

## 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  $175^\circ\text{C}$
  - Low  $V_{CE,\text{sat}}$
- Mechanical features
  - Integrated NTC temperature sensor
  - PressFIT contact technology
  - Copper base plate
  - $\text{Al}_2\text{O}_3$  substrate with low thermal resistance
  - Pre-applied thermal interface material



Typical appearance

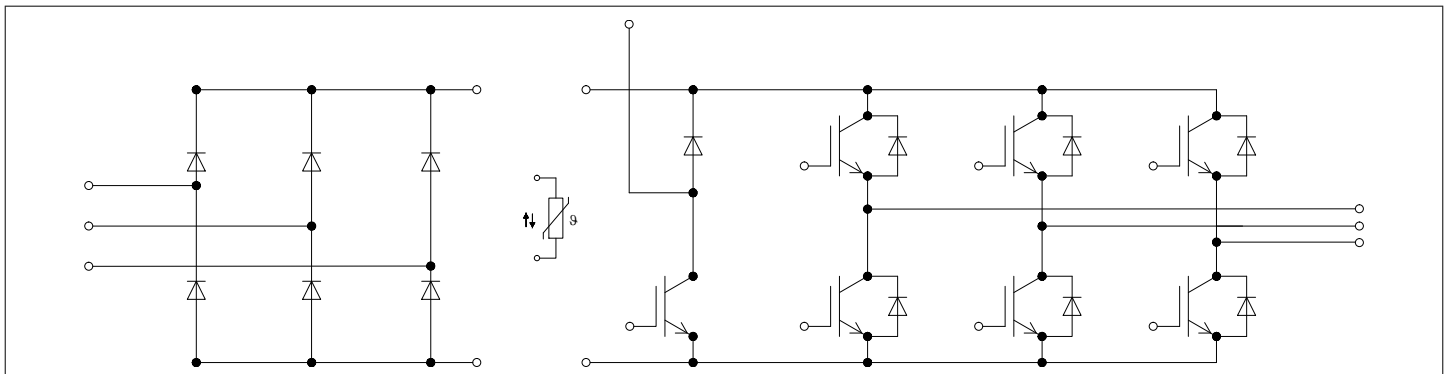
### Potential applications

- 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)	$\text{Al}_2\text{O}_3$	
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	$V_{CE\ sat}$	$I_C = 150\ A, V_{GE} = 15\ V$	$T_{vj} = 25\ ^\circ C$	1.55	1.80	V
			$T_{vj} = 125\ ^\circ C$	1.69		
			$T_{vj} = 175\ ^\circ C$	1.77		
Gate threshold voltage	$V_{GEth}$	$I_C = 3.5\ mA, V_{CE} = V_{GE}, T_{vj} = 25\ ^\circ C$	5.15	5.80	6.45	V
Gate charge	$Q_G$	$V_{GE} = \pm 15\ V, V_{CE} = 600\ V$		2.5		$\mu C$
Internal gate resistor	$R_{Gint}$	$T_{vj} = 25\ ^\circ C$		1		$\Omega$
Input capacitance	$C_{ies}$	$f = 100\ kHz, T_{vj} = 25\ ^\circ C, V_{CE} = 25\ V, V_{GE} = 0\ V$		30.1		nF
Reverse transfer capacitance	$C_{res}$	$f = 100\ kHz, T_{vj} = 25\ ^\circ C, V_{CE} = 25\ V, V_{GE} = 0\ V$		0.105		nF
Collector-emitter cut-off current	$I_{CES}$	$V_{CE} = 1200\ V, V_{GE} = 0\ V$			0.012	mA
Gate-emitter leakage current	$I_{GES}$	$V_{CE} = 0\ V, V_{GE} = 20\ V, T_{vj} = 25\ ^\circ C$			100	nA
Turn-on delay time (inductive load)	$t_{don}$	$I_C = 150\ A, V_{CE} = 600\ V, V_{GE} = \pm 15\ V, R_{Gon} = 3.3\ \Omega$	$T_{vj} = 25\ ^\circ C$	0.172		$\mu s$
			$T_{vj} = 125\ ^\circ C$	0.183		
			$T_{vj} = 175\ ^\circ C$	0.189		
Rise time (inductive load)	$t_r$	$I_C = 150\ A, V_{CE} = 600\ V, V_{GE} = \pm 15\ V, R_{Gon} = 3.3\ \Omega$	$T_{vj} = 25\ ^\circ C$	0.072		$\mu s$
			$T_{vj} = 125\ ^\circ C$	0.077		
			$T_{vj} = 175\ ^\circ C$	0.080		
Turn-off delay time (inductive load)	$t_{doff}$	$I_C = 150\ A, V_{CE} = 600\ V, V_{GE} = \pm 15\ V, R_{Goff} = 3.3\ \Omega$	$T_{vj} = 25\ ^\circ C$	0.331		$\mu s$
			$T_{vj} = 125\ ^\circ C$	0.414		
			$T_{vj} = 175\ ^\circ C$	0.433		
Fall time (inductive load)	$t_f$	$I_C = 150\ A, V_{CE} = 600\ V, V_{GE} = \pm 15\ V, R_{Goff} = 3.3\ \Omega$	$T_{vj} = 25\ ^\circ C$	0.103		$\mu s$
			$T_{vj} = 125\ ^\circ C$	0.198		
			$T_{vj} = 175\ ^\circ C$	0.262		
Turn-on energy loss per pulse	$E_{on}$	$I_C = 150\ A, V_{CE} = 600\ V, L_\sigma = 35\ nH, V_{GE} = \pm 15\ V, R_{Gon} = 3.3\ \Omega, di/dt = 1700\ A/\mu s (T_{vj} = 175\ ^\circ C)$	$T_{vj} = 25\ ^\circ C$	16.6		mJ
			$T_{vj} = 125\ ^\circ C$	24.9		
			$T_{vj} = 175\ ^\circ C$	29.6		
Turn-off energy loss per pulse	$E_{off}$	$I_C = 150\ A, V_{CE} = 600\ V, L_\sigma = 35\ nH, V_{GE} = \pm 15\ V, R_{Goff} = 3.3\ \Omega, dv/dt = 3200\ V/\mu s (T_{vj} = 175\ ^\circ C)$	$T_{vj} = 25\ ^\circ C$	10.4		mJ
			$T_{vj} = 125\ ^\circ C$	15.9		
			$T_{vj} = 175\ ^\circ C$	19.9		

