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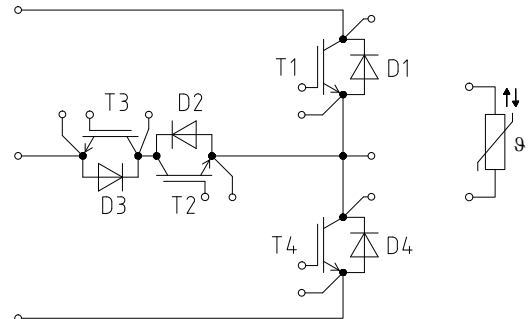
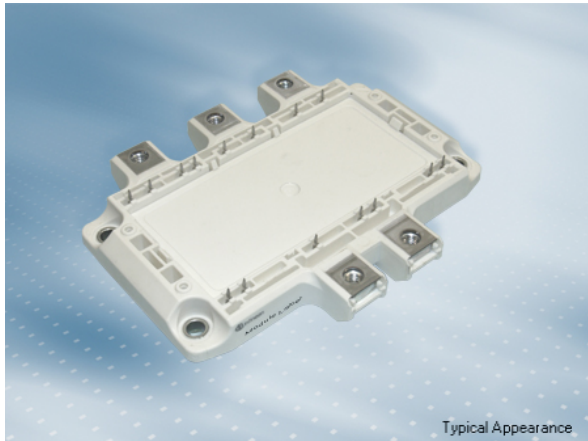
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EconoPACK™4 Modul mit aktiver "Neutral Point Clamp 2" Topologie und PressFIT / bereits aufgetragenem Thermal Interface Material

EconoPACK™4 module with active "Neutral Point Clamp 2" topology and PressFIT / pre-applied Thermal Interface Material

Vorläufige Daten / Preliminary Data



$V_{CES} = 1200V$

$I_{C\ nom} = 400A / I_{CRM} = 800A$

Typische Anwendungen

- Solar Anwendungen
- USV-Systeme

Typical Applications

- Solar applications
- UPS systems

Elektrische Eigenschaften

- Erweiterte Sperrschichttemperatur $T_{vj\ op}$
- Niedrige Schaltverluste
- Niedriges V_{CEsat}
- $T_{vj\ op} = 150^{\circ}C$
- Trench IGBT 4
- V_{CEsat} mit positivem Temperaturkoeffizienten

Electrical Features

- Extended operating temperature $T_{vj\ op}$
- Low switching losses
- Low V_{CEsat}
- $T_{vj\ op} = 150^{\circ}C$
- Trench IGBT 4
- V_{CEsat} with positive temperature coefficient

Mechanische Eigenschaften

- Isolierte Bodenplatte
- Kompaktes Design
- PressFIT Verbindungstechnik
- Standardgehäuse
- Thermisches Interface Material bereits aufgetragen

Mechanical Features

- Isolated base plate
- Compact design
- PressFIT contact technology
- Standard housing
- Pre-applied Thermal Interface Material

Module Label Code

Barcode Code 128



DMX - Code



Content of the 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

IGBT, T1 / T4 / IGBT, T1 / T4

Höchstzulässige Werte / Maximum Rated Values

Kollektor-Emitter-Sperrspannung Collector-emitter voltage	$T_{vj} = 25^{\circ}\text{C}$	V_{CES}	1200	V
Kollektor-Dauergleichstrom Continuous DC collector current	$T_H = 65^{\circ}\text{C}, T_{vj\text{ max}} = 175^{\circ}\text{C}$	$I_{C\text{ nom}}$	400	A
Periodischer Kollektor-Spitzenstrom Repetitive peak collector current	$t_P = 1\text{ ms}$	I_{CRM}	800	A
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	$I_C = 400\text{ A}, V_{GE} = 15\text{ V}$ $I_C = 400\text{ A}, V_{GE} = 15\text{ V}$ $I_C = 400\text{ A}, V_{GE} = 15\text{ V}$	$T_{vj} = 25^{\circ}\text{C}$ $T_{vj} = 125^{\circ}\text{C}$ $T_{vj} = 150^{\circ}\text{C}$	$V_{CE\text{ sat}}$	1,75 2,05 2,10	2,15	V V V
Gate-Schwellenspannung Gate threshold voltage	$I_C = 15,0\text{ mA}, V_{CE} = V_{GE}, T_{vj} = 25^{\circ}\text{C}$		V_{GEth}	5,20 5,80	6,40	V
Gateladung Gate charge	$V_{GE} = -15\text{ V} \dots +15\text{ V}$		Q_G	3,30		μC
Interner Gatewiderstand Internal gate resistor	$T_{vj} = 25^{\circ}\text{C}$		R_{Gint}	1,8		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}	25,0		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}	1,35		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}		1,0	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}		100	nA
Einschaltverzögerungszeit, induktive Last Turn-on delay time, inductive load	$I_C = 400\text{ A}, V_{CE} = 300\text{ V}$ $V_{GE} = \pm 15\text{ V}$ $R_{Gon} = 1,5\ \Omega$	$T_{vj} = 25^{\circ}\text{C}$ $T_{vj} = 125^{\circ}\text{C}$ $T_{vj} = 150^{\circ}\text{C}$	t_{don}	0,20 0,22 0,23		μs μs μs
Anstiegszeit, induktive Last Rise time, inductive load	$I_C = 400\text{ A}, V_{CE} = 300\text{ V}$ $V_{GE} = \pm 15\text{ V}$ $R_{Gon} = 1,5\ \Omega$	$T_{vj} = 25^{\circ}\text{C}$ $T_{vj} = 125^{\circ}\text{C}$ $T_{vj} = 150^{\circ}\text{C}$	t_r	0,11 0,12 0,12		μs μs μs
Abschaltverzögerungszeit, induktive Last Turn-off delay time, inductive load	$I_C = 400\text{ A}, V_{CE} = 300\text{ V}$ $V_{GE} = \pm 15\text{ V}$ $R_{Goff} = 1,5\ \Omega$	$T_{vj} = 25^{\circ}\text{C}$ $T_{vj} = 125^{\circ}\text{C}$ $T_{vj} = 150^{\circ}\text{C}$	t_{doff}	0,40 0,48 0,50		μs μs μs
Fallzeit, induktive Last Fall time, inductive load	$I_C = 400\text{ A}, V_{CE} = 300\text{ V}$ $V_{GE} = \pm 15\text{ V}$ $R_{Goff} = 1,5\ \Omega$	$T_{vj} = 25^{\circ}\text{C}$ $T_{vj} = 125^{\circ}\text{C}$ $T_{vj} = 150^{\circ}\text{C}$	t_f	0,07 0,10 0,11		μs μs μs
Einschaltverlustenergie pro Puls Turn-on energy loss per pulse	$I_C = 400\text{ A}, V_{CE} = 300\text{ V}, L_S = 35\text{ nH}$ $V_{GE} = \pm 15\text{ V}, di/dt = 2650\text{ A}/\mu\text{s} (T_{vj} = 150^{\circ}\text{C})$ $R_{Gon} = 1,5\ \Omega$	$T_{vj} = 25^{\circ}\text{C}$ $T_{vj} = 125^{\circ}\text{C}$ $T_{vj} = 150^{\circ}\text{C}$	E_{on}	8,75 13,0 13,5		mJ mJ mJ
Abschaltverlustenergie pro Puls Turn-off energy loss per pulse	$I_C = 400\text{ A}, V_{CE} = 300\text{ V}, L_S = 35\text{ nH}$ $V_{GE} = \pm 15\text{ V}, du/dt = 2300\text{ V}/\mu\text{s} (T_{vj} = 150^{\circ}\text{C})$ $R_{Goff} = 1,5\ \Omega$	$T_{vj} = 25^{\circ}\text{C}$ $T_{vj} = 125^{\circ}\text{C}$ $T_{vj} = 150^{\circ}\text{C}$	E_{off}	18,0 26,0 28,5		mJ mJ mJ
Kurzschlußverhalten SC data	$V_{GE} \leq 15\text{ V}, V_{CC} = 800\text{ V}$ $V_{CEmax} = V_{CES} - L_{SCE} \cdot di/dt$	$t_P \leq 10\ \mu\text{s}, T_{vj} = 25^{\circ}\text{C}$ $t_P \leq 10\ \mu\text{s}, T_{vj} = 150^{\circ}\text{C}$	I_{SC}	2200 1900		A A
Wärmewiderstand, Chip bis Kühlkörper Thermal resistance, junction to heatsink	pro IGBT / per IGBT valid with IFX pre-applied thermal interface material		R_{thJH}		0,105	K/W
Temperatur im Schaltbetrieb Temperature under switching conditions			$T_{vj\text{ op}}$	-40	150	$^{\circ}\text{C}$

