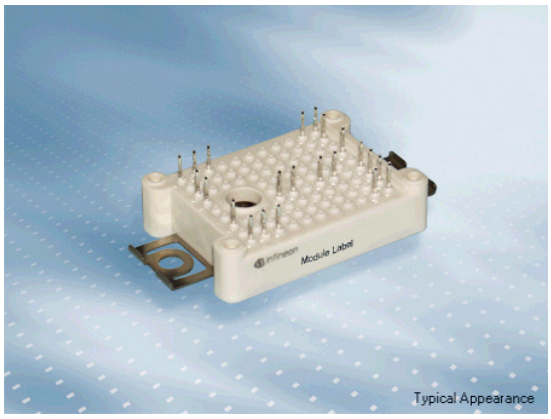
Technische Information / technical information

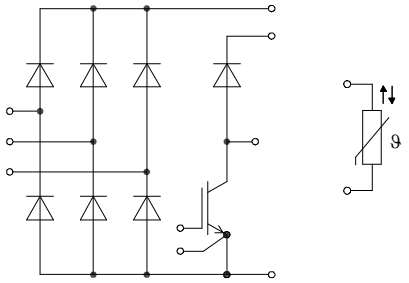
IGBT-Module
IGBT-modules

DDB6U75N16W1R_B11

EasyBRIDGE Modul mit Trench/Feldstopp IGBT4 und Emitter Controlled 4 Diode und PressFIT / NTC
EasyBRIDGE module with Trench/Fieldstop IGBT4 and Emitter Controlled 4 diode and PressFIT / NTC

Vorläufige Daten / preliminary data





V_{CES} = 1200V
$I_{C\ nom}$ = 75A / I_{CRM} = 150A

Typische Anwendungen

- Hilfsumrichter
- Klimaanlagen
- Motorantriebe

Typical Applications

- Auxiliary Inverters
- Air Conditioning
- Motor Drives

Elektrische Eigenschaften

- Sehr große Robustheit
- Trench IGBT 4

Electrical Features

- Unbeatable Robustness
- Trench IGBT 4

Mechanische Eigenschaften

- Al_2O_3 Substrat mit kleinem thermischen Widerstand
- Kompaktes Design
- PressFIT Verbindungstechnik
- Robuste Montage durch integrierte Befestigungsklammern

Mechanical Features

- Al_2O_3 Substrate with Low Thermal Resistance
- Compact design
- PressFIT Contact Technology
- Rugged mounting due to integrated mounting clamps

Module Label Code

Barcode Code 128

Sample
00000123456000000000000

DMX - Code

Content of the Code	Digit
Module Serial Number	1 - 5
Module Material Number	6 - 11
Production Order Number	12 - 19
Datecode (Production Year)	20 - 21
Datecode (Production Week)	22 - 23

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approved by: MB	revision: 2.0	

Vorläufige Daten
preliminary data

Diode-Gleichrichter / diode-rectifier

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 = 100°C	I_{FRMSM}	65	A
Gleichrichter Ausgang Grenzeffektivstrom maximum RMS current at Rectifier output	T_C = 100°C	I_{RMSM}	90	A
Stoßstrom Grenzwert surge forward current	t_p = 10 ms, T_{vj} = 25°C t_p = 10 ms, T_{vj} = 150°C	I_{FSM}	605 470	A A
Grenzlastintegral I²t - value	t_p = 10 ms, T_{vj} = 25°C t_p = 10 ms, T_{vj} = 150°C	I²t	1850 1100	A²s A²s

Charakteristische Werte / characteristic values

			min.	typ.	max.	
Durchlassspannung forward voltage	T_{vj} = 150°C, I_F = 65 A	V_F		1,10		V
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}		0,65	0,72	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}		0,80		K/W

