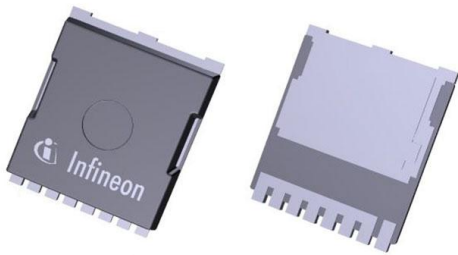


# IPT022N10NF2SATMA1 Datasheet

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DiGi Electronics Part Number	IPT022N10NF2SATMA1-DG
Manufacturer	<a href="#">Infineon Technologies</a>
Manufacturer Product Number	IPT022N10NF2SATMA1
Description	MOSFET
Detailed Description	N-Channel 100 V 29A (Ta), 236A (Tc) 3.8W (Ta), 250 W (Tc) Surface Mount PG-HSOF-8

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## Purchase and inquiry

### Manufacturer Product Number:

IPT022N10NF2SATMA1

### Series:

StrongIRFET™ 2

### FET Type:

N-Channel

### Drain to Source Voltage (Vdss):

100 V

### Drive Voltage (Max Rds On, Min Rds On):

6V, 10V

### Vgs(th) (Max) @ Id:

3.8V @ 169µA

### Vgs (Max):

±20V

### FET Feature:

-

### Operating Temperature:

-55°C ~ 175°C (Tj)

### Supplier Device Package:

PG-HSOF-8

### Manufacturer:

Infineon Technologies

### Product Status:

Active

### Technology:

MOSFET (Metal Oxide)

### Current - Continuous Drain (Id) @ 25°C:

29A (Ta), 236A (Tc)

### Rds On (Max) @ Id, Vgs:

2.25mOhm @ 150A, 10V

### Gate Charge (Qg) (Max) @ Vgs:

155 nC @ 10 V

### Input Capacitance (Ciss) (Max) @ Vds:

7300 pF @ 50 V

### Power Dissipation (Max):

3.8W (Ta), 250W (Tc)

### Mounting Type:

Surface Mount

### Package / Case:

8-PowerSFN

## Environmental & Export classification

### RoHS Status:

ROHS3 Compliant

### REACH Status:

REACH Unaffected

### HTSUS:

8541.29.0095

### Moisture Sensitivity Level (MSL):

1 (Unlimited)

### ECCN:

EAR99

# MOSFET

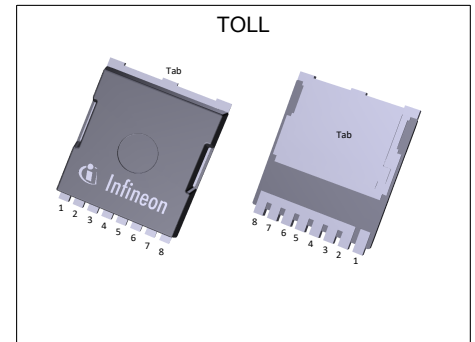
## StrongIRFET™ 2 Power-Transistor

### 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

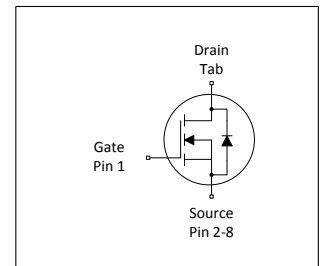
### Product validation

Qualified according to JEDEC Standard



**Table 1 Key Performance Parameters**

Parameter	Value	Unit
$V_{DS}$	100	V
$R_{DS(on),max}$	2.25	m $\Omega$
$I_D$	236	A
$Q_{oss}$	131	nC
$Q_G$	103	nC



RoHS

Type / Ordering Code	Package	Marking	Related Links
IPT022N10NF2S	PG-HSOF-8	022N10NS	-



# StrongIRFET™ 2 Power-Transistor

## IPT022N10NF2S

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# StrongIRFET™ 2 Power-Transistor

## IPT022N10NF2S

### 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>	$I_D$	-	-	236 167 148 29	A	$V_{GS}=10\text{ V}$ , $T_C=25\text{ °C}$ $V_{GS}=10\text{ V}$ , $T_C=100\text{ °C}$ $V_{GS}=6\text{ V}$ , $T_C=100\text{ °C}$ $V_{GS}=10\text{ V}$ , $T_A=25\text{ °C}$ , $R_{thJA}=40\text{ °C/W}^2)$
Pulsed drain current <sup>3)</sup>	$I_{D,pulse}$	-	-	944	A	$T_A=25\text{ °C}$
Avalanche energy, single pulse <sup>4)</sup>	$E_{AS}$	-	-	150	mJ	$I_D=130\text{ A}$ , $R_{GS}=25\text{ }\Omega$
Gate source voltage	$V_{GS}$	-20	-	20	V	-
Power dissipation	$P_{tot}$	-	-	250 3.8	W	$T_C=25\text{ °C}$ $T_A=25\text{ °C}$ , $R_{thJA}=40\text{ °C/W}^2)$
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	$R_{thJC}$	-	-	0.6	°C/W	-
Thermal resistance, junction - ambient, 6 cm <sup>2</sup> cooling area <sup>2)</sup>	$R_{thJA}$	-	-	40	°C/W	-
Thermal resistance, junction - ambient, minimal footprint	$R_{thJA}$	-	-	62	°C/W	-

