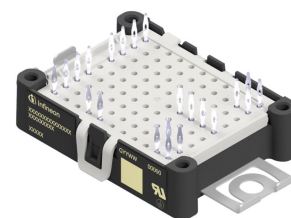


## Preliminary datasheet

### EasyPACK™ module with CoolSiC™ Trench MOSFET and PressFIT / pre-applied thermal interface material / NTC

#### Features

- Electrical features
  - $V_{DS} = 1200\text{ V}$
  - $I_{DN} = 50\text{ A}$  /  $I_{DRM} = 100\text{ A}$
  - Low inductive design
  - Low switching losses
  - High current density
  - Suitable Infineon gate drivers can be found under <https://www.infineon.com/gdfinder>
- Mechanical features
  - PressFIT contact technology
  - Integrated NTC temperature sensor
  - Rugged mounting due to integrated mounting clamps
  - Package with CTI > 600
  - High current pin



#### Potential applications

- High-frequency switching application
- DC/DC converter
- DC charger for EV

#### Product validation

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

#### Description

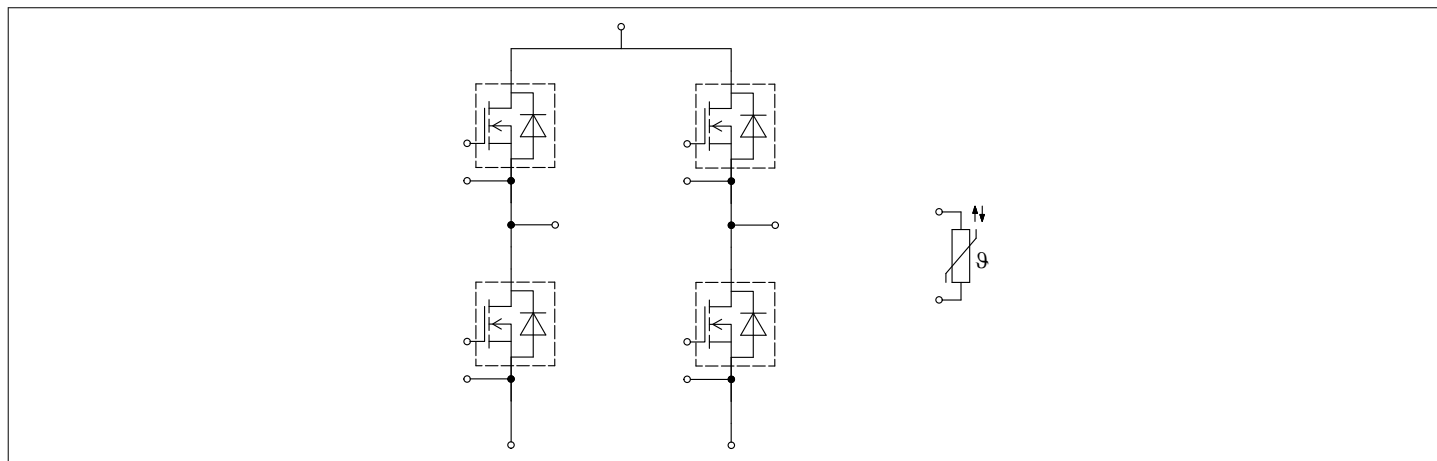


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## 1 Package

**Table 1** Insulation coordination

Parameter	Symbol	Note or test condition	Values	Unit
Isolation test voltage	$V_{ISOL}$	RMS, $f = 50 \text{ Hz}$ , $t = 60 \text{ s}$	3.0	kV
Isolation test voltage NTC	$V_{ISOL(NTC)}$	RMS, $f = 50 \text{ Hz}$ , $t = 60 \text{ s}$	3.0	kV
Internal isolation		basic insulation (class 1, IEC 61140)	$Al_2O_3$	
Comparative tracking index	$CTI$		> 600	
Relative thermal index (electrical)	$RTI$	frame	130	°C
		lid	130	

**Table 2** Characteristic values

Parameter	Symbol	Note or test condition	Values			Unit
			Min.	Typ.	Max.	
Stray inductance module	$L_{SCE}$			14		nH
Module lead resistance, terminals - chip	$R_{CC'+EE'}$	$T_H = 25 \text{ °C}$ , per switch		2.6		mΩ
Storage temperature	$T_{stg}$		-40		130	°C
Maximum baseplate operation temperature	$T_{BPmax}$				150	°C
Mounting force per clamp	$F$		20		50	N
Weight	$G$			24		g

**Note:** The current under continuous operation is limited to 50 A rms per connector pin.  
Storage and shipment of modules with TIM => see AN 2012-07

## 2 MOSFET, T1-T4

**Table 3** Maximum rated values

Parameter	Symbol	Note or test condition		Values	Unit
Drain-source voltage	$V_{DSS}$		$T_{vj} = 25 \text{ °C}$	1200	V
Implemented drain current	$I_{DN}$			50	A
Continuous DC drain current	$I_{DDC}$	$T_{vj} = 175 \text{ °C}$ , $V_{GS} = 18 \text{ V}$	$T_H = 25 \text{ °C}$	60	A
Repetitive peak drain current	$I_{DRM}$	verified by design, $t_p$ limited by $T_{vjmax}$		100	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	$R_{DS(on)}$	$I_D = 50\text{ A}$	$V_{GS}=18\text{ V}, T_{vj}=25\text{ °C}$		12.5		mΩ
			$V_{GS}=18\text{ V}, T_{vj}=125\text{ °C}$		19.4		
			$V_{GS} = 18\text{ V}, T_{vj} = 175\text{ °C}$		25.2		
			$V_{GS} = 15\text{ V}, T_{vj} = 25\text{ °C}$		15		
Gate threshold voltage	$V_{GS(th)}$	$I_D = 22\text{ mA}, V_{DS} = V_{GS}, T_{vj} = 25\text{ °C},$ (tested after 1ms pulse at $V_{GS} = +20\text{ V}$ )		3.45	4.3	5.15	V
Total gate charge	$Q_G$	$V_{DD}=800\text{ V}, V_{GS} = -3/18\text{ V}, T_{vj} = 25\text{ °C}$			0.158		μC
Internal gate resistor	$R_{Gint}$	$T_{vj}=25\text{ °C}$			5.2		Ω
Input capacitance	$C_{ISS}$	$f = 100\text{ kHz}, V_{DS}=800\text{ V}, V_{GS}=0\text{ V}$	$T_{vj}=25\text{ °C}$		4.8		nF
Output capacitance	$C_{OSS}$	$f = 100\text{ kHz}, V_{DS}=800\text{ V}, V_{GS}=0\text{ V}$	$T_{vj}=25\text{ °C}$		0.196		nF
Reverse transfer capacitance	$C_{rss}$	$f = 100\text{ kHz}, V_{DS}=800\text{ V}, V_{GS}=0\text{ V}$	$T_{vj}=25\text{ °C}$		0.013		nF
$C_{OSS}$ stored energy	$E_{OSS}$	$V_{DS}=800\text{ V}, V_{GS} = -3/18\text{ V}, T_{vj} = 25\text{ °C}$			80.4		μJ
Drain-source leakage current	$I_{DSS}$	$V_{DS} = 1200\text{ V}, V_{GS} = -3\text{ V}$	$T_{vj} = 25\text{ °C}$		0.2	208	μA
Gate-source leakage current	$I_{GSS}$	$V_{DS} = 0\text{ V}, T_{vj} = 25\text{ °C}$	$V_{GS}=20\text{ V}$			400	nA
Turn-on delay time (inductive load)	$t_{d on}$	$I_D = 50\text{ A}, R_{Gon} = 4.7\text{ Ω}, V_{DD} = 800\text{ V}, V_{GS} = -3/18\text{ V}, t_{dead} = 1000\text{ ns}, 0.1 V_{GS}$ to $0.1 I_D$	$T_{vj} = 25\text{ °C}$		24		ns
			$T_{vj} = 125\text{ °C}$		24		
			$T_{vj} = 175\text{ °C}$		24		
Rise time (inductive load)	$t_r$	$I_D = 50\text{ A}, R_{Gon} = 4.7\text{ Ω}, V_{DD} = 800\text{ V}, V_{GS} = -3/18\text{ V}, t_{dead} = 1000\text{ ns}, 0.1 I_D$ to $0.9 I_D$	$T_{vj} = 25\text{ °C}$		12		ns
			$T_{vj} = 125\text{ °C}$		11		
			$T_{vj} = 175\text{ °C}$		11		
Turn-off delay time (inductive load)	$t_{d off}$	$I_D = 50\text{ A}, R_{Goff} = 0.22\text{ Ω}, V_{DD} = 800\text{ V}, V_{GS} = -3/18\text{ V}, 0.9 V_{GS}$ to $0.9 I_D$	$T_{vj} = 25\text{ °C}$		39		ns
			$T_{vj} = 125\text{ °C}$		46		
			$T_{vj} = 175\text{ °C}$		48		