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 = 100°C, T_{vj} = 175°C T_C = 25°C, T_{vj} = 175°C	I_{Cnom} I_C	50 69	A A
Periodischer Kollektor Spitzenstrom repetitive peak collector current	t_P = 1 ms	I_{CRM}	100	A
Gesamt-Verlustleistung total power dissipation	T_C = 25°C, T_{vj} = 175°C	P_{tot}	335	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 = 50 A, V_{GE} = 15 V I_C = 50 A, V_{GE} = 15 V I_C = 50 A, V_{GE} = 15 V	T_{vj} = 25°C T_{vj} = 125°C T_{vj} = 150°C	$V_{CE\ sat}$	1,85 2,15 2,25	2,15	V V V
Gate-Schwellenspannung gate threshold voltage	I_C = 1,60 mA, V_{CE} = V_{GE}, T_{vj} = 25°C		V_{GEth}	5,2	5,8	6,4	V
Gateladung gate charge	V_{GE} = -15 V ... +15 V		Q_G		0,38		µC
Interner Gatewiderstand internal gate resistor	T_{vj} = 25°C		R_{Gint}		4,00		Ω
Eingangskapazität input capacitance	f = 1 MHz, T_{vj} = 25°C, V_{CE} = 25 V, V_{GE} = 0 V		C_{ies}		2,80		nF
Rückwirkungskapazität reverse transfer capacitance	f = 1 MHz, T_{vj} = 25°C, V_{CE} = 25 V, V_{GE} = 0 V		C_{res}		0,10		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}			400	nA
Einschaltverzögerungszeit (ind. Last) turn-on delay time (inductive load)	I_C = 50 A, V_{CE} = 600 V V_{GE} = ±15 V R_{Gon} = 22 Ω	T_{vj} = 25°C T_{vj} = 125°C T_{vj} = 150°C	$t_{d\ on}$		0,08 0,085 0,085		µs µs µs
Anstiegszeit (induktive Last) rise time (inductive load)	I_C = 50 A, V_{CE} = 600 V V_{GE} = ±15 V R_{Gon} = 22 Ω	T_{vj} = 25°C T_{vj} = 125°C T_{vj} = 150°C	t_r		0,044 0,05 0,052		µs µs µs
Abschaltverzögerungszeit (ind. Last) turn-off delay time (inductive load)	I_C = 50 A, V_{CE} = 600 V V_{GE} = ±15 V R_{Goff} = 22 Ω	T_{vj} = 25°C T_{vj} = 125°C T_{vj} = 150°C	$t_{d\ off}$		0,37 0,44 0,46		µs µs µs
Fallzeit (induktive Last) fall time (inductive load)	I_C = 50 A, V_{CE} = 600 V V_{GE} = ±15 V R_{Goff} = 22 Ω	T_{vj} = 25°C T_{vj} = 125°C T_{vj} = 150°C	t_f		0,10 0,16 0,17		µs µs µs
Einschaltverlustenergie pro Puls turn-on energy loss per pulse	I_C = 50 A, V_{CE} = 600 V, L_S = 45 nH V_{GE} = ±15 V R_{Gon} = 22 Ω	T_{vj} = 25°C T_{vj} = 125°C T_{vj} = 150°C	E_{on}		4,70 5,80 6,00		mJ mJ mJ
Abschaltverlustenergie pro Puls turn-off energy loss per pulse	I_C = 50 A, V_{CE} = 600 V, L_S = 45 nH V_{GE} = ±15 V, du/dt = 3700 V/µs (T_{vj}=150°C) R_{Goff} = 22 Ω	T_{vj} = 25°C T_{vj} = 125°C T_{vj} = 150°C	E_{off}		3,10 4,40 4,90		mJ mJ mJ
Kurzschlussverhalten SC data	V_{GE} ≤ 15 V, V_{CC} = 800 V V_{CEmax} = V_{CES} -L_{sCE} · di/dt	t_P ≤ 10 µs, T_{vj} = 150°C	I_{SC}		180		A
Innerer Wärmewiderstand thermal resistance, junction to case	pro IGBT / per IGBT		R_{thJC}		0,40	0,45	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}		0,65		K/W

Vorläufige Daten
preliminary data

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	15		A
Periodischer Spitzenstrom repetitive peak forw. current	t_p = 1 ms	I_{FRM}	30		A
Grenzlastintegral I²t - value	V_R = 0 V, t_P = 10 ms, T_{vj} = 125°C V_R = 0 V, t_P = 10 ms, T_{vj} = 150°C	I²t	40,0 34,0		A²s A²s

