Preliminary datasheet
EasyPACK™ module with CoolSiC™ Trench MOSFET and PressFIT / NTC

Features



- Electrical features
  - V_{DSS} = 3300 V
  - I_{DN} = 80 A / I_{DRM} = 200 A
  - Low inductive design
  - Low switching losses
  - High current density
  - Suitable Infineon gate drivers can be found under https://www.infineon.com/gdfinder
  - Silicon carbide MOSFET with .XT
  - Integrated snubber
- Mechanical features
  - PressFIT contact technology
  - Integrated NTC temperature sensor
  - AlN substrate with low thermal resistance
  - Package with CTI > 600
  - High current pin
  - High power cycling capability due to .XT

Potential applications

- High-frequency switching application
- DC/DC converter
- DC charger for EV
- Energy storage systems
- Solid state transformers
- Solar applications

Product validation

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

Description

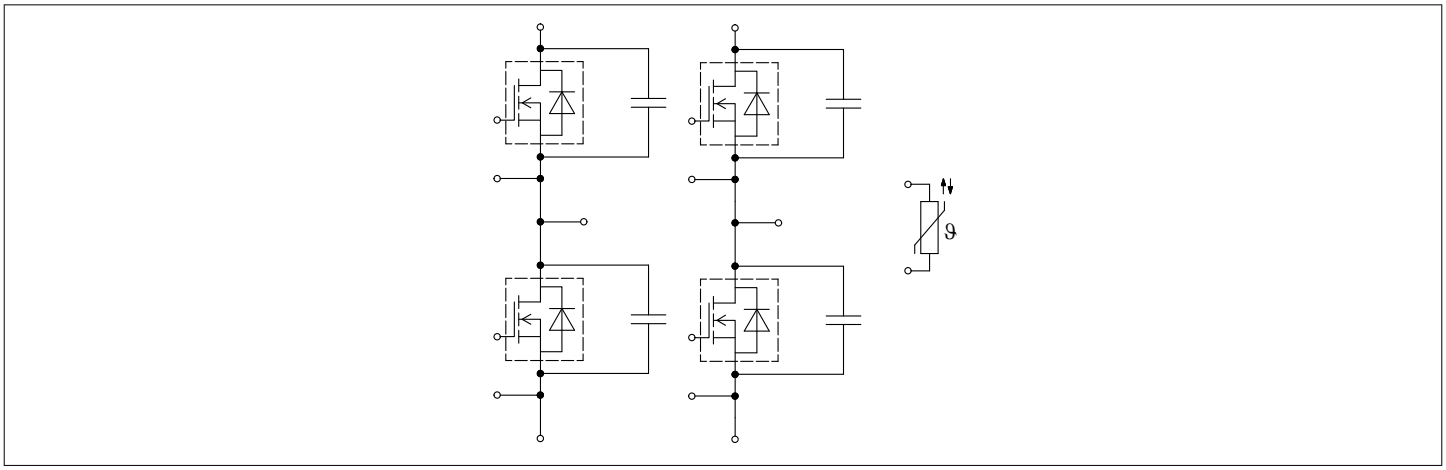


Table of contents

Description . . . 1
Features . . . 1
Potential applications . . . 1
Product validation . . . 1
Table of contents . . . 2
1 Package . . . 3
2 MOSFET, T1-T4 . . . 3
3 Body diode (MOSFET, T1-T4) . . . 5
4 NTC-Thermistor . . . 6
5 Capacitor . . . 7
6 Characteristics diagrams . . . 8
7 Circuit diagram . . . 15
8 Package outlines . . . 16
9 Module label code . . . 17
Revision history . . . 18
Disclaimer . . . 19

1 Package

Table 1 Insulation coordination

Parameter	Symbol	Note or test condition	Values	Unit
Isolation test voltage	V_{ISOL}	RMS, f = 50 Hz, *t* = 1 min	5.0	kV
Isolation test voltage NTC	$V_{ISOL(NTC)}$	RMS, f = 50 Hz, *t* = 1 min	3.6	kV
Internal isolation		basic insulation (class 1, IEC 61140)	AlN	
Comparative tracking index	*CTI*		> 600	
Relative thermal index (electrical)	*RTI*	frame	180	°C
		lid	150	

Table 2 Characteristic values

Parameter	Symbol	Note or test condition	Values			Unit
			Min.	Typ.	Max.	
Stray inductance module	L_{sDS}			16		nH
Module lead resistance, terminals - chip	$R_{DD'+SS'}$	T_H = 25 °C, per switch		1.7		mΩ
Storage temperature	T_{stg}		-40		150	°C
Mounting force per clamp	*F*		40		80	N
Weight	*G*			38		g

***Note**: The current up to 50A per pin is limited by the interaction of the pins with the PCB design and cooling conditions.*

2 MOSFET, T1-T4

Table 3 Maximum rated values

Parameter	Symbol	Note or test condition		Values	Unit
Drain-source voltage	V_{DSS}		T_{vj} = 25 °C	3300	V
Implemented drain current	I_{DN}			80	A
Continuous DC drain current	I_{DDC}	T_{vj} = 175 °C, V_{GS} = 18 V	T_H = 25 °C	75	A
Repetitive peak drain current	I_{DRM}	verified by design, t_p limited by T_{vjmax}		200	A
Gate-source voltage, max. transient voltage	V_{GS}	*D* < 0.01		-10/23	V
Gate-source voltage, max. static voltage	V_{GS}			-7/20	V

Table 4 Recommended values

Parameter	Symbol	Note or test condition	Values	Unit
On-state gate voltage	$V_{GS(on)}$		15...18	V
Off-state gate voltage	$V_{GS(off)}$		-5...0	V

Table 5 Characteristic values

Parameter	Symbol	Note or test condition		Values			Unit
				Min.	Typ.	Max.	
Drain-source on-resistance	$R_{DS(on)}$	I_D = 80 A	V_{GS} = 15 V, T_{vj} = 25 °C		26		mΩ
			V_{GS} = 18 V, T_{vj} = 25 °C		24.9		
			V_{GS} = 18 V, T_{vj} = 125 °C		56.2		
			V_{GS} = 18 V, T_{vj} = 175 °C		78.5		
Gate threshold voltage	$V_{GS(th)}$	I_D = 56 mA, V_{DS} = V_{GS}, (tested after 1ms pulse at V_{GS} = +20 V), T_{vj} = 25 °C		3.45	4.1	5.15	V
Total gate charge	Q_G	V_{DD} = 1800 V, V_{GS} = -4/18 V, T_{vj} = 25 °C			0.334		µC
Internal gate resistor	R_{Gint}	T_{vj} = 25 °C			2.5		Ω
Input capacitance	C_{ISS}	f = 100 kHz, V_{DS} = 1800 V, V_{GS} = 0 V	T_{vj} = 25 °C		10.4		nF
Output capacitance	C_{OSS}	f = 100 kHz, V_{DS} = 1800 V, V_{GS} = 0 V	T_{vj} = 25 °C		0.168		nF
Reverse transfer capacitance	C_{rss}	f = 100 kHz, V_{DS} = 1800 V, V_{GS} = 0 V	T_{vj} = 25 °C		0.012		nF
C_{OSS} stored energy	E_{OSS}	V_{DS} = 1800 V, V_{GS} = -4/18 V, T_{vj} = 25 °C			344		µJ
Drain-source leakage current	I_{DSS}	V_{DS} = 3300 V, V_{GS} = -4 V	T_{vj} = 25 °C		0.02		µA
Gate-source leakage current	I_{GSS}	V_{DS} = 0 V, T_{vj} = 25 °C	V_{GS} = 20 V			400	nA
Turn-on delay time (inductive load)	$t_{d\,on}$	I_D = 80 A, R_{Gon}=0.75 Ω, V_{DD} = 1800 V, V_{GS} = -4/18 V, t_{dead} = 4000 ns, 0.1 V_{GS} to 0.1 I_D	T_{vj} = 25 °C		26		ns
			T_{vj} = 125 °C		25		
			T_{vj} = 175 °C		25		
Rise time (inductive load)	t_r	I_D = 80 A, R_{Gon}=0.75 Ω, V_{DD} = 1800 V, V_{GS} = -4/18 V, t_{dead} = 4000 ns, 0.1 I_D to 0.9 I_D	T_{vj} = 25 °C		8		ns
			T_{vj} = 125 °C		8		
			T_{vj} = 175 °C		8		

(table continues...)

