

## OptiMOS™3 Power-Transistor

### Features

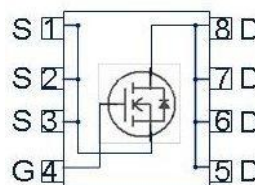
- Ideal for high frequency switching and sync. rec.
- Optimized technology for DC/DC converters
- Excellent gate charge x  $R_{DS(on)}$  product (FOM)
- Superior thermal resistance
- N-channel, normal level
- 100% avalanche tested
- Pb-free plating; RoHS compliant
- Qualified according to JEDEC<sup>1)</sup> for target applications
- Halogen-free according to IEC61249-2-21

### Product Summary

|                  |     |    |
|------------------|-----|----|
| $V_{DS}$         | 60  | V  |
| $R_{DS(on),max}$ | 7.6 | mΩ |
| $I_D$            | 50  | A  |



|                |                                                                                     |
|----------------|-------------------------------------------------------------------------------------|
| <b>Type</b>    | BSC076N06NS3 G                                                                      |
|                |  |
| <b>Package</b> | PG-TDSON-8                                                                          |
| <b>Marking</b> | 076N06NS                                                                            |



**Maximum ratings**, at  $T_j=25\text{ °C}$ , unless otherwise specified

| Parameter                                    | Symbol        | Conditions                                                                       | Value | Unit |
|----------------------------------------------|---------------|----------------------------------------------------------------------------------|-------|------|
| Continuous drain current                     | $I_D$         | $V_{GS}=10\text{ V}$ , $T_C=25\text{ °C}$                                        | 50    | A    |
|                                              |               | $V_{GS}=10\text{ V}$ , $T_C=100\text{ °C}$                                       | 47    |      |
|                                              |               | $V_{GS}=10\text{ V}$ , $T_C=25\text{ °C}$ ,<br>$R_{thJA}=50\text{ K/W J41}^{2)}$ | 14    |      |
| Pulsed drain current <sup>3)</sup>           | $I_{D,pulse}$ | $T_C=25\text{ °C}$                                                               | 200   |      |
| Avalanche energy, single pulse <sup>4)</sup> | $E_{AS}$      | $I_D=50\text{ A}$ , $R_{GS}=25\text{ Ω}$                                         | 47    | mJ   |
| © 2009 Infineon Technologies AG              | $V_{GS}$      |                                                                                  | ±20   | V    |

<sup>1)</sup> J-STD20 and JEDEC22

<sup>2)</sup> Device on 40 mm x 40 mm x 1.5 mm epoxy PCB FR4 with 6 cm<sup>2</sup> (one layer, 70 μm thick) copper area for drain connection. PCB is vertical in still air.

<sup>3)</sup> See figure 3 for more detailed information

<sup>4)</sup> See figure 13 for more detailed information

**Maximum ratings**, at  $T_j=25\text{ °C}$ , unless otherwise specified

| Parameter                           | Symbol                | Conditions                                                    | Value       | Unit |
|-------------------------------------|-----------------------|---------------------------------------------------------------|-------------|------|
| Power dissipation                   | $P_{\text{tot}}$      | $T_C=25\text{ °C}$                                            | 69          | W    |
|                                     |                       | $T_A=25\text{ °C}$ ,<br>$R_{\text{thJA}}=50\text{ K/W}^{(2)}$ | 2.5         |      |
| Operating and storage temperature   | $T_j, T_{\text{stg}}$ |                                                               | -55 ... 150 | °C   |
| IEC climatic category; DIN IEC 68-1 |                       |                                                               | 55/150/56   |      |

| Parameter | Symbol | Conditions | Values |      |      | Unit |
|-----------|--------|------------|--------|------|------|------|
|           |        |            | min.   | typ. | max. |      |

#### Thermal characteristics

|                                     |                   |                                               |   |   |     |     |
|-------------------------------------|-------------------|-----------------------------------------------|---|---|-----|-----|
| Thermal resistance, junction - case | $R_{\text{thJC}}$ |                                               | - | - | 1.8 | K/W |
| Device on PCB                       | $R_{\text{thJA}}$ | minimal footprint                             | - | - | 62  |     |
|                                     |                   | 6 cm <sup>2</sup> cooling area <sup>(2)</sup> | - | - | 50  |     |