**Table 4** Characteristic values (continued)

Parameter	Symbol	Note or test condition	Values			Unit
			Min.	Typ.	Max.	
SC data	$I_{SC}$	$V_{GE} \leq 15 \text{ V}, V_{CC} = 800 \text{ V}, V_{CEmax} = V_{CES} - L_{sCE} * di/dt$	$t_p \leq 8 \mu\text{s}, T_{vj} = 150 \text{ }^\circ\text{C}$		520	A
			$t_p \leq 7 \mu\text{s}, T_{vj} = 175 \text{ }^\circ\text{C}$		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	$T_{vjop}$		-40		175	$^\circ\text{C}$

Note:  $T_{vjop} > 150^\circ\text{C}$  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	
Continuous 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	$\text{A}^2\text{s}$
			$T_{vj} = 175 \text{ }^\circ\text{C}$	2250	

**Table 6** Characteristic values

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

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	$\text{A}^2\text{s}$
			$T_{vj} = 150\text{ °C}$	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	$I_{CES}$	$V_{CE} = 1200\text{ V}, V_{GE} = 0\text{ V}$			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)	$t_{don}$	$I_C = 100\text{ A}, V_{CE} = 600\text{ V}, V_{GE} = \pm 15\text{ V}, R_{Gon} = 4.3\text{ }\Omega$	$T_{vj} = 25\text{ °C}$	0.169		µs
			$T_{vj} = 125\text{ °C}$	0.180		
			$T_{vj} = 175\text{ °C}$	0.187		
Rise time (inductive load)	$t_r$	$I_C = 100\text{ A}, V_{CE} = 600\text{ V}, V_{GE} = \pm 15\text{ V}, R_{Gon} = 4.3\text{ }\Omega$	$T_{vj} = 25\text{ °C}$	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)	$t_{doff}$	$I_C = 100\text{ A}, V_{CE} = 600\text{ V}, V_{GE} = \pm 15\text{ V}, R_{Goff} = 4.3\ \Omega$	$T_{vj} = 25\text{ }^\circ\text{C}$	0.310		$\mu\text{s}$
			$T_{vj} = 125\text{ }^\circ\text{C}$	0.390		
			$T_{vj} = 175\text{ }^\circ\text{C}$	0.410		
Fall time (inductive load)	$t_f$	$I_C = 100\text{ A}, V_{CE} = 600\text{ V}, V_{GE} = \pm 15\text{ V}, R_{Goff} = 4.3\ \Omega$	$T_{vj} = 25\text{ }^\circ\text{C}$	0.110		$\mu\text{s}$
			$T_{vj} = 125\text{ }^\circ\text{C}$	0.190		
			$T_{vj} = 175\text{ }^\circ\text{C}$	0.250		
Turn-on energy loss per pulse	$E_{on}$	$I_C = 100\text{ A}, V_{CE} = 600\text{ V}, L_\sigma = 35\text{ nH}, V_{GE} = \pm 15\text{ V}, R_{Gon} = 4.3\ \Omega, di/dt = 1100\text{ A}/\mu\text{s} (T_{vj} = 175\text{ }^\circ\text{C})$	$T_{vj} = 25\text{ }^\circ\text{C}$	7.12		mJ
			$T_{vj} = 125\text{ }^\circ\text{C}$	11.7		
			$T_{vj} = 175\text{ }^\circ\text{C}$	14.5		
Turn-off energy loss per pulse	$E_{off}$	$I_C = 100\text{ A}, V_{CE} = 600\text{ V}, L_\sigma = 35\text{ nH}, V_{GE} = \pm 15\text{ V}, R_{Goff} = 4.3\ \Omega, dv/dt = 2800\text{ V}/\mu\text{s} (T_{vj} = 175\text{ }^\circ\text{C})$	$T_{vj} = 25\text{ }^\circ\text{C}$	6.93		mJ
			$T_{vj} = 125\text{ }^\circ\text{C}$	10.6		
			$T_{vj} = 175\text{ }^\circ\text{C}$	13.3		
SC data	$I_{SC}$	$V_{GE} \leq 15\text{ V}, V_{CC} = 800\text{ V}, V_{CEmax} = V_{CES} - L_{sCE} \cdot di/dt$	$t_p \leq 8\ \mu\text{s}, T_{vj} = 150\text{ }^\circ\text{C}$	370		A
			$t_p \leq 7\ \mu\text{s}, T_{vj} = 175\text{ }^\circ\text{C}$	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	$T_{vj\ op}$		-40		175	$^\circ\text{C}$

Note:  $T_{vj\ op} > 150\text{ }^\circ\text{C}$  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	$V_{RRM}$	$T_{vj} = 25\text{ }^\circ\text{C}$	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	$I^2t$	$V_R = 0\text{ V}, t_p = 10\text{ ms}$	$T_{vj} = 125\text{ }^\circ\text{C}$	220	$\text{A}^2\text{s}$
			$T_{vj} = 175\text{ }^\circ\text{C}$	200	



**Table 12** Characteristic values

Parameter	Symbol	Note or test condition	Values			Unit	
			Min.	Typ.	Max.		
Forward voltage	$V_F$	$I_F = 50 \text{ A}, V_{GE} = 0 \text{ V}$	$T_{vj} = 25 \text{ }^\circ\text{C}$		1.72	2.10	V
			$T_{vj} = 125 \text{ }^\circ\text{C}$		1.59		
			$T_{vj} = 175 \text{ }^\circ\text{C}$		1.52		
Peak reverse recovery current	$I_{RM}$	$I_F = 50 \text{ A}, V_R = 600 \text{ V}, V_{GE} = -15 \text{ V}, -di_F/dt = 550 \text{ A}/\mu\text{s} (T_{vj} = 175 \text{ }^\circ\text{C})$	$T_{vj} = 25 \text{ }^\circ\text{C}$		37.3		A
			$T_{vj} = 125 \text{ }^\circ\text{C}$		44.3		
			$T_{vj} = 175 \text{ }^\circ\text{C}$		49.6		
Recovered charge	$Q_r$	$I_F = 50 \text{ A}, V_R = 600 \text{ V}, V_{GE} = -15 \text{ V}, -di_F/dt = 550 \text{ A}/\mu\text{s} (T_{vj} = 175 \text{ }^\circ\text{C})$	$T_{vj} = 25 \text{ }^\circ\text{C}$		3.86		$\mu\text{C}$
			$T_{vj} = 125 \text{ }^\circ\text{C}$		7.05		
			$T_{vj} = 175 \text{ }^\circ\text{C}$		10.1		
Reverse recovery energy	$E_{rec}$	$I_F = 50 \text{ A}, V_R = 600 \text{ V}, V_{GE} = -15 \text{ V}, -di_F/dt = 550 \text{ A}/\mu\text{s} (T_{vj} = 175 \text{ }^\circ\text{C})$	$T_{vj} = 25 \text{ }^\circ\text{C}$		1.13		mJ
			$T_{vj} = 125 \text{ }^\circ\text{C}$		2.34		
			$T_{vj} = 175 \text{ }^\circ\text{C}$		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	$T_{vj\text{op}}$			-40		175	$^\circ\text{C}$

