Diode-Gleichrichter / diode-rectifier

Vorläufige Daten / preliminary data

Höchstzulässige Werte / maximum rated values

Periodische Rückw. Spitzensperrspannung repetitive peak reverse voltage	T_{vj} = 25°C	V_{RRM}	1600	V
Durchlassstrom Grenzeffektivwert pro Dio. forward current RMS maximum per diode	T_C = 80°C	I_{FRMSM}	150	A
Gleichrichter Ausgang Grenzeffektivstrom maximum RMS current at Rectifier output	T_C = 80°C	I_{RMSM}	180	A
Stoßstrom Grenzwert surge forward current	t_p = 10 ms, T_{vj} = 25°C t_p = 10 ms, T_{vj} = 150°C	I_{FSM}	1600 1400	A A
Grenzlastintegral I²t - value	t_p = 10 ms, T_{vj} = 25°C t_p = 10 ms, T_{vj} = 150°C	I²t	13000 9500	A²s A²s

Charakteristische Werte / characteristic values

			min.	typ.	max.	
Durchlassspannung forward voltage	T_{vj} = 150°C, I_F = 150 A	V_F		1,20		V
Schleusenspannung threshold voltage	T_{vj} = 150°C	V_{TO}		0,83		V
Ersatzwiderstand slope resistance	T_{vj} = 150°C	r_T		2,30		mΩ
Sperrstrom reverse current	T_{vj} = 150°C, V_R = 1600 V	I_R		1,00		mA
Innerer Wärmewiderstand thermal resistance, junction to case	pro Diode per diode	R_{thJC}			0,35	K/W
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}		0,165		K/W

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Vorläufige Daten
preliminary data

Thyristor-Gleichrichter / thyristor-rectifier

Höchstzulässige Werte / maximum rated values

Periodische Rückw. Spitzensperrspannung repetitive peak reverse voltage	T_{vj} = 25°C	V_{RRM}	1600	V
Durchlaßstrom Grenzeffektivwert pro Chip forward current RMS maximum per chip	T_C = 80°C	I_{FRMSM}	150	A
Gleichrichter Ausgang Grenzeffektivstrom maximum RMS current at Rectifier output	T_C = 80°C	I_{RMSmax}	180	A
Stoßstrom Grenzwert surge forward current	t_P = 10ms, T_{vj} = 25°C t_P = 10ms, T_{vj} = 130°C	I_{FSM}	1550 1300	A
Grenzlastintegral I²t - value	t_P = 10ms, T_{vj} = 25°C t_P = 10ms, T_{vj} = 130°C	I²t	12000 8450	A²s
kritische Stromsteilheit critical rate of rise of on-state current	DIN IEC 60 754-6 f = 50Hz, iGM = 0,6A, diG/dt = 0,6A/µs	$(di/dt)_{cr}$	100	A/µs
kritische Spannungssteilheit critical rate of rise of on-state voltage	T_{vj} = 130°C, vD = 0,67 VDRM	$(dv/dt)_{cr}$	1000	V/µs