**Electrical characteristics**, at  $T_j=25\text{ °C}$ , unless otherwise specified

#### Static characteristics

|                                  |                             |                                                                                       |    |     |     |               |
|----------------------------------|-----------------------------|---------------------------------------------------------------------------------------|----|-----|-----|---------------|
| Drain-source breakdown voltage   | $V_{(\text{BR})\text{DSS}}$ | $V_{\text{GS}}=0\text{ V}$ , $I_{\text{D}}=1\text{ mA}$                               | 60 | -   | -   | V             |
| Gate threshold voltage           | $V_{\text{GS(th)}}$         | $V_{\text{DS}}=V_{\text{GS}}$ , $I_{\text{D}}=35\text{ }\mu\text{A}$                  | 2  | 3   | 4   |               |
| Zero gate voltage drain current  | $I_{\text{DSS}}$            | $V_{\text{DS}}=60\text{ V}$ , $V_{\text{GS}}=0\text{ V}$ ,<br>$T_j=25\text{ °C}$      | -  | 0.1 | 1   | $\mu\text{A}$ |
|                                  |                             | $V_{\text{DS}}=60\text{ V}$ , $V_{\text{GS}}=0\text{ V}$ ,<br>$T_j=125\text{ °C}$     | -  | 10  | 100 |               |
| Gate-source leakage current      | $I_{\text{GSS}}$            | $V_{\text{GS}}=20\text{ V}$ , $V_{\text{DS}}=0\text{ V}$                              | -  | 10  | 100 | nA            |
| Drain-source on-state resistance | $R_{\text{DS(on)}}$         | $V_{\text{GS}}=10\text{ V}$ , $I_{\text{D}}=50\text{ A}$                              | -  | 6.2 | 7.6 | mΩ            |
| Gate resistance                  | $R_{\text{G}}$              |                                                                                       | -  | 1   | -   | Ω             |
| Transconductance                 | $g_{\text{fs}}$             | $ V_{\text{DS}} >2 I_{\text{D}} R_{\text{DS(on)max}}$ ,<br>$I_{\text{D}}=50\text{ A}$ | 30 | 61  | -   | S             |

| Parameter | Symbol | Conditions | Values |      |      | Unit |
|-----------|--------|------------|--------|------|------|------|
|           |        |            | min.   | typ. | max. |      |

**Dynamic characteristics**

|                              |              |                                                                                 |   |      |      |    |
|------------------------------|--------------|---------------------------------------------------------------------------------|---|------|------|----|
| Input capacitance            | $C_{iss}$    | $V_{GS}=0\text{ V}, V_{DS}=30\text{ V},$<br>$f=1\text{ MHz}$                    | - | 3000 | 4000 | pF |
| Output capacitance           | $C_{oss}$    |                                                                                 | - | 660  | 880  |    |
| Reverse transfer capacitance | $C_{rss}$    |                                                                                 | - | 24   | -    |    |
| Turn-on delay time           | $t_{d(on)}$  | $V_{DD}=30\text{ V}, V_{GS}=10\text{ V},$<br>$I_D=50\text{ A}, R_G=3.5\ \Omega$ | - | 15   | -    | ns |
| Rise time                    | $t_r$        |                                                                                 | - | 40   | -    |    |
| Turn-off delay time          | $t_{d(off)}$ |                                                                                 | - | 20   | -    |    |
| Fall time                    | $t_f$        |                                                                                 | - | 5    | -    |    |

**Gate Charge Characteristics<sup>5)</sup>**

|                          |               |                                                                            |   |     |    |    |
|--------------------------|---------------|----------------------------------------------------------------------------|---|-----|----|----|
| Gate to source charge    | $Q_{gs}$      | $V_{DD}=30\text{ V}, I_D=50\text{ A},$<br>$V_{GS}=0\text{ to }10\text{ V}$ | - | 17  | -  | nC |
| Gate charge at threshold | $Q_{g(th)}$   |                                                                            | - | 9   | -  |    |
| Gate to drain charge     | $Q_{gd}$      |                                                                            | - | 4   | -  |    |
| Switching charge         | $Q_{sw}$      |                                                                            | - | 11  | -  |    |
| Gate charge total        | $Q_g$         |                                                                            | - | 37  | 50 |    |
| Gate plateau voltage     | $V_{plateau}$ |                                                                            | - | 5.5 | -  | V  |
| Output charge            | $Q_{oss}$     | $V_{DD}=30\text{ V}, V_{GS}=0\text{ V}$                                    | - | 30  | 40 |    |

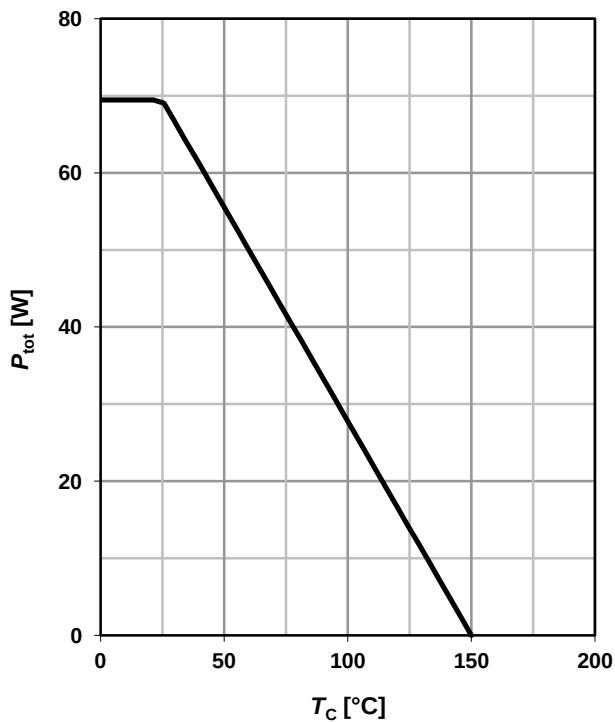
**© 2009 Infineon Technologies AG**

|                                  |               |                                                                           |   |     |     |    |
|----------------------------------|---------------|---------------------------------------------------------------------------|---|-----|-----|----|
| Diode continuous forward current | $I_S$         | $T_C=25\text{ °C}$                                                        | - | -   | 75  | A  |
| Diode pulse current              | $I_{S,pulse}$ |                                                                           | - | -   | 300 |    |
| Diode forward voltage            | $V_{SD}$      | $V_{GS}=0\text{ V}, I_F=50\text{ A},$<br>$T_J=25\text{ °C}$               | - | 0.9 | 1.2 | V  |
| Reverse recovery time            | $t_{rr}$      | $V_R=30\text{ V}, I_F=50\text{ A},$<br>$di_F/dt=100\text{ A}/\mu\text{s}$ | - | 45  | -   | ns |
| Reverse recovery charge          | $Q_{rr}$      |                                                                           | - | 40  | -   | nC |

