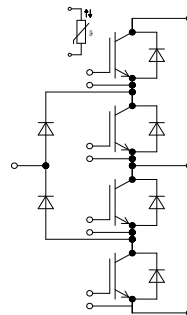
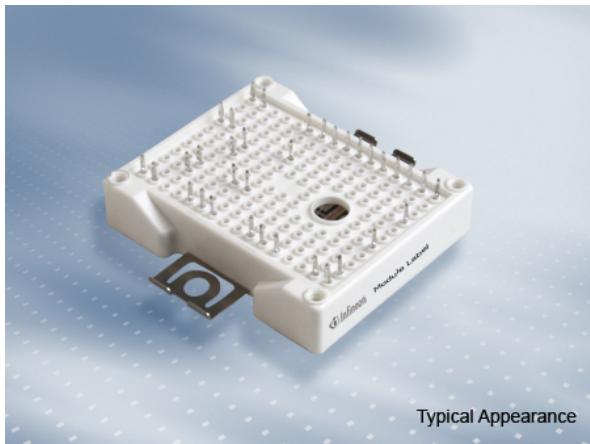


EasyPACK™ Modul mit TRENCHSTOP™ 5 und CoolSiC™ Schottky Diode und PressFIT / NTC
 EasyPACK™ module with TRENCHSTOP™ 5 and CoolSiC™ Schottky diode and PressFIT / NTC



$V_{CES} = 650V$
 $I_{C\ nom} = 100A / I_{CRM} = 200A$

Potentielle Anwendungen

- 3-Level-Applikationen
- Motorantriebe
- Solar Anwendungen
- USV-Systeme

Potential Applications

- 3-level-applications
- Motor drives
- Solar applications
- UPS systems

Elektrische Eigenschaften

- CoolSiC™ Schottky Diode Gen 5
- Erhöhte Sperrspannungsfestigkeit auf 650V
- Niedrige Schaltverluste

Electrical Features

- CoolSiC™ Schottky diode gen 5
- Increased blocking voltage capability up to 650V
- Low switching losses

Mechanische Eigenschaften

- Al₂O₃ Substrat mit kleinem thermischen Widerstand
- Kompaktes Design
- PressFIT Verbindungstechnik
- Robuste Montage durch integrierte Befestigungsklammern

Mechanical Features

- Al₂O₃ substrate with low thermal resistance
- Compact design
- PressFIT contact technology
- Rugged mounting due to integrated mounting clamps

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}	650	V
Implementierter Kollektor-Strom Implemented collector current		I_{CN}	200	A
Kollektor-Dauergleichstrom Continuous DC collector current	$T_H = 65^{\circ}\text{C}, T_{vj\text{max}} = 175^{\circ}\text{C}$	I_{CDC}	95	A
Periodischer Kollektor-Spitzenstrom Repetitive peak collector current	$t_p = 1\text{ ms}$	I_{CRM}	400	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	$I_C = 100\text{ A}$ $V_{GE} = 15\text{ V}$	$T_{vj} = 25^{\circ}\text{C}$ $T_{vj} = 125^{\circ}\text{C}$ $T_{vj} = 150^{\circ}\text{C}$	$V_{CE\text{sat}}$	1,17 1,20 1,21	1,38 V V V
Gate-Schwellenspannung Gate threshold voltage	$I_C = 2,00\text{ mA}, V_{CE} = V_{GE}, T_{vj} = 25^{\circ}\text{C}$		V_{GETH}	3,25 4,00 4,75	V
Gateladung Gate charge	$V_{GE} = -15 / 15\text{ V}, V_{CE} = 400\text{ V}$		Q_G	0,84	μC
Interner Gatewiderstand Internal gate resistor	$T_{vj} = 25^{\circ}\text{C}$		R_{Gint}	0,0	Ω
Eingangskapazität Input capacitance	$f = 100\text{ kHz}, T_{vj} = 25^{\circ}\text{C}, V_{CE} = 25\text{ V}, V_{GE} = 0\text{ V}$		C_{ies}	14,3	nF
Rückwirkungskapazität Reverse transfer capacitance	$f = 100\text{ kHz}, T_{vj} = 25^{\circ}\text{C}, V_{CE} = 25\text{ V}, V_{GE} = 0\text{ V}$		C_{res}	0,05	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	$I_C = 100\text{ A}, V_{CE} = 300\text{ V}$ $V_{GE} = -15 / 15\text{ V}$ $R_{Gon} = 20\ \Omega$	$T_{vj} = 25^{\circ}\text{C}$ $T_{vj} = 125^{\circ}\text{C}$ $T_{vj} = 150^{\circ}\text{C}$	t_{don}	0,097 0,087 0,082	μs μs μs
Anstiegszeit, induktive Last Rise time, inductive load	$I_C = 100\text{ A}, V_{CE} = 300\text{ V}$ $V_{GE} = -15 / 15\text{ V}$ $R_{Gon} = 20\ \Omega$	$T_{vj} = 25^{\circ}\text{C}$ $T_{vj} = 125^{\circ}\text{C}$ $T_{vj} = 150^{\circ}\text{C}$	t_r	0,046 0,05 0,054	μs μs μs
Abschaltverzögerungszeit, induktive Last Turn-off delay time, inductive load	$I_C = 100\text{ A}, V_{CE} = 300\text{ V}$ $V_{GE} = -15 / 15\text{ V}$ $R_{Goff} = 39\ \Omega$	$T_{vj} = 25^{\circ}\text{C}$ $T_{vj} = 125^{\circ}\text{C}$ $T_{vj} = 150^{\circ}\text{C}$	t_{doff}	0,654 0,687 0,704	μs μs μs
Fallzeit, induktive Last Fall time, inductive load	$I_C = 100\text{ A}, V_{CE} = 300\text{ V}$ $V_{GE} = -15 / 15\text{ V}$ $R_{Goff} = 39\ \Omega$	$T_{vj} = 25^{\circ}\text{C}$ $T_{vj} = 125^{\circ}\text{C}$ $T_{vj} = 150^{\circ}\text{C}$	t_f	0,029 0,033 0,033	μs μs μs
Einschaltverlustenergie pro Puls Turn-on energy loss per pulse	$I_C = 100\text{ A}, V_{CE} = 300\text{ V}, L_{\sigma} = 35\text{ nH}$ $di/dt = 1800\text{ A}/\mu\text{s} (T_{vj} = 150^{\circ}\text{C})$ $V_{GE} = -15 / 15\text{ V}, R_{Gon} = 20\ \Omega$	$T_{vj} = 25^{\circ}\text{C}$ $T_{vj} = 125^{\circ}\text{C}$ $T_{vj} = 150^{\circ}\text{C}$	E_{on}	2,79 3,20 3,51	mJ mJ mJ
Abschaltverlustenergie pro Puls Turn-off energy loss per pulse	$I_C = 100\text{ A}, V_{CE} = 300\text{ V}, L_{\sigma} = 35\text{ nH}$ $du/dt = 3700\text{ V}/\mu\text{s} (T_{vj} = 150^{\circ}\text{C})$ $V_{GE} = -15 / 15\text{ V}, R_{Goff} = 39\ \Omega$	$T_{vj} = 25^{\circ}\text{C}$ $T_{vj} = 125^{\circ}\text{C}$ $T_{vj} = 150^{\circ}\text{C}$	E_{off}	1,21 1,48 1,61	mJ mJ mJ
Kurzschlußverhalten SC data	$V_{GE} \leq 15\text{ V}, V_{CC} = 360\text{ V}$ $V_{CEmax} = V_{CES} - L_{SCE} \cdot di/dt$	$t_p \leq 0\ \mu\text{s}, T_{vj} = 150^{\circ}\text{C}$	I_{SC}	1600	A
Wärmewiderstand, Chip bis Kühlkörper Thermal resistance, junction to heatsink	pro IGBT / per IGBT		R_{thJH}	0,814	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
Implementierter Kollektor-Strom Implemented collector current		I_{CN}	200	A
Kollektor-Dauergleichstrom Continuous DC collector current	$T_H = 65^{\circ}\text{C}, T_{vj\max} = 175^{\circ}\text{C}$	I_{CDC}	95	A
Periodischer Kollektor-Spitzenstrom Repetitive peak collector current	$t_p = 1\text{ ms}$	I_{CRM}	400	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	$I_C = 100\text{ A}$ $V_{GE} = 15\text{ V}$	$T_{vj} = 25^{\circ}\text{C}$ $T_{vj} = 125^{\circ}\text{C}$ $T_{vj} = 150^{\circ}\text{C}$	$V_{CE\text{ sat}}$	1,17 1,20 1,21	1,38 V V V
Gate-Schwellenspannung Gate threshold voltage	$I_C = 2,00\text{ mA}, V_{CE} = V_{GE}, T_{vj} = 25^{\circ}\text{C}$		V_{GETH}	3,25 4,00 4,75	V
Gateladung Gate charge	$V_{GE} = -15 / 15\text{ V}, V_{CE} = 400\text{ V}$		Q_G	0,84	μC
Interner Gatewiderstand Internal gate resistor	$T_{vj} = 25^{\circ}\text{C}$		R_{Gint}	0,0	Ω
Eingangskapazität Input capacitance	$f = 100\text{ kHz}, T_{vj} = 25^{\circ}\text{C}, V_{CE} = 25\text{ V}, V_{GE} = 0\text{ V}$		C_{ies}	14,3	nF
Rückwirkungskapazität Reverse transfer capacitance	$f = 100\text{ kHz}, T_{vj} = 25^{\circ}\text{C}, V_{CE} = 25\text{ V}, V_{GE} = 0\text{ V}$		C_{res}	0,05	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}		0,044 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	$I_C = 100\text{ A}, V_{CE} = 300\text{ V}$ $V_{GE} = -15 / 15\text{ V}$ $R_{Gon} = 20\ \Omega$	$T_{vj} = 25^{\circ}\text{C}$ $T_{vj} = 125^{\circ}\text{C}$ $T_{vj} = 150^{\circ}\text{C}$	t_{don}	0,098 0,087 0,085	μs μs μs
Anstiegszeit, induktive Last Rise time, inductive load	$I_C = 100\text{ A}, V_{CE} = 300\text{ V}$ $V_{GE} = -15 / 15\text{ V}$ $R_{Gon} = 20\ \Omega$	$T_{vj} = 25^{\circ}\text{C}$ $T_{vj} = 125^{\circ}\text{C}$ $T_{vj} = 150^{\circ}\text{C}$	t_r	0,037 0,043 0,046	μs μs μs
Abschaltverzögerungszeit, induktive Last Turn-off delay time, inductive load	$I_C = 100\text{ A}, V_{CE} = 300\text{ V}$ $V_{GE} = -15 / 15\text{ V}$ $R_{Goff} = 39\ \Omega$	$T_{vj} = 25^{\circ}\text{C}$ $T_{vj} = 125^{\circ}\text{C}$ $T_{vj} = 150^{\circ}\text{C}$	t_{doff}	0,651 0,685 0,695	μs μs μs
Fallzeit, induktive Last Fall time, inductive load	$I_C = 100\text{ A}, V_{CE} = 300\text{ V}$ $V_{GE} = -15 / 15\text{ V}$ $R_{Goff} = 39\ \Omega$	$T_{vj} = 25^{\circ}\text{C}$ $T_{vj} = 125^{\circ}\text{C}$ $T_{vj} = 150^{\circ}\text{C}$	t_f	0,018 0,024 0,026	μs μs μs
Einschaltverlustenergie pro Puls Turn-on energy loss per pulse	$I_C = 100\text{ A}, V_{CE} = 300\text{ V}, L\sigma = 35\text{ nH}$ $di/dt = 2200\text{ A}/\mu\text{s} (T_{vj} = 150^{\circ}\text{C})$ $V_{GE} = -15 / 15\text{ V}, R_{Gon} = 20\ \Omega$	$T_{vj} = 25^{\circ}\text{C}$ $T_{vj} = 125^{\circ}\text{C}$ $T_{vj} = 150^{\circ}\text{C}$	E_{on}	2,18 2,56 2,79	mJ mJ mJ
Abschaltverlustenergie pro Puls Turn-off energy loss per pulse	$I_C = 100\text{ A}, V_{CE} = 300\text{ V}, L\sigma = 35\text{ nH}$ $du/dt = 3500\text{ V}/\mu\text{s} (T_{vj} = 150^{\circ}\text{C})$ $V_{GE} = -15 / 15\text{ V}, R_{Goff} = 39\ \Omega$	$T_{vj} = 25^{\circ}\text{C}$ $T_{vj} = 125^{\circ}\text{C}$ $T_{vj} = 150^{\circ}\text{C}$	E_{off}	1,28 1,65 1,80	mJ mJ mJ
Kurzschlußverhalten SC data	$V_{GE} \leq 15\text{ V}, V_{CC} = 360\text{ V}$ $V_{CE\max} = V_{CES} - L_{SCE} \cdot di/dt$	$t_p \leq 0\ \mu\text{s}, T_{vj} = 150^{\circ}\text{C}$	I_{SC}	1600	A
Wärmewiderstand, Chip bis Kühlkörper Thermal resistance, junction to heatsink	pro IGBT / per IGBT		R_{thJH}	0,814	K/W
Temperatur im Schaltbetrieb Temperature under switching conditions			$T_{vj\text{ op}}$	-40	150 $^{\circ}\text{C}$

