Final datasheet

CoolSiC™ 1200 V SiC MOSFET G2 : Silicon Carbide MOSFET with .XT interconnection technology

Features

- V_{DSS} = 1200 V at T_{vj} = 25°C
- I_{DDC} = 27 A at T_c = 25°C
- $R_{DS(on)}$ = 53 mΩ at V_{GS} = 18 V, T_{vj} = 25°C
- Very low switching losses
- Overload operation up to T_{vj} = 200°C
- Short circuit withstand time 2 µs
- Benchmark gate threshold voltage, $V_{GS(th)}$ = 4.2 V
- Robust against parasitic turn on, 0 V turn-off gate voltage can be applied
- Robust body diode for hard commutation
- .XT interconnection technology for best-in-class thermal performance
- Suitable Infineon gate drivers can be found under https://www.infineon.com/gdfinder

Halogen-free

Green

Lead-free

RoHS

Potential applications

- General purpose drives (GPD)
- EV Charging
- Online UPS / Industrial UPS
- String inverter
- Energy storage systems (ESS)
- Welding

Product validation

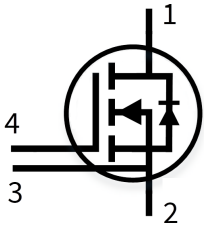
- Qualified for industrial applications according to the relevant tests of JEDEC47/20/22

Description

Pin definition:

- Pin 1 – Drain
- Pin 2 – Source
- Pin 3 – Kelvin sense contact
- Pin 4 – Gate

Note: the source and sense pins are not exchangeable, their exchange might lead to malfunction



Type	Package	Marking
IMZA120R053M2H	PG-TO247-4-U02	12M2H053

Table of contents

	Description	1
	Features	1
	Potential applications	1
	Product validation	1
	Table of contents	2
1	**Package**	3
2	**MOSFET**	3
3	**Body diode (MOSFET)**	6
4	**Characteristics diagrams**	8
5	**Package outlines**	15
6	**Testing conditions**	16
	Revision history	17
	Disclaimer	18

1 Package

Table 1 Characteristic values

Parameter	Symbol	Note or test condition	Values			Unit
			Min.	Typ.	Max.	
Storage temperature	T_{stg}		-55		150	°C
Soldering temperature	T_{sold}	Wave soldering 1.6 mm (0.063 in.) from case for 10 s			260	°C
Mounting torque	M	M3 screw, Maximum of mounting processes: 3			0.6	Nm
Thermal resistance, junction-ambient	$R_{th(j-a)}$				62	K/W
MOSFET/body diode thermal resistance, junction-case	$R_{th(j-c)}$			0.63	0.82	K/W

2 MOSFET

Table 2 Maximum rated values

Parameter	Symbol	Note or test condition		Values	Unit
Drain-source voltage	V_{DSS}	$T_{vj} \geq 25$ °C		1200	V
Continuous DC drain current for $R_{th(j-c,max)}$, limited by $T_{vj(max)}$	I_{DDC}	$V_{GS} = 18$ V	$T_c = 25$ °C	38	A
			$T_c = 100$ °C	27	
Peak drain current, t_p limited by $T_{vj(max)}$ [1)]	I_{DM}	$V_{GS} = 18$ V		135	A
Gate-source voltage, max. transient voltage	V_{GS}	$t_p \leq 0.5$ µs, $D < 0.01$		-10...25	V
Gate-source voltage, max. static voltage [2)]	V_{GS}			-7...23	V
Avalanche energy, single pulse	E_{AS}	$I_D = 13$ A, $V_{DD} = 50$ V, $L = 1.9$ mH, $T_{vj(start)} = 25$ °C		166	mJ
Avalanche energy, repetitive	E_{AR}	$I_D = 13$ A, $V_{DD} = 50$ V, $L = 9.5$ µH, $T_{vj(start)} = 25$ °C		0.83	mJ
Short-circuit withstand time	t_{SC}	$V_{DD} \leq 800$ V, $V_{DS,peak} < 1200$ V, $V_{GS(on)} = 15$ V, $T_{vj(start)} = 25$ °C		2	µs
Power dissipation, limited by $T_{vj(max)}$	P_{tot}		$T_c = 25$ °C	182	W
			$T_c = 100$ °C	91	

1) Verified by the design/characterization.
2) The maximum gate-source voltage in the application design should be in accordance to IPC-9592B.

Table 3 **Recommended values**

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

Table 4 **Characteristic values**

Parameter	Symbol	Note or test condition		Values			Unit
				Min.	Typ.	Max.	
Drain-source on-state resistance	$R_{DS(on)}$	I_D = 13 A	T_{vj} = 25 °C, $V_{GS(on)}$ = 18 V		53	69	mΩ
			T_{vj} = 25 °C, $V_{GS(on)}$ = 15 V		66	88	
			T_{vj} = 150 °C, $V_{GS(on)}$ = 18 V		107		
			T_{vj} = 175 °C, $V_{GS(on)}$ = 18 V		124		
Gate-source threshold voltage	$V_{GS(th)}$	I_D = 4.1 mA, V_{DS} = V_{GS} (tested after 1 ms pulse at V_{GS} = 20 V)	T_{vj} = 25 °C	3.5	4.2	5.1	V
			T_{vj} = 175 °C		3.2		
Zero gate-voltage drain current	I_{DSS}	V_{DS} = 1200 V, V_{GS} = 0 V	T_{vj} = 25 °C			20	µA
			T_{vj} = 175 °C		2		
Gate leakage current	I_{GSS}	V_{DS} = 0 V	V_{GS} = -10 V			-120	nA
			V_{GS} = 23 V			120	
Forward transconductance	g_{fs}	I_D = 13 A, V_{DS} = 20 V			9		S
Internal gate resistance	$R_{G,int}$	f = 1 MHz, V_{AC} = 25 mV			8.5		Ω
Input capacitance	C_{iss}	V_{DS} = 800 V, V_{GS} = 0 V, f = 100 kHz, V_{AC} = 25 mV			1010		pF
Output capacitance	C_{oss}	V_{DS} = 800 V, V_{GS} = 0 V, f = 100 kHz, V_{AC} = 25 mV			41		pF
Reverse transfer capacitance	C_{rss}	V_{DS} = 800 V, V_{GS} = 0 V, f = 100 kHz, V_{AC} = 25 mV			4		pF
C_{oss} stored energy	E_{oss}	Calculated based on C_{oss} = f(V_{DD})			17		µJ
Output charge	Q_{oss}	Calculated based on C_{oss} = f(V_{DD})			64		nC
Effective output capacitance, energy related	$C_{o(er)}$	V_{DS} = 0...800 V, V_{GS} = 0 V, Calculated based on E_{oss}			53		pF
Effective output capacitance, time related	$C_{o(tr)}$	I_D = constant, V_{DS} = 0...800 V, V_{GS} = 0 V, Calculated based on Q_{oss}			80		pF
Total gate charge	Q_G	V_{DD} = 800 V, I_D = 13 A, V_{GS} = 0/18 V, turn-on pulse			30		nC

(table continues...)

Table 4 (continued) Characteristic values

Parameter	Symbol	Note or test condition		Values			Unit
				Min.	Typ.	Max.	
Plateau gate charge	$Q_{GS(pl)}$	V_{DD} = 800 V, I_D = 13 A, V_{GS} = 0/18 V, turn-on pulse			7		nC
Gate-drain charge	Q_{GD}	V_{DD} = 800 V, I_D = 13 A, V_{GS} = 0/18 V, turn-on pulse			8		nC
Turn-on delay time	$t_{d(on)}$	V_{DD} = 800 V, I_D = 13 A, V_{GS} = 0/18 V, $R_{G,ext}$ = 2.3 Ω, L_σ = 12 nH, diode: body diode at V_{GS} = 0 V	T_{vj} = 25 °C		7		ns
			T_{vj} = 175 °C		5.2		
Rise time	t_r	V_{DD} = 800 V, I_D = 13 A, V_{GS} = 0/18 V, $R_{G,ext}$ = 2.3 Ω, L_σ = 12 nH, diode: body diode at V_{GS} = 0 V	T_{vj} = 25 °C		4.1		ns
			T_{vj} = 175 °C		3.7		
Turn-off delay time	$t_{d(off)}$	V_{DD} = 800 V, I_D = 13 A, V_{GS} = 0/18 V, $R_{G,ext}$ = 2.3 Ω, L_σ = 12 nH, diode: body diode at V_{GS} = 0 V	T_{vj} = 25 °C		14.8		ns
			T_{vj} = 175 °C		17.3		
Fall time	t_f	V_{DD} = 800 V, I_D = 13 A, V_{GS} = 0/18 V, $R_{G,ext}$ = 2.3 Ω, L_σ = 12 nH, diode: body diode at V_{GS} = 0 V	T_{vj} = 25 °C		6.2		ns
			T_{vj} = 175 °C		7.3		
Turn-on energy	E_{on}	V_{DD} = 800 V, I_D = 13 A, V_{GS} = 0/18 V, $R_{G,ext}$ = 2.3 Ω, L_σ = 12 nH, diode: body diode at V_{GS} = 0 V	T_{vj} = 25 °C		89		µJ
			T_{vj} = 175 °C		170		
Turn-off energy	E_{off}	V_{DD} = 800 V, I_D = 13 A, V_{GS} = 0/18 V, $R_{G,ext}$ = 2.3 Ω, L_σ = 12 nH, diode: body diode at V_{GS} = 0 V	T_{vj} = 25 °C		39		µJ
			T_{vj} = 175 °C		55		
Total switching energy[1)]	E_{tot}	V_{DD} = 800 V, I_D = 13 A, V_{GS} = 0/18 V, $R_{G,ext}$ = 2.3 Ω, L_σ = 12 nH, diode: body diode at V_{GS} = 0 V	T_{vj} = 25 °C		178		µJ
			T_{vj} = 175 °C		368		

(table continues...)

