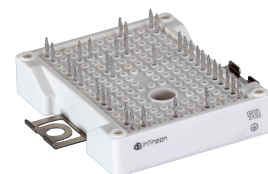


Final datasheet

EasyPACK™ 2B module and PressFIT / pre-applied thermal interface material / NTC

Features

- Electrical features
 - $V_{CES} = 1200\text{ V}$
 - $I_{C\text{ nom}} = 40\text{ A} / I_{CRM} = 80\text{ A}$
 - Ultra fast IGBT chips
 - Overload operation up to 175°C
 - Low switching losses
 - Low $V_{CE,sat}$
 - Suitable Infineon gate drivers can be found under <https://www.infineon.com/gdfinder>
- Mechanical features
 - 3 kV AC 1 minute insulation
 - Al_2O_3 substrate with low thermal resistance
 - Compact design
 - PressFIT contact technology
 - Rugged mounting due to integrated mounting clamps
 - Pre-applied thermal interface material



Typical appearance

Potential applications

- Three-level applications
- Solar applications

Product validation

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

Description

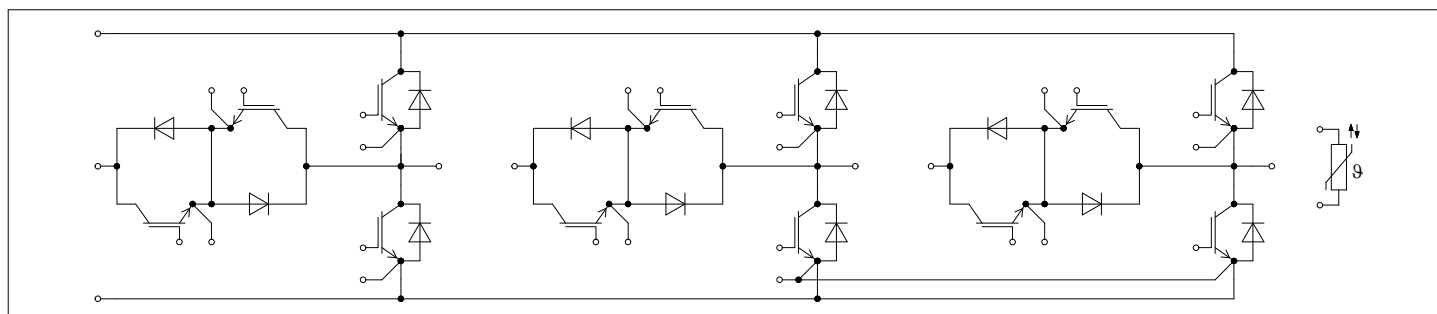


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1 Package

Table 1 Insulation coordination

Parameter	Symbol	Note or test condition	Values	Unit
Isolation test voltage	V_{ISOL}	RMS, $f = 50 \text{ Hz}$, $t = 1 \text{ min}$	3.0	kV
Isolation test voltage NTC	$V_{ISOL(NTC)}$	RMS, $f = 50 \text{ Hz}$, $t = 1 \text{ min}$	3.0	kV
Internal isolation		basic insulation (class 1, IEC 61140)	Al_2O_3	
Comparative tracking index	CTI		> 225	
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}			30		nH
Module lead resistance, terminals - chip	$R_{CC'+EE'}$	$T_H = 25 \text{ °C}$, per switch		7		mΩ
Storage temperature	T_{stg}		-40		125	°C
Maximum baseplate operation temperature	T_{BPmax}				125	°C
Mounting force per clamp	F		40		80	N
Weight	G			39		g

Note: Storage and shipment of modules with TIM => see AN2012-07
The current under continuous operation is limited to 25 A rms per connector pin.

2 IGBT, T1-T2 / T5-T6 / T9-T10

Table 3 Maximum rated values

Parameter	Symbol	Note or test condition		Values	Unit
Collector-emitter voltage	V_{CES}		$T_{vj} = 25 \text{ °C}$	1200	V
Implemented collector current	I_{CN}			40	A
Continuous DC collector current	I_{CDC}	$T_{vj \text{ max}} = 175 \text{ °C}$	$T_H = 65 \text{ °C}$	25	A
Repetitive peak collector current	I_{CRM}	t_p limited by $T_{vj \text{ op}}$		80	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	$V_{CE\ sat}$	$I_C = 40\ A, V_{GE} = 15\ V$	$T_{vj} = 25\ ^\circ C$		1.70	2.25	V
			$T_{vj} = 125\ ^\circ C$		1.90		
			$T_{vj} = 175\ ^\circ C$		2.00		
Gate threshold voltage	V_{GETh}	$I_C = 8.16\ mA, V_{CE} = V_{GE}, T_{vj} = 25\ ^\circ C$		4.85	5.5	6.15	V
Gate charge	Q_G	$V_{GE} = \pm 15\ V, V_{CC} = 600\ V$			0.59		μC
Input capacitance	C_{ies}	$f = 100\ kHz, T_{vj} = 25\ ^\circ C, V_{CE} = 25\ V, V_{GE} = 0\ V$			4.54		nF
Reverse transfer capacitance	C_{res}	$f = 100\ kHz, T_{vj} = 25\ ^\circ C, V_{CE} = 25\ V, V_{GE} = 0\ V$			0.086		nF
Collector-emitter cut-off current	I_{CES}	$V_{CE} = 1200\ V, V_{GE} = 0\ V$	$T_{vj} = 25\ ^\circ C$			3.5	μA
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}	$I_C = 40\ A, V_{CC} = 350\ V, V_{GE} = \pm 15\ V, R_{Gon} = 0.51\ \Omega$	$T_{vj} = 25\ ^\circ C$		0.021		μs
			$T_{vj} = 125\ ^\circ C$		0.025		
			$T_{vj} = 175\ ^\circ C$		0.026		
Rise time (inductive load)	t_r	$I_C = 40\ A, V_{CC} = 350\ V, V_{GE} = \pm 15\ V, R_{Gon} = 0.51\ \Omega$	$T_{vj} = 25\ ^\circ C$		0.017		μs
			$T_{vj} = 125\ ^\circ C$		0.020		
			$T_{vj} = 175\ ^\circ C$		0.022		
Turn-off delay time (inductive load)	t_{doff}	$I_C = 40\ A, V_{CC} = 350\ V, V_{GE} = \pm 15\ V, R_{Goff} = 0.62\ \Omega$	$T_{vj} = 25\ ^\circ C$		0.110		μs
			$T_{vj} = 125\ ^\circ C$		0.140		
			$T_{vj} = 175\ ^\circ C$		0.160		
Fall time (inductive load)	t_f	$I_C = 40\ A, V_{CC} = 350\ V, V_{GE} = \pm 15\ V, R_{Goff} = 0.62\ \Omega$	$T_{vj} = 25\ ^\circ C$		0.080		μs
			$T_{vj} = 125\ ^\circ C$		0.150		
			$T_{vj} = 175\ ^\circ C$		0.180		
Turn-on energy loss per pulse	E_{on}	$I_C = 40\ A, V_{CC} = 350\ V, L_\sigma = 7\ nH, V_{GE} = \pm 15\ V, R_{Gon} = 0.51\ \Omega, di/dt = 1130\ A/ns (T_{vj} = 175\ ^\circ C)$	$T_{vj} = 25\ ^\circ C$		0.36		mJ
			$T_{vj} = 125\ ^\circ C$		0.51		
			$T_{vj} = 175\ ^\circ C$		0.58		
Turn-off energy loss per pulse	E_{off}	$I_C = 40\ A, V_{CC} = 350\ V, L_\sigma = 7\ nH, V_{GE} = \pm 15\ V, R_{Goff} = 0.62\ \Omega, dv/dt = 5300\ V/\mu s (T_{vj} = 175\ ^\circ C)$	$T_{vj} = 25\ ^\circ C$		0.81		mJ
			$T_{vj} = 125\ ^\circ C$		1.22		
			$T_{vj} = 175\ ^\circ C$		1.45		
Thermal resistance, junction to heat sink	R_{thJH}	per IGBT, Valid with IFX pre-applied Thermal Interface Material				1.68	K/W
Temperature under switching conditions	$T_{vj\ op}$			-40		175	$^\circ C$

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

3 Diode, D1-D2 / D5-D6 / D9-D10

Table 5 Maximum rated values

Parameter	Symbol	Note or test condition		Values	Unit
Repetitive peak reverse voltage	V_{RRM}		$T_{vj} = 25\ ^\circ\text{C}$	1200	V
Implemented forward current	I_{FN}			40	A
Continuous DC forward current	I_F			25	A
Repetitive peak forward current	I_{FRM}	$t_P = 1\ \text{ms}$		80	A
I^2t - value	I^2t	$t_P = 10\ \text{ms}, V_R = 0\ \text{V}$	$T_{vj} = 125\ ^\circ\text{C}$	61	A^2s
			$T_{vj} = 175\ ^\circ\text{C}$	35	