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}	650	V
Implementierter Durchlassstrom Implemented forward current		I_{FN}	120	A
Dauergleichstrom Continuous DC forward current		I_F	100	A
Periodischer Spitzenstrom Repetitive peak forward current	$t_p = 1\text{ ms}$	I_{FRM}	240	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	700 690	A^2s A^2s

Charakteristische Werte / Characteristic Values

			min.	typ.	max.	
Durchlassspannung Forward voltage	$I_F = 100\text{ A}, V_{GE} = 0\text{ V}$	$T_{vj} = 25^{\circ}\text{C}$	V_F	1,38	1,65	V
	$I_F = 100\text{ A}, V_{GE} = 0\text{ V}$	$T_{vj} = 125^{\circ}\text{C}$		1,49		V
	$I_F = 100\text{ A}, V_{GE} = 0\text{ V}$	$T_{vj} = 150^{\circ}\text{C}$		1,52		V
Rückstromspitze Peak reverse recovery current	$I_F = 100\text{ A}, -di_F/dt = 1800\text{ A}/\mu\text{s} (T_{vj}=150^{\circ}\text{C})$ $V_R = 300\text{ V}$	$T_{vj} = 25^{\circ}\text{C}$	I_{RM}	58,3	A	A
		$T_{vj} = 125^{\circ}\text{C}$		74,4		A
		$T_{vj} = 150^{\circ}\text{C}$		77,6		A
Sperrverzögerungsladung Recovered charge	$I_F = 100\text{ A}, -di_F/dt = 1800\text{ A}/\mu\text{s} (T_{vj}=150^{\circ}\text{C})$ $V_R = 300\text{ V}$	$T_{vj} = 25^{\circ}\text{C}$	Q_r	3,10	μC	μC
		$T_{vj} = 125^{\circ}\text{C}$		5,40		μC
		$T_{vj} = 150^{\circ}\text{C}$		5,50		μC
Abschaltenergie pro Puls Reverse recovery energy	$I_F = 100\text{ A}, -di_F/dt = 1800\text{ A}/\mu\text{s} (T_{vj}=150^{\circ}\text{C})$ $V_R = 300\text{ V}$	$T_{vj} = 25^{\circ}\text{C}$	E_{rec}	0,50	mJ	mJ
		$T_{vj} = 125^{\circ}\text{C}$		0,57		mJ
		$T_{vj} = 150^{\circ}\text{C}$		0,69		mJ
Wärmewiderstand, Chip bis Kühlkörper Thermal resistance, junction to heatsink	pro Diode / per diode	R_{thJH}		1,15		K/W
Temperatur im Schaltbetrieb Temperature under switching conditions		$T_{vj\text{ op}}$	-40		150	$^{\circ}\text{C}$

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
Implementierter Durchlassstrom Implemented forward current		I_{FN}	150	A
Dauergleichstrom Continuous DC forward current		I_F	100	A
Periodischer Spitzenstrom Repetitive peak forward current	$t_p = 1\text{ ms}$	I_{FRM}	300	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	770 690	A^2s A^2s

Charakteristische Werte / Characteristic Values

			min.	typ.	max.	
Durchlassspannung Forward voltage	$I_F = 100\text{ A}, V_{GE} = 0\text{ V}$	$T_{vj} = 25^{\circ}\text{C}$	V_F	1,33	1,55	V
	$I_F = 100\text{ A}, V_{GE} = 0\text{ V}$	$T_{vj} = 125^{\circ}\text{C}$		1,29		V
	$I_F = 100\text{ A}, V_{GE} = 0\text{ V}$	$T_{vj} = 150^{\circ}\text{C}$		1,26		V
Rückstromspitze Peak reverse recovery current	$I_F = 100\text{ A}, -di_F/dt = 2200\text{ A}/\mu\text{s} (T_{vj}=150^{\circ}\text{C})$ $V_R = 300\text{ V}$ $V_{GE} = -15\text{ V}$	$T_{vj} = 25^{\circ}\text{C}$	I_{RM}	47,6	A	A
		$T_{vj} = 125^{\circ}\text{C}$		49,8		A
		$T_{vj} = 150^{\circ}\text{C}$		52,7		A
Sperrverzögerungsladung Recovered charge	$I_F = 100\text{ A}, -di_F/dt = 2200\text{ A}/\mu\text{s} (T_{vj}=150^{\circ}\text{C})$ $V_R = 300\text{ V}$ $V_{GE} = -15\text{ V}$	$T_{vj} = 25^{\circ}\text{C}$	Q_r	1,90	μC	μC
		$T_{vj} = 125^{\circ}\text{C}$		2,00		μC
		$T_{vj} = 150^{\circ}\text{C}$		2,10		μC
Abschaltenergie pro Puls Reverse recovery energy	$I_F = 100\text{ A}, -di_F/dt = 2200\text{ A}/\mu\text{s} (T_{vj}=150^{\circ}\text{C})$ $V_R = 300\text{ V}$ $V_{GE} = -15\text{ V}$	$T_{vj} = 25^{\circ}\text{C}$	E_{rec}	0,527	mJ	mJ
		$T_{vj} = 125^{\circ}\text{C}$		0,965		mJ
		$T_{vj} = 150^{\circ}\text{C}$		1,11		mJ
Wärmewiderstand, Chip bis Kühlkörper Thermal resistance, junction to heatsink	pro Diode / per diode	R_{thJH}		0,953		K/W
Temperatur im Schaltbetrieb Temperature under switching conditions		$T_{vj\text{ op}}$	-40		150	$^{\circ}\text{C}$

Diode, D5-D6 / Diode, D5-D6

Höchstzulässige Werte / Maximum Rated Values

Periodische Spitzensperrspannung Repetitive peak reverse voltage	$T_{vj} = 25^{\circ}\text{C}$	V_{RRM}	650	V
Implementierter Durchlassstrom Implemented forward current		I_{FN}	120	A
Dauergleichstrom Continuous DC forward current		I_F	100	A
Periodischer Spitzenstrom Repetitive peak forward current	$t_p = 1 \text{ ms}$	I_{FRM}	240	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	700 690	A^2s A^2s

Charakteristische Werte / Characteristic Values

		min.	typ.	max.	
Durchlassspannung Forward voltage	$I_F = 100 \text{ A}, V_{GE} = 0 \text{ V}$ $T_{vj} = 25^{\circ}\text{C}$		1,38	1,65	V
	$I_F = 100 \text{ A}, V_{GE} = 0 \text{ V}$ $T_{vj} = 125^{\circ}\text{C}$		1,49		V
	$I_F = 100 \text{ A}, V_{GE} = 0 \text{ V}$ $T_{vj} = 150^{\circ}\text{C}$		1,52		V
Rückstromspitze Peak reverse recovery current	$I_F = 100 \text{ A}, -di_F/dt = 1800 \text{ A}/\mu\text{s} (T_{vj}=150^{\circ}\text{C})$ $T_{vj} = 25^{\circ}\text{C}$		58,3		A
	$V_R = 300 \text{ V}$ $T_{vj} = 125^{\circ}\text{C}$		74,4		A
	$V_{GE} = -15 \text{ V}$ $T_{vj} = 150^{\circ}\text{C}$		77,6		A
Sperrverzögerungsladung Recovered charge	$I_F = 100 \text{ A}, -di_F/dt = 1800 \text{ A}/\mu\text{s} (T_{vj}=150^{\circ}\text{C})$ $T_{vj} = 25^{\circ}\text{C}$		3,10		μC
	$V_R = 300 \text{ V}$ $T_{vj} = 125^{\circ}\text{C}$		5,40		μC
	$V_{GE} = -15 \text{ V}$ $T_{vj} = 150^{\circ}\text{C}$		5,50		μC
Abschaltenergie pro Puls Reverse recovery energy	$I_F = 100 \text{ A}, -di_F/dt = 1800 \text{ A}/\mu\text{s} (T_{vj}=150^{\circ}\text{C})$ $T_{vj} = 25^{\circ}\text{C}$		0,50		mJ
	$V_R = 300 \text{ V}$ $T_{vj} = 125^{\circ}\text{C}$		0,57		mJ
	$V_{GE} = -15 \text{ V}$ $T_{vj} = 150^{\circ}\text{C}$		0,69		mJ
Wärmewiderstand, Chip bis Kühlkörper Thermal resistance, junction to heatsink	pro Diode / per diode	R_{thJH}	1,15		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.

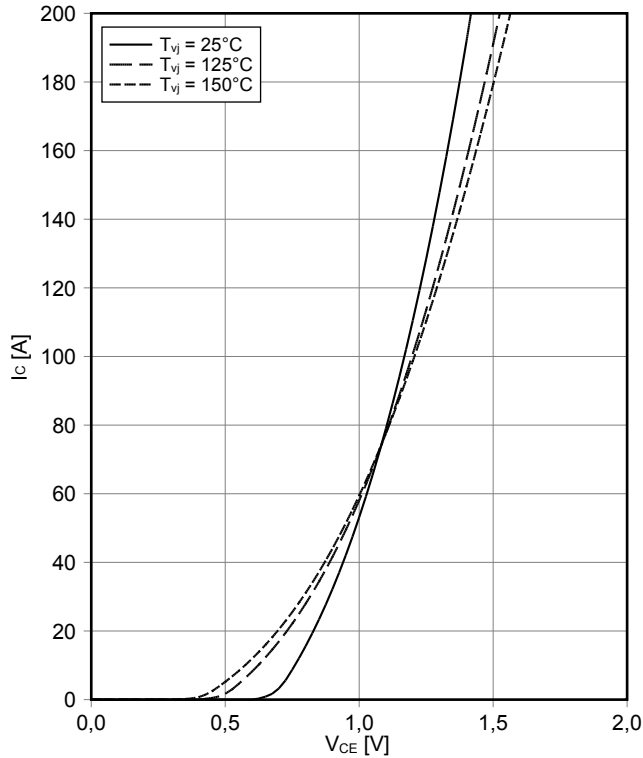
Modul / Module

Isolations-Prüfspannung Isolation test voltage	RMS, f = 50 Hz, t = 1 min.	V _{ISOL}	2,5			kV
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		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			
Relativer Temperaturindex (elektr.) RTI Elec.	Gehäuse housing	RTI	140			°C
			min.	typ.	max.	
Modulstreuinduktivität Stray inductance module		L _{sCE}		20		nH
Lagertemperatur Storage temperature		T _{stg}	-40		125	°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.

