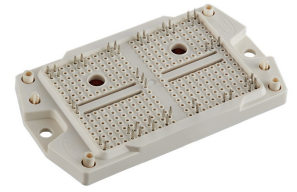


EasyPACK™ module with TRENCHSTOP™ 5 and Emitter Controlled 3 diode and PressFIT / NTC

Features

- Electrical features
 - $V_{CES} = 650\text{ V}$
 - $I_{C\text{nom}} = 100\text{ A} / I_{CRM} = 200\text{ A}$
 - Low switching losses
- Mechanical features
 - Al_2O_3 substrate with low thermal resistance
 - Integrated NTC temperature sensor
 - PressFIT contact technology



Potential applications

- Solar applications
- 3-level-applications

Product validation

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

Description

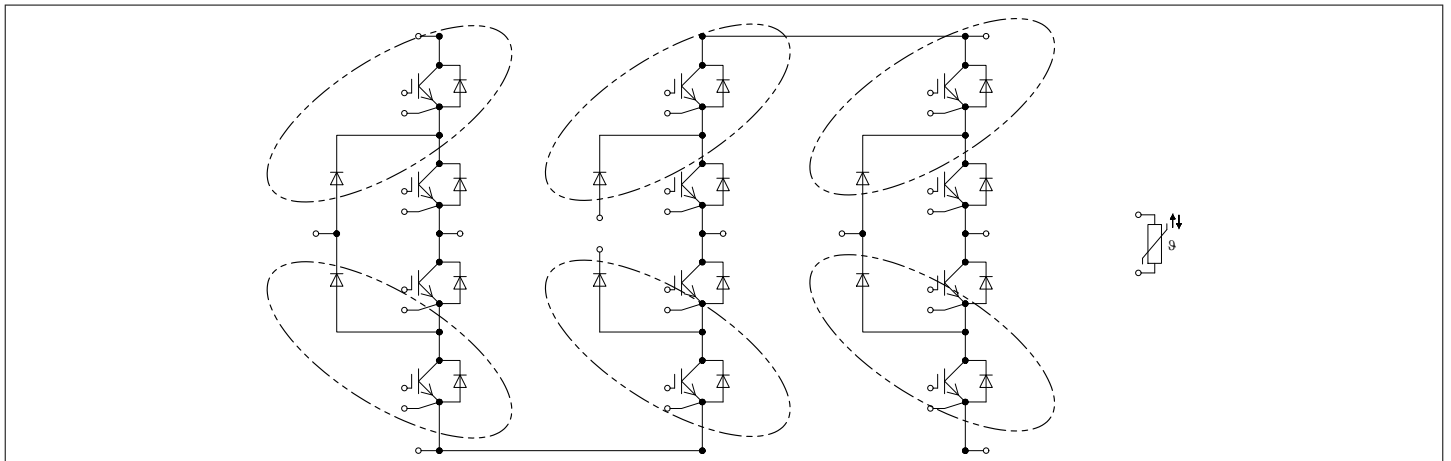


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1 Package

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
Internal Isolation		basic insulation (class 1, IEC 61140)	Al_2O_3	
Creepage distance	d_{Creep}	terminal to heatsink	9.6	mm
Creepage distance	d_{Creep}	terminal to terminal	6.8	mm
Clearance	d_{Clear}	terminal to heatsink	9.4	mm
Clearance	d_{Clear}	terminal to terminal	5.5	mm
Comparative tracking index	CTI		> 400	
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}			28		nH
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
Mounting torque for modul mounting	M	- Mounting according to valid application note	M5, Screw	1.3	1.5	Nm
Weight	G			78		g

Note: The current under continuous operation is limited to 25 A rms per connector pin.

2 IGBT,3-Level

Table 3 Maximum rated values

Parameter	Symbol	Note or test condition	Values	Unit
Collector-emitter voltage	V_{CES}	$T_{vj} = 25^\circ\text{C}$	650	V
Implemented collector current	I_{CN}		100	A
Continuous DC collector current	I_{CDC}	$T_{vj \text{ max}} = 175^\circ\text{C}$ $T_H = 65^\circ\text{C}$	70	A
Repetitive peak collector current	I_{CRM}	$t_p = 1 \text{ ms}$	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	$V_{CE\ sat}$	$I_C = 50\ A, V_{GE} = 15\ V$	$T_{vj} = 25\ ^\circ C$	1.17	1.38	V
			$T_{vj} = 125\ ^\circ C$	1.20		
			$T_{vj} = 150\ ^\circ C$	1.21		
Gate threshold voltage	V_{GEth}	$I_C = 1\ mA, V_{CE} = V_{GE}, T_{vj} = 25\ ^\circ C$	3.25	4	4.75	V
Gate charge	Q_G	$V_{GE} = \pm 15\ V, V_{CE} = 400\ V$		0.42		μC
Internal gate resistor	R_{Gint}	$T_{vj} = 25\ ^\circ C$		0		Ω
Input capacitance	C_{ies}	$f = 100\ kHz, T_{vj} = 25\ ^\circ C, V_{CE} = 25\ V, V_{GE} = 0\ V$		7.1		nF
Reverse transfer capacitance	C_{res}	$f = 100\ kHz, T_{vj} = 25\ ^\circ C, V_{CE} = 25\ V, V_{GE} = 0\ V$		0.025		nF
Collector-emitter cut-off current	I_{CES}	$V_{CE} = 650\ V, V_{GE} = 0\ V$	$T_{vj} = 25\ ^\circ C$		0.007	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}	$I_C = 50\ A, V_{CE} = 300\ V, V_{GE} = \pm 15\ V, R_{Gon} = 8.2\ \Omega$	$T_{vj} = 25\ ^\circ C$	0.026		μs
			$T_{vj} = 125\ ^\circ C$	0.028		
			$T_{vj} = 150\ ^\circ C$	0.028		
Rise time (inductive load)	t_r	$I_C = 50\ A, V_{CE} = 300\ V, V_{GE} = \pm 15\ V, R_{Gon} = 8.2\ \Omega$	$T_{vj} = 25\ ^\circ C$	0.011		μs
			$T_{vj} = 125\ ^\circ C$	0.012		
			$T_{vj} = 150\ ^\circ C$	0.012		
Turn-off delay time (inductive load)	t_{doff}	$I_C = 50\ A, V_{CE} = 300\ V, V_{GE} = \pm 15\ V, R_{Goff} = 8.2\ \Omega$	$T_{vj} = 25\ ^\circ C$	0.140		μs
			$T_{vj} = 125\ ^\circ C$	0.170		
			$T_{vj} = 150\ ^\circ C$	0.180		
Fall time (inductive load)	t_f	$I_C = 50\ A, V_{CE} = 300\ V, V_{GE} = \pm 15\ V, R_{Goff} = 8.2\ \Omega$	$T_{vj} = 25\ ^\circ C$	0.020		μs
			$T_{vj} = 125\ ^\circ C$	0.050		
			$T_{vj} = 150\ ^\circ C$	0.050		
Turn-on energy loss per pulse	E_{on}	$I_C = 50\ A, V_{CE} = 300\ V, L_\sigma = 35\ nH, V_{GE} = \pm 15\ V, R_{Gon} = 8.2\ \Omega, di/dt = 2900\ A/\mu s (T_{vj} = 150\ ^\circ C)$	$T_{vj} = 25\ ^\circ C$	0.45		mJ
			$T_{vj} = 125\ ^\circ C$	0.66		
			$T_{vj} = 150\ ^\circ C$	0.72		
Turn-off energy loss per pulse	E_{off}	$I_C = 50\ A, V_{CE} = 300\ V, L_\sigma = 35\ nH, V_{GE} = \pm 15\ V, R_{Goff} = 8.2\ \Omega, dv/dt = 4500\ V/\mu s (T_{vj} = 150\ ^\circ C)$	$T_{vj} = 25\ ^\circ C$	0.65		mJ
			$T_{vj} = 125\ ^\circ C$	0.92		
			$T_{vj} = 150\ ^\circ C$	1.02		
SC data	I_{SC}	$V_{GE} \leq 15\ V, V_{CC} = 360\ V, V_{CEmax} = V_{CES} - L_{sCE} * di/dt$	$t_p \leq 0\ \mu s, T_{vj} = 150\ ^\circ C$	800		A
Thermal resistance, junction to heatsink	R_{thJH}	per IGBT		0.886		K/W

Table 4 Characteristic values (continued)