<sup>5)</sup> See figure 16 for gate charge parameter definition

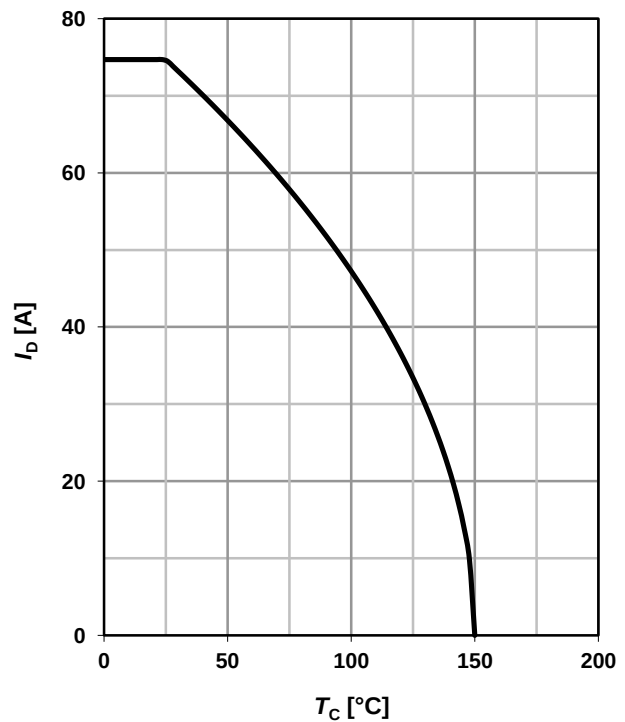
### 1 Power dissipation

$$P_{\text{tot}} = f(T_C)$$



### 2 Drain current

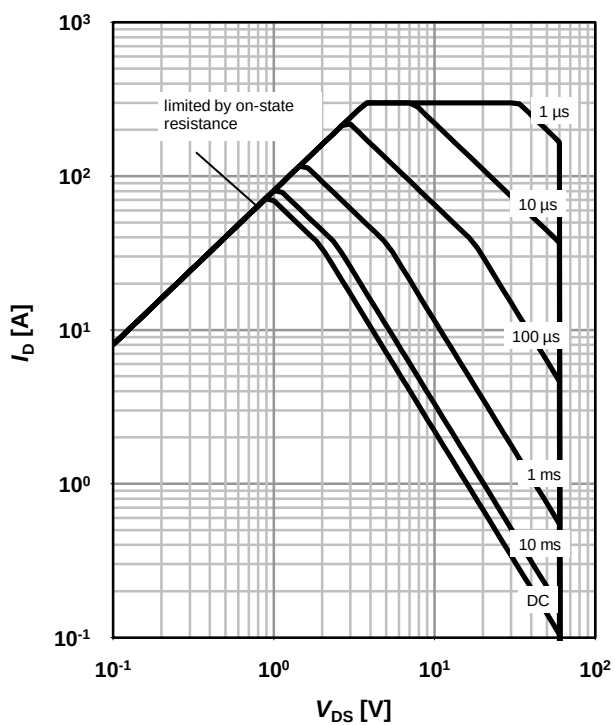
$$I_D = f(T_C); V_{GS} \geq 10 \text{ V}$$