Charakteristische Werte / characteristic values

Durchlaßspannung forward voltage	T_{vj} = 130°C, I_F = 150 A	V_F		1,30		V
Schleusenspannung threshold voltage	T_{vj} = 130°C	$V_{(TO)}$	-	0,85		V
Ersatzwiderstand slope resistance	T_{vj} = 130°C	r_T	-	3,20		mΩ
Zündstrom gate trigger current	T_{vj} = 25°C, v_D = 6 V	I_{GT}			100	mA
Zündspannung gate trigger voltage	T_{vj} = 25°C, v_D = 6 V	V_{GT}			2,0	V
Nicht zündender Steuerstrom gate non-trigger current	T_{vj} = 130°C, v_D = 6 V T_{vj} = 130°C, v_D = 0,5 V_{DRM}	I_{GD}			6,0 3,0	mA
Nicht zündende Steuerspannung gate non-trigger voltage	T_{vj} = 130°C, v_D = 0,5 V_{DRM}	V_{GD}			0,3	V
Haltestrom holding current	T_{vj} = 25°C, v_D = 6 V, R_A = 5 Ω	I_H			220	mA
Einraststrom latching current	T_{vj} = 25°C, v_D = 6 V, R_{GK} ≥ 20 Ω i_{GM} = 0,6 A, di_G/dt = 0,6 A/µs, t_g = 10 µs	I_L			550	mA
Zündverzug gate controlled delay time	DIN IEC 747-6 T_{vj} = 25°C, i_{GM} = 0,6 A, di_G/dt = 0,6 A/µs	t_{gd}			1,2	µs
Freiwerdezeit circuit commutated turn-off time	T_{vj} = 130°C, i_{TM} = 50 A v_{RM} = 100 V, V_{DM} = 0,67 V_{DRM} dv_D/dt = 20 V/µs, $-di_T/dt$ = 10 A/µs	t_q		150		µs
Sperrstrom reverse current	T_{vj} = 130°C, V_R = 1600 V	I_R I_D	-	5,00		mA
Innerer Wärmewiderstand thermal resistance, junction to case	pro Thyristor per thyristor	R_{thJC}			0,30	K/W
Übergangs-Wärmewiderstand thermal resistance, case to heatsink	pro Thyristor / per thyristor λ_{Paste} = 1 W/(m·K) / λ_{grease} = 1 W/(m·K)	R_{thCH}		0,14		K/W

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Vorläufige Daten
preliminary data

IGBT-Brems-Chopper / IGBT-brake-chopper

Höchstzulässige Werte / maximum rated values

Kollektor-Emitter-Sperrspannung collector-emitter voltage	T_{vj} = 25°C	V_{CES}	1200	V
Kollektor-Dauergleichstrom DC-collector current	T_C = 80°C, T_{vj} = 175°C T_C = 25°C, T_{vj} = 175°C	I_{Cnom} I_C	100 140	A A
Periodischer Kollektor Spitzenstrom repetitive peak collector current	t_P = 1 ms	I_{CRM}	200	A
Gesamt-Verlustleistung total power dissipation	T_C = 25°C, T_{vj} = 175°C	P_{tot}	515	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 = 100 A, V_{GE} = 15 V I_C = 100 A, V_{GE} = 15 V I_C = 100 A, V_{GE} = 15 V	T_{vj} = 25°C T_{vj} = 125°C T_{vj} = 150°C	$V_{CE\ sat}$	1,75 2,05 2,10	2,20	V V V
Gate-Schwellenspannung gate threshold voltage	I_C = 3,55 mA, V_{CE} = V_{GE}, T_{vj} = 25°C		V_{GEth}	5,0	5,8	6,5	V
Gateladung gate charge	V_{GE} = -15 V ... +15 V		Q_G		0,80		µC
Interner Gatewiderstand internal gate resistor	T_{vj} = 25°C		R_{Gint}		7,50		Ω
Eingangskapazität input capacitance	f = 1 MHz, T_{vj} = 25°C, V_{CE} = 25 V, V_{GE} = 0 V		C_{ies}		6,30		nF
Rückwirkungskapazität reverse transfer capacitance	f = 1 MHz, T_{vj} = 25°C, V_{CE} = 25 V, V_{GE} = 0 V		C_{res}		0,27		nF
Kollektor-Emitter Reststrom collector-emitter cut-off current	V_{CE} = 1200 V, V_{GE} = 0 V, T_{vj} = 25°C		I_{CES}			1,0	mA
Gate-Emitter Reststrom gate-emitter leakage current	V_{CE} = 0 V, V_{GE} = 20 V, T_{vj} = 25°C		I_{GES}			100	nA
Einschaltverzögerungszeit (ind. Last) turn-on delay time (inductive load)	I_C = 100 A, V_{CE} = 600 V V_{GE} = ±15 V R_{Gon} = 1,6 Ω	T_{vj} = 25°C T_{vj} = 125°C T_{vj} = 150°C	$t_{d\ on}$		0,16 0,17 0,17		µs µs µs
Anstiegszeit (induktive Last) rise time (inductive load)	I_C = 100 A, V_{CE} = 600 V V_{GE} = ±15 V R_{Gon} = 1,6 Ω	T_{vj} = 25°C T_{vj} = 125°C T_{vj} = 150°C	t_r		0,03 0,04 0,04		µs µs µs
Abschaltverzögerungszeit (ind. Last) turn-off delay time (inductive load)	I_C = 100 A, V_{CE} = 600 V V_{GE} = ±15 V R_{Goff} = 1,6 Ω	T_{vj} = 25°C T_{vj} = 125°C T_{vj} = 150°C	$t_{d\ off}$		0,33 0,43 0,45		µs µs µs
Fallzeit (induktive Last) fall time (inductive load)	I_C = 100 A, V_{CE} = 600 V V_{GE} = ±15 V R_{Goff} = 1,6 Ω	T_{vj} = 25°C T_{vj} = 125°C T_{vj} = 150°C	t_f		0,08 0,145 0,17		µs µs µs
Einschaltverlustenergie pro Puls turn-on energy loss per pulse	I_C = 100 A, V_{CE} = 600 V V_{GE} = ±15 V R_{Gon} = 1,6 Ω	T_{vj} = 25°C T_{vj} = 125°C T_{vj} = 150°C	E_{on}		5,50 8,50 9,50		mJ mJ mJ
Abschaltverlustenergie pro Puls turn-off energy loss per pulse	I_C = 100 A, V_{CE} = 600 V V_{GE} = ±15 V R_{Goff} = 1,6 Ω	T_{vj} = 25°C T_{vj} = 125°C T_{vj} = 150°C	E_{off}		5,50 8,50 9,50		mJ mJ mJ
Kurzschlussverhalten SC data	V_{GE} ≤ 15 V, V_{CC} = 900 V V_{CEmax} = V_{CES} -L_{sCE} · di/dt	t_P ≤ 10 µs, T_{vj} = 150°C	I_{SC}		360		A
Innerer Wärmewiderstand thermal resistance, junction to case	pro IGBT per IGBT		R_{thJC}			0,29	K/W
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}		0,135		K/W

