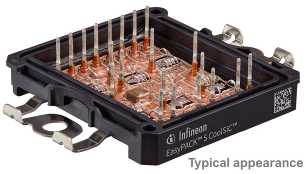
Final datasheet

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


Typical appearance

Features

- Electrical features
  - V_{DSS} = 1200 V
  - I_{DN} = 25 A / I_{DRM} = 50 A
  - Low inductive design
  - Low switching losses
  - Suitable Infineon gate drivers can be found under https://www.infineon.com/gdfinder
- Mechanical features
  - PressFIT contact technology
  - High current pin
  - Integrated NTC temperature sensor

Potential applications

- High-frequency switching application
- DC/DC converter
- Active rectifier
- On-board battery charger - hybrid /EV

Product validation

- Qualified according to AQG 324, release no.: 03.1/2021

Description

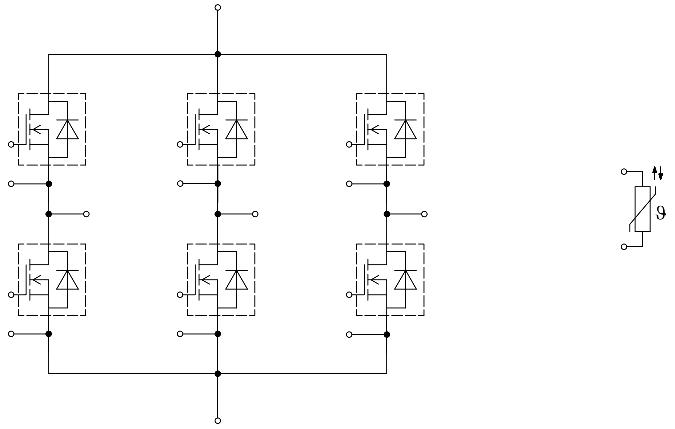


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Table 1 Insulation coordination

Parameter	Symbol	Note or test condition	Values	Unit
Isolation test voltage	V_{ISOL}	RMS, f = 50 Hz, $t = 1$ min	4.0	kV
Isolation test voltage NTC	$V_{ISOL(NTC)}$	RMS, f = 50 Hz, $t = 1$ min	1.0	kV
Internal isolation			Al_2O_3	
Comparative tracking index	*CTI*		600	
Relative thermal index (electrical)	*RTI*	housing	200	°C

Table 2 Characteristic values

Parameter	Symbol	Note or test condition	Values			Unit
			Min.	Typ.	Max.	
Stray inductance module	L_{sDS}			10		nH
Module lead resistance, terminals - chip	$R_{DD'+SS'}$	$T_H = 25$ °C, per switch		2.8		mΩ
Storage temperature	T_{stg}		-40		125	°C
Mounting force per clamp	*F*		20		30	N
Weight	*G*			10		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

Table 3 Maximum rated values

Parameter	Symbol	Note or test condition		Values	Unit
Drain-source voltage	V_{DSS}		$T_{vj} = 25$ °C	1200	V
Implemented drain current	I_{DN}			25	A
Continuous DC drain current	I_{DDC}	$T_{vj} = 175$ °C, $V_{GS} = 18$ V	$T_H = 85$ °C	25	A
Repetitive peak drain current	I_{DRM}	verified by design, t_p limited by T_{vjmax}		50	A
Gate-source voltage, max. transient voltage	V_{GS}	$D < 0.01$		-10/25	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 = 25 A	V_{GS} = 15 V, T_{vj} = 25 °C		26.2		mΩ
			V_{GS} = 18 V, T_{vj} = 25 °C		22.9	38.5	
			V_{GS} = 18 V, T_{vj} = 125 °C		38.8		
			V_{GS} = 18 V, T_{vj} = 175 °C		52		
Gate threshold voltage	$V_{GS(th)}$	V_{DS} = V_{GS}, (tested after 1ms pulse at V_{GS} = +20 V), T_{vj} = 25 °C, I_D = 10.4 mA		3.45	4.2	5.15	V
		V_{DS} = V_{GS}, (tested after 1ms pulse at V_{GS} = +20 V), T_{vj} = 175 °C, I_D = 10.4 mA			3.2		
Total gate charge	Q_G	V_{DD} = 800 V, V_{GS} = -3/18 V, T_{vj} = 25 °C			0.076		μC
Internal gate resistor	R_{Gint}	T_{vj} = 25 °C			1.5		Ω
Input capacitance	C_{ISS}	f = 100 kHz, V_{DS} = 800 V, V_{GS} = 0 V	T_{vj} = 25 °C		2.6		nF
Output capacitance	C_{OSS}	f = 100 kHz, V_{DS} = 800 V, V_{GS} = 0 V	T_{vj} = 25 °C		0.1		nF
Reverse transfer capacitance	C_{rss}	f = 100 kHz, V_{DS} = 800 V, V_{GS} = 0 V	T_{vj} = 25 °C		6.48		pF
C_{OSS} stored energy	E_{OSS}	V_{DS} = 800 V, V_{GS} = -3/18 V, T_{vj} = 25 °C			40.9		μJ
Drain-source leakage current	I_{DSS}	V_{DS} = 1200 V, V_{GS} = -3 V	T_{vj} = 25 °C			111	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 = 25 A, R_{Gon} = 8 Ω, V_{DD} = 800 V, V_{GS} = -3/18 V, t_{dead} = 1000 ns, 0.1 V_{GS} to 0.1 I_D	T_{vj} = 25 °C		23.1		ns
			T_{vj} = 125 °C		23.7		
			T_{vj} = 175 °C		24		
Rise time (inductive load)	t_r	I_D = 25 A, R_{Gon} = 8 Ω, V_{DD} = 800 V, V_{GS} = -3/18 V, t_{dead} = 1000 ns, 0.1 I_D to 0.9 I_D	T_{vj} = 25 °C		5.4		ns
			T_{vj} = 125 °C		4.9		
			T_{vj} = 175 °C		4.8		

(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 = 25 A, R_{Goff} = 0.51 Ω, V_{DD} = 800 V, V_{GS} = -3/18 V, 0.9 V_{GS} to 0.9 I_D	T_{vj} = 25 °C		13.9		ns
			T_{vj} = 125 °C		14.9		
			T_{vj} = 175 °C		15.4		
Fall time (inductive load)	t_f	I_D = 25 A, R_{Goff} = 0.51 Ω, V_{DD} = 800 V, V_{GS} = -3/18 V, 0.9 I_D to 0.1 I_D	T_{vj} = 25 °C		18		ns
			T_{vj} = 125 °C		18.1		
			T_{vj} = 175 °C		18.2		
Turn-on energy loss per pulse	E_{on}	I_D = 25 A, V_{DD} = 800 V, L_σ = 15 nH, V_{GS} = -3/18 V, R_{Gon} = 8 Ω, di/dt = 6.2 kA/µs (T_{vj} = 175 °C), t_{dead} = 1000 ns	T_{vj} = 25 °C		482		µJ
			T_{vj} = 125 °C		567		
			T_{vj} = 175 °C		670		
Turn-on energy loss per pulse, optimized	$E_{on,o}$	I_D = 25 A, V_{DD} = 800 V, L_σ = 15 nH, V_{GS} = -3/18 V, $R_{Gon,o}$ = 6.8 Ω, di/dt = 7.3 kA/µs (T_{vj} = 175 °C), t_{dead} = 100 ns	T_{vj} = 25 °C		405		µJ
			T_{vj} = 125 °C		437		
			T_{vj} = 175 °C		483		
Turn-off energy loss per pulse	E_{off}	I_D = 25 A, V_{DD} = 800 V, L_σ = 15 nH, V_{GS} = -3/18 V, R_{Goff} = 0.51 Ω, dv/dt = 60 kV/µs (T_{vj} = 175 °C)	T_{vj} = 25 °C		81		µJ
			T_{vj} = 125 °C		82		
			T_{vj} = 175 °C		82		
Thermal resistance, junction to heat sink	R_{thJH}	per MOSFET, λ_{grease} = 5 W/(m·K)			1.63		K/W
Temperature under switching conditions	$T_{vj\ op}$			-40		175	°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.*

