

最终数据手册

英飞凌工业用CoolSiC™ 1200 V SiC 沟槽 MOSFET：采用 .XT 互连技术的碳化硅 MOSFET

特性

- $T_{vj} = 25^{\circ}\text{C}$ 时 $V_{DSS} = 1200\text{ V}$
- $T_C = 25^{\circ}\text{C}$ 时 $I_{DDC} = 55\text{ A}$
- $R_{DS(on)} = 39\text{ m}\Omega$  at  $V_{GS} = 18\text{ V}$ ,  $T_{vj} = 25^{\circ}\text{C}$
- 开关损耗非常低
- 短路耐受时间  $3\text{ }\mu\text{s}$
- 基准栅极阈值电压,  $V_{GS(th)} = 4.2\text{ V}$
- 具有抗寄生导通能力, 可应用  $0\text{ V}$  关断栅极电压
- 坚固的体二极管, 适用于硬换向
- 英飞凌.XT 互连技术, 实现、行业领先的热性能



潜在应用

- 通用驱动器 (GPD)
- 电动汽车充电桩
- 在线式UPS/工业UPS
- 组串式逆变器
- 太阳能优化器

- Halogen-free
- Green
- Lead-free
- RoHS

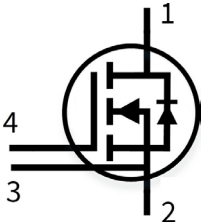
产品验证

- 符合JEDEC47/20/22相关测试的工业应用要求

描述

- 1 - 漏极
- 2 - 来源
- 3 - 开尔文检测
- 4 - 栅极

注：源极和开尔文传感触点引脚不可互换，互换可能会导致故障（仅适用于 4 pin及TO263-7L封装）



| Type           | Package        | Marking  |
|----------------|----------------|----------|
| IMZA120R040M1H | PG-TO247-4-U02 | 12M1H040 |

本数据手册的原文使用英文撰写。为方便起见，英飞凌提供了译文；由于翻译过程中可能使用了自动化工具，英飞凌不保证译文的准确性。为确认准确性，请务必访问 [infineon.com](http://infineon.com) 参考最新的英文版本（控制文档）。



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1封装

1 封装

表1 特征值

| 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 | $R_{th(j-c)}$ |                                                      |        | 0.51 | 0.66 | K/W  |

2 MOSFET

表2 最大额定值

| Parameter                                                                    | Symbol    | Note or test condition                                                                                                   |                       | Values | Unit          |
|------------------------------------------------------------------------------|-----------|--------------------------------------------------------------------------------------------------------------------------|-----------------------|--------|---------------|
| Drain-source voltage                                                         | $V_{DSS}$ | $T_{vj} \geq 25\text{ °C}$                                                                                               |                       | 1200   | V             |
| Continuous DC drain current for $R_{th(j-c,max)}$ , limited by $T_{vj(max)}$ | $I_{DDC}$ | $V_{GS} = 18\text{ V}$                                                                                                   | $T_c = 25\text{ °C}$  | 55     | A             |
|                                                                              |           |                                                                                                                          | $T_c = 100\text{ °C}$ | 39     |               |
| Peak drain current, $t_p$ limited by $T_{vj(max)}$                           | $I_{DM}$  | $V_{GS} = 18\text{ V}$                                                                                                   |                       | 117    | A             |
| Gate-source voltage, max. transient voltage <sup>1)</sup>                    | $V_{GS}$  | $t_p \leq 0.5\text{ }\mu\text{s}$ , $D < 0.01$                                                                           |                       | -10/23 | V             |
| Gate-source voltage, max. static voltage                                     | $V_{GS}$  |                                                                                                                          |                       | -7/20  | V             |
| Avalanche energy, single pulse                                               | $E_{AS}$  | $I_D = 18.8\text{ A}$ , $V_{DD} = 50\text{ V}$ , $L = 1.9\text{ mH}$                                                     |                       | 339    | mJ            |
| Avalanche energy, repetitive                                                 | $E_{AR}$  | $I_D = 18.8\text{ A}$ , $V_{DD} = 50\text{ V}$ , $L = 9.5\text{ }\mu\text{H}$                                            |                       | 1.68   | mJ            |
| Short-circuit withstand time                                                 | $t_{SC}$  | $V_{DD} \leq 800\text{ V}$ , $V_{DS,peak} < 1200\text{ V}$ , $V_{GS(on)} = 15\text{ V}$ , $T_{vj(start)} = 25\text{ °C}$ |                       | 3      | $\mu\text{s}$ |
| Power dissipation, limited by $T_{vj(max)}$                                  | $P_{tot}$ |                                                                                                                          | $T_c = 25\text{ °C}$  | 227    | W             |
|                                                                              |           |                                                                                                                          | $T_c = 100\text{ °C}$ | 114    |               |

1) 重要提示：正、负栅极源电压的选择会影响器件的长期行为。必须考虑应用说明 AN2018-09 中描述的设计指南，以确保设备在计划的使用寿命内正常运行。

表3 建议值

| 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    |

表4 特征值

| Parameter                        | Symbol       | Note or test condition                                                                               |                                                                        | Values |      |      | Unit |
|----------------------------------|--------------|------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------|--------|------|------|------|
|                                  |              |                                                                                                      |                                                                        | Min.   | Typ. | Max. |      |
| Drain-source on-state resistance | $R_{DS(on)}$ | $I_D = 19.3\text{ A}$                                                                                | $T_{vj} = 25\text{ }^{\circ}\text{C}$ ,<br>$V_{GS(on)} = 18\text{ V}$  |        | 39   | 54.4 | mΩ   |
|                                  |              |                                                                                                      | $T_{vj} = 100\text{ }^{\circ}\text{C}$ ,<br>$V_{GS(on)} = 18\text{ V}$ |        | 54   |      |      |
|                                  |              |                                                                                                      | $T_{vj} = 175\text{ }^{\circ}\text{C}$ ,<br>$V_{GS(on)} = 18\text{ V}$ |        | 77   |      |      |
|                                  |              |                                                                                                      | $T_{vj} = 25\text{ }^{\circ}\text{C}$ ,<br>$V_{GS(on)} = 15\text{ V}$  |        | 50.4 | 61.5 |      |
| Gate-source threshold voltage    | $V_{GS(th)}$ | $I_D = 8.3\text{ mA}$ , $V_{DS} = V_{GS}$<br>(tested after 1 ms pulse<br>at $V_{GS} = 20\text{ V}$ ) | $T_{vj} = 25\text{ }^{\circ}\text{C}$                                  | 3.5    | 4.2  | 5.2  | V    |
|                                  |              |                                                                                                      | $T_{vj} = 175\text{ }^{\circ}\text{C}$                                 |        | 3.6  |      |      |
| Zero gate-voltage drain current  | $I_{DSS}$    | $V_{DS} = 1200\text{ V}$ , $V_{GS} = 0\text{ V}$                                                     | $T_{vj} = 25\text{ }^{\circ}\text{C}$                                  |        |      | 150  | μA   |
|                                  |              |                                                                                                      | $T_{vj} = 175\text{ }^{\circ}\text{C}$                                 |        | 2.6  |      |      |
| Gate leakage current             | $I_{GSS}$    | $V_{DS} = 0\text{ V}$                                                                                | $V_{GS} = 23\text{ V}$                                                 |        |      | 100  | nA   |
|                                  |              |                                                                                                      | $V_{GS} = -10\text{ V}$                                                |        |      | -100 |      |
| Forward transconductance         | $g_{fs}$     | $I_D = 19.3\text{ A}$ , $V_{DS} = 20\text{ V}$                                                       |                                                                        |        | 9.8  |      | S    |
| Internal gate resistance         | $R_{G,int}$  | $f = 1\text{ MHz}$ , $V_{AC} = 25\text{ mV}$                                                         |                                                                        |        | 2.5  |      | Ω    |
| Input capacitance                | $C_{iss}$    | $V_{DS} = 800\text{ V}$ , $V_{GS} = 0\text{ V}$ , $f = 100\text{ kHz}$ , $V_{AC} = 25\text{ mV}$     |                                                                        |        | 1620 |      | pF   |
| Output capacitance               | $C_{oss}$    | $V_{DS} = 800\text{ V}$ , $V_{GS} = 0\text{ V}$ , $f = 100\text{ kHz}$ , $V_{AC} = 25\text{ mV}$     |                                                                        |        | 75   |      | pF   |
| Reverse transfer capacitance     | $C_{rss}$    | $V_{DS} = 800\text{ V}$ , $V_{GS} = 0\text{ V}$ , $f = 100\text{ kHz}$ , $V_{AC} = 25\text{ mV}$     |                                                                        |        | 11   |      | pF   |
| $C_{oss}$ stored energy          | $E_{oss}$    | $V_{DS} = 800\text{ V}$ , $V_{GS} = 0\text{ V}$ , $f = 100\text{ kHz}$ , $V_{AC} = 25\text{ mV}$     |                                                                        |        | 30   |      | μJ   |
| Total gate charge                | $Q_G$        | $V_{DD} = 800\text{ V}$ , $I_D = 19.3\text{ A}$ , $V_{GS} = -2/18\text{ V}$ , turn-on pulse          |                                                                        |        | 51   |      | nC   |
| Plateau gate charge              | $Q_{GS(pl)}$ | $V_{DD} = 800\text{ V}$ , $I_D = 19.3\text{ A}$ , $V_{GS} = -2/18\text{ V}$ , turn-on pulse          |                                                                        |        | 12.7 |      | nC   |
| Gate-to-drain charge             | $Q_{GD}$     | $V_{DD} = 800\text{ V}$ , $I_D = 19.3\text{ A}$ , $V_{GS} = -2/18\text{ V}$ , turn-on pulse          |                                                                        |        | 10.2 |      | nC   |