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Vorläufige Daten
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Diode-Brems-Chopper / Diode-brake-chopper

Höchstzulässige Werte / maximum rated values

Periodische Spitzensperrspannung repetitive peak reverse voltage	T_{vj} = 25°C		V_{RRM}	1200	V
Dauergleichstrom DC forward current			I_F	50	A
Periodischer Spitzenstrom repetitive peak forw. current	t_p = 1 ms		I_{FRM}	100	A
Grenzlastintegral I²t - value	V_R = 0 V, t_P = 10 ms, T_{vj} = 125°C		I²t	510	A²s

Charakteristische Werte / characteristic values

				min.	typ.	max.	
Durchlassspannung forward voltage	I_F = 50 A, V_{GE} = 0 V I_F = 50 A, V_{GE} = 0 V I_F = 50 A, V_{GE} = 0 V	T_{vj} = 25°C T_{vj} = 125°C T_{vj} = 150°C	V_F		1,70 1,65 1,65	2,15	V V V
Rückstromspitze peak reverse recovery current	I_F = 50 A, - di_F/dt = 3000 A/µs (T_{vj}=150°C) V_R = 600 V V_{GE} = -15 V	T_{vj} = 25°C T_{vj} = 125°C T_{vj} = 150°C	I_{RM}		54,0 60,0 63,0		A A A
Sperrverzögerungsladung recovered charge	I_F = 50 A, - di_F/dt = 3000 A/µs (T_{vj}=150°C) V_R = 600 V V_{GE} = -15 V	T_{vj} = 25°C T_{vj} = 125°C T_{vj} = 150°C	Q_r		5,50 8,80 10,0		µC µC µC
Abschaltenergie pro Puls reverse recovery energy	I_F = 50 A, - di_F/dt = 3000 A/µs (T_{vj}=150°C) V_R = 600 V V_{GE} = -15 V	T_{vj} = 25°C T_{vj} = 125°C T_{vj} = 150°C	E_{rec}		1,70 3,00 3,70		mJ mJ mJ
Innerer Wärmewiderstand thermal resistance, junction to case	pro Diode per diode		R_{thJC}			0,81	K/W
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}		0,375		K/W