Table 6 Characteristic values

Parameter	Symbol	Note or test condition	Values			Unit
			Min.	Typ.	Max.	
Forward voltage	V_F	$I_F = 40\ \text{A}, V_{GE} = 0\ \text{V}$	$T_{vj} = 25\ ^\circ\text{C}$	2.50	3.05	V
			$T_{vj} = 125\ ^\circ\text{C}$	2.18		
			$T_{vj} = 175\ ^\circ\text{C}$	1.98		
Peak reverse recovery current	I_{RM}	$V_{CC} = 350\ \text{V}, I_F = 40\ \text{A}, V_{GE} = -15\ \text{V}, -di_F/dt = 2.1\ \text{kA}/\mu\text{s} (T_{vj} = 175\ ^\circ\text{C})$	$T_{vj} = 25\ ^\circ\text{C}$	36.4		A
			$T_{vj} = 125\ ^\circ\text{C}$	52.2		
			$T_{vj} = 175\ ^\circ\text{C}$	58.6		
Recovered charge	Q_r	$V_{CC} = 350\ \text{V}, I_F = 40\ \text{A}, V_{GE} = -15\ \text{V}, -di_F/dt = 2.1\ \text{kA}/\mu\text{s} (T_{vj} = 175\ ^\circ\text{C})$	$T_{vj} = 25\ ^\circ\text{C}$	0.68		μC
			$T_{vj} = 125\ ^\circ\text{C}$	1.61		
			$T_{vj} = 175\ ^\circ\text{C}$	2.22		
Reverse recovery energy	E_{rec}	$V_{CC} = 350\ \text{V}, I_F = 40\ \text{A}, V_{GE} = -15\ \text{V}, -di_F/dt = 2.1\ \text{kA}/\mu\text{s} (T_{vj} = 175\ ^\circ\text{C})$	$T_{vj} = 25\ ^\circ\text{C}$	0.214		mJ
			$T_{vj} = 125\ ^\circ\text{C}$	0.503		
			$T_{vj} = 175\ ^\circ\text{C}$	0.647		
Thermal resistance, junction to heat sink	R_{thJH}	per diode, Valid with IFX pre-applied Thermal Interface Material			2.07	K/W
Temperature under switching conditions	$T_{vj\ op}$			-40	175	$^\circ\text{C}$

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

4 IGBT, T3-T4 / T7-T8 / T11-T12

Table 7 Maximum rated values

Parameter	Symbol	Note or test condition		Values	Unit
Collector-emitter voltage	V_{CES}		$T_{vj} = 25\text{ °C}$	650	V
Implemented collector current	I_{CN}			35	A
Continuous DC collector current	I_{CDC}	$T_{vj\text{ max}} = 175\text{ °C}$	$T_H = 65\text{ °C}$	20	A
Repetitive peak collector current	I_{CRM}	t_p limited by $T_{vj\text{ op}}$		70	A
Gate-emitter peak voltage	V_{GES}			±20	V

Table 8 Characteristic values

Parameter	Symbol	Note or test condition		Values			Unit
				Min.	Typ.	Max.	
Collector-emitter saturation voltage	$V_{CE\text{ sat}}$	$I_C = 35\text{ A}$, $V_{GE} = 15\text{ V}$	$T_{vj} = 25\text{ °C}$		1.42	1.90	V
			$T_{vj} = 125\text{ °C}$		1.53		
			$T_{vj} = 175\text{ °C}$		1.62		
Gate threshold voltage	V_{GEth}	$I_C = 6.5\text{ mA}$, $V_{CE} = V_{GE}$, $T_{vj} = 25\text{ °C}$		3.25	4	4.75	V
Gate charge	Q_G	$V_{GE} = \pm 15\text{ V}$, $V_{CC} = 400\text{ V}$			0.143		μC
Input capacitance	C_{ies}	$f = 100\text{ kHz}$, $T_{vj} = 25\text{ °C}$, $V_{CE} = 25\text{ V}$, $V_{GE} = 0\text{ V}$			25.2		nF
Reverse transfer capacitance	C_{res}	$f = 100\text{ kHz}$, $T_{vj} = 25\text{ °C}$, $V_{CE} = 25\text{ V}$, $V_{GE} = 0\text{ V}$			0.078		nF
Collector-emitter cut-off current	I_{CES}	$V_{CE} = 650\text{ V}$, $V_{GE} = 0\text{ V}$	$T_{vj} = 25\text{ °C}$			24	μA
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}	$I_C = 35\text{ A}$, $V_{CC} = 350\text{ V}$, $V_{GE} = \pm 15\text{ V}$, $R_{Gon} = 1.5\text{ }\Omega$	$T_{vj} = 25\text{ °C}$		0.010		μs
			$T_{vj} = 125\text{ °C}$		0.011		
			$T_{vj} = 175\text{ °C}$		0.012		
Rise time (inductive load)	t_r	$I_C = 35\text{ A}$, $V_{CC} = 350\text{ V}$, $V_{GE} = \pm 15\text{ V}$, $R_{Gon} = 1.5\text{ }\Omega$	$T_{vj} = 25\text{ °C}$		0.013		μs
			$T_{vj} = 125\text{ °C}$		0.015		
			$T_{vj} = 150\text{ °C}$		0.015		
Turn-off delay time (inductive load)	t_{doff}	$I_C = 35\text{ A}$, $V_{CC} = 350\text{ V}$, $V_{GE} = \pm 15\text{ V}$, $R_{Goff} = 1.5\text{ }\Omega$	$T_{vj} = 25\text{ °C}$		0.075		μs
			$T_{vj} = 125\text{ °C}$		0.092		
			$T_{vj} = 175\text{ °C}$		0.099		

(table continues...)

Table 8 (continued) Characteristic values

Parameter	Symbol	Note or test condition	Values			Unit
			Min.	Typ.	Max.	
Fall time (inductive load)	t_f	$I_C = 35\text{ A}$, $V_{CC} = 350\text{ V}$, $V_{GE} = \pm 15\text{ V}$, $R_{Goff} = 1.5\ \Omega$	$T_{vj} = 25\text{ °C}$	0.036		μs
			$T_{vj} = 125\text{ °C}$	0.051		
			$T_{vj} = 175\text{ °C}$	0.071		
Turn-on energy loss per pulse	E_{on}	$I_C = 35\text{ A}$, $V_{CC} = 350\text{ V}$, $L_\sigma = 7\text{ nH}$, $V_{GE} = \pm 15\text{ V}$, $R_{Gon} = 1.5\ \Omega$, $di/dt = 1790\text{ A}/\mu\text{s}$ ($T_{vj} = 175\text{ °C}$)	$T_{vj} = 25\text{ °C}$	0.13		mJ
			$T_{vj} = 125\text{ °C}$	0.2		
			$T_{vj} = 175\text{ °C}$	0.26		
Turn-off energy loss per pulse	E_{off}	$I_C = 35\text{ A}$, $V_{CC} = 350\text{ V}$, $L_\sigma = 7\text{ nH}$, $V_{GE} = \pm 15\text{ V}$, $R_{Goff} = 1.5\ \Omega$, $dv/dt = 7570\text{ V}/\mu\text{s}$ ($T_{vj} = 175\text{ °C}$)	$T_{vj} = 25\text{ °C}$	0.432		mJ
			$T_{vj} = 125\text{ °C}$	0.625		
			$T_{vj} = 175\text{ °C}$	0.737		
Thermal resistance, junction to heat sink	R_{thJH}	per IGBT, Valid with IFX pre-applied Thermal Interface Material			2.59	K/W
Temperature under switching conditions	$T_{vj\text{ op}}$		-40		175	°C

5 Diode, D3-D4 / D7-D8 / D11-D12

Table 9 Maximum rated values

Parameter	Symbol	Note or test condition	Values	Unit
Repetitive peak reverse voltage	V_{RRM}	$T_{vj} = 25\text{ °C}$	650	V
Implemented forward current	I_{FN}		50	A
Continuous DC forward current	I_F		25	A
Repetitive peak forward current	I_{FRM}	$t_P = 1\text{ ms}$	100	A
I^2t - value	I^2t	$t_P = 10\text{ ms}$, $V_R = 0\text{ V}$	$T_{vj} = 125\text{ °C}$	A^2s
			$T_{vj} = 175\text{ °C}$	

Table 10 Characteristic values

Parameter	Symbol	Note or test condition	Values			Unit
			Min.	Typ.	Max.	
Forward voltage	V_F	$I_F = 50\text{ A}$, $V_{GE} = 0\text{ V}$	$T_{vj} = 25\text{ °C}$	1.65	2.15	V
			$T_{vj} = 125\text{ °C}$	1.55		
			$T_{vj} = 175\text{ °C}$	1.45		

(table continues...)