### 3 Safe operating area

$$I_D = f(V_{DS}); T_C = 25^\circ\text{C}; D = 0$$

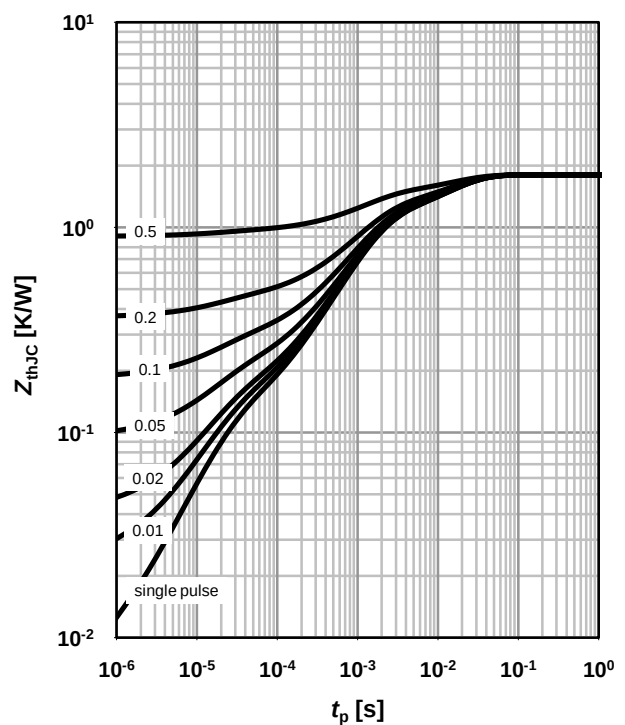
parameter:  $t_p$



### 4 Max. transient thermal impedance

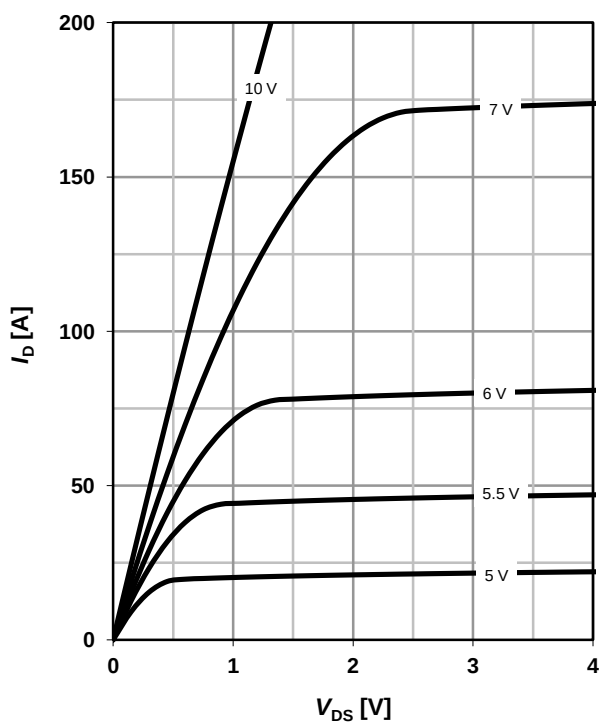
$$Z_{thJC} = f(t_p)$$

parameter:  $D = t_p/T$



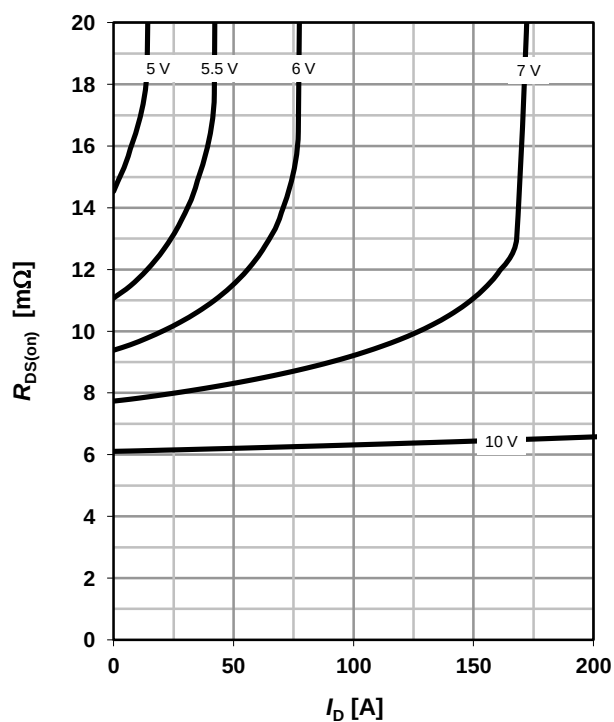
## 5 Typ. output characteristics

 $I_D = f(V_{DS}); T_j = 25^\circ\text{C}$ 

parameter:  $V_{GS}$ 


