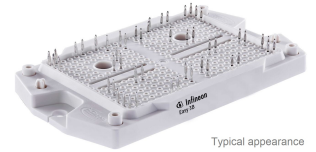


EasyPACK™ module with TRENCHSTOP™ IGBT H3 and emitter controlled 7 diode and PressFIT / NTC

Features

- Electrical features
 - $V_{CES} = 1200\text{ V}$
 - $I_{C\text{nom}} = 225\text{ A} / I_{CRM} = 450\text{ A}$
 - Low switching losses
 - High-speed IGBT H3
- Mechanical features
 - Compact design
 - PressFIT contact technology
 - Integrated NTC temperature sensor
 - High power density



Typical appearance

Potential applications

- Energy storage systems
- Solar applications
- Three-level applications

Product validation

- Qualified for industrial applications according to the relevant tests of IEC 60747, 60749 and 60068

Description

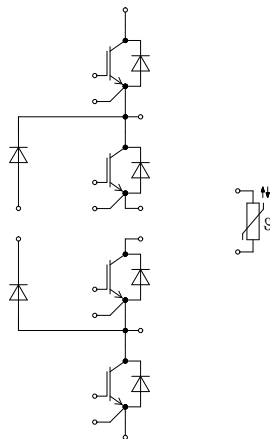


Table of contents

	Description	1
	Features	1
	Potential applications	1
	Product validation	1
	Table of contents	2
1	Package	3
2	IGBT, T1 / T4	3
3	IGBT, T2 / T3	5
4	Diode, D1 / D4	6
5	Diode, D2 / D3	7
6	Diode, D5 / D6	8
7	NTC-Thermistor	9
8	Characteristics diagrams	10
9	Circuit diagram	18
10	Package outlines	19
11	Module label code	19
	Revision history	20
	Disclaimer	21

1 Package

Table 1 Insulation coordination

Parameter	Symbol	Note or test condition	Values	Unit
Isolation test voltage	V_{ISOL}	RMS, $f = 50 \text{ Hz}$, $t = 1 \text{ min}$	3.2	kV
Internal isolation		basic insulation (class 1, IEC 61140)	Al_2O_3	
Comparative tracking index	CTI		> 400	
Relative thermal index (electrical)	RTI	housing	140	°C

Table 2 Characteristic values

Parameter	Symbol	Note or test condition	Values			Unit
			Min.	Typ.	Max.	
Stray inductance module	L_{sCE}			21		nH
Module lead resistance, terminals - chip	$R_{AA'+CC'}$	$T_H = 25 \text{ °C}$, per switch		2.3		mΩ
Module lead resistance, terminals - chip	$R_{CC'+EE'}$	$T_H = 25 \text{ °C}$, per switch		1.7		mΩ
Storage temperature	T_{stg}		-40		125	°C
Mounting torque for module mounting	M	- Mounting according to valid application note	M5, Screw	1.3	1.5	Nm
Weight	G			78		g

Note: The current under continuous operation is limited to 25A rms per connector pin.

2 IGBT, T1 / T4

Table 3 Maximum rated values

Parameter	Symbol	Note or test condition	Values	Unit
Collector-emitter voltage	V_{CES}	$T_{vj} = 25 \text{ °C}$	1200	V
Implemented collector current	I_{CN}		225	A
Continuous DC collector current	I_{CDC}	$T_{vj \text{ max}} = 175 \text{ °C}$ $T_H = 65 \text{ °C}$	175	A
Repetitive peak collector current	I_{CRM}	t_p limited by $T_{vj \text{ op}}$	450	A
Gate-emitter peak voltage	V_{GES}		±20	V

Table 4 Characteristic values

Parameter	Symbol	Note or test condition	Values			Unit	
			Min.	Typ.	Max.		
Collector-emitter saturation voltage	$V_{CE\ sat}$	$I_C = 225\ A, V_{GE} = 15\ V$	$T_{vj} = 25\ ^\circ C$		2.07	2.55	V
			$T_{vj} = 125\ ^\circ C$		2.50		
			$T_{vj} = 150\ ^\circ C$		2.60		
Gate threshold voltage	V_{GETh}	$I_C = 7.8\ mA, V_{CE} = V_{GE}, T_{vj} = 25\ ^\circ C$		5.25	5.80	6.35	V
Gate charge	Q_G	$V_{GE} = \pm 15\ V$			1.73		μC
Internal gate resistor	R_{Gint}	$T_{vj} = 25\ ^\circ C$			3.3		Ω
Input capacitance	C_{ies}	$f = 100\ kHz, T_{vj} = 25\ ^\circ C, V_{CE} = 25\ V, V_{GE} = 0\ V$			13.1		nF
Reverse transfer capacitance	C_{res}	$f = 100\ kHz, T_{vj} = 25\ ^\circ C, V_{CE} = 25\ V, V_{GE} = 0\ V$			0.72		nF
Collector-emitter cut-off current	I_{CES}	$V_{CE} = 1200\ V, V_{GE} = 0\ V$	$T_{vj} = 25\ ^\circ C$			1	mA
Gate-emitter leakage current	I_{GES}	$V_{CE} = 0\ V, V_{GE} = 20\ V, T_{vj} = 25\ ^\circ C$				100	nA
Turn-on delay time (inductive load)	t_{don}	$I_C = 225\ A, V_{CC} = 600\ V, V_{GE} = \pm 15\ V, R_{Gon} = 0.47\ \Omega$	$T_{vj} = 25\ ^\circ C$		0.107		μs
			$T_{vj} = 125\ ^\circ C$		0.115		
			$T_{vj} = 150\ ^\circ C$		0.118		
Rise time (inductive load)	t_r	$I_C = 225\ A, V_{CC} = 600\ V, V_{GE} = \pm 15\ V, R_{Gon} = 0.47\ \Omega$	$T_{vj} = 25\ ^\circ C$		0.030		μs
			$T_{vj} = 125\ ^\circ C$		0.035		
			$T_{vj} = 150\ ^\circ C$		0.037		
Turn-off delay time (inductive load)	t_{doff}	$I_C = 225\ A, V_{CC} = 600\ V, V_{GE} = \pm 15\ V, R_{Goff} = 0.47\ \Omega$	$T_{vj} = 25\ ^\circ C$		0.300		μs
			$T_{vj} = 125\ ^\circ C$		0.329		
			$T_{vj} = 150\ ^\circ C$		0.346		
Fall time (inductive load)	t_f	$I_C = 225\ A, V_{CC} = 600\ V, V_{GE} = \pm 15\ V, R_{Goff} = 0.47\ \Omega$	$T_{vj} = 25\ ^\circ C$		0.040		μs
			$T_{vj} = 125\ ^\circ C$		0.129		
			$T_{vj} = 150\ ^\circ C$		0.148		
Turn-on energy loss per pulse	E_{on}	$I_C = 225\ A, V_{CC} = 600\ V, L_\sigma = 35\ nH, V_{GE} = \pm 15\ V, R_{Gon} = 0.47\ \Omega, di/dt = 6100\ A/\mu s (T_{vj} = 150\ ^\circ C)$	$T_{vj} = 25\ ^\circ C$		11.8		mJ
			$T_{vj} = 125\ ^\circ C$		20.7		
			$T_{vj} = 150\ ^\circ C$		23.4		
Turn-off energy loss per pulse	E_{off}	$I_C = 225\ A, V_{CC} = 600\ V, L_\sigma = 35\ nH, V_{GE} = \pm 15\ V, R_{Goff} = 0.47\ \Omega, dv/dt = 4500\ V/\mu s (T_{vj} = 150\ ^\circ C)$	$T_{vj} = 25\ ^\circ C$		8.67		mJ
			$T_{vj} = 125\ ^\circ C$		15.9		
			$T_{vj} = 150\ ^\circ C$		17.8		
SC data	I_{SC}	$V_{GE} \leq 15\ V, V_{CC} = 800\ V, V_{CEmax} = V_{CES} - L_{sCE} * di/dt$	$t_p \leq 10\ \mu s, T_{vj} = 150\ ^\circ C$		900		A

(table continues...)

Table 4 (continued) Characteristic values

Parameter	Symbol	Note or test condition	Values			Unit
			Min.	Typ.	Max.	
Thermal resistance, junction to heat sink	R_{thJH}	per IGBT, $\lambda_{grease} = 3.3 \text{ W}/(\text{m}\cdot\text{K})$		0.218		K/W
Temperature under switching conditions	$T_{vj\text{op}}$		-40		150	°C

3 IGBT, T2 / T3

Table 5 Maximum rated values

Parameter	Symbol	Note or test condition	Values	Unit
Collector-emitter voltage	V_{CES}	$T_{vj} = 25 \text{ °C}$	1200	V
Implemented collector current	I_{CN}		225	A
Continuous DC collector current	I_{CDC}	$T_{vj\text{max}} = 175 \text{ °C}$ $T_H = 65 \text{ °C}$	180	A
Repetitive peak collector current	I_{CRM}	t_p limited by $T_{vj\text{op}}$	450	A
Gate-emitter peak voltage	V_{GES}		±20	V

Table 6 Characteristic values

Parameter	Symbol	Note or test condition	Values			Unit
			Min.	Typ.	Max.	
Collector-emitter saturation voltage	$V_{CE\text{sat}}$	$I_C = 225 \text{ A}, V_{GE} = 15 \text{ V}$	$T_{vj} = 25 \text{ °C}$	2.07	2.55	V
			$T_{vj} = 125 \text{ °C}$	2.50		
			$T_{vj} = 150 \text{ °C}$	2.60		
Gate threshold voltage	V_{GEth}	$I_C = 7.8 \text{ mA}, V_{CE} = V_{GE}, T_{vj} = 25 \text{ °C}$	5.25	5.80	6.35	V
Gate charge	Q_G	$V_{GE} = \pm 15 \text{ V}$		1.73		μC
Internal gate resistor	R_{Gint}	$T_{vj} = 25 \text{ °C}$		3.3		Ω
Input capacitance	C_{ies}	$f = 100 \text{ kHz}, T_{vj} = 25 \text{ °C}, V_{CE} = 25 \text{ V}, V_{GE} = 0 \text{ V}$		13.1		nF
Reverse transfer capacitance	C_{res}	$f = 100 \text{ kHz}, T_{vj} = 25 \text{ °C}, V_{CE} = 25 \text{ V}, V_{GE} = 0 \text{ V}$		0.72		nF
Collector-emitter cut-off current	I_{CES}	$V_{CE} = 1200 \text{ V}, V_{GE} = 0 \text{ V}$ $T_{vj} = 25 \text{ °C}$			1	mA
Gate-emitter leakage current	I_{GES}	$V_{CE} = 0 \text{ V}, V_{GE} = 20 \text{ V}, T_{vj} = 25 \text{ °C}$			100	nA

(table continues...)

