Final datasheet
EconoPACK™3 module with TRENCHSTOP™ IGBT7 and CoolSiC™ Schottky diode and NTC

Features

- Electrical features
  - V_{CES} = 950 V
  - $I_{C\ nom}$ = 200 A / I_{CRM} = 200 A
  - Low switching losses
  - TRENCHSTOP™ IGBT7
  - Suitable Infineon gate drivers can be found under https://www.infineon.com/gdfinder
- Mechanical features
  - Compact design
  - Integrated NTC temperature sensor
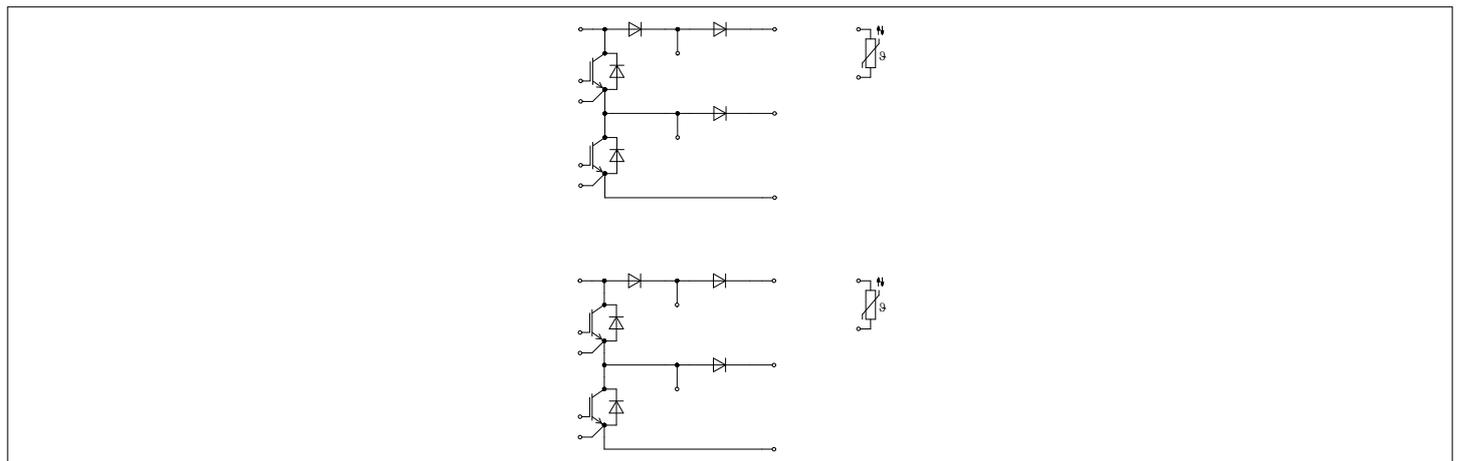 - High power density

Typical appearance

Potential applications

- Solar applications

Product validation

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

Description

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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	3.2	kV
Isolation test voltage NTC	$V_{ISOL(NTC)}$	RMS, f = 50 Hz, t = 1 min	3.2	kV
Material of module baseplate			Cu	
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}			40		nH
Module lead resistance, terminals - chip	$R_{AA'+CC'}$	T_C = 25 °C, per switch		2.3		mΩ
Module lead resistance, terminals - chip	$R_{CC'+EE'}$	T_C = 25 °C, per switch		2.2		mΩ
Storage temperature	T_{stg}		-40		125	°C
Mounting torque for module mounting	M	- Mounting according to valid application note	M5, Screw	3		6	Nm
Weight	G			300		g

Note: *The current under continuous operation is limited to 50 A rms per connector pin*

2 IGBT, T11 / T21

Table 3 **Maximum rated values**

Parameter	Symbol	Note or test condition		Values	Unit
Collector-emitter voltage	V_{CES}		T_{vj} = 25 °C	950	V
Implemented collector current	I_{CN}			200	A
Continuous DC collector current	I_{CDC}	$T_{vj\,max}$ = 175 °C	T_C = 115 °C	105	A
Repetitive peak collector current	I_{CRM}	t_p limited by $T_{vj\,op}$		200	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	$V_{CE\,sat}$	$I_C = 70$ A, $V_{GE} = 15$ V	$T_{vj} = 25$ °C		1.38	1.57	V
			$T_{vj} = 125$ °C		1.45		
			$T_{vj} = 150$ °C		1.46		
Gate threshold voltage	V_{GEth}	$I_C = 3.33$ mA, $V_{CE} = V_{GE}$, $T_{vj} = 25$ °C		4.35	5.10	5.85	V
Gate charge	Q_G	$V_{GE} = \pm15$ V, $V_{CC} = 600$ V, $T_{vj} = 25$ °C			0.46		µC
Internal gate resistor	R_{Gint}	$T_{vj} = 25$ °C			0.75		Ω
Input capacitance	C_{ies}	$f = 100$ kHz, $T_{vj} = 25$ °C, $V_{CE} = 25$ V, $V_{GE} = 0$ V			13		nF
Reverse transfer capacitance	C_{res}	$f = 100$ kHz, $T_{vj} = 25$ °C, $V_{CE} = 25$ V, $V_{GE} = 0$ V			0.04		nF
Collector-emitter cut-off current	I_{CES}	$V_{CE} = 950$ V, $V_{GE} = 0$ V	$T_{vj} = 25$ °C			0.025	mA
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}	$I_C = 70$ A, $V_{CC} = 500$ V, $V_{GE} = \pm15$ V, $R_{Gon} = 2.2$ Ω	$T_{vj} = 25$ °C		0.038		µs
			$T_{vj} = 125$ °C		0.039		
			$T_{vj} = 150$ °C		0.043		
Rise time (inductive load)	t_r	$I_C = 70$ A, $V_{CC} = 500$ V, $V_{GE} = \pm15$ V, $R_{Gon} = 2.2$ Ω	$T_{vj} = 25$ °C		0.007		µs
			$T_{vj} = 125$ °C		0.008		
			$T_{vj} = 150$ °C		0.008		
Turn-off delay time (inductive load)	t_{doff}	$I_C = 70$ A, $V_{CC} = 500$ V, $V_{GE} = \pm15$ V, $R_{Goff} = 3.9$ Ω	$T_{vj} = 25$ °C		0.168		µs
			$T_{vj} = 125$ °C		0.241		
			$T_{vj} = 150$ °C		0.256		
Fall time (inductive load)	t_f	$I_C = 70$ A, $V_{CC} = 500$ V, $V_{GE} = \pm15$ V, $R_{Goff} = 3.9$ Ω	$T_{vj} = 25$ °C		0.055		µs
			$T_{vj} = 125$ °C		0.085		
			$T_{vj} = 150$ °C		0.100		
Turn-on energy loss per pulse	E_{on}	$I_C = 70$ A, $V_{CC} = 500$ V, $L_\sigma = 35$ nH, $V_{GE} = \pm15$ V, $R_{Gon} = 2.2$ Ω, di/dt = 6450 A/µs ($T_{vj} = 150$ °C)	$T_{vj} = 25$ °C		0.03		mJ
			$T_{vj} = 125$ °C		0.32		
			$T_{vj} = 150$ °C		0.48		
Turn-off energy loss per pulse	E_{off}	$I_C = 70$ A, $V_{CC} = 500$ V, $L_\sigma = 35$ nH, $V_{GE} = \pm15$ V, $R_{Goff} = 3.9$ Ω, dv/dt = 3890 V/µs ($T_{vj} = 150$ °C)	$T_{vj} = 25$ °C		1.72		mJ
			$T_{vj} = 125$ °C		3.04		
			$T_{vj} = 150$ °C		3.47		
Thermal resistance, junction to case	R_{thJC}	per IGBT				0.281	K/W

(table continues…)

Infineon

Table 4 (continued) Characteristic values

Parameter	Symbol	Note or test condition	Values			Unit
			Min.	Typ.	Max.	
Thermal resistance, case to heat sink	R_{thCH}	per IGBT, λ_{grease} = 5 W/(m·K)		0.059		K/W
Temperature under switching conditions	$T_{vj\,op}$		-40		150	°C