Vorläufige Daten Preliminary Data

Diode, D2 / D3 / Diode, D2 / D3

Höchstzulässige Werte / Maximum Rated Values

Periodische Spitzensperrspannung Repetitive peak reverse voltage	$T_{vj} = 25^{\circ}\text{C}$	V_{RRM}	650	V
Dauergleichstrom Continuous DC forward current		I_F	400	A
Periodischer Spitzenstrom Repetitive peak forward current	$t_P = 1\text{ ms}$	I_{FRM}	800	A
Grenzlastintegral I^2t - value	$V_R = 0\text{ V}, t_P = 10\text{ ms}, T_{vj} = 125^{\circ}\text{C}$ $V_R = 0\text{ V}, t_P = 10\text{ ms}, T_{vj} = 150^{\circ}\text{C}$	I^2t	6700 6150	A^2s A^2s

Charakteristische Werte / Characteristic Values

		min.	typ.	max.	
Durchlassspannung Forward voltage	$I_F = 400\text{ A}, V_{GE} = 0\text{ V}$ $T_{vj} = 25^{\circ}\text{C}$		1,55	1,95	V
	$I_F = 400\text{ A}, V_{GE} = 0\text{ V}$ $T_{vj} = 125^{\circ}\text{C}$		1,50		V
	$I_F = 400\text{ A}, V_{GE} = 0\text{ V}$ $T_{vj} = 150^{\circ}\text{C}$		1,45		V
Rückstromspitze Peak reverse recovery current	$I_F = 400\text{ A}, -di_F/dt = 2650\text{ A}/\mu\text{s} (T_{vj}=150^{\circ}\text{C})$ $T_{vj} = 25^{\circ}\text{C}$		145		A
	$V_R = 300\text{ V}$ $T_{vj} = 125^{\circ}\text{C}$		205		A
	$V_{GE} = -15\text{ V}$ $T_{vj} = 150^{\circ}\text{C}$		215		A
Sperrverzögerungsladung Recovered charge	$I_F = 400\text{ A}, -di_F/dt = 2650\text{ A}/\mu\text{s} (T_{vj}=150^{\circ}\text{C})$ $T_{vj} = 25^{\circ}\text{C}$		13,5		μC
	$V_R = 300\text{ V}$ $T_{vj} = 125^{\circ}\text{C}$		26,0		μC
	$V_{GE} = -15\text{ V}$ $T_{vj} = 150^{\circ}\text{C}$		28,5		μC
Abschaltenergie pro Puls Reverse recovery energy	$I_F = 400\text{ A}, -di_F/dt = 2650\text{ A}/\mu\text{s} (T_{vj}=150^{\circ}\text{C})$ $T_{vj} = 25^{\circ}\text{C}$		3,40		mJ
	$V_R = 300\text{ V}$ $T_{vj} = 125^{\circ}\text{C}$		6,35		mJ
	$V_{GE} = -15\text{ V}$ $T_{vj} = 150^{\circ}\text{C}$		7,15		mJ
Wärmewiderstand, Chip bis Kühlkörper Thermal resistance, junction to heatsink	pro Diode / per diode valid with IFX pre-applied thermal interface material	R_{thJH}		0,308	K/W
Temperatur im Schaltbetrieb Temperature under switching conditions		$T_{vj\text{ op}}$	-40	150	$^{\circ}\text{C}$

IGBT, T2 / T3 / IGBT, T2 / T3

Höchstzulässige Werte / Maximum Rated Values

Kollektor-Emitter-Sperrspannung Collector-emitter voltage	$T_{vj} = 25^{\circ}\text{C}$	V_{CES}	650	V
Kollektor-Dauergleichstrom Continuous DC collector current	$T_H = 25^{\circ}\text{C}, T_{vj\text{ max}} = 175^{\circ}\text{C}$	$I_{C\text{ nom}}$	280	A
Periodischer Kollektor-Spitzenstrom Repetitive peak collector current	$t_P = 1\text{ ms}$	I_{CRM}	560	A
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	$I_C = 280\text{ A}, V_{GE} = 15\text{ V}$ $I_C = 280\text{ A}, V_{GE} = 15\text{ V}$ $I_C = 280\text{ A}, V_{GE} = 15\text{ V}$	$T_{vj} = 25^{\circ}\text{C}$ $T_{vj} = 125^{\circ}\text{C}$ $T_{vj} = 150^{\circ}\text{C}$	$V_{CE\text{ sat}}$	1,50 1,65 1,70	1,75	V V V
Gate-Schwellenspannung Gate threshold voltage	$I_C = 4,80\text{ mA}, V_{CE} = V_{GE}, T_{vj} = 25^{\circ}\text{C}$		V_{GEth}	4,90 5,80	6,50	V
Gateladung Gate charge	$V_{GE} = -15\text{ V} \dots +15\text{ V}$		Q_G	3,20		μC
Interner Gatewiderstand Internal gate resistor	$T_{vj} = 25^{\circ}\text{C}$		R_{Gint}	1,0		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}	18,5		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}	0,57		nF
Kollektor-Emitter-Reststrom Collector-emitter cut-off current	$V_{CE} = 650\text{ V}, V_{GE} = 0\text{ V}, T_{vj} = 25^{\circ}\text{C}$		I_{CES}		1,0	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}		100	nA
Einschaltverzögerungszeit, induktive Last Turn-on delay time, inductive load	$I_C = 280\text{ A}, V_{CE} = 300\text{ V}$ $V_{GE} = \pm 15\text{ V}$ $R_{Gon} = 1,5\ \Omega$	$T_{vj} = 25^{\circ}\text{C}$ $T_{vj} = 125^{\circ}\text{C}$ $T_{vj} = 150^{\circ}\text{C}$	t_{don}	0,08 0,08 0,09		μs μs μs
Anstiegszeit, induktive Last Rise time, inductive load	$I_C = 280\text{ A}, V_{CE} = 300\text{ V}$ $V_{GE} = \pm 15\text{ V}$ $R_{Gon} = 1,5\ \Omega$	$T_{vj} = 25^{\circ}\text{C}$ $T_{vj} = 125^{\circ}\text{C}$ $T_{vj} = 150^{\circ}\text{C}$	t_r	0,07 0,075 0,075		μs μs μs
Abschaltverzögerungszeit, induktive Last Turn-off delay time, inductive load	$I_C = 280\text{ A}, V_{CE} = 300\text{ V}$ $V_{GE} = \pm 15\text{ V}$ $R_{Goff} = 1,5\ \Omega$	$T_{vj} = 25^{\circ}\text{C}$ $T_{vj} = 125^{\circ}\text{C}$ $T_{vj} = 150^{\circ}\text{C}$	t_{doff}	0,064 0,14 0,145		μs μs μs
Fallzeit, induktive Last Fall time, inductive load	$I_C = 280\text{ A}, V_{CE} = 300\text{ V}$ $V_{GE} = \pm 15\text{ V}$ $R_{Goff} = 1,5\ \Omega$	$T_{vj} = 25^{\circ}\text{C}$ $T_{vj} = 125^{\circ}\text{C}$ $T_{vj} = 150^{\circ}\text{C}$	t_f	0,085 0,115 0,12		μs μs μs
Einschaltverlustenergie pro Puls Turn-on energy loss per pulse	$I_C = 280\text{ A}, V_{CE} = 300\text{ V}, L_S = 35\text{ nH}$ $V_{GE} = \pm 15\text{ V}, di/dt = 3300\text{ A}/\mu\text{s} (T_{vj} = 150^{\circ}\text{C})$ $R_{Gon} = 1,5\ \Omega$	$T_{vj} = 25^{\circ}\text{C}$ $T_{vj} = 125^{\circ}\text{C}$ $T_{vj} = 150^{\circ}\text{C}$	E_{on}	3,40 4,90 5,85		mJ mJ mJ
Abschaltverlustenergie pro Puls Turn-off energy loss per pulse	$I_C = 280\text{ A}, V_{CE} = 300\text{ V}, L_S = 35\text{ nH}$ $V_{GE} = \pm 15\text{ V}, du/dt = 4000\text{ V}/\mu\text{s} (T_{vj} = 150^{\circ}\text{C})$ $R_{Goff} = 1,5\ \Omega$	$T_{vj} = 25^{\circ}\text{C}$ $T_{vj} = 125^{\circ}\text{C}$ $T_{vj} = 150^{\circ}\text{C}$	E_{off}	13,5 16,5 17,5		mJ mJ mJ
Kurzschlußverhalten SC data	$V_{GE} \leq 15\text{ V}, V_{CC} = 360\text{ V}$ $V_{CEmax} = V_{CES} - L_{SCE} \cdot di/dt$	$t_P \leq 10\ \mu\text{s}, T_{vj} = 25^{\circ}\text{C}$ $t_P \leq 10\ \mu\text{s}, T_{vj} = 150^{\circ}\text{C}$	I_{SC}	1800 1400		A A
Wärmewiderstand, Chip bis Kühlkörper Thermal resistance, junction to heatsink	pro IGBT / per IGBT valid with IFX pre-applied thermal interface material		R_{thJH}		0,250	K/W
Temperatur im Schaltbetrieb Temperature under switching conditions			$T_{vj\text{ op}}$	-40	150	$^{\circ}\text{C}$