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表 4（续）特征值

| Parameter              | Symbol       | Note or test condition                                                                                                                                                                                                    | Values                   |      |      | Unit          |
|------------------------|--------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------|------|------|---------------|
|                        |              |                                                                                                                                                                                                                           | Min.                     | Typ. | Max. |               |
| Turn-on delay time     | $t_{d(on)}$  | $V_{DD} = 800\text{ V}$ , $I_D = 19.3\text{ A}$ ,<br>$V_{GS} = 0/18\text{ V}$ ,<br>$R_{GS(on)} = 1\ \Omega$ ,<br>$R_{GS(off)} = 1\ \Omega$ , $L_\sigma = 15\text{ nH}$ ,<br>diode: body diode at<br>$V_{GS} = 0\text{ V}$ | $T_{vj} = 25\text{ °C}$  | 17   |      | ns            |
|                        |              |                                                                                                                                                                                                                           | $T_{vj} = 175\text{ °C}$ | 16   |      |               |
| Rise time              | $t_r$        | $V_{DD} = 800\text{ V}$ , $I_D = 19.3\text{ A}$ ,<br>$V_{GS} = 0/18\text{ V}$ ,<br>$R_{GS(on)} = 1\ \Omega$ ,<br>$R_{GS(off)} = 1\ \Omega$ , $L_\sigma = 15\text{ nH}$ ,<br>diode: body diode at<br>$V_{GS} = 0\text{ V}$ | $T_{vj} = 25\text{ °C}$  | 6.4  |      | ns            |
|                        |              |                                                                                                                                                                                                                           | $T_{vj} = 175\text{ °C}$ | 7.3  |      |               |
| Turn-off delay time    | $t_{d(off)}$ | $V_{DD} = 800\text{ V}$ , $I_D = 19.3\text{ A}$ ,<br>$V_{GS} = 0/18\text{ V}$ ,<br>$R_{GS(on)} = 1\ \Omega$ ,<br>$R_{GS(off)} = 1\ \Omega$ , $L_\sigma = 15\text{ nH}$ ,<br>diode: body diode at<br>$V_{GS} = 0\text{ V}$ | $T_{vj} = 25\text{ °C}$  | 20.6 |      | ns            |
|                        |              |                                                                                                                                                                                                                           | $T_{vj} = 175\text{ °C}$ | 21   |      |               |
| Fall time              | $t_f$        | $V_{DD} = 800\text{ V}$ , $I_D = 19.3\text{ A}$ ,<br>$V_{GS} = 0/18\text{ V}$ ,<br>$R_{GS(on)} = 1\ \Omega$ ,<br>$R_{GS(off)} = 1\ \Omega$ , $L_\sigma = 15\text{ nH}$ ,<br>diode: body diode at<br>$V_{GS} = 0\text{ V}$ | $T_{vj} = 25\text{ °C}$  | 6.9  |      | ns            |
|                        |              |                                                                                                                                                                                                                           | $T_{vj} = 175\text{ °C}$ | 6.9  |      |               |
| Turn-on energy         | $E_{on}$     | $V_{DD} = 800\text{ V}$ , $I_D = 19.3\text{ A}$ ,<br>$V_{GS} = 0/18\text{ V}$ ,<br>$R_{GS(on)} = 1\ \Omega$ ,<br>$R_{GS(off)} = 1\ \Omega$ , $L_\sigma = 15\text{ nH}$ ,<br>diode: body diode at<br>$V_{GS} = 0\text{ V}$ | $T_{vj} = 25\text{ °C}$  | 170  |      | $\mu\text{J}$ |
|                        |              |                                                                                                                                                                                                                           | $T_{vj} = 175\text{ °C}$ | 290  |      |               |
| Turn-off energy        | $E_{off}$    | $V_{DD} = 800\text{ V}$ , $I_D = 19.3\text{ A}$ ,<br>$V_{GS} = 0/18\text{ V}$ ,<br>$R_{GS(on)} = 1\ \Omega$ ,<br>$R_{GS(off)} = 1\ \Omega$ , $L_\sigma = 15\text{ nH}$ ,<br>diode: body diode at<br>$V_{GS} = 0\text{ V}$ | $T_{vj} = 25\text{ °C}$  | 45   |      | $\mu\text{J}$ |
|                        |              |                                                                                                                                                                                                                           | $T_{vj} = 175\text{ °C}$ | 47   |      |               |
| Total switching energy | $E_{tot}$    | $V_{DD} = 800\text{ V}$ , $I_D = 19.3\text{ A}$ ,<br>$V_{GS} = 0/18\text{ V}$ ,<br>$R_{GS(on)} = 1\ \Omega$ ,<br>$R_{GS(off)} = 1\ \Omega$ , $L_\sigma = 15\text{ nH}$ ,<br>diode: body diode at<br>$V_{GS} = 0\text{ V}$ | $T_{vj} = 25\text{ °C}$  | 245  |      | $\mu\text{J}$ |
|                        |              |                                                                                                                                                                                                                           | $T_{vj} = 175\text{ °C}$ | 460  |      |               |

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表 4 (续) 特征值

| Parameter                    | Symbol   | Note or test condition | Values |      |      | Unit |
|------------------------------|----------|------------------------|--------|------|------|------|
|                              |          |                        | Min.   | Typ. | Max. |      |
| Virtual junction temperature | $T_{vj}$ |                        | -55    |      | 175  | °C   |

