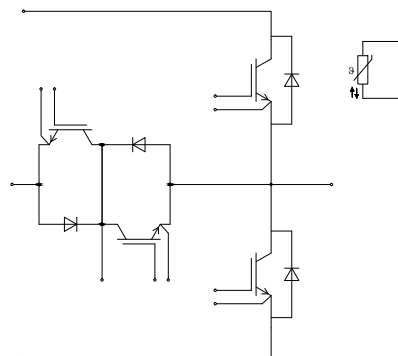
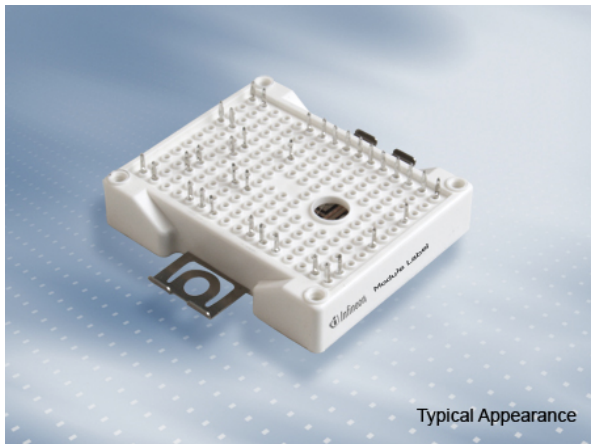


EasyPACK モジュール ニュートラル ポイント クランプ2 トポロジー内蔵 and PressFIT / NTCサーミスタ
EasyPACK module with active "Neutral Point Clamp 2" topology and PressFIT / NTC



$V_{CES} = 1200V$
 $I_{C\ nom} = 75A / I_{CRM} = 150A$

一般応用

- 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

- 高速IGBT H3
- 低スイッチング損失
- $T_{vj\ op} = 150^{\circ}C$

機械的特性

- PressFIT 接合 技術
- RoHS対応

Typical Applications

- 3-Level-Applications
- Solar Applications

Electrical Features

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

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: 2014-11-26	
approved by: AKDA	revision: 3.0	UL approved (E83335)



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
コレクタ電流 Implemented collector current		I_{CN}	150	A
連続DCコレクタ電流 Continuous DC collector current	$T_C = 100^{\circ}\text{C}, T_{vj\max} = 175^{\circ}\text{C}$	$I_{C\text{nom}}$	75	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}	300	A
トータル損失 Total power dissipation	$T_C = 25^{\circ}\text{C}, T_{vj\max} = 175^{\circ}\text{C}$	P_{tot}	500	W
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	$I_C = 75\text{A}, V_{GE} = 15\text{V}$ $I_C = 75\text{A}, V_{GE} = 15\text{V}$ $I_C = 75\text{A}, V_{GE} = 15\text{V}$	$T_{vj} = 25^{\circ}\text{C}$ $T_{vj} = 125^{\circ}\text{C}$ $T_{vj} = 150^{\circ}\text{C}$	$V_{CE\text{sat}}$	1,55 1,70 1,75	1,75	V V V	
ゲート・エミッタ間しきい値電圧 Gate threshold voltage	$I_C = 5,20\text{mA}, V_{CE} = V_{GE}, T_{vj} = 25^{\circ}\text{C}$		$V_{G\text{Eth}}$	5,25	5,80	6,35	V
ゲート電荷量 Gate charge	$V_{GE} = -15\text{V} \dots +15\text{V}$		Q_G	1,15			μC
内蔵ゲート抵抗 Internal gate resistor	$T_{vj} = 25^{\circ}\text{C}$		$R_{G\text{int}}$	5,0			Ω
入力容量 Input capacitance	$f = 1\text{MHz}, T_{vj} = 25^{\circ}\text{C}, V_{CE} = 25\text{V}, V_{GE} = 0\text{V}$		C_{ies}	8,70			nF
帰還容量 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}	0,48			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	$I_C = 75\text{A}, V_{CE} = 400\text{V}$ $V_{GE} = \pm 15\text{V}$ $R_{G\text{on}} = 3,0\Omega$	$T_{vj} = 25^{\circ}\text{C}$ $T_{vj} = 125^{\circ}\text{C}$ $T_{vj} = 150^{\circ}\text{C}$	$t_{d\text{on}}$	0,16 0,17 0,175			μs μs μs
ターンオン上昇時間 (誘導負荷) Rise time, inductive load	$I_C = 75\text{A}, V_{CE} = 400\text{V}$ $V_{GE} = \pm 15\text{V}$ $R_{G\text{on}} = 3,0\Omega$	$T_{vj} = 25^{\circ}\text{C}$ $T_{vj} = 125^{\circ}\text{C}$ $T_{vj} = 150^{\circ}\text{C}$	t_r	0,03 0,035 0,035			μs μs μs
ターンオフ遅れ時間 (誘導負荷) Turn-off delay time, inductive load	$I_C = 75\text{A}, V_{CE} = 400\text{V}$ $V_{GE} = \pm 15\text{V}$ $R_{G\text{off}} = 3,0\Omega$	$T_{vj} = 25^{\circ}\text{C}$ $T_{vj} = 125^{\circ}\text{C}$ $T_{vj} = 150^{\circ}\text{C}$	$t_{d\text{off}}$	0,33 0,42 0,44			μs μs μs
ターンオフ下降時間 (誘導負荷) Fall time, inductive load	$I_C = 75\text{A}, V_{CE} = 400\text{V}$ $V_{GE} = \pm 15\text{V}$ $R_{G\text{off}} = 3,0\Omega$	$T_{vj} = 25^{\circ}\text{C}$ $T_{vj} = 125^{\circ}\text{C}$ $T_{vj} = 150^{\circ}\text{C}$	t_f	0,035 0,06 0,07			μs μs μs
ターンオンスイッチング損失 Turn-on energy loss per pulse	$I_C = 75\text{A}, V_{CE} = 400\text{V}, L_S = 25\text{nH}$ $V_{GE} = \pm 15\text{V}, di/dt = 2600\text{A}/\mu\text{s} (T_{vj} = 150^{\circ}\text{C})$ $R_{G\text{on}} = 3,0\Omega$	$T_{vj} = 25^{\circ}\text{C}$ $T_{vj} = 125^{\circ}\text{C}$ $T_{vj} = 150^{\circ}\text{C}$	E_{on}	1,55 2,45 2,70			mJ mJ mJ
ターンオフスイッチング損失 Turn-off energy loss per pulse	$I_C = 75\text{A}, V_{CE} = 400\text{V}, L_S = 25\text{nH}$ $V_{GE} = \pm 15\text{V}, du/dt = 2400\text{V}/\mu\text{s} (T_{vj} = 150^{\circ}\text{C})$ $R_{G\text{off}} = 3,0\Omega$	$T_{vj} = 25^{\circ}\text{C}$ $T_{vj} = 125^{\circ}\text{C}$ $T_{vj} = 150^{\circ}\text{C}$	E_{off}	2,60 4,40 5,00			mJ mJ mJ
短絡電流 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}	600			A
ジャンクション・ケース間熱抵抗 Thermal resistance, junction to case	IGBT部 (1素子当り) / per IGBT		R_{thJC}	0,25	0,30		K/W

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ケース・ヒートシンク間熱抵抗 Thermal resistance, case to heatsink	IGBT部 (1 素子当り) / per IGBT $\lambda_{\text{Paste}} = 1 \text{ W/(m}\cdot\text{K)}$ / $\lambda_{\text{grease}} = 1 \text{ W/(m}\cdot\text{K)}$	R_{thCH}		0,30		K/W
動作温度 Temperature under switching conditions		$T_{\text{vj op}}$	-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	$T_{\text{vj}} = 25^\circ\text{C}$	V_{RRM}		650		V
順電流 Implemented forward current		I_{FN}		125		A
連続DC電流 Continuous DC forward current		I_{F}		75		A
ピーク繰返し順電流 Repetitive peak forward current	$t_{\text{p}} = 1 \text{ ms}$	I_{FRM}		250		A
電流二乗時間積 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		1450 1400		A ² s A ² s