Table 4 **(continued) Characteristic values**

Parameter	Symbol	Note or test condition		Values			Unit
				Min.	Typ.	Max.	
Turn-on energy at -5 V	E_{on}	V_{DD} = 800 V, I_D = 13 A, V_{GS} = -5/18 V, $R_{G,ext}$ = 2.3 Ω, L_σ = 12 nH, diode: body diode at V_{GS} = -5 V	T_{vj} = 25 °C		80		µJ
			T_{vj} = 175 °C		161		
Turn-off energy at -5 V	E_{off}	V_{DD} = 800 V, I_D = 13 A, V_{GS} = -5/18 V, $R_{G,ext}$ = 2.3 Ω, L_σ = 12 nH, diode: body diode at V_{GS} = -5 V	T_{vj} = 25 °C		19		µJ
			T_{vj} = 175 °C		21		
Total switching energy at -5 V[1)]	E_{tot}	V_{DD} = 800 V, I_D = 13 A, V_{GS} = -5/18 V, $R_{G,ext}$ = 2.3 Ω, L_σ = 12 nH, diode: body diode at V_{GS} = -5 V	T_{vj} = 25 °C		149		µJ
			T_{vj} = 175 °C		350		
Virtual junction temperature	T_{vj}			-55		175	°C
Virtual junction temperature	$T_{vj(over)}$	overload, cumulative max. 100 h[2)]				200	°C

1) Including E_{fr}
2) Up to 5000 cycles. Maximum ΔT limited to 100 K.

Note: *The chip technology was characterized up to 200 kV/µs. The measured dV/dt was limited by measurement test setup and package.*
Characteristics at T_{vj} = 25°C, unless otherwise specified.

3 Body diode (MOSFET)

Table 5 **Maximum rated values**

Parameter	Symbol	Note or test condition		Values	Unit
Drain-source voltage	V_{DSS}	T_{vj} ≥ 25 °C		1200	V
Continuous reverse drain current for $R_{th(j-c,max)}$, limited by $T_{vj(max)}$	I_{SDC}	V_{GS} = 0 V	T_c = 25 °C	32	A
			T_c = 100 °C	18	
Peak reverse drain current, t_p limited by $T_{vj(max)}$	I_{SM}	V_{GS} = 0 V		81	A

Table 6 Characteristic values

Parameter	Symbol	Note or test condition		Values			Unit
				Min.	Typ.	Max.	
Drain-source reverse voltage	V_{SD}	I_{SD} = 13 A, V_{GS} = 0 V	T_{vj} = 25 °C		4.2	5.5	V
			T_{vj} = 100 °C		4.11		
			T_{vj} = 175 °C		4.05		
MOSFET forward recovery charge	Q_{fr}	V_{DD} = 800 V, I_{SD} = 13 A, V_{GS} = 0 V, $R_{GS(on)}$ = 2.3 Ω, Q_{fr} includes also Q_C	T_{vj} = 25 °C		0.13		µC
			T_{vj} = 175 °C		0.28		
MOSFET peak forward recovery current	I_{frm}	V_{DD} = 800 V, I_{SD} = 13 A, V_{GS} = 0 V, $R_{GS(on)}$ = 2.3 Ω, Q_{fr} includes also Q_C	T_{vj} = 25 °C		23.2		A
			T_{vj} = 175 °C		38.2		
MOSFET forward recovery energy	E_{fr}	V_{DD} = 800 V, I_{SD} = 13 A, V_{GS} = 0 V, $R_{GS(on)}$ = 2.3 Ω, Q_{fr} includes also Q_C	T_{vj} = 25 °C		50		µJ
			T_{vj} = 175 °C		143		
MOSFET forward recovery energy at -5 V	E_{fr}	V_{DD} = 800 V, I_{SD} = 13 A, V_{GS} = -5 V, $R_{GS(on)}$ = 2.3 Ω, Q_{fr} includes also Q_C	T_{vj} = 25 °C		50		µJ
			T_{vj} = 175 °C		168		
Virtual junction temperature	T_{vj}			-55		175	°C
Virtual junction temperature	$T_{vj(over)}$	overload, cumulative max. 100 h[1)]				200	°C

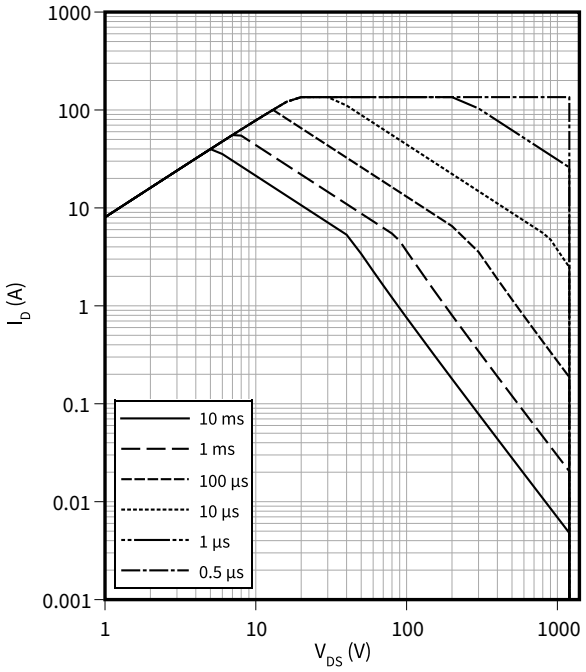
1) Up to 5000 cycles. Maximum ΔT limited to 100 K.

4 Characteristics diagrams

Safe operating area (SOA)

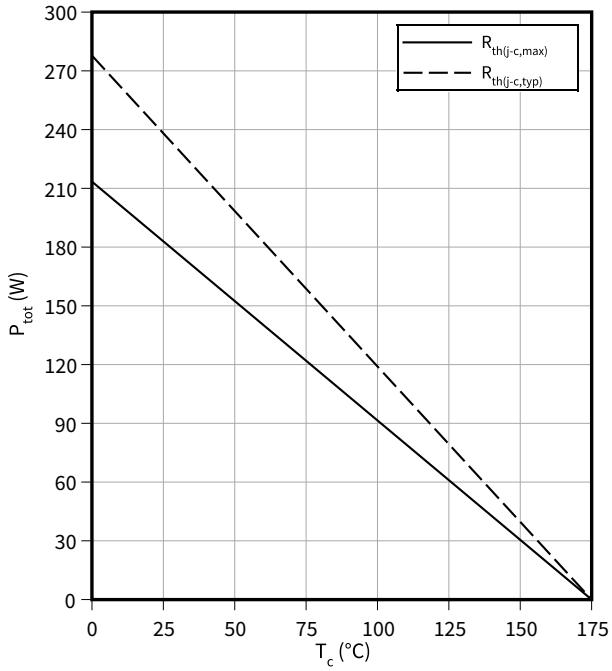
$I_D = f(V_{DS})$

$T_{vj} \leq 175\ °C$, $T_c = 25\ °C$



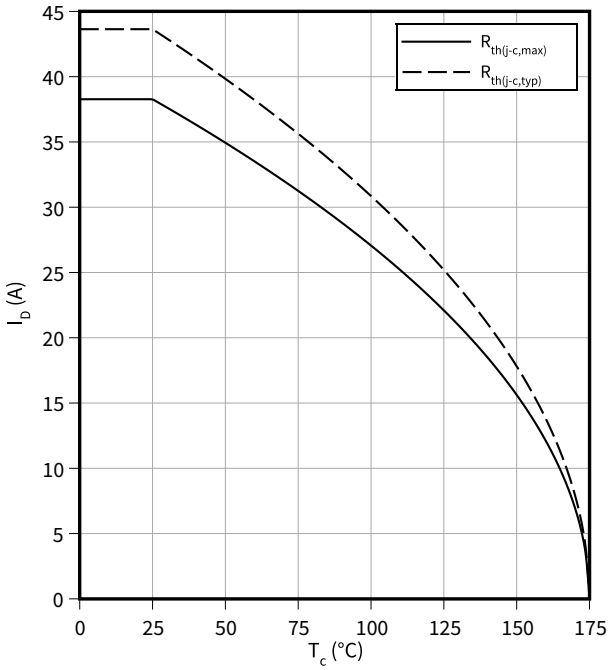
Power dissipation as a function of case temperature

