

MOSFET

StrongIRFET™2 Power-Transistor, 30 V

Features

- Optimized for a wide range of applications
- N-channel, logic level
- 100% avalanche tested
- 175°C rated
- Pb-free lead plating; RoHS compliant
- Halogen-free according to IEC61249-2-21

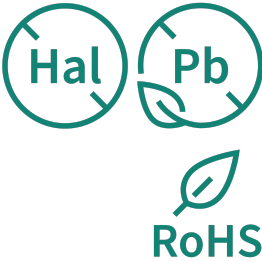
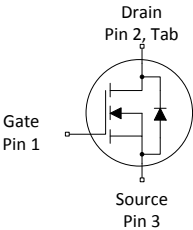
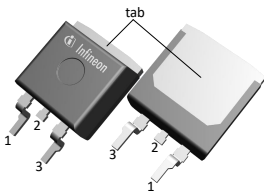
Product validation

Qualified according to JEDEC Standard

Table 1 Key performance parameters

| Parameter        | Value | Unit |
|------------------|-------|------|
| $V_{DS}$         | 30    | V    |
| $R_{DS(on),max}$ | 2.05  | mΩ   |
| $I_D$            | 122   | A    |
| $Q_{oss}$        | 54    | nC   |
| $Q_G(0V..4.5V)$  | 33    | nC   |

D<sup>2</sup>PAK



| Type / Ordering code | Package    | Marking  | Related links |
|----------------------|------------|----------|---------------|
| IPB020N03LF2S        | PG-TO263-3 | 020N03F2 | -             |



Table of contents

Description ..... 1

Maximum ratings ..... 3

Thermal characteristics ..... 4

Electrical characteristics ..... 5

Electrical characteristics diagrams ..... 7

Package outlines ..... 11

Revision history ..... 12

Trademarks ..... 12

Disclaimer ..... 12

## 1 Maximum ratings

at  $T_A=25\text{ °C}$ , unless otherwise specified

**Table 2 Maximum ratings**

| Parameter                                    | Symbol         | Values |      |                 | Unit | Note / Test condition                                                                                                                                                          |
|----------------------------------------------|----------------|--------|------|-----------------|------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                              |                | Min.   | Typ. | Max.            |      |                                                                                                                                                                                |
| Continuous drain current <sup>1)</sup>       | $I_D$          | -      | -    | 122<br>94<br>33 | A    | $V_{GS}=10\text{ V}$ , $T_C=25\text{ °C}$<br>$V_{GS}=10\text{ V}$ , $T_C=100\text{ °C}$<br>$V_{GS}=10\text{ V}$ , $T_A=25\text{ °C}$ , $R_{THJA}=40\text{ °C/W}$ <sup>2)</sup> |
| Pulsed drain current <sup>3)</sup>           | $I_{D,pulse}$  | -      | -    | 488             | A    | $T_C=25\text{ °C}$                                                                                                                                                             |
| Avalanche energy, single pulse <sup>4)</sup> | $E_{AS}$       | -      | -    | 338<br>676      | mJ   | $I_D=70\text{ A}$ , $R_{GS}=25\text{ }\Omega$<br>$I_D=35\text{ A}$ , $R_{GS}=25\text{ }\Omega$                                                                                 |
| Gate source voltage                          | $V_{GS}$       | -20    | -    | 20              | V    | -                                                                                                                                                                              |
| Power dissipation                            | $P_{tot}$      | -      | -    | 136<br>3.8      | W    | $T_C=25\text{ °C}$<br>$T_A=25\text{ °C}$ , $R_{THJA}=40\text{ °C/W}$ <sup>2)</sup>                                                                                             |
| Operating and storage temperature            | $T_j, T_{stg}$ | -55    | -    | 175             | °C   | -                                                                                                                                                                              |

<sup>1)</sup> Rating refers to the product only with datasheet specified absolute maximum values, maintaining case temperature as specified. For other case temperatures please refer to Diagram 2. De-rating will be required based on the actual environmental conditions.

<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 Diagram 3 for more detailed information

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

## 2 Thermal characteristics

**Table 3 Thermal characteristics**

| Parameter                                                                            | Symbol     | Values |      |      | Unit | Note / Test condition |
|--------------------------------------------------------------------------------------|------------|--------|------|------|------|-----------------------|
|                                                                                      |            | Min.   | Typ. | Max. |      |                       |
| Thermal resistance, junction - case                                                  | $R_{thJC}$ | -      | -    | 1.1  | °C/W | -                     |
| Thermal resistance, junction - ambient, 6 cm <sup>2</sup> cooling area <sup>5)</sup> | $R_{thJA}$ | -      | -    | 40   | °C/W |                       |
| Thermal resistance, junction - ambient, minimal footprint                            | $R_{thJA}$ | -      | -    | 62   | °C/W |                       |

<sup>5)</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.