Vorläufige Daten Preliminary Data

Diode, D1 / D4 / Diode, D1 / D4

Höchstzulässige Werte / Maximum Rated Values

Periodische Spitzensperrspannung Repetitive peak reverse voltage	$T_{vj} = 25^{\circ}\text{C}$	V_{RRM}	1200	V
Dauergleichstrom Continuous DC forward current		I_F	400	A
Periodischer Spitzenstrom Repetitive peak forward current	$t_P = 1\text{ ms}$	I_{FRM}	800	A
Grenzlastintegral I^2t - value	$V_R = 0\text{ V}, t_P = 10\text{ ms}, T_{vj} = 125^{\circ}\text{C}$ $V_R = 0\text{ V}, t_P = 10\text{ ms}, T_{vj} = 150^{\circ}\text{C}$	I^2t	15500 11500	A^2s A^2s

Charakteristische Werte / Characteristic Values

		min.	typ.	max.	
Durchlassspannung Forward voltage	$I_F = 400\text{ A}, V_{GE} = 0\text{ V}$ $T_{vj} = 25^{\circ}\text{C}$		1,80	2,30	V
	$I_F = 400\text{ A}, V_{GE} = 0\text{ V}$ $T_{vj} = 125^{\circ}\text{C}$		1,85		V
	$I_F = 400\text{ A}, V_{GE} = 0\text{ V}$ $T_{vj} = 150^{\circ}\text{C}$		1,90		V
Rückstromspitze Peak reverse recovery current	$I_F = 400\text{ A}, -di_F/dt = 3300\text{ A}/\mu\text{s} (T_{vj}=150^{\circ}\text{C})$ $T_{vj} = 25^{\circ}\text{C}$		255		A
	$V_R = 300\text{ V}$ $T_{vj} = 125^{\circ}\text{C}$		310		A
	$T_{vj} = 150^{\circ}\text{C}$		325		A
Sperrverzögerungsladung Recovered charge	$I_F = 400\text{ A}, -di_F/dt = 3300\text{ A}/\mu\text{s} (T_{vj}=150^{\circ}\text{C})$ $T_{vj} = 25^{\circ}\text{C}$		29,0		μC
	$V_R = 300\text{ V}$ $T_{vj} = 125^{\circ}\text{C}$		56,0		μC
	$T_{vj} = 150^{\circ}\text{C}$		65,0		μC
Abschaltenergie pro Puls Reverse recovery energy	$I_F = 400\text{ A}, -di_F/dt = 3300\text{ A}/\mu\text{s} (T_{vj}=150^{\circ}\text{C})$ $T_{vj} = 25^{\circ}\text{C}$		8,70		mJ
	$V_R = 300\text{ V}$ $T_{vj} = 125^{\circ}\text{C}$		16,5		mJ
	$T_{vj} = 150^{\circ}\text{C}$		19,0		mJ
Wärmewiderstand, Chip bis Kühlkörper Thermal resistance, junction to heatsink	pro Diode / per diode valid with IFX pre-applied thermal interface material	R_{thJH}		0,243	K/W
Temperatur im Schaltbetrieb Temperature under switching conditions		$T_{vj\text{ op}}$	-40	150	$^{\circ}\text{C}$

NTC-Widerstand / NTC-Thermistor

Charakteristische Werte / Characteristic Values

		min.	typ.	max.	
Nennwiderstand Rated resistance	$T_{NTC} = 25^{\circ}\text{C}$	R_{25}	5,00		$\text{k}\Omega$
Abweichung von R100 Deviation of R100	$T_{NTC} = 100^{\circ}\text{C}, R_{100} = 493\ \Omega$	$\Delta R/R$	-5	5	%
Verlustleistung Power dissipation	$T_{NTC} = 25^{\circ}\text{C}$	P_{25}		20,0	mW
B-Wert B-value	$R_2 = R_{25} \exp [B_{25/50}(1/T_2 - 1/(298,15\text{ K}))]$	$B_{25/50}$	3375		K
B-Wert B-value	$R_2 = R_{25} \exp [B_{25/80}(1/T_2 - 1/(298,15\text{ K}))]$	$B_{25/80}$	3411		K
B-Wert B-value	$R_2 = R_{25} \exp [B_{25/100}(1/T_2 - 1/(298,15\text{ K}))]$	$B_{25/100}$	3433		K

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

Vorläufige Daten Preliminary Data

Modul / Module

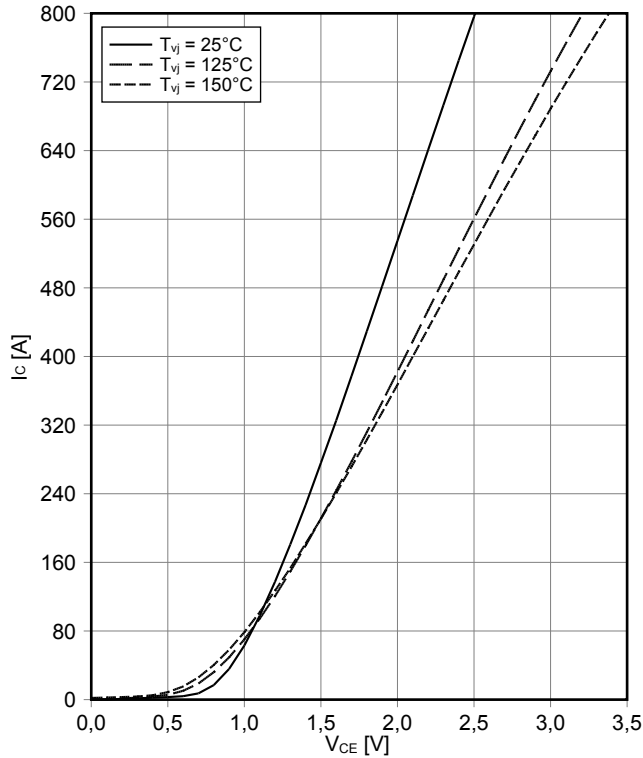
Isolations-Prüfspannung Isolation test voltage	RMS, f = 50 Hz, t = 1 min.	V _{ISOL}	2,5		kV
Material Modulgrundplatte Material of module baseplate			Cu		
Innere Isolation Internal isolation	Basisisolierung (Schutzklasse 1, EN61140) basic insulation (class 1, IEC 61140)		Al ₂ O ₃		
Kriechstrecke Creepage distance	Kontakt - Kühlkörper / terminal to heatsink Kontakt - Kontakt / terminal to terminal		25,0 12,5		mm
Luftstrecke Clearance	Kontakt - Kühlkörper / terminal to heatsink Kontakt - Kontakt / terminal to terminal		11,0 7,0		mm
Vergleichszahl der Kriechwegbildung Comperative tracking index		CTI	> 200		
			min.	typ.	max.
Modulstreuinduktivität Stray inductance module		L _{sCE}		38	nH
Modulleitungswiderstand, Anschlüsse - Chip Module lead resistance, terminals - chip	T _H = 25°C, pro Schalter / per switch	R _{CC'+EE'}		0,75	mΩ
Lagertemperatur Storage temperature		T _{stg}	-40		125 °C
Höchstzulässige Bodenplattenbetriebstemperatur Maximum baseplate operation temperature		T _{BPmax}			125 °C
Anzugsdrehmoment f. Modulmontage Mounting torque for modul mounting	Schraube M5 - Montage gem. gültiger Applikationsschrift Screw M5 - Mounting according to valid application note	M	3,00		6,00 Nm
Anzugsdrehmoment f. elektr. Anschlüsse Terminal connection torque	Schraube M6 - Montage gem. gültiger Applikationsschrift Screw M6 - Mounting according to valid application note	M	3,0	-	6,0 Nm
Gewicht Weight		G		400	g

Lagerung und Transport von Modulen mit TIM => siehe AN2012-07
Storage and shipment of modules with TIM => see AN2012-07

Vorläufige Daten Preliminary Data

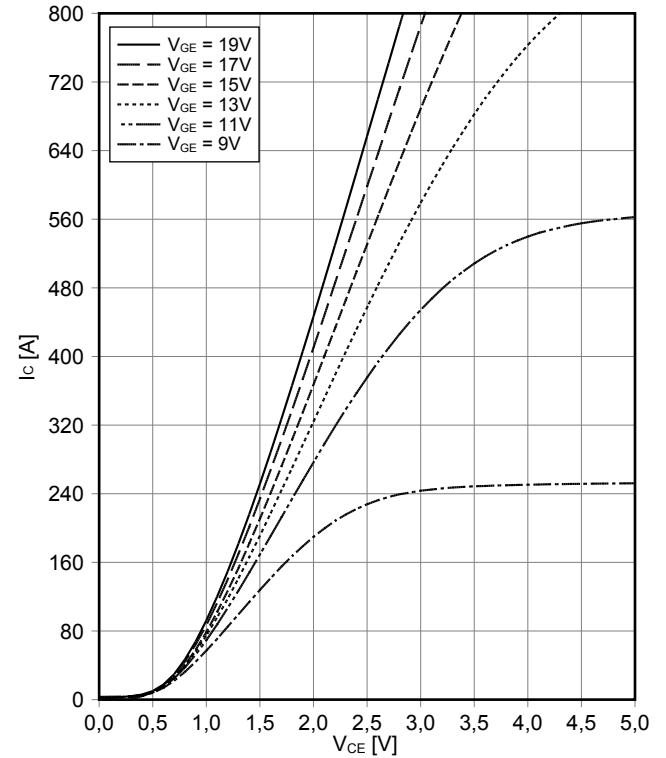
Ausgangskennlinie IGBT, T1 / T4 (typisch)
output characteristic IGBT, T1 / T4 (typical)