3 IGBT, T12 / T22

Table 5 Maximum rated values

Parameter	Symbol	Note or test condition		Values	Unit
Collector-emitter voltage	V_{CES}		T_{vj} = 25 °C	950	V
Implemented collector current	I_{CN}			200	A
Continuous DC collector current	I_{CDC}	$T_{vj\,max}$ = 175 °C	T_C = 115 °C	105	A
Repetitive peak collector current	I_{CRM}	t_p limited by $T_{vj\,op}$		200	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	$V_{CE\,sat}$	I_C = 70 A, V_{GE} = 15 V	T_{vj} = 25 °C		1.38	1.57	V
			T_{vj} = 125 °C		1.45		
			T_{vj} = 150 °C		1.46		
Gate threshold voltage	V_{GEth}	I_C = 3.33 mA, $V_{CE} = V_{GE}$, T_{vj} = 25 °C		4.35	5.10	5.85	V
Gate charge	Q_G	V_{GE} = ±15 V, V_{CC} = 600 V, T_{vj} = 25 °C			0.46		µC
Internal gate resistor	R_{Gint}	T_{vj} = 25 °C			0.75		Ω
Input capacitance	C_{ies}	f = 100 kHz, T_{vj} = 25 °C, V_{CE} = 25 V, V_{GE} = 0 V			13		nF
Reverse transfer capacitance	C_{res}	f = 100 kHz, T_{vj} = 25 °C, V_{CE} = 25 V, V_{GE} = 0 V			0.04		nF
Collector-emitter cut-off current	I_{CES}	V_{CE} = 950 V, V_{GE} = 0 V	T_{vj} = 25 °C			0.025	mA
Gate-emitter leakage current	I_{GES}	V_{CE} = 0 V, V_{GE} = 20 V, T_{vj} = 25 °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 = 70 A, V_{CC} = 500 V, V_{GE} = ±15 V, R_{Gon} = 2.2 Ω	T_{vj} = 25 °C		0.038		µs
			T_{vj} = 125 °C		0.039		
			T_{vj} = 150 °C		0.043		
Rise time (inductive load)	t_r	I_C = 70 A, V_{CC} = 500 V, V_{GE} = ±15 V, R_{Gon} = 2.2 Ω	T_{vj} = 25 °C		0.007		µs
			T_{vj} = 125 °C		0.008		
			T_{vj} = 150 °C		0.008		
Turn-off delay time (inductive load)	t_{doff}	I_C = 70 A, V_{CC} = 500 V, V_{GE} = ±15 V, R_{Goff} = 3.9 Ω	T_{vj} = 25 °C		0.168		µs
			T_{vj} = 125 °C		0.241		
			T_{vj} = 150 °C		0.256		
Fall time (inductive load)	t_f	I_C = 70 A, V_{CC} = 500 V, V_{GE} = ±15 V, R_{Goff} = 3.9 Ω	T_{vj} = 25 °C		0.055		µs
			T_{vj} = 125 °C		0.085		
			T_{vj} = 150 °C		0.100		
Turn-on energy loss per pulse	E_{on}	I_C = 70 A, V_{CC} = 500 V, L_σ = 35 nH, V_{GE} = ±15 V, R_{Gon} = 2.2 Ω, di/dt = 6450 A/µs (T_{vj} = 150 °C)	T_{vj} = 25 °C		0.03		mJ
			T_{vj} = 125 °C		0.32		
			T_{vj} = 150 °C		0.48		
Turn-off energy loss per pulse	E_{off}	I_C = 70 A, V_{CC} = 500 V, L_σ = 35 nH, V_{GE} = ±15 V, R_{Goff} = 3.9 Ω, dv/dt = 3890 V/µs (T_{vj} = 150 °C)	T_{vj} = 25 °C		1.72		mJ
			T_{vj} = 125 °C		3.04		
			T_{vj} = 150 °C		3.47		
Thermal resistance, junction to case	R_{thJC}	per IGBT				0.281	K/W
Thermal resistance, case to heat sink	R_{thCH}	per IGBT, λ_{grease} = 5 W/(m·K)			0.059		K/W
Temperature under switching conditions	$T_{vj\,op}$			-40		150	°C

4   Diode, D11 / D21

Table 7   Maximum rated values

Parameter	Symbol	Note or test condition		Values	Unit
Repetitive peak reverse voltage	V_{RRM}		T_{vj} = 25 °C	1200	V
Implemented forward current	I_{FN}			100	A
Continuous DC forward current	I_F			70	A

(table continues...)

Table 7 **(continued) Maximum rated values**

Parameter	Symbol	Note or test condition		Values	Unit
Repetitive peak forward current	I_{FRM}	t_P = 1 ms		200	A
I²t - value	I^2t	t_P = 10 ms, V_R = 0 V	T_{vj} = 125 °C	1430	A²s
			T_{vj} = 175 °C	1170	

Table 8 **Characteristic values**

Parameter	Symbol	Note or test condition		Values			Unit
				Min.	Typ.	Max.	
Forward voltage	V_F	I_F = 70 A, V_{GE} = 0 V	T_{vj} = 25 °C		1.53	1.80	V
			T_{vj} = 125 °C		1.41		
			T_{vj} = 175 °C		1.33		
Thermal resistance, junction to case	R_{thJC}	per diode				0.655	K/W
Thermal resistance, case to heat sink	R_{thCH}	per diode, λ_{grease} = 5 W/(m·K)			0.083		K/W
Temperature under switching conditions	$T_{vj\,op}$			-40		175	°C

Note: $T_{vj\,op}$ > 150℃ is allowed for operation at overload conditions. For detailed specifications, please refer to AN 2018-14.

5   Diode, D12 / D22

Table 9 **Maximum rated values**

Parameter	Symbol	Note or test condition		Values	Unit
Repetitive peak reverse voltage	V_{RRM}		T_{vj} = 25 °C	1200	V
Implemented forward current	I_{FN}			100	A
Continuous DC forward current	I_F			70	A
Repetitive peak forward current	I_{FRM}	t_P = 1 ms		200	A
I²t - value	I^2t	t_P = 10 ms, V_R = 0 V	T_{vj} = 125 °C	1430	A²s
			T_{vj} = 175 °C	1170	

Table 10 **Characteristic values**

Parameter	Symbol	Note or test condition		Min.	Typ.	Max.	Unit
Forward voltage	V_F	I_F = 70 A, V_{GE} = 0 V	T_{vj} = 25 °C		1.53	1.80	V
			T_{vj} = 125 °C		1.41		
			T_{vj} = 175 °C		1.33		
Thermal resistance, junction to case	R_{thJC}	per diode				0.655	K/W
Thermal resistance, case to heat sink	R_{thCH}	per diode, λ_{grease} = 5 W/(m·K)			0.083		K/W
Temperature under switching conditions	$T_{vj\,op}$			-40		175	°C

Note: $T_{vj\,op}$ > 150°C is allowed for operation at overload conditions. For detailed specifications, please refer to AN 2018-14.

6 Diode, D13 / D23

Table 11 **Maximum rated values**

Parameter	Symbol	Note or test condition		Values	Unit
Repetitive peak reverse voltage	V_{RRM}		T_{vj} = 25 °C	1200	V
Implemented forward current	I_{FN}			100	A
Continuous DC forward current	I_F			70	A
Repetitive peak forward current	I_{FRM}	t_P = 1 ms		200	A
I^2t - value	I^2t	t_P = 10 ms, V_R = 0 V	T_{vj} = 125 °C	1820	A^2s
			T_{vj} = 150 °C	939	

Table 12 **Characteristic values**

Parameter	Symbol	Note or test condition		Min.	Typ.	Max.	Unit
Forward voltage	V_F	I_F = 70 A, V_{GE} = 0 V	T_{vj} = 25 °C		1.32	1.54	V
			T_{vj} = 125 °C		1.48		
			T_{vj} = 150 °C		1.56		

(table continues...)

Table 12   (continued) Characteristic values

Parameter	Symbol	Note or test condition		Values			Unit
				Min.	Typ.	Max.	
Peak reverse recovery current	I_{RM}	V_{CC} = 500 V, I_F = 70 A, V_{GE} = ±15 V, -di$_F$/dt = 6450 A/μs (T_{vj} = 150 °C)	T_{vj} = 25 °C		52.1		A
			T_{vj} = 125 °C		52.1		
			T_{vj} = 150 °C		52.1		
Recovered charge	Q_r	V_{CC} = 500 V, I_F = 70 A, V_{GE} = ±15 V, -di$_F$/dt = 6450 A/μs (T_{vj} = 150 °C)	T_{vj} = 25 °C		0.8		μC
			T_{vj} = 125 °C		0.8		
			T_{vj} = 150 °C		0.8		
Reverse recovery energy	E_{rec}	V_{CC} = 500 V, I_F = 70 A, V_{GE} = ±15 V, -di$_F$/dt = 6450 A/μs (T_{vj} = 150 °C)	T_{vj} = 25 °C		0.14		mJ
			T_{vj} = 125 °C		0.14		
			T_{vj} = 150 °C		0.14		
Thermal resistance, junction to case	R_{thJC}	per diode				0.288	K/W
Thermal resistance, case to heat sink	R_{thCH}	per diode, λ_{grease} = 5 W/(m·K)			0.105		K/W
Temperature under switching conditions	$T_{vj\,op}$			-40		150	°C

7   Diode, D14 / D24

Table 13   Maximum rated values

Parameter	Symbol	Note or test condition		Values	Unit
Repetitive peak reverse voltage	V_{RRM}		T_{vj} = 25 °C	1200	V
Implemented forward current	I_{FN}			100	A
Continuous DC forward current	I_F			70	A
Repetitive peak forward current	I_{FRM}	t_P = 1 ms		200	A
I²t - value	I^2t	t_P = 10 ms, V_R = 0 V	T_{vj} = 125 °C	1820	A²s
			T_{vj} = 150 °C	939	

Table 14   **Characteristic values**

Parameter	Symbol	Note or test condition		Min.	Typ.	Max.	Unit
				Values			
				Min.	Typ.	Max.	
Forward voltage	V_F	$I_F = 70$ A, $V_{GE} = 0$ V	$T_{vj} = 25$ °C		1.32	1.54	V
			$T_{vj} = 125$ °C		1.48		
			$T_{vj} = 150$ °C		1.56		
Peak reverse recovery current	I_{RM}	$V_{CC} = 500$ V, $I_F = 70$ A, $V_{GE} = \pm15$ V, $-di_F/dt = 6450$ A/µs ($T_{vj} = 150$ °C)	$T_{vj} = 25$ °C		52.1		A
			$T_{vj} = 125$ °C		52.1		
			$T_{vj} = 150$ °C		52.1		
Recovered charge	Q_r	$V_{CC} = 500$ V, $I_F = 70$ A, $V_{GE} = \pm15$ V, $-di_F/dt = 6450$ A/µs ($T_{vj} = 150$ °C)	$T_{vj} = 25$ °C		0.8		µC
			$T_{vj} = 125$ °C		0.8		
			$T_{vj} = 150$ °C		0.8		
Reverse recovery energy	E_{rec}	$V_{CC} = 500$ V, $I_F = 70$ A, $V_{GE} = \pm15$ V, $-di_F/dt = 6450$ A/µs ($T_{vj} = 150$ °C)	$T_{vj} = 25$ °C		0.14		mJ
			$T_{vj} = 125$ °C		0.14		
			$T_{vj} = 150$ °C		0.14		
Thermal resistance, junction to case	R_{thJC}	per diode				0.288	K/W
Thermal resistance, case to heat sink	R_{thCH}	per diode, $\lambda_{grease} = 5$ W/(m·K)			0.105		K/W
Temperature under switching conditions	$T_{vj\ op}$			-40		150	°C

