

DATASHEET

EUPEC

FS75R12KE3-B3

OTHER SYMBOLS:

FS75R12KE3B3, FS75R12KE3 B3, FS75R12KE3-B3

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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	75 100	A A
Periodischer Kollektor Spitzenstrom repetitive peak collector current	$t_P = 1\text{ ms}$, $T_C = 80^{\circ}\text{C}$	I_{CRM}	150	A
Gesamt-Verlustleistung total power dissipation	$T_C = 25^{\circ}\text{C}$	P_{tot}	355	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	$I_C = 75\text{ A}$, $V_{GE} = 15\text{ V}$, $T_{vj} = 25^{\circ}\text{C}$ $I_C = 75\text{ A}$, $V_{GE} = 15\text{ V}$, $T_{vj} = 125^{\circ}\text{C}$	$V_{CE\text{ sat}}$		1,70 2,00	2,15	V V
Gate-Schwellenspannung gate threshold voltage	$I_C = 3,00\text{ mA}$, $V_{CE} = V_{GE}$, $T_{vj} = 25^{\circ}\text{C}$	V_{GEth}	5,0	5,8	6,5	V
Gateladung gate charge	$V_{GE} = -15\text{ V} \dots +15\text{ V}$	Q_G		0,70		μC
Interner Gatewiderstand internal gate resistor	$T_{vj} = 25^{\circ}\text{C}$	R_{Gint}		10		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}		5,30		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}		0,20		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)	$I_C = 75\text{ A}$, $V_{CE} = 600\text{ V}$ $V_{GE} = \pm 15\text{ V}$, $R_{Gon} = 4,7\ \Omega$, $T_{vj} = 25^{\circ}\text{C}$ $V_{GE} = \pm 15\text{ V}$, $R_{Gon} = 4,7\ \Omega$, $T_{vj} = 125^{\circ}\text{C}$	$t_{d\text{ on}}$		0,26 0,29		μs μs
Anstiegszeit (induktive Last) rise time (inductive load)	$I_C = 75\text{ A}$, $V_{CE} = 600\text{ V}$ $V_{GE} = \pm 15\text{ V}$, $R_{Gon} = 4,7\ \Omega$, $T_{vj} = 25^{\circ}\text{C}$ $V_{GE} = \pm 15\text{ V}$, $R_{Gon} = 4,7\ \Omega$, $T_{vj} = 125^{\circ}\text{C}$	t_r		0,03 0,05		μs μs
Abschaltverzögerungszeit (ind. Last) turn-off delay time (inductive load)	$I_C = 75\text{ A}$, $V_{CE} = 600\text{ V}$ $V_{GE} = \pm 15\text{ V}$, $R_{Goff} = 4,7\ \Omega$, $T_{vj} = 25^{\circ}\text{C}$ $V_{GE} = \pm 15\text{ V}$, $R_{Goff} = 4,7\ \Omega$, $T_{vj} = 125^{\circ}\text{C}$	$t_{d\text{ off}}$		0,42 0,52		μs μs
Fallzeit (induktive Last) fall time (inductive load)	$I_C = 75\text{ A}$, $V_{CE} = 600\text{ V}$ $V_{GE} = \pm 15\text{ V}$, $R_{Goff} = 4,7\ \Omega$, $T_{vj} = 25^{\circ}\text{C}$ $V_{GE} = \pm 15\text{ V}$, $R_{Goff} = 4,7\ \Omega$, $T_{vj} = 125^{\circ}\text{C}$	t_f		0,07 0,09		μs μs
Einschaltverlustenergie pro Puls turn-on energy loss per pulse	$I_C = 75\text{ A}$, $V_{CE} = 600\text{ V}$, $L_S = 50\text{ nH}$ $V_{GE} = \pm 15\text{ V}$, $R_{Gon} = 4,7\ \Omega$, $T_{vj} = 25^{\circ}\text{C}$ $V_{GE} = \pm 15\text{ V}$, $R_{Gon} = 4,7\ \Omega$, $T_{vj} = 125^{\circ}\text{C}$	E_{on}		4,70 6,75		mJ mJ
Abschaltverlustenergie pro Puls turn-off energy loss per pulse	$I_C = 75\text{ A}$, $V_{CE} = 600\text{ V}$, $L_S = 50\text{ nH}$ $V_{GE} = \pm 15\text{ V}$, $R_{Goff} = 4,7\ \Omega$, $T_{vj} = 25^{\circ}\text{C}$ $V_{GE} = \pm 15\text{ V}$, $R_{Goff} = 4,7\ \Omega$, $T_{vj} = 125^{\circ}\text{C}$	E_{off}		6,20 10,0		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}		300		A
Innerer Wärmewiderstand thermal resistance, junction to case	pro IGBT per IGBT	R_{thJC}			0,35	K/W