### 3 Electrical characteristics

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

**Table 4 Static characteristics**

| Parameter                        | Symbol        | Values |             |             | Unit          | Note / Test condition                                                                                                               |
|----------------------------------|---------------|--------|-------------|-------------|---------------|-------------------------------------------------------------------------------------------------------------------------------------|
|                                  |               | Min.   | Typ.        | Max.        |               |                                                                                                                                     |
| Drain-source breakdown voltage   | $V_{(BR)DSS}$ | 30     | -           | -           | V             | $V_{GS}=0\text{ V}$ , $I_D=2\text{ mA}$                                                                                             |
| Gate threshold voltage           | $V_{GS(th)}$  | 1.35   | 1.85        | 2.35        | V             | $V_{DS}=V_{GS}$ , $I_D=80\text{ }\mu\text{A}$                                                                                       |
| Zero gate voltage drain current  | $I_{DSS}$     | -      | 0.1<br>10   | 1<br>100    | $\mu\text{A}$ | $V_{DS}=30\text{ V}$ , $V_{GS}=0\text{ V}$ , $T_j=25\text{ °C}$<br>$V_{DS}=30\text{ V}$ , $V_{GS}=0\text{ V}$ , $T_j=125\text{ °C}$ |
| Gate-source leakage current      | $I_{GSS}$     | -      | 10          | 100         | nA            | $V_{GS}=20\text{ V}$ , $V_{DS}=0\text{ V}$                                                                                          |
| Drain-source on-state resistance | $R_{DS(on)}$  | -      | 1.76<br>2.1 | 2.05<br>3.0 | m $\Omega$    | $V_{GS}=10\text{ V}$ , $I_D=70\text{ A}$<br>$V_{GS}=4.5\text{ V}$ , $I_D=35\text{ A}$                                               |
| Gate resistance                  | $R_G$         | -      | 2.3         | -           | $\Omega$      | -                                                                                                                                   |
| Transconductance <sup>6)</sup>   | $g_{fs}$      | 100    | -           | -           | S             | $ V_{DS} \geq 2 I_D R_{DS(on)max}$ , $I_D=70\text{ A}$                                                                              |

<sup>6)</sup> Defined by design. Not subject to production test.

**Table 5 Dynamic characteristics**

| Parameter                    | Symbol       | Values |      |      | Unit | Note / Test condition                                                                            |
|------------------------------|--------------|--------|------|------|------|--------------------------------------------------------------------------------------------------|
|                              |              | Min.   | Typ. | Max. |      |                                                                                                  |
| Input capacitance            | $C_{iss}$    | -      | 4700 | -    | pF   | $V_{GS}=0\text{ V}$ , $V_{DS}=15\text{ V}$ , $f=1\text{ MHz}$                                    |
| Output capacitance           | $C_{oss}$    | -      | 910  | -    | pF   |                                                                                                  |
| Reverse transfer capacitance | $C_{rss}$    | -      | 235  | -    | pF   |                                                                                                  |
| Turn-on delay time           | $t_{d(on)}$  | -      | 22   | -    | ns   | $V_{DD}=15\text{ V}$ , $V_{GS}=4.5\text{ V}$ , $I_D=70\text{ A}$ , $R_{G,ext}=1.6\text{ }\Omega$ |
| Rise time                    | $t_r$        | -      | 70   | -    | ns   |                                                                                                  |
| Turn-off delay time          | $t_{d(off)}$ | -      | 28   | -    | ns   |                                                                                                  |
| Fall time                    | $t_f$        | -      | 13   | -    | ns   |                                                                                                  |

**Table 6 Gate charge characteristics <sup>7)</sup>**

| Parameter                       | Symbol        | Values |      |      | Unit | Note / Test condition                                                        |
|---------------------------------|---------------|--------|------|------|------|------------------------------------------------------------------------------|
|                                 |               | Min.   | Typ. | Max. |      |                                                                              |
| Gate to source charge           | $Q_{gs}$      | -      | 15   | -    | nC   | $V_{DD}=15\text{ V}$ , $I_D=70\text{ A}$ , $V_{GS}=0\text{ to }4.5\text{ V}$ |
| Gate charge at threshold        | $Q_{g(th)}$   | -      | 8.6  | -    | nC   |                                                                              |
| Gate to drain charge            | $Q_{gd}$      | -      | 10   | -    | nC   |                                                                              |
| Switching charge                | $Q_{sw}$      | -      | 17   | -    | nC   |                                                                              |
| Gate charge total <sup>8)</sup> | $Q_g$         | -      | 33   | 50   | nC   |                                                                              |
| Gate plateau voltage            | $V_{plateau}$ | -      | 3.3  | -    | V    | $V_{DD}=15\text{ V}$ , $I_D=70\text{ A}$ , $V_{GS}=0\text{ to }10\text{ V}$  |
| Gate charge total <sup>8)</sup> | $Q_g$         | -      | 69   | 104  | nC   |                                                                              |

**Table 6 Gate charge characteristics** <sup>7)</sup>

| Parameter                                  | Symbol        | Values |      |      | Unit | Note / Test condition                                     |
|--------------------------------------------|---------------|--------|------|------|------|-----------------------------------------------------------|
|                                            |               | Min.   | Typ. | Max. |      |                                                           |
| Gate charge total, sync. FET <sup>8)</sup> | $Q_{g(sync)}$ | -      | 29   | -    | nC   | $V_{DS}=0.1\text{ V}$ , $V_{GS}=0\text{ to }4.5\text{ V}$ |
| Output charge <sup>8)</sup>                | $Q_{oss}$     | -      | 54   | -    | nC   | $V_{DS}=15\text{ V}$ , $V_{GS}=0\text{ V}$                |

<sup>7)</sup> See "Gate charge waveforms" for parameter definition

<sup>8)</sup> Defined by design. Not subject to production test.