Table 5 (continued) Characteristic values

Parameter	Symbol	Note or test condition		Values			Unit
				Min.	Typ.	Max.	
Turn-off delay time (inductive load)	$t_{d\ off}$	I_D = 80 A, R_{Goff} = 0.25 Ω, V_{DD} = 1800 V, V_{GS} = -4/18 V, 0.9 V_{GS} to 0.9 I_D	T_{vj} = 25 °C		38		ns
			T_{vj} = 125 °C		42		
			T_{vj} = 175 °C		44		
Fall time (inductive load)	t_f	I_D = 80 A, R_{Goff} = 0.25 Ω, V_{DD} = 1800 V, V_{GS} = -4/18 V, 0.9 I_D to 0.1 I_D	T_{vj} = 25 °C		42		ns
			T_{vj} = 125 °C		42		
			T_{vj} = 175 °C		43		
Turn-on energy loss per pulse	E_{on}	I_D = 80 A, V_{DD} = 1800 V, L_σ = 20 nH, V_{GS} = -4/18 V, R_{Gon}=0.75 Ω, di/dt = 15.7 kA/µs (T_{vj} = 175 °C), t_{dead} = 4000 ns	T_{vj} = 25 °C		4.6		mJ
			T_{vj} = 125 °C		5.9		
			T_{vj} = 175 °C		8.9		
Turn-on energy loss per pulse, optimized	$E_{on,o}$	I_D = 80 A, V_{DD} = 1800 V, L_σ = 20 nH, V_{GS} = -4/18 V, $R_{Gon,o}$ = 0.25 Ω, di/dt = 17.8 kA/µs (T_{vj} = 175 °C), t_{dead} = 200 ns	T_{vj} = 25 °C		4		mJ
			T_{vj} = 125 °C		4.4		
			T_{vj} = 175 °C		5.1		
Turn-off energy loss per pulse	E_{off}	I_D = 80 A, V_{DD} = 1800 V, L_σ = 20 nH, V_{GS} = -4/18 V, R_{Goff} = 0.25 Ω, dv/dt = 48 kV/µs (T_{vj} = 175 °C)	T_{vj} = 25 °C		1.4		mJ
			T_{vj} = 125 °C		1.5		
			T_{vj} = 175 °C		1.6		
Thermal resistance, junction to heat sink	R_{thJH}	per MOSFET, λ_{grease} = 5 W/(m·K)			0.266		K/W
Temperature under switching conditions	$T_{vj\ op}$			-40		175	°C
Temperature under overload switching conditions	$T_{vj\ over}$	Overload, cumulative max. 200 h				200	°C

***Note**: The selection of positive and negative gate-source voltages impacts losses and the long-term behavior of the MOSFET and body diode. The design guidelines described in Application Notes AN 2018-09 and AN 2025-02 must be considered to ensure sound operation of the device over the planned lifetime.*

Maximum drain-source voltage is limited by rated DC capacitor voltage

3 Body diode (MOSFET, T1-T4)

Table 6 Maximum rated values

Parameter	Symbol	Note or test condition		Values	Unit
DC body diode forward current	I_{SD}	T_{vj} = 175 °C, V_{GS} = -4 V	T_H = 70 °C	80	A
Pulsed body diode current	$I_{SD\ pulse}$			200	A

Table 7 Characteristic values

Parameter	Symbol	Note or test condition		Values			Unit
				Min.	Typ.	Max.	
Forward voltage	V_{SD}	I_{SD} = 80 A, V_{GS}=-4 V	T_{vj} = 25 °C		5		V
			T_{vj} = 125 °C		4.4		
			T_{vj} = 175 °C		3.9		
Peak reverse recovery current	I_{rrm}	I_{SD} = 80 A, di_s/dt = 15.7 kA/µs (T_{vj} = 175 °C), V_{DD} = 1800 V, V_{GS} = -4 V, t_{dead} = 4000 ns	T_{vj} = 25 °C		152		A
			T_{vj} = 125 °C		185		
			T_{vj} = 175 °C		270		
Recovered charge	Q_{rr}	I_{SD} = 80 A, di_s/dt = 15.7 kA/µs (T_{vj} = 175 °C), V_{DD} = 1800 V, V_{GS} = -4 V, t_{dead} = 4000 ns	T_{vj} = 25 °C		3.7		µC
			T_{vj} = 125 °C		5.7		
			T_{vj} = 175 °C		8.8		
Reverse recovery energy	E_{rec}	I_{SD} = 80 A, di_s/dt = 15.7 kA/µs (T_{vj} = 175 °C), V_{DD} = 1800 V, V_{GS} = -4 V, t_{dead} = 4000 ns	T_{vj} = 25 °C		2.4		mJ
			T_{vj} = 125 °C		5.2		
			T_{vj} = 175 °C		9.3		
Reverse recovery energy, optimized	$E_{rec,o}$	I_{SD} = 80 A, di_s/dt = 17.8 kA/µs (T_{vj} = 175 °C), V_{DD} = 1800 V, V_{GS} = -4 V, t_{dead} = 200 ns	T_{vj} = 25 °C		2.8		mJ
			T_{vj} = 125 °C		4		
			T_{vj} = 175 °C		5		

4 NTC-Thermistor

Table 8 Characteristic values

Parameter	Symbol	Note or test condition	Values			Unit
			Min.	Typ.	Max.	
Rated resistance	R_{25}	T_{NTC} = 25 °C		5		kΩ
Deviation of R_{100}	$\Delta R/R$	T_{NTC} = 100 °C, R_{100} = 493 Ω	-5		5	%
Power dissipation	P_{25}	T_{NTC} = 25 °C			20	mW
B-value	$B_{25/50}$	$R_2 = R_{25} \exp[B_{25/50}(1/T_2-1/(298{,}15\ K))]$		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**: For an analytical description of the NTC characteristics please refer to AN2009-10, chapter 4*

