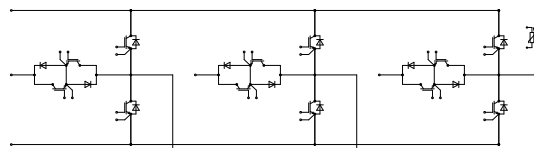
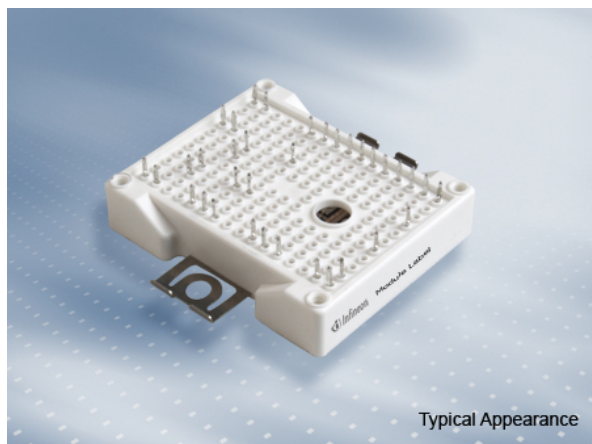


EasyPACK™ モジュール 高速トレンチ/フィールドストップ IGBT4 and エミッターコントロール4 diode内蔵
とPressFIT / NTCサーミスタ

EasyPACK™ module with fast Trench/Fieldstop IGBT4 and Emitter Controlled 4 diode and PressFIT / NTC

暫定データ / Preliminary Data



$V_{CES} = 1200V$

$I_{C\ nom} = 25A / I_{CRM} = 50A$

アプリケーションの可能性

- 3レベル アプリケーション
- ソーラーアプリケーション

電気的特性

- 低インダクタンス設計
- 低スイッチング損失
- 高速IGBT H3

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

Potential Applications

- 3-level-applications
- Solar applications

Electrical Features

- Low inductive design
- Low switching losses
- High speed IGBT H3

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



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

暫定データ Preliminary Data

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	$T_{vj} = 25^{\circ}\text{C}$	V_{CES}	1200	V
連続DCコレクタ電流 Continuous DC collector current	$T_H = 60^{\circ}\text{C}, T_{vj\max} = 175^{\circ}\text{C}$	I_{CDC}	25	A
繰り返しピークコレクタ電流 Repetitive peak collector current	$t_P = 1\text{ ms}$	I_{CRM}	50	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	$I_C = 25\text{ A}$ $V_{GE} = 15\text{ V}$	$T_{vj} = 25^{\circ}\text{C}$ $T_{vj} = 125^{\circ}\text{C}$ $T_{vj} = 150^{\circ}\text{C}$	$V_{CE\text{ sat}}$	2,05 2,50 2,60	2,40 V V V
ゲート・エミッタ間しきい値電圧 Gate threshold voltage	$I_C = 0,85\text{ mA}, V_{CE} = V_{GE}, T_{vj} = 25^{\circ}\text{C}$		V_{GEth}	5,25 5,80 6,35	V
ゲート電荷量 Gate charge	$V_{GE} = -15 / 15\text{ V}$		Q_G	0,13	μC
内蔵ゲート抵抗 Internal gate resistor	$T_{vj} = 25^{\circ}\text{C}$		R_{Gint}	0,0	Ω
入力容量 Input capacitance	$f = 1000\text{ kHz}, T_{vj} = 25^{\circ}\text{C}, V_{CE} = 25\text{ V}, V_{GE} = 0\text{ V}$		C_{ies}	1,43	nF
帰還容量 Reverse transfer capacitance	$f = 1000\text{ kHz}, T_{vj} = 25^{\circ}\text{C}, V_{CE} = 25\text{ V}, V_{GE} = 0\text{ V}$		C_{res}	0,075	nF
コレクタ・エミッタ間遮断電流 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
ゲート・エミッタ間漏れ電流 Gate-emitter leakage current	$V_{CE} = 0\text{ V}, V_{GE} = 20\text{ V}, T_{vj} = 25^{\circ}\text{C}$		I_{GES}		100 nA
ターンオン遅れ時間 (誘導負荷) Turn-on delay time, inductive load	$I_C = 25\text{ A}, V_{CE} = 350\text{ V}$ $V_{GE} = -15 / 15\text{ V}$ $R_{Gon} = 20\ \Omega$	$T_{vj} = 25^{\circ}\text{C}$ $T_{vj} = 125^{\circ}\text{C}$ $T_{vj} = 150^{\circ}\text{C}$	t_{don}	0,055 0,055 0,055	μs μs μs
ターンオン上昇時間 (誘導負荷) Rise time, inductive load	$I_C = 25\text{ A}, V_{CE} = 350\text{ V}$ $V_{GE} = -15 / 15\text{ V}$ $R_{Gon} = 20\ \Omega$	$T_{vj} = 25^{\circ}\text{C}$ $T_{vj} = 125^{\circ}\text{C}$ $T_{vj} = 150^{\circ}\text{C}$	t_r	0,04 0,04 0,04	μs μs μs
ターンオフ遅れ時間 (誘導負荷) Turn-off delay time, inductive load	$I_C = 25\text{ A}, V_{CE} = 350\text{ V}$ $V_{GE} = -15 / 15\text{ V}$ $R_{Goff} = 20\ \Omega$	$T_{vj} = 25^{\circ}\text{C}$ $T_{vj} = 125^{\circ}\text{C}$ $T_{vj} = 150^{\circ}\text{C}$	t_{doff}	0,185 0,23 0,24	μs μs μs
ターンオフ下降時間 (誘導負荷) Fall time, inductive load	$I_C = 25\text{ A}, V_{CE} = 350\text{ V}$ $V_{GE} = -15 / 15\text{ V}$ $R_{Goff} = 20\ \Omega$	$T_{vj} = 25^{\circ}\text{C}$ $T_{vj} = 125^{\circ}\text{C}$ $T_{vj} = 150^{\circ}\text{C}$	t_f	0,025 0,05 0,055	μs μs μs
ターンオンスイッチング損失 Turn-on energy loss per pulse	$I_C = 25\text{ A}, V_{CE} = 350\text{ V}, L\sigma = 30\text{ nH}$ $di/dt = 1050\text{ A}/\mu\text{s} (T_{vj} = 150^{\circ}\text{C})$ $V_{GE} = -15 / 15\text{ V}, R_{Gon} = 20\ \Omega$	$T_{vj} = 25^{\circ}\text{C}$ $T_{vj} = 125^{\circ}\text{C}$ $T_{vj} = 150^{\circ}\text{C}$	E_{on}	0,67 1,00 1,05	mJ mJ mJ
ターンオフスイッチング損失 Turn-off energy loss per pulse	$I_C = 25\text{ A}, V_{CE} = 350\text{ V}, L\sigma = 30\text{ nH}$ $du/dt = 3000\text{ V}/\mu\text{s} (T_{vj} = 150^{\circ}\text{C})$ $V_{GE} = -15 / 15\text{ V}, R_{Goff} = 20\ \Omega$	$T_{vj} = 25^{\circ}\text{C}$ $T_{vj} = 125^{\circ}\text{C}$ $T_{vj} = 150^{\circ}\text{C}$	E_{off}	0,60 0,95 1,00	mJ mJ mJ
短絡電流 SC data	$V_{GE} \leq 15\text{ V}, V_{CC} = 800\text{ V}$ $V_{CE\max} = V_{CES} - L_{SCE} \cdot di/dt$ $t_P \leq 10\ \mu\text{s}, T_{vj} = 150^{\circ}\text{C}$		I_{SC}	80	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}	1,45	K/W
動作温度 Temperature under switching conditions			$T_{vj\text{ op}}$	-40	150 $^{\circ}\text{C}$

暫定データ
Preliminary Data

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	$T_{vj} = 25^{\circ}\text{C}$	V_{RRM}	1200	V
連続DC電流 Continuous DC forward current		I_F	15	A
ピーク繰返し順電流 Repetitive peak forward current	$t_P = 1\text{ ms}$	I_{FRM}	50	A
電流二乗時間積 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	40,0 34,0	A^2s A^2s