8   Diode, D15 / D25

Table 15   **Maximum rated values**

Parameter	Symbol	Note or test condition		Values	Unit
Repetitive peak reverse voltage	V_{RRM}		$T_{vj} = 25$ °C	1200	V
Implemented forward current	I_{FN}			100	A
Continuous DC forward current	I_F			70	A
Repetitive peak forward current	I_{FRM}	$t_P = 1$ ms		200	A
I^2t - value	I^2t	$t_P = 10$ ms, $V_R = 0$ V	$T_{vj} = 125$ °C	954	A^2s
			$T_{vj} = 175$ °C	873	

Table 16   **Characteristic values**

Parameter	Symbol	Note or test condition		Values			Unit
				Min.	Typ.	Max.	
Forward voltage	V_F	$I_F = 70$ A, $V_{GE} = 0$ V	$T_{vj} = 25$ °C		1.53	1.80	V
			$T_{vj} = 125$ °C		1.41		
			$T_{vj} = 175$ °C		1.33		
Thermal resistance, junction to case	R_{thJC}	per diode				0.655	K/W
Thermal resistance, case to heat sink	R_{thCH}	per diode, $\lambda_{grease} = 5$ W/(m·K)			0.083		K/W
Temperature under switching conditions	$T_{vj\,op}$			-40		175	°C

Note: $T_{vj\,op} > 150°C$ is allowed for operation at overload conditions. For detailed specifications, please refer to AN 2018-14.

9   NTC-Thermistor

Table 17   **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	$B_{25/50}$	$R_2 = R_{25} \exp[B_{25/50}(1/T_2 - 1/(298,15\text{ K}))]$		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: For an analytical description of the NTC characteristics please refer to AN2009-10, chapter 4.

10 Characteristics diagrams

Output characteristic (typical), IGBT, T11 / T21
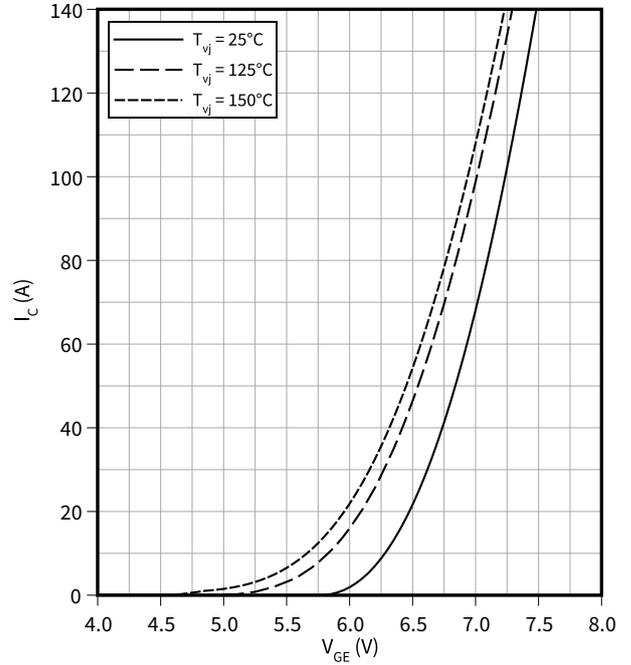$I_C = f(V_{CE})$
$V_{GE} = 15\ V$
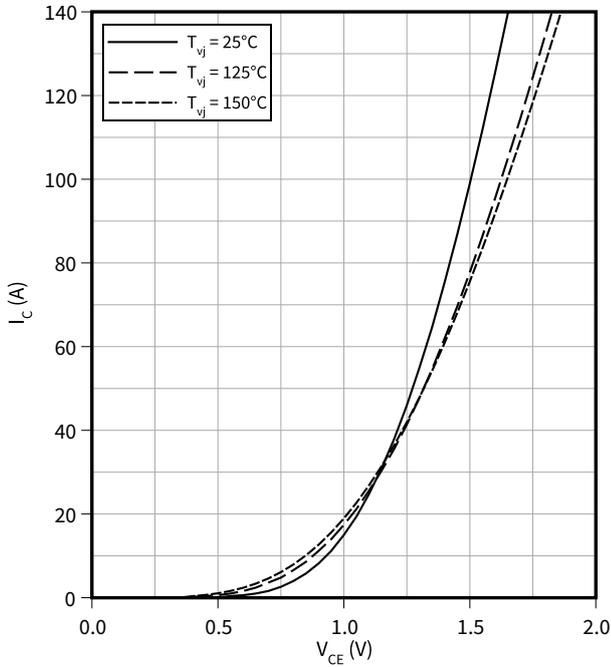
Output characteristic field (typical), IGBT, T11 / T21
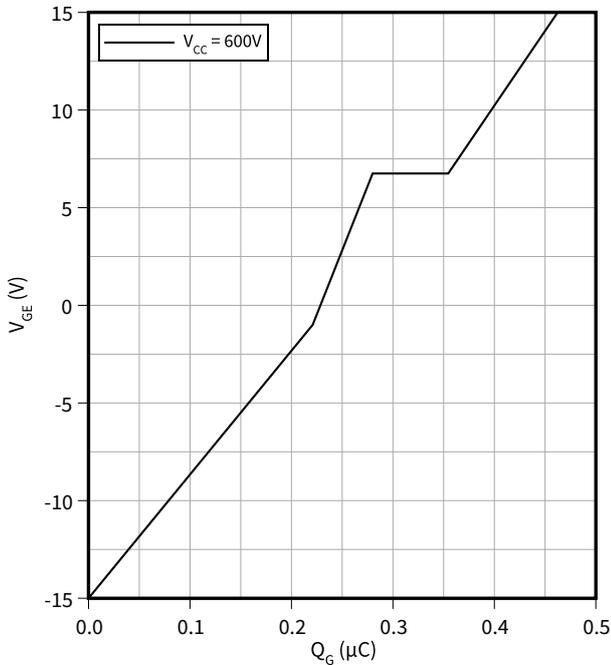$I_C = f(V_{CE})$
$T_{vj} = 150\ °C$
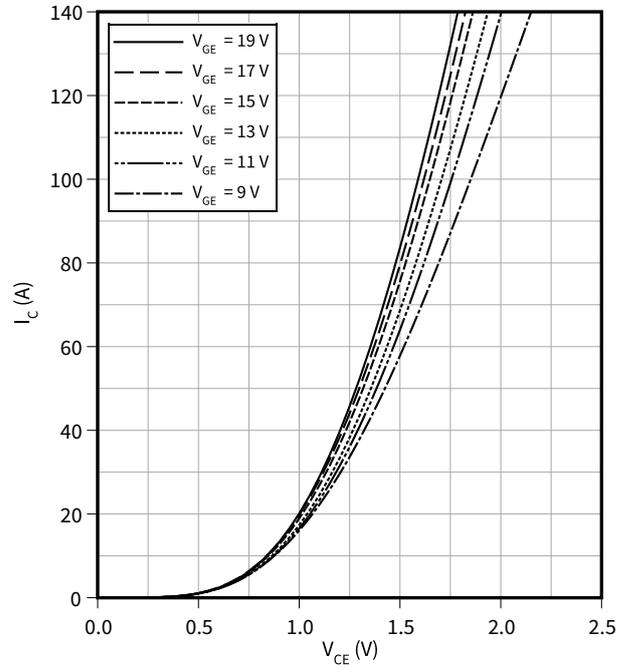
### Transfer characteristic (typical), IGBT, T11 / T21
$I_C = f(V_{GE})$
$V_{CE} = 20\ V$
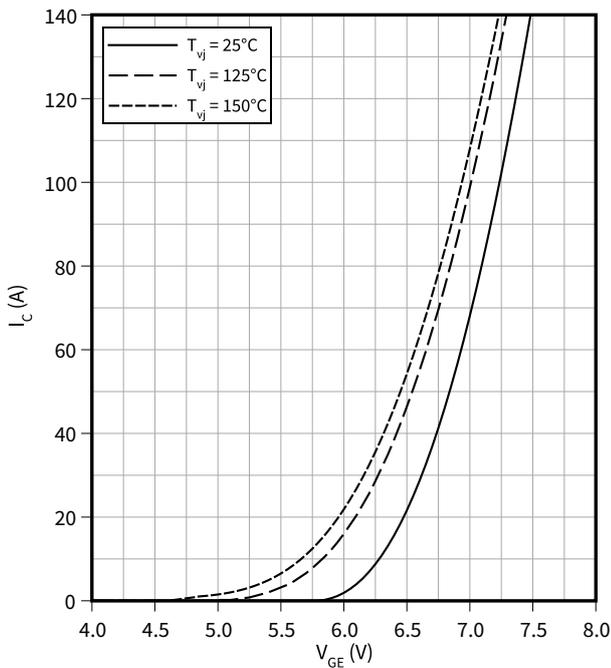
Gate charge characteristic (typical), IGBT, T11 / T21
$V_{GE} = f(Q_G)$
$I_C = 200\ A,\ T_{vj} = 25\ °C$
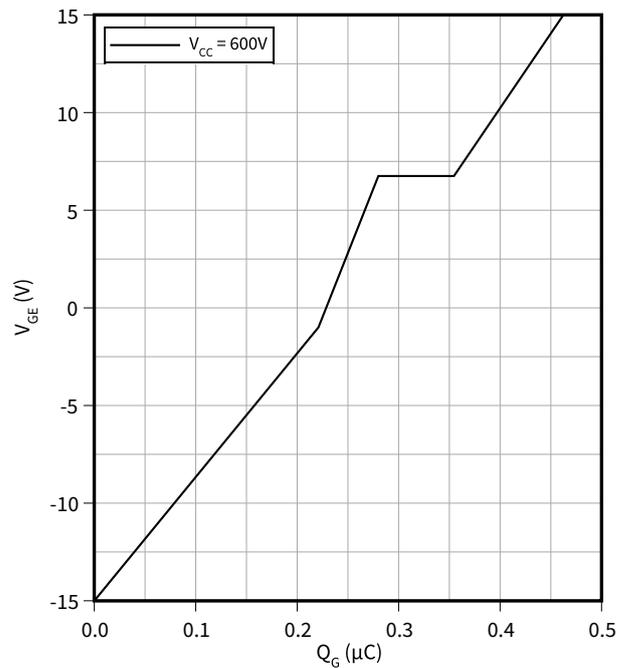
Capacity characteristic (typical), IGBT, T11 / T21