$P_{tot} = f(T_c)$



Maximum DC drain to source current as a function of case temperature limited by bond wire

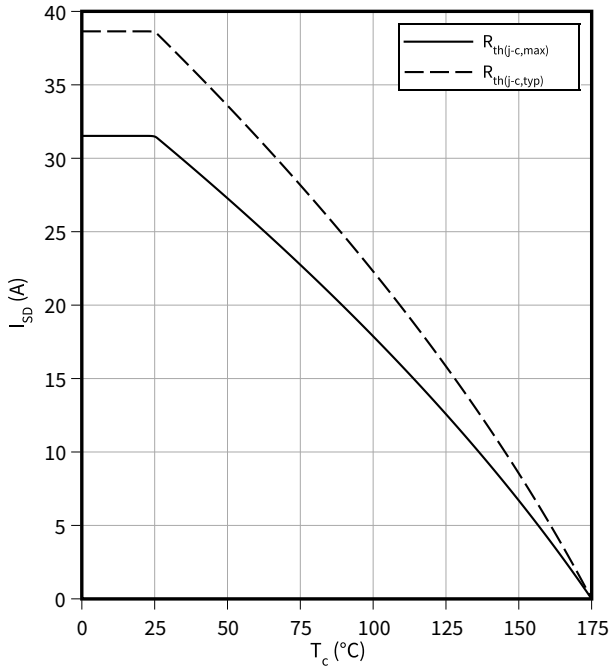
$I_D = f(T_c)$



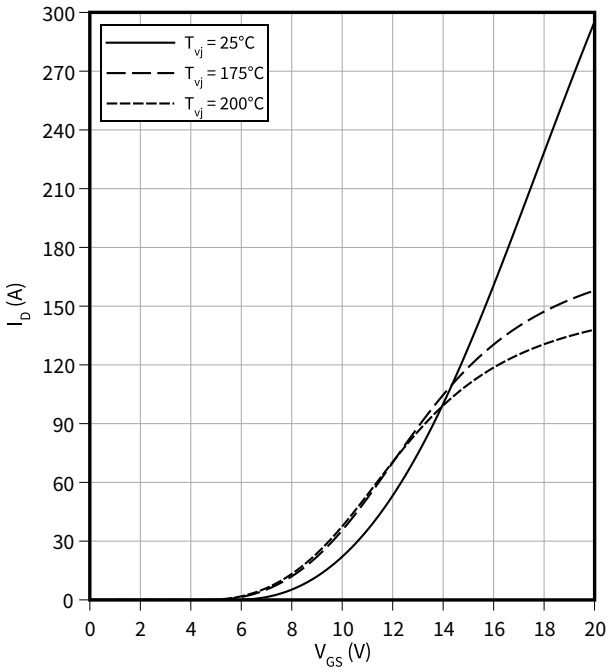
Maximum source to drain current as a function of case temperature limited by bond wire

$I_{SD} = f(T_c)$

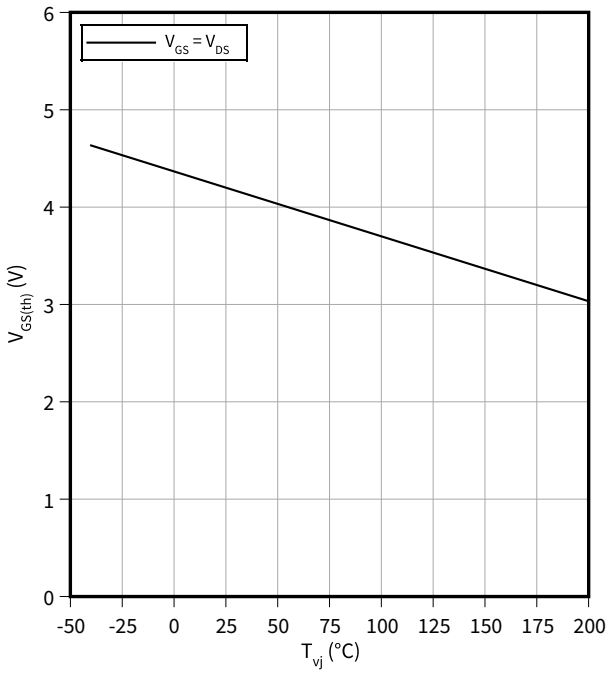
$V_{GS} = 0\ V$



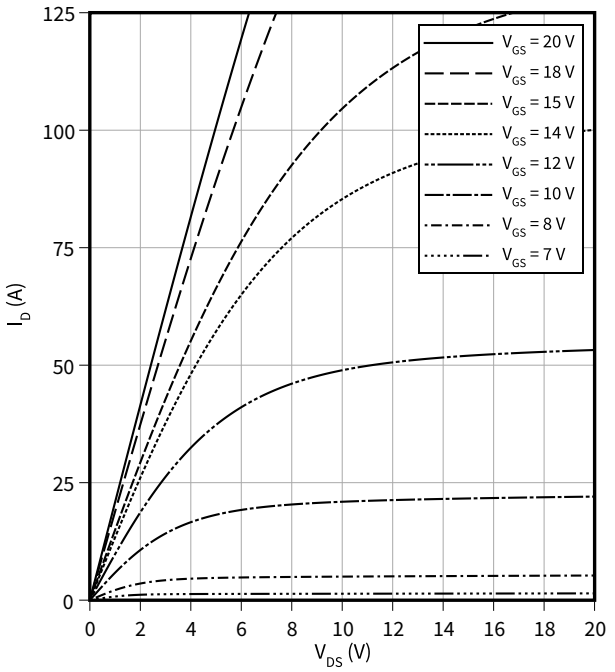
Typical transfer characteristic
$I_D = f(V_{GS})$
$V_{DS} = 20$ V, $t_p = 20$ µs



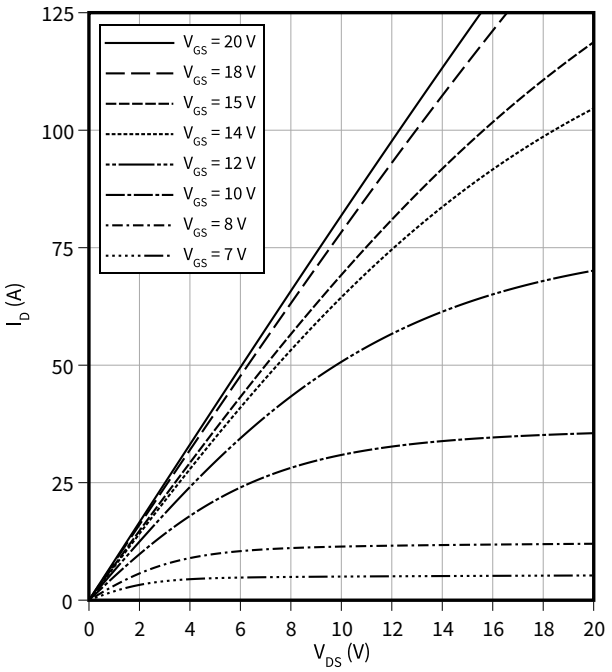
Typical gate-source threshold voltage as a function of junction temperature
$V_{GS(th)} = f(T_{vj})$
$I_D = 4.1$ mA



Typical output characteristic, V_{GS} as a parameter
$I_D = f(V_{DS})$
$T_{vj} = 25$ °C, $t_p = 20$ µs