電気的特性 / Characteristic Values

				min.	typ.	max.	
順電圧 Forward voltage	$I_{\text{F}} = 75 \text{ A}, V_{\text{GE}} = 0 \text{ V}$ $I_{\text{F}} = 75 \text{ A}, V_{\text{GE}} = 0 \text{ V}$ $I_{\text{F}} = 75 \text{ A}, V_{\text{GE}} = 0 \text{ V}$	$T_{\text{vj}} = 25^\circ\text{C}$ $T_{\text{vj}} = 125^\circ\text{C}$ $T_{\text{vj}} = 150^\circ\text{C}$	V_{F}		1,45 1,30 1,35	1,70	V V V
ピーク逆回復電流 Peak reverse recovery current	$I_{\text{F}} = 75 \text{ A}, -di_{\text{F}}/dt = 2600 \text{ A}/\mu\text{s} (T_{\text{vj}}=150^\circ\text{C})$ $V_{\text{R}} = 400 \text{ V}$ $V_{\text{GE}} = -15 \text{ V}$	$T_{\text{vj}} = 25^\circ\text{C}$ $T_{\text{vj}} = 125^\circ\text{C}$ $T_{\text{vj}} = 150^\circ\text{C}$	I_{RM}		62,0 72,0 75,0		A A A
逆回復電荷量 Recovered charge	$I_{\text{F}} = 75 \text{ A}, -di_{\text{F}}/dt = 2600 \text{ A}/\mu\text{s} (T_{\text{vj}}=150^\circ\text{C})$ $V_{\text{R}} = 400 \text{ V}$ $V_{\text{GE}} = -15 \text{ V}$	$T_{\text{vj}} = 25^\circ\text{C}$ $T_{\text{vj}} = 125^\circ\text{C}$ $T_{\text{vj}} = 150^\circ\text{C}$	Q_{r}		3,40 5,00 5,60		μC μC μC
逆回復損失 Reverse recovery energy	$I_{\text{F}} = 75 \text{ A}, -di_{\text{F}}/dt = 2600 \text{ A}/\mu\text{s} (T_{\text{vj}}=150^\circ\text{C})$ $V_{\text{R}} = 400 \text{ V}$ $V_{\text{GE}} = -15 \text{ V}$	$T_{\text{vj}} = 25^\circ\text{C}$ $T_{\text{vj}} = 125^\circ\text{C}$ $T_{\text{vj}} = 150^\circ\text{C}$	E_{rec}		0,60 0,95 1,10		mJ mJ mJ
ジャンクション・ケース間熱抵抗 Thermal resistance, junction to case	/Diode (1 素子当り) / per diode		R_{thJC}		0,55	0,65	K/W
ケース・ヒートシンク間熱抵抗 Thermal resistance, case to heatsink	/Diode (1 素子当り) / per diode $\lambda_{\text{Paste}} = 1 \text{ W/(m}\cdot\text{K)}$ / $\lambda_{\text{grease}} = 1 \text{ W/(m}\cdot\text{K)}$		R_{thCH}		0,60		K/W
動作温度 Temperature under switching conditions			$T_{\text{vj op}}$	-40		150	°C

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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
連続DCコレクタ電流 Continuous DC collector current	$T_C = 100^{\circ}\text{C}, T_{vj\max} = 175^{\circ}\text{C}$	$I_{C\text{nom}}$	75	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}	150	A
トータル損失 Total power dissipation	$T_C = 25^{\circ}\text{C}, T_{vj\max} = 175^{\circ}\text{C}$	P_{tot}	215	W
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	$I_C = 75\text{A}, V_{GE} = 15\text{V}$ $I_C = 75\text{A}, V_{GE} = 15\text{V}$ $I_C = 75\text{A}, V_{GE} = 15\text{V}$	$T_{vj} = 25^{\circ}\text{C}$ $T_{vj} = 125^{\circ}\text{C}$ $T_{vj} = 150^{\circ}\text{C}$	$V_{CE\text{sat}}$	1,45 1,60 1,70	1,90	V V V	
ゲート・エミッタ間しきい値電圧 Gate threshold voltage	$I_C = 1,20\text{mA}, V_{CE} = V_{GE}, T_{vj} = 25^{\circ}\text{C}$		V_{GEth}	4,95	5,80	6,45	V
ゲート電荷量 Gate charge	$V_{GE} = -15\text{V} \dots +15\text{V}$		Q_G	0,80			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	$f = 1\text{MHz}, T_{vj} = 25^{\circ}\text{C}, V_{CE} = 25\text{V}, V_{GE} = 0\text{V}$		C_{ies}	4,60			nF
帰還容量 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}	0,145			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	$I_C = 75\text{A}, V_{CE} = 400\text{V}$ $V_{GE} = \pm 15\text{V}$ $R_{Gon} = 5,1\Omega$	$T_{vj} = 25^{\circ}\text{C}$ $T_{vj} = 125^{\circ}\text{C}$ $T_{vj} = 150^{\circ}\text{C}$	t_{don}	0,025 0,025 0,025			μs μs μs
ターンオン上昇時間 (誘導負荷) Rise time, inductive load	$I_C = 75\text{A}, V_{CE} = 400\text{V}$ $V_{GE} = \pm 15\text{V}$ $R_{Gon} = 5,1\Omega$	$T_{vj} = 25^{\circ}\text{C}$ $T_{vj} = 125^{\circ}\text{C}$ $T_{vj} = 150^{\circ}\text{C}$	t_r	0,02 0,02 0,02			μs μs μs
ターンオフ遅れ時間 (誘導負荷) Turn-off delay time, inductive load	$I_C = 75\text{A}, V_{CE} = 400\text{V}$ $V_{GE} = \pm 15\text{V}$ $R_{Goff} = 5,1\Omega$	$T_{vj} = 25^{\circ}\text{C}$ $T_{vj} = 125^{\circ}\text{C}$ $T_{vj} = 150^{\circ}\text{C}$	t_{doff}	0,19 0,21 0,22			μs μs μs
ターンオフ下降時間 (誘導負荷) Fall time, inductive load	$I_C = 75\text{A}, V_{CE} = 400\text{V}$ $V_{GE} = \pm 15\text{V}$ $R_{Goff} = 5,1\Omega$	$T_{vj} = 25^{\circ}\text{C}$ $T_{vj} = 125^{\circ}\text{C}$ $T_{vj} = 150^{\circ}\text{C}$	t_f	0,02 0,035 0,04			μs μs μs
ターンオンスイッチング損失 Turn-on energy loss per pulse	$I_C = 75\text{A}, V_{CE} = 400\text{V}, L_S = 25\text{nH}$ $V_{GE} = \pm 15\text{V}, di/dt = 3600\text{A}/\mu\text{s} (T_{vj} = 150^{\circ}\text{C})$ $R_{Gon} = 5,1\Omega$	$T_{vj} = 25^{\circ}\text{C}$ $T_{vj} = 125^{\circ}\text{C}$ $T_{vj} = 150^{\circ}\text{C}$	E_{on}	1,30 2,10 2,30			mJ mJ mJ
ターンオフスイッチング損失 Turn-off energy loss per pulse	$I_C = 75\text{A}, V_{CE} = 400\text{V}, L_S = 25\text{nH}$ $V_{GE} = \pm 15\text{V}, du/dt = 5400\text{V}/\mu\text{s} (T_{vj} = 150^{\circ}\text{C})$ $R_{Goff} = 5,1\Omega$	$T_{vj} = 25^{\circ}\text{C}$ $T_{vj} = 125^{\circ}\text{C}$ $T_{vj} = 150^{\circ}\text{C}$	E_{off}	1,70 2,40 2,60			mJ mJ mJ
短絡電流 SC data	$V_{GE} \leq 15\text{V}, V_{CC} = 360\text{V}$ $V_{CE\text{max}} = V_{CES} - L_{SCE} \cdot di/dt$	$t_P \leq 8\mu\text{s}, T_{vj} = 25^{\circ}\text{C}$ $t_P \leq 6\mu\text{s}, T_{vj} = 150^{\circ}\text{C}$	I_{SC}	530 380			A A
ジャンクション・ケース間熱抵抗 Thermal resistance, junction to case	IGBT部 (1素子当り) / per IGBT		R_{thJC}	0,60	0,70		K/W
ケース・ヒートシンク間熱抵抗 Thermal resistance, case to heatsink	IGBT部 (1素子当り) / 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}	0,60			K/W
動作温度 Temperature under switching conditions			$T_{vj\text{op}}$	-40	150		$^{\circ}\text{C}$