(table continues...)

**Table 5** (continued) Characteristic values

Parameter	Symbol	Note or test condition	Values			Unit
			Min.	Typ.	Max.	
Fall time (inductive load)	$t_f$	$I_D = 50 \text{ A}$ , $R_{Goff} = 0.22 \text{ } \Omega$ , $V_{DD} = 800 \text{ V}$ , $V_{GS} = -3/18 \text{ V}$ , $0.9 I_D$ to $0.1 I_D$	$T_{vj} = 25 \text{ } ^\circ\text{C}$	14		ns
			$T_{vj} = 125 \text{ } ^\circ\text{C}$	16		
			$T_{vj} = 175 \text{ } ^\circ\text{C}$	16		
Turn-on energy loss per pulse	$E_{on}$	$I_D = 50 \text{ A}$ , $V_{DD} = 800 \text{ V}$ , $L_\sigma = 15 \text{ nH}$ , $V_{GS} = -3/18 \text{ V}$ , $R_{Gon} = 4.7 \text{ } \Omega$ , $di/dt =$ $5.17 \text{ kA}/\mu\text{s}$ ( $T_{vj} = 175 \text{ } ^\circ\text{C}$ ), $t_{dead} = 1000 \text{ ns}$	$T_{vj} = 25 \text{ } ^\circ\text{C}$	0.95		mJ
			$T_{vj} = 125 \text{ } ^\circ\text{C}$	1.14		
			$T_{vj} = 175 \text{ } ^\circ\text{C}$	1.31		
Turn-on energy loss per pulse, optimized	$E_{on,o}$	$I_D = 50 \text{ A}$ , $V_{DD} = 800 \text{ V}$ , $L_\sigma = 15 \text{ nH}$ , $V_{GS} = -3/15 \text{ V}$ , $R_{Gon,o} = 0.22 \text{ } \Omega$ , $di/dt =$ $9.15 \text{ kA}/\mu\text{s}$ ( $T_{vj} = 175 \text{ } ^\circ\text{C}$ ), $t_{dead} = 100 \text{ ns}$	$T_{vj} = 25 \text{ } ^\circ\text{C}$	0.52		mJ
			$T_{vj} = 125 \text{ } ^\circ\text{C}$	0.52		
			$T_{vj} = 175 \text{ } ^\circ\text{C}$	0.57		
Turn-off energy loss per pulse	$E_{off}$	$I_D = 50 \text{ A}$ , $V_{DD} = 800 \text{ V}$ , $L_\sigma = 15 \text{ nH}$ , $V_{GS} = -3/18 \text{ V}$ , $R_{Goff} = 0.22 \text{ } \Omega$ , $dv/dt =$ $41.8 \text{ kV}/\mu\text{s}$ ( $T_{vj} = 175 \text{ } ^\circ\text{C}$ )	$T_{vj} = 25 \text{ } ^\circ\text{C}$	0.27		mJ
			$T_{vj} = 125 \text{ } ^\circ\text{C}$	0.31		
			$T_{vj} = 175 \text{ } ^\circ\text{C}$	0.34		
Thermal resistance, junction to heat sink	$R_{thJH}$	per MOSFET, Valid with IFX pre-applied Thermal Interface Material		0.952		K/W
Temperature under switching conditions	$T_{vj op}$		-40		175	$^\circ\text{C}$
Temperature under overload switching conditions	$T_{vj over}$	Overload, cumulative max. 100 h			200	$^\circ\text{C}$

**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, T1-T4)

**Table 6** Maximum rated values

Parameter	Symbol	Note or test condition	Values	Unit
DC body diode forward current	$I_{SD}$	$T_{vj} = 175 \text{ } ^\circ\text{C}$ , $V_{GS} = -3 \text{ V}$ $T_H = 25 \text{ } ^\circ\text{C}$	30	A
Pulsed body diode current	$I_{SD pulse}$		100	A

**Table 7** Characteristic values

Parameter	Symbol	Note or test condition	Values			Unit
			Min.	Typ.	Max.	
Forward voltage	$V_{SD}$	$I_{SD} = 50 \text{ A}$ , $V_{GS} = -3 \text{ V}$	$T_{vj} = 25 \text{ °C}$	4.35	5.35	V
			$T_{vj} = 125 \text{ °C}$	4.05		
			$T_{vj} = 175 \text{ °C}$	3.9		
Peak reverse recovery current	$I_{rrm}$	$I_{SD} = 50 \text{ A}$ , $di_s/dt = 5.17 \text{ kA}/\mu\text{s}$ , $V_{DD} = 800 \text{ V}$ , $V_{GS} = -3 \text{ V}$ , $t_{dead} = 1000 \text{ ns}$	$T_{vj} = 25 \text{ °C}$	43.1		A
			$T_{vj} = 125 \text{ °C}$	58.7		
			$T_{vj} = 175 \text{ °C}$	70.7		
Recovered charge	$Q_{rr}$	$I_{SD} = 50 \text{ A}$ , $di_s/dt = 5.17 \text{ kA}/\mu\text{s}$ , $V_{DD} = 800 \text{ V}$ , $V_{GS} = -3 \text{ V}$ , $t_{dead} = 1000 \text{ ns}$	$T_{vj} = 25 \text{ °C}$	0.45		$\mu\text{C}$
			$T_{vj} = 125 \text{ °C}$	0.88		
			$T_{vj} = 175 \text{ °C}$	1.21		
Reverse recovery energy	$E_{rec}$	$I_{SD} = 50 \text{ A}$ , $di_s/dt = 5.17 \text{ kA}/\mu\text{s}$ ( $T_{vj} = 175 \text{ °C}$ ), $V_{DD} = 800 \text{ V}$ , $V_{GS} = -3 \text{ V}$ , $t_{dead} = 1000 \text{ ns}$	$T_{vj} = 25 \text{ °C}$	0.12		mJ
			$T_{vj} = 125 \text{ °C}$	0.34		
			$T_{vj} = 175 \text{ °C}$	0.41		
Reverse recovery energy, optimized	$E_{rec,o}$	$I_{SD} = 50 \text{ A}$ , $di_s/dt = 9.15 \text{ kA}/\mu\text{s}$ ( $T_{vj} = 175 \text{ °C}$ ), $V_{DD} = 800 \text{ V}$ , $V_{GS} = -3/18 \text{ V}$ , $t_{dead} = 100 \text{ ns}$	$T_{vj} = 25 \text{ °C}$	0.19		mJ
			$T_{vj} = 125 \text{ °C}$	0.21		
			$T_{vj} = 175 \text{ °C}$	0.25		

