Final datasheet

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

Features


Typical appearance

- 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
  - PressFIT contact technology
  - Integrated NTC temperature sensor
  - High power density

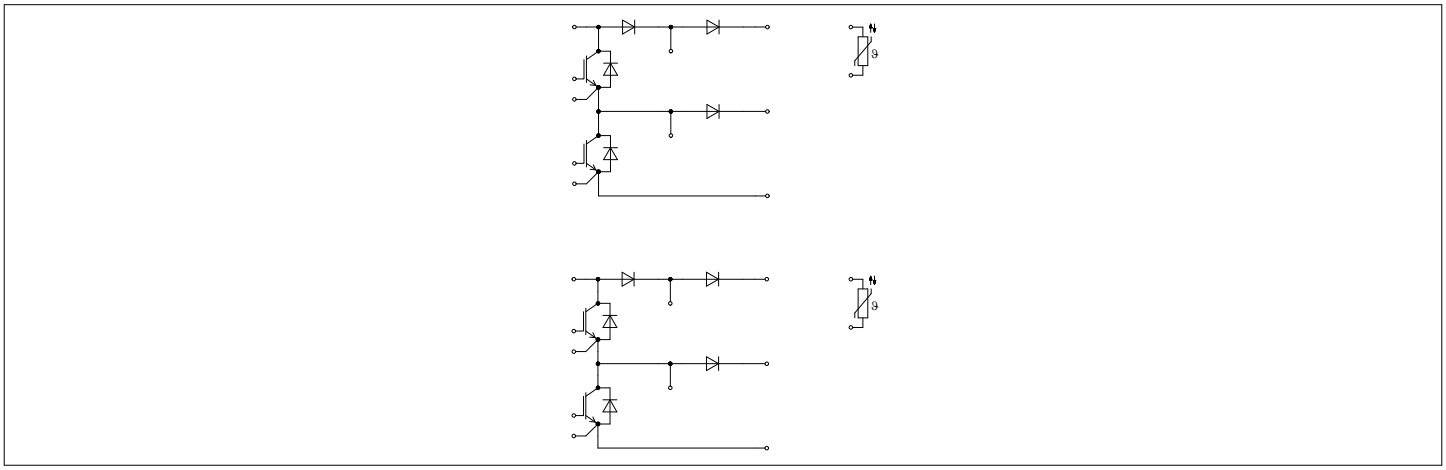
Potential applications

- 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	
Creepage distance	$d_{Creep\ nom}$	terminal to baseplate, nom.	10.0	mm
Clearance	$d_{Clear\ nom}$	terminal to baseplate, nom.	7.5	mm
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*

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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

(table continues...)

Table 3 (continued) Maximum rated values

Parameter	Symbol	Note or test condition	Values	Unit
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	5.1	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
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		

(table continues...)

Table 4 (continued) Characteristic values

Parameter	Symbol	Note or test condition		Values			Unit
				Min.	Typ.	Max.	
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)			0.0590		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	5.1	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

(table continues...)

Table 6 (continued) Characteristic values

Parameter	Symbol	Note or test condition		Values			Unit
				Min.	Typ.	Max.	
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} = ±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)			0.0590		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

(table continues...)

Table 7 (continued) Maximum rated values

Parameter	Symbol	Note or test condition		Values	Unit
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	1430	A^2s
			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)			0.0830		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.*

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
I^2t - value	I^2t	t_P = 10 ms, V_R = 0 V	T_{vj} = 125 °C	1430	A^2s
			T_{vj} = 175 °C	1170	

Table 10 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)			0.0830		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		Values			Unit
				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		

(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
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 14 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		1.32	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} = ±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

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, λ_{grease} = 5 W/(m·K)			0.0830		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	$B_{25/50}$	$R_2 = R_{25} \exp[B_{25/50}(1/T_2\text{-}1/(298{,}15\ K))]$		3375		K
B-value	$B_{25/80}$	$R_2 = R_{25} \exp[B_{25/80}(1/T_2\text{-}1/(298{,}15\ K))]$		3411		K
B-value	$B_{25/100}$	$R_2 = R_{25} \exp[B_{25/100}(1/T_2\text{-}1/(298{,}15\ K))]$		3433		K

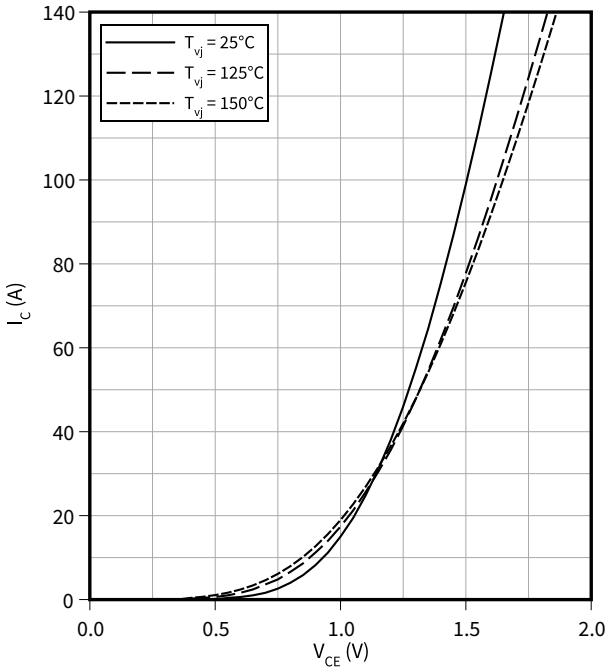
***Note**: For an analytical description of the NTC characteristics please refer to AN2009-10, chapter 4.*