**Table 7 Reverse diode**

| Parameter                        | Symbol        | Values |      |      | Unit | Note / Test condition                                                      |
|----------------------------------|---------------|--------|------|------|------|----------------------------------------------------------------------------|
|                                  |               | Min.   | Typ. | Max. |      |                                                                            |
| Diode continuous forward current | $I_S$         | -      | -    | 94   | A    | $T_C=25\text{ °C}$                                                         |
| Diode pulse current              | $I_{S,pulse}$ | -      | -    | 488  | A    |                                                                            |
| Diode forward voltage            | $V_{SD}$      | -      | 0.85 | 1.0  | V    | $V_{GS}=0\text{ V}$ , $I_F=70\text{ A}$ , $T_J=25\text{ °C}$               |
| Reverse recovery time            | $t_{rr}$      | -      | 20   | -    | ns   | $V_R=15\text{ V}$ , $I_F=70\text{ A}$ , $di_F/dt=500\text{ A}/\mu\text{s}$ |
| Reverse recovery charge          | $Q_{rr}$      | -      | 63   | -    | nC   |                                                                            |

## 4 Electrical characteristics diagrams

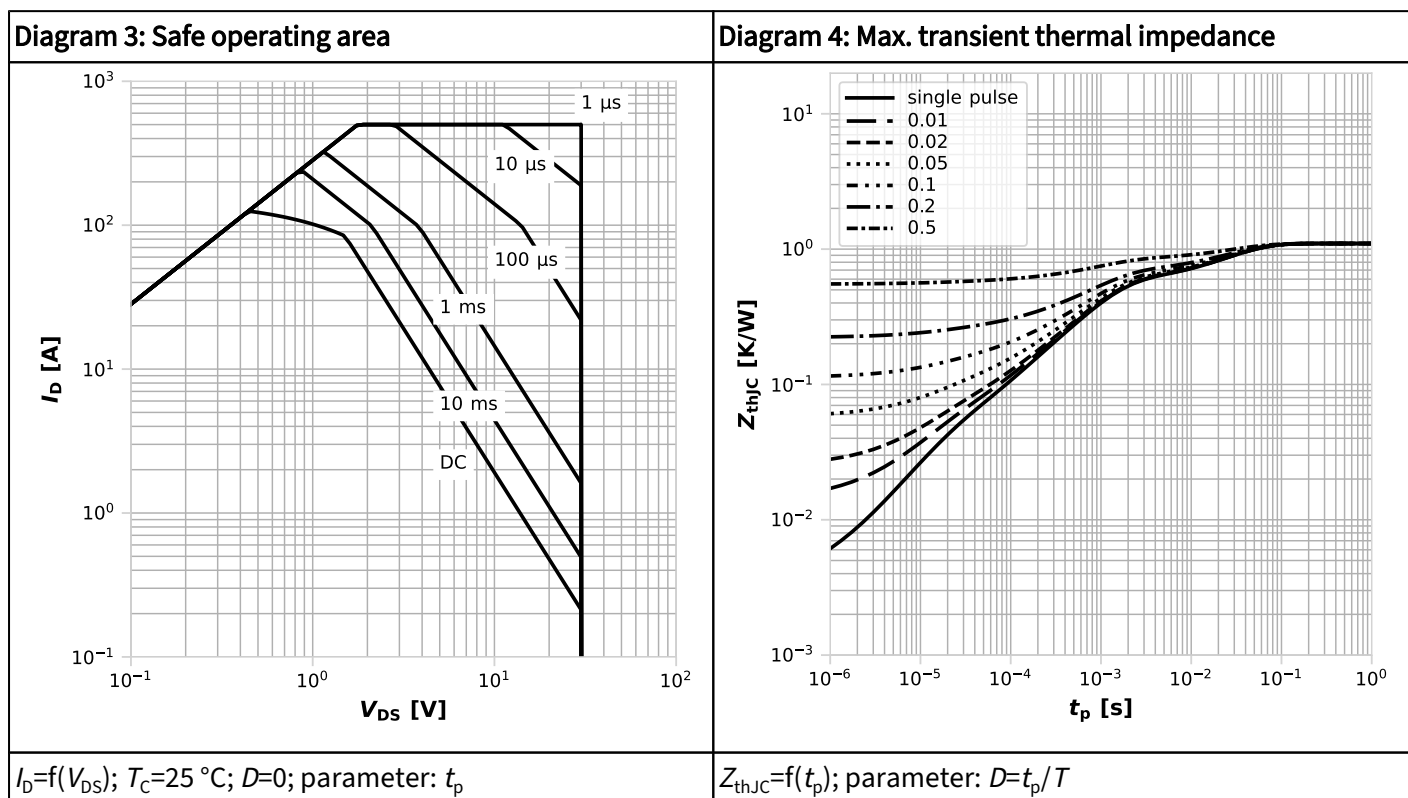
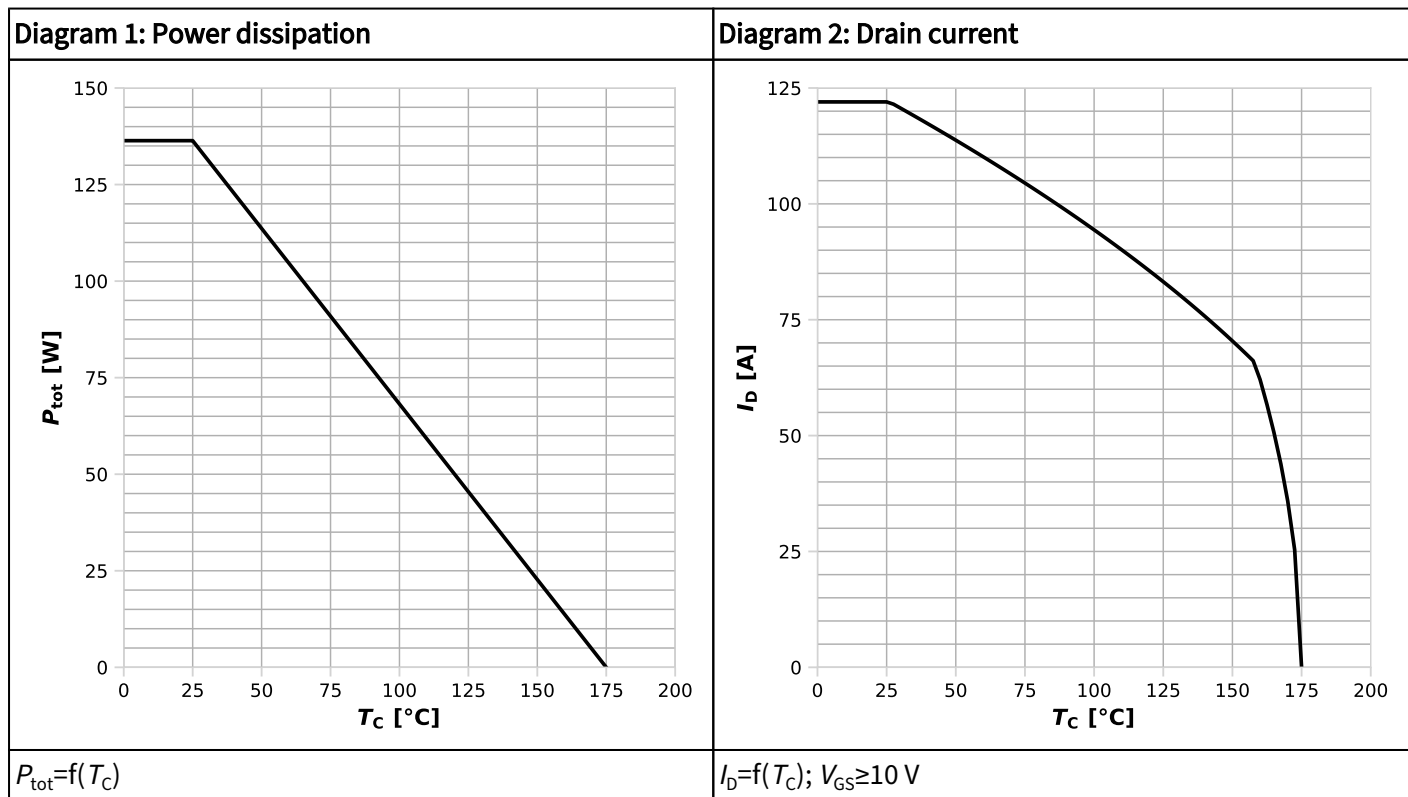
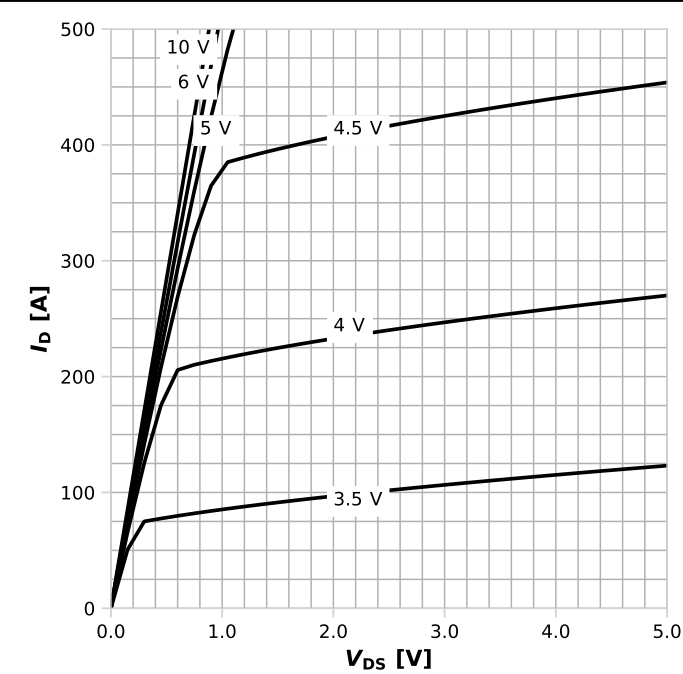