3 Body diode (MOSFET)

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} = -3 V	T_H = 65 °C	16	A
Pulsed body diode current	$I_{SD\ pulse}$			50	A

Table 7 **Characteristic values**

Parameter	**Symbol**	**Note or test condition**		**Values**			**Unit**
				Min.	**Typ.**	**Max.**	
Forward voltage	V_{SD}	I_{SD} = 25 A, V_{GS} = -3 V	T_{vj} = 25 °C		4.25	5.15	V
			T_{vj} = 125 °C		3.95		
			T_{vj} = 175 °C		3.8		
Peak reverse recovery current	I_{rrm}	I_{SD} = 25 A, di_s/dt = 6.2 kA/µs, V_{DD} = 800 V, V_{GS} = 18/-3 V, t_{dead} = 1000 ns	T_{vj} = 25 °C		43		A
			T_{vj} = 125 °C		47		
			T_{vj} = 175 °C		53		
Recovered charge	Q_{rr}	I_{SD} = 25 A, di_s/dt = 6.2 kA/µs, V_{DD} = 800 V, V_{GS} = 18/-3 V, t_{dead} = 1000 ns	T_{vj} = 25 °C		38		µC
			T_{vj} = 125 °C		53		
			T_{vj} = 175 °C		68		
Reverse recovery energy	E_{rec}	I_{SD} = 25 A, di_s/dt = 6.2 kA/µs (T_{vj} = 175 °C), V_{DD} = 800 V, V_{GS} = 18/-3 V, t_{dead} = 1000 ns	T_{vj} = 25 °C		104		µJ
			T_{vj} = 125 °C		138		
			T_{vj} = 175 °C		169		
Reverse recovery energy, optimized	$E_{rec,o}$	I_{SD} = 25 A, di_s/dt = 7.3 kA/µs (T_{vj} = 175 °C), V_{DD} = 800 V, t_{dead} = 100 ns	T_{vj} = 25 °C		94		µJ
			T_{vj} = 125 °C		97		
			T_{vj} = 175 °C		113		

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		10		kΩ
Deviation of R_{100}	$\Delta R/R$	T_{NTC} = 100 °C, R_{100} = 977 Ω	-3		3	%
Power dissipation	P_{25}	T_{NTC} = 25 °C			20	mW
B-value	$B_{25/50}$	$R_2 = R_{25} \exp[B_{25/50}(1/T_2-1/(298{,}15\ K))]$		3450		K
B-value	$B_{25/80}$	$R_2 = R_{25} \exp[B_{25/80}(1/T_2-1/(298{,}15\ K))]$		3490		K
B-value	$B_{25/100}$	$R_2 = R_{25} \exp[B_{25/100}(1/T_2-1/(298{,}15\ K))]$		3510		K

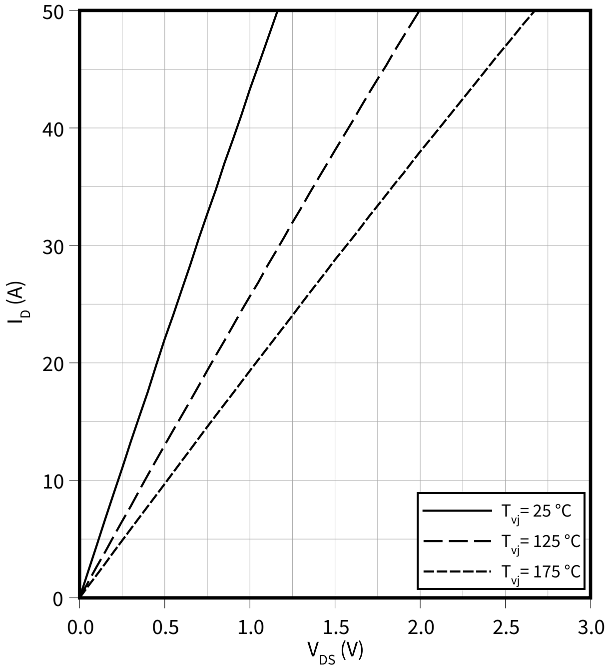
***Note**: For an analytical description of the NTC characteristics please refer to AN2009-10, chapter 4*