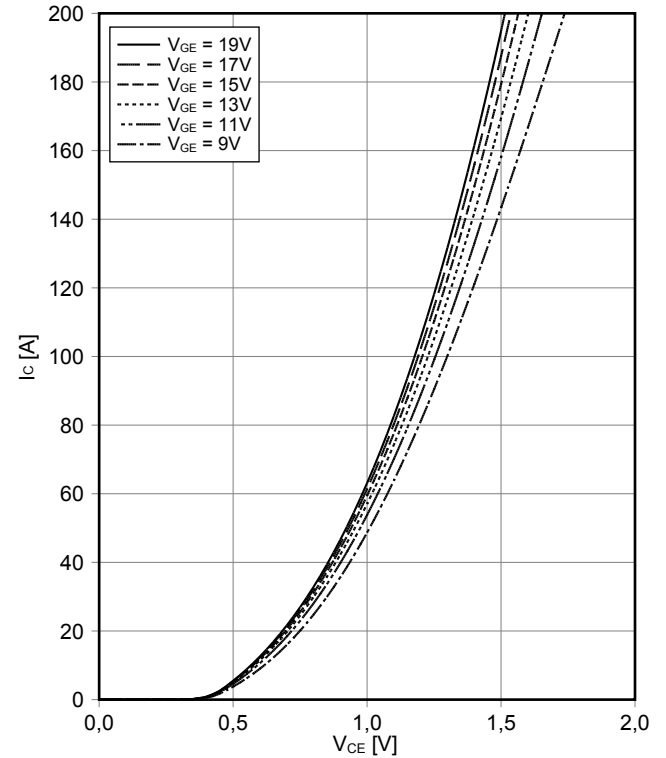
Ausgangskennlinie IGBT, T1 / T4 (typisch)
output characteristic IGBT, T1 / T4 (typical)

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



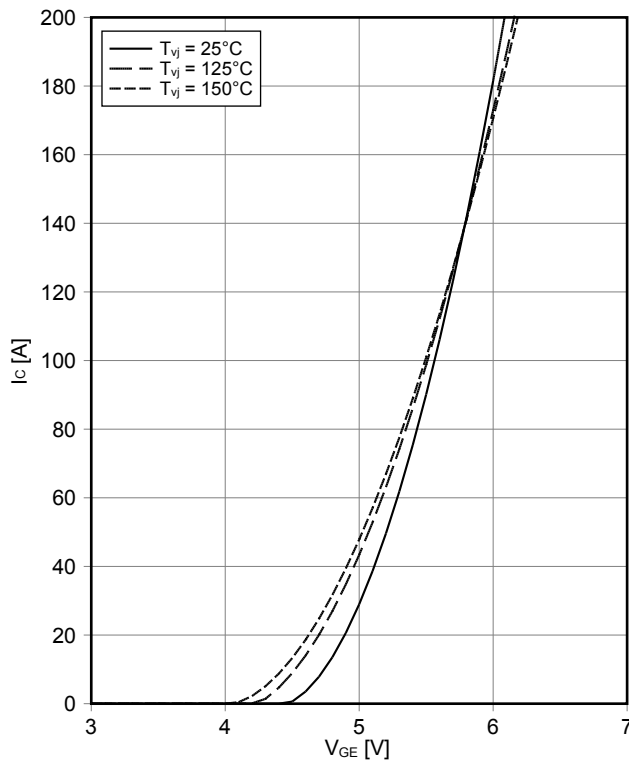
Ausgangskennlinienfeld IGBT, T1 / T4 (typisch)
output characteristic IGBT, T1 / T4 (typical)

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



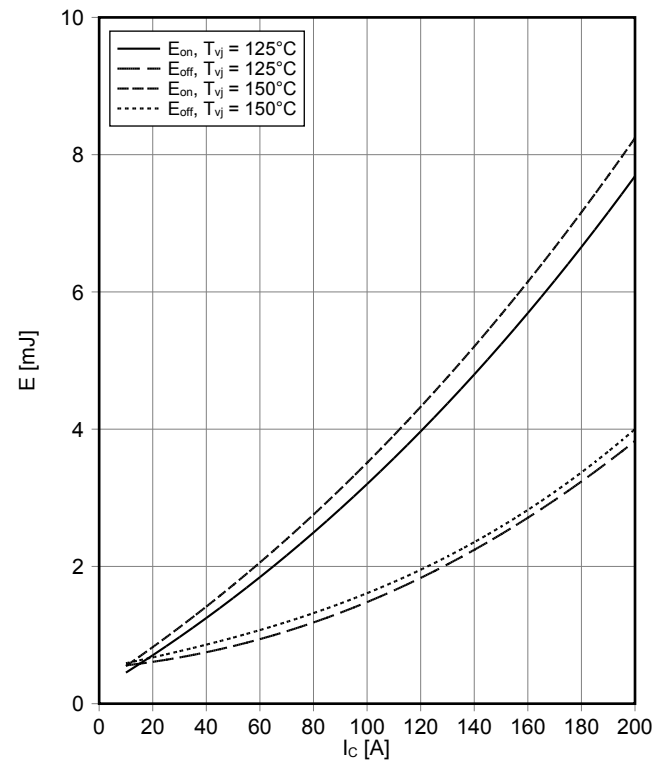
Übertragungscharakteristik IGBT, T1 / T4 (typisch)
transfer characteristic IGBT, T1 / T4 (typical)

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



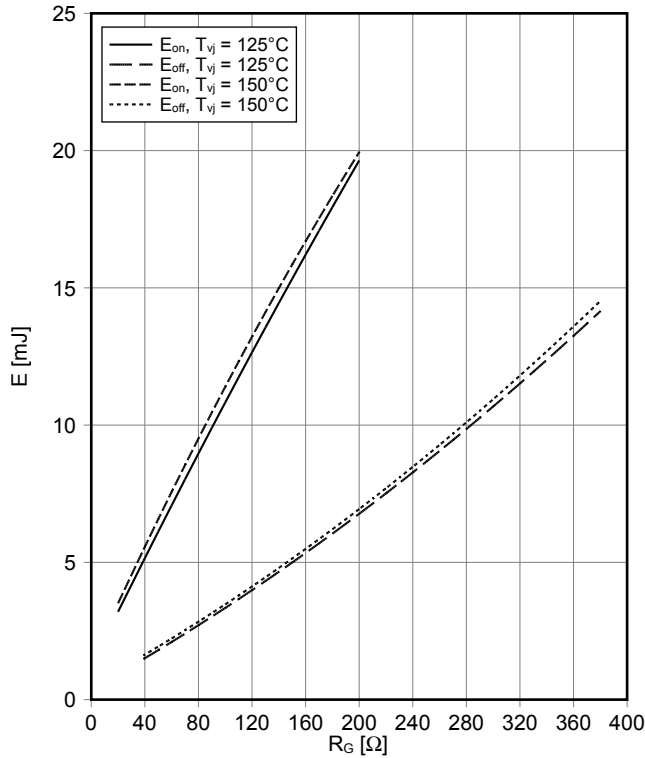
Schaltverluste IGBT, T1 / T4 (typisch)
switching losses IGBT, T1 / T4 (typical)

$E_{on} = f(I_C)$, $E_{off} = f(I_C)$
 $V_{GE} = \pm 15\text{ V}$, $R_{Gon} = 20\ \Omega$, $R_{Goff} = 39\ \Omega$, $V_{CE} = 300\text{ V}$



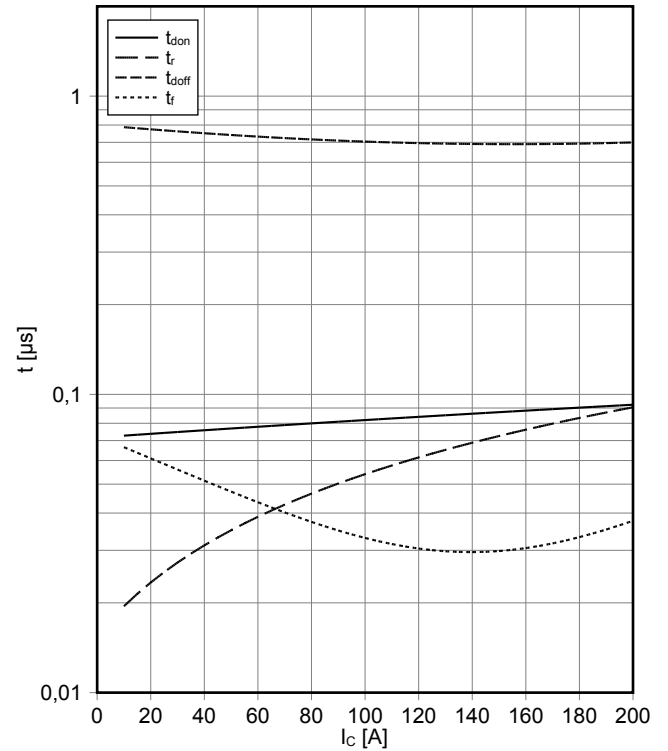
Schaltverluste IGBT, T1 / T4 (typisch)
switching losses IGBT, T1 / T4 (typical)

$E_{on} = f(R_G), E_{off} = f(R_G)$
 $V_{GE} = \pm 15\text{ V}, I_C = 100\text{ A}, V_{CE} = 300\text{ V}$



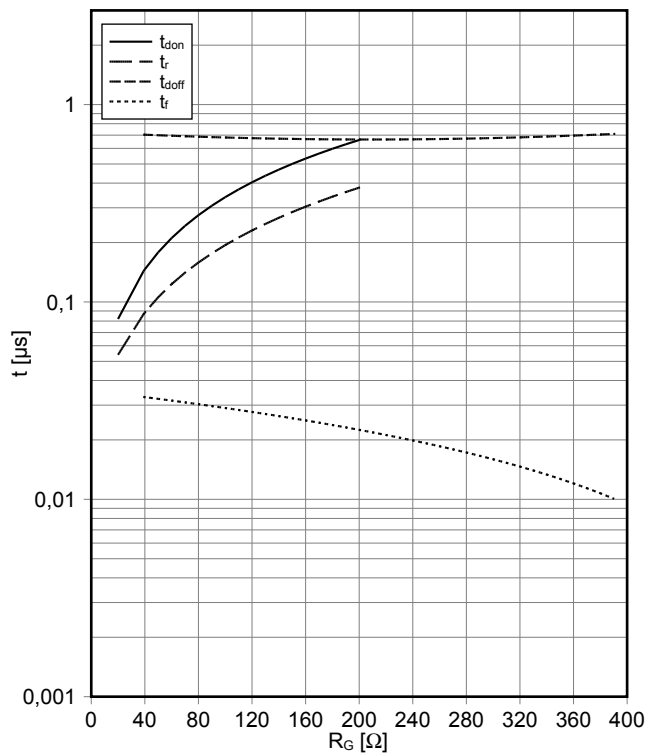
Schaltzeiten IGBT, T1 / T4 (typisch)
switching times IGBT, T1 / T4 (typical)