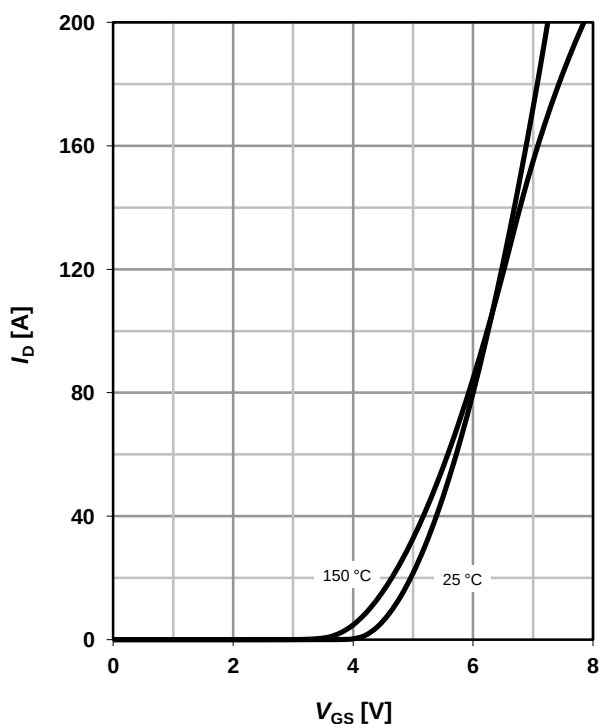
## 6 Typ. drain-source on resistance

 $R_{DS(on)} = f(I_D); T_j = 25^\circ\text{C}$ 

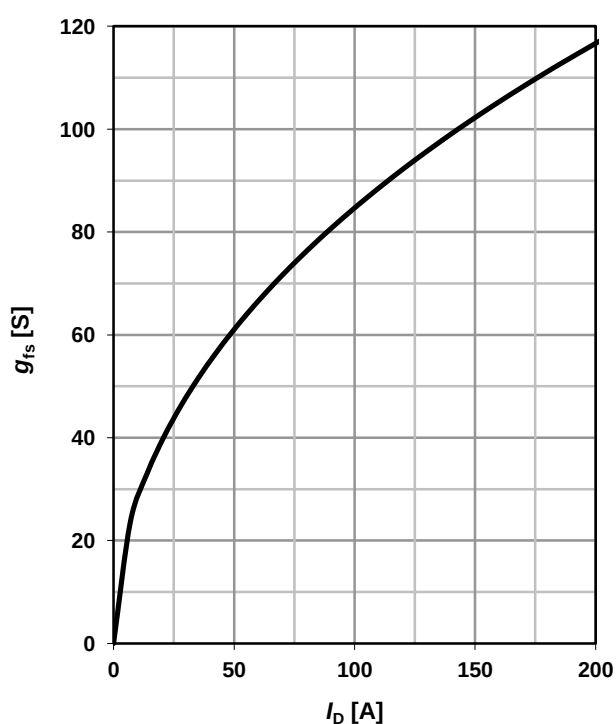
parameter:  $V_{GS}$ 


## 7 Typ. transfer characteristics

 $I_D = f(V_{GS}); |V_{DS}| > 2|I_D| R_{DS(on)max}$ 

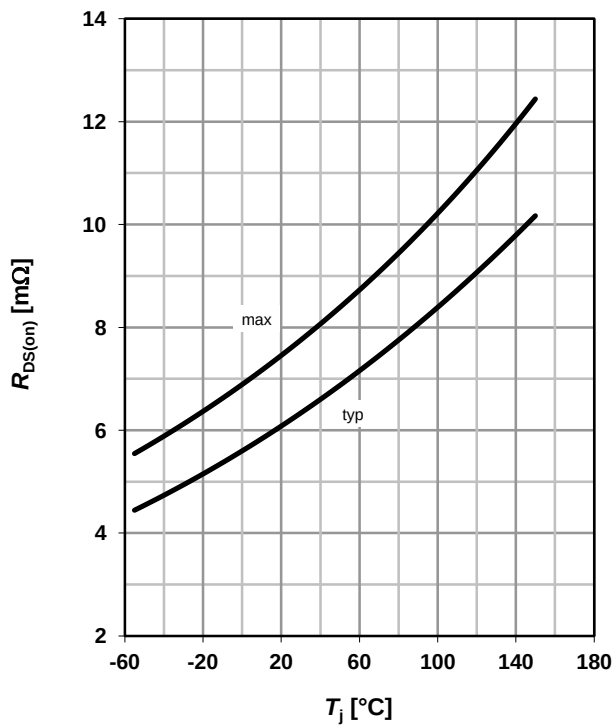
parameter:  $T_j$ 


## 8 Typ. forward transconductance

 $g_{fs} = f(I_D); T_j = 25^\circ\text{C}$ 