$C = f(V_{CE})$

$f = 100$ kHz, $V_{GE} = 0$ V, $T_{vj} = 25$ °C
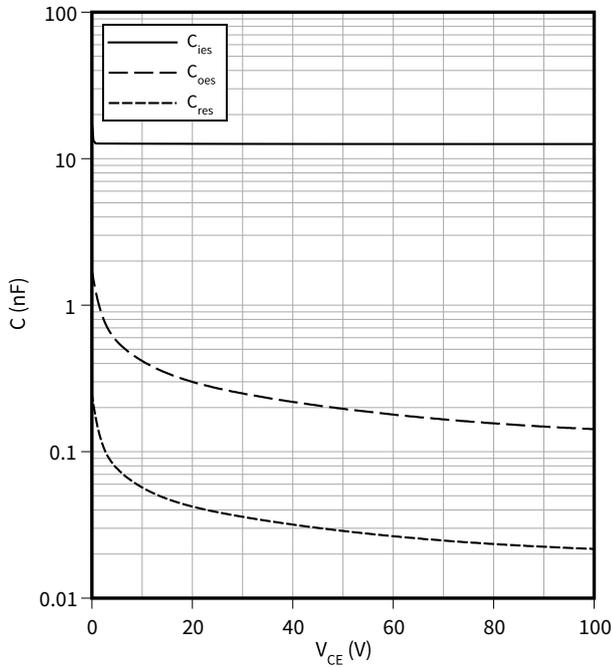
Switching times (typical), IGBT, T11 / T21

$t = f(I_C)$

$R_{Goff} = 3.9$ Ω, $R_{Gon} = 2.2$ Ω, $V_{GE} = \pm 15$ V, $V_{CC} = 500$ V, $T_{vj} = 150$ °C

Switching times (typical), IGBT, T11 / T21

$t = f(R_G)$

$V_{GE} = \pm 15$ V, $I_C = 70$ A, $V_{CC} = 500$ V, $T_{vj} = 150$ °C
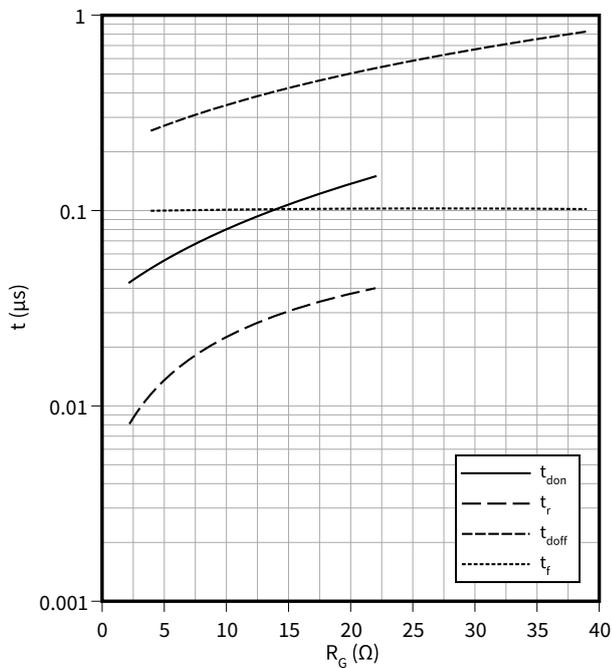
Switching losses (typical), IGBT, T11 / T21

$E = f(I_C)$

$V_{CC} = 500$ V, $R_{Goff} = 3.9$ Ω, $R_{Gon} = 2.2$ Ω, $V_{GE} = \pm 15$ V

Switching losses (typical), IGBT, T11 / T21

$E = f(R_G)$

$V_{GE} = \pm15$ V, $I_C = 70$ A, $V_{CC} = 500$ V

Legend:
- E_{on}, $T_{vj} = 125°C$
- E_{off}, $T_{vj} = 125°C$
- E_{on}, $T_{vj} = 150°C$
- E_{off}, $T_{vj} = 150°C$
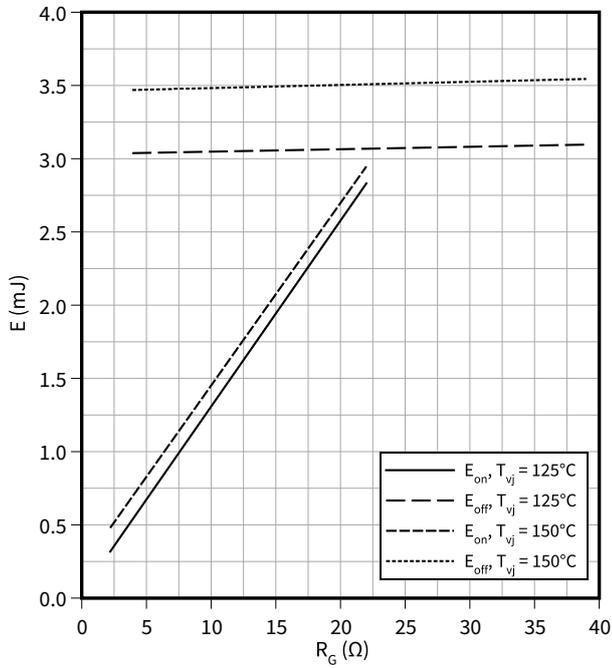
Reverse bias safe operating area (RBSOA), IGBT, T11 / T21

$I_C = f(V_{CE})$

$R_{Goff} = 3.9$ Ω, $V_{GE} = \pm15$ V, $T_{vj} = 150$ °C

Legend:
- I_C, Modul
- I_C, Chip

Transient thermal impedance, IGBT, T11 / T21

$Z_{th} = f(t)$

i	1	2	3	4
r_i[K/W]	0.0324	0.0196	0.103	0.126
τ_i[s]	2.82E-4	0.0032	0.031	0.165
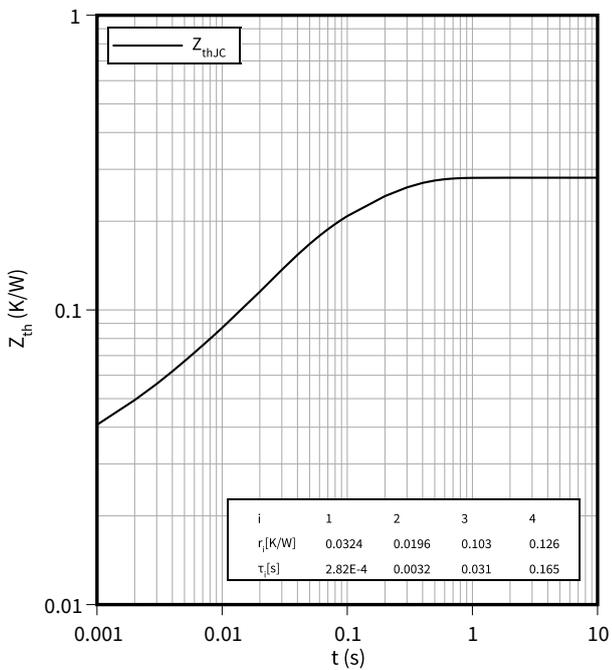
Output characteristic (typical), IGBT, T12 / T22

$I_C = f(V_{CE})$

$V_{GE} = 15$ V

Legend:
- $T_{vj} = 25°C$
- $T_{vj} = 125°C$
- $T_{vj} = 150°C$
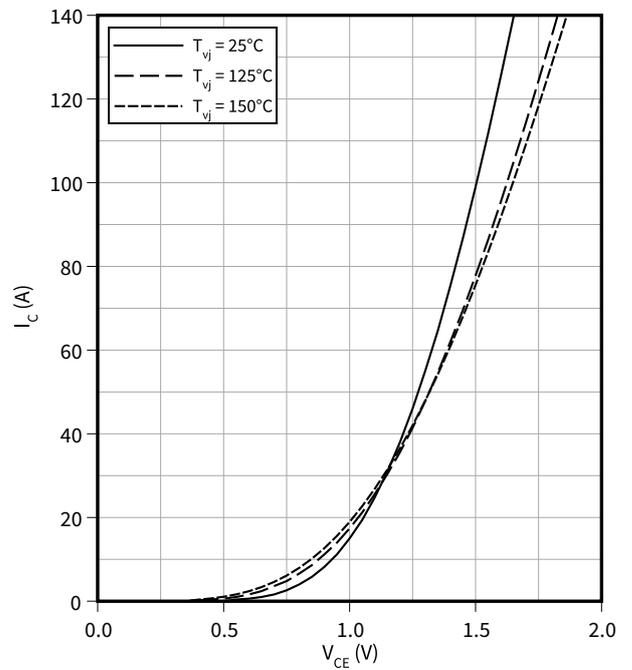
Output characteristic field (typical), IGBT, T12 / T22