Note:  $T_{vj\text{op}} > 150^\circ\text{C}$  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	$R_{25}$	$T_{NTC} = 25 \text{ }^\circ\text{C}$		5		k $\Omega$
Deviation of $R_{100}$	$\Delta R/R$	$T_{NTC} = 100 \text{ }^\circ\text{C}, R_{100} = 493 \text{ } \Omega$	-5		5	%
Power dissipation	$P_{25}$	$T_{NTC} = 25 \text{ }^\circ\text{C}$			20	mW
B-value	$B_{25/50}$	$R_2 = R_{25} \exp[B_{25/50}(1/T_2 - 1/(298,15 \text{ K}))]$		3375		K
B-value	$B_{25/80}$	$R_2 = R_{25} \exp[B_{25/80}(1/T_2 - 1/(298,15 \text{ K}))]$		3411		K
B-value	$B_{25/100}$	$R_2 = R_{25} \exp[B_{25/100}(1/T_2 - 1/(298,15 \text{ K}))]$		3433		K

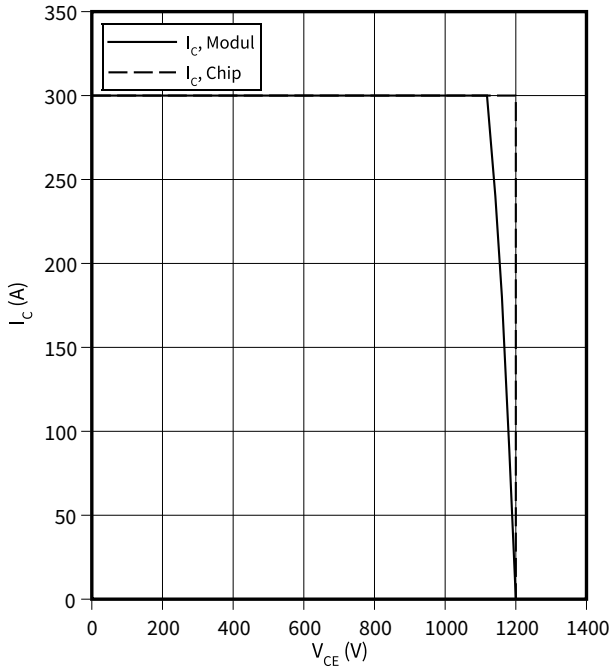
Note: Specification according to the valid application note.

## 8 Characteristics diagrams

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

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

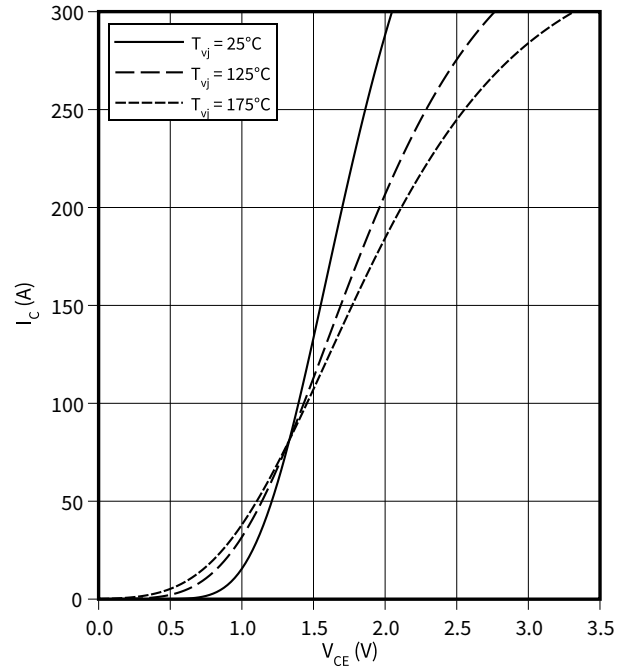
$R_{Goff} = 3.3 \Omega$ ,  $V_{GE} = 15 \text{ V}$ ,  $T_{vj} = 175 \text{ }^\circ\text{C}$



