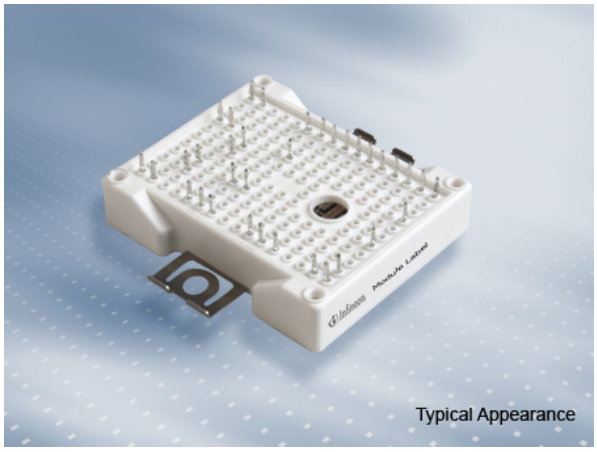
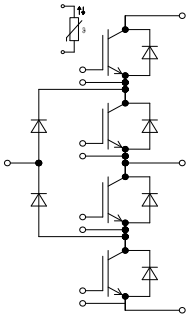
EasyPACK™ モジュール TRENCHSTOP™ 5 とCoolSiC™ ショットキーダイオード内蔵 とPressFIT / NTCサーミスタ

EasyPACK™ module with TRENCHSTOP™ 5 and CoolSiC™ Schottky diode and PressFIT / NTC





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

アプリケーションの可能性
- 3レベル　アプリケーション
- UPSシステム
- ソーラーアプリケーション
- モーター駆動

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

電気的特性
- 650Vに増加したブロッキング電圧
- CoolSiC™ ショットキーダイオード gen5
- 低スイッチング損失

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

機械的特性
- PressFIT 接合 技術
- コンパクトデザイン
- 低熱インピーダンスの Al_2O_3　DCB
- 固定用クランプによる強固なマウンティング

Mechanical Features
- PressFIT contact technology
- Compact design
- Al_2O_3 substrate with low thermal resistance
- 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

IGBT, T1 / T4 / IGBT, T1 / T4

最大定格 / Maximum Rated Values

コレクタ・エミッタ間電圧 Collector-emitter voltage	T_{vj} = 25°C	V_{CES}	650	V
コレクタ電流 Implemented collector current		I_{CN}	200	A
連続DCコレクタ電流 Continuous DC collector current	T_H = 65°C, $T_{vj\,max}$ = 175°C	I_{CDC}	95	A
繰り返しピークコレクタ電流 Repetitive peak collector current	t_P = 1 ms	I_{CRM}	400	A
ゲート・エミッタ間ピーク電圧 Gate-emitter peak voltage		V_{GES}	+/-20	V

電気的特性 / Characteristic Values

			min.	typ.	max.	
コレクタ・エミッタ間飽和電圧 Collector-emitter saturation voltage	I_C = 100 A V_{GE} = 15 V	T_{vj} = 25°C T_{vj} = 125°C T_{vj} = 150°C	$V_{CE\,sat}$		1,17 1,20 1,21	1,38	V V V
ゲート・エミッタ間しきい値電圧 Gate threshold voltage	I_C = 2,00 mA, V_{CE} = V_{GE}, T_{vj} = 25°C		V_{GEth}	3,25	4,00	4,75	V
ゲート電荷量 Gate charge	V_{GE} = -15 / 15 V, V_{CE} = 400 V		Q_G		0,84		µC
内蔵ゲート抵抗 Internal gate resistor	T_{vj} = 25°C		R_{Gint}		0,0		Ω
入力容量 Input capacitance	f = 100 kHz, T_{vj} = 25°C, V_{CE} = 25 V, V_{GE} = 0 V		C_{ies}		14,3		nF
帰還容量 Reverse transfer capacitance	f = 100 kHz, T_{vj} = 25°C, V_{CE} = 25 V, V_{GE} = 0 V		C_{res}		0,05		nF
コレクタ・エミッタ間遮断電流 Collector-emitter cut-off current	V_{CE} = 650 V, V_{GE} = 0 V	T_{vj} = 25°C	I_{CES}			1,0	mA
ゲート・エミッタ間漏れ電流 Gate-emitter leakage current	V_{CE} = 0 V, V_{GE} = 20 V, T_{vj} = 25°C		I_{GES}			100	nA
ターンオン遅れ時間（誘導負荷） Turn-on delay time, inductive load	I_C = 100 A, V_{CE} = 300 V V_{GE} = -15 / 15 V R_{Gon} = 20 Ω	T_{vj} = 25°C T_{vj} = 125°C T_{vj} = 150°C	$t_{d\,on}$		0,097 0,087 0,082		µs µs µs
ターンオン上昇時間（誘導負荷） Rise time, inductive load	I_C = 100 A, V_{CE} = 300 V V_{GE} = -15 / 15 V R_{Gon} = 20 Ω	T_{vj} = 25°C T_{vj} = 125°C T_{vj} = 150°C	t_r		0,046 0,05 0,054		µs µs µs
ターンオフ遅れ時間（誘導負荷） Turn-off delay time, inductive load	I_C = 100 A, V_{CE} = 300 V V_{GE} = -15 / 15 V R_{Goff} = 39 Ω	T_{vj} = 25°C T_{vj} = 125°C T_{vj} = 150°C	$t_{d\,off}$		0,654 0,687 0,704		µs µs µs
ターンオフ下降時間（誘導負荷） Fall time, inductive load	I_C = 100 A, V_{CE} = 300 V V_{GE} = -15 / 15 V R_{Goff} = 39 Ω	T_{vj} = 25°C T_{vj} = 125°C T_{vj} = 150°C	t_f		0,029 0,033 0,033		µs µs µs
ターンオンスイッチング損失 Turn-on energy loss per pulse	I_C = 100 A, V_{CE} = 300 V, Lσ = 35 nH di/dt = 1800 A/µs (T_{vj} = 150°C) V_{GE} = -15 / 15 V, R_{Gon} = 20 Ω	T_{vj} = 25°C T_{vj} = 125°C T_{vj} = 150°C	E_{on}		2,79 3,20 3,51		mJ mJ mJ
ターンオフスイッチング損失 Turn-off energy loss per pulse	I_C = 100 A, V_{CE} = 300 V, Lσ = 35 nH du/dt = 3700 V/µs (T_{vj} = 150°C) V_{GE} = -15 / 15 V, R_{Goff} = 39 Ω	T_{vj} = 25°C T_{vj} = 125°C T_{vj} = 150°C	E_{off}		1,21 1,48 1,61		mJ mJ mJ
短絡電流 SC data	V_{GE} ≤ 15 V, V_{CC} = 360 V V_{CEmax} = V_{CES} -L_{sCE} ·di/dt	t_P ≤ 0 µs, T_{vj} = 150°C	I_{SC}		1600		A
ジャンクション・ヒートシンク間熱抵抗 Thermal resistance, junction to heatsink	IGBT部（1素子当り）/ per IGBT		R_{thJH}		0,814		K/W
動作温度 Temperature under switching conditions			$T_{vj\,op}$	-40		150	°C

IGBT, T2 / T3 / IGBT, T2 / T3

最大定格 / Maximum Rated Values

コレクタ・エミッタ間電圧 Collector-emitter voltage	T_{vj} = 25°C	V_{CES}	650	V
コレクタ電流 Implemented collector current		I_{CN}	200	A
連続DCコレクタ電流 Continuous DC collector current	T_H = 65°C, $T_{vj\,max}$ = 175°C	I_{CDC}	95	A
繰り返しピークコレクタ電流 Repetitive peak collector current	t_P = 1 ms	I_{CRM}	400	A
ゲート・エミッタ間ピーク電圧 Gate-emitter peak voltage		V_{GES}	+/-20	V

電気的特性 / Characteristic Values

			min.	typ.	max.	
コレクタ・エミッタ間飽和電圧 Collector-emitter saturation voltage	I_C = 100 A V_{GE} = 15 V	T_{vj} = 25°C T_{vj} = 125°C T_{vj} = 150°C	$V_{CE\,sat}$		1,17 1,20 1,21	1,38	V V V
ゲート・エミッタ間しきい値電圧 Gate threshold voltage	I_C = 2,00 mA, V_{CE} = V_{GE}, T_{vj} = 25°C		V_{GEth}	3,25	4,00	4,75	V
ゲート電荷量 Gate charge	V_{GE} = -15 / 15 V, V_{CE} = 400 V		Q_G		0,84		µC
内蔵ゲート抵抗 Internal gate resistor	T_{vj} = 25°C		R_{Gint}		0,0		Ω
入力容量 Input capacitance	f = 100 kHz, T_{vj} = 25°C, V_{CE} = 25 V, V_{GE} = 0 V		C_{ies}		14,3		nF
帰還容量 Reverse transfer capacitance	f = 100 kHz, T_{vj} = 25°C, V_{CE} = 25 V, V_{GE} = 0 V		C_{res}		0,05		nF
コレクタ・エミッタ間遮断電流 Collector-emitter cut-off current	V_{CE} = 650 V, V_{GE} = 0 V	T_{vj} = 25°C	I_{CES}			0,044	mA
ゲート・エミッタ間漏れ電流 Gate-emitter leakage current	V_{CE} = 0 V, V_{GE} = 20 V, T_{vj} = 25°C		I_{GES}			100	nA
ターンオン遅れ時間（誘導負荷） Turn-on delay time, inductive load	I_C = 100 A, V_{CE} = 300 V V_{GE} = -15 / 15 V R_{Gon} = 20 Ω	T_{vj} = 25°C T_{vj} = 125°C T_{vj} = 150°C	$t_{d\,on}$		0,098 0,087 0,085		µs µs µs
ターンオン上昇時間（誘導負荷） Rise time, inductive load	I_C = 100 A, V_{CE} = 300 V V_{GE} = -15 / 15 V R_{Gon} = 20 Ω	T_{vj} = 25°C T_{vj} = 125°C T_{vj} = 150°C	t_r		0,037 0,043 0,046		µs µs µs
ターンオフ遅れ時間（誘導負荷） Turn-off delay time, inductive load	I_C = 100 A, V_{CE} = 300 V V_{GE} = -15 / 15 V R_{Goff} = 39 Ω	T_{vj} = 25°C T_{vj} = 125°C T_{vj} = 150°C	$t_{d\,off}$		0,651 0,685 0,695		µs µs µs
ターンオフ下降時間（誘導負荷） Fall time, inductive load	I_C = 100 A, V_{CE} = 300 V V_{GE} = -15 / 15 V R_{Goff} = 39 Ω	T_{vj} = 25°C T_{vj} = 125°C T_{vj} = 150°C	t_f		0,018 0,024 0,026		µs µs µs
ターンオンスイッチング損失 Turn-on energy loss per pulse	I_C = 100 A, V_{CE} = 300 V, Lσ = 35 nH di/dt = 2200 A/µs (T_{vj} = 150°C) V_{GE} = -15 / 15 V, R_{Gon} = 20 Ω	T_{vj} = 25°C T_{vj} = 125°C T_{vj} = 150°C	E_{on}		2,18 2,56 2,79		mJ mJ mJ
ターンオフスイッチング損失 Turn-off energy loss per pulse	I_C = 100 A, V_{CE} = 300 V, Lσ = 35 nH du/dt = 3500 V/µs (T_{vj} = 150°C) V_{GE} = -15 / 15 V, R_{Goff} = 39 Ω	T_{vj} = 25°C T_{vj} = 125°C T_{vj} = 150°C	E_{off}		1,28 1,65 1,80		mJ mJ mJ
短絡電流 SC data	V_{GE} ≤ 15 V, V_{CC} = 360 V V_{CEmax} = V_{CES} -L_{sCE} ·di/dt	t_P ≤ 0 µs, T_{vj} = 150°C	I_{SC}		1600		A
ジャンクション・ヒートシンク間熱抵抗 Thermal resistance, junction to heatsink	IGBT部（1素子当り）/ per IGBT		R_{thJH}		0,814		K/W
動作温度 Temperature under switching conditions			$T_{vj\,op}$	-40		150	°C