Vorläufige Daten
preliminary data**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	75	A
Periodischer Spitzenstrom repetitive peak forward current	$t_P = 1 \text{ ms}$	I_{FRM}	150	A
Grenzlastintegral I^2t - value	$V_R = 0 \text{ V}$, $t_P = 10 \text{ ms}$, $T_{vj} = 125^{\circ}\text{C}$	I^2t	1200	A^2s

Charakteristische Werte / characteristic values

			min.	typ.	max.	
Durchlassspannung forward voltage	$I_F = 75 \text{ A}$, $V_{GE} = 0 \text{ V}$, $T_{vj} = 25^{\circ}\text{C}$ $I_F = 75 \text{ A}$, $V_{GE} = 0 \text{ V}$, $T_{vj} = 125^{\circ}\text{C}$	V_F		1,65 1,65	2,15	V V
Rückstromspitze peak reverse recovery current	$I_F = 75 \text{ A}$, $-di_F/dt = 2000 \text{ A}/\mu\text{s}$ $V_R = 600 \text{ V}$, $V_{GE} = -15 \text{ V}$, $T_{vj} = 25^{\circ}\text{C}$ $V_R = 600 \text{ V}$, $V_{GE} = -15 \text{ V}$, $T_{vj} = 125^{\circ}\text{C}$	I_{RM}		90,0 100		A A
Sperrverzögerungsladung recovered charge	$I_F = 75 \text{ A}$, $-di_F/dt = 2000 \text{ A}/\mu\text{s}$ $V_R = 600 \text{ V}$, $V_{GE} = -15 \text{ V}$, $T_{vj} = 25^{\circ}\text{C}$ $V_R = 600 \text{ V}$, $V_{GE} = -15 \text{ V}$, $T_{vj} = 125^{\circ}\text{C}$	Q_r		7,00 14,0		μC μC
Abschaltenergie pro Puls reverse recovery energy	$I_F = 75 \text{ A}$, $-di_F/dt = 2000 \text{ A}/\mu\text{s}$ $V_R = 600 \text{ V}$, $V_{GE} = -15 \text{ V}$, $T_{vj} = 25^{\circ}\text{C}$ $V_R = 600 \text{ V}$, $V_{GE} = -15 \text{ V}$, $T_{vj} = 125^{\circ}\text{C}$	E_{rec}		3,00 6,00		mJ mJ
Innerer Wärmewiderstand thermal resistance, junction to case	pro Diode per diode	R_{thJC}			0,58	K/W

Strommesswiderstand / shunt

			min.	typ.	max.	
Nennwiderstand rated resistance	$T_c = 20^{\circ}\text{C}$	R_{20}		2,40		m Ω
Temperaturkoeffizient temperature coefficient (tcr)	20°C - 60°C			<30		ppm/K
Belastbarkeit pro Shunt-Widerstand load capacity per shunt-resistor	$T_c = 80^{\circ}\text{C}$	P			20	W
Betriebstemperatur Shunt-Widerstand operation temperatur shunt-resistor		T_{tvjop}			140	$^{\circ}\text{C}$
Innerer Wärmewiderstand; DC thermal resistance; junction to case		R_{thJC}			2,9	K/W

