

EconoPIM™3 module with TRENCHSTOP™ IGBT7 and emitter controlled 7 diode and PressFIT / NTC / TIM

Features

- Electrical features
 - $V_{CES} = 1200\text{ V}$
 - $I_{C\text{ nom}} = 150\text{ A} / I_{CRM} = 300\text{ A}$
 - TRENCHSTOP™ IGBT7
 - Overload operation up to 175°C
 - Low $V_{CE,sat}$
- Mechanical features
 - Integrated NTC temperature sensor
 - PressFIT contact technology
 - Copper base plate
 - Al_2O_3 substrate with low thermal resistance
 - Pre-applied thermal interface material



Typical appearance

Potential applications

- Auxiliary inverters
- Motor drives
- Servo drives

Product validation

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

Description

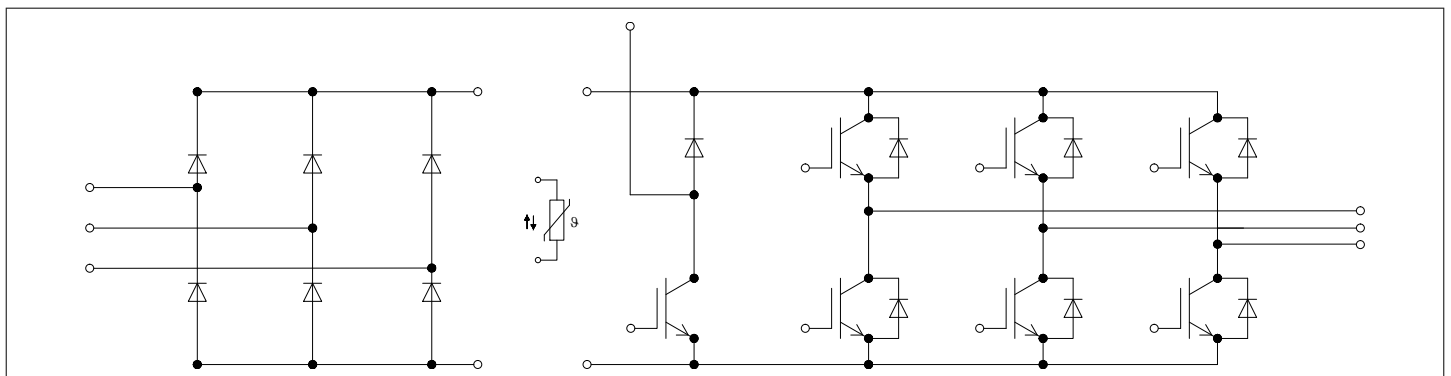


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1 Package

1 Package

Table 1 Insulation coordination

Parameter	Symbol	Note or test condition	Values	Unit
Isolation test voltage	V_{ISOL}	RMS, $f = 50 \text{ Hz}$, $t = 1 \text{ min}$	2.5	kV
Material of module baseplate			Cu	
Internal Isolation		basic insulation (class 1, IEC 61140)	Al_2O_3	
Creepage distance	d_{Creep}	terminal to heatsink	10.0	mm
Clearance	d_{Clear}	terminal to heatsink	7.5	mm
Comparative tracking index	CTI		> 200	
RTI Elec.	RTI	housing	140	°C

Table 2 Characteristic values

Parameter	Symbol	Note or test condition	Values			Unit
			Min.	Typ.	Max.	
Stray inductance module	L_{SCE}			25		nH
Module lead resistance, terminals - chip	$R_{AA'+CC'}$	$T_H = 25^\circ\text{C}$, per switch		1.1		mΩ
Module lead resistance, terminals - chip	$R_{CC'+EE'}$	$T_H = 25^\circ\text{C}$, per switch		1.6		mΩ
Storage temperature	T_{stg}		-40		125	°C
Maximum baseplate operation temperature	T_{BPmax}				125	°C
Mounting torque for modul 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.
Storage and shipment of modules with TIM => see AN2012-07

2 IGBT, Inverter

Table 3 Maximum rated values

Parameter	Symbol	Note or test condition	Values	Unit
Collector-emitter voltage	V_{CES}	$T_{vj} = 25^\circ\text{C}$	1200	V
Continous DC collector current	I_{CDC}	$T_{vj \max} = 175^\circ\text{C}$ $T_H = 50^\circ\text{C}$	150	A
Repetitive peak collector current	I_{CRM}	$t_p = 1 \text{ ms}$	300	A

Table 3 Maximum rated values (continued)

Parameter	Symbol	Note or test condition	Values	Unit
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	$V_{CE\ sat}$	$I_C = 150\text{ A}$, $V_{GE} = 15\text{ V}$	$T_{vj} = 25\text{ °C}$	1.55	1.80	V
			$T_{vj} = 125\text{ °C}$	1.69		
			$T_{vj} = 175\text{ °C}$	1.77		
Gate threshold voltage	V_{GEth}	$I_C = 3.5\text{ mA}$, $V_{CE} = V_{GE}$, $T_{vj} = 25\text{ °C}$	5.15	5.80	6.45	V
Gate charge	Q_G	$V_{GE} = \pm 15\text{ V}$, $V_{CE} = 600\text{ V}$		2.5		μC
Internal gate resistor	R_{Gint}	$T_{vj} = 25\text{ °C}$		1		Ω
Input capacitance	C_{ies}	$f = 100\text{ kHz}$, $T_{vj} = 25\text{ °C}$, $V_{CE} = 25\text{ V}$, $V_{GE} = 0\text{ V}$		30.1		nF
Reverse transfer capacitance	C_{res}	$f = 100\text{ kHz}$, $T_{vj} = 25\text{ °C}$, $V_{CE} = 25\text{ V}$, $V_{GE} = 0\text{ V}$		0.105		nF
Collector-emitter cut-off current	I_{CES}	$V_{CE} = 1200\text{ V}$, $V_{GE} = 0\text{ V}$	$T_{vj} = 25\text{ °C}$		0.012	mA
Gate-emitter leakage current	I_{GES}	$V_{CE} = 0\text{ V}$, $V_{GE} = 20\text{ V}$, $T_{vj} = 25\text{ °C}$			100	nA
Turn-on delay time (inductive load)	t_{don}	$I_C = 150\text{ A}$, $V_{CE} = 600\text{ V}$, $V_{GE} = \pm 15\text{ V}$, $R_{Gon} = 3.3\text{ }\Omega$	$T_{vj} = 25\text{ °C}$	0.172		μs
			$T_{vj} = 125\text{ °C}$	0.183		
			$T_{vj} = 175\text{ °C}$	0.189		
Rise time (inductive load)	t_r	$I_C = 150\text{ A}$, $V_{CE} = 600\text{ V}$, $V_{GE} = \pm 15\text{ V}$, $R_{Gon} = 3.3\text{ }\Omega$	$T_{vj} = 25\text{ °C}$	0.072		μs
			$T_{vj} = 125\text{ °C}$	0.077		
			$T_{vj} = 175\text{ °C}$	0.080		
Turn-off delay time (inductive load)	t_{doff}	$I_C = 150\text{ A}$, $V_{CE} = 600\text{ V}$, $V_{GE} = \pm 15\text{ V}$, $R_{Goff} = 3.3\text{ }\Omega$	$T_{vj} = 25\text{ °C}$	0.331		μs
			$T_{vj} = 125\text{ °C}$	0.414		
			$T_{vj} = 175\text{ °C}$	0.433		
Fall time (inductive load)	t_f	$I_C = 150\text{ A}$, $V_{CE} = 600\text{ V}$, $V_{GE} = \pm 15\text{ V}$, $R_{Goff} = 3.3\text{ }\Omega$	$T_{vj} = 25\text{ °C}$	0.103		μs
			$T_{vj} = 125\text{ °C}$	0.198		
			$T_{vj} = 175\text{ °C}$	0.262		
Turn-on energy loss per pulse	E_{on}	$I_C = 150\text{ A}$, $V_{CE} = 600\text{ V}$, $L_\sigma = 35\text{ nH}$, $V_{GE} = \pm 15\text{ V}$, $R_{Gon} = 3.3\text{ }\Omega$, $di/dt = 1700\text{ A}/\mu\text{s}$ ($T_{vj} = 175\text{ °C}$)	$T_{vj} = 25\text{ °C}$	16.6		mJ
			$T_{vj} = 125\text{ °C}$	24.9		
			$T_{vj} = 175\text{ °C}$	29.6		
Turn-off energy loss per pulse	E_{off}	$I_C = 150\text{ A}$, $V_{CE} = 600\text{ V}$, $L_\sigma = 35\text{ nH}$, $V_{GE} = \pm 15\text{ V}$, $R_{Goff} = 3.3\text{ }\Omega$, $dv/dt = 3200\text{ V}/\mu\text{s}$ ($T_{vj} = 175\text{ °C}$)	$T_{vj} = 25\text{ °C}$	10.4		mJ
			$T_{vj} = 125\text{ °C}$	15.9		
			$T_{vj} = 175\text{ °C}$	19.9		