電気的特性 / Characteristic Values

		min.	typ.	max.	
順電圧 Forward voltage	$I_F = 15\text{ A}, V_{GE} = 0\text{ V}$		1,75	2,15	V
	$I_F = 15\text{ A}, V_{GE} = 0\text{ V}$		1,75		V
	$I_F = 15\text{ A}, V_{GE} = 0\text{ V}$		1,75		V
ピーク逆回復電流 Peak reverse recovery current	$I_F = 15\text{ A}, -di_F/dt = 1300\text{ A}/\mu\text{s} (T_{vj}=150^{\circ}\text{C})$		36,0		A
	$V_R = 350\text{ V}$		38,0		A
	$V_{GE} = -15\text{ V}$		38,0		A
逆回復電荷量 Recovered charge	$I_F = 15\text{ A}, -di_F/dt = 1300\text{ A}/\mu\text{s} (T_{vj}=150^{\circ}\text{C})$		1,05		μC
	$V_R = 350\text{ V}$		2,10		μC
	$V_{GE} = -15\text{ V}$		2,40		μC
逆回復損失 Reverse recovery energy	$I_F = 15\text{ A}, -di_F/dt = 1300\text{ A}/\mu\text{s} (T_{vj}=150^{\circ}\text{C})$		0,40		mJ
	$V_R = 350\text{ V}$		0,66		mJ
	$V_{GE} = -15\text{ V}$		0,70		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}	2,35		K/W
動作温度 Temperature under switching conditions		$T_{vj\text{ op}}$	-40	150	$^{\circ}\text{C}$

暫定データ Preliminary Data

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	$T_{vj} = 25^{\circ}\text{C}$	V_{CES}	650	V
コレクタ電流 Implemented collector current		I_{CN}	30	A
連続DCコレクタ電流 Continuous DC collector current	$T_H = 100^{\circ}\text{C}, T_{vj\max} = 175^{\circ}\text{C}$	I_{CDC}	15	A
繰り返しピークコレクタ電流 Repetitive peak collector current	$t_P = 1\text{ ms}$	I_{CRM}	60	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	$I_C = 15\text{ A}$ $V_{GE} = 15\text{ V}$	$T_{vj} = 25^{\circ}\text{C}$ $T_{vj} = 125^{\circ}\text{C}$ $T_{vj} = 150^{\circ}\text{C}$	$V_{CE\text{ sat}}$	1,20 1,25 1,28	1,45 V V V
ゲート・エミッタ間しきい値電圧 Gate threshold voltage	$I_C = 0,30\text{ mA}, V_{CE} = V_{GE}, T_{vj} = 25^{\circ}\text{C}$		V_{Geth}	4,95	5,80 6,45 V
ゲート電荷量 Gate charge	$V_{GE} = -15 / 15\text{ V}$		Q_G	0,30	μC
内蔵ゲート抵抗 Internal gate resistor	$T_{vj} = 25^{\circ}\text{C}$		R_{Gint}	0,0	Ω
入力容量 Input capacitance	$f = 1000\text{ kHz}, T_{vj} = 25^{\circ}\text{C}, V_{CE} = 25\text{ V}, V_{GE} = 0\text{ V}$		C_{ies}	1,65	nF
帰還容量 Reverse transfer capacitance	$f = 1000\text{ kHz}, T_{vj} = 25^{\circ}\text{C}, V_{CE} = 25\text{ V}, V_{GE} = 0\text{ V}$		C_{res}	0,051	nF
コレクタ・エミッタ間遮断電流 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
ゲート・エミッタ間漏れ電流 Gate-emitter leakage current	$V_{CE} = 0\text{ V}, V_{GE} = 20\text{ V}, T_{vj} = 25^{\circ}\text{C}$		I_{GES}		100 nA
ターンオン遅れ時間 (誘導負荷) Turn-on delay time, inductive load	$I_C = 15\text{ A}, V_{CE} = 350\text{ V}$ $V_{GE} = -15 / 15\text{ V}$ $R_{Gon} = 15\ \Omega$	$T_{vj} = 25^{\circ}\text{C}$ $T_{vj} = 125^{\circ}\text{C}$ $T_{vj} = 150^{\circ}\text{C}$	t_{don}	0,035 0,035 0,035	μs μs μs
ターンオン上昇時間 (誘導負荷) Rise time, inductive load	$I_C = 15\text{ A}, V_{CE} = 350\text{ V}$ $V_{GE} = -15 / 15\text{ V}$ $R_{Gon} = 15\ \Omega$	$T_{vj} = 25^{\circ}\text{C}$ $T_{vj} = 125^{\circ}\text{C}$ $T_{vj} = 150^{\circ}\text{C}$	t_r	0,01 0,012 0,013	μs μs μs
ターンオフ遅れ時間 (誘導負荷) Turn-off delay time, inductive load	$I_C = 15\text{ A}, V_{CE} = 350\text{ V}$ $V_{GE} = -15 / 15\text{ V}$ $R_{Goff} = 15\ \Omega$	$T_{vj} = 25^{\circ}\text{C}$ $T_{vj} = 125^{\circ}\text{C}$ $T_{vj} = 150^{\circ}\text{C}$	t_{doff}	0,34 0,38 0,39	μs μs μs
ターンオフ下降時間 (誘導負荷) Fall time, inductive load	$I_C = 15\text{ A}, V_{CE} = 350\text{ V}$ $V_{GE} = -15 / 15\text{ V}$ $R_{Goff} = 15\ \Omega$	$T_{vj} = 25^{\circ}\text{C}$ $T_{vj} = 125^{\circ}\text{C}$ $T_{vj} = 150^{\circ}\text{C}$	t_f	0,045 0,07 0,075	μs μs μs
ターンオンスイッチング損失 Turn-on energy loss per pulse	$I_C = 15\text{ A}, V_{CE} = 350\text{ V}, L_{\sigma} = 40\text{ nH}$ $di/dt = 1300\text{ A}/\mu\text{s} (T_{vj} = 150^{\circ}\text{C})$ $V_{GE} = -15 / 15\text{ V}, R_{Gon} = 15\ \Omega$	$T_{vj} = 25^{\circ}\text{C}$ $T_{vj} = 125^{\circ}\text{C}$ $T_{vj} = 150^{\circ}\text{C}$	E_{on}	0,19 0,26 0,28	mJ mJ mJ
ターンオフスイッチング損失 Turn-off energy loss per pulse	$I_C = 15\text{ A}, V_{CE} = 350\text{ V}, L_{\sigma} = 40\text{ nH}$ $du/dt = 2600\text{ V}/\mu\text{s} (T_{vj} = 150^{\circ}\text{C})$ $V_{GE} = -15 / 15\text{ V}, R_{Goff} = 15\ \Omega$	$T_{vj} = 25^{\circ}\text{C}$ $T_{vj} = 125^{\circ}\text{C}$ $T_{vj} = 150^{\circ}\text{C}$	E_{off}	0,47 0,60 0,64	mJ mJ mJ
短絡電流 SC data	$V_{GE} \leq 15\text{ V}, V_{CC} = 360\text{ V}$ $V_{CE\max} = V_{CES} - L_{sCE} \cdot di/dt$	$t_P \leq 8\ \mu\text{s}, T_{vj} = 25^{\circ}\text{C}$ $t_P \leq 6\ \mu\text{s}, T_{vj} = 150^{\circ}\text{C}$	I_{SC}	210 150	A 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}	1,75	K/W
動作温度 Temperature under switching conditions			$T_{vj\text{ op}}$	-40	150 $^{\circ}\text{C}$

暫定データ Preliminary Data

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	$T_{vj} = 25^{\circ}\text{C}$	V_{RRM}	650	V
連続DC電流 Continuous DC forward current		I_F	25	A
ピーク繰返し順電流 Repetitive peak forward current	$t_P = 1 \text{ ms}$	I_{FRM}	50	A
電流二乗時間積 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	40,0 50,0	A^2s A^2s