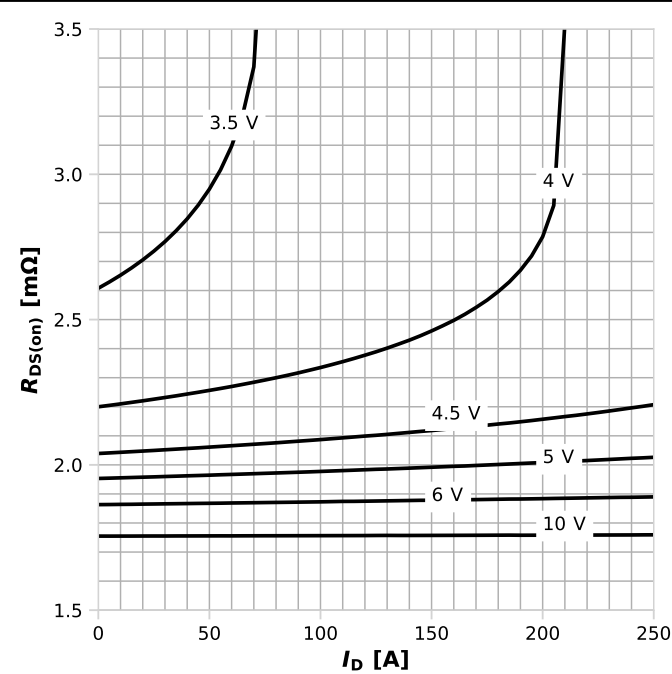


Diagram 5: Typ. output characteristics



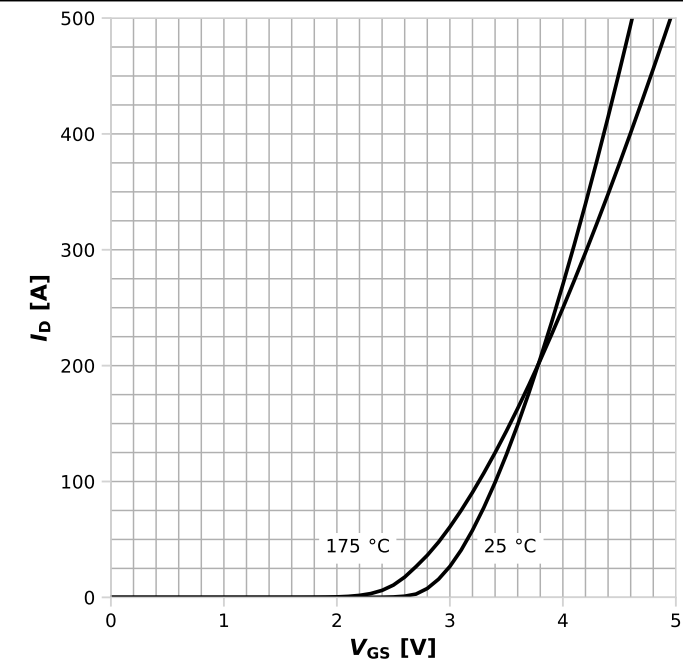
$I_D = f(V_{DS}), T_j = 25\text{ °C}; \text{parameter: } V_{GS}$

Diagram 6: Typ. drain-source on resistance



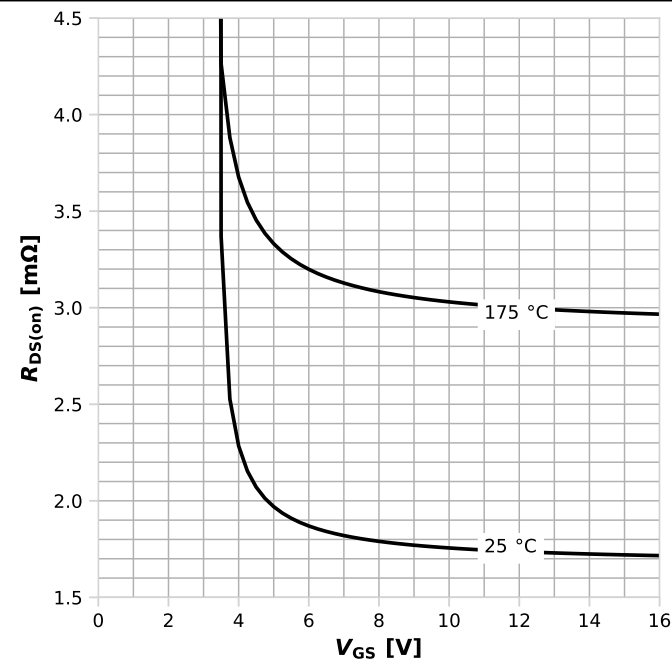
$R_{DS(on)} = f(I_D), T_j = 25\text{ °C}; \text{parameter: } V_{GS}$

Diagram 7: Typ. transfer characteristics



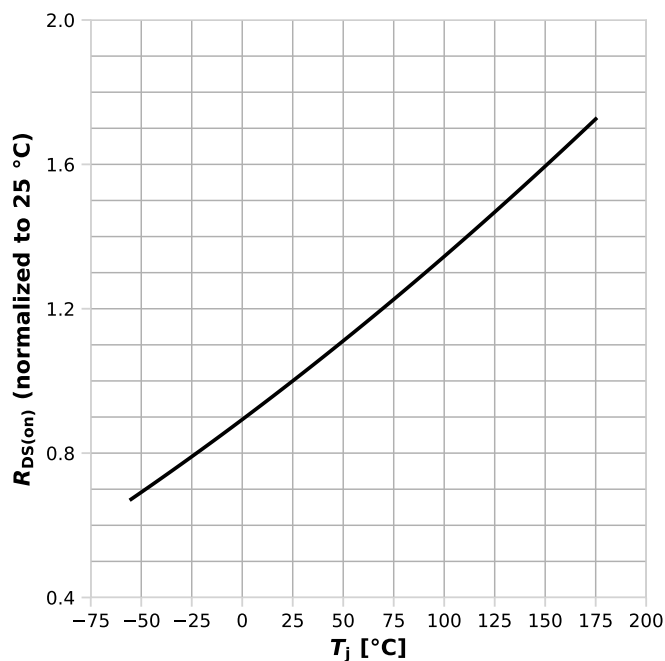
$I_D = f(V_{GS}), |V_{DS}| > 2|I_D|R_{DS(on)max}; \text{parameter: } T_j$

Diagram 8: Typ. drain-source on resistance



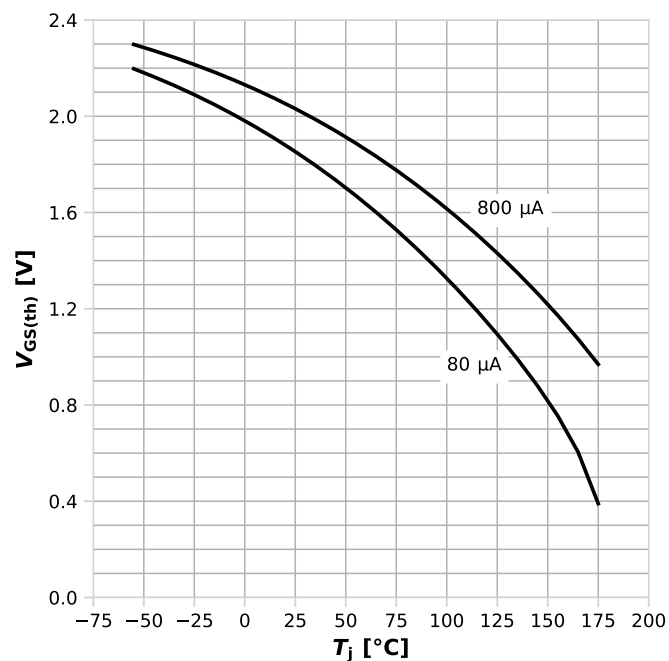
$R_{DS(on)} = f(V_{GS}), I_D = 70\text{ A}; \text{parameter: } T_j$