Table 10 (continued) Characteristic values

Parameter	Symbol	Note or test condition	Values			Unit
			Min.	Typ.	Max.	
Peak reverse recovery current	I_{RM}	$V_{CC} = 350 \text{ V}$, $I_F = 50 \text{ A}$, $-di_F/dt = 1430 \text{ A}/\mu\text{s}$ ($T_{vj} = 175 \text{ }^\circ\text{C}$)	$T_{vj} = 25 \text{ }^\circ\text{C}$	25.4		A
			$T_{vj} = 125 \text{ }^\circ\text{C}$	33.3		
			$T_{vj} = 175 \text{ }^\circ\text{C}$	37.8		
Recovered charge	Q_r	$V_{CC} = 350 \text{ V}$, $I_F = 50 \text{ A}$, $-di_F/dt = 1430 \text{ A}/\mu\text{s}$ ($T_{vj} = 175 \text{ }^\circ\text{C}$)	$T_{vj} = 25 \text{ }^\circ\text{C}$	0.9		μC
			$T_{vj} = 125 \text{ }^\circ\text{C}$	1.71		
			$T_{vj} = 175 \text{ }^\circ\text{C}$	2.22		
Reverse recovery energy	E_{rec}	$V_{CC} = 350 \text{ V}$, $I_F = 50 \text{ A}$, $-di_F/dt = 1430 \text{ A}/\mu\text{s}$ ($T_{vj} = 175 \text{ }^\circ\text{C}$)	$T_{vj} = 25 \text{ }^\circ\text{C}$	0.223		mJ
			$T_{vj} = 125 \text{ }^\circ\text{C}$	0.428		
			$T_{vj} = 175 \text{ }^\circ\text{C}$	0.555		
Thermal resistance, junction to heat sink	R_{thJH}	per diode, Valid with IFX pre-applied Thermal Interface Material			1.83	K/W
Temperature under switching conditions	$T_{vj op}$		-40		175	$^\circ\text{C}$

6 NTC-Thermistor

Table 11 Characteristic values

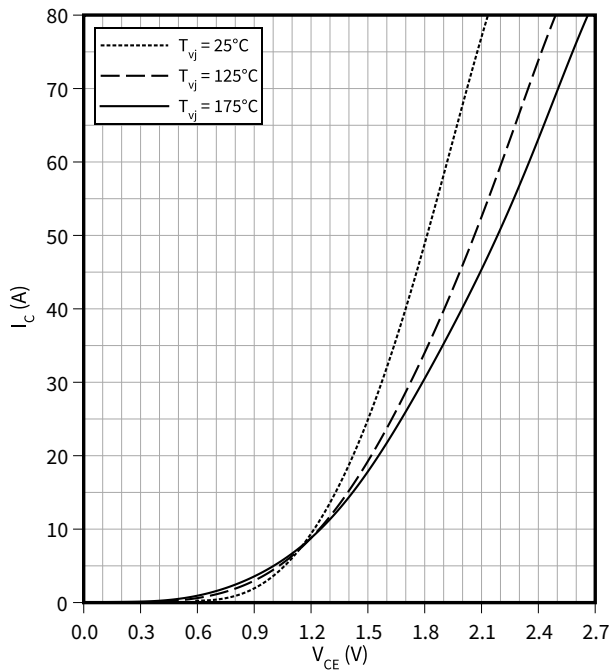
Parameter	Symbol	Note or test condition	Values			Unit
			Min.	Typ.	Max.	
Rated resistance	R_{25}	$T_{NTC} = 25 \text{ }^\circ\text{C}$		5		k Ω
Deviation of R_{100}	$\Delta R/R$	$T_{NTC} = 100 \text{ }^\circ\text{C}$, $R_{100} = 493 \text{ } \Omega$	-5		5	%
Power dissipation	P_{25}	$T_{NTC} = 25 \text{ }^\circ\text{C}$			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: For an analytical description of the NTC characteristics please refer to AN2009-10, chapter 4

7 Characteristics diagrams

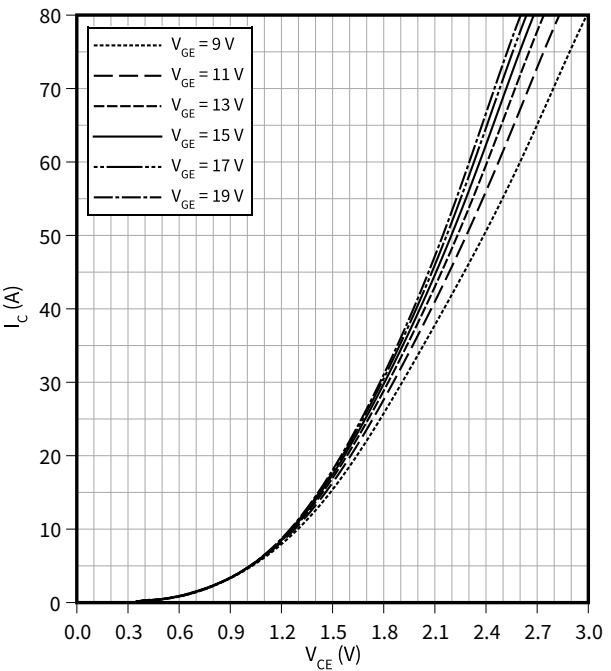
Output characteristic (typical), IGBT, T1-T2 / T5-T6 / T9-T10

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



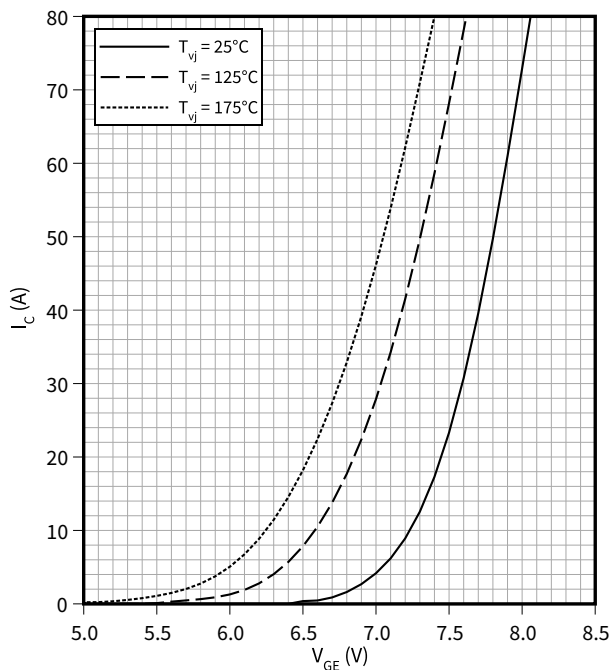
Output characteristic field (typical), IGBT, T1-T2 / T5-T6 / T9-T10

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



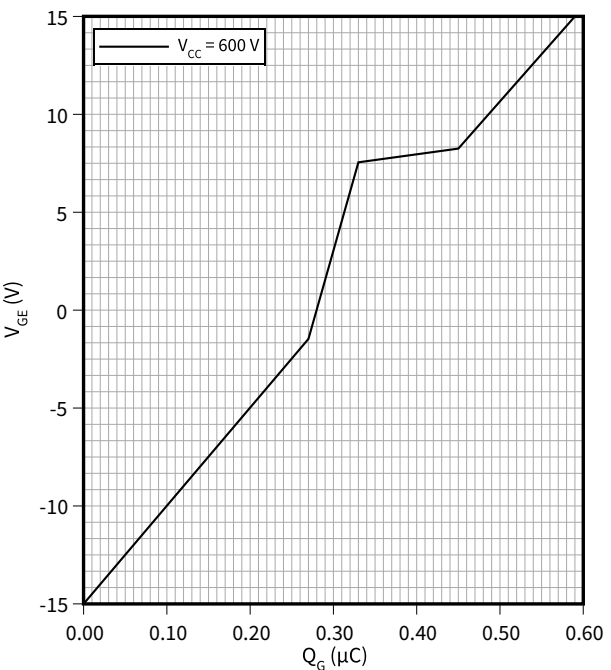
Transfer characteristic (typical), IGBT, T1-T2 / T5-T6 / T9-T10

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



Gate charge characteristic (typical), IGBT, T1-T2 / T5-T6 / T9-T10

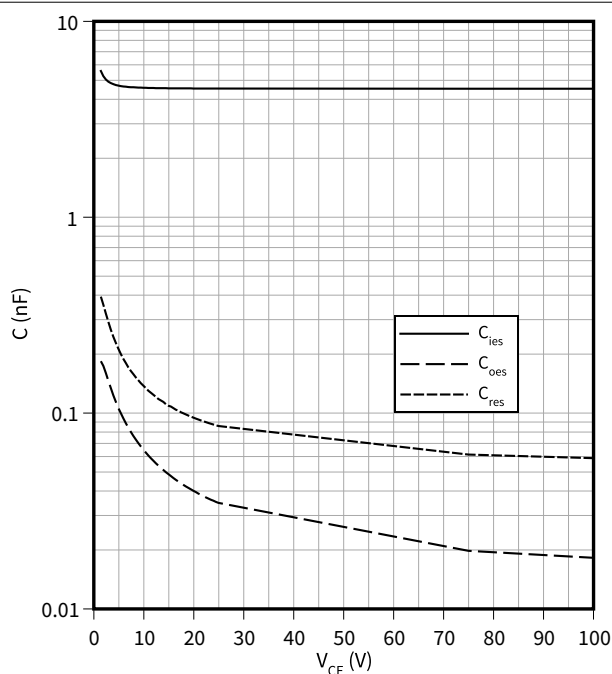
$V_{GE} = f(Q_G)$
 $I_C = 40\text{ A}, T_{vj} = 25\text{ °C}$