ダイオード, D1 / D4 / Diode, D1 / D4

最大定格 / Maximum Rated Values

ピーク繰返し逆電圧 Repetitive peak reverse voltage	T_{vj} = 25°C	V_{RRM}		650	V
順電流 Implemented forward current		I_{FN}		120	A
連続DC電流 Continuous DC forward current		I_F		100	A
ピーク繰返し順電流 Repetitive peak forward current	t_P = 1 ms	I_{FRM}		240	A
電流二乗時間積 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		700 690	A²s A²s

電気的特性 / Characteristic Values

			min.	typ.	max.	
順電圧 Forward voltage	I_F = 100 A, V_{GE} = 0 V I_F = 100 A, V_{GE} = 0 V I_F = 100 A, V_{GE} = 0 V	T_{vj} = 25°C T_{vj} = 125°C T_{vj} = 150°C	V_F		1,38 1,49 1,52	1,65	V V V
ピーク逆回復電流 Peak reverse recovery current	I_F = 100 A, - di_F/dt = 1800 A/µs (T_{vj}=150°C) V_R = 300 V	T_{vj} = 25°C T_{vj} = 125°C T_{vj} = 150°C	I_{RM}		58,3 74,4 77,6		A A A
逆回復電荷量 Recovered charge	I_F = 100 A, - di_F/dt = 1800 A/µs (T_{vj}=150°C) V_R = 300 V	T_{vj} = 25°C T_{vj} = 125°C T_{vj} = 150°C	Q_r		3,10 5,40 5,50		µC µC µC
逆回復損失 Reverse recovery energy	I_F = 100 A, - di_F/dt = 1800 A/µs (T_{vj}=150°C) V_R = 300 V	T_{vj} = 25°C T_{vj} = 125°C T_{vj} = 150°C	E_{rec}		0,50 0,57 0,69		mJ mJ mJ
ジャンクション・ヒートシンク間熱抵抗 Thermal resistance, junction to heatsink	/Diode (1素子当り) / per diode		R_{thJH}		1,15		K/W
動作温度 Temperature under switching conditions			$T_{vj\,op}$	-40		150	°C

ダイオード, D2 / D3 / Diode, D2 / D3

最大定格 / Maximum Rated Values

ピーク繰返し逆電圧 Repetitive peak reverse voltage	T_{vj} = 25°C	V_{RRM}		650	V
順電流 Implemented forward current		I_{FN}		150	A
連続DC電流 Continuous DC forward current		I_F		100	A
ピーク繰返し順電流 Repetitive peak forward current	t_P = 1 ms	I_{FRM}		300	A
電流二乗時間積 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		770 690	A²s A²s

電気的特性 / Characteristic Values

			min.	typ.	max.	
順電圧 Forward voltage	I_F = 100 A, V_{GE} = 0 V I_F = 100 A, V_{GE} = 0 V I_F = 100 A, V_{GE} = 0 V	T_{vj} = 25°C T_{vj} = 125°C T_{vj} = 150°C	V_F		1,33 1,29 1,26	1,55	V V V
ピーク逆回復電流 Peak reverse recovery current	I_F = 100 A, - di_F/dt = 2200 A/µs (T_{vj}=150°C) V_R = 300 V V_{GE} = -15 V	T_{vj} = 25°C T_{vj} = 125°C T_{vj} = 150°C	I_{RM}		47,6 49,8 52,7		A A A
逆回復電荷量 Recovered charge	I_F = 100 A, - di_F/dt = 2200 A/µs (T_{vj}=150°C) V_R = 300 V V_{GE} = -15 V	T_{vj} = 25°C T_{vj} = 125°C T_{vj} = 150°C	Q_r		1,90 2,00 2,10		µC µC µC
逆回復損失 Reverse recovery energy	I_F = 100 A, - di_F/dt = 2200 A/µs (T_{vj}=150°C) V_R = 300 V V_{GE} = -15 V	T_{vj} = 25°C T_{vj} = 125°C T_{vj} = 150°C	E_{rec}		0,527 0,965 1,11		mJ mJ mJ
ジャンクション・ヒートシンク間熱抵抗 Thermal resistance, junction to heatsink	/Diode (1素子当り) / per diode		R_{thJH}		0,953		K/W
動作温度 Temperature under switching conditions			$T_{vj\,op}$	-40		150	°C

ダイオード、D5-D6 / Diode, D5-D6

最大定格 / Maximum Rated Values

ピーク繰返し逆電圧 Repetitive peak reverse voltage	T_{vj} = 25°C	V_{RRM}	650	V
順電流 Implemented forward current		I_{FN}	120	A
連続DC電流 Continuous DC forward current		I_F	100	A
ピーク繰返し順電流 Repetitive peak forward current	t_P = 1 ms	I_{FRM}	240	A
電流二乗時間積 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	700 690	A²s A²s

電気的特性 / Characteristic Values

			min.	typ.	max.	
順電圧 Forward voltage	I_F = 100 A, V_{GE} = 0 V I_F = 100 A, V_{GE} = 0 V I_F = 100 A, V_{GE} = 0 V	T_{vj} = 25°C T_{vj} = 125°C T_{vj} = 150°C	V_F		1,38 1,49 1,52	1,65	V V V
ピーク逆回復電流 Peak reverse recovery current	I_F = 100 A, - di_F/dt = 1800 A/µs (T_{vj}=150°C) V_R = 300 V V_{GE} = -15 V	T_{vj} = 25°C T_{vj} = 125°C T_{vj} = 150°C	I_{RM}		58,3 74,4 77,6		A A A
逆回復電荷量 Recovered charge	I_F = 100 A, - di_F/dt = 1800 A/µs (T_{vj}=150°C) V_R = 300 V V_{GE} = -15 V	T_{vj} = 25°C T_{vj} = 125°C T_{vj} = 150°C	Q_r		3,10 5,40 5,50		µC µC µC
逆回復損失 Reverse recovery energy	I_F = 100 A, - di_F/dt = 1800 A/µs (T_{vj}=150°C) V_R = 300 V V_{GE} = -15 V	T_{vj} = 25°C T_{vj} = 125°C T_{vj} = 150°C	E_{rec}		0,50 0,57 0,69		mJ mJ mJ
ジャンクション・ヒートシンク間熱抵抗 Thermal resistance, junction to heatsink	/Diode (1素子当り) / per diode		R_{thJH}		1,15		K/W
動作温度 Temperature under switching conditions			$T_{vj\,op}$	-40		150	°C

NTC-サーミスタ / NTC-Thermistor

電気的特性 / Characteristic Values

			min.	typ.	max.	
定格抵抗値 Rated resistance	T_{NTC} = 25°C	R_{25}		5,00		kΩ
R100の偏差 Deviation of R100	T_{NTC} = 100°C, R_{100} = 493 Ω	ΔR/R	-5		5	%
損失 Power dissipation	T_{NTC} = 25°C	P_{25}			20,0	mW
B-定数 B-value	$R_2 = R_{25} \exp [B_{25/50}(1/T_2 - 1/(298{,}15\ K))]$	$B_{25/50}$		3375		K
B-定数 B-value	$R_2 = R_{25} \exp [B_{25/80}(1/T_2 - 1/(298{,}15\ K))]$	$B_{25/80}$		3411		K
B-定数 B-value	$R_2 = R_{25} \exp [B_{25/100}(1/T_2 - 1/(298{,}15\ K))]$	$B_{25/100}$		3433		K

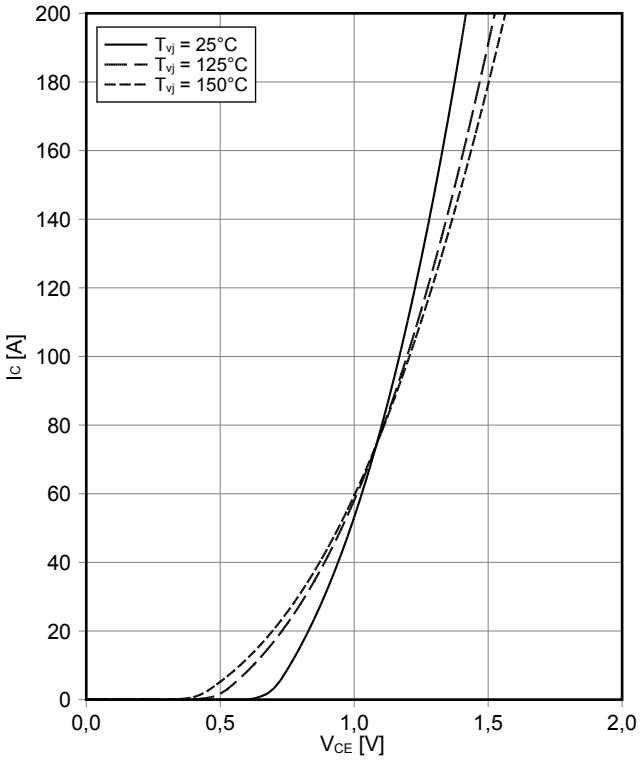
適切なアプリケーションノートによる仕様
Specification according to the valid application note.