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Vorläufige Daten
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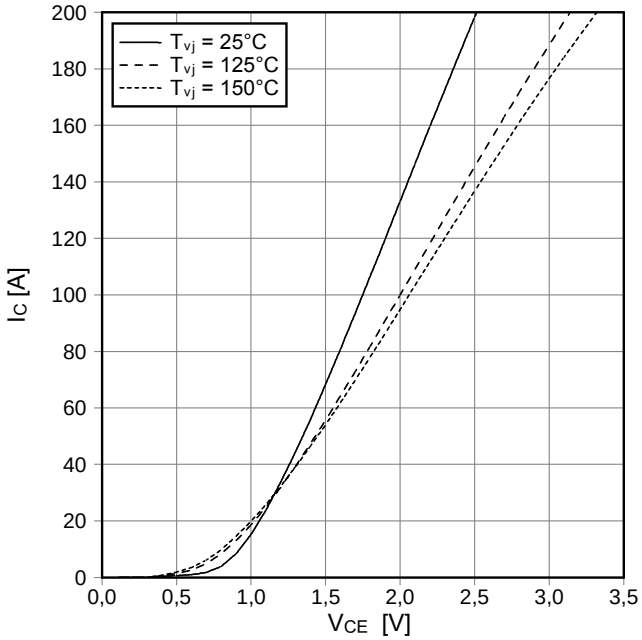
Modul / module

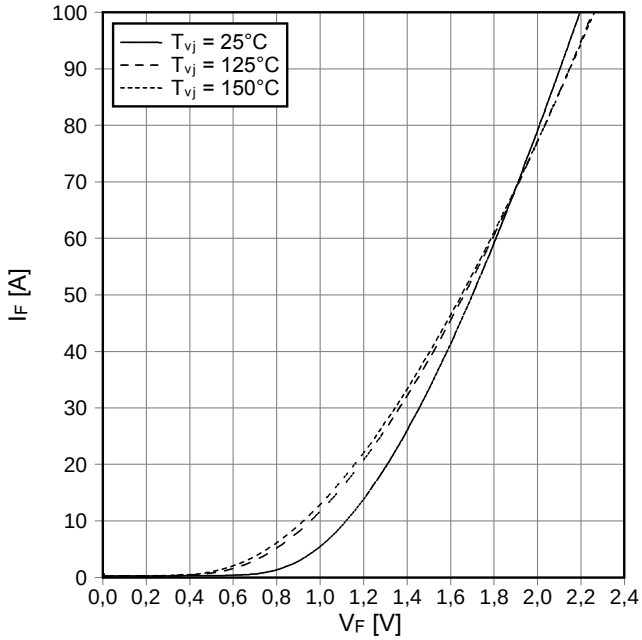
Isolations-Prüfspannung insulation test voltage	RMS, f = 50 Hz, t = 1 min.	V_{ISOL}		2,5		kV
Material Modulgrundplatte material of module baseplate				Cu		
Material für innere Isolation material for internal insulation				Al_2O_3		
Kriechstrecke creepage distance	Kontakt - Kühlkörper / terminal to heatsink Kontakt - Kontakt / terminal to terminal			10,0		mm
Luftstrecke clearance distance	Kontakt - Kühlkörper / terminal to heatsink Kontakt - Kontakt / terminal to terminal			7,5		mm
Vergleichszahl der Kriechwegbildung comparative tracking index		CTI		> 225		
			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}		0,02		K/W
Modulinduktivität stray inductance module		L_{sCE}		50		nH
Höchstzulässige Sperrschichttemperatur maximum junction temperature	Wechselrichter, Brems-Chopper / Inverter, Brake-Chopper Gleichrichter / rectifier	$T_{vj\ max}$			175 130	°C °C
Temperatur im Schaltbetrieb temperature under switching conditions	Wechselrichter, Brems-Chopper / Inverter, Brake-Chopper Gleichrichter / rectifier	$T_{vj\ op}$	-40 -40		150 130	°C °C
Lagertemperatur storage temperature		T_{stg}	-40		125	°C
Anzugsdrehmoment f. mech. Befestigung mounting torque	Schraube M5 - Montage gem. gültiger Applikation Note screw M5 - mounting according to valid application note	M	3,00	-	6,00	Nm
Gewicht weight		G		180		g