<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

## StrongIRFET™ 2 Power-Transistor

### IPT022N10NF2S

### 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	$V_{(BR)DSS}$	100	-	-	V	$V_{GS}=0\text{ V}$ , $I_D=1\text{ mA}$
Gate threshold voltage	$V_{GS(th)}$	2.2	3.0	3.8	V	$V_{DS}=V_{GS}$ , $I_D=169\text{ }\mu\text{A}$
Zero gate voltage drain current	$I_{DSS}$	-	0.1 10	1 100	$\mu\text{A}$	$V_{DS}=100\text{ V}$ , $V_{GS}=0\text{ V}$ , $T_j=25\text{ °C}$ $V_{DS}=100\text{ V}$ , $V_{GS}=0\text{ V}$ , $T_j=125\text{ °C}$
Gate-source leakage current	$I_{GSS}$	-	10	100	nA	$V_{GS}=20\text{ V}$ , $V_{DS}=0\text{ V}$
Drain-source on-state resistance	$R_{DS(on)}$	-	2.0 2.5	2.25 2.9	$\text{m}\Omega$	$V_{GS}=10\text{ V}$ , $I_D=150\text{ A}$ $V_{GS}=6\text{ V}$ , $I_D=75\text{ A}$
Gate resistance	$R_G$	-	1.8	-	$\Omega$	-
Transconductance <sup>1)</sup>	$g_{fs}$	110	-	-	S	$ V_{DS} \geq 2 I_D R_{DS(on)max}$ , $I_D=100\text{ A}$

**Table 5 Dynamic characteristics**

Parameter	Symbol	Values			Unit	Note / Test Condition
		Min.	Typ.	Max.		
Input capacitance	$C_{iss}$	-	7300	-	pF	$V_{GS}=0\text{ V}$ , $V_{DS}=50\text{ V}$ , $f=1\text{ MHz}$
Output capacitance	$C_{oss}$	-	1100	-	pF	$V_{GS}=0\text{ V}$ , $V_{DS}=50\text{ V}$ , $f=1\text{ MHz}$
Reverse transfer capacitance	$C_{rss}$	-	49	-	pF	$V_{GS}=0\text{ V}$ , $V_{DS}=50\text{ V}$ , $f=1\text{ MHz}$
Turn-on delay time	$t_{d(on)}$	-	20	-	ns	$V_{DD}=50\text{ V}$ , $V_{GS}=10\text{ V}$ , $I_D=100\text{ A}$ , $R_{G,ext}=1.6\text{ }\Omega$
Rise time	$t_r$	-	65	-	ns	$V_{DD}=50\text{ V}$ , $V_{GS}=10\text{ V}$ , $I_D=100\text{ A}$ , $R_{G,ext}=1.6\text{ }\Omega$
Turn-off delay time	$t_{d(off)}$	-	47	-	ns	$V_{DD}=50\text{ V}$ , $V_{GS}=10\text{ V}$ , $I_D=100\text{ A}$ , $R_{G,ext}=1.6\text{ }\Omega$
Fall time	$t_f$	-	26	-	ns	$V_{DD}=50\text{ V}$ , $V_{GS}=10\text{ V}$ , $I_D=100\text{ A}$ , $R_{G,ext}=1.6\text{ }\Omega$

**Table 6 Gate charge characteristics<sup>2)</sup>**

Parameter	Symbol	Values			Unit	Note / Test Condition
		Min.	Typ.	Max.		
Gate to source charge	$Q_{gs}$	-	34	-	nC	$V_{DD}=50\text{ V}$ , $I_D=100\text{ A}$ , $V_{GS}=0\text{ to }10\text{ V}$
Gate charge at threshold	$Q_{g(th)}$	-	22	-	nC	$V_{DD}=50\text{ V}$ , $I_D=100\text{ A}$ , $V_{GS}=0\text{ to }10\text{ V}$
Gate to drain charge	$Q_{gd}$	-	21	-	nC	$V_{DD}=50\text{ V}$ , $I_D=100\text{ A}$ , $V_{GS}=0\text{ to }10\text{ V}$
Switching charge	$Q_{sw}$	-	33	-	nC	$V_{DD}=50\text{ V}$ , $I_D=100\text{ A}$ , $V_{GS}=0\text{ to }10\text{ V}$
Gate charge total <sup>1)</sup>	$Q_g$	-	103	155	nC	$V_{DD}=50\text{ V}$ , $I_D=100\text{ A}$ , $V_{GS}=0\text{ to }10\text{ V}$
Gate plateau voltage	$V_{plateau}$	-	4.6	-	V	$V_{DD}=50\text{ V}$ , $I_D=100\text{ A}$ , $V_{GS}=0\text{ to }10\text{ V}$
Output charge	$Q_{oss}$	-	131	-	nC	$V_{DS}=50\text{ V}$ , $V_{GS}=0\text{ V}$

<sup>1)</sup> Defined by design. Not subject to production test.

