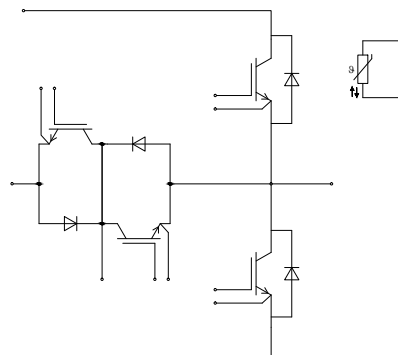


EasyPACK Modul mit aktiver "Neutral Point Clamp 2" Topologie und PressFIT / NTC
EasyPACK module with active "Neutral Point Clamp 2" topology and PressFIT / NTC

Vorläufige Daten / Preliminary Data



$V_{CES} = 1200V$
 $I_{C\ nom} = 50A / I_{CRM} = 100A$

Typische Anwendungen

- 3-Level-Applikationen
- Solar Anwendungen

Typical Applications

- 3-Level-Applications
- Solar Applications

Elektrische Eigenschaften

- High Speed IGBT H3
- Niedrige Schaltverluste
- $T_{vj\ op} = 150^{\circ}C$

Electrical Features

- High Speed IGBT H3
- Low Switching Losses
- $T_{vj\ op} = 150^{\circ}C$

Mechanische Eigenschaften

- PressFIT Verbindungstechnik
- RoHS konform

Mechanical Features

- PressFIT Contact Technology
- RoHS compliant

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

prepared by: CM	date of publication: 2015-02-03	
approved by: AKDA	revision: 2.3	UL approved (E83335)



**Vorläufige Daten
Preliminary Data**

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
Implementierter Kollektor-Strom Implemented collector current		I_{CN}	100	A
Kollektor-Dauergleichstrom Continuous DC collector current	$T_C = 100^{\circ}\text{C}, T_{vj\max} = 175^{\circ}\text{C}$	$I_{C\text{nom}}$	50	A
Periodischer Kollektor-Spitzenstrom Repetitive peak collector current	$t_P = 1\text{ ms}$	I_{CRM}	200	A
Gesamt-Verlustleistung Total power dissipation	$T_C = 25^{\circ}\text{C}, T_{vj\max} = 175^{\circ}\text{C}$	P_{tot}	375	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	$I_C = 50\text{ A}, V_{GE} = 15\text{ V}$ $I_C = 50\text{ A}, V_{GE} = 15\text{ V}$ $I_C = 50\text{ A}, V_{GE} = 15\text{ V}$	$T_{vj} = 25^{\circ}\text{C}$ $T_{vj} = 125^{\circ}\text{C}$ $T_{vj} = 150^{\circ}\text{C}$	$V_{CE\text{sat}}$	1,55 1,70 1,75	1,75	V V V
Gate-Schwellenspannung Gate threshold voltage	$I_C = 3,80\text{ mA}, V_{CE} = V_{GE}, T_{vj} = 25^{\circ}\text{C}$		$V_{G\text{Eth}}$	5,05	5,80	6,45 V
Gateladung Gate charge	$V_{GE} = -15\text{ V} \dots +15\text{ V}$		Q_G	0,80		μC
Interner Gatewiderstand Internal gate resistor	$T_{vj} = 25^{\circ}\text{C}$		$R_{G\text{int}}$	7,5		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}	6,15		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}	0,345		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	$I_C = 50\text{ A}, V_{CE} = 400\text{ V}$ $V_{GE} = \pm 15\text{ V}$ $R_{G\text{on}} = 1,1\ \Omega$	$T_{vj} = 25^{\circ}\text{C}$ $T_{vj} = 125^{\circ}\text{C}$ $T_{vj} = 150^{\circ}\text{C}$	$t_{d\text{on}}$	0,13 0,14 0,145		μs μs μs
Anstiegszeit, induktive Last Rise time, inductive load	$I_C = 50\text{ A}, V_{CE} = 400\text{ V}$ $V_{GE} = \pm 15\text{ V}$ $R_{G\text{on}} = 1,1\ \Omega$	$T_{vj} = 25^{\circ}\text{C}$ $T_{vj} = 125^{\circ}\text{C}$ $T_{vj} = 150^{\circ}\text{C}$	t_r	0,02 0,03 0,03		μs μs μs
Abschaltverzögerungszeit, induktive Last Turn-off delay time, inductive load	$I_C = 50\text{ A}, V_{CE} = 400\text{ V}$ $V_{GE} = \pm 15\text{ V}$ $R_{G\text{off}} = 1,1\ \Omega$	$T_{vj} = 25^{\circ}\text{C}$ $T_{vj} = 125^{\circ}\text{C}$ $T_{vj} = 150^{\circ}\text{C}$	$t_{d\text{off}}$	0,30 0,38 0,40		μs μs μs
Fallzeit, induktive Last Fall time, inductive load	$I_C = 50\text{ A}, V_{CE} = 400\text{ V}$ $V_{GE} = \pm 15\text{ V}$ $R_{G\text{off}} = 1,1\ \Omega$	$T_{vj} = 25^{\circ}\text{C}$ $T_{vj} = 125^{\circ}\text{C}$ $T_{vj} = 150^{\circ}\text{C}$	t_f	0,03 0,06 0,065		μs μs μs
Einschaltverlustenergie pro Puls Turn-on energy loss per pulse	$I_C = 50\text{ A}, V_{CE} = 400\text{ V}, L_S = 25\text{ nH}$ $V_{GE} = \pm 15\text{ V}, di/dt = 2200\text{ A}/\mu\text{s} (T_{vj} = 150^{\circ}\text{C})$ $R_{G\text{on}} = 1,1\ \Omega$	$T_{vj} = 25^{\circ}\text{C}$ $T_{vj} = 125^{\circ}\text{C}$ $T_{vj} = 150^{\circ}\text{C}$	E_{on}	1,05 1,65 1,80		mJ mJ mJ
Abschaltverlustenergie pro Puls Turn-off energy loss per pulse	$I_C = 50\text{ A}, V_{CE} = 400\text{ V}, L_S = 25\text{ nH}$ $V_{GE} = \pm 15\text{ V}, du/dt = 2400\text{ V}/\mu\text{s} (T_{vj} = 150^{\circ}\text{C})$ $R_{G\text{off}} = 1,1\ \Omega$	$T_{vj} = 25^{\circ}\text{C}$ $T_{vj} = 125^{\circ}\text{C}$ $T_{vj} = 150^{\circ}\text{C}$	E_{off}	1,60 2,60 2,95		mJ mJ mJ
Kurzschlußverhalten SC data	$V_{GE} \leq 15\text{ V}, V_{CC} = 800\text{ V}$ $V_{CE\text{max}} = V_{CES} - L_{SCE} \cdot di/dt$ $t_P \leq 10\ \mu\text{s}, T_{vj} = 150^{\circ}\text{C}$		I_{SC}	400		A
Wärmewiderstand, Chip bis Gehäuse Thermal resistance, junction to case	pro IGBT / per IGBT		R_{thJC}	0,30	0,40	K/W

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**Vorläufige Daten
Preliminary Data**

Wärmewiderstand, Gehäuse bis Kühlkörper Thermal resistance, case to heatsink	pro IGBT / per IGBT $\lambda_{\text{Paste}} = 1 \text{ W}/(\text{m}\cdot\text{K})$ / $\lambda_{\text{grease}} = 1 \text{ W}/(\text{m}\cdot\text{K})$	R_{thCH}		0,35		K/W
Temperatur im Schaltbetrieb Temperature under switching conditions		$T_{\text{vj op}}$	-40		150	°C

Diode, D2 / D3 / Diode, D2 / D3

Höchstzulässige Werte / Maximum Rated Values

Periodische Spitzensperrspannung Repetitive peak reverse voltage	$T_{\text{vj}} = 25^\circ\text{C}$	V_{RRM}		650		V
Implementierter Durchlassstrom Implemented forward current		I_{FN}		100		A
Dauergleichstrom Continuous DC forward current		I_{F}		50		A
Periodischer Spitzenstrom Repetitive peak forward current	$t_{\text{p}} = 1 \text{ ms}$	I_{FRM}		200		A
Grenzlastintegral I^2t - value	$V_{\text{R}} = 0 \text{ V}, t_{\text{p}} = 10 \text{ ms}, T_{\text{vj}} = 125^\circ\text{C}$ $V_{\text{R}} = 0 \text{ V}, t_{\text{p}} = 10 \text{ ms}, T_{\text{vj}} = 150^\circ\text{C}$	I^2t		850 800		A ² s A ² s