10 Characteristics diagrams

Output characteristic (typical), IGBT, T11 / T21

$I_C = f(V_{CE})$

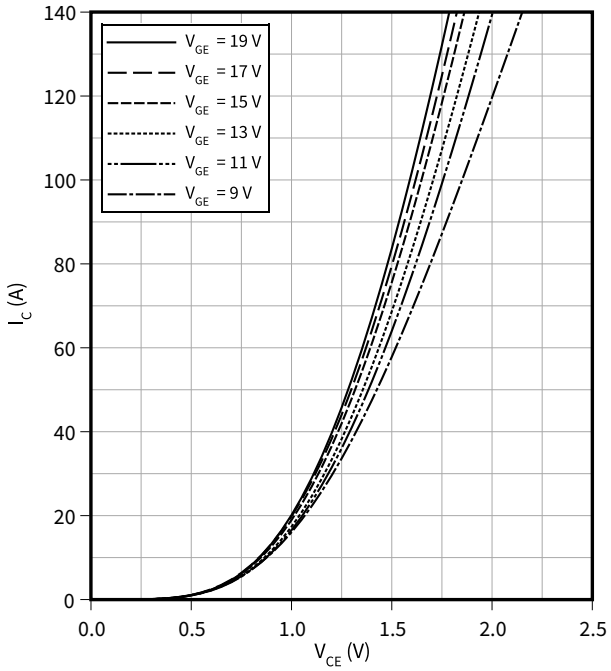
V_{GE} = 15 V



Output characteristic field (typical), IGBT, T11 / T21

$I_C = f(V_{CE})$

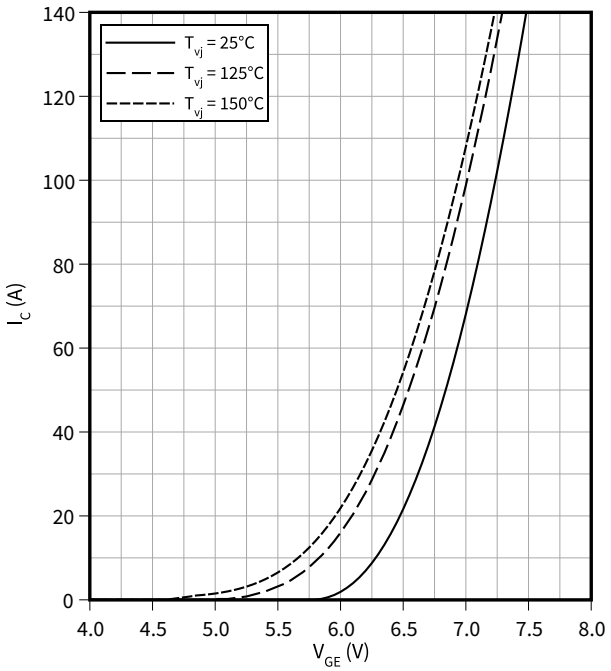
T_{vj} = 150 °C



Transfer characteristic (typical), IGBT, T11 / T21

$I_C = f(V_{GE})$

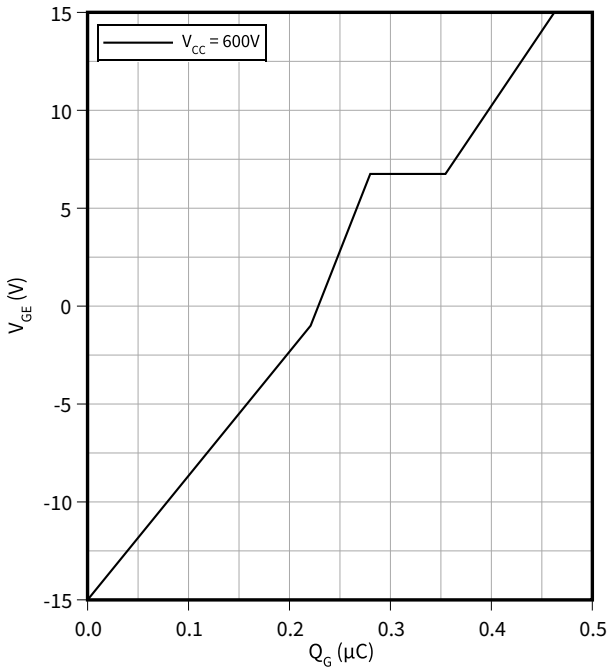
V_{CE} = 20 V



Gate charge characteristic (typical), IGBT, T11 / T21

$V_{GE} = f(Q_G)$

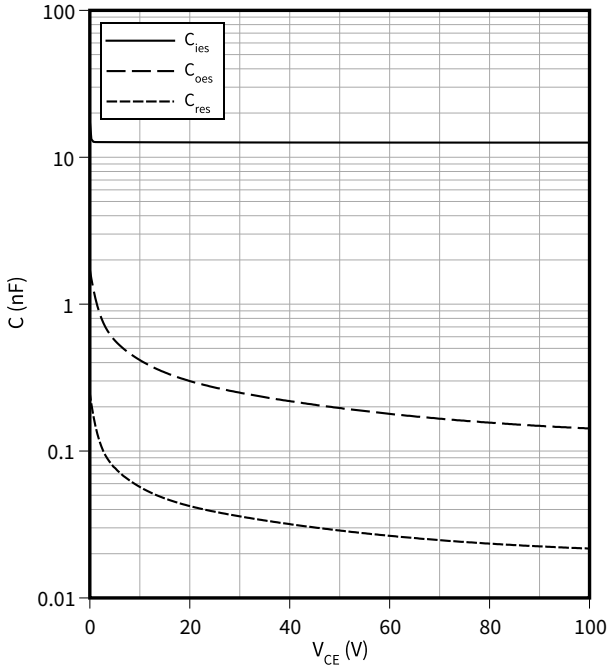
I_C = 200 A, T_{vj} = 25 °C



Capacity characteristic (typical), IGBT, T11 / T21

$C = f(V_{CE})$

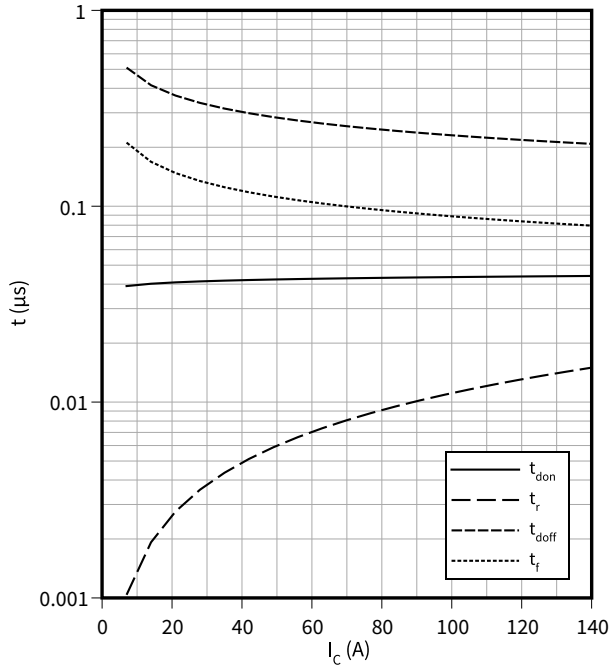
$f = 100\ kHz$, $V_{GE} = 0\ V$, $T_{vj} = 25\ °C$



Switching times (typical), IGBT, T11 / T21

$t = f(I_C)$

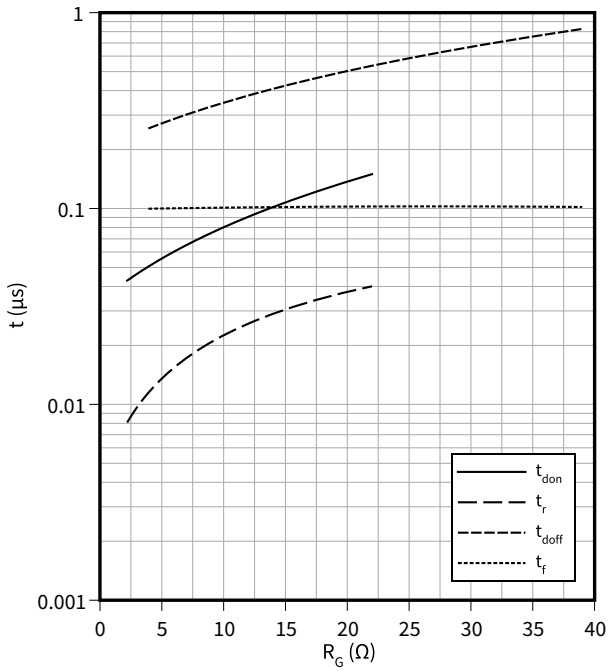
$R_{Goff} = 3.9\ \Omega$, $R_{Gon} = 2.2\ \Omega$, $V_{GE} = \pm 15\ V$, $V_{CC} = 500\ V$, $T_{vj} = 150\ °C$



Switching times (typical), IGBT, T11 / T21

$t = f(R_G)$

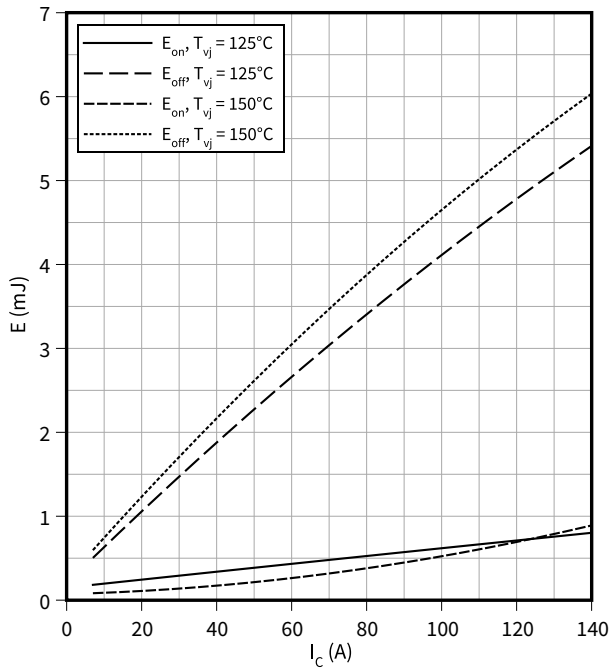
$V_{GE} = \pm 15\ V$, $I_C = 70\ A$, $V_{CC} = 500\ V$, $T_{vj} = 150\ °C$



Switching losses (typical), IGBT, T11 / T21

$E = f(I_C)$

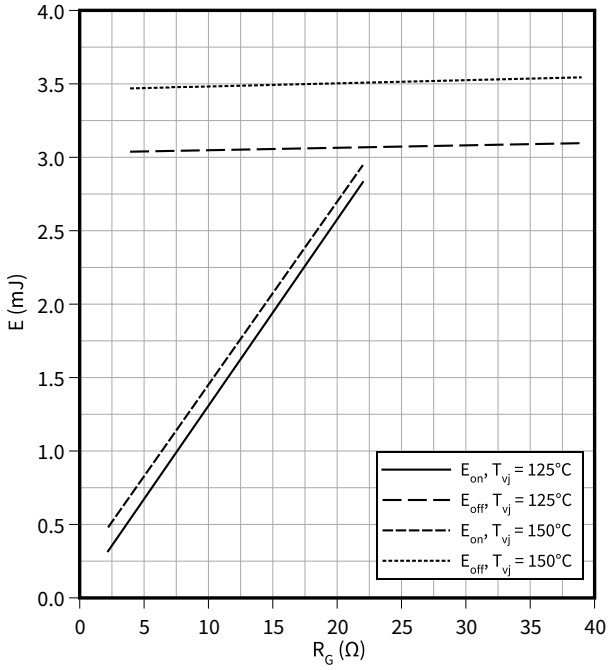
$V_{CC} = 500\ V$, $R_{Goff} = 3.9\ \Omega$, $R_{Gon} = 2.2\ \Omega$, $V_{GE} = \pm 15\ V$