## 4 NTC-Thermistor

**Table 8** Characteristic values

Parameter	Symbol	Note or test condition	Values			Unit
			Min.	Typ.	Max.	
Rated resistance	$R_{25}$	$T_{NTC} = 25 \text{ °C}$		5		k $\Omega$
Deviation of $R_{100}$	$\Delta R/R$	$T_{NTC} = 100 \text{ °C}$ , $R_{100} = 493 \text{ }\Omega$	-5		5	%
Power dissipation	$P_{25}$	$T_{NTC} = 25 \text{ °C}$			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

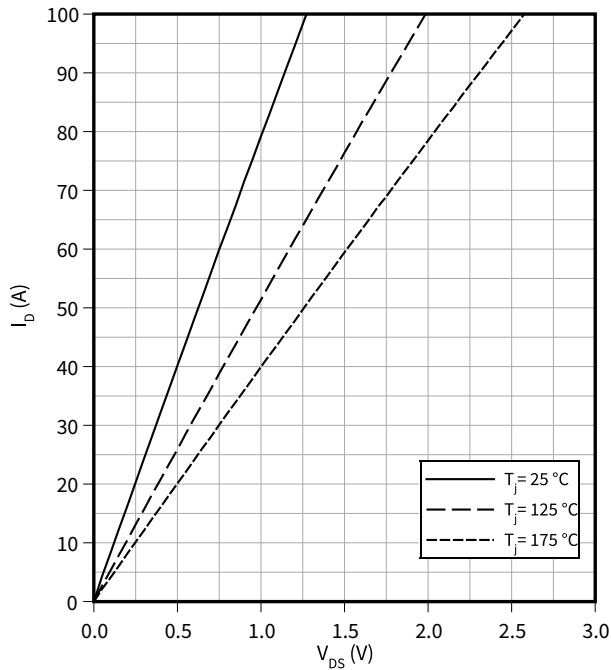
**Note:** For an analytical description of the NTC characteristics please refer to AN2009-10, chapter 4.