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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	50	A
ピーク繰返し順電流 Repetitive peak forward current	$t_P = 1\text{ ms}$	I_{FRM}	150	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	1050 985	A^2s A^2s

電気的特性 / Characteristic Values

			min.	typ.	max.	
順電圧 Forward voltage	$I_F = 50\text{ A}, V_{GE} = 0\text{ V}$ $I_F = 50\text{ A}, V_{GE} = 0\text{ V}$ $I_F = 50\text{ A}, V_{GE} = 0\text{ V}$	$T_{vj} = 25^{\circ}\text{C}$ $T_{vj} = 125^{\circ}\text{C}$ $T_{vj} = 150^{\circ}\text{C}$	V_F	2,00 1,70 1,65	2,55	V V V
ピーク逆回復電流 Peak reverse recovery current	$I_F = 50\text{ A}, -di_F/dt = 3200\text{ A}/\mu\text{s} (T_{vj}=150^{\circ}\text{C})$ $V_R = 400\text{ V}$ $V_{GE} = -15\text{ V}$	$T_{vj} = 25^{\circ}\text{C}$ $T_{vj} = 125^{\circ}\text{C}$ $T_{vj} = 150^{\circ}\text{C}$	I_{RM}	100 120 130		A A A
逆回復電荷量 Recovered charge	$I_F = 50\text{ A}, -di_F/dt = 3200\text{ A}/\mu\text{s} (T_{vj}=150^{\circ}\text{C})$ $V_R = 400\text{ V}$ $V_{GE} = -15\text{ V}$	$T_{vj} = 25^{\circ}\text{C}$ $T_{vj} = 125^{\circ}\text{C}$ $T_{vj} = 150^{\circ}\text{C}$	Q_r	3,50 7,80 10,0		μC μC μC
逆回復損失 Reverse recovery energy	$I_F = 50\text{ A}, -di_F/dt = 3200\text{ A}/\mu\text{s} (T_{vj}=150^{\circ}\text{C})$ $V_R = 400\text{ V}$ $V_{GE} = -15\text{ V}$	$T_{vj} = 25^{\circ}\text{C}$ $T_{vj} = 125^{\circ}\text{C}$ $T_{vj} = 150^{\circ}\text{C}$	E_{rec}	1,10 2,50 3,30		mJ mJ mJ
ジャンクション・ケース間熱抵抗 Thermal resistance, junction to case	/Diode (1 素子当り) / per diode		R_{thJC}	0,55	0,60	K/W
ケース・ヒートシンク間熱抵抗 Thermal resistance, case to heatsink	/Diode (1 素子当り) / per diode $\lambda_{Paste} = 1\text{ W}/(\text{m}\cdot\text{K}) / \lambda_{grease} = 1\text{ W}/(\text{m}\cdot\text{K})$		R_{thCH}	0,50		K/W
動作温度 Temperature under switching conditions			$T_{vj\text{ op}}$	-40	150	$^{\circ}\text{C}$

モジュール / Module

絶縁耐圧 Isolation test voltage	RMS, $f = 50\text{ Hz}, t = 1\text{ min.}$	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	
内部インダクタンス Stray inductance module		L_{sCE}	14	nH
保存温度 Storage temperature		T_{stg}	-40	125 $^{\circ}\text{C}$
Anpresskraft für mech. Bef. pro Feder mounting 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.

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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	$T_C = 25^\circ\text{C}$	R_{25}	5,00		k Ω
R100の偏差 Deviation of R100	$T_C = 100^\circ\text{C}, R_{100} = 493 \Omega$	$\Delta R/R$	-5	5	%
損失 Power dissipation	$T_C = 25^\circ\text{C}$	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.

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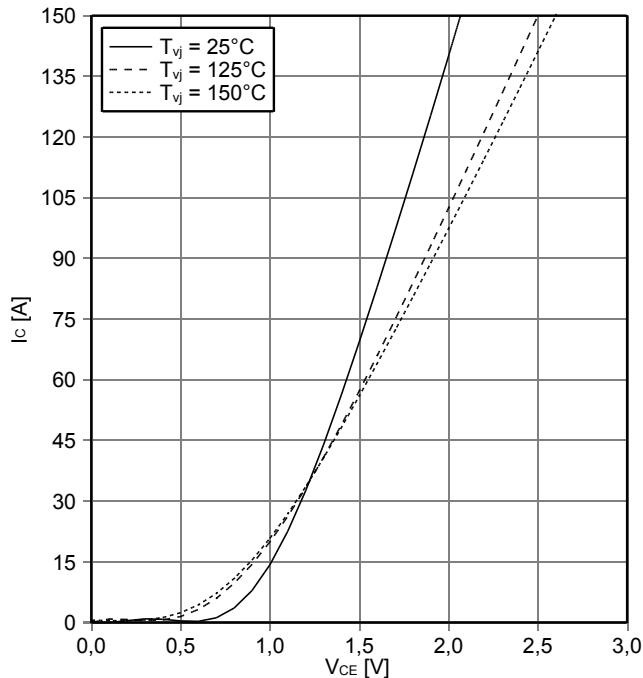


IGBT-モジュール
IGBT-Module

F3L150R12W2H3_B11

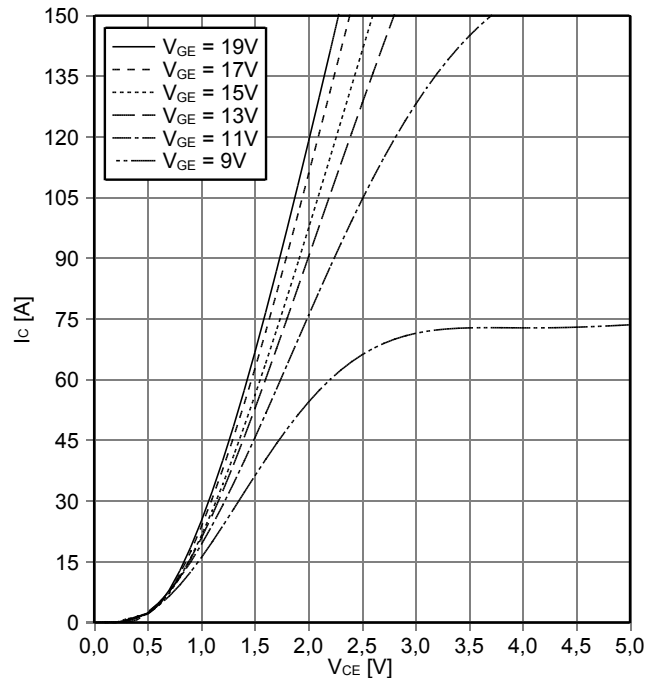
出力特性 IGBT, T1 / T4 (Typical)
output characteristic IGBT, T1 / T4 (typical)