<sup>2)</sup> See "Gate charge waveforms" for parameter definition

# StrongIRFET™ 2 Power-Transistor

## IPT022N10NF2S

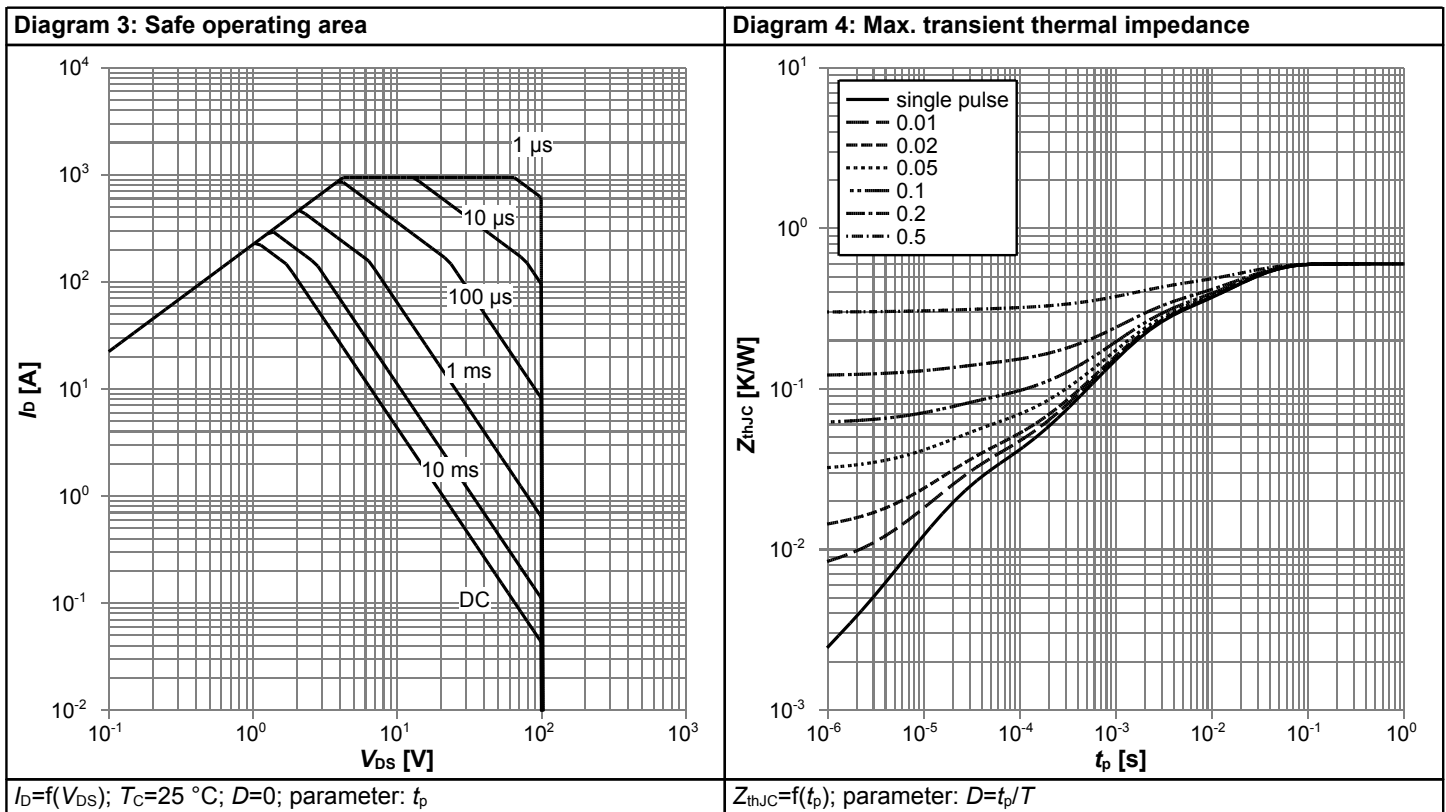
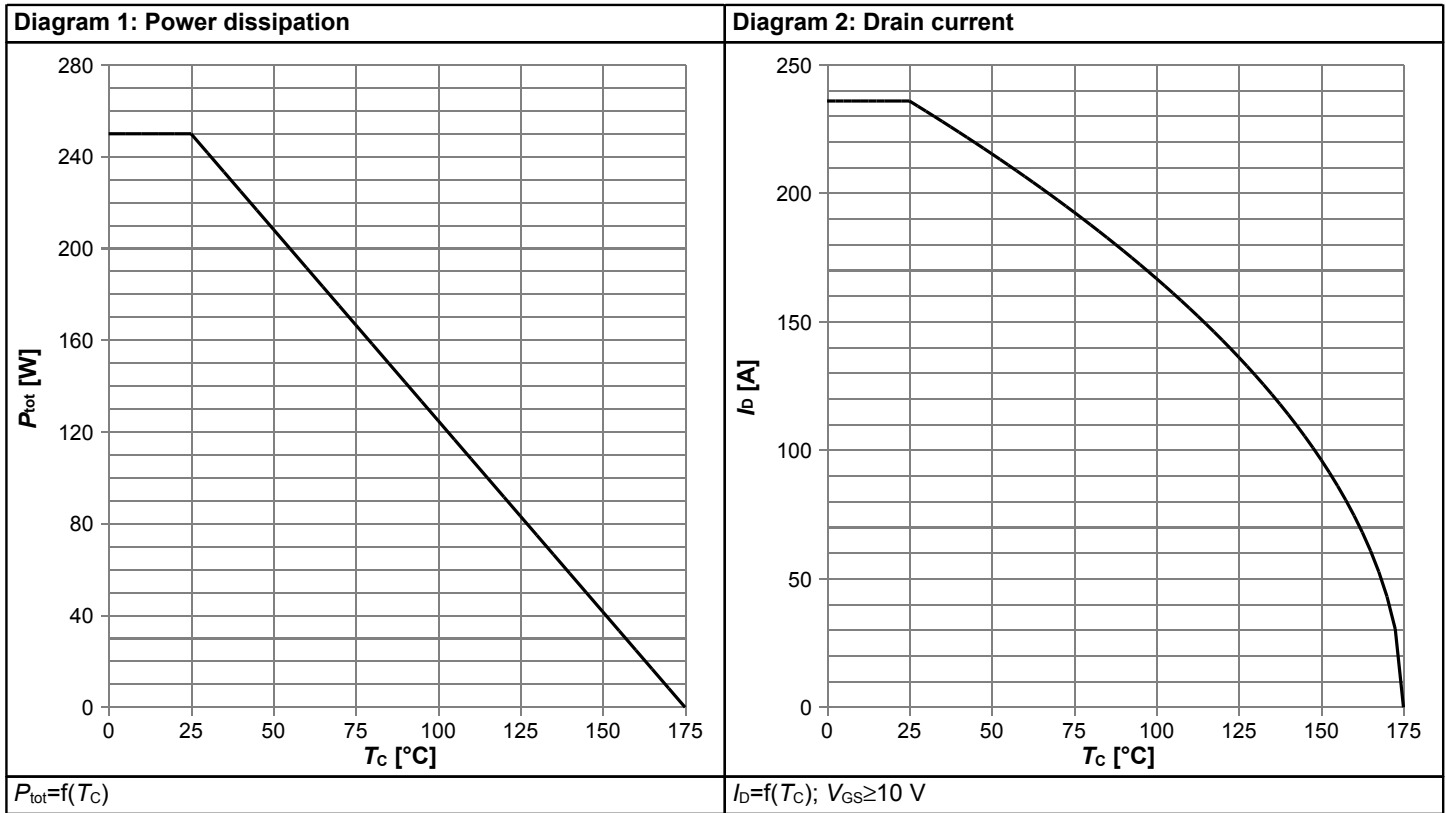
**Table 7 Reverse diode**