$t_{don} = f(I_C), t_r = f(I_C), t_{doff} = f(I_C), t_f = f(I_C)$
 $V_{GE} = \pm 15\text{ V}, R_{Gon} = 20\ \Omega, R_{Goff} = 39\ \Omega, V_{CE} = 300\text{ V}, T_{vj} = 150^\circ\text{C}$



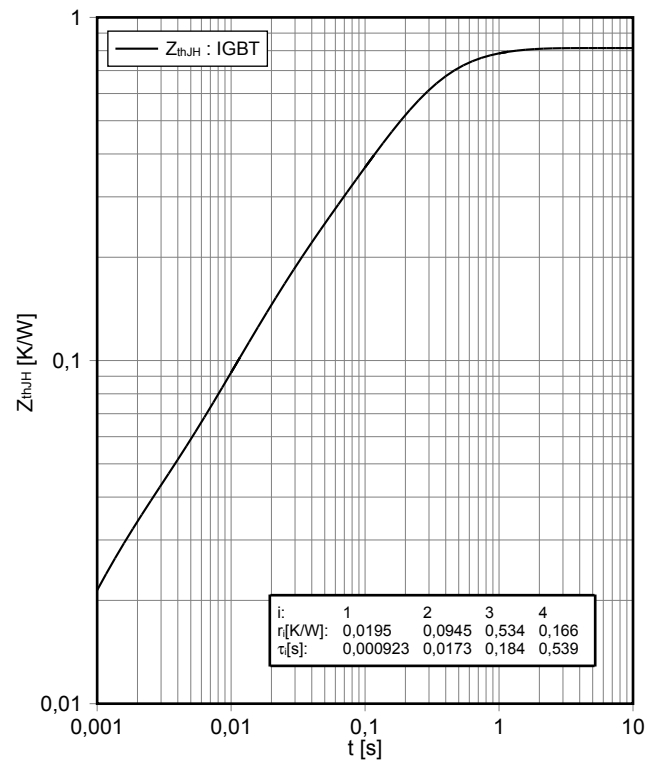
Schaltzeiten IGBT, T1 / T4 (typisch)
switching times IGBT, T1 / T4 (typical)

$t_{don} = f(R_G), t_r = f(R_G), t_{doff} = f(R_G), t_f = f(R_G)$
 $V_{GE} = \pm 15\text{ V}, I_C = 100\text{ A}, V_{CE} = 300\text{ V}, T_{vj} = 150^\circ\text{C}$



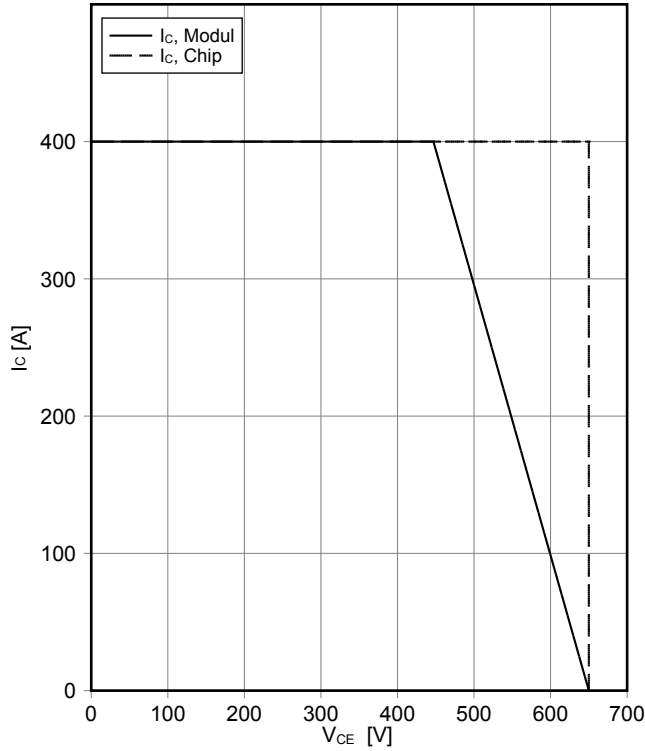
Transienter Wärmewiderstand IGBT, T1 / T4
transient thermal impedance IGBT, T1 / T4

$Z_{thJH} = f(t)$



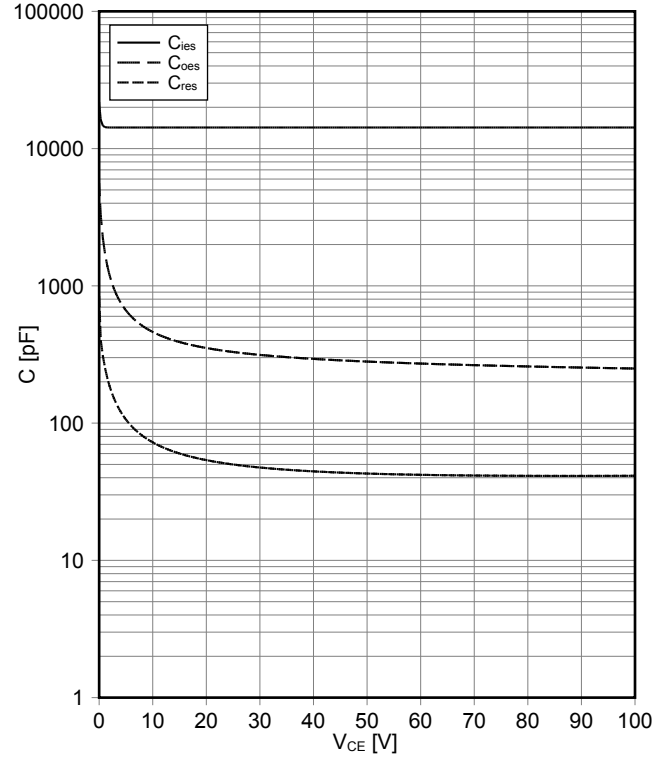
Sicherer Rückwärts-Arbeitsbereich IGBT, T1 / T4 (RBSOA)
reverse bias safe operating area IGBT, T1 / T4 (RBSOA)

$I_C = f(V_{CE})$
 $V_{GE} = \pm 15\text{ V}$, $R_{Goff} = 39\ \Omega$, $T_{vj} = 150^\circ\text{C}$



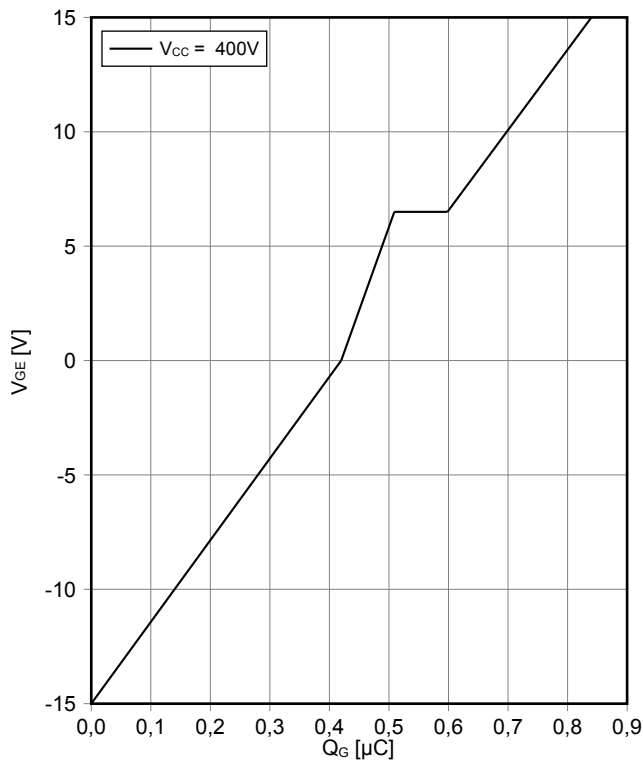
Kapazitäts Charakteristik IGBT, T1 / T4 (typisch)
capacity characteristic IGBT, T1 / T4 (typical)

$C = f(V_{CE})$
 $V_{GE} = 0\text{ V}$, $T_{vj} = 25^\circ\text{C}$, $f = 100\text{kHz}$



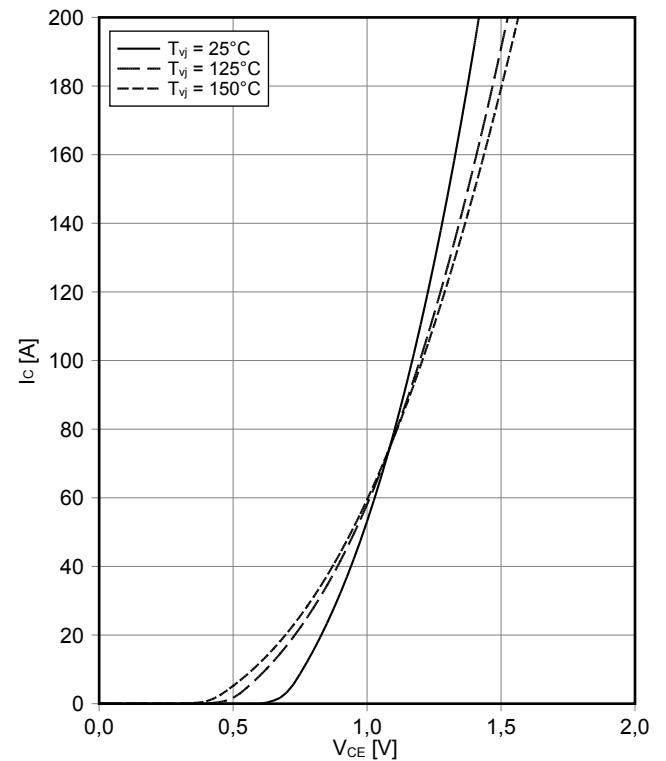
Gateladungs Charakteristik IGBT, T1 / T4 (typisch)
gate charge characteristic IGBT, T1 / T4 (typical)

$V_{GE} = f(Q_G)$
 $I_C = 200\text{ A}$, $T_{vj} = 25^\circ\text{C}$



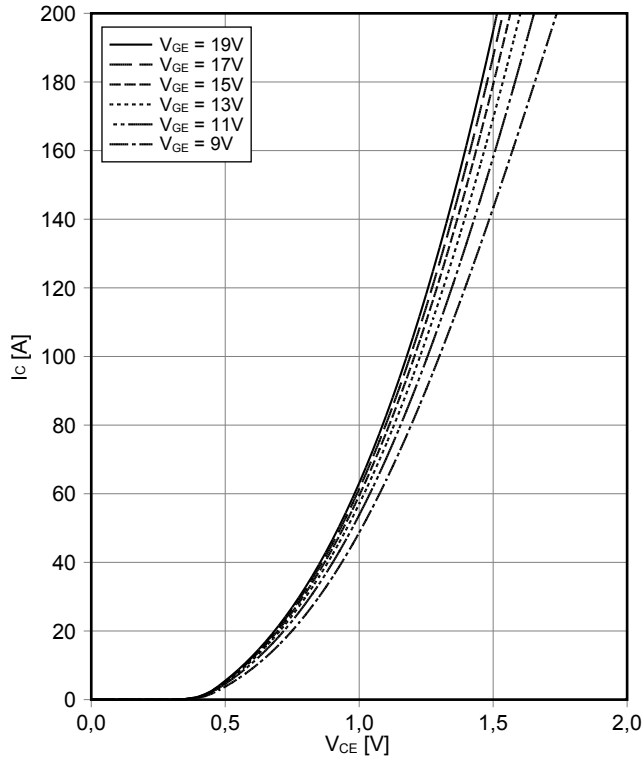
Ausgangskennlinie IGBT, T2 / T3 (typisch)
output characteristic IGBT, T2 / T3 (typical)

