

# IPU07N03LA Datasheet



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DiGi Electronics Part Number	IPU07N03LA-DG
Manufacturer	<a href="#">Infineon Technologies</a>
Manufacturer Product Number	IPU07N03LA
Description	MOSFET N-CH 25V 30A TO251-3
Detailed Description	N-Channel 25 V 30A (Tc) 83W (Tc) Through Hole P-T O251-3-1



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## Purchase and inquiry

**Manufacturer Product Number:**

IPU07N03LA

**Series:**

OptiMOS™

**Part Status:**

Discontinued at Digi-Key

**Technology:**

MOSFET (Metal Oxide)

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

30A (Tc)

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

6.5mOhm @ 30A, 10V

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

22 nC @ 5 V

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

2653 pF @ 15 V

**Power Dissipation (Max):**

83W (Tc)

**Mounting Type:**

Through Hole

**Package / Case:**

TO-251-3 Short Leads, IPak, TO-251AA

**Manufacturer:**

Infineon Technologies

**Packaging:**

Tube

**FET Type:**

N-Channel

**Drain to Source Voltage (Vdss):**

25 V

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

4.5V, 10V

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

2V @ 40µA

**Vgs (Max):**

±20V

**FET Feature:**

-

**Operating Temperature:**

-55°C ~ 175°C (Tj)

**Supplier Device Package:**

P-TO251-3-1

**Base Product Number:**

IPU07N

## Environmental & Export classification

**RoHS Status:**

RoHS non-compliant

**REACH Status:**

REACH Unaffected

**HTSUS:**

8541.29.0095

**Moisture Sensitivity Level (MSL):**

1 (Unlimited)

**ECCN:**

EAR99



IPU07N03LA

## OptiMOS<sup>®</sup> 2 Power-Transistor

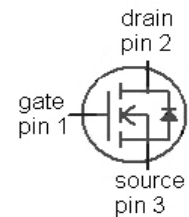
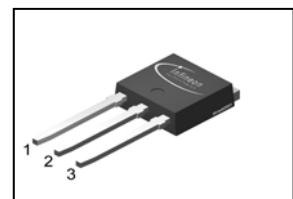
### Features

- Ideal for high-frequency dc/dc converters
- N-channel
- Logic level
- Excellent gate charge x  $R_{DS(on)}$  product (FOM)
- Very low on-resistance  $R_{DS(on)}$
- Superior thermal resistance
- 175 °C operating temperature
- dv/dt rated

### Product Summary

$V_{DS}$	25	V
$R_{DS(on),max}$	6.5	m $\Omega$
$I_D$	30	A

P-TO251-3-1



Type	Package	Ordering Code	Marking
IPU07N03LA	P-TO251-3-1	Q67042-S4150	07N03LA

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

Parameter	Symbol	Conditions	Value	Unit
Continuous drain current	$I_D$	$T_C=25\text{ °C}^1)$	30	A
		$T_C=100\text{ °C}$	30	
Pulsed drain current	$I_{D,pulse}$	$T_C=25\text{ °C}^2)$	210	
Avalanche energy, single pulse	$E_{AS}$	$I_D=30\text{ A}$ , $R_{GS}=25\ \Omega$	375	mJ
Reverse diode dv/dt	dv/dt	$I_D=30\text{ A}$ , $V_{DS}=20\text{ V}$ , $di/dt=200\text{ A}/\mu\text{s}$ , $T_{j,max}=175\text{ °C}$	6	kV/ $\mu\text{s}$
Gate source voltage <sup>3)</sup>	$V_{GS}$		$\pm 20$	V
Power dissipation	$P_{tot}$	$T_C=25\text{ °C}$	83	W
Operating and storage temperature	$T_j$ , $T_{stg}$		-55 ... 175	°C
IEC climatic category; DIN IEC 68-1			55/175/56	



## IPU07N03LA

Parameter	Symbol	Conditions	Values			Unit
			min.	typ.	max.	