$I_C = f(V_{CE})$
 $V_{GE} = 15\text{ V}$



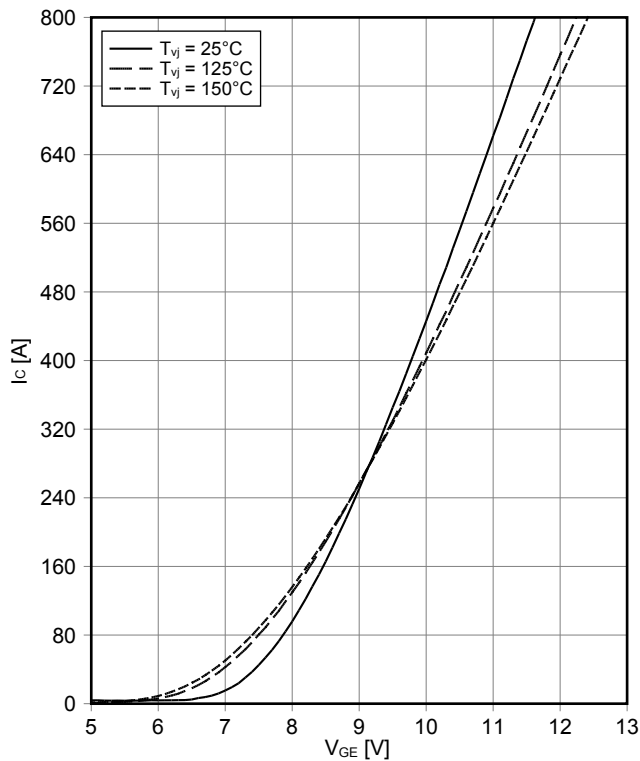
Ausgangskennlinienfeld IGBT, T1 / T4 (typisch)
output characteristic IGBT, T1 / T4 (typical)

$I_C = f(V_{CE})$
 $T_{vj} = 150^\circ\text{C}$



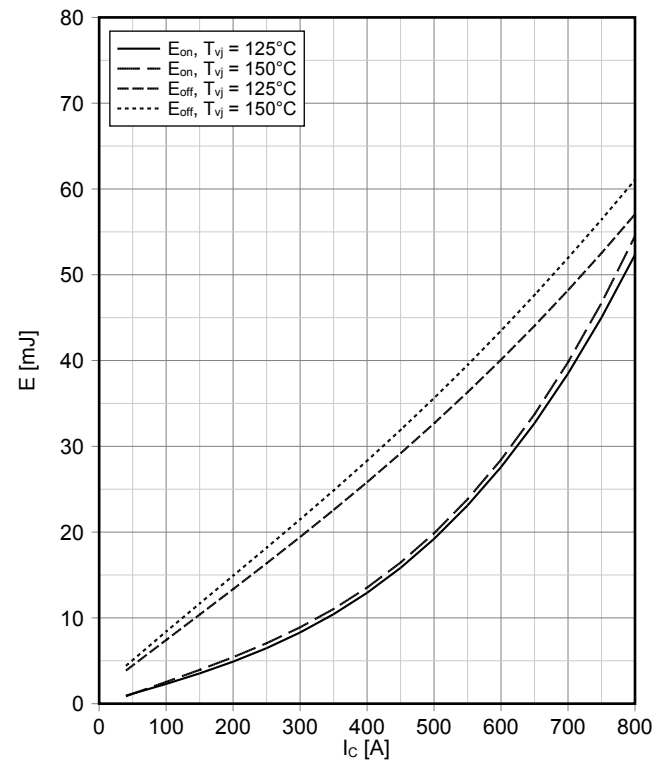
Übertragungscharakteristik IGBT, T1 / T4 (typisch)
transfer characteristic IGBT, T1 / T4 (typical)

$I_C = f(V_{GE})$
 $V_{CE} = 20\text{ V}$



Schaltverluste IGBT, T1 / T4 (typisch)
switching losses IGBT, T1 / T4 (typical)

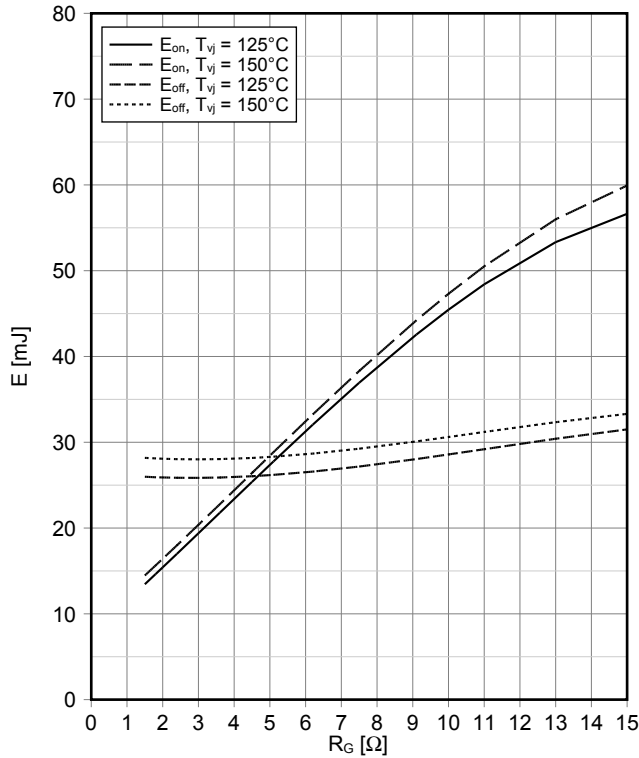
$E_{on} = f(I_C)$, $E_{off} = f(I_C)$
 $V_{GE} = \pm 15\text{ V}$, $R_{Gon} = 1.5\ \Omega$, $R_{Goff} = 1.5\ \Omega$, $V_{CE} = 300\text{ V}$



Vorläufige Daten Preliminary Data

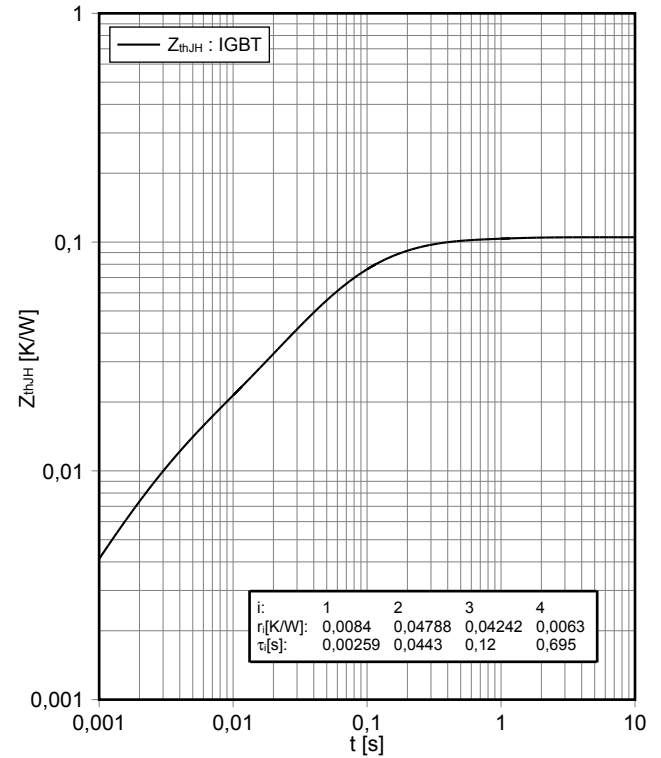
Schaltverluste IGBT, T1 / T4 (typisch) switching losses IGBT, T1 / T4 (typical)

$E_{on} = f(R_G), E_{off} = f(R_G)$
 $V_{GE} = \pm 15 \text{ V}, I_C = 400 \text{ A}, V_{CE} = 300 \text{ V}$