Table 4 Characteristic values (continued)

Parameter	Symbol	Note or test condition	Values			Unit
			Min.	Typ.	Max.	
SC data	I_{SC}	$V_{GE} \leq 15 \text{ V}, V_{CC} = 800 \text{ V}, V_{CEmax} = V_{CES} - L_{sCE} \cdot di/dt$		520		A
				490		
Thermal resistance, junction to heatsink	R_{thJH}	per IGBT, Valid with IFX pre-applied Thermal Interface Material			0.374	K/W
Temperature under switching conditions	$T_{vj op}$		-40		175	°C

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

3 Diode, Inverter

Table 5 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
Continous DC forward current	I_F			150	A
Repetitive peak forward current	I_{FRM}	$t_p = 1\text{ ms}$		300	A
I^2t - value	I^2t	$V_R = 0\text{ V}, t_p = 10\text{ ms}$	$T_{vj} = 125\text{ }^{\circ}\text{C}$	2700	A^2s
			$T_{vj} = 175\text{ }^{\circ}\text{C}$	2250	

Table 6 Characteristic values

Parameter	Symbol	Note or test condition	Values			Unit
			Min.	Typ.	Max.	
Forward voltage	V_F	$I_F = 150 \text{ A}, V_{GE} = 0 \text{ V}$	$T_{vj} = 25^\circ\text{C}$	1.72	2.10	V
			$T_{vj} = 125^\circ\text{C}$	1.59		
			$T_{vj} = 175^\circ\text{C}$	1.52		
Peak reverse recovery current	I_{RM}	$I_F = 150 \text{ A}, V_R = 600 \text{ V}, V_{GE} = -15 \text{ V}, -di_F/dt = 1700 \text{ A}/\mu\text{s} (T_{vj} = 175^\circ\text{C})$	$T_{vj} = 25^\circ\text{C}$	65.3		A
			$T_{vj} = 125^\circ\text{C}$	91.8		
			$T_{vj} = 175^\circ\text{C}$	107		

Table 6 Characteristic values (continued)

Parameter	Symbol	Note or test condition	Values			Unit
			Min.	Typ.	Max.	
Recovered charge	Q_r	$I_F = 150\text{ A}$, $V_R = 600\text{ V}$, $V_{GE} = -15\text{ V}$, $-di_F/dt = 1700\text{ A}/\mu\text{s}$ ($T_{vj} = 175\text{ °C}$)	$T_{vj} = 25\text{ °C}$	10.3		μC
			$T_{vj} = 125\text{ °C}$	21.7		
			$T_{vj} = 175\text{ °C}$	28.6		
Reverse recovery energy	E_{rec}	$I_F = 150\text{ A}$, $V_R = 600\text{ V}$, $V_{GE} = -15\text{ V}$, $-di_F/dt = 1700\text{ A}/\mu\text{s}$ ($T_{vj} = 175\text{ °C}$)	$T_{vj} = 25\text{ °C}$	3.27		mJ
			$T_{vj} = 125\text{ °C}$	7.32		
			$T_{vj} = 175\text{ °C}$	9.88		
Thermal resistance, junction to heatsink	R_{thJH}	per diode, Valid with IFX pre-applied Thermal Interface Material			0.581	K/W
Temperature under switching conditions	$T_{vj\text{ op}}$		-40		175	°C

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

4 Diode, Rectifier

Table 7 Maximum rated values

Parameter	Symbol	Note or test condition		Values	Unit
Repetitive peak reverse voltage	V_{RRM}	$T_{vj} = 25\text{ °C}$		1600	V
Maximum RMS forward current per chip	I_{FRMSM}	$T_H = 105\text{ °C}$		150	A
Maximum RMS current at rectifier output	I_{RMSM}	$T_H = 105\text{ °C}$		150	A
Surge forward current	I_{FSM}	$t_p = 10\text{ ms}$	$T_{vj} = 25\text{ °C}$	1600	A
			$T_{vj} = 150\text{ °C}$	1400	
I^2t - value	I^2t	$t_p = 10\text{ ms}$	$T_{vj} = 25\text{ °C}$	12800	A^2s
			$T_{vj} = 150\text{ °C}$	9800	

Table 8 Characteristic values

Parameter	Symbol	Note or test condition	Values			Unit
			Min.	Typ.	Max.	
Forward voltage	V_F	$I_F = 150\text{ A}$ $T_{vj} = 150\text{ °C}$		0.97		V
Reverse current	I_r	$T_{vj} = 150\text{ °C}$, $V_R = 1600\text{ V}$		1		mA
Thermal resistance, junction to heatsink	R_{thJH}	per diode, Valid with IFX pre-applied Thermal Interface Material			0.435	K/W

Table 8 Characteristic values (continued)

Parameter	Symbol	Note or test condition	Values			Unit
			Min.	Typ.	Max.	
Temperature under switching conditions	$T_{vj, op}$		-40		150	°C

5 IGBT, Brake-Chopper

Table 9 Maximum rated values

Parameter	Symbol	Note or test condition		Values	Unit
Collector-emitter voltage	V_{CES}		$T_{vj} = 25\text{ °C}$	1200	V
Continuous DC collector current	I_{CDC}	$T_{vj\ max} = 175\text{ °C}$	$T_H = 75\text{ °C}$	100	A
Repetitive peak collector current	I_{CRM}	$t_P = 1\text{ ms}$		200	A
Gate-emitter peak voltage	V_{GES}			±20	V

