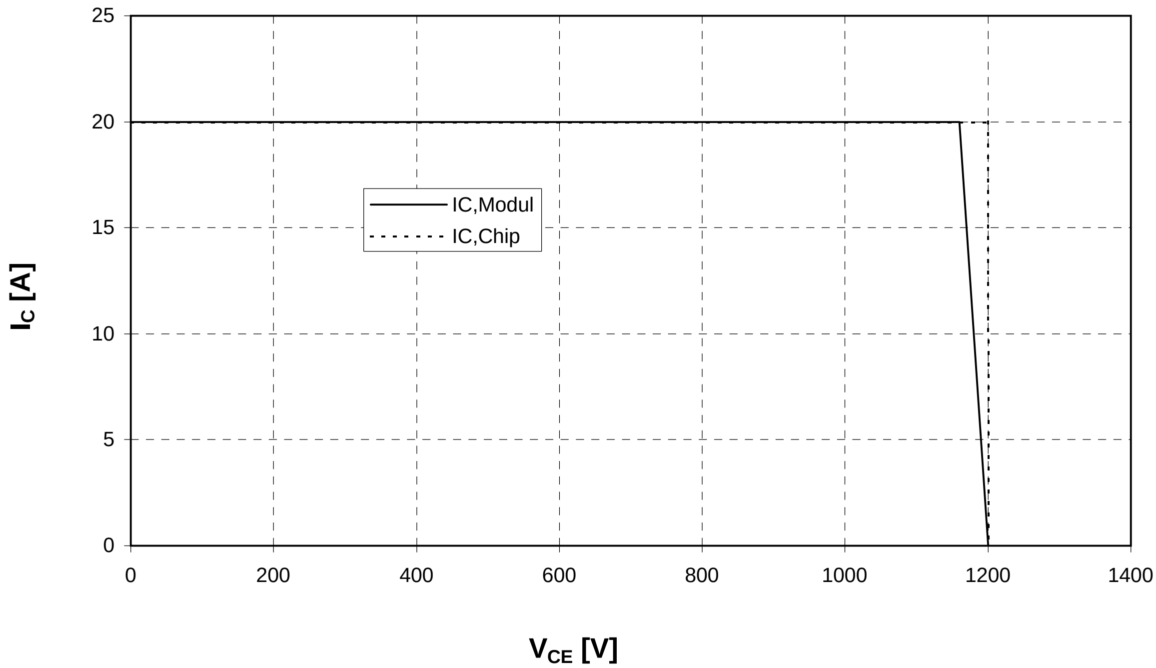
Schaltverluste Wechselr. (typisch) $E_{on} = f(R_G)$, $E_{off} = f(R_G)$, $E_{rec} = f(R_G)$
Switching losses Inverter (typical) $T_j = 125°C$, $V_{GE} = +-15$ V , $I_c = I_{nenn}$, V_{CC} = 600 V



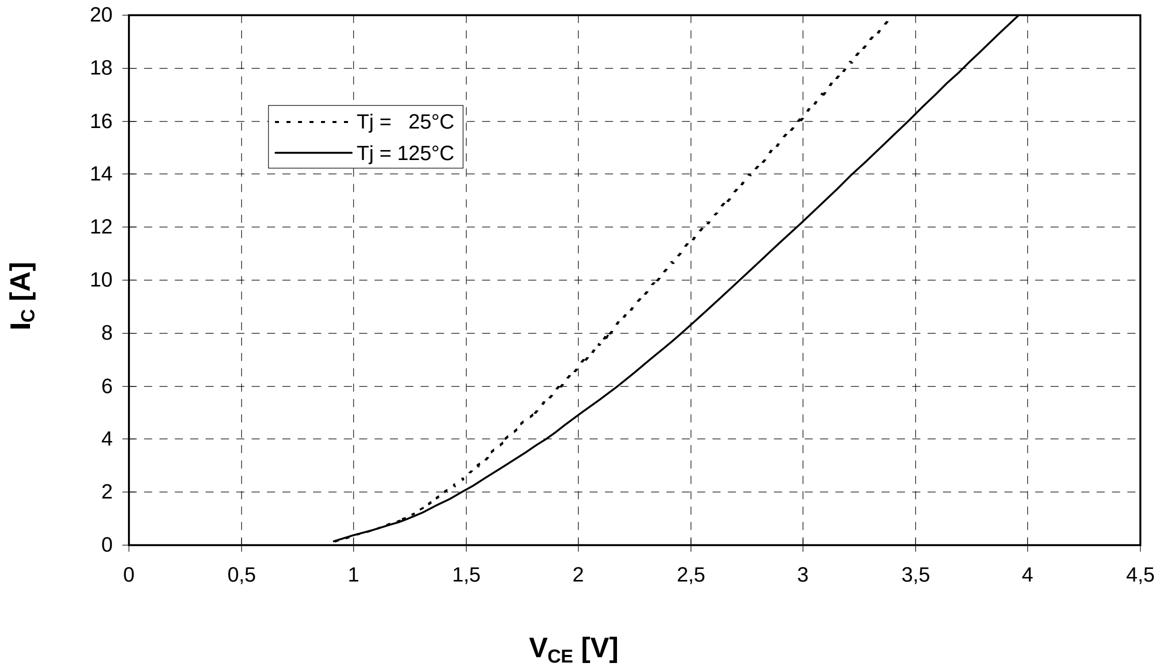
Transienter Wärmewiderstand Wechselr. **Z_{thJC} = f (t)**
Transient thermal impedance Inverter