電気的特性 / Characteristic Values

			min.	typ.	max.	
順電圧 Forward voltage	$I_F = 25 \text{ A}, V_{GE} = 0 \text{ V}$	$T_{vj} = 25^{\circ}\text{C}$	V_F	1,65	2,15	V
	$I_F = 25 \text{ A}, V_{GE} = 0 \text{ V}$	$T_{vj} = 125^{\circ}\text{C}$		1,60		V
	$I_F = 25 \text{ A}, V_{GE} = 0 \text{ V}$	$T_{vj} = 150^{\circ}\text{C}$		1,55		V
ピーク逆回復電流 Peak reverse recovery current	$I_F = 25 \text{ A}, -di_F/dt = 1050 \text{ A}/\mu\text{s} (T_{vj}=150^{\circ}\text{C})$ $V_R = 350 \text{ V}$	$T_{vj} = 25^{\circ}\text{C}$	I_{RM}	13,0		A
		$T_{vj} = 125^{\circ}\text{C}$		15,0		A
		$T_{vj} = 150^{\circ}\text{C}$		16,0		A
逆回復電荷量 Recovered charge	$I_F = 25 \text{ A}, -di_F/dt = 1050 \text{ A}/\mu\text{s} (T_{vj}=150^{\circ}\text{C})$ $V_R = 350 \text{ V}$	$T_{vj} = 25^{\circ}\text{C}$	Q_r	0,85		μC
		$T_{vj} = 125^{\circ}\text{C}$		1,45		μC
		$T_{vj} = 150^{\circ}\text{C}$		1,60		μC
逆回復損失 Reverse recovery energy	$I_F = 25 \text{ A}, -di_F/dt = 1050 \text{ A}/\mu\text{s} (T_{vj}=150^{\circ}\text{C})$ $V_R = 350 \text{ V}$	$T_{vj} = 25^{\circ}\text{C}$	E_{rec}	0,15		mJ
		$T_{vj} = 125^{\circ}\text{C}$		0,26		mJ
		$T_{vj} = 150^{\circ}\text{C}$		0,30		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}		3,30		K/W
動作温度 Temperature under switching conditions		$T_{vj op}$	-40		150	$^{\circ}\text{C}$

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	$T_{NTC} = 25^{\circ}\text{C}$	R_{25}		5,00		k Ω
R100の偏差 Deviation of R100	$T_{NTC} = 100^{\circ}\text{C}, R_{100} = 493 \Omega$	$\Delta R/R$	-5		5	%
損失 Power dissipation	$T_{NTC} = 25^{\circ}\text{C}$	P_{25}			20,0	mW
B-定数 B-value	$R_2 = R_{25} \exp [B_{25/50}(1/T_2 - 1/(298,15 \text{ K}))]$	$B_{25/50}$		3375		K
B-定数 B-value	$R_2 = R_{25} \exp [B_{25/80}(1/T_2 - 1/(298,15 \text{ K}))]$	$B_{25/80}$		3411		K
B-定数 B-value	$R_2 = R_{25} \exp [B_{25/100}(1/T_2 - 1/(298,15 \text{ K}))]$	$B_{25/100}$		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.

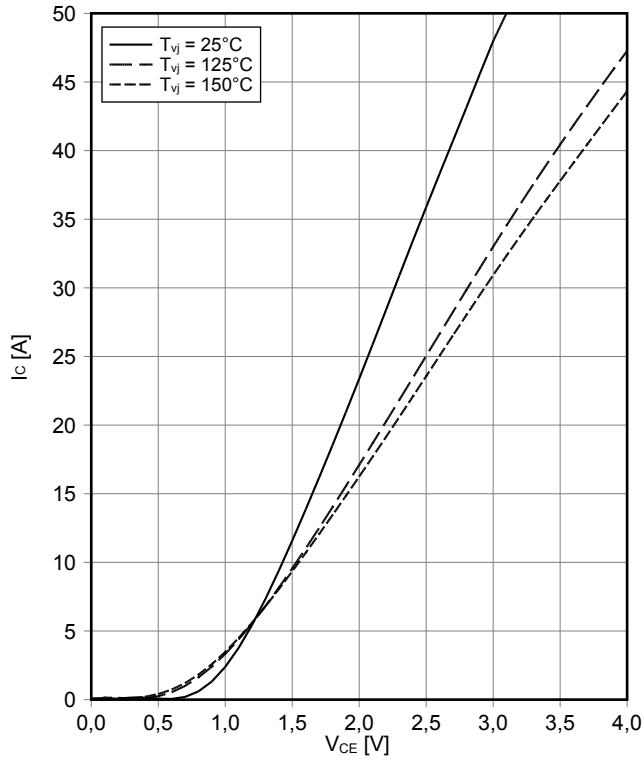
暫定データ Preliminary Data

モジュール / Module

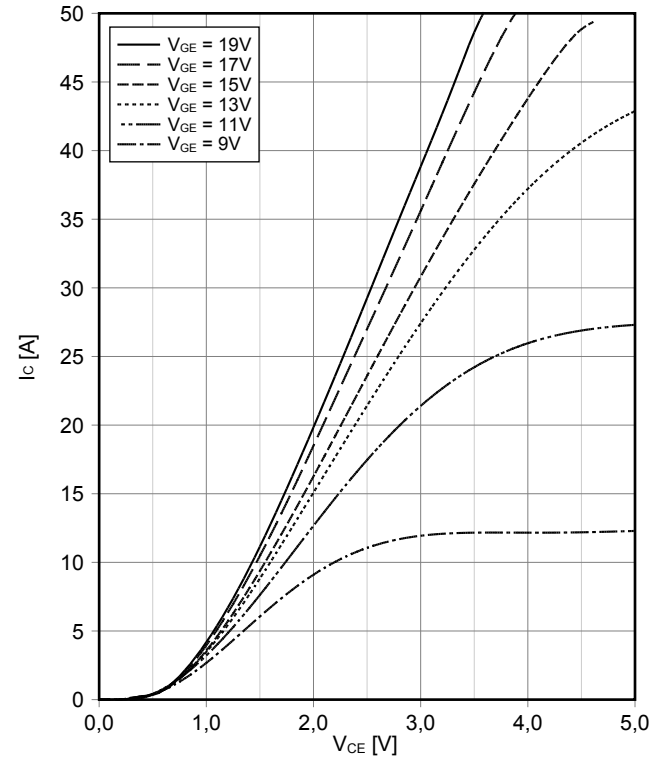
絶縁耐圧 Isolation test voltage	RMS, f = 50 Hz, t = 1 min.	V _{ISOL}	2,5			kV
内部絶縁 Internal isolation	基礎絶縁 (クラス1, IEC 61140) basic insulation (class 1, IEC 61140)		Al ₂ O ₃			
沿面距離 Creepage distance	連絡方法 - ヒートシンク / terminal to heatsink 連絡方法 - 連絡方法 / terminal to terminal		11,5 6,3			mm
空間距離 Clearance	連絡方法 - 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			
			min.	typ.	max.	
内部インダクタンス Stray inductance module		L _{sCE}		25		nH
保存温度 Storage temperature		T _{stg}	-40		125	°C
Anpresskraft für mech. Bef. pro Feder mounting force per clamp		F	40	-	80	N
質量 Weight		G		39		g

暫定データ Preliminary Data

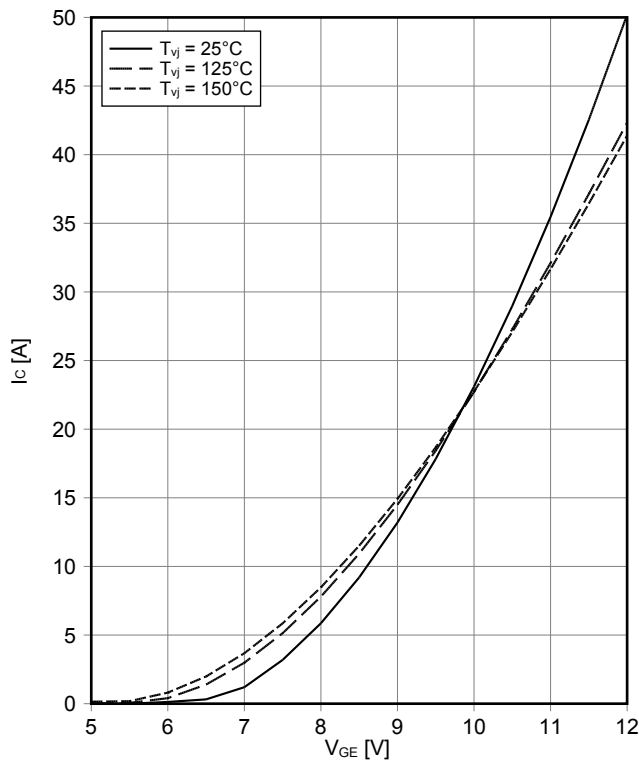
出力特性 IGBT, T1 / T4 (Typical)
output characteristic IGBT, T1 / T4 (typical)
 $I_C = f(V_{CE})$
 $V_{GE} = 15\text{ V}$