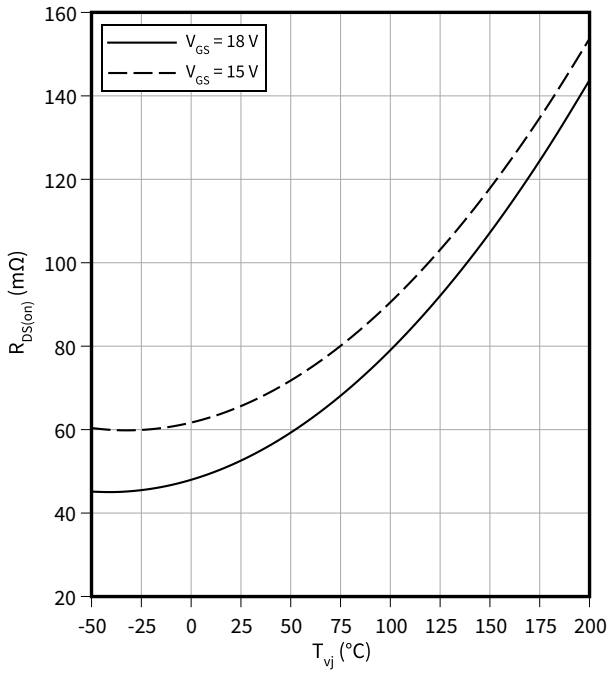
Typical output characteristic, V_{GS} as a parameter
$I_D = f(V_{DS})$
$T_{vj} = 175$ °C, $t_p = 20$ µs



Typical on-state resistance as a function of junction temperature

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

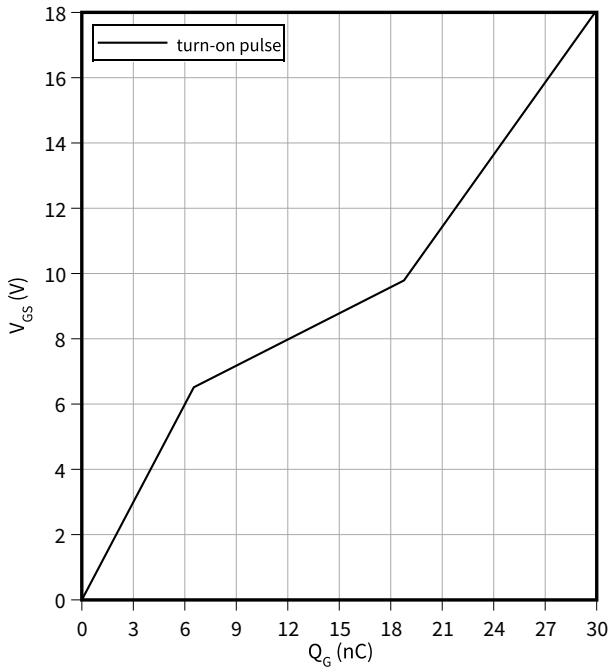
$I_D = 13$ A



Typical gate charge

$V_{GS} = f(Q_G)$

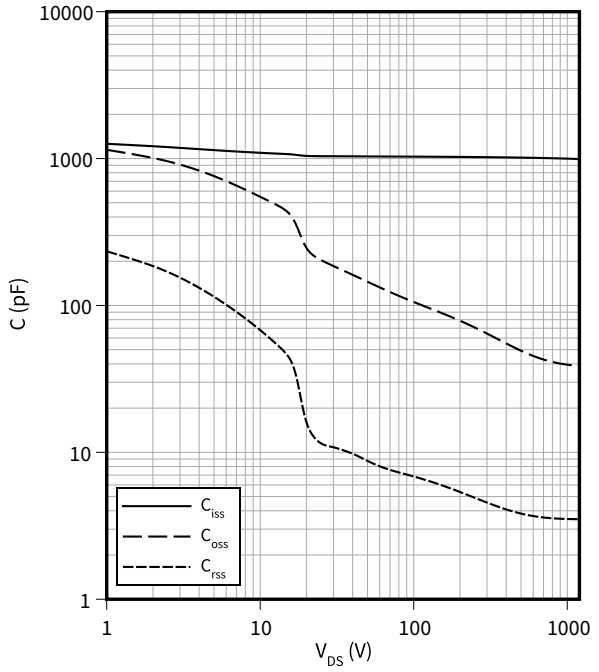
$I_D = 13$ A, $V_{DS} = 800$ V



Typical capacitance as a function of drain-source voltage

$C = f(V_{DS})$

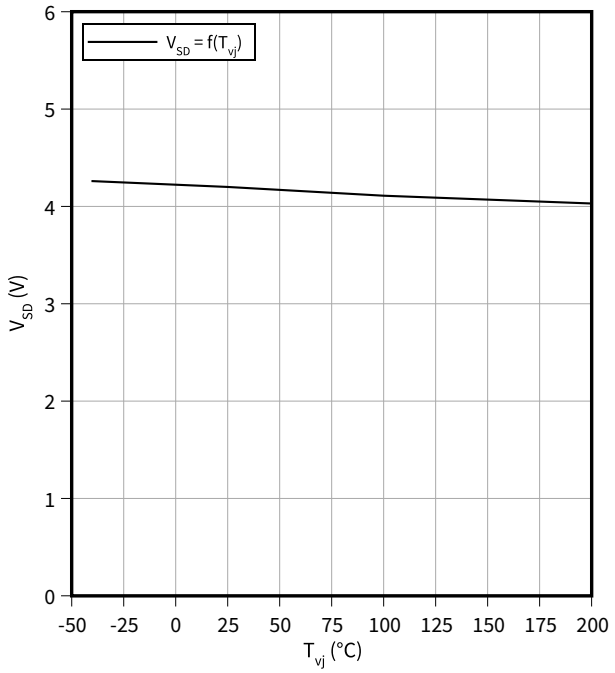
$f = 100$ kHz, $V_{GS} = 0$ V



Typical reverse drain voltage as a function of junction temperature

$V_{SD} = f(T_{vj})$

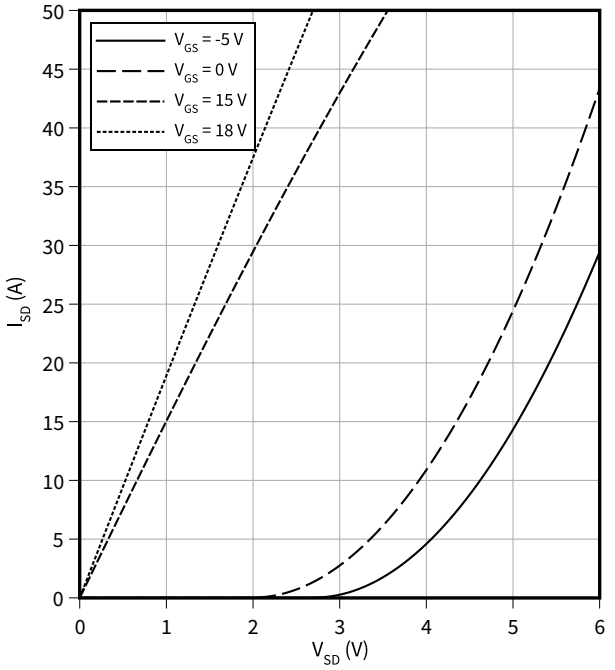
$I_{SD} = 13$ A, $V_{GS} = 0$ V



Typical reverse drain current as a function of reverse drain voltage, V_{GS} as a parameter

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

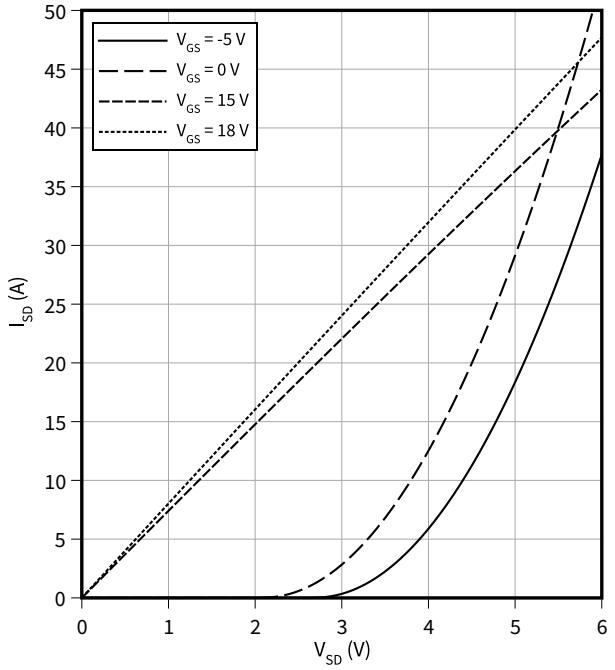
$T_{vj} = 25\ °C$, $t_p = 20\ \mu s$



Typical reverse drain current as a function of reverse drain voltage, V_{GS} as a parameter