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

3 IGBT, Inverter

Table 5 Maximum rated values

Parameter	Symbol	Note or test condition	Values	Unit
Collector-emitter voltage	V_{CES}	$T_{vj} = 25\ ^\circ\text{C}$	650	V
Implemented collector current	I_{CN}		75	A
Continuous DC collector current	I_{CDC}	$T_{vj\ max} = 175\ ^\circ\text{C}$ $T_H = 65\ ^\circ\text{C}$	75	A
Repetitive peak collector current	I_{CRM}	$t_p = 1\ \text{ms}$	150	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	$V_{CE\ sat}$	$I_C = 50\ \text{A}, V_{GE} = 15\ \text{V}$	$T_{vj} = 25\ ^\circ\text{C}$	0.99	1.43	V
			$T_{vj} = 125\ ^\circ\text{C}$	0.94		
			$T_{vj} = 150\ ^\circ\text{C}$	0.91		
Gate threshold voltage	V_{GEth}	$I_C = 1\ \text{mA}, V_{CE} = 20\ \text{V}, T_{vj} = 25\ ^\circ\text{C}$	4.25	5	5.75	V
Gate charge	Q_G	$V_{GE} = \pm 15\ \text{V}, V_{CE} = 400\ \text{V}$		0.92		μC
Internal gate resistor	R_{Gint}	$T_{vj} = 25\ ^\circ\text{C}$		0		Ω
Input capacitance	C_{ies}	$f = 100\ \text{kHz}, T_{vj} = 25\ ^\circ\text{C}, V_{CE} = 25\ \text{V}, V_{GE} = 0\ \text{V}$		11.8		nF
Reverse transfer capacitance	C_{res}	$f = 100\ \text{kHz}, T_{vj} = 25\ ^\circ\text{C}, V_{CE} = 25\ \text{V}, V_{GE} = 0\ \text{V}$		0.042		nF
Collector-emitter cut-off current	I_{CES}	$V_{CE} = 650\ \text{V}, V_{GE} = 0\ \text{V}$ $T_{vj} = 25\ ^\circ\text{C}$			0.007	mA
Gate-emitter leakage current	I_{GES}	$V_{CE} = 0\ \text{V}, V_{GE} = 20\ \text{V}, T_{vj} = 25\ ^\circ\text{C}$			100	nA
Turn-on delay time (inductive load)	t_{don}	$I_C = 50\ \text{A}, V_{CE} = 300\ \text{V}, V_{GE} = \pm 15\ \text{V}, R_{Gon} = 8.2\ \Omega$	$T_{vj} = 25\ ^\circ\text{C}$	0.053		μs
			$T_{vj} = 125\ ^\circ\text{C}$	0.049		
			$T_{vj} = 150\ ^\circ\text{C}$	0.048		

Table 6 Characteristic values (continued)

Parameter	Symbol	Note or test condition	Values			Unit
			Min.	Typ.	Max.	
Rise time (inductive load)	t_r	$I_C = 50 \text{ A}, V_{CE} = 300 \text{ V}, V_{GE} = \pm 15 \text{ V}, R_{Gon} = 8.2 \Omega$	$T_{vj} = 25 \text{ }^\circ\text{C}$	0.017		μs
			$T_{vj} = 125 \text{ }^\circ\text{C}$	0.018		
			$T_{vj} = 150 \text{ }^\circ\text{C}$	0.019		
Turn-off delay time (inductive load)	t_{doff}	$I_C = 50 \text{ A}, V_{CE} = 300 \text{ V}, V_{GE} = \pm 15 \text{ V}, R_{Goff} = 8.2 \Omega$	$T_{vj} = 25 \text{ }^\circ\text{C}$	0.330		μs
			$T_{vj} = 125 \text{ }^\circ\text{C}$	0.370		
			$T_{vj} = 150 \text{ }^\circ\text{C}$	0.380		
Fall time (inductive load)	t_f	$I_C = 50 \text{ A}, V_{CE} = 300 \text{ V}, V_{GE} = \pm 15 \text{ V}, R_{Goff} = 8.2 \Omega$	$T_{vj} = 25 \text{ }^\circ\text{C}$	0.130		μs
			$T_{vj} = 125 \text{ }^\circ\text{C}$	0.210		
			$T_{vj} = 150 \text{ }^\circ\text{C}$	0.240		
Turn-on energy loss per pulse	E_{on}	$I_C = 50 \text{ A}, V_{CE} = 300 \text{ V}, L_\sigma = 35 \text{ nH}, V_{GE} = \pm 15 \text{ V}, R_{Gon} = 8.2 \Omega, di/dt = 2400 \text{ A}/\mu\text{s} (T_{vj} = 150 \text{ }^\circ\text{C})$	$T_{vj} = 25 \text{ }^\circ\text{C}$	0.29		mJ
			$T_{vj} = 125 \text{ }^\circ\text{C}$	0.34		
			$T_{vj} = 150 \text{ }^\circ\text{C}$	0.36		
Turn-off energy loss per pulse	E_{off}	$I_C = 50 \text{ A}, V_{CE} = 300 \text{ V}, L_\sigma = 35 \text{ nH}, V_{GE} = \pm 15 \text{ V}, R_{Goff} = 8.2 \Omega, dv/dt = 1600 \text{ V}/\mu\text{s} (T_{vj} = 150 \text{ }^\circ\text{C})$	$T_{vj} = 25 \text{ }^\circ\text{C}$	2.48		mJ
			$T_{vj} = 125 \text{ }^\circ\text{C}$	3.45		
			$T_{vj} = 150 \text{ }^\circ\text{C}$	3.69		
SC data	I_{SC}	$V_{GE} \leq 15 \text{ V}, V_{CC} = 360 \text{ V}, V_{CEmax} = V_{CES} - L_{sCE} * di/dt$	$t_p \leq 0 \mu\text{s}, T_{vj} \leq 150 \text{ }^\circ\text{C}$	900		A
Thermal resistance, junction to heatsink	R_{thJH}	per IGBT		0.902		K/W
Temperature under switching conditions	$T_{vj op}$			-40	150	$^\circ\text{C}$

4 Diode, 3-Level

Table 7 Maximum rated values

Parameter	Symbol	Note or test condition	Values	Unit
Repetitive peak reverse voltage	V_{RRM}	$T_{vj} = 25 \text{ }^\circ\text{C}$	650	V
Implemented forward current	I_{FN}		75	A
Continuous DC forward current	I_F		40	A
Repetitive peak forward current	I_{FRM}	$t_p = 1 \text{ ms}$	150	A

Table 7 Maximum rated values (continued)

Parameter	Symbol	Note or test condition	Values	Unit	
I ² t - value	I ² t	V _R = 0 V, t _p = 10 ms	T _{vj} = 125 °C	370	A ² s
			T _{vj} = 150 °C	360	

Table 8 Characteristic values

Parameter	Symbol	Note or test condition	Values			Unit	
			Min.	Typ.	Max.		
Forward voltage	V _F	I _F = 40 A, V _{GE} = 0 V	T _{vj} = 25 °C		1.30	1.64	V
			T _{vj} = 125 °C		1.20		
			T _{vj} = 150 °C		1.15		
Peak reverse recovery current	I _{RM}	I _F = 40 A, V _R = 300 V, V _{GE} = -15 V, -di _F /dt = 2900 A/μs (T _{vj} = 150 °C)	T _{vj} = 25 °C		47		A
			T _{vj} = 125 °C		60		
			T _{vj} = 150 °C		66		
Recovered charge	Q _r	I _F = 40 A, V _R = 300 V, V _{GE} = -15 V, -di _F /dt = 2900 A/μs (T _{vj} = 150 °C)	T _{vj} = 25 °C		2.13		μC
			T _{vj} = 125 °C		4.18		
			T _{vj} = 150 °C		4.9		
Reverse recovery energy	E _{rec}	I _F = 40 A, V _R = 300 V, V _{GE} = -15 V, -di _F /dt = 2900 A/μs (T _{vj} = 150 °C)	T _{vj} = 25 °C		0.55		mJ
			T _{vj} = 125 °C		1.04		
			T _{vj} = 150 °C		1.23		
Thermal resistance, junction to heatsink	R _{thJH}	per diode		1.21		K/W	
Temperature under switching conditions	T _{vj op}		-40		150	°C	

5 Diode, Inverter

Table 9 Maximum rated values

Parameter	Symbol	Note or test condition	Values	Unit
Repetitive peak reverse voltage	V _{RRM}	T _{vj} = 25 °C	650	V
Implemented forward current	I _{FN}		75	A
Continuous DC forward current	I _F		40	A
Repetitive peak forward current	I _{FRM}	t _p = 1 ms	150	A

Table 9 Maximum rated values (continued)

Parameter	Symbol	Note or test condition	Values	Unit	
I ² t - value	I ² t	V _R = 0 V, t _p = 10 ms	T _{vj} = 125 °C	370	A ² s
			T _{vj} = 150 °C	360	

Table 10 Characteristic values

Parameter	Symbol	Note or test condition	Values			Unit	
			Min.	Typ.	Max.		
Forward voltage	V _F	I _F = 40 A, V _{GE} = 0 V	T _{vj} = 25 °C		1.30	1.64	V
			T _{vj} = 125 °C		1.20		
			T _{vj} = 150 °C		1.15		
Peak reverse recovery current	I _{RM}	I _F = 40 A, V _R = 300 V, V _{GE} = -15 V, -di _F /dt = 2400 A/μs (T _{vj} = 150 °C)	T _{vj} = 25 °C		42		A
			T _{vj} = 125 °C		55		
			T _{vj} = 150 °C		59		
Recovered charge	Q _r	I _F = 40 A, V _R = 300 V, V _{GE} = -15 V, -di _F /dt = 2400 A/μs (T _{vj} = 150 °C)	T _{vj} = 25 °C		1.73		μC
			T _{vj} = 125 °C		4.11		
			T _{vj} = 150 °C		4.47		
Reverse recovery energy	E _{rec}	I _F = 40 A, V _R = 300 V, V _{GE} = -15 V, -di _F /dt = 2400 A/μs (T _{vj} = 150 °C)	T _{vj} = 25 °C		0.21		mJ
			T _{vj} = 125 °C		1.03		
			T _{vj} = 150 °C		1.18		
Thermal resistance, junction to heatsink	R _{thJH}	per diode		1.04		K/W	
Temperature under switching conditions	T _{vj op}		-40		150	°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 °C		5		kΩ
Deviation of R ₁₀₀	ΔR/R	T _{NTC} = 100 °C, R ₁₀₀ = 493 Ω	-5		5	%
Power dissipation	P ₂₅	T _{NTC} = 25 °C			20	mW
B-value	B _{25/50}	R ₂ = R ₂₅ exp[B _{25/50} (1/T ₂ -1/(298,15 K))]		3375		K
B-value	B _{25/80}	R ₂ = R ₂₅ exp[B _{25/80} (1/T ₂ -1/(298,15 K))]		3411		K
B-value	B _{25/100}	R ₂ = R ₂₅ exp[B _{25/100} (1/T ₂ -1/(298,15 K))]		3433		K