5 Characteristics diagrams

Output characteristic (typical), MOSFET, T1-T4

$I_D = f(V_{DS})$

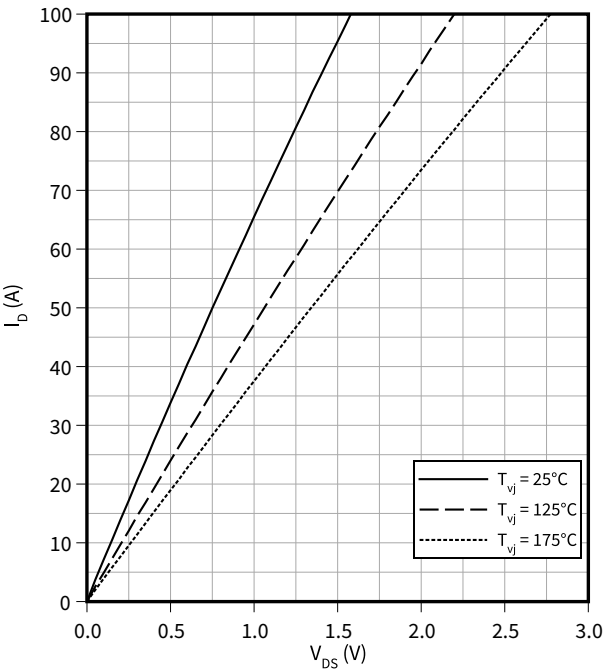
$V_{GS} = 18\text{ V}$



Output characteristic (typical), MOSFET, T1-T4

$I_D = f(V_{DS})$

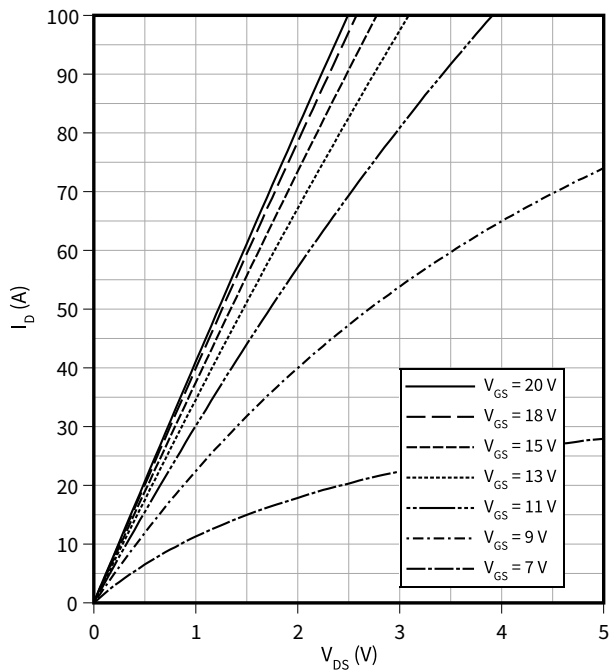
$V_{GS} = 15\text{ V}$



Output characteristic field (typical), MOSFET, T1-T4

$I_D = f(V_{DS})$

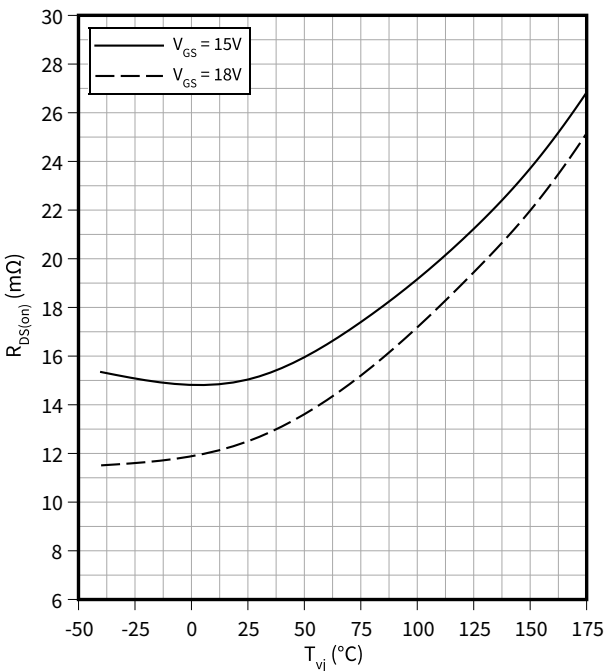
$T_{vj} = 175\text{ °C}$



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

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

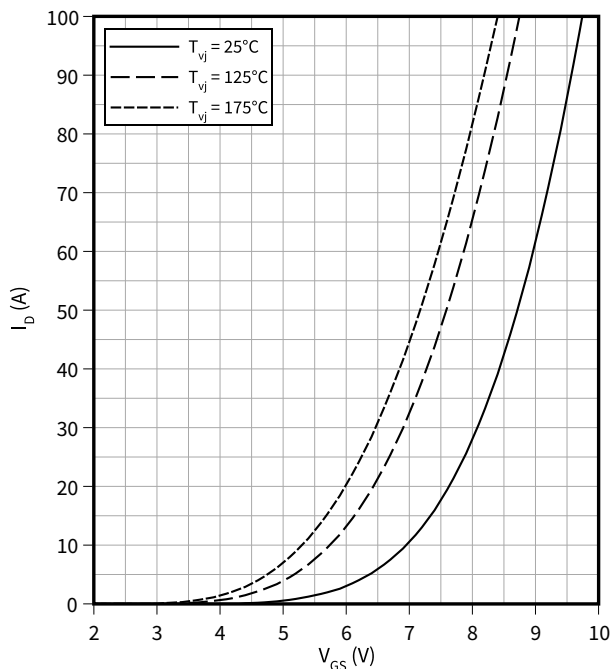
$I_D = 50\text{ A}$



5 Characteristics diagrams

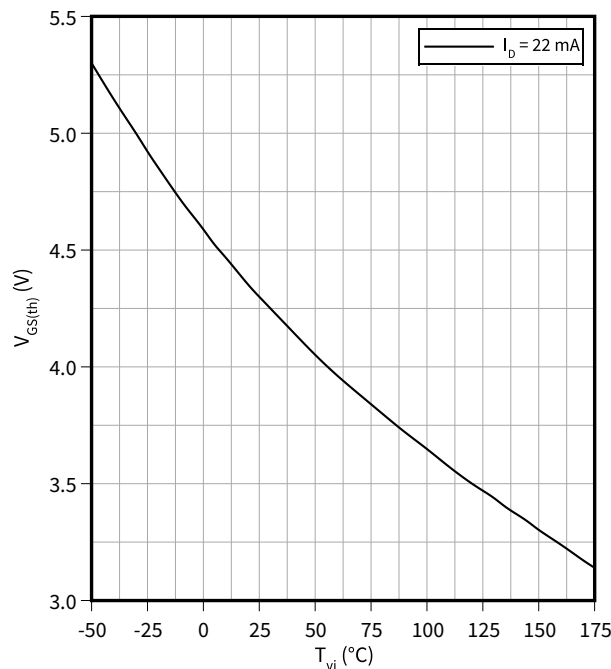
Transfer characteristic (typical), MOSFET, T1-T4

$I_D = f(V_{GS})$   
 $V_{DS} = 20\text{ V}$



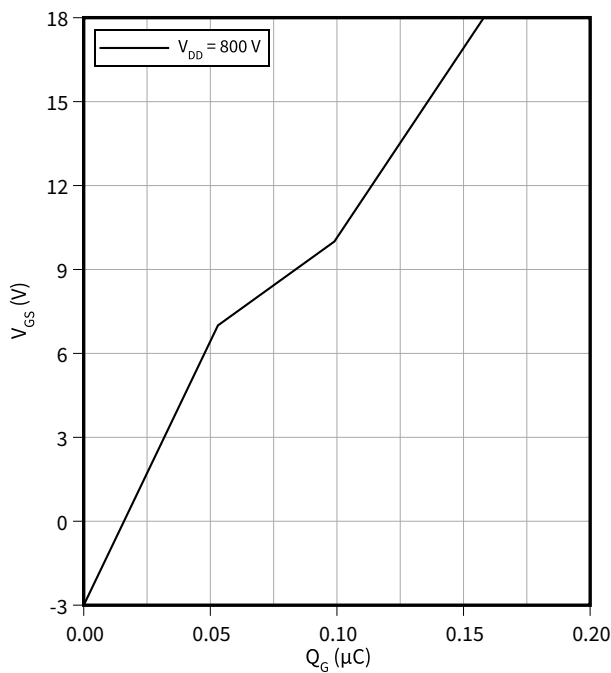
Gate-source threshold voltage (typical), MOSFET, T1-T4

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



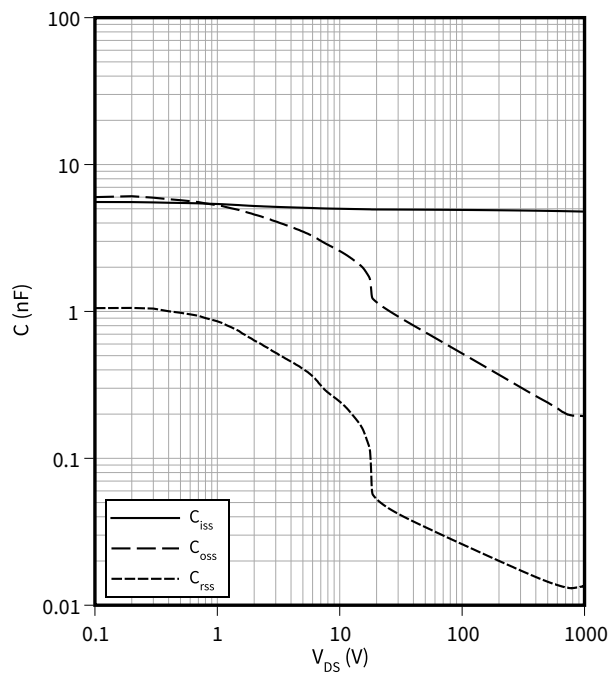
Gate charge characteristic (typical), MOSFET, T1-T4

$V_{GS} = f(Q_G)$   
 $I_D = 50\text{ A}$ ,  $T_{vj} = 25\text{ °C}$



Capacity characteristic (typical), MOSFET, T1-T4

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



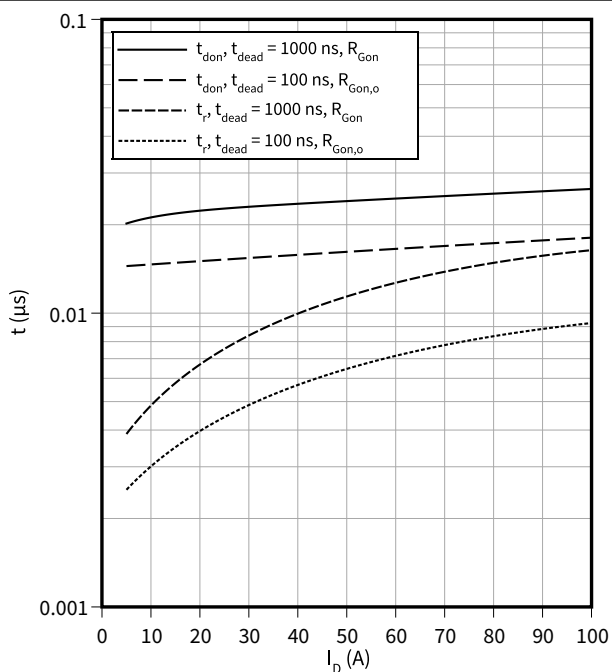


**5 Characteristics diagrams**

**Switching times (typical), MOSFET, T1-T4**

$t = f(I_D)$

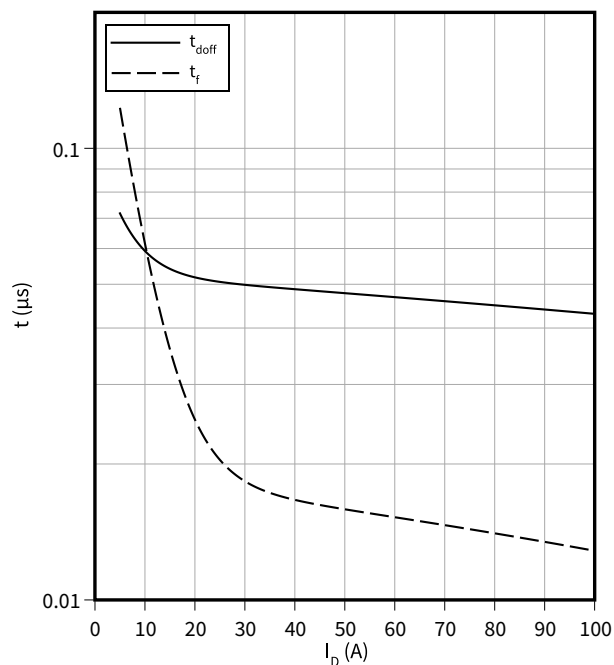
$R_{Gon} = 4.7 \Omega$ ,  $V_{DD} = 800 \text{ V}$ ,  $R_{Gon,o} = 0.22 \Omega$ ,  $T_{vj} = 175 \text{ }^\circ\text{C}$ ,  $V_{GS} = -3/18 \text{ V}$