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

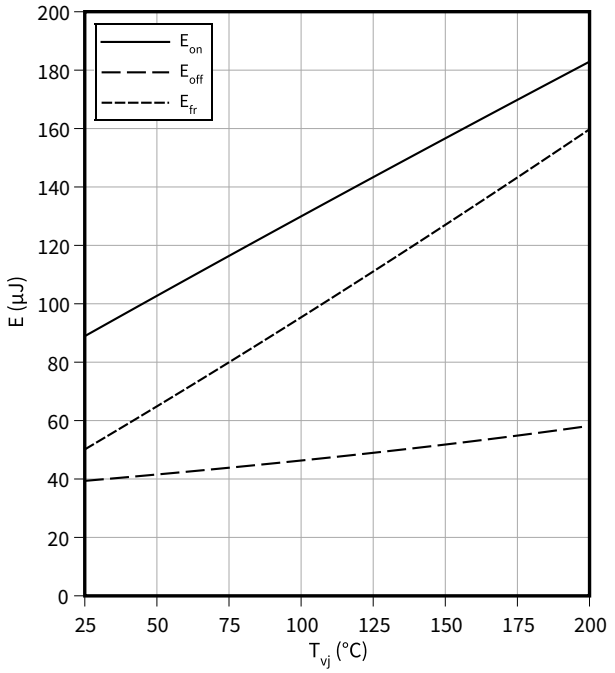
$T_{vj} = 175\ °C$, $t_p = 20\ \mu s$



Typical switching energy as a function of junction temperature, test circuit in Fig. F, 2nd device own body diode: V_{GS} = 0 V

$E = f(T_{vj})$

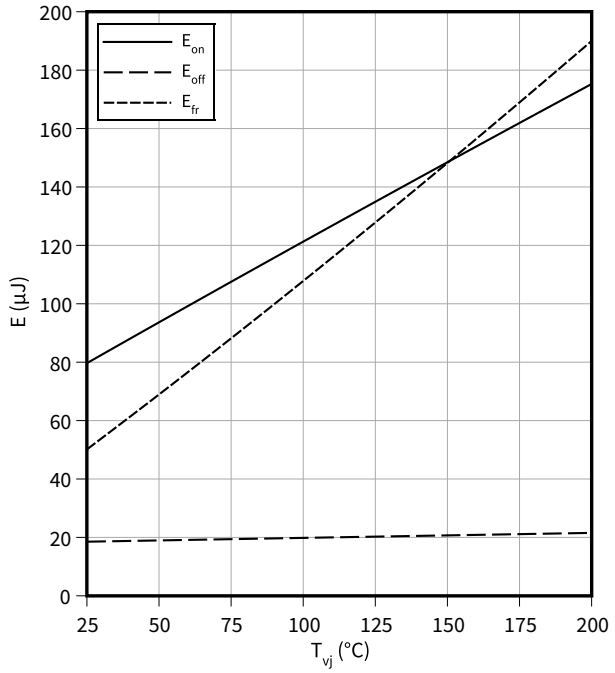
$V_{GS} = 0/18\ V$, $I_D = 13\ A$, $R_{G,ext} = 2.3\ \Omega$, $V_{DD} = 800\ V$



Typical switching energy as a function of junction temperature, test circuit in Fig. F, 2nd device own body diode: V_{GS} = -5 V

$E = f(T_{vj})$

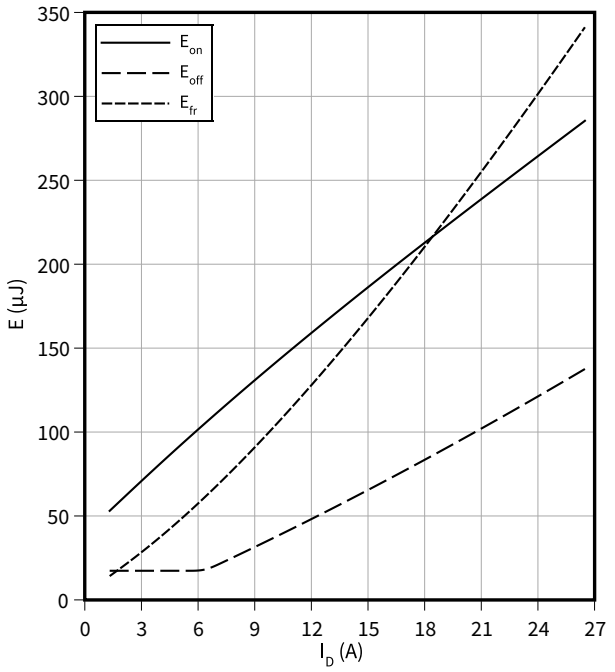
$V_{GS} = -5/18\ V$, $I_D = 13\ A$, $R_{G,ext} = 2.3\ \Omega$, $V_{DD} = 800\ V$



Typical switching energy as a function of drain current, test circuit in Fig. F, 2nd device own body diode: V_{GS} = 0 V

$E = f(I_D)$

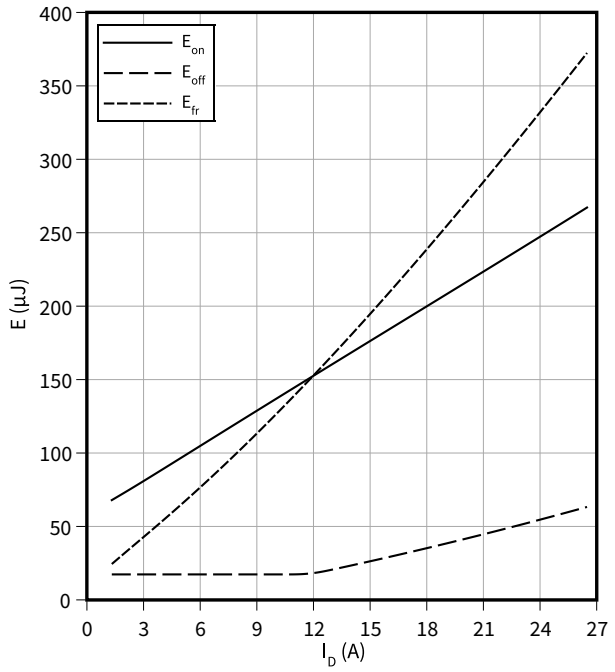
V_{GS} = 0/18 V, T_{vj} = 175 °C, $R_{G,ext}$ = 2.3 Ω, V_{DD} = 800 V



Typical switching energy as a function of drain current, test circuit in Fig. F, 2nd device own body diode: V_{GS} = -5 V

$E = f(I_D)$

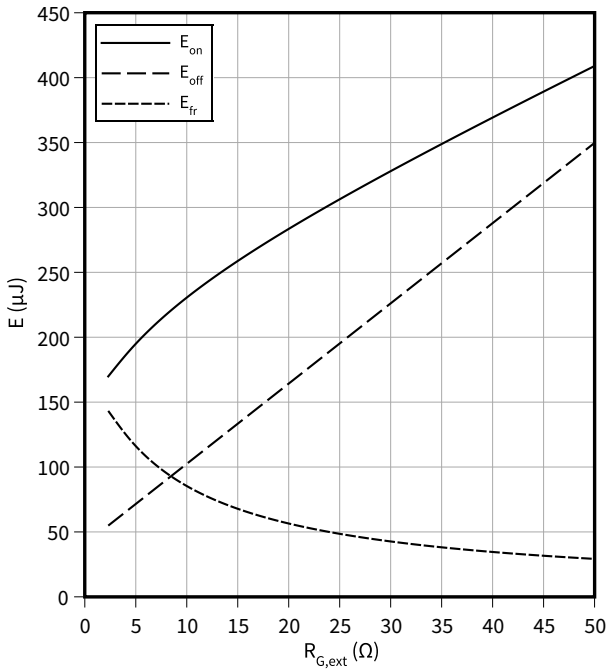
V_{GS} = -5/18 V, T_{vj} = 175 °C, $R_{G,ext}$ = 2.3 Ω, V_{DD} = 800 V



Typical switching energy as a function of gate resistance, test circuit in Fig. F, 2nd device own body diode: V_{GS} = 0 V