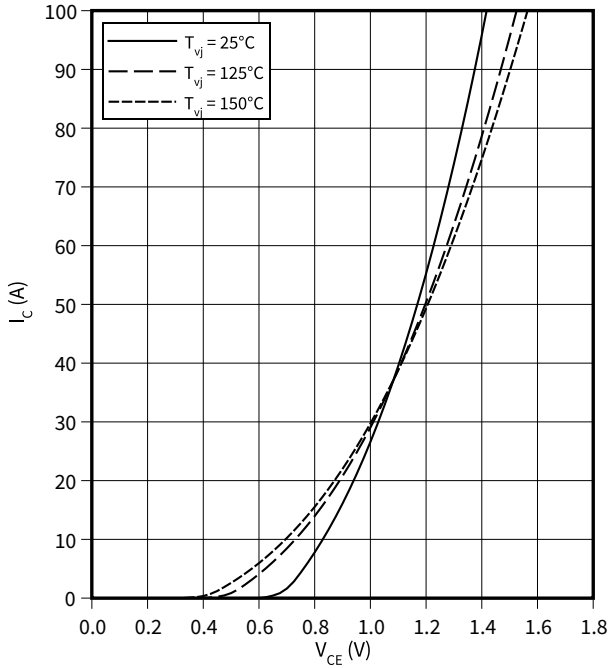
Note: Specification according to the valid application note.

7 Characteristics diagrams

output characteristic (typical), IGBT,3-Level

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

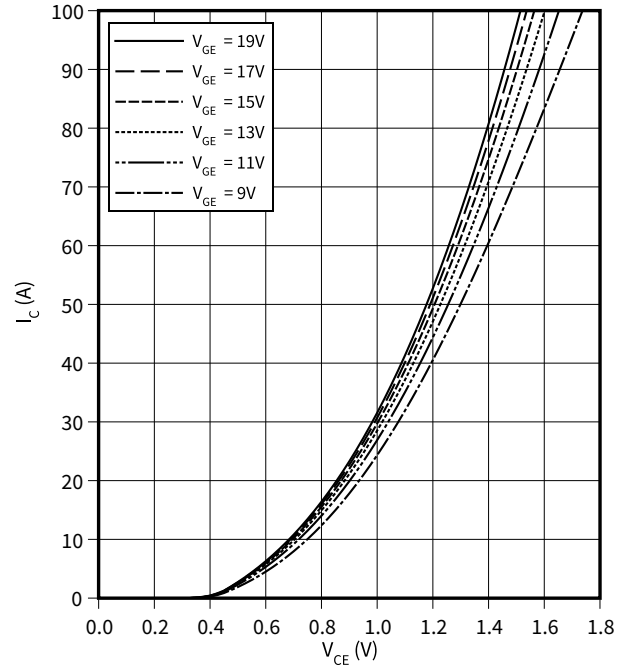
$$V_{GE} = 15 \text{ V}$$



output characteristic (typical), IGBT,3-Level

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

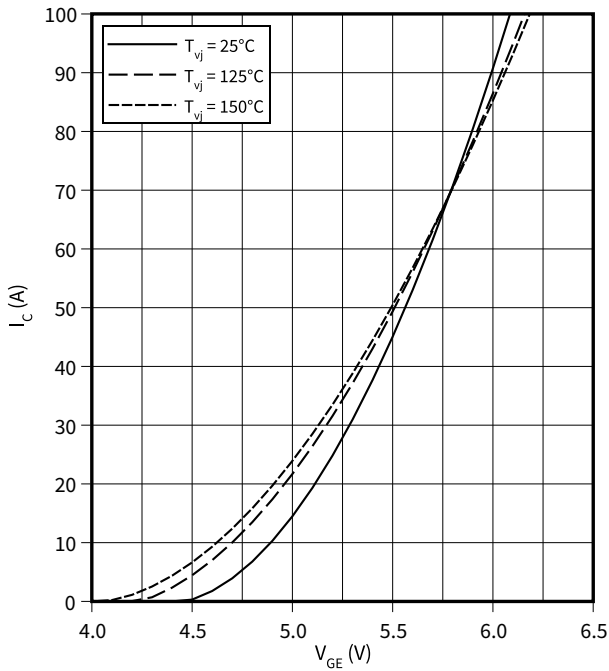
$$T_{vj} = 150 \text{ °C}$$



transfer characteristic (typical), IGBT,3-Level

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

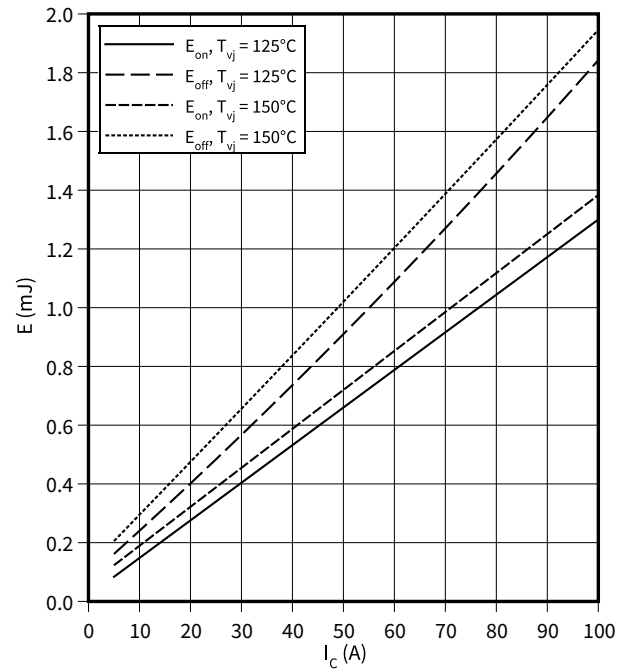
$$V_{CE} = 20 \text{ V}$$



switching losses (typical), IGBT,3-Level

$$E = f(I_C)$$

$$R_{Goff} = 8.2 \text{ } \Omega, R_{Gon} = 8.2 \text{ } \Omega, V_{CE} = 300 \text{ V}, V_{GE} = \pm 15 \text{ V}$$

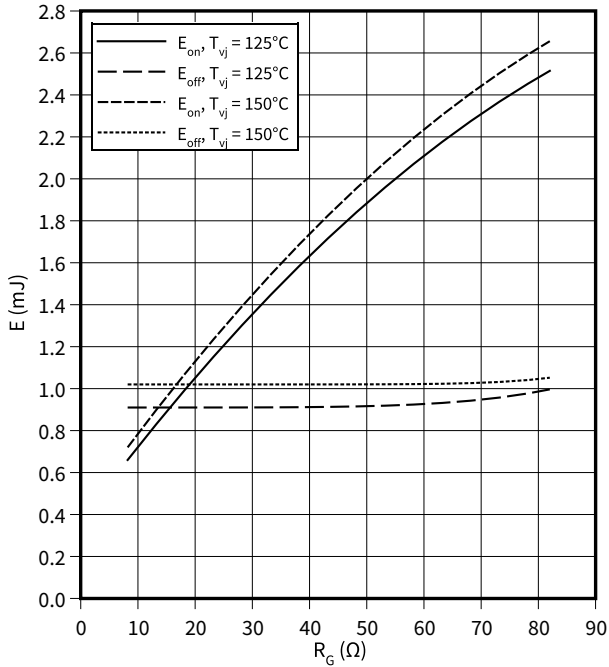


7 Characteristics diagrams

switching losses (typical), IGBT,3-Level

$E = f(R_G)$

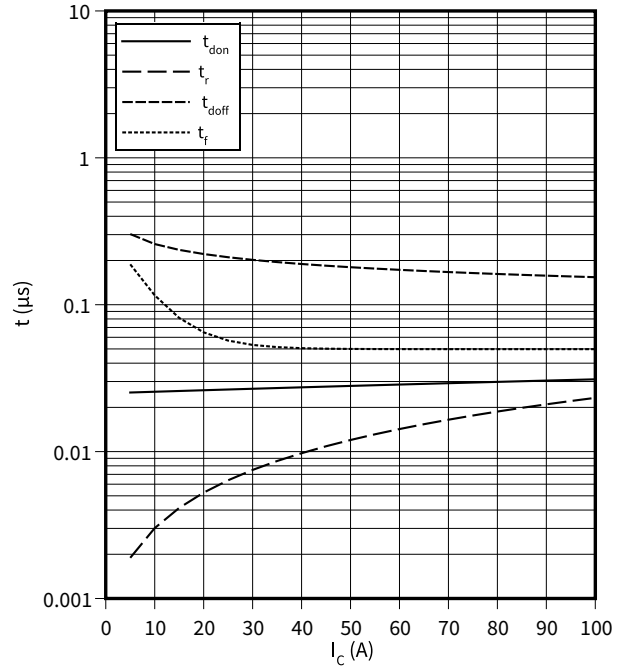
$I_C = 50 \text{ A}, V_{CE} = 300 \text{ V}, V_{GE} = \pm 15 \text{ V}$