Charakteristische Werte / characteristic values

				min.	typ.	max.	
Durchlassspannung forward voltage	I_F = 15 A, V_{GE} = 0 V I_F = 15 A, V_{GE} = 0 V I_F = 15 A, V_{GE} = 0 V	T_{vj} = 25°C T_{vj} = 125°C T_{vj} = 150°C	V_F		1,75 1,75 1,75	2,15	V V V
Rückstromspitze peak reverse recovery current	I_F = 15 A, - di_F/dt = 1000 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}		25,0 27,0 29,0		A A A
Sperrverzögerungsladung recovered charge	I_F = 15 A, - di_F/dt = 1000 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		1,60 2,80 3,30		µC µC µC
Abschaltenergie pro Puls reverse recovery energy	I_F = 15 A, - di_F/dt = 1000 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}		0,55 1,00 1,20		mJ mJ mJ
Innerer Wärmewiderstand thermal resistance, junction to case	pro Diode / per diode		R_{thJC}		1,50	1,65	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}		1,25		K/W

NTC-Widerstand / NTC-thermistor

Charakteristische Werte / characteristic values

			min.	typ.	max.	
Nennwiderstand rated resistance	T_C = 25°C	R_{25}		5,00		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}			20,0	mW
B-Wert B-value	$R_2 = R_{25} \exp [B_{25/50}(1/T_2 - 1/(298{,}15\ K))]$	$B_{25/50}$		3375		K
B-Wert B-value	$R_2 = R_{25} \exp [B_{25/80}(1/T_2 - 1/(298{,}15\ K))]$	$B_{25/80}$		3411		K
B-Wert B-value	$R_2 = R_{25} \exp [B_{25/100}(1/T_2 - 1/(298{,}15\ K))]$	$B_{25/100}$		3433		K

Angaben gemäß gültiger Application Note.
Specification according to the valid application note.

Vorläufige Daten
preliminary data

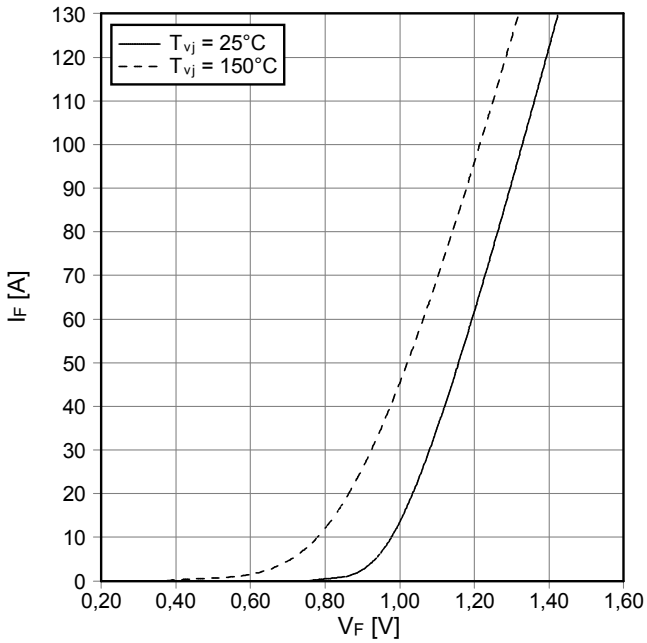
Modul / module

Isolations-Prüfspannung insulation test voltage	RMS, f = 50 Hz, t = 1 min.	V_{ISOL}		2,5		kV
Material für innere Isolation material for internal insulation				Al_2O_3		
Kriechstrecke creepage distance	Kontakt - Kühlkörper / terminal to heatsink Kontakt - Kontakt / terminal to terminal			11,5 6,3		mm
Luftstrecke clearance distance	Kontakt - Kühlkörper / terminal to heatsink Kontakt - Kontakt / terminal to terminal			10,0 5,0		mm
Vergleichszahl der Kriechwegbildung comparative tracking index		CTI		> 200		
			min.	typ.	max.	
Modulinduktivität stray inductance module		L_{sCE}		25		nH
Modulleitungswiderstand, Anschlüsse - Chip module lead resistance, terminals - chip	T_C = 25°C, pro Schalter / per switch	$R_{CC'+EE'}$ $R_{AA'+CC'}$		6,00 4,00		mΩ
Höchstzulässige Sperrschichttemperatur maximum junction temperature	Wechselrichter, Brems-Chopper / Inverter, Brake-Chopper	$T_{vj\ max}$			175	°C
Temperatur im Schaltbetrieb temperature under switching conditions	Wechselrichter, Brems-Chopper / Inverter, Brake-Chopper	$T_{vj\ op}$	-40		150	°C
Lagertemperatur storage temperature		T_{stg}	-40		125	°C
Anpresskraft für mech. Bef. pro Feder mountig force per clamp		F	40	-	80	N
Gewicht weight		G		39		g