Table 6 (continued) **Characteristic values**

Parameter	Symbol	Note or test condition	Values			Unit
			Min.	Typ.	Max.	
Turn-on delay time (inductive load)	t_{don}	$I_C = 225\text{ A}, V_{CC} = 600\text{ V},$ $V_{GE} = \pm 15\text{ V}, R_{Gon} = 0.47\ \Omega$	$T_{vj} = 25\text{ }^\circ\text{C}$	0.107		μs
			$T_{vj} = 125\text{ }^\circ\text{C}$	0.117		
			$T_{vj} = 150\text{ }^\circ\text{C}$	0.122		
Rise time (inductive load)	t_r	$I_C = 225\text{ A}, V_{CC} = 600\text{ V},$ $V_{GE} = \pm 15\text{ V}, R_{Gon} = 0.47\ \Omega$	$T_{vj} = 25\text{ }^\circ\text{C}$	0.039		μs
			$T_{vj} = 125\text{ }^\circ\text{C}$	0.048		
			$T_{vj} = 150\text{ }^\circ\text{C}$	0.050		
Turn-off delay time (inductive load)	t_{doff}	$I_C = 225\text{ A}, V_{CC} = 600\text{ V},$ $V_{GE} = \pm 15\text{ V}, R_{Goff} = 0.47\ \Omega$	$T_{vj} = 25\text{ }^\circ\text{C}$	0.290		μs
			$T_{vj} = 125\text{ }^\circ\text{C}$	0.340		
			$T_{vj} = 150\text{ }^\circ\text{C}$	0.360		
Fall time (inductive load)	t_f	$I_C = 225\text{ A}, V_{CC} = 600\text{ V},$ $V_{GE} = \pm 15\text{ V}, R_{Goff} = 0.47\ \Omega$	$T_{vj} = 25\text{ }^\circ\text{C}$	0.041		μs
			$T_{vj} = 125\text{ }^\circ\text{C}$	0.114		
			$T_{vj} = 150\text{ }^\circ\text{C}$	0.139		
Turn-on energy loss per pulse	E_{on}	$I_C = 225\text{ A}, V_{CC} = 600\text{ V},$ $L_\sigma = 35\text{ nH}, V_{GE} = \pm 15\text{ V},$ $R_{Gon} = 0.47\ \Omega, di/dt =$ $4600\text{ A}/\mu\text{s} (T_{vj} = 150\text{ }^\circ\text{C})$	$T_{vj} = 25\text{ }^\circ\text{C}$	8.1		mJ
			$T_{vj} = 125\text{ }^\circ\text{C}$	14.3		
			$T_{vj} = 150\text{ }^\circ\text{C}$	16.4		
Turn-off energy loss per pulse	E_{off}	$I_C = 225\text{ A}, V_{CC} = 600\text{ V},$ $L_\sigma = 35\text{ nH}, V_{GE} = \pm 15\text{ V},$ $R_{Goff} = 0.47\ \Omega, dv/dt =$ $4200\text{ V}/\mu\text{s} (T_{vj} = 150\text{ }^\circ\text{C})$	$T_{vj} = 25\text{ }^\circ\text{C}$	9.25		mJ
			$T_{vj} = 125\text{ }^\circ\text{C}$	17.5		
			$T_{vj} = 150\text{ }^\circ\text{C}$	19.6		
SC data	I_{SC}	$V_{GE} \leq 15\text{ V}, V_{CC} = 800\text{ V},$ $V_{CEmax} = V_{CES} - L_{SCE} * di/dt$	$t_p \leq 10\ \mu\text{s},$ $T_{vj} = 150\text{ }^\circ\text{C}$	900		A
Thermal resistance, junction to heat sink	R_{thJH}	per IGBT, $\lambda_{grease} = 3.3\text{ W}/(\text{m}\cdot\text{K})$		0.212		K/W
Temperature under switching conditions	$T_{vj\ op}$			-40	150	$^\circ\text{C}$

4 Diode, D1 / D4

Table 7 **Maximum rated values**

Parameter	Symbol	Note or test condition	Values	Unit
Repetitive peak reverse voltage	V_{RRM}	$T_{vj} = 25\text{ }^\circ\text{C}$	1200	V
Continuous DC forward current	I_F		300	A
Repetitive peak forward current	I_{FRM}	$t_p = 1\text{ ms}$	600	A

(table continues...)

Table 7 (continued) Maximum rated values

Parameter	Symbol	Note or test condition	Values	Unit	
I^2t - value	I^2t	$t_p = 10 \text{ ms}, V_R = 0 \text{ V}$	$T_{vj} = 125 \text{ }^\circ\text{C}$	10900	A^2s
			$T_{vj} = 150 \text{ }^\circ\text{C}$	6280	

Table 8 Characteristic values

Parameter	Symbol	Note or test condition	Values			Unit	
			Min.	Typ.	Max.		
Forward voltage	V_F	$I_F = 300 \text{ A}, V_{GE} = 0 \text{ V}$	$T_{vj} = 25 \text{ }^\circ\text{C}$		1.72	2.10	V
			$T_{vj} = 125 \text{ }^\circ\text{C}$		1.59		
			$T_{vj} = 150 \text{ }^\circ\text{C}$		1.56		
Peak reverse recovery current	I_{RM}	$V_{CC} = 600 \text{ V}, I_F = 300 \text{ A}, V_{GE} = -15 \text{ V}, -di_F/dt = 4800 \text{ A}/\mu\text{s} (T_{vj} = 150 \text{ }^\circ\text{C})$	$T_{vj} = 25 \text{ }^\circ\text{C}$		229		A
			$T_{vj} = 125 \text{ }^\circ\text{C}$		263		
			$T_{vj} = 150 \text{ }^\circ\text{C}$		272		
Recovered charge	Q_r	$V_{CC} = 600 \text{ V}, I_F = 300 \text{ A}, V_{GE} = -15 \text{ V}, -di_F/dt = 4800 \text{ A}/\mu\text{s} (T_{vj} = 150 \text{ }^\circ\text{C})$	$T_{vj} = 25 \text{ }^\circ\text{C}$		20.5		μC
			$T_{vj} = 125 \text{ }^\circ\text{C}$		38.4		
			$T_{vj} = 150 \text{ }^\circ\text{C}$		44.5		
Reverse recovery energy	E_{rec}	$V_{CC} = 600 \text{ V}, I_F = 300 \text{ A}, V_{GE} = -15 \text{ V}, -di_F/dt = 4800 \text{ A}/\mu\text{s} (T_{vj} = 150 \text{ }^\circ\text{C})$	$T_{vj} = 25 \text{ }^\circ\text{C}$		7.88		mJ
			$T_{vj} = 125 \text{ }^\circ\text{C}$		14.2		
			$T_{vj} = 150 \text{ }^\circ\text{C}$		16.2		
Thermal resistance, junction to heat sink	R_{thJH}	per diode, $\lambda_{grease} = 3.3 \text{ W}/(\text{m}\cdot\text{K})$		0.354		K/W	
Temperature under switching conditions	T_{vjop}		-40		150	$^\circ\text{C}$	

5 Diode, D2 / D3

Table 9 Maximum rated values

Parameter	Symbol	Note or test condition	Values	Unit	
Repetitive peak reverse voltage	V_{RRM}		$T_{vj} = 25 \text{ }^\circ\text{C}$	1200	V
Continuous DC forward current	I_F			200	A
Repetitive peak forward current	I_{FRM}	$t_p = 1 \text{ ms}$		400	A
I^2t - value	I^2t	$t_p = 10 \text{ ms}, V_R = 0 \text{ V}$	$T_{vj} = 125 \text{ }^\circ\text{C}$	3320	A^2s
			$T_{vj} = 150 \text{ }^\circ\text{C}$	2110	

Table 10 Characteristic values

Parameter	Symbol	Note or test condition	Values			Unit	
			Min.	Typ.	Max.		
Forward voltage	V_F	$I_F = 200 \text{ A}, V_{GE} = 0 \text{ V}$	$T_{vj} = 25 \text{ }^\circ\text{C}$		1.72	2.10	V
			$T_{vj} = 125 \text{ }^\circ\text{C}$		1.59		
			$T_{vj} = 150 \text{ }^\circ\text{C}$		1.56		
Peak reverse recovery current	I_{RM}	$V_{CC} = 600 \text{ V}, I_F = 200 \text{ A}, V_{GE} = -15 \text{ V}, -di_F/dt = 4300 \text{ A}/\mu\text{s} (T_{vj} = 150 \text{ }^\circ\text{C})$	$T_{vj} = 25 \text{ }^\circ\text{C}$		195		A
			$T_{vj} = 125 \text{ }^\circ\text{C}$		238		
			$T_{vj} = 150 \text{ }^\circ\text{C}$		248		
Recovered charge	Q_r	$V_{CC} = 600 \text{ V}, I_F = 200 \text{ A}, V_{GE} = -15 \text{ V}, -di_F/dt = 4300 \text{ A}/\mu\text{s} (T_{vj} = 150 \text{ }^\circ\text{C})$	$T_{vj} = 25 \text{ }^\circ\text{C}$		14.1		μC
			$T_{vj} = 125 \text{ }^\circ\text{C}$		27.4		
			$T_{vj} = 150 \text{ }^\circ\text{C}$		31.3		
Reverse recovery energy	E_{rec}	$V_{CC} = 600 \text{ V}, I_F = 200 \text{ A}, V_{GE} = -15 \text{ V}, -di_F/dt = 4300 \text{ A}/\mu\text{s} (T_{vj} = 150 \text{ }^\circ\text{C})$	$T_{vj} = 25 \text{ }^\circ\text{C}$		5.72		mJ
			$T_{vj} = 125 \text{ }^\circ\text{C}$		11.1		
			$T_{vj} = 150 \text{ }^\circ\text{C}$		12.5		
Thermal resistance, junction to heat sink	R_{thJH}	per diode, $\lambda_{grease} = 3.3 \text{ W}/(\text{m}\cdot\text{K})$			0.415		K/W
Temperature under switching conditions	$T_{vj\ op}$			-40		150	$^\circ\text{C}$