**Switching times (typical), MOSFET, T1-T4**

$t = f(I_D)$

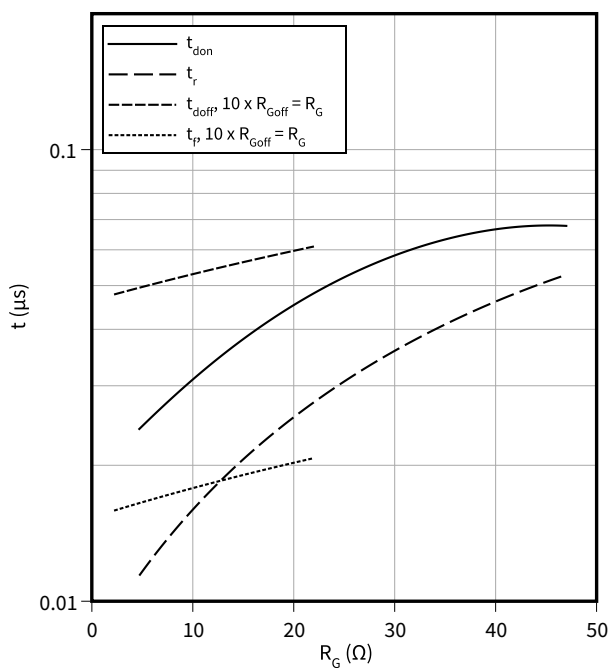
$R_{Goff} = 0.22 \Omega$ ,  $V_{DD} = 800 \text{ V}$ ,  $T_{vj} = 175 \text{ }^\circ\text{C}$ ,  $V_{GS} = -3/18 \text{ V}$



**Switching times (typical), MOSFET, T1-T4**

$t = f(R_G)$

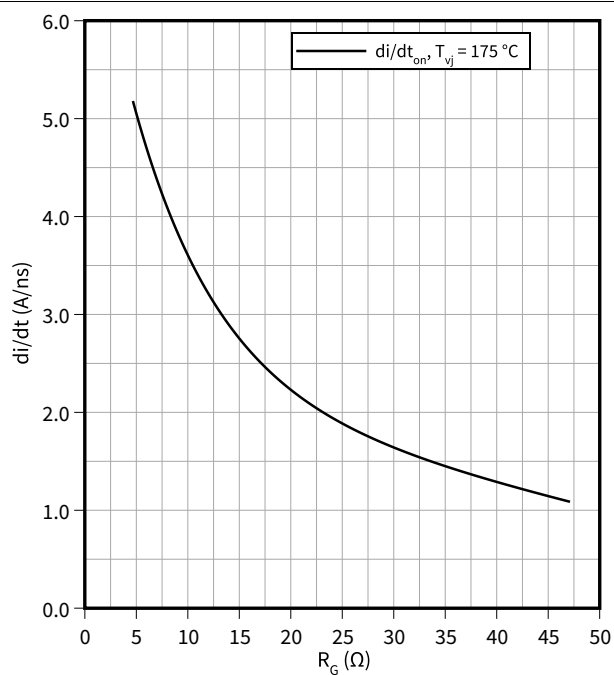
$V_{DD} = 800 \text{ V}$ ,  $t_{dead} = 1000 \text{ ns}$ ,  $I_D = 50 \text{ A}$ ,  $T_{vj} = 175 \text{ }^\circ\text{C}$ ,  $V_{GS} = -3/18 \text{ V}$



**Current slope (typical), MOSFET, T1-T4**

$di/dt = f(R_G)$

$V_{DD} = 800 \text{ V}$ ,  $t_{dead} = 1000 \text{ ns}$ ,  $I_D = 50 \text{ A}$ ,  $V_{GS} = -3/18 \text{ V}$

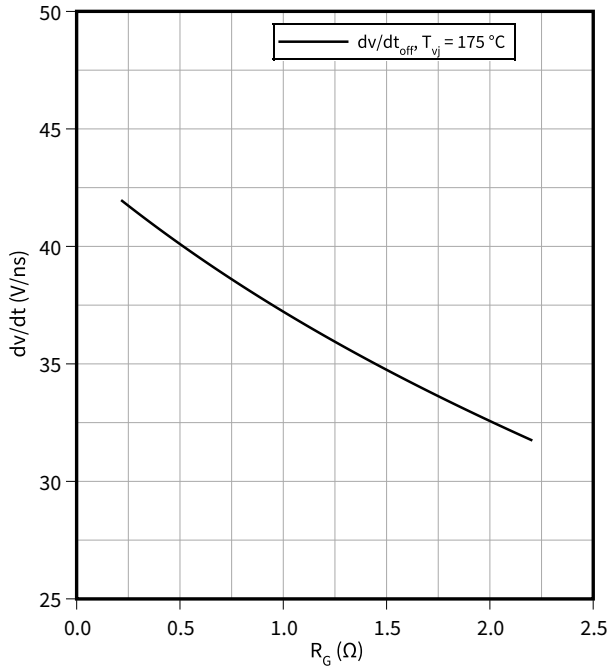


5 Characteristics diagrams

Voltage slope (typical), MOSFET, T1-T4

$dv/dt = f(R_G)$

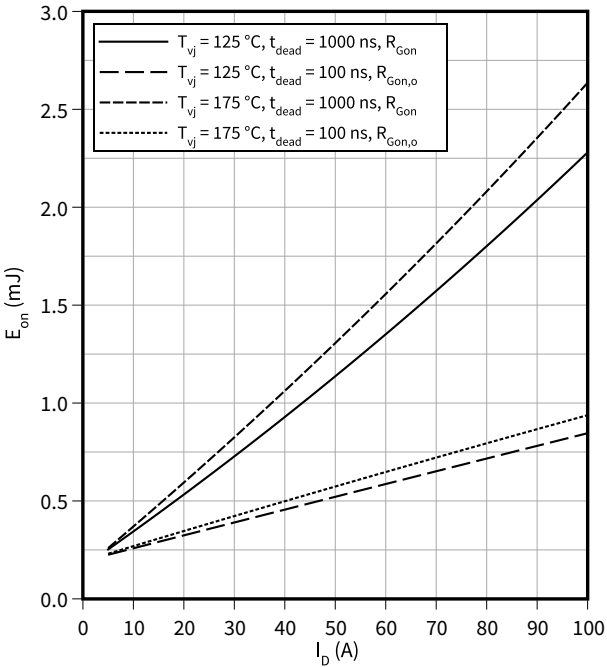
$V_{DD} = 800\text{ V}$ ,  $I_D = 50\text{ A}$ ,  $V_{GS} = -3/18\text{ V}$



Switching losses (typical), MOSFET, T1-T4

$E_{on} = f(I_D)$

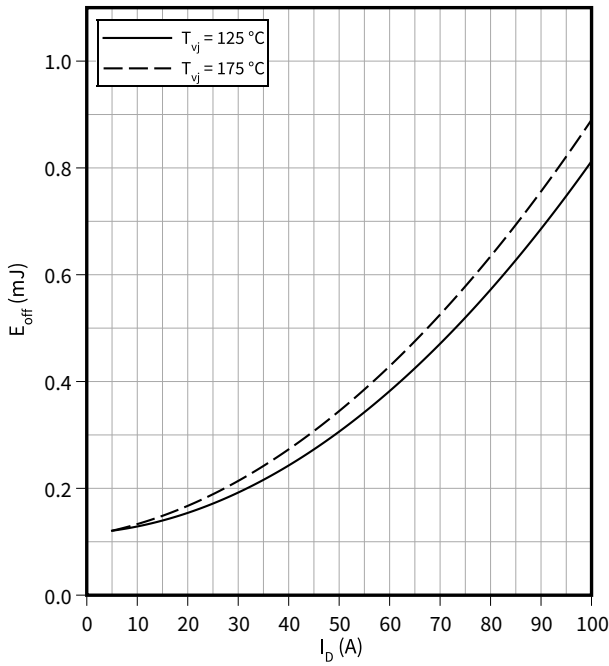
$R_{Gon} = 4.7\text{ }\Omega$ ,  $V_{DD} = 800\text{ V}$ ,  $R_{Gon,o} = 0.22\text{ }\Omega$ ,  $V_{GS} = -3/18\text{ V}$



