# IPT015N10NF2SATMA1 Datasheet


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|---|---|
| DiGi Electronics Part Number | IPT015N10NF2SATMA1-DG |
| Manufacturer | Infineon Technologies |
| Manufacturer Product Number | IPT015N10NF2SATMA1 |
| Description | MOSFET |
| Detailed Description | N-Channel 100 V 35A (Ta), 315A (Tc) 3.8W (Ta), 300 W (Tc) Surface Mount PG-HSOF-8 |

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## Purchase and inquiry

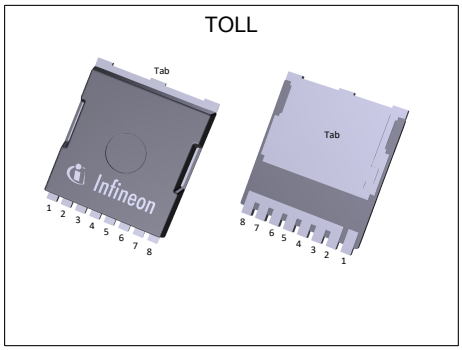
| Manufacturer Product Number: | Manufacturer: |
| --- | --- |
| IPT015N10NF2SATMA1 | Infineon Technologies |
| Series: | Product Status: |
| StrongIRFET™ 2 | Active |
| FET Type: | Technology: |
| N-Channel | MOSFET (Metal Oxide) |
| Drain to Source Voltage (Vdss): | Current - Continuous Drain (Id) @ 25°C: |
| 100 V | 35A (Ta), 315A (Tc) |
| Drive Voltage (Max Rds On, Min Rds On): | Rds On (Max) @ Id, Vgs: |
| 6V, 10V | 1.5mOhm @ 150A, 10V |
| Vgs(th) (Max) @ Id: | Gate Charge (Qg) (Max) @ Vgs: |
| 3.8V @ 267µA | 242 nC @ 10 V |
| Vgs (Max): | Input Capacitance (Ciss) (Max) @ Vds: |
| ±20V | 11000 pF @ 50 V |
| FET Feature: | Power Dissipation (Max): |
| - | 3.8W (Ta), 300W (Tc) |
| Operating Temperature: | Mounting Type: |
| -55°C ~ 175°C (TJ) | Surface Mount |
| Supplier Device Package: | Package / Case: |
| PG-HSOF-8 | 8-PowerSFN |

## Environmental & Export classification

| RoHS Status: | Moisture Sensitivity Level (MSL): |
| --- | --- |
| ROHS3 Compliant | 1 (Unlimited) |
| REACH Status: | ECCN: |
| REACH Unaffected | EAR99 |
| HTSUS: | |
| 8541.29.0095 | |

# MOSFET

## StrongIRFET™ 2 Power-Transistor

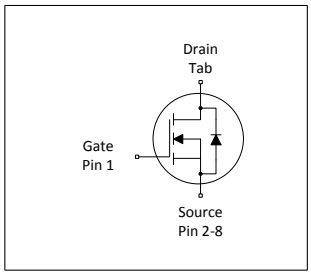



### Features

- Optimized for a wide range of applications
- N-Channel, normal level
- 100% avalanche tested
- 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 |
|---|---|---|
| $V_{DS}$ | 100 | V |
| $R_{DS(on),max}$ | 1.5 | mΩ |
| $I_D$ | 315 | A |
| $Q_{oss}$ | 204 | nC |
| $Q_G$ | 161 | nC |

| Type / Ordering Code | Package | Marking | Related Links |
|---|---|---|---|
| IPT015N10NF2S | PG-HSOF-8 | 015N10NS | - |

# StrongIRFET™ 2 Power-Transistor
**IPT015N10NF2S**

## Table of Contents

# StrongIRFET™ 2 Power-Transistor
**IPT015N10NF2S**

## 1 Maximum ratings
at $T_A$=25 °C, unless otherwise specified

### Table 2 Maximum ratings

| Parameter | Symbol | Values | | | Unit | Note / Test Condition |
|---|---|---|---|---|---|---|
| | | Min. | Typ. | Max. | | |
| Continuous drain current[1] | $I_D$ | -<br>-<br>-<br>- | -<br>-<br>-<br>- | 315<br>223<br>198<br>35 | A | $V_{GS}$=10 V, $T_C$=25 °C<br>$V_{GS}$=10 V, $T_C$=100 °C<br>$V_{GS}$=6 V, $T_C$=100 °C<br>$V_{GS}$=10V, $T_A$=25°C, $R_{thJA}$=40°C/W[2] |
| Pulsed drain current[3] | $I_{D,pulse}$ | - | - | 1260 | A | $T_A$=25 °C |
| Avalanche energy, single pulse[4] | $E_{AS}$ | - | - | 406 | mJ | $I_D$=150 A, $R_{GS}$=25 Ω |
| Gate source voltage | $V_{GS}$ | -20 | - | 20 | V | - |
| Power dissipation | $P_{tot}$ | -<br>- | -<br>- | 300<br>3.8 | W | $T_C$=25 °C<br>$T_A$=25 °C, $R_{thJA}$=40 °C/W[2] |
| Operating and storage temperature | $T_j$, $T_{stg}$ | -55 | - | 175 | °C | - |

## 2 Thermal characteristics

### Table 3 Thermal characteristics

| Parameter | Symbol | Values | | | Unit | Note / Test Condition |
|---|---|---|---|---|---|---|
| | | Min. | Typ. | Max. | | |
| Thermal resistance, junction - case | $R_{thJC}$ | - | - | 0.5 | °C/W | - |
| Thermal resistance, junction - ambient, 6 cm² cooling area[2] | $R_{thJA}$ | - | - | 40 | °C/W | - |
| Thermal resistance, junction - ambient, minimal footprint | $R_{thJA}$ | - | - | 62 | °C/W | - |