6 Diode, D5 / D6

Table 11 Maximum rated values

Parameter	Symbol	Note or test condition	Values	Unit	
Repetitive peak reverse voltage	V_{RRM}	$T_{vj} = 25 \text{ }^\circ\text{C}$	1200	V	
Continuous DC forward current	I_F		300	A	
Repetitive peak forward current	I_{FRM}	$t_p = 1 \text{ ms}$	600	A	
I^2t - value	I^2t	$t_p = 10 \text{ ms}, V_R = 0 \text{ V}$	$T_{vj} = 125 \text{ }^\circ\text{C}$	10900	A^2s
			$T_{vj} = 150 \text{ }^\circ\text{C}$	6280	

Table 12 Characteristic values

Parameter	Symbol	Note or test condition	Values			Unit	
			Min.	Typ.	Max.		
Forward voltage	V_F	$I_F = 300 \text{ A}, V_{GE} = 0 \text{ V}$	$T_{vj} = 25 \text{ }^\circ\text{C}$		1.72	2.10	V
			$T_{vj} = 125 \text{ }^\circ\text{C}$		1.59		
			$T_{vj} = 150 \text{ }^\circ\text{C}$		1.56		
Peak reverse recovery current	I_{RM}	$V_{CC} = 600 \text{ V}, I_F = 300 \text{ A}, V_{GE} = -15 \text{ V}, -di_F/dt = 6200 \text{ A}/\mu\text{s} (T_{vj} = 150 \text{ }^\circ\text{C})$	$T_{vj} = 25 \text{ }^\circ\text{C}$		244		A
			$T_{vj} = 125 \text{ }^\circ\text{C}$		263		
			$T_{vj} = 150 \text{ }^\circ\text{C}$		272		
Recovered charge	Q_r	$V_{CC} = 600 \text{ V}, I_F = 300 \text{ A}, V_{GE} = -15 \text{ V}, -di_F/dt = 6200 \text{ A}/\mu\text{s} (T_{vj} = 150 \text{ }^\circ\text{C})$	$T_{vj} = 25 \text{ }^\circ\text{C}$		20.4		μC
			$T_{vj} = 125 \text{ }^\circ\text{C}$		38.4		
			$T_{vj} = 150 \text{ }^\circ\text{C}$		44.5		
Reverse recovery energy	E_{rec}	$V_{CC} = 600 \text{ V}, I_F = 300 \text{ A}, V_{GE} = -15 \text{ V}, -di_F/dt = 6200 \text{ A}/\mu\text{s} (T_{vj} = 150 \text{ }^\circ\text{C})$	$T_{vj} = 25 \text{ }^\circ\text{C}$		6.87		mJ
			$T_{vj} = 125 \text{ }^\circ\text{C}$		13		
			$T_{vj} = 150 \text{ }^\circ\text{C}$		14.8		
Thermal resistance, junction to heat sink	R_{thJH}	per diode, $\lambda_{grease} = 3.3 \text{ W}/(\text{m}\cdot\text{K})$			0.399		K/W
Temperature under switching conditions	$T_{vj\text{ op}}$			-40		150	$^\circ\text{C}$

7 NTC-Thermistor

Table 13 Characteristic values

Parameter	Symbol	Note or test condition	Values			Unit
			Min.	Typ.	Max.	
Rated resistance	R_{25}	$T_{NTC} = 25 \text{ }^\circ\text{C}$		5		k Ω
Deviation of R_{100}	$\Delta R/R$	$T_{NTC} = 100 \text{ }^\circ\text{C}, R_{100} = 493 \text{ } \Omega$	-5		5	%
Power dissipation	P_{25}	$T_{NTC} = 25 \text{ }^\circ\text{C}$			20	mW
B-value	$B_{25/50}$	$R_2 = R_{25} \exp[B_{25/50}(1/T_2 - 1/(298,15 \text{ K}))]$		3375		K
B-value	$B_{25/80}$	$R_2 = R_{25} \exp[B_{25/80}(1/T_2 - 1/(298,15 \text{ K}))]$		3411		K
B-value	$B_{25/100}$	$R_2 = R_{25} \exp[B_{25/100}(1/T_2 - 1/(298,15 \text{ K}))]$		3433		K

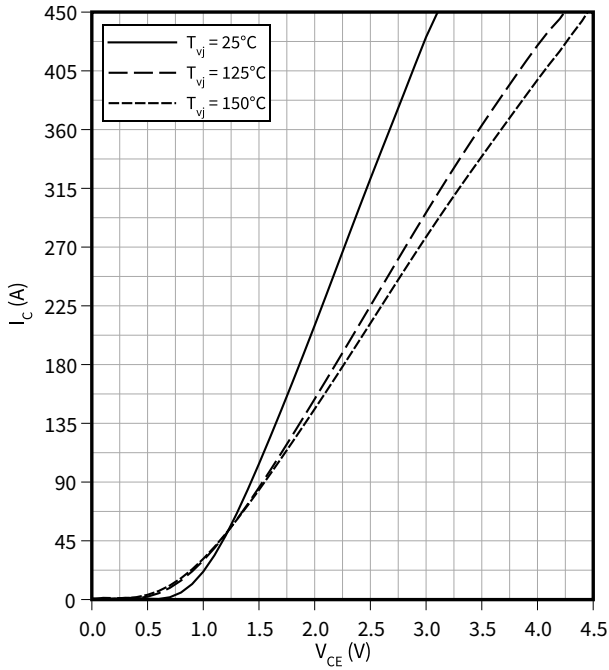
Note: Specification according to the valid application note.