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



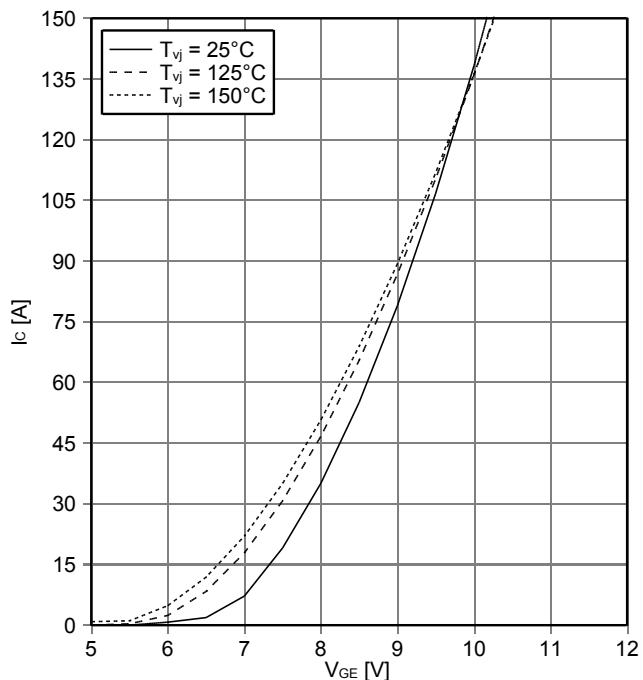
出力特性 IGBT, T1 / T4 (Typical)
output characteristic IGBT, T1 / T4 (typical)

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



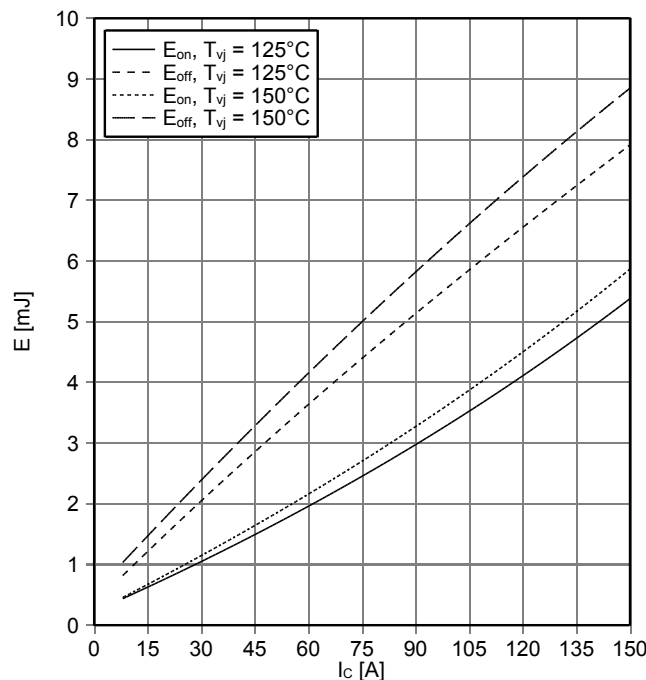
伝達特性 IGBT, T1 / T4 (Typical)
transfer characteristic IGBT, T1 / T4 (typical)

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



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

$E_{on} = f(I_C), E_{off} = f(I_C)$
 $V_{GE} = \pm 15\text{ V}, R_{Gon} = 3\ \Omega, R_{Goff} = 3\ \Omega, V_{CE} = 400\text{ V}$



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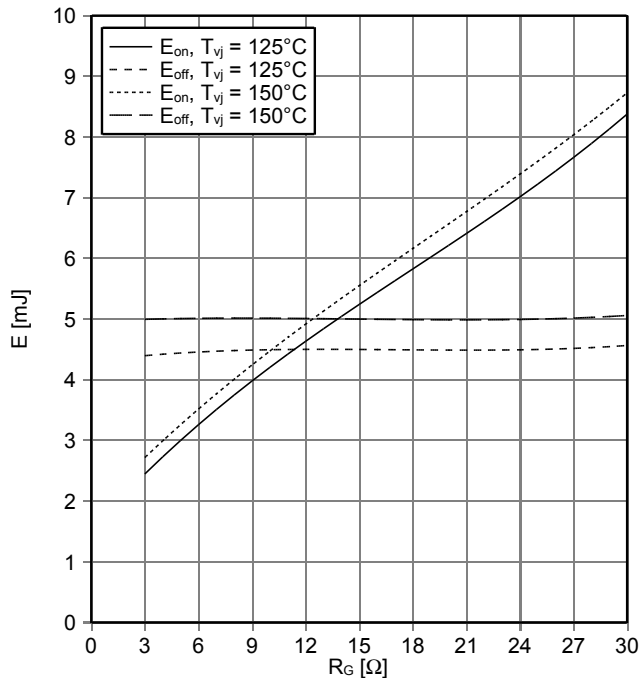


スイッチング損失 IGBT, T1 / T4 (Typical)

switching losses IGBT, T1 / T4 (typical)

$E_{on} = f(R_G), E_{off} = f(R_G)$

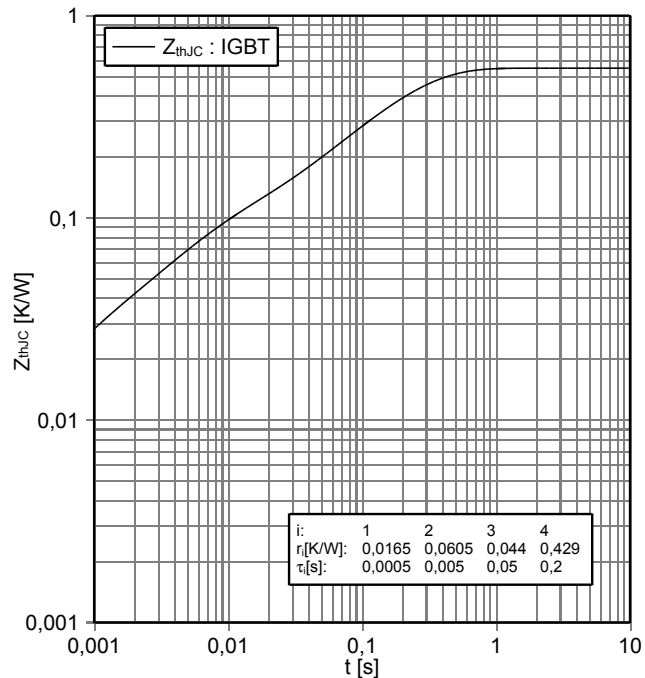
$V_{GE} = \pm 15\text{ V}, I_C = 75\text{ A}, V_{CE} = 400\text{ V}$



過渡熱インピーダンス IGBT, T1 / T4

transient thermal impedance IGBT, T1 / T4

$Z_{thJC} = f(t)$

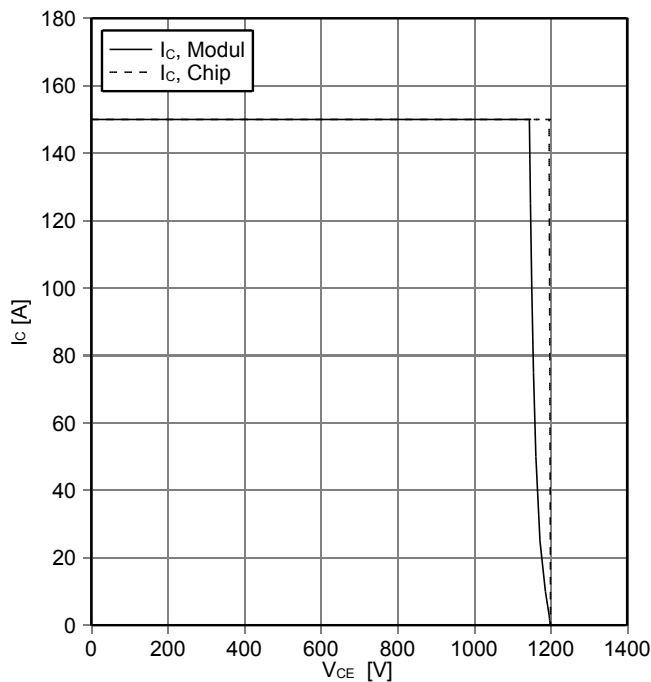


逆バイアス安全動作領域 IGBT, T1 / T4 (RBSOA)

reverse bias safe operating area IGBT, T1 / T4 (RBSOA)