[1] 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.
[2] Device on 40 mm x 40 mm x 1.5 mm epoxy PCB FR4 with 6 cm² (one layer, 70 µm thick) copper area for drain connection. PCB is vertical in still air.
[3] See Diagram 3 for more detailed information
[4] See Diagram 13 for more detailed information

# 3 Electrical characteristics

at $T_j$=25 °C, unless otherwise specified

## Table 4 Static characteristics

| Parameter | Symbol | Values | | | Unit | Note / Test Condition |
|---|---|---|---|---|---|---|
| | | Min. | Typ. | Max. | | |
| Drain-source breakdown voltage | $V_{(BR)DSS}$ | 100 | - | - | V | $V_{GS}$=0 V, $I_D$=1 mA |
| Gate threshold voltage | $V_{GS(th)}$ | 2.2 | 3.0 | 3.8 | V | $V_{DS}$=$V_{GS}$, $I_D$=267 µA |
| Zero gate voltage drain current | $I_{DSS}$ | -<br>- | 0.1<br>10 | 1<br>100 | µA | $V_{DS}$=100 V, $V_{GS}$=0 V, $T_j$=25 °C<br>$V_{DS}$=100 V, $V_{GS}$=0 V, $T_j$=125 °C |
| Gate-source leakage current | $I_{GSS}$ | - | 10 | 100 | nA | $V_{GS}$=20 V, $V_{DS}$=0 V |
| Drain-source on-state resistance | $R_{DS(on)}$ | -<br>- | 1.3<br>1.6 | 1.5<br>2.0 | mΩ | $V_{GS}$=10 V, $I_D$=150 A<br>$V_{GS}$=6 V, $I_D$=75 A |
| Gate resistance | $R_G$ | - | 1.4 | - | Ω | - |
| Transconductance[1] | $g_{fs}$ | 135 | - | - | S | \|$V_{DS}$\|≥2\|$I_D$\|$R_{DS(on)max}$, $I_D$=100 A |

## Table 5 Dynamic characteristics

| Parameter | Symbol | Values | | | Unit | Note / Test Condition |
|---|---|---|---|---|---|---|
| | | Min. | Typ. | Max. | | |
| Input capacitance | $C_{iss}$ | - | 11000 | - | pF | $V_{GS}$=0 V, $V_{DS}$=50 V, $f$=1 MHz |
| Output capacitance | $C_{oss}$ | - | 1700 | - | pF | $V_{GS}$=0 V, $V_{DS}$=50 V, $f$=1 MHz |
| Reverse transfer capacitance | $C_{rss}$ | - | 76 | - | pF | $V_{GS}$=0 V, $V_{DS}$=50 V, $f$=1 MHz |
| Turn-on delay time | $t_{d(on)}$ | - | 25 | - | ns | $V_{DD}$=50 V, $V_{GS}$=10 V, $I_D$=100 A, $R_{G,ext}$=1.6 Ω |
| Rise time | $t_r$ | - | 65 | - | ns | $V_{DD}$=50 V, $V_{GS}$=10 V, $I_D$=100 A, $R_{G,ext}$=1.6 Ω |
| Turn-off delay time | $t_{d(off)}$ | - | 60 | - | ns | $V_{DD}$=50 V, $V_{GS}$=10 V, $I_D$=100 A, $R_{G,ext}$=1.6 Ω |
| Fall time | $t_f$ | - | 33 | - | ns | $V_{DD}$=50 V, $V_{GS}$=10 V, $I_D$=100 A, $R_{G,ext}$=1.6 Ω |

## Table 6 Gate charge characteristics[2]

| Parameter | Symbol | Values | | | Unit | Note / Test Condition |
|---|---|---|---|---|---|---|
| | | Min. | Typ. | Max. | | |
| Gate to source charge | $Q_{gs}$ | - | 51 | - | nC | $V_{DD}$=50 V, $I_D$=100 A, $V_{GS}$=0 to 10 V |
| Gate charge at threshold | $Q_{g(th)}$ | - | 34 | - | nC | $V_{DD}$=50 V, $I_D$=100 A, $V_{GS}$=0 to 10 V |
| Gate to drain charge | $Q_{gd}$ | - | 32 | - | nC | $V_{DD}$=50 V, $I_D$=100 A, $V_{GS}$=0 to 10 V |
| Switching charge | $Q_{sw}$ | - | 49 | - | nC | $V_{DD}$=50 V, $I_D$=100 A, $V_{GS}$=0 to 10 V |
| Gate charge total[1] | $Q_g$ | - | 161 | 242 | nC | $V_{DD}$=50 V, $I_D$=100 A, $V_{GS}$=0 to 10 V |
| Gate plateau voltage | $V_{plateau}$ | - | 4.4 | - | V | $V_{DD}$=50 V, $I_D$=100 A, $V_{GS}$=0 to 10 V |
| Output charge | $Q_{oss}$ | - | 204 | - | nC | $V_{DS}$=50 V, $V_{GS}$=0 V |

[1] Defined by design. Not subject to production test.
[2] See ″Gate charge waveforms″ for parameter definition