**Thermal characteristics**

Thermal resistance, junction - case	$R_{thJC}$		-	-	1.8	K/W
SMD version, device on PCB	$R_{thJA}$	minimal footprint	-	-	75	
		6 cm <sup>2</sup> cooling area <sup>4)</sup>	-	-	50	

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

Drain-source breakdown voltage	$V_{(BR)DSS}$	$V_{GS}=0\text{ V}, I_D=1\text{ mA}$	25	-	-	V
Gate threshold voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=40\text{ }\mu\text{A}$	1.2	1.6	2	
Zero gate voltage drain current	$I_{DSS}$	$V_{DS}=25\text{ V}, V_{GS}=0\text{ V}, T_j=25\text{ °C}$	-	0.1	1	$\mu\text{A}$
		$V_{DS}=25\text{ V}, V_{GS}=0\text{ V}, T_j=125\text{ °C}$	-	10	100	
Gate-source leakage current	$I_{GSS}$	$V_{GS}=20\text{ V}, V_{DS}=0\text{ V}$	-	10	100	nA
Drain-source on-state resistance	$R_{DS(on)}$	$V_{GS}=4.5\text{ V}, I_D=30\text{ A}$	-	8.1	10.1	m $\Omega$
		$V_{GS}=10\text{ V}, I_D=30\text{ A}$	-	5.4	6.5	
Gate resistance	$R_G$		-	1.2	-	$\Omega$
Transconductance	$g_{fs}$	$ V_{DS} >2 I_D R_{DS(on)max}, I_D=30\text{ A}$	26	51	-	S

<sup>1)</sup> Current is limited by bondwire; with an  $R_{thJC}=1.8\text{ K/W}$  the chip is able to carry 88 A.

<sup>2)</sup> See figure 3

<sup>3)</sup>  $T_{j,max}=150\text{ °C}$  and duty cycle  $D<0.25$  for  $V_{GS}<-5\text{ V}$

<sup>4)</sup> Device on 40 mm x 40 mm x 1.5 mm epoxy PCB FR4 with 6 cm<sup>2</sup> (one layer, 70  $\mu\text{m}$  thick) copper area for drain connection. PCB is vertical in still air.



## IPU07N03LA

Parameter	Symbol	Conditions	Values			Unit
			min.	typ.	max.	

**Dynamic characteristics**

Input capacitance	$C_{iss}$	$V_{GS}=0\text{ V}, V_{DS}=15\text{ V},$ $f=1\text{ MHz}$	-	1995	2653	pF
Output capacitance	$C_{oss}$		-	848	1128	
Reverse transfer capacitance	$C_{rss}$		-	124	186	
Turn-on delay time	$t_{d(on)}$	$V_{DD}=15\text{ V}, V_{GS}=10\text{ V},$ $I_D=15\text{ A}, R_G=2.7\ \Omega$	-	9	14	ns
Rise time	$t_r$		-	18	28	
Turn-off delay time	$t_{d(off)}$		-	28	43	
Fall time	$t_f$		-	4	6	

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

Gate to source charge	$Q_{gs}$	$V_{DD}=15\text{ V}, I_D=15\text{ A},$ $V_{GS}=0\text{ to }5\text{ V}$	-	6	8	nC
Gate charge at threshold	$Q_{g(th)}$		-	3.2	4.2	
Gate to drain charge	$Q_{gd}$		-	4.6	6.9	
Switching charge	$Q_{sw}$		-	7	11	
Gate charge total	$Q_g$		-	16	22	
Gate plateau voltage	$V_{plateau}$		-	3.0	-	V
Gate charge total, sync. FET	$Q_{g(sync)}$	$V_{DS}=0.1\text{ V},$ $V_{GS}=0\text{ to }5\text{ V}$	-	14	19	nC
Output charge	$Q_{oss}$	$V_{DD}=15\text{ V}, V_{GS}=0\text{ V}$	-	18	24	

**Reverse Diode**

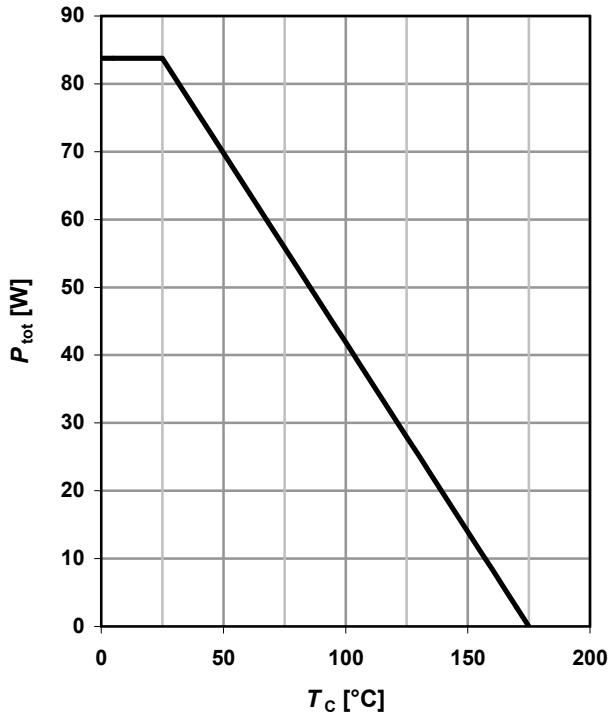
Diode continuous forward current	$I_S$	$T_C=25\text{ }^\circ\text{C}$	-	-	30	A
Diode pulse current	$I_{S,pulse}$		-	-	210	
Diode forward voltage	$V_{SD}$	$V_{GS}=0\text{ V}, I_F=30\text{ A},$ $T_J=25\text{ }^\circ\text{C}$	-	0.88	1.2	V
Reverse recovery charge	$Q_{rr}$	$V_R=15\text{ V}, I_F=I_S,$ $di_F/dt=400\text{ A}/\mu\text{s}$	-	-	10	nC