Switching losses (typical), MOSFET, T1-T4

$E_{off} = f(I_D)$

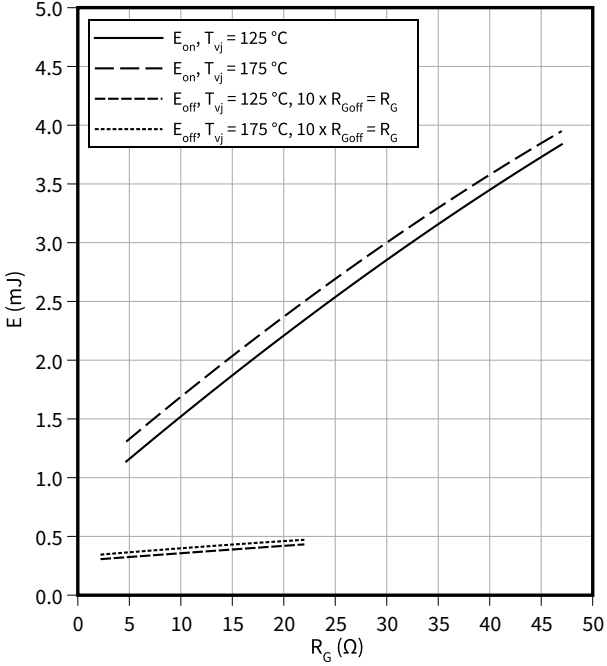
$R_{Goff} = 0.22\text{ }\Omega$ ,  $V_{DD} = 800\text{ V}$ ,  $V_{GS} = -3/18\text{ V}$



Switching losses (typical), MOSFET, T1-T4

$E = f(R_G)$

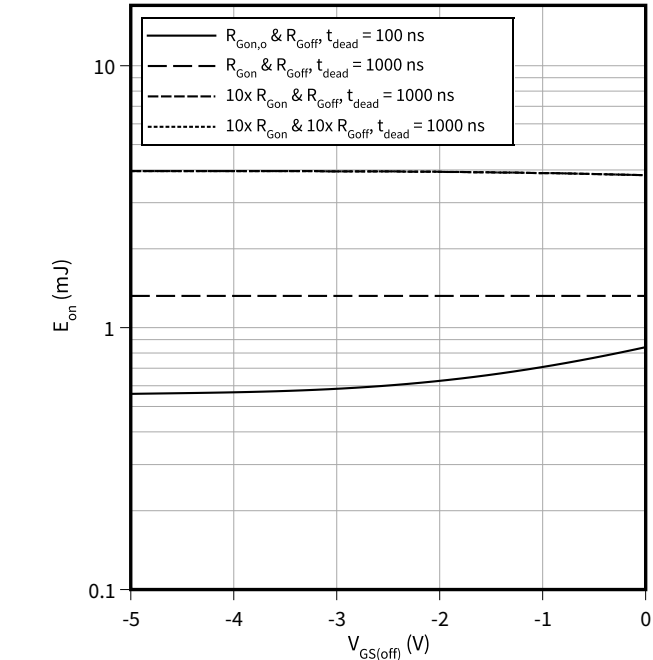
$V_{DD} = 800\text{ V}$ ,  $t_{dead} = 1000\text{ ns}$ ,  $I_D = 50\text{ A}$ ,  $V_{GS} = -3/18\text{ V}$



5 Characteristics diagrams

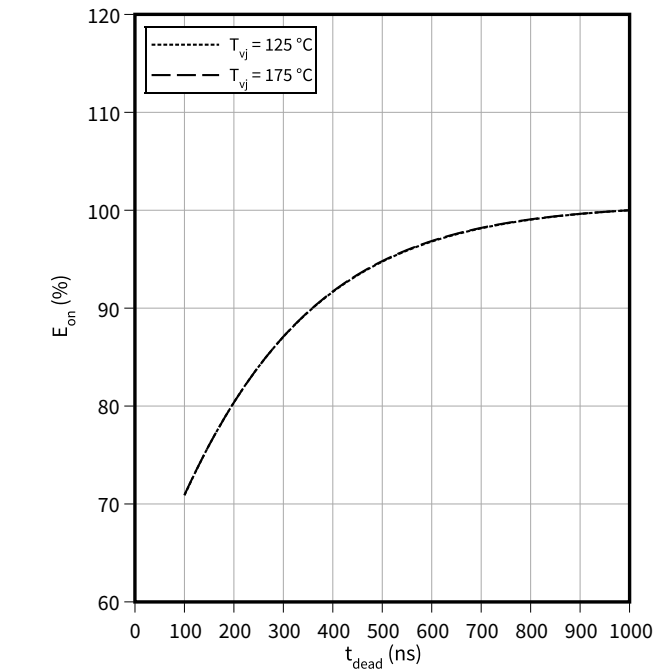
Switching losses (typical), MOSFET, T1-T4

$E_{on} = f(V_{GS(off)})$   
 $R_{Goff} = 0.22 \Omega$ ,  $V_{DD} = 800 \text{ V}$ ,  $R_{Gon} = 4.7 \Omega$ ,  $I_D = 50 \text{ A}$ ,  $V_{GS(on)} = 18 \text{ V}$ ,  $R_{Gon,o} = 0.22 \Omega$ ,  $T_{vj} = 175 \text{ }^\circ\text{C}$



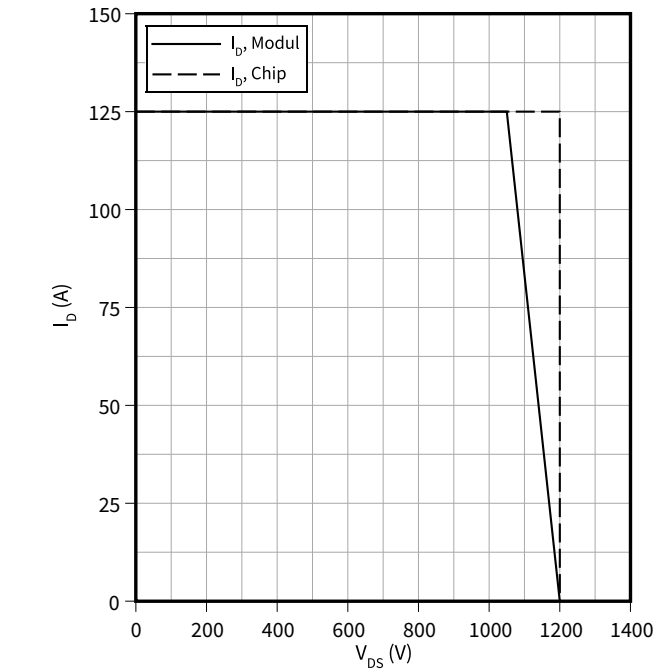
Switching losses (typical), MOSFET, T1-T4

$E_{on} = f(t_{dead})$   
 $R_{Gon} = 4.7 \Omega$ ,  $I_D = 50 \text{ A}$ ,  $V_{DD} = 800 \text{ V}$ ,  $V_{GS} = -3/18 \text{ V}$