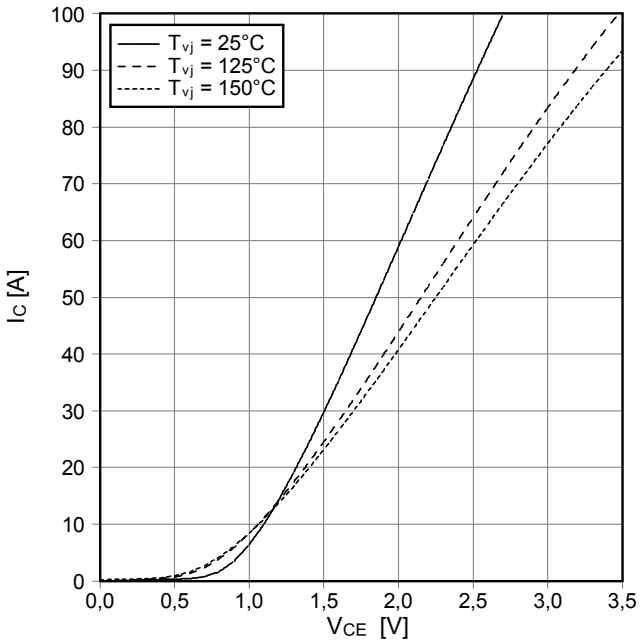
Der Strom im Dauerbetrieb ist auf 25A effektiv pro Anschlusspin begrenzt.
The current under continuous operation is limited to 25A rms per connector pin.

Vorläufige Daten
preliminary data

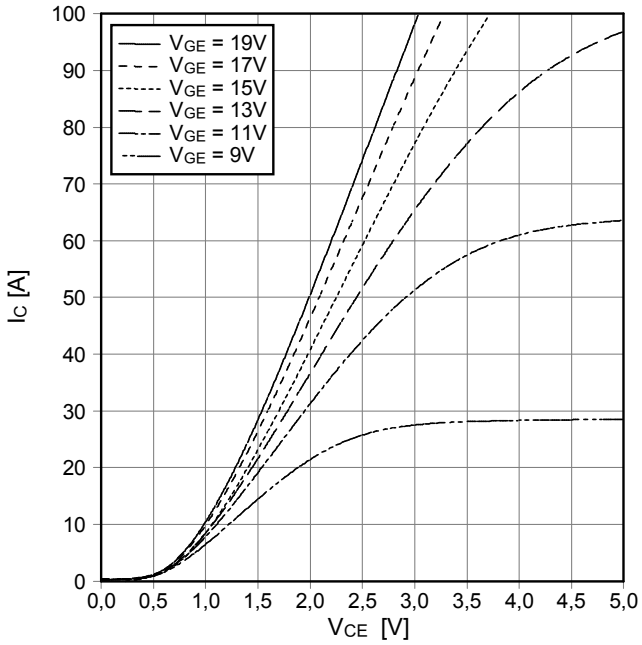
Durchlasskennlinie der Diode-Gleichrichter (typisch)
forward characteristic of diode-rectifier (typical)
$I_F = f(V_F)$



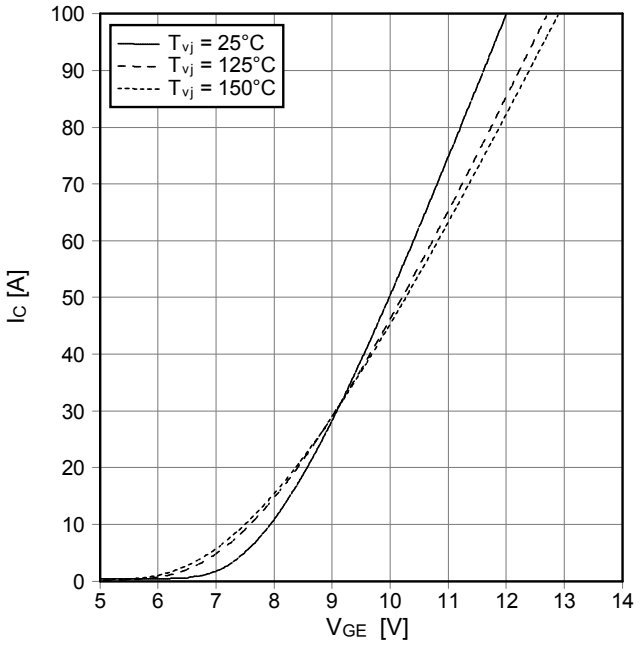
Ausgangskennlinie IGBT-Brems-Copper (typisch)
output characteristic IGBT-brake-chopper (typical)
$I_C = f(V_{CE})$
V_{GE} = 15 V