### output characteristic (typical), IGBT, Inverter

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

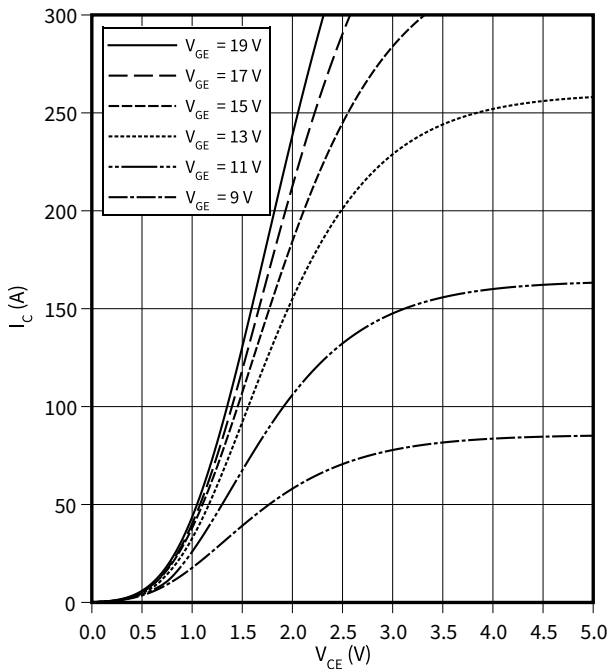
$V_{GE} = 15 \text{ V}$



### output characteristic (typical), IGBT, Inverter

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

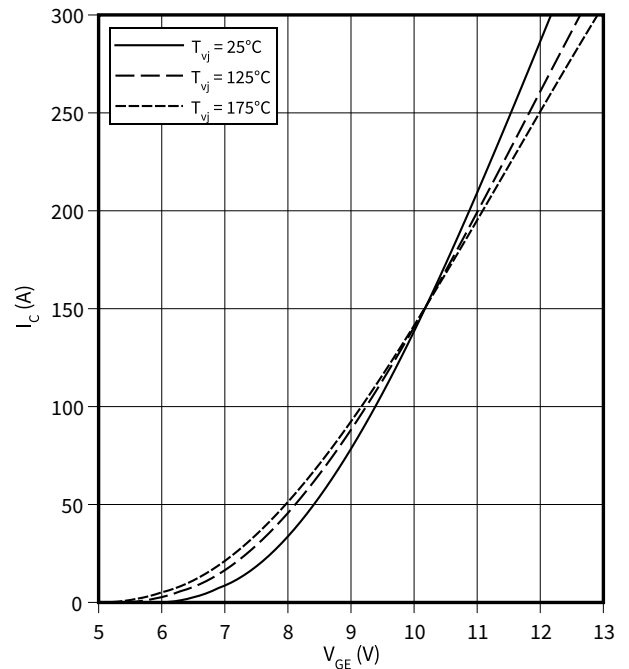
$T_{vj} = 175 \text{ }^\circ\text{C}$



### transfer characteristic (typical), IGBT, Inverter

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

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

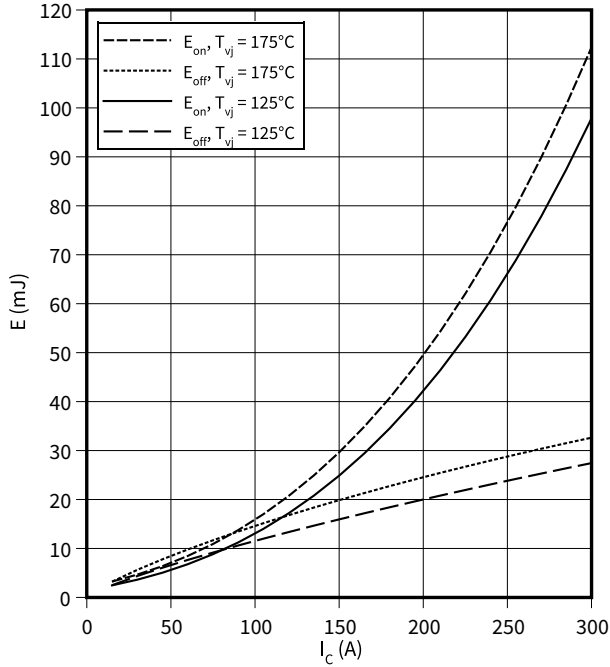


8 Characteristics diagrams

**switching losses (typical), IGBT, Inverter**

$E = f(I_C)$

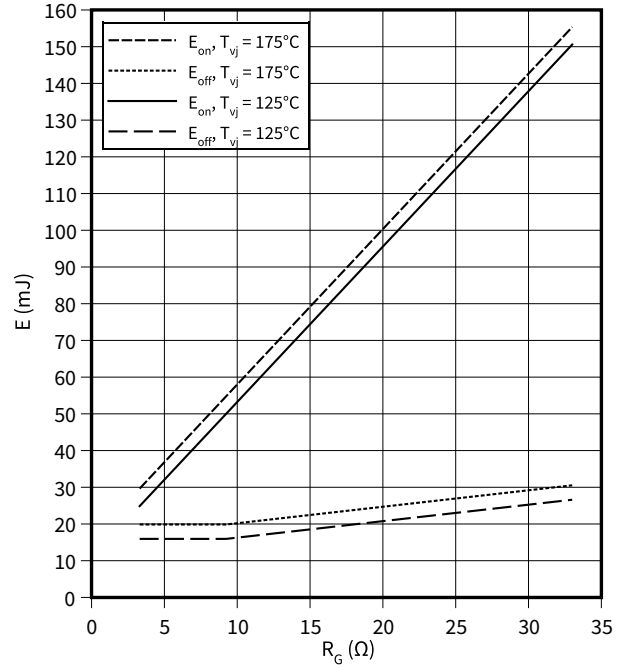
$R_{Goff} = 3.3 \Omega$ ,  $R_{Gon} = 3.3 \Omega$ ,  $V_{CE} = 600 \text{ V}$ ,  $V_{GE} = -15 / 15 \text{ V}$



**switching losses (typical), IGBT, Inverter**

$E = f(R_G)$

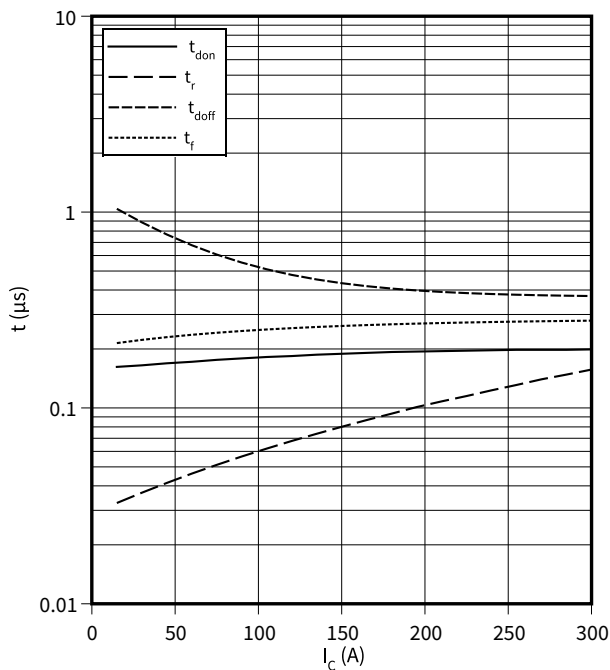
$I_C = 150 \text{ A}$ ,  $V_{CE} = 600 \text{ V}$ ,  $V_{GE} = -15 / 15 \text{ V}$



**switching times (typical), IGBT, Inverter**

$t = f(I_C)$

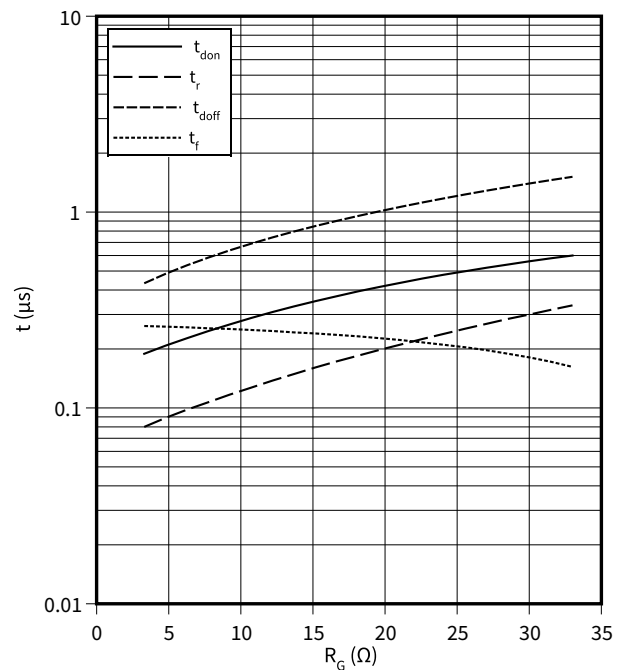
$R_{Goff} = 3.3 \Omega$ ,  $R_{Gon} = 3.3 \Omega$ ,  $V_{CE} = 600 \text{ V}$ ,  $V_{GE} = -15 / 15 \text{ V}$ ,  $T_{vj} = 175 \text{ °C}$