5 Characteristics diagrams

Output characteristic (typical), MOSFET

$I_D = f(V_{DS})$

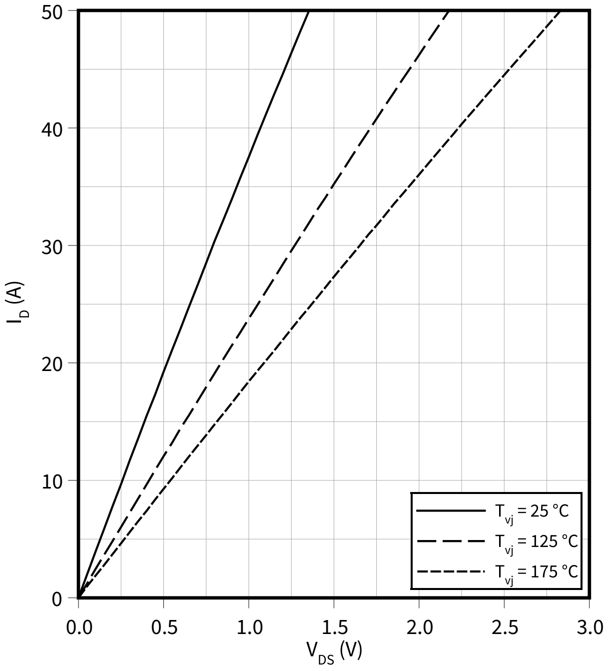
$V_{GS} = 18\ V$



Output characteristic (typical), MOSFET

$I_D = f(V_{DS})$

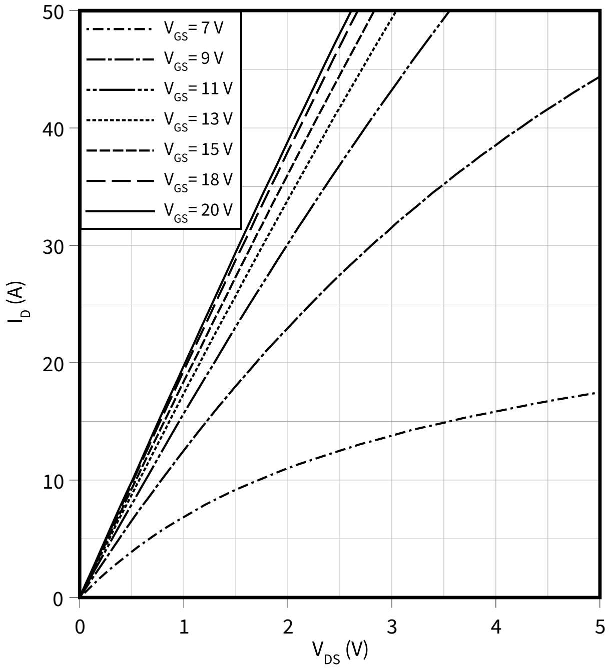
$V_{GS} = 15\ V$



Output characteristic field (typical), MOSFET

$I_D = f(V_{DS})$

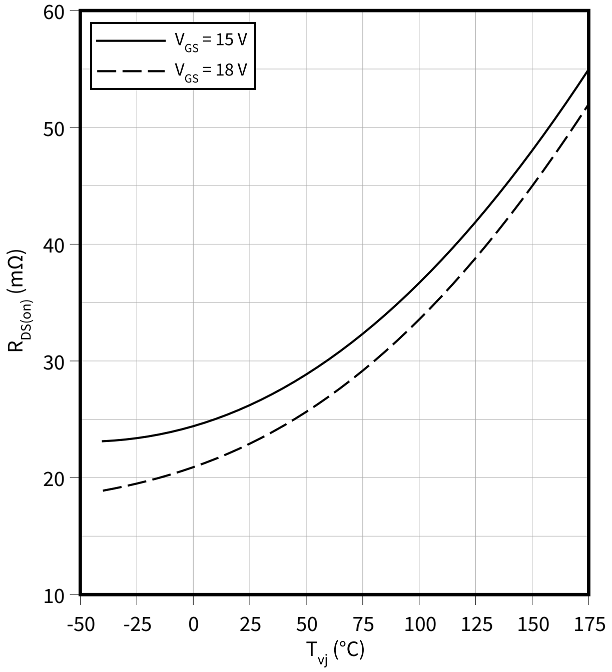
$T_{vj} = 175\ °C$



Drain source on-resistance (typical), MOSFET

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

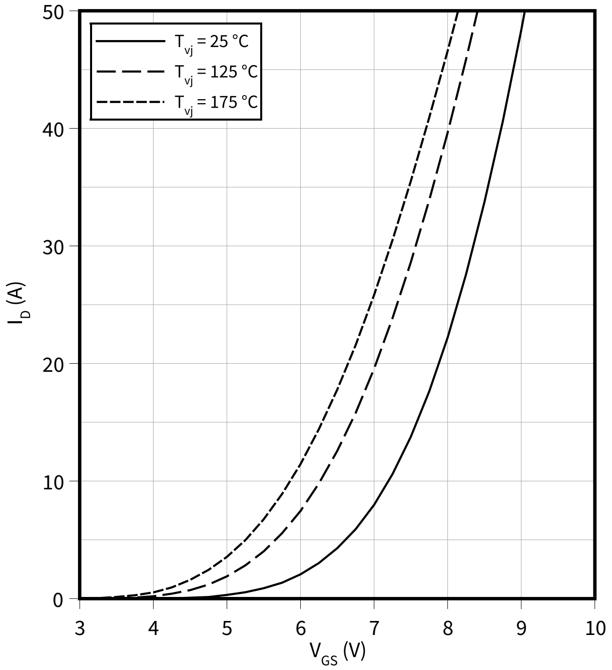
$I_D = 25\ A$



Transfer characteristic (typical), MOSFET

$I_D = f(V_{GS})$

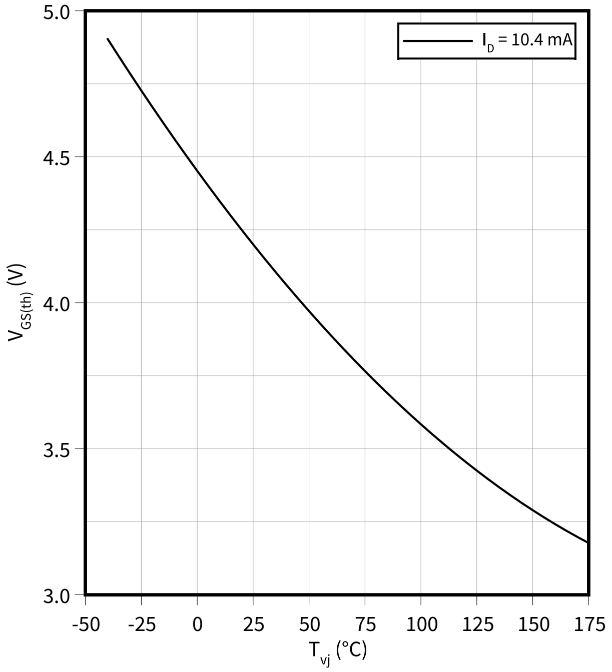
$V_{DS} = 20\ V$



Gate-source threshold voltage (typical), MOSFET

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

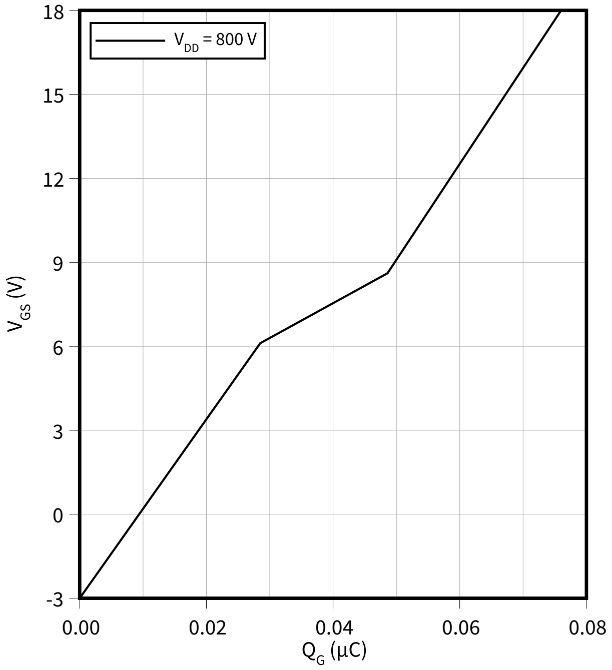
$V_{GS} = V_{DS}$