モジュール / Module

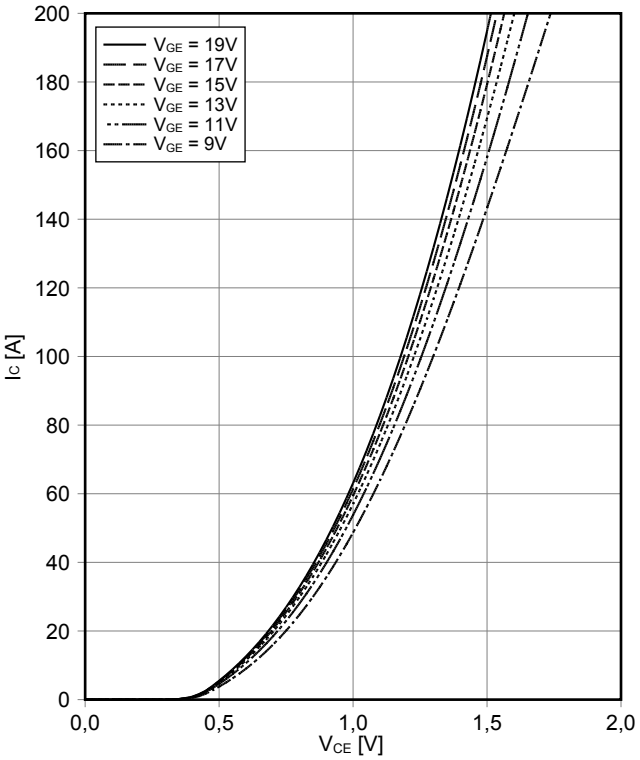
絶縁耐圧 Isolation test voltage	RMS, f = 50 Hz, t = 1 min.	V_{ISOL}		2,5		kV
内部絶縁 Internal isolation	基礎絶縁 (クラス1, IEC 61140) basic insulation (class 1, IEC 61140)			Al_2O_3		
沿面距離 Creepage distance	連絡方法 - ヒートシンク / terminal to heatsink 連絡方法 - 連絡方法 / terminal to terminal			11,5 6,3		mm
空間距離 Clearance	連絡方法 - ヒートシンク / terminal to heatsink 連絡方法 - 連絡方法 / terminal to terminal			10,0 5,0		mm
相対トラッキング指数 Comperative tracking index		CTI		> 200		
相対温度指数 (電気) RTI Elec.	住宅 housing	RTI		140		°C
			min.	typ.	max.	
内部インダクタンス Stray inductance module		L_{sCE}		20		nH
保存温度 Storage temperature		T_{stg}	-40		125	°C
Anpresskraft für mech. Bef. pro Feder mountig force per clamp		F	40	-	80	N
質量 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.

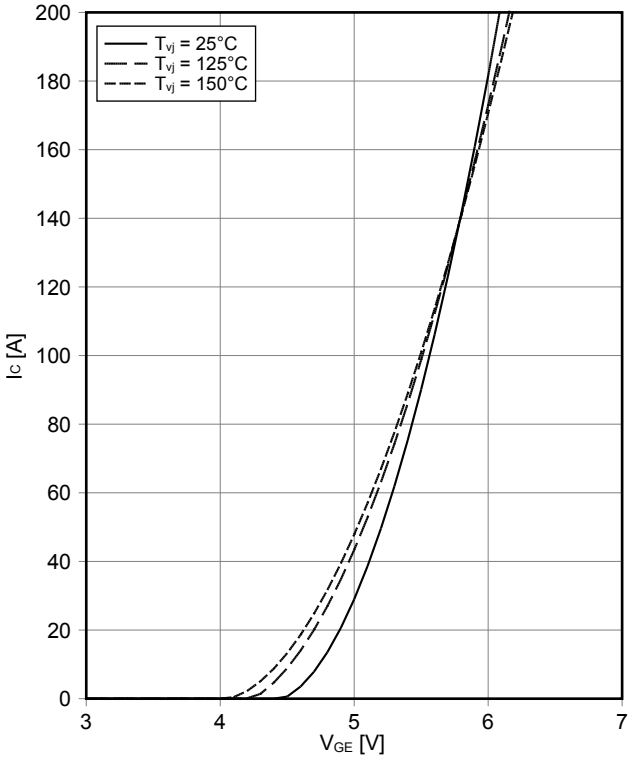
出力特性 IGBT, T1 / T4 (Typical)
output characteristic IGBT, T1 / T4 (typical)
$I_C = f(V_{CE})$
V_{GE} = 15 V



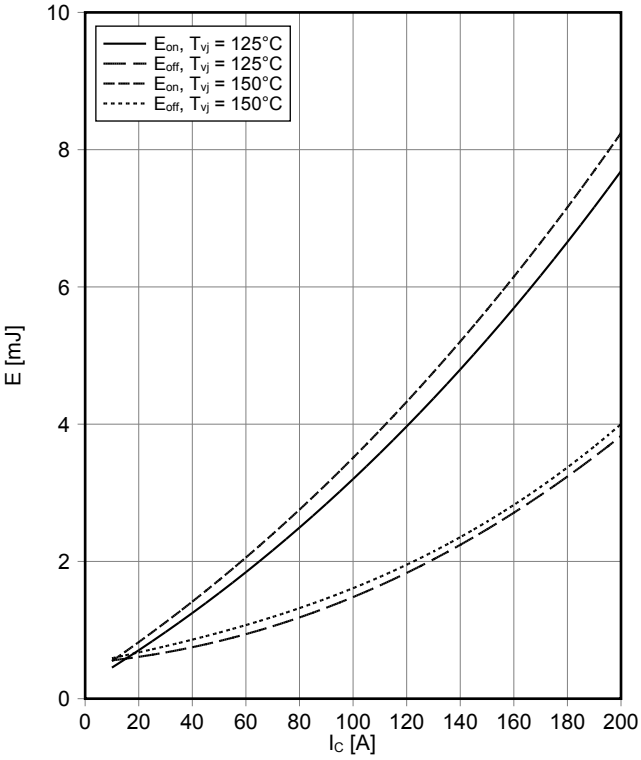
出力特性 IGBT, T1 / T4 (Typical)
output characteristic IGBT, T1 / T4 (typical)
$I_C = f(V_{CE})$
T_{vj} = 150°C



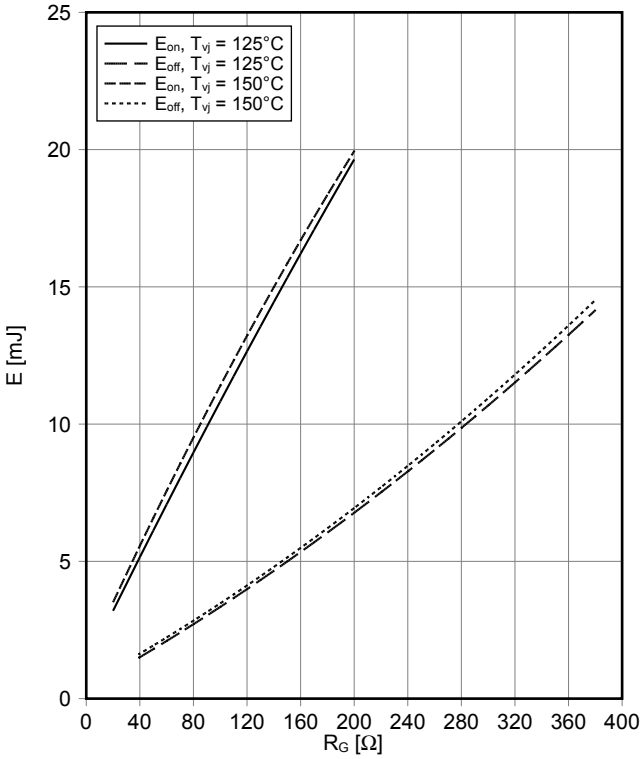
伝達特性 IGBT, T1 / T4 (Typical)
transfer characteristic IGBT, T1 / T4 (typical)
$I_C = f(V_{GE})$
V_{CE} = 20 V



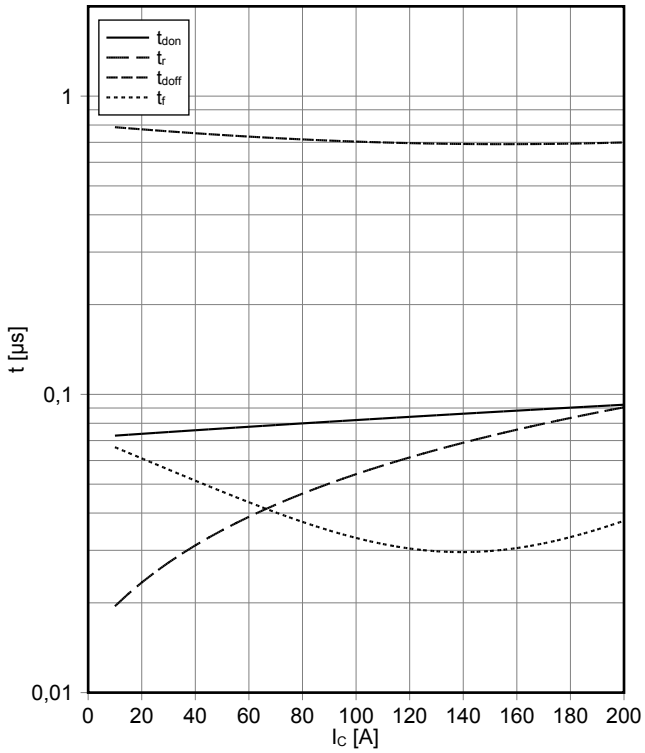
スイッチング損失 IGBT, T1 / T4 (Typical)
switching losses IGBT, T1 / T4 (typical)
$E_{on} = f(I_C)$, $E_{off} = f(I_C)$
V_{GE} = ±15 V, R_{Gon} = 20 Ω, R_{Goff} = 39 Ω, V_{CE} = 300 V



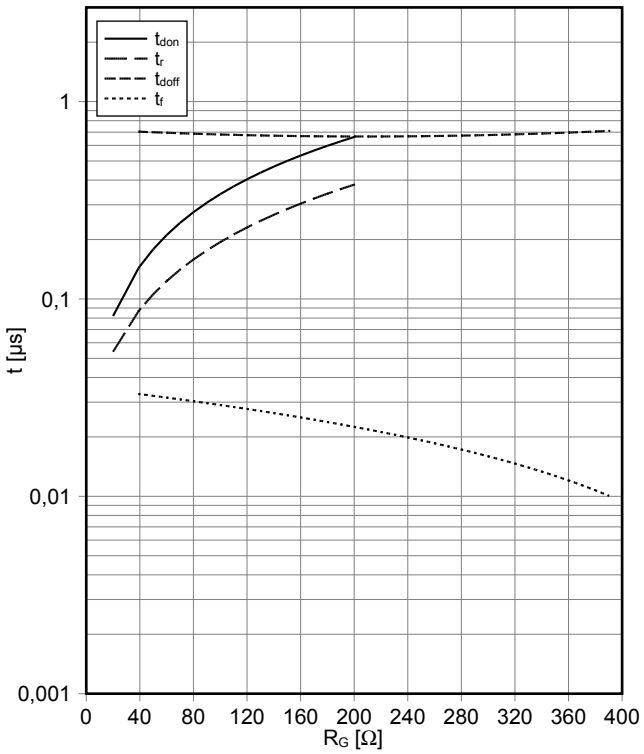
スイッチング損失 IGBT, T1 / T4 (Typical)
switching losses IGBT, T1 / T4 (typical)
$E_{on} = f(R_G)$, $E_{off} = f(R_G)$
V_{GE} = ±15 V, I_C = 100 A, V_{CE} = 300 V