Switching losses (typical), IGBT, T11 / T21

$E = f(R_G)$

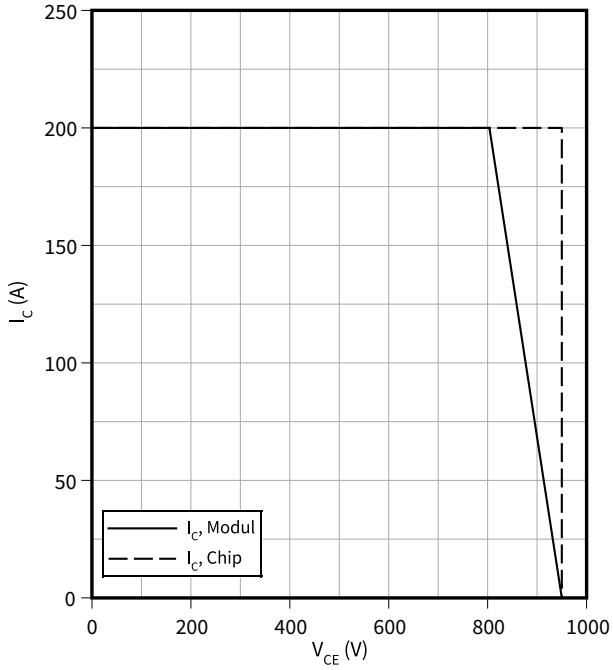
$V_{GE} = \pm 15$ V, $I_C = 70$ A, $V_{CC} = 500$ V



Reverse bias safe operating area (RBSOA), IGBT, T11 / T21

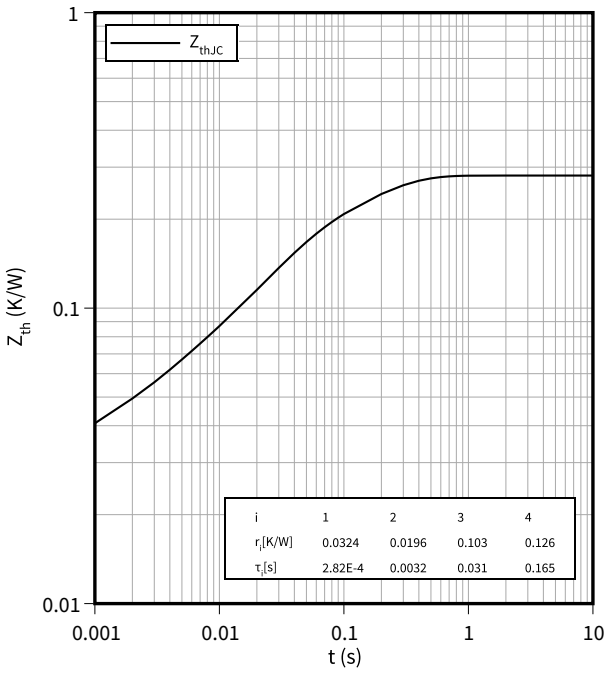
$I_C = f(V_{CE})$

$R_{Goff} = 3.9\ \Omega$, $V_{GE} = \pm 15$ V, $T_{vj} = 150$ °C



Transient thermal impedance, IGBT, T11 / T21

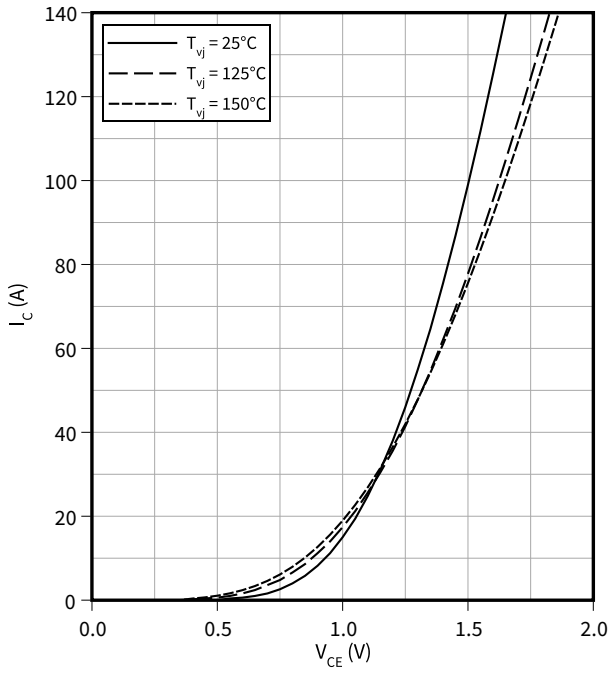
$Z_{th} = f(t)$



Output characteristic (typical), IGBT, T12 / T22

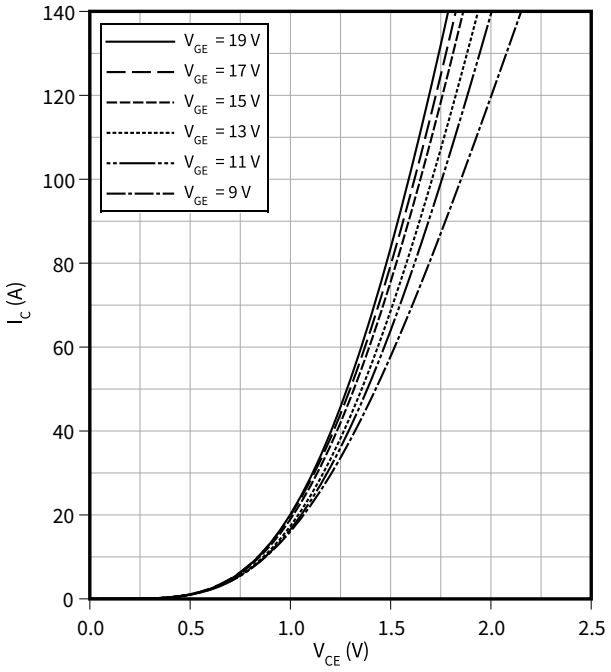
$I_C = f(V_{CE})$

$V_{GE} = 15$ V



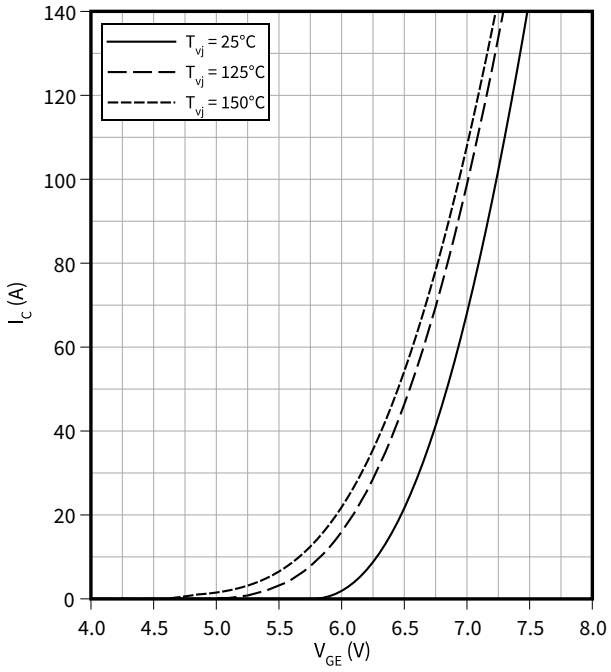
Output characteristic field (typical), IGBT, T12 / T22