Gate charge characteristic (typical), MOSFET

$V_{GS} = f(Q_G)$

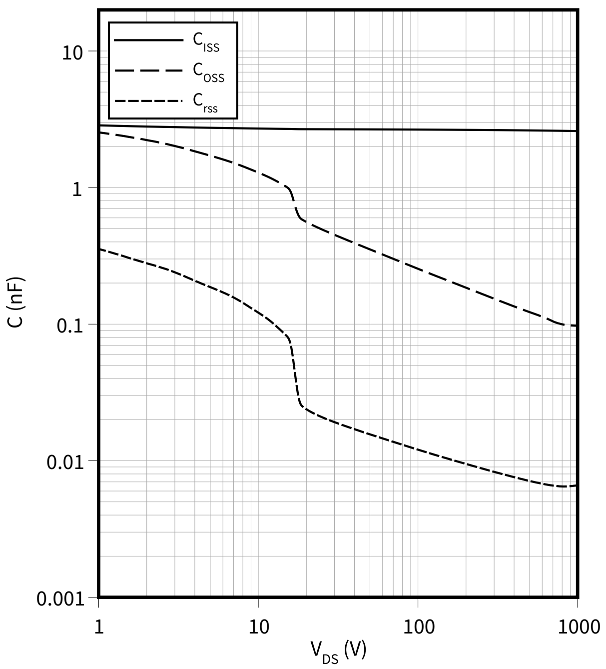
$I_D = 25\ A, T_{vj} = 25\ °C$



Capacity characteristic (typical), MOSFET

$C = f(V_{DS})$

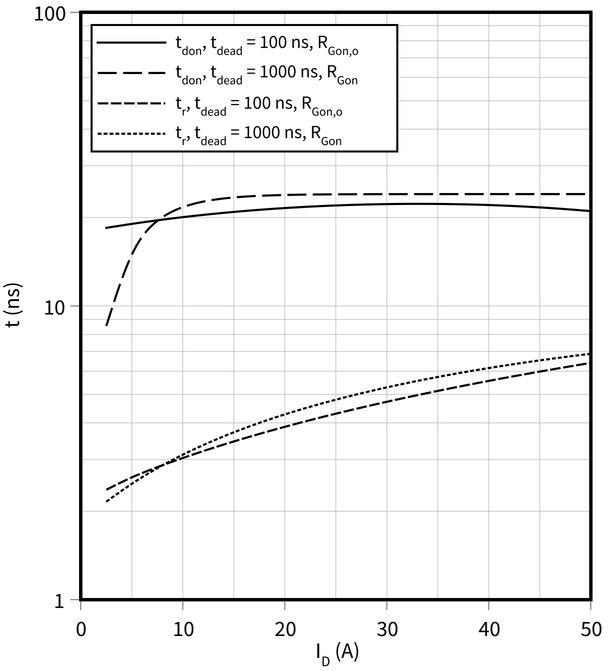
$f = 100\ kHz, T_{vj} = 25\ °C, V_{GS} = 0\ V$



Switching times (typical), MOSFET

$t = f(I_D)$

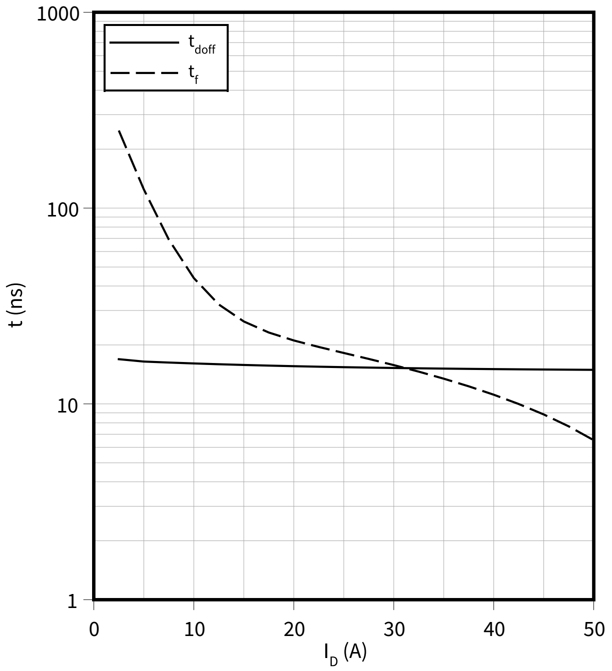
$V_{DD} = 800$ V, $R_{Gon} = 8\ \Omega$, $R_{Gon,o} = 6.8\ \Omega$, $T_{vj} = 175$ °C, $V_{GS} = -3/18$ V



Switching times (typical), MOSFET

$t = f(I_D)$

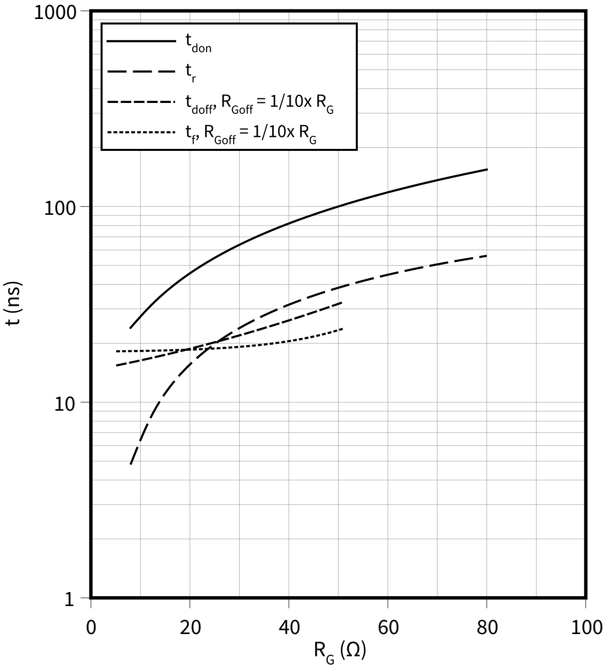
$R_{Goff} = 0.51\ \Omega$, $V_{DD} = 800$ V, $T_{vj} = 175$ °C, $V_{GS} = -3/18$ V



Switching times (typical), MOSFET

$t = f(R_G)$

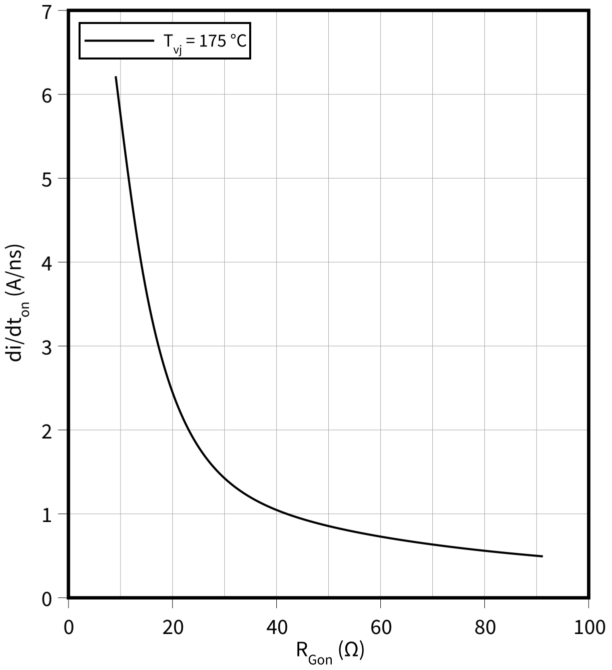
$T_{vj} = 175$ °C, $V_{GS} = -3/18$ V, $V_{DD} = 800$ V, $t_{dead} = 1000$ ns, $I_D = 25$ A