Diagram 9: Normalized drain-source on resistance



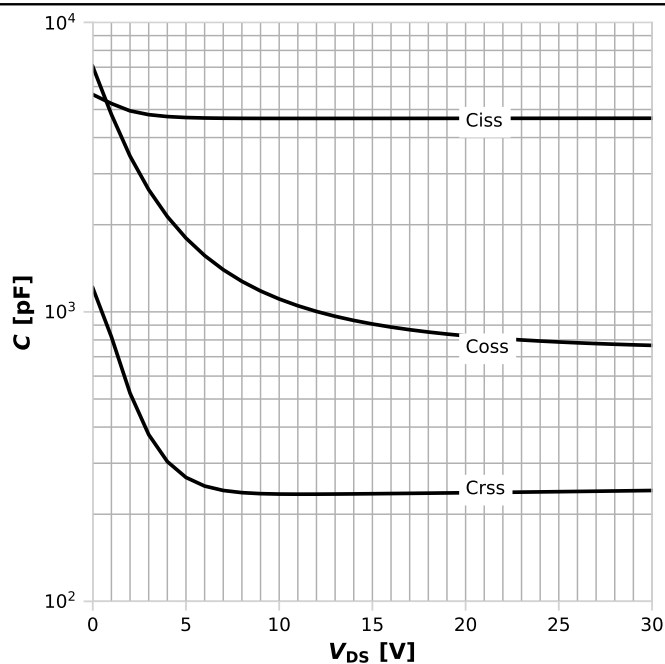
$$R_{DS(on)} = f(T_j), I_D = 70 \text{ A}, V_{GS} = 10 \text{ V}$$

Diagram 10: Typ. gate threshold voltage



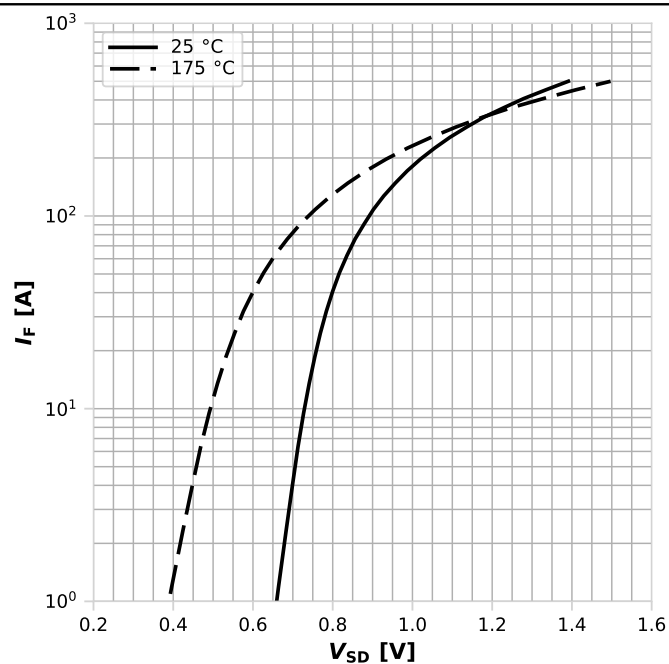
$$V_{GS(th)} = f(T_j), V_{GS} = V_{DS}; \text{ parameter: } I_D$$