$I_C = f(V_{CE})$
$T_{vj} = 150\ °C$



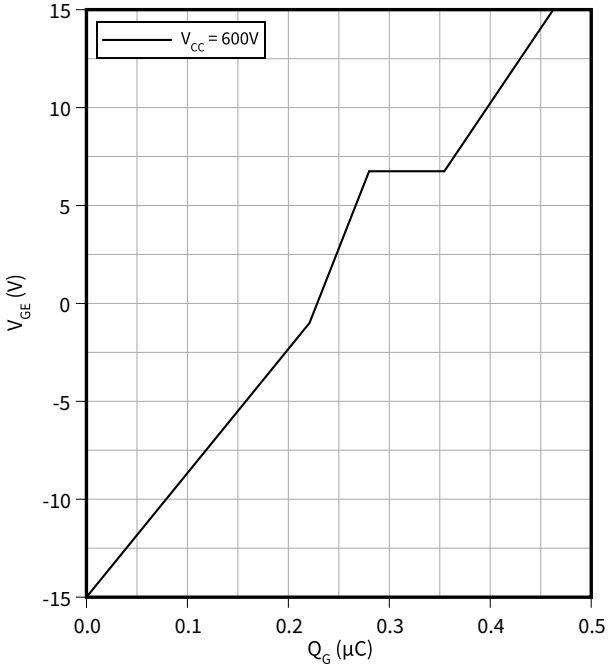
Transfer characteristic (typical), IGBT, T12 / T22

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



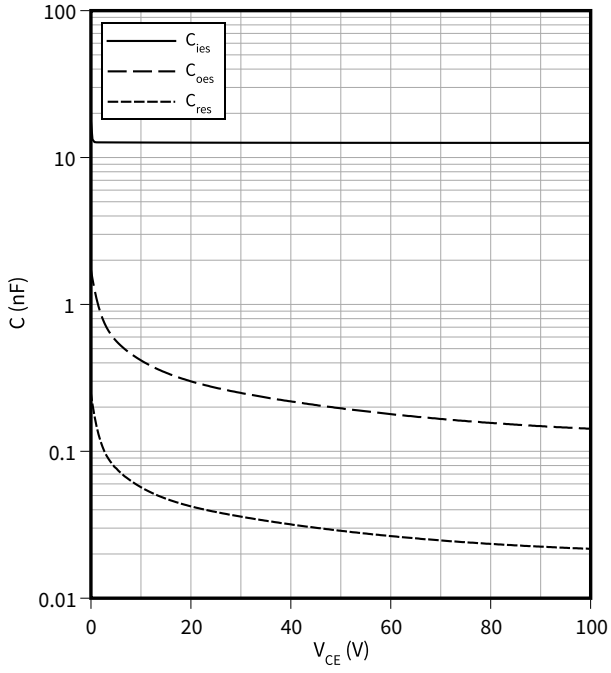
Gate charge characteristic (typical), IGBT, T12 / T22

$V_{GE} = f(Q_G)$
$I_C = 200\ A,\ T_{vj} = 25\ °C$



Capacity characteristic (typical), IGBT, T12 / T22

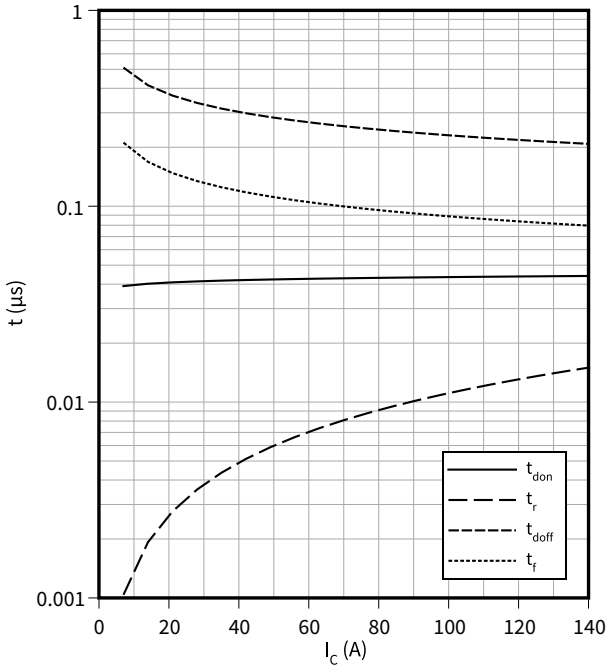
$C = f(V_{CE})$
$f = 100\ kHz,\ V_{GE} = 0\ V,\ T_{vj} = 25\ °C$



Switching times (typical), IGBT, T12 / T22

$t = f(I_C)$

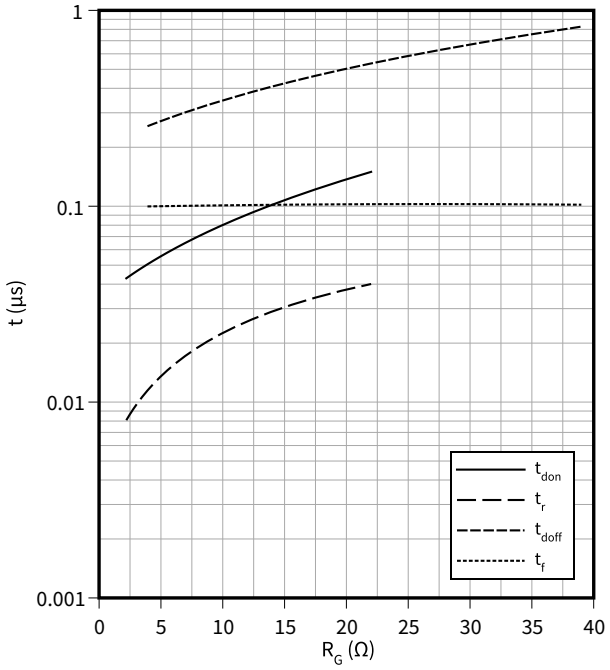
$R_{Goff} = 3.9\ \Omega$, $R_{Gon} = 2.2\ \Omega$, $V_{GE} = \pm 15$ V, $V_{CC} = 500$ V, $T_{vj} = 150$ °C



Switching times (typical), IGBT, T12 / T22

$t = f(R_G)$

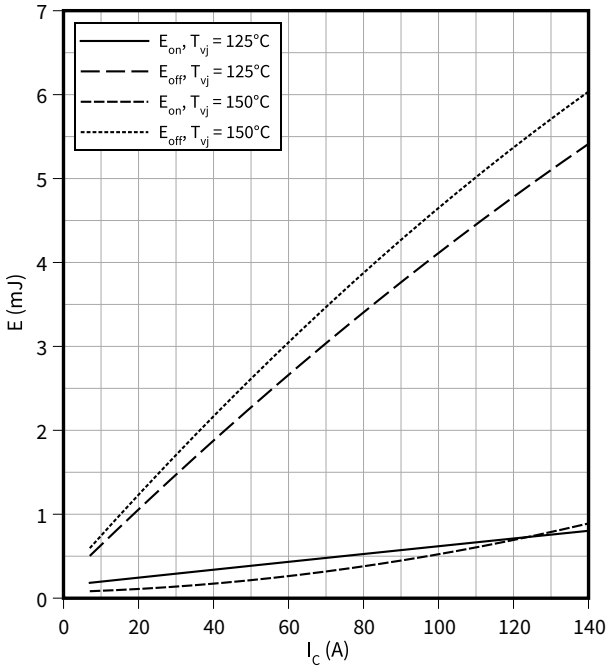
$V_{GE} = \pm 15$ V, $I_C = 70$ A, $V_{CC} = 500$ V, $T_{vj} = 150$ °C



Switching losses (typical), IGBT, T12 / T22

$E = f(I_C)$

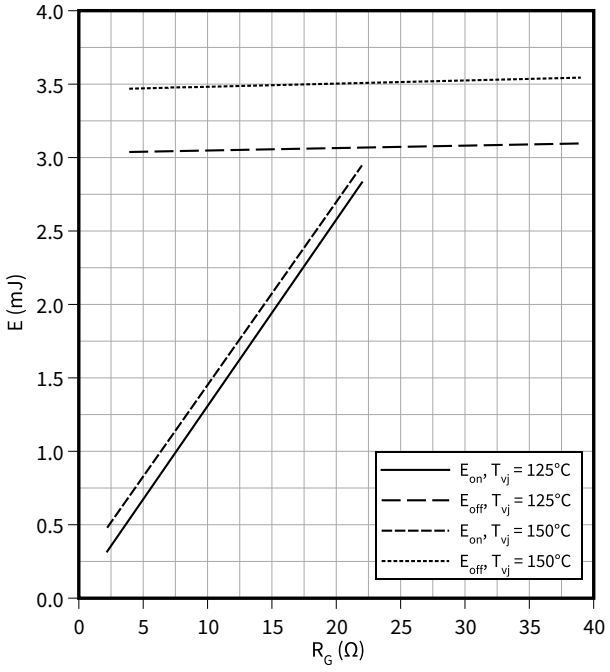
$V_{CC} = 500$ V, $R_{Goff} = 3.9\ \Omega$, $R_{Gon} = 2.2\ \Omega$, $V_{GE} = \pm 15$ V