Charakteristische Werte / Characteristic Values

				min.	typ.	max.	
Durchlassspannung Forward voltage	$I_{\text{F}} = 50 \text{ A}, V_{\text{GE}} = 0 \text{ V}$ $I_{\text{F}} = 50 \text{ A}, V_{\text{GE}} = 0 \text{ V}$ $I_{\text{F}} = 50 \text{ A}, V_{\text{GE}} = 0 \text{ V}$	$T_{\text{vj}} = 25^\circ\text{C}$ $T_{\text{vj}} = 125^\circ\text{C}$ $T_{\text{vj}} = 150^\circ\text{C}$	V_{F}		1,35 1,30 1,25	1,60	V V V
Rückstromspitze Peak reverse recovery current	$I_{\text{F}} = 50 \text{ A}, -di_{\text{F}}/dt = 2200 \text{ A}/\mu\text{s} (T_{\text{vj}}=150^\circ\text{C})$ $V_{\text{R}} = 400 \text{ V}$ $V_{\text{GE}} = -15 \text{ V}$	$T_{\text{vj}} = 25^\circ\text{C}$ $T_{\text{vj}} = 125^\circ\text{C}$ $T_{\text{vj}} = 150^\circ\text{C}$	I_{RM}		52,0 57,0 59,0		A A A
Sperrverzögerungsladung Recovered charge	$I_{\text{F}} = 50 \text{ A}, -di_{\text{F}}/dt = 2200 \text{ A}/\mu\text{s} (T_{\text{vj}}=150^\circ\text{C})$ $V_{\text{R}} = 400 \text{ V}$ $V_{\text{GE}} = -15 \text{ V}$	$T_{\text{vj}} = 25^\circ\text{C}$ $T_{\text{vj}} = 125^\circ\text{C}$ $T_{\text{vj}} = 150^\circ\text{C}$	Q_{r}		1,90 3,60 4,10		μC μC μC
Abschaltenergie pro Puls Reverse recovery energy	$I_{\text{F}} = 50 \text{ A}, -di_{\text{F}}/dt = 2200 \text{ A}/\mu\text{s} (T_{\text{vj}}=150^\circ\text{C})$ $V_{\text{R}} = 400 \text{ V}$ $V_{\text{GE}} = -15 \text{ V}$	$T_{\text{vj}} = 25^\circ\text{C}$ $T_{\text{vj}} = 125^\circ\text{C}$ $T_{\text{vj}} = 150^\circ\text{C}$	E_{rec}		0,45 0,75 0,85		mJ mJ mJ
Wärmewiderstand, Chip bis Gehäuse Thermal resistance, junction to case	pro Diode / per diode		R_{thJC}		0,55	0,70	K/W
Wärmewiderstand, Gehäuse bis Kühlkörper Thermal resistance, case to heatsink	pro Diode / per diode $\lambda_{\text{Paste}} = 1 \text{ W}/(\text{m}\cdot\text{K})$ / $\lambda_{\text{grease}} = 1 \text{ W}/(\text{m}\cdot\text{K})$		R_{thCH}		0,65		K/W
Temperatur im Schaltbetrieb Temperature under switching conditions			$T_{\text{vj op}}$	-40		150	°C

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**Vorläufige Daten
Preliminary Data**

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	$T_C = 75^{\circ}\text{C}, T_{vj\ max} = 175^{\circ}\text{C}$	$I_{C\ nom}$	50	A
Periodischer Kollektor-Spitzenstrom Repetitive peak collector current	$t_P = 1\ \text{ms}$	I_{CRM}	100	A
Gesamt-Verlustleistung Total power dissipation	$T_C = 25^{\circ}\text{C}, T_{vj\ max} = 175^{\circ}\text{C}$	P_{tot}	175	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	$I_C = 50\ \text{A}, V_{GE} = 15\ \text{V}$ $I_C = 50\ \text{A}, V_{GE} = 15\ \text{V}$ $I_C = 50\ \text{A}, V_{GE} = 15\ \text{V}$	$T_{vj} = 25^{\circ}\text{C}$ $T_{vj} = 125^{\circ}\text{C}$ $T_{vj} = 150^{\circ}\text{C}$	$V_{CE\ sat}$	1,45 1,60 1,70	1,90	V V V
Gate-Schwellenspannung Gate threshold voltage	$I_C = 0,80\ \text{mA}, V_{CE} = V_{GE}, T_{vj} = 25^{\circ}\text{C}$		V_{GEth}	4,90	5,80	6,50 V
Gateladung Gate charge	$V_{GE} = -15\ \text{V} \dots +15\ \text{V}$		Q_G	0,50		μC
Interner Gatewiderstand Internal gate resistor	$T_{vj} = 25^{\circ}\text{C}$		R_{Gint}	0,0		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}	3,10		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}	0,095		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	$I_C = 50\ \text{A}, V_{CE} = 400\ \text{V}$ $V_{GE} = \pm 15\ \text{V}$ $R_{Gon} = 8,2\ \Omega$	$T_{vj} = 25^{\circ}\text{C}$ $T_{vj} = 125^{\circ}\text{C}$ $T_{vj} = 150^{\circ}\text{C}$	$t_{d\ on}$	0,025 0,025 0,025		μs μs μs
Anstiegszeit, induktive Last Rise time, inductive load	$I_C = 50\ \text{A}, V_{CE} = 400\ \text{V}$ $V_{GE} = \pm 15\ \text{V}$ $R_{Gon} = 8,2\ \Omega$	$T_{vj} = 25^{\circ}\text{C}$ $T_{vj} = 125^{\circ}\text{C}$ $T_{vj} = 150^{\circ}\text{C}$	t_r	0,017 0,021 0,022		μs μs μs
Abschaltverzögerungszeit, induktive Last Turn-off delay time, inductive load	$I_C = 50\ \text{A}, V_{CE} = 400\ \text{V}$ $V_{GE} = \pm 15\ \text{V}$ $R_{Goff} = 8,2\ \Omega$	$T_{vj} = 25^{\circ}\text{C}$ $T_{vj} = 125^{\circ}\text{C}$ $T_{vj} = 150^{\circ}\text{C}$	$t_{d\ off}$	0,19 0,22 0,25		μs μs μs
Fallzeit, induktive Last Fall time, inductive load	$I_C = 50\ \text{A}, V_{CE} = 400\ \text{V}$ $V_{GE} = \pm 15\ \text{V}$ $R_{Goff} = 8,2\ \Omega$	$T_{vj} = 25^{\circ}\text{C}$ $T_{vj} = 125^{\circ}\text{C}$ $T_{vj} = 150^{\circ}\text{C}$	t_f	0,033 0,05 0,055		μs μs μs
Einschaltverlustenergie pro Puls Turn-on energy loss per pulse	$I_C = 50\ \text{A}, V_{CE} = 400\ \text{V}, L_S = 25\ \text{nH}$ $V_{GE} = \pm 15\ \text{V}, di/dt = 2600\ \text{A}/\mu\text{s} (T_{vj} = 150^{\circ}\text{C})$ $R_{Gon} = 8,2\ \Omega$	$T_{vj} = 25^{\circ}\text{C}$ $T_{vj} = 125^{\circ}\text{C}$ $T_{vj} = 150^{\circ}\text{C}$	E_{on}	1,10 1,75 1,90		mJ mJ mJ
Abschaltverlustenergie pro Puls Turn-off energy loss per pulse	$I_C = 50\ \text{A}, V_{CE} = 400\ \text{V}, L_S = 25\ \text{nH}$ $V_{GE} = \pm 15\ \text{V}, du/dt = 4000\ \text{V}/\mu\text{s} (T_{vj} = 150^{\circ}\text{C})$ $R_{Goff} = 8,2\ \Omega$	$T_{vj} = 25^{\circ}\text{C}$ $T_{vj} = 125^{\circ}\text{C}$ $T_{vj} = 150^{\circ}\text{C}$	E_{off}	1,50 2,05 2,20		mJ mJ mJ
Kurzschlußverhalten SC data	$V_{GE} \leq 15\ \text{V}, V_{CC} = 360\ \text{V}$ $V_{CEmax} = V_{CES} - L_{SCE} \cdot di/dt$	$t_P \leq 8\ \mu\text{s}, T_{vj} = 25^{\circ}\text{C}$ $t_P \leq 6\ \mu\text{s}, T_{vj} = 150^{\circ}\text{C}$	I_{SC}	350 250		A A
Wärmewiderstand, Chip bis Gehäuse Thermal resistance, junction to case	pro IGBT / per IGBT		R_{thJC}	0,75	0,85	K/W
Wärmewiderstand, Gehäuse bis Kühlkörper Thermal resistance, case to heatsink	pro IGBT / per IGBT $\lambda_{Paste} = 1\ \text{W}/(\text{m}\cdot\text{K})$ / $\lambda_{grease} = 1\ \text{W}/(\text{m}\cdot\text{K})$		R_{thCH}	0,70		K/W
Temperatur im Schaltbetrieb Temperature under switching conditions			$T_{vj\ op}$	-40	150	$^{\circ}\text{C}$