switching times (typical), IGBT,3-Level

$t = f(I_C)$

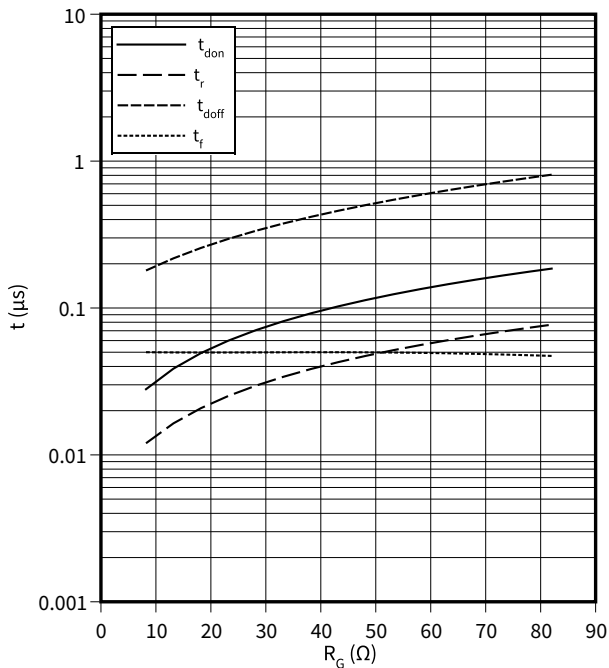
$R_{Goff} = 8.2 \Omega, R_{Gon} = 8.2 \Omega, V_{CE} = 300 \text{ V}, V_{GE} = \pm 15 \text{ V}, T_{vj} = 150 \text{ °C}$



switching times (typical), IGBT,3-Level

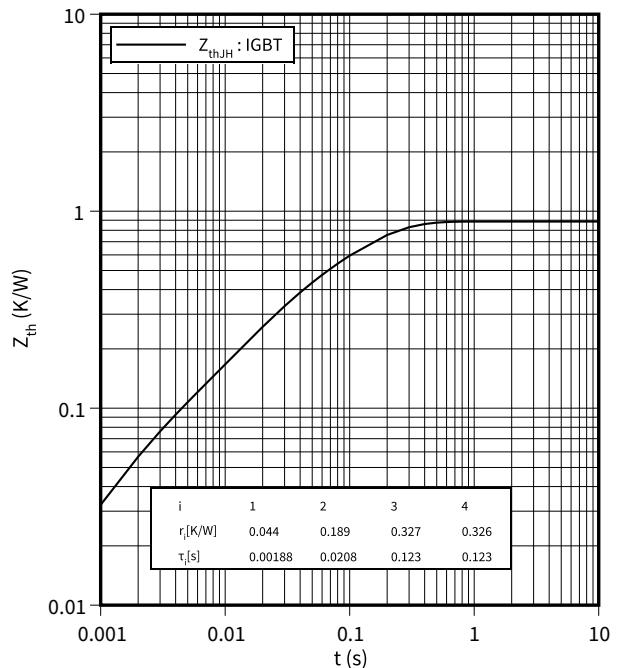
$t = f(R_G)$

$I_C = 50 \text{ A}, V_{CE} = 300 \text{ V}, V_{GE} = \pm 15 \text{ V}, T_{vj} = 150 \text{ °C}$



transient thermal impedance, IGBT,3-Level

$Z_{th} = f(t)$

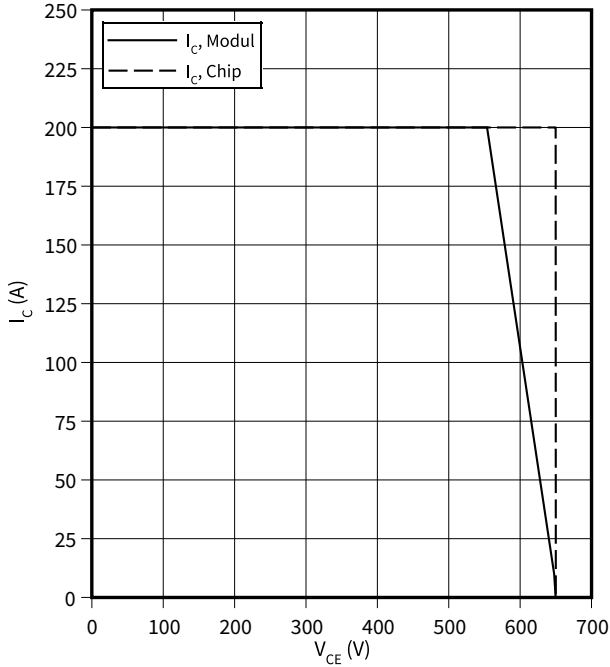


7 Characteristics diagrams

reverse bias safe operating area (RBSOA), IGBT,3-Level

$I_C = f(V_{CE})$

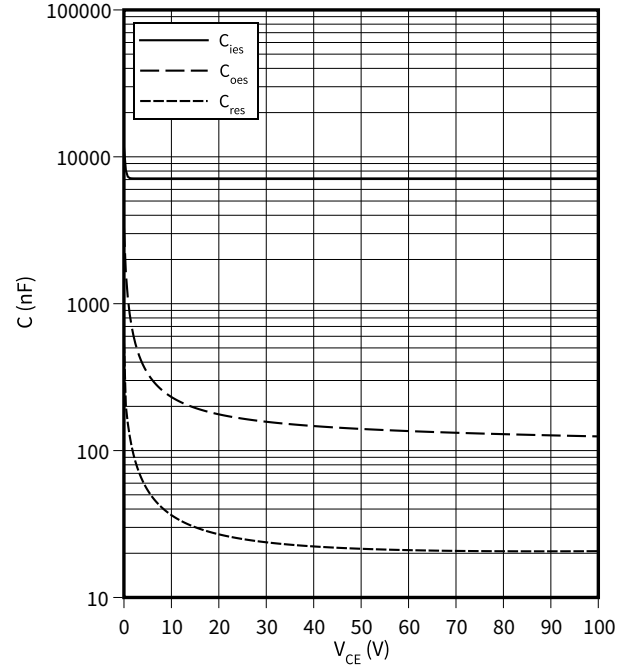
$R_{Goff} = 8.2 \Omega$, $V_{GE} = \pm 15 \text{ V}$, $T_{vj} = 150 \text{ }^\circ\text{C}$



capacity characteristic (typical), IGBT,3-Level

$C = f(V_{CE})$

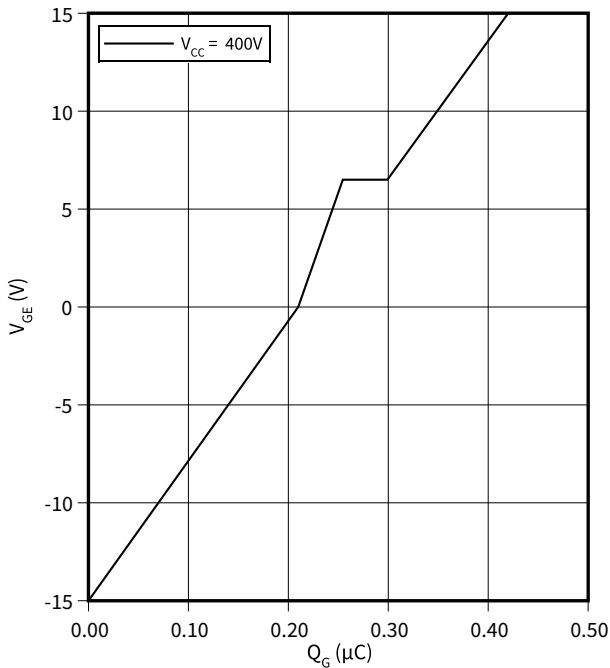
$f = 100 \text{ kHz}$, $V_{GE} = 0 \text{ V}$, $T_{vj} = 25 \text{ }^\circ\text{C}$



gate charge characteristic (typical), IGBT,3-Level

$V_{GE} = f(Q_G)$

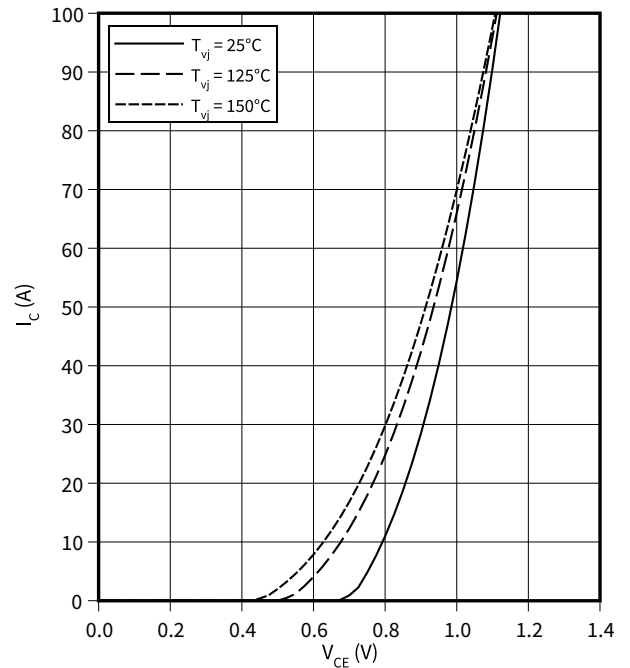
$I_C = 50 \text{ A}$, $T_{vj} = 25 \text{ }^\circ\text{C}$



