Final datasheet

EasyPACK™ module with TRENCHSTOP™ 5 and RAPID 1 diode and PressFIT / pre-applied thermal interface material / NTC

Features

Typical appearance

- Electrical features
  - V_{CES} = 650 V
  - $I_{C\ nom}$ = 150 A / I_{CRM} = 300 A
  - Low switching losses
  - Increased blocking voltage capability up to 650 V
  - Suitable Infineon gate drivers can be found under https://www.infineon.com/gdfinder
- Mechanical features
  - Al_2O_3 substrate with low thermal resistance
  - Compact design
  - PressFIT contact technology
  - Rugged mounting due to integrated mounting clamps
  - Pre-applied thermal interface material

Potential applications

- UPS systems
- Three-level applications

Product validation

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

Description

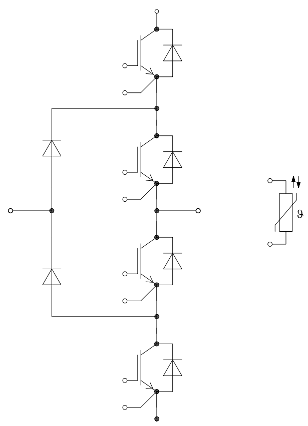


Table of contents

	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**	19
10	**Package outlines**	20
11	**Module label code**	21
	Revision history	22
	Disclaimer	23

1 Package

Table 1 Insulation coordination

Parameter	Symbol	Note or test condition	Values	Unit
Isolation test voltage	V_{ISOL}	RMS, f = 50 Hz, *t* = 1 min	2.5	kV
Isolation test voltage NTC	$V_{ISOL(NTC)}$	RMS, f = 50 Hz, *t* = 1 min	2.5	kV
Internal isolation		basic insulation (class 1, IEC 61140)	Al_2O_3	
Comparative tracking index	*CTI*		> 200	
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}			19		nH
Module lead resistance, terminals - chip	$R_{AA'+CC'}$	T_H = 25 °C, per switch		0.9		mΩ
Module lead resistance, terminals - chip	$R_{CC'+EE'}$	T_H = 25 °C, per switch		1.1		mΩ
Storage temperature	T_{stg}		-40		125	°C
Maximum baseplate operation temperature	T_{BPmax}				125	°C
Mounting force per clamp	*F*		40		80	N
Weight	*G*			39		g

***Note**: The current under continuous operation is limited to 25A rms per connector pin.*
Storage and shipment of modules with TIM => see AN 2012-07

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 °C	650	V
Implemented collector current	I_{CN}			200	A
Continuous DC collector current	I_{CDC}	$T_{vj\,max}$ = 175 °C	T_H = 65 °C	105	A
Repetitive peak collector current	I_{CRM}	t_p limited by $T_{vj\,op}$		400	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 = 150 A, V_{GE} = 15 V	T_{vj} = 25 °C		1.30	1.67	V
			T_{vj} = 125 °C		1.38		
			T_{vj} = 150 °C		1.40		
Gate threshold voltage	V_{GEth}	I_C = 2 mA, V_{CE} = V_{GE}, T_{vj} = 25 °C		3.25	4	4.75	V
Gate charge	Q_G	V_{GE} = ±15 V, V_{CC} = 400 V			0.84		µC
Internal gate resistor	R_{Gint}	T_{vj} = 25 °C			0		Ω
Input capacitance	C_{ies}	f = 100 kHz, T_{vj} = 25 °C, V_{CE} = 25 V, V_{GE} = 0 V			14.3		nF
Reverse transfer capacitance	C_{res}	f = 100 kHz, T_{vj} = 25 °C, V_{CE} = 25 V, V_{GE} = 0 V			0.05		nF
Collector-emitter cut-off current	I_{CES}	V_{CE} = 650 V, V_{GE} = 0 V	T_{vj} = 25 °C			45	µA
Gate-emitter leakage current	I_{GES}	V_{CE} = 0 V, V_{GE} = 20 V, T_{vj} = 25 °C				100	nA
Turn-on delay time (inductive load)	t_{don}	I_C = 150 A, V_{CC} = 300 V, V_{GE} = ±15 V, R_{Gon} = 15 Ω	T_{vj} = 25 °C		0.070		µs
			T_{vj} = 125 °C		0.066		
			T_{vj} = 150 °C		0.064		
Rise time (inductive load)	t_r	I_C = 150 A, V_{CC} = 300 V, V_{GE} = ±15 V, R_{Gon} = 15 Ω	T_{vj} = 25 °C		0.043		µs
			T_{vj} = 125 °C		0.046		
			T_{vj} = 150 °C		0.049		
Turn-off delay time (inductive load)	t_{doff}	I_C = 150 A, V_{CC} = 300 V, V_{GE} = ±15 V, R_{Goff} = 39 Ω	T_{vj} = 25 °C		0.630		µs
			T_{vj} = 125 °C		0.650		
			T_{vj} = 150 °C		0.660		
Fall time (inductive load)	t_f	I_C = 150 A, V_{CC} = 300 V, V_{GE} = ±15 V, R_{Goff} = 39 Ω	T_{vj} = 25 °C		0.028		µs
			T_{vj} = 125 °C		0.031		
			T_{vj} = 150 °C		0.035		
Turn-on energy loss per pulse	E_{on}	I_C = 150 A, V_{CC} = 300 V, L_σ = 35 nH, V_{GE} = ±15 V, R_{Gon} = 15 Ω, di/dt = 2900 A/µs (T_{vj} = 150 °C)	T_{vj} = 25 °C		3.22		mJ
			T_{vj} = 125 °C		3.86		
			T_{vj} = 150 °C		3.98		
Turn-off energy loss per pulse	E_{off}	I_C = 150 A, V_{CC} = 300 V, L_σ = 35 nH, V_{GE} = ±15 V, R_{Goff} = 39 Ω, dv/dt = 4020 V/µs (T_{vj} = 150 °C)	T_{vj} = 25 °C		2.6		mJ
			T_{vj} = 125 °C		2.89		
			T_{vj} = 150 °C		3.03		
Thermal resistance, junction to heat sink	R_{thJH}	per IGBT, Valid with IFX pre-applied Thermal Interface Material, λ_{grease} = 1 W/(m·K)				0.655	K/W

(table continues...)

Table 4 (continued) Characteristic values

Parameter	Symbol	Note or test condition	Values			Unit
			Min.	Typ.	Max.	
Temperature under switching conditions	$T_{vj\ op}$		-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 °C	650	V
Implemented collector current	I_{CN}			200	A
Continuous DC collector current	I_{CDC}	$T_{vj\ max}$ = 175 °C	T_H = 65 °C	105	A
Repetitive peak collector current	I_{CRM}	t_p limited by $T_{vj\ op}$		400	A
Gate-emitter peak voltage	V_{GES}			±20	V

Table 6 Characteristic values

Parameter	Symbol	Note or test condition		Min.	Typ.	Max.	Unit
Collector-emitter saturation voltage	$V_{CE\ sat}$	I_C = 150 A, V_{GE} = 15 V	T_{vj} = 25 °C		1.30	1.67	V
			T_{vj} = 125 °C		1.38		
			T_{vj} = 150 °C		1.40		
Gate threshold voltage	V_{GEth}	I_C = 2 mA, V_{CE} = V_{GE}, T_{vj} = 25 °C		3.25	4	4.75	V
Gate charge	Q_G	V_{GE} = ±15 V, V_{CC} = 400 V			0.84		µC
Internal gate resistor	R_{Gint}	T_{vj} = 25 °C			0		Ω
Input capacitance	C_{ies}	f = 100 kHz, T_{vj} = 25 °C, V_{CE} = 25 V, V_{GE} = 0 V			14.3		nF
Reverse transfer capacitance	C_{res}	f = 100 kHz, T_{vj} = 25 °C, V_{CE} = 25 V, V_{GE} = 0 V			0.05		nF
Collector-emitter cut-off current	I_{CES}	V_{CE} = 650 V, V_{GE} = 0 V	T_{vj} = 25 °C			45	µA
Gate-emitter leakage current	I_{GES}	V_{CE} = 0 V, V_{GE} = 20 V, T_{vj} = 25 °C				100	nA
Turn-on delay time (inductive load)	t_{don}	I_C = 150 A, V_{CC} = 300 V, V_{GE} = ±15 V, R_{Gon} = 15 Ω	T_{vj} = 25 °C		0.068		µs
			T_{vj} = 125 °C		0.064		
			T_{vj} = 150 °C		0.064		

(table continues...)