$I_C = f(V_{CE})$

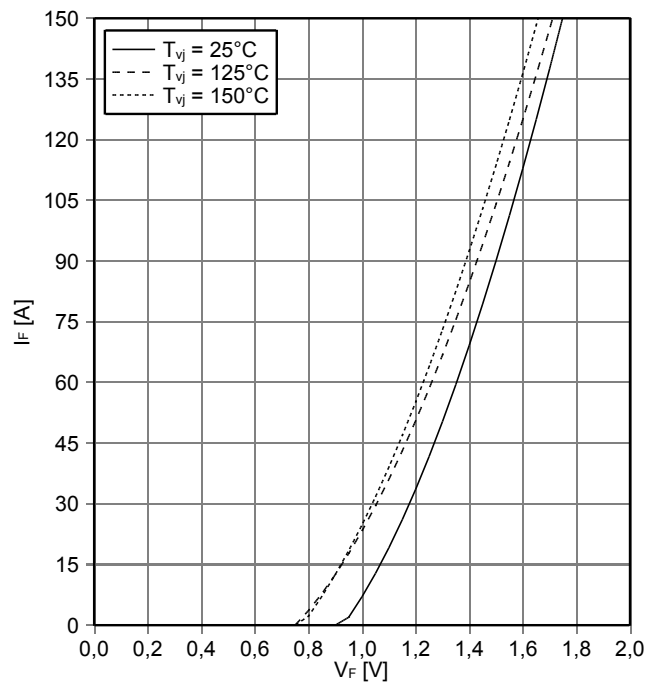
$V_{GE} = \pm 15\text{ V}, R_{Goff} = 3\ \Omega, T_{vj} = 150^\circ\text{C}$



順電圧特性 ダイオード, D2 / D3 (typical)

forward characteristic of Diode, D2 / D3 (typical)

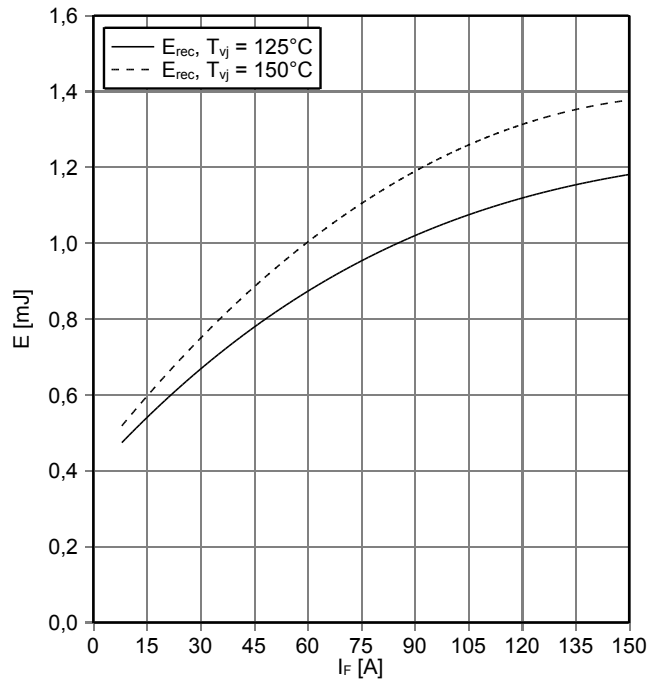
$I_F = f(V_F)$



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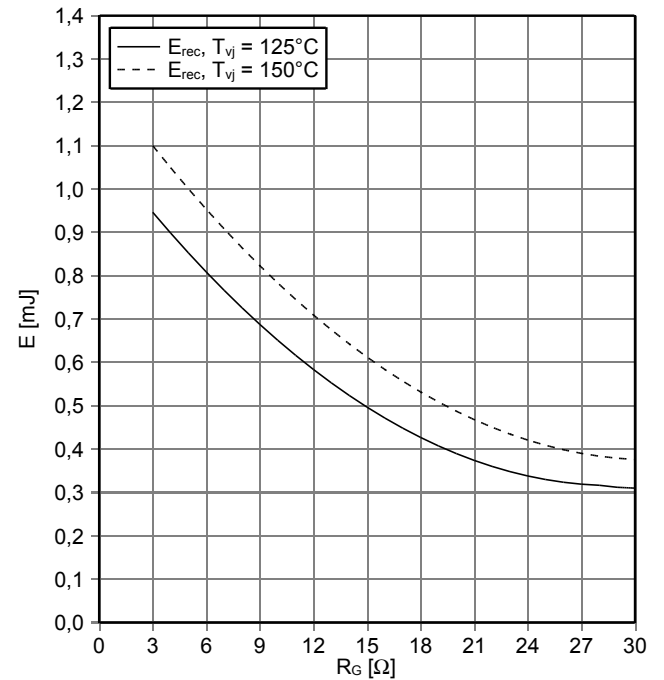
スイッチング損失 ダイオード, D2 / D3 (Typical)
switching losses Diode, D2 / D3 (typical)

$E_{rec} = f(I_F)$
 $R_{Gon} = 3 \Omega, V_{CE} = 400 V$



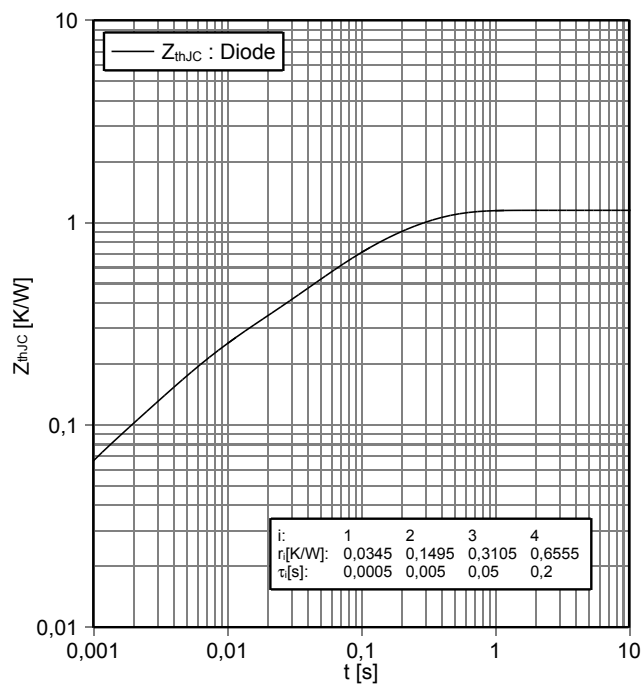
スイッチング損失 ダイオード, D2 / D3 (Typical)
switching losses Diode, D2 / D3 (typical)