Ausgangskennlinienfeld IGBT-Brems-Chopper (typisch)
output characteristic IGBT-brake-chopper (typical)
$I_C = f(V_{CE})$
T_{vj} = 150°C



Übertragungscharakteristik IGBT-Brems-Chopper (typisch)
transfer characteristic IGBT-brake-chopper (typical)
$I_C = f(V_{GE})$
V_{CE} = 20 V



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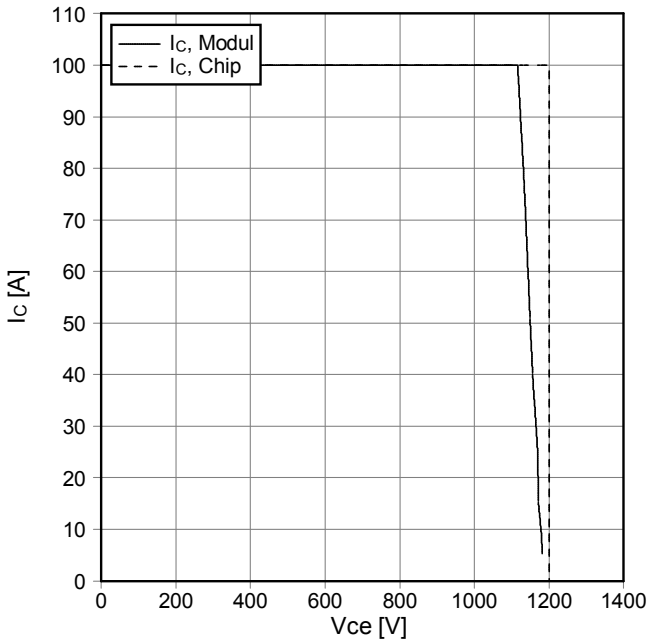
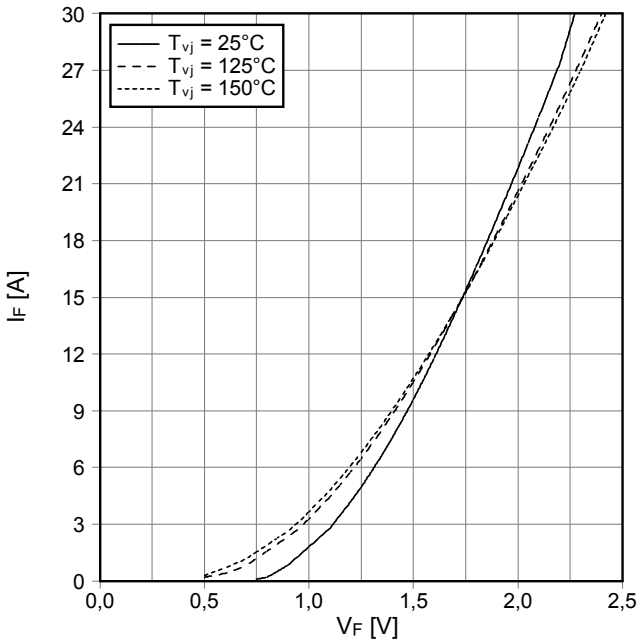
Vorläufige Daten
preliminary data