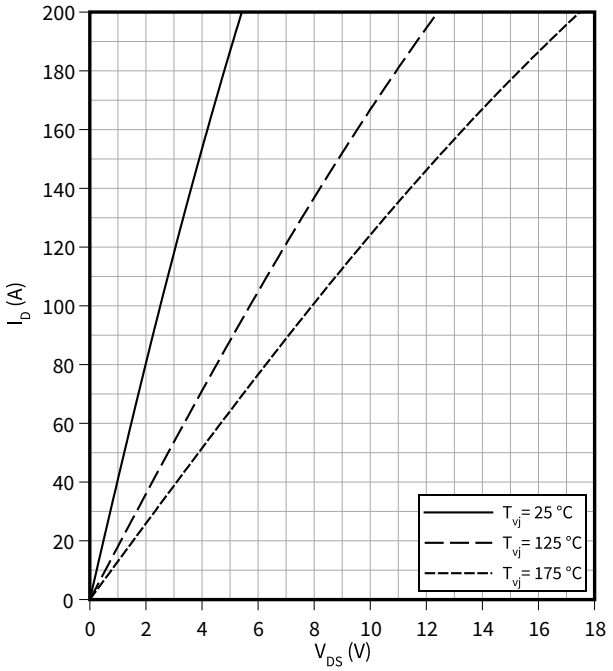
5 Capacitor

Table 9 Characteristic values

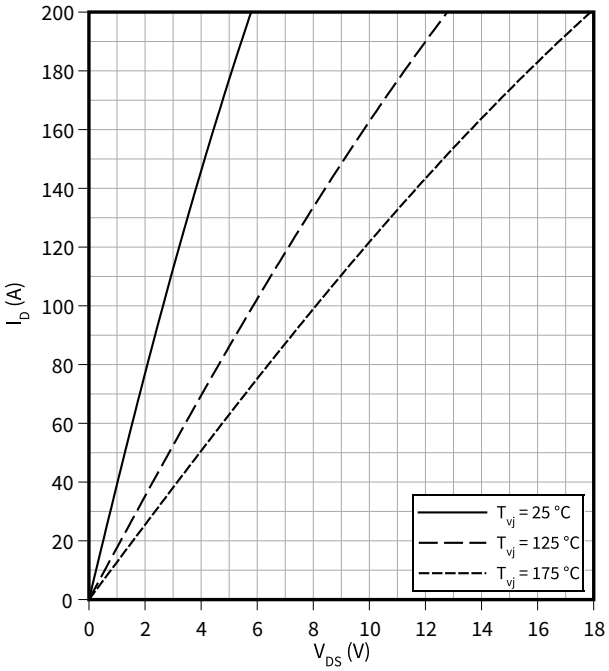
Parameter	Symbol	Note or test condition	Values			Unit
			Min.	Typ.	Max.	
Rated DC voltage	V_{DC}	T = 25 °C		3000		V
Capacitance value	C_{nom}	T = 25 °C		0.33		nF
Temperature range	T_{cap}		-40		125	°C

6 Characteristics diagrams

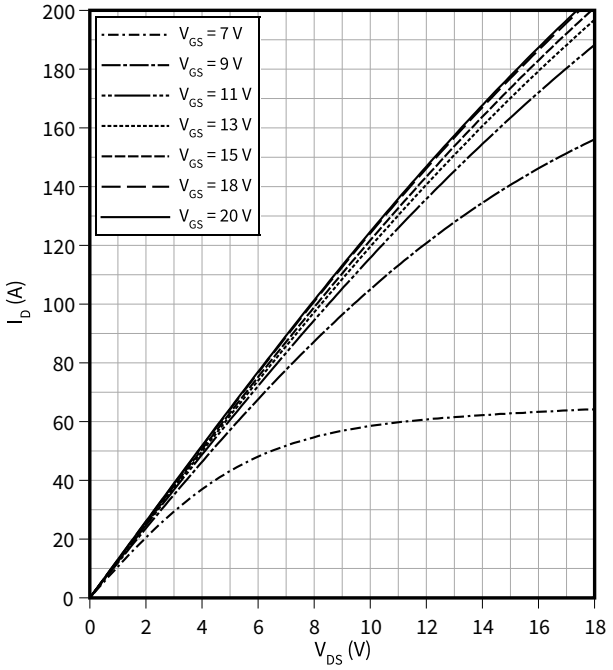
Output characteristic (typical), MOSFET, T1-T4
$I_D = f(V_{DS})$
V_{GS} = 18 V



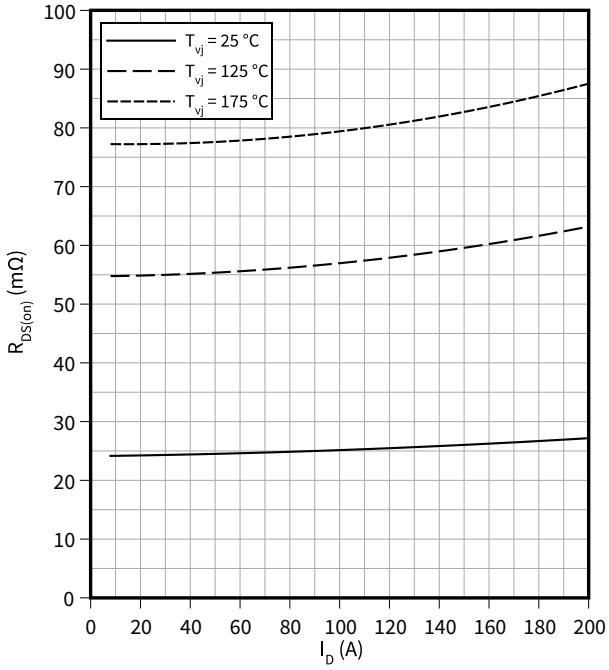
Output characteristic (typical), MOSFET, T1-T4
$I_D = f(V_{DS})$
V_{GS} = 15 V



Output characteristic field (typical), MOSFET, T1-T4
$I_D = f(V_{DS})$
T_{vj} = 175 °C

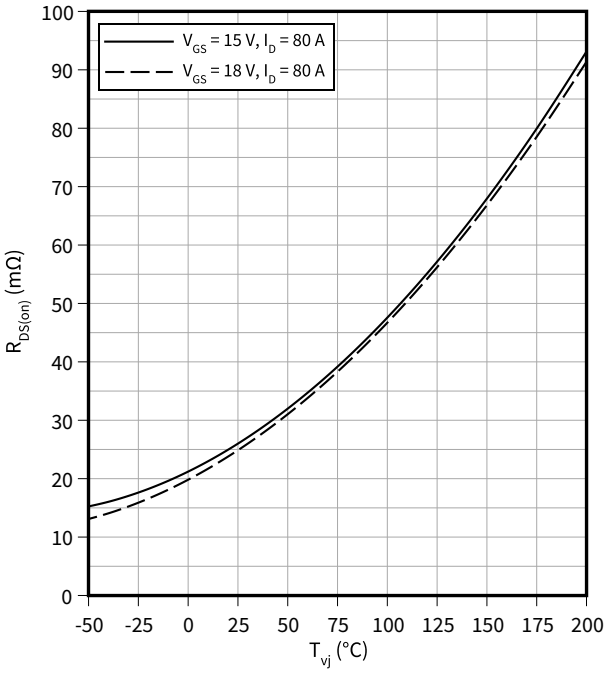


Drain source on-resistance (typical), MOSFET, T1-T4
$R_{DS(on)} = f(I_D)$
V_{GS} = 18 V