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



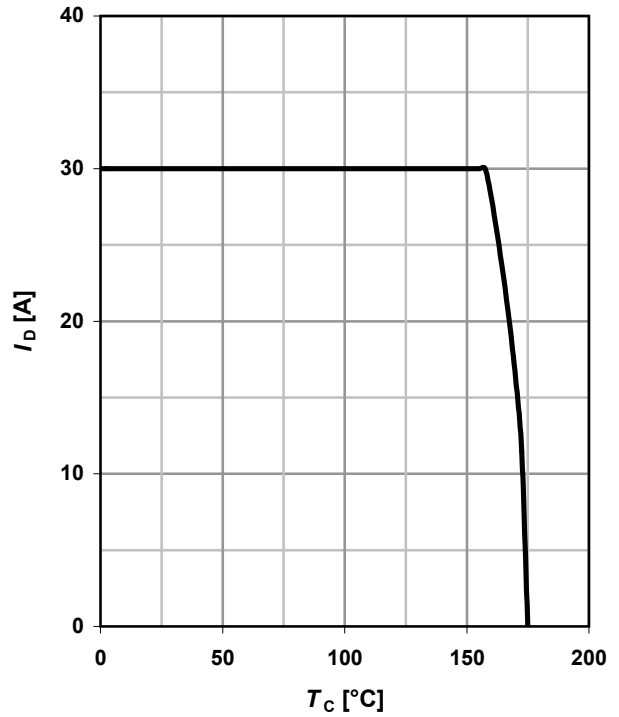
**1 Power dissipation**

$P_{tot}=f(T_C)$



**2 Drain current**

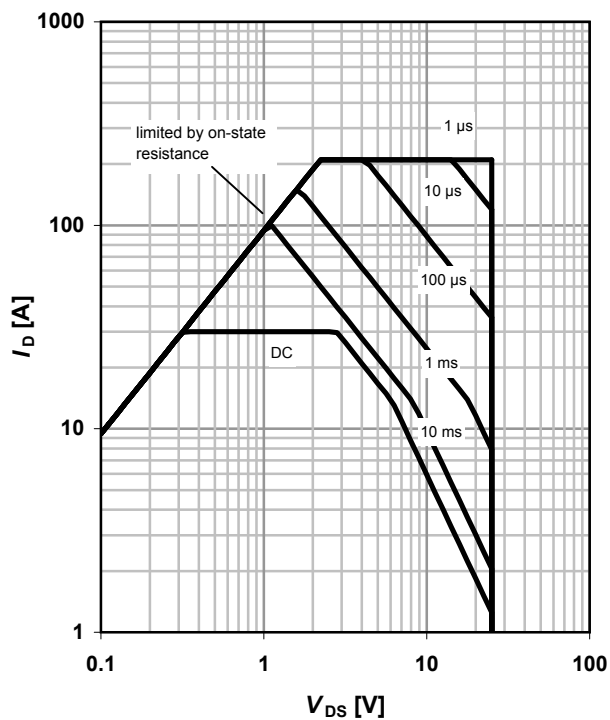
$I_D=f(T_C); V_{GS} \geq 10\text{ V}$



**3 Safe operation area**

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

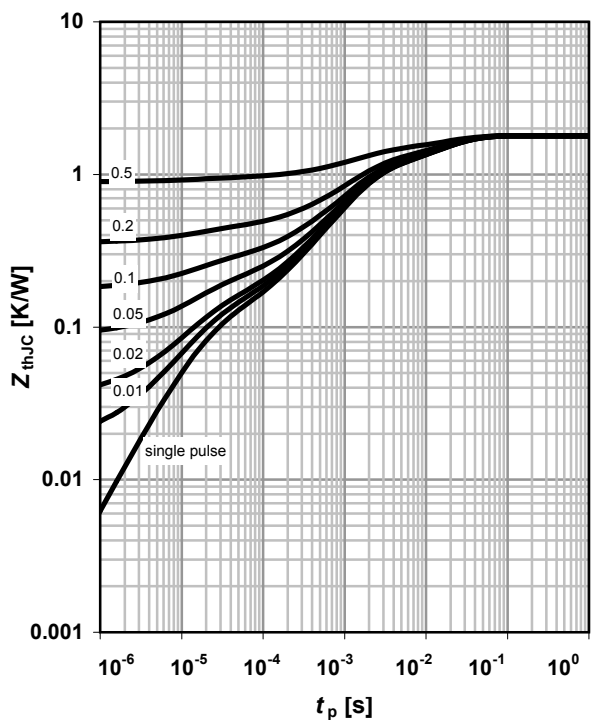
parameter:  $t_p$