8 Characteristics diagrams

Output characteristic (typical), IGBT, T1 / T4

$$I_C = f(V_{CE})$$

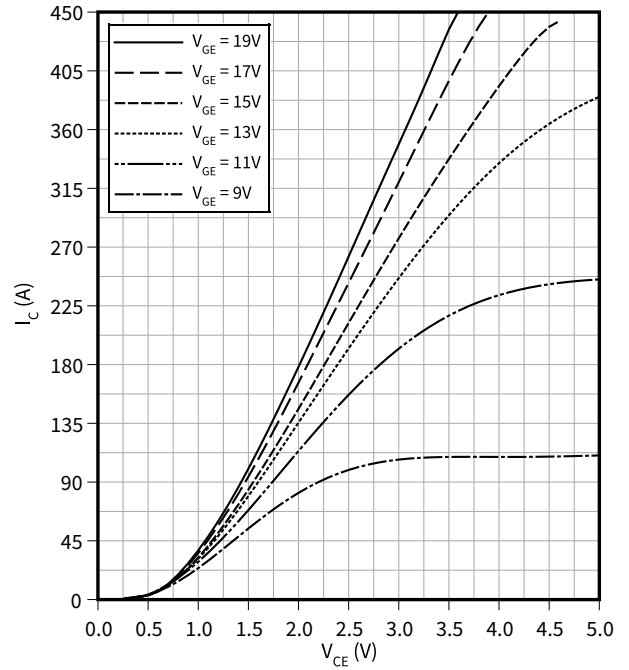
$$V_{GE} = 15 \text{ V}$$



Output characteristic field (typical), IGBT, T1 / T4

$$I_C = f(V_{CE})$$

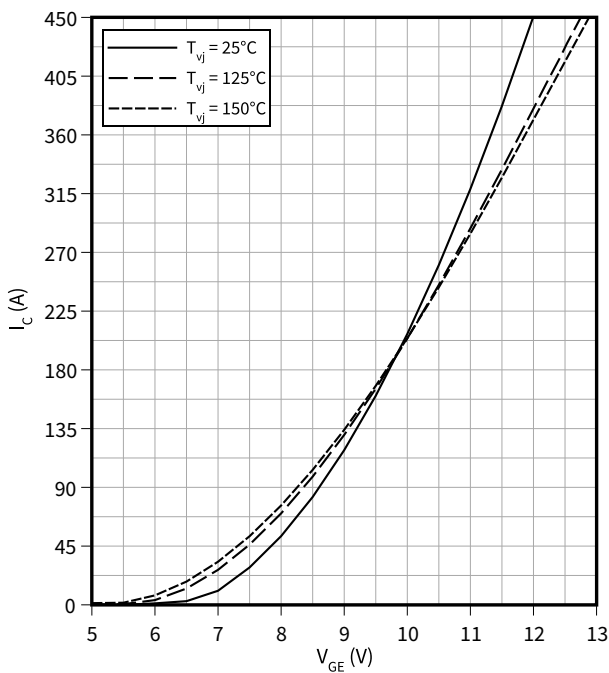
$$T_{vj} = 150 \text{ °C}$$



Transfer characteristic (typical), IGBT, T1 / T4

$$I_C = f(V_{GE})$$

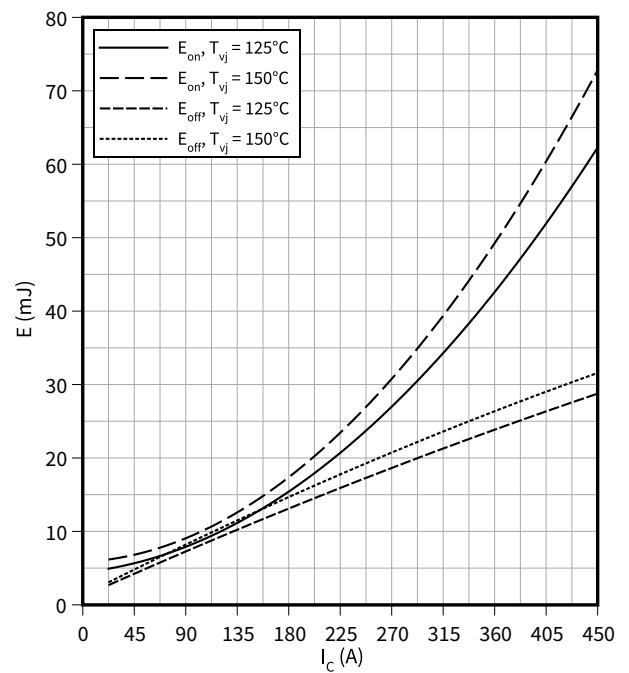
$$V_{CE} = 20 \text{ V}$$



Switching losses (typical), IGBT, T1 / T4

$$E = f(I_C)$$

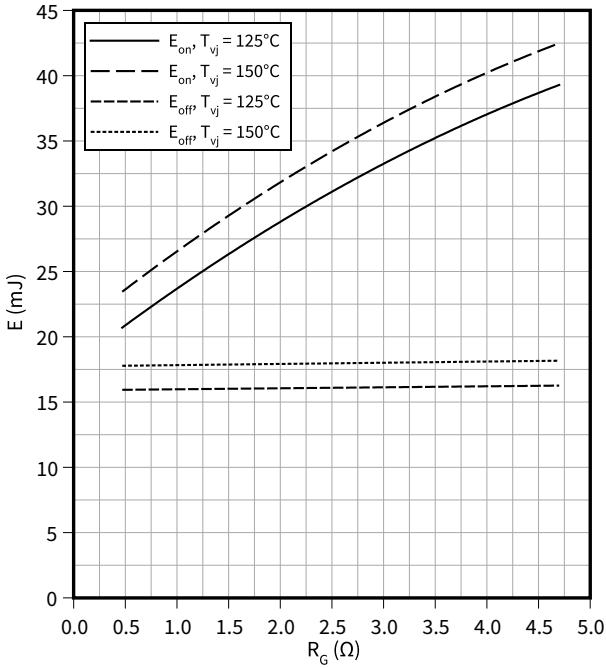
$$R_{Goff} = 0.47 \text{ } \Omega, R_{Gon} = 0.47 \text{ } \Omega, V_{GE} = \pm 15 \text{ V}, V_{CC} = 600 \text{ V}$$



Switching losses (typical), IGBT, T1 / T4

$E = f(R_G)$

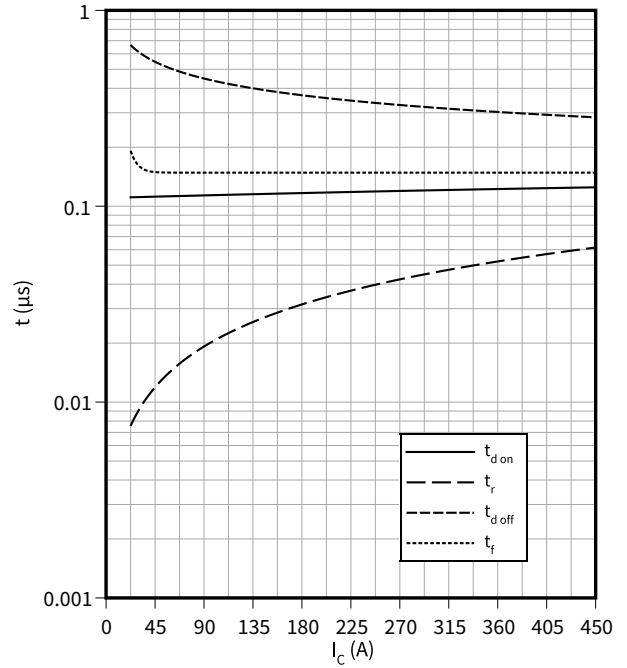
$V_{GE} = \pm 15 \text{ V}$, $I_C = 225 \text{ A}$, $V_{CC} = 600 \text{ V}$



Switching times (typical), IGBT, T1 / T4

$t = f(I_C)$

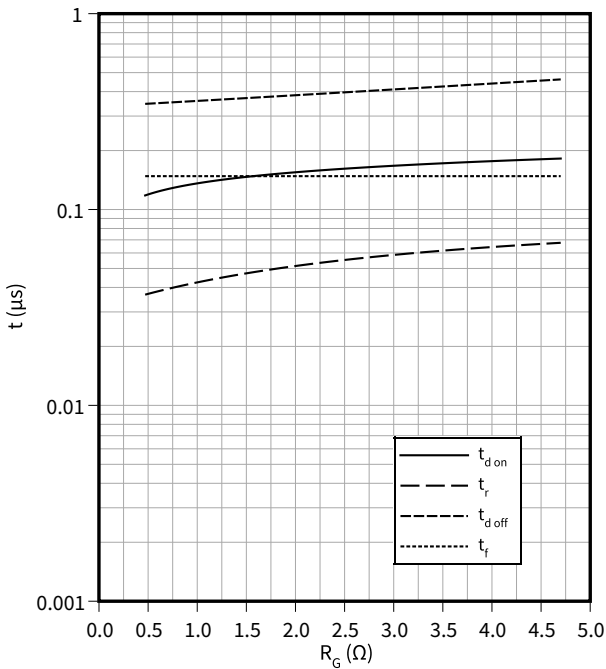
$R_{Goff} = 0.47 \Omega$, $R_{Gon} = 0.47 \Omega$, $V_{GE} = \pm 15 \text{ V}$, $V_{CC} = 600 \text{ V}$, $T_{vj} = 150 \text{ °C}$



Switching times (typical), IGBT, T1 / T4

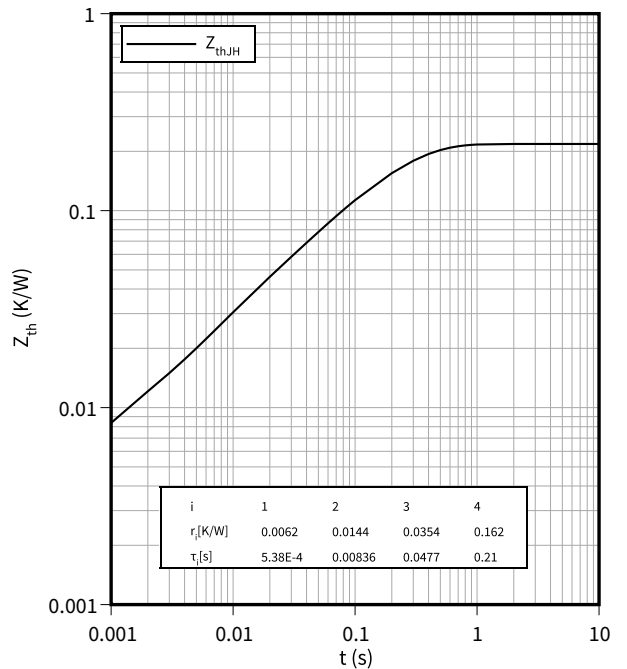
$t = f(R_G)$

$V_{GE} = \pm 15 \text{ V}$, $I_C = 225 \text{ A}$, $V_{CC} = 600 \text{ V}$, $T_{vj} = 150 \text{ °C}$



Transient thermal impedance, IGBT, T1 / T4

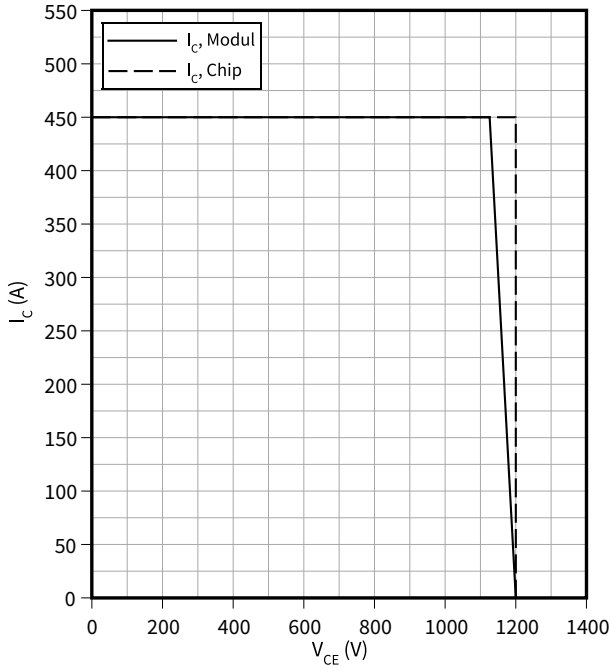
$Z_{th} = f(t)$



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

$I_C = f(V_{CE})$

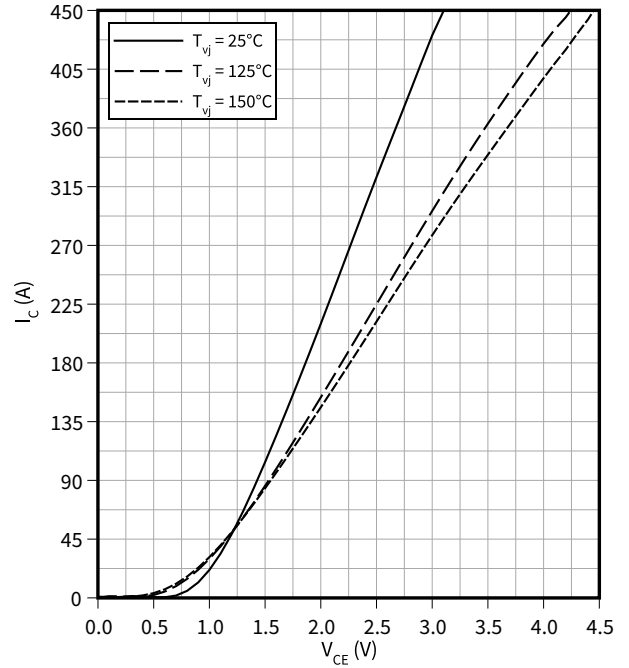
$R_{Goff} = 0.47 \Omega$, $V_{GE} = \pm 15 \text{ V}$, $T_{vj} = 150 \text{ }^\circ\text{C}$