Capacity characteristic (typical), IGBT, T1-T2 / T5-T6 / T9-T10

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

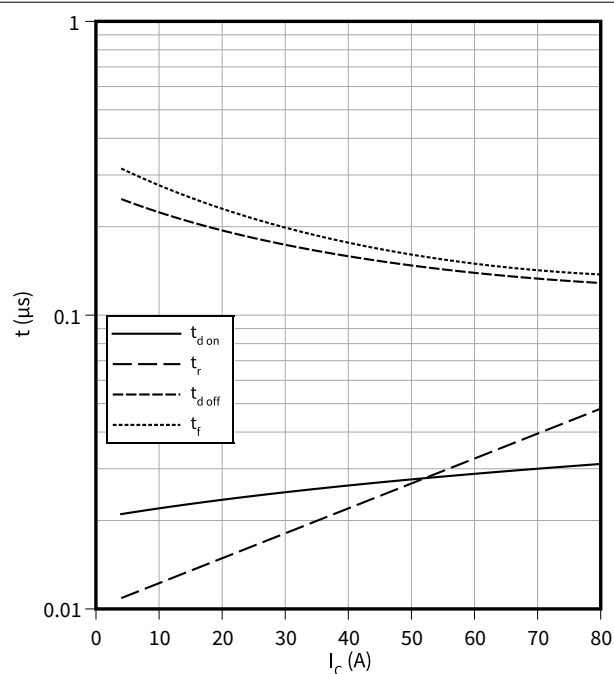
$f = 100 \text{ kHz}$, $V_{GE} = 0 \text{ V}$, $T_{vj} = 25 \text{ }^{\circ}\text{C}$



Switching times (typical), IGBT, T1-T2 / T5-T6 / T9-T10

$$t = f(I_C)$$

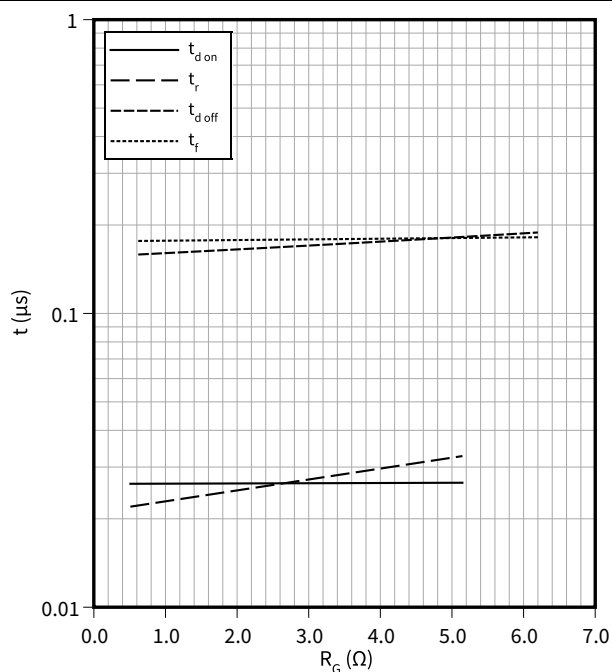
$V_{CC} = 350 \text{ V}$, $R_{Goff} = 0.62 \text{ } \Omega$, $R_{Gon} = 0.51 \text{ } \Omega$, $V_{GE} = \pm 15 \text{ V}$, $T_{vj} = 175 \text{ }^{\circ}\text{C}$



Switching times (typical), IGBT, T1-T2 / T5-T6 / T9-T10

$$t = f(R_G)$$

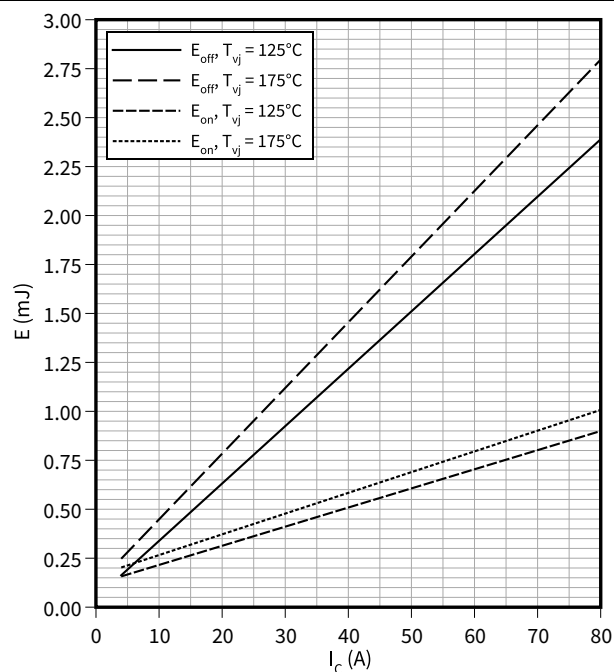
$V_{GE} = \pm 15 \text{ V}$, $I_C = 40 \text{ A}$, $V_{CC} = 350 \text{ V}$, $T_{vj} = 175 \text{ }^{\circ}\text{C}$



Switching losses (typical), IGBT, T1-T2 / T5-T6 / T9-T10

$$E = f(I_C)$$

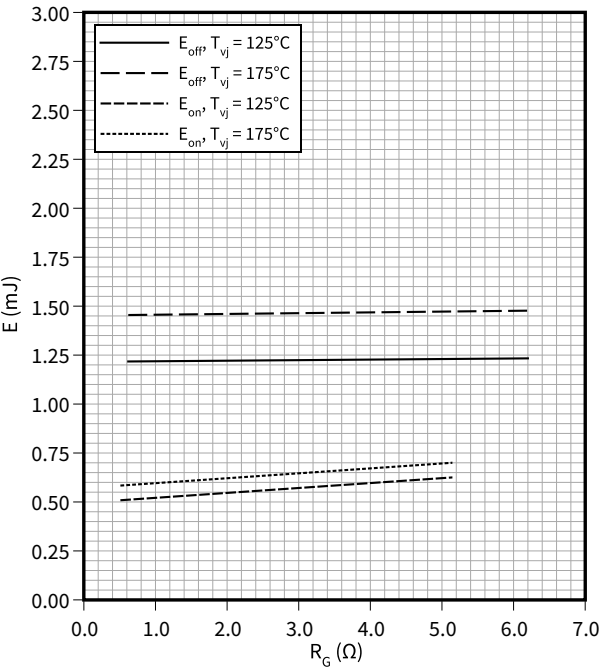
$R_{Goff} = 0.62 \text{ } \Omega$, $R_{Gon} = 0.51 \text{ } \Omega$, $V_{CC} = 350 \text{ V}$, $V_{GE} = \pm 15 \text{ V}$



7 Characteristics diagrams

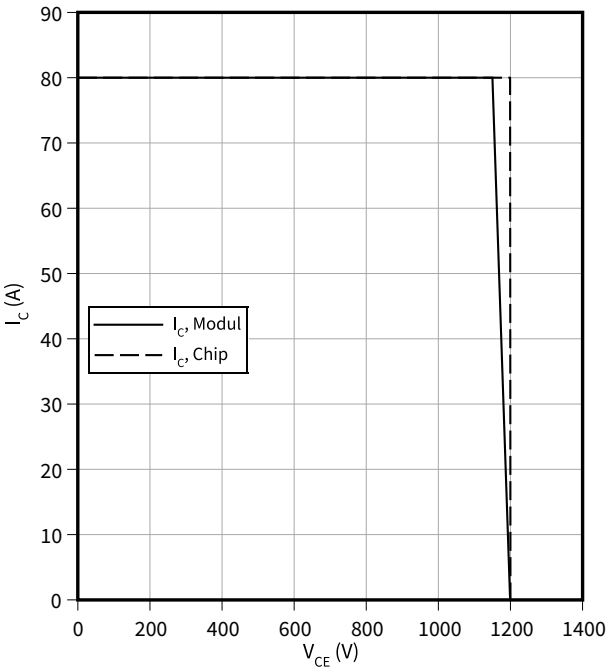
Switching losses (typical), IGBT, T1-T2 / T5-T6 / T9-T10

$E = f(R_G)$
 $I_C = 40\text{ A}$, $V_{CC} = 350\text{ V}$, $V_{GE} = \pm 15\text{ V}$



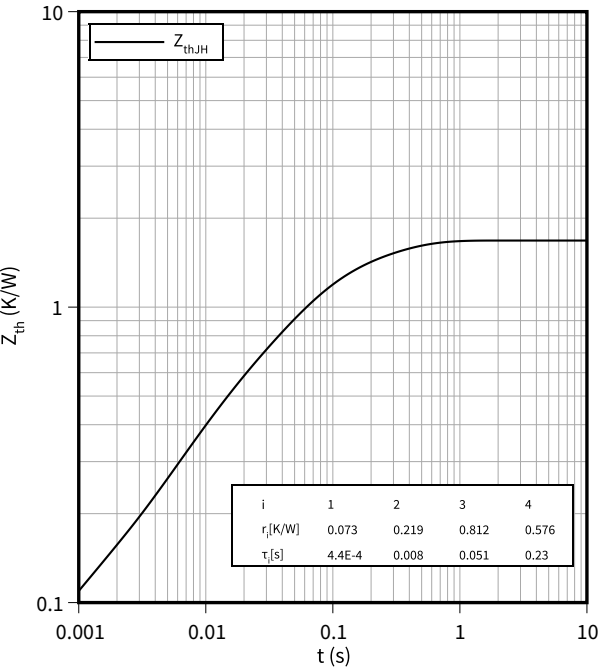
Reverse bias safe operating area (RBSOA), IGBT, T1-T2 / T5-T6 / T9-T10