# StrongIRFET™ 2 Power-Transistor
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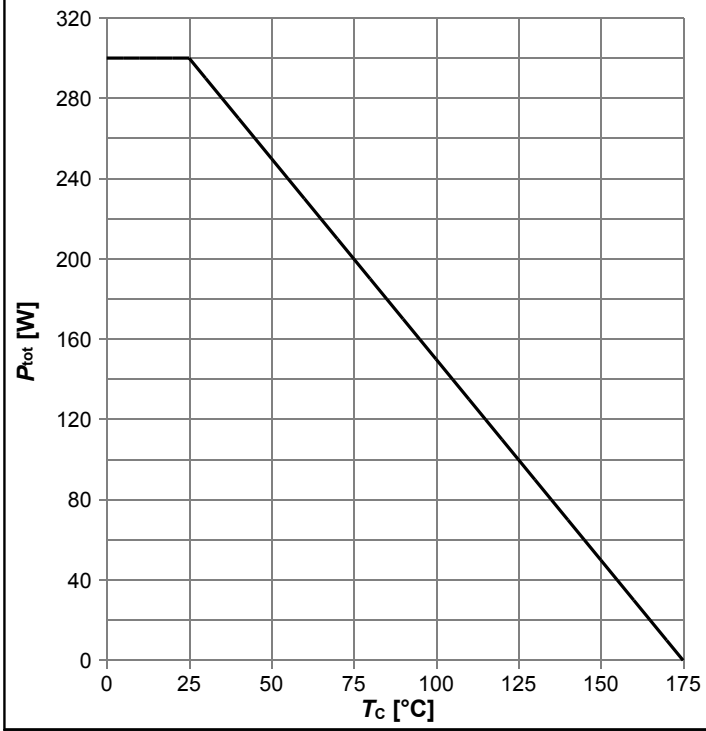
## Table 7 Reverse diode

| Parameter | Symbol | Values | | | Unit | Note / Test Condition |
|---|---|---|---|---|---|---|
| | | Min. | Typ. | Max. | | |
| Diode continuous forward current | $I_S$ | - | - | 214 | A | $T_C$=25 °C |
| Diode pulse current | $I_{S,pulse}$ | - | - | 1260 | A | $T_C$=25 °C |
| Diode forward voltage | $V_{SD}$ | - | 0.85 | 1.2 | V | $V_{GS}$=0 V, $I_F$=100 A, $T_j$=25 °C |
| Reverse recovery time | $t_{rr}$ | - | 49 | - | ns | $V_R$=50 V, $I_F$=100 A, d$i_F$/d$t$=500 A/µs |
| Reverse recovery charge | $Q_{rr}$ | - | 437 | - | nC | $V_R$=50 V, $I_F$=100 A, d$i_F$/d$t$=500 A/µs |