$I_C = f(V_{CE})$

$T_{vj} = 150\ °C$
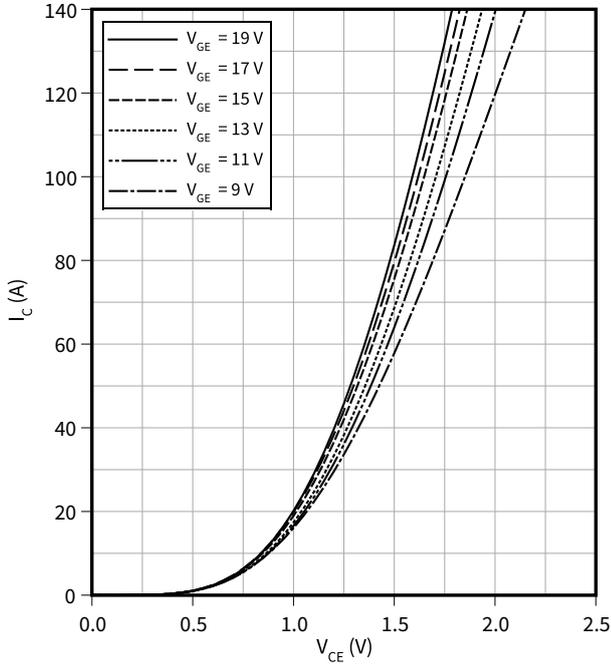
Transfer characteristic (typical), IGBT, T12 / T22

$I_C = f(V_{GE})$

$V_{CE} = 20\ V$

Gate charge characteristic (typical), IGBT, T12 / T22

$V_{GE} = f(Q_G)$

$I_C = 200\ A,\ T_{vj} = 25\ °C$

Capacity characteristic (typical), IGBT, T12 / T22

$C = f(V_{CE})$

$f = 100\ kHz,\ V_{GE} = 0\ V,\ T_{vj} = 25\ °C$
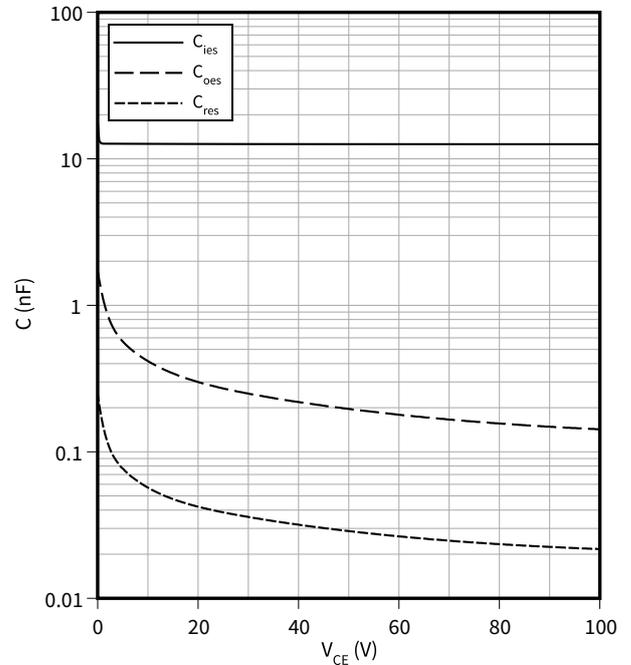
Switching times (typical), IGBT, T12 / T22

$t = f(I_C)$

$R_{Goff} = 3.9\ \Omega$, $R_{Gon} = 2.2\ \Omega$, $V_{GE} = \pm15\ V$, $V_{CC} = 500\ V$, $T_{vj} = 150\ °C$
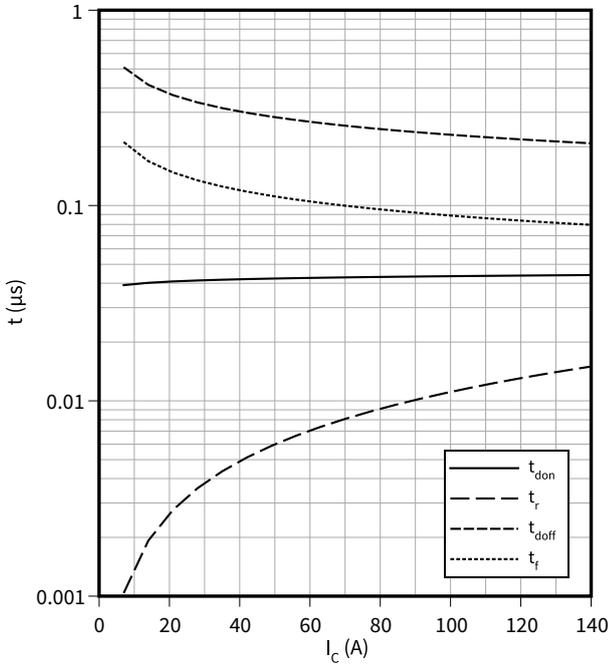
Switching times (typical), IGBT, T12 / T22

$t = f(R_G)$

$V_{GE} = \pm15\ V$, $I_C = 70\ A$, $V_{CC} = 500\ V$, $T_{vj} = 150\ °C$
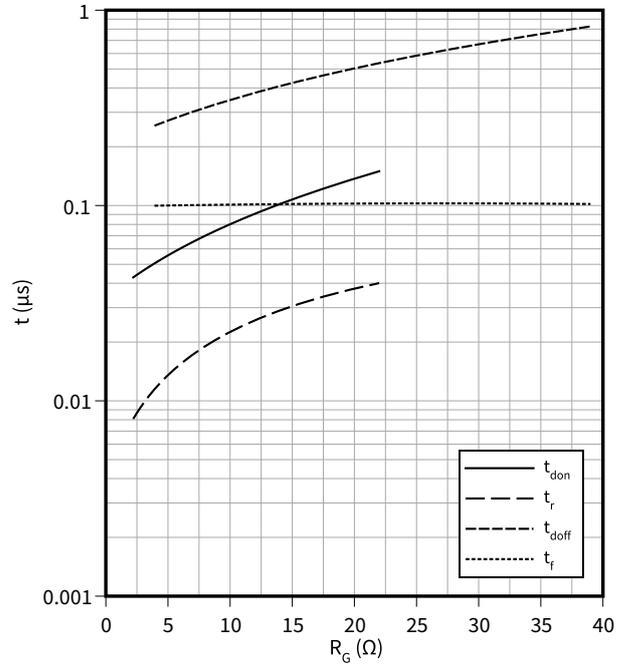
Switching losses (typical), IGBT, T12 / T22

$E = f(I_C)$

$V_{CC} = 500\ V$, $R_{Goff} = 3.9\ \Omega$, $R_{Gon} = 2.2\ \Omega$, $V_{GE} = \pm15\ V$
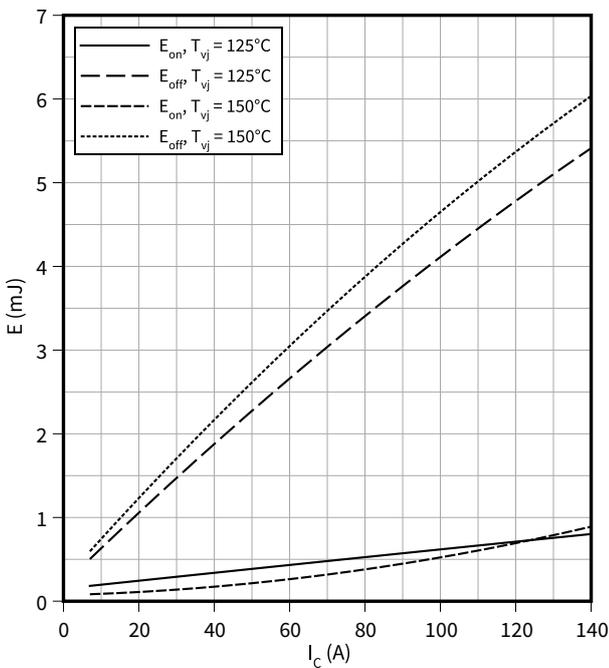
Switching losses (typical), IGBT, T12 / T22

$E = f(R_G)$

$V_{GE} = \pm15\ V$, $I_C = 70\ A$, $V_{CC} = 500\ V$

Reverse bias safe operating area (RBSOA), IGBT, T12 / T22

$I_C = f(V_{CE})$

$R_{Goff} = 3.9\ \Omega$, $V_{GE} = \pm15$ V, $T_{vj} = 150\ °C$
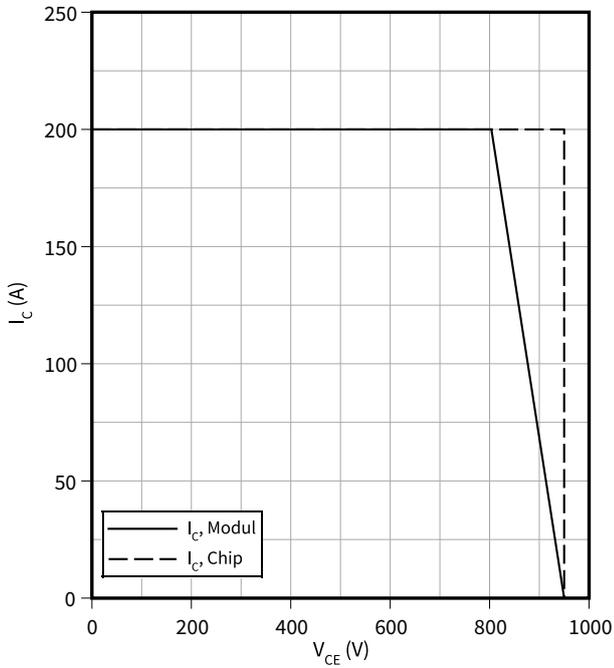
Transient thermal impedance, IGBT, T12 / T22