Current slope (typical), MOSFET

$di/dt_{on} = f(R_{Gon})$

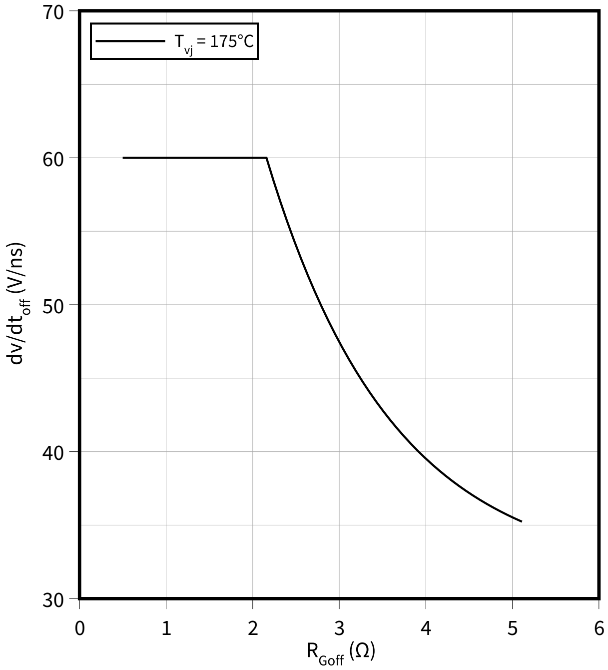
$V_{DD} = 800$ V, $t_{dead} = 1000$ ns, $I_D = 25$ A, $V_{GS} = -3/18$ V



Voltage slope (typical), MOSFET

$dv/dt_{off} = f(R_{Goff})$

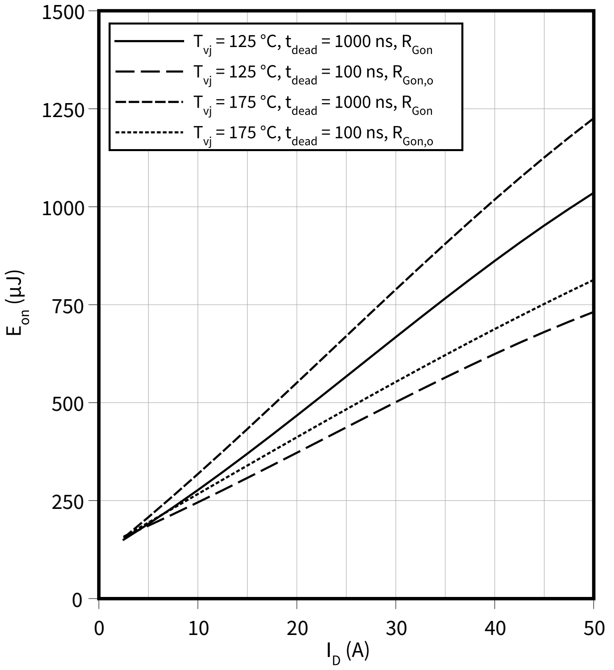
$V_{DD} = 800$ V, $I_D = 25$ A, $V_{GS} = -3/18$ V



Switching losses (typical), MOSFET

$E_{on} = f(I_D)$

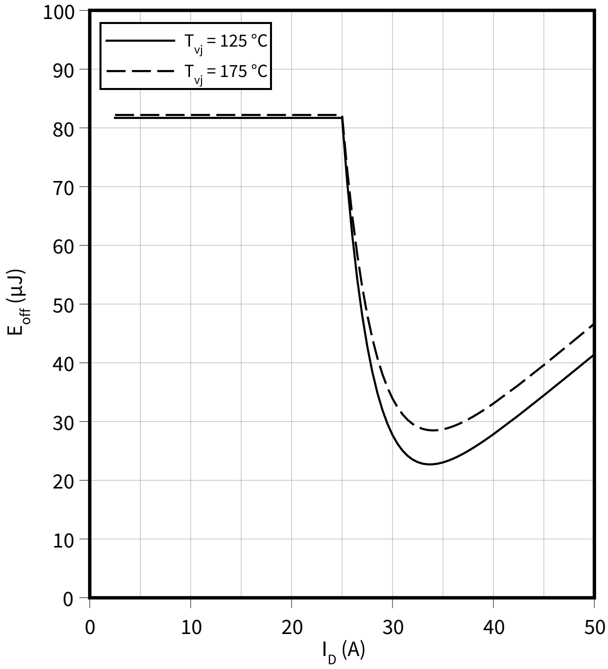
$V_{DD} = 800$ V, $R_{Gon} = 8$ Ω, $R_{Gon,o} = 6.8$ Ω, $V_{GS} = -3/18$ V



Switching losses (typical), MOSFET

$E_{off} = f(I_D)$

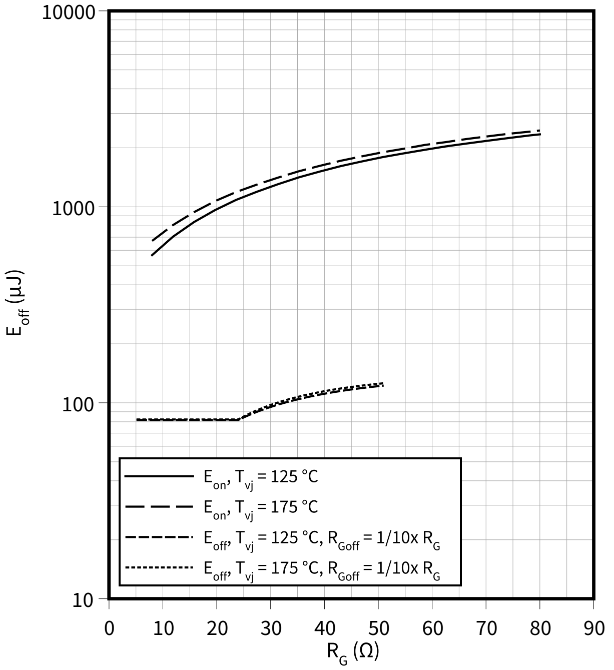
$R_{Goff} = 0.51$ Ω, $V_{DD} = 800$ V, $V_{GS} = -3/18$ V



Switching losses (typical), MOSFET

$E_{off} = f(R_G)$, $E = f(R_G)$

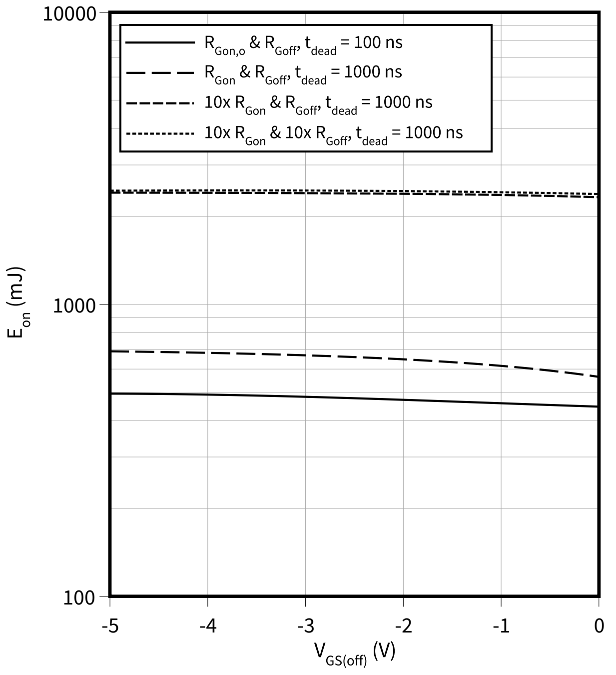
$V_{DD} = 800$ V, $t_{dead} = 1000$ ns, $I_D = 25$ A, $V_{GS} = -3/18$ V