$E_{rec} = f(R_G)$
 $I_F = 75 A, V_{CE} = 400 V$



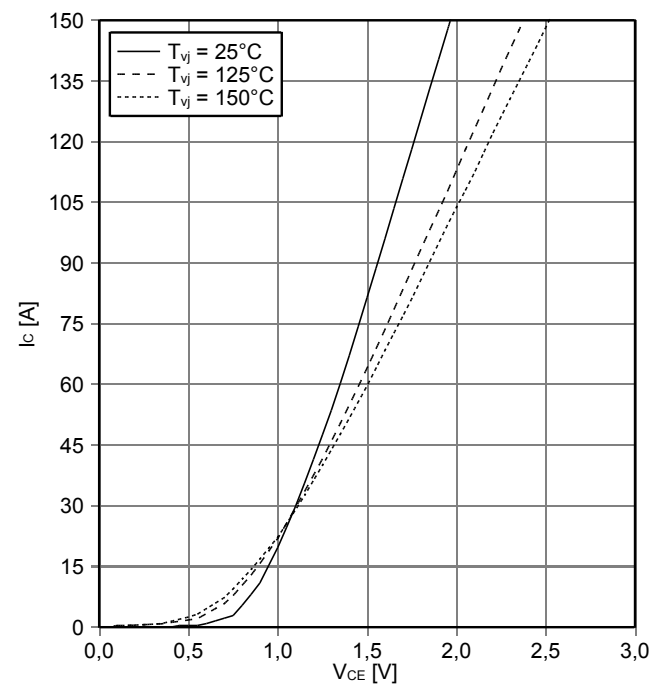
過渡熱インピーダンス ダイオード, D2 / D3
transient thermal impedance Diode, D2 / D3

$Z_{thJC} = f(t)$



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

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



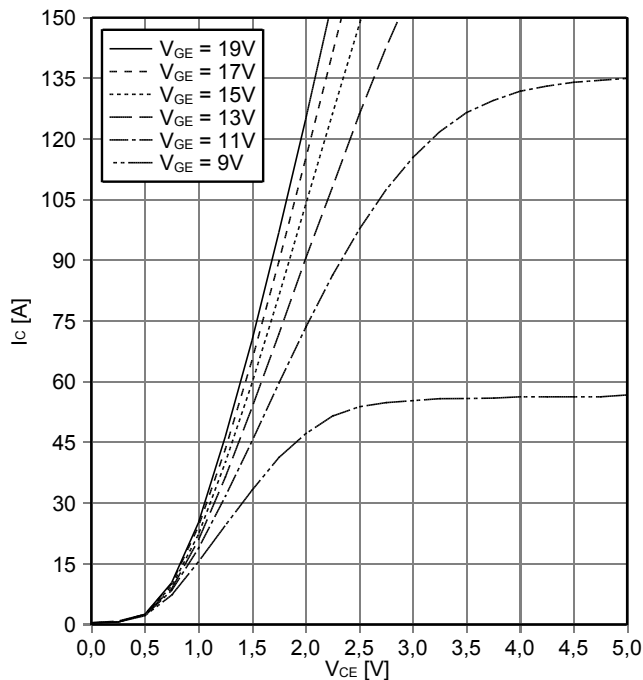


IGBT-モジュール
IGBT-Module

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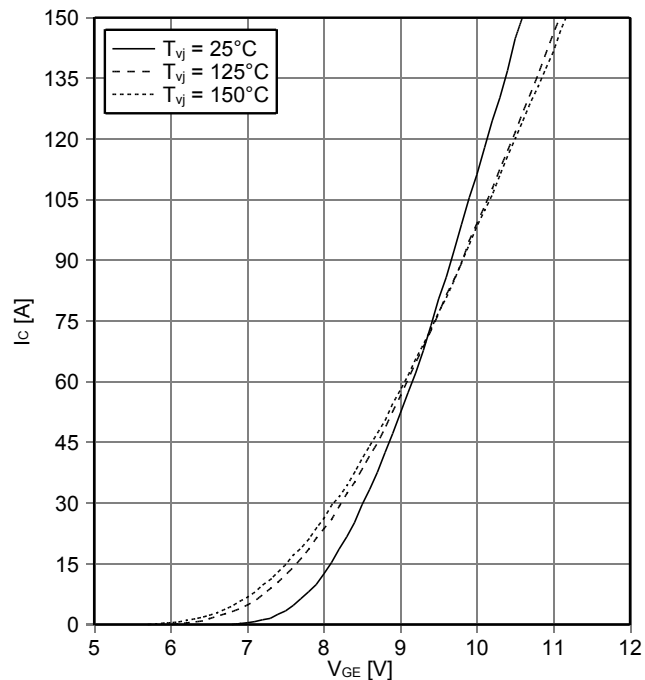
出力特性 IGBT, T2 / T3 (Typical)
output characteristic IGBT, T2 / T3 (typical)

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



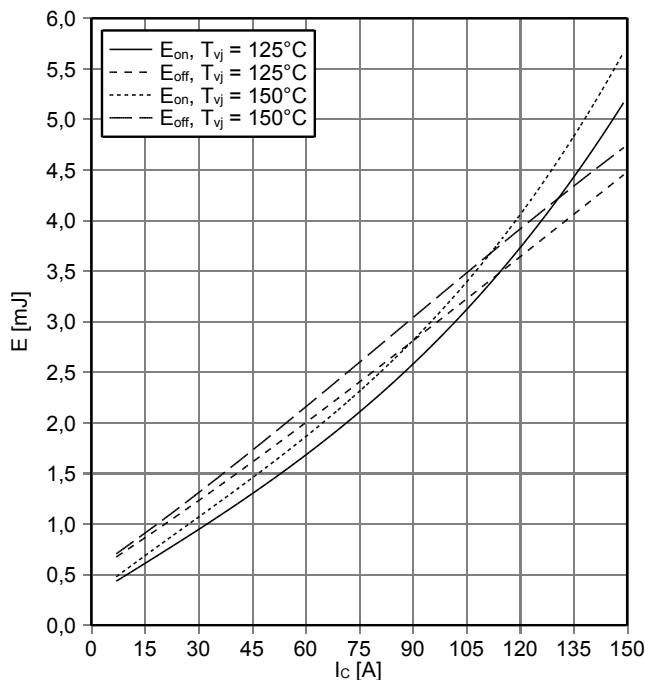
伝達特性 IGBT, T2 / T3 (Typical)
transfer characteristic IGBT, T2 / T3 (typical)

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



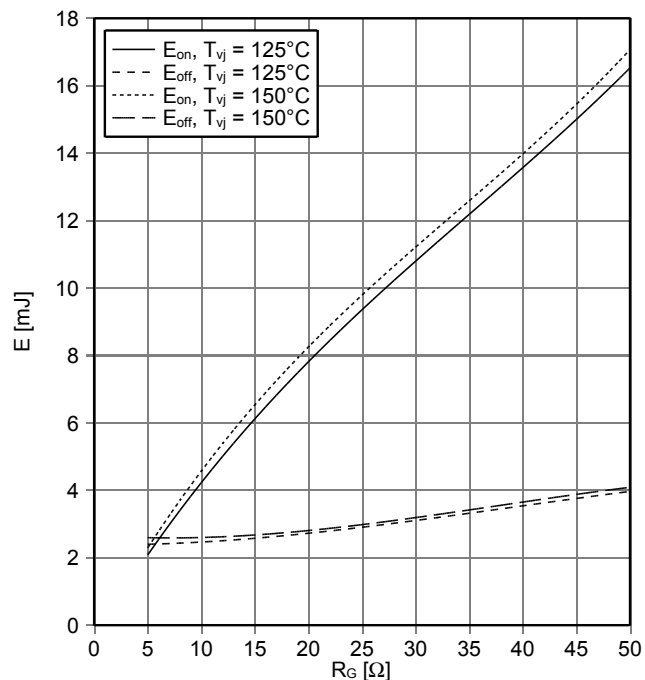
スイッチング損失 IGBT, T2 / T3 (Typical)
switching losses IGBT, T2 / T3 (typical)

$E_{on} = f(I_C), E_{off} = f(I_C)$
 $V_{GE} = \pm 15\text{ V}, R_{Gon} = 5.1\ \Omega, R_{Goff} = 5.1\ \Omega, V_{CE} = 400\text{ V}$



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

$E_{on} = f(R_G), E_{off} = f(R_G)$
 $V_{GE} = \pm 15\text{ V}, I_C = 75\text{ A}, V_{CE} = 400\text{ V}$