$Z_{th} = f(t)$

i	1	2	3	4
r_i[K/W]	0.0324	0.0196	0.103	0.126
τ_i[s]	2.82E-4	0.0032	0.031	0.165
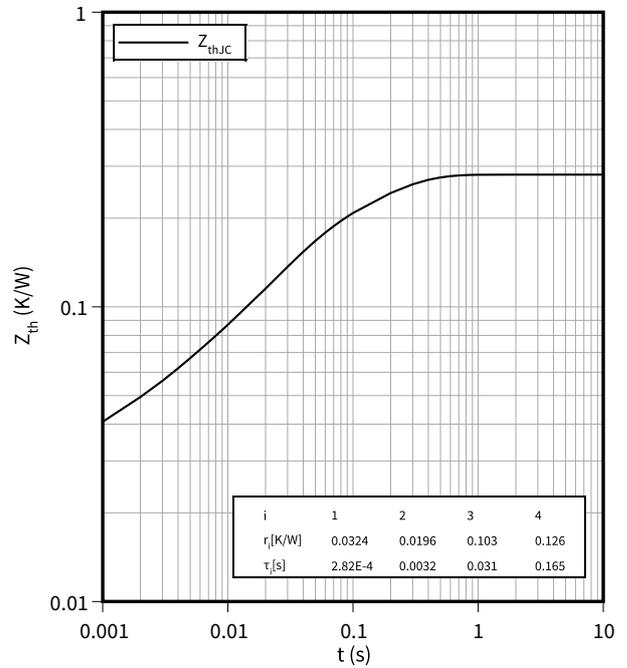
Forward characteristic (typical), Diode, D11 / D21

$I_F = f(V_F)$
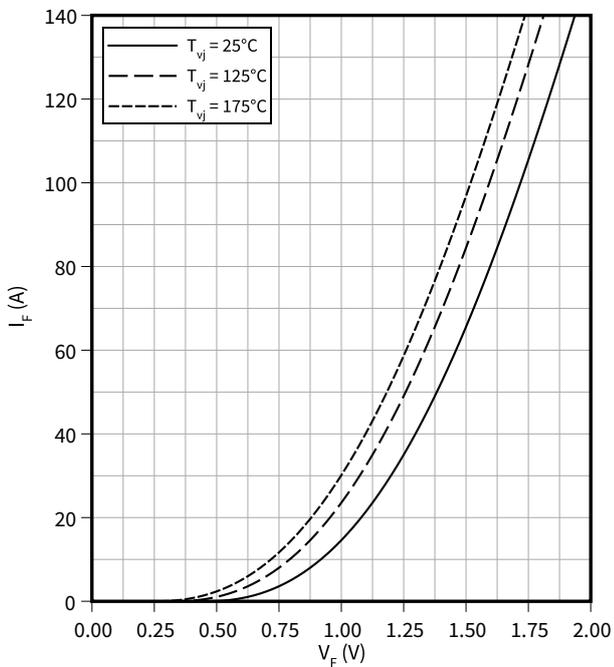
Transient thermal impedance, Diode, D11 / D21

$Z_{th} = f(t)$

i	1	2	3	4
r_i[K/W]	0.0725	0.0615	0.302	0.219
τ_i[s]	3.12E-4	0.00416	0.0298	0.137
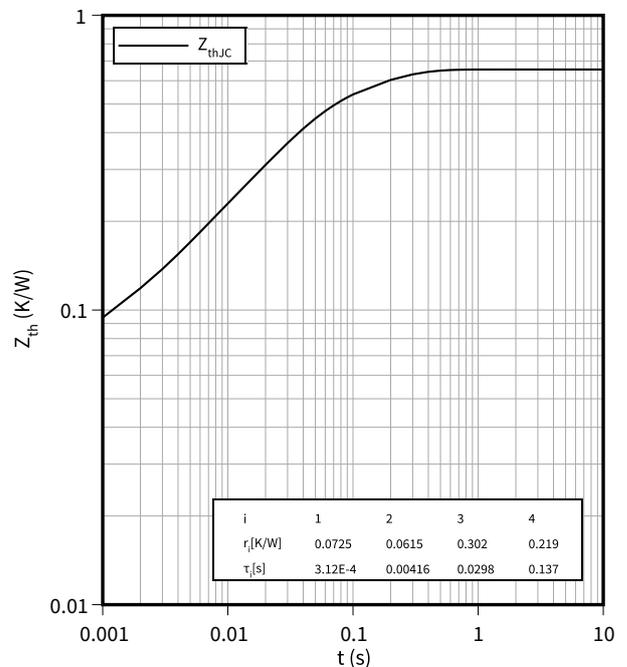
Forward characteristic (typical), Diode, D12 / D22
$I_F = f(V_F)$
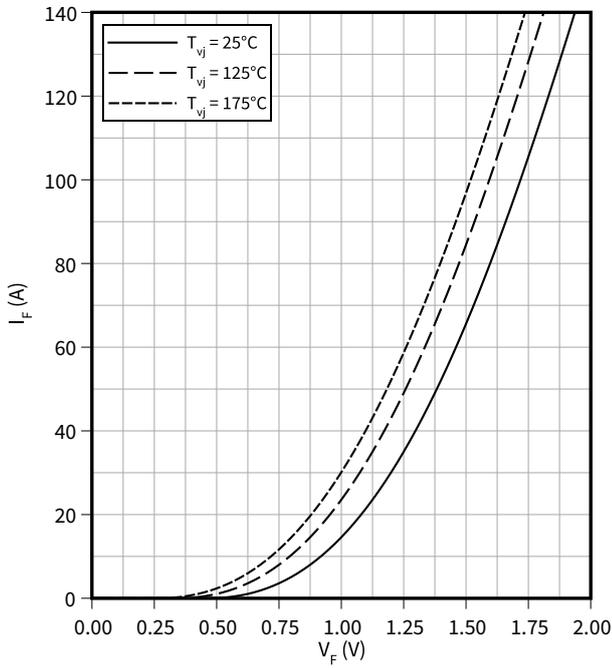
Transient thermal impedance, Diode, D12 / D22
$Z_{th} = f(t)$

i	1	2	3	4
r_i[K/W]	0.0725	0.0615	0.302	0.219
τ_i[s]	3.12E-4	0.00416	0.0298	0.137
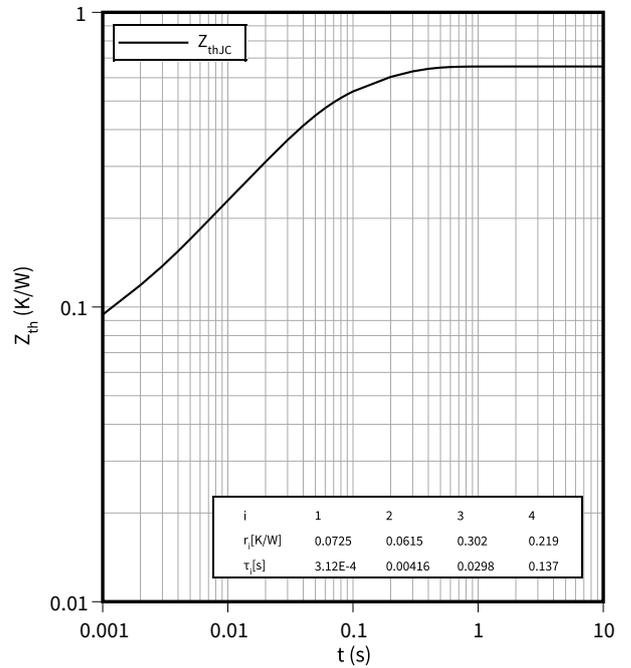
Forward characteristic (typical), Diode, D13 / D23
$I_F = f(V_F)$
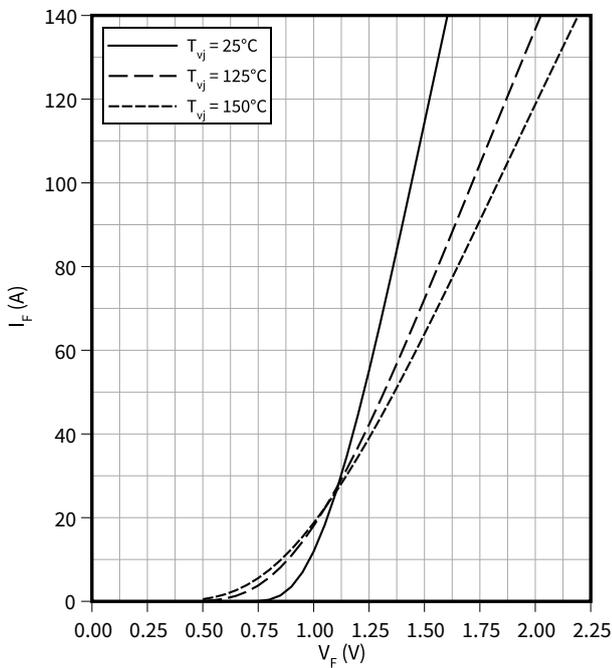
Switching losses (typical), Diode, D13 / D23
$E_{rec} = f(I_F)$
$R_{Gon} = 2.2\ \Omega,\ V_{CE} = 500\ V$
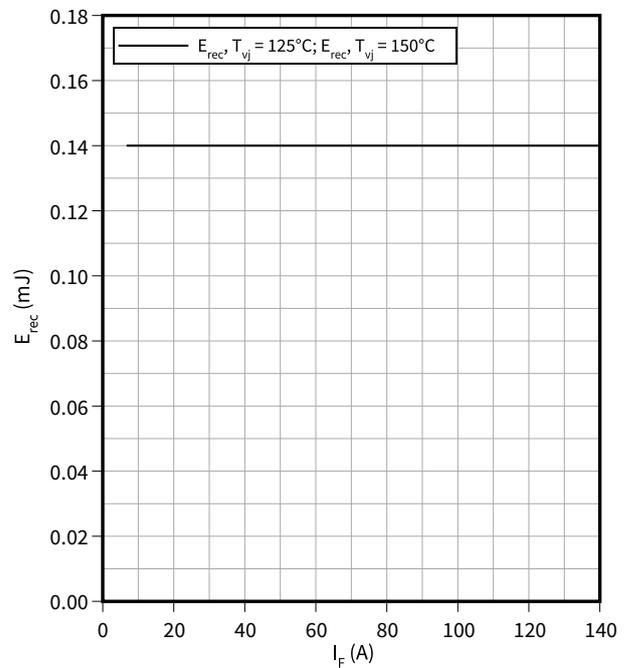
Switching losses (typical), Diode, D13 / D23