Diagram 11: Typ. capacitances

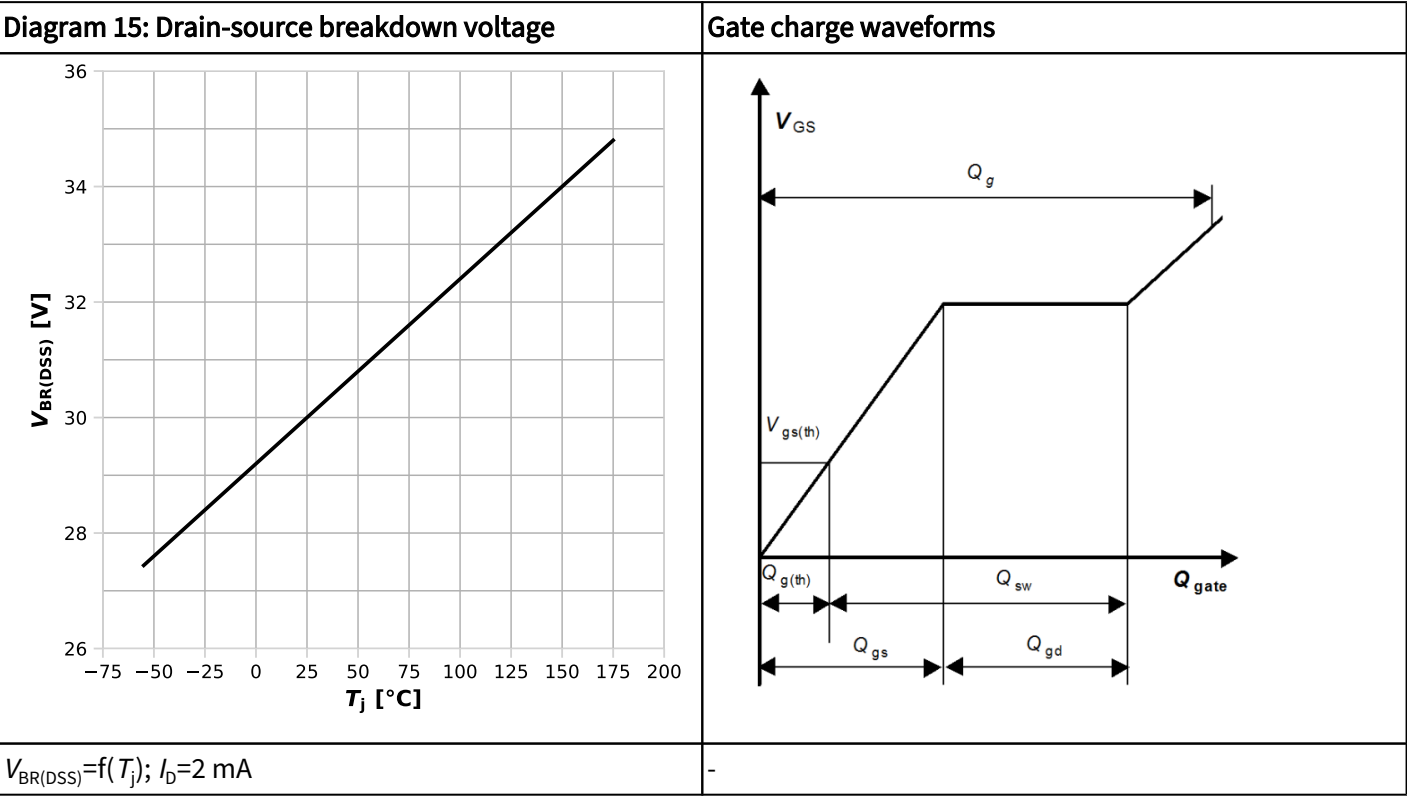
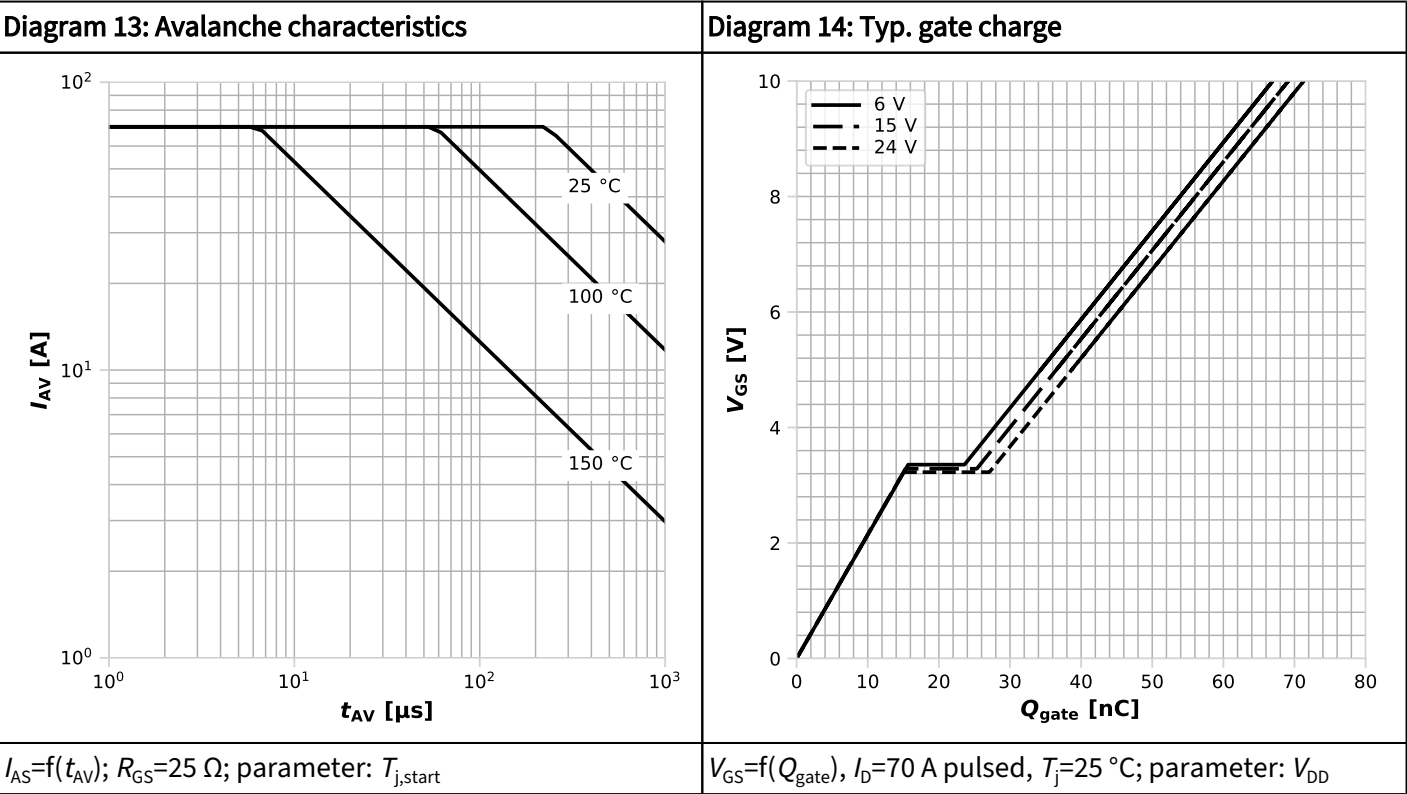