Table 6 **(continued) Characteristic values**

Parameter	Symbol	Note or test condition		Values			Unit
				Min.	Typ.	Max.	
Rise time (inductive load)	t_r	I_C = 150 A, V_{CC} = 300 V, V_{GE} = ±15 V, R_{Gon} = 15 Ω	T_{vj} = 25 °C		0.045		µs
			T_{vj} = 125 °C		0.052		
			T_{vj} = 150 °C		0.052		
Turn-off delay time (inductive load)	t_{doff}	I_C = 150 A, V_{CC} = 300 V, V_{GE} = ±15 V, R_{Goff} = 39 Ω	T_{vj} = 25 °C		0.640		µs
			T_{vj} = 125 °C		0.660		
			T_{vj} = 150 °C		0.680		
Fall time (inductive load)	t_f	I_C = 150 A, V_{CC} = 300 V, V_{GE} = ±15 V, R_{Goff} = 39 Ω	T_{vj} = 25 °C		0.028		µs
			T_{vj} = 125 °C		0.033		
			T_{vj} = 150 °C		0.038		
Turn-on energy loss per pulse	E_{on}	I_C = 150 A, V_{CC} = 300 V, L_σ = 35 nH, V_{GE} = ±15 V, R_{Gon} = 15 Ω, di/dt = 2600 A/µs (T_{vj} = 150 °C)	T_{vj} = 25 °C		3.1		mJ
			T_{vj} = 125 °C		3.61		
			T_{vj} = 150 °C		3.61		
Turn-off energy loss per pulse	E_{off}	I_C = 150 A, V_{CC} = 300 V, L_σ = 35 nH, V_{GE} = ±15 V, R_{Goff} = 39 Ω, dv/dt = 4000 V/µs (T_{vj} = 150 °C)	T_{vj} = 25 °C		2.6		mJ
			T_{vj} = 125 °C		2.99		
			T_{vj} = 150 °C		3.08		
Thermal resistance, junction to heat sink	R_{thJH}	per IGBT, Valid with IFX pre-applied Thermal Interface Material, λ_{grease} = 1 W/(m·K)				0.655	K/W
Temperature under switching conditions	$T_{vj\,op}$			-40		150	°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 °C	650	V
Continuous DC forward current	I_F			150	A
Repetitive peak forward current	I_{FRM}	t_P = 1 ms		300	A
I^2t - value	I^2t	t_P = 10 ms, V_R = 0 V	T_{vj} = 125 °C	760	A^2s
			T_{vj} = 150 °C	680	

Table 8 **Characteristic values**

Parameter	Symbol	Note or test condition		Values Min.	Values Typ.	Values Max.	Unit
Forward voltage	V_F	I_F = 150 A, V_{GE} = 0 V	T_{vj} = 25 °C		1.50	2.05	V
			T_{vj} = 125 °C		1.48		
			T_{vj} = 150 °C		1.47		
Peak reverse recovery current	I_{RM}	V_{CC} = 300 V, I_F = 150 A, V_{GE} = -15 V, -di$_F$/dt = 2600 A/µs (T_{vj} = 150 °C)	T_{vj} = 25 °C		63		A
			T_{vj} = 125 °C		92		
			T_{vj} = 150 °C		97		
Recovered charge	Q_r	V_{CC} = 300 V, I_F = 150 A, V_{GE} = -15 V, -di$_F$/dt = 2600 A/µs (T_{vj} = 150 °C)	T_{vj} = 25 °C		4.44		µC
			T_{vj} = 125 °C		8.69		
			T_{vj} = 150 °C		9.95		
Reverse recovery energy	E_{rec}	V_{CC} = 300 V, I_F = 150 A, V_{GE} = -15 V, -di$_F$/dt = 2600 A/µs (T_{vj} = 150 °C)	T_{vj} = 25 °C		0.55		mJ
			T_{vj} = 125 °C		1.27		
			T_{vj} = 150 °C		1.5		
Thermal resistance, junction to heat sink	R_{thJH}	per diode, Valid with IFX pre-applied Thermal Interface Material, λ_{grease} = 1 W/(m·K)				1.00	K/W
Temperature under switching conditions	$T_{vj\ op}$			-40		150	°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 °C	650	V
Continuous DC forward current	I_F			150	A
Repetitive peak forward current	I_{FRM}	t_P = 1 ms		300	A
I^2t - value	I^2t	t_P = 10 ms, V_R = 0 V	T_{vj} = 125 °C	760	A^2s
			T_{vj} = 150 °C	680	

Table 10 **Characteristic values**

Parameter	Symbol	Note or test condition		Values			Unit
				Min.	Typ.	Max.	
Forward voltage	V_F	I_F = 150 A, V_{GE} = 0 V	T_{vj} = 25 °C		1.50	2.05	V
			T_{vj} = 125 °C		1.48		
			T_{vj} = 150 °C		1.47		
Peak reverse recovery current	I_{RM}	V_{CC} = 300 V, I_F = 150 A, V_{GE} = -15 V, -di$_F$/dt = 2600 A/µs (T_{vj} = 150 °C)	T_{vj} = 25 °C		63		A
			T_{vj} = 125 °C		92		
			T_{vj} = 150 °C		97		
Recovered charge	Q_r	V_{CC} = 300 V, I_F = 150 A, V_{GE} = -15 V, -di$_F$/dt = 2600 A/µs (T_{vj} = 150 °C)	T_{vj} = 25 °C		4.44		µC
			T_{vj} = 125 °C		8.69		
			T_{vj} = 150 °C		9.95		
Reverse recovery energy	E_{rec}	V_{CC} = 300 V, I_F = 150 A, V_{GE} = -15 V, -di$_F$/dt = 2600 A/µs (T_{vj} = 150 °C)	T_{vj} = 25 °C		0.55		mJ
			T_{vj} = 125 °C		1.27		
			T_{vj} = 150 °C		1.5		
Thermal resistance, junction to heat sink	R_{thJH}	per diode, Valid with IFX pre-applied Thermal Interface Material, λ_{grease} = 1 W/(m·K)				1.00	K/W
Temperature under switching conditions	$T_{vj\ op}$			-40		150	°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 °C	650	V
Continuous DC forward current	I_F			150	A
Repetitive peak forward current	I_{FRM}	t_P = 1 ms		300	A
I^2t - value	I^2t	t_P = 10 ms, V_R = 0 V	T_{vj} = 125 °C	760	A^2s
			T_{vj} = 150 °C	680	

Table 12 **Characteristic values**

Parameter	Symbol	Note or test condition		Values			Unit
				Min.	Typ.	Max.	
Forward voltage	V_F	I_F = 150 A, V_{GE} = 0 V	T_{vj} = 25 °C		1.50	2.05	V
			T_{vj} = 125 °C		1.48		
			T_{vj} = 150 °C		1.47		
Peak reverse recovery current	I_{RM}	V_{CC} = 300 V, I_F = 150 A, V_{GE} = -15 V, -di_F/dt = 2900 A/µs (T_{vj} = 150 °C)	T_{vj} = 25 °C		67		A
			T_{vj} = 125 °C		98		
			T_{vj} = 150 °C		105		
Recovered charge	Q_r	V_{CC} = 300 V, I_F = 150 A, V_{GE} = -15 V, -di_F/dt = 2900 A/µs (T_{vj} = 150 °C)	T_{vj} = 25 °C		35		µC
			T_{vj} = 125 °C		75		
			T_{vj} = 150 °C		87		
Reverse recovery energy	E_{rec}	V_{CC} = 300 V, I_F = 150 A, V_{GE} = -15 V, -di_F/dt = 2900 A/µs (T_{vj} = 150 °C)	T_{vj} = 25 °C		0.54		mJ
			T_{vj} = 125 °C		1.26		
			T_{vj} = 150 °C		1.55		
Thermal resistance, junction to heat sink	R_{thJH}	per diode, Valid with IFX pre-applied Thermal Interface Material, λ_{grease} = 1 W/(m·K)				1.00	K/W
Temperature under switching conditions	$T_{vj\ op}$			-40		150	°C

7 NTC-Thermistor

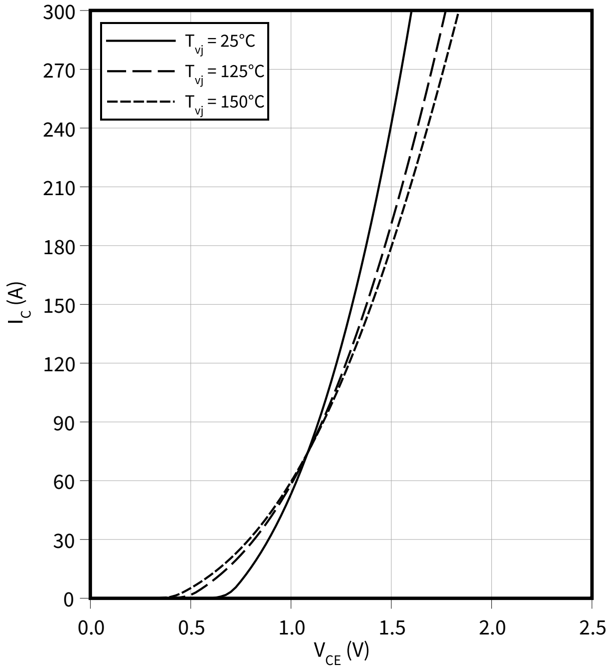
Table 13 **Characteristic values**

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

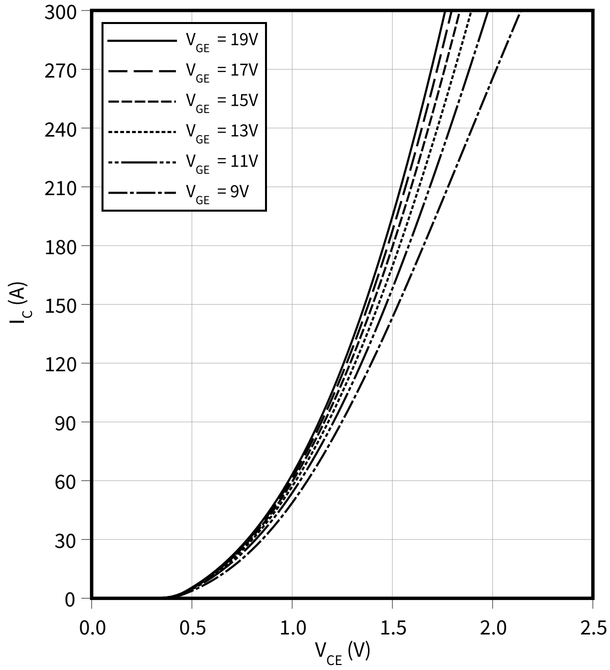
Note: *For an analytical description of the NTC characteristics please refer to AN2009-10, chapter 4.*