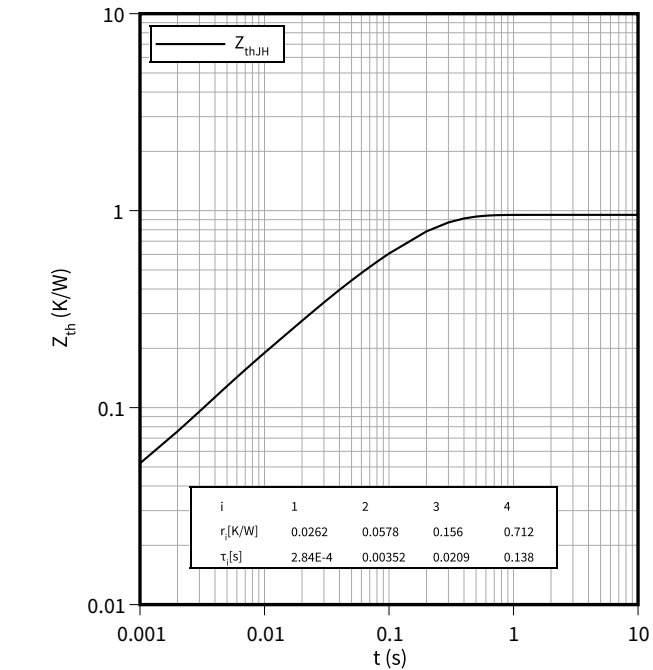
Reverse bias safe operating area (RBSOA), MOSFET, T1-T4

$I_D = f(V_{DS})$   
 $R_{Goff} = 0.22 \Omega$ ,  $T_{vj} = 175 \text{ }^\circ\text{C}$ ,  $V_{GS} = -3/18 \text{ V}$



Transient thermal impedance, MOSFET, T1-T4

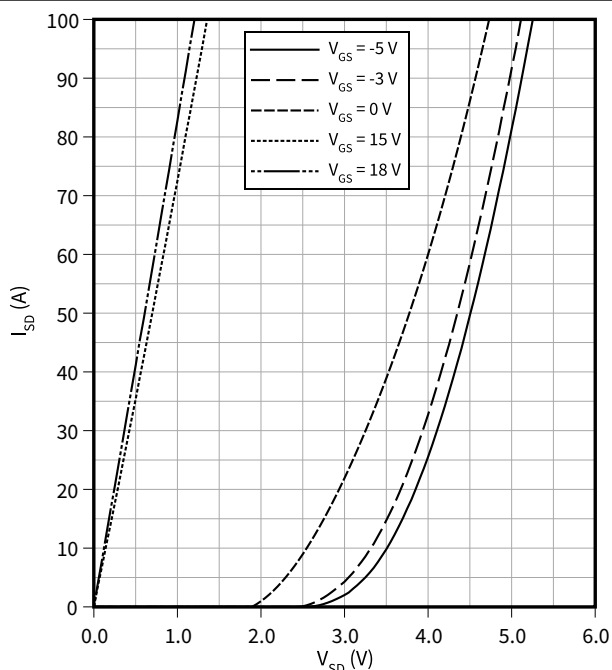
$Z_{th} = f(t)$



**5 Characteristics diagrams**

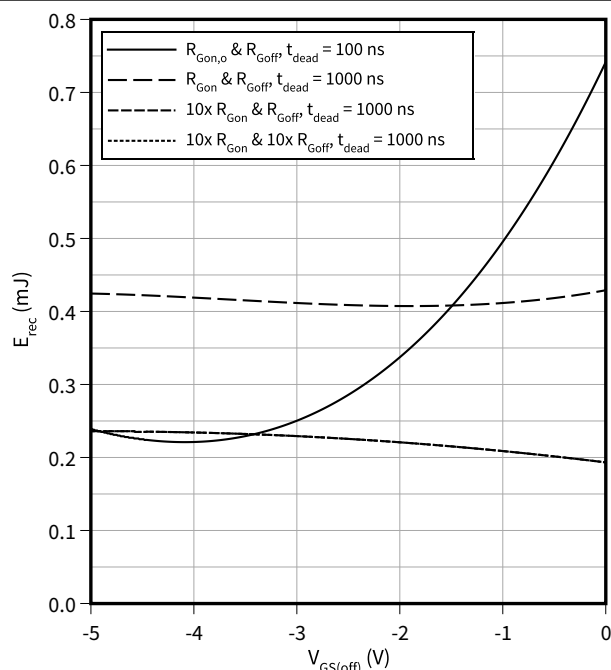
**Forward characteristic body diode (typical), MOSFET, T1-T4**

$I_{SD} = f(V_{SD})$   
 $T_{vj} = 25\text{ °C}$



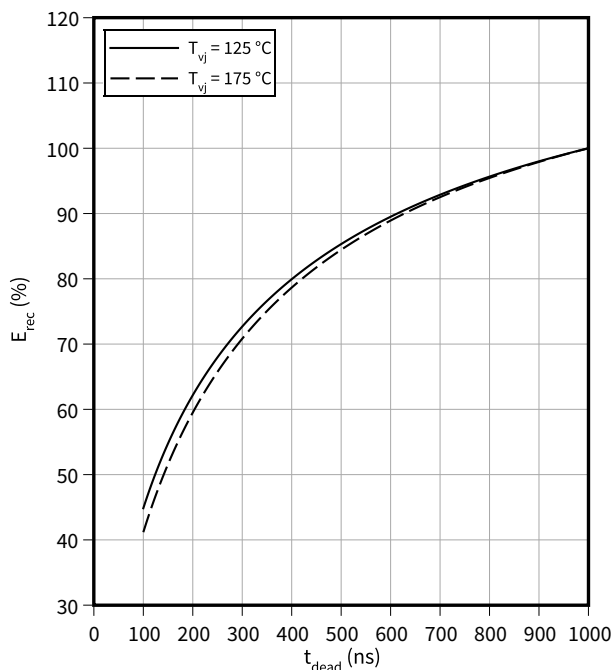
**Switching losses body diode (typical), MOSFET, T1-T4**

$E_{rec} = f(V_{GS(off)})$   
 $R_{Goff} = 0.22\text{ }\Omega$ ,  $R_{Gon} = 4.7\text{ }\Omega$ ,  $V_{GS(on)} = 18\text{ V}$ ,  $I_{SD} = 50\text{ A}$ ,  $R_{Gon,o} = 0.22\text{ }\Omega$ ,  $V_{DD} = 800\text{ V}$ ,  $T_{vj} = 175\text{ °C}$



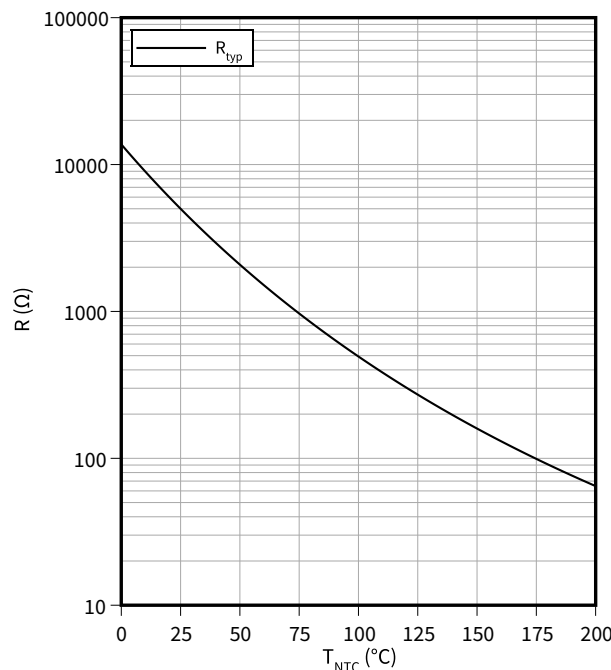
**Switching losses body diode (typical), MOSFET, T1-T4**

$E_{rec} = f(t_{dead})$   
 $R_{Gon} = 4.7\text{ }\Omega$ ,  $I_D = 50\text{ A}$ ,  $V_{DD} = 800\text{ V}$ ,  $V_{GS} = -3/18\text{ V}$