Output characteristic (typical), IGBT, T2 / T3

$I_C = f(V_{CE})$

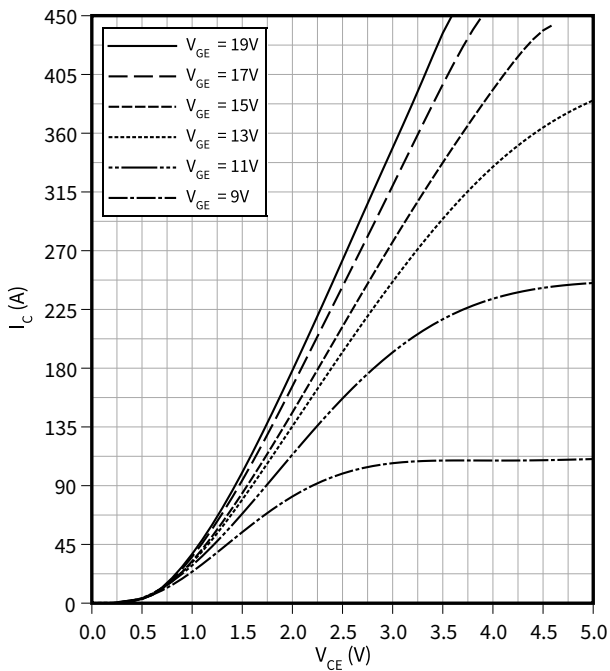
$V_{GE} = 15 \text{ V}$



Output characteristic field (typical), IGBT, T2 / T3

$I_C = f(V_{CE})$

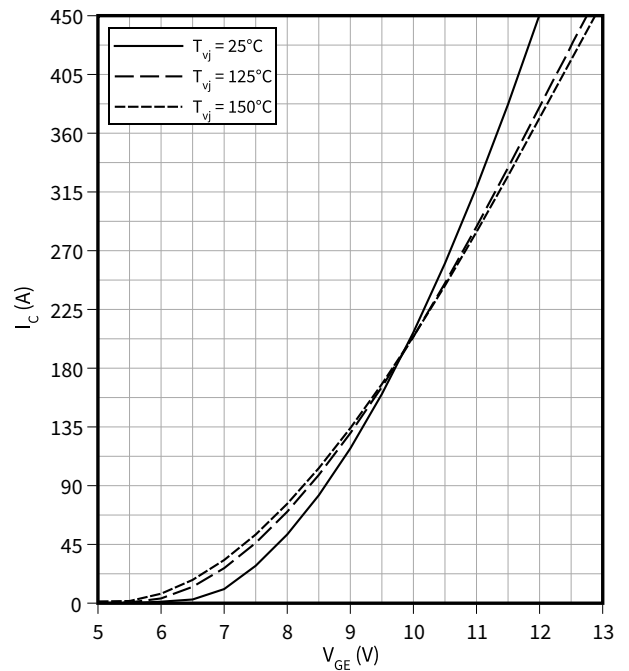
$T_{vj} = 150 \text{ }^\circ\text{C}$



Transfer characteristic (typical), IGBT, T2 / T3

$I_C = f(V_{GE})$

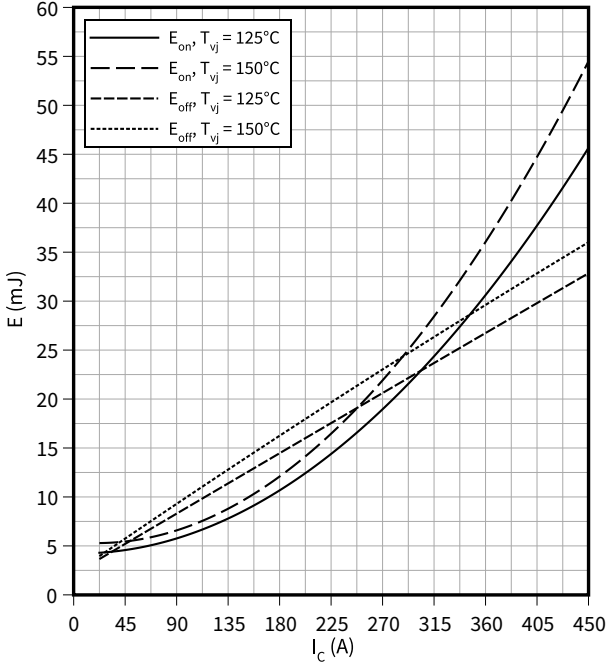
$V_{CE} = 20 \text{ V}$



Switching losses (typical), IGBT, T2 / T3

$E = f(I_C)$

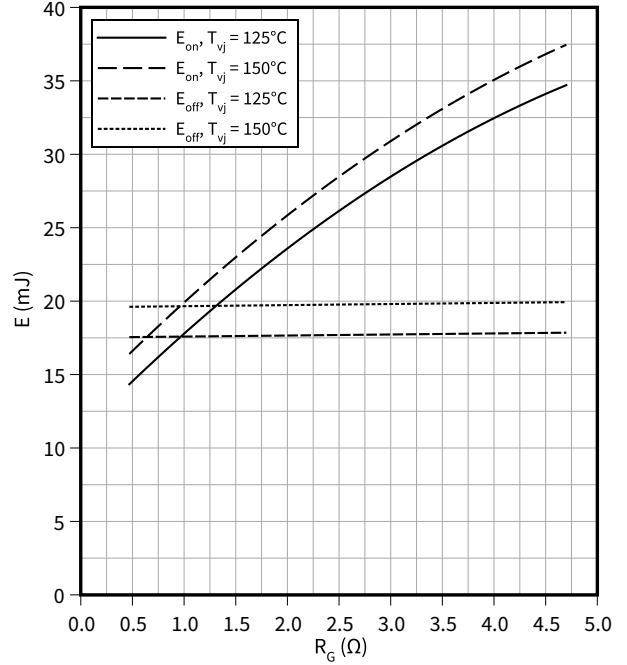
$R_{Goff} = 0.47 \Omega$, $R_{Gon} = 0.47 \Omega$, $V_{GE} = \pm 15 \text{ V}$, $V_{CC} = 600 \text{ V}$



Switching losses (typical), IGBT, T2 / T3

$E = f(R_G)$

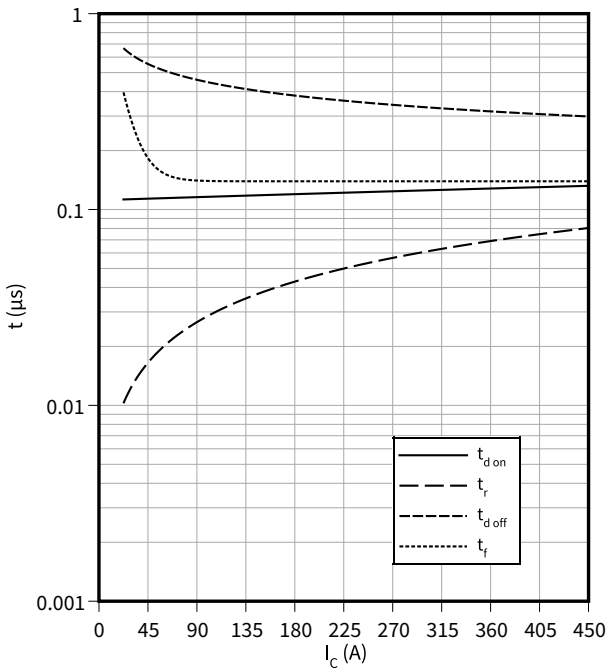
$I_C = 225 \text{ A}$, $V_{CC} = 600 \text{ V}$, $V_{GE} = -15 / 15 \text{ V}$



Switching times (typical), IGBT, T2 / T3

$t = f(I_C)$

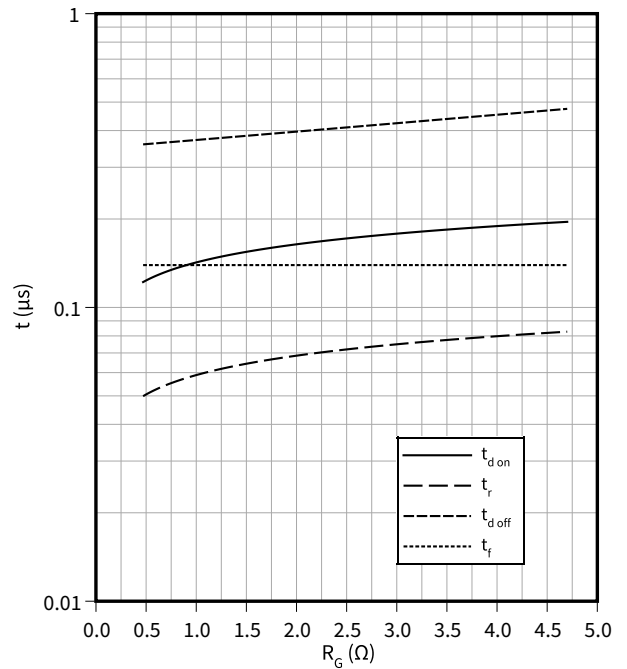
$R_{Goff} = 0.47 \Omega$, $R_{Gon} = 0.47 \Omega$, $V_{GE} = \pm 15 \text{ V}$, $V_{CC} = 600 \text{ V}$, $T_{vj} = 150 \text{ °C}$



Switching times (typical), IGBT, T2 / T3

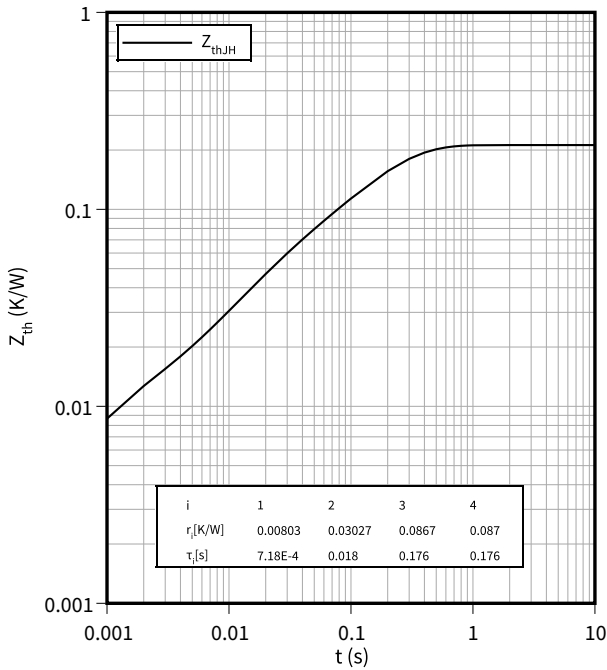
$t = f(R_G)$

$V_{GE} = \pm 15 \text{ V}$, $I_C = 225 \text{ A}$, $V_{CC} = 600 \text{ V}$, $T_{vj} = 150 \text{ °C}$