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**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	35	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	510	A^2s
	$V_R = 0\text{ V}, t_P = 10\text{ ms}, T_{vj} = 150^{\circ}\text{C}$		450	A^2s

Charakteristische Werte / Characteristic Values

			min.	typ.	max.	
Durchlassspannung Forward voltage	$I_F = 35\text{ A}, V_{GE} = 0\text{ V}$	$T_{vj} = 25^{\circ}\text{C}$		2,00	2,55	V
	$I_F = 35\text{ A}, V_{GE} = 0\text{ V}$	$T_{vj} = 125^{\circ}\text{C}$		1,70		V
	$I_F = 35\text{ A}, V_{GE} = 0\text{ V}$	$T_{vj} = 150^{\circ}\text{C}$		1,65		V
Rückstromspitze Peak reverse recovery current	$I_F = 35\text{ A}, -di_F/dt = 2400\text{ A}/\mu\text{s} (T_{vj}=150^{\circ}\text{C})$ $V_R = 400\text{ V}$ $V_{GE} = -15\text{ V}$	$T_{vj} = 25^{\circ}\text{C}$		70,0		A
		$T_{vj} = 125^{\circ}\text{C}$		85,0		A
		$T_{vj} = 150^{\circ}\text{C}$		90,0		A
Sperrverzögerungsladung Recovered charge	$I_F = 35\text{ A}, -di_F/dt = 2400\text{ A}/\mu\text{s} (T_{vj}=150^{\circ}\text{C})$ $V_R = 400\text{ V}$ $V_{GE} = -15\text{ V}$	$T_{vj} = 25^{\circ}\text{C}$		2,40		μC
		$T_{vj} = 125^{\circ}\text{C}$		5,70		μC
		$T_{vj} = 150^{\circ}\text{C}$		7,00		μC
Abschaltenergie pro Puls Reverse recovery energy	$I_F = 35\text{ A}, -di_F/dt = 2400\text{ A}/\mu\text{s} (T_{vj}=150^{\circ}\text{C})$ $V_R = 400\text{ V}$ $V_{GE} = -15\text{ V}$	$T_{vj} = 25^{\circ}\text{C}$		0,70		mJ
		$T_{vj} = 125^{\circ}\text{C}$		1,75		mJ
		$T_{vj} = 150^{\circ}\text{C}$		2,15		mJ
Wärmewiderstand, Chip bis Gehäuse Thermal resistance, junction to case	pro Diode / per diode	R_{thJC}		0,65	0,75	K/W
Wärmewiderstand, Gehäuse bis Kühlkörper Thermal resistance, case to heatsink	pro Diode / per diode $\lambda_{Paste} = 1\text{ W}/(\text{m}\cdot\text{K}) / \lambda_{grease} = 1\text{ W}/(\text{m}\cdot\text{K})$	R_{thCH}		0,85		K/W
Temperatur im Schaltbetrieb Temperature under switching conditions		$T_{vj\text{ op}}$	-40		150	$^{\circ}\text{C}$

Modul / Module

Isolations-Prüfspannung Isolation test voltage	RMS, $f = 50\text{ Hz}, t = 1\text{ min.}$	V_{ISOL}		2,5		kV
Innere Isolation Internal isolation	Basisisolation (Schutzklasse 1, EN61140) basic insulation (class 1, IEC 61140)			Al_2O_3		
Kriechstrecke Creepage distance	Kontakt - Kühlkörper / terminal to heatsink Kontakt - Kontakt / terminal to terminal			11,5 6,3		mm
Luftstrecke Clearance	Kontakt - Kühlkörper / terminal to heatsink Kontakt - Kontakt / terminal to terminal			10,0 5,0		mm
Vergleichszahl der Kriechwegbildung Comperative tracking index		CTI		> 200		
			min.	typ.	max.	
Modulstreuintuktivität Stray inductance module		L_{sCE}		14		nH
Lagertemperatur Storage temperature		T_{stg}	-40		125	$^{\circ}\text{C}$
Anpresskraft für mech. Bef. pro Feder mounting 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.

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**Vorläufige Daten
Preliminary Data**

**NTC-Widerstand / NTC-Thermistor
Charakteristische Werte / Characteristic Values**

			min.	typ.	max.	
Nennwiderstand Rated resistance	$T_C = 25^\circ\text{C}$	R_{25}		5,00		k Ω
Abweichung von R100 Deviation of R100	$T_C = 100^\circ\text{C}, R_{100} = 493 \Omega$	$\Delta R/R$	-5		5	%
Verlustleistung Power dissipation	$T_C = 25^\circ\text{C}$	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

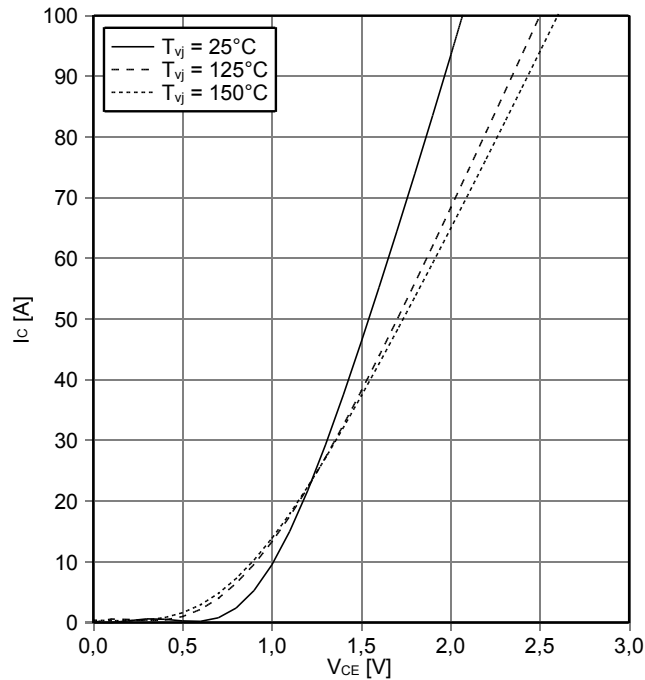
Angaben gemäß gültiger Application Note.
Specification according to the valid application note.