output characteristic (typical), IGBT, Inverter

$I_C = f(V_{CE})$

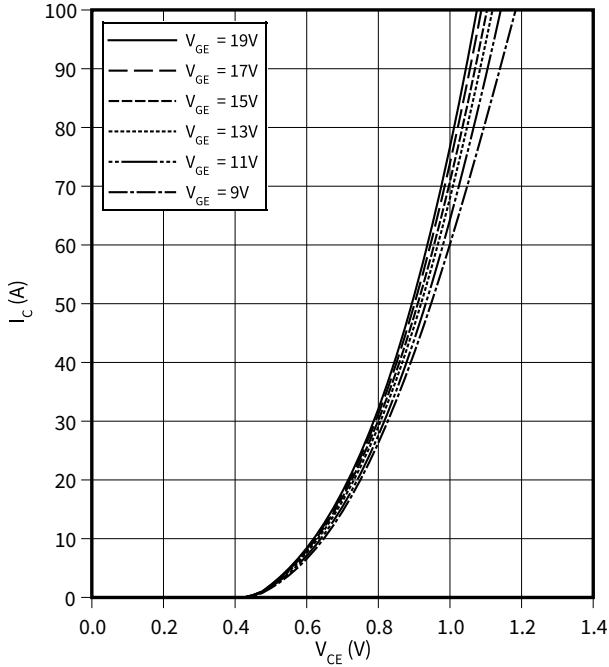
$V_{GE} = 15 \text{ V}$



7 Characteristics diagrams

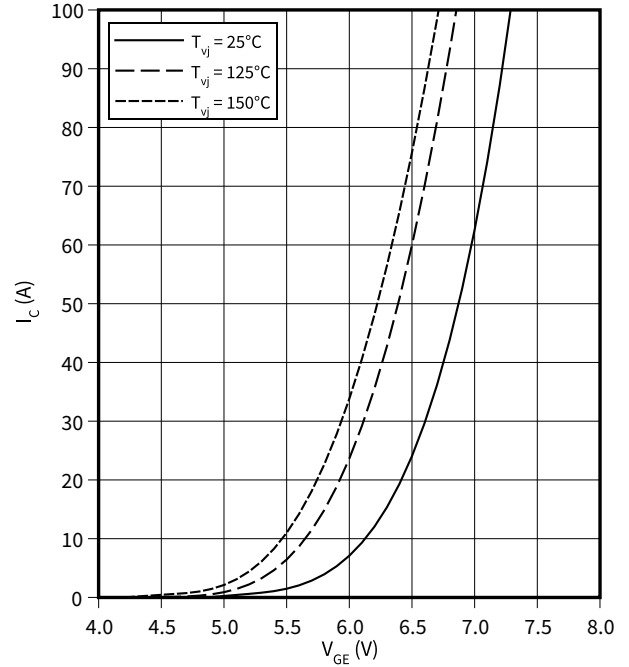
output characteristic (typical), IGBT, Inverter

$I_C = f(V_{CE})$
 $T_{vj} = 150\text{ °C}$



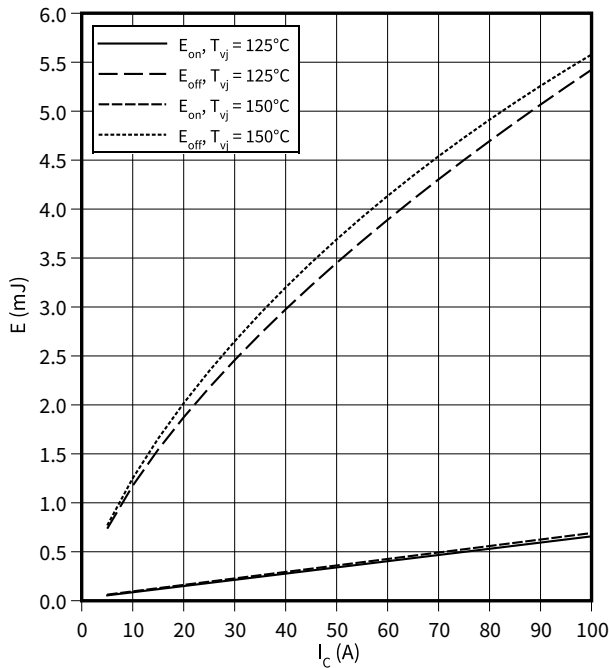
transfer characteristic (typical), IGBT, Inverter

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



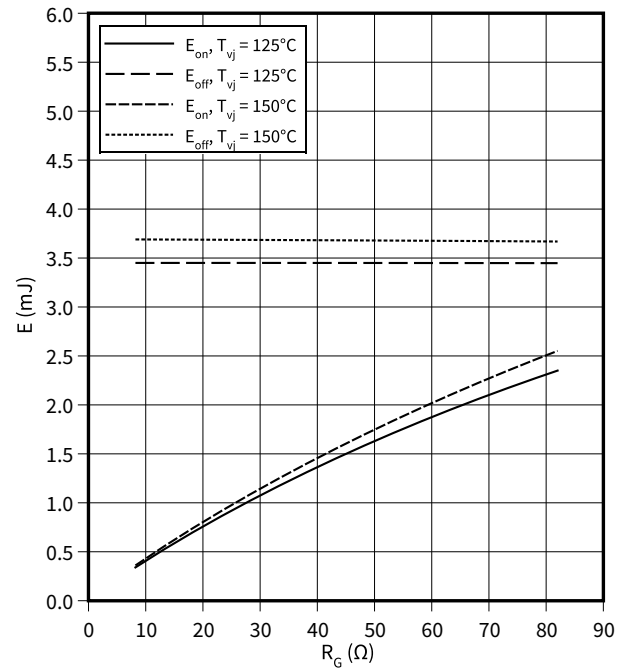
switching losses (typical), IGBT, Inverter

$E = f(I_C)$
 $R_{Goff} = 8.2\ \Omega$, $R_{Gon} = 8.2\ \Omega$, $V_{CE} = 300\text{ V}$, $V_{GE} = \pm 15\text{ V}$



switching losses (typical), IGBT, Inverter

$E = f(R_G)$
 $I_C = 50\text{ A}$, $V_{CE} = 300\text{ V}$, $V_{GE} = \pm 15\text{ V}$

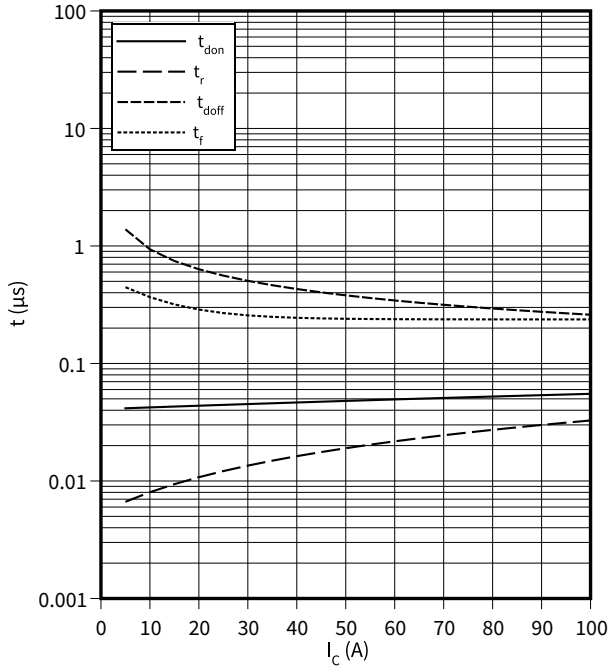


7 Characteristics diagrams

switching times (typical), IGBT, Inverter

$t = f(I_C)$

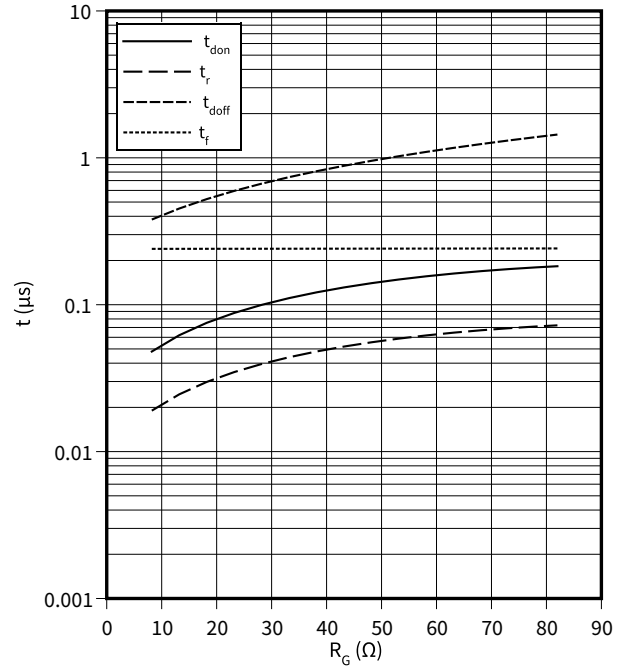
$R_{Goff} = 8.2 \Omega$, $R_{Gon} = 8.2 \Omega$, $V_{CE} = 300 \text{ V}$, $V_{GE} = \pm 15 \text{ V}$, $T_{vj} = 150 \text{ }^\circ\text{C}$