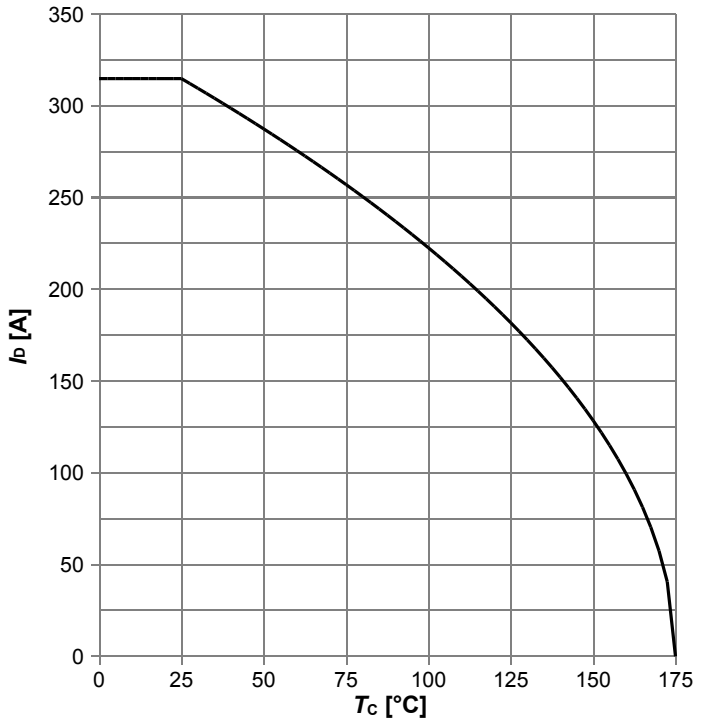
# 4 Electrical characteristics diagrams

**Diagram 1: Power dissipation**



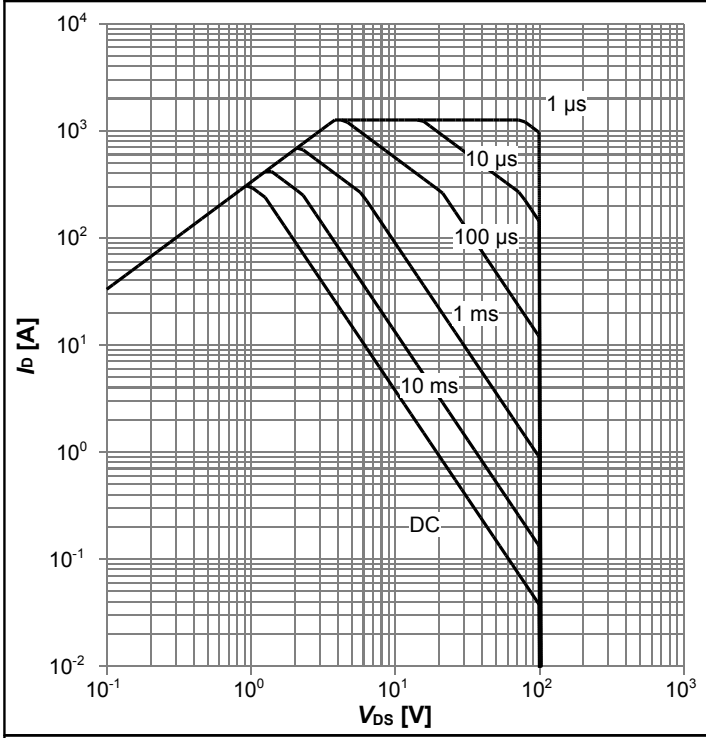

$P_{tot}=f(T_C)$

**Diagram 2: Drain current**



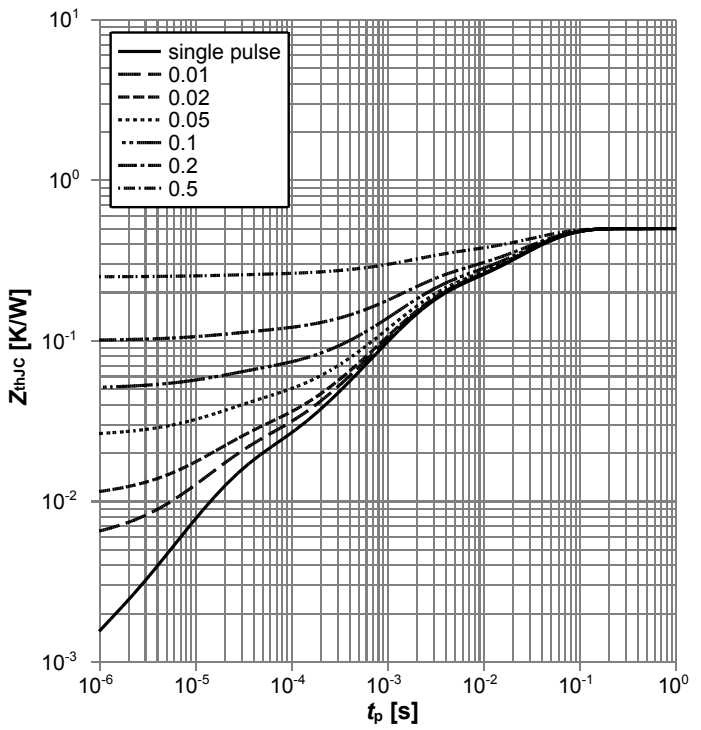

$I_D=f(T_C)$; $V_{GS}\geq 10$ V

**Diagram 3: Safe operating area**




$I_D=f(V_{DS})$; $T_C$=25 °C; $D$=0; parameter: $t_p$

**Diagram 4: Max. transient thermal impedance**




$Z_{thJC}=f(t_p)$; parameter: $D=t_p/T$

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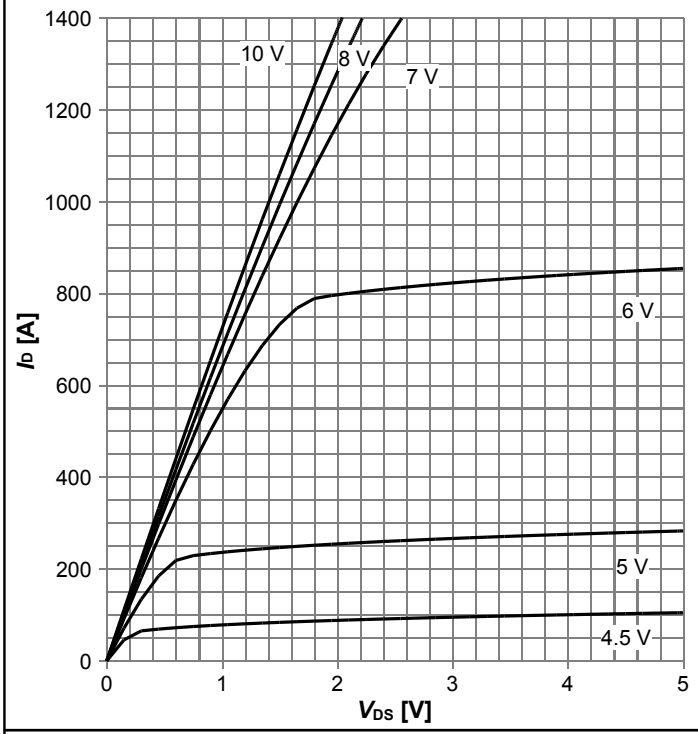
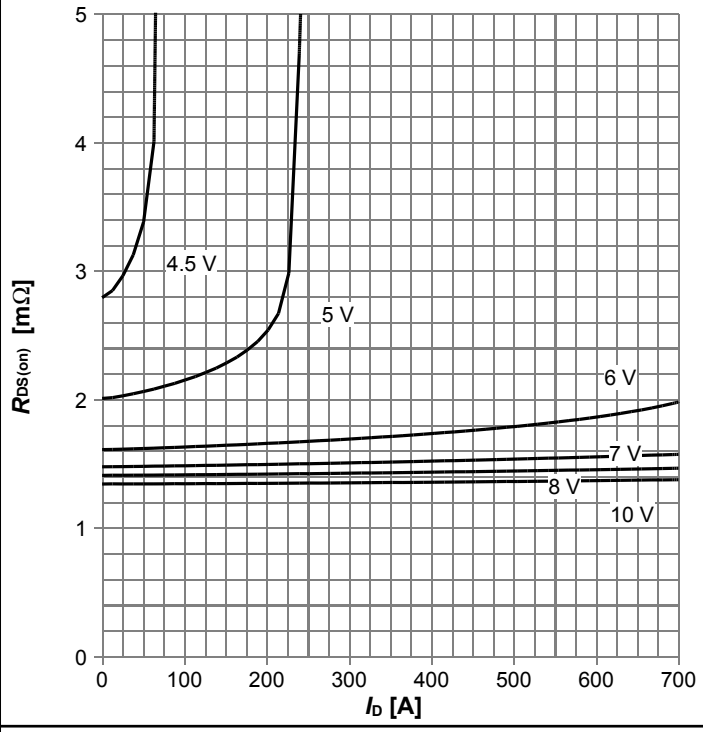
**Diagram 5: Typ. output characteristics**