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Vorläufige Daten
Preliminary Data

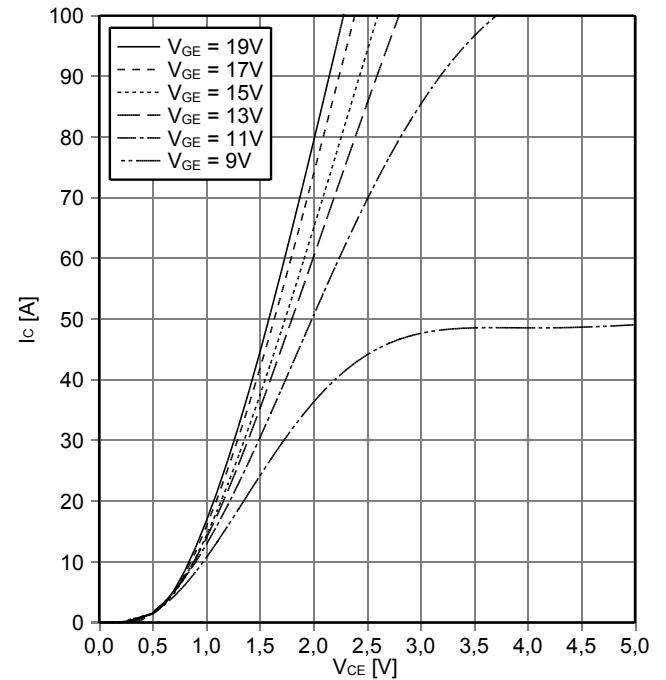
Ausgangskennlinie IGBT, T1 / T4 (typisch)
output characteristic IGBT, T1 / T4 (typical)

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



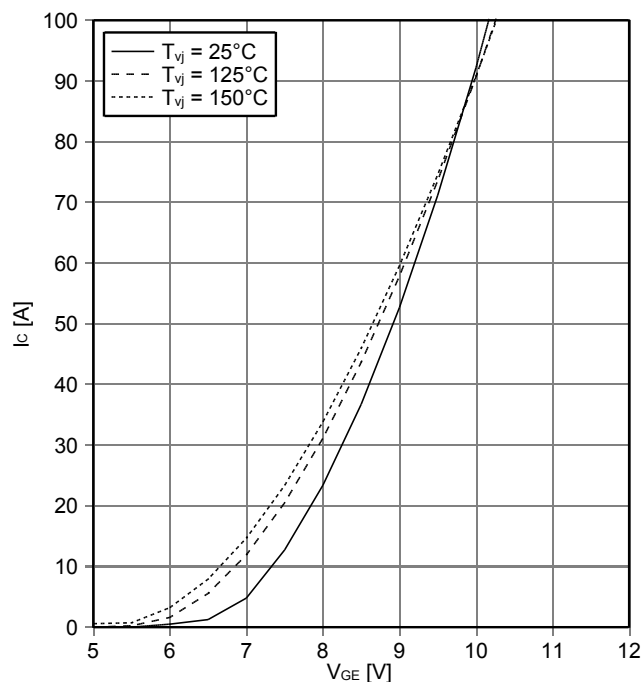
Ausgangskennlinienfeld IGBT, T1 / T4 (typisch)
output characteristic IGBT, T1 / T4 (typical)

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



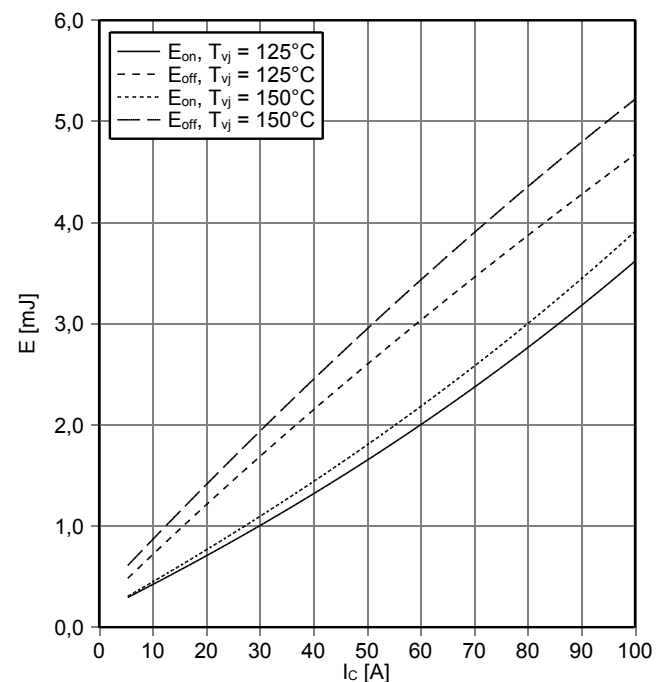
Übertragungscharakteristik IGBT, T1 / T4 (typisch)
transfer characteristic IGBT, T1 / T4 (typical)

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



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

$E_{on} = f(I_C), E_{off} = f(I_C)$
 $V_{GE} = \pm 15\text{ V}, R_{Gon} = 1.1\ \Omega, R_{Goff} = 1.1\ \Omega, V_{CE} = 400\text{ V}$



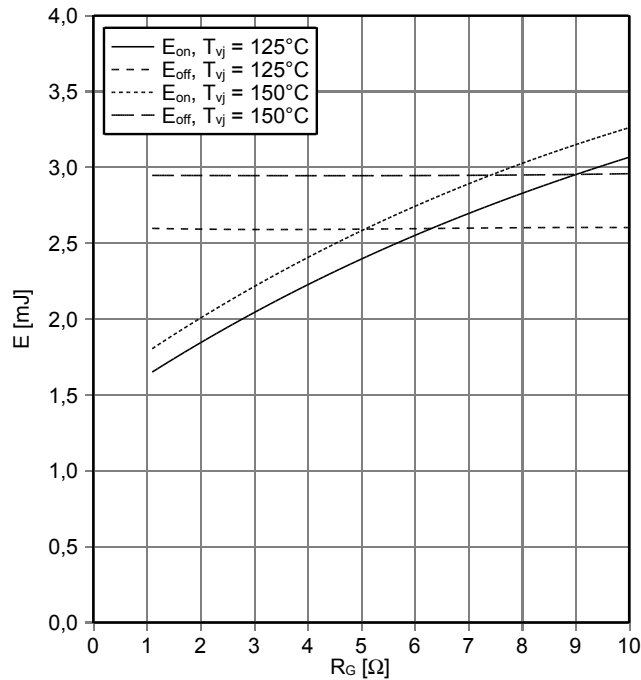
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Vorläufige Daten
Preliminary Data

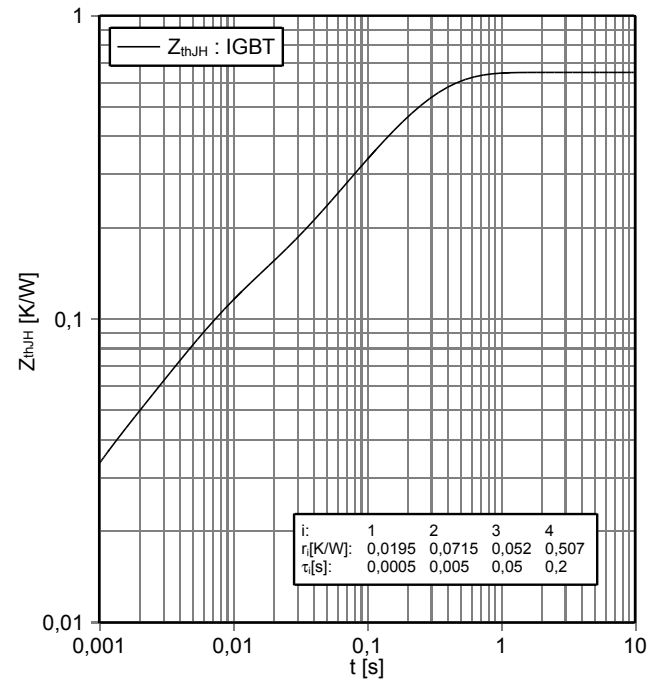
Schaltverluste IGBT, T1 / T4 (typisch)
switching losses IGBT, T1 / T4 (typical)

$E_{on} = f(R_G), E_{off} = f(R_G)$
 $V_{GE} = \pm 15 V, I_C = 50 A, V_{CE} = 400 V$