switching times (typical), IGBT, Inverter

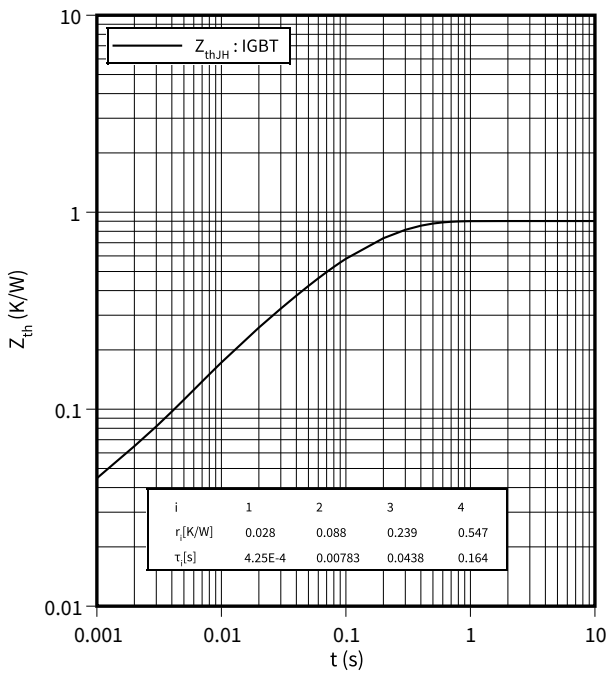
$t = f(R_G)$

$I_C = 50 \text{ A}$, $V_{CE} = 300 \text{ V}$, $V_{GE} = \pm 15 \text{ V}$, $T_{vj} = 150 \text{ }^\circ\text{C}$



transient thermal impedance , IGBT, Inverter

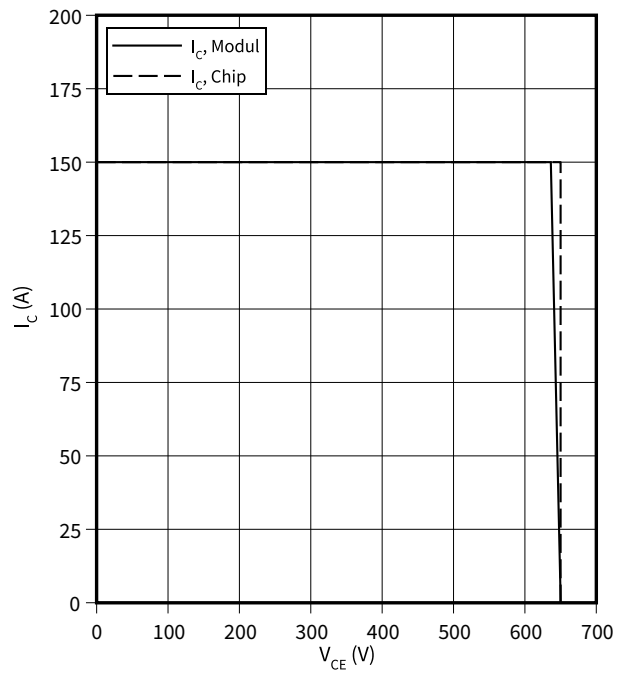
$Z_{th} = f(t)$



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

$I_C = f(V_{CE})$

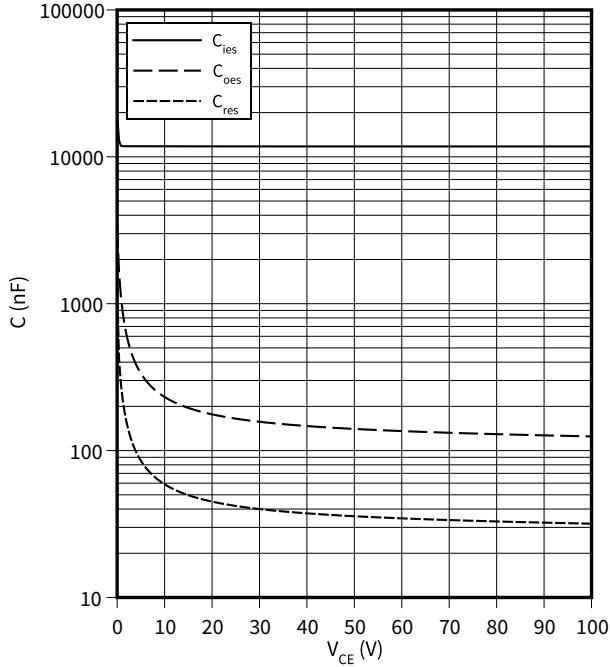
$R_{Goff} = 8.2 \Omega$, $V_{GE} = \pm 15 \text{ V}$, $T_{vj} = 150 \text{ }^\circ\text{C}$



7 Characteristics diagrams

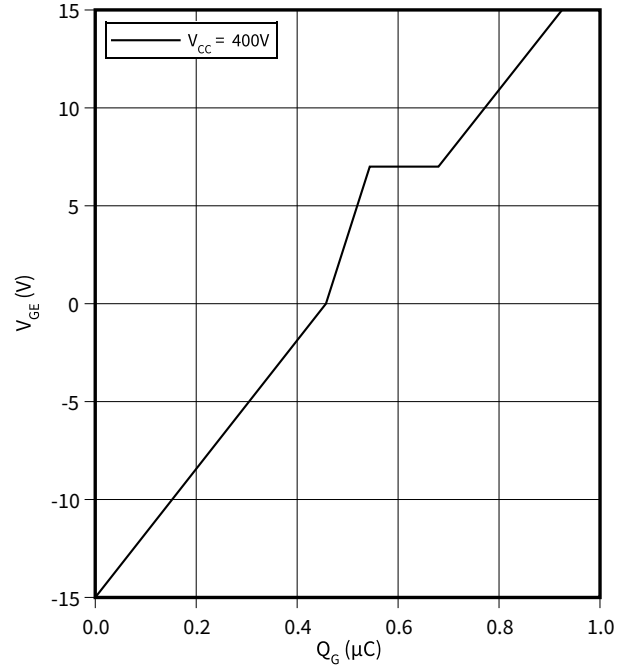
capacity characteristic (typical), IGBT, Inverter

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



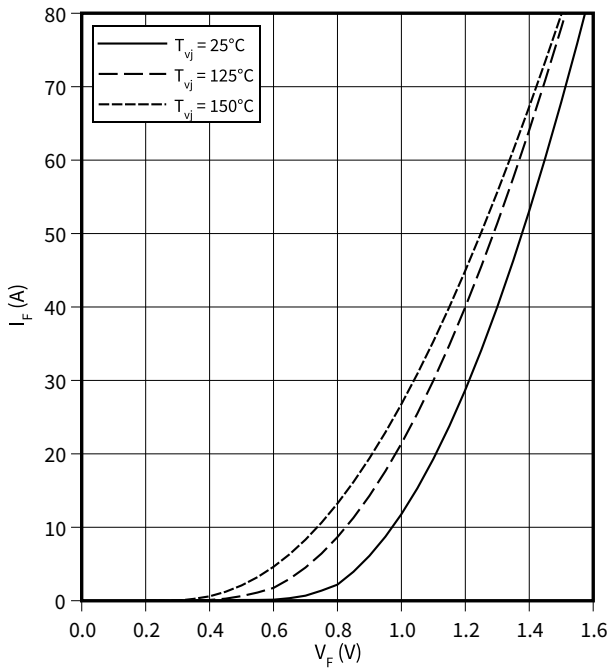
gate charge characteristic (typical), IGBT, Inverter

$V_{GE} = f(Q_G)$
 $I_C = 50 \text{ A}, T_{vj} = 25 \text{ }^\circ\text{C}$



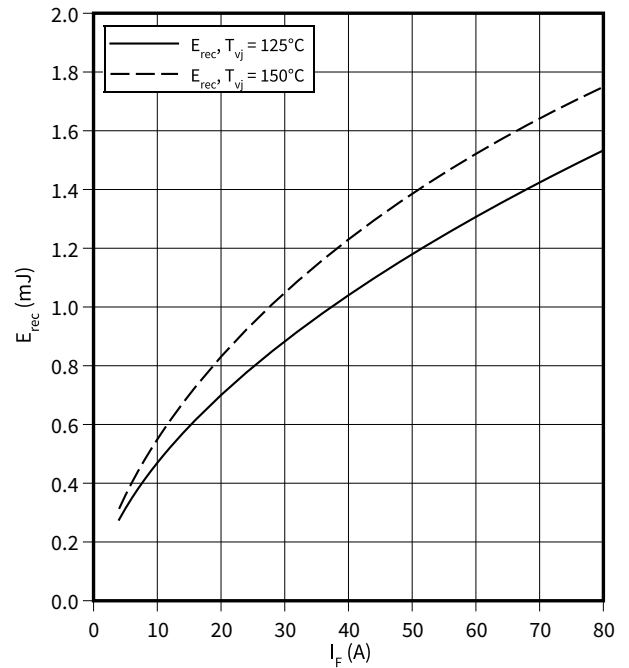
forward characteristic of (typical), Diode, 3-Level