$I_C = f(V_{CE})$
 $R_{Goff} = 0.62\ \Omega$, $V_{GE} = \pm 15\text{ V}$, $T_{vj} = 175\text{ °C}$



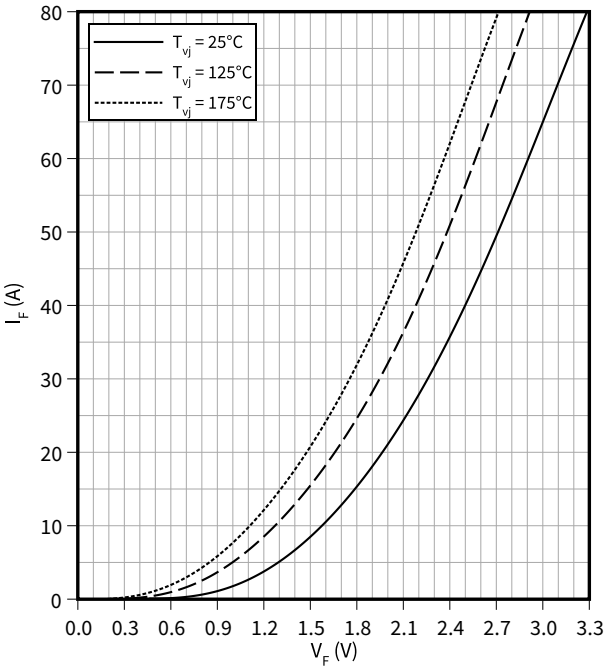
Transient thermal impedance, IGBT, T1-T2 / T5-T6 / T9-T10

$Z_{th} = f(t)$



Forward characteristic (typical), Diode, D1-D2 / D5-D6 / D9-D10

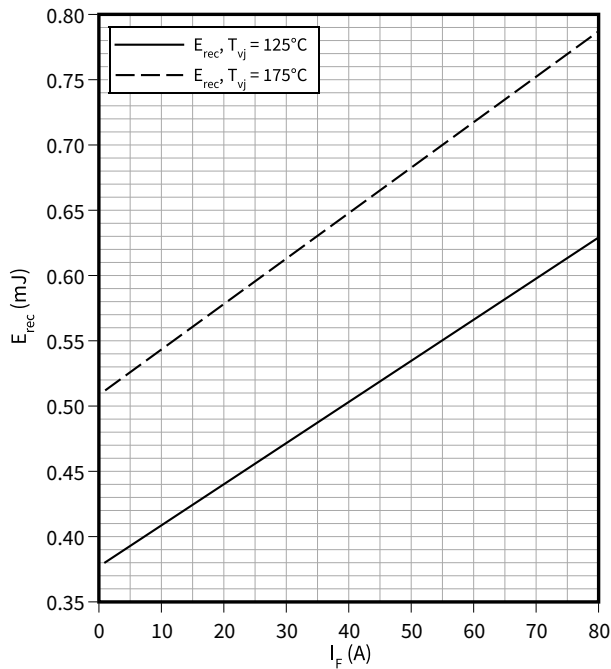
$I_F = f(V_F)$



7 Characteristics diagrams

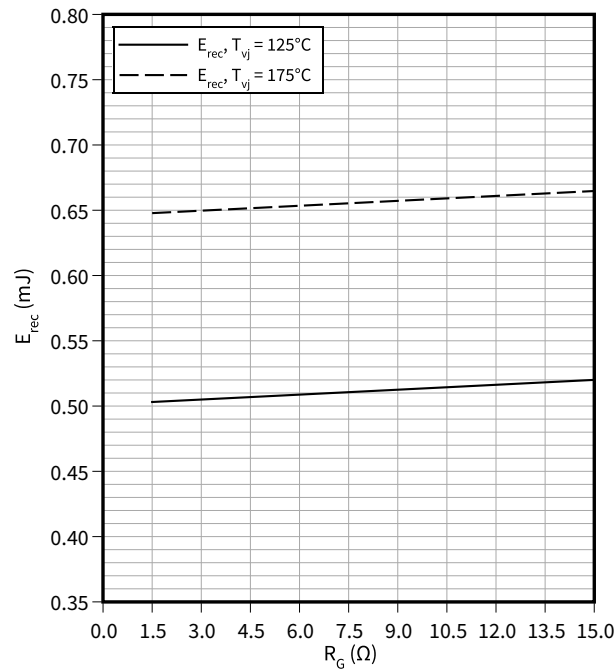
Switching losses (typical), Diode, D1-D2 / D5-D6 / D9-D10

$E_{rec} = f(I_F)$
 $V_{CE} = 350\text{ V}, R_G = 1.5\ \Omega$



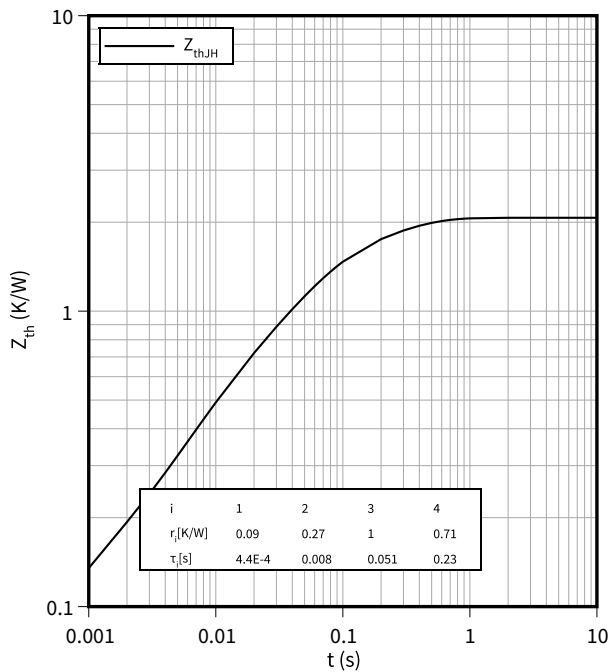
Switching losses (typical), Diode, D1-D2 / D5-D6 / D9-D10

$E_{rec} = f(R_G)$
 $V_{CE} = 350\text{ V}, I_F = 40\text{ A}$



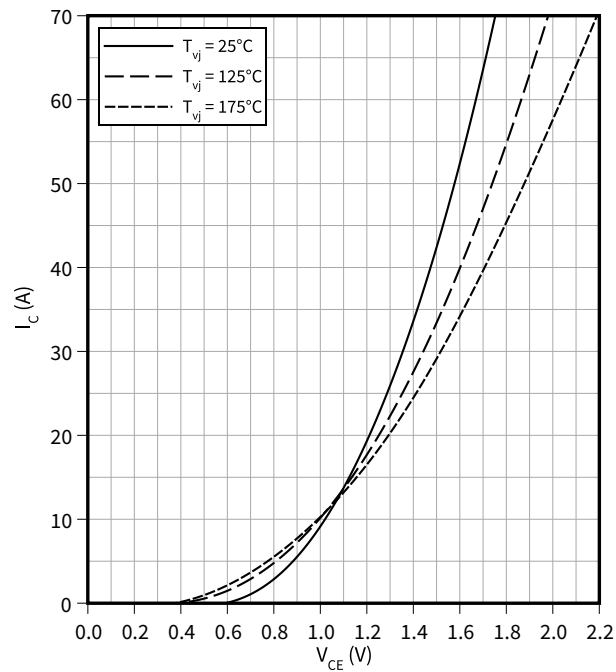
Transient thermal impedance, Diode, D1-D2 / D5-D6 / D9-D10

$Z_{th} = f(t)$



Output characteristic (typical), IGBT, T3-T4 / T7-T8 / T11-T12

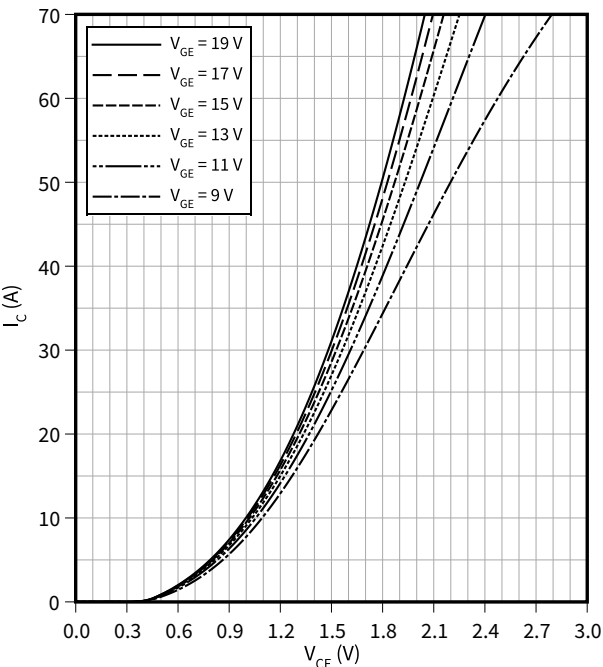
$I_C = f(V_{CE})$
 $V_{GE} = 15\text{ V}$