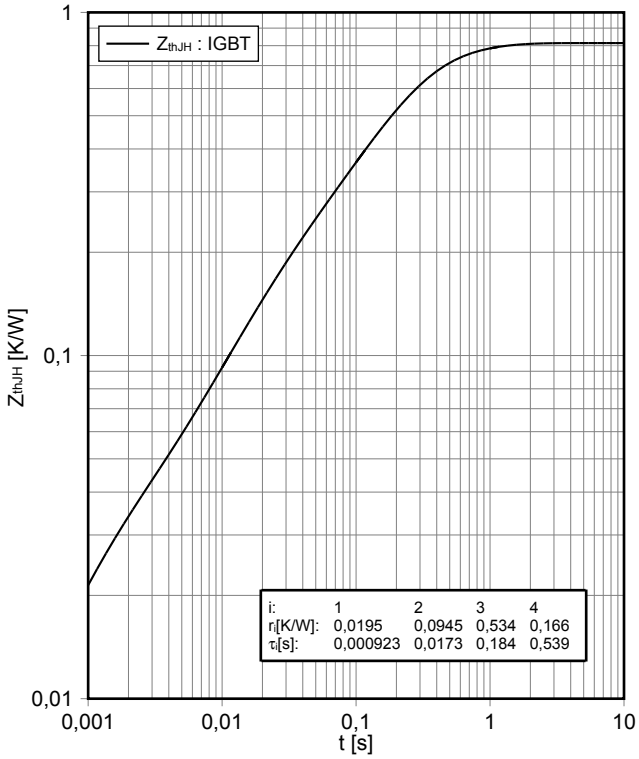
??? IGBT, T1 / T4 (Typical)
switching times IGBT, T1 / T4 (typical)
$t_{don} = f(I_C)$, $t_r = f(I_C)$, $t_{doff} = f(I_C)$, $t_f = f(I_C)$
V_{GE} = ±15 V, R_{Gon} = 20 Ω, R_{Goff} = 39 Ω, V_{CE} = 300 V, Tvj = 150°C



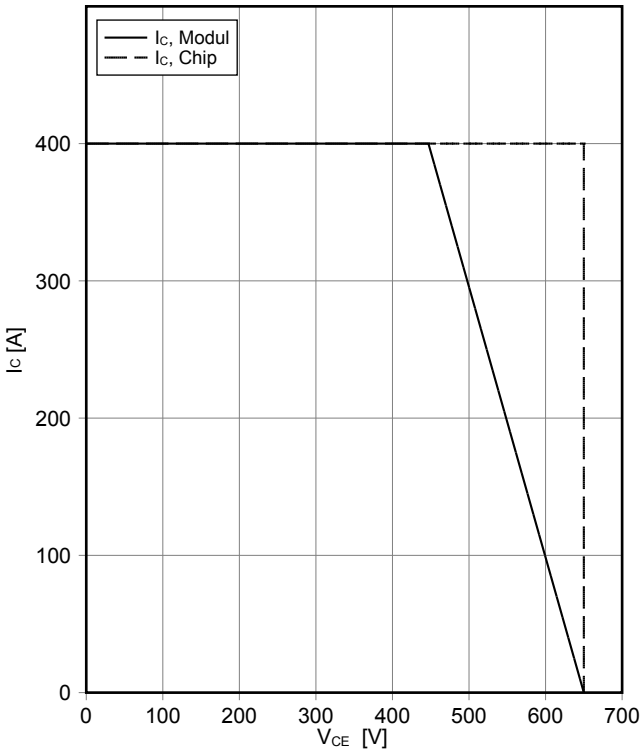
??? IGBT, T1 / T4 (Typical)
switching times IGBT, T1 / T4 (typical)
$t_{don} = f(R_G)$, $t_r = f(R_G)$, $t_{doff} = f(R_G)$, $t_f = f(R_G)$
V_{GE} = ±15 V, I_C = 100 A, V_{CE} = 300 V, Tvj = 150°C



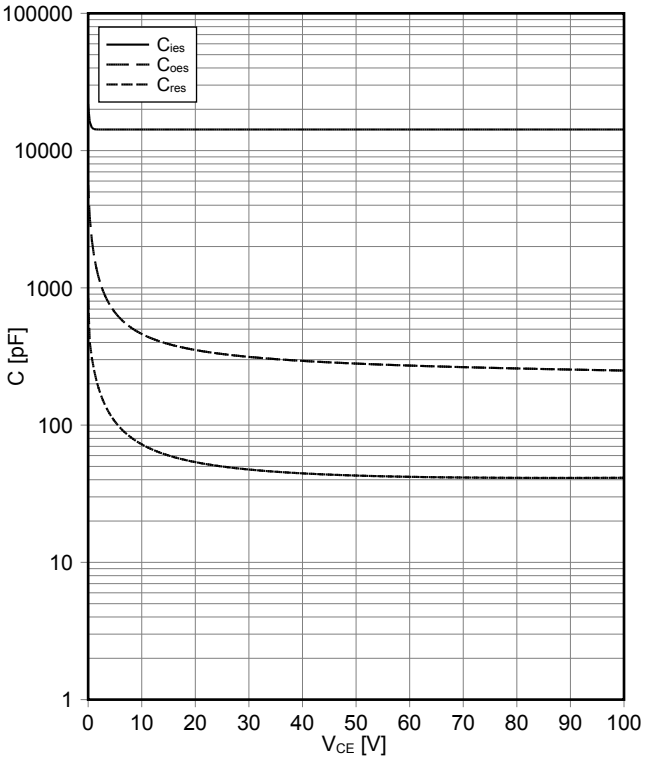
過渡熱インピーダンス IGBT, T1 / T4
transient thermal impedance IGBT, T1 / T4
$Z_{thJH} = f(t)$



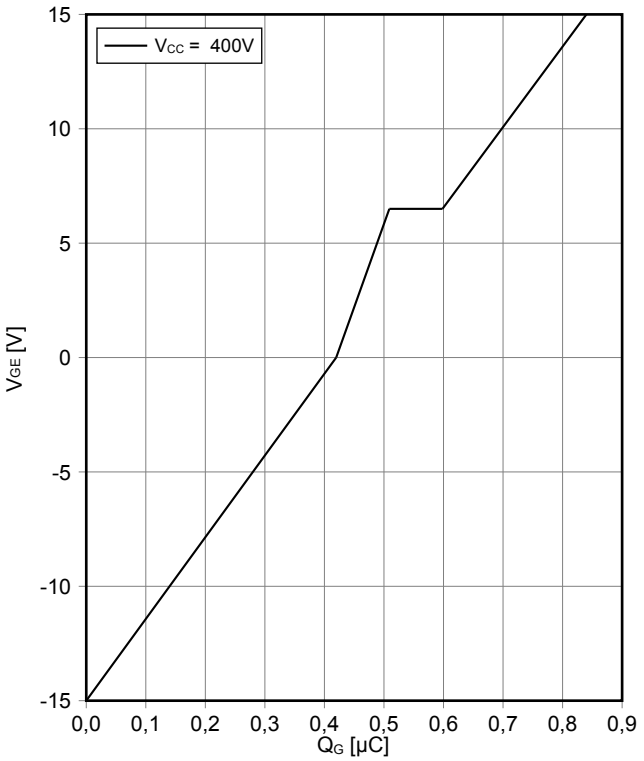
逆バイアス安全動作領域 IGBT, T1 / T4 （ RBSOA ））
reverse bias safe operating area IGBT, T1 / T4 (RBSOA)
$I_C = f(V_{CE})$
V_{GE} = ±15 V, R_{Goff} = 39 Ω, T_{vj} = 150°C



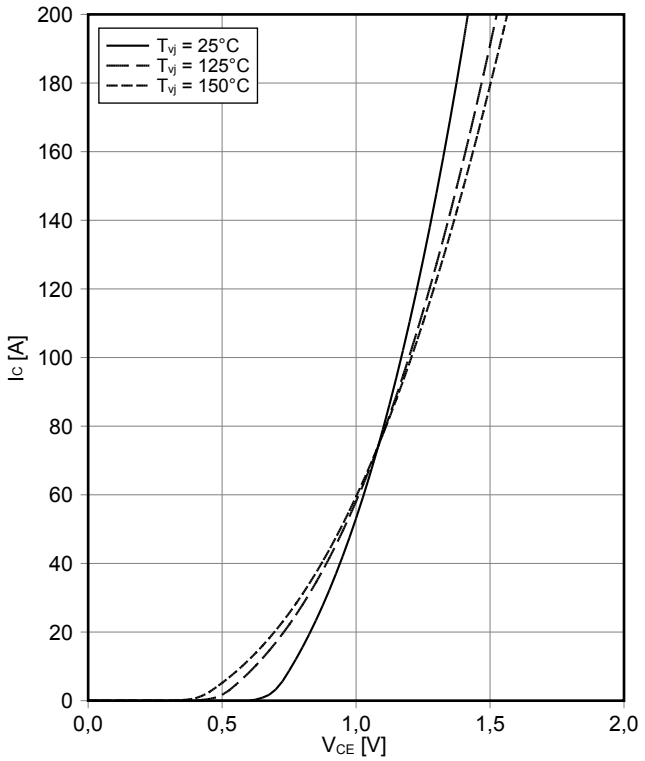
容量特性 IGBT, T1 / T4 (Typical)
capacity characteristic IGBT, T1 / T4 (typical)
$C = f(V_{CE})$
V_{GE} = 0 V, T_{vj} = 25°C, f = 100kHz



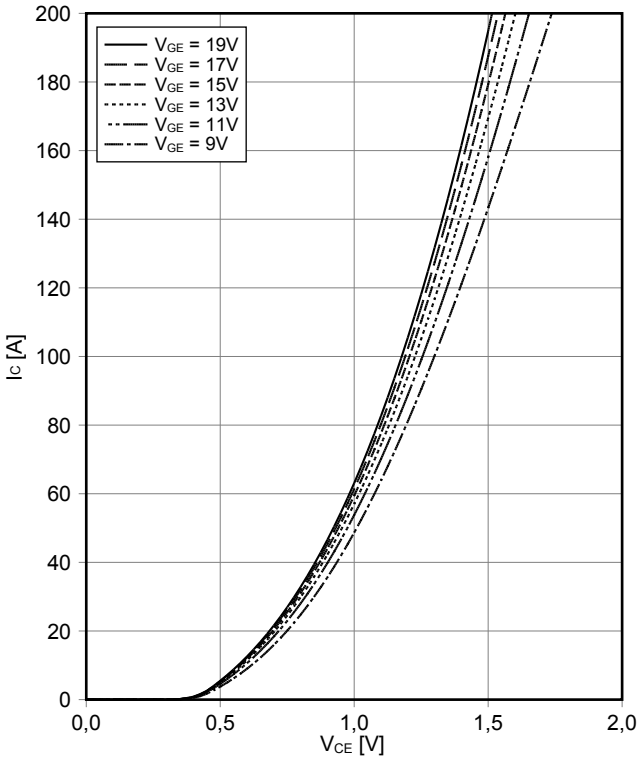
ゲート充電特性 IGBT, T1 / T4 （ 典型）
gate charge characteristic IGBT, T1 / T4 (typical)
$V_{GE} = f(Q_G)$
I_C = 200 A, T_{vj} = 25°C