$I_F = f(V_F)$



switching losses (typical), Diode, 3-Level

$E_{rec} = f(I_F)$
 $R_{Gon} = 8.2 \text{ } \Omega, V_{CE} = 300 \text{ V}$

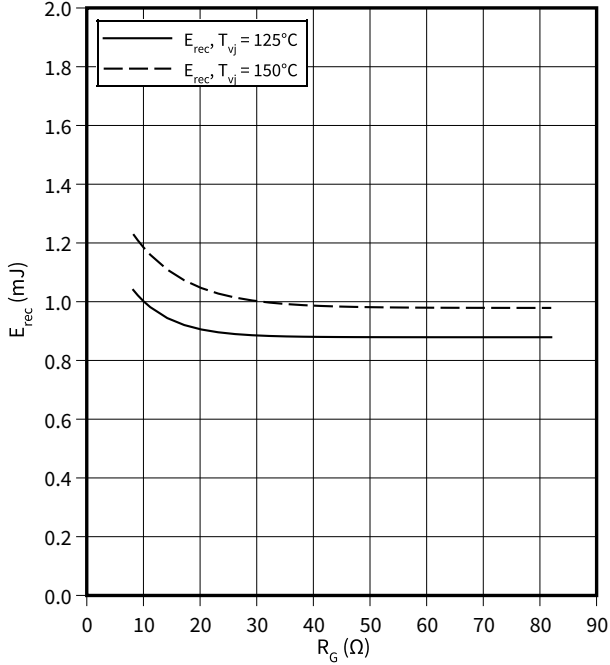


7 Characteristics diagrams

switching losses (typical), Diode, 3-Level

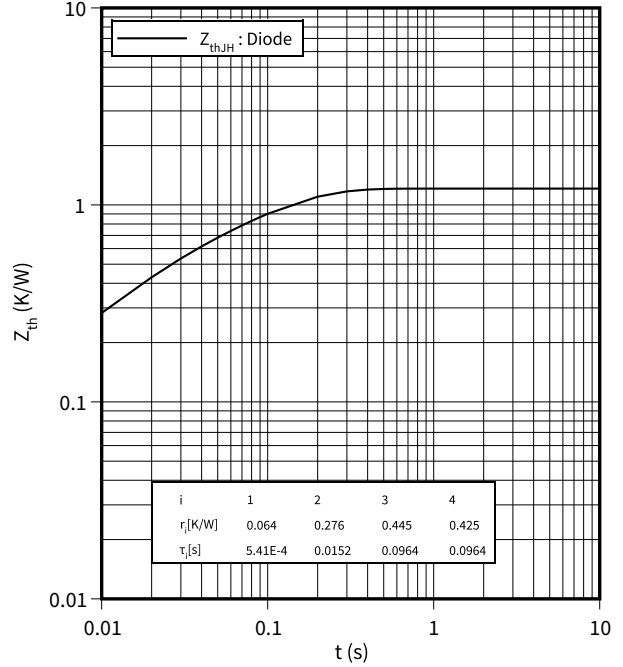
$E_{rec} = f(R_G)$

$V_{CE} = 300\text{ V}$, $I_F = 40\text{ A}$



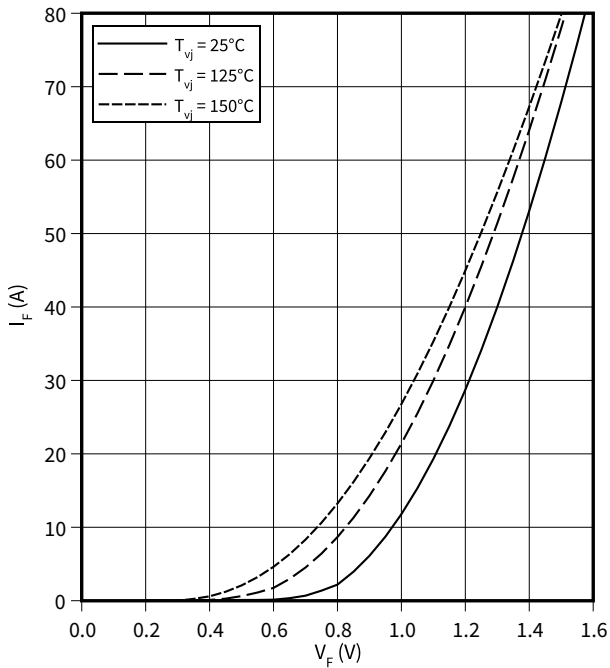
transient thermal impedance, Diode, 3-Level

$Z_{th} = f(t)$



forward characteristic of (typical), Diode, Inverter

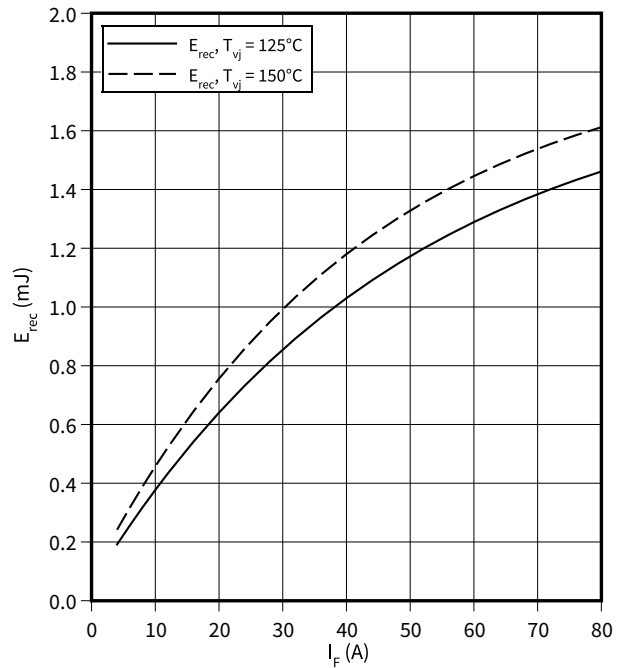
$I_F = f(V_F)$



switching losses (typical), Diode, Inverter

$E_{rec} = f(I_F)$

$R_{Gon} = 8.2\ \Omega$, $V_{CE} = 300\text{ V}$

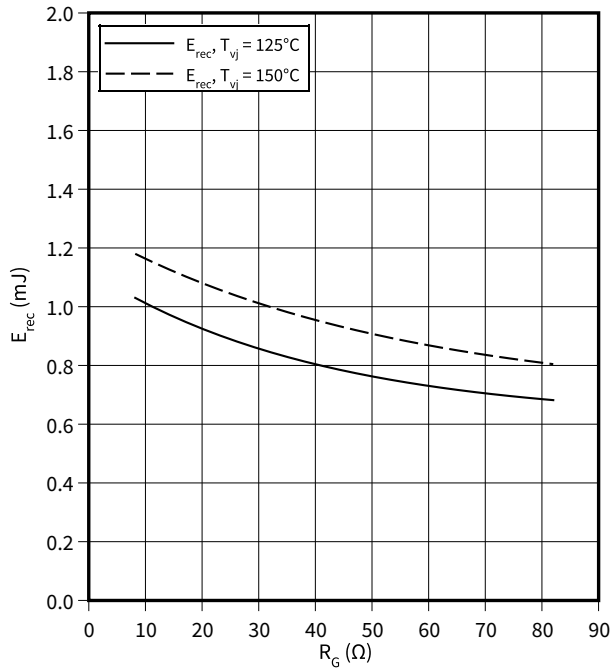


7 Characteristics diagrams

switching losses (typical), Diode, Inverter

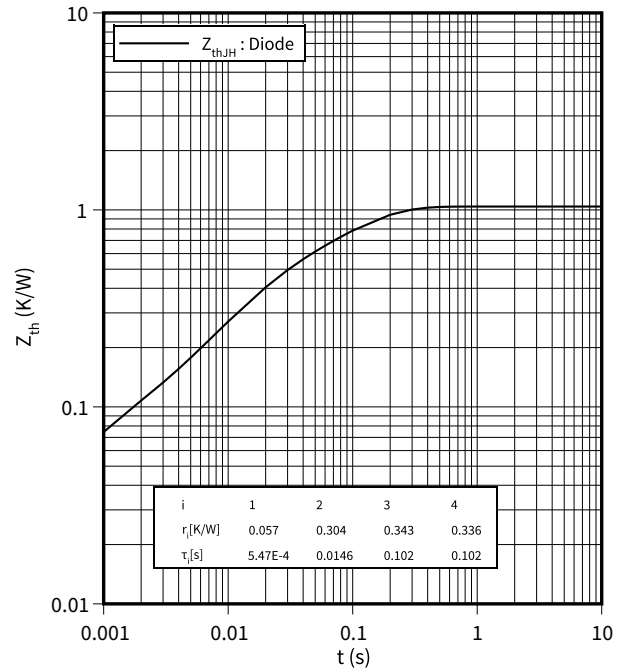
$E_{rec} = f(R_G)$

$V_{CE} = 300\text{ V}, I_F = 40\text{ A}$



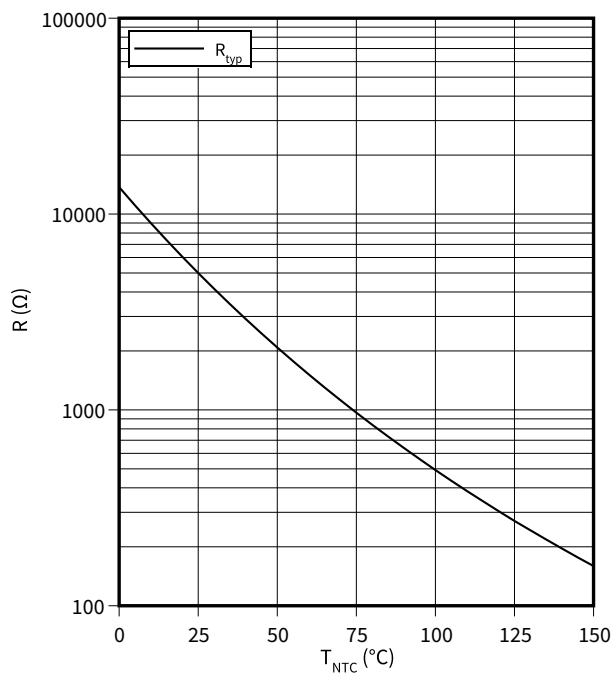
transient thermal impedance , Diode, Inverter