Vorläufige Daten
preliminary data

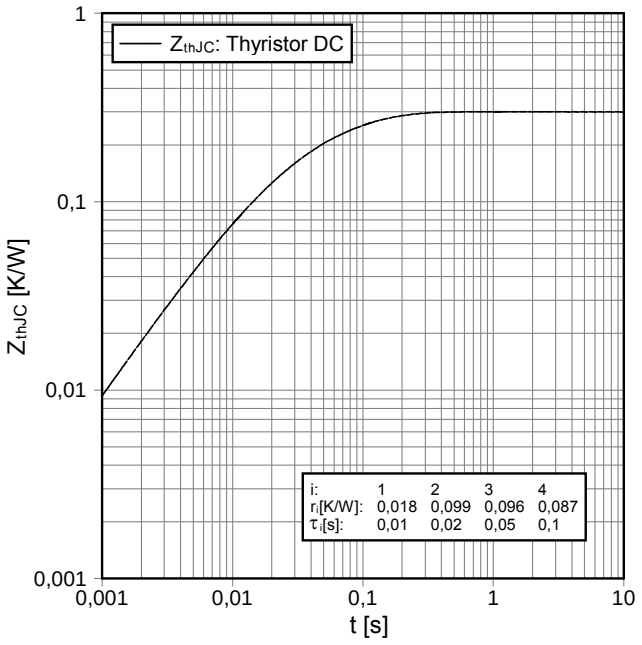
Ausgangskennlinie IGBT-Brems-Chopper (typisch)
output characteristic IGBT-brake-chopper (typical)
$I_C = f(V_{CE})$
V_{GE} = 15 V



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



Transienter Wärmewiderstand Thyristor-Gleichrichter
transient thermal impedance thyristor-rectifier
$Z_{thJC} = f(t)$