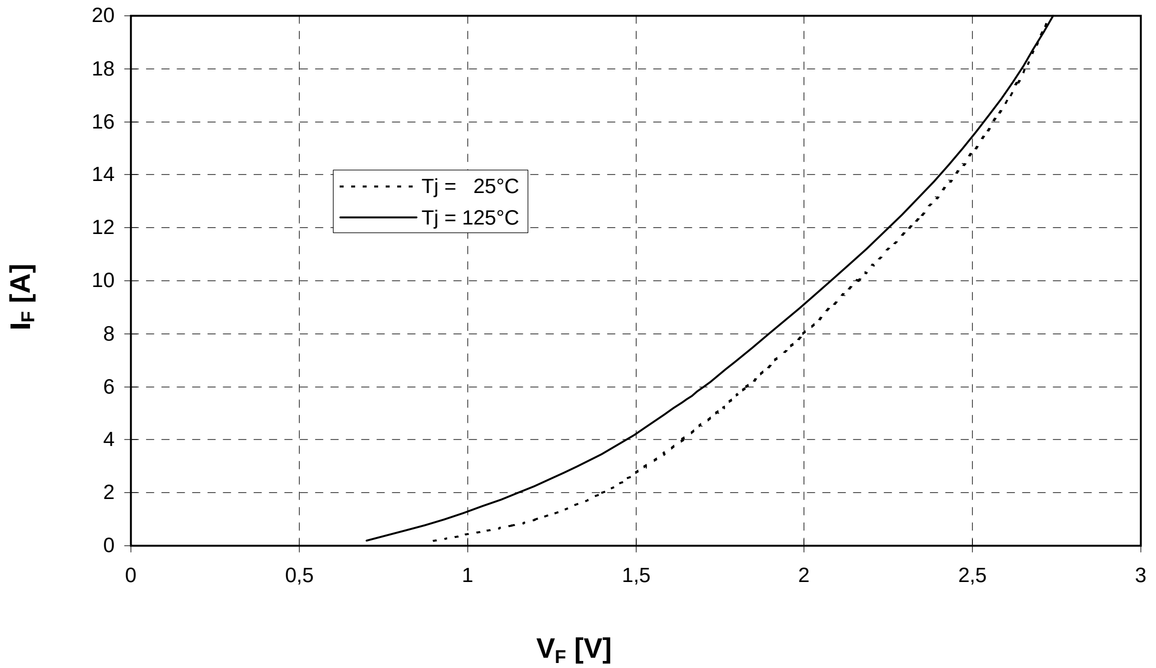
Sicherer Arbeitsbereich Wechselr. (RBSOA) **I_C = f (V_{CE})**
Reverse bias save operating area Inverter (RBSOA) **T_{vj} = 125°C, V_{GE} = ±15V, R_G = 82 Ohm**