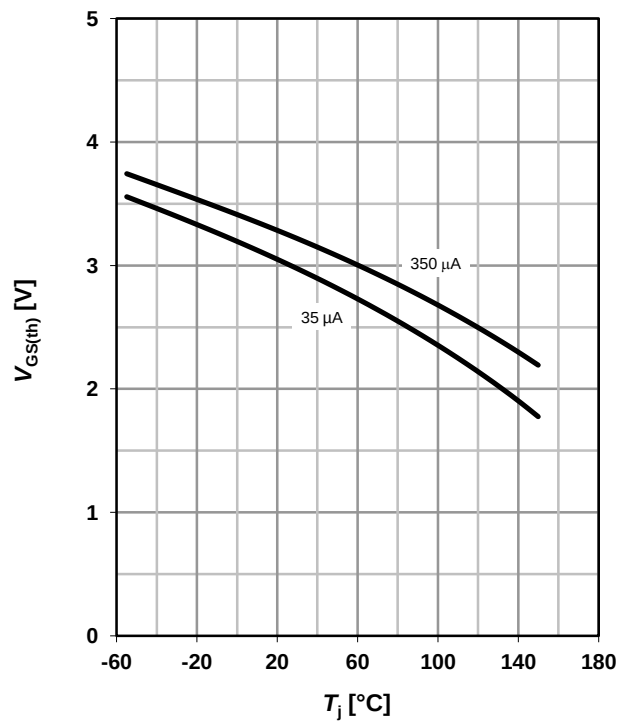
## 9 Drain-source on-state resistance

$$R_{DS(on)} = f(T_j); I_D = 50 \text{ A}; V_{GS} = 10 \text{ V}$$



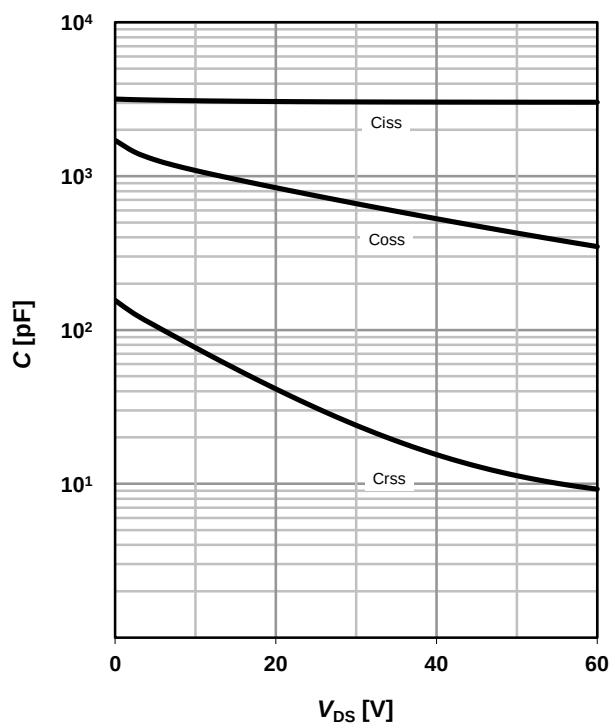
## 10 Typ. gate threshold voltage

$$V_{GS(th)} = f(T_j); V_{GS} = V_{DS}$$



## 11 Typ. capacitances

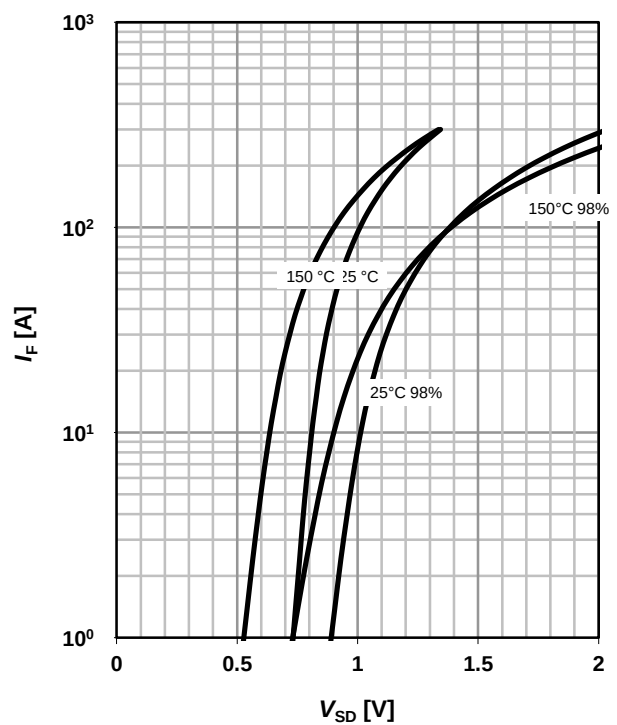
$$C = f(V_{DS}); V_{GS} = 0 \text{ V}; f = 1 \text{ MHz}$$