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



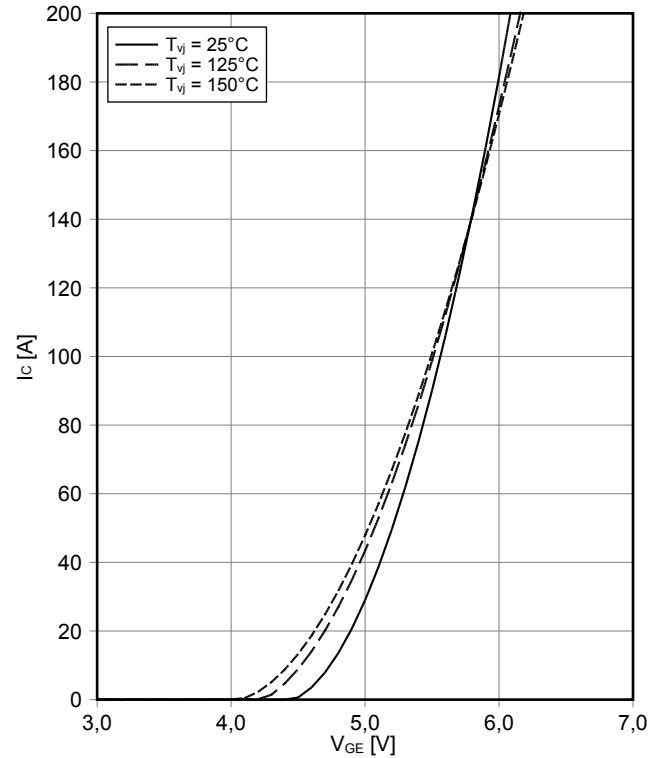
Ausgangskennlinienfeld IGBT, T2 / T3 (typisch)
output characteristic IGBT, T2 / T3 (typical)

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



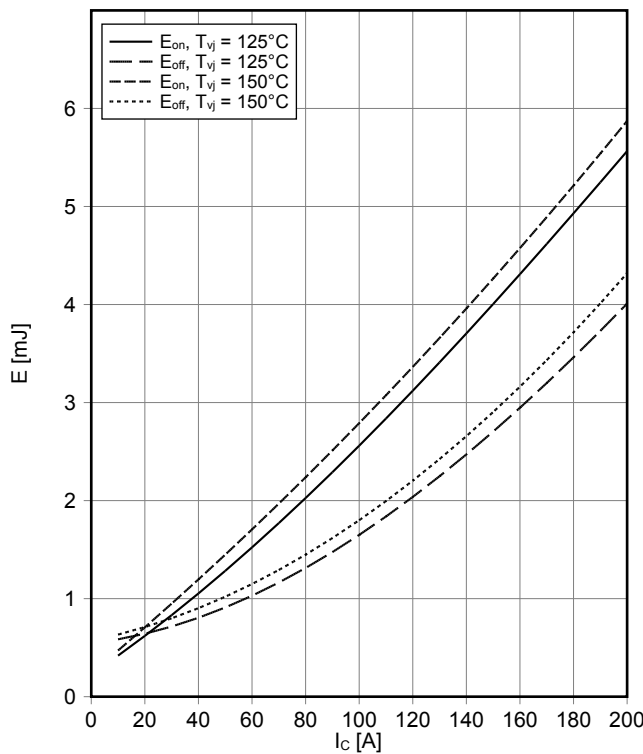
Übertragungscharakteristik IGBT, T2 / T3 (typisch)
transfer characteristic IGBT, T2 / T3 (typical)

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



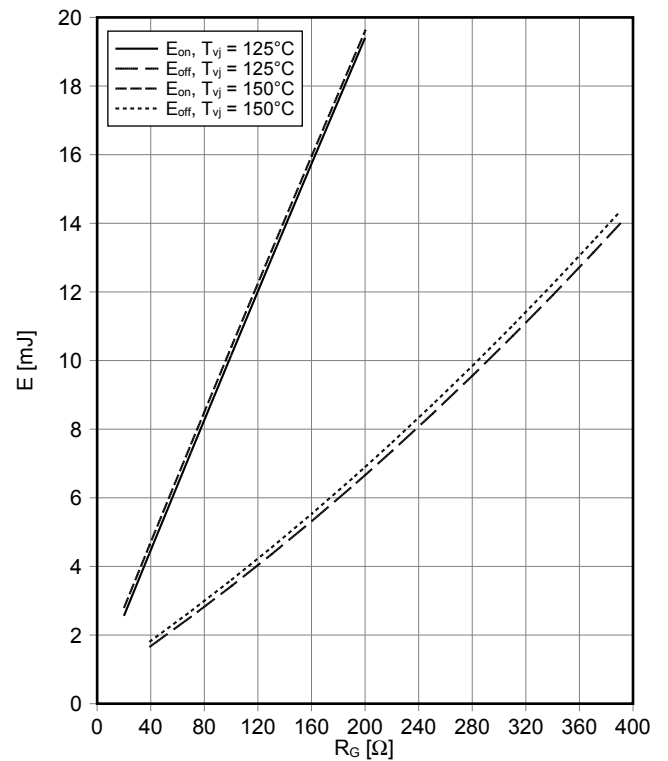
Schaltverluste IGBT, T2 / T3 (typisch)
switching losses IGBT, T2 / T3 (typical)

$E_{on} = f(I_C)$, $E_{off} = f(I_C)$
 $V_{GE} = \pm 15\text{ V}$, $R_{Gon} = 20\ \Omega$, $R_{Goff} = 39\ \Omega$, $V_{CE} = 300\text{ V}$



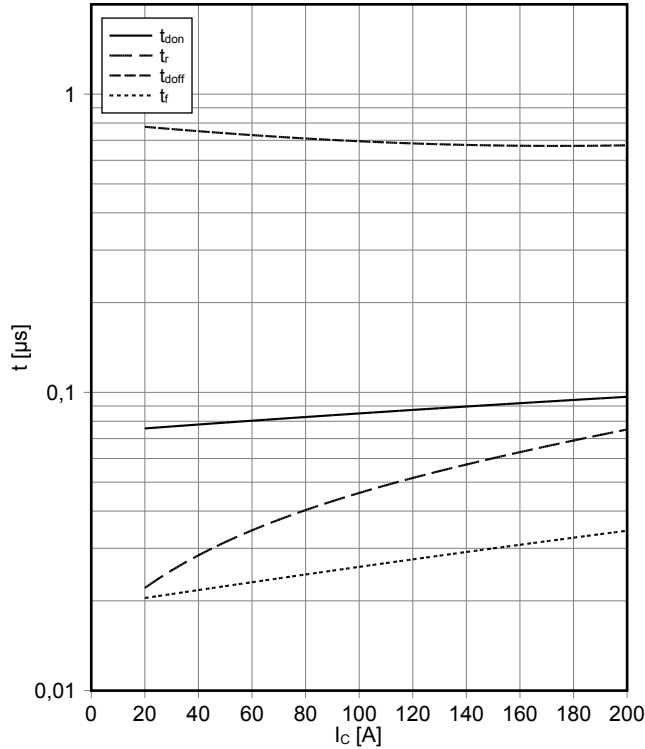
Schaltverluste IGBT, T2 / T3 (typisch)
switching losses IGBT, T2 / T3 (typical)

$E_{on} = f(R_G)$, $E_{off} = f(R_G)$
 $V_{GE} = \pm 15\text{ V}$, $I_C = 100\text{ A}$, $V_{CE} = 300\text{ V}$



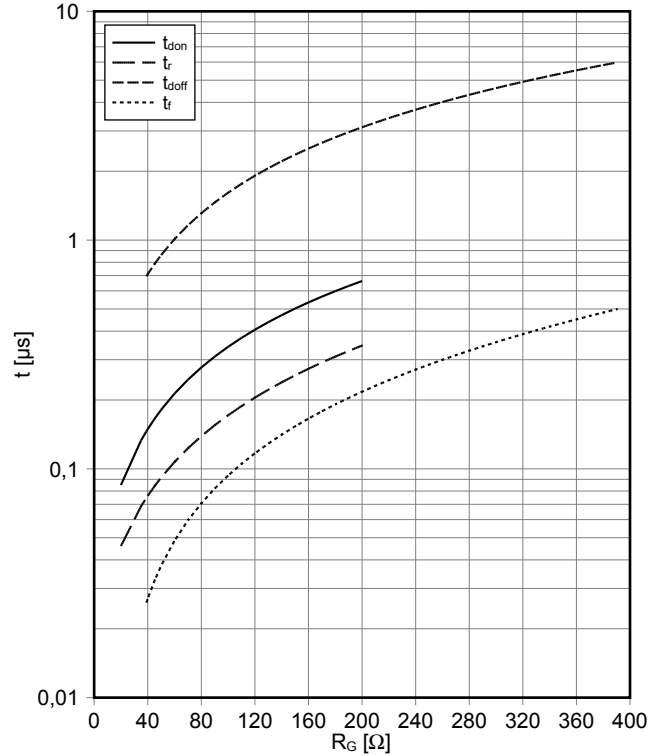
Schaltzeiten IGBT, T2 / T3 (typisch)
switching times IGBT, T2 / T3 (typical)

$t_{don} = f(I_C)$, $t_r = f(I_C)$, $t_{doff} = f(I_C)$, $t_f = f(I_C)$
 $V_{GE} = \pm 15\text{ V}$, $R_{Gon} = 20\ \Omega$, $R_{Goff} = 39\ \Omega$, $V_{CE} = 300\text{ V}$, $T_{vj} = 150^\circ\text{C}$



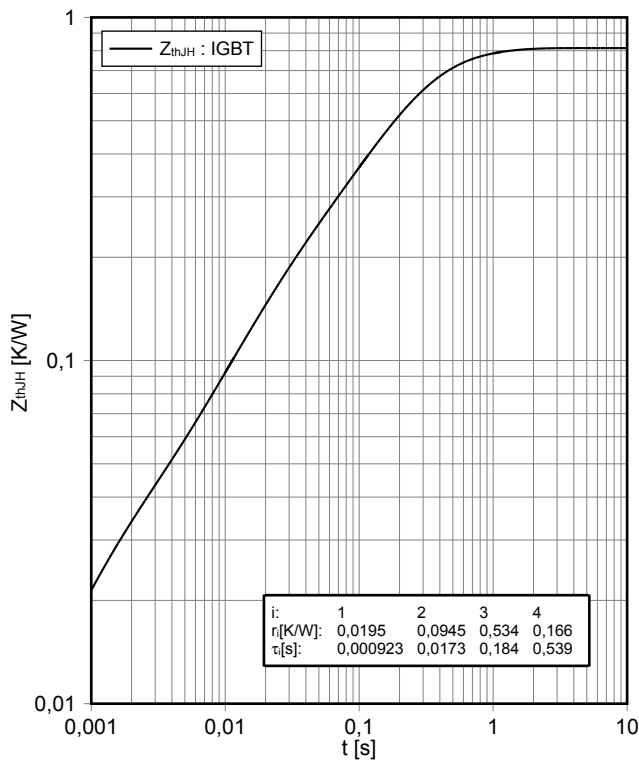
Schaltzeiten IGBT, T2 / T3 (typisch)
switching times IGBT, T2 / T3 (typical)