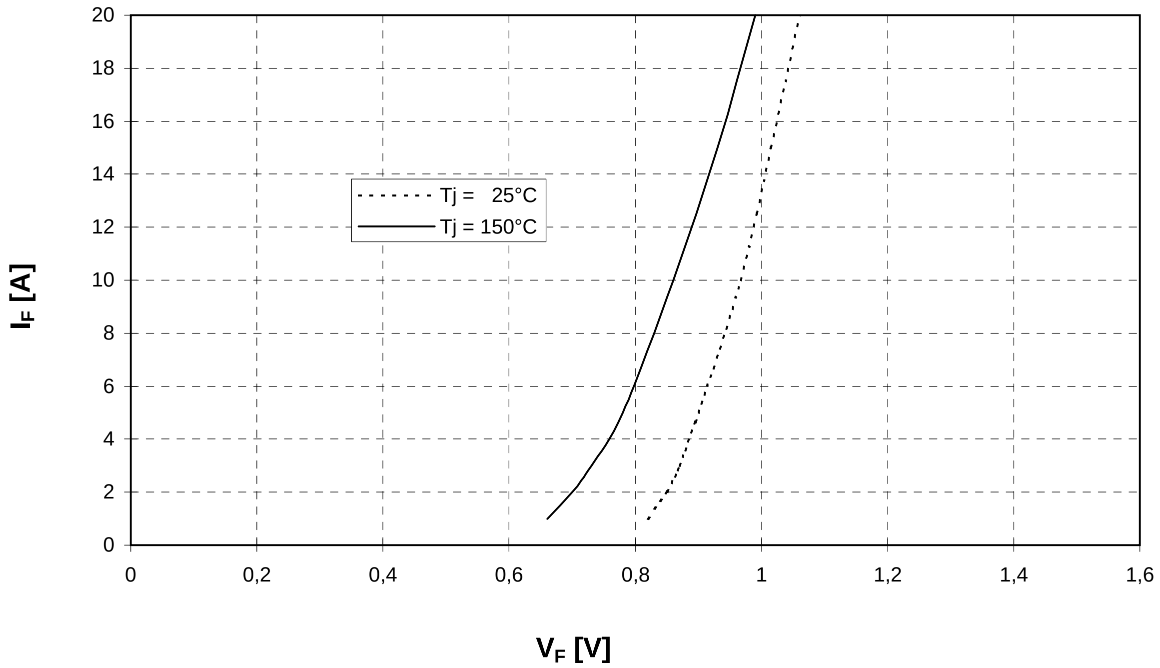
Ausgangskennlinienfeld Brems-Chopper-IGBT (typisch) $I_C = f(V_{CE})$
Output characteristic brake-chopper-IGBT (typical) $V_{GE} = 15\ V$



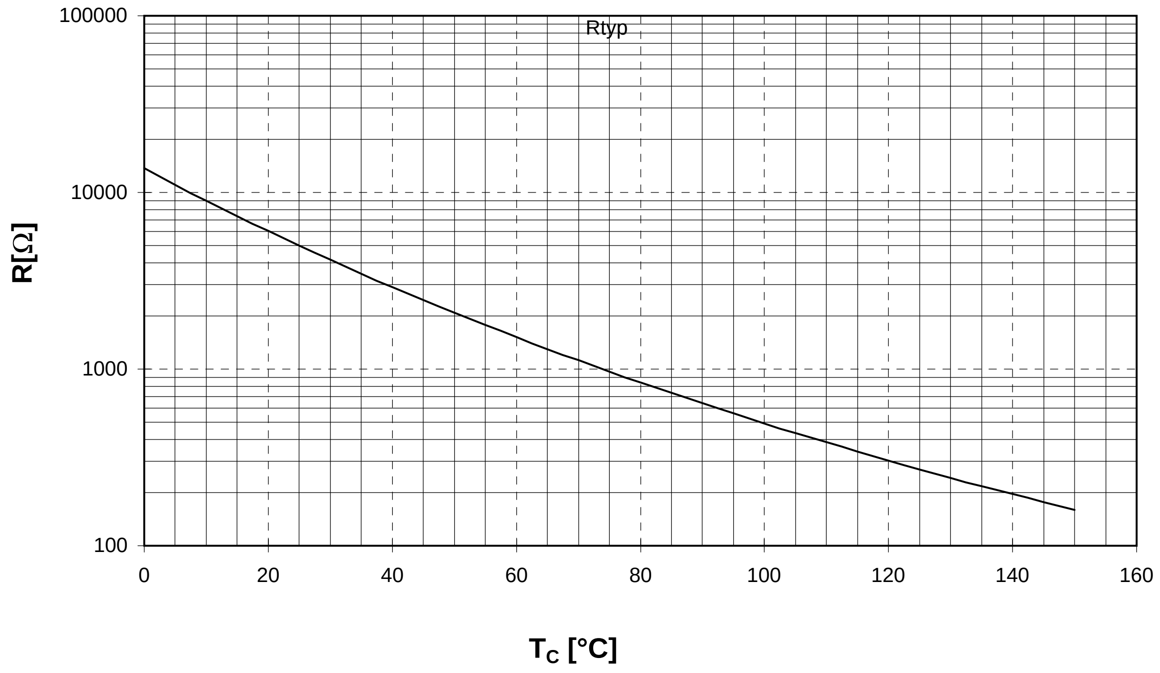
Durchlaßkennlinie der Brems-Chopper-Diode (typisch) $I_F = f(V_F)$
Forward characteristic of brake-chopper-FWD (typical)