8 Characteristics diagrams

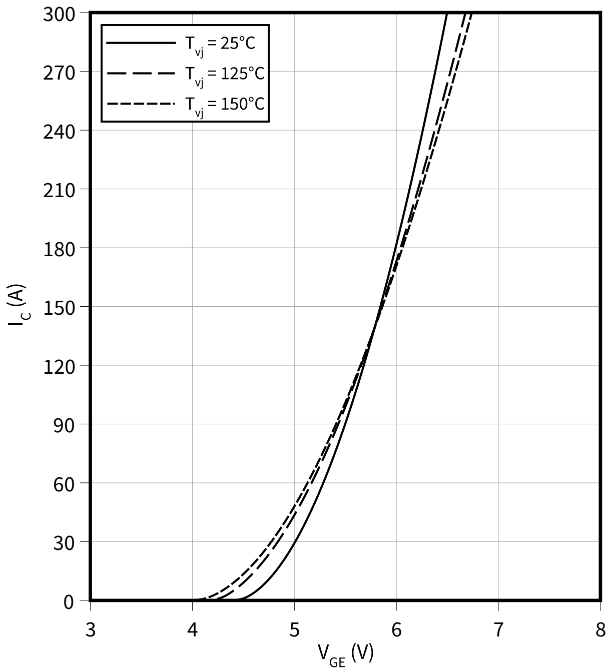
Output characteristic (typical), IGBT, T1 / T4
$I_C = f(V_{CE})$
$V_{GE} = 15\ V$



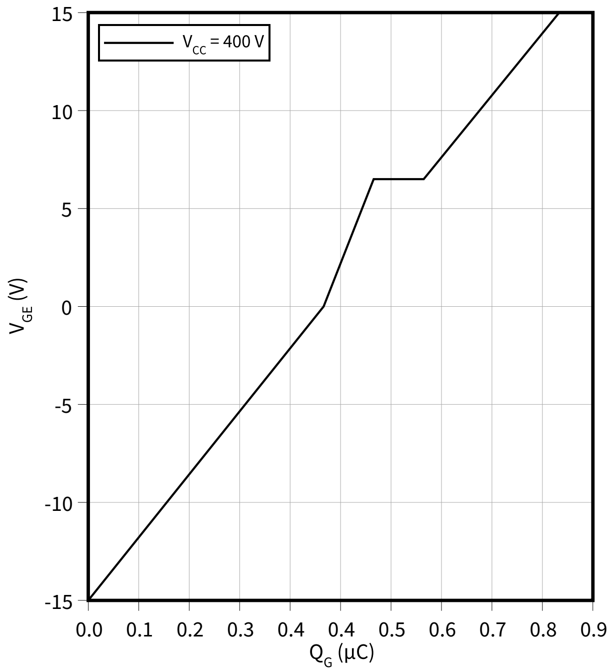
Output characteristic field (typical), IGBT, T1 / T4
$I_C = f(V_{CE})$
$T_{vj} = 150\ °C$



Transfer characteristic (typical), IGBT, T1 / T4
$I_C = f(V_{GE})$
$V_{CE} = 20\ V$



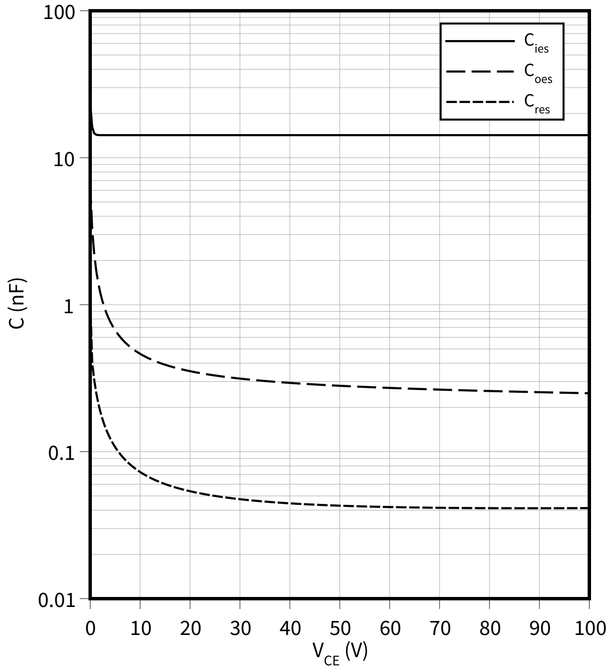
Gate charge characteristic (typical), IGBT, T1 / T4
$V_{GE} = f(Q_G)$
$I_C = 150\ A$, $T_{vj} = 25\ °C$



Capacity characteristic (typical), IGBT, T1 / T4

$C = f(V_{CE})$

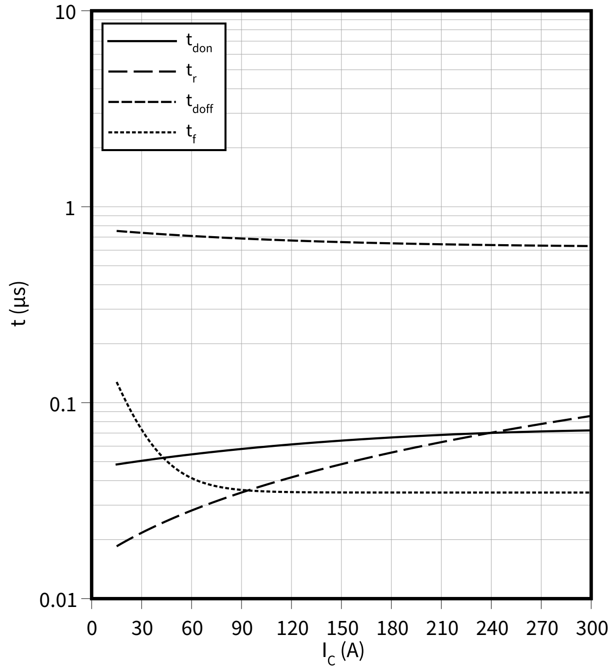
$f = 100$ kHz, $V_{GE} = 0$ V, $T_{vj} = 25$ °C



Switching times (typical), IGBT, T1 / T4

$t = f(I_C)$

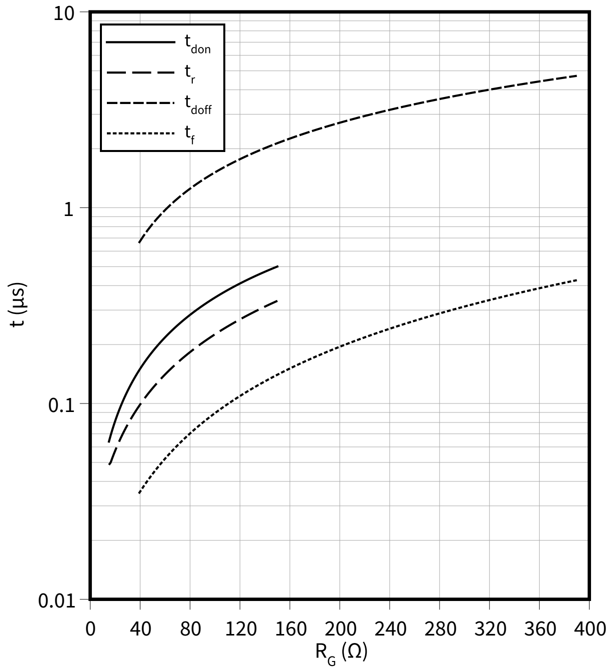
$R_{Goff} = 39\ \Omega$, $R_{Gon} = 15\ \Omega$, $V_{CC} = 300$ V, $V_{GE} = \pm 15$ V, $T_{vj} = 150$ °C



Switching times (typical), IGBT, T1 / T4

$t = f(R_G)$

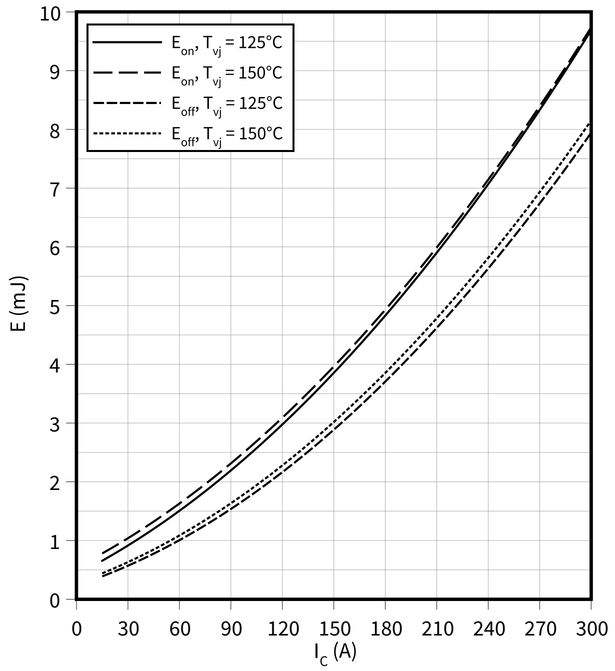
$I_C = 150$ A, $V_{CC} = 300$ V, $V_{GE} = \pm 15$ V, $T_{vj} = 150$ °C