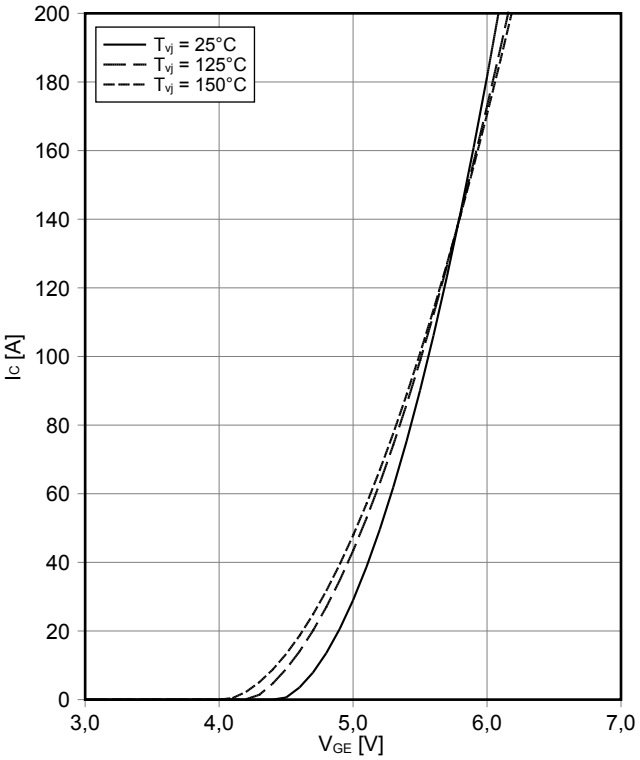
出力特性 IGBT, T2 / T3 (Typical)
output characteristic IGBT, T2 / T3 (typical)
$I_C = f(V_{CE})$
V_{GE} = 15 V



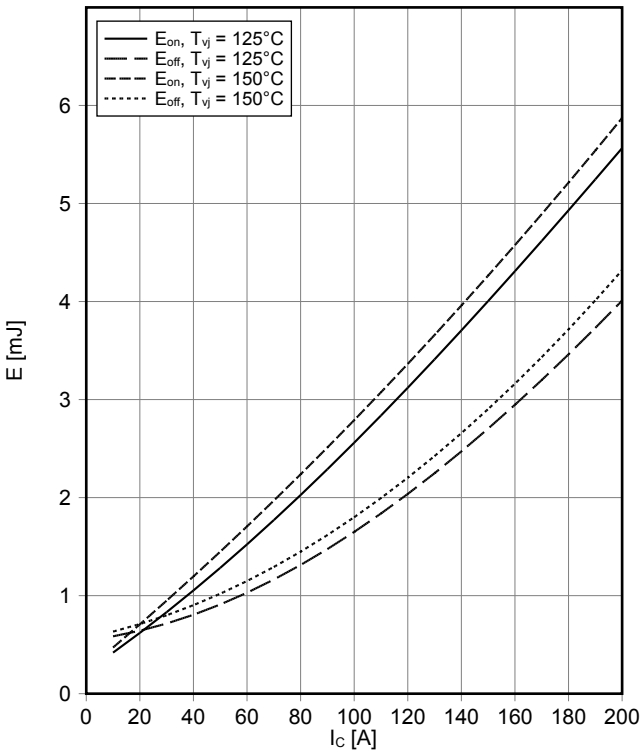
出力特性 IGBT, T2 / T3 (Typical)
output characteristic IGBT, T2 / T3 (typical)
$I_C = f(V_{CE})$
$T_{vj} = 150°C$



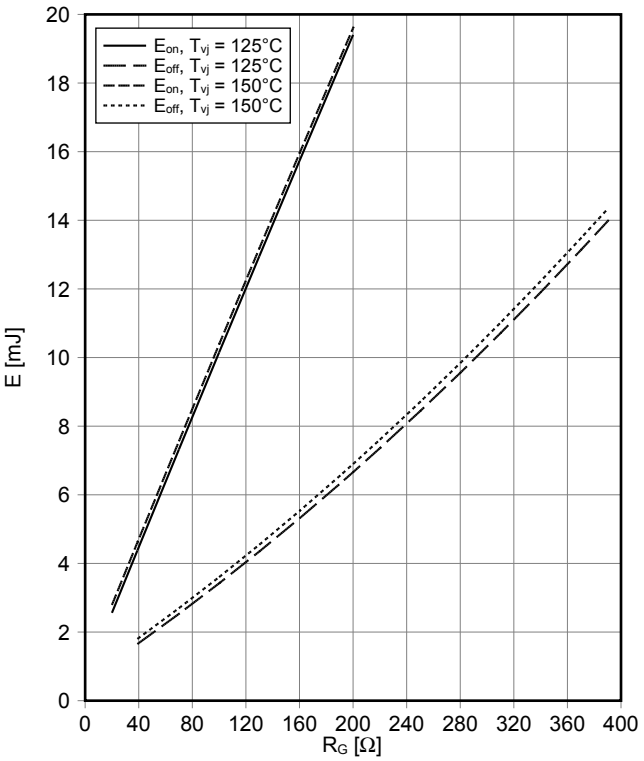
伝達特性 IGBT, T2 / T3 (Typical)
transfer characteristic IGBT, T2 / T3 (typical)
$I_C = f(V_{GE})$
$V_{CE} = 20\ V$



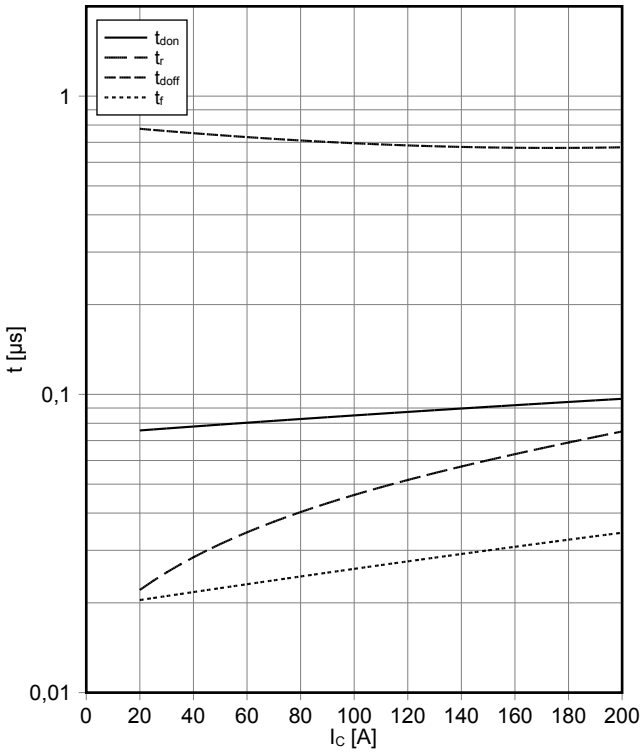
スイッチング損失 IGBT, T2 / T3 (Typical)
switching losses IGBT, T2 / T3 (typical)
$E_{on} = f(I_C)$, $E_{off} = f(I_C)$
$V_{GE} = \pm 15\ V$, $R_{Gon} = 20\ \Omega$, $R_{Goff} = 39\ \Omega$, $V_{CE} = 300\ V$



スイッチング損失 IGBT, T2 / T3 (Typical)
switching losses IGBT, T2 / T3 (typical)
$E_{on} = f(R_G)$, $E_{off} = f(R_G)$
$V_{GE} = \pm 15\ V$, $I_C = 100\ A$, $V_{CE} = 300\ V$



??? IGBT, T2 / T3 (Typical)
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} = ±15 V, R_{Gon} = 20 Ω, R_{Goff} = 39 Ω, V_{CE} = 300 V, Tvj = 150°C



??? IGBT, T2 / T3 (Typical)
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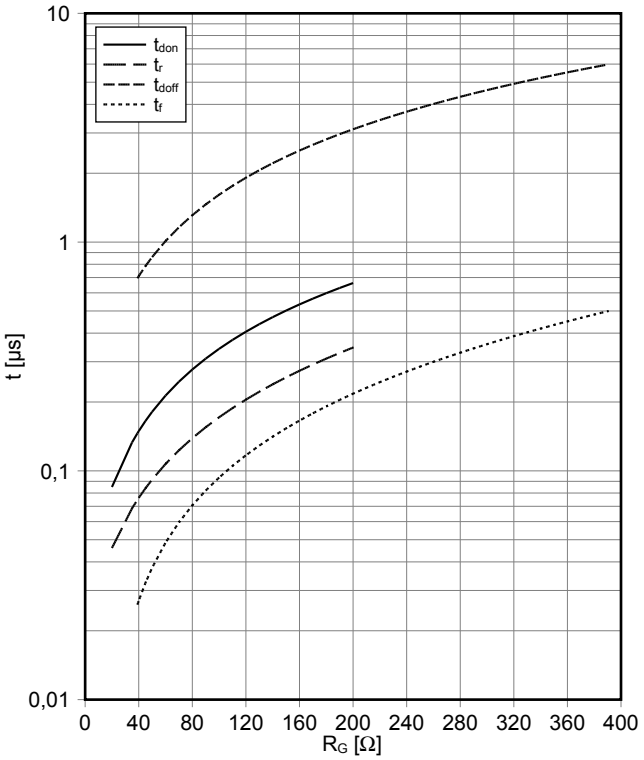
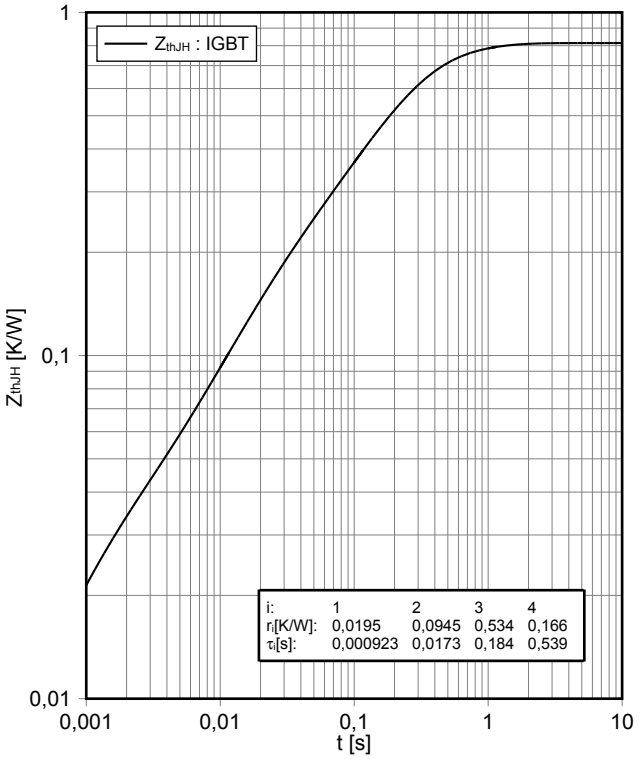
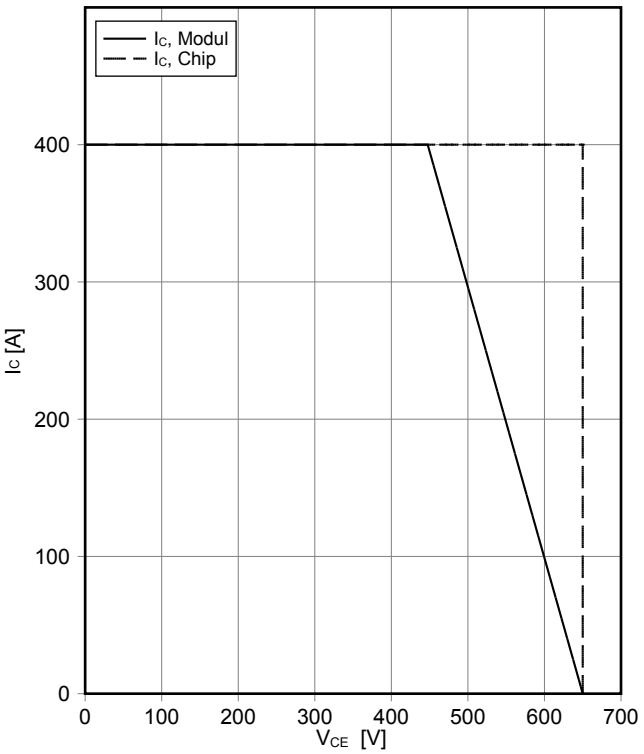
$t_{don} = f(R_G)$, $t_r = f(R_G)$, $t_{doff} = f(R_G)$, $t_f = f(R_G)$
V_{GE} = ±15 V, I_C = 100 A, V_{CE} = 300 V, Tvj = 150°C