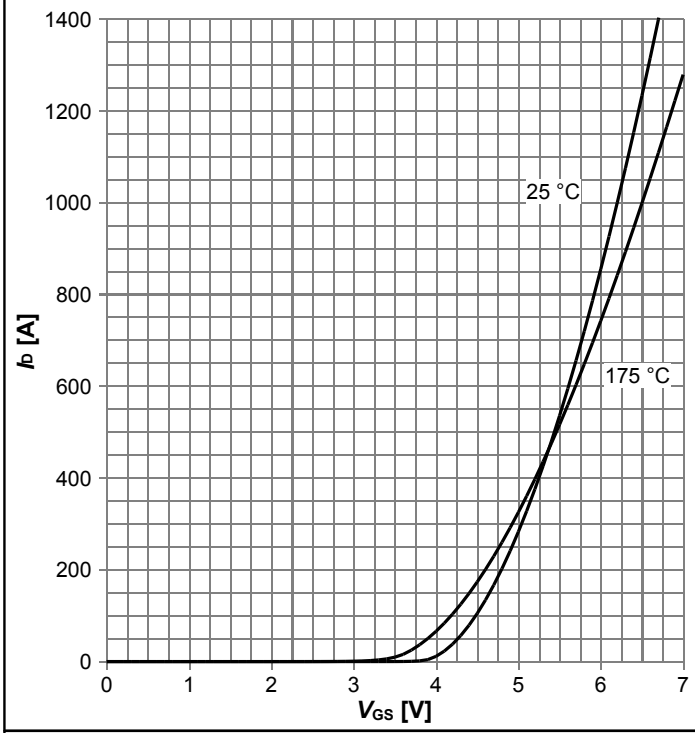

$I_D$=f($V_{DS}$), $T_j$=25 °C; parameter: $V_{GS}$

**Diagram 6: Typ. drain-source on resistance**



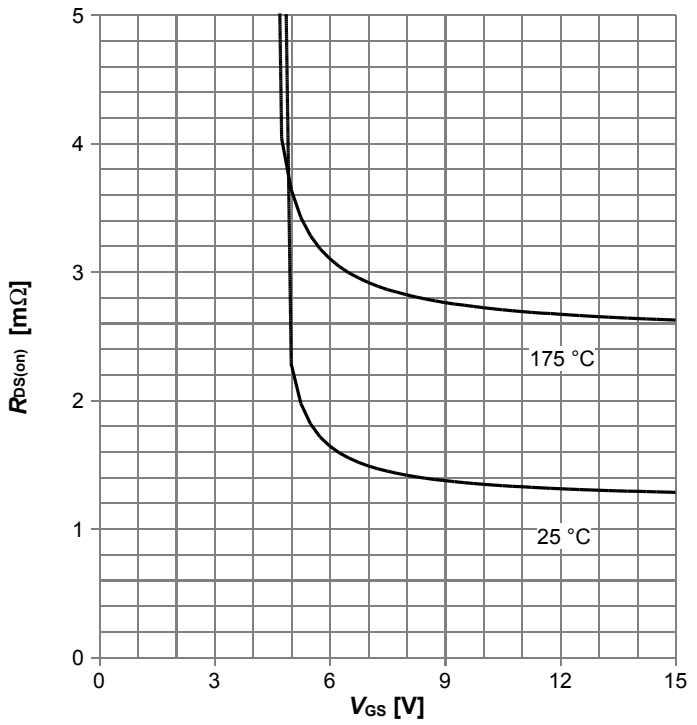

$R_{DS(on)}$=f($I_D$), $T_j$=25 °C; parameter: $V_{GS}$

**Diagram 7: Typ. transfer characteristics**




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

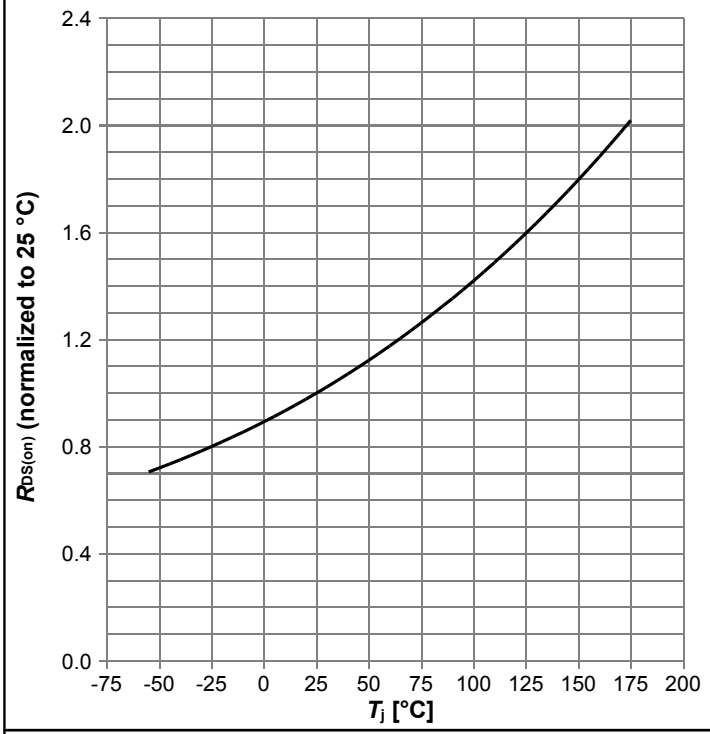
**Diagram 8: Typ. drain-source on resistance**