**switching times (typical), IGBT, Inverter**

$t = f(R_G)$

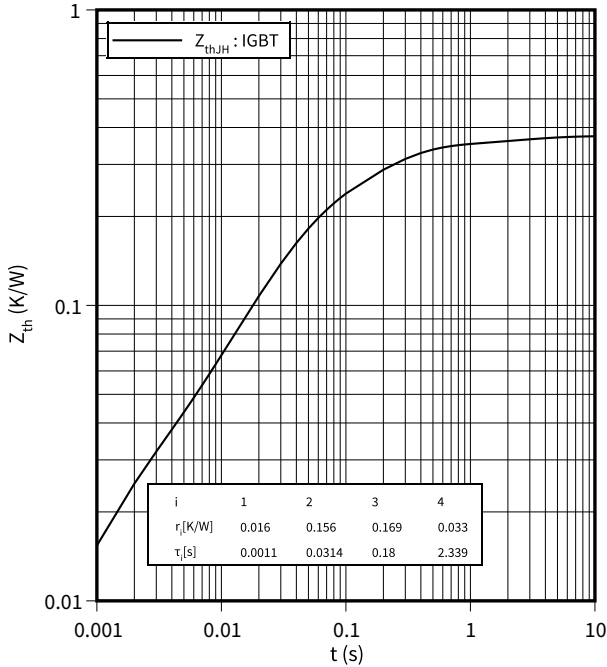
$I_C = 150 \text{ A}$ ,  $V_{CE} = 600 \text{ V}$ ,  $V_{GE} = -15 / 15 \text{ V}$ ,  $T_{vj} = 175 \text{ °C}$



8 Characteristics diagrams

**transient thermal impedance , IGBT, Inverter**

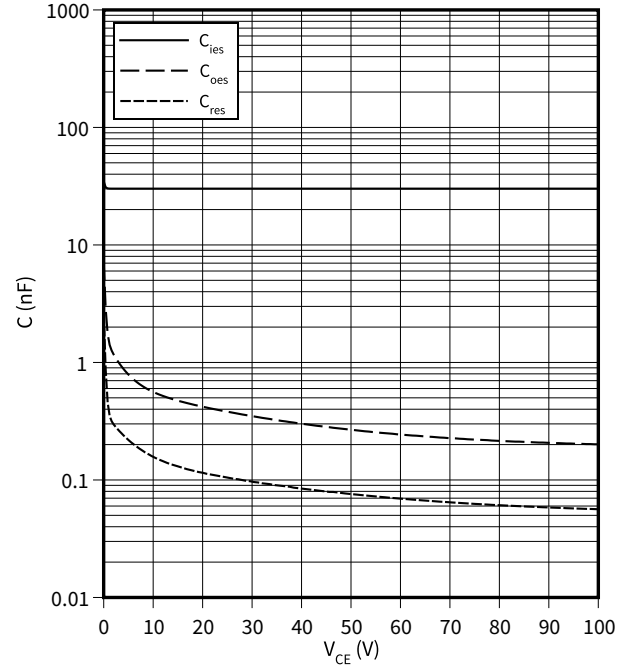
$Z_{th} = f(t)$



**capacity characteristic (typical), IGBT, Inverter**

$C = f(V_{CE})$

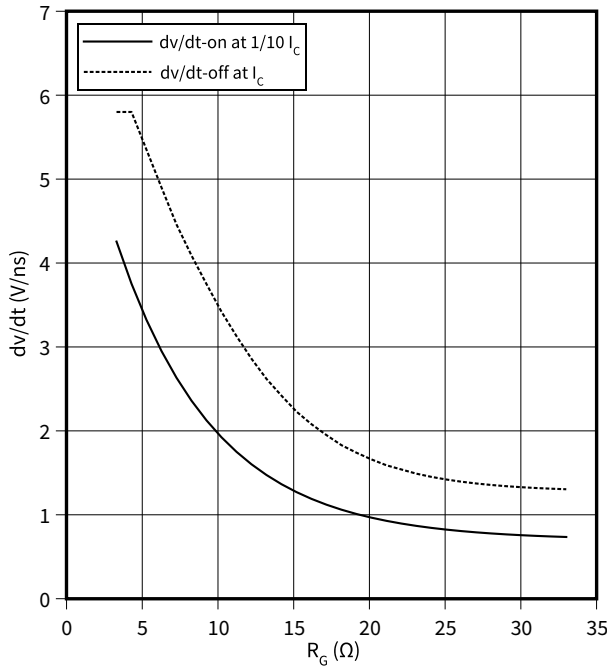
$f = 100 \text{ kHz}, V_{GE} = 0 \text{ V}, T_{vj} = 25 \text{ }^\circ\text{C}$



**Voltage slope (typical), IGBT, Inverter**

$dv/dt = f(R_G)$

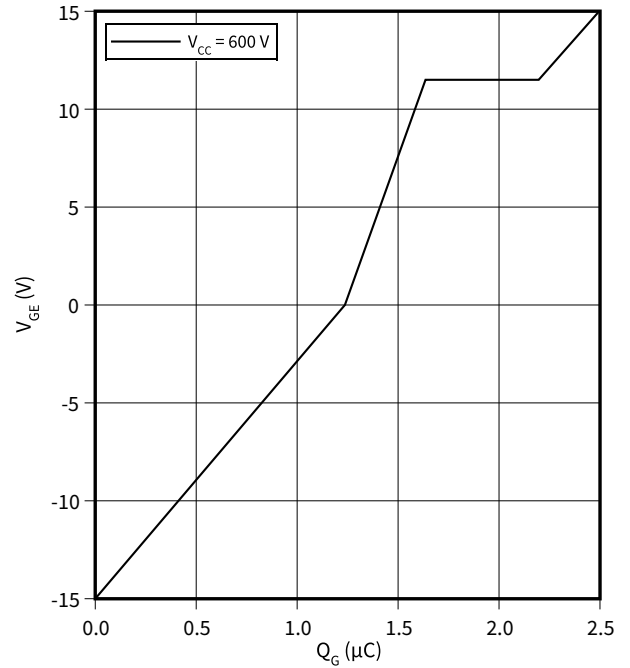
$I_C = 150 \text{ A}, V_{CE} = 600 \text{ V}, V_{GE} = \pm 15 \text{ V}, T_{vj} = 25 \text{ }^\circ\text{C}$