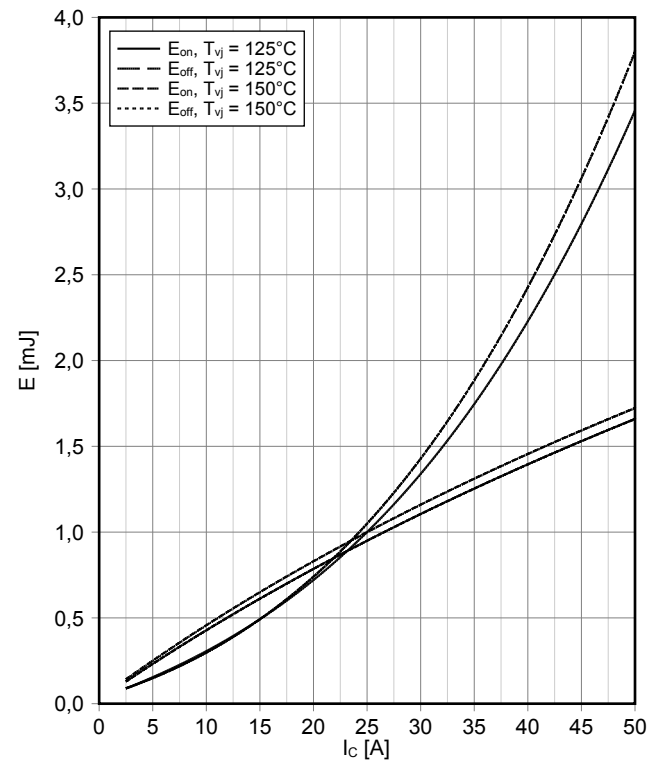
出力特性 IGBT, T1 / T4 (Typical)
output characteristic IGBT, T1 / T4 (typical)
 $I_C = f(V_{CE})$
 $T_{vj} = 150^\circ\text{C}$



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



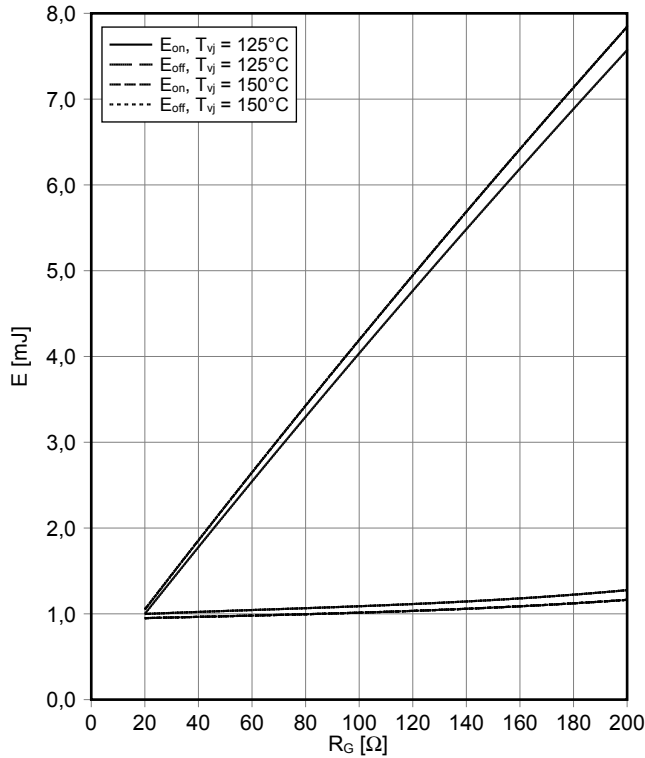
スイッチング損失 IGBT, T1 / T4 (Typical)
switching losses IGBT, T1 / T4 (typical)
 $E_{on} = f(I_C)$, $E_{off} = f(I_C)$
 $V_{GE} = \pm 15\text{ V}$, $R_{Gon} = 20\ \Omega$, $R_{Goff} = 20\ \Omega$, $V_{CE} = 350\text{ V}$



暫定データ Preliminary Data

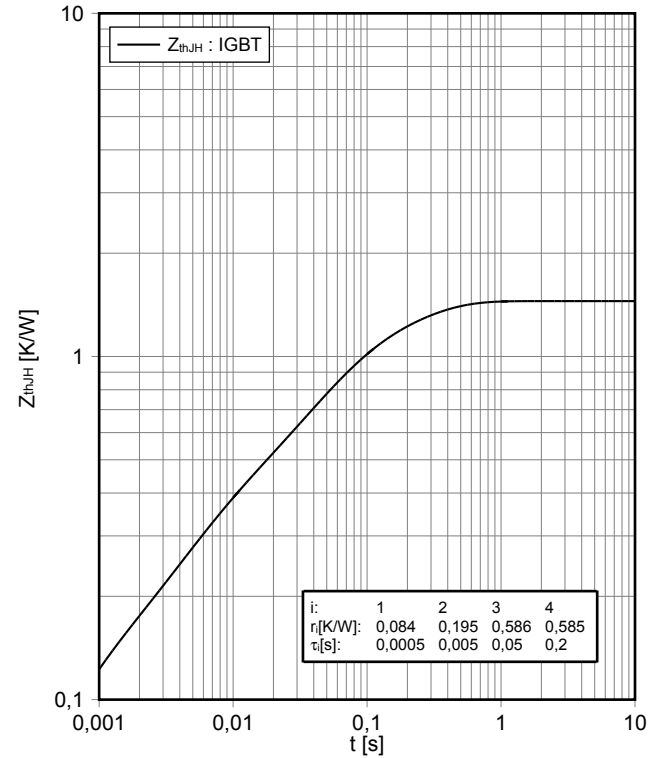
スイッチング損失 IGBT, T1 / T4 (typical) switching losses IGBT, T1 / T4 (typical)

$E_{on} = f(R_G)$, $E_{off} = f(R_G)$
 $V_{GE} = \pm 15\text{ V}$, $I_C = 25\text{ A}$, $V_{CE} = 350\text{ V}$



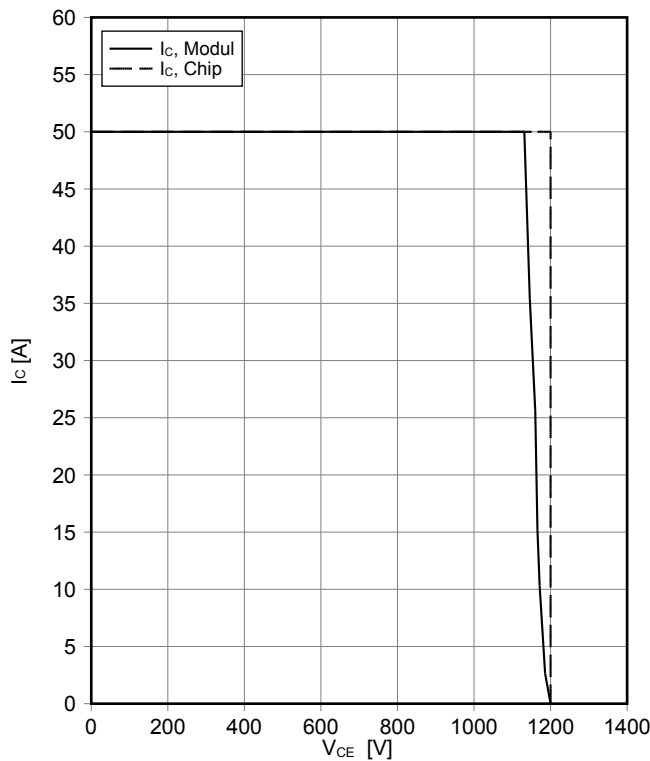
過渡熱インピーダンス IGBT, T1 / T4 transient thermal impedance IGBT, T1 / T4

$Z_{thJH} = f(t)$



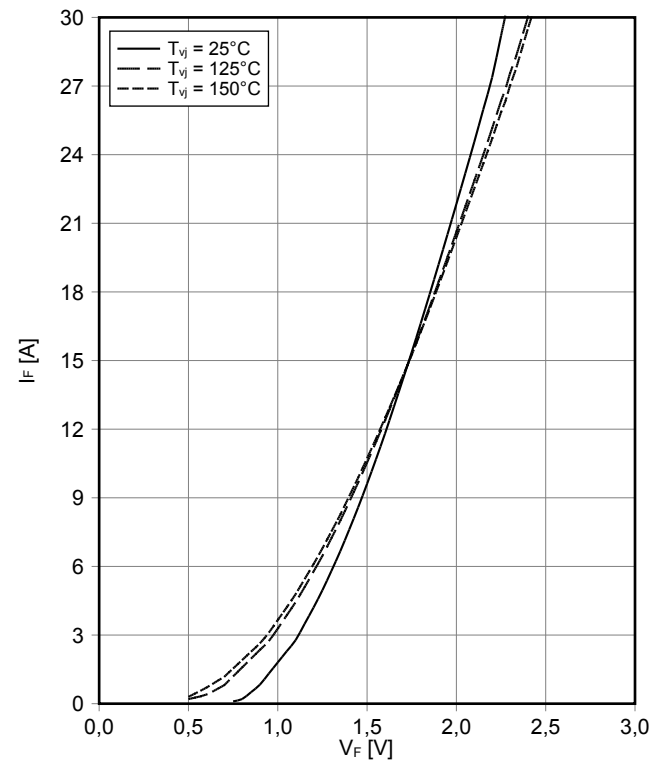
逆バイアス安全動作領域 IGBT, T1 / T4 (RBSOA) reverse bias safe operating area IGBT, T1 / T4 (RBSOA)