$t_{don} = f(R_G)$, $t_r = f(R_G)$, $t_{doff} = f(R_G)$, $t_f = f(R_G)$
 $V_{GE} = \pm 15\text{ V}$, $I_C = 100\text{ A}$, $V_{CE} = 300\text{ V}$, $T_{vj} = 150^\circ\text{C}$



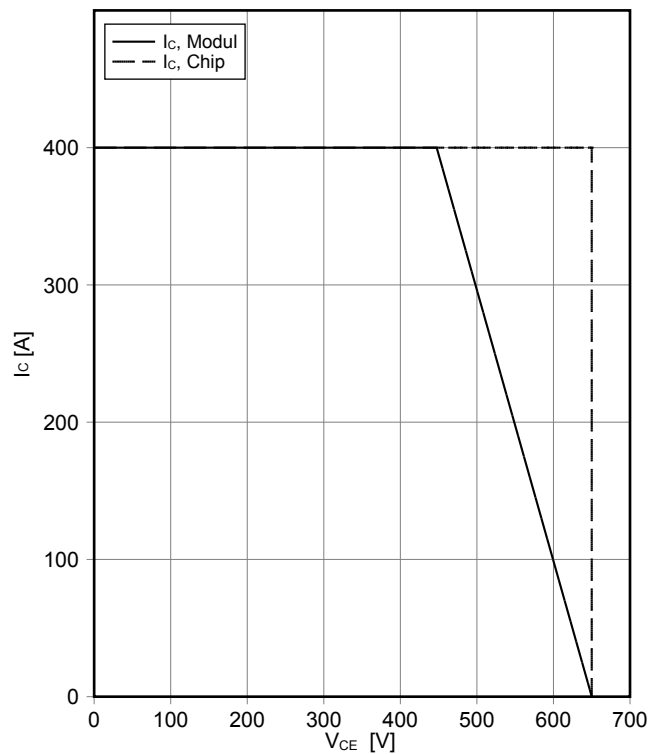
Transienter Wärmewiderstand IGBT, T2 / T3
transient thermal impedance IGBT, T2 / T3

$Z_{thJH} = f(t)$



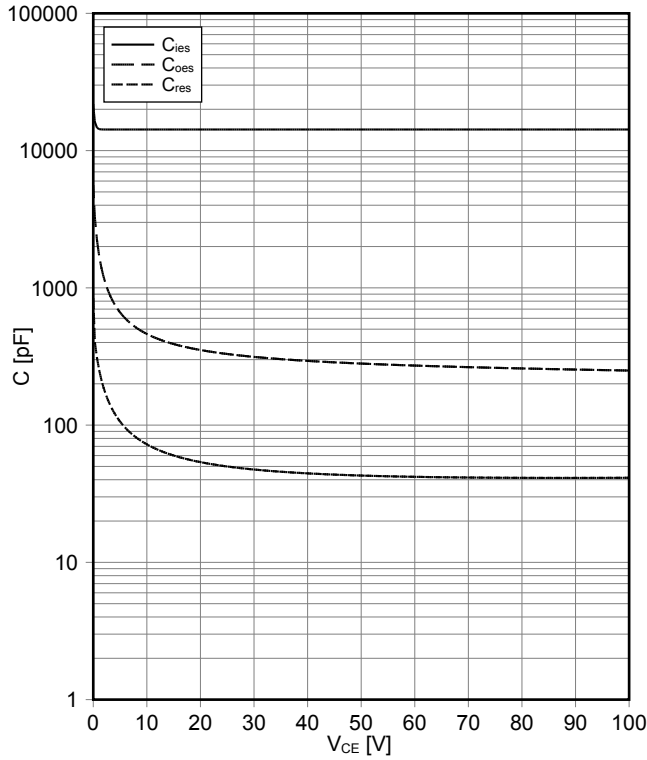
Sicherer Rückwärts-Arbeitsbereich IGBT, T2 / T3 (RBSOA)
reverse bias safe operating area IGBT, T2 / T3 (RBSOA)

$I_C = f(V_{CE})$
 $V_{GE} = \pm 15\text{ V}$, $R_{Goff} = 39\ \Omega$, $T_{vj} = 150^\circ\text{C}$



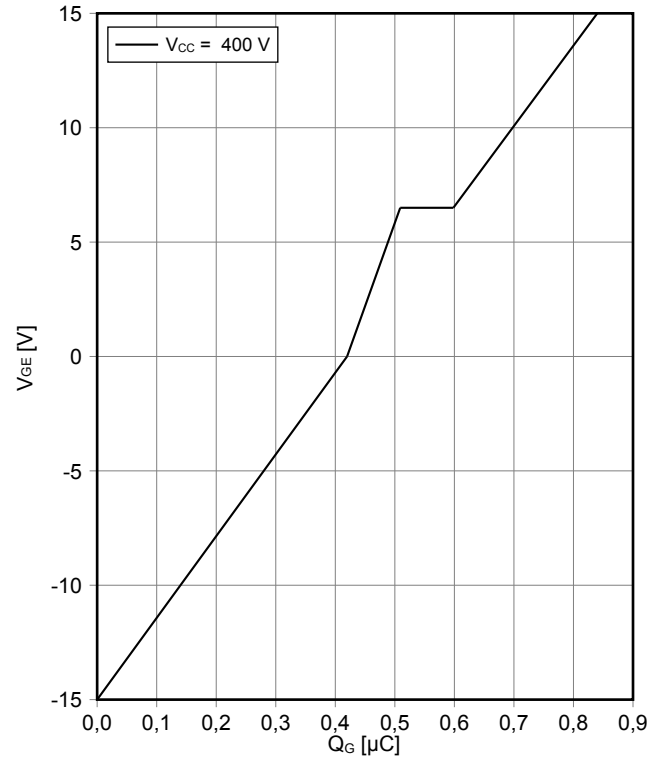
Kapazitäts Charakteristik IGBT, T2 / T3 (typisch)
capacity characteristic IGBT, T2 / T3 (typical)

$C = f(V_{CE})$
 $V_{GE} = 0 \text{ V}$, $T_{vj} = 25^\circ\text{C}$, $f = 100\text{kHz}$



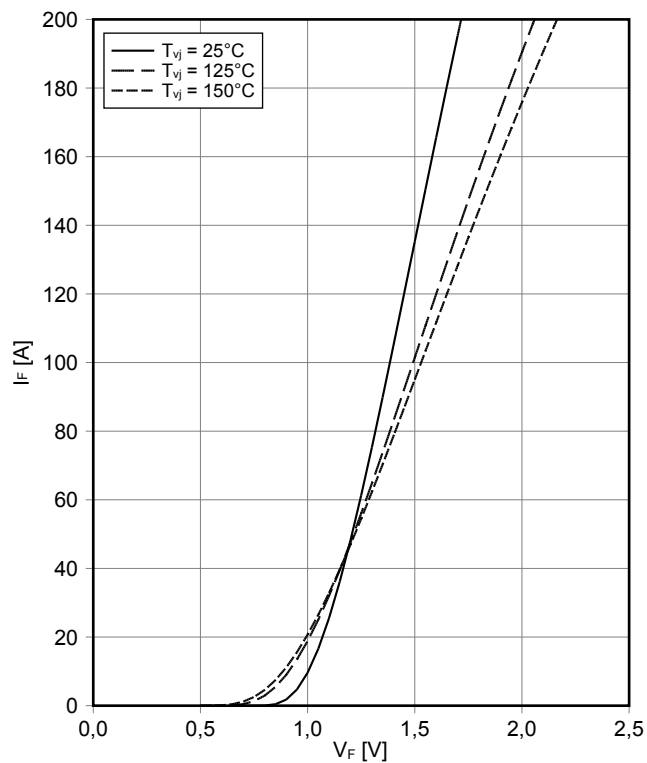
Gateladungs Charakteristik IGBT, T2 / T3 (typisch)
gate charge characteristic IGBT, T2 / T3 (typical)

$V_{GE} = f(Q_G)$
 $I_C = 200 \text{ A}$, $T_{vj} = 25^\circ\text{C}$



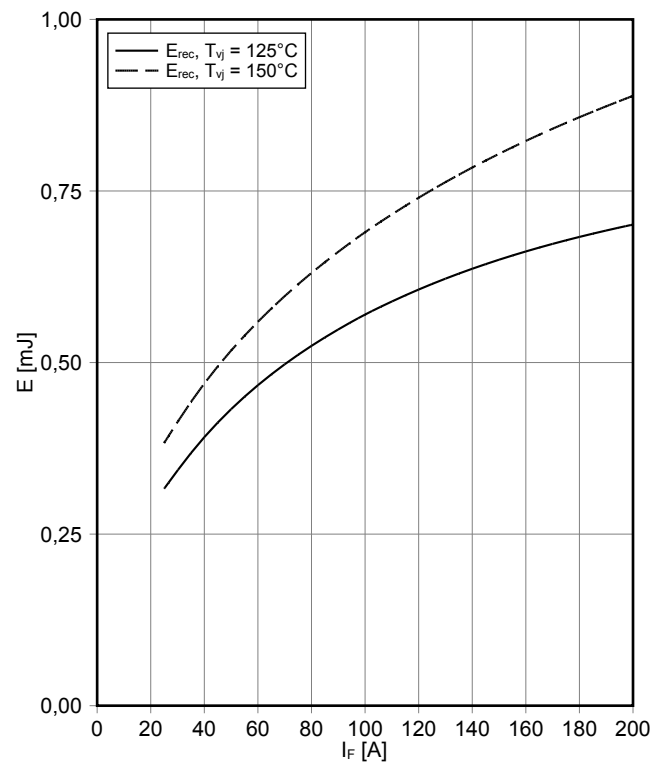
Durchlasskennlinie der Diode, D1 / D4 (typisch)
forward characteristic of Diode, D1 / D4 (typical)

$I_F = f(V_F)$



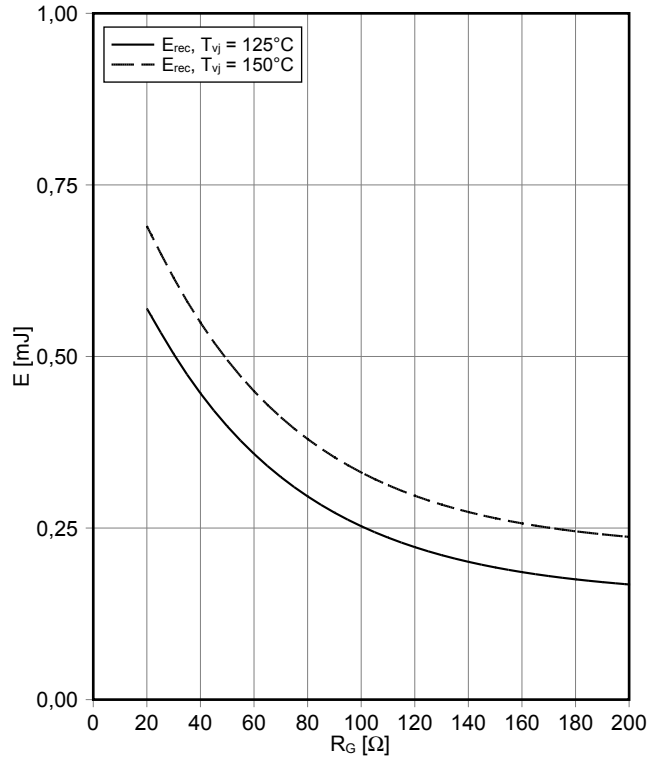
Schaltverluste Diode, D1 / D4 (typisch)
switching losses Diode, D1 / D4 (typical)