Switching losses (typical), MOSFET

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

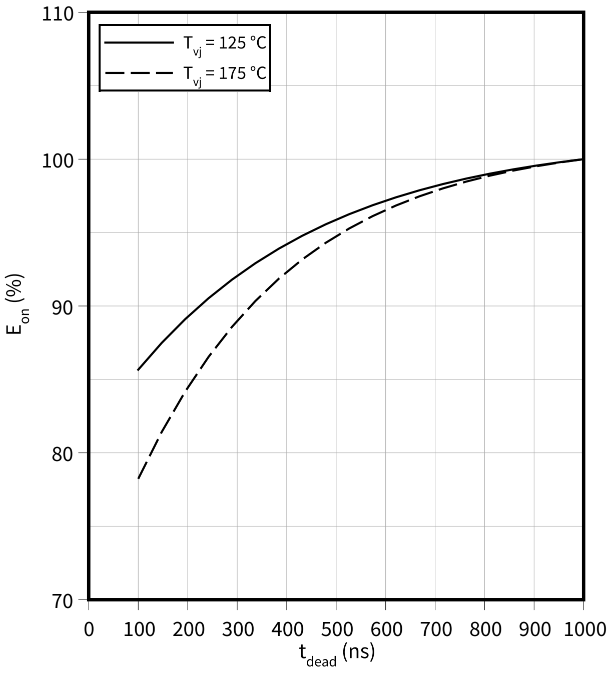
$R_{Goff} = 0.51\ \Omega$, $V_{DD} = 800$ V, $R_{Gon} = 8\ \Omega$, $V_{GS(on)} = 18$ V, $I_D = 25$ A, $R_{Gon,o} = 6.8\ \Omega$, $T_{vj} = 175$ °C



Switching losses (typical), MOSFET

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

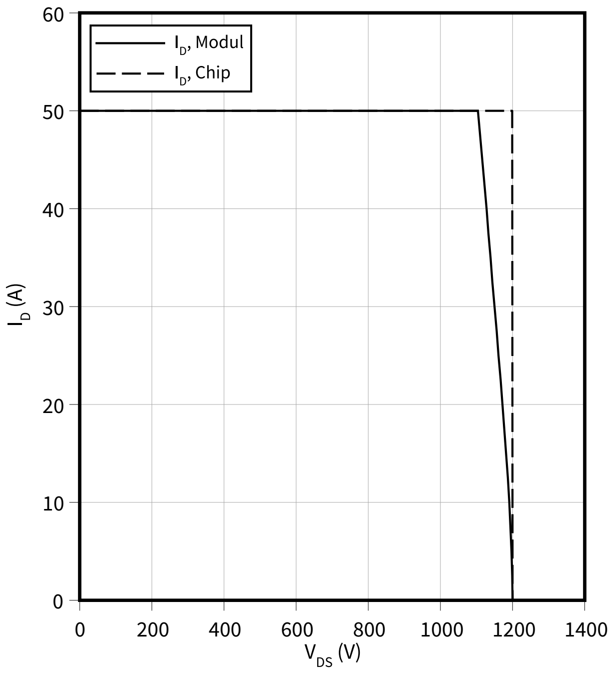
$R_{Gon} = 8\ \Omega$, $I_D = 25$ A, $V_{DD} = 800$ V, $V_{GS} = -3/18$ V



Reverse bias safe operating area (RBSOA), MOSFET

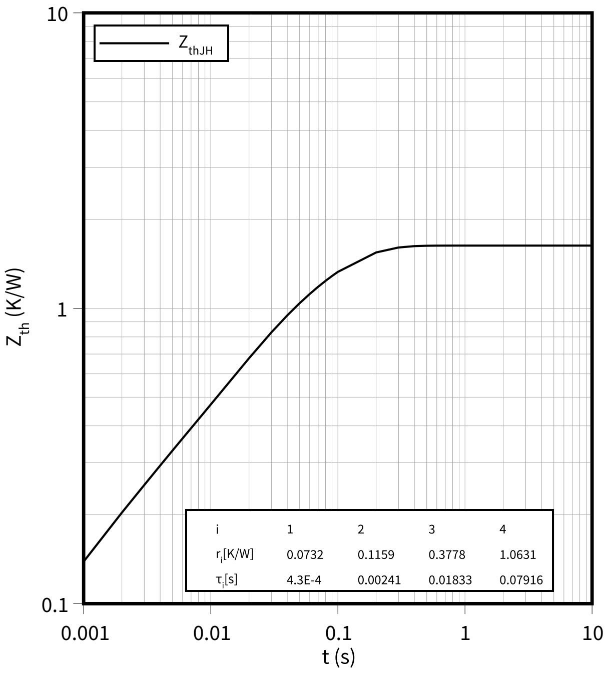
$I_D = f(V_{DS})$

$R_{Goff} = 0.51\ \Omega$, $T_{vj} = 175$ °C, $V_{GS} = -3/18$ V



Transient thermal impedance, MOSFET

$Z_{th} = f(t)$

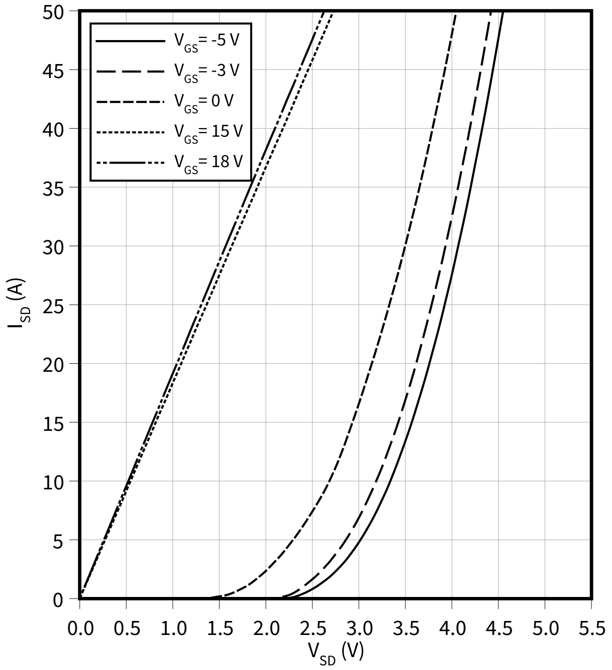


i	1	2	3	4
r_i[K/W]	0.0732	0.1159	0.3778	1.0631
τ_i[s]	4.3E-4	0.00241	0.01833	0.07916