Switching losses (typical), IGBT, T1 / T4

$E = f(I_C)$

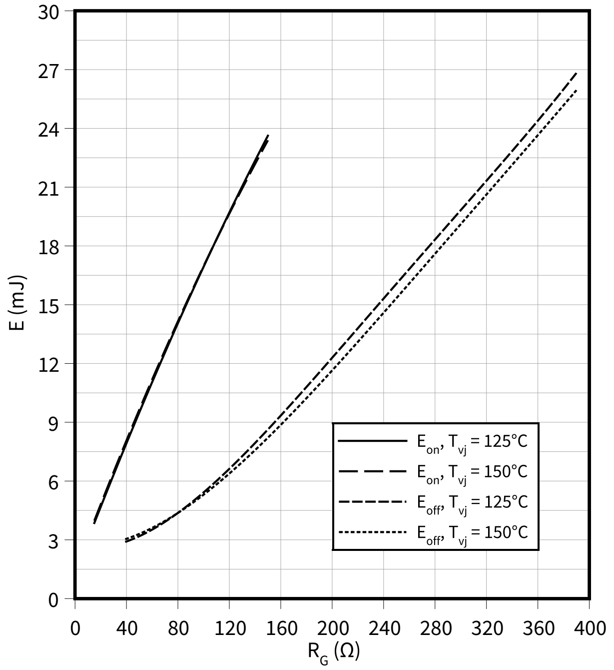
$R_{Goff} = 39\ \Omega$, $R_{Gon} = 15\ \Omega$, $V_{CC} = 300$ V, $V_{GE} = \pm 15$ V



Switching losses (typical), IGBT, T1 / T4

$E = f(R_G)$

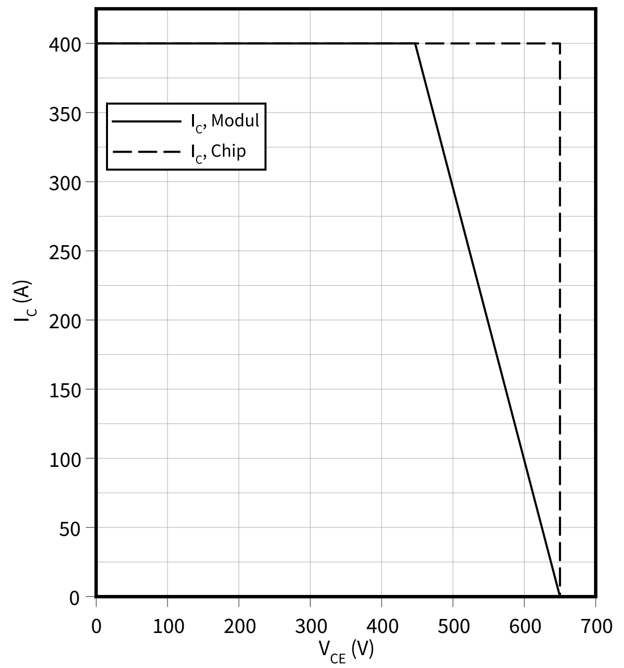
$I_C = 150$ A, $V_{CC} = 300$ V, $V_{GE} = \pm 15$ V



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

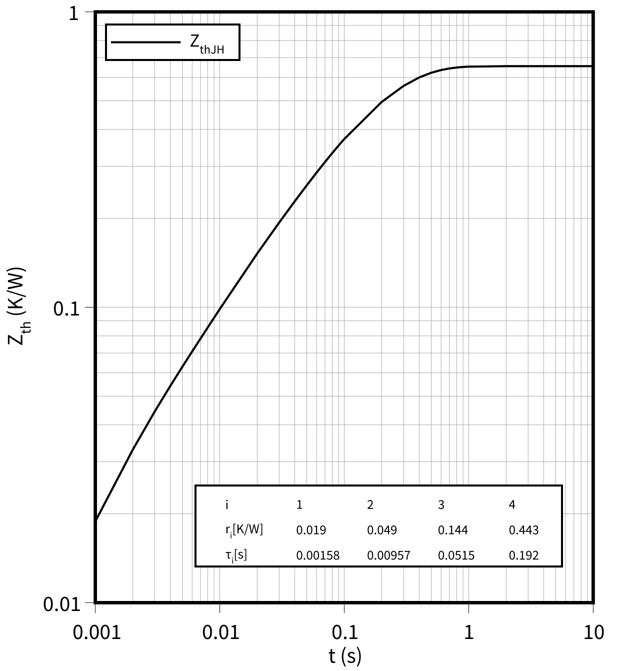
$I_C = f(V_{CE})$

$R_{Goff} = 39\ \Omega$, $V_{GE} = \pm 15$ V, $T_{vj} = 150$ °C



Transient thermal impedance, IGBT, T1 / T4

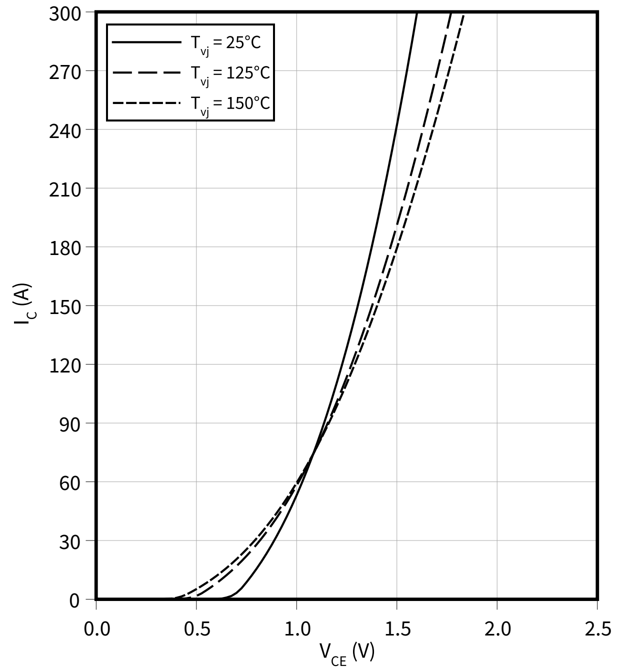
$Z_{th} = f(t)$



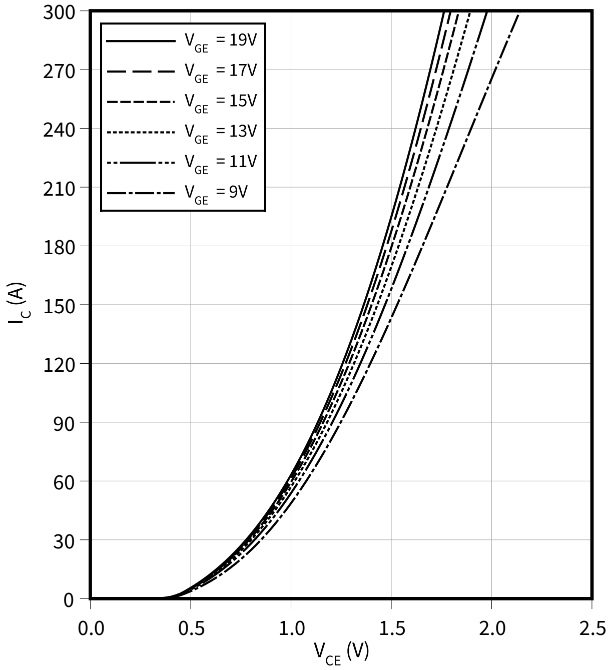
Output characteristic (typical), IGBT, T2 / T3

$I_C = f(V_{CE})$

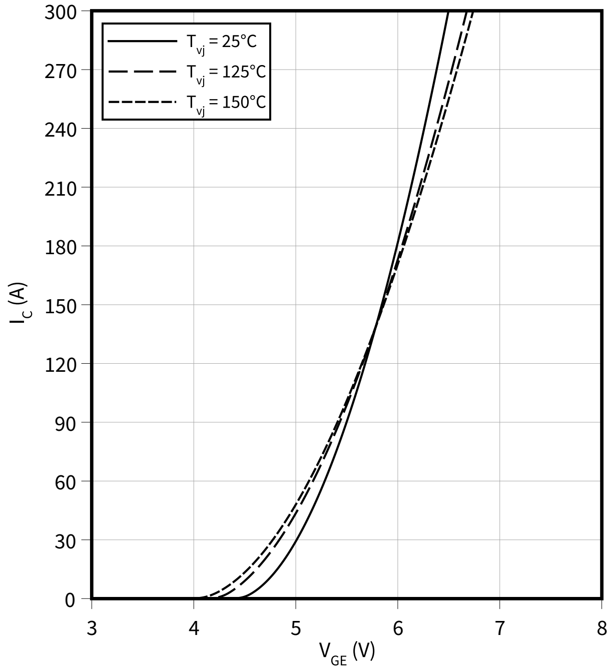
$V_{GE} = 15$ V



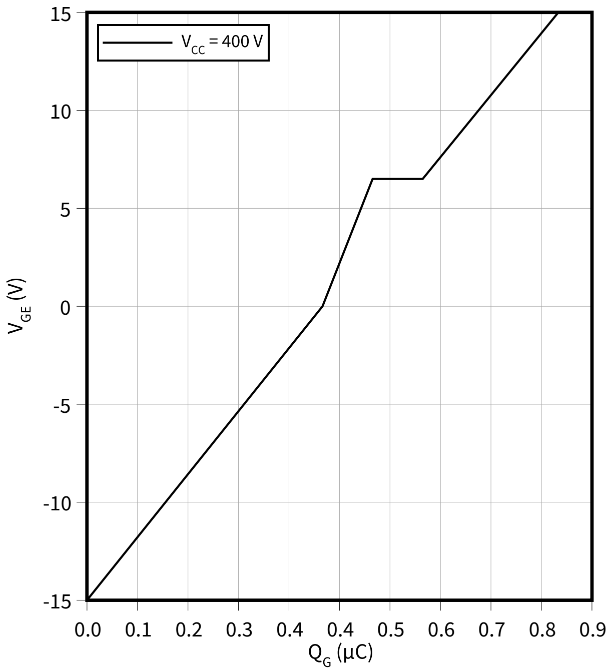
Output characteristic field (typical), IGBT, T2 / T3
$I_C = f(V_{CE})$
$T_{vj} = 150$ °C