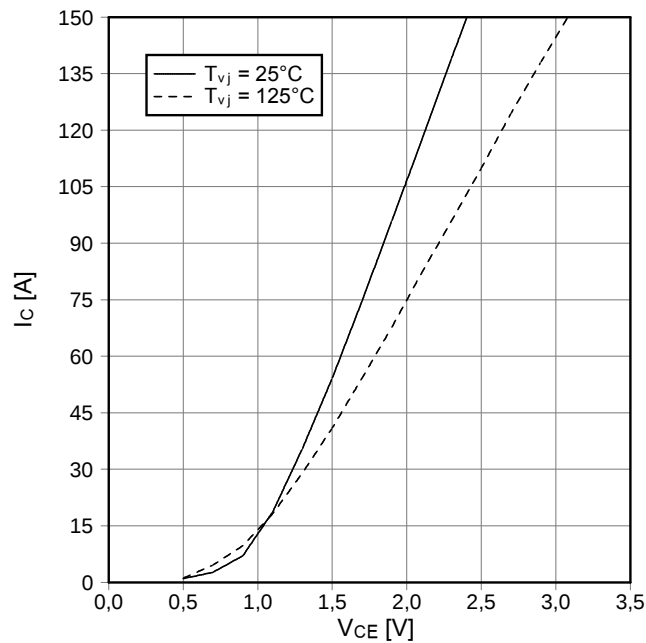
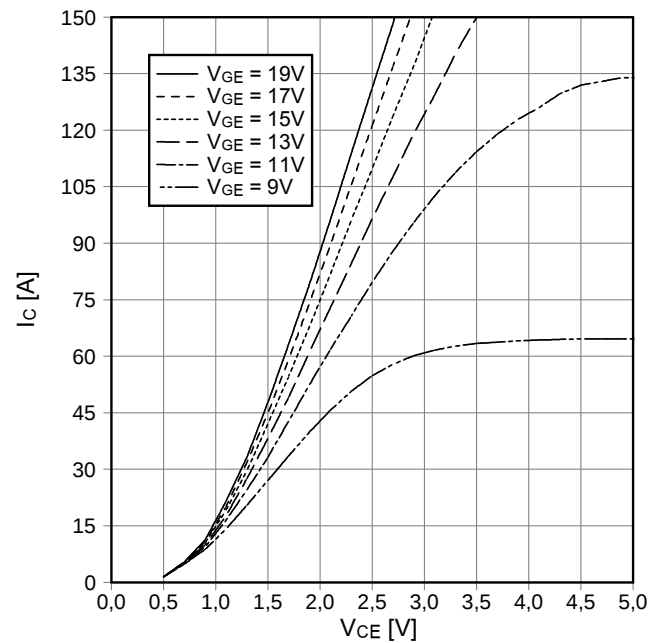
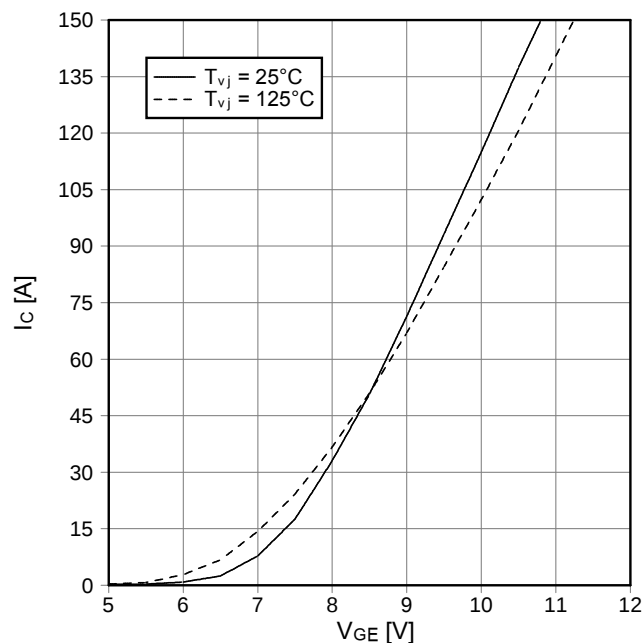
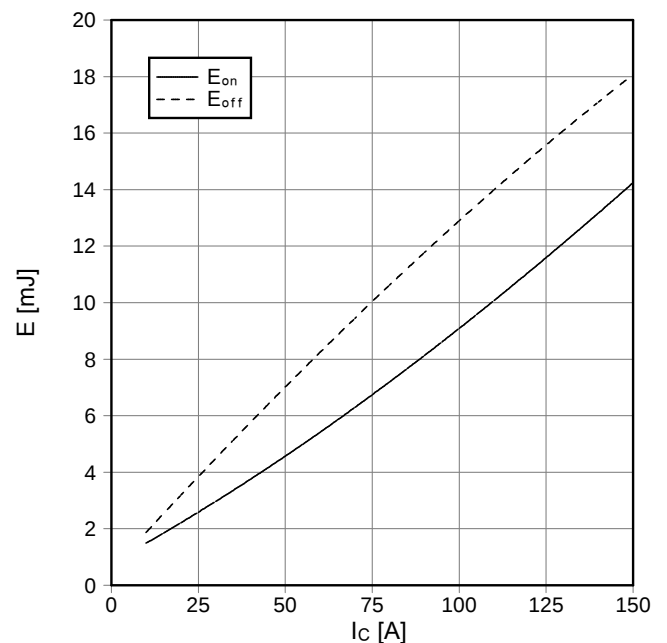
Vorläufige Daten
preliminary data**Modul / module**