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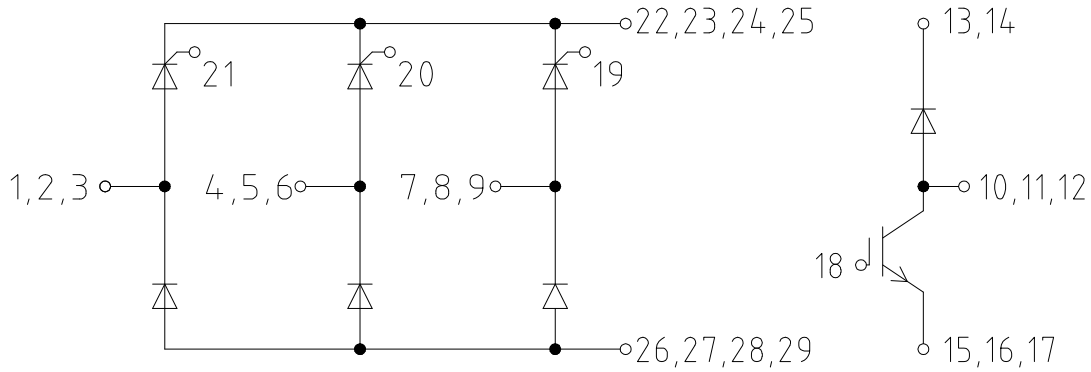
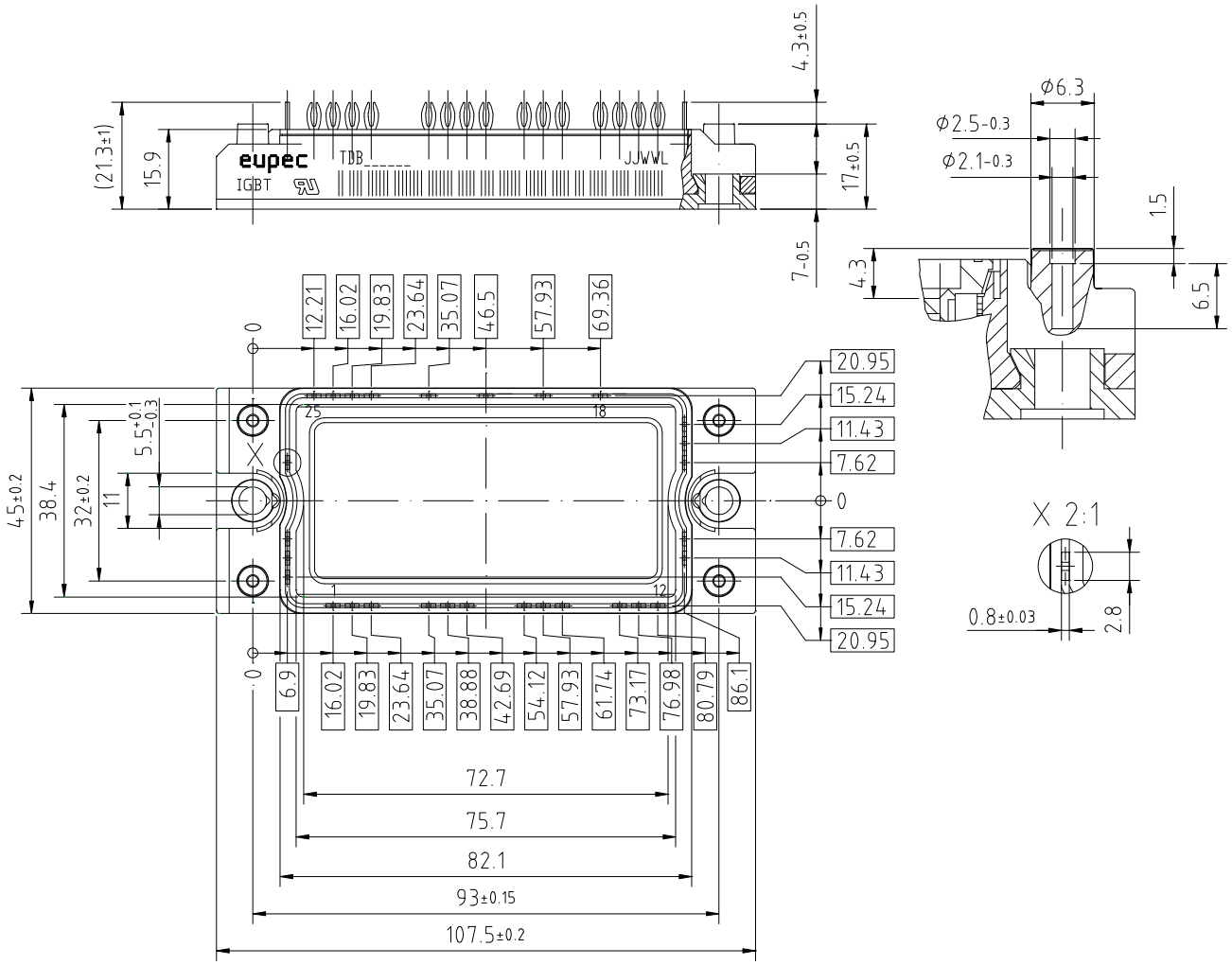
Schaltplan / circuit diagram



Gehäuseabmessungen / package outlines



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