Switching losses (typical), IGBT, T12 / T22

$E = f(R_G)$

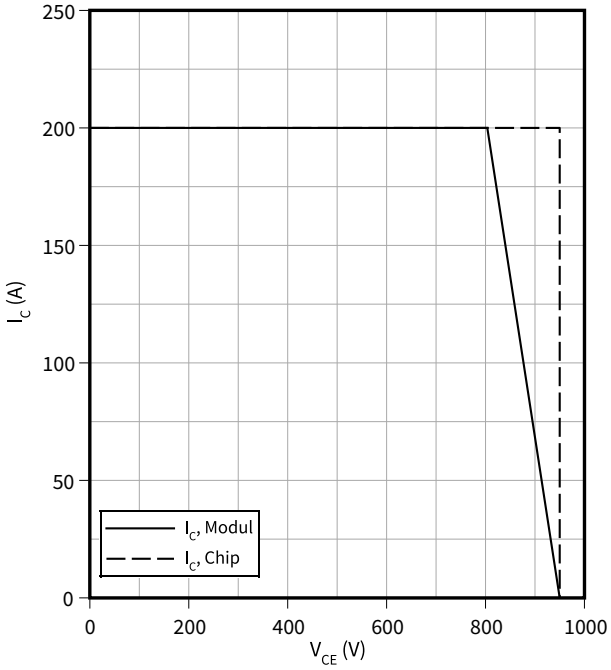
$V_{GE} = \pm 15$ V, $I_C = 70$ A, $V_{CC} = 500$ V



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

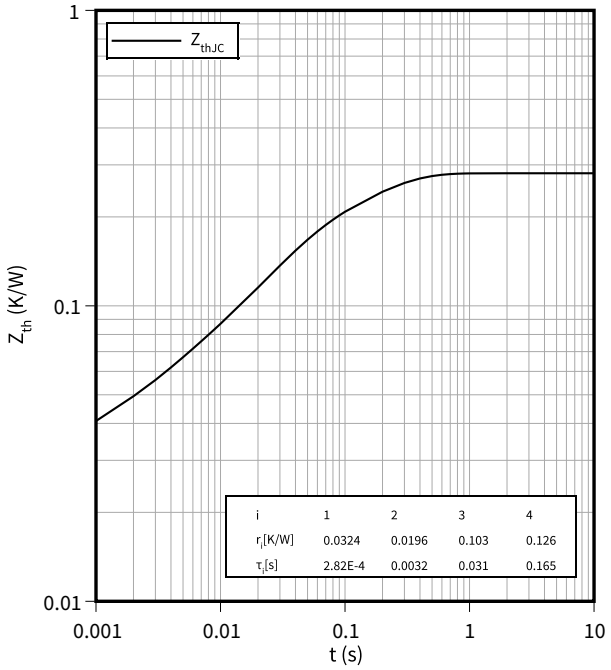
$I_C = f(V_{CE})$

$R_{Goff} = 3.9\ \Omega$, $V_{GE} = \pm 15$ V, $T_{vj} = 150$ °C



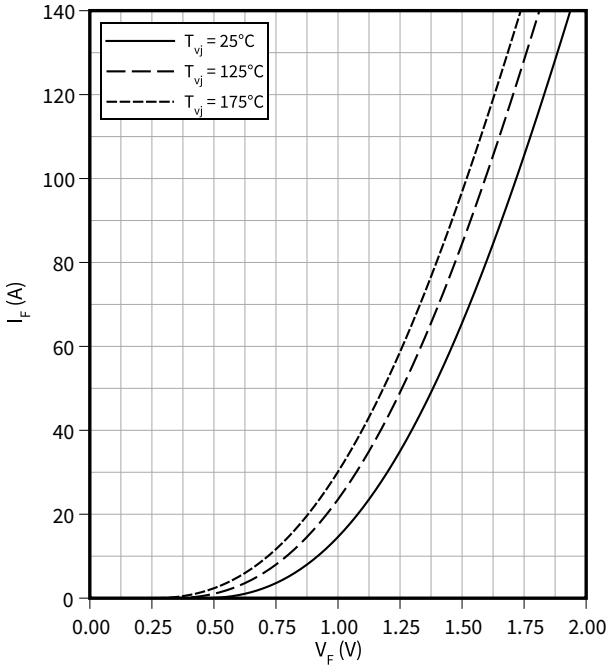
Transient thermal impedance, IGBT, T12 / T22

$Z_{th} = f(t)$



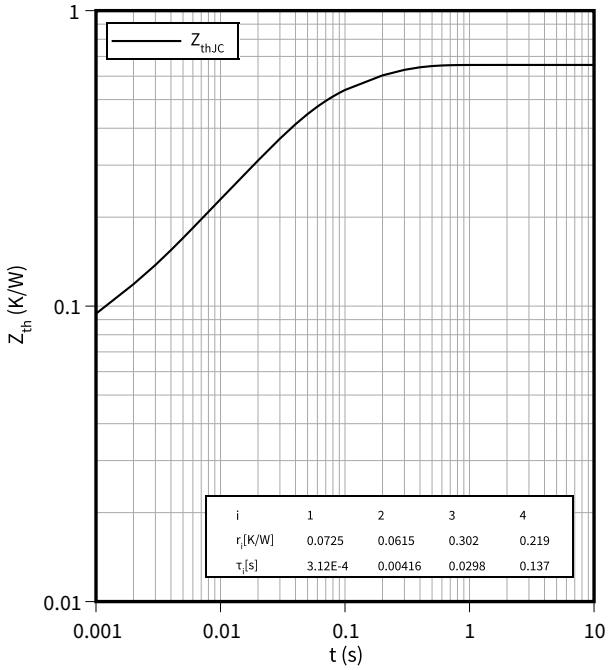
Forward characteristic (typical), Diode, D11 / D21

$I_F = f(V_F)$



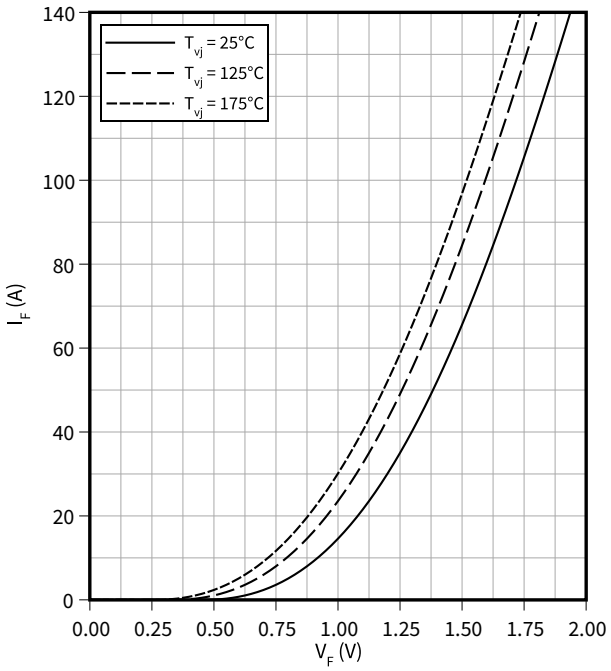
Transient thermal impedance, Diode, D11 / D21