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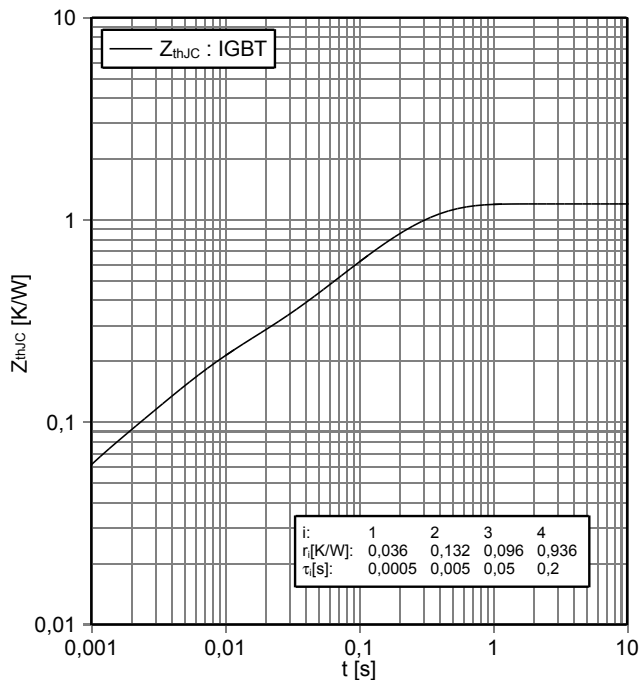


IGBT-モジュール
IGBT-Module

F3L150R12W2H3_B11

過渡熱インピーダンス IGBT, T2 / T3
transient thermal impedance IGBT, T2 / T3

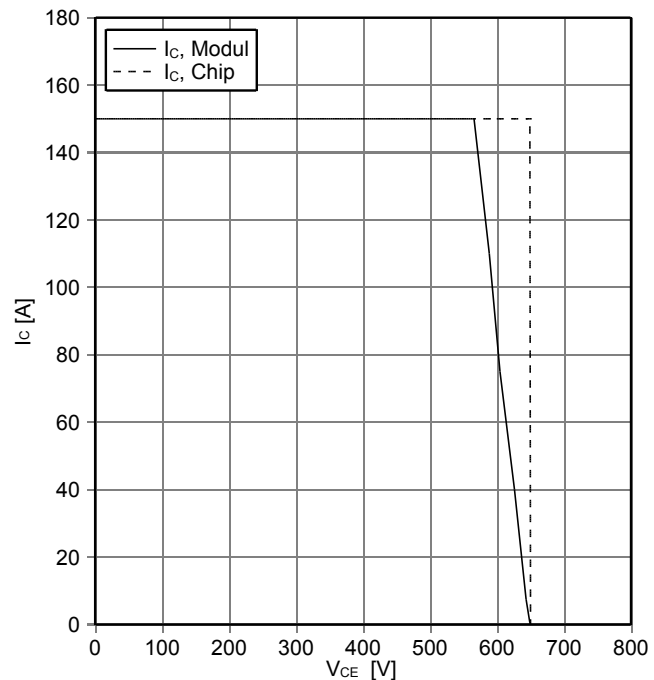
$Z_{thJC} = f(t)$



逆バイアス安全動作領域 IGBT, T2 / T3 (RBSOA)
reverse bias safe operating area IGBT, T2 / T3 (RBSOA)