Transient thermal impedance, IGBT, T2 / T3

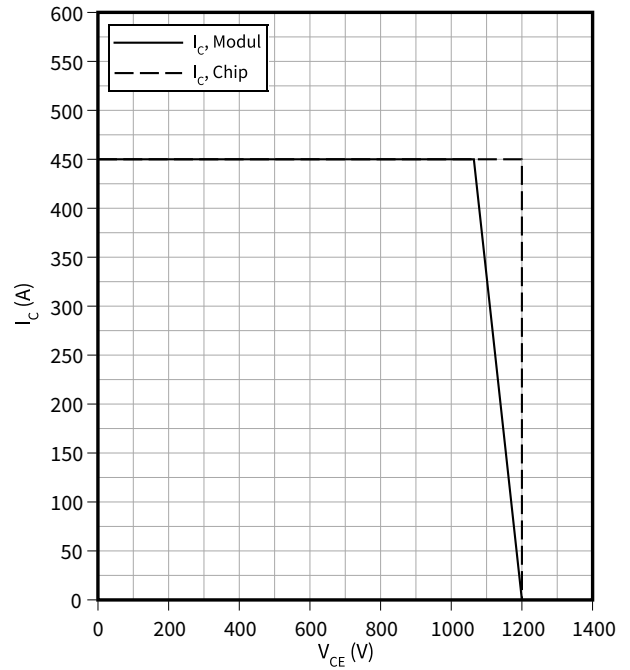
$Z_{th} = f(t)$



Reverse bias safe operating area (RBSOA), IGBT, T2 / T3

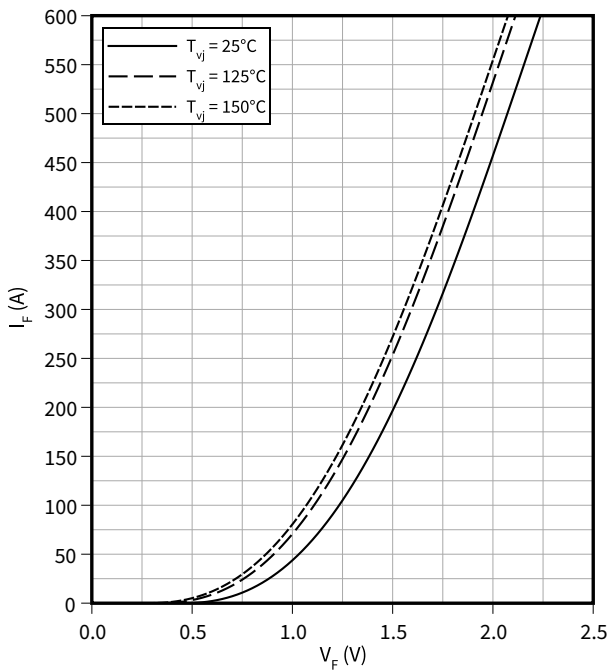
$I_C = f(V_{CE})$

$R_{Goff} = 0.47 \Omega, V_{GE} = \pm 15 V, T_{vj} = 150 \text{ }^\circ\text{C}$



Forward characteristic (typical), Diode, D1 / D4

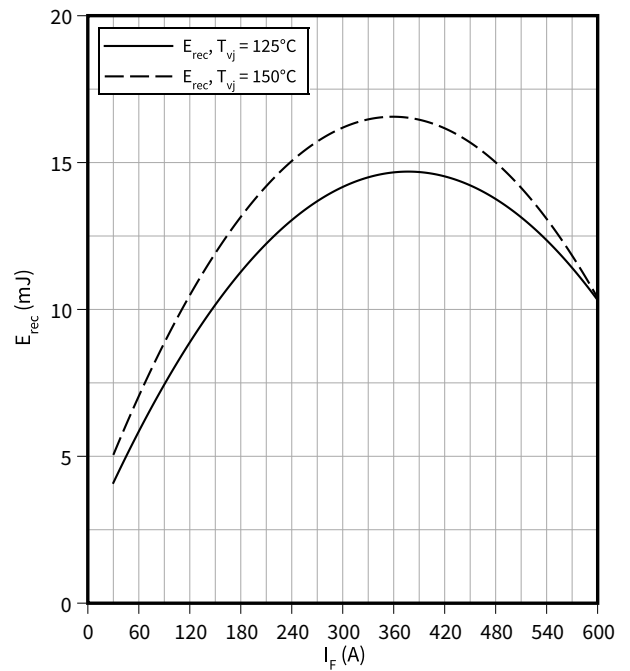
$I_F = f(V_F)$



Switching losses (typical), Diode, D1 / D4

$E_{rec} = f(I_F)$

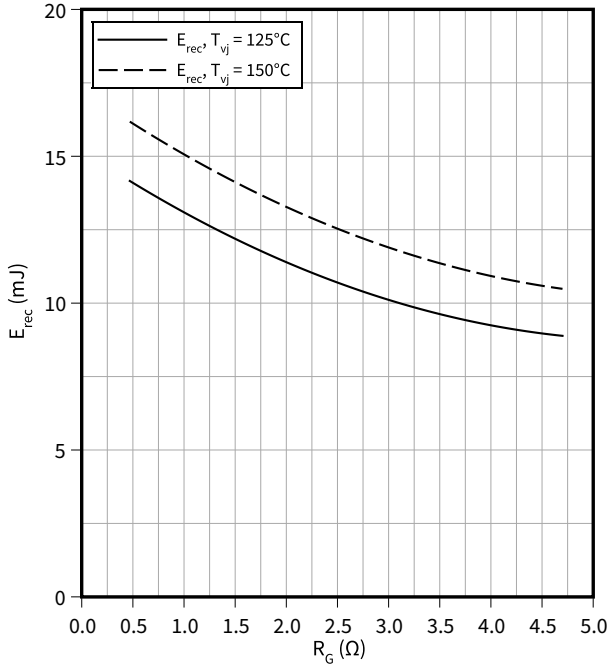
$R_G = 0.47 \Omega, V_{CC} = 600 V$



Switching losses (typical), Diode, D1 / D4

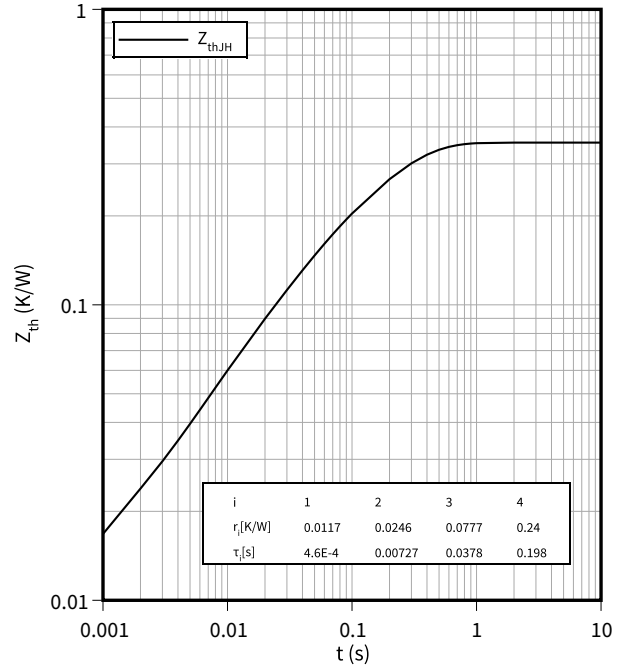
$E_{rec} = f(R_G)$

$I_F = 300 \text{ A}, V_{CC} = 600 \text{ V}$



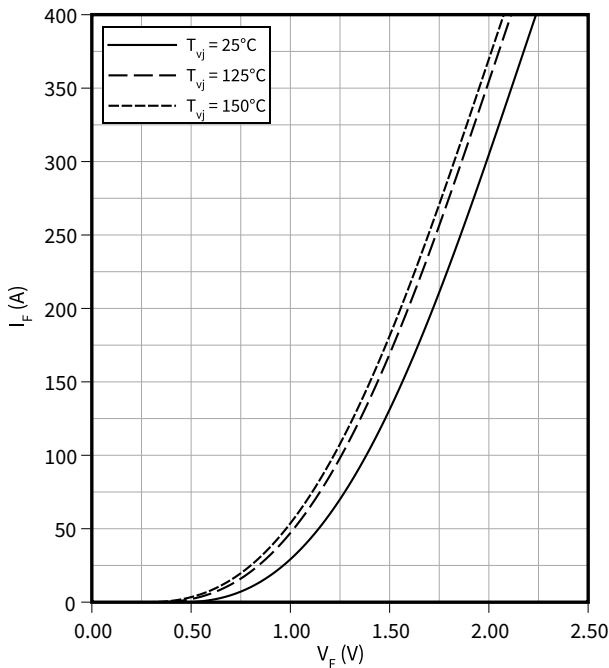
Transient thermal impedance, Diode, D1 / D4