**gate charge characteristic (typical), IGBT, Inverter**

$V_{GE} = f(Q_G)$

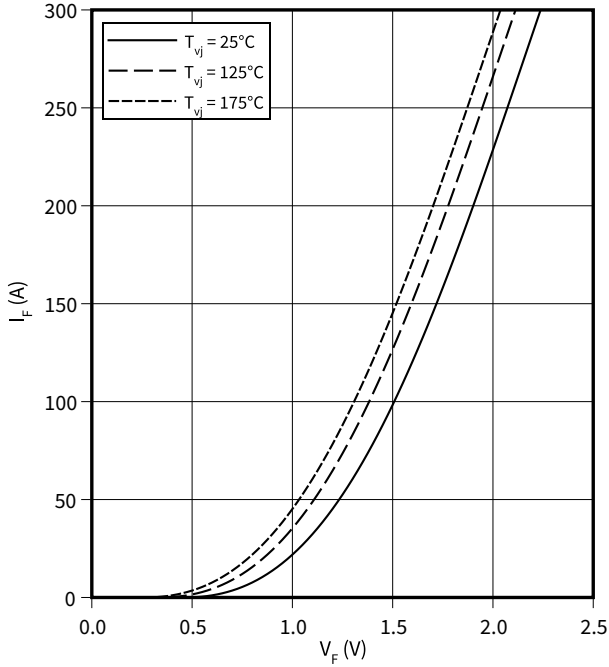
$I_C = 150 \text{ A}, T_{vj} = 25 \text{ }^\circ\text{C}$



8 Characteristics diagrams

**forward characteristic (typical), Diode, Inverter**

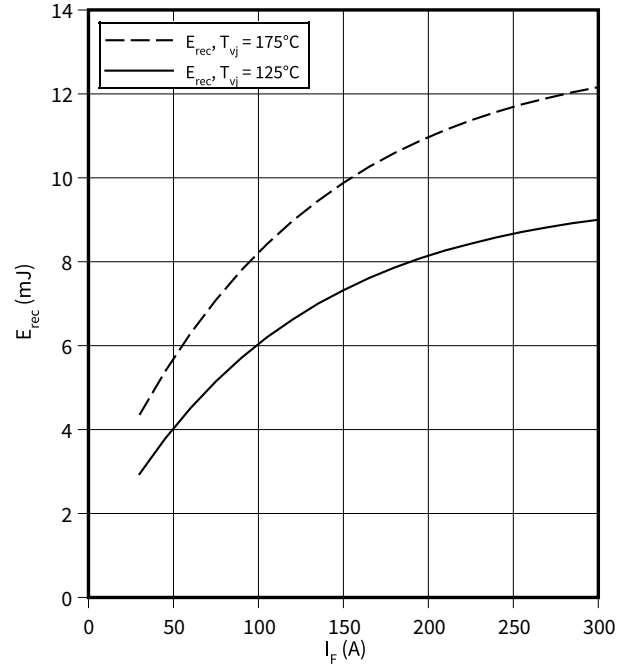
$I_F = f(V_F)$



**switching losses (typical), Diode, Inverter**

$E_{rec} = f(I_F)$

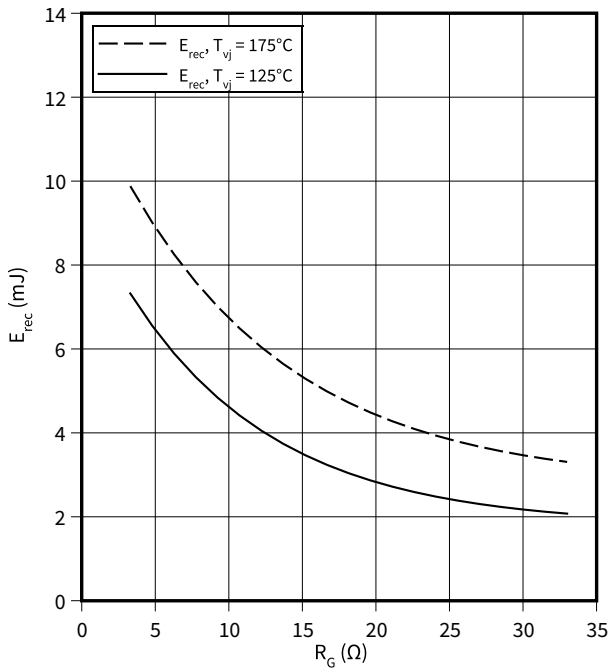
$R_{Gon} = 3.3 \Omega, V_{CE} = 600 \text{ V}$