$I_C = f(V_{CE})$
 $V_{GE} = \pm 15\text{ V}$, $R_{Goff} = 20\ \Omega$, $T_{vj} = 150^\circ\text{C}$



順電圧特性 ダイオード, D1 / D4 (typical) forward characteristic of Diode, D1 / D4 (typical)

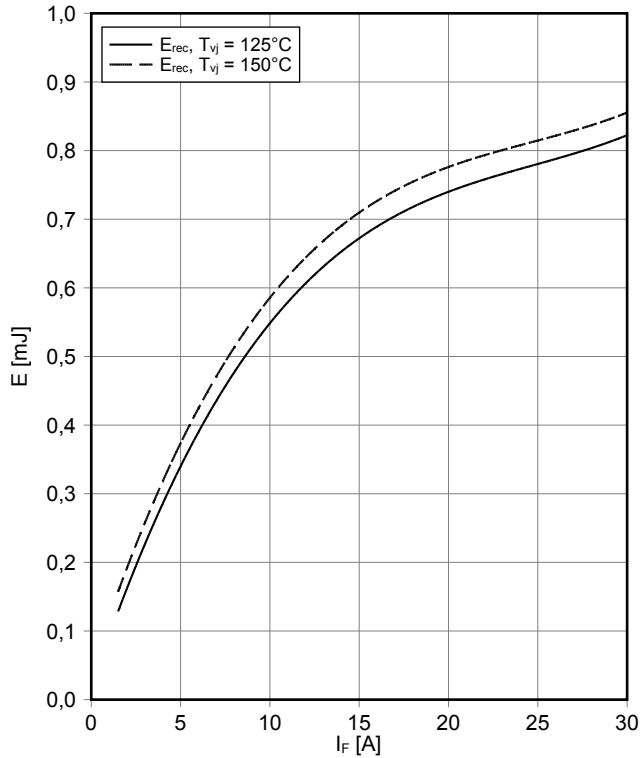
$I_F = f(V_F)$



暫定データ Preliminary Data

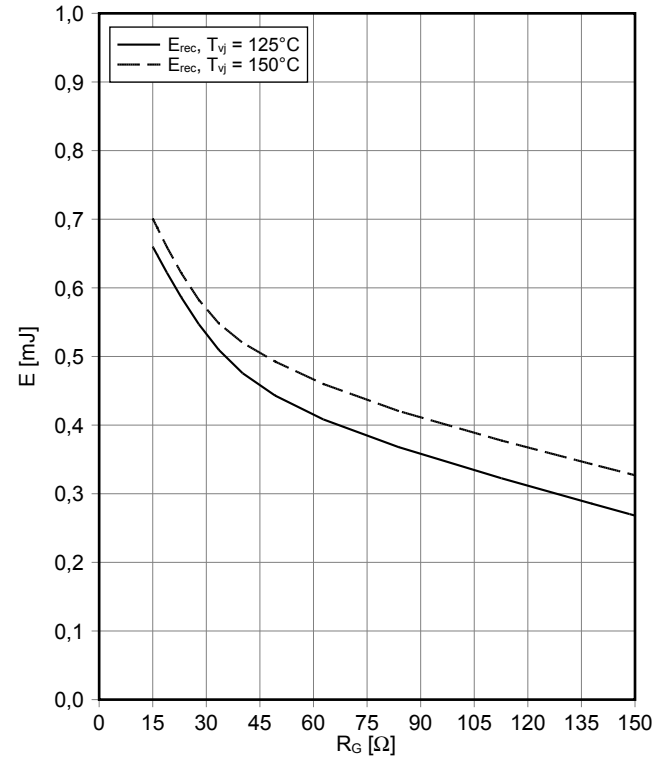
スイッチング損失 ダイオード, D1 / D4 (Typical)
switching losses Diode, D1 / D4 (typical)

$E_{rec} = f(I_F)$
 $R_{Gon} = 15 \Omega, V_{CE} = 350 V$



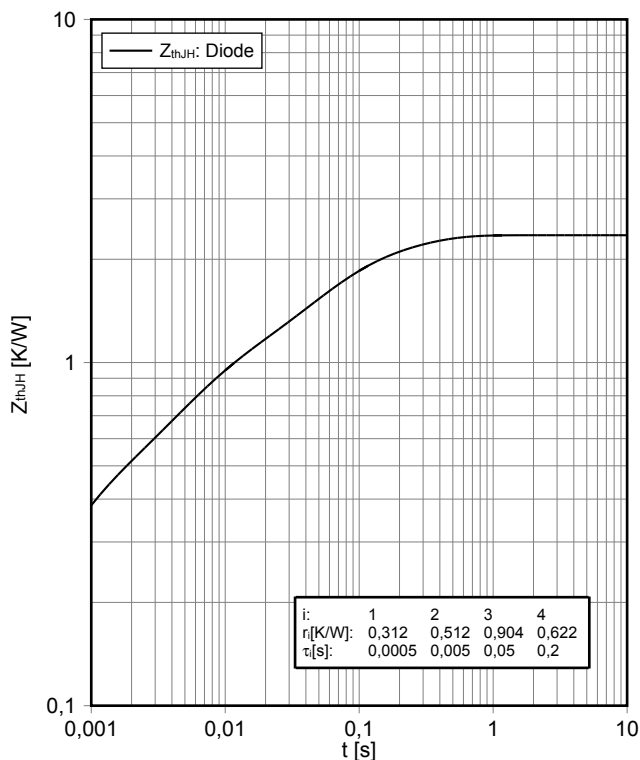
スイッチング損失 ダイオード, D1 / D4 (Typical)
switching losses Diode, D1 / D4 (typical)

$E_{rec} = f(R_G)$
 $I_F = 15 A, V_{CE} = 350 V$



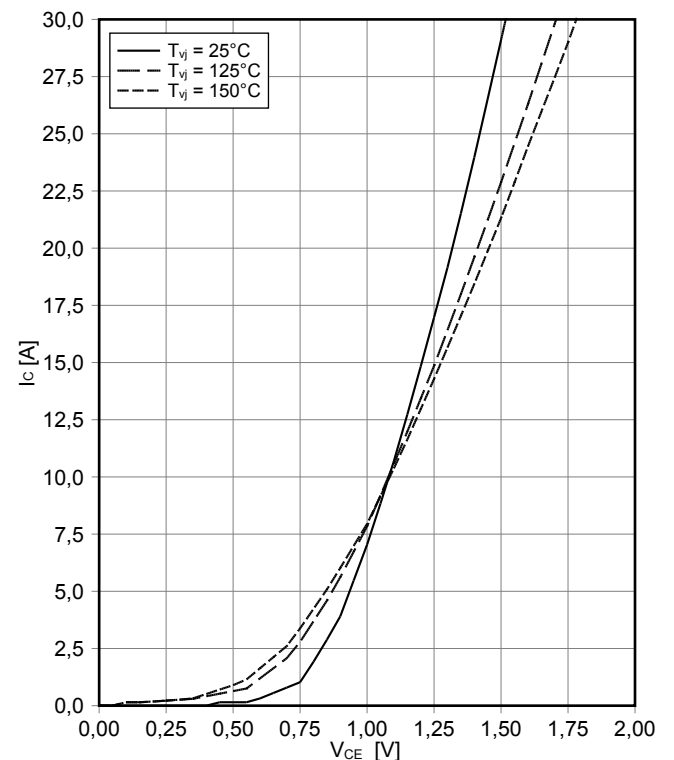
過渡熱インピーダンス ダイオード, D1 / D4
transient thermal impedance Diode, D1 / D4