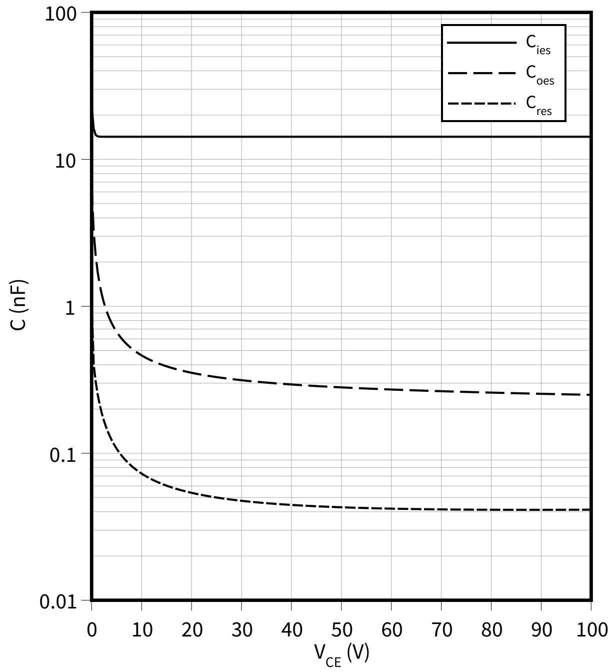
Transfer characteristic (typical), IGBT, T2 / T3
$I_C = f(V_{GE})$
$V_{CE} = 20$ V



Gate charge characteristic (typical), IGBT, T2 / T3
$V_{GE} = f(Q_G)$
$I_C = 150$ A, $T_{vj} = 25$ °C



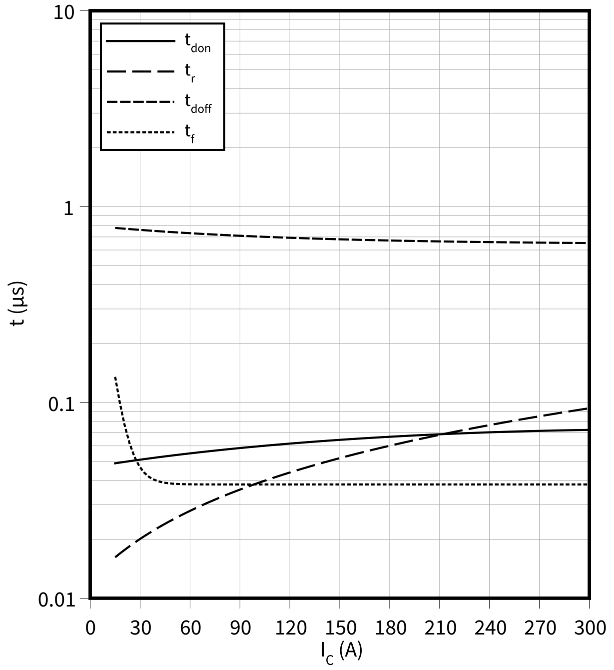
Capacity characteristic (typical), IGBT, T2 / T3
$C = f(V_{CE})$
$f = 100$ kHz, $V_{GE} = 0$ V, $T_{vj} = 25$ °C



Switching times (typical), IGBT, T2 / T3

$t = f(I_C)$

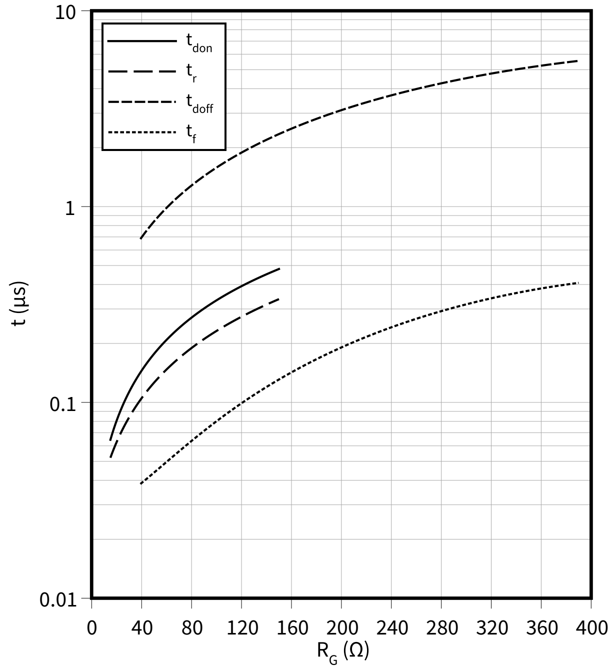
R_{Goff} = 39 Ω, R_{Gon} = 15 Ω, V_{CC} = 300 V, V_{GE} = ± 15 V, T_{vj} = 150 °C



Switching times (typical), IGBT, T2 / T3

$t = f(R_G)$

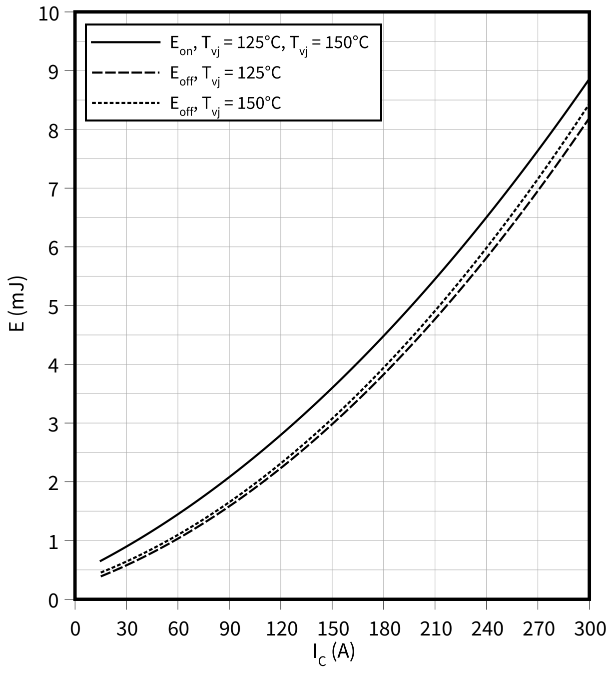
I_C = 150 A, V_{CC} = 300 V, V_{GE} = ± 15 V, T_{vj} = 150 °C



Switching losses (typical), IGBT, T2 / T3

$E = f(I_C)$

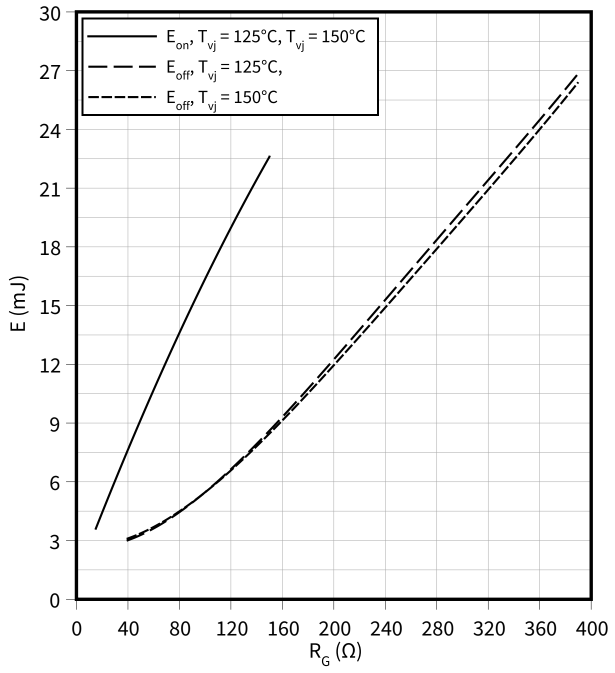
R_{Goff} = 39 Ω, R_{Gon} = 15 Ω, V_{CC} = 300 V, V_{GE} = ± 15 V



Switching losses (typical), IGBT, T2 / T3

$E = f(R_G)$

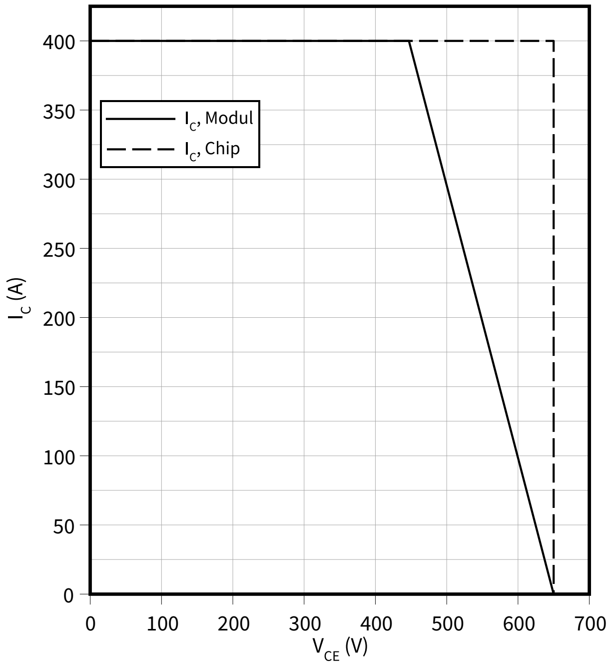
I_C = 150 A, V_{CC} = 300 V, V_{GE} = ± 15 V