**switching losses (typical), Diode, Inverter**

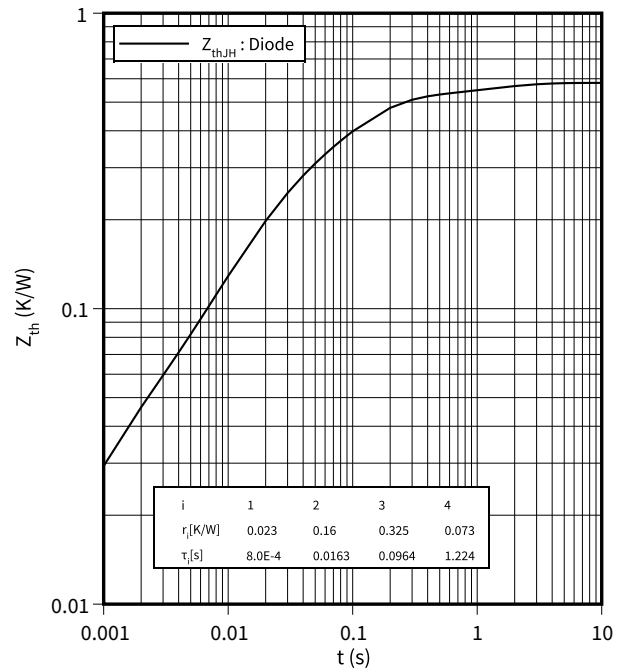
$E_{rec} = f(R_G)$

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



**transient thermal impedance, Diode, Inverter**

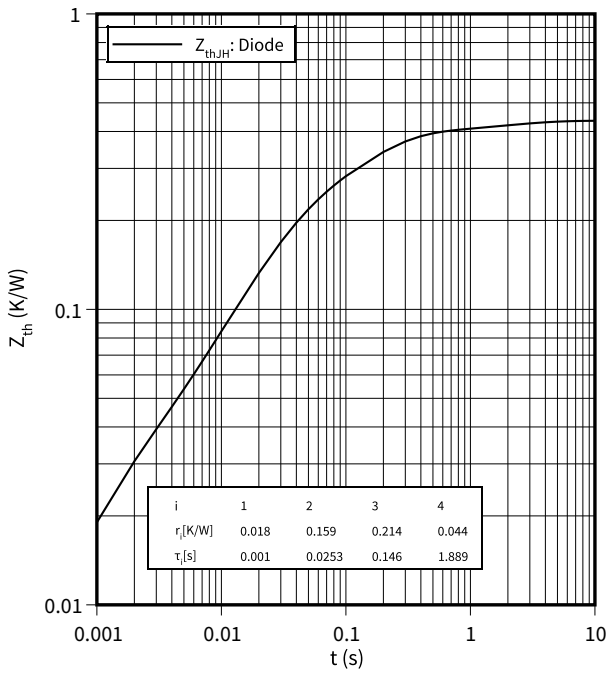
$Z_{th} = f(t)$



8 Characteristics diagrams

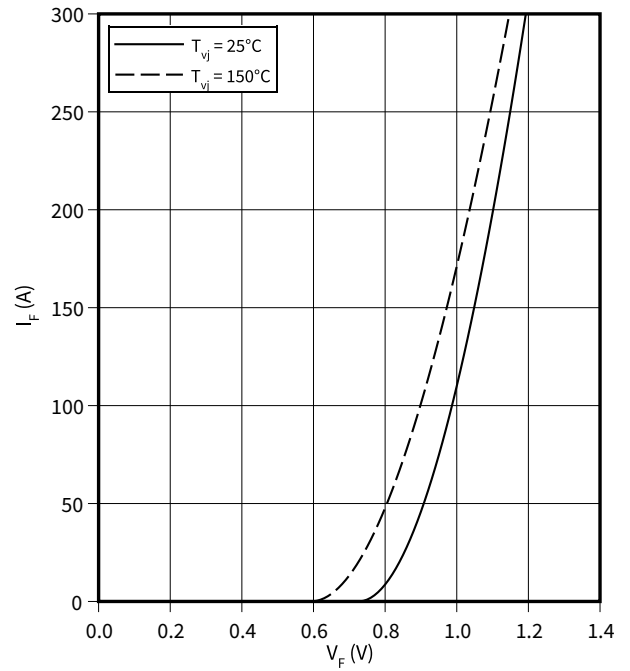
**transient thermal impedance , Diode, Rectifier**

$Z_{th} = f(t)$



**forward characteristic (typical), Diode, Rectifier**

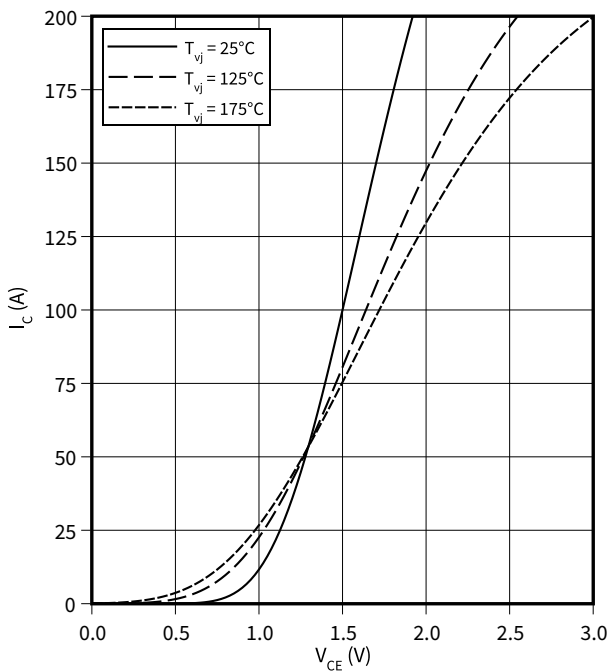
$I_F = f(V_F)$



**output characteristic (typical), IGBT, Brake-Chopper**

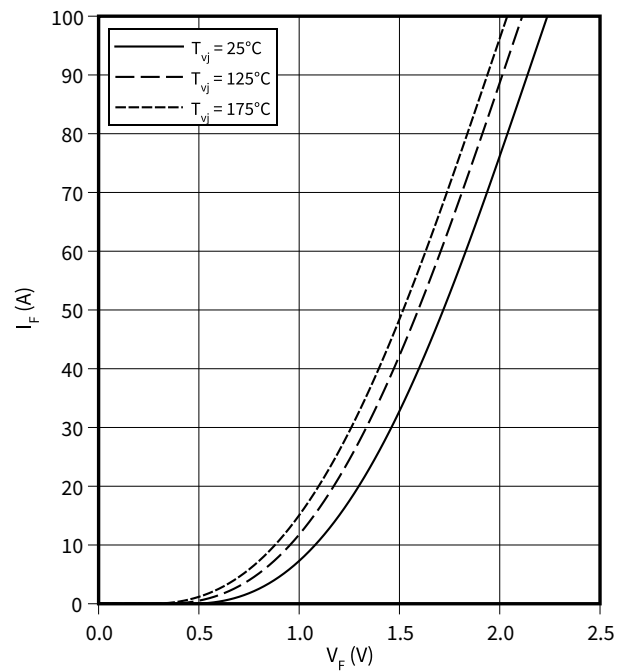
$I_C = f(V_{CE})$

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



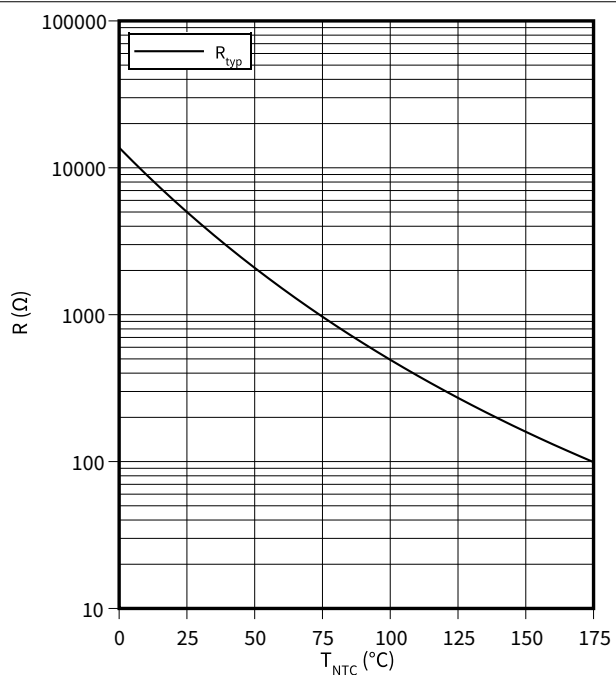
**forward characteristic (typical), Diode, Brake-Chopper**