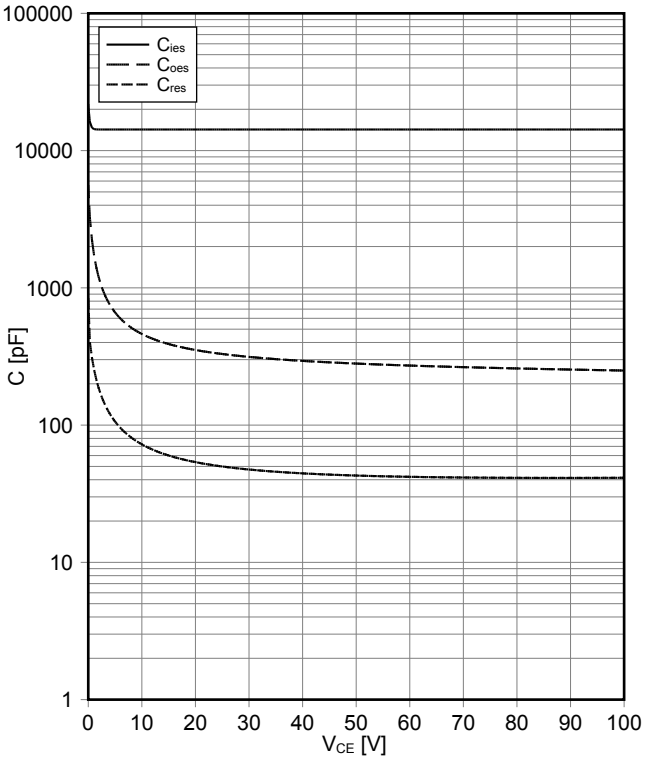
過渡熱インピーダンス IGBT, T2 / T3
transient thermal impedance IGBT, T2 / T3
$Z_{thJH} = f(t)$



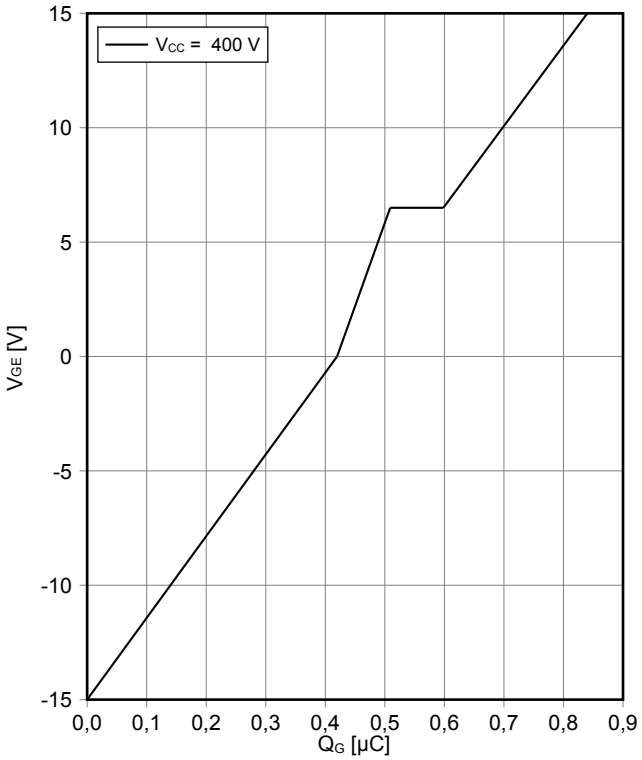
逆バイアス安全動作領域 IGBT, T2 / T3（RBSOA）)
reverse bias safe operating area IGBT, T2 / T3 (RBSOA)
$I_C = f(V_{CE})$
V_{GE} = ±15 V, R_{Goff} = 39 Ω, T_{vj} = 150°C



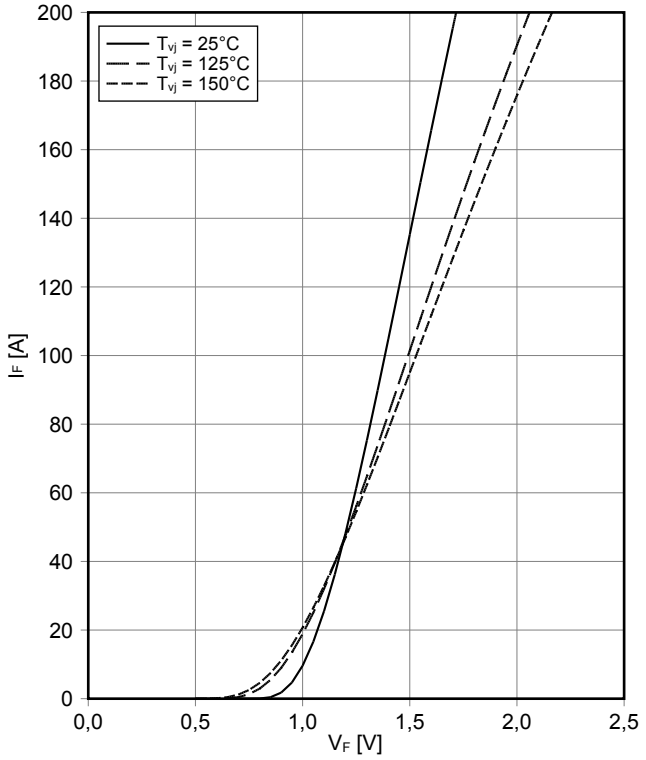
容量特性 IGBT, T2 / T3 (Typical)
capacity characteristic IGBT, T2 / T3 (typical)
$C = f(V_{CE})$
V_{GE} = 0 V, T_{vj} = 25°C, f = 100kHz



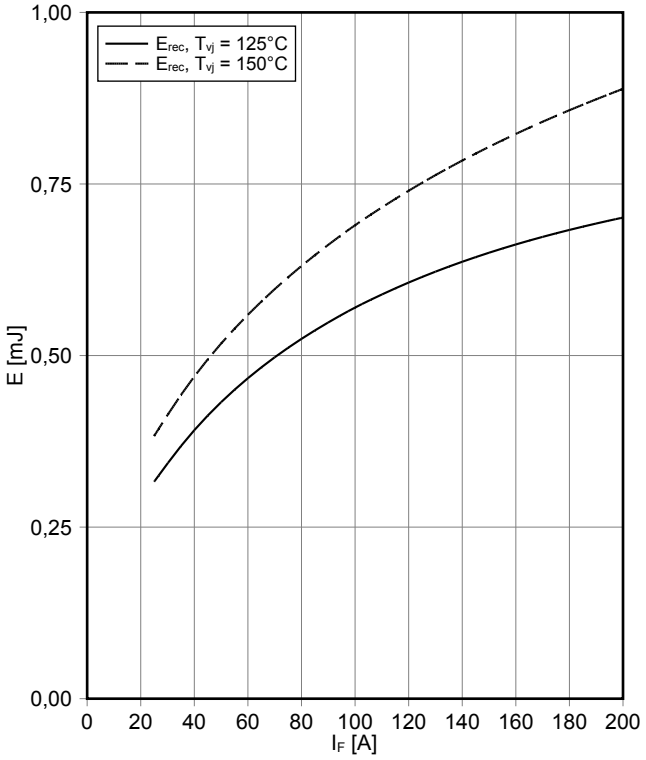
ゲート充電特性 IGBT, T2 / T3 （典型）
gate charge characteristic IGBT, T2 / T3 (typical)
$V_{GE} = f(Q_G)$
I_C = 200 A, T_{vj} = 25°C



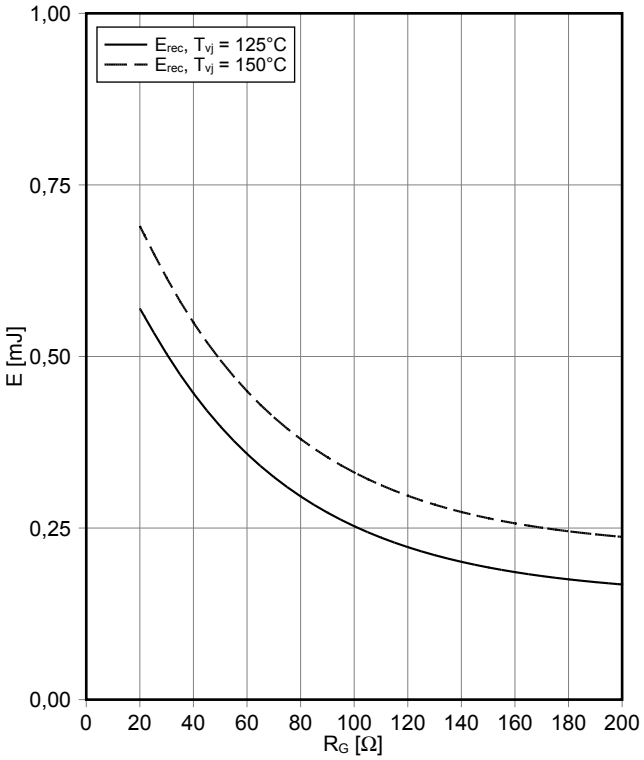
順電圧特性 ダイオード, D1 / D4 （typical)
forward characteristic of Diode, D1 / D4 (typical)
$I_F = f(V_F)$