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

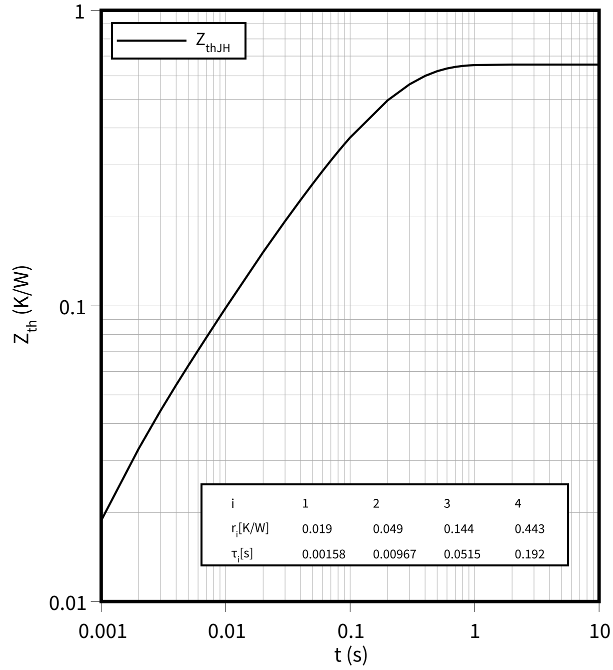
$I_C = f(V_{CE})$

$R_{Goff} = 39\ \Omega$, $V_{GE} = \pm 15\ V$, $T_{vj} = 150\ °C$



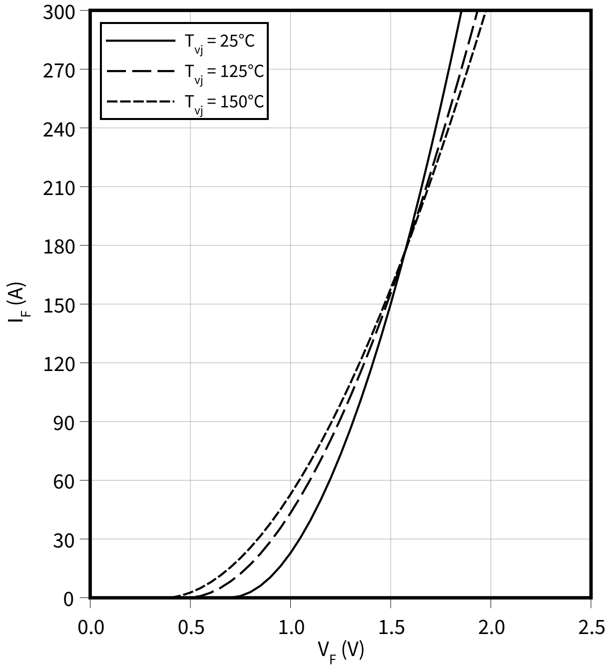
Transient thermal impedance, IGBT, T2 / T3

$Z_{th} = f(t)$



Forward characteristic (typical), Diode, D1 / D4

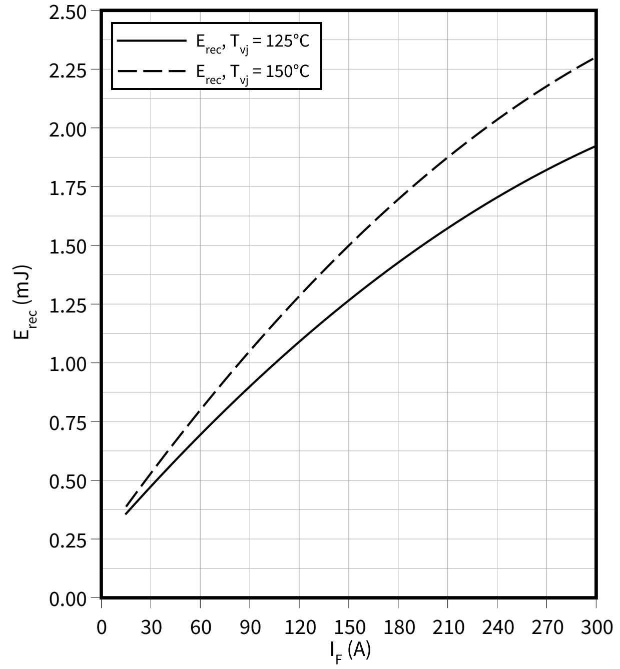
$I_F = f(V_F)$



Switching losses (typical), Diode, D1 / D4

$E_{rec} = f(I_F)$

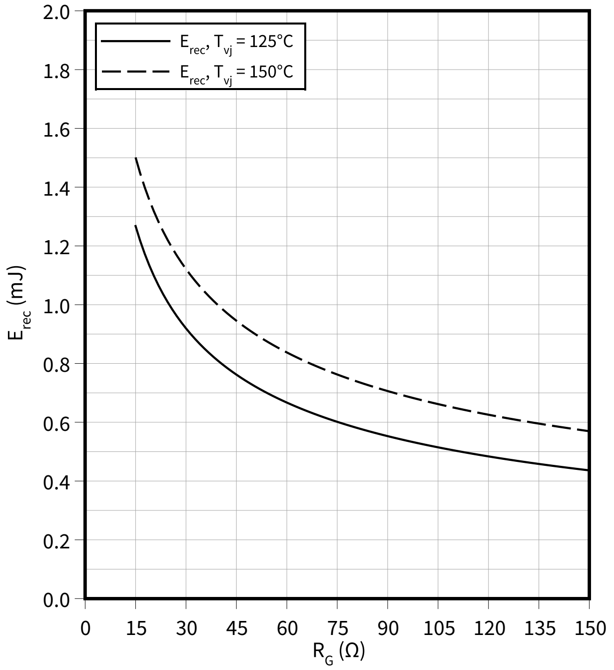
$V_{CE} = 300\ V$, $R_{Gon} = 15$



Switching losses (typical), Diode, D1 / D4

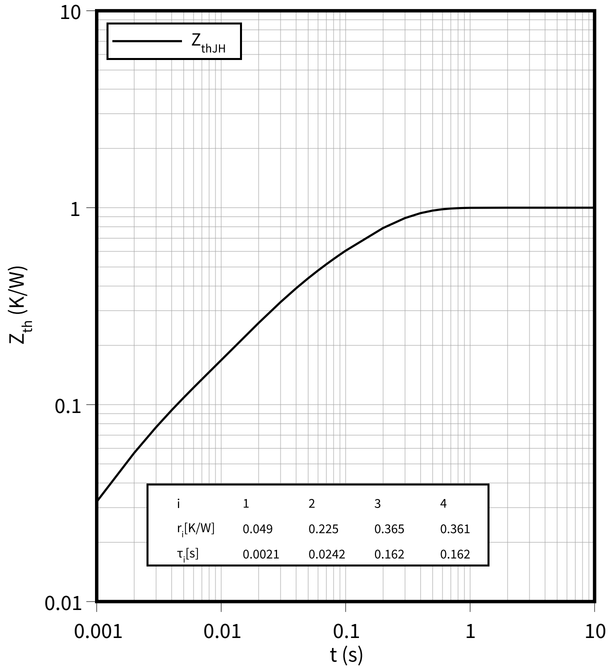
$E_{rec} = f(R_G)$

$V_{CE} = 300$ V, $I_F = 150$ A



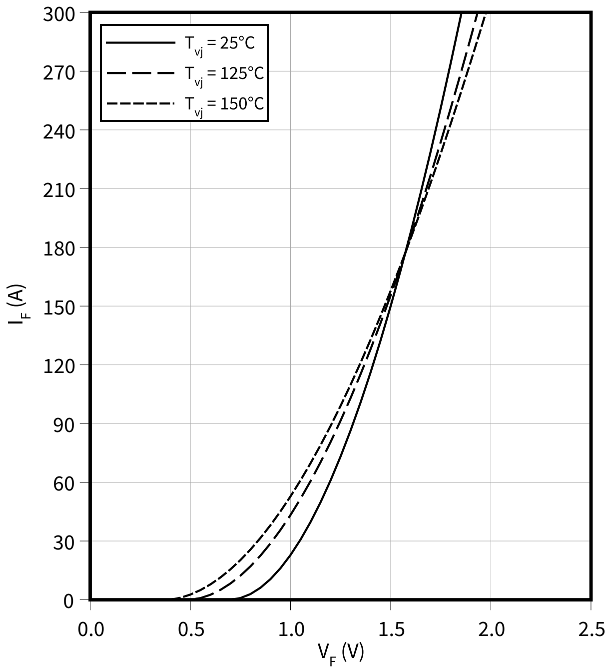
Transient thermal impedance, Diode, D1 / D4