Drain source on-resistance (typical), MOSFET, T1-T4

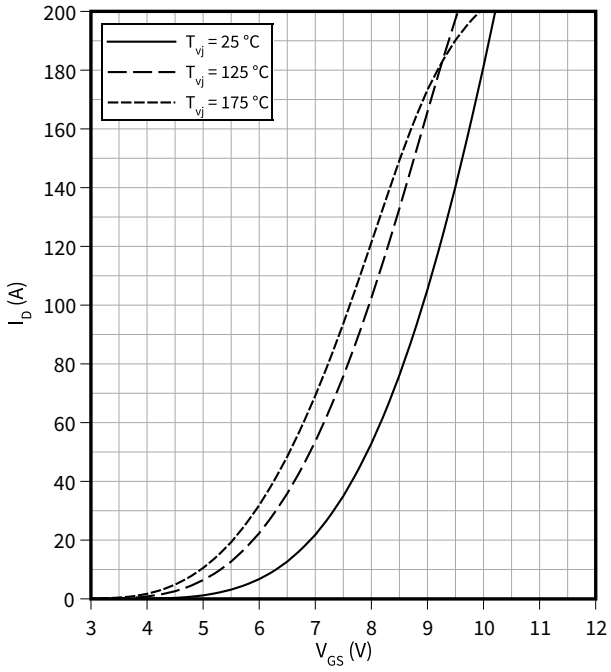
$R_{DS(on)} = f(T_{vj})$



Transfer characteristic (typical), MOSFET, T1-T4

$I_D = f(V_{GS})$

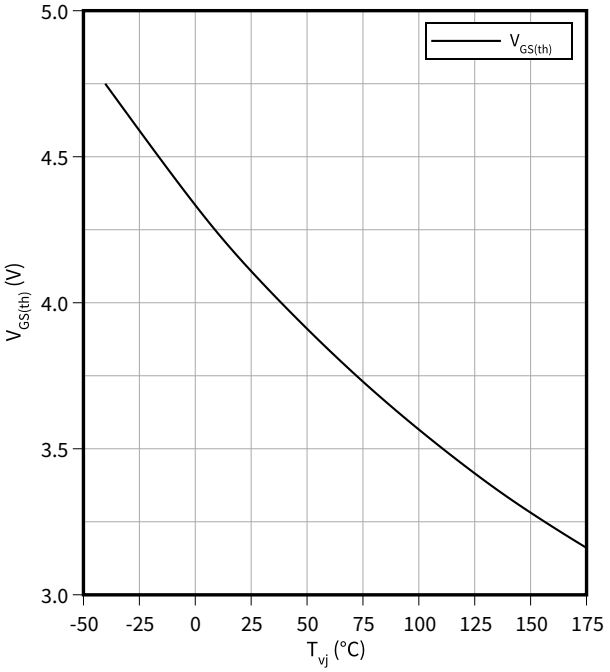
$V_{DS} = 20$ V



Gate-source threshold voltage (typical), MOSFET, T1-T4

$V_{GS(th)} = f(T_{vj})$

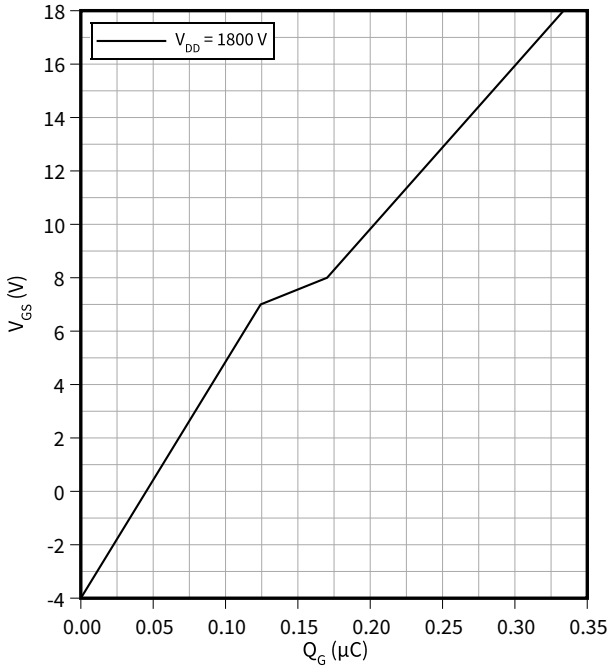
$I_D = 56$ mA, $V_{GS} = V_{DS}$



Gate charge characteristic (typical), MOSFET, T1-T4

$V_{GS} = f(Q_G)$

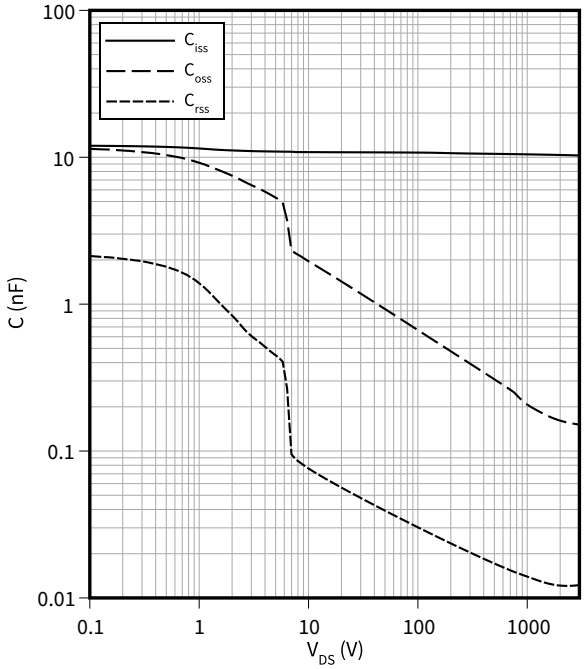
$I_D = 80$ A, $T_{vj} = 25$ °C



Capacity characteristic (typical), MOSFET, T1-T4

$C = f(V_{DS})$

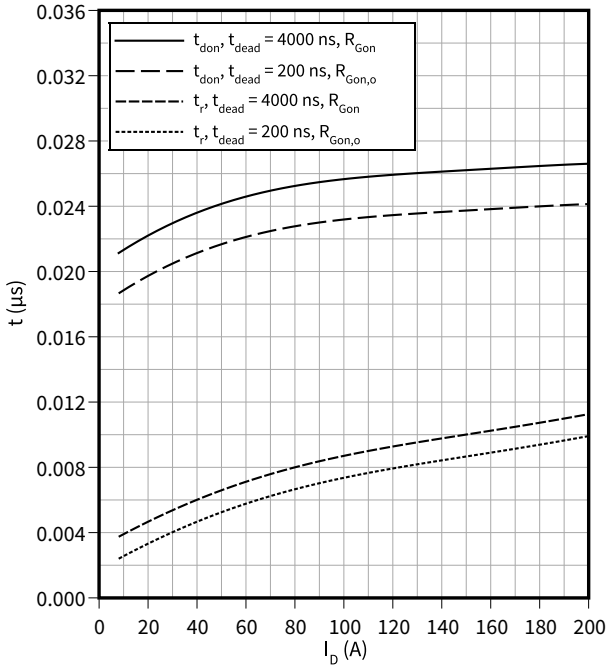
$f = 100$ kHz, $T_{vj} = 25$ °C, $V_{GS} = 0$ V



Switching times (typical), MOSFET, T1-T4

$t = f(I_D)$

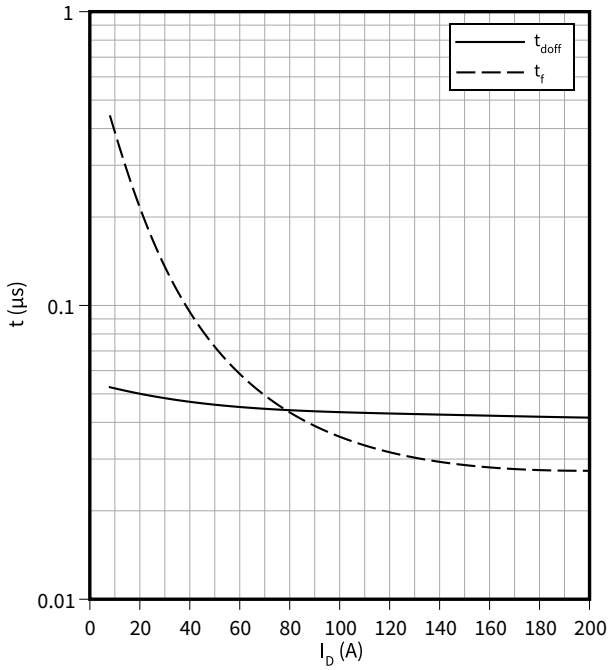
$V_{DD} = 1800$ V, $R_{Gon} = 0.75\ \Omega$, $R_{Gon,o} = 0.25\ \Omega$, $T_{vj} = 175$ °C, $V_{GS} = -4/18$ V