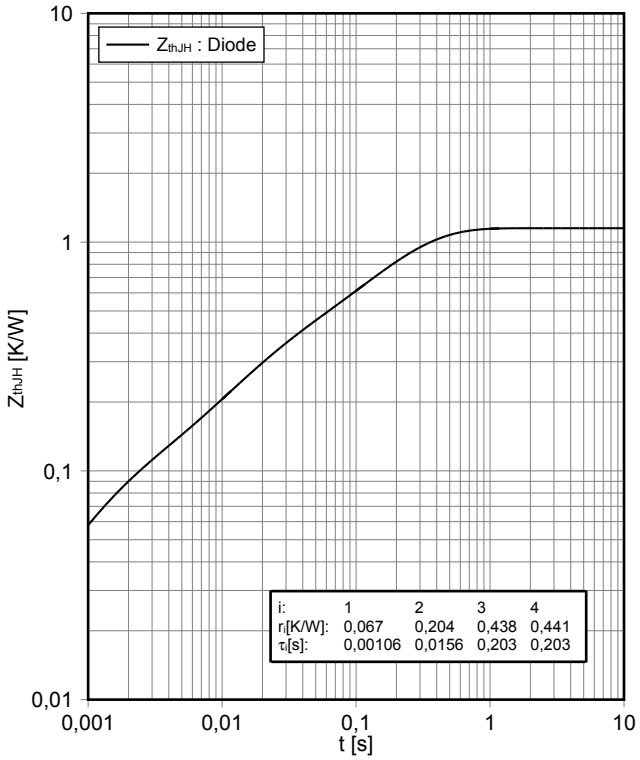
スイッチング損失 ダイオード, D1 / D4 (Typical)
switching losses Diode, D1 / D4 (typical)
$E_{rec} = f(I_F)$
R_{Gon} = 20 Ω, V_{CE} = 300 V



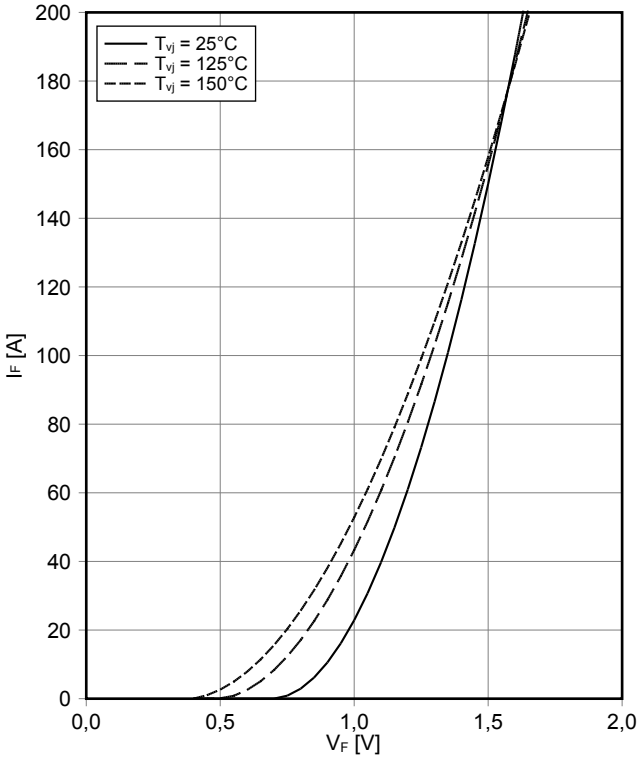
スイッチング損失 ダイオード, D1 / D4 (Typical)
switching losses Diode, D1 / D4 (typical)
$E_{rec} = f(R_G)$
I_F = 100 A, V_{CE} = 300 V



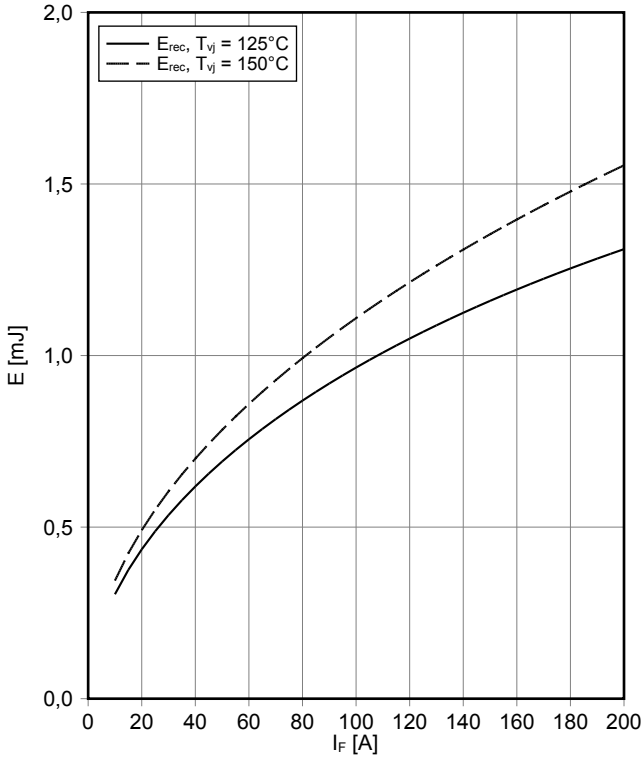
過渡熱インピーダンス ダイオード, D1 / D4
transient thermal impedance Diode, D1 / D4
$Z_{thJH} = f(t)$



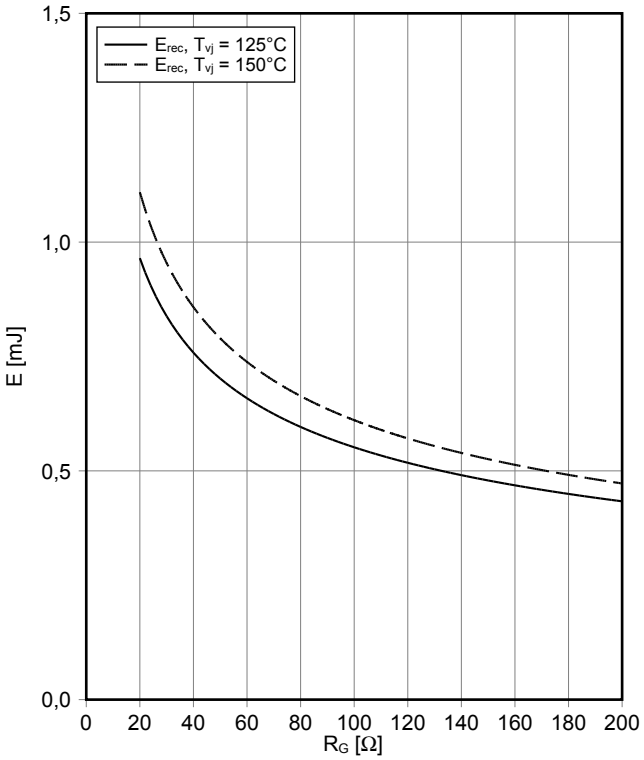
順電圧特性 ダイオード, D2 / D3 （typical)
forward characteristic of Diode, D2 / D3 (typical)
$I_F = f(V_F)$



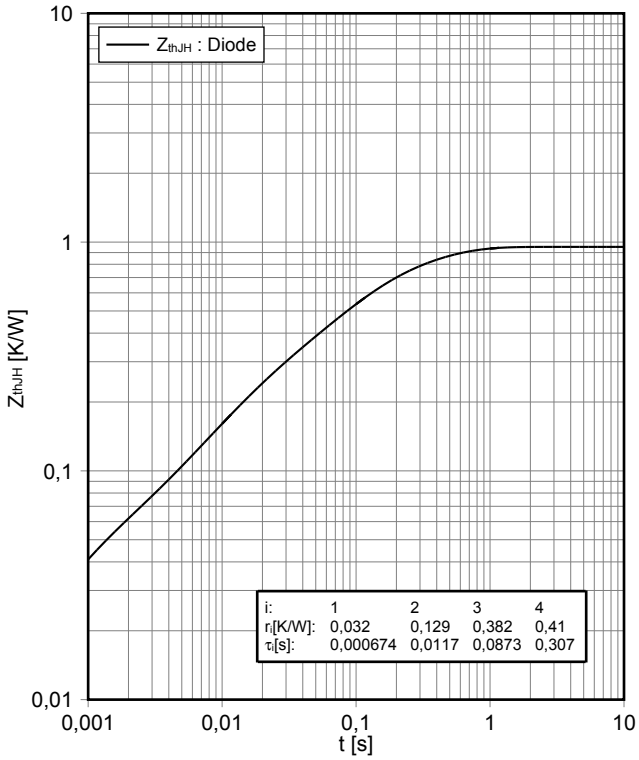
スイッチング損失 ダイオード, D2 / D3 (Typical)
switching losses Diode, D2 / D3 (typical)
$E_{rec} = f(I_F)$
R_{Gon} = 20 Ω, V_{CE} = 300 V



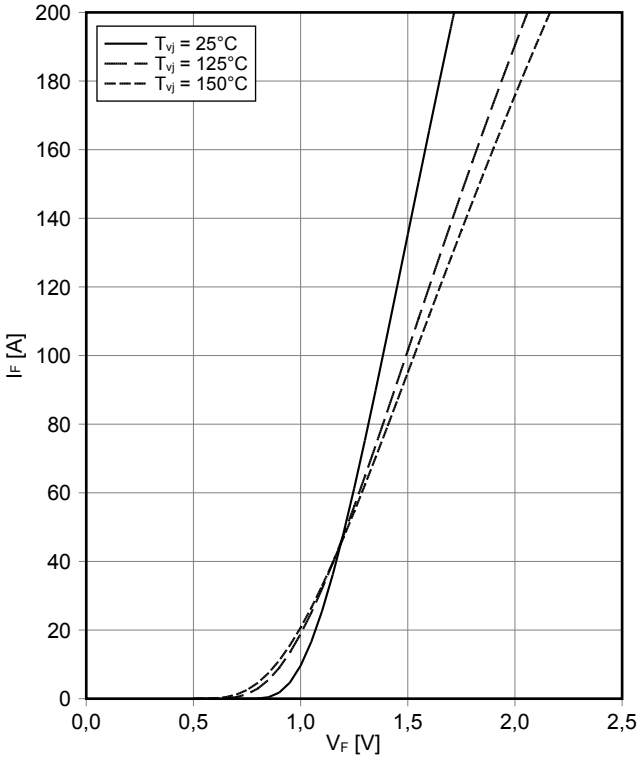
スイッチング損失 ダイオード, D2 / D3 (Typical)
switching losses Diode, D2 / D3 (typical)
$E_{rec} = f(R_G)$
I_F = 100 A, V_{CE} = 300 V