$Z_{th} = f(t)$



Forward characteristic (typical), Diode, D2 / D3

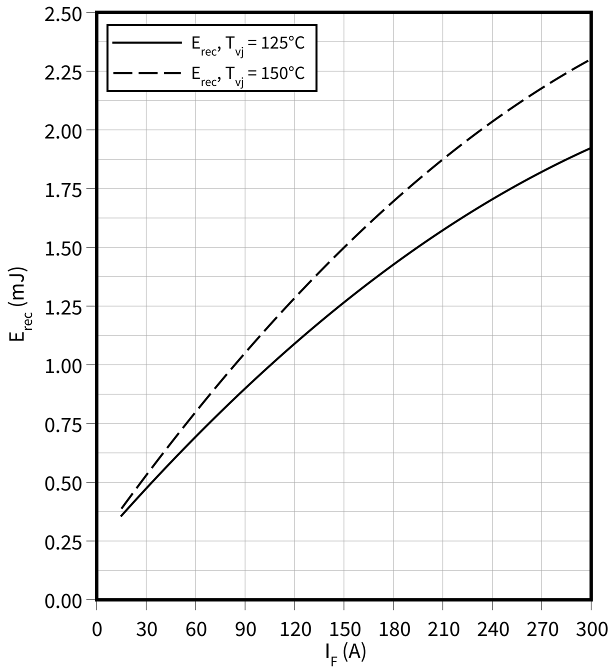
$I_F = f(V_F)$



Switching losses (typical), Diode, D2 / D3

$E_{rec} = f(I_F)$

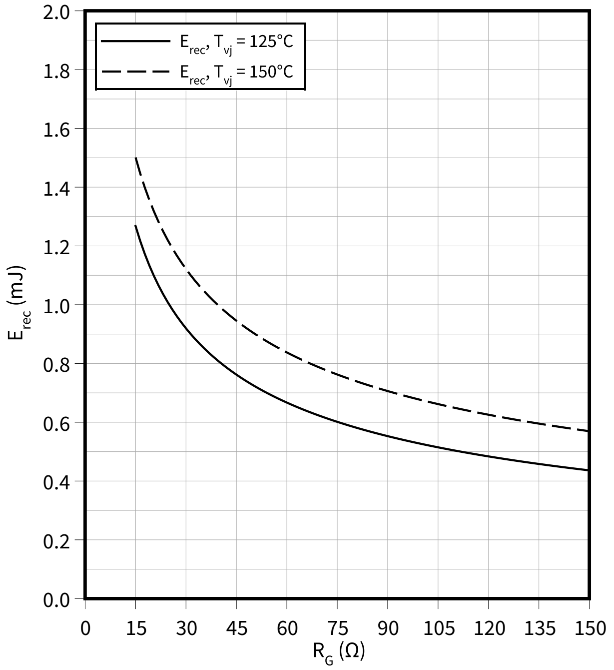
$V_{CE} = 300$ V, $R_{Gon} = 15$



Switching losses (typical), Diode, D2 / D3

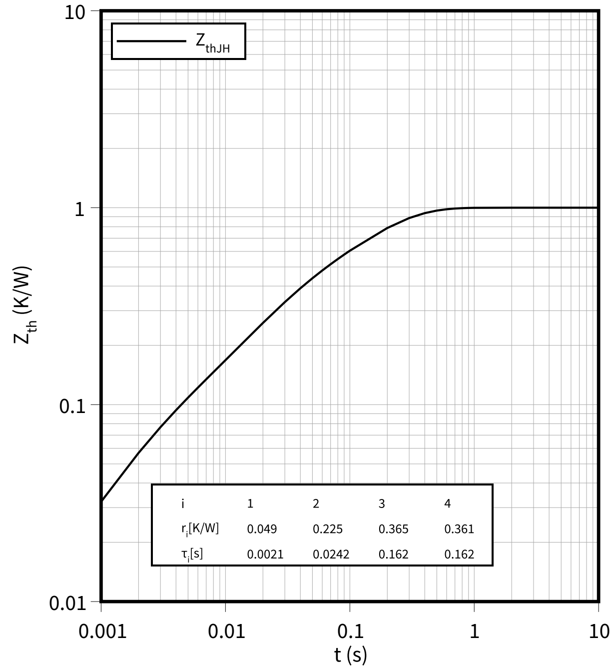
$E_{rec} = f(R_G)$

$V_{CE} = 300$ V, $I_F = 150$ A



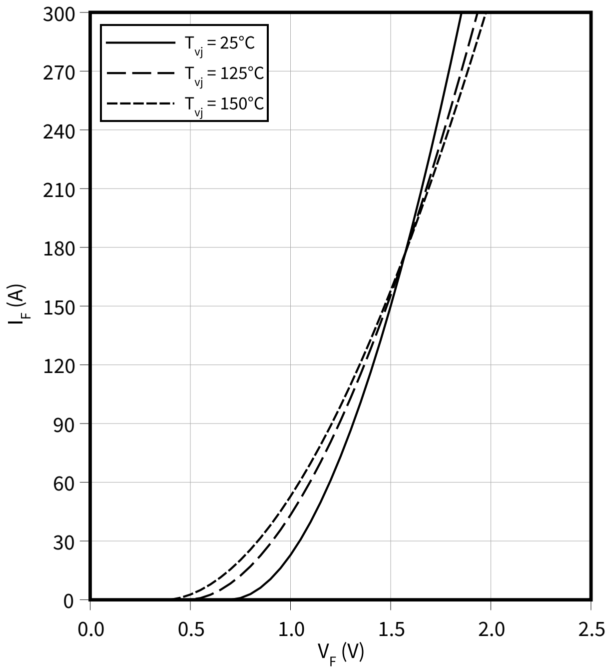
Transient thermal impedance, Diode, D2 / D3

$Z_{th} = f(t)$



Forward characteristic (typical), Diode, D5 / D6

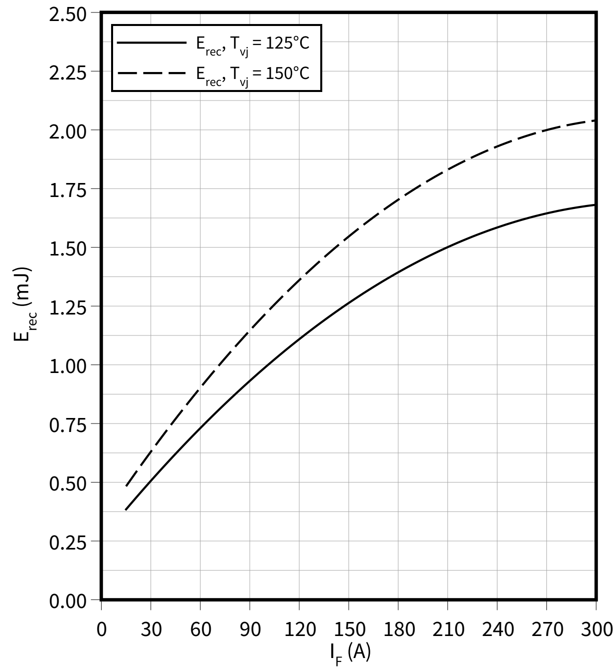
$I_F = f(V_F)$



Switching losses (typical), Diode, D5 / D6

$E_{rec} = f(I_F)$

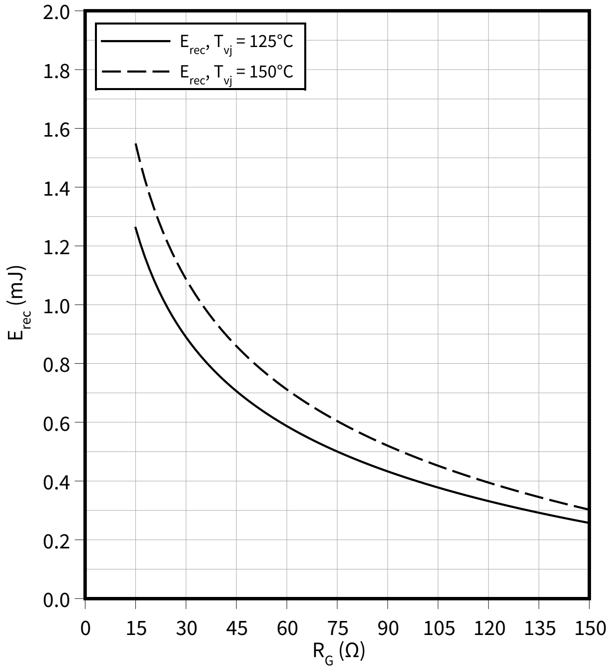
$V_{CE} = 300$ V, $R_{Gon} = 15$



Switching losses (typical), Diode, D5 / D6

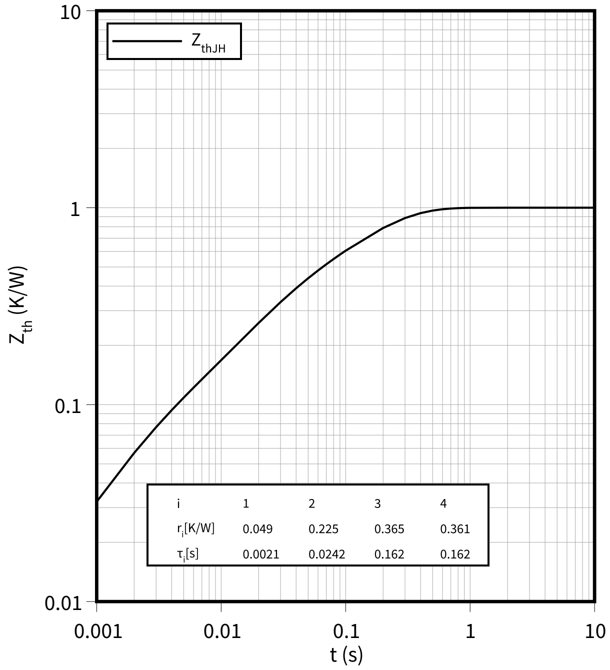
$E_{rec} = f(R_G)$

$V_{CE} = 300$ V, $I_F = 150$ A



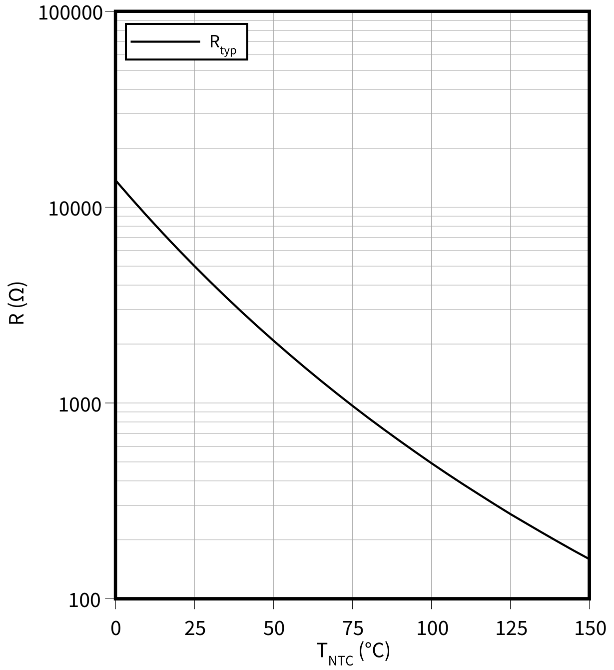
Transient thermal impedance, Diode, D5 / D6