$Z_{th} = f(t)$



Forward characteristic (typical), Diode, D2 / D3

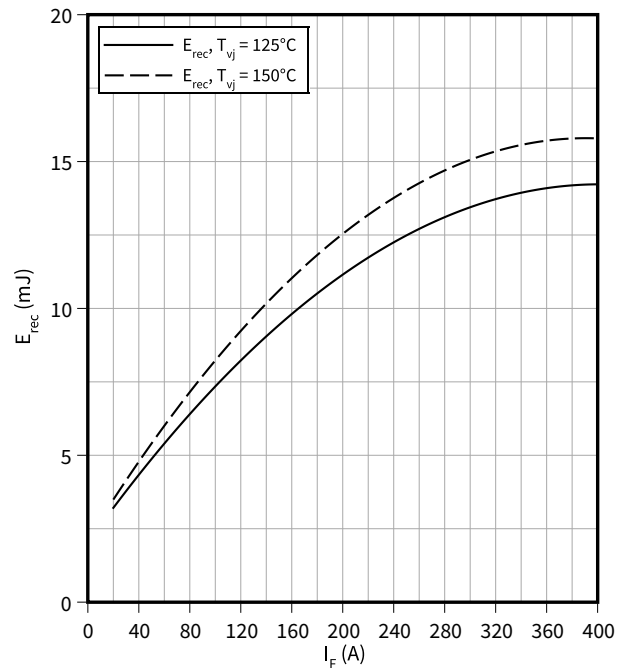
$I_F = f(V_F)$



Switching losses (typical), Diode, D2 / D3

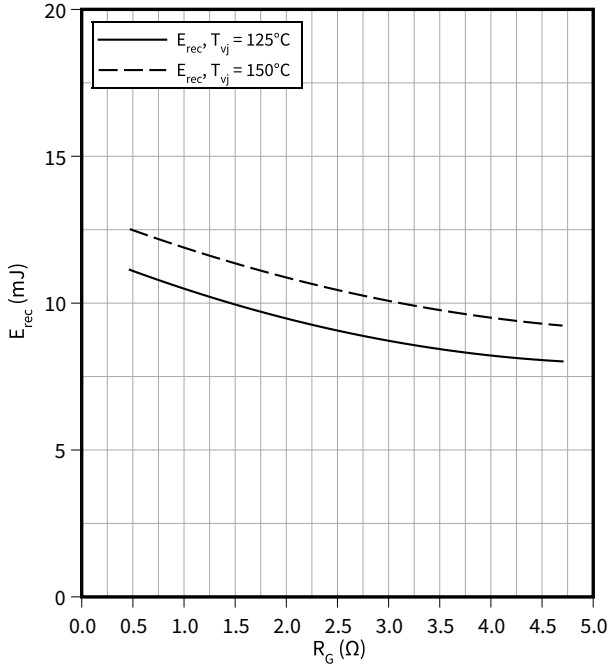
$E_{rec} = f(I_F)$

$R_{Gon} = 0.47 \Omega, V_{CC} = 600 \text{ V}$



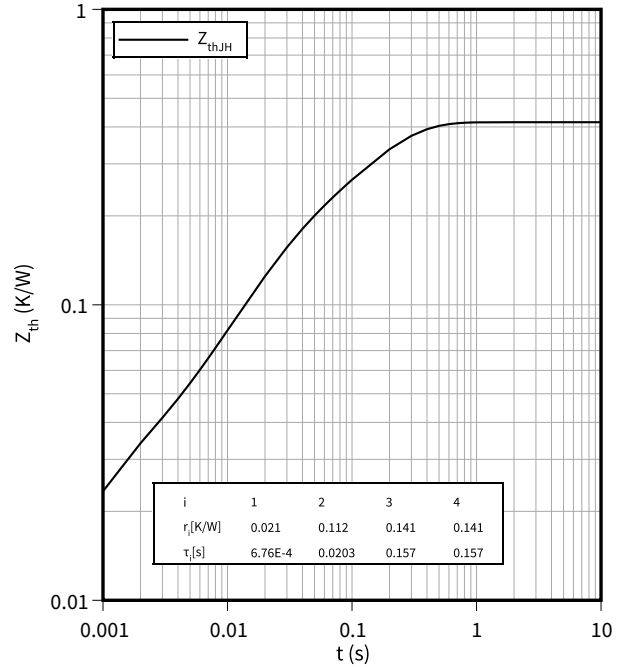
Switching losses (typical), Diode, D2 / D3

$E_{rec} = f(R_G)$
 $I_F = 200 \text{ A}, V_{CC} = 600 \text{ V}$



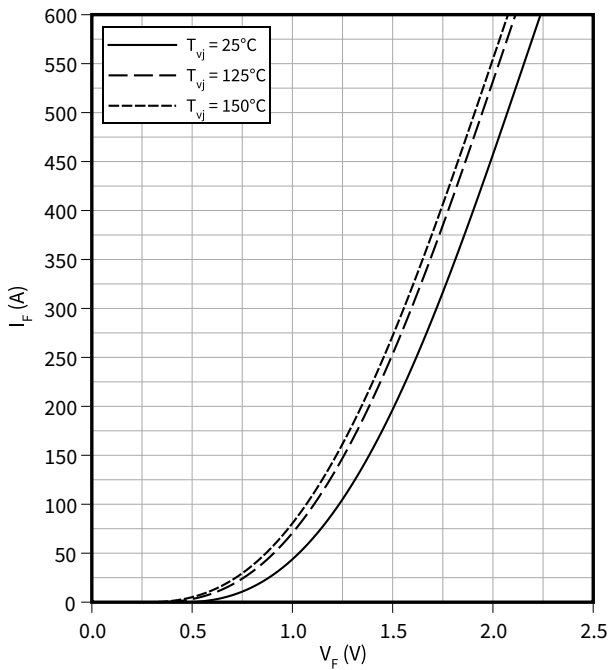
Transient thermal impedance, Diode, D2 / D3

$Z_{th} = f(t)$



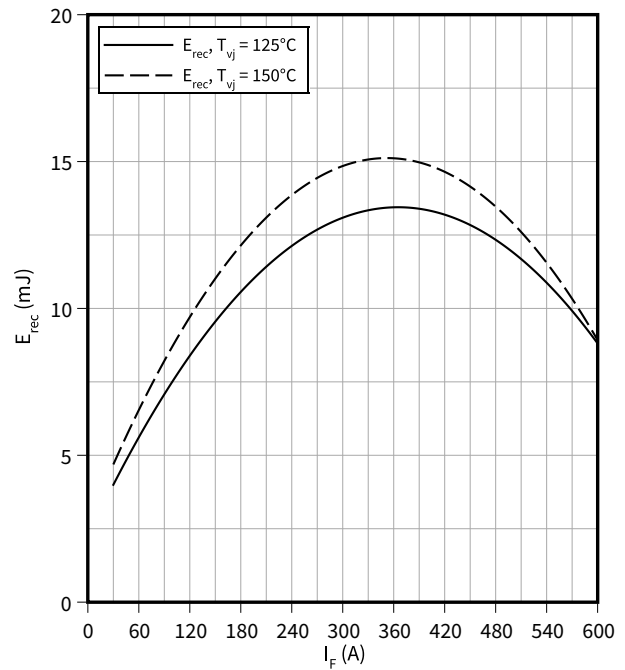
Forward characteristic (typical), Diode, D5 / D6

$I_F = f(V_F)$



Switching losses (typical), Diode, D5 / D6

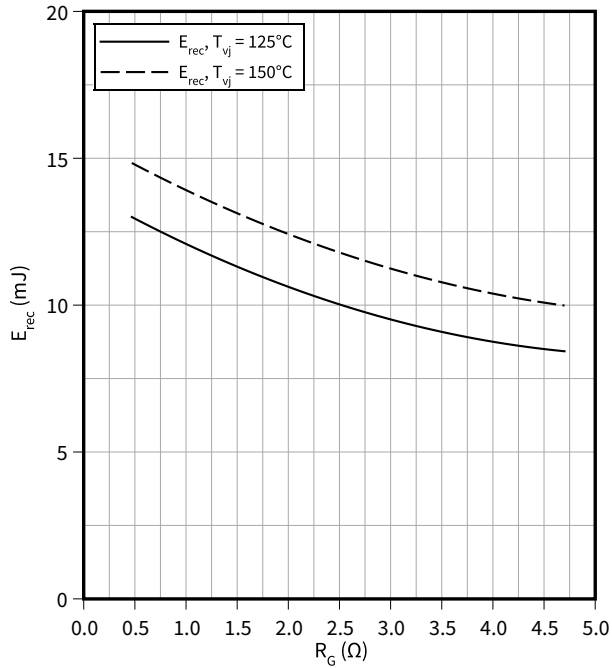
$E_{rec} = f(I_F)$
 $R_G = 0.47 \text{ } \Omega, V_{CC} = 600 \text{ V}$



Switching losses (typical), Diode, D5 / D6

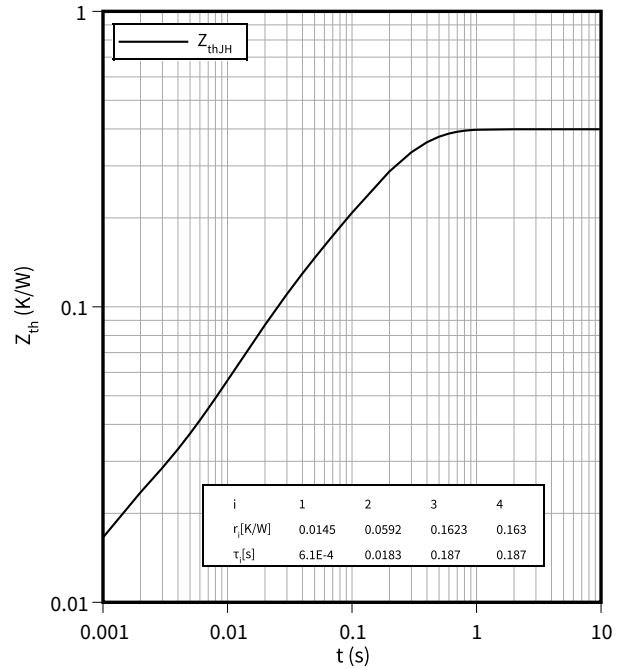
$E_{rec} = f(R_G)$

$I_F = 300\text{ A}, V_{CC} = 600\text{ V}$



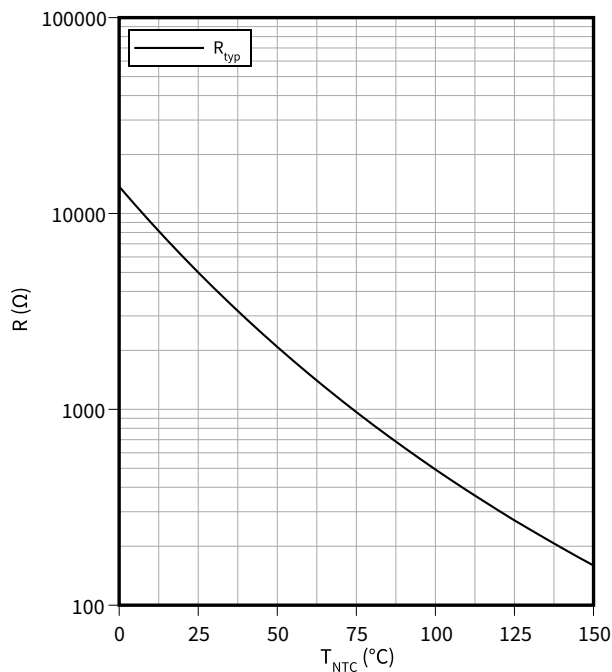
Transient thermal impedance, Diode, D5 / D6