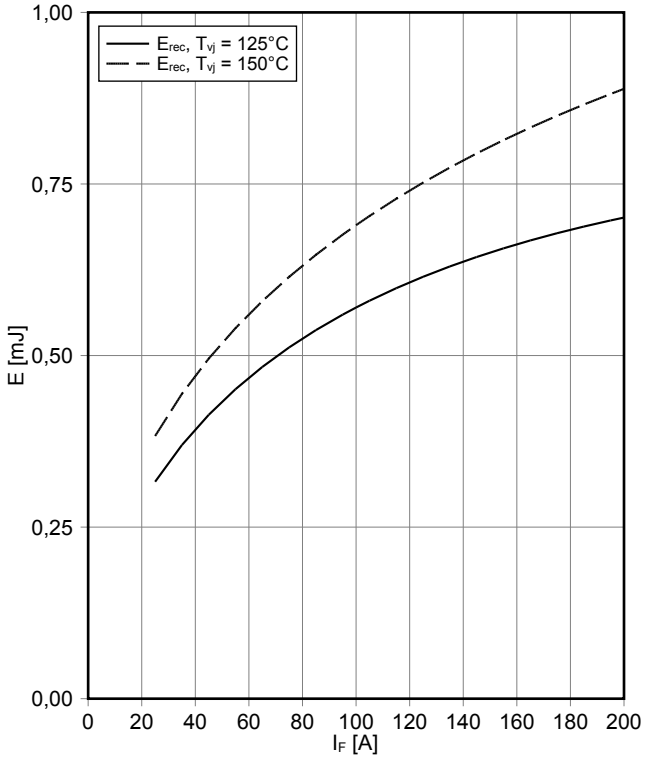
過渡熱インピーダンス ダイオード, D2 / D3
transient thermal impedance Diode, D2 / D3
$Z_{thJH} = f(t)$



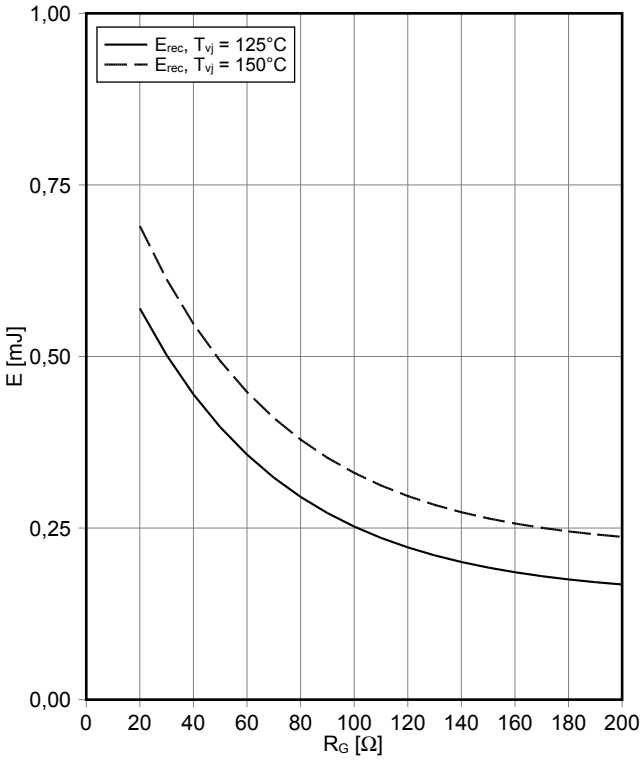
順電圧特性 ダイオード、D5-D6 (typical)
forward characteristic of Diode, D5-D6 (typical)
$I_F = f(V_F)$



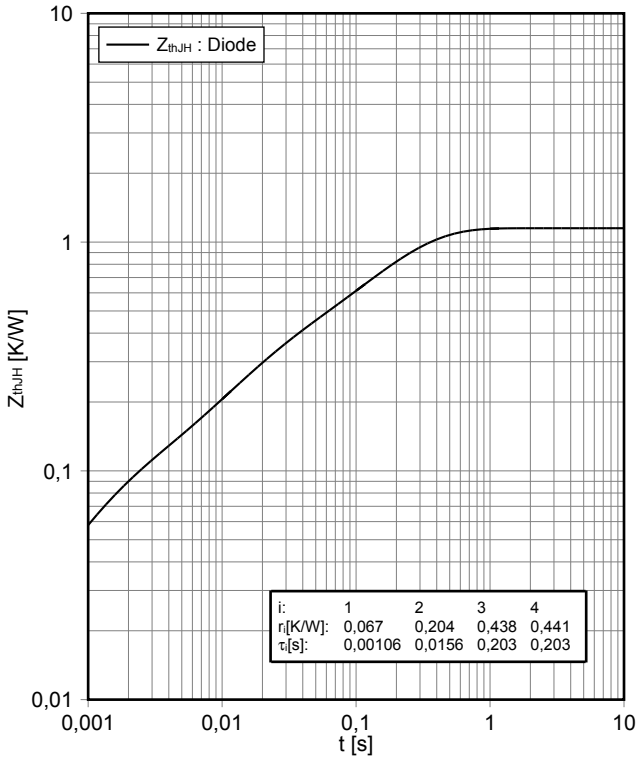
スイッチング損失 ダイオード、D5-D6 (Typical)
switching losses Diode, D5-D6 (typical)
$E_{rec} = f(I_F)$
R_{Gon} = 20 Ω, V_{CE} = 300 V



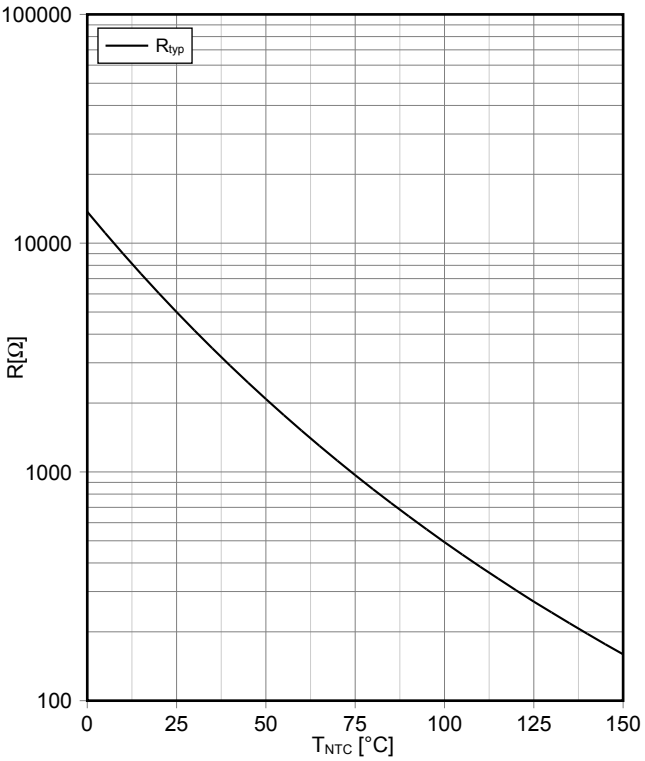
スイッチング損失 ダイオード、D5-D6 (Typical)
switching losses Diode, D5-D6 (typical)
$E_{rec} = f(R_G)$
$I_F = 100\ A,\ V_{CE} = 300\ V$



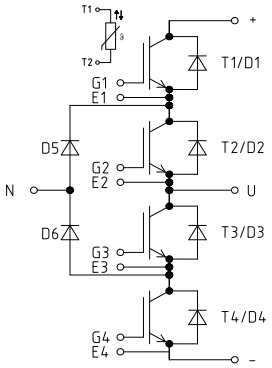
過渡熱インピーダンス ダイオード、D5-D6
transient thermal impedance Diode, D5-D6
$Z_{thJH} = f(t)$



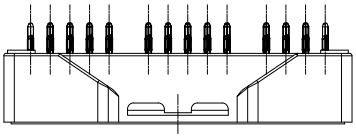
NTC-サーミスタ サーミスタの温度特性
NTC-Thermistor-temperature characteristic (typical)
$R = f(T_{NTC})$

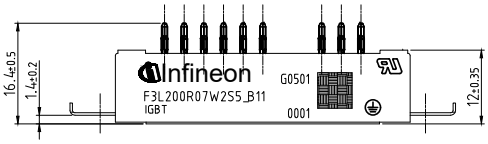


回路図 / Circuit diagram

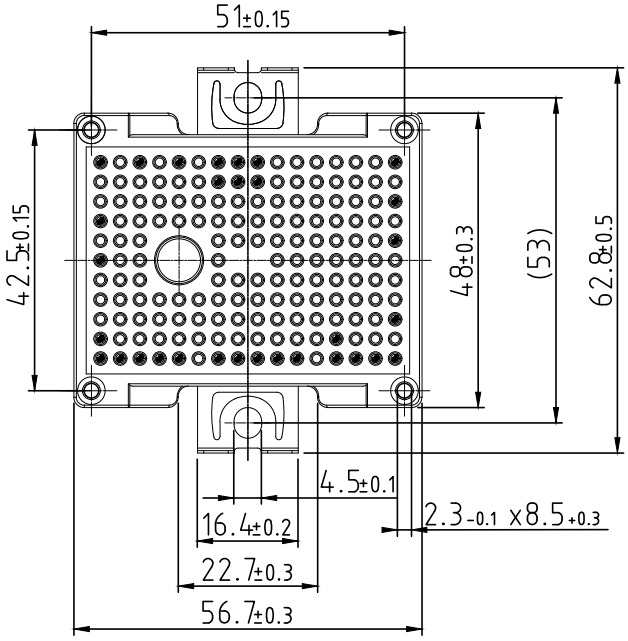


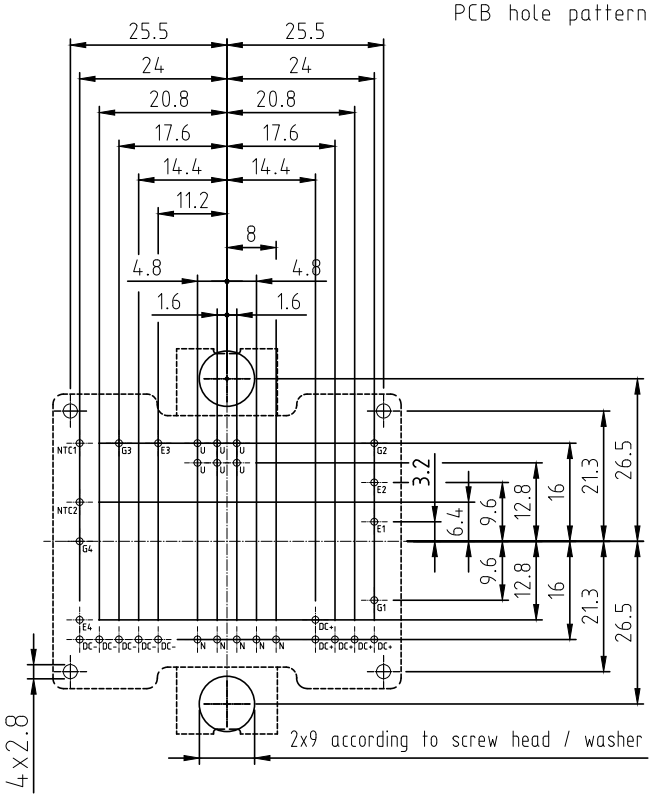
パッケージ概要 / Package outlines





PCB hole pattern





- Pin-Grid 3.2mm
- Tolerance of PCB hole pattern ⌖ ø0.1
- Hole specification for contacts see AN 2009-01:
  Diameters of drill ø 1.15mm
  and copper thickness in hole 25-50µm

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