## 12 Forward characteristics of reverse diode

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

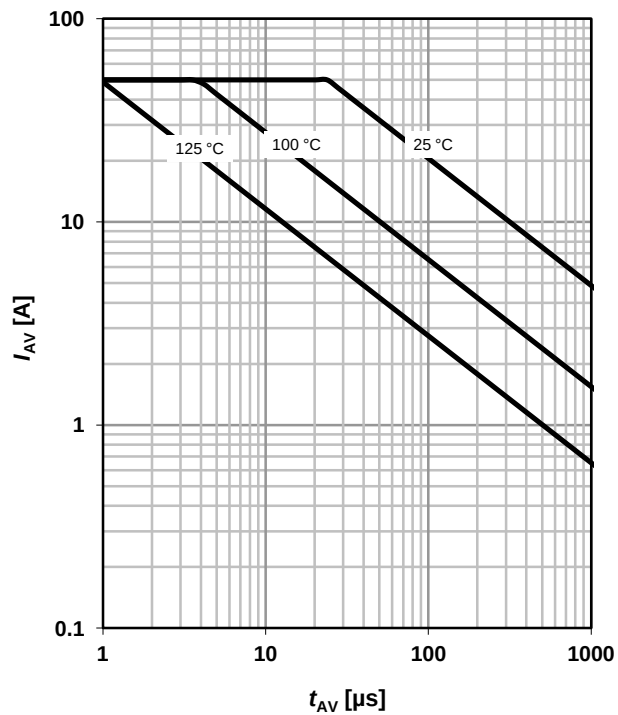
parameter:  $T_j$



### 13 Avalanche characteristics

$$I_{AS}=f(t_{AV}); R_{GS}=25\ \Omega$$

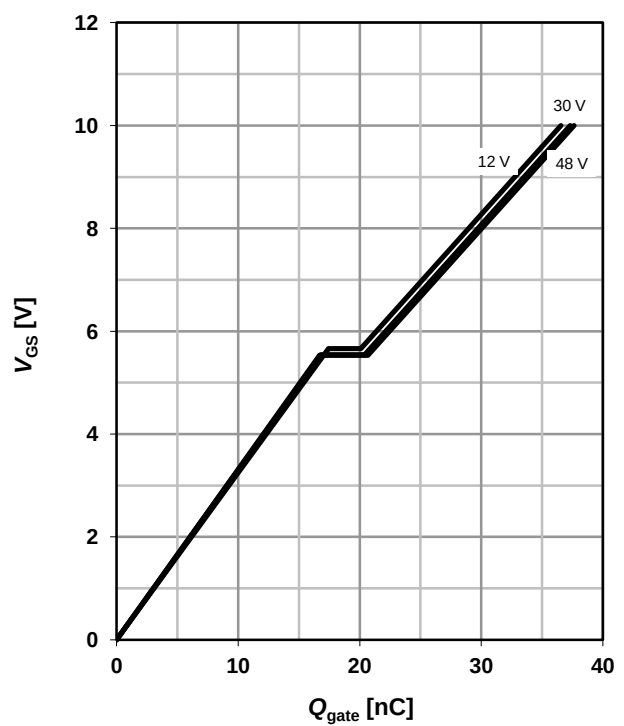
parameter:  $T_{j(\text{start})}$



### 14 Typ. gate charge

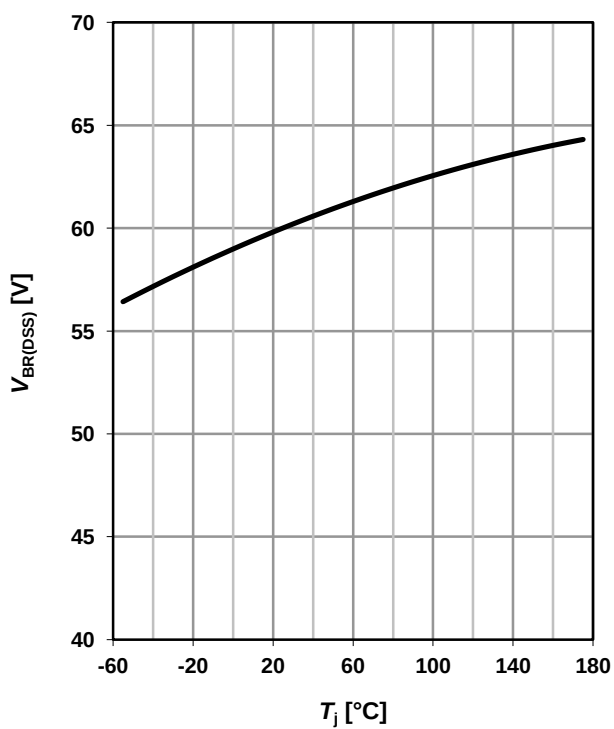
$$V_{GS}=f(Q_{\text{gate}}); I_D=50\ \text{A pulsed}$$

parameter:  $V_{DD}$

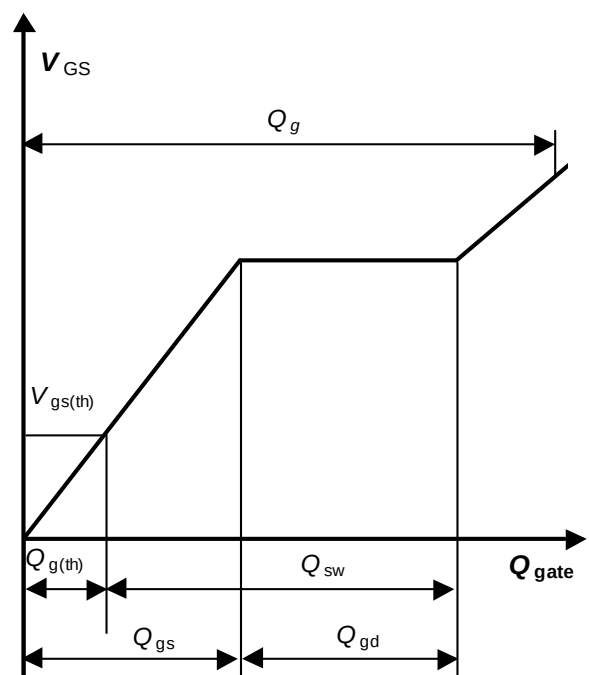


### 15 Drain-source breakdown voltage

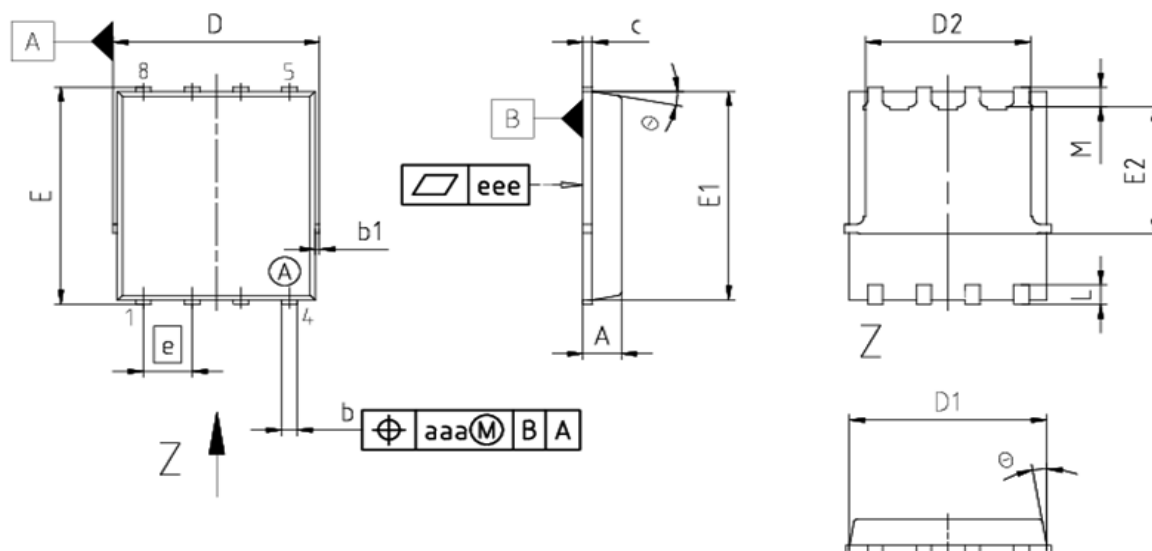
$$V_{BR(DSS)}=f(T_j); I_D=1\ \text{mA}$$