Table 10 Characteristic values

Parameter	Symbol	Note or test condition		Values			Unit
				Min.	Typ.	Max.	
Collector-emitter saturation voltage	$V_{CE\ sat}$	$I_C = 100\text{ A}, V_{GE} = 15\text{ V}$	$T_{vj} = 25\text{ °C}$		1.50	1.80	V
			$T_{vj} = 125\text{ °C}$		1.64		
			$T_{vj} = 175\text{ °C}$		1.72		
Gate threshold voltage	V_{GEth}	$I_C = 2.5\text{ mA}, V_{CE} = V_{GE}, T_{vj} = 25\text{ °C}$		5.15	5.80	6.45	V
Gate charge	Q_G	$V_{GE} = \pm 15\text{ V}, V_{CE} = 600\text{ V}$			1.8		μC
Internal gate resistor	R_{Gint}	$T_{vj} = 25\text{ °C}$			1.5		Ω
Input capacitance	C_{ies}	$f = 100\text{ kHz}, T_{vj} = 25\text{ °C}, V_{CE} = 25\text{ V}, V_{GE} = 0\text{ V}$			21.7		nF
Reverse transfer capacitance	C_{res}	$f = 100\text{ kHz}, T_{vj} = 25\text{ °C}, V_{CE} = 25\text{ V}, V_{GE} = 0\text{ V}$			0.076		nF
Collector-emitter cut-off current	I_{CES}	$V_{CE} = 1200\text{ V}, V_{GE} = 0\text{ V}$	$T_{vj} = 25\text{ °C}$			0.01	mA
Gate-emitter leakage current	I_{GES}	$V_{CE} = 0\text{ V}, V_{GE} = 20\text{ V}, T_{vj} = 25\text{ °C}$				100	nA
Turn-on delay time (inductive load)	t_{don}	$I_C = 100\text{ A}, V_{CE} = 600\text{ V}, V_{GE} = \pm 15\text{ V}, R_{Gon} = 4.3\text{ Ω}$	$T_{vj} = 25\text{ °C}$		0.169		μs
			$T_{vj} = 125\text{ °C}$		0.180		
			$T_{vj} = 175\text{ °C}$		0.187		
Rise time (inductive load)	t_r	$I_C = 100\text{ A}, V_{CE} = 600\text{ V}, V_{GE} = \pm 15\text{ V}, R_{Gon} = 4.3\text{ Ω}$	$T_{vj} = 25\text{ °C}$		0.063		μs
			$T_{vj} = 125\text{ °C}$		0.067		
			$T_{vj} = 175\text{ °C}$		0.070		

Table 10 Characteristic values (continued)

Parameter	Symbol	Note or test condition	Values			Unit
			Min.	Typ.	Max.	
Turn-off delay time (inductive load)	t_{doff}	$I_C = 100 \text{ A}$, $V_{\text{CE}} = 600 \text{ V}$, $V_{\text{GE}} = \pm 15 \text{ V}$, $R_{\text{Goff}} = 4.3 \Omega$	$T_{\text{vj}} = 25 \text{ }^\circ\text{C}$	0.310		μs
			$T_{\text{vj}} = 125 \text{ }^\circ\text{C}$	0.390		
			$T_{\text{vj}} = 175 \text{ }^\circ\text{C}$	0.410		
Fall time (inductive load)	t_f	$I_C = 100 \text{ A}$, $V_{\text{CE}} = 600 \text{ V}$, $V_{\text{GE}} = \pm 15 \text{ V}$, $R_{\text{Goff}} = 4.3 \Omega$	$T_{\text{vj}} = 25 \text{ }^\circ\text{C}$	0.110		μs
			$T_{\text{vj}} = 125 \text{ }^\circ\text{C}$	0.190		
			$T_{\text{vj}} = 175 \text{ }^\circ\text{C}$	0.250		
Turn-on energy loss per pulse	E_{on}	$I_C = 100 \text{ A}$, $V_{\text{CE}} = 600 \text{ V}$, $L_\sigma = 35 \text{ nH}$, $V_{\text{GE}} = \pm 15 \text{ V}$, $R_{\text{Gon}} = 4.3 \Omega$, $di/dt = 1100 \text{ A}/\mu\text{s}$ ($T_{\text{vj}} = 175 \text{ }^\circ\text{C}$)	$T_{\text{vj}} = 25 \text{ }^\circ\text{C}$	7.12		mJ
			$T_{\text{vj}} = 125 \text{ }^\circ\text{C}$	11.7		
			$T_{\text{vj}} = 175 \text{ }^\circ\text{C}$	14.5		
Turn-off energy loss per pulse	E_{off}	$I_C = 100 \text{ A}$, $V_{\text{CE}} = 600 \text{ V}$, $L_\sigma = 35 \text{ nH}$, $V_{\text{GE}} = \pm 15 \text{ V}$, $R_{\text{Goff}} = 4.3 \Omega$, $dv/dt = 2800 \text{ V}/\mu\text{s}$ ($T_{\text{vj}} = 175 \text{ }^\circ\text{C}$)	$T_{\text{vj}} = 25 \text{ }^\circ\text{C}$	6.93		mJ
			$T_{\text{vj}} = 125 \text{ }^\circ\text{C}$	10.6		
			$T_{\text{vj}} = 175 \text{ }^\circ\text{C}$	13.3		
SC data	I_{SC}	$V_{\text{GE}} \leq 15 \text{ V}$, $V_{\text{CC}} = 800 \text{ V}$, $V_{\text{CEmax}} = V_{\text{CES}} - L_{\text{SCE}} \cdot di/dt$	$t_P \leq 8 \mu\text{s}$, $T_{\text{vj}} = 150 \text{ }^\circ\text{C}$	370		A
			$t_P \leq 7 \mu\text{s}$, $T_{\text{vj}} = 175 \text{ }^\circ\text{C}$	350		
Thermal resistance, junction to heatsink	R_{thJH}	per IGBT, Valid with IFX pre-applied Thermal Interface Material			0.474	K/W
Temperature under switching conditions	$T_{\text{vj op}}$		-40		175	$^\circ\text{C}$

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

6 Diode, Brake-Chopper

Table 11 Maximum rated values

Parameter	Symbol	Note or test condition		Values	Unit
Repetitive peak reverse voltage	V_{RRM}		$T_{\text{vj}} = 25 \text{ }^\circ\text{C}$	1200	V
Continuous DC forward current	I_F			50	A
Repetitive peak forward current	I_{FRM}	$t_P = 1 \text{ ms}$		100	A
I^2t - value	I^2t	$V_R = 0 \text{ V}$, $t_P = 10 \text{ ms}$	$T_{\text{vj}} = 125 \text{ }^\circ\text{C}$	220	A^2s
			$T_{\text{vj}} = 175 \text{ }^\circ\text{C}$	200	

Table 12 Characteristic values

Parameter	Symbol	Note or test condition	Values			Unit
			Min.	Typ.	Max.	
Forward voltage	V_F	$I_F = 50 \text{ A}$, $V_{GE} = 0 \text{ V}$	$T_{vj} = 25 \text{ °C}$	1.72	2.10	V
			$T_{vj} = 125 \text{ °C}$	1.59		
			$T_{vj} = 175 \text{ °C}$	1.52		
Peak reverse recovery current	I_{RM}	$I_F = 50 \text{ A}$, $V_R = 600 \text{ V}$, $V_{GE} = -15 \text{ V}$, $-di_F/dt = 550 \text{ A}/\mu\text{s}$ ($T_{vj} = 175 \text{ °C}$)	$T_{vj} = 25 \text{ °C}$	37.3		A
			$T_{vj} = 125 \text{ °C}$	44.3		
			$T_{vj} = 175 \text{ °C}$	49.6		
Recovered charge	Q_r	$I_F = 50 \text{ A}$, $V_R = 600 \text{ V}$, $V_{GE} = -15 \text{ V}$, $-di_F/dt = 550 \text{ A}/\mu\text{s}$ ($T_{vj} = 175 \text{ °C}$)	$T_{vj} = 25 \text{ °C}$	3.86		μC
			$T_{vj} = 125 \text{ °C}$	7.05		
			$T_{vj} = 175 \text{ °C}$	10.1		
Reverse recovery energy	E_{rec}	$I_F = 50 \text{ A}$, $V_R = 600 \text{ V}$, $V_{GE} = -15 \text{ V}$, $-di_F/dt = 550 \text{ A}/\mu\text{s}$ ($T_{vj} = 175 \text{ °C}$)	$T_{vj} = 25 \text{ °C}$	1.13		mJ
			$T_{vj} = 125 \text{ °C}$	2.34		
			$T_{vj} = 175 \text{ °C}$	3.23		
Thermal resistance, junction to heatsink	R_{thJH}	per diode, Valid with IFX pre-applied Thermal Interface Material			1.07	K/W
Temperature under switching conditions	$T_{vj op}$		-40		175	°C