$R_{DS(on)}$=f($V_{GS}$), $I_D$=150 A; parameter: $T_j$

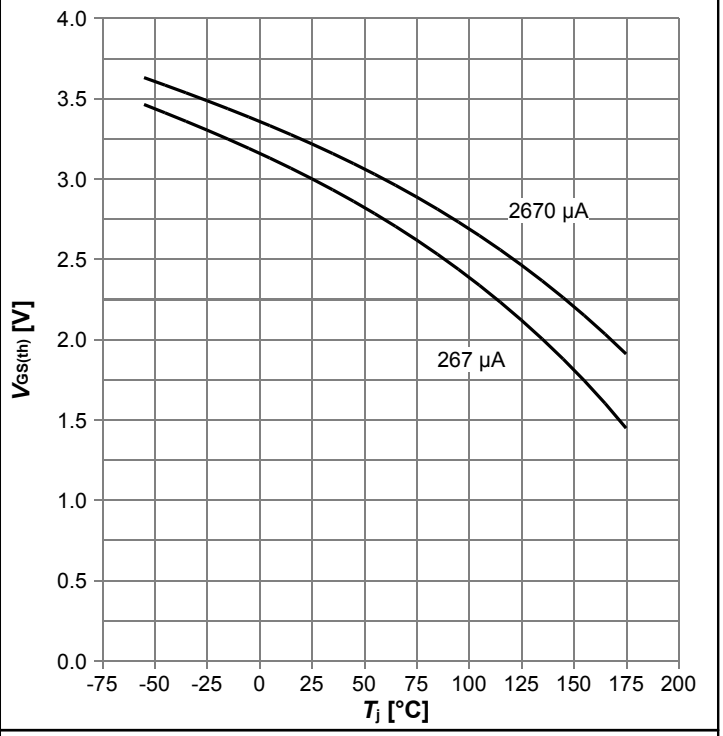
# StrongIRFET™ 2 Power-Transistor
## IPT015N10NF2S