$Z_{th} = f(t)$



Temperature characteristic (typical), NTC-Thermistor

$R = f(T_{NTC})$



9 Circuit diagram

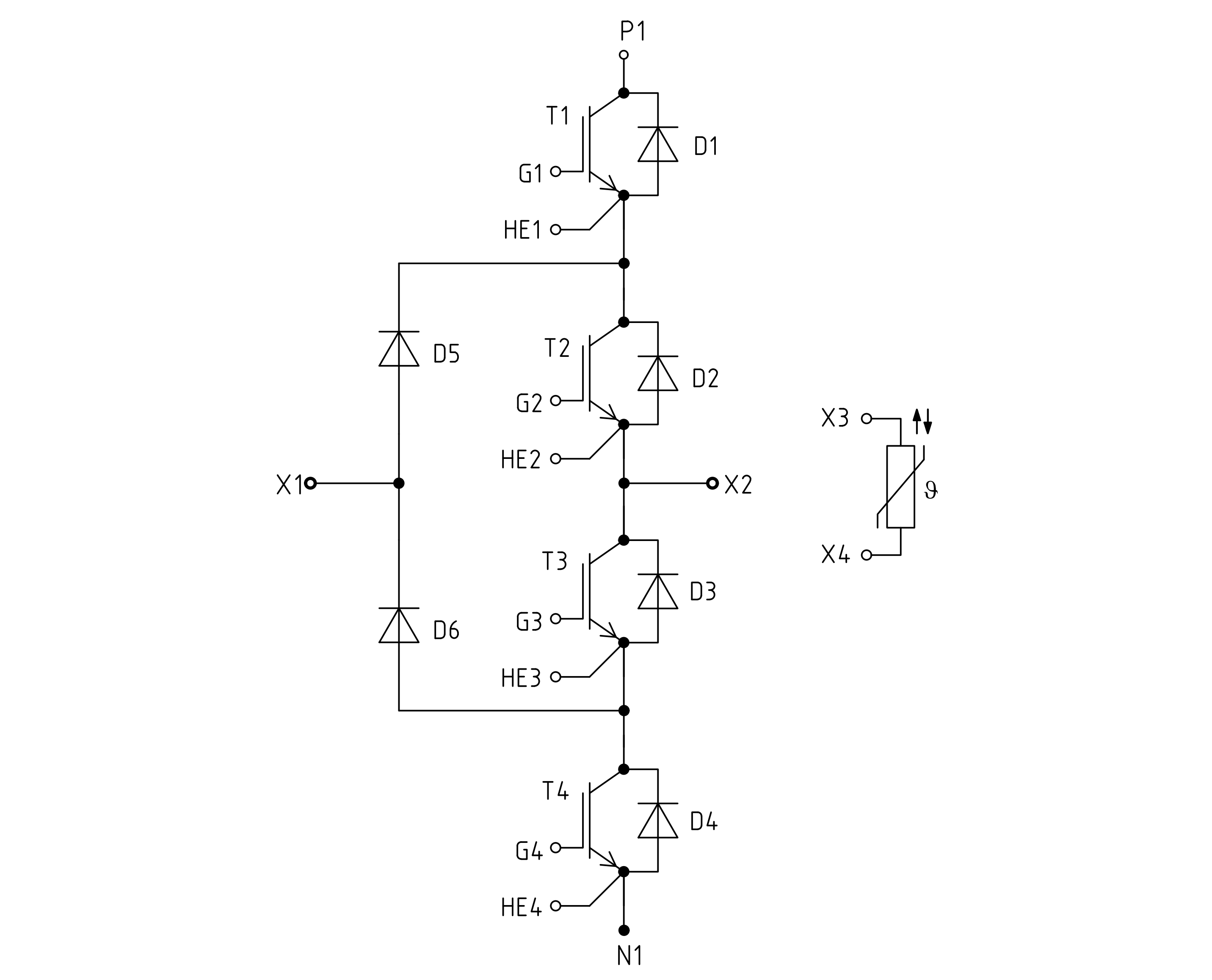


Figure 1

10 Package outlines

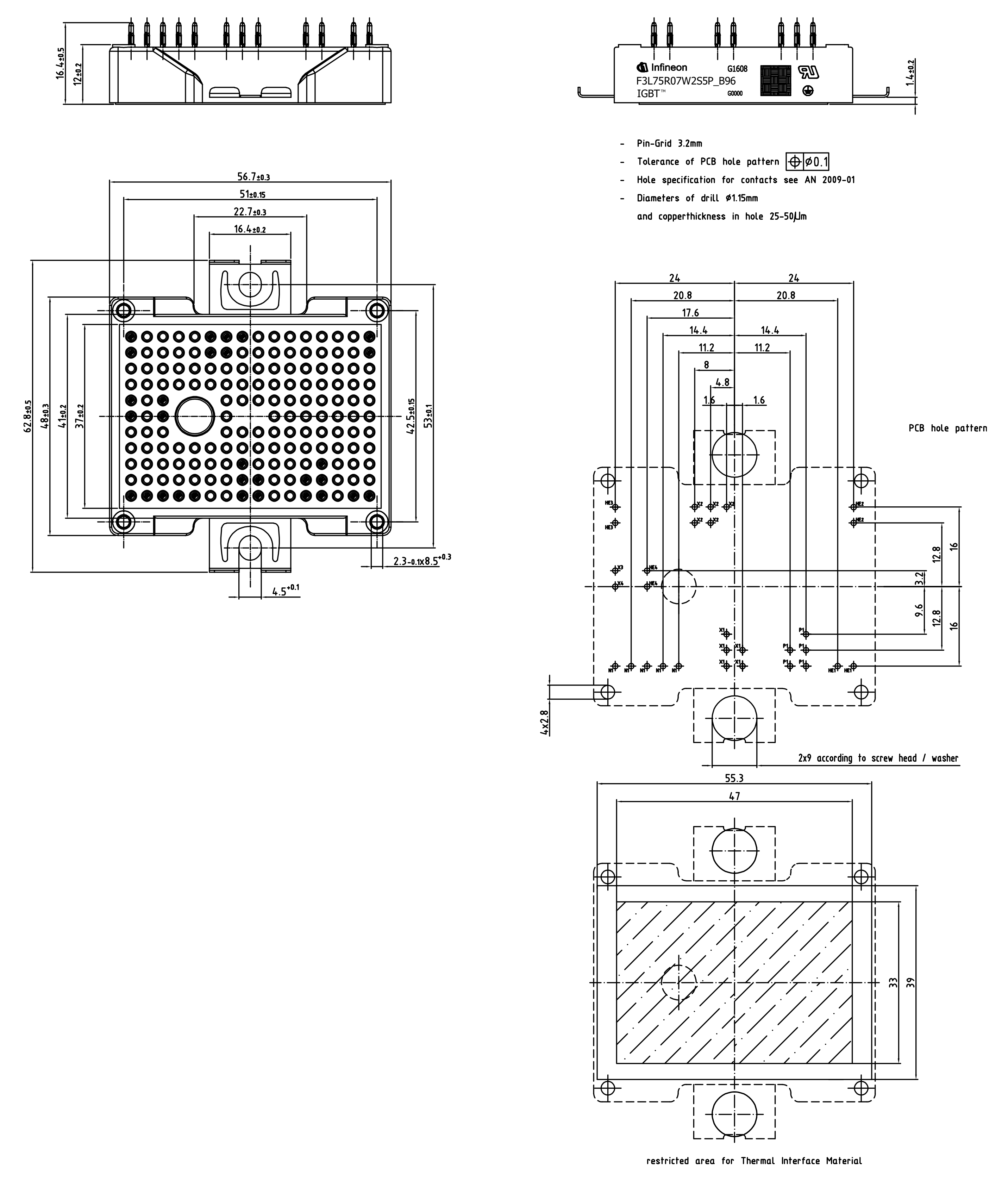


Figure 2

11 Module label code

<table>
<tr><th colspan="4">Module label code</th></tr>
<tr><td>Code format</td><td colspan="2">Data Matrix</td><td>Barcode Code128</td></tr>
<tr><td>Encoding</td><td colspan="2">ASCII text</td><td>Code Set A</td></tr>
<tr><td>Symbol size</td><td colspan="2">16x16</td><td>23 digits</td></tr>
<tr><td>Standard</td><td colspan="2">IEC24720 and IEC16022</td><td>IEC8859-1</td></tr>
<tr><td>Code content</td><td>Content
Module serial number
Module material number
Production order number
Date code (production year)
Date code (production week)</td><td>Digit
1 – 5
6 - 11
12 - 19
20 – 21
22 – 23</td><td>Example
71549
142846
55054991
15
30</td></tr>
<tr><td>Example</td><td colspan="2">71549142846550549911530</td><td>71549142846550549911530</td></tr>
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Figure 3

Revision history

Document version	Date of release	Description of changes
0.10	2023-09-29	Initial version
1.00	2023-12-07	Final datasheet

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