$Z_{th} = f(t)$



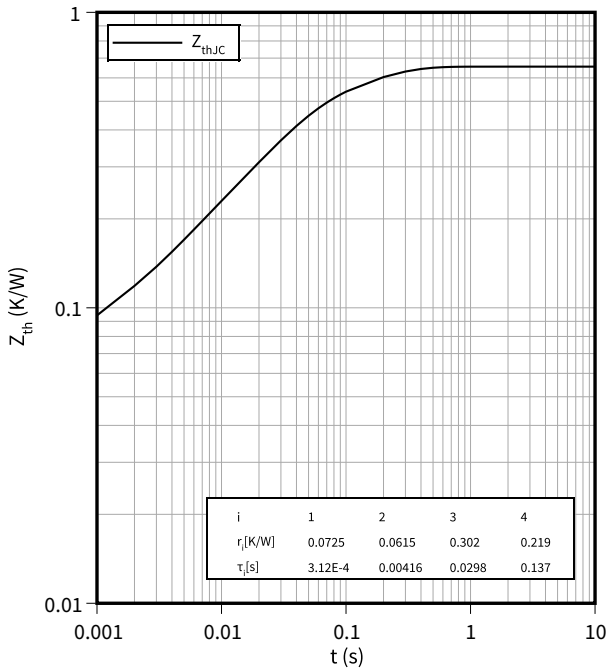
Forward characteristic (typical), Diode, D12 / D22

$I_F = f(V_F)$



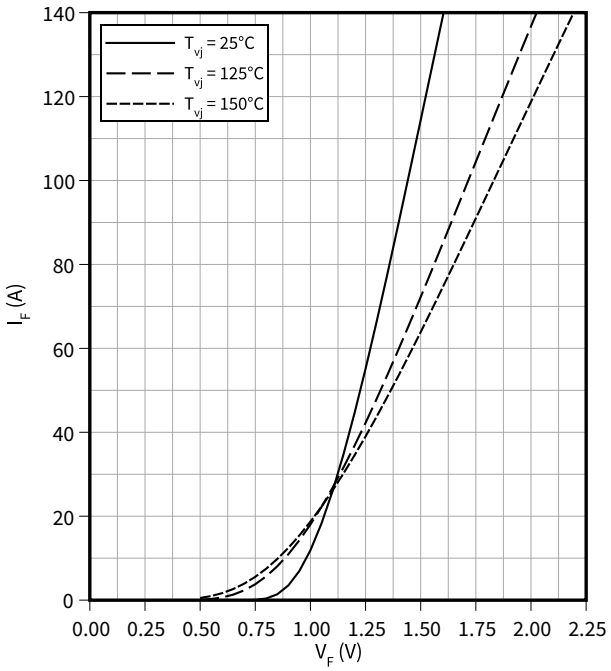
Transient thermal impedance, Diode, D12 / D22

$Z_{th} = f(t)$



Forward characteristic (typical), Diode, D13 / D23

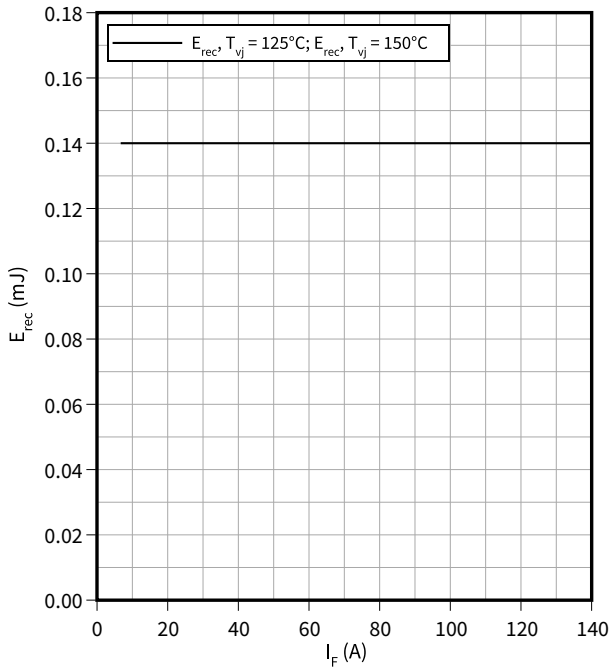
$I_F = f(V_F)$



Switching losses (typical), Diode, D13 / D23

$E_{rec} = f(I_F)$

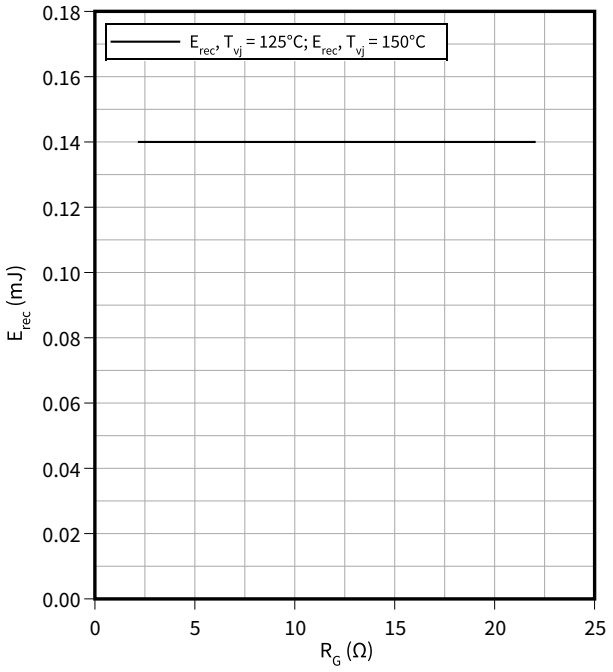
$R_{Gon} = 2.2\ \Omega$, $V_{CE} = 500\ V$



Switching losses (typical), Diode, D13 / D23

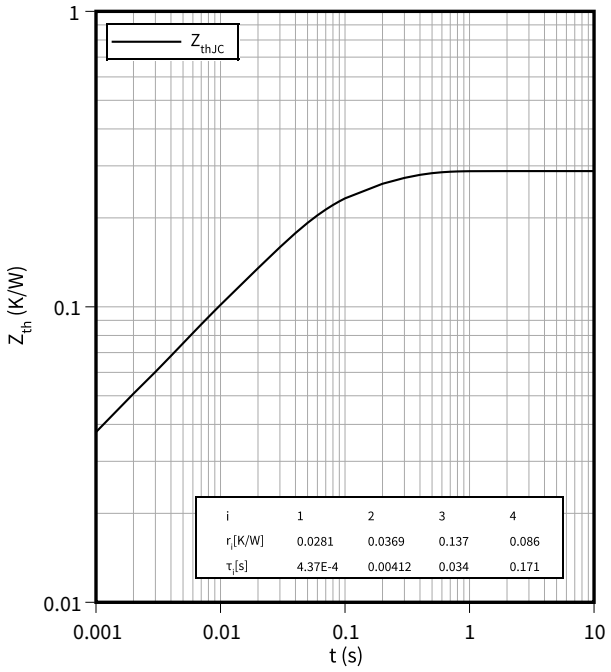
$E_{rec} = f(R_G)$

$V_{CE} = 500$ V, $I_F = 70$ A



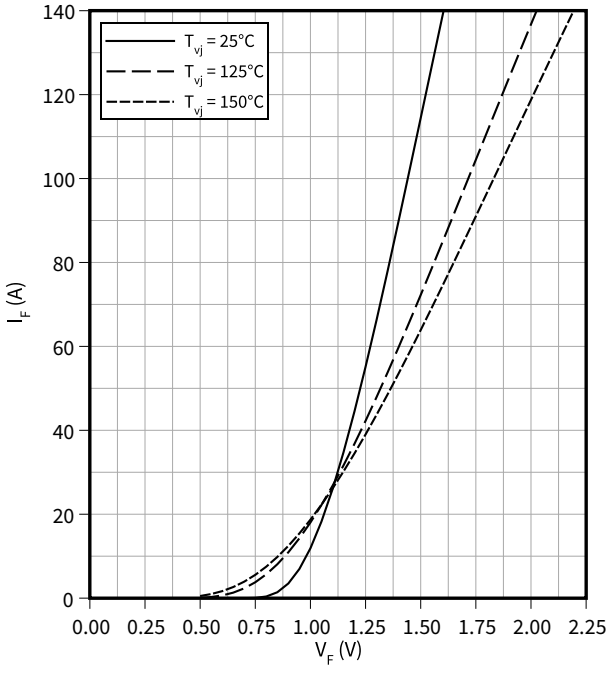
Transient thermal impedance, Diode, D13 / D23