Parameter	Symbol	Values			Unit	Note / Test Condition
		Min.	Typ.	Max.		
Diode continuous forward current	$I_S$	-	-	182	A	$T_C=25\text{ °C}$
Diode pulse current	$I_{S,pulse}$	-	-	944	A	$T_C=25\text{ °C}$
Diode forward voltage	$V_{SD}$	-	0.87	1.2	V	$V_{GS}=0\text{ V}, I_F=100\text{ A}, T_j=25\text{ °C}$
Reverse recovery time	$t_{rr}$	-	44	-	ns	$V_R=50\text{ V}, I_F=100\text{ A}, di_F/dt=500\text{ A}/\mu\text{s}$
Reverse recovery charge	$Q_{rr}$	-	327	-	nC	$V_R=50\text{ V}, I_F=100\text{ A}, di_F/dt=500\text{ A}/\mu\text{s}$



**StrongIRFET™ 2 Power-Transistor**  
**IPT022N10NF2S**

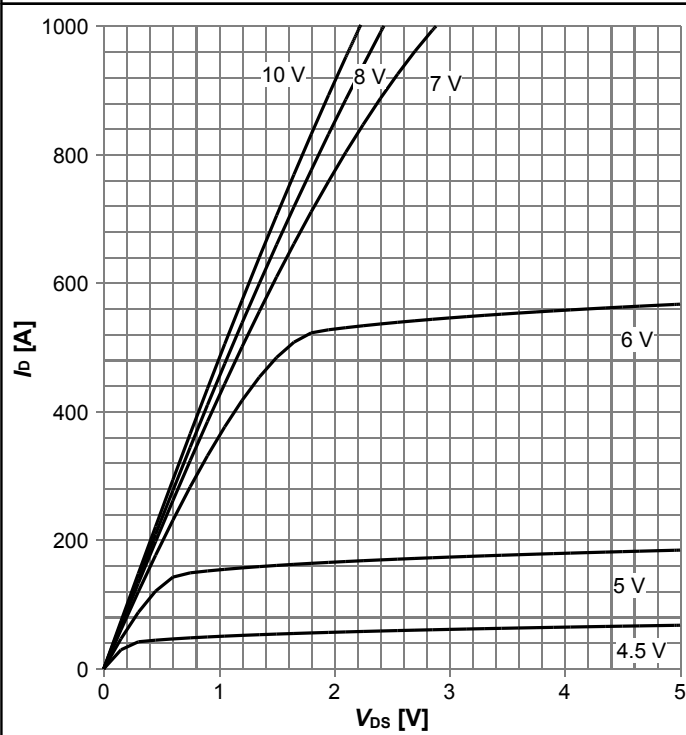
**4 Electrical characteristics diagrams**





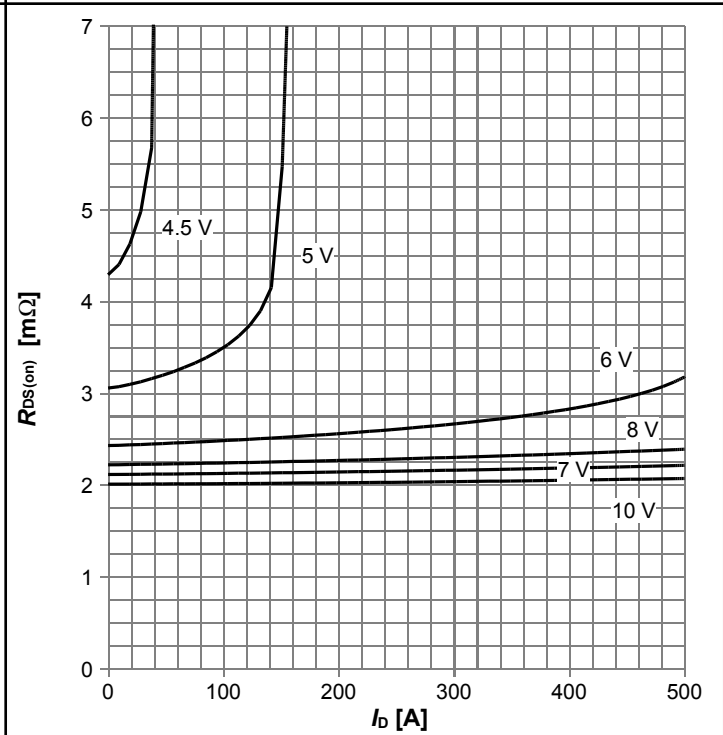
**StrongIRFET™ 2 Power-Transistor**  
**IPT022N10NF2S**