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

7 NTC-Thermistor

Table 13 Characteristic values

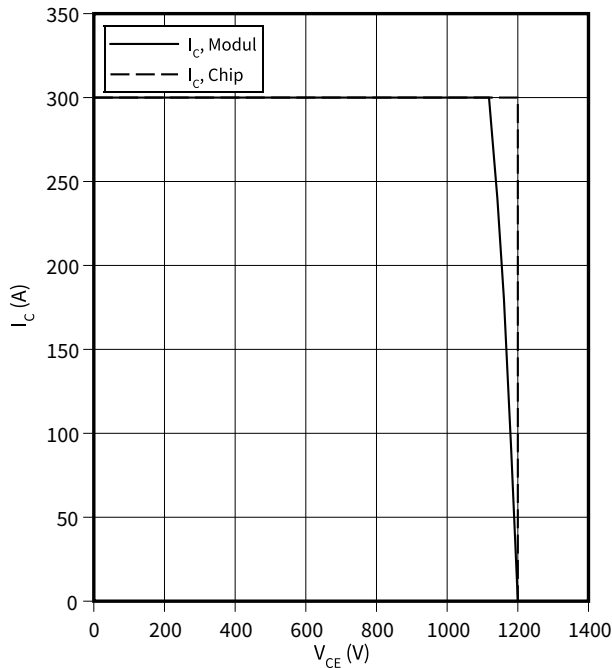
Parameter	Symbol	Note or test condition	Values			Unit
			Min.	Typ.	Max.	
Rated resistance	R_{25}	$T_{NTC} = 25 \text{ °C}$		5		k Ω
Deviation of R_{100}	$\Delta R/R$	$T_{NTC} = 100 \text{ °C}$, $R_{100} = 493 \text{ }\Omega$	-5		5	%
Power dissipation	P_{25}	$T_{NTC} = 25 \text{ °C}$			20	mW
B-value	$B_{25/50}$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

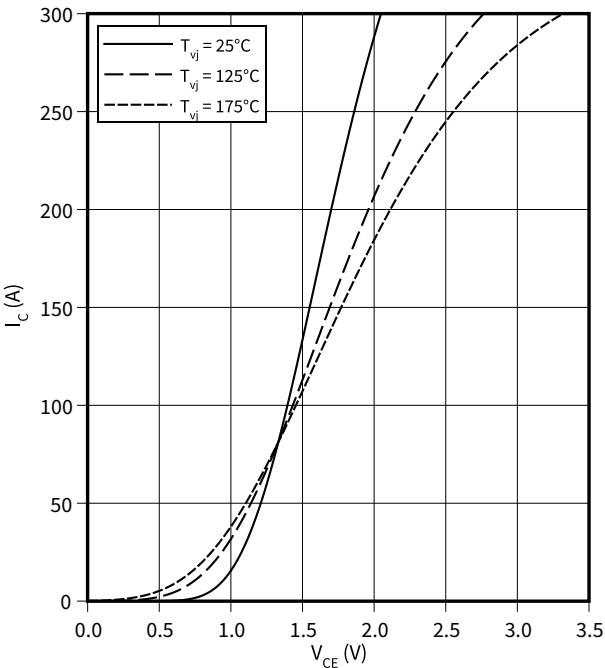
reverse bias safe operating area (RBSOA), IGBT, Inverter

$I_C = f(V_{CE})$
 $R_{Goff} = 3.3 \Omega$, $V_{GE} = 15 \text{ V}$, $T_{vj} = 175 \text{ }^\circ\text{C}$



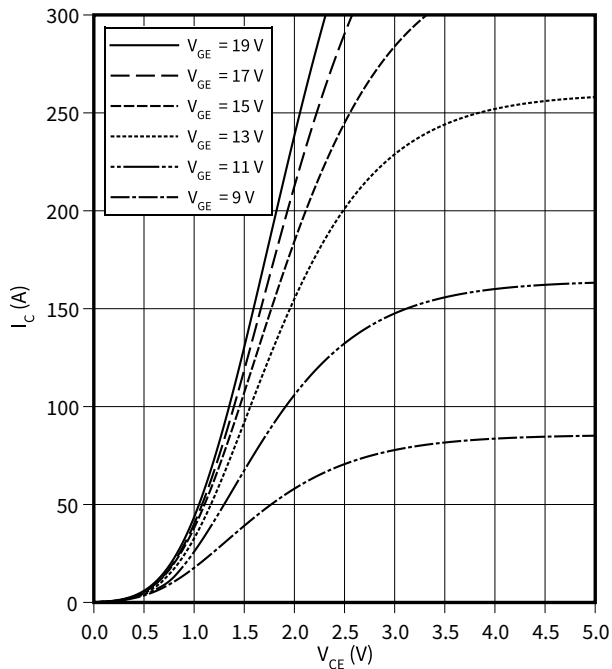
output characteristic (typical), IGBT, Inverter

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



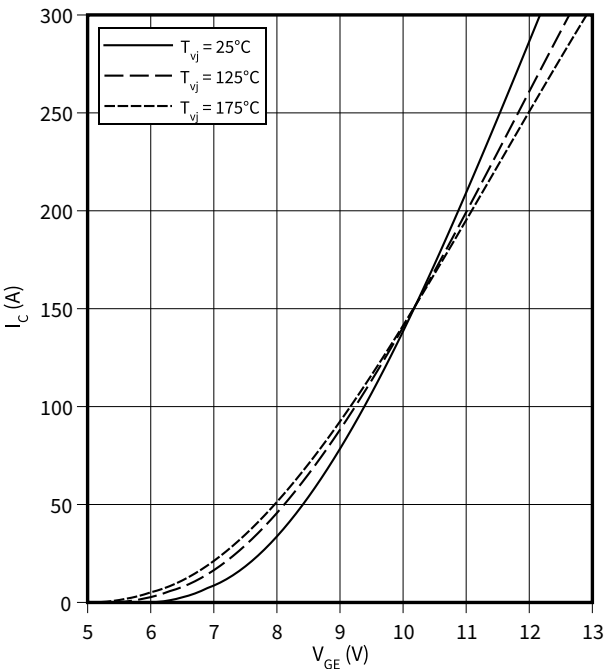
output characteristic (typical), IGBT, Inverter