注意：为了获得最佳的使用寿命和可靠性，英飞凌建议工作条件不超过本数据手册中所述最大额定值的 80%。

该芯片技术的特征高达 200 kV/μs。测量的 dv/dt 受到测量测试设置和封装的限制。

动态测试电路见图 F。

### 3 体二极管 (MOSFET)

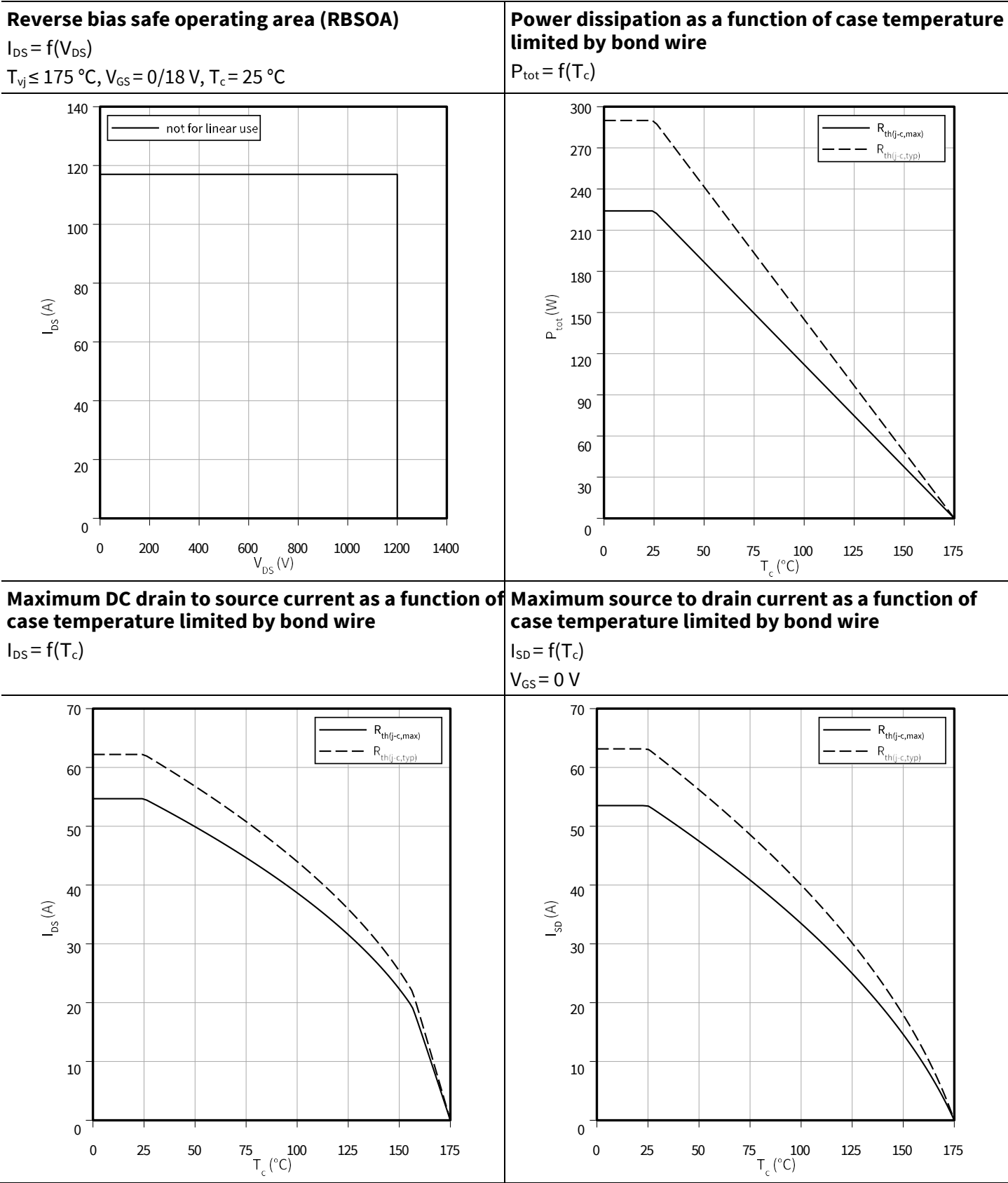
表 5 最大额定值

| Parameter                                                                         | Symbol    | Note or test condition     |                       | Values | Unit |
|-----------------------------------------------------------------------------------|-----------|----------------------------|-----------------------|--------|------|
| Drain-source voltage                                                              | $V_{DSS}$ | $T_{vj} \geq 25\text{ °C}$ |                       | 1200   | V    |
| Continuous reverse drain current for $R_{th(j-c,max)}$ , limited by $T_{vj(max)}$ | $I_{SDC}$ | $V_{GS} = 0\text{ V}$      | $T_c = 25\text{ °C}$  | 54     | A    |
|                                                                                   |           |                            | $T_c = 100\text{ °C}$ | 33     |      |
| Peak reverse drain current, $t_p$ limited by $T_{vj(max)}$                        | $I_{SM}$  | $V_{GS} = 0\text{ V}$      |                       | 117    | A    |

表 6 特征值

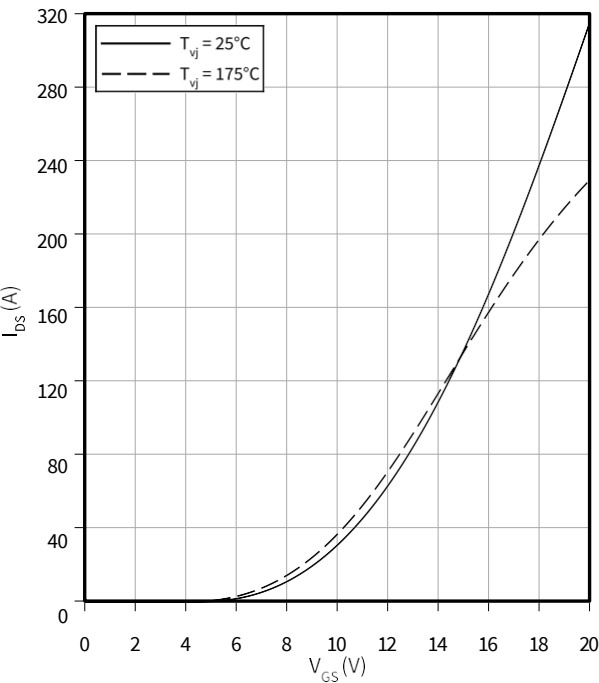
| Parameter                            | Symbol    | Note or test condition                                                                                                                                      |                          | Values |      |      | Unit |
|--------------------------------------|-----------|-------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------|--------|------|------|------|
|                                      |           |                                                                                                                                                             |                          | Min.   | Typ. | Max. |      |
| Drain-source reverse voltage         | $V_{SD}$  | $I_{SD} = 19.3\text{ A}$ , $V_{GS} = 0\text{ V}$                                                                                                            | $T_{vj} = 25\text{ °C}$  |        | 3.8  | 5    | V    |
|                                      |           |                                                                                                                                                             | $T_{vj} = 100\text{ °C}$ |        | 3.7  |      |      |
|                                      |           |                                                                                                                                                             | $T_{vj} = 175\text{ °C}$ |        | 3.6  |      |      |
| MOSFET forward recovery charge       | $Q_{fr}$  | $V_{DD} = 800\text{ V}$ ,<br>$I_{SD} = 19.3\text{ A}$ , $V_{GS} = 0\text{ V}$ ,<br>$-di_{SD}/dt = 3000\text{ A}/\mu\text{s}$ , $Q_{fr}$ includes also $Q_C$ | $T_{vj} = 25\text{ °C}$  |        | 160  |      | nC   |
|                                      |           |                                                                                                                                                             | $T_{vj} = 175\text{ °C}$ |        | 293  |      |      |
| MOSFET peak forward recovery current | $I_{frm}$ | $V_{DD} = 800\text{ V}$ ,<br>$I_{SD} = 19.3\text{ A}$ , $V_{GS} = 0\text{ V}$ ,<br>$-di_{SD}/dt = 3000\text{ A}/\mu\text{s}$ , $Q_{fr}$ includes also $Q_C$ | $T_{vj} = 25\text{ °C}$  |        | 31   |      | A    |
|                                      |           |                                                                                                                                                             | $T_{vj} = 175\text{ °C}$ |        | 50   |      |      |
| MOSFET forward recovery energy       | $E_{fr}$  | $V_{DD} = 800\text{ V}$ ,<br>$I_{SD} = 19.3\text{ A}$ , $V_{GS} = 0\text{ V}$ ,<br>$-di_{SD}/dt = 3000\text{ A}/\mu\text{s}$ , $Q_{fr}$ includes also $Q_C$ | $T_{vj} = 25\text{ °C}$  |        | 30   |      | μJ   |
|                                      |           |                                                                                                                                                             | $T_{vj} = 175\text{ °C}$ |        | 122  |      |      |
| Virtual junction temperature         | $T_{vj}$  |                                                                                                                                                             |                          | -55    |      | 175  | °C   |