**Diagram 5: Typ. output characteristics**



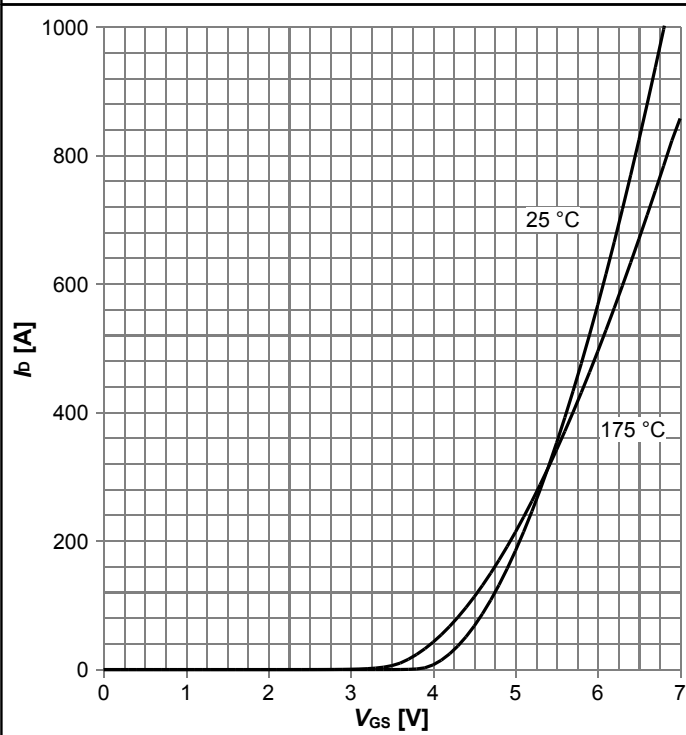
$I_D = f(V_{DS}), T_j = 25\text{ °C};$  parameter:  $V_{GS}$

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



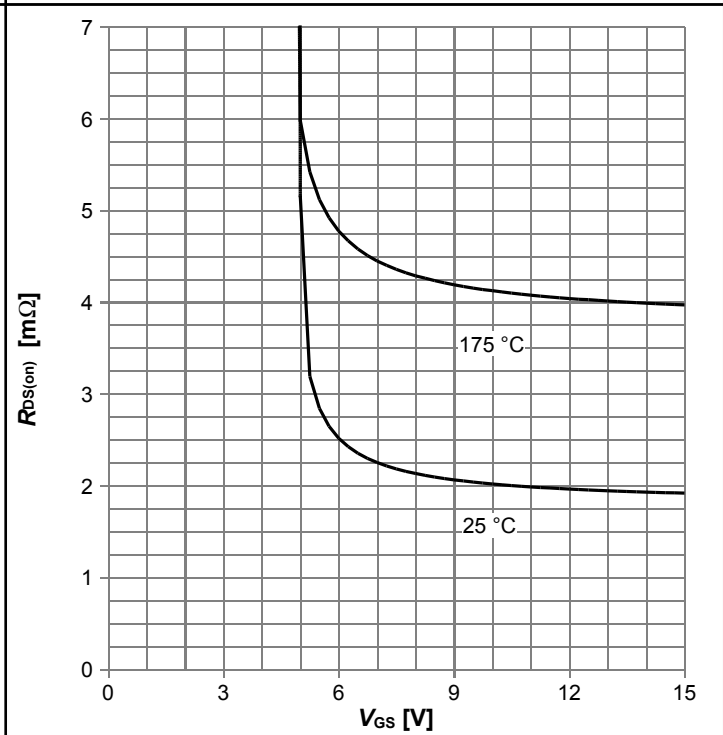
$R_{DS(on)} = f(I_D), T_j = 25\text{ °C};$  parameter:  $V_{GS}$