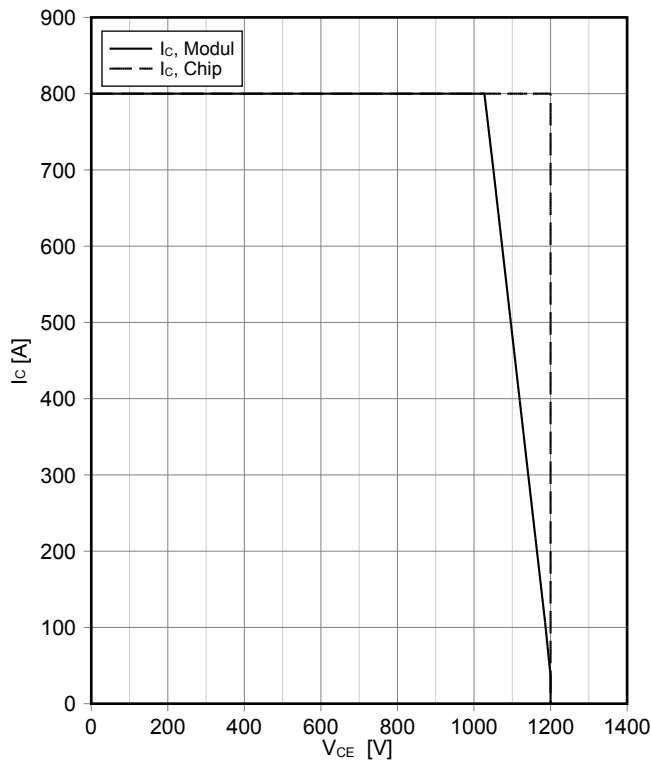
Transienter Wärmewiderstand IGBT, T1 / T4 transient thermal impedance IGBT, T1 / T4

$Z_{thJH} = f(t)$



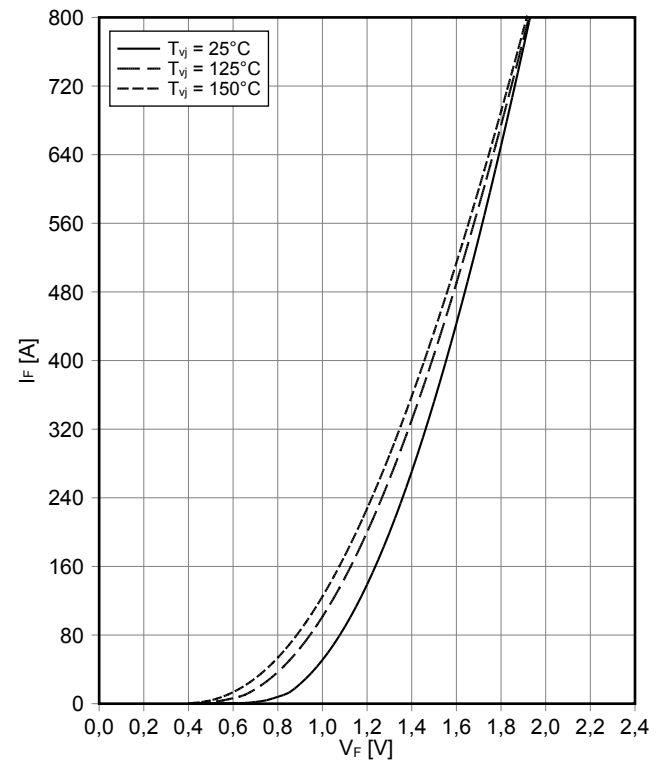
Sicherer Rückwärts-Arbeitsbereich IGBT, T1 / T4 (RBSOA) reverse bias safe operating area IGBT, T1 / T4 (RBSOA)

$I_C = f(V_{CE})$
 $V_{GE} = \pm 15 \text{ V}, R_{Goff} = 1.5 \Omega, T_{vj} = 150^\circ\text{C}$



Durchlasskennlinie der Diode, D2 / D3 (typisch) forward characteristic of Diode, D2 / D3 (typical)

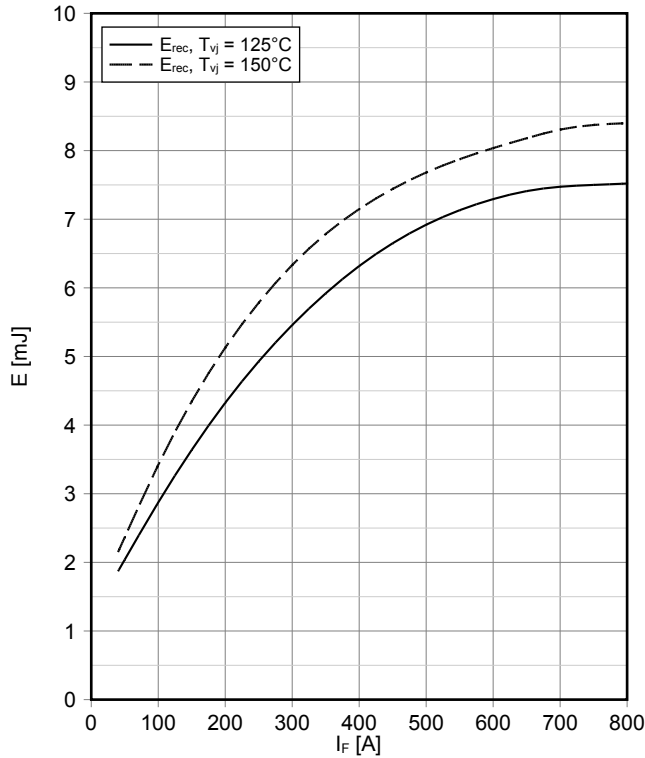
$I_F = f(V_F)$



Vorläufige Daten Preliminary Data

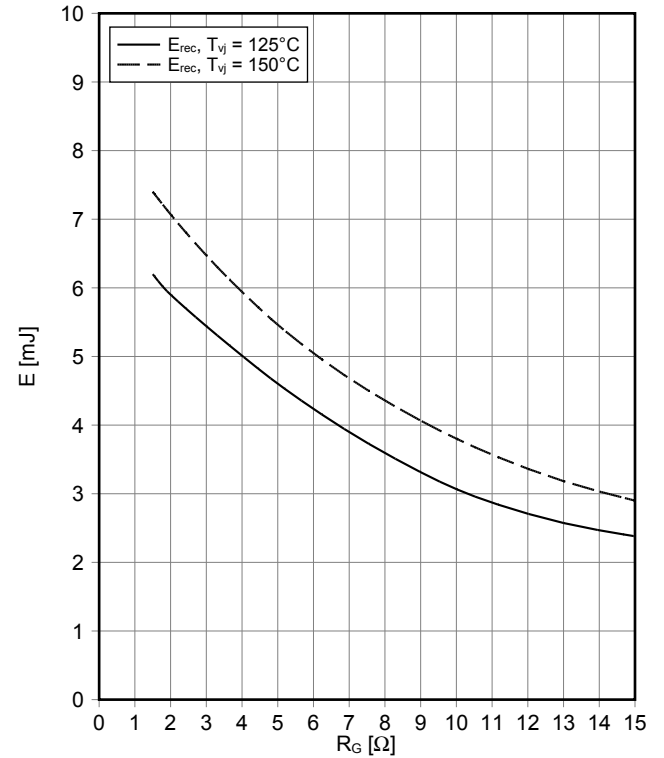
Schaltverluste Diode, D2 / D3 (typisch) switching losses Diode, D2 / D3 (typical)

$E_{rec} = f(I_F)$
 $R_{Gon} = 1.5 \Omega, V_{CE} = 300 V$



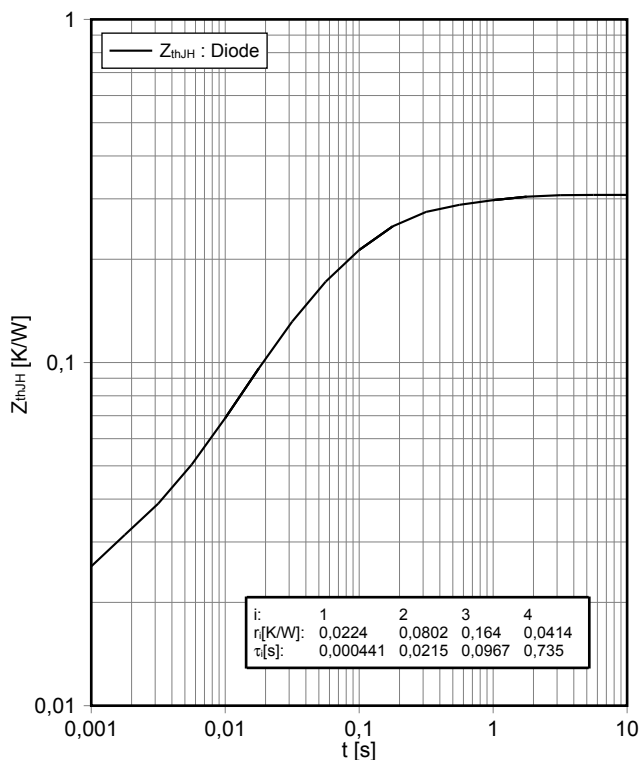
Schaltverluste Diode, D2 / D3 (typisch) switching losses Diode, D2 / D3 (typical)