Forward characteristic body diode (typical), MOSFET

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

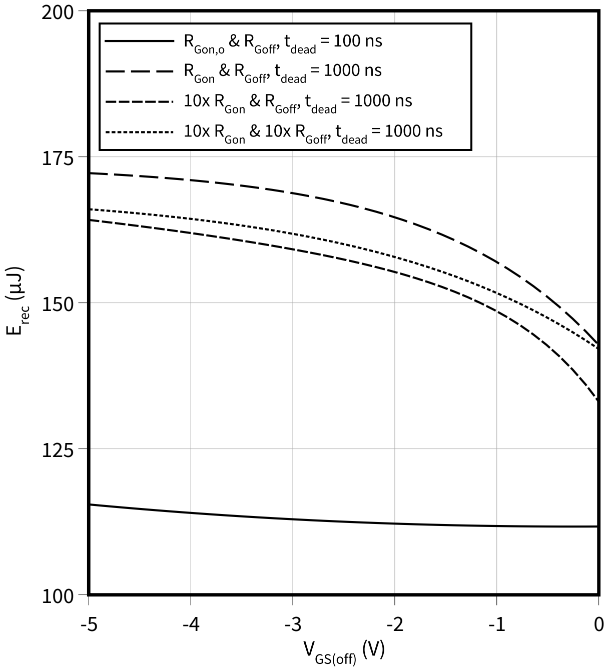
$T_{vj} = 175\ °C$



Switching losses body diode (typical), MOSFET

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

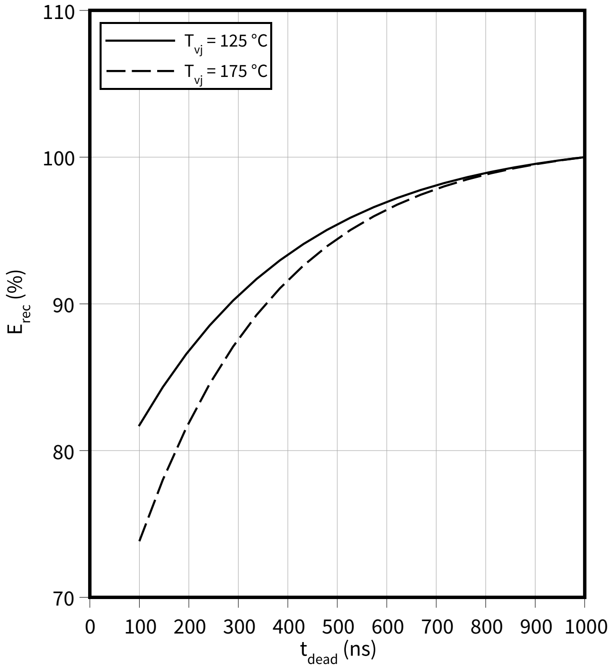
$R_{Goff} = 0.51\ \Omega$, $R_{Gon} = 8\ \Omega$, $V_{GS(on)} = 18$ V, $I_{SD} = 25$ A, $R_{Gon,o} = 6.8\ \Omega$, $V_{DD} = 800$ V, $T_{vj} = 175\ °C$