$I_C = f(V_{CE})$
 $T_{vj} = 175 \text{ }^\circ\text{C}$



transfer characteristic (typical), IGBT, Inverter

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

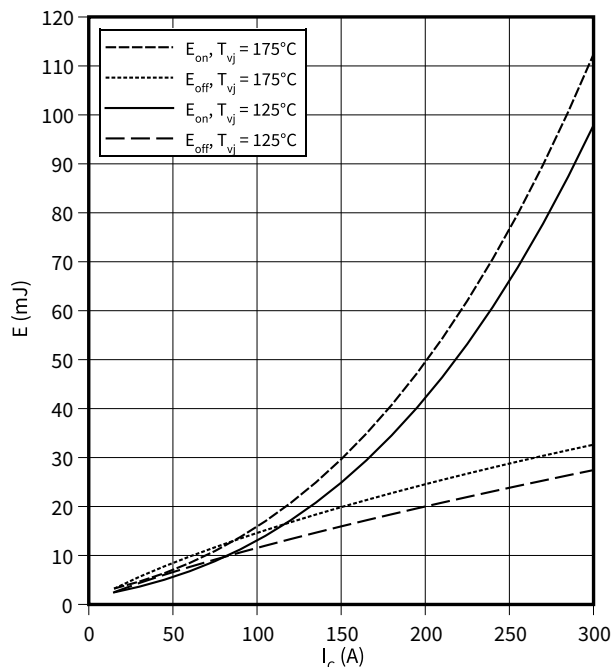


8 Characteristics diagrams

switching losses (typical), IGBT, Inverter

$$E = f(I_C)$$

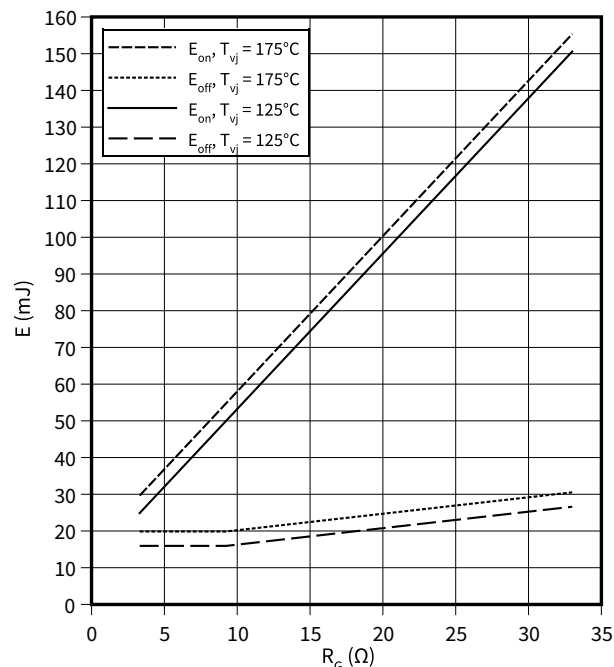
$R_{Goff} = 3.3 \Omega$, $R_{Gon} = 3.3 \Omega$, $V_{CE} = 600 \text{ V}$, $V_{GE} = -15 / 15 \text{ V}$



switching losses (typical), IGBT, Inverter

$$E = f(R_G)$$

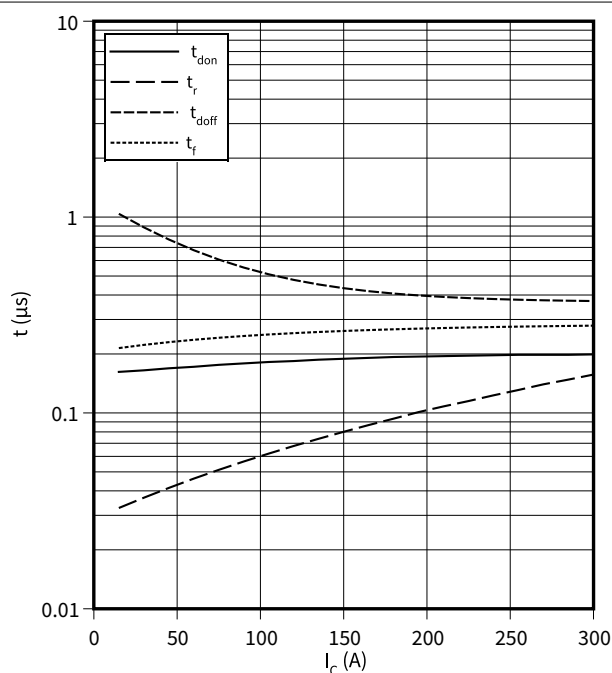
$I_C = 150 \text{ A}$, $V_{CE} = 600 \text{ V}$, $V_{GE} = -15 / 15 \text{ V}$



switching times (typical), IGBT, Inverter

$$t = f(I_C)$$

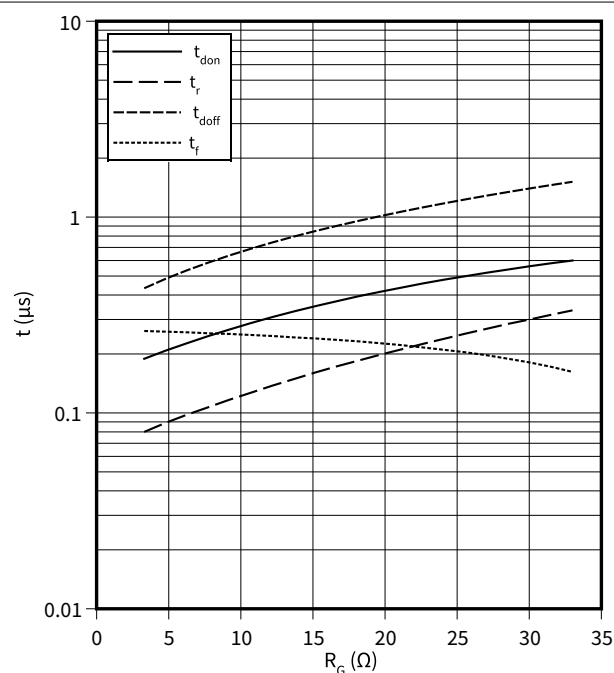
$R_{Goff} = 3.3 \Omega$, $R_{Gon} = 3.3 \Omega$, $V_{CE} = 600 \text{ V}$, $V_{GE} = -15 / 15 \text{ V}$, $T_{vj} = 175^\circ\text{C}$



switching times (typical), IGBT, Inverter

$$t = f(R_G)$$

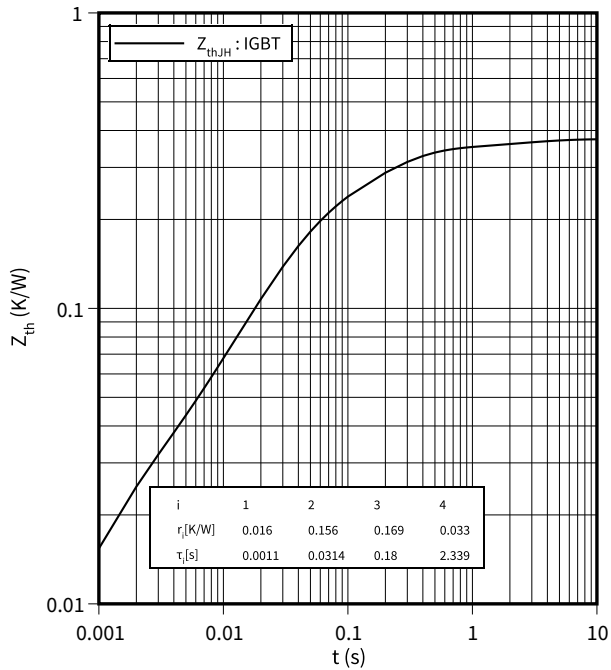
$I_C = 150 \text{ A}$, $V_{CE} = 600 \text{ V}$, $V_{GE} = -15 / 15 \text{ V}$, $T_{vj} = 175^\circ\text{C}$