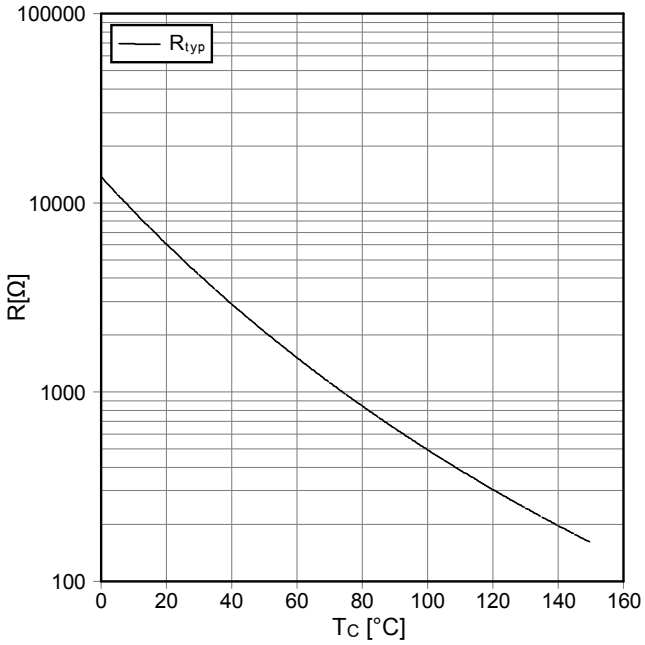
Sicherer Rückwärts-Arbeitsbereich IGBT-BC (RBSOA)
reverse bias safe operating area IGBT-BC (RBSOA)
$I_C = f(V_{CE})$
$V_{GE} = \pm 15$ V, $R_{Goff} = 22\ \Omega$, $T_{vj} = 150°C$



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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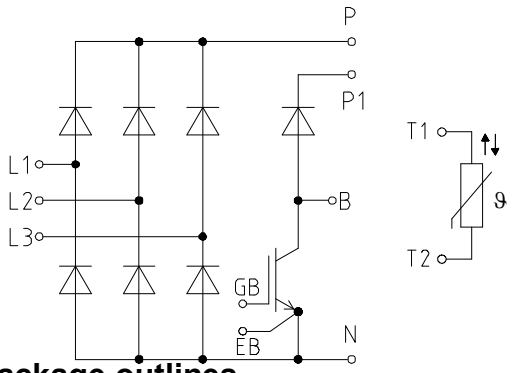
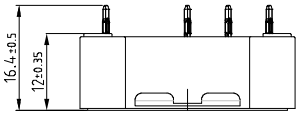
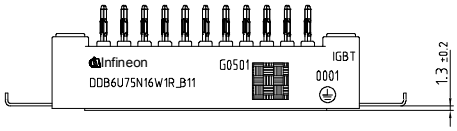
Vorläufige Daten
preliminary data

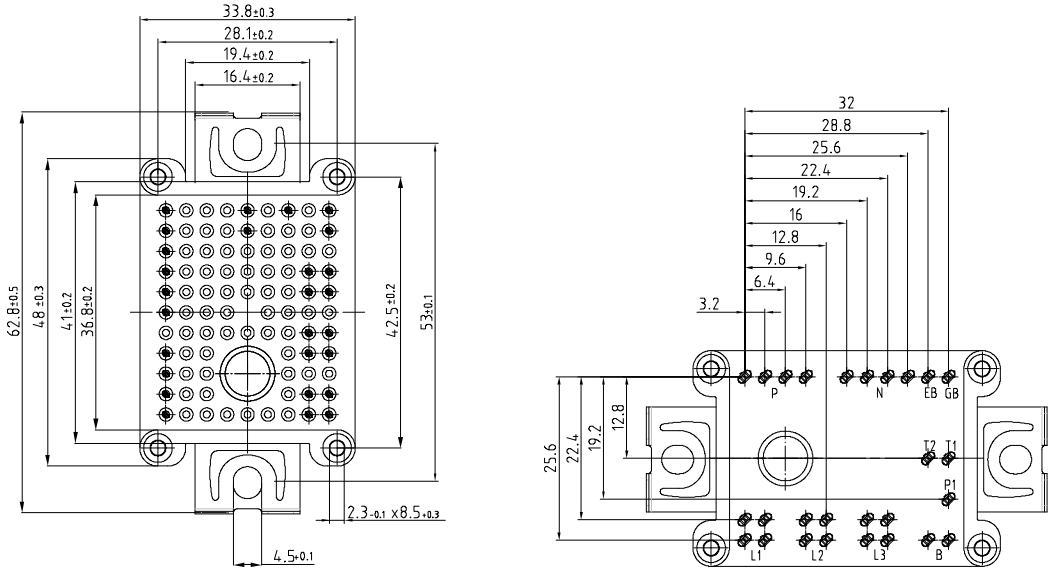
Schaltplan / circuit diagram



Gehäuseabmessungen / package outlines







Pinpositions with tolerance ⌖ ⌀0.4

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