$E_{rec} = f(I_F)$
 $R_{Gon} = 20 \Omega$, $V_{CE} = 300 \text{ V}$



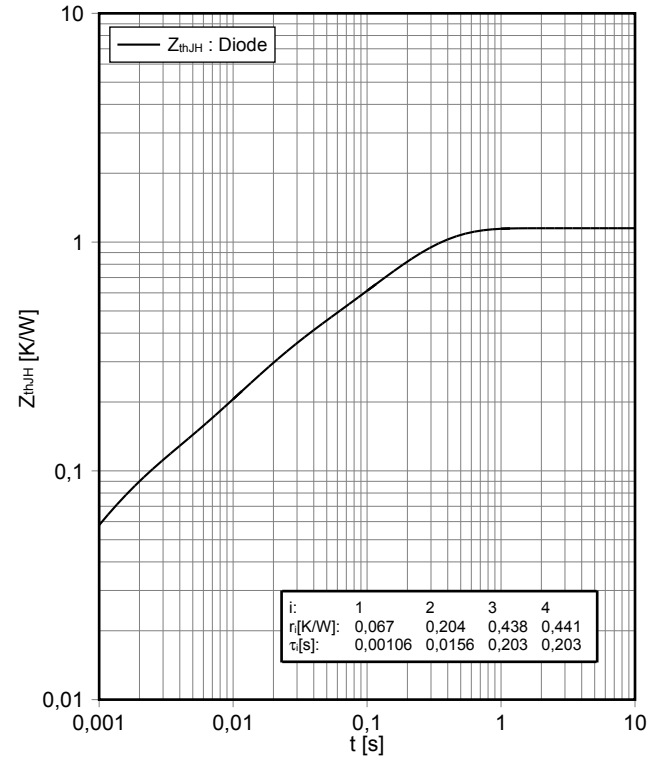
Schaltverluste Diode, D1 / D4 (typisch)
switching losses Diode, D1 / D4 (typical)

$E_{rec} = f(R_G)$
 $I_F = 100\text{ A}, V_{CE} = 300\text{ V}$



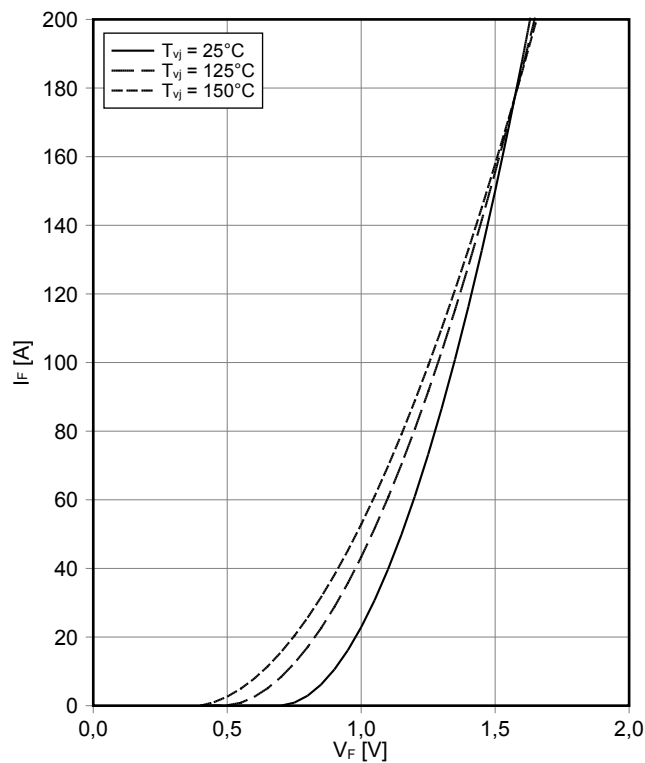
Transienter Wärmewiderstand Diode, D1 / D4
transient thermal impedance Diode, D1 / D4

$Z_{thJH} = f(t)$



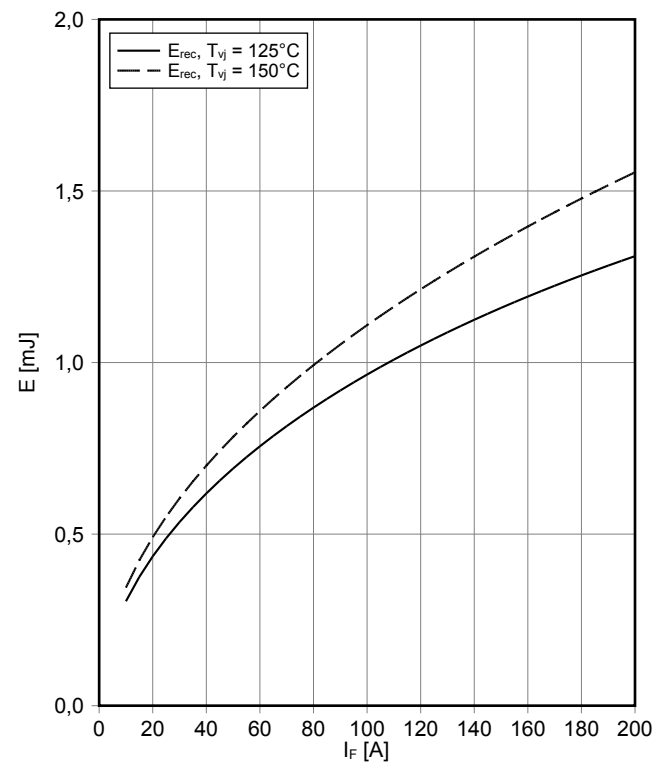
Durchlasskennlinie der Diode, D2 / D3 (typisch)
forward characteristic of Diode, D2 / D3 (typical)

$I_F = f(V_F)$



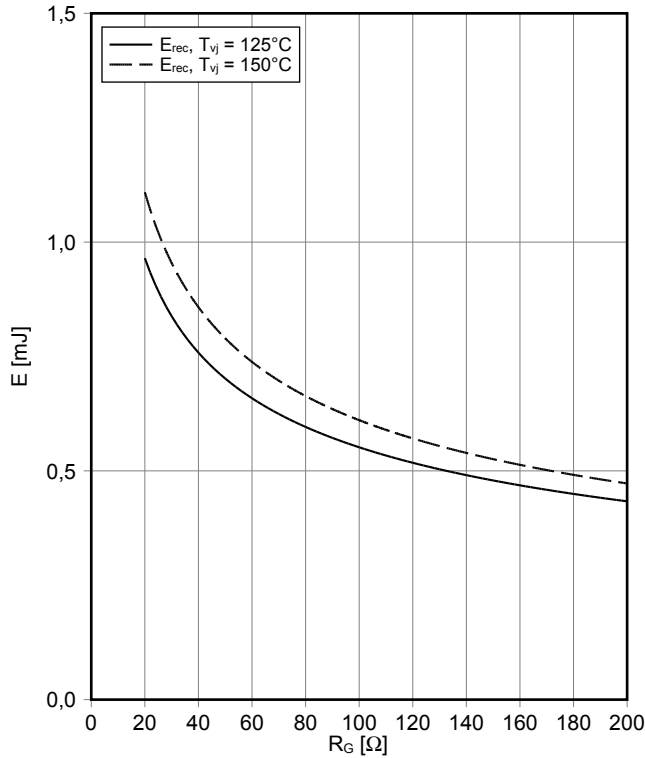
Schaltverluste Diode, D2 / D3 (typisch)
switching losses Diode, D2 / D3 (typical)

$E_{rec} = f(I_F)$
 $R_{Gon} = 20\ \Omega, V_{CE} = 300\text{ V}$



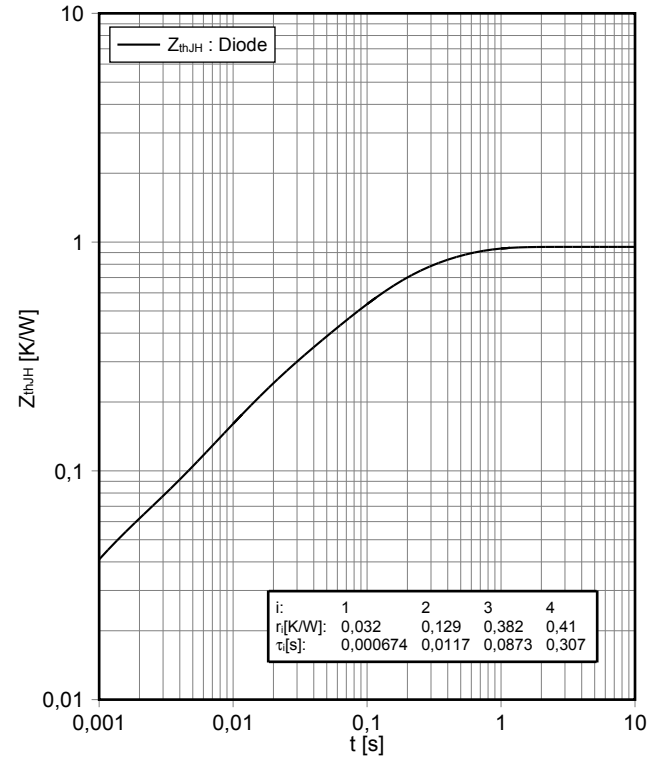
Schaltverluste Diode, D2 / D3 (typisch)
switching losses Diode, D2 / D3 (typical)

$E_{rec} = f(R_G)$
 $I_F = 100\text{ A}, V_{CE} = 300\text{ V}$



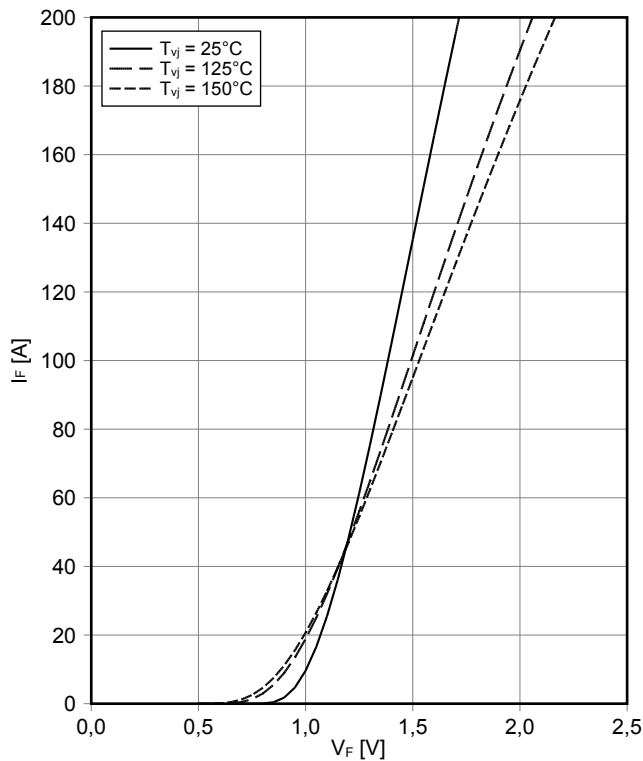
Transienter Wärmewiderstand Diode, D2 / D3
transient thermal impedance Diode, D2 / D3