7 Characteristics diagrams

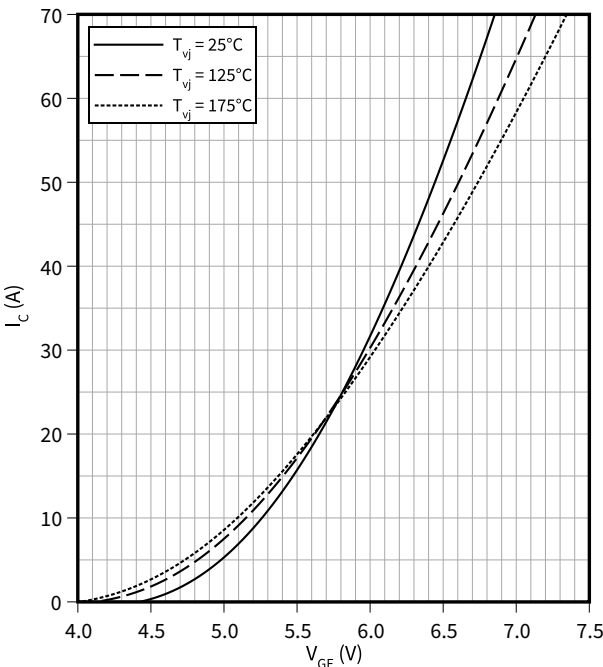
Output characteristic field (typical), IGBT, T3-T4 / T7-T8 / T11-T12

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



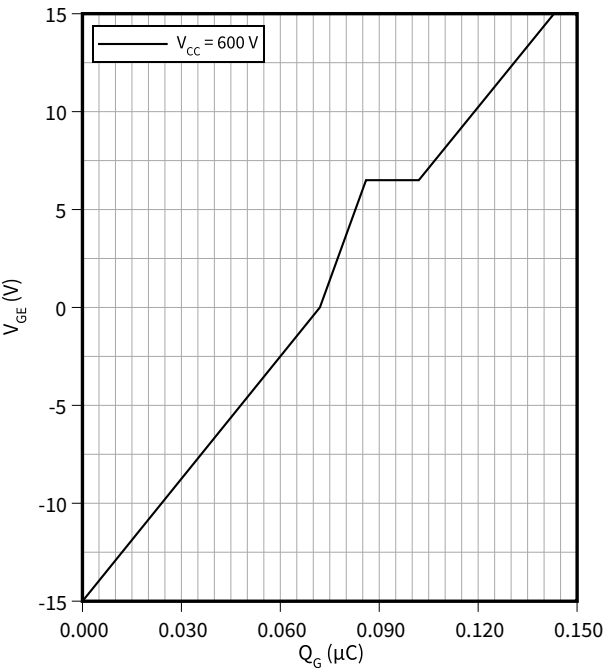
Transfer characteristic (typical), IGBT, T3-T4 / T7-T8 / T11-T12

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



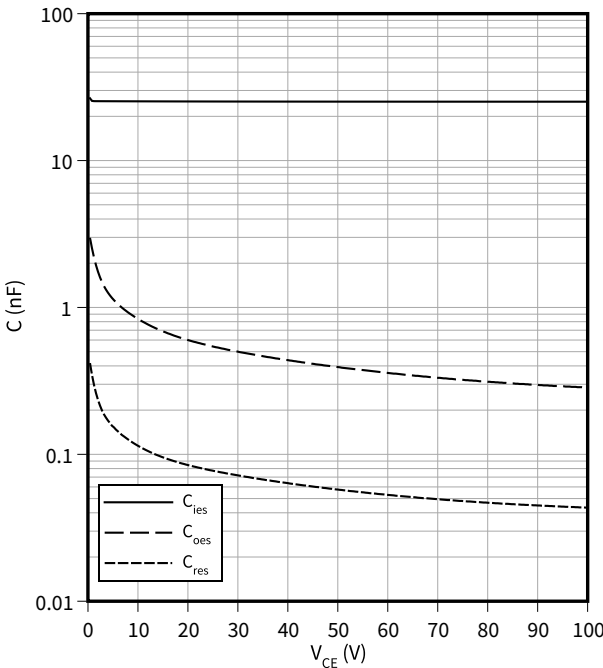
Gate charge characteristic (typical), IGBT, T3-T4 / T7-T8 / T11-T12

$V_{GE} = f(Q_G)$
 $I_C = 35\text{ A}$, $T_{vj} = 25\text{ °C}$



Capacity characteristic (typical), IGBT, T3-T4 / T7-T8 / T11-T12

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

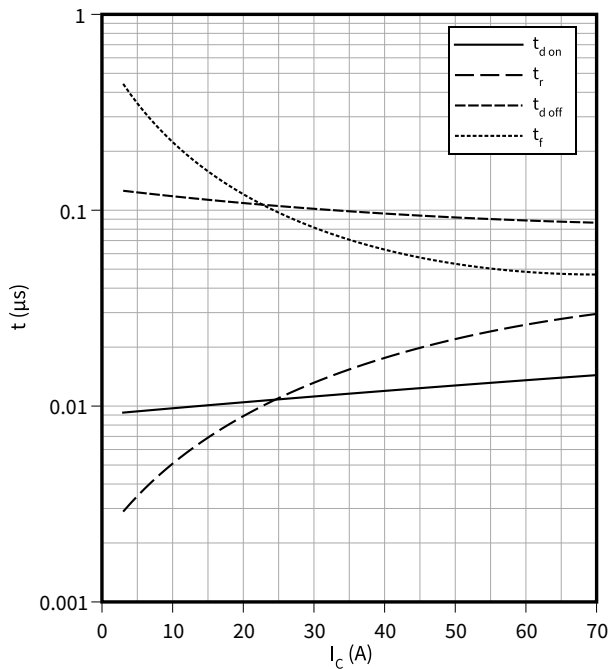


7 Characteristics diagrams

Switching times (typical), IGBT, T3-T4 / T7-T8 / T11-T12

$t = f(I_C)$

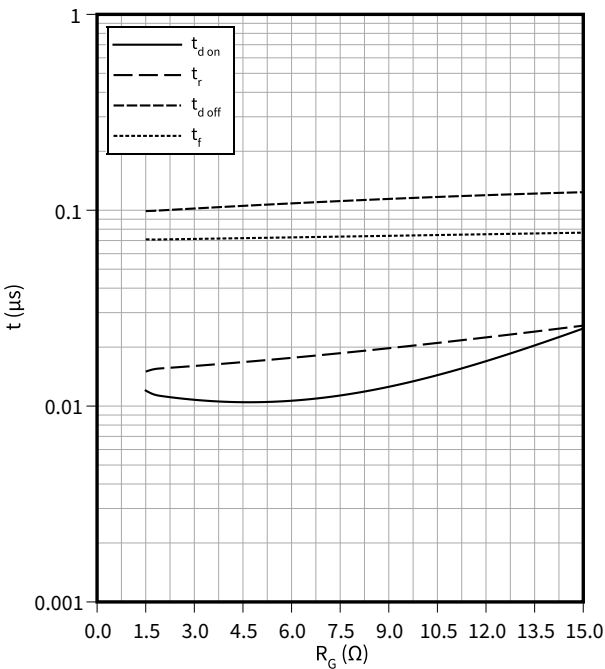
$R_{Goff} = 1.5 \Omega$, $R_{Gon} = 1.5 \Omega$, $V_{GE} = \pm 15 \text{ V}$, $V_{CC} = 350 \text{ V}$



Switching times (typical), IGBT, T3-T4 / T7-T8 / T11-T12

$t = f(R_G)$

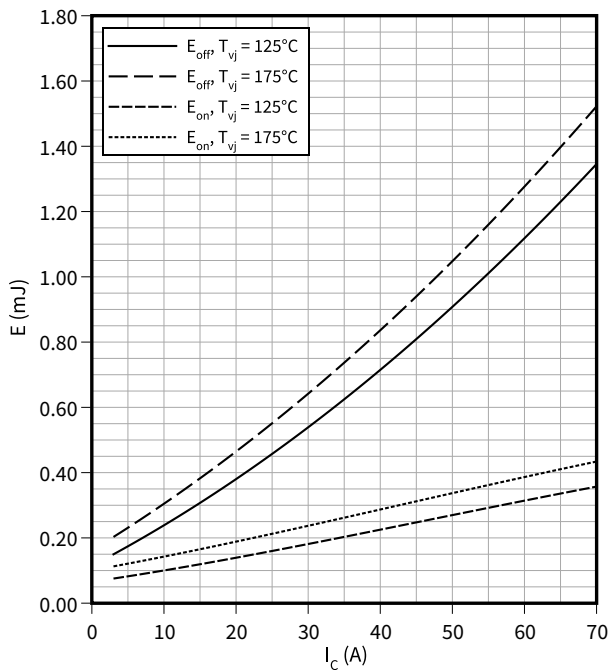
$V_{GE} = \pm 15 \text{ V}$, $I_C = 35 \text{ A}$, $V_{CC} = 350 \text{ V}$