$I_F = f(V_F)$

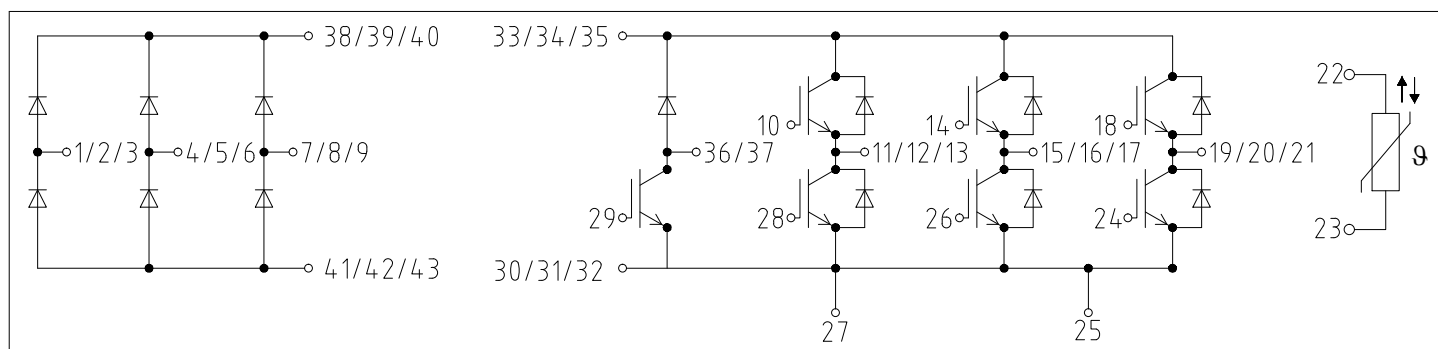


**temperature characteristic (typical), NTC-Thermistor**

$R = f(T_{NTC})$



**9**      **Circuit diagram**



**Figure 2**



10 Package outlines

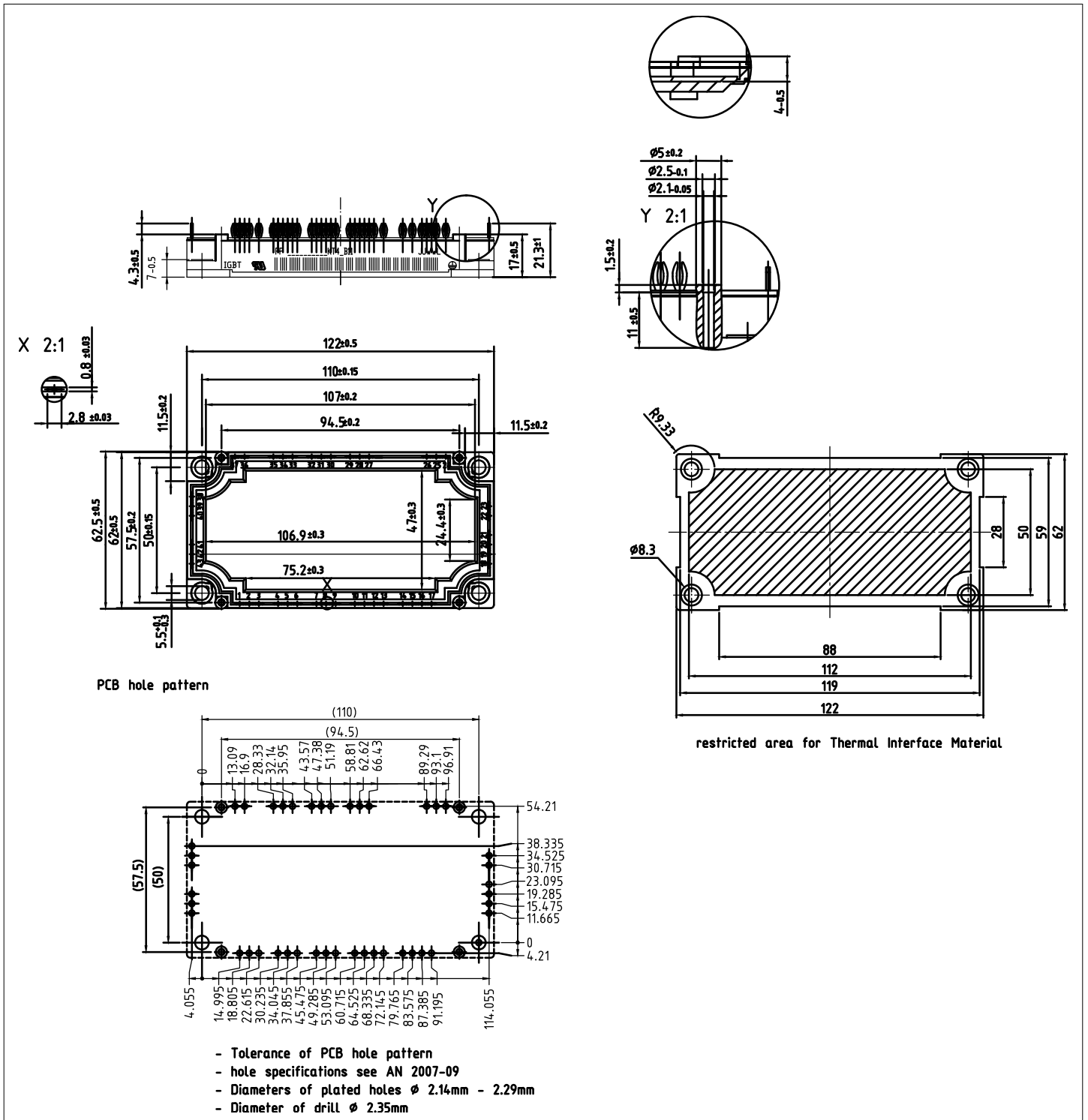


Figure 3

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Revision history

## Revision history

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

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**IFX-ABB922-001**

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