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

$R = f(T_{NTC})$



6 Circuit diagram

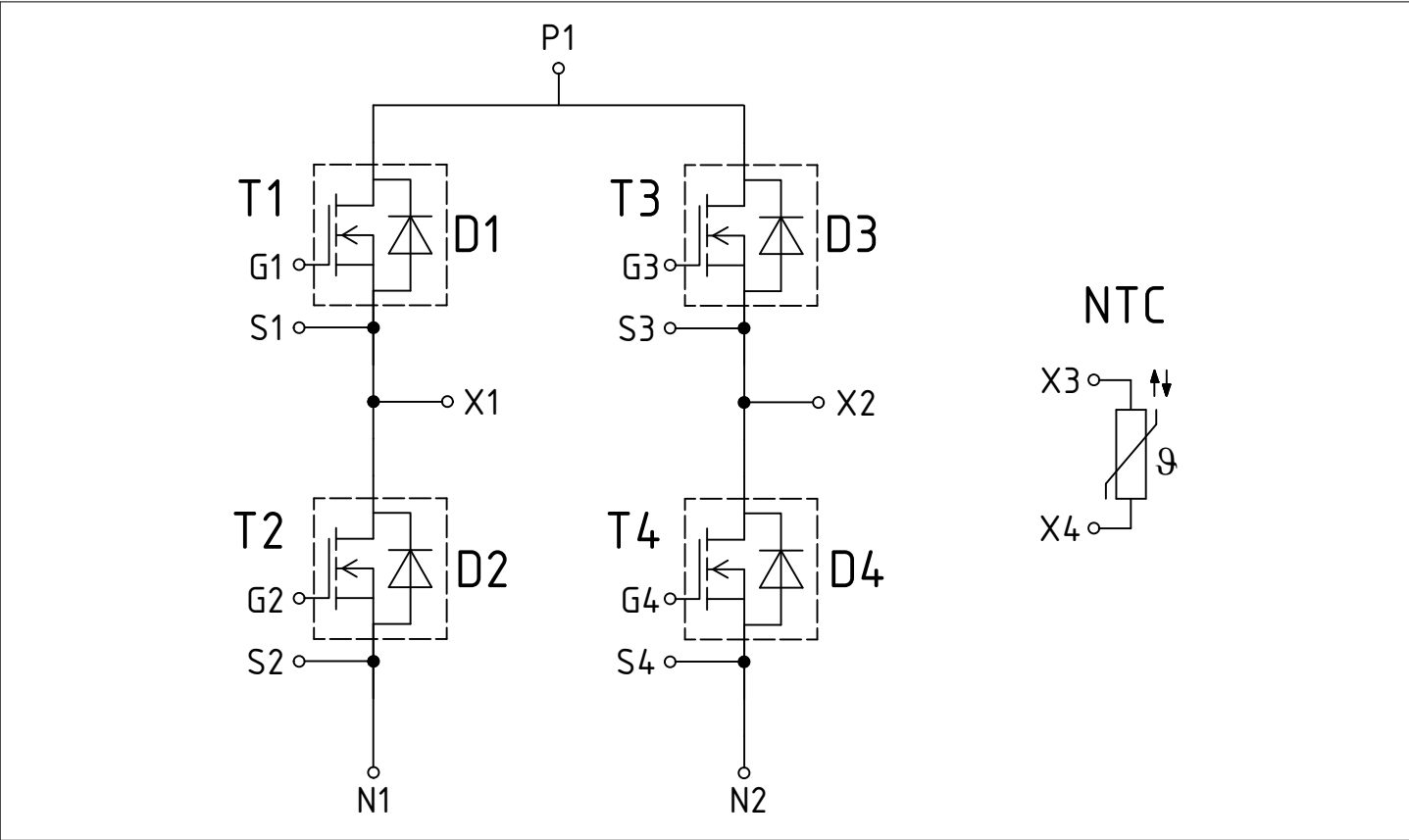


Figure 1

7 Package outlines

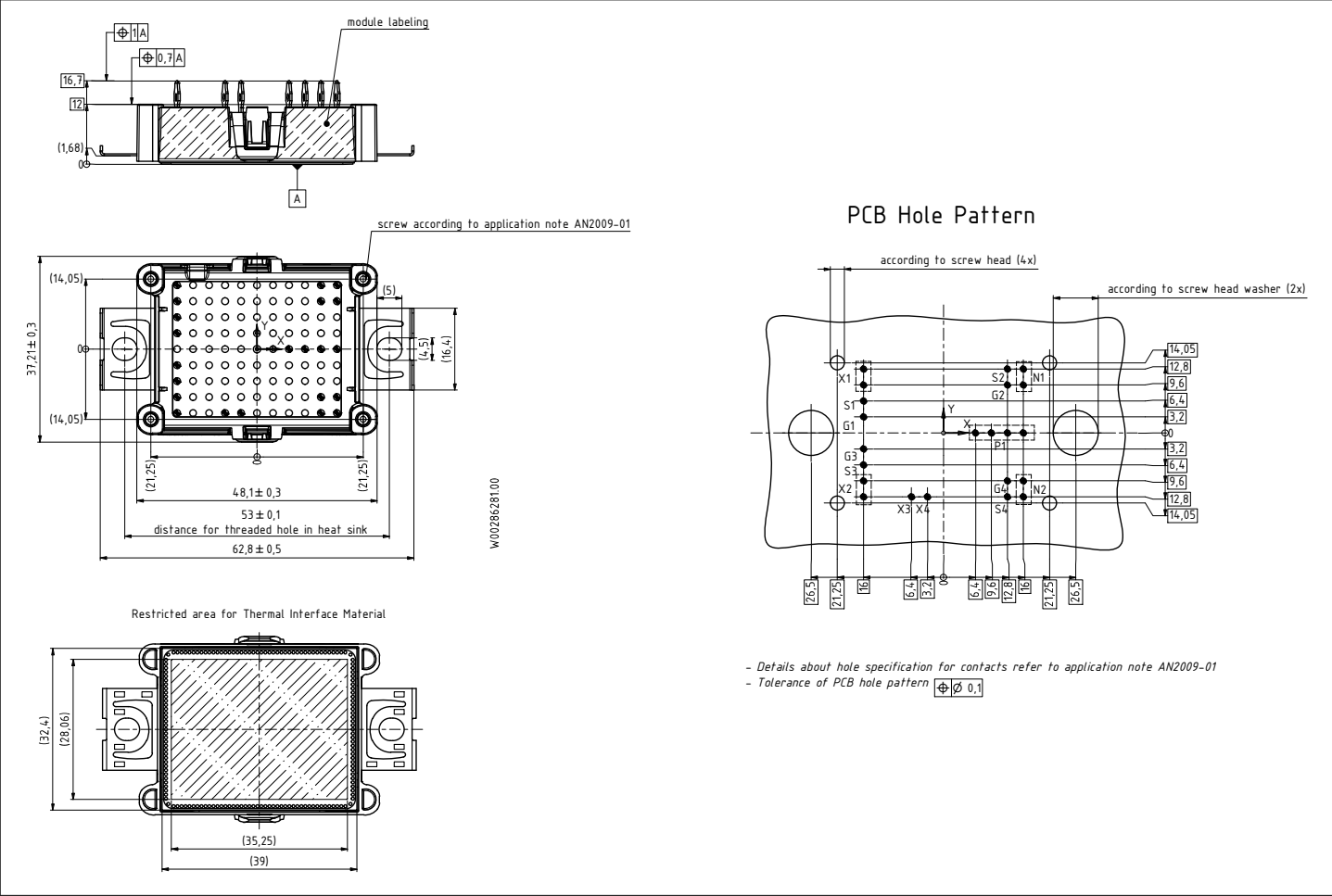


Figure 2

8 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 3



Revision history

Document revision	Date of release	Description of changes
0.10	2025-07-02	Preliminary datasheet



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