8 Characteristics diagrams

transient thermal impedance , IGBT, Inverter

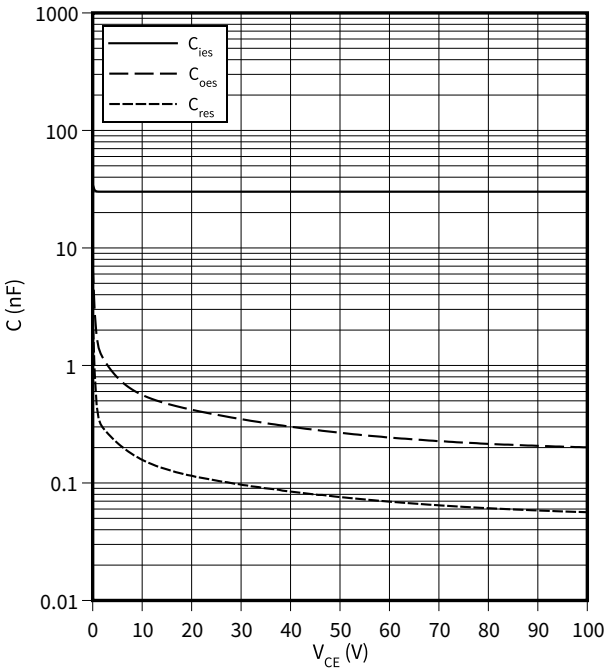
$Z_{th} = f(t)$



capacity characteristic (typical), IGBT, Inverter

$C = f(V_{CE})$

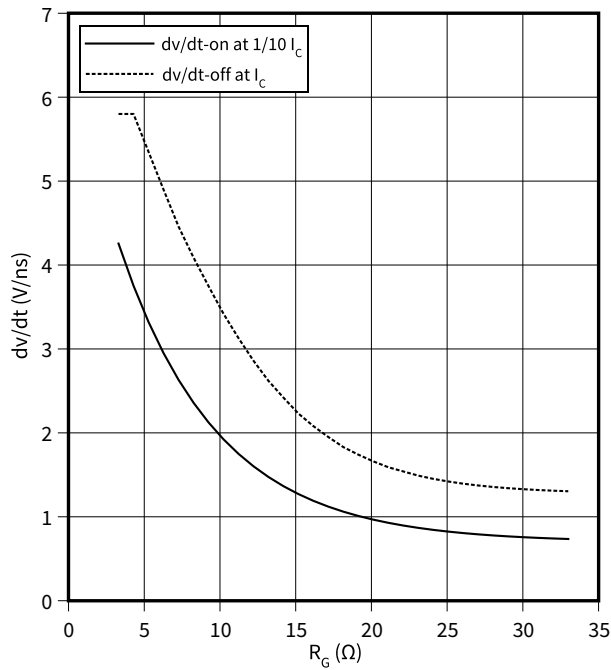
$f = 100 \text{ kHz}, V_{GE} = 0 \text{ V}, T_{vj} = 25 \text{ }^\circ\text{C}$



Voltage slope (typical), IGBT, Inverter

$dv/dt = f(R_G)$

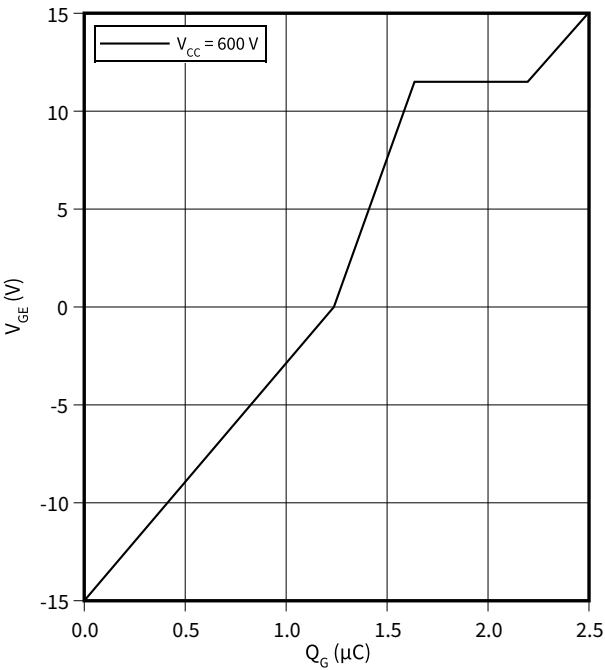
$I_C = 150 \text{ A}, V_{CE} = 600 \text{ V}, V_{GE} = \pm 15 \text{ V}, T_{vj} = 25 \text{ }^\circ\text{C}$



gate charge characteristic (typical), IGBT, Inverter

$V_{GE} = f(Q_G)$

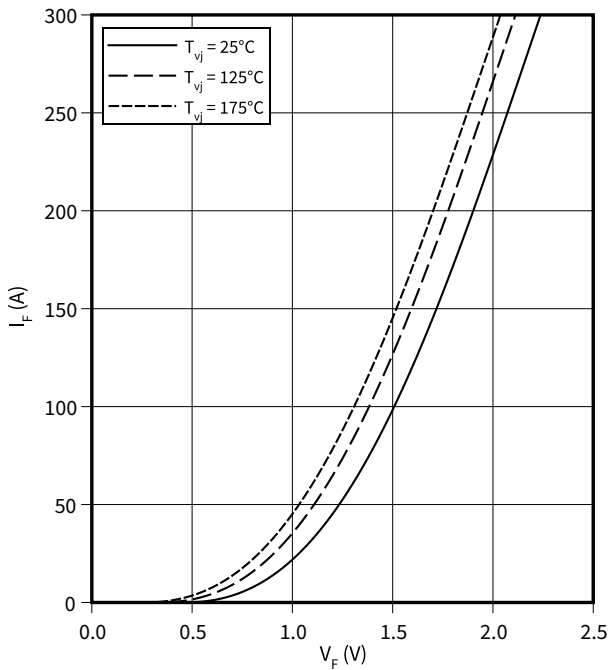
$I_C = 150 \text{ A}, T_{vj} = 25 \text{ }^\circ\text{C}$



8 Characteristics diagrams

forward characteristic (typical), Diode, Inverter

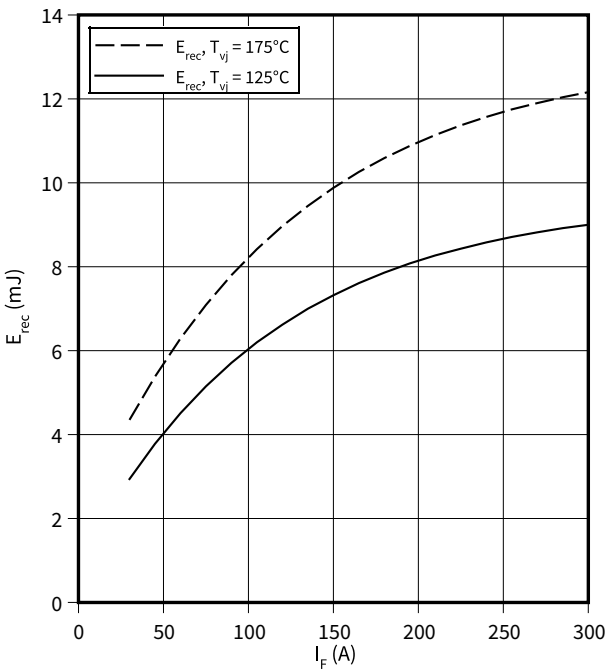
$I_F = f(V_F)$



switching losses (typical), Diode, Inverter

$E_{rec} = f(I_F)$

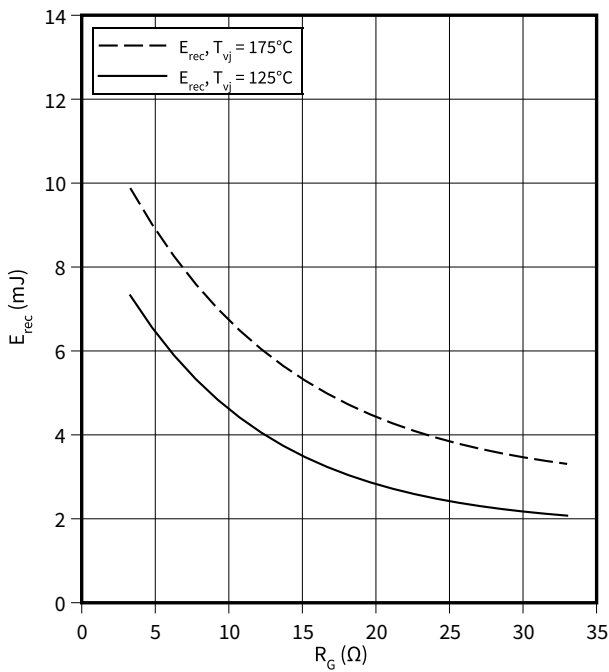
$R_{Gon} = 3.3\ \Omega, V_{CE} = 600\ \text{V}$