$E_{rec} = f(R_G)$
 $I_F = 400 A, V_{CE} = 300 V$



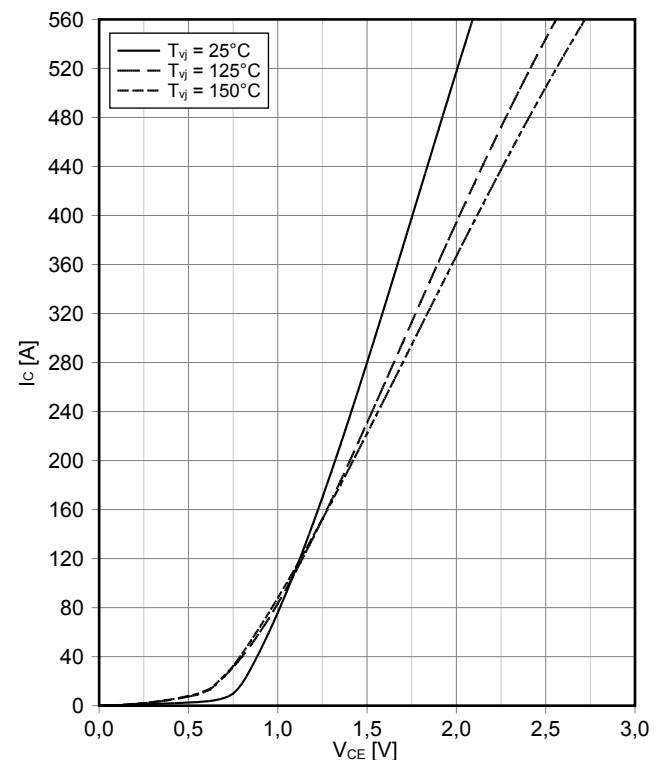
Transienter Wärmewiderstand Diode, D2 / D3 transient thermal impedance Diode, D2 / D3

$Z_{thJH} = f(t)$



Ausgangskennlinie IGBT, T2 / T3 (typisch) output characteristic IGBT, T2 / T3 (typical)

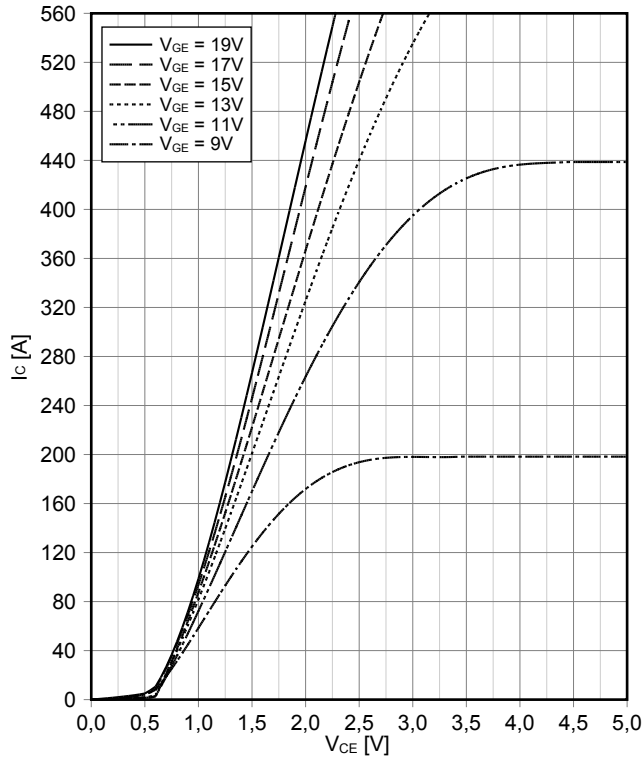
$I_C = f(V_{CE})$
 $V_{GE} = 15 V$



Vorläufige Daten Preliminary Data

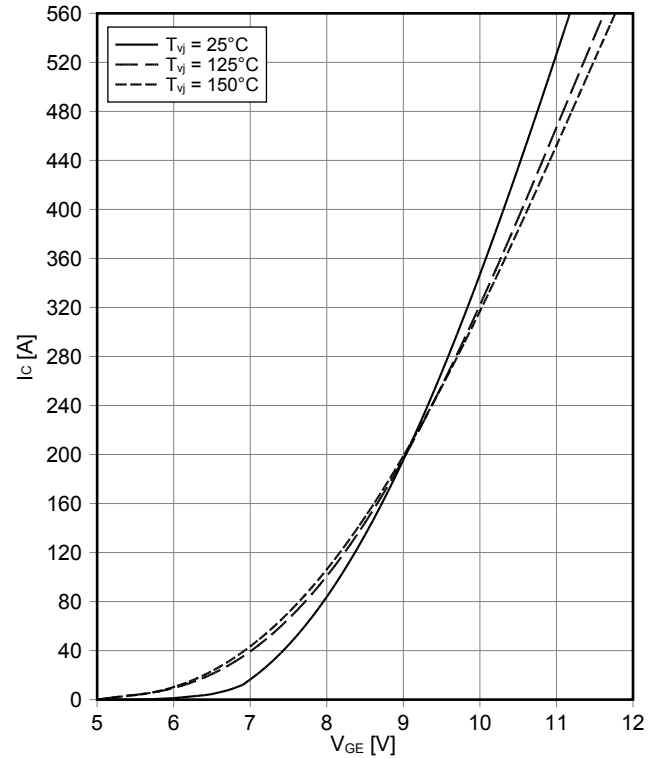
Ausgangskennlinienfeld IGBT, T2 / T3 (typisch) output characteristic IGBT, T2 / T3 (typical)

$I_C = f(V_{CE})$
 $T_{vj} = 150^\circ\text{C}$



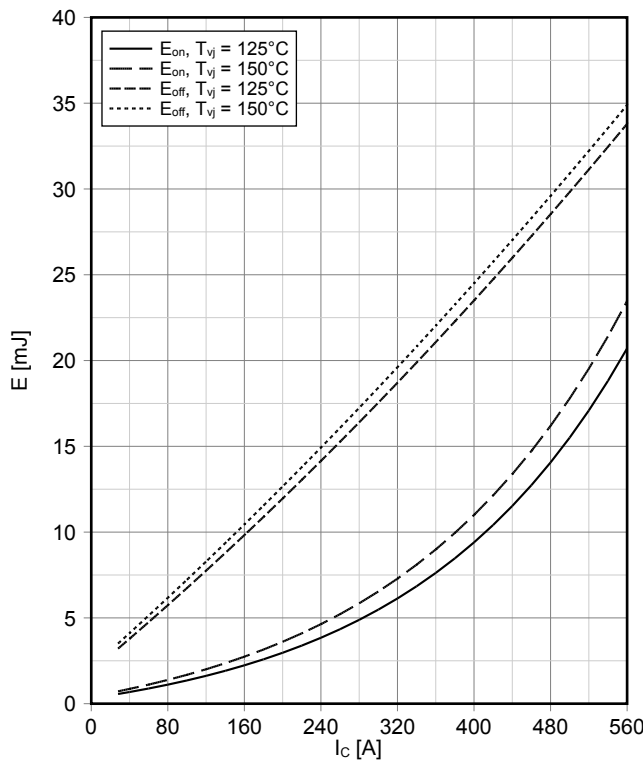
Übertragungscharakteristik IGBT, T2 / T3 (typisch) transfer characteristic IGBT, T2 / T3 (typical)

$I_C = f(V_{GE})$
 $V_{CE} = 20\text{ V}$



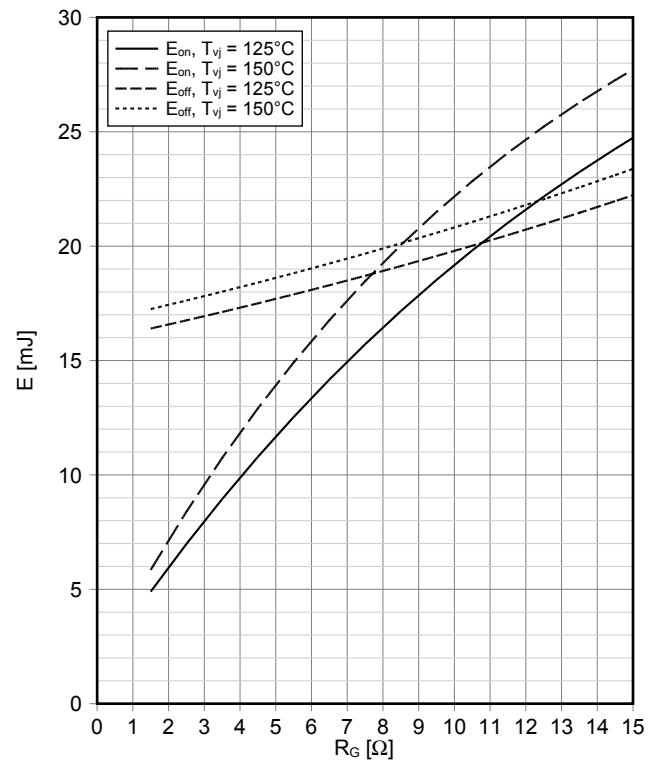
Schaltverluste IGBT, T2 / T3 (typisch) switching losses IGBT, T2 / T3 (typical)