**4 Max. transient thermal impedance**

$Z_{thJC}=f(t_p)$

parameter:  $D=t_p/T$

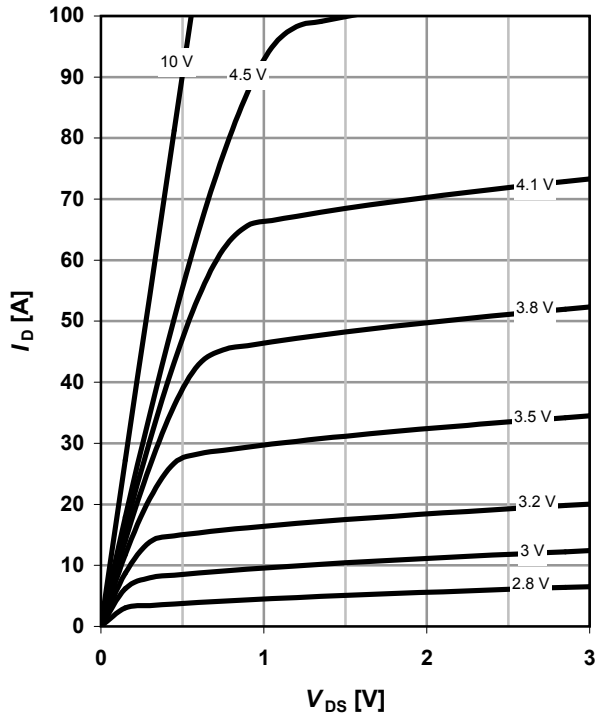




**5 Typ. output characteristics**

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

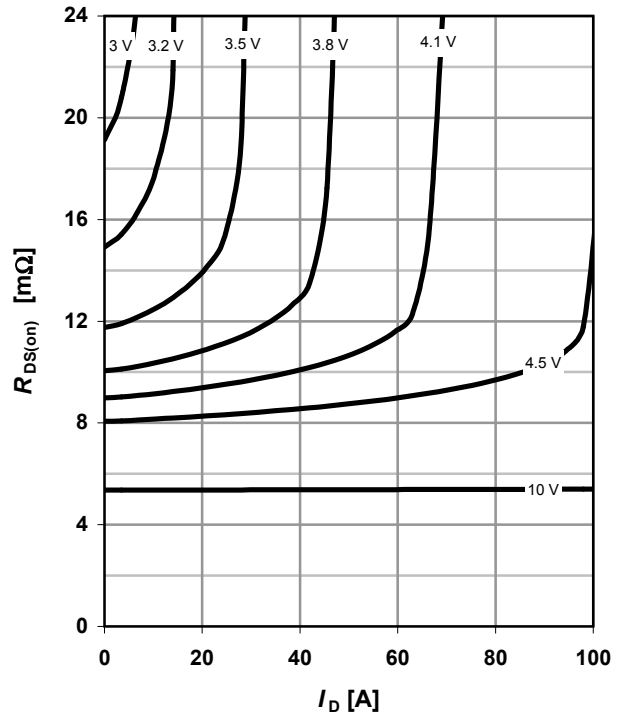
parameter:  $V_{GS}$



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

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