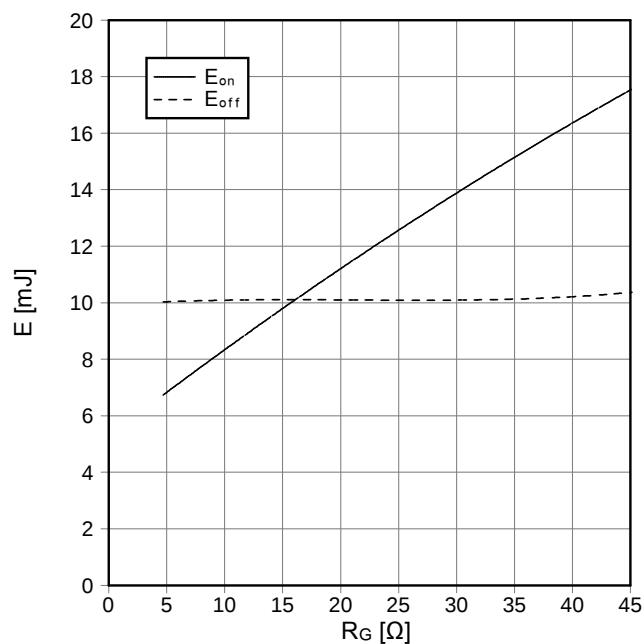
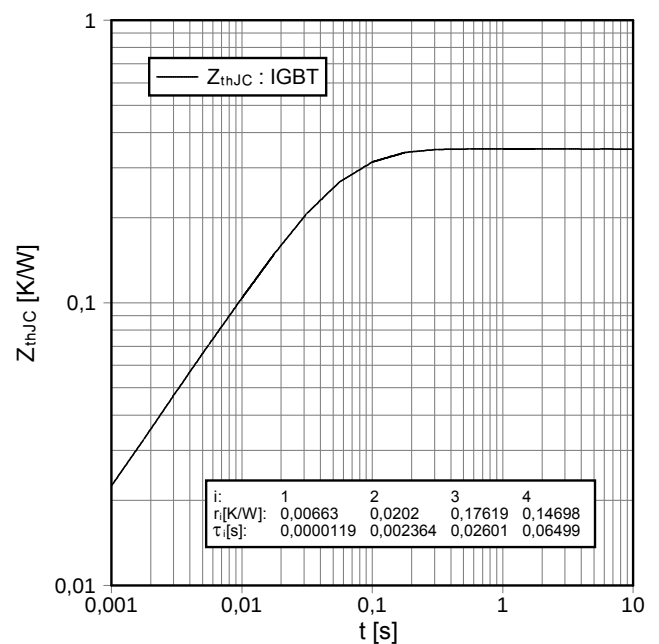
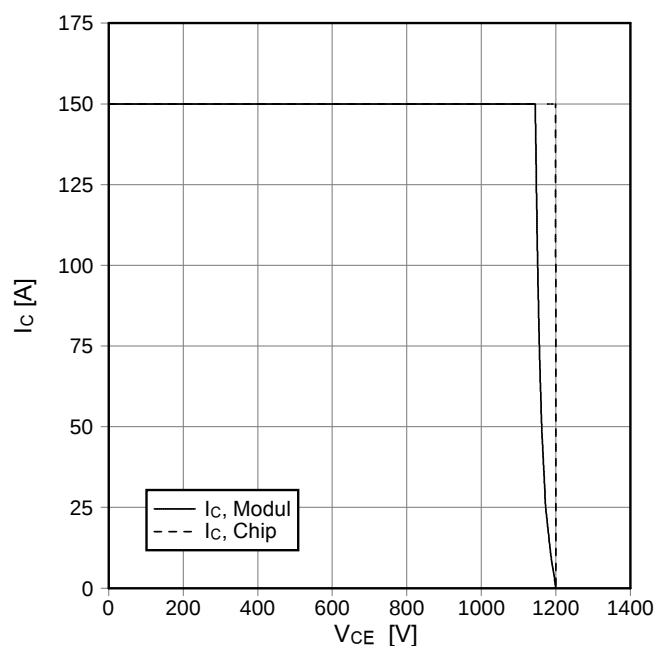
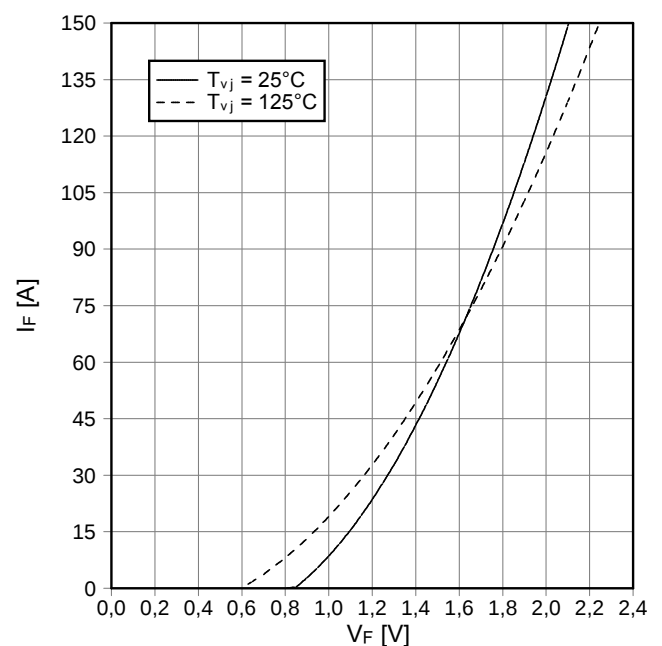
Isolations-Prüfspannung insulation test voltage	RMS, f = 50 Hz, t = 1 min.	V _{ISO}	2,5	kV
Material Modulgrundplatte material of module baseplate			Cu	
Material für innere Isolation material for internal insulation			Al ₂ O ₃	
Kriechstrecke creepage distance	Kontakt - Kühlkörper / terminal to heatsink 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	
Übergangs-Wärmewiderstand thermal resistance, case to heatsink	pro Modul / per module $\lambda_{\text{Paste}} = 1 \text{ W/(m}\cdot\text{K)} / \lambda_{\text{grease}} = 1 \text{ W/(m}\cdot\text{K)}$	R _{thCH}	min. 0,009	typ. max. K/W
Modulinduktivität stray inductance module		L _{sCE}	25	nH
Modulleitungswiderstand, Anschlüsse - Chip module lead resistance, terminals - chip	T _C = 25°C, pro Schalter / per switch	R _{CC'+EE'}	1,80	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	300	g