$Z_{th} = f(t)$



Forward characteristic (typical), Diode, D14 / D24

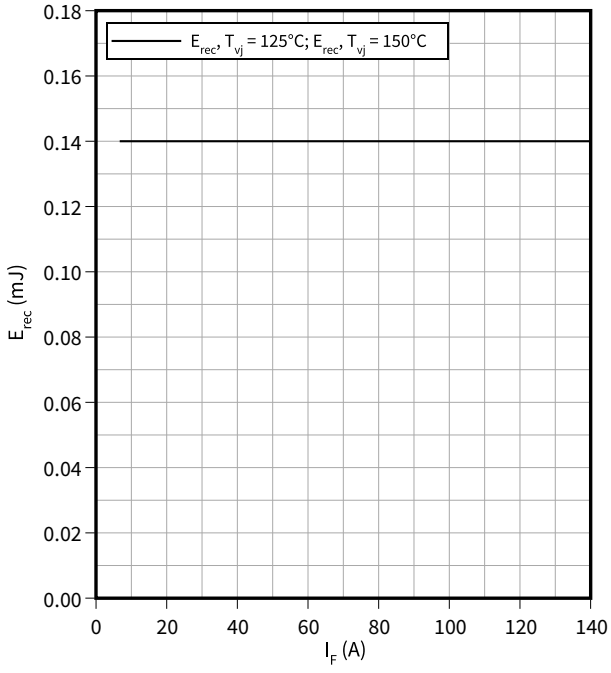
$I_F = f(V_F)$



Switching losses (typical), Diode, D14 / D24

$E_{rec} = f(I_F)$

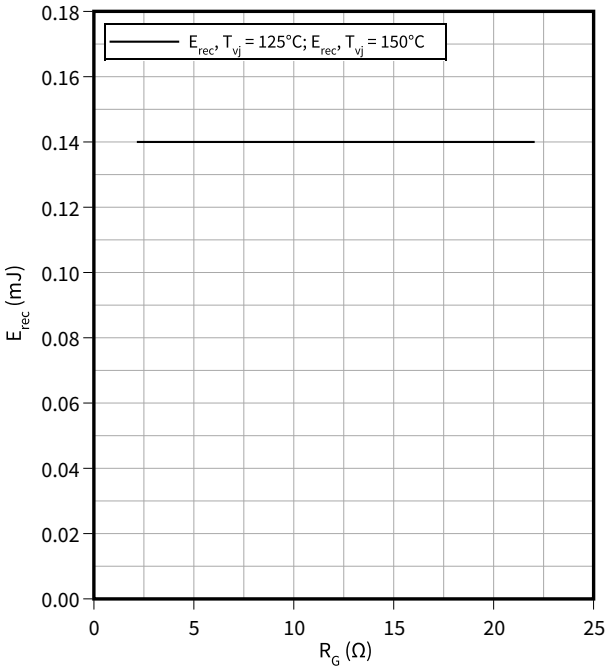
$R_{Gon} = 2.2\ \Omega$, $V_{CE} = 500$ V



Switching losses (typical), Diode, D14 / D24

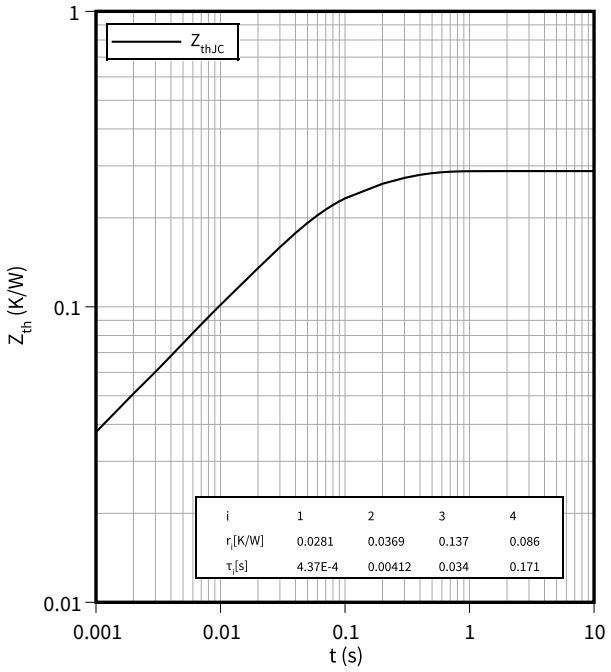
$E_{rec} = f(R_G)$

$V_{CE} = 500\ V$, $I_F = 70\ A$



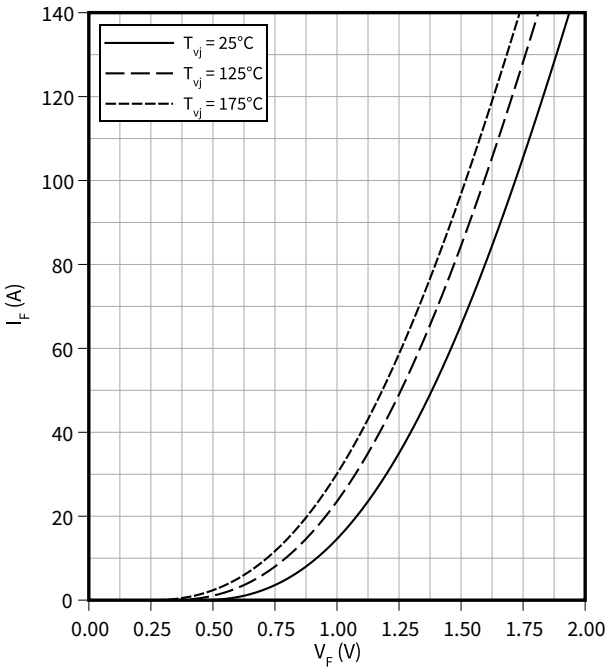
Transient thermal impedance, Diode, D14 / D24

$Z_{th} = f(t)$



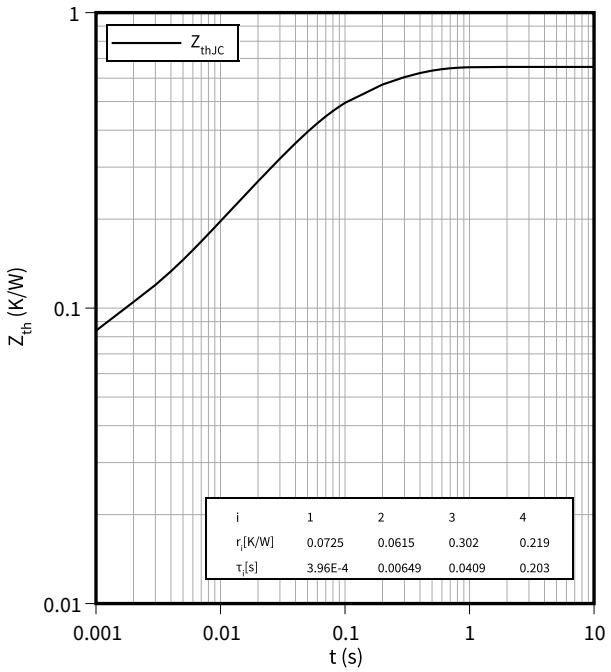
Forward characteristic (typical), Diode, D15 / D25

$I_F = f(V_F)$



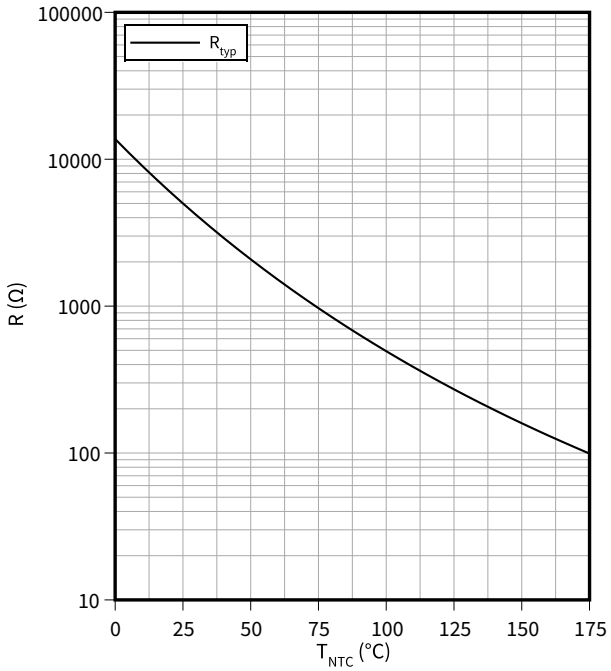
Transient thermal impedance, Diode, D15 / D25