Switching times (typical), MOSFET, T1-T4

$t = f(I_D)$

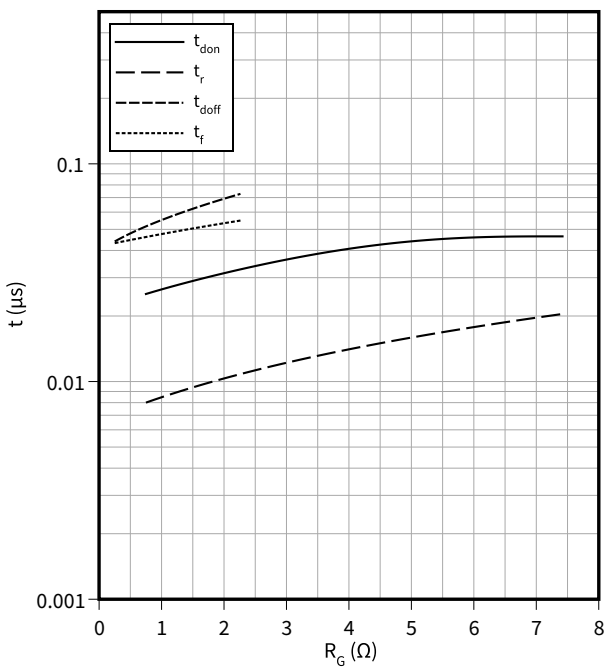
$R_{Goff} = 0.25\ \Omega$, $V_{DD} = 1800$ V, $T_{vj} = 175$ °C, $V_{GS} = -4/18$ V



Switching times (typical), MOSFET, T1-T4

$t = f(R_G)$

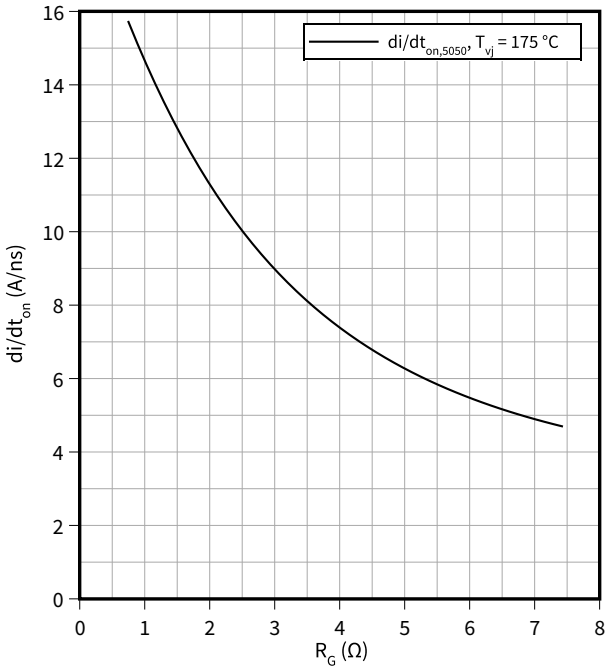
$V_{DD} = 1800$ V, $t_{dead} = 4000$ ns, $I_D = 80$ A, $T_{vj} = 175$ °C, $V_{GS} = -4/18$ V



Current slope (typical), MOSFET, T1-T4

$di/dt_{on} = f(R_G)$

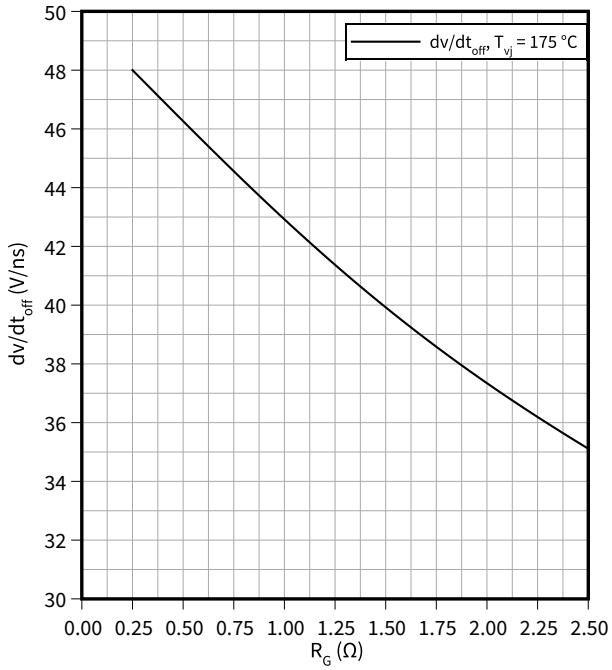
V_{DD} = 1800 V, t_{dead} = 4000 ns, I_D = 80 A, V_{GS} = -4/18 V



Voltage slope (typical), MOSFET, T1-T4

$dv/dt_{off} = f(R_G)$

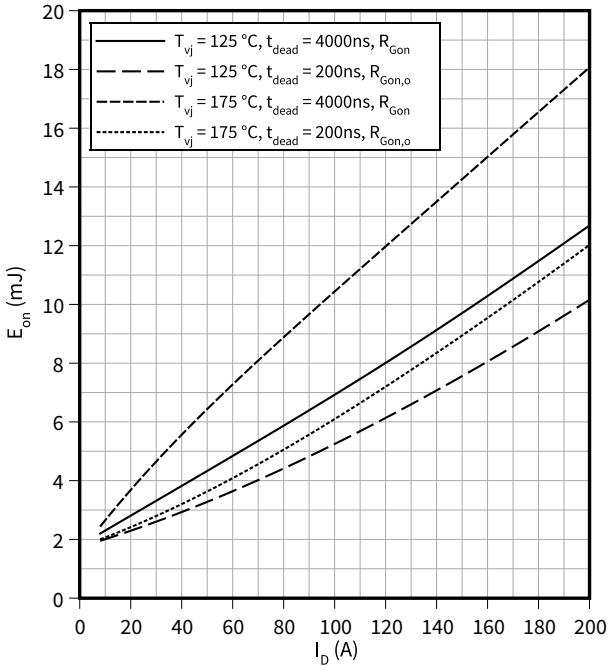
V_{DD} = 1800 V, I_D = 80 A, V_{GS} = -4/18 V



Switching losses (typical), MOSFET, T1-T4

$E_{on} = f(I_D)$

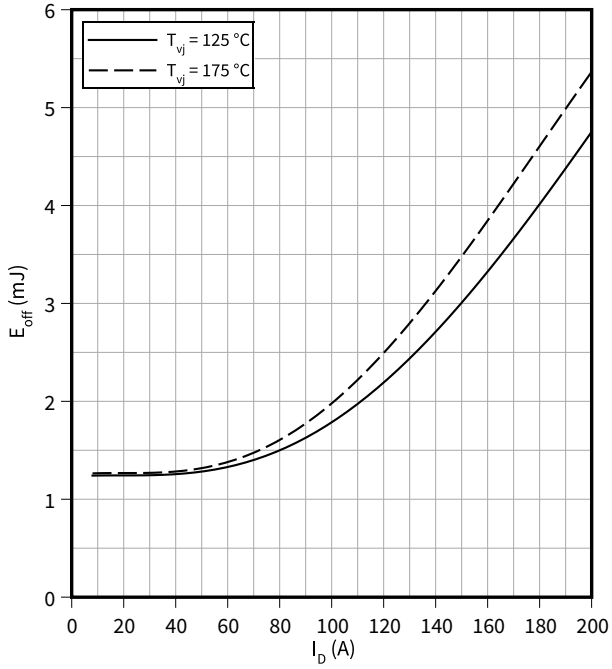
R_{Gon} = 0.75 Ω, V_{DD} = 1800 V, $R_{Gon,o}$ = 0.25 Ω, V_{GS} = -4/18 V