$Z_{th} = f(t)$



temperature characteristic (typical), NTC-Thermistor

$R = f(T_{NTC})$



8 Circuit diagram

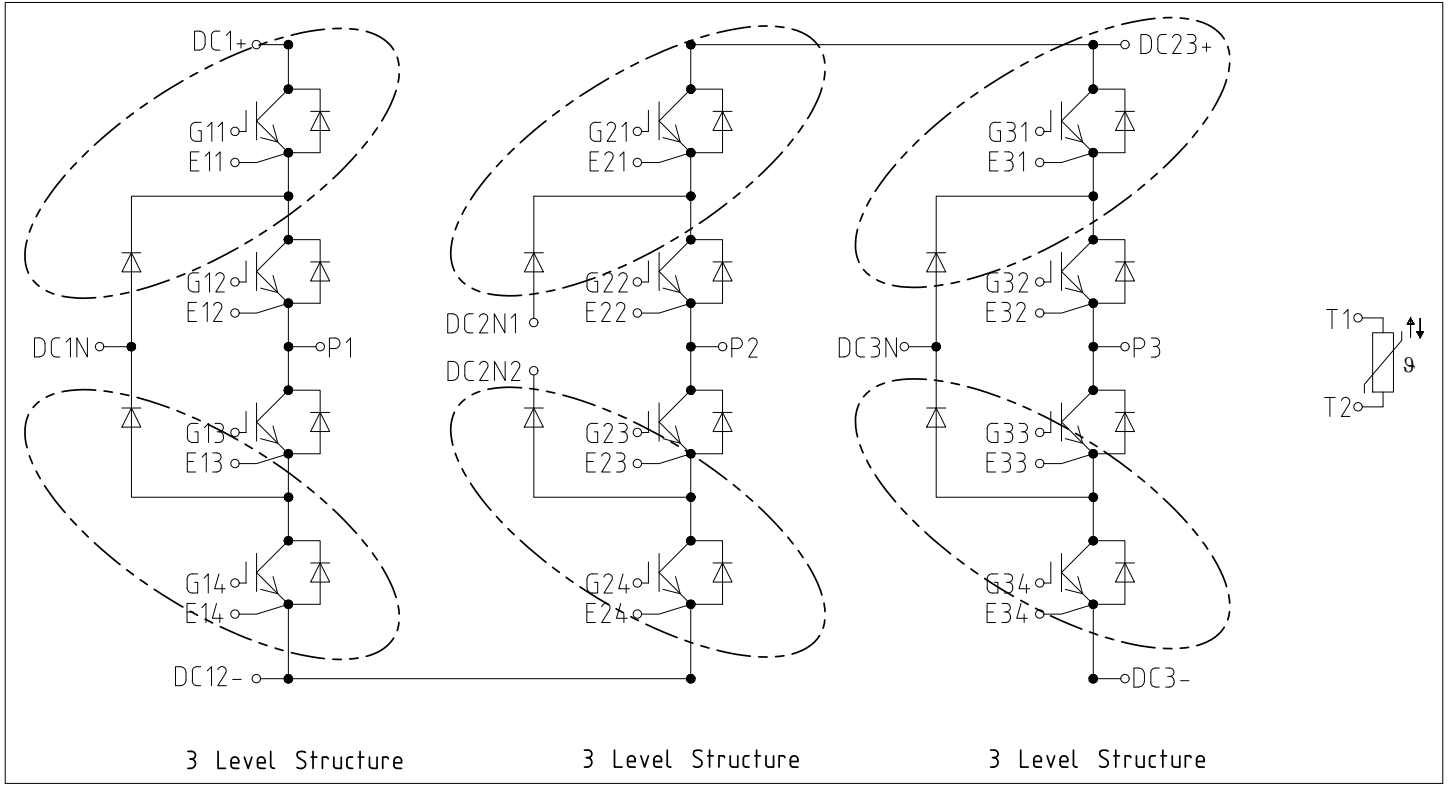


Figure 2

9 Package outlines

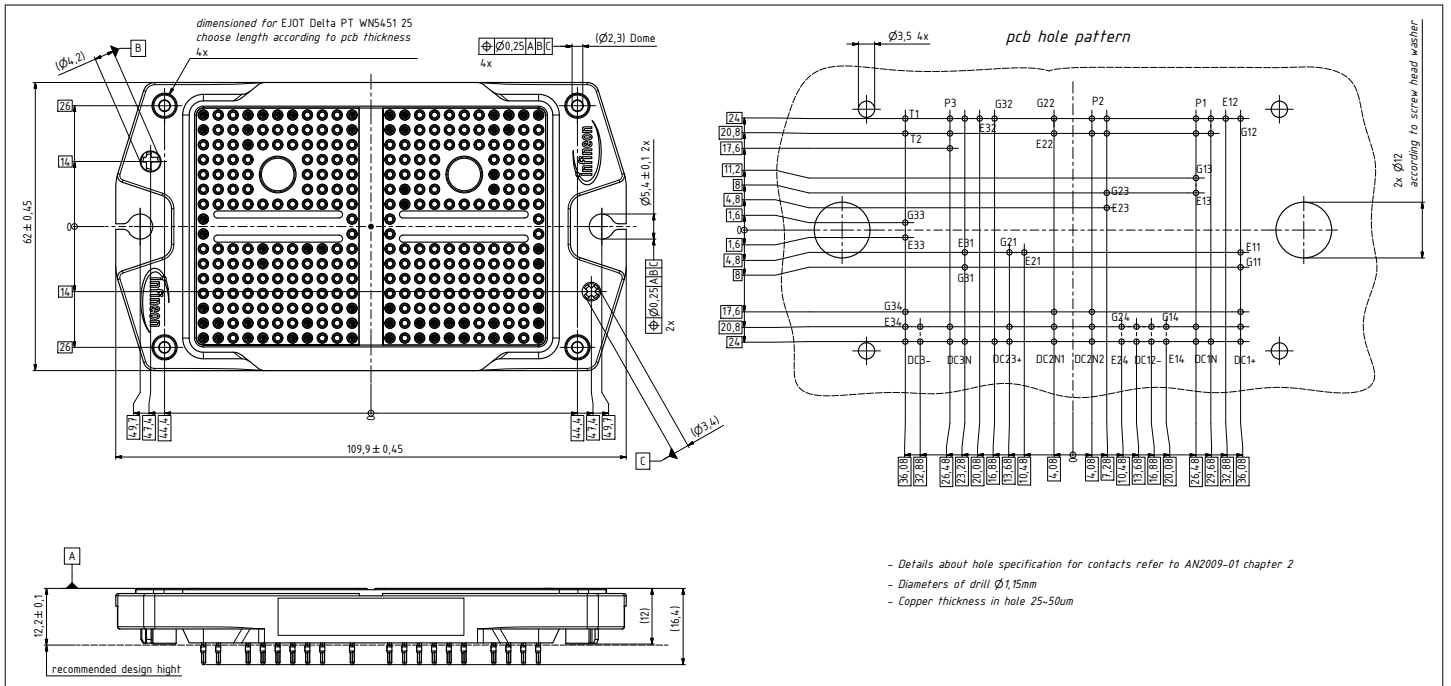


Figure 3

10 Module label code


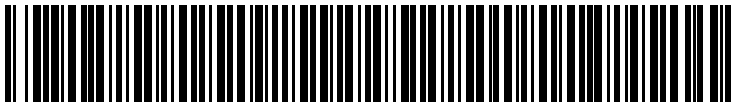
Module label code			
Code format	Data Matrix	Barcode Code128	
Encoding	ASCII text	Code Set A	
Symbol size	16x16	23 digits	
Standard	IEC24720 and IEC16022	IEC8859-1	
Code content	<i>Content</i>	<i>Digit</i>	<i>Example</i>
	Module serial number	1 - 5	71549
	Module material number	6 - 11	142846
	Production order number	12 - 19	55054991
	Date code (production year)	20 - 21	15
	Date code (production week)	22 - 23	30
Example	 		
	71549142846550549911530		71549142846550549911530

Figure 4

Revision history

Revision history

Document revision	Date of release	Description of changes
V1.0	2020-04-03	
1.00	2021-04-22	Final

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