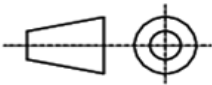
### 16 Gate charge waveforms



## PG-TDSON-8-5 (SuperSO8)



| DIM | MILLIMETERS |      |
|-----|-------------|------|
|     | MIN         | MAX  |
| A   | 0.90        | 1.10 |
| b   | 0.31        | 0.54 |
| b1  | 0.02        | 0.22 |
| c   | 0.15        | 0.35 |
| D   | 5.15        | 5.49 |
| D1  | 4.95        | 5.35 |
| D2  | 3.70        | 4.40 |
| E   | 5.95        | 6.35 |
| E1  | 5.70        | 6.10 |
| E2  | 3.40        | 3.80 |
| e   | 1.27        |      |
| N   | 8           |      |
| L   | 0.45        | 0.71 |
| M   | 0.45        | 0.75 |
| ⊙   | 8.5°        | 12°  |
| aaa | 0.25        |      |
| eee | 0.08        |      |

|                                                                                                                    |
|--------------------------------------------------------------------------------------------------------------------|
| <b>DOCUMENT NO.</b><br>Z8B00003332                                                                                 |
| <b>SCALE</b><br>0 2 4mm                                                                                            |
| <b>EUROPEAN PROJECTION</b><br> |
| <b>ISSUE DATE</b><br>10-04-2013                                                                                    |
| <b>REVISION</b><br>04                                                                                              |



**Published by**  
**Infineon Technologies AG**  
**81726 Munich, Germany**  
**© 2009 Infineon Technologies AG**  
**All Rights Reserved.**

#### **Legal Disclaimer**

The information given in this document shall in no event be regarded as a guarantee of conditions or characteristics. With respect to any examples or hints given herein, any typical values stated herein and/or any information regarding the application of the device, Infineon Technologies hereby disclaims any and all warranties and liabilities of any kind, including without limitation, warranties of non-infringement of intellectual property rights of any third party.

#### **Information**

For further information on technology, delivery terms and conditions and prices, please contact the nearest Infineon Technologies Office ([www.infineon.com](http://www.infineon.com)).

#### **Warnings**

Due to technical requirements, components may contain dangerous substances. For information on the types in question, please contact the nearest Infineon Technologies Office.

Infineon Technologies components may be used in life-support devices or systems only with the express written approval of Infineon Technologies, if a failure of such components can reasonably be expected to cause the failure of that life-support device or system or to affect the safety or effectiveness of that device or system. Life support devices or systems are intended to be implanted in the human body or to support and/or maintain and sustain and/or protect human life. If they fail, it is reasonable to assume that the health of the user or other persons may be endangered.

## Данный компонент на территории Российской Федерации

**Вы можете приобрести в компании MosChip.**

Для оперативного оформления запроса Вам необходимо перейти по данной ссылке:

<http://moschip.ru/get-element>

Вы можете разместить у нас заказ для любого Вашего проекта, будь то серийное производство или разработка единичного прибора.

В нашем ассортименте представлены ведущие мировые производители активных и пассивных электронных компонентов.

Нашей специализацией является поставка электронной компонентной базы двойного назначения, продукции таких производителей как XILINX, Intel (ex.ALTERA), Vicor, Microchip, Texas Instruments, Analog Devices, Mini-Circuits, Amphenol, Glenair.

Сотрудничество с глобальными дистрибьюторами электронных компонентов, предоставляет возможность заказывать и получать с международных складов практически любой перечень компонентов в оптимальные для Вас сроки.

На всех этапах разработки и производства наши партнеры могут получить квалифицированную поддержку опытных инженеров.

Система менеджмента качества компании отвечает требованиям в соответствии с ГОСТ Р ИСО 9001, ГОСТ РВ 0015-002 и ЭС РД 009

### Офис по работе с юридическими лицами:

105318, г.Москва, ул.Щербаковская д.3, офис 1107, 1118, ДЦ «Щербаковский»

Телефон: +7 495 668-12-70 (многоканальный)

Факс: +7 495 668-12-70 (доб.304)

E-mail: [info@moschip.ru](mailto:info@moschip.ru)

Skype отдела продаж:

moschip.ru

moschip.ru\_4

moschip.ru\_6

moschip.ru\_9