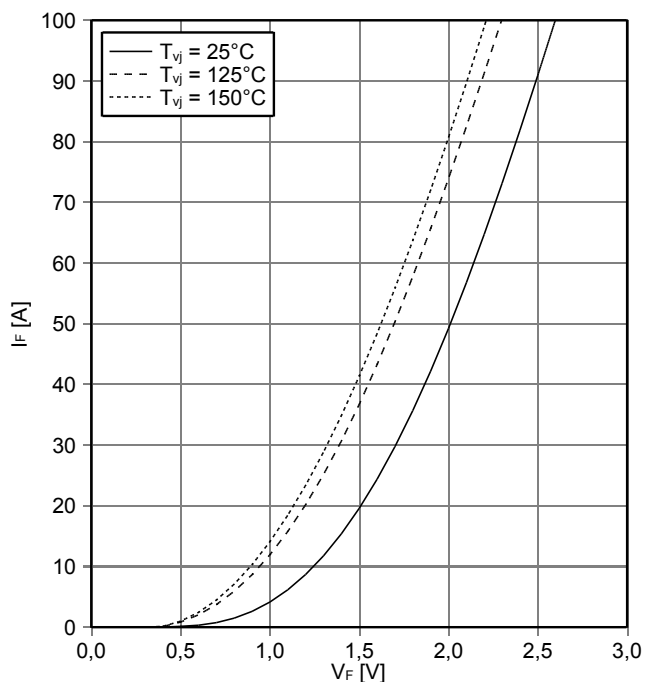
$I_C = f(V_{CE})$

$V_{GE} = \pm 15 V, R_{Goff} = 5.1 \Omega, T_{vj} = 150^\circ C$



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

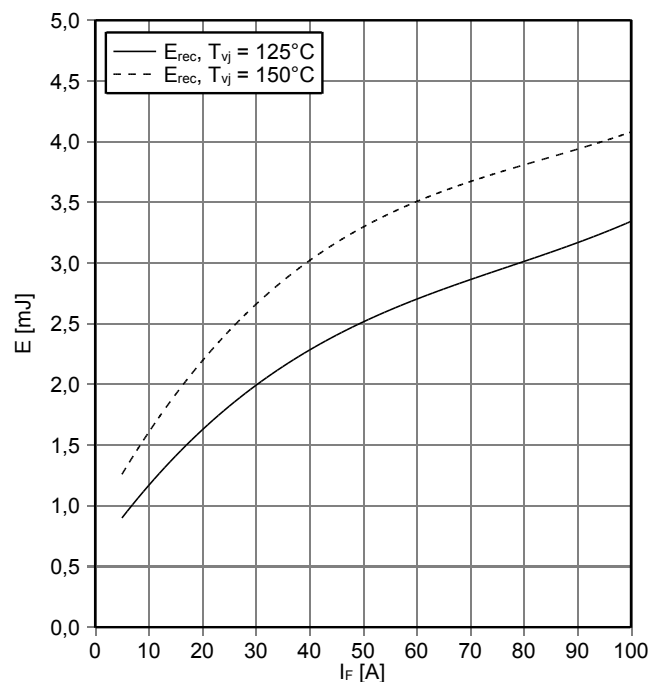
$I_F = f(V_F)$



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

$E_{rec} = f(I_F)$

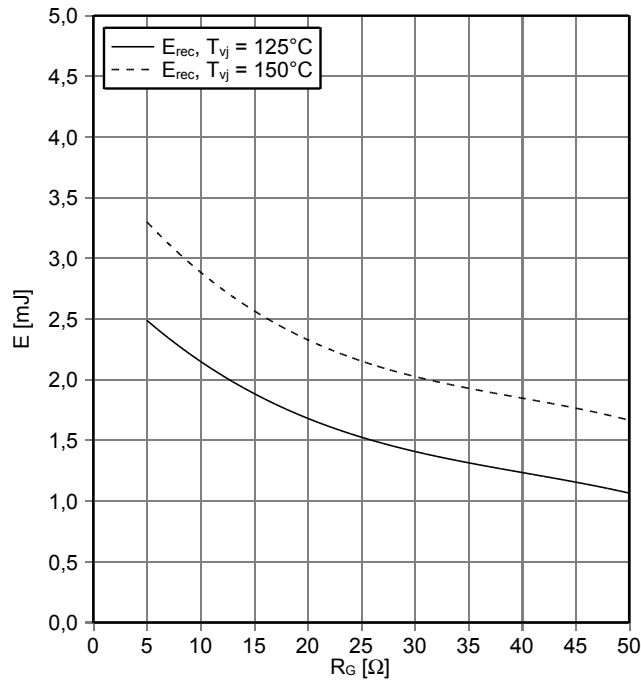
$R_{Gon} = 5.1 \Omega, V_{CE} = 400 V$



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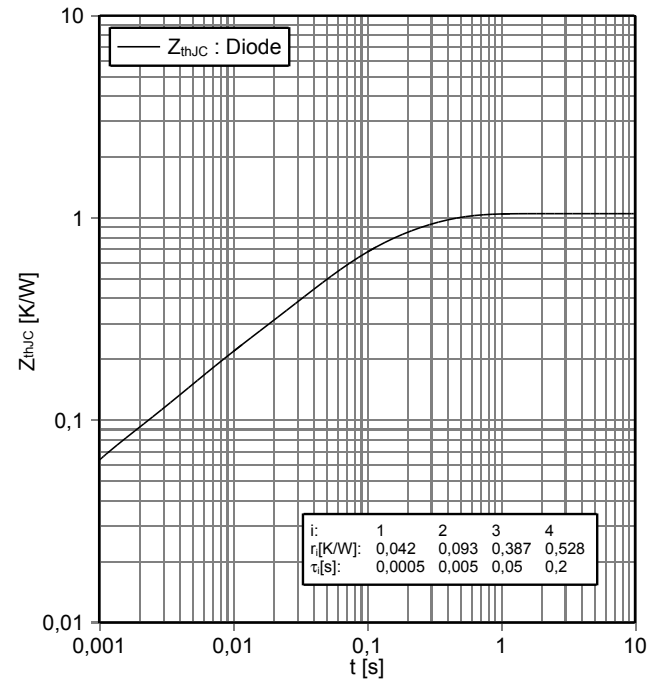
スイッチング損失 ダイオード, D1 / D4 (Typical)
switching losses Diode, D1 / D4 (typical)

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



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

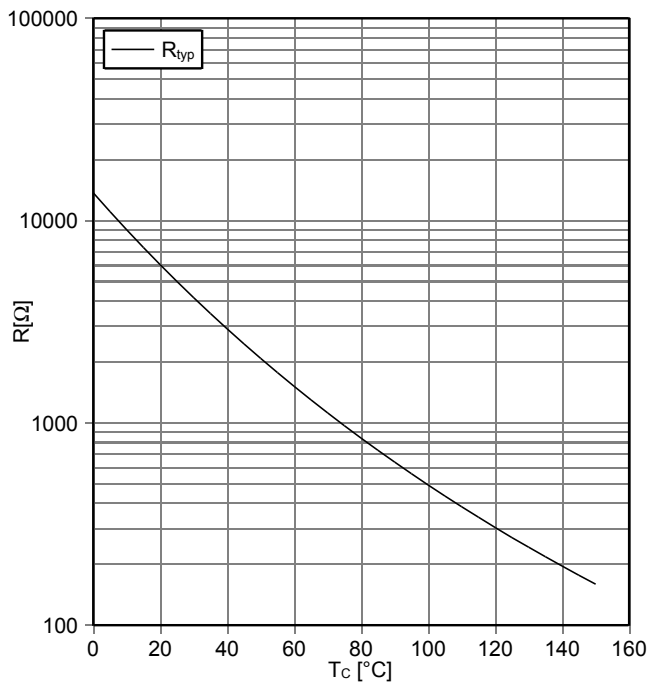
$Z_{thJC} = f(t)$



i:	1	2	3	4
r[K/W]:	0,042	0,093	0,387	0,528
τ[s]:	0,0005	0,005	0,05	0,2

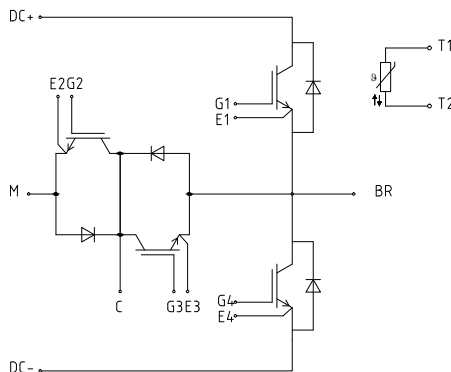
NTC-サーミスタ サーミスタの温度特性
NTC-Thermistor-temperature characteristic (typical)

$R = f(T)$

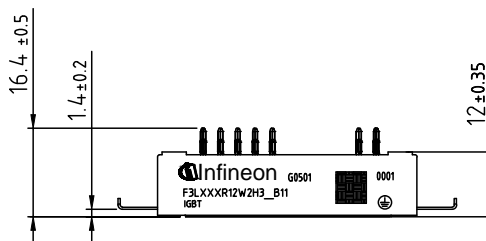
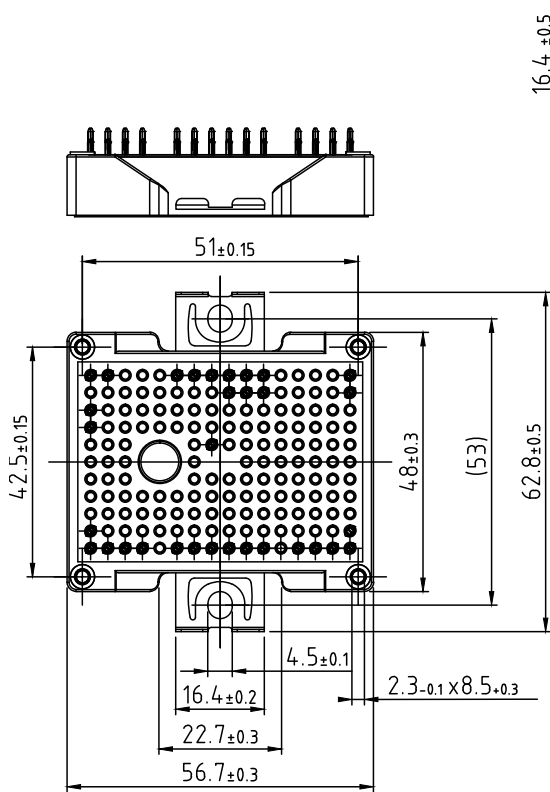


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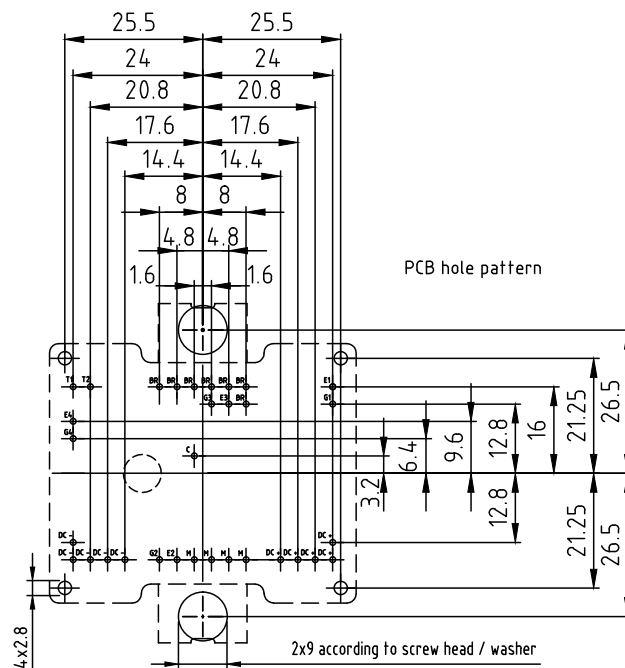
回路図 / circuit_diagram_headline



パッケージ概要 / 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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— 品質契約

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- to perform joint Risk and Quality Assessments;

- the conclusion of Quality Agreements;

- to establish joint measures of an ongoing product survey, and that we may make delivery depended on the realization of any such measures.

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