**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**

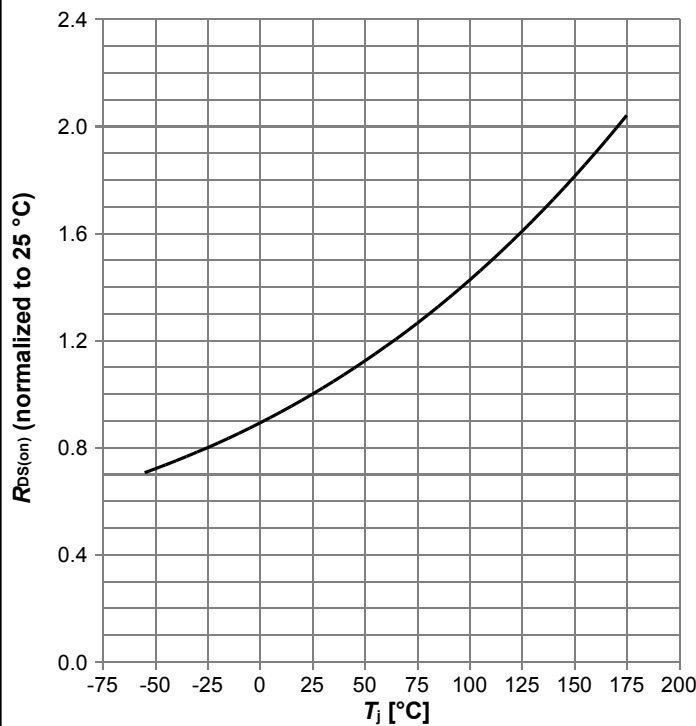


$R_{DS(on)} = f(V_{GS}), I_D = 150\text{ A};$  parameter:  $T_j$



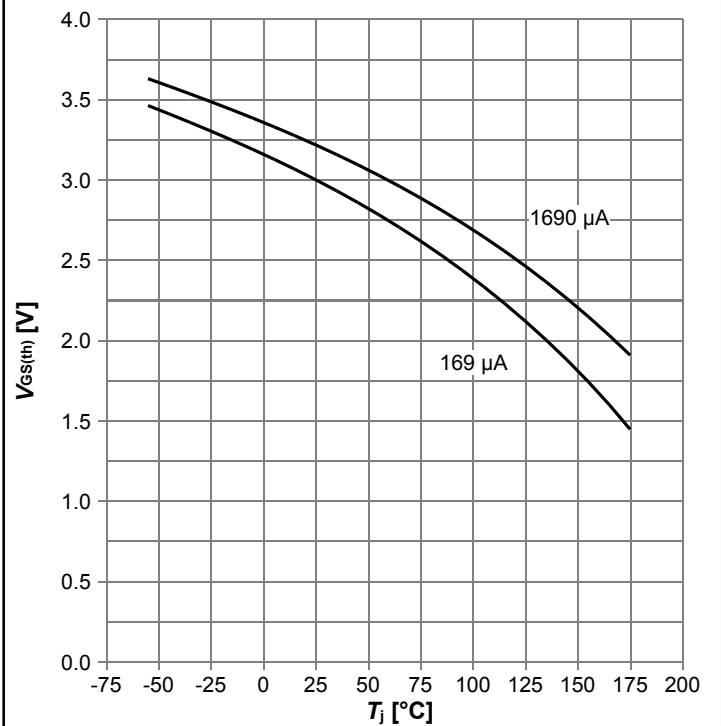
**StrongIRFET™ 2 Power-Transistor**  
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**Diagram 9: Normalized drain-source on resistance**



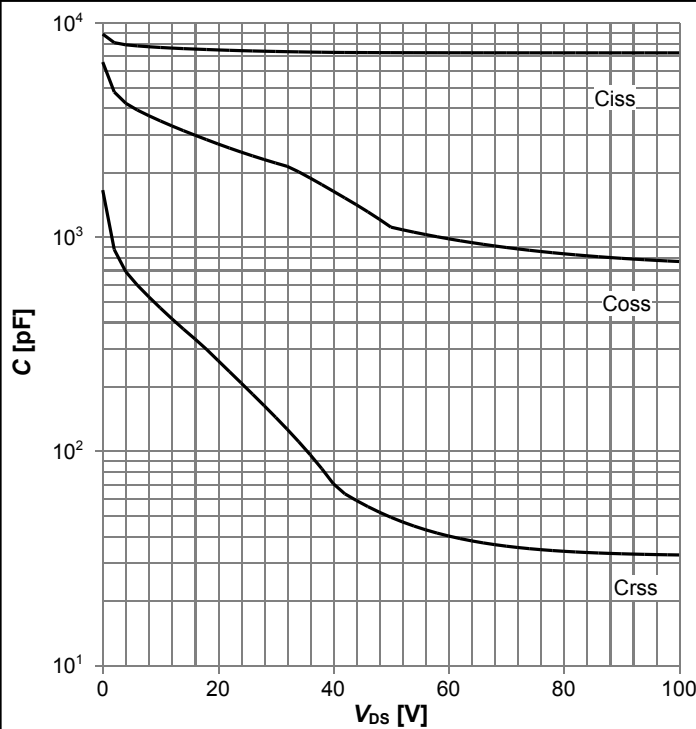
$R_{DS(on)}=f(T_j)$ ,  $I_D=150$  A,  $V_{GS}=10$  V

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



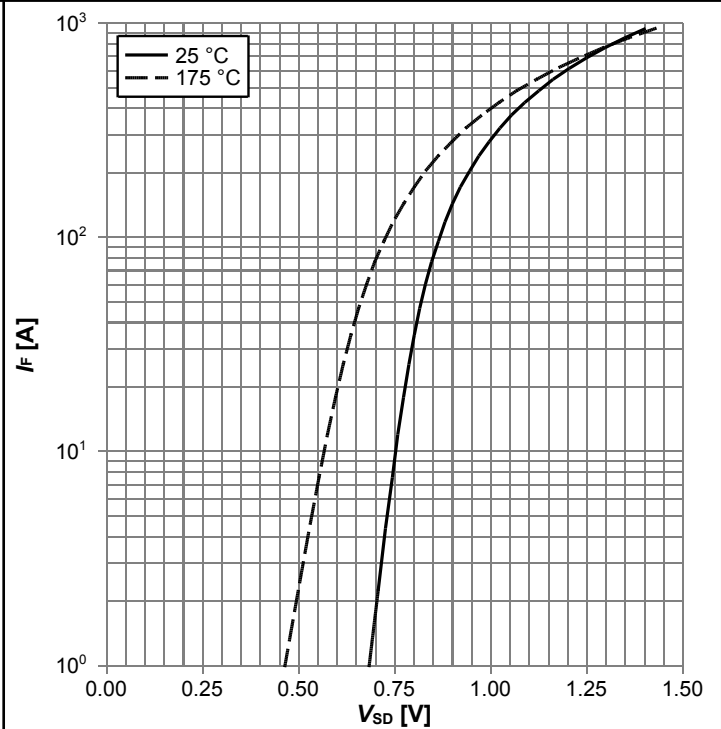
$V_{GS(th)}=f(T_j)$ ,  $V_{GS}=V_{DS}$ ; parameter:  $I_D$