$Z_{th} = f(t)$



Temperature characteristic (typical), NTC-Thermistor

$R = f(T_{NTC})$



9 Circuit diagram

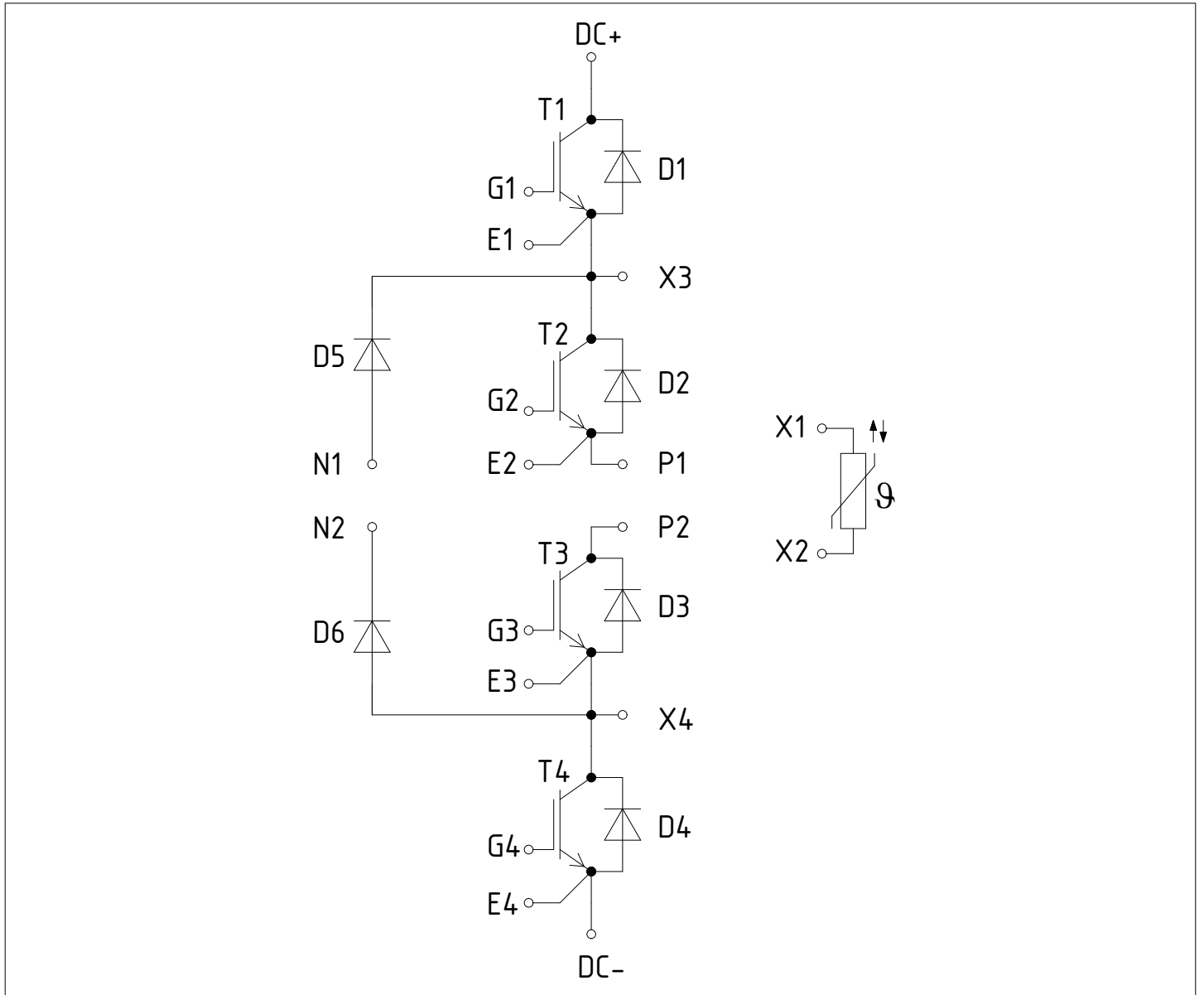


Figure 1

10 Package outlines

10 Package outlines

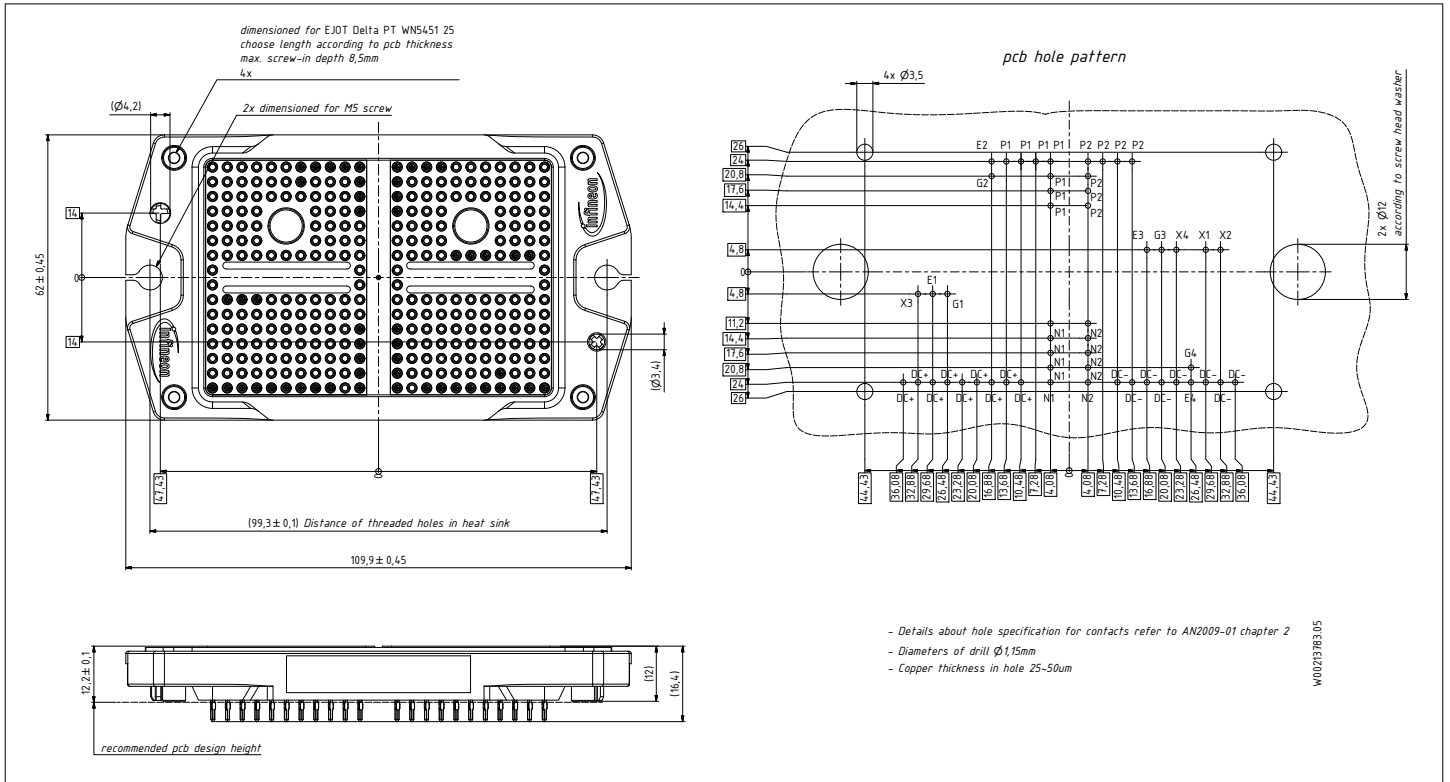


Figure 2

11 Module label code


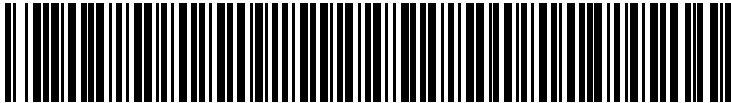
Module label code			
Code format	Data Matrix	Barcode Code128	
Encoding	ASCII text	Code Set A	
Symbol size	16x16	23 digits	
Standard	IEC24720 and IEC16022	IEC8859-1	
Code content	<i>Content</i>	<i>Digit</i>	<i>Example</i>
	Module serial number	1 - 5	71549
	Module material number	6 - 11	142846
	Production order number	12 - 19	55054991
	Date code (production year)	20 - 21	15
	Date code (production week)	22 - 23	30
Example	 		
	71549142846550549911530		
	71549142846550549911530		

Figure 3

Revision history

Document version	Date of release	Description of changes
0.10	2022-09-16	Initial version
1.00	2023-02-13	Final datasheet

Trademarks

All referenced product or service names and trademarks are the property of their respective owners.

Edition 2023-02-13

Published by

Infineon Technologies AG

81726 Munich, Germany

© 2023 Infineon Technologies AG

All Rights Reserved.

Do you have a question about any aspect of this document?

Email: erratum@infineon.com

Document reference

IFX-ABB158-002

Important notice

The information given in this document shall in no event be regarded as a guarantee of conditions or characteristics ("Beschaffheitsgarantie").

With respect to any examples, hints or any typical values stated herein and/or any information regarding the application of the product, Infineon Technologies hereby disclaims any and all warranties and liabilities of any kind, including without limitation warranties of non-infringement of intellectual property rights of any third party.

In addition, any information given in this document is subject to customer's compliance with its obligations stated in this document and any applicable legal requirements, norms and standards concerning customer's products and any use of the product of Infineon Technologies in customer's applications.

The data contained in this document is exclusively intended for technically trained staff. It is the responsibility of customer's technical departments to evaluate the suitability of the product for the intended application and the completeness of the product information given in this document with respect to such application.

Warnings

Due to technical requirements products may contain dangerous substances. For information on the types in question please contact your nearest Infineon Technologies office.

Except as otherwise explicitly approved by Infineon Technologies in a written document signed by authorized representatives of Infineon Technologies, Infineon Technologies' products may not be used in any applications where a failure of the product or any consequences of the use thereof can reasonably be expected to result in personal injury.