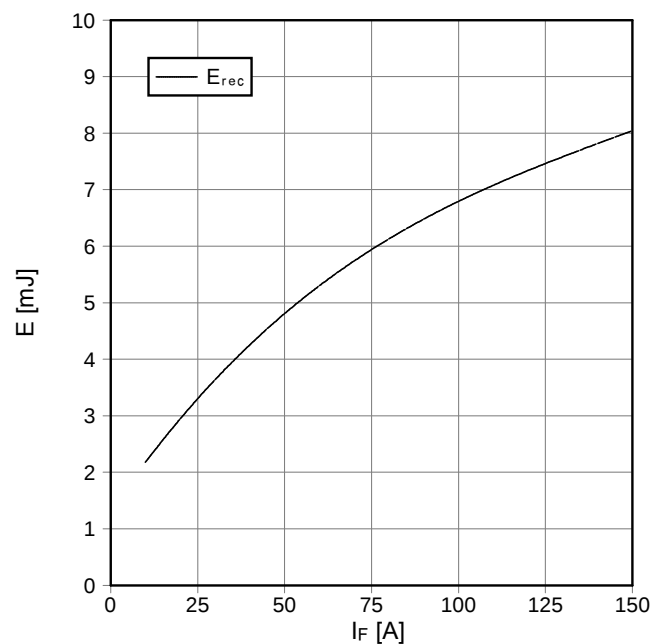
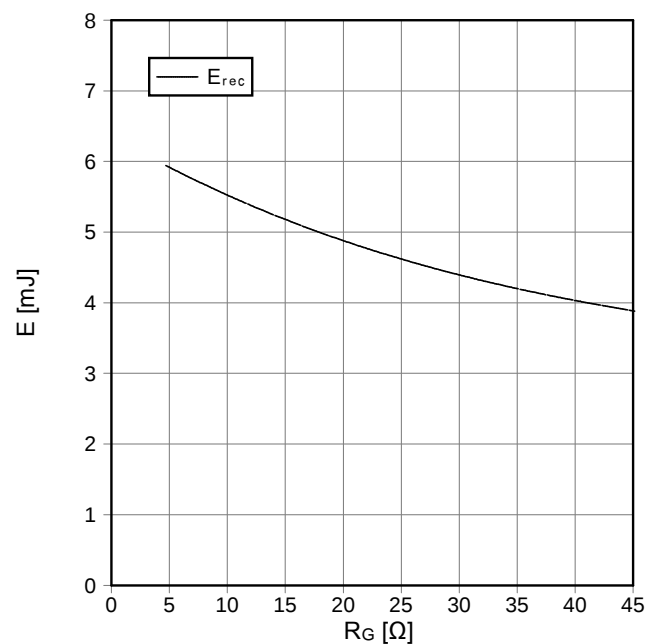
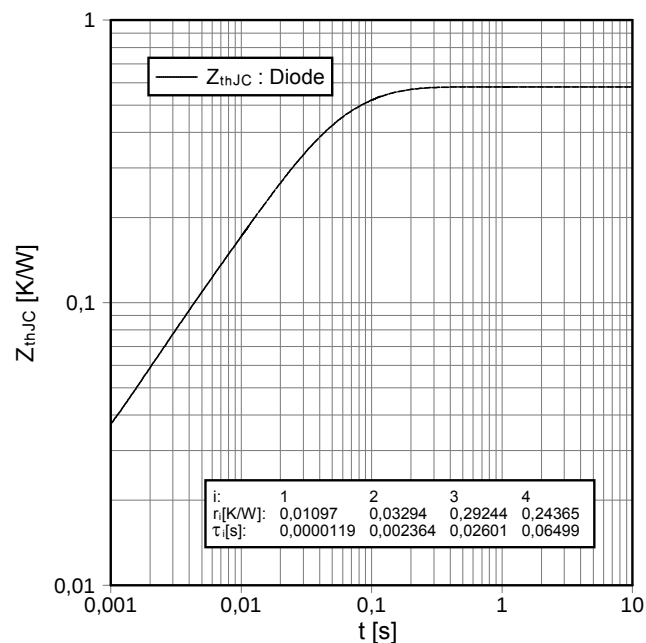
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This technical information specifies semiconductor devices but guarantees no characteristics. It is valid with the appropriate technical explanations.