$E = f(R_{G,ext})$

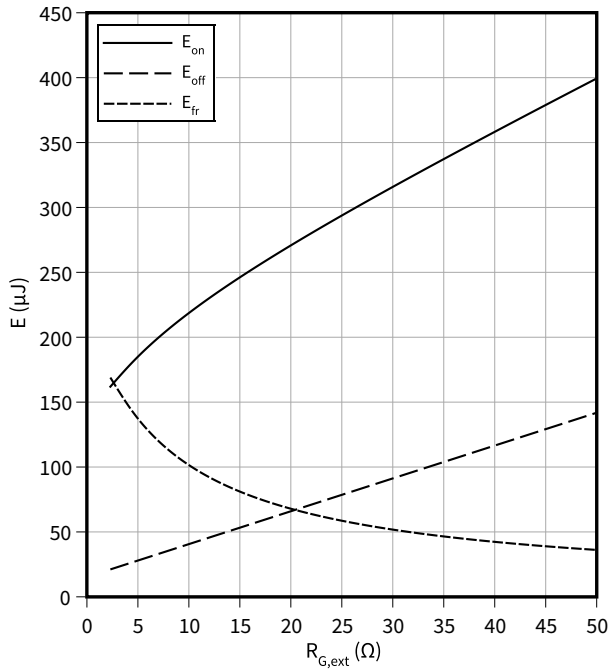
V_{GS} = 0/18 V, I_D = 13 A, T_{vj} = 175 °C, V_{DD} = 800 V



Typical switching energy as a function of gate resistance, test circuit in Fig. F, 2nd device own body diode: V_{GS} = -5 V

$E = f(R_{G,ext})$

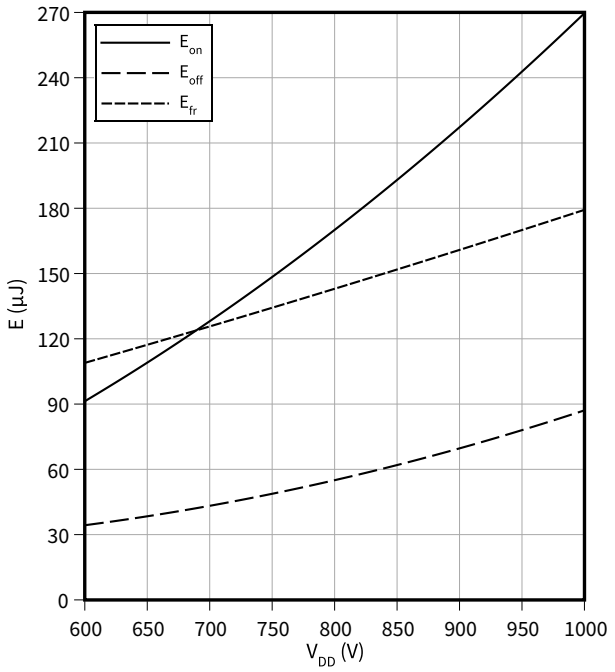
V_{GS} = -5/18 V, I_D = 13 A, T_{vj} = 175 °C, V_{DD} = 800 V



Typical switching energy as a function of DC link voltage, test circuit in Fig. F, 2nd device own body diode: V_{GS} = 0 V

$E = f(V_{DD})$

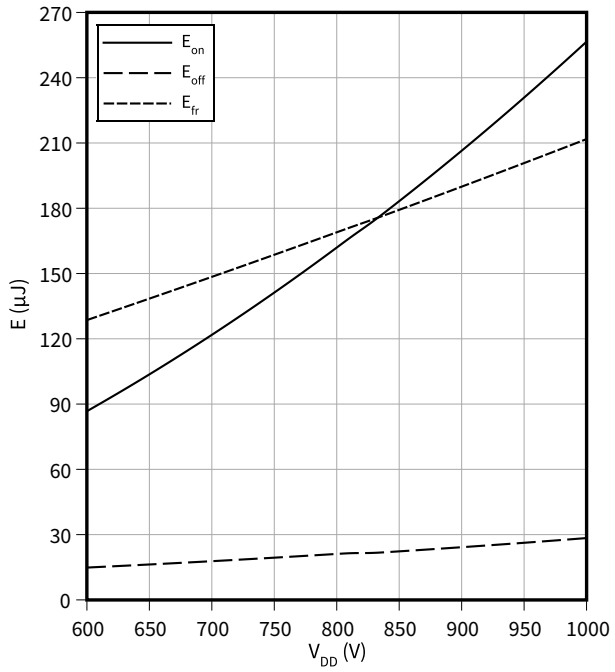
V_{GS} = 0/18 V, I_D = 13 A, T_{vj} = 175 °C, $R_{G,ext}$ = 2.3 Ω



Typical switching energy as a function of DC link voltage, test circuit in Fig. F, 2nd device own body diode: V_{GS} = -5 V

$E = f(V_{DD})$

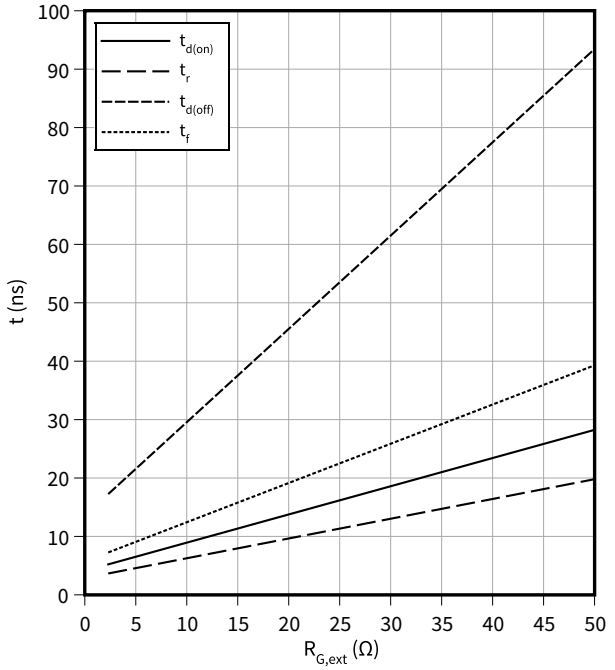
V_{GS} = -5/18 V, I_D = 13 A, T_{vj} = 175 °C, $R_{G,ext}$ = 2.3 Ω



Typical switching times as a function of gate resistance, test circuit in Fig. F, 2nd device own body diode: V_{GS} = -0V

$t = f(R_{G,ext})$

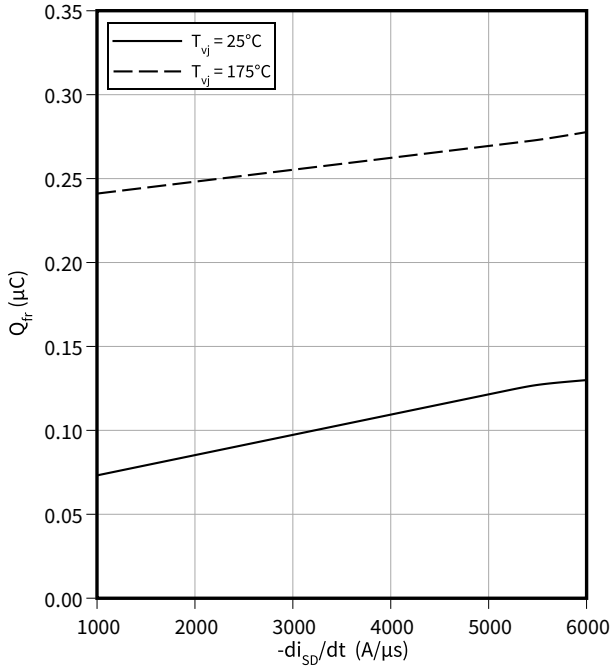
V_{GS} = 0/18 V, I_D = 13 A, T_{vj} = 175 °C, V_{DD} = 800 V



Typical reverse recovery charge as a function of reverse drain current slope, test circuit in Fig. F, 2nd device own body diode: V_{GS} = 0 V

$Q_{fr} = f(-di_{SD}/dt)$

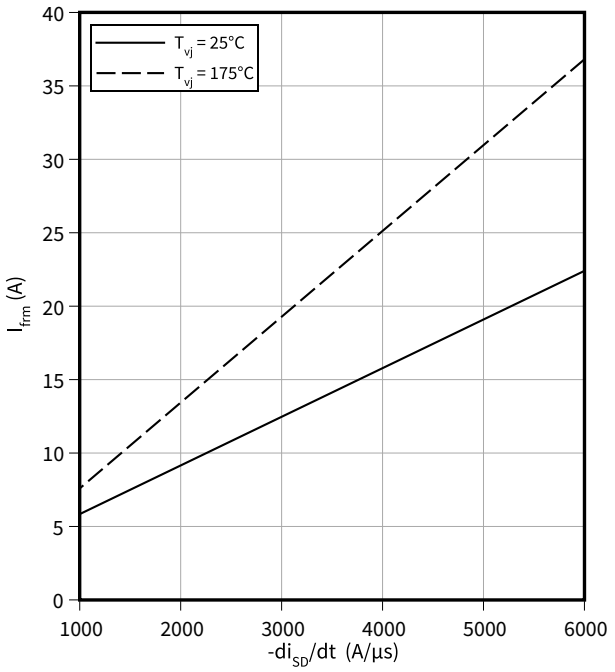
V_{GS} = 0/18 V, I_{SD} = 13 A, V_{DD} = 800 V