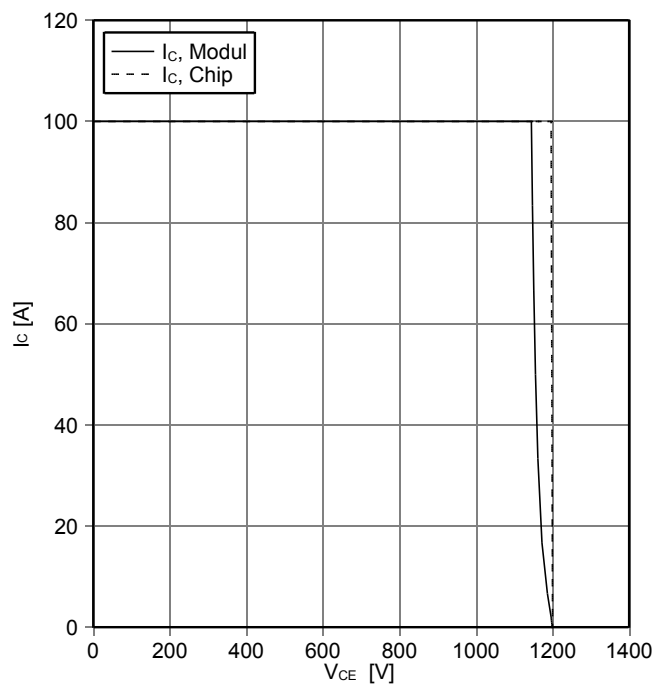
Transienter Wärmewiderstand IGBT, T1 / T4
transient thermal impedance IGBT, T1 / T4

$Z_{thJH} = f(t)$



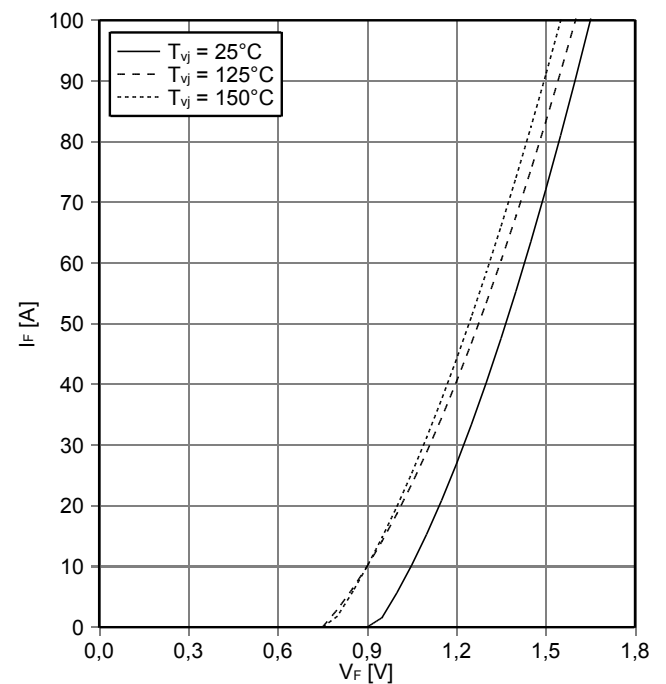
Sicherer Rückwärts-Arbeitsbereich IGBT, T1 / T4 (RBSOA)
reverse bias safe operating area IGBT, T1 / T4 (RBSOA)

$I_C = f(V_{CE})$
 $V_{GE} = \pm 15 V, R_{Goff} = 1.1 \Omega, T_{vj} = 150^\circ C$



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

$I_F = f(V_F)$

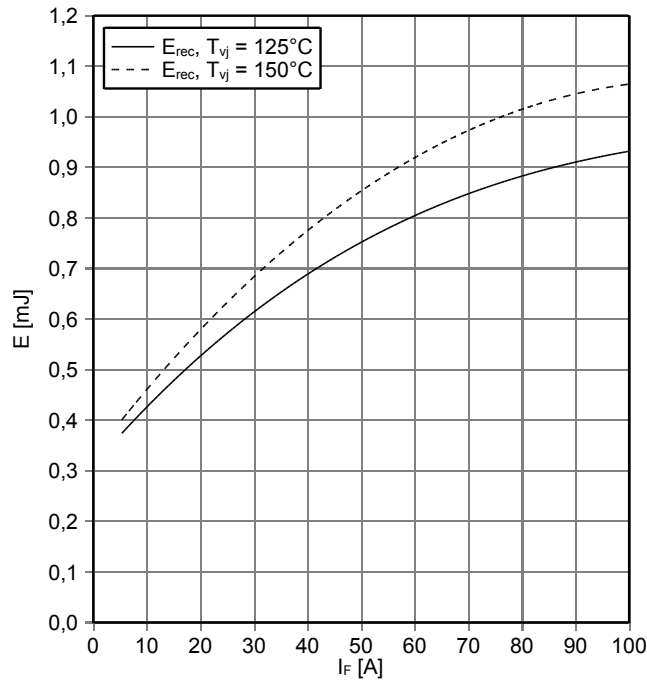


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Vorläufige Daten
Preliminary Data

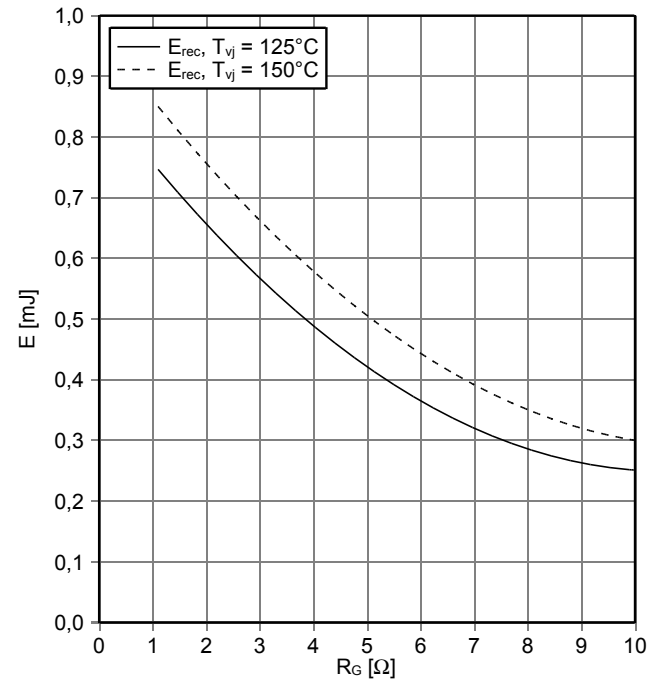
Schaltverluste Diode, D2 / D3 (typisch)
switching losses Diode, D2 / D3 (typical)

$E_{rec} = f(I_F)$
 $R_{Gon} = 1.1 \Omega, V_{CE} = 400 V$



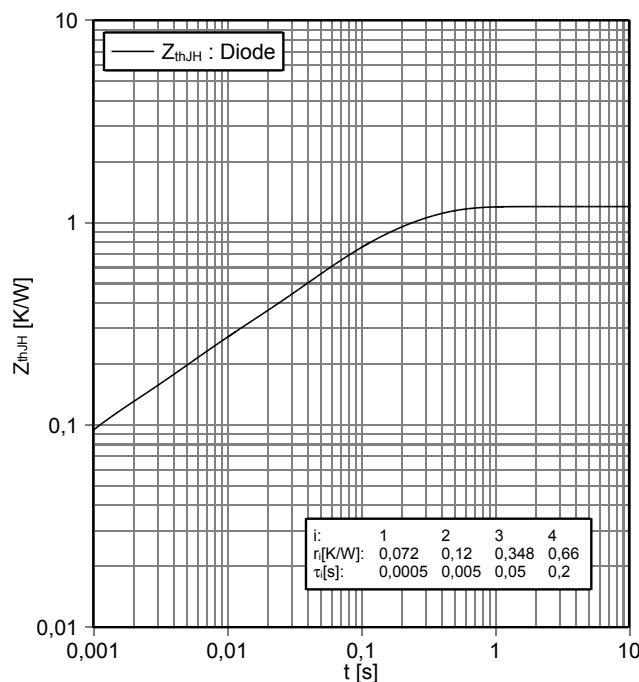
Schaltverluste Diode, D2 / D3 (typisch)
switching losses Diode, D2 / D3 (typical)