Switching losses (typical), IGBT, T3-T4 / T7-T8 / T11-T12

$E = f(I_C)$

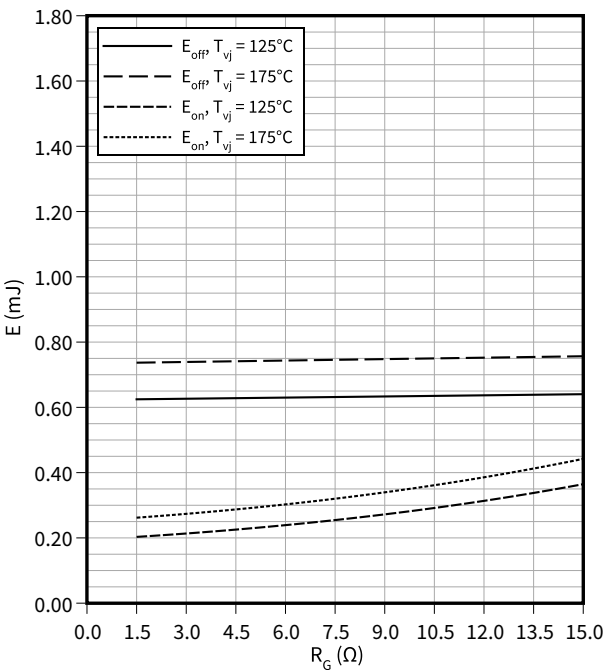
$R_{Goff} = 1.5 \Omega$, $R_{Gon} = 1.5 \Omega$, $V_{CC} = 350 \text{ V}$, $V_{GE} = \pm 15 \text{ V}$



Switching losses (typical), IGBT, T3-T4 / T7-T8 / T11-T12

$E = f(R_G)$

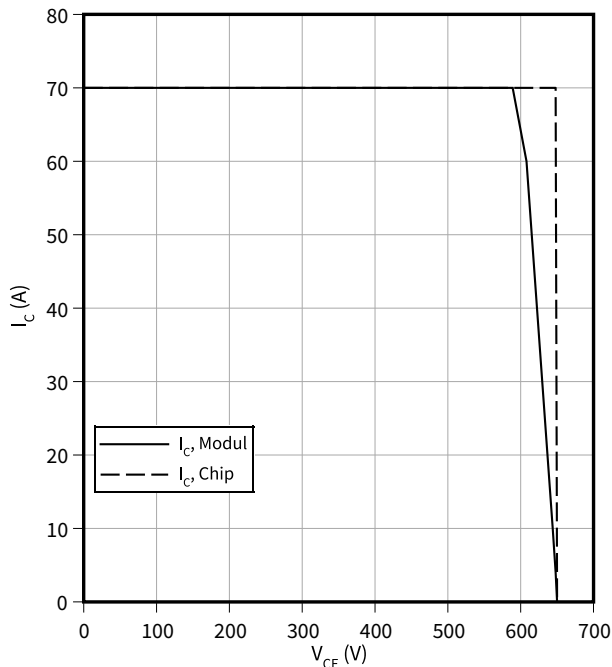
$I_C = 35 \text{ A}$, $V_{CC} = 350 \text{ V}$, $V_{GE} = \pm 15 \text{ V}$



7 Characteristics diagrams

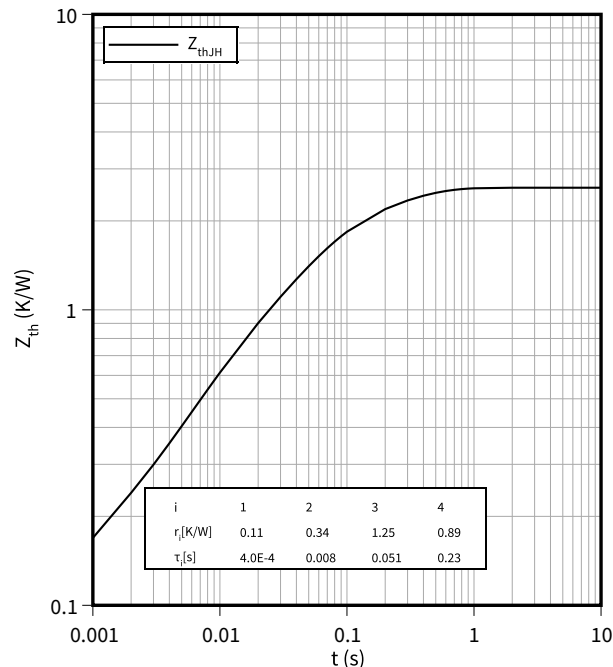
Reverse bias safe operating area (RBSOA), IGBT, T3-T4 / T7-T8 / T11-T12

$I_C = f(V_{CE})$
 $R_{Goff} = 1.5 \Omega$, $V_{GE} = \pm 15 \text{ V}$, $T_{vj} = 175^\circ\text{C}$



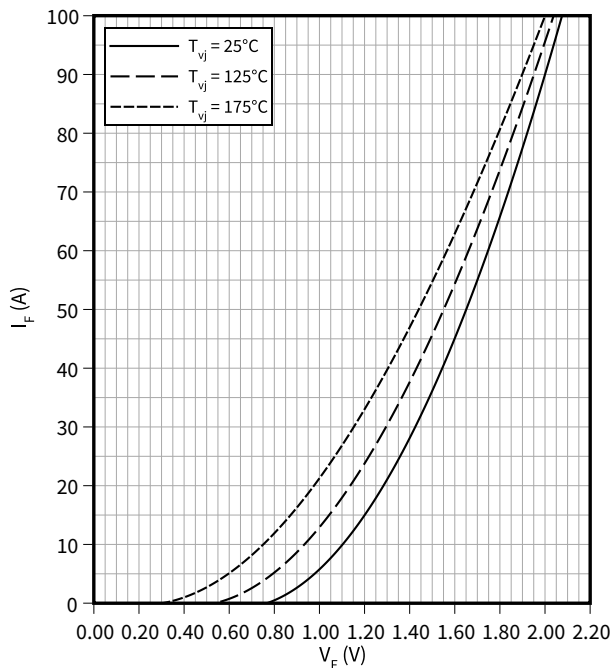
Transient thermal impedance, IGBT, T3-T4 / T7-T8 / T11-T12

$Z_{th} = f(t)$



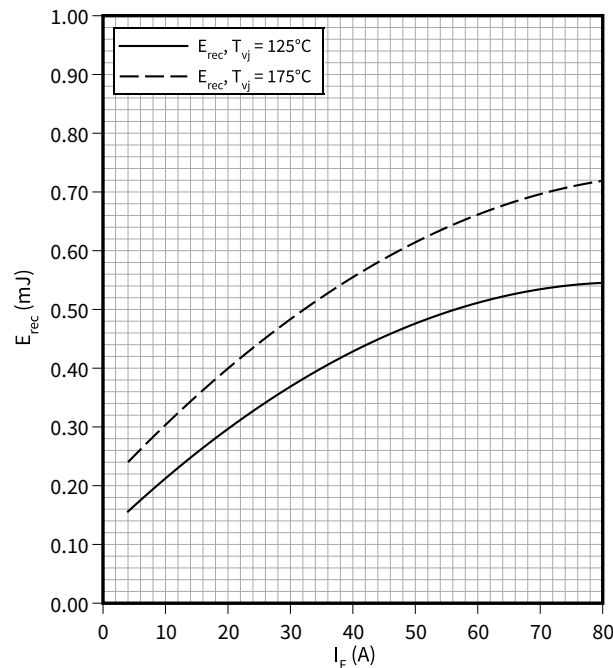
Forward characteristic (typical), Diode, D3-D4 / D7-D8 / D11-D12

$I_F = f(V_F)$



Switching losses (typical), Diode, D3-D4 / D7-D8 / D11-D12

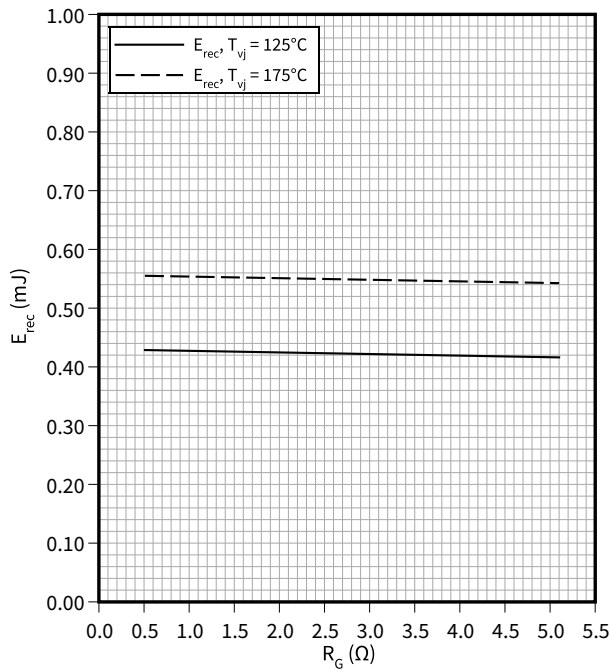
$E_{rec} = f(I_F)$
 $V_{CE} = 350 \text{ V}$, $R_G = 0.51 \Omega$