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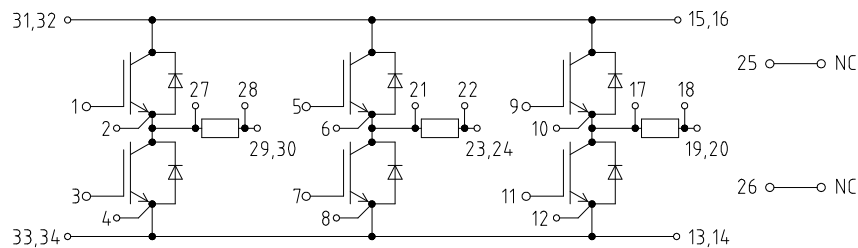
Vorläufige Daten
preliminary data**Ausgangskennlinie IGBT-Wechselr. (typisch)**
output characteristic IGBT-inverter (typical) $I_C = f(V_{CE})$
 $V_{GE} = 15 \text{ V}$ **Ausgangskennlinienfeld IGBT-Wechselr. (typisch)**
output characteristic IGBT-inverter (typical) $I_C = f(V_{CE})$
 $T_{vj} = 125^\circ\text{C}$ **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) $E_{on} = f(I_C)$, $E_{off} = f(I_C)$
 $V_{GE} = \pm 15 \text{ V}$, $R_{Gon} = 4,7 \Omega$, $R_{Goff} = 4,7 \Omega$, $V_{CE} = 600 \text{ V}$,
 $T_{vj} = 125^\circ\text{C}$ 