4 特性图



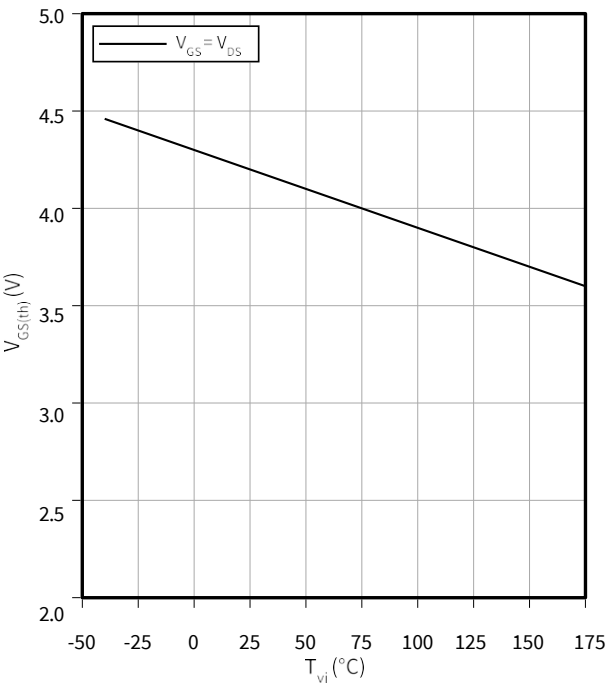
Typical transfer characteristic

$I_{DS} = f(V_{GS})$   
 $V_{DS} = 20\text{ V}$ ,  $t_p = 20\text{ }\mu\text{s}$



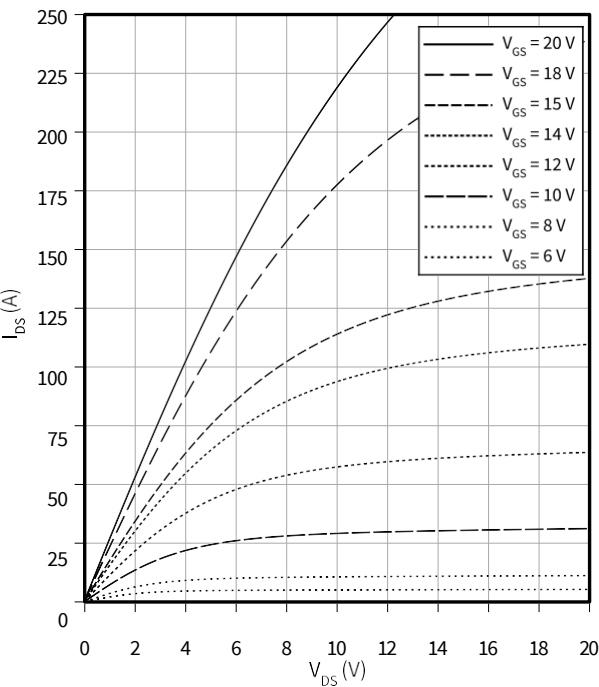
Typical gate-source threshold voltage as a function of junction temperature

$V_{GS(th)} = f(T_{vj})$   
 $I_D = 8.3\text{ mA}$



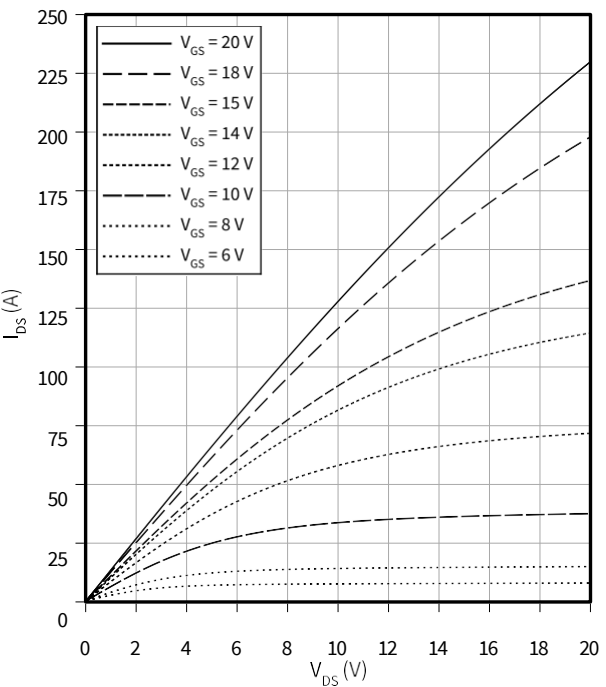
Typical output characteristic,  $V_{GS}$  as parameter

$I_{DS} = f(V_{DS})$   
 $T_{vj} = 25\text{ }^\circ\text{C}$ ,  $t_p = 20\text{ }\mu\text{s}$



Typical output characteristic,  $V_{GS}$  as parameter

$I_{DS} = f(V_{DS})$   
 $T_{vj} = 175\text{ }^\circ\text{C}$ ,  $t_p = 20\text{ }\mu\text{s}$