7 Characteristics diagrams

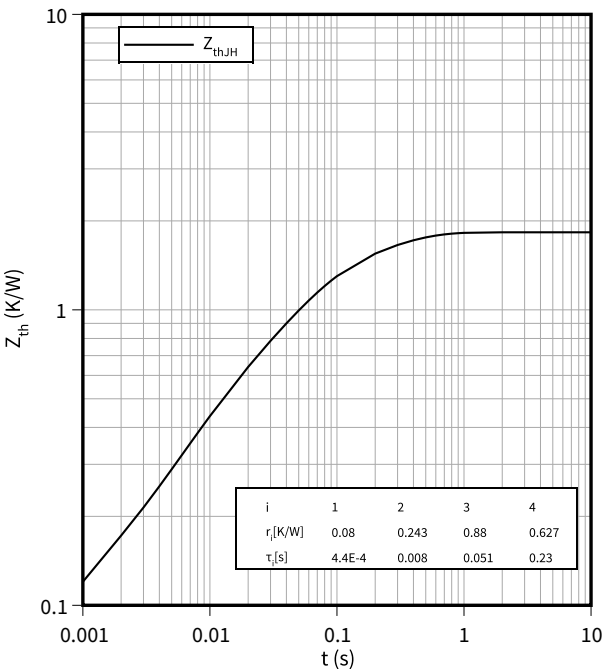
Switching losses (typical), Diode, D3-D4 / D7-D8 / D11-D12

$E_{rec} = f(R_G)$
 $V_{CE} = 350\text{ V}, I_F = 50\text{ A}$



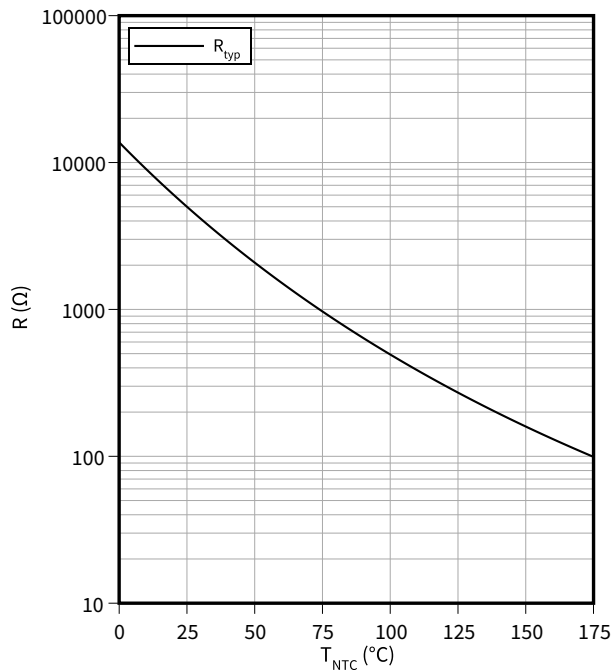
Transient thermal impedance, Diode, D3-D4 / D7-D8 / D11-D12

$Z_{th} = f(t)$



Temperature characteristic (typical), NTC-Thermistor

$R = f(T_{NTC})$



8 Circuit diagram

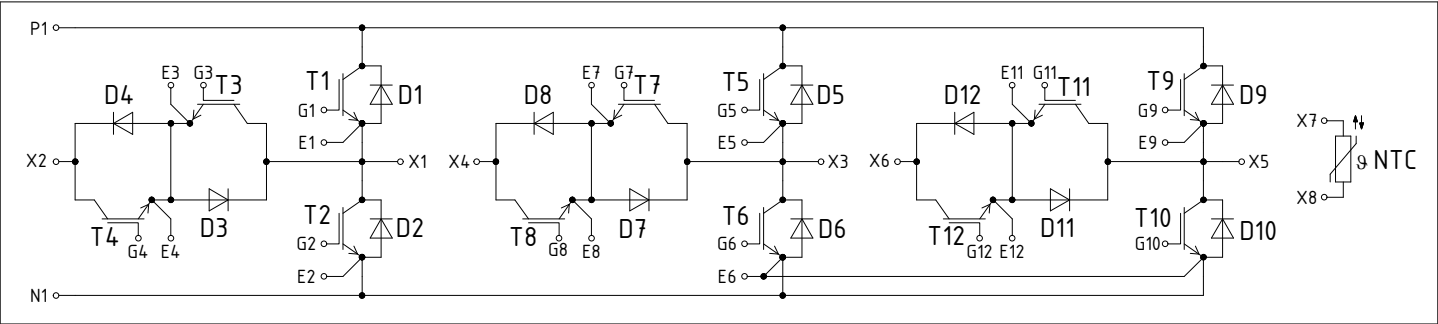


Figure 1

9 Package outlines

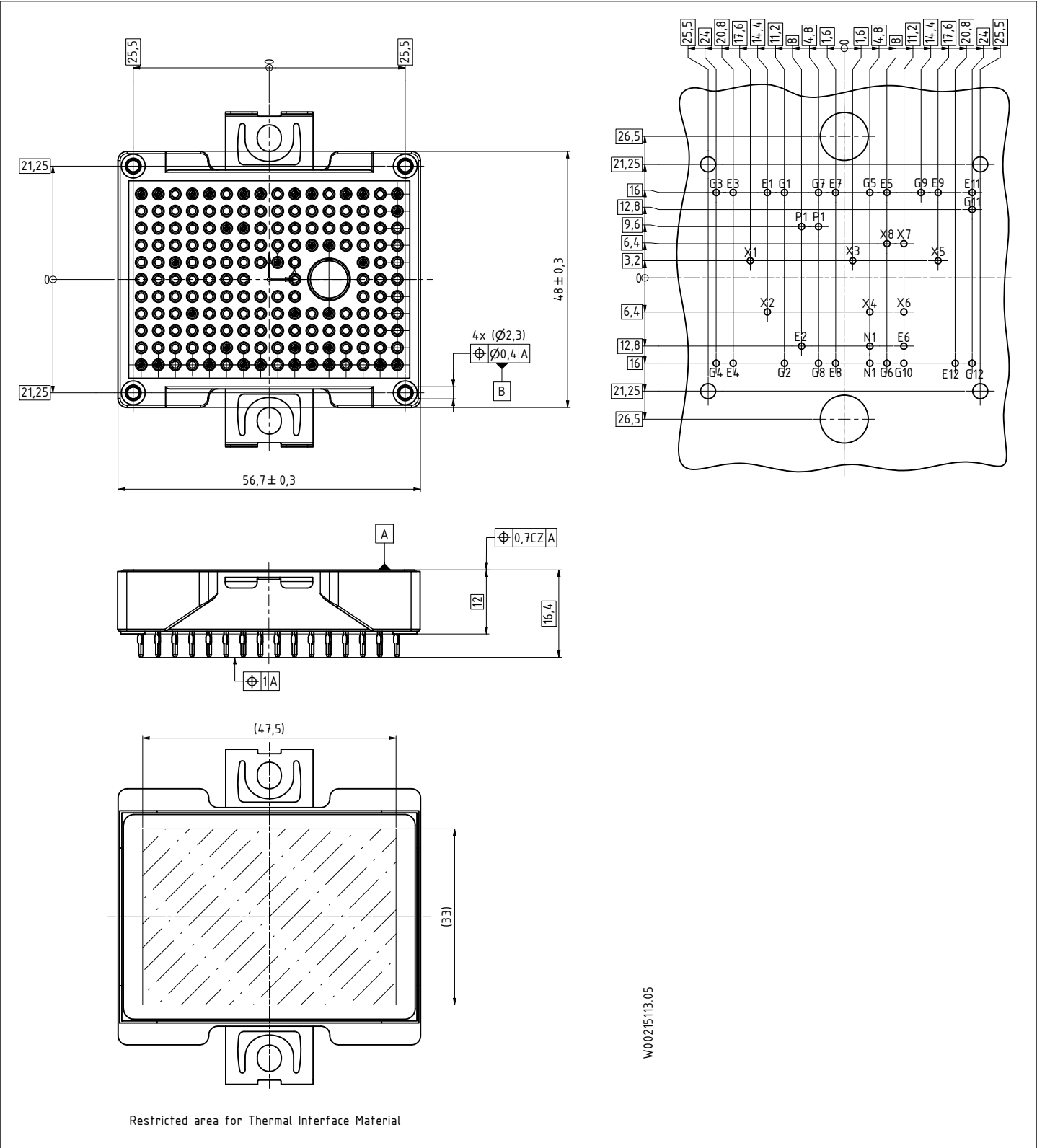


Figure 2

10 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	<i>Content</i>	<i>Digit</i>	<i>Example</i>
	Module serial number	1 – 5	71549
	Module material number	6 - 11	142846
	Production order number	12 - 19	55054991
	Date code (production year)	20 – 21	15
	Date code (production week)	22 – 23	30
Example	 7154914284655054991153071549142846550549911530		

Figure 3

Revision history

Document revision	Date of release	Description of changes
0.10	2023-01-26	Initial version
1.00	2023-12-12	Final datasheet

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Edition 2023-12-12

Published by

Infineon Technologies AG
81726 Munich, Germany

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Document reference
IFX-ABF403-002

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