$E_{rec} = f(R_G)$

$V_{CE} = 500\ V,\ I_F = 70\ A$
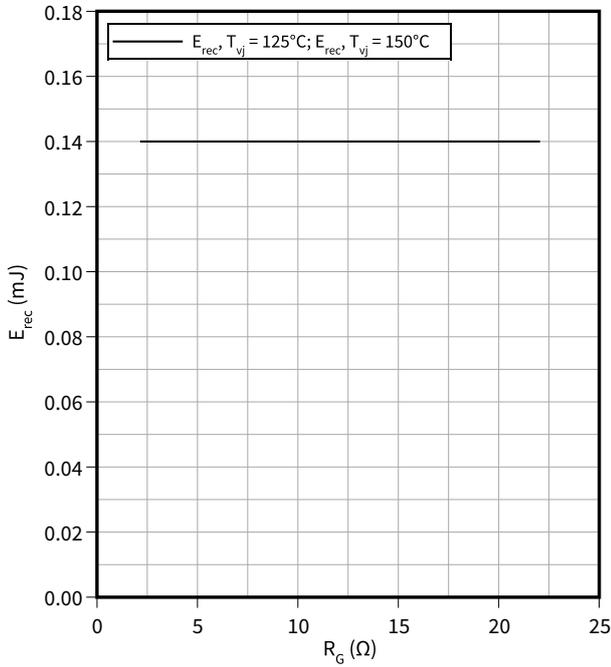
Transient thermal impedance, Diode, D13 / D23

$Z_{th} = f(t)$

i	1	2	3	4
r_i[K/W]	0.0281	0.0369	0.137	0.086
τ_i[s]	4.37E-4	0.00412	0.034	0.171
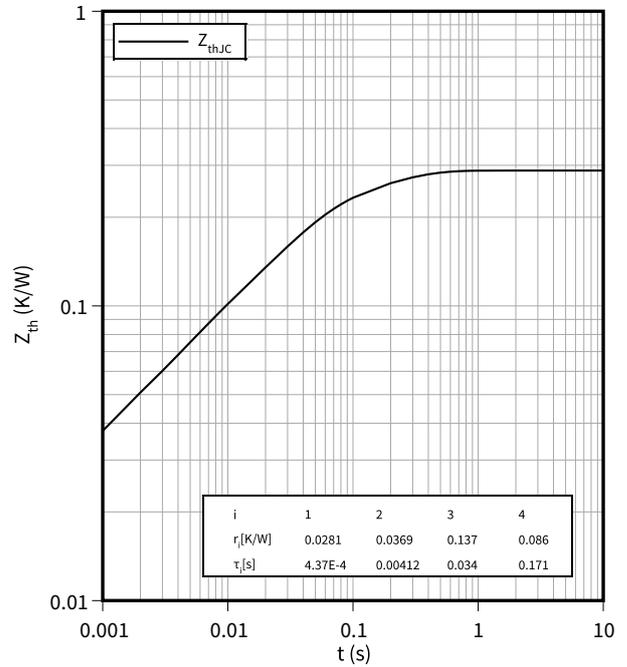
Forward characteristic (typical), Diode, D14 / D24

$I_F = f(V_F)$
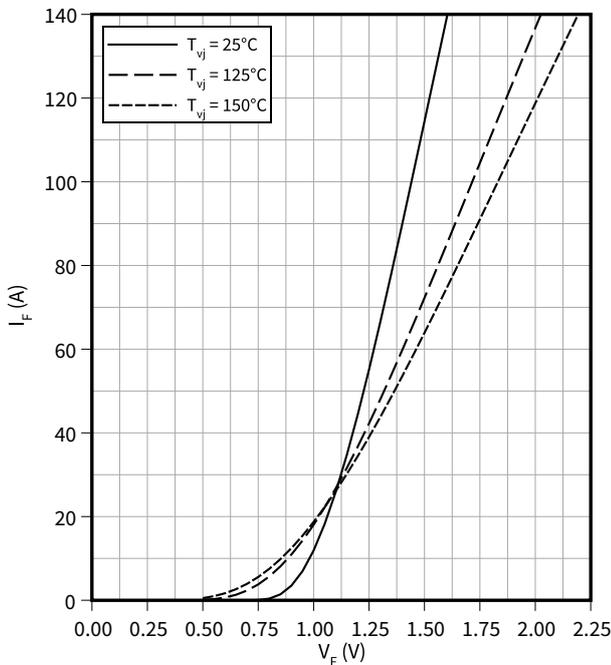
Switching losses (typical), Diode, D14 / D24

$E_{rec} = f(I_F)$

$R_{Gon} = 2.2\ \Omega,\ V_{CE} = 500\ V$
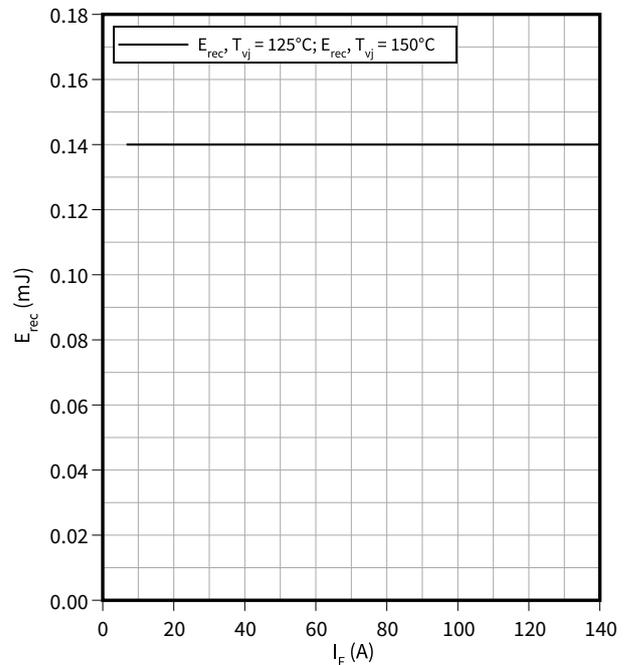
Switching losses (typical), Diode, D14 / D24

$E_{rec} = f(R_G)$

$V_{CE} = 500\ V,\ I_F = 70\ A$
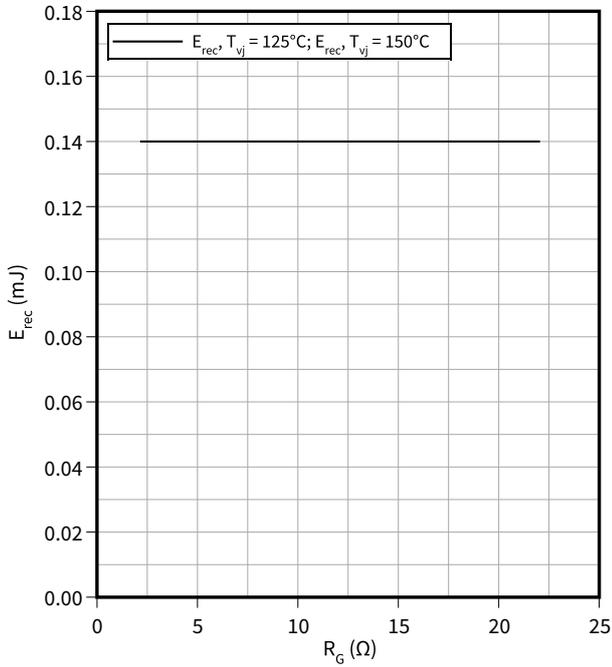
Transient thermal impedance, Diode, D14 / D24

$Z_{th} = f(t)$

i	1	2	3	4
r_i[K/W]	0.0281	0.0369	0.137	0.086
τ_i[s]	4.37E-4	0.00412	0.034	0.171
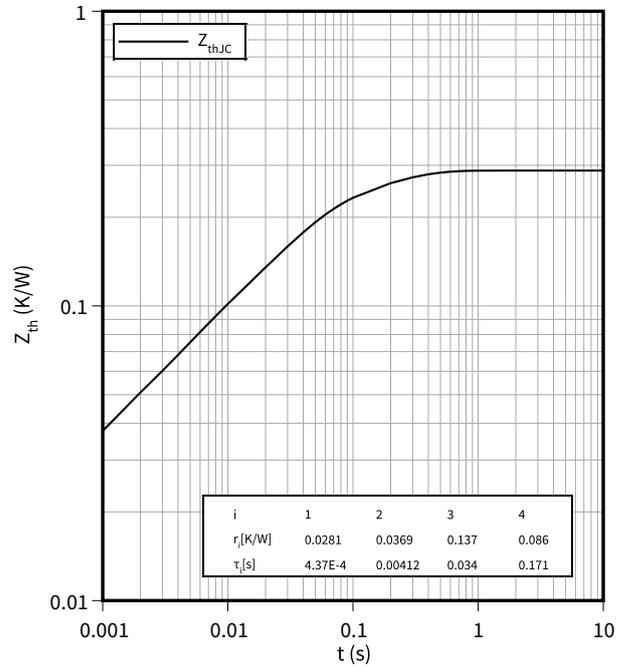
Forward characteristic (typical), Diode, D15 / D25