$E_{rec} = f(R_G)$
 $I_F = 50 A, V_{CE} = 400 V$



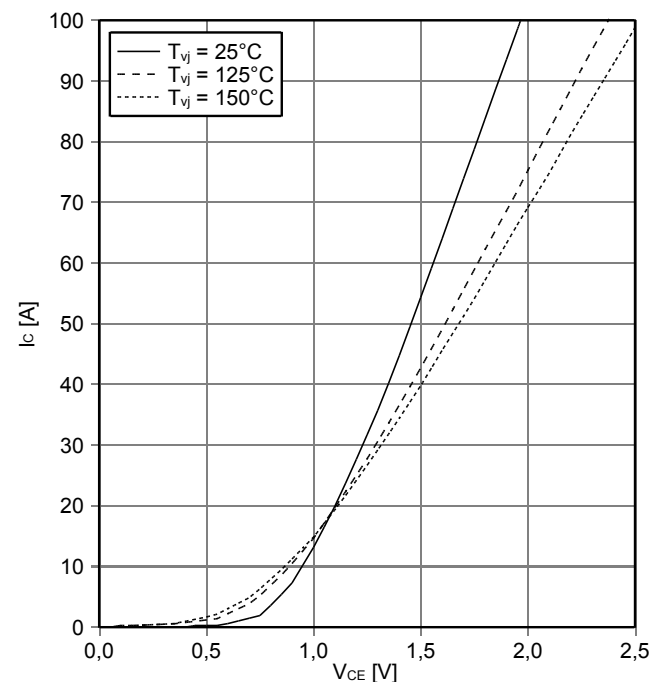
Transienter Wärmewiderstand Diode, D2 / D3
transient thermal impedance Diode, D2 / D3

$Z_{thJH} = f(t)$



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

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

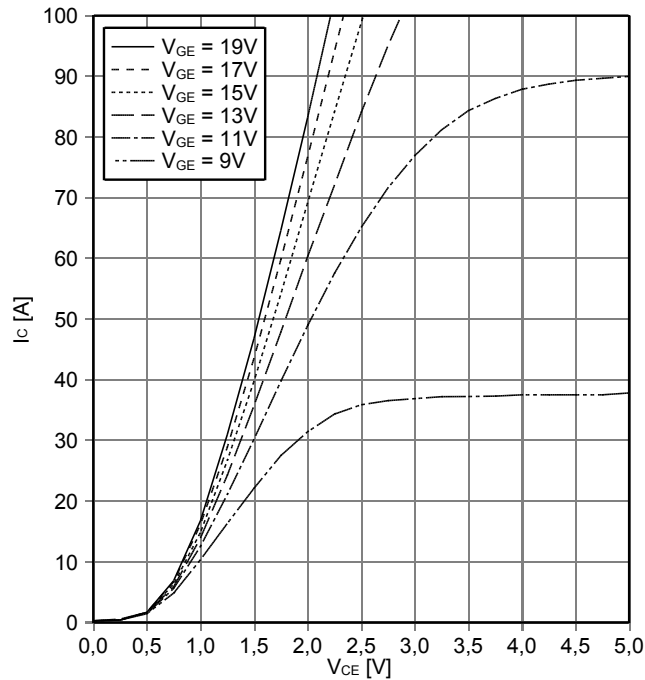


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Vorläufige Daten
Preliminary Data

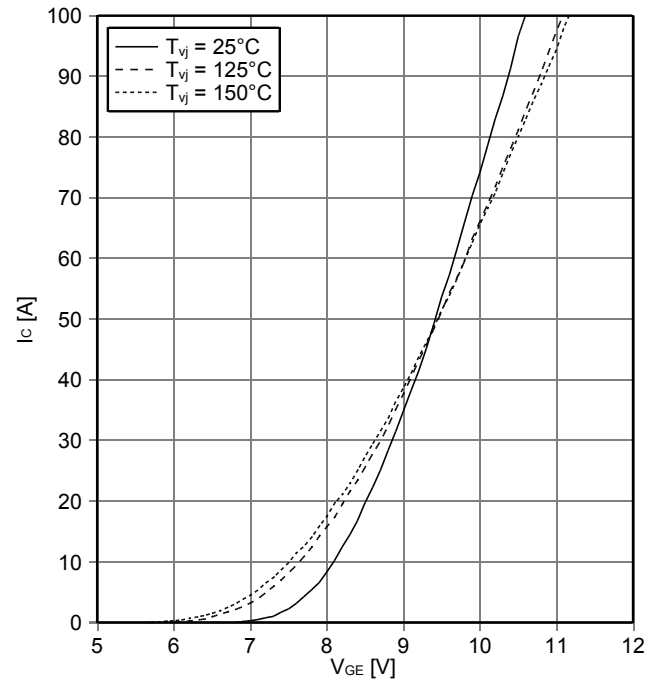
Ausgangskennlinienfeld IGBT, T2 / T3 (typisch)
output characteristic IGBT, T2 / T3 (typical)

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



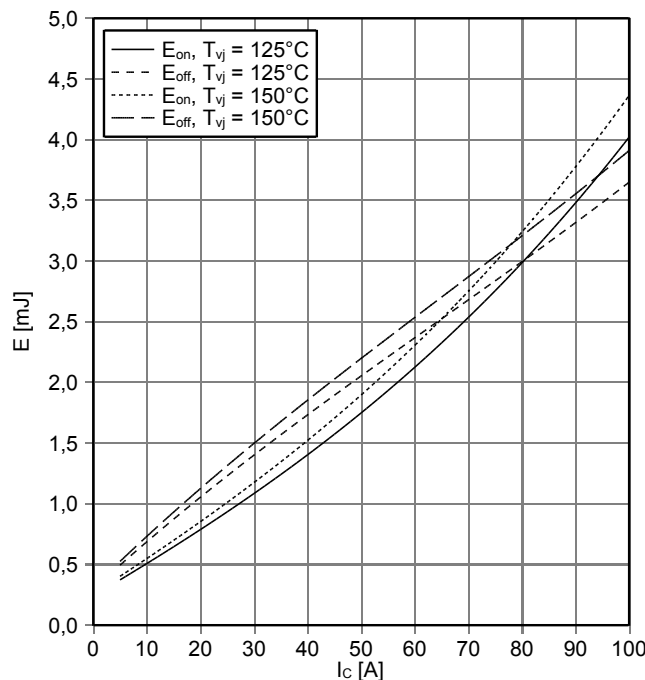
Übertragungscharakteristik IGBT, T2 / T3 (typisch)
transfer characteristic IGBT, T2 / T3 (typical)

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



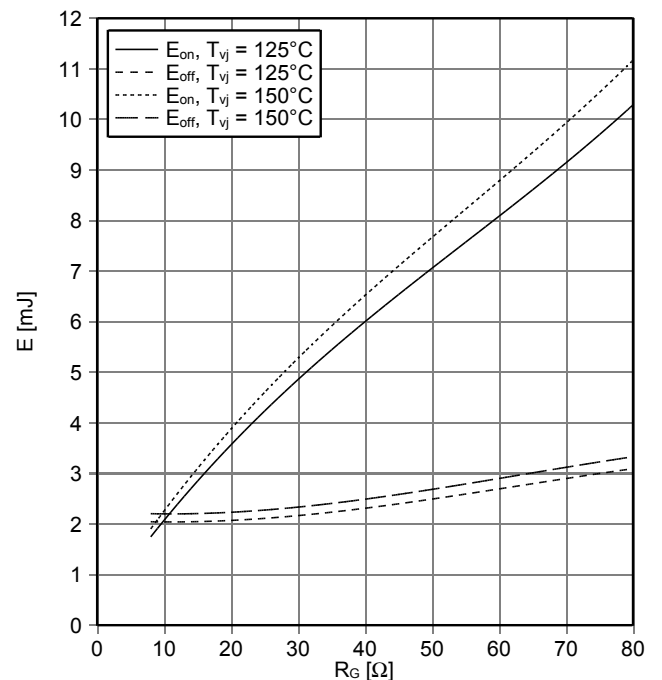
Schaltverluste IGBT, T2 / T3 (typisch)
switching losses IGBT, T2 / T3 (typical)