**Diagram 9: Normalized drain-source on resistance**



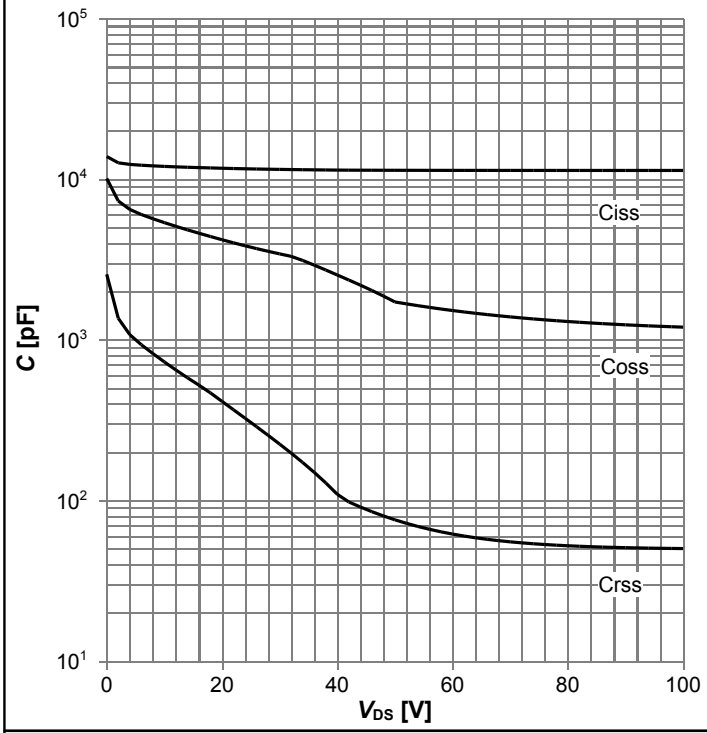

$R_{DS(on)}$=f($T_j$), $I_D$=150 A, $V_{GS}$=10 V

**Diagram 10: Typ. gate threshold voltage**



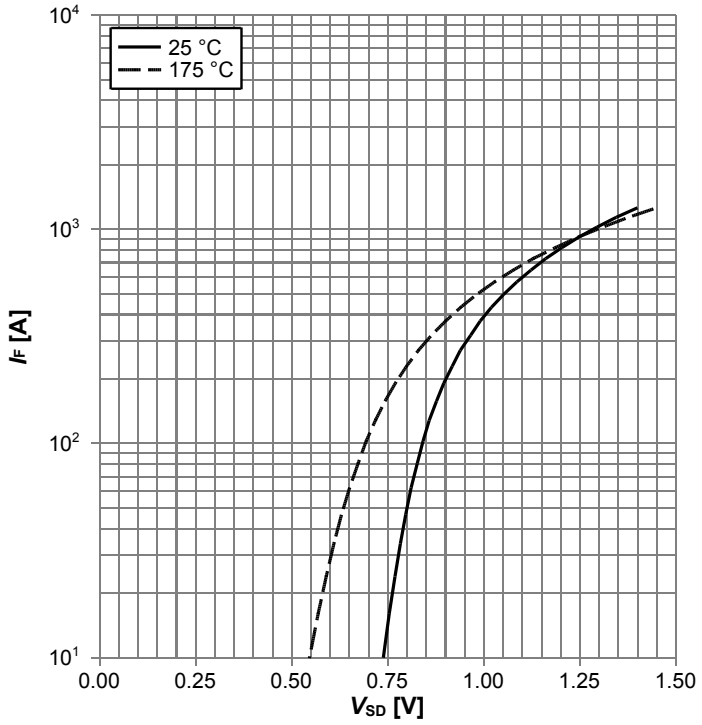

$V_{GS(th}$=f($T_j$), $V_{GS}$=$V_{DS}$; parameter: $I_D$

**Diagram 11: Typ. capacitances**




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

**Diagram 12: Typ. forward characteristics of reverse diode**




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

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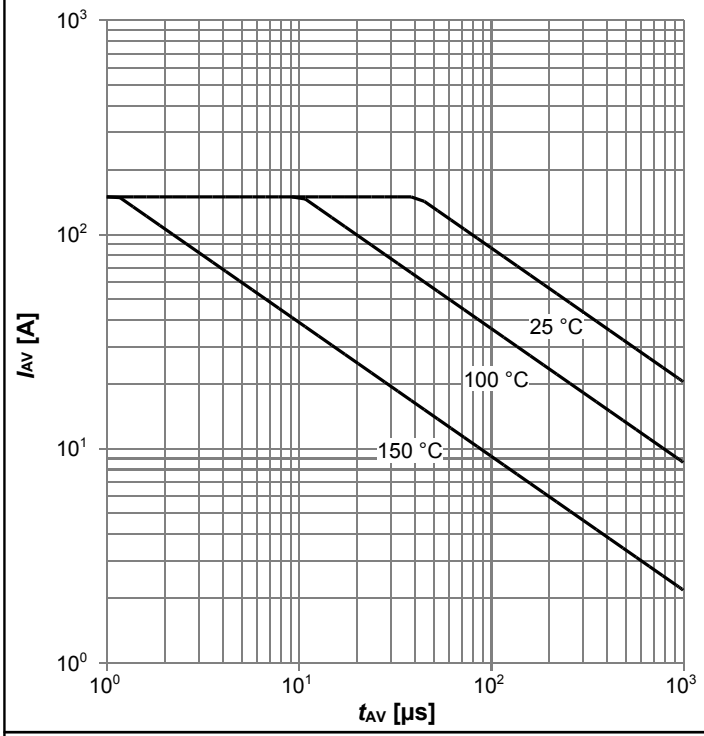
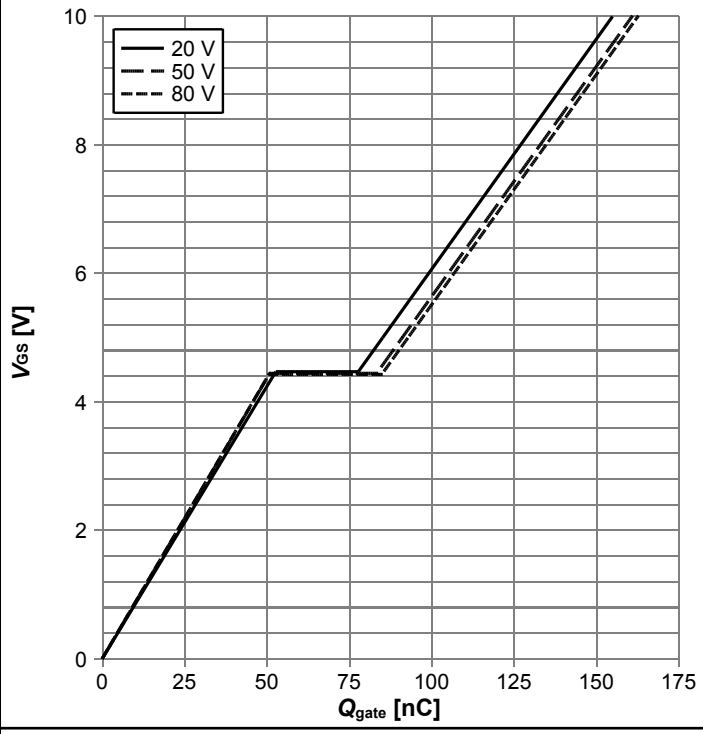
**Diagram 13: Avalanche characteristics**