**Diagram 11: Typ. capacitances**



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

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

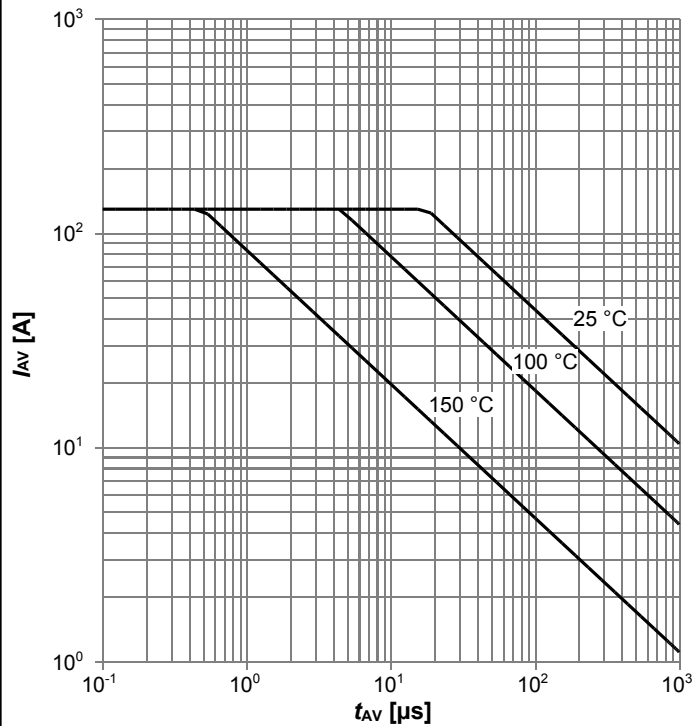


$I_F=f(V_{SD})$ ; parameter:  $T_j$



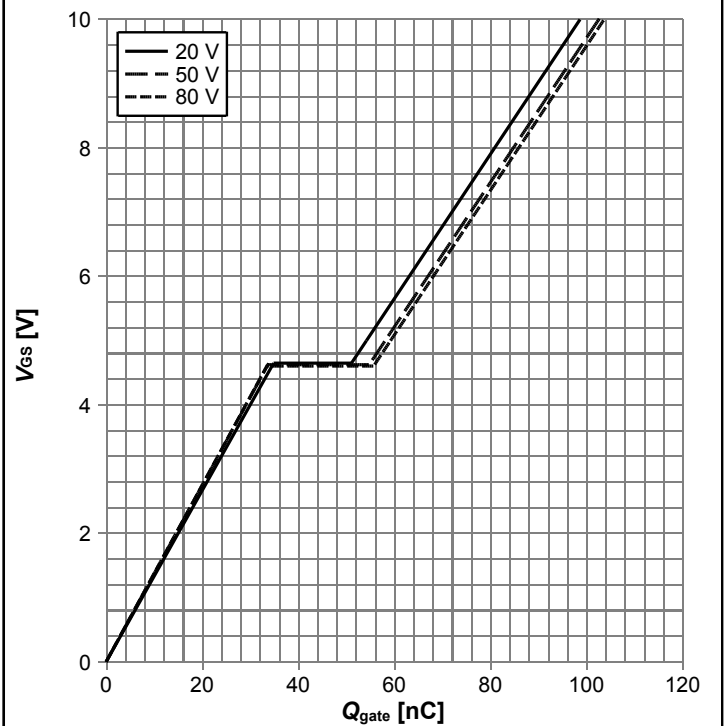
**StrongIRFET™ 2 Power-Transistor**  
**IPT022N10NF2S**

**Diagram 13: Avalanche characteristics**



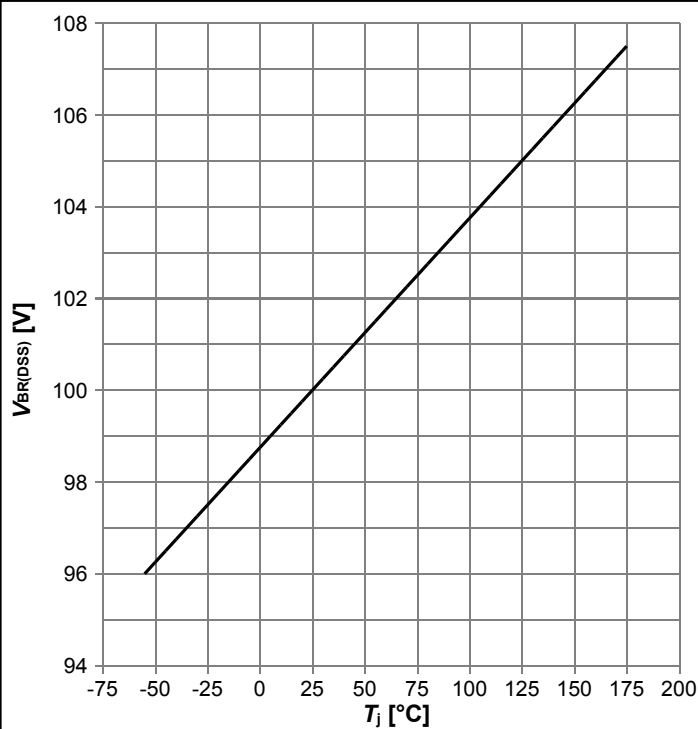
$I_{AS}=f(t_{AV}); R_{GS}=25 \Omega$ ; parameter:  $T_{j,start}$