$Z_{th} = f(t)$



Temperature characteristic (typical), NTC-Thermistor

$R = f(T_{NTC})$



11 Circuit diagram

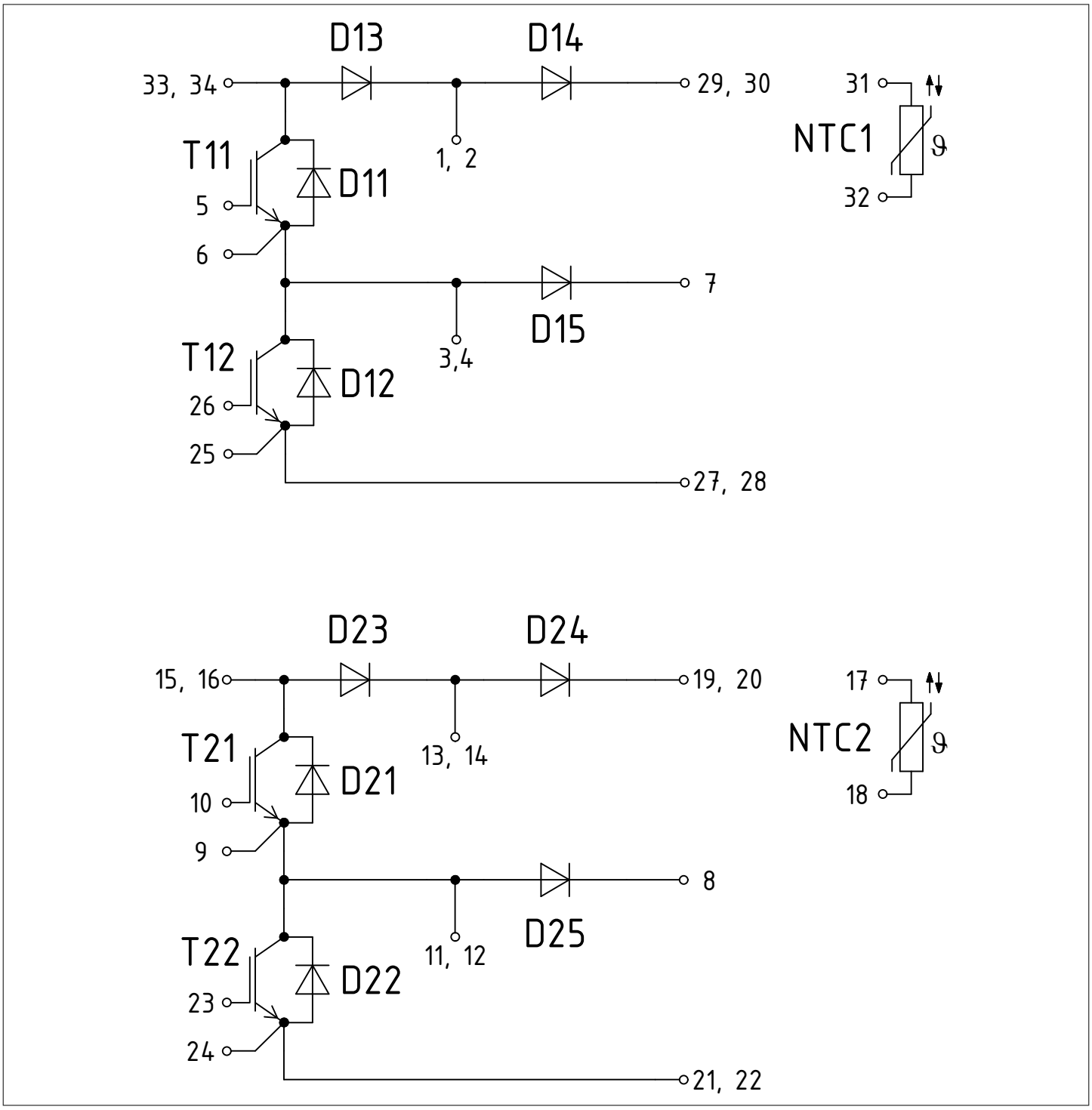


Figure 1

12 Package outlines

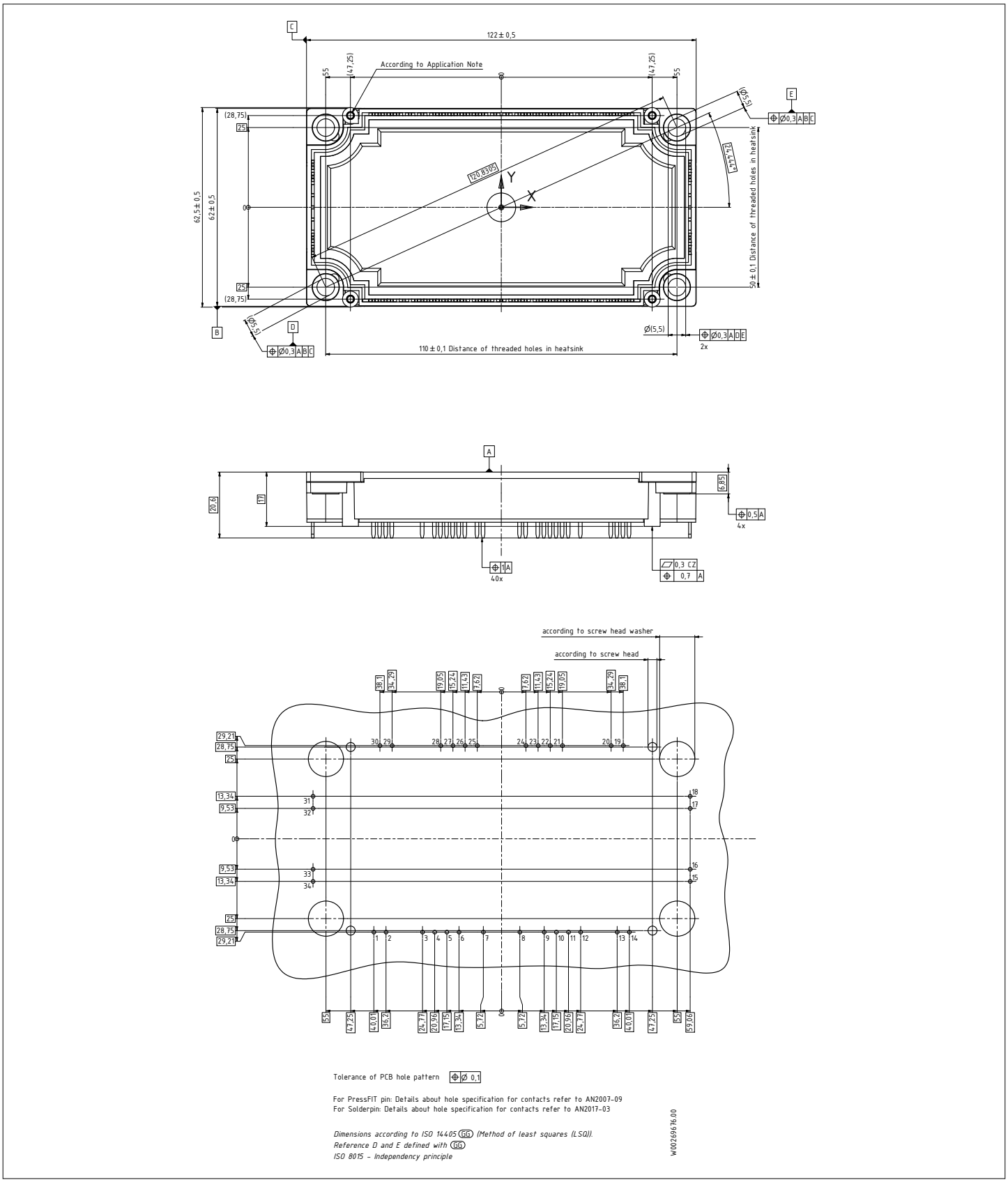


Figure 2

13 Module label code

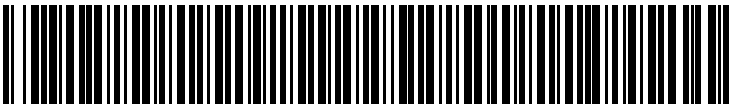
Module label code			
Code format	Data Matrix		Barcode Code128
Encoding	ASCII text		Code Set A
Symbol size	16x16		23 digits
Standard	IEC24720 and IEC16022		IEC8859-1
Code content	*Content* Module serial number Module material number Production order number Date code (production year) Date code (production week)	*Digit* 1 – 5 6 - 11 12 - 19 20 – 21 22 – 23	*Example* 71549 142846 55054991 15 30
Example	 7154914284655054991530	 7154914284655054991530	

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

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Document reference
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