$E_{on} = f(I_C), E_{off} = f(I_C)$
 $V_{GE} = \pm 15\text{ V}, R_{Gon} = 8.2\ \Omega, R_{Goff} = 8.2\ \Omega, V_{CE} = 400\text{ V}$



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

$E_{on} = f(R_G), E_{off} = f(R_G)$
 $V_{GE} = \pm 15\text{ V}, I_C = 50\text{ A}, V_{CE} = 400\text{ V}$



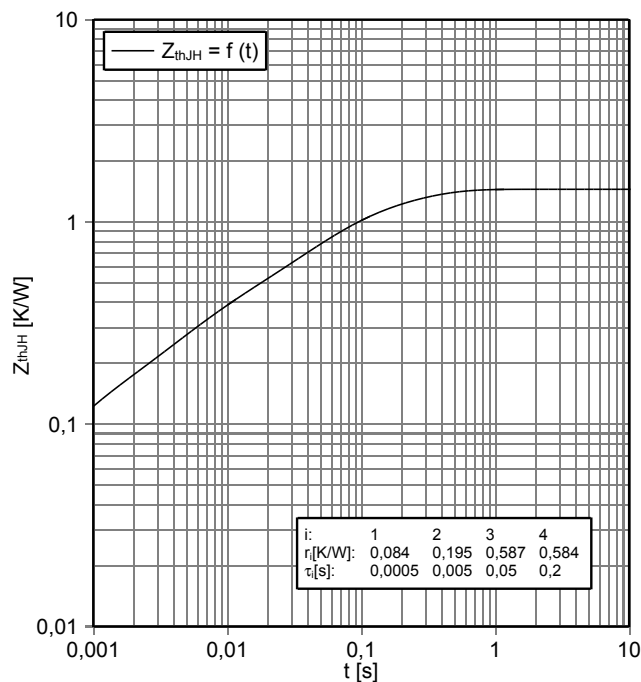
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**Vorläufige Daten
Preliminary Data**

**Transienter Wärmewiderstand IGBT, T2 / T3
transient thermal impedance IGBT, T2 / T3**

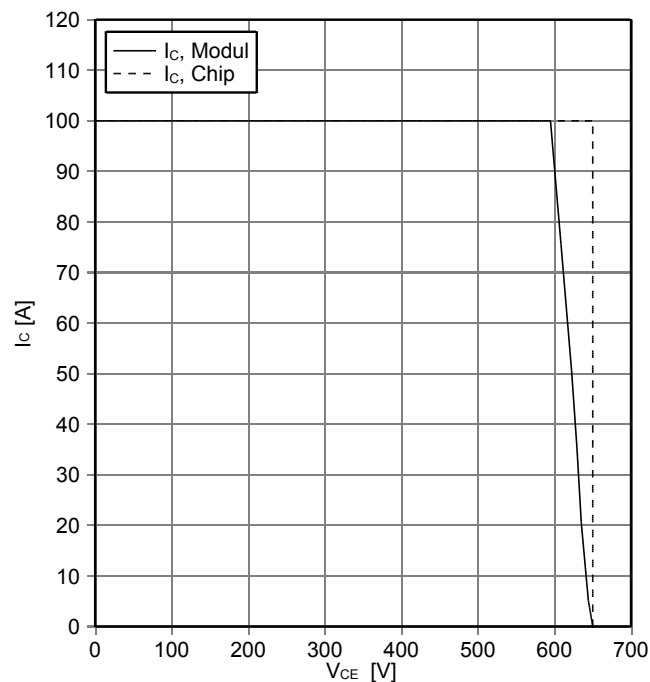
$Z_{thJH} = f(t)$



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

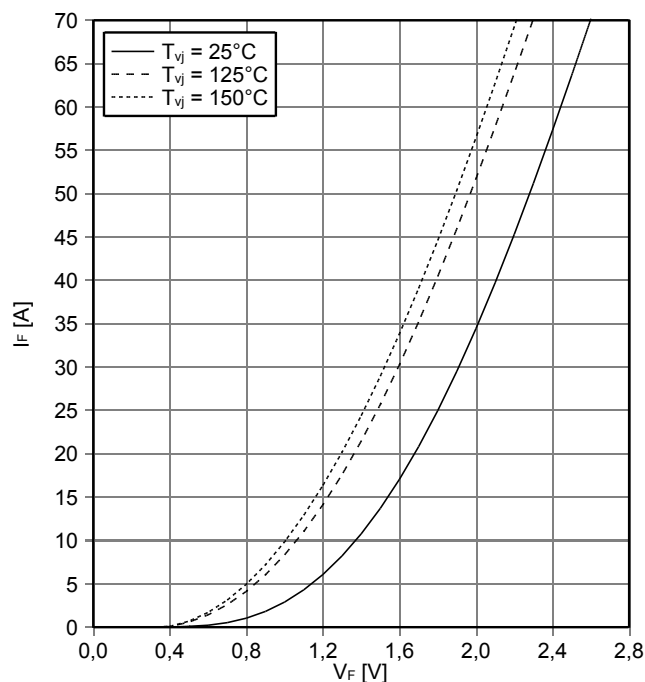
$I_C = f(V_{CE})$

$V_{GE} = \pm 15\text{ V}$, $R_{Goff} = 8.2\ \Omega$, $T_{vj} = 150^\circ\text{C}$



**Durchlasskennlinie der Diode, D1 / D4 (typisch)
forward characteristic of Diode, D1 / D4 (typical)**

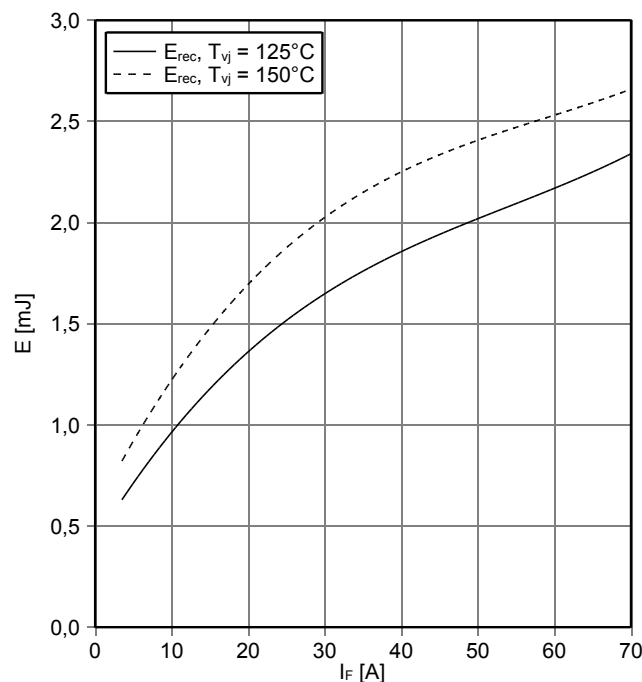
$I_F = f(V_F)$



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

$E_{rec} = f(I_F)$

$R_{Gon} = 8.2\ \Omega$, $V_{CE} = 400\text{ V}$



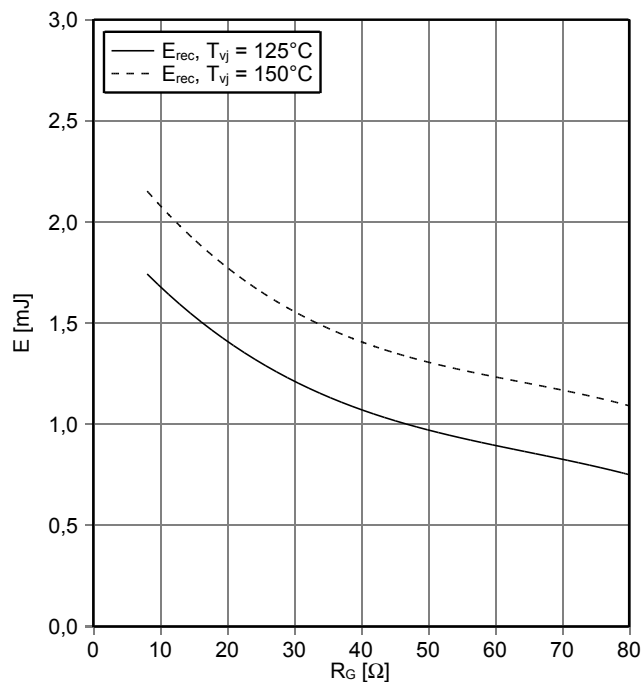
prepared by: CM	date of publication: 2015-02-03
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**Vorläufige Daten
Preliminary Data**