**Diagram 14: Typ. gate charge**



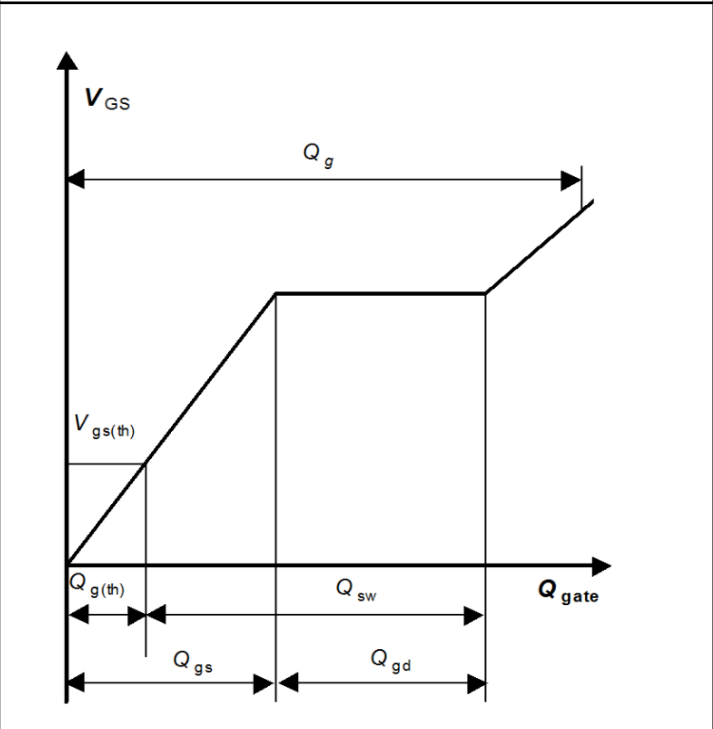
$V_{GS}=f(Q_{gate}), I_D=100$  A pulsed,  $T_j=25$  °C; parameter:  $V_{DD}$

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



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

**Diagram Gate charge waveforms**



# StrongIRFET™ 2 Power-Transistor

## IPT022N10NF2S

### 5 Package Outlines

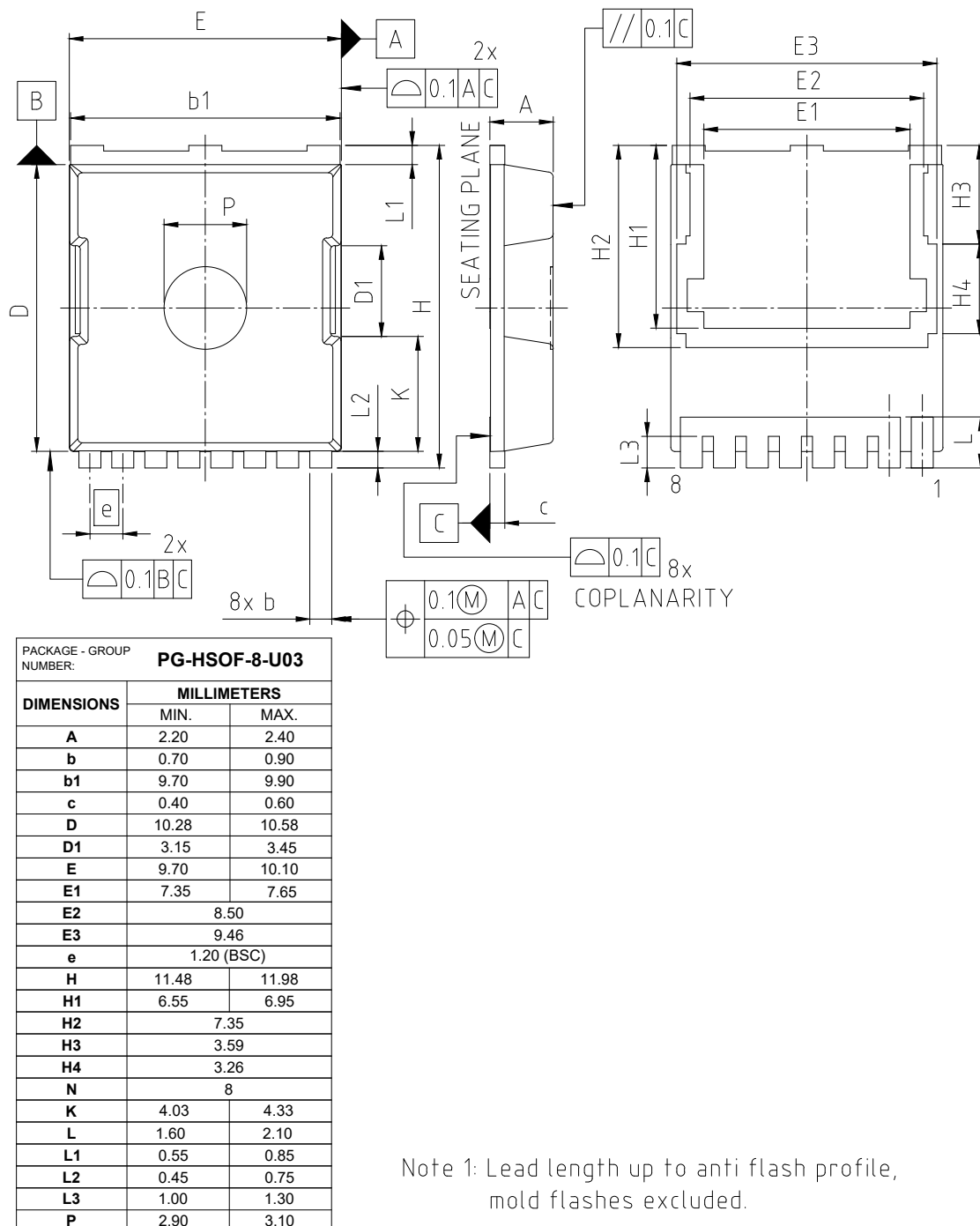


Figure 1 Outline PG-HSOF-8, dimensions in mm



# StrongIRFET™ 2 Power-Transistor

## IPT022N10NF2S

### Revision History

IPT022N10NF2S

**Revision: 2022-08-08, Rev. 2.1**

Previous Revision

Revision	Date	Subjects (major changes since last revision)
2.0	2022-07-20	Release of final version
2.1	2022-08-08	Update current Rds(on)

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