$Z_{thJH} = f(t)$



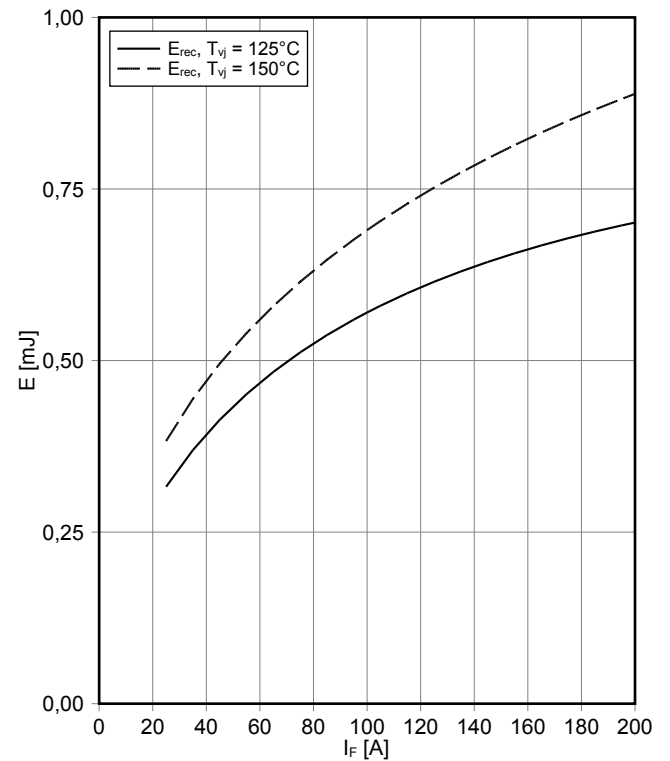
Durchlasskennlinie der Diode, D5-D6 (typisch)
forward characteristic of Diode, D5-D6 (typical)

$I_F = f(V_F)$



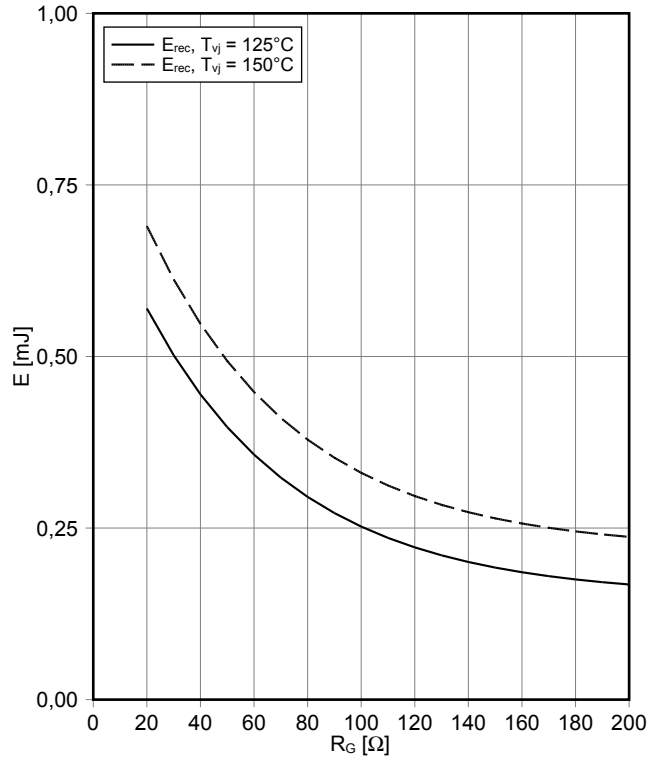
Schaltverluste Diode, D5-D6 (typisch)
switching losses Diode, D5-D6 (typical)

$E_{rec} = f(I_F)$
 $R_{Gon} = 20\ \Omega, V_{CE} = 300\text{ V}$



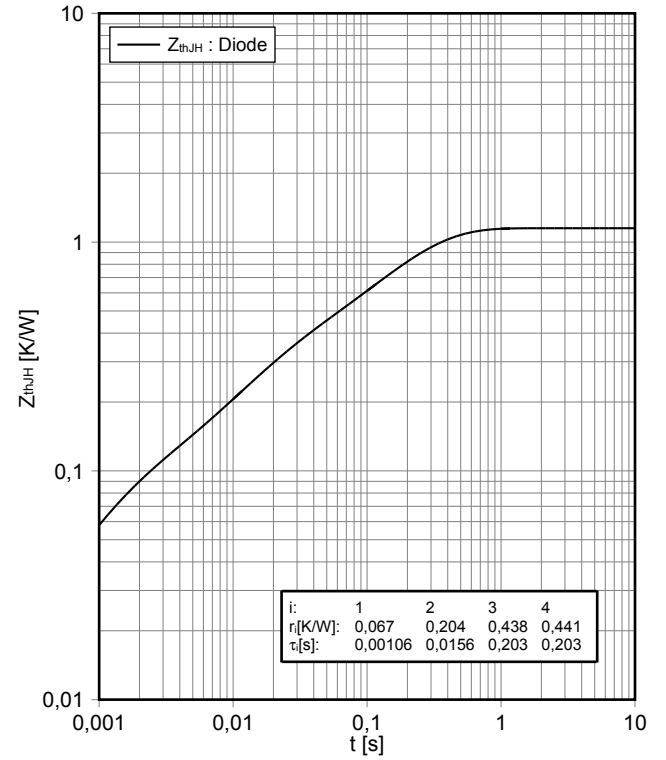
Schaltverluste Diode, D5-D6 (typisch)
switching losses Diode, D5-D6 (typical)

$E_{rec} = f(R_G)$
 $I_F = 100\text{ A}, V_{CE} = 300\text{ V}$



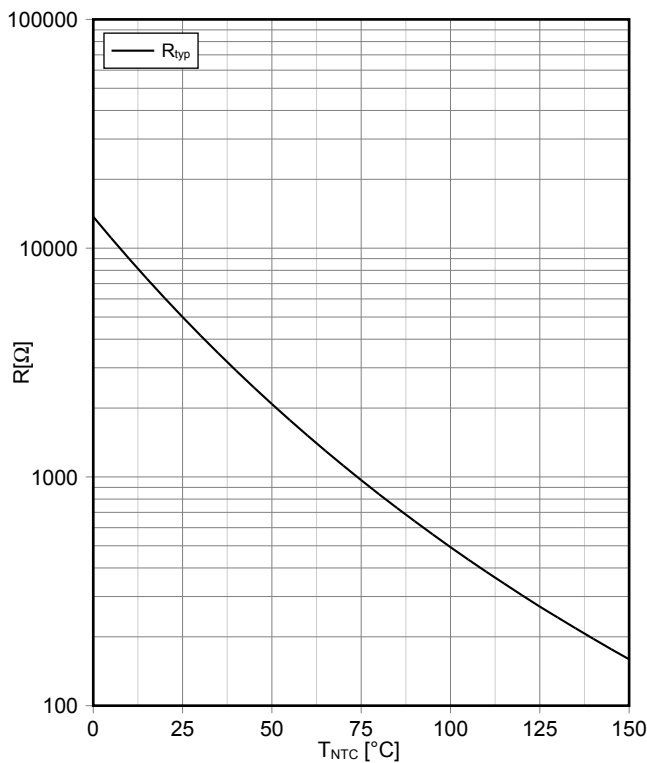
Transienter Wärmewiderstand Diode, D5-D6
transient thermal impedance Diode, D5-D6

$Z_{thJH} = f(t)$

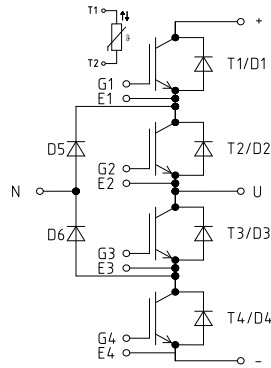


NTC-Widerstand-Temperaturkennlinie (typisch)
NTC-Thermistor-temperature characteristic (typical)

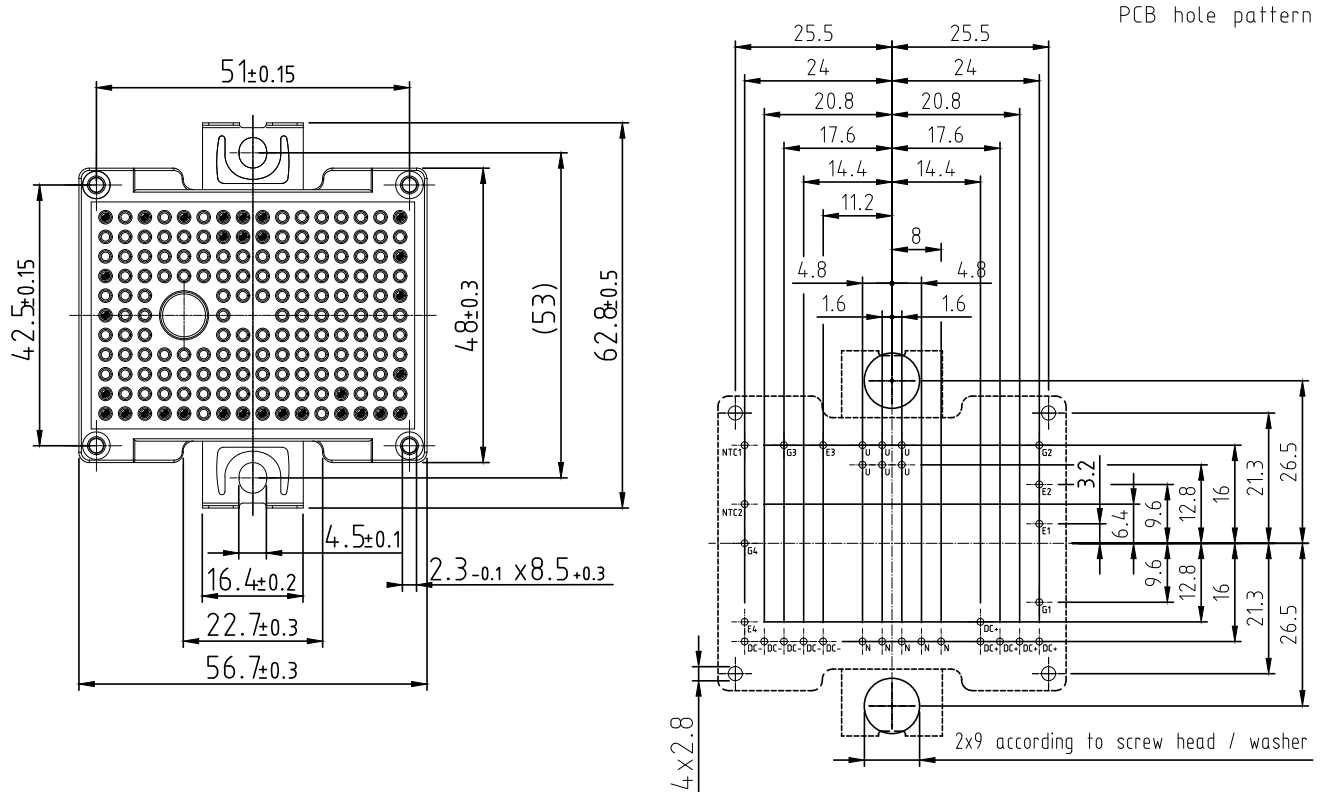
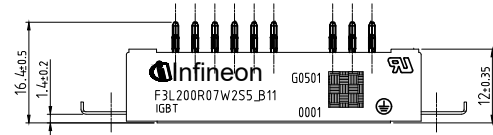
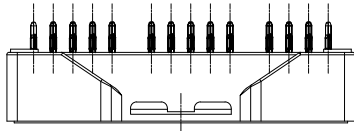
$R = f(T_{NTC})$



Schaltplan / Circuit diagram



Gehäuseabmessungen / Package outlines



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

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