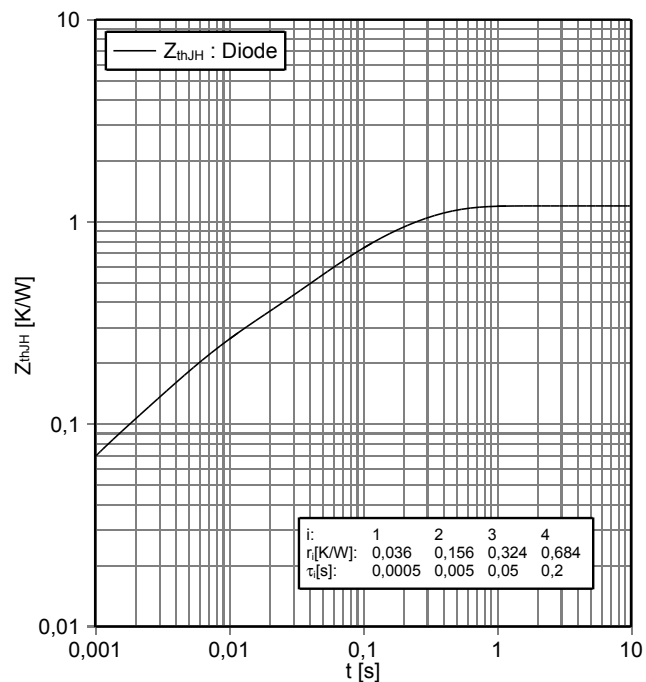
**Schaltverluste Diode, D1 / D4 (typisch)
switching losses Diode, D1 / D4 (typical)**

$E_{rec} = f(R_G)$
 $I_F = 35\text{ A}, V_{CE} = 400\text{ V}$



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

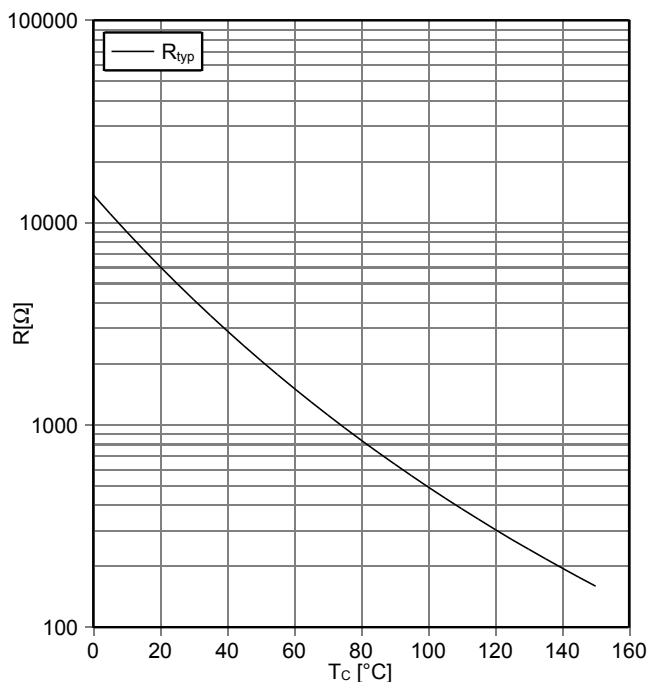
$Z_{thJH} = f(t)$



i:	1	2	3	4
r[K/W]:	0,036	0,156	0,324	0,684
τ[s]:	0,0005	0,005	0,05	0,2

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

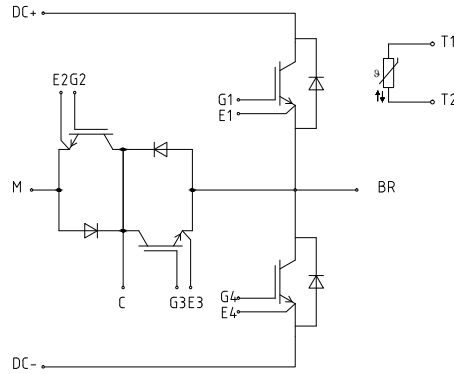
$R = f(T)$



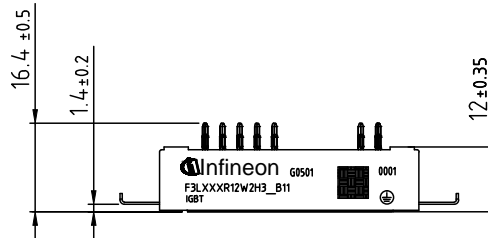
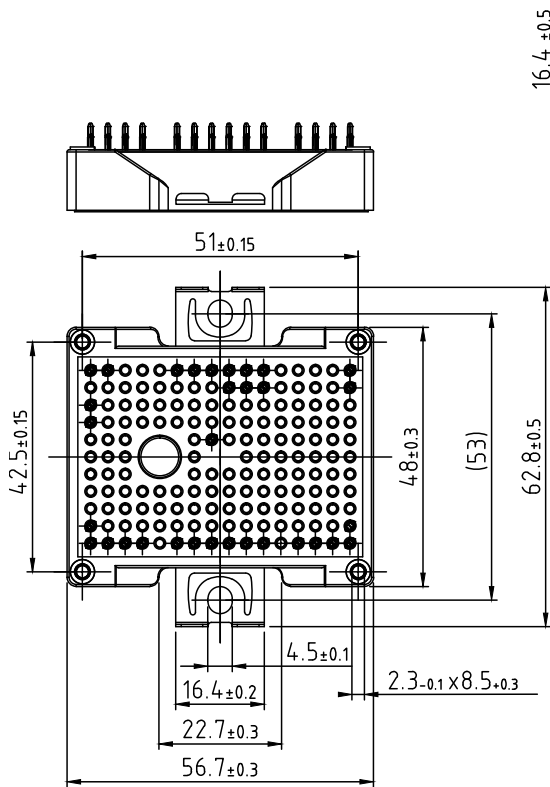
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Preliminary Data

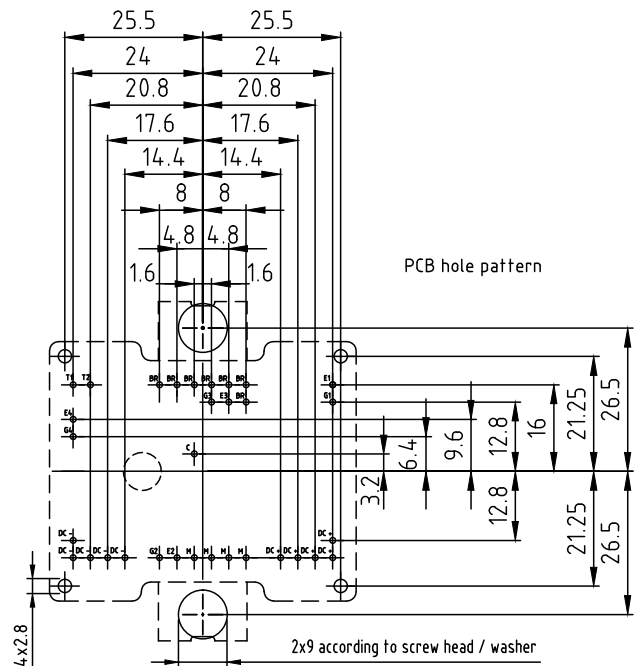
Schaltplan / circuit_diagram_headline



Gehäuseabmessungen / package outlines



- Pin-Grid 3.2mm
- Tolerance of PCB hole pattern $\varnothing 0.1$
- Hole specification for contacts see AN 2009-01:
Diameters of drill $\varnothing 1.15\text{mm}$
and copper thickness in hole 25-50 μm



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