$$C = f(V_{DS}); V_{GS} = 0 \text{ V}; f = 1 \text{ MHz}$$

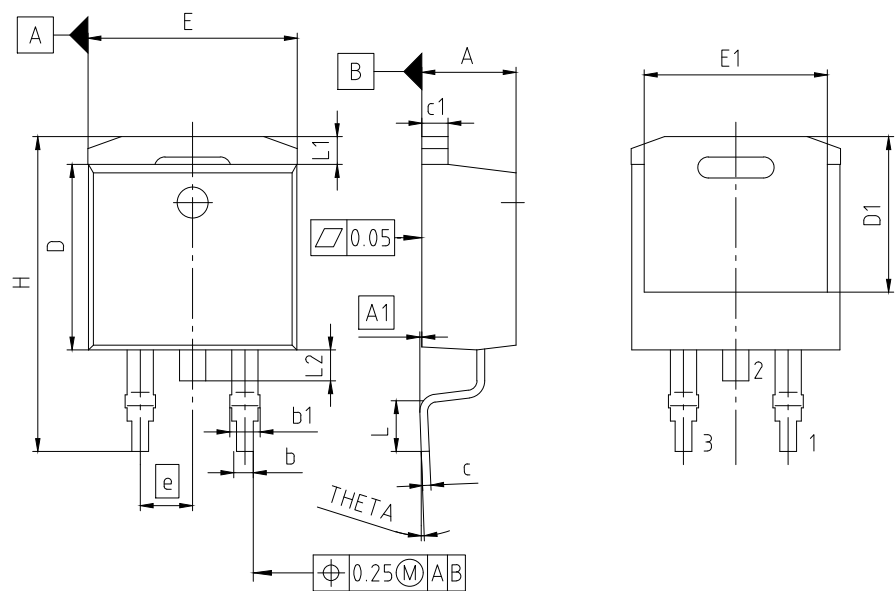
Diagram 12: Forward characteristics of reverse diode



$$I_F = f(V_{SD}); \text{ parameter: } T_j$$



5 Package outlines



| PACKAGE - GROUP<br>NUMBER: PG-T0263-3-U02 |             |       |
|-------------------------------------------|-------------|-------|
| DIMENSIONS                                | MILLIMETERS |       |
|                                           | MIN.        | MAX.  |
| A                                         | 4.06        | 4.83  |
| A1                                        | 0.00        | 0.25  |
| b                                         | 0.51        | 1.00  |
| b1                                        | 1.07        | 1.78  |
| c                                         | 0.30        | 0.73  |
| c1                                        | 1.14        | 1.65  |
| D                                         | 8.38        | 9.65  |
| D1                                        | 6.60        | 7.50  |
| E                                         | 9.65        | 10.67 |
| E1                                        | 6.22        | 8.70  |
| e                                         | 2.54        |       |
| N                                         | 3           |       |
| H                                         | 14.60       | 15.88 |
| L                                         | 1.52        | 2.60  |
| L1                                        | 1.05        | 1.68  |
| L2                                        | 1.35        | 1.78  |
| THETA                                     | -9.00°      | 8.00° |

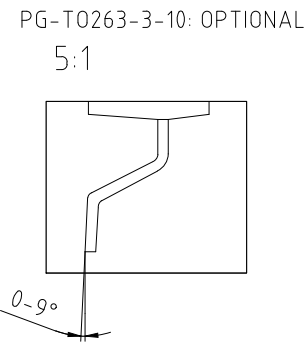


Figure 1 Outline PG-T0263-3, dimensions in mm

## X-ON Electronics

Largest Supplier of Electrical and Electronic Components

*Click to view similar products for [MOSFETs](#) category:*

*Click to view products by [Infineon](#) manufacturer:*

Other Similar products are found below :

[MCH3443-TL-E](#) [MCH6422-TL-E](#) [PMV32UP215](#) [NTNS3A92PZT5G](#) [IRFD120](#) [2SK2464-TL-E](#) [2SK3818-DL-E](#) [2SJ277-DL-E](#)  
[MIC4420CM-TR](#) [IRFS350](#) [IPS70R2K0CEAKMA1](#) [AON6932A](#) [TS19452CS RL](#) [2SK2614\(Te16L1,Q\)](#) [EFC2J004NUZTDG](#)  
[DMN1053UCP4-7](#) [NTE2384](#) [2N7000TA](#) [743-9](#) [US6M2GTR](#) [STF5N65M6](#) [IRF40H233XTMA1](#) [STU5N65M6](#) [DMN13M9UCA6-7](#)  
[STU7N60DM2](#) [2N7002W-G](#) [MCAC30N06Y-TP](#) [IPB45P03P4L11ATMA2](#) [BXP4N65F](#) [BXP2N20L](#) [BXP2N65D](#) [SLF10N65ABV2](#)  
[CJAC130SN06L](#) [HSBA6054](#) [HSBB6054](#) [HSBB0210](#) [HSBA6901](#) [BSC004NE2LS5](#) [BSZ075N08NS5](#) [LBSS138DW1T1G](#) [AP0903G](#)  
[SSM10N954L,EFF\(S\)](#) [2SK3878\(STA1,E,S\)](#) [TPN6R303NC,LQ\(S\)](#) [AP3N5R0MT](#) [AP6NA3R2MT](#) [AP3C023AMT](#) [AP6242](#) [HSBB3909](#)  
[HSBA3204](#)