Switching losses body diode (typical), MOSFET

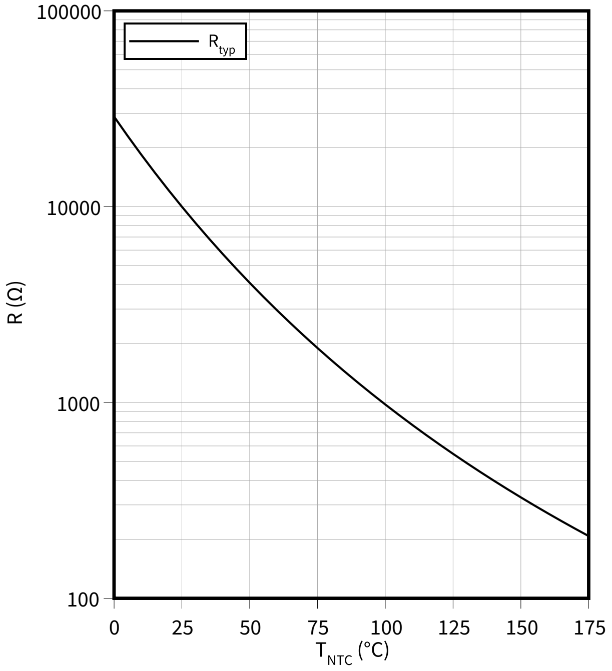
$E_{rec} = f(t_{dead})$

$R_{Gon} = 8\ \Omega$, $I_D = 25$ A, $V_{DD} = 800$ V, $V_{GS} = -3/18$ V



Temperature characteristic (typical), NTC-Thermistor

$R = f(T_{NTC})$



6 Circuit diagram

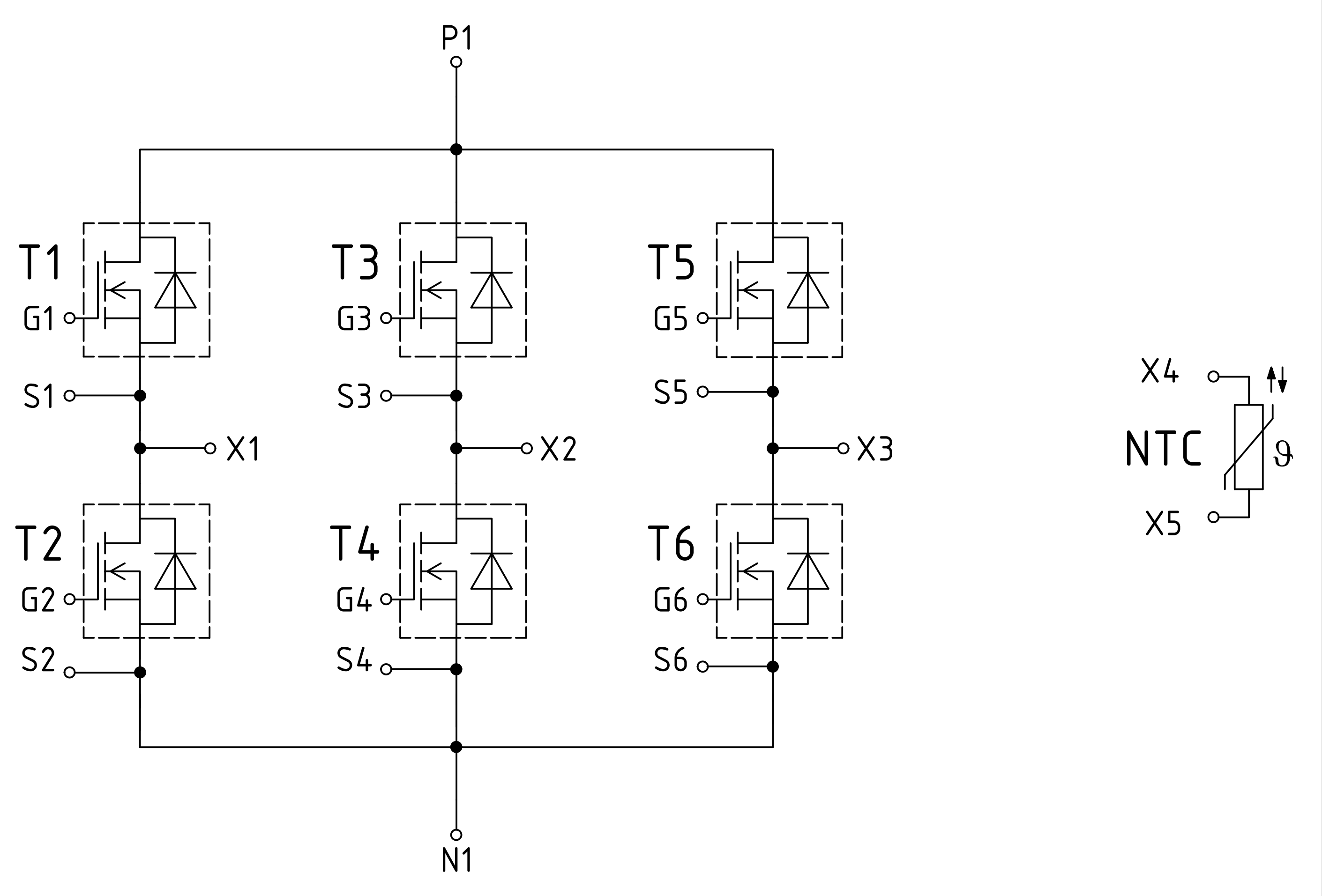
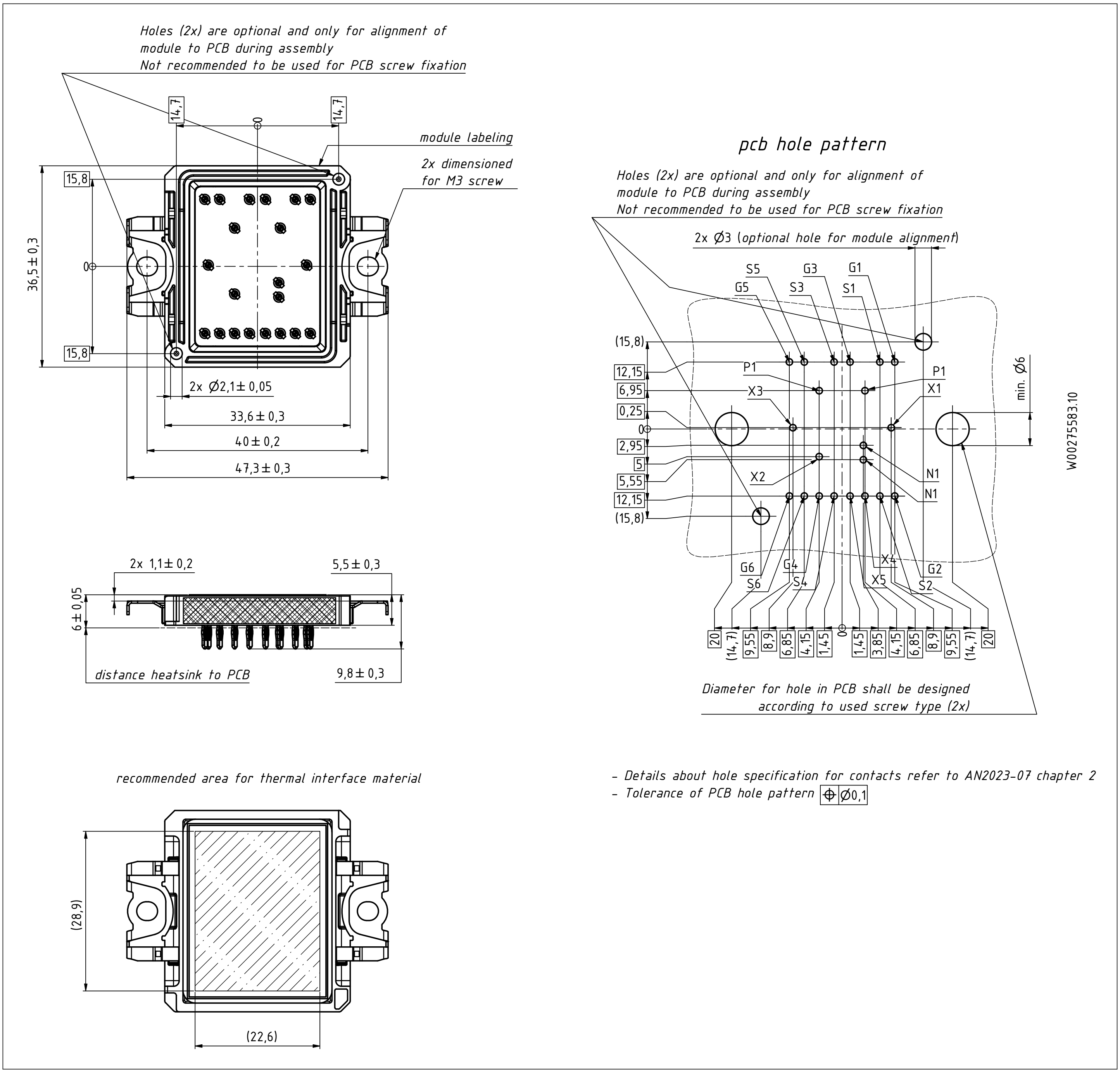


Figure 1

7 Package outlines



Holes (2x) are optional and only for alignment of module to PCB during assembly
Not recommended to be used for PCB screw fixation

recommended area for thermal interface material

Holes (2x) are optional and only for alignment of module to PCB during assembly
Not recommended to be used for PCB screw fixation

Diameter for hole in PCB shall be designed according to used screw type (2x)

- *Details about hole specification for contacts refer to AN2023-07 chapter 2*
- *Tolerance of PCB hole pattern* ⌖ Ø0,1

Figure 2

8 Module label code

<table>
<tr><th colspan="4">Module label code</th></tr>
<tr><td>Code format</td><td colspan="2">Data Matrix</td><td>Barcode Code128</td></tr>
<tr><td>Encoding</td><td colspan="2">ASCII text</td><td>Code Set A</td></tr>
<tr><td>Symbol size</td><td colspan="2">16x16</td><td>23 digits</td></tr>
<tr><td>Standard</td><td colspan="2">IEC24720 and IEC16022</td><td>IEC8859-1</td></tr>
<tr><td>Code content</td><td><i>Content</i></td><td><i>Digit</i></td><td><i>Example</i></td></tr>
<tr><td></td><td>Module serial number</td><td>1 – 5</td><td>71549</td></tr>
<tr><td></td><td>Module material number</td><td>6 - 11</td><td>142846</td></tr>
<tr><td></td><td>Production order number</td><td>12 - 19</td><td>55054991</td></tr>
<tr><td></td><td>Date code (production year)</td><td>20 – 21</td><td>15</td></tr>
<tr><td></td><td>Date code (production week)</td><td>22 – 23</td><td>30</td></tr>
<tr><td>Example</td><td colspan="2">71549142846550549911530</td><td>71549142846550549911530</td></tr>
</table>

Figure 3

Revision history

Document revision	Date of release	Description of changes
0.10	2025-11-13	Target datasheet
1.00	2026-04-02	Final Datasheet
1.01	2026-04-16	Correction of RTI
1.02	2026-04-20	Update of package outline

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Edition 2026-04-20

Published by

Infineon Technologies AG

81726 Munich, Germany

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Document reference
IFX-ABM405-004

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