Switching losses (typical), MOSFET, T1-T4

$E_{off} = f(I_D)$

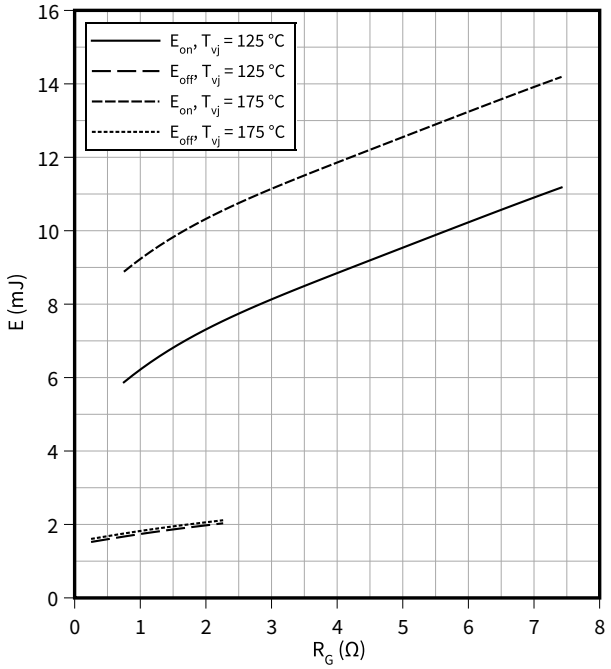
R_{Goff} = 0.25 Ω, V_{DD} = 1800 V, V_{GS} = -4/18 V



Switching losses (typical), MOSFET, T1-T4

$E = f(R_G)$

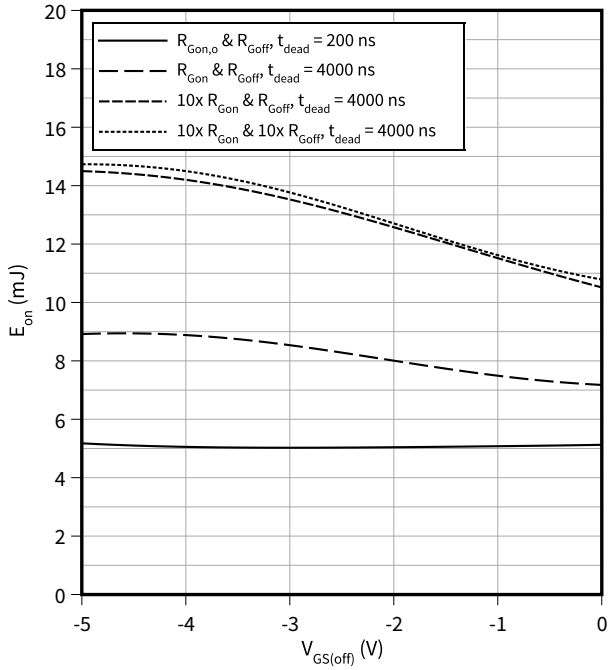
V_{DD} = 1800 V, t_{dead} = 4000 ns, I_D = 80 A, V_{GS} = -4/18 V



Switching losses (typical), MOSFET, T1-T4

$E_{on} = f(V_{GS(off)})$

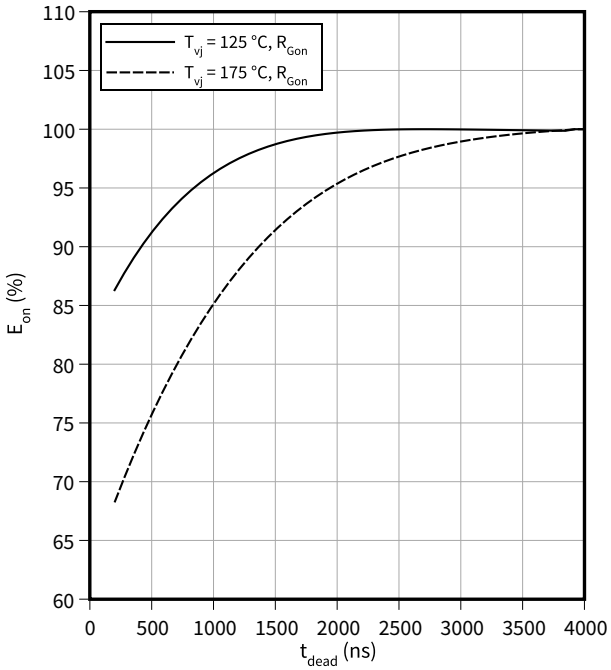
R_{Goff} = 0.25 Ω, V_{DD} = 1800 V, R_{Gon} = 0.75 Ω, $V_{GS(on)}$ = 18 V, I_D = 80 A, $R_{Gon,o}$ = 0.25 Ω, T_{vj} = 175 °C



Switching losses (typical), MOSFET, T1-T4

$E_{on} = f(t_{dead})$

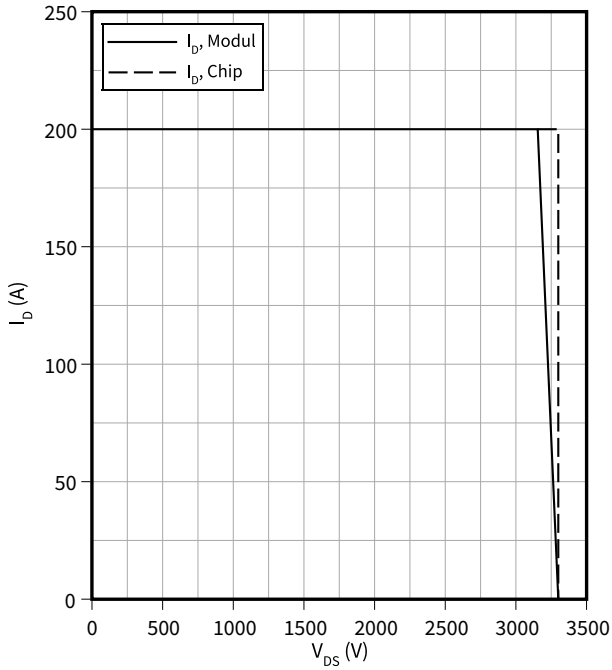
R_{Gon} = 0.75 Ω, I_D = 80 A, V_{DD} = 1800 V, V_{GS} = -4/18 V