switching losses (typical), Diode, Inverter

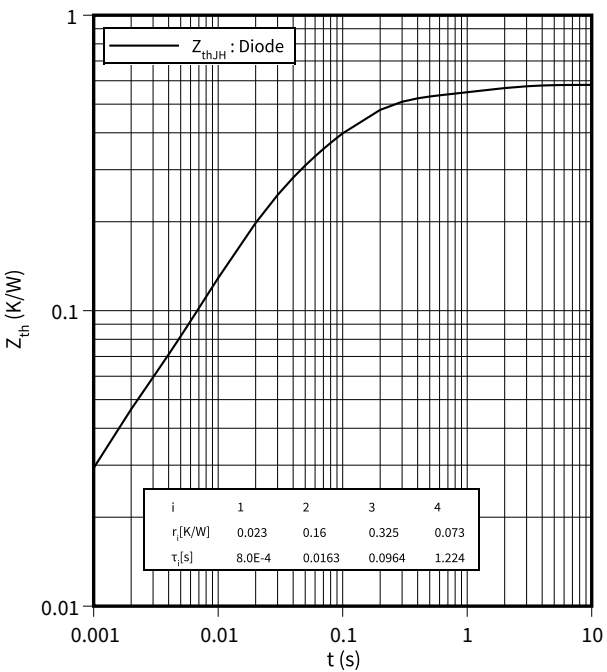
$E_{rec} = f(R_G)$

$V_{CE} = 600\ \text{V}, I_F = 150\ \text{A}$



transient thermal impedance , Diode, Inverter

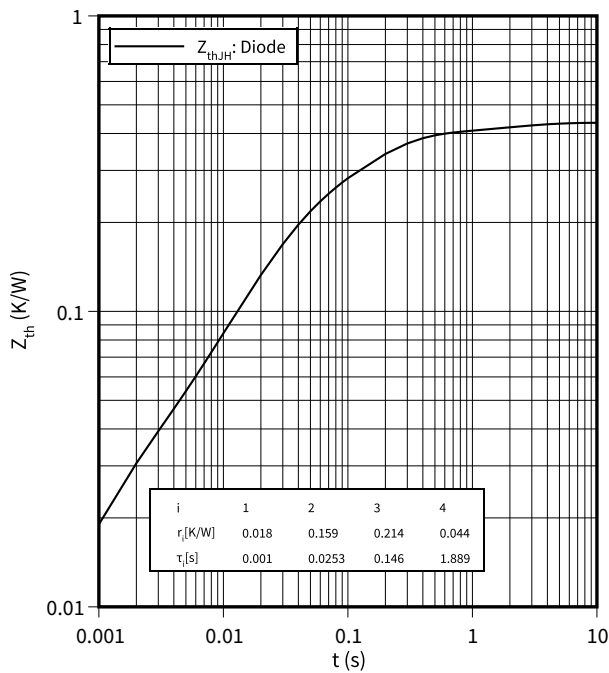
$Z_{th} = f(t)$



8 Characteristics diagrams

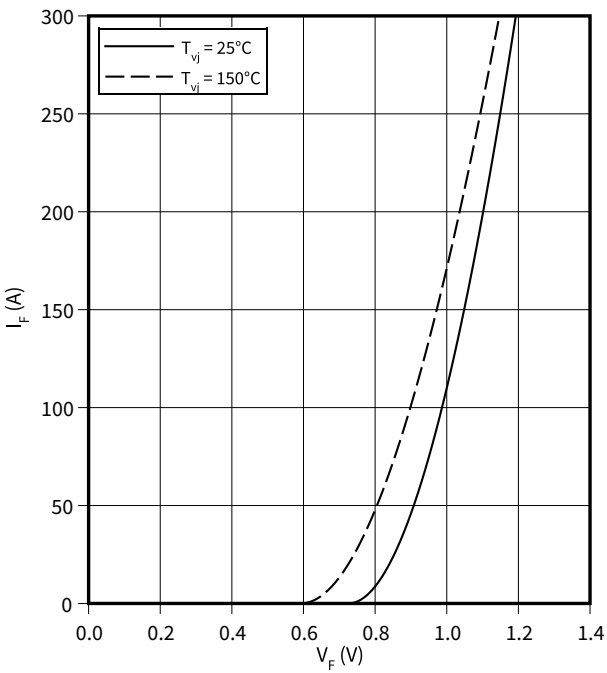
transient thermal impedance , Diode, Rectifier