Typical reverse recovery current as a function of reverse drain current slope, test circuit in Fig. F, 2nd device own body diode: V_{GS} = 0 V

$I_{frm} = f(-di_{SD}/dt)$

V_{GS} = 0/18 V, I_{SD} = 13 A, V_{DD} = 800 V

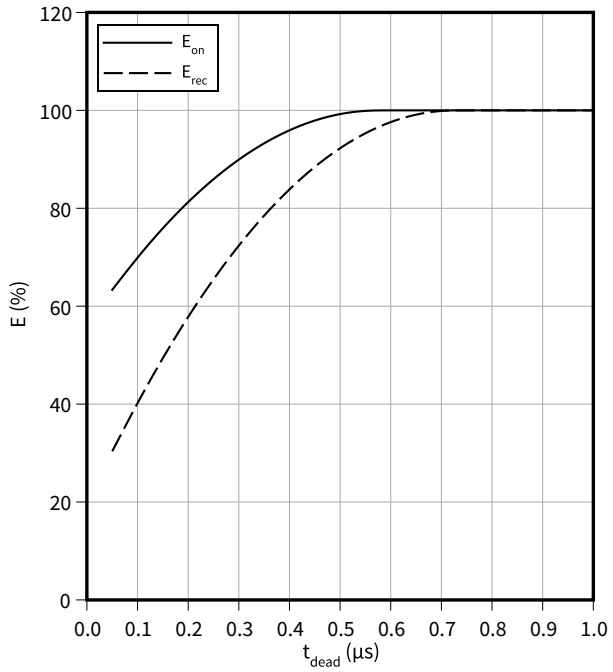


Typical switching energy as a function of dead time / blanking time, test circuit in Fig. F, 2nd device own body diode: V_{GS} = 0 V

$E = f(t_{dead})$

I_D = 13 A, V_{GS} = 0/18 V, T_{vj} = 175 °C, $R_{G,ext}$ = 2.3 Ω

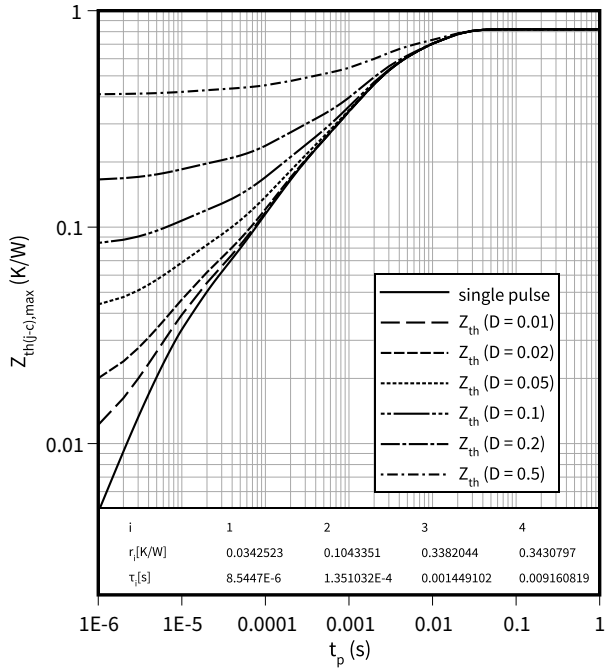
V_{DD} = 800 V



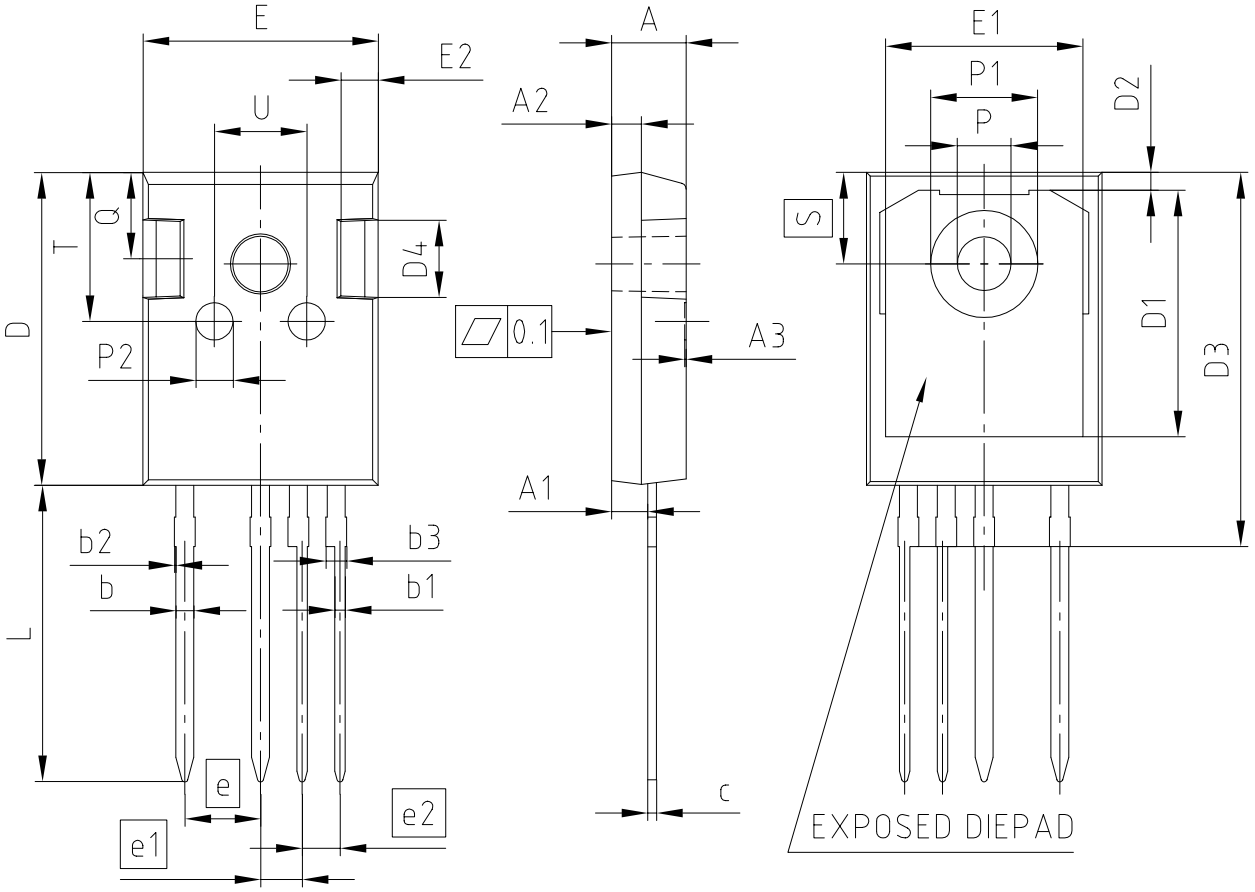
Max. transient thermal impedance (MOSFET/diode)

$Z_{th(j-c),max} = f(t_p)$

$D = t_p/T$



5 Package outlines



NOTES:
DIMENSIONS DO NOT INCLUDE MOLD FLASH, PROTRUSION OR GATE BURRS

PACKAGE - GROUP NUMBER:	PG-TO247-4-U02				
DIMENSIONS	**MILLIMETERS**		**DIMENSIONS**	**MILLIMETERS**	
	MIN.	MAX.		MIN.	MAX.
A	4.90	5.10	**E**	15.70	15.90
A1	2.31	2.51	**E1**	13.10	13.50
A2	1.90	2.10	**E2**	2.40	2.60
A3	0.05	0.25	**e**	5.08	
b	1.10	1.30	**e1**	2.79	
b1	0.65	0.79	**e2**	2.54	
b2	---	0.20	**N**	4	
b3	1.10	1.70	**L**	19.80	20.10
c	0.58	0.66	**øP**	3.50	3.70
D	20.90	21.10	**øP1**	7.00	7.40
D1	16.25	16.85	**øP2**	2.40	2.60
D2	1.05	1.35	**Q**	5.60	6.00
D3	24.97	25.27	**S**	6.15	
D4	4.90	5.10	**T**	9.80	10.20
			U	6.00	6.40