$Z_{thJH} = f(t)$



出力特性 IGBT, T2 / T3 (Typical)
output characteristic IGBT, T2 / T3 (typical)

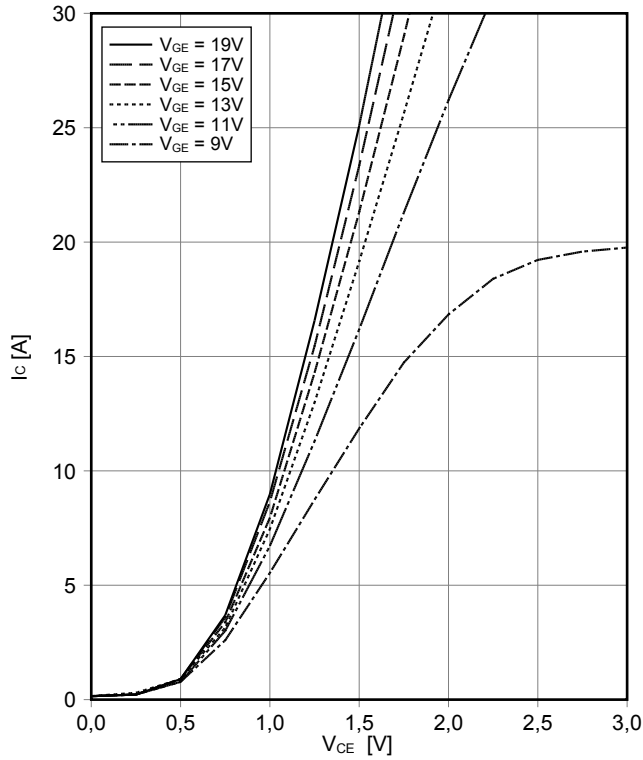
$I_C = f(V_{CE})$
 $V_{GE} = 15 V$



暫定データ Preliminary Data

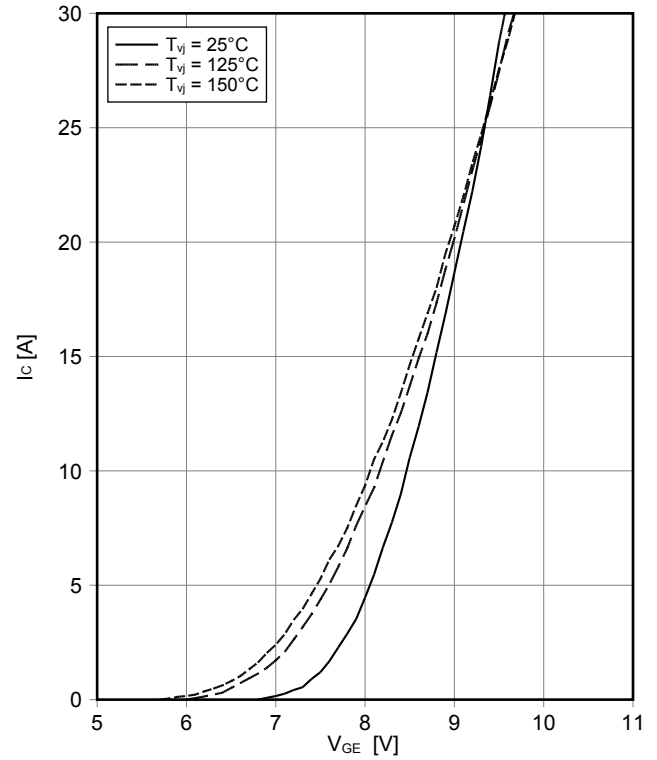
出力特性 IGBT, T2 / T3 (Typical)
output characteristic IGBT, T2 / T3 (typical)

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



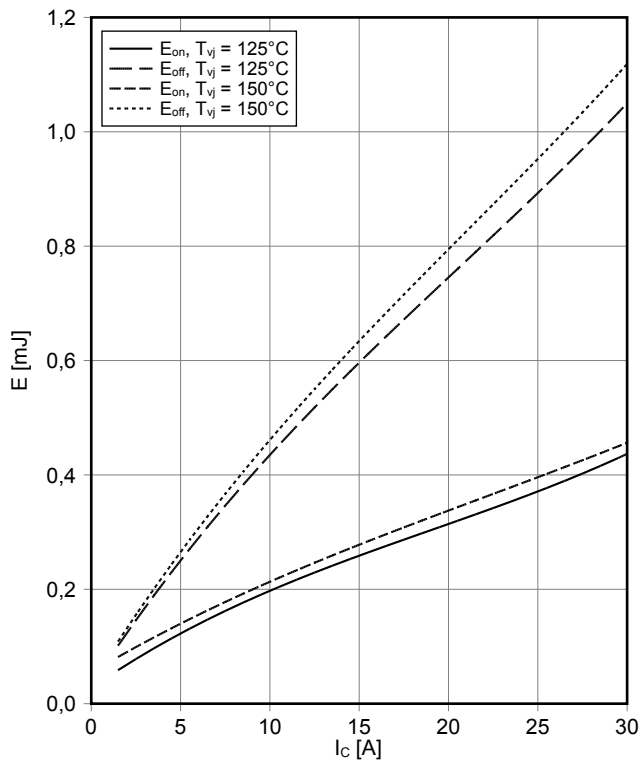
伝達特性 IGBT, T2 / T3 (Typical)
transfer characteristic IGBT, T2 / T3 (typical)

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



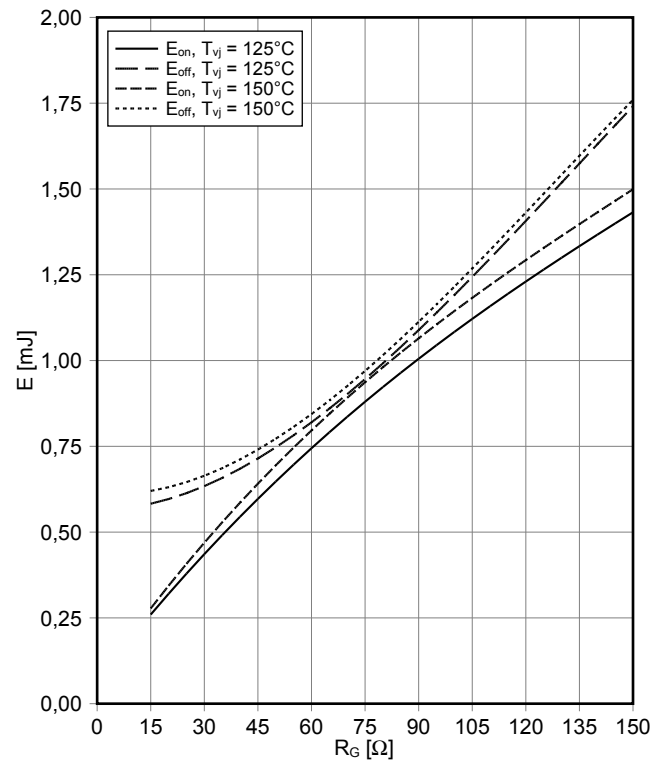
スイッチング損失 IGBT, T2 / T3 (Typical)
switching losses IGBT, T2 / T3 (typical)

$E_{on} = f(I_C), E_{off} = f(I_C)$
 $V_{GE} = \pm 15\text{ V}, R_{Gon} = 15\ \Omega, R_{Goff} = 15\ \Omega, V_{CE} = 350\text{ V}$



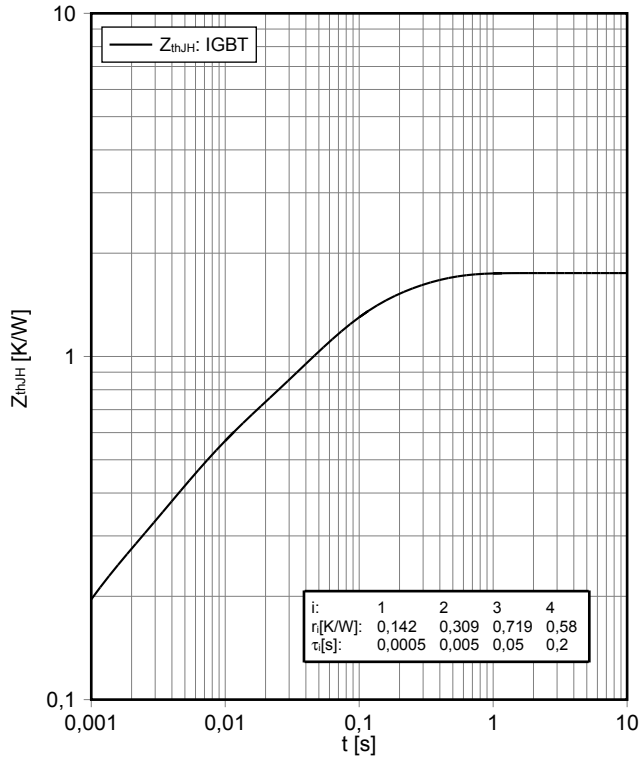
スイッチング損失 IGBT, T2 / T3 (Typical)
switching losses IGBT, T2 / T3 (typical)