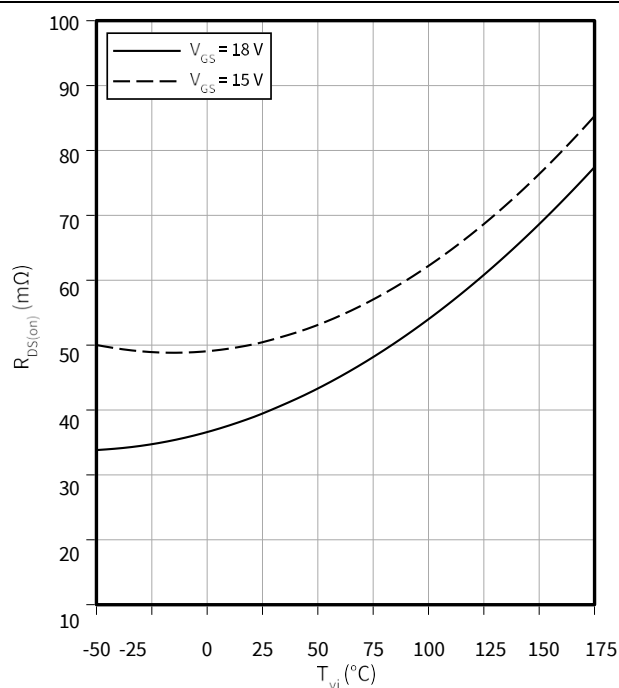




### Typical on-state resistance as a function of junction temperature

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

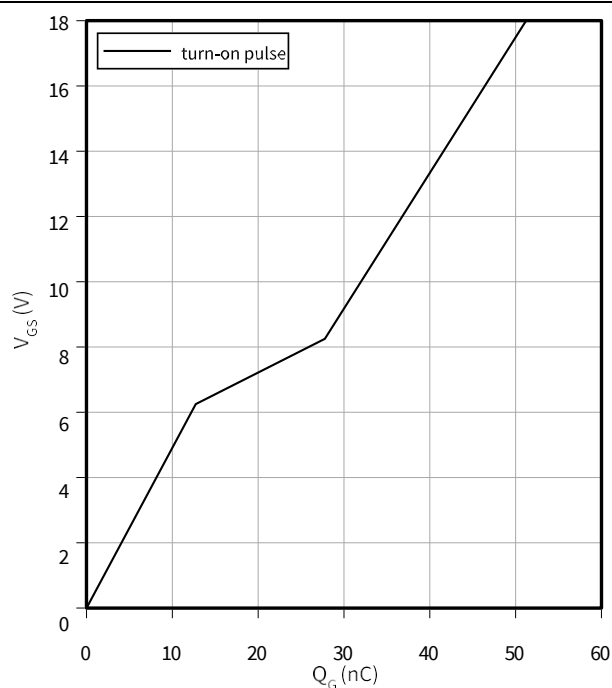
$I_D = 19.3 \text{ A}$



### Typical gate charge

$$V_{GS} = f(Q_G)$$

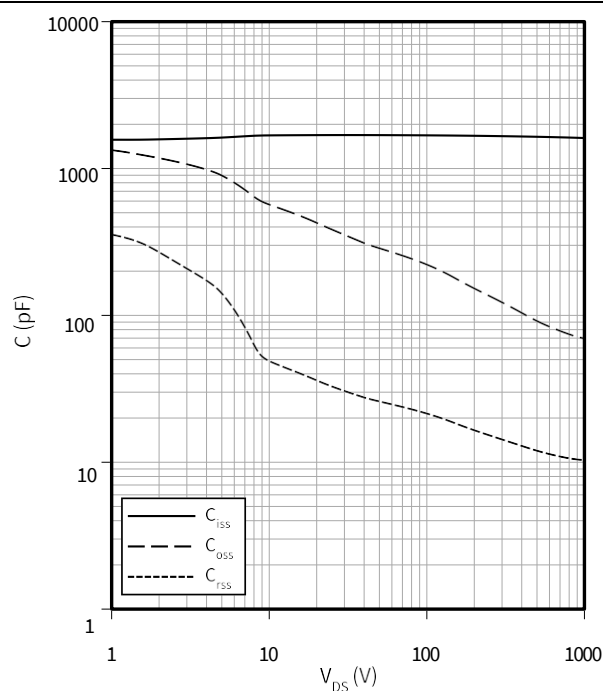
$I_D = 19.3 \text{ A}, V_{DS} = 800 \text{ V}$



### Typical capacitance as a function of drain-source voltage

$$C = f(V_{DS})$$

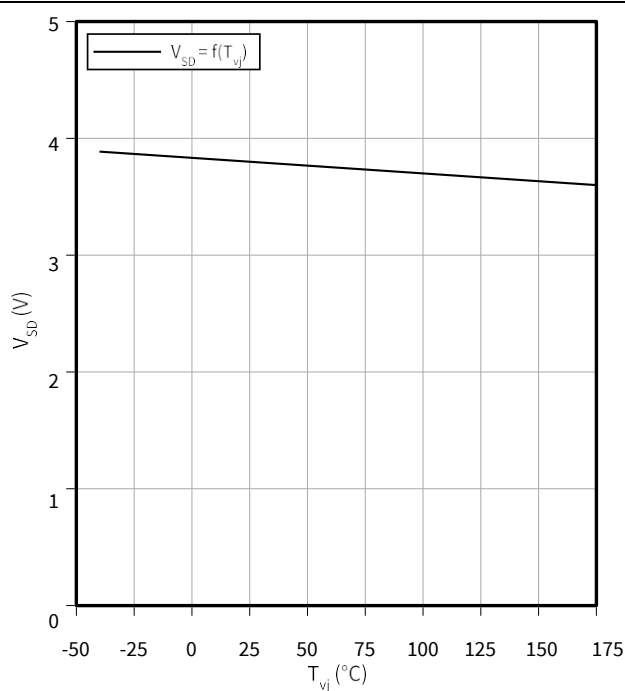
$f = 100 \text{ kHz}, V_{GS} = 0 \text{ V}$



### Typical reverse drain voltage as function of junction temperature

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

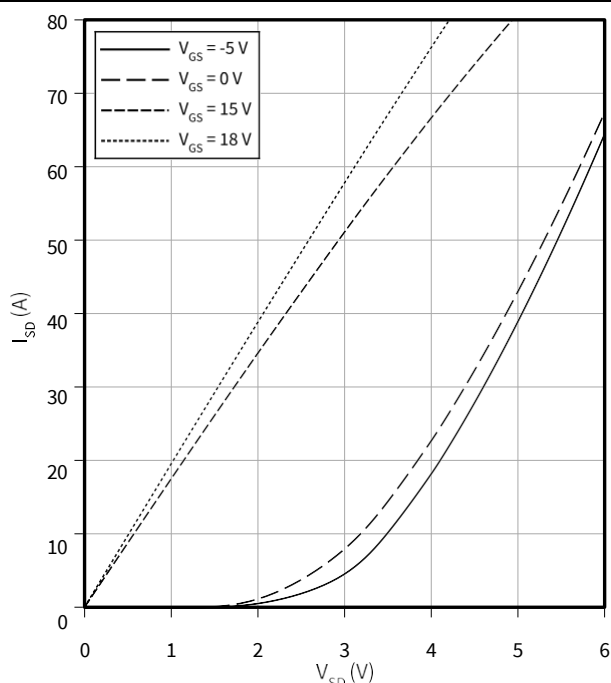
$I_{SD} = 19.3 \text{ A}, V_{GS} = 0 \text{ V}$



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

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

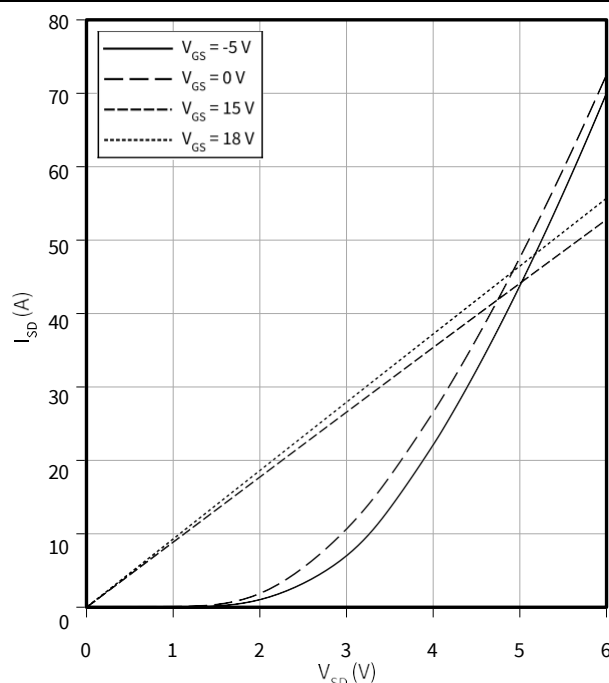
$T_{vj} = 25\text{ °C}$ ,  $t_p = 20\text{ }\mu\text{s}$