Figure 1

6 Testing conditions

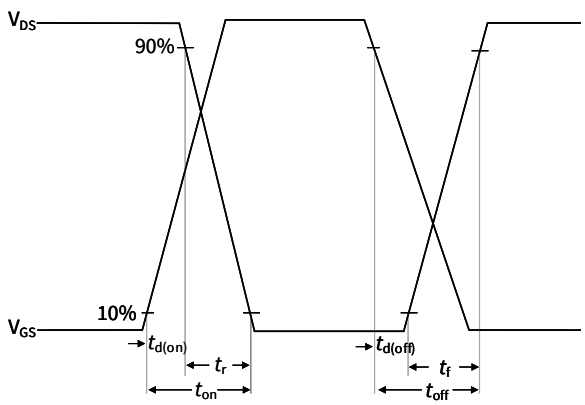


Figure A. **Definition of switching times**

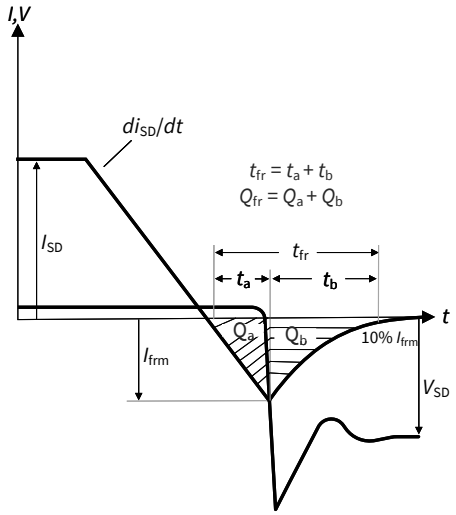


Figure B. **Definition of body diode switching characteristics**

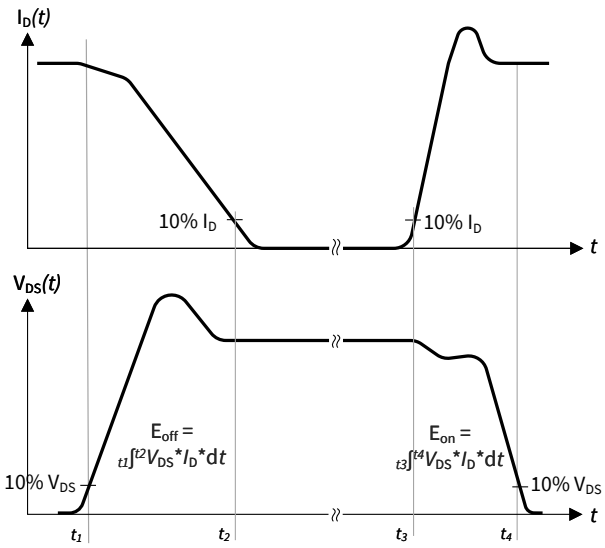


Figure C. **Definition of switching losses**

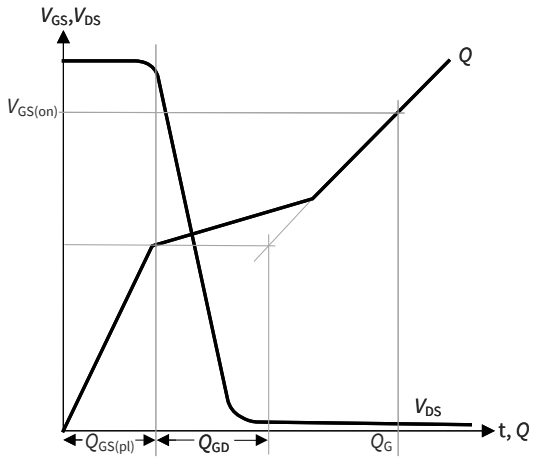


Figure D. **Definition of QGD**

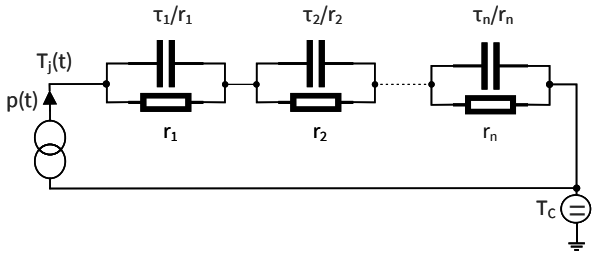


Figure E. **Thermal equivalent circuit**

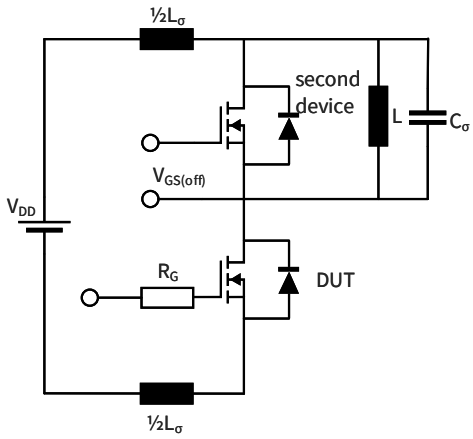


Figure F. **Dynamic test circuit**
Parasitic inductance L_σ,
Parasitic capacitor C_σ,

Figure 2

Revision history

Document revision	Date of release	Description of changes
0.10	2025-03-24	Preliminary datasheet
1.00	2025-03-25	Final datasheet
1.10	2025-07-04	Increased I_{DM} in Table 2 Added switching information for V_{GS} = -5/18 V in Table 5 and 6 and corresponding diagrams Added I_{SDC} in Table 5 Added SOA diagram on page 8 Added diagram E = f(V_{DD}) @ V_{GS} = 0/18 V Added diagram E = f(V_{DD}) @ V_{GS} = -5/18 V Editorial changes
1.20	2026-07-23	Updated I_{DSS} max in Table 4

Trademarks

All referenced product or service names and trademarks are the property of their respective owners.

Edition 2026-07-23

Published by

Infineon Technologies AG

81726 Munich, Germany

© 2026 Infineon Technologies AG

All Rights Reserved.

Do you have a question about any aspect of this document?

Email: erratum@infineon.com

Document reference
IFX-ABN058-004

Important notice

Products which may also include samples and may be comprised of hardware or software or both ("Product(s)") are sold or provided and delivered by Infineon Technologies AG and its affiliates ("Infineon") subject to the terms and conditions of the frame supply contract or other written agreement(s) executed by a customer and Infineon or, in the absence of the foregoing, the applicable Sales Conditions of Infineon. General terms and conditions of a customer or deviations from applicable Sales Conditions of Infineon shall only be binding for Infineon if and to the extent Infineon has given its express written consent.

For the avoidance of doubt, Infineon disclaims all warranties of non-infringement of third-party rights and implied warranties such as warranties of fitness for a specific use/purpose or merchantability. Infineon shall not be responsible for any information with respect to samples, the application or customer's specific use of any Product or for any examples or typical values given in this document.

If this document is marked as 'Preliminary', 'Target', 'Draft' or 'Proposal', Infineon reserves the right to change all information given in this document at any time without notice. Subject to the development and release of a Product for series supply by Infineon, the technical specifications of the Product are set forth in the relevant datasheet provided by Infineon without such marking.

The data contained in this document is exclusively intended for technically qualified and skilled customer representatives. It is the responsibility of the customer to evaluate the suitability of the Product for the intended application and the customer's specific use and to verify all relevant technical data contained in this document in the intended application and the customer's specific use. The customer is responsible for properly designing, programming, and testing the functionality and safety of the intended application, as well as complying with any legal requirements related to its use.

Unless otherwise explicitly approved by Infineon, Products may not be used in any application where a failure of the Products or any consequences of the use thereof can reasonably be expected to result in personal injury.

However, the foregoing shall not prevent the customer from using any Product in such fields of use that Infineon has explicitly designed and sold it for, provided that the overall responsibility for the application lies with the customer. Infineon expressly reserves the right to use its content for commercial text and data mining (TDM) according to applicable laws, e.g. Section 44b of the German Copyright Act (UrhG). If the Product includes security features:

Because no computing device can be absolutely secure, and despite security measures implemented in the Product, Infineon does not guarantee that the Product will be free from intrusion, data theft or loss, or other breaches ("Security Breaches"), and Infineon shall have no liability arising out of any Security Breaches.

If this document includes or references software:

The software is owned by Infineon under the intellectual property laws and treaties of the United States, Germany, and other countries worldwide. All rights reserved. Therefore, you may use the software only as provided in the software license agreement accompanying the software.

If no software license agreement applies, Infineon hereby grants you a personal, non-exclusive, non-transferable license (without the right to sublicense) under its intellectual property rights in the software (a) for software provided in source code form, to modify and reproduce the software solely for use with Infineon hardware products, only internally within your organization, and (b) to distribute the software in binary code form externally to end users, solely for use on Infineon hardware products. Any other use, reproduction, modification, translation, or compilation of the software is prohibited.

For further information on the Product, technology, delivery terms and conditions, and prices, please contact your nearest Infineon office or visit www.infineon.com.