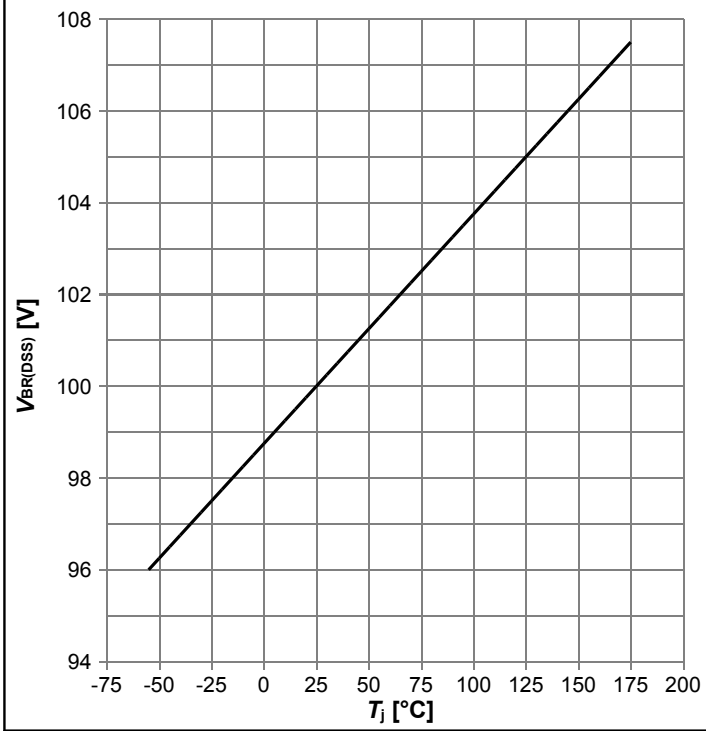

$I_{AS}$=f($t_{AV}$); $R_{GS}$=25 Ω; parameter: $T_{j,start}$

**Diagram 14: Typ. gate charge**



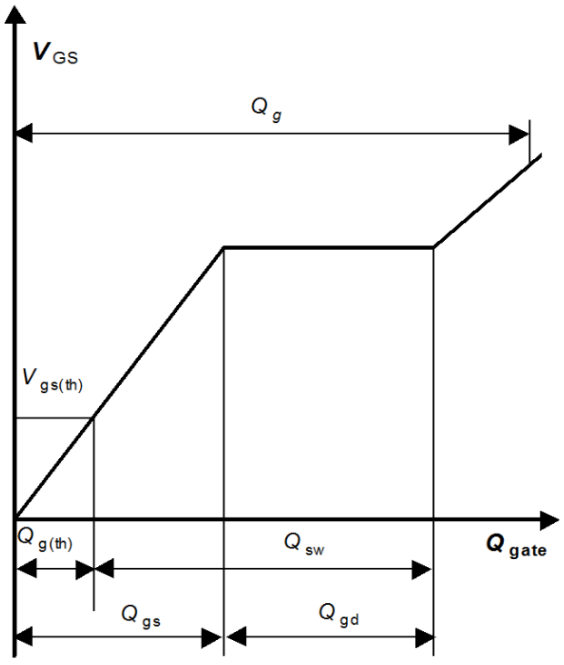

$V_{GS}$=f($Q_{gate}$), $I_D$=100 A pulsed, $T_j$=25 °C; parameter: $V_{DD}$

**Diagram 15: Drain-source breakdown voltage**

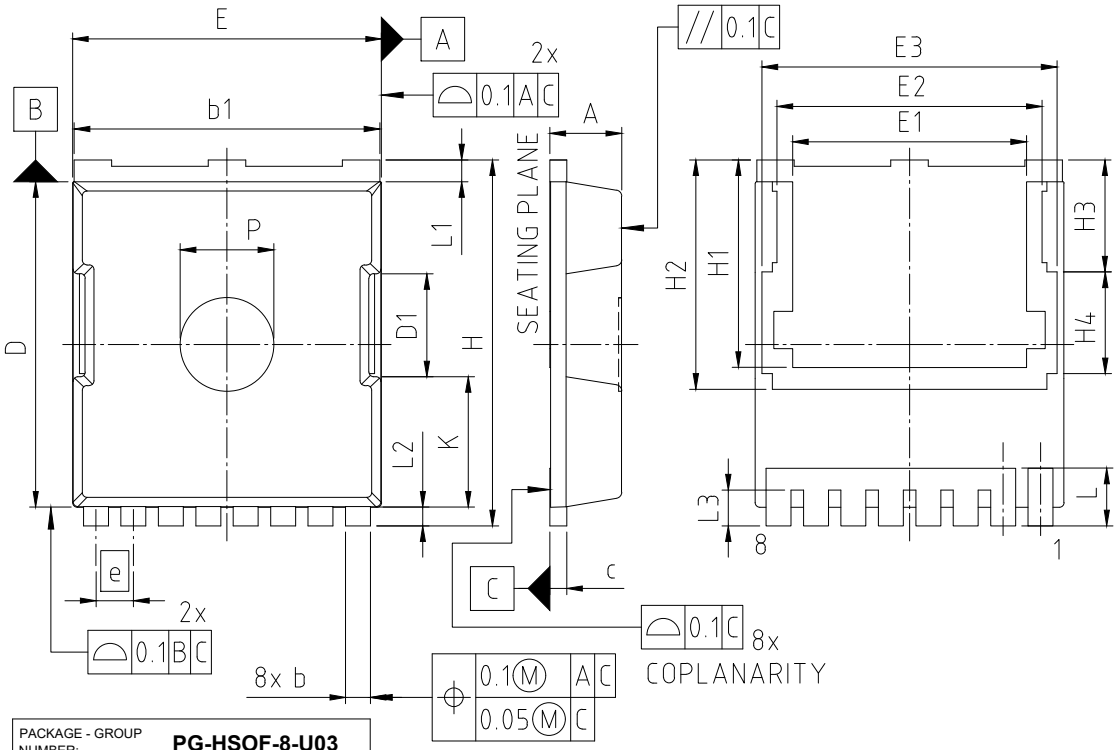



$V_{BR(DSS)}$=f($T_j$); $I_D$=1 mA

**Diagram Gate charge waveforms**



# 5 Package Outlines




| PACKAGE - GROUP NUMBER: | PG-HSOF-8-U03 | |
|---|---|---|
| **DIMENSIONS** | **MILLIMETERS** | |
| | MIN. | MAX. |
| **A** | 2.20 | 2.40 |
| **b** | 0.70 | 0.90 |
| **b1** | 9.70 | 9.90 |
| **c** | 0.40 | 0.60 |
| **D** | 10.28 | 10.58 |
| **D1** | 3.15 | 3.45 |
| **E** | 9.70 | 10.10 |
| **E1** | 7.35 | 7.65 |
| **E2** | 8.50 | |
| **E3** | 9.46 | |
| **e** | 1.20 (BSC) | |
| **H** | 11.48 | 11.98 |
| **H1** | 6.55 | 6.95 |
| **H2** | 7.35 | |
| **H3** | 3.59 | |
| **H4** | 3.26 | |
| **N** | 8 | |
| **K** | 4.03 | 4.33 |
| **L** | 1.60 | 2.10 |
| **L1** | 0.55 | 0.85 |
| **L2** | 0.45 | 0.75 |
| **L3** | 1.00 | 1.30 |
| **P** | 2.90 | 3.10 |

Note 1: Lead length up to anti flash profile, mold flashes excluded.

**Figure 1 Outline PG-HSOF-8, dimensions in mm**

# StrongIRFET™ 2 Power-Transistor
**IPT015N10NF2S**

## Revision History

IPT015N10NF2S

**Revision: 2022-08-04, Rev. 2.0**

| Previous Revision | | |
|---|---|---|
| Revision | Date | Subjects (major changes since last revision) |
| 2.0 | 2022-08-04 | Release of final version |



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