$I_F = f(V_F)$
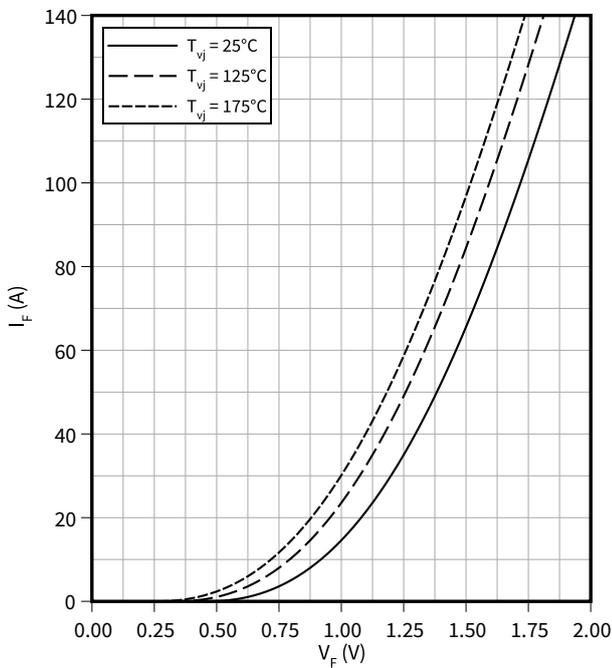
Transient thermal impedance, Diode, D15 / D25

$Z_{th} = f(t)$

i	1	2	3	4
r_i[K/W]	0.0725	0.0615	0.302	0.219
τ_i[s]	3.96E-4	0.00649	0.0409	0.203
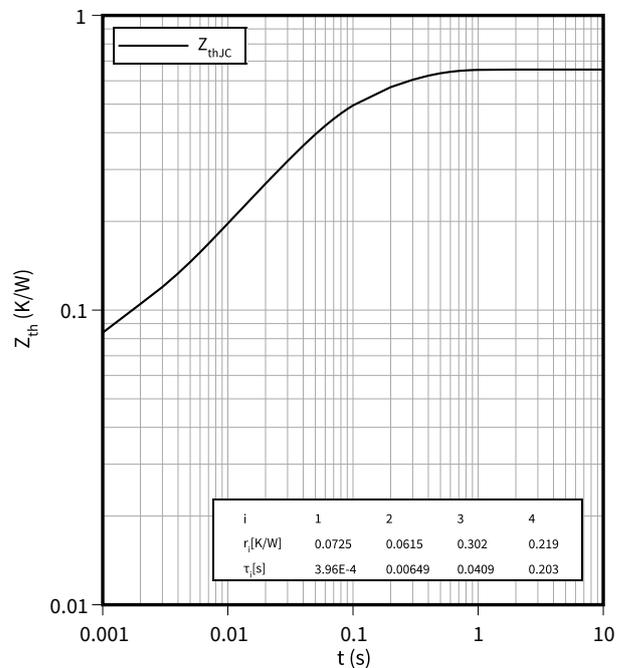
Temperature characteristic (typical), NTC-Thermistor
$R = f(T_{NTC})$
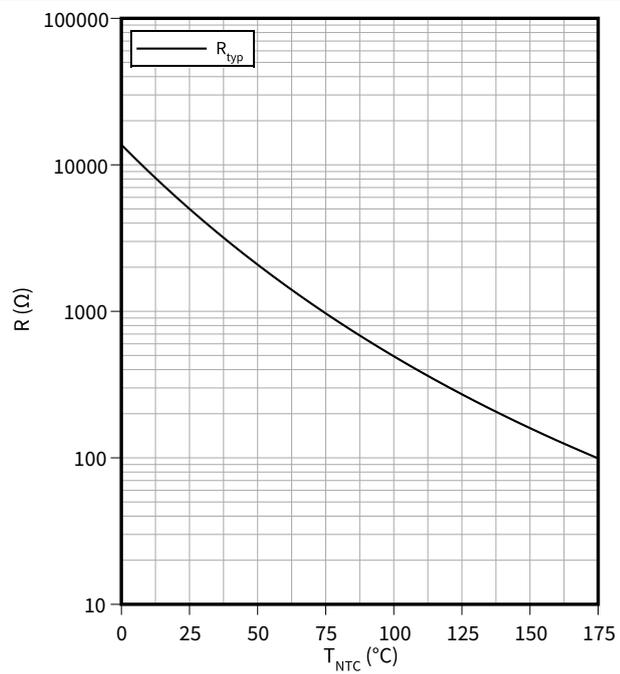
11 Circuit diagram

Figure 1

12 Package outlines
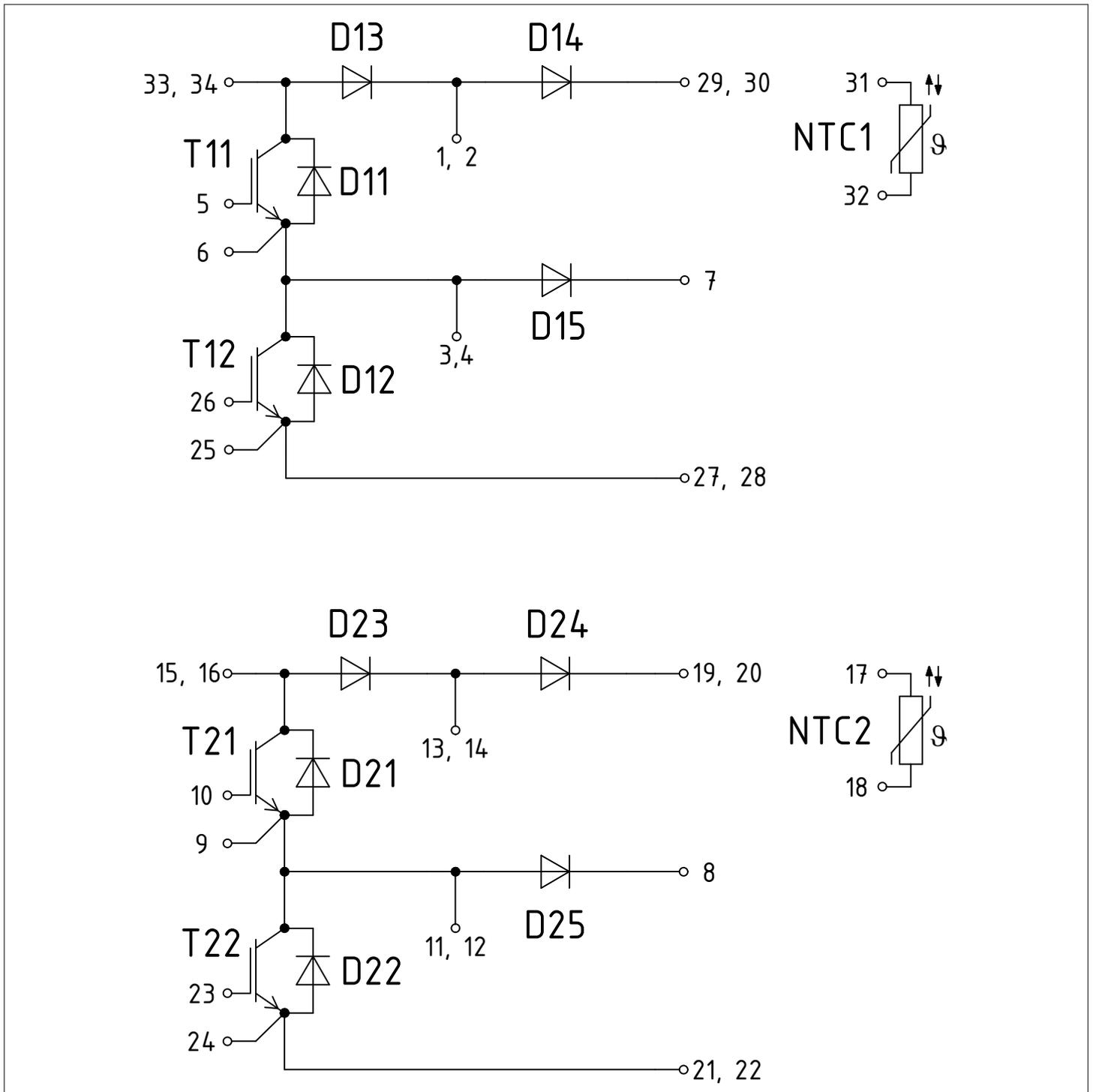
Figure 2

13   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	*Content* Module serial number Module material number Production order number Date code (production year) Date code (production week)	*Digit* 1 – 5 6 - 11 12 - 19 20 – 21 22 – 23	*Example* 71549 142846 55054991 15 30
Example	 71549142846550549911530		71549142846550549911530

Figure 3

Revision history

Document revision	Date of release	Description of changes
0.10	2024-09-25	Initial version
1.00	2025-01-17	Final datasheet
1.10	2025-02-05	Final datasheet
1.20	2025-11-04	Final datasheet

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