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

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

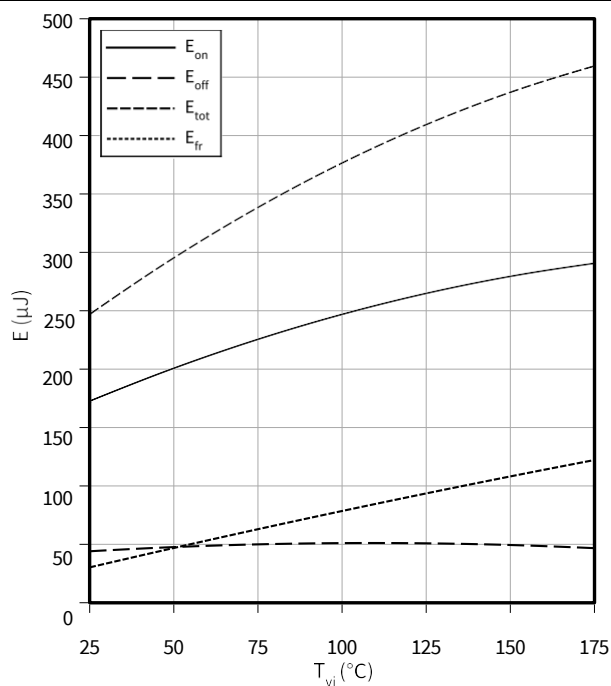
$T_{vj} = 175\text{ °C}$ ,  $t_p = 20\text{ }\mu\text{s}$



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

$$E = f(T_{vj})$$

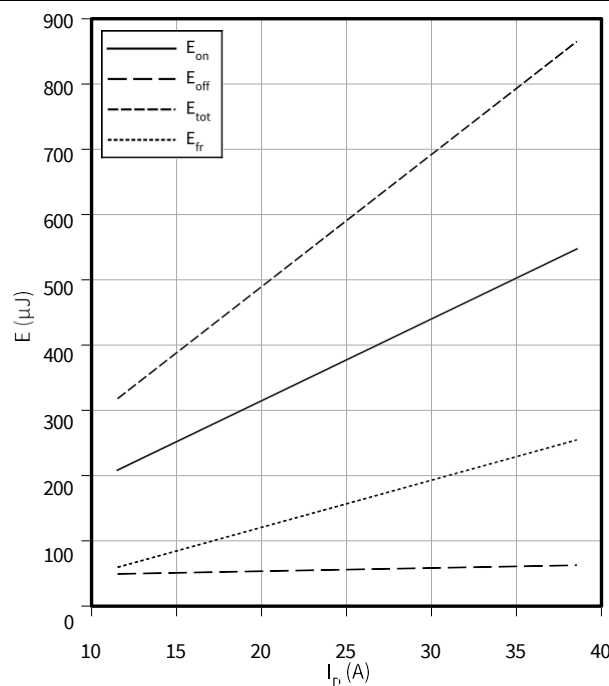
$V_{GS} = 0/18\text{ V}$ ,  $I_D = 19.3\text{ A}$ ,  $R_{G,ext} = 1\text{ }\Omega$ ,  $V_{DD} = 800\text{ V}$



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

$$E = f(I_D)$$

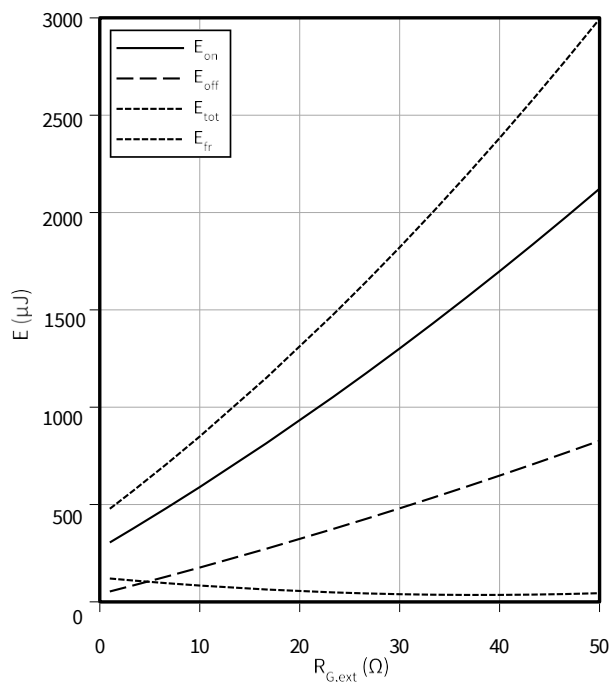
$V_{GS} = 0/18\text{ V}$ ,  $T_{vj} = 175\text{ °C}$ ,  $R_{G,ext} = 1\text{ }\Omega$ ,  $V_{DD} = 800\text{ V}$



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

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

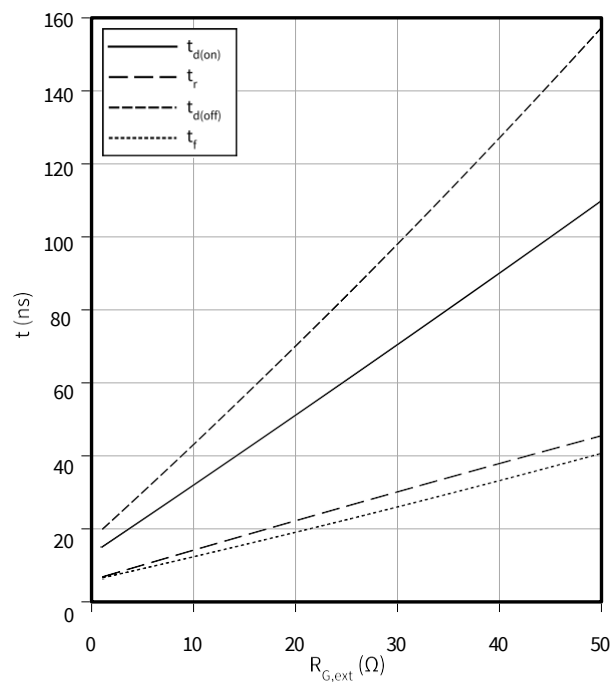
$V_{GS} = 0/18$  V,  $I_D = 19.3$  A,  $T_{vj} = 175$  °C,  $V_{DD} = 800$  V



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

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

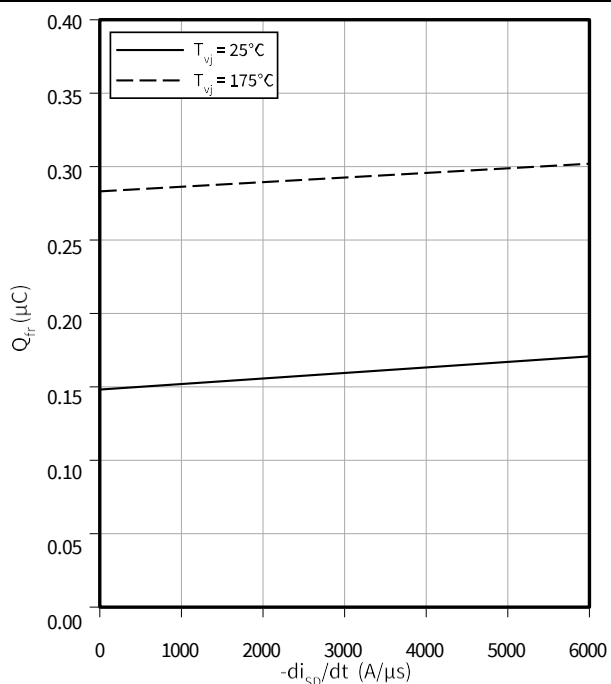
$V_{GS} = 0/18$  V,  $I_D = 19.3$  A,  $T_{vj} = 175$  °C,  $V_{DD} = 800$  V