$E_{on} = f(R_G), E_{off} = f(R_G)$
 $V_{GE} = \pm 15\text{ V}, I_C = 15\text{ A}, V_{CE} = 350\text{ V}$

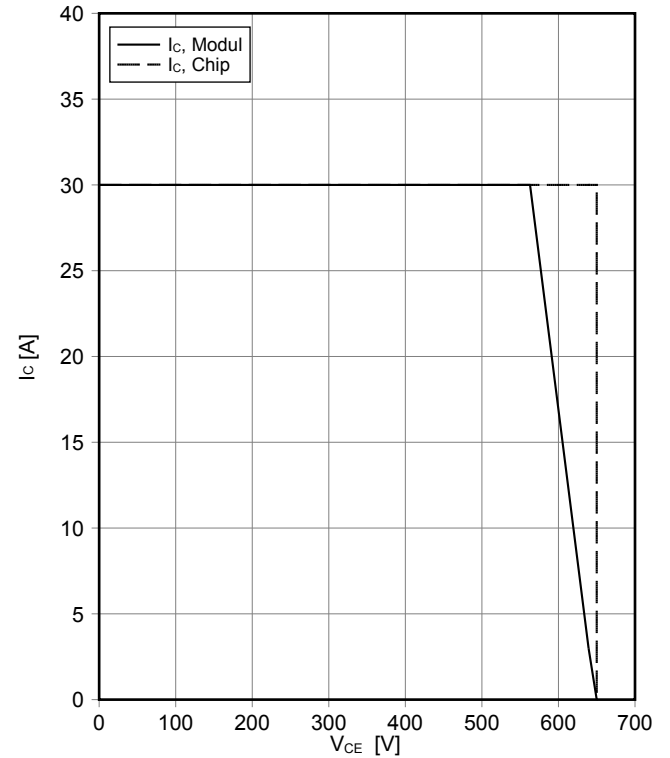


暫定データ Preliminary Data

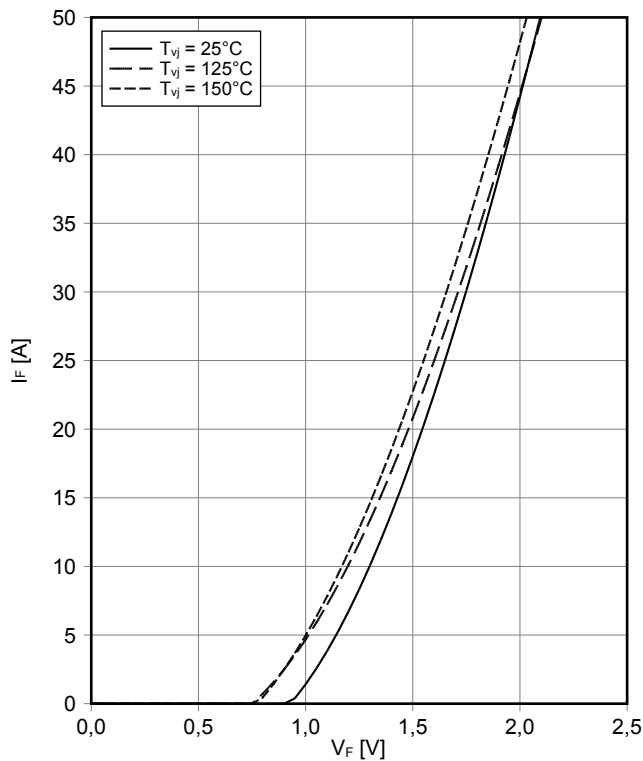
過渡熱インピーダンス IGBT, T2 / T3
transient thermal impedance IGBT, T2 / T3
 $Z_{thJH} = f(t)$



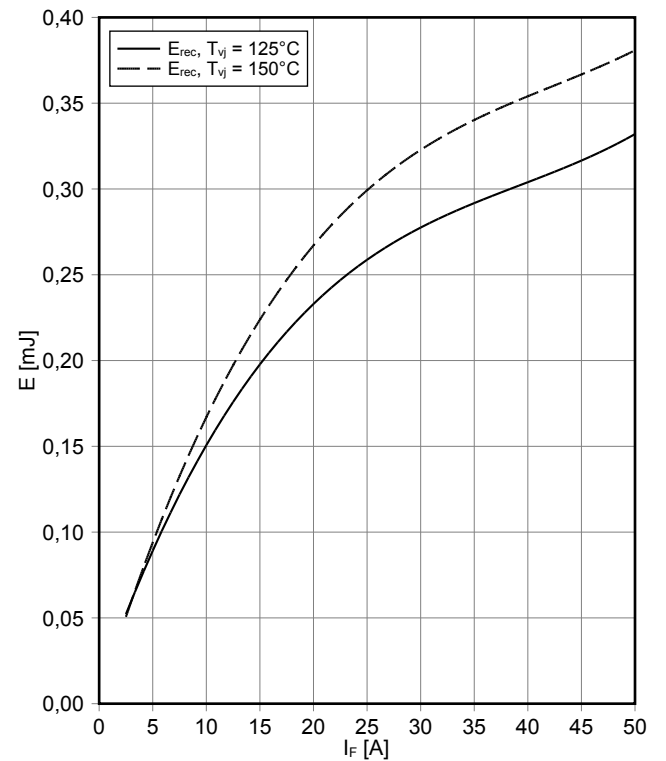
逆バイアス安全動作領域 IGBT, T2 / T3 (RBSOA)
reverse bias safe operating area IGBT, T2 / T3 (RBSOA)
 $I_C = f(V_{CE})$
 $V_{GE} = \pm 15\text{ V}, R_{Goff} = 15\ \Omega, T_{vj} = 150^\circ\text{C}$



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



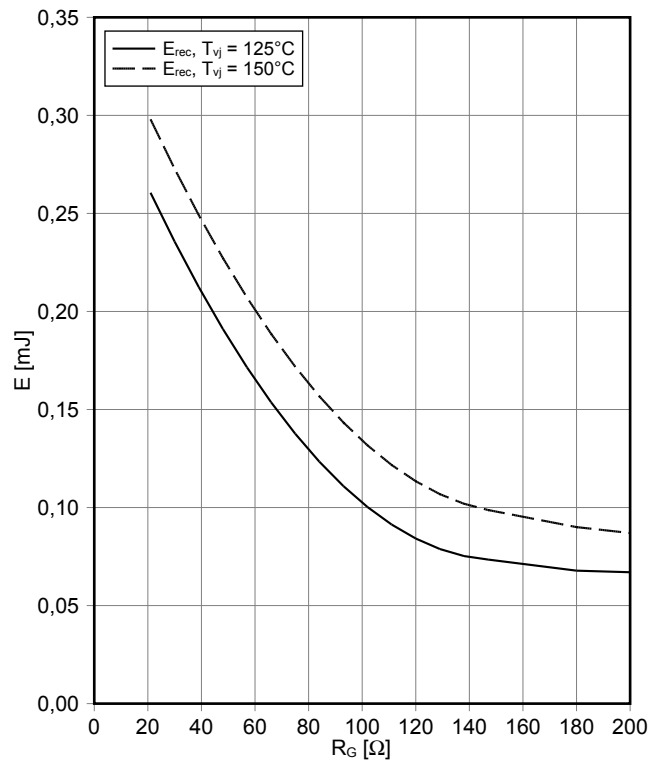
スイッチング損失 ダイオード, D2 / D3 (Typical)
switching losses Diode, D2 / D3 (typical)
 $E_{rec} = f(I_F)$
 $R_{Gon} = 20\ \Omega, V_{CE} = 350\text{ V}$