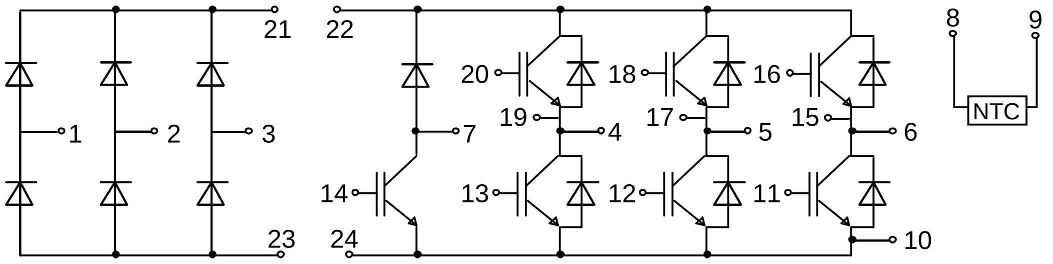
Durchlaßkennlinie der Gleichrichterdiode (typisch) **$I_F = f(V_F)$**
Forward characteristic of Rectifier Diode (typical)



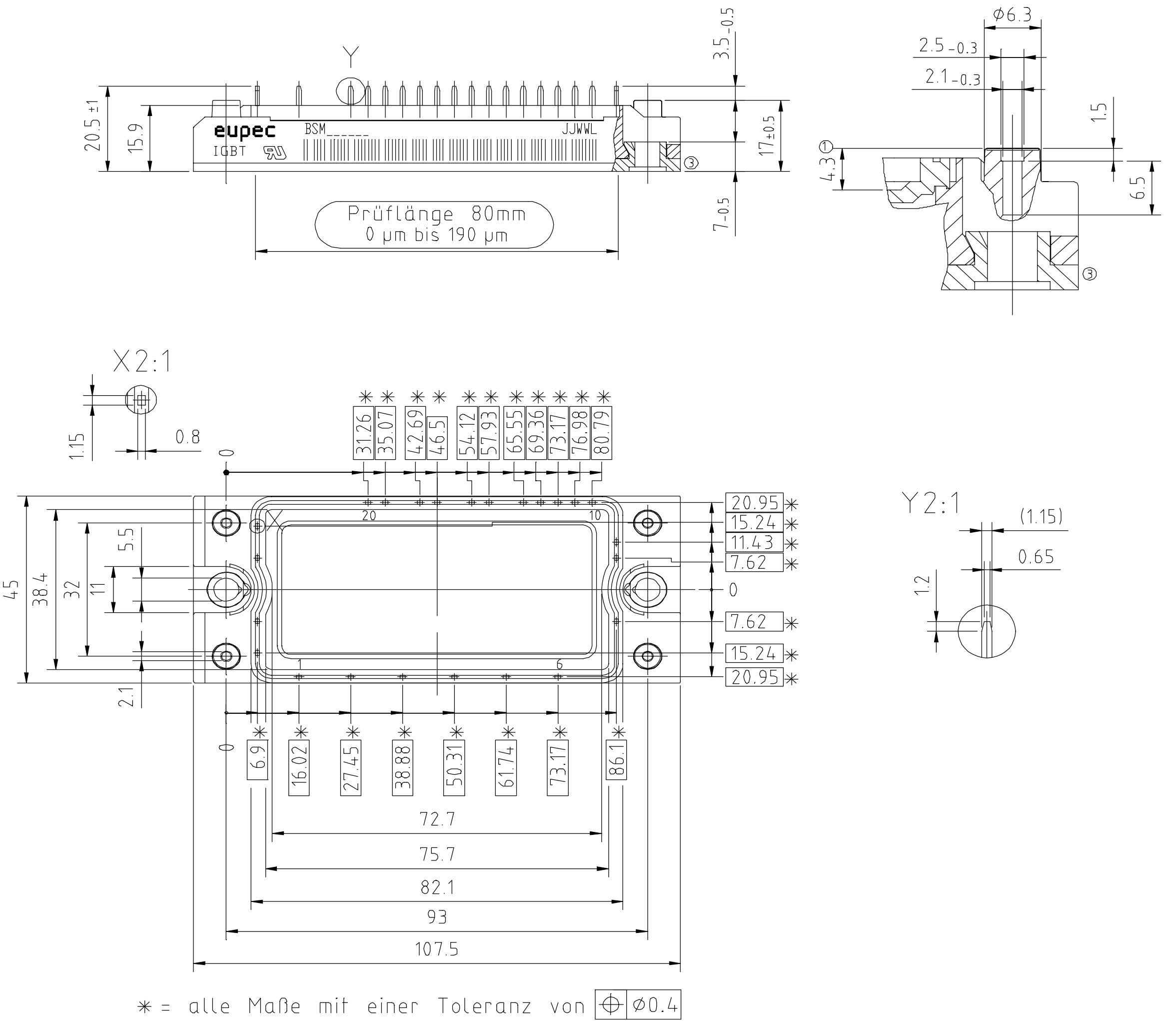
NTC- Temperaturkennlinie (typisch) **R = f (T)**
NTC- temperature characteristic (typical)



Schaltplan/ Circuit diagram



Gehäuseabmessungen/ Package outlines



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.