**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**

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

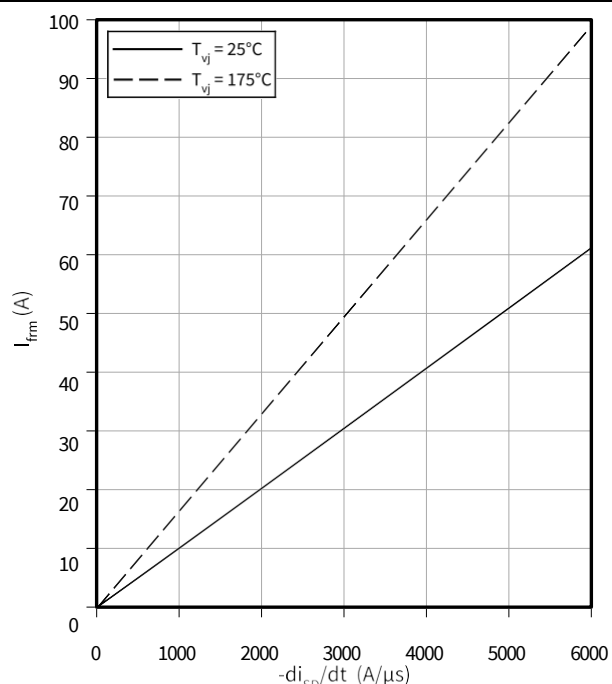
$V_{GS} = 0/18$  V,  $I_{SD} = 19.3$  A,  $V_{DD} = 800$  V



**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**

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

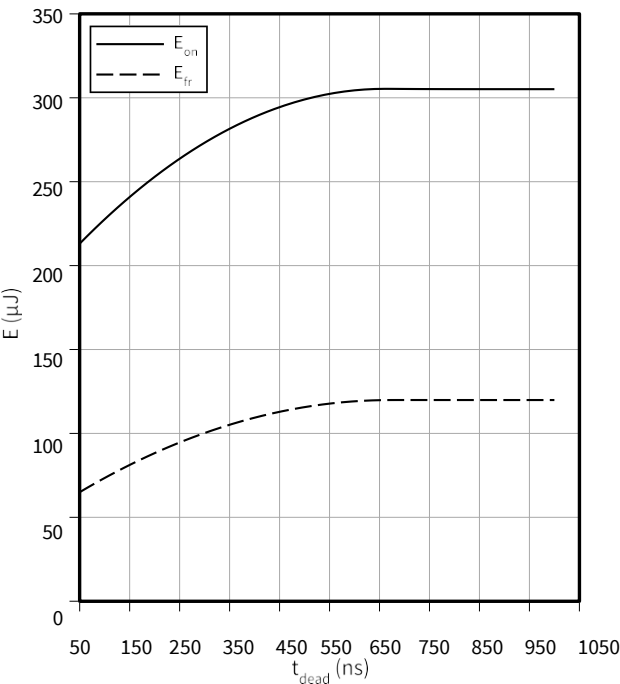
$V_{GS} = 0/18$  V,  $I_{SD} = 19.3$  A,  $V_{DD} = 800$  V



Typical switching energy losses as a function of dead time / blanking time, test circuit in Fig. F, 2nd device own body diode:  $V_{GS} = -5\text{ V}$

$E = f(t_{dead})$

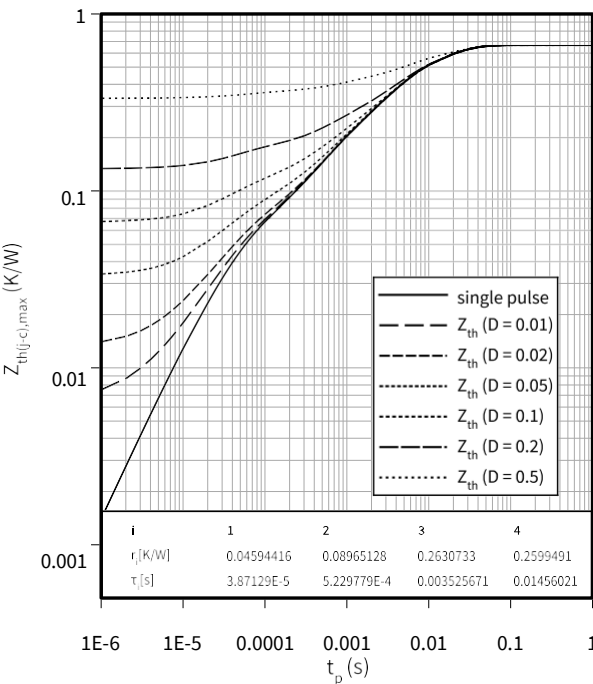
$V_{GS} = -5/18\text{ V}$ ,  $I_D = 19.3\text{ A}$ ,  $T_{vj} = 175\text{ °C}$ ,  $V_{DD} = 800\text{ V}$



Max. transient thermal impedance (MOSFET/diode)

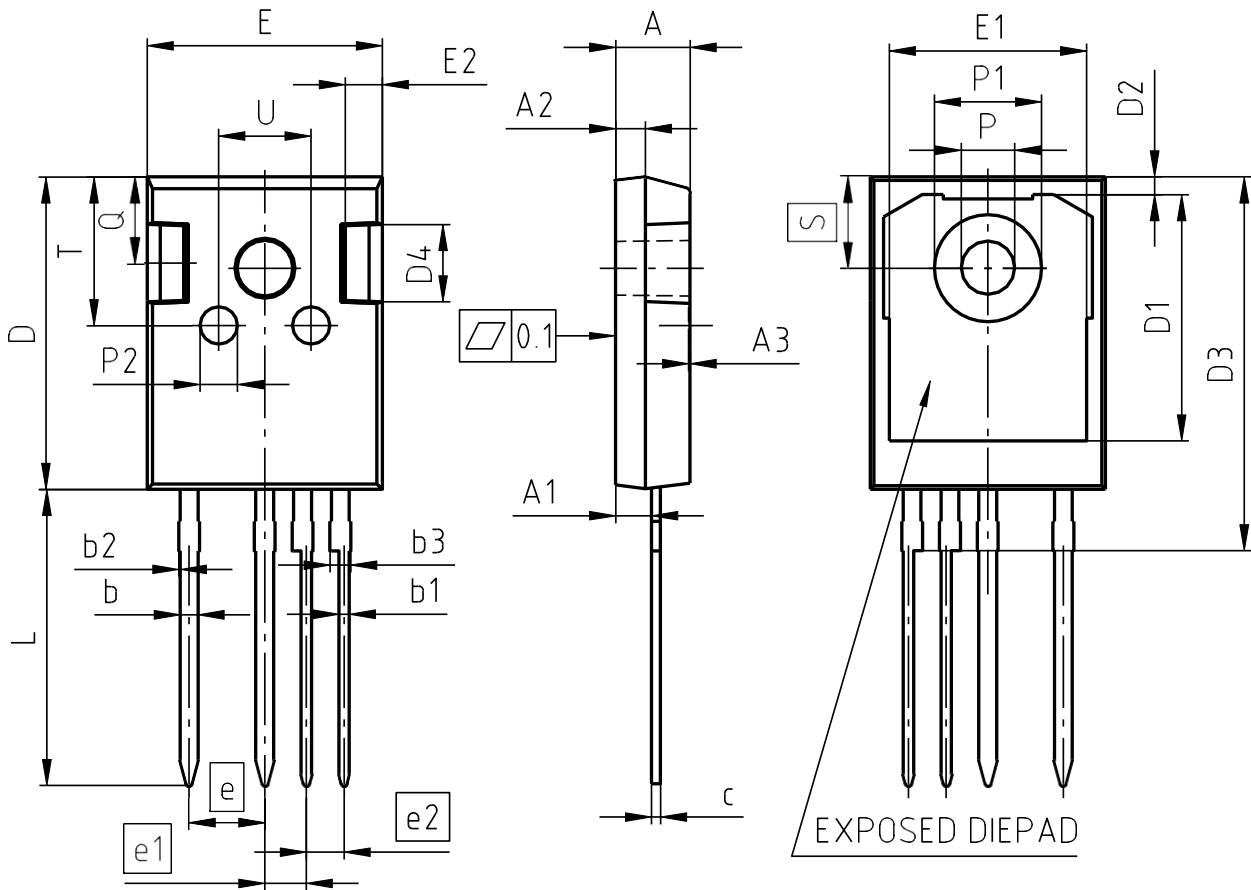
$Z_{th(j-c),max} = f(t_p)$

$D = t_p/T$



3 封装外形

5 封装外形



NOTES:  
ALL DIMENSIONS DO NOT INCLUDE MOLD FLASH  
OR PROTRUSIONS.