Reverse bias safe operating area (RBSOA), MOSFET, T1-T4

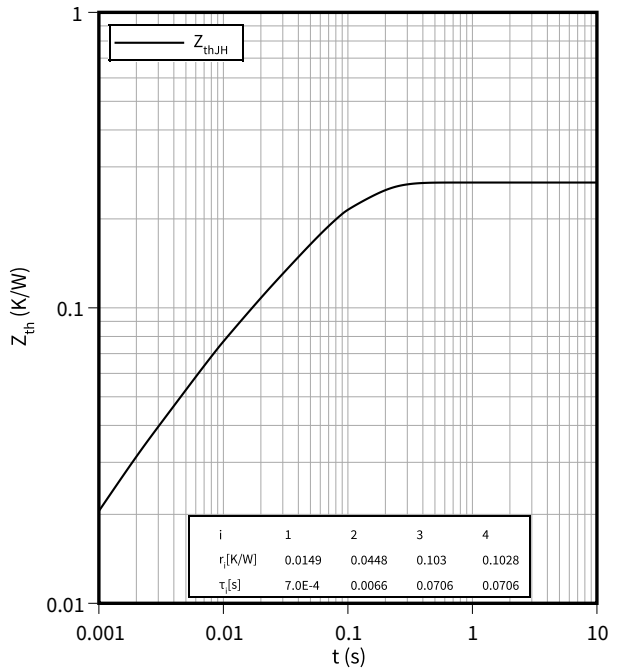
$I_D = f(V_{DS})$

R_{Goff} = 0.25 Ω, T_{vj} = 175 °C, V_{GS} = -4/18 V



Transient thermal impedance, MOSFET, T1-T4

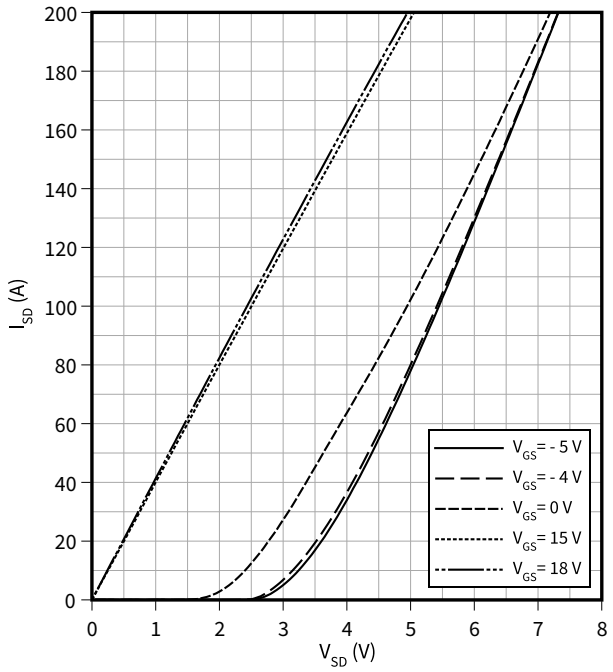
$Z_{th} = f(t)$



Forward characteristic body diode (typical), MOSFET, T1-T4

$I_{SD} = f(V_{SD})$

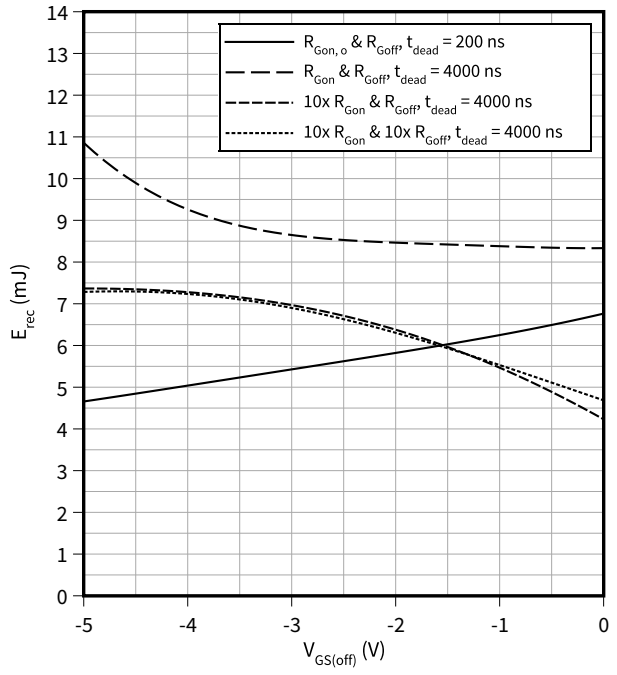
$T_{vj} = 25\ °C$



Switching losses body diode (typical), MOSFET, T1-T4

$E_{rec} = f(V_{GS(off)})$

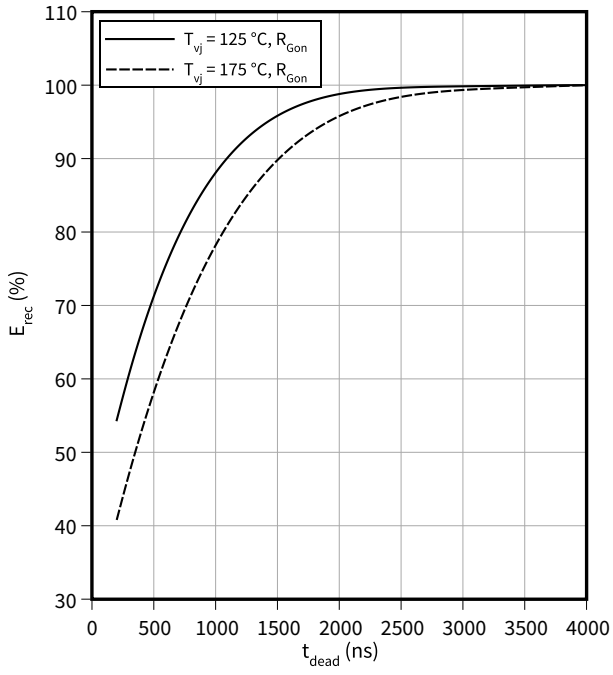
$R_{Goff} = 0.25\ \Omega$, $R_{Gon} = 0.75\ \Omega$, $V_{GS(on)} = 18\ V$, $I_{SD} = 80\ A$, $R_{Gon,o} = 0.25\ \Omega$, $V_{DD} = 1800\ V$, $T_{vj} = 175\ °C$