暫定データ Preliminary Data

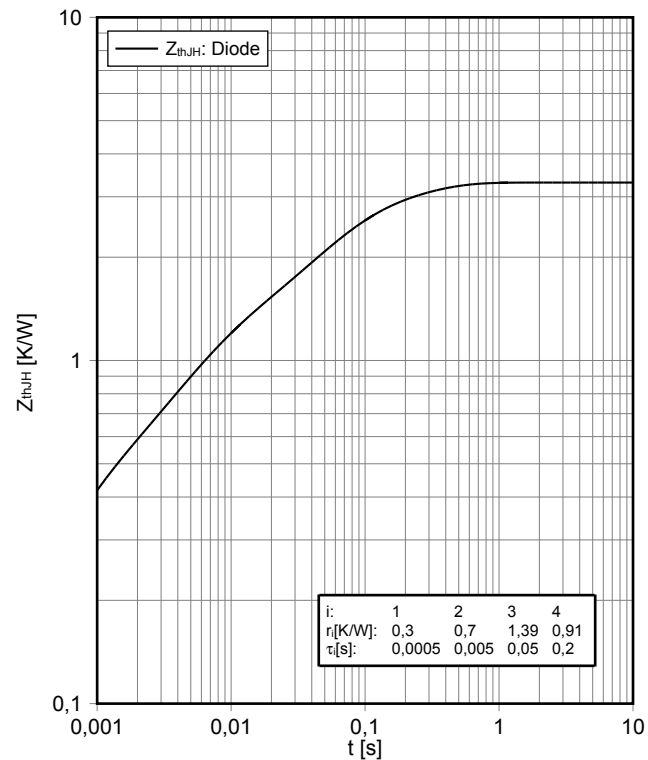
スイッチング損失 ダイオード, D2 / D3 (Typical)
switching losses Diode, D2 / D3 (typical)

$E_{rec} = f(R_G)$
 $I_F = 25\text{ A}, V_{CE} = 350\text{ V}$



過渡熱インピーダンス ダイオード, D2 / D3
transient thermal impedance Diode, D2 / D3

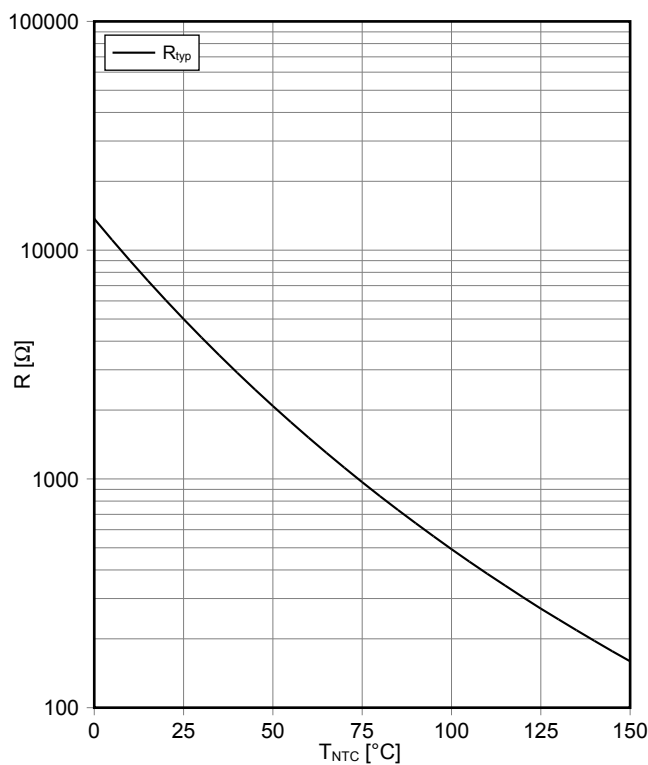
$Z_{thJH} = f(t)$



i:	1	2	3	4
r[K/W]:	0,3	0,7	1,39	0,91
τ[s]:	0,0005	0,005	0,05	0,2

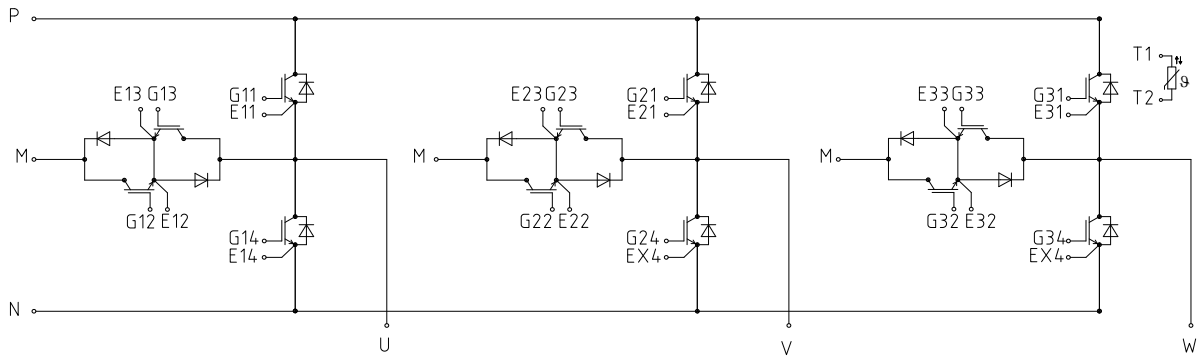
NTC-サーミスタ サーミスタの温度特性
NTC-Thermistor-temperature characteristic (typical)

$R = f(T_{NTC})$

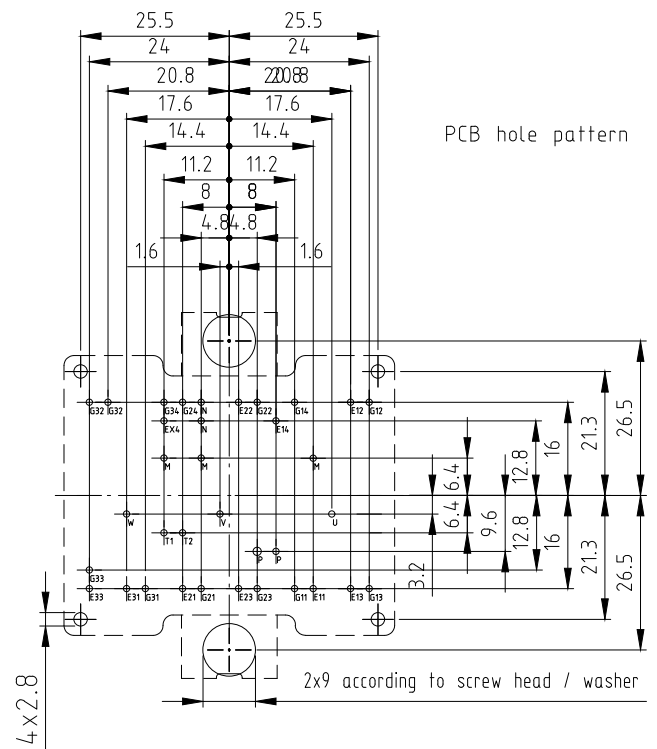
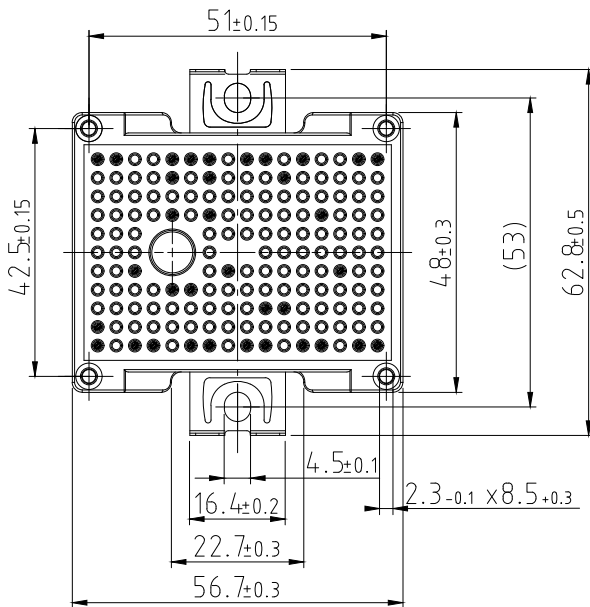
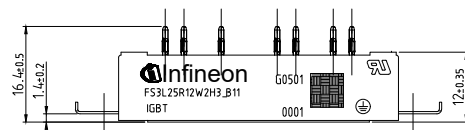
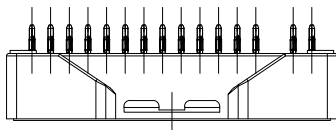


暫定データ
Preliminary Data

回路図 / Circuit diagram



パッケージ概要 / Package outlines



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