$Z_{th} = f(t)$



forward characteristic (typical), Diode, Rectifier

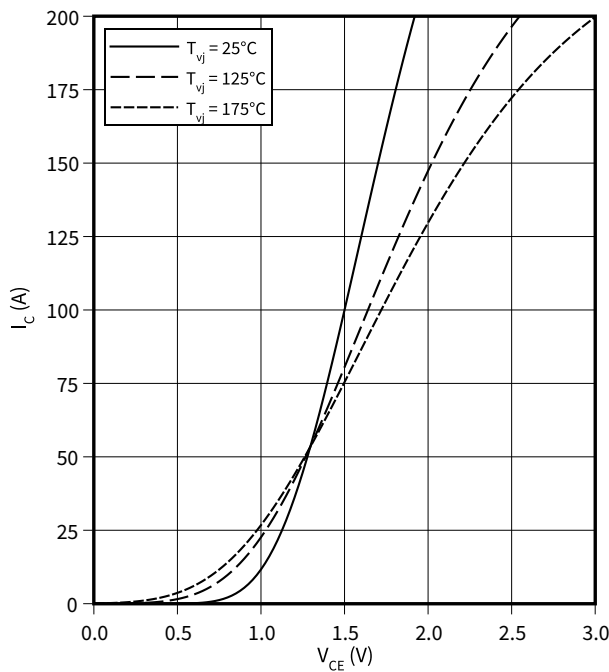
$I_F = f(V_F)$



output characteristic (typical), IGBT, Brake-Chopper

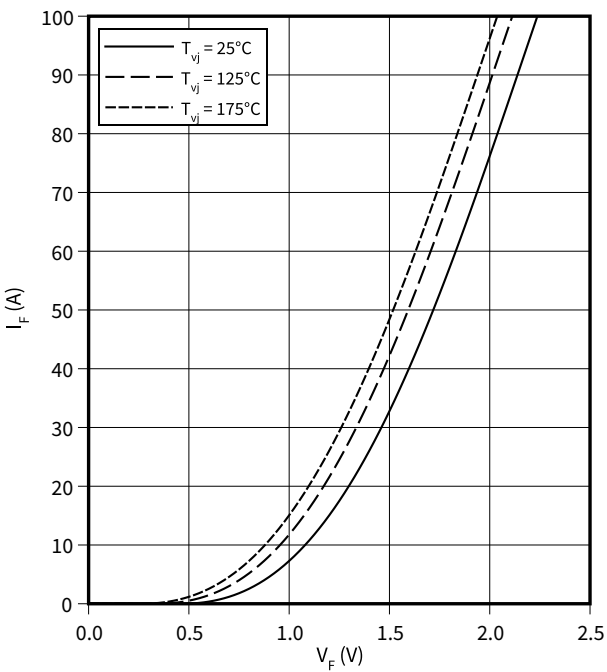
$I_C = f(V_{CE})$

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



forward characteristic (typical), Diode, Brake-Chopper

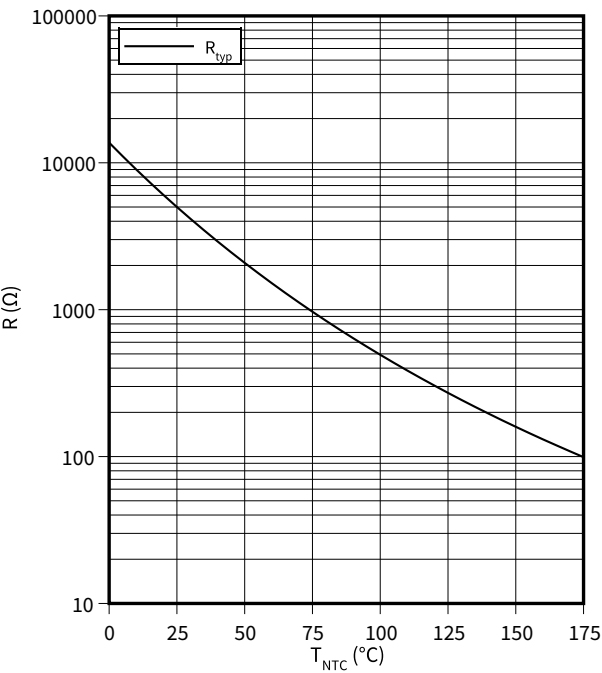
$I_F = f(V_F)$



8 Characteristics diagrams

temperature characteristic (typical), NTC-Thermistor

$R = f(T_{NTC})$



9 Circuit diagram

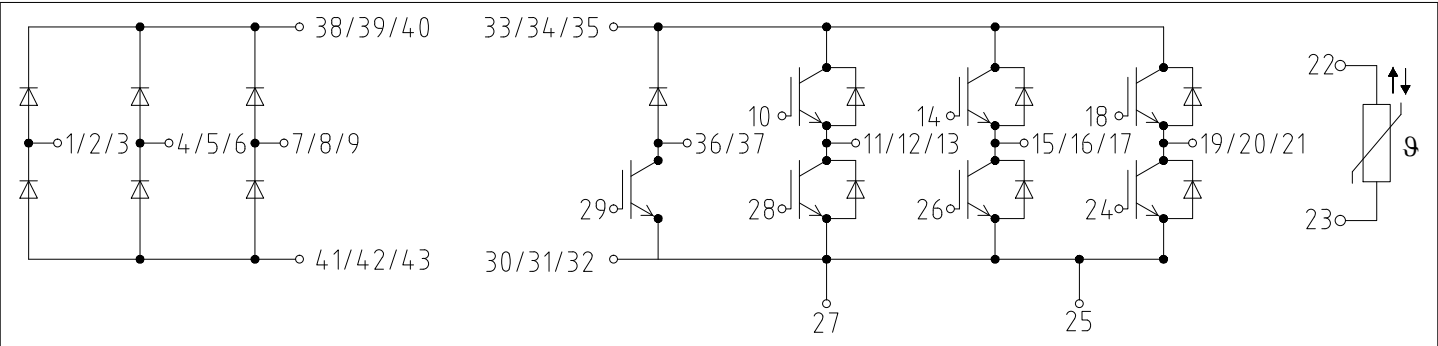


Figure 2

10 Package outlines

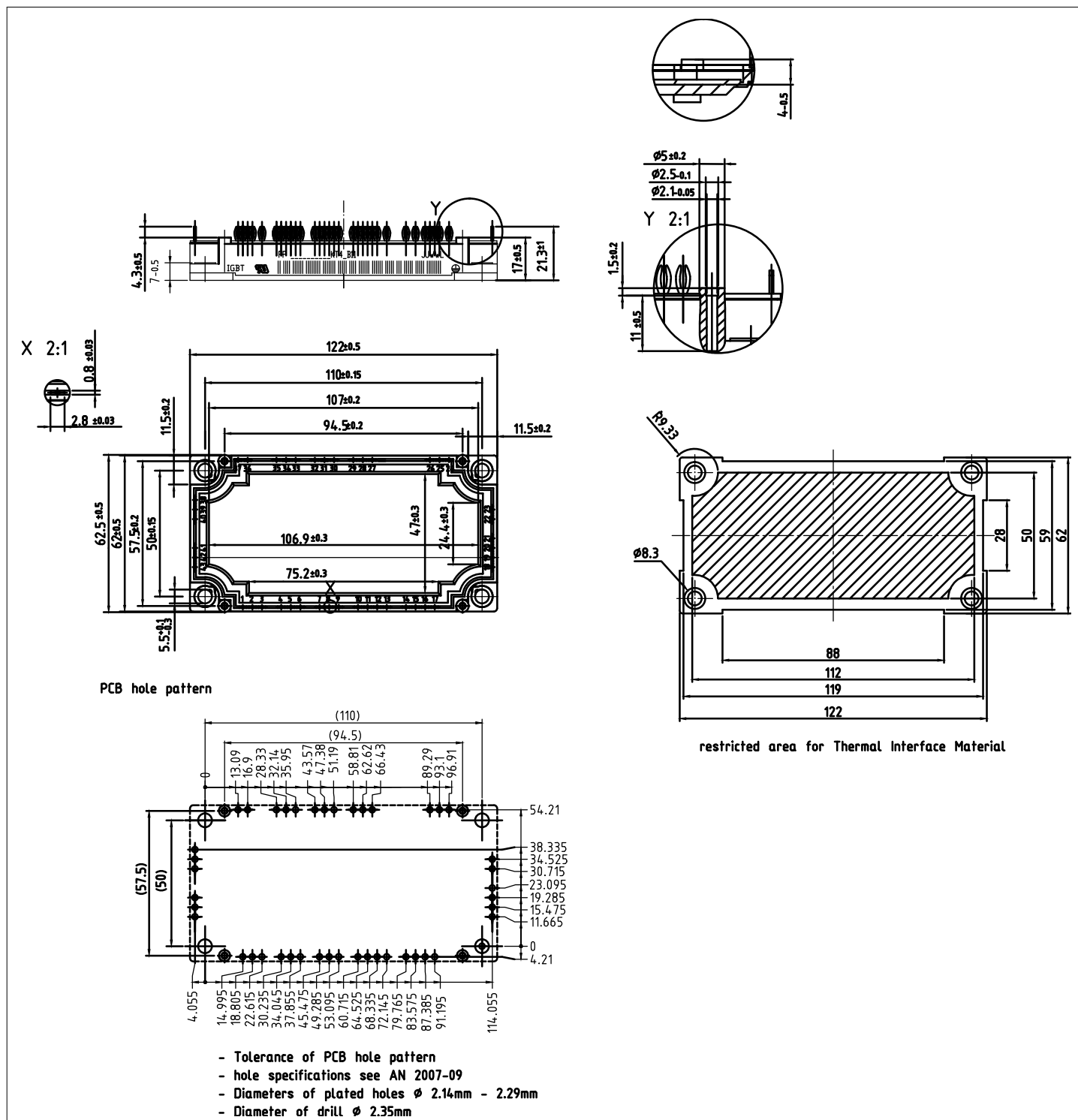


Figure 3

Revision history

Revision history

Document revision	Date of release	Description of changes
1.00	2021-09-22	Initial version

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