$E_{on} = f(I_C), E_{off} = f(I_C)$
 $V_{GE} = \pm 15\text{ V}, R_{Gon} = 1.5\ \Omega, R_{Goff} = 1.5\ \Omega, V_{CE} = 300\text{ V}$



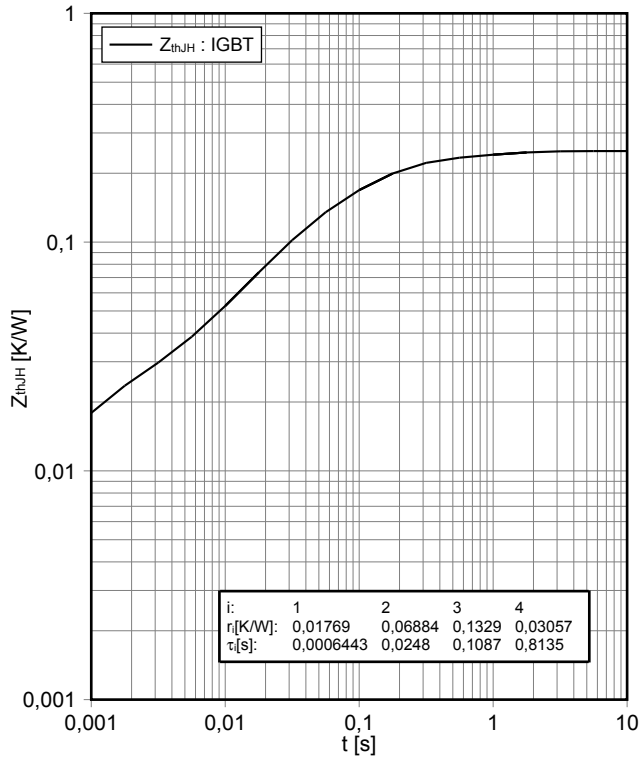
Schaltverluste IGBT, T2 / T3 (typisch) switching losses IGBT, T2 / T3 (typical)

$E_{on} = f(R_G), E_{off} = f(R_G)$
 $V_{GE} = \pm 15\text{ V}, I_C = 280\text{ A}, V_{CE} = 300\text{ V}$



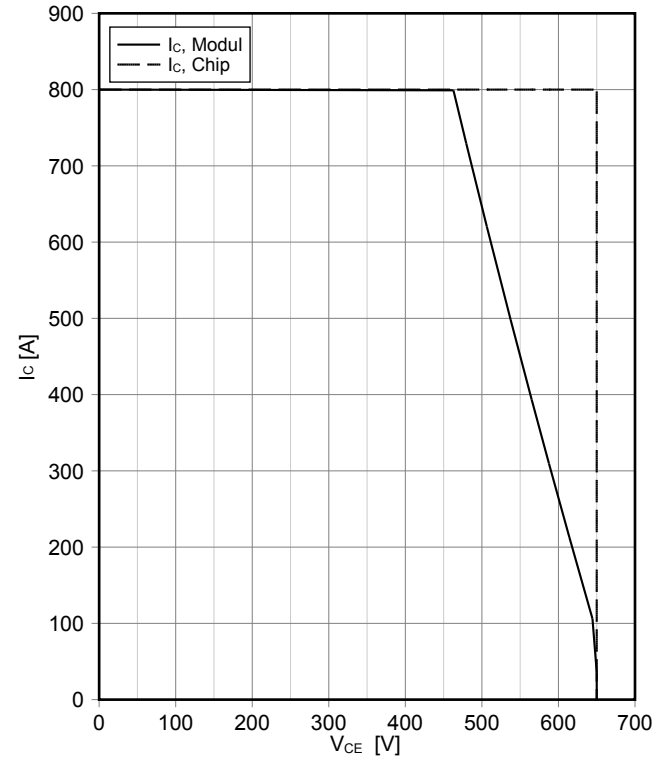
Vorläufige Daten Preliminary Data

Transienter Wärmewiderstand IGBT, T2 / T3
transient thermal impedance IGBT, T2 / T3
 $Z_{thJH} = f(t)$

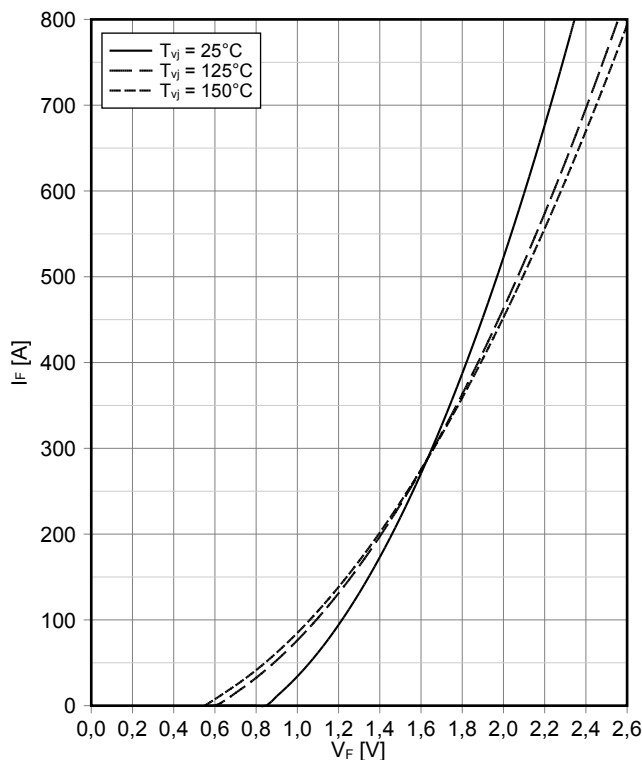


Sicherer Rückwärts-Arbeitsbereich IGBT, T2 / T3 (RBSOA)
reverse bias safe operating area IGBT, T2 / T3 (RBSOA)

$I_C = f(V_{CE})$
 $V_{GE} = \pm 15 \text{ V}, R_{Goff} = 1.5 \Omega, T_{vj} = 150^\circ\text{C}$

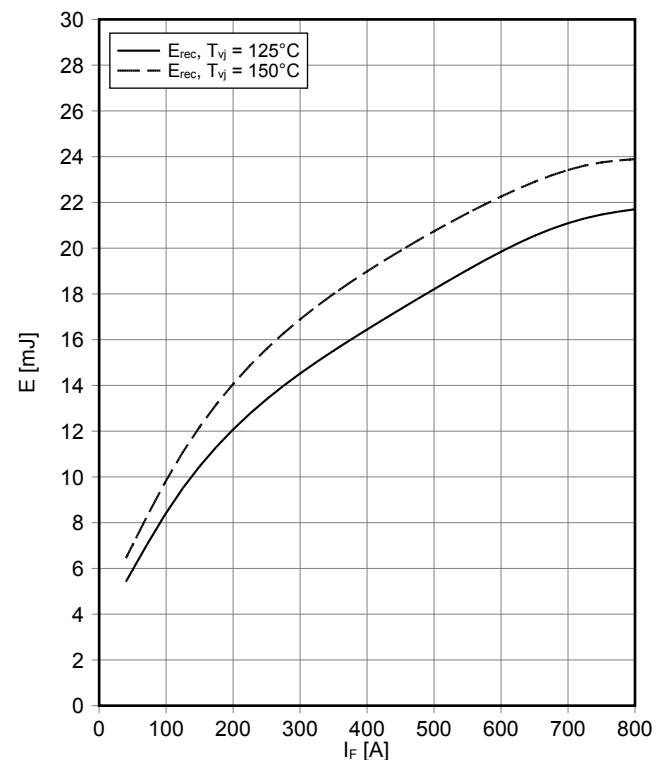


Durchlasskennlinie der Diode, D1 / D4 (typisch)
forward characteristic of Diode, D1 / D4 (typical)
 $I_F = f(V_F)$



Schaltverluste Diode, D1 / D4 (typisch)
switching losses Diode, D1 / D4 (typical)