Vorläufige Daten
preliminary data**Schaltverluste IGBT-Wechselr. (typisch)**
switching losses IGBT-Inverter (typical) $E_{on} = f(R_G)$, $E_{off} = f(R_G)$ $V_{GE} = \pm 15\text{ V}$, $I_C = 75\text{ A}$, $V_{CE} = 600\text{ V}$, $T_{vj} = 125^\circ\text{C}$ **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) $I_C = f(V_{CE})$ $V_{GE} = \pm 15\text{ V}$, $R_{Goff} = 4.7\ \Omega$, $T_{vj} = 125^\circ\text{C}$ **Durchlaßkennlinie der Diode-Wechselr. (typisch)**
forward characteristic of diode-inverter (typical) $I_F = f(V_F)$ 

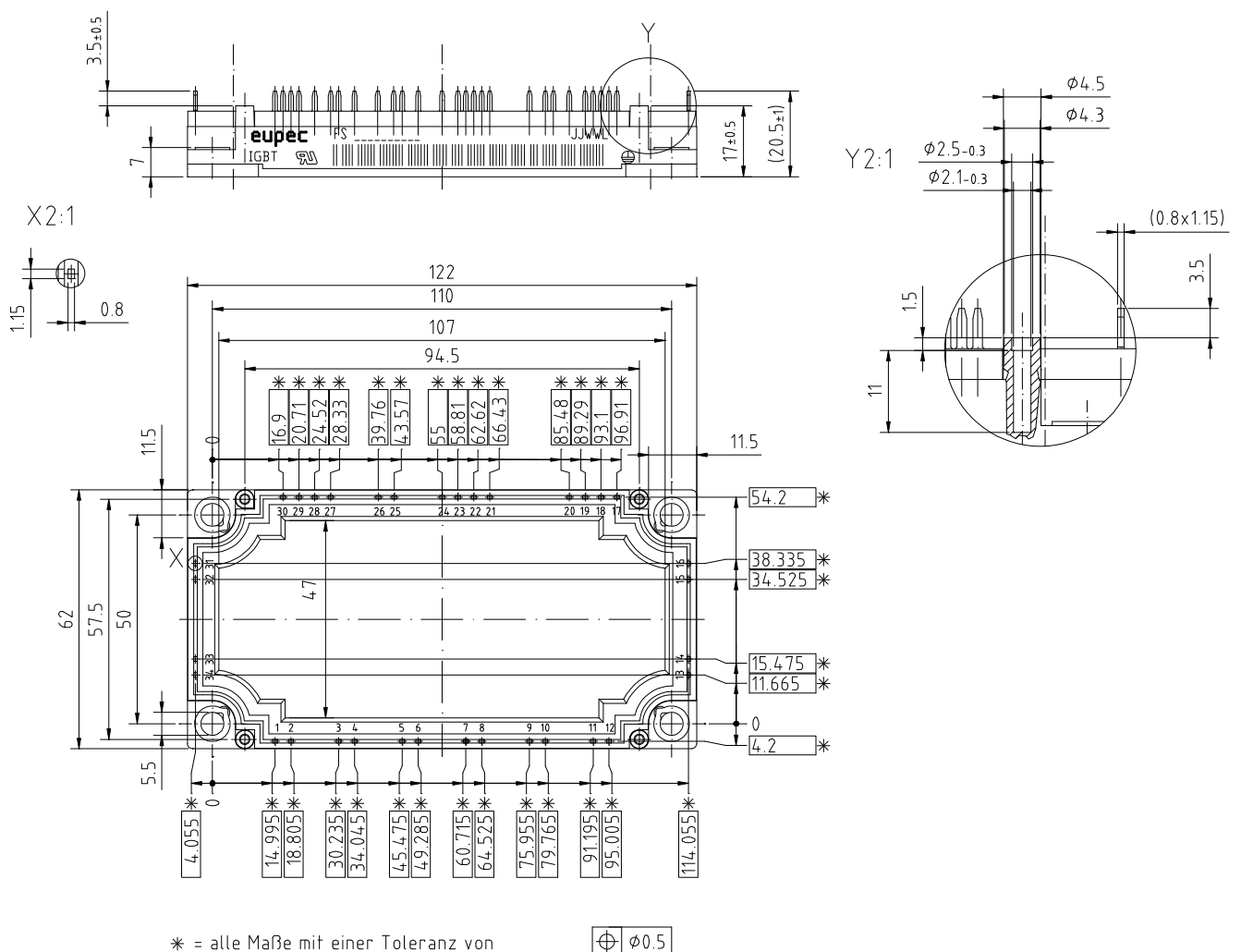
Vorläufige Daten
preliminary data**Schaltverluste Diode-Wechselr. (typisch)**
switching losses diode-inverter (typical) $E_{rec} = f(I_F)$
 $R_{Gon} = 4,7 \Omega$, $V_{CE} = 600 \text{ V}$, $T_{vj} = 125^\circ\text{C}$ **Schaltverluste Diode-Wechselr. (typisch)**
switching losses diode-inverter (typical) $E_{rec} = f(R_G)$
 $I_F = 75 \text{ A}$, $V_{CE} = 600 \text{ V}$, $T_{vj} = 125^\circ\text{C}$ **Transienter Wärmewiderstand Diode-Wechselr.**
transient thermal impedance diode-inverter $Z_{thJC} = f(t)$ 

Vorläufige Daten
preliminary data

Schaltplan / circuit diagram



Gehäuseabmessungen / package outlines



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