| PACKAGE - GROUP PG-T0247-4-U02 |             |       |            |             |       |
|--------------------------------|-------------|-------|------------|-------------|-------|
| NUMBER:                        |             |       |            |             |       |
| 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                             | 1.34        | 1.44  | 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  |

图 1

6 测试条件

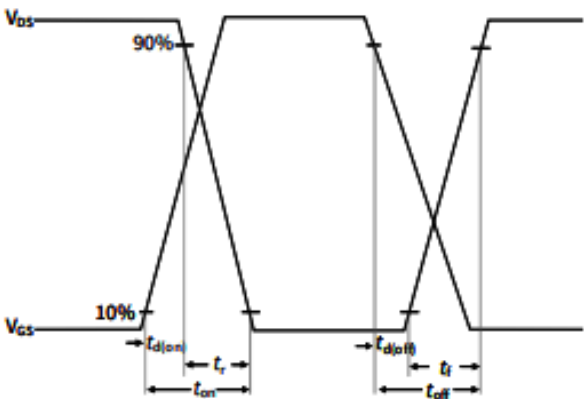


Figure A. Definition of switching times

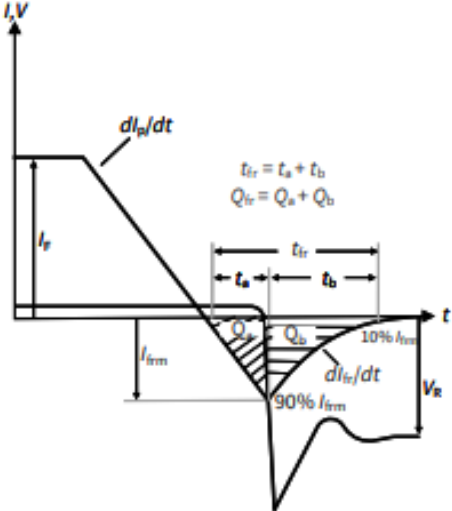


Figure B. Definition of diode switching characteristics

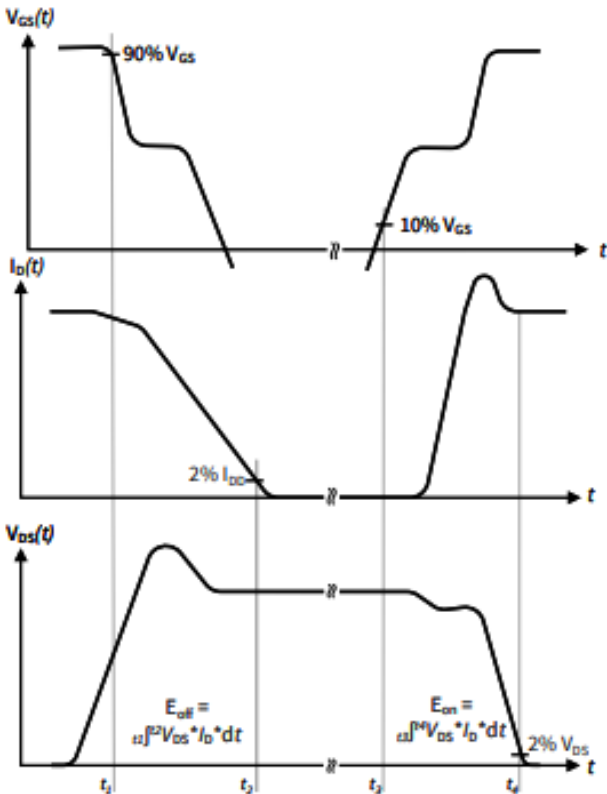


Figure C. Definition of switching losses

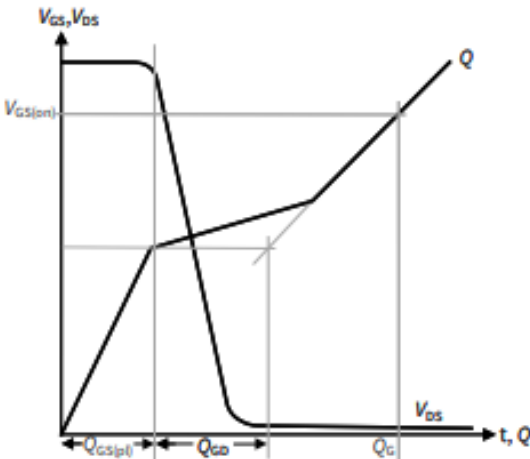


Figure D. Definition of QGD

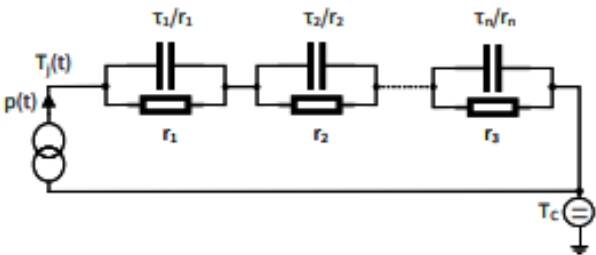


Figure E. Thermal equivalent circuit

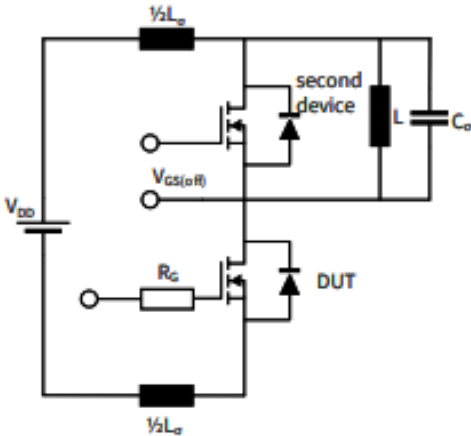


Figure F. Dynamic test circuit  
Parasitic inductance  $L_G$ ,  
Parasitic capacitor  $C_o$

修订记录

| Document revision | Date of release | Description of changes                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|-------------------|-----------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1.00              | 2022-02-03      | Final datasheet                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| 1.10              | 2022-08-11      | Change of test condition of dynamic capacitances in Table 4, “Characteristic values” ( $C_{iss}$ , $C_{oss}$ , $C_{rss}$ ): $V_{DD}= 25\text{ V}$ to $V_{DD}= 800\text{ V}$<br>Correction of unit of “Input capacitance” $C_{iss}$ from nF to pF<br>Change of $V_{GS}$ “Gate-source voltage, max. static voltage” in Table 2, “Maximum rated values” from -5/20 V to -7/20 V<br>Editorial changes in “Features” on page 1<br>Editorial changes in “Package” on page 1<br>Correction of unit of x-axis at diagram “Max. transient thermal impedance (MOSFET/diode)” from $\mu\text{s}$ to s, on page 13<br>Correction of diagram “Max. transient thermal impedance (MOSFET/diode)”, on page 13 |
| 1.20              | 2023-05-08      | Correction of gate charge values in Table 4<br>Editorial changes                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| 1.30              | 2024-11-15      | Updated package name<br>Corrected forward transconductance $g_{fs}$ in Table 4<br>Corrected switching energies in Table 4<br>Corrected diagram “Typical output characteristic, $V_{GS}$ as parameter”<br>Corrected diagram “Typical transfer characteristic”<br>Editorial changes                                                                                                                                                                                                                                                                                                                                                                                                             |



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**Email:**

[erratum@infineon.com](mailto:erratum@infineon.com)

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