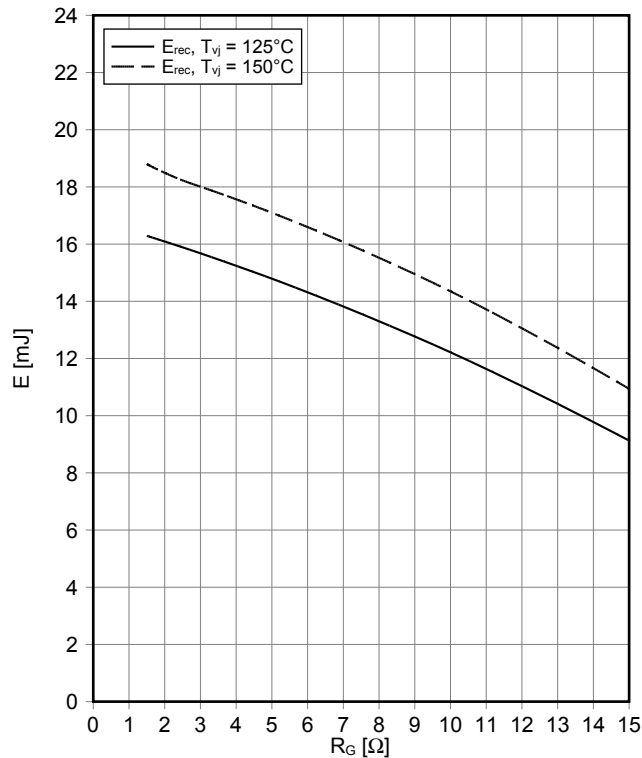
$E_{rec} = f(I_F)$
 $R_{Gon} = 1.5 \Omega, V_{CE} = 300 \text{ V}$



Vorläufige Daten Preliminary Data

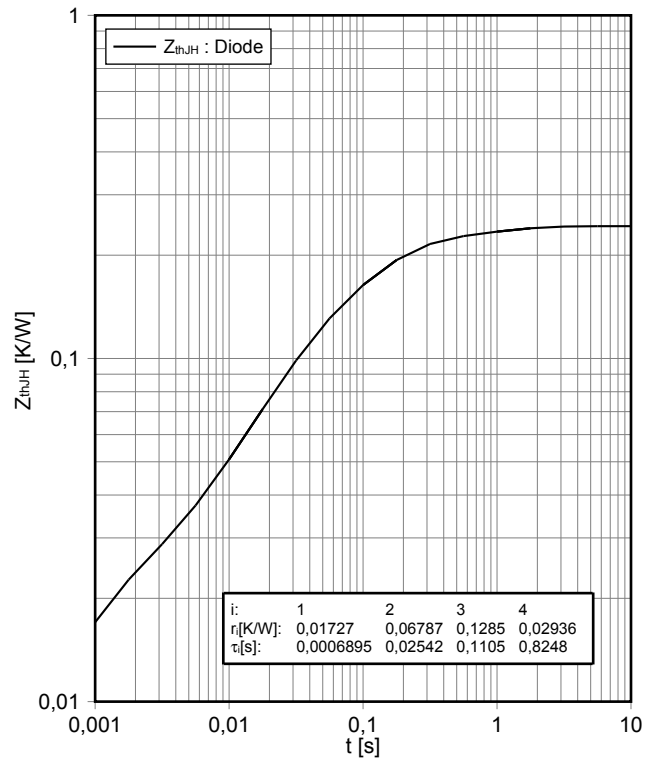
Schaltverluste Diode, D1 / D4 (typisch) switching losses Diode, D1 / D4 (typical)

$E_{rec} = f(R_G)$
 $I_F = 400\text{ A}, V_{CE} = 300\text{ V}$



Transienter Wärmewiderstand Diode, D1 / D4 transient thermal impedance Diode, D1 / D4

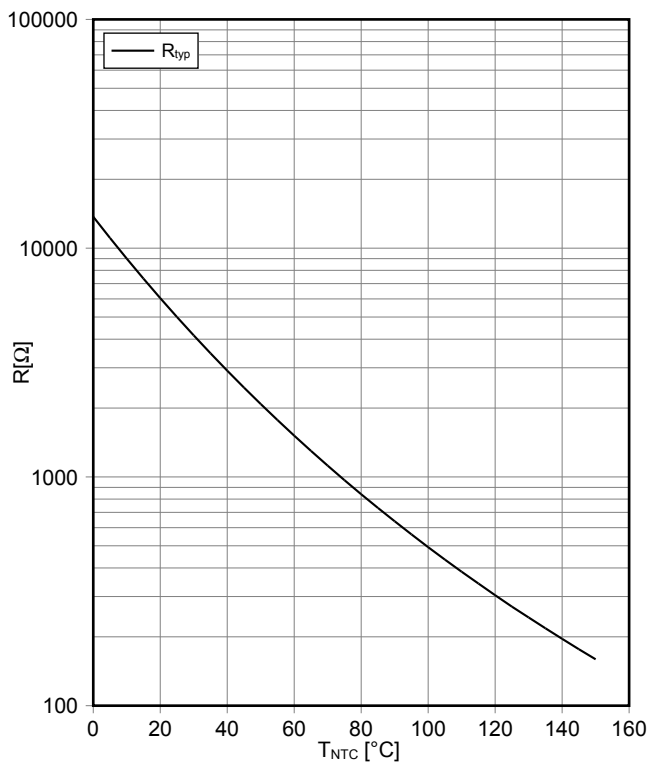
$Z_{thJH} = f(t)$



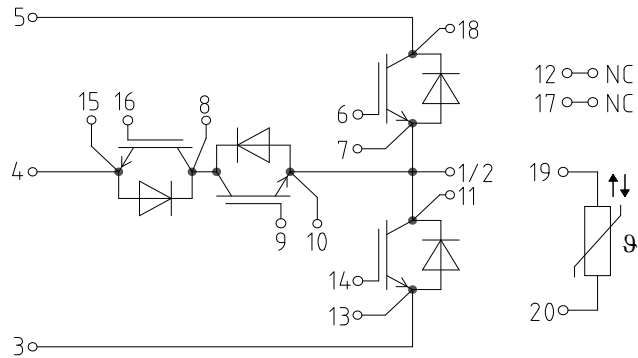
i:	1	2	3	4
r [K/W]:	0,01727	0,06787	0,1285	0,02936
τ [s]:	0,0006895	0,02542	0,1105	0,8248

NTC-Widerstand-Temperaturkennlinie (typisch) NTC-Thermistor-temperature characteristic (typical)

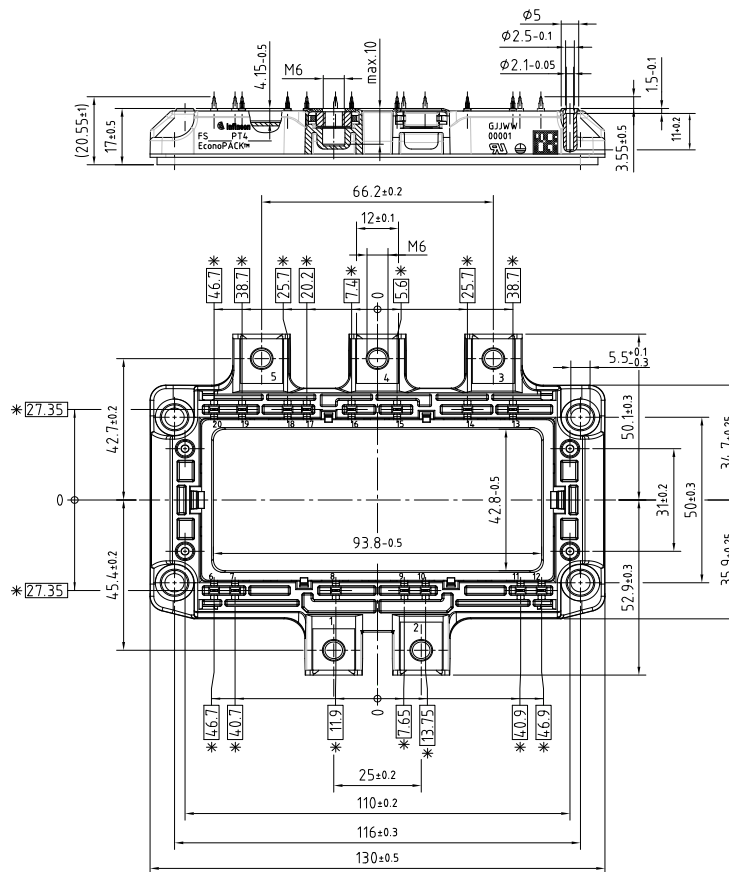
$R = f(T)$



Schaltplan / Circuit diagram

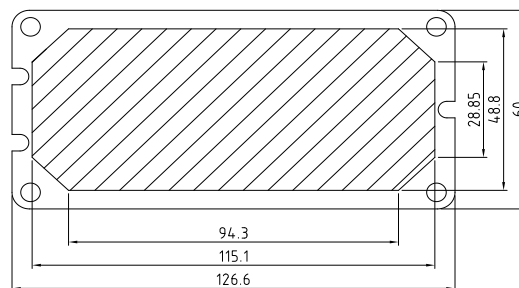


Gehäuseabmessungen / Package outlines



* = alle Maße mit einer Toleranz von ± 0.4
 * = all dimensions with tolerance of ± 0.4

Maße im aufgeschraubtem Zustand gemessen
 dimensions valid in mounted condition



restricted area for Thermal Interface Material

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