Switching losses body diode (typical), MOSFET, T1-T4

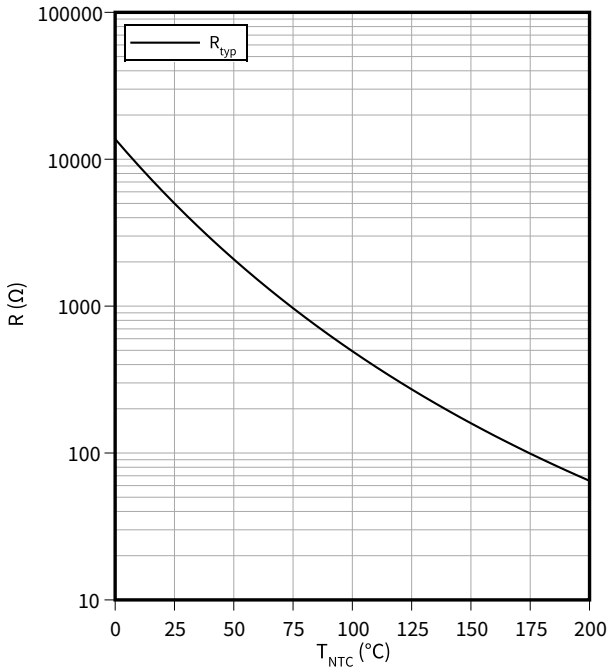
$E_{rec} = f(t_{dead})$

$R_{Gon} = 0.75\ \Omega$, $I_D = 80\ A$, $V_{DD} = 1800\ V$, $V_{GS} = -4/18\ V$



Temperature characteristic (typical), NTC-Thermistor

$R = f(T_{NTC})$



7 Circuit diagram

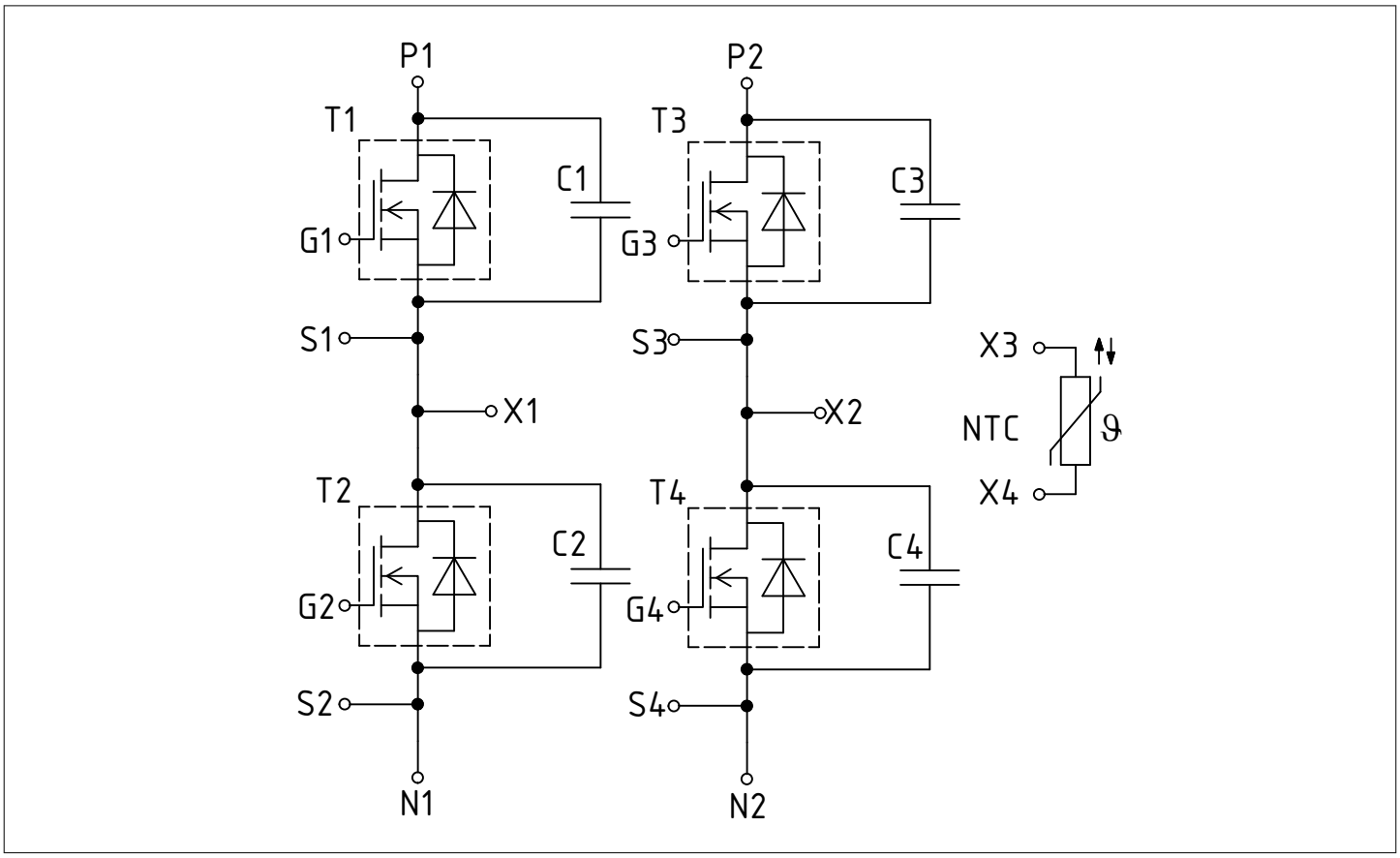


Figure 1

8 Package outlines

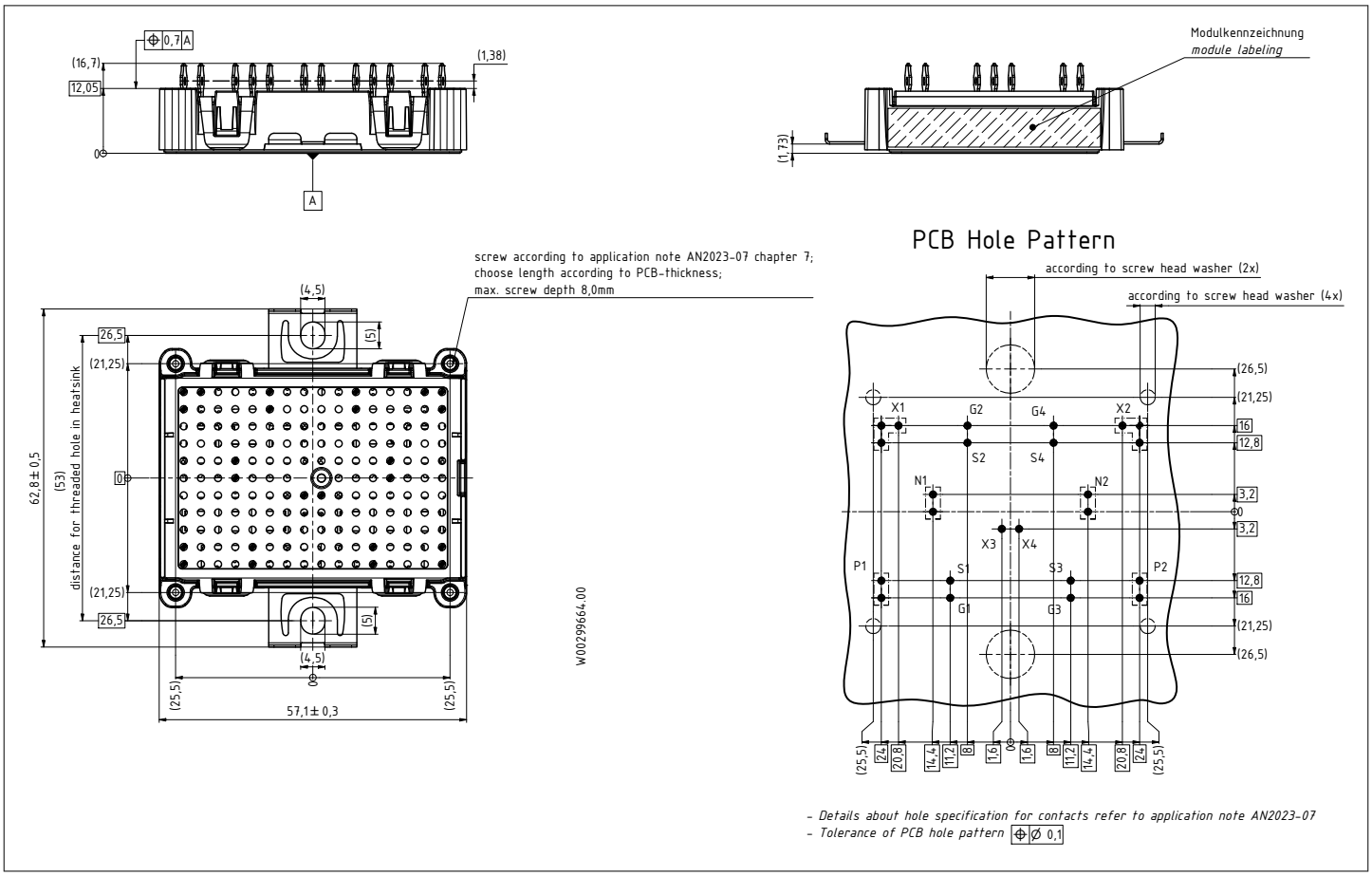


Figure 2

9 Module label code

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

Figure 3

Revision history

Document revision	Date of release	Description of changes
0.10	2026-10-09	Initial version

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