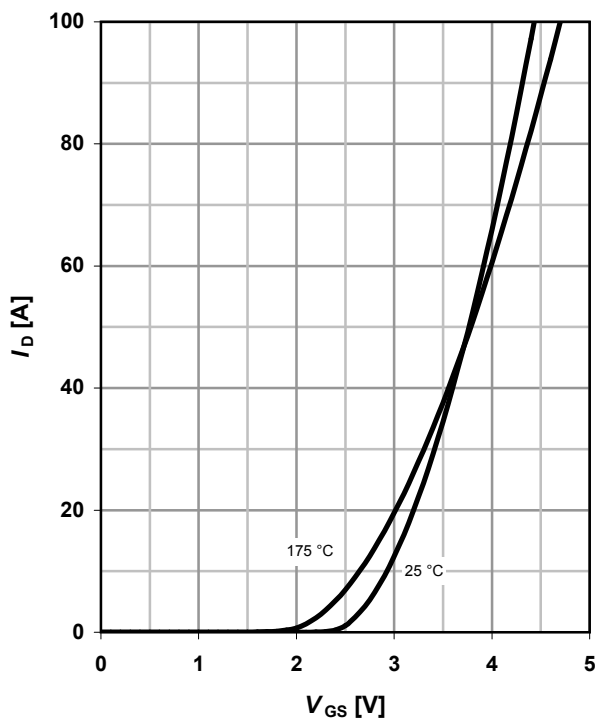
parameter:  $V_{GS}$



**7 Typ. transfer characteristics**

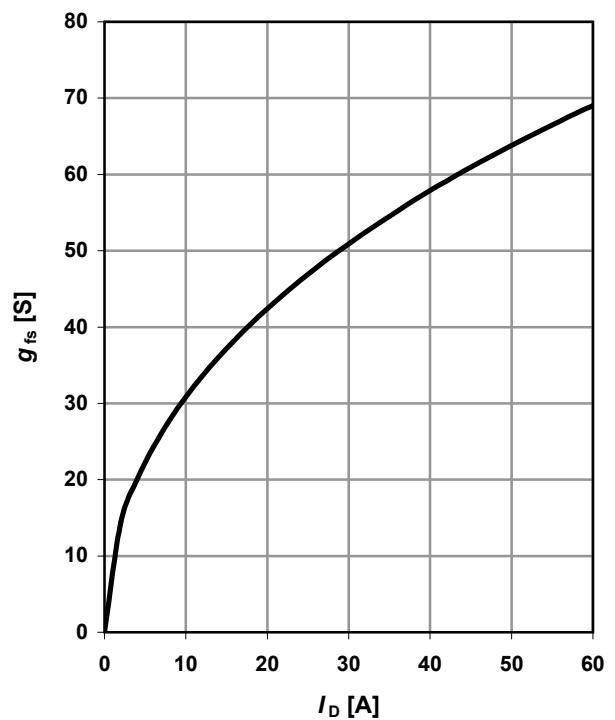
$I_D = f(V_{GS}); |V_{DS}| > 2|I_D|R_{DS(on)max}$

parameter:  $T_j$



**8 Typ. forward transconductance**

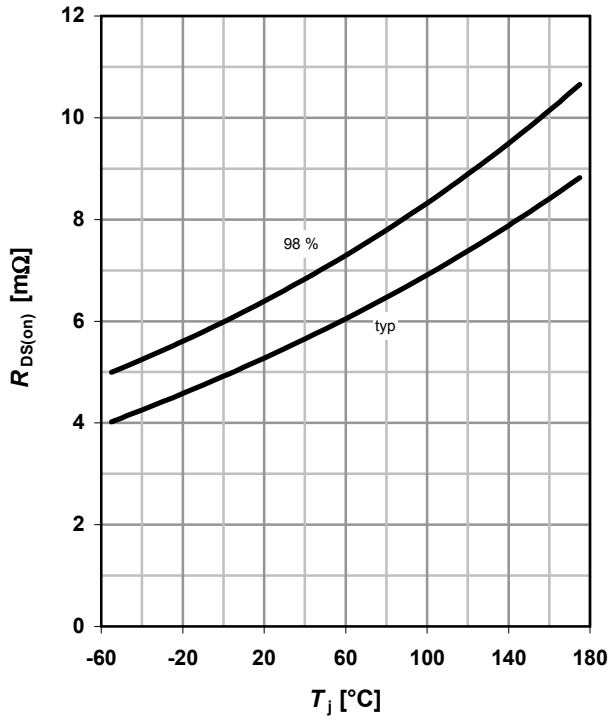
$g_{fs} = f(I_D); T_j = 25\text{ }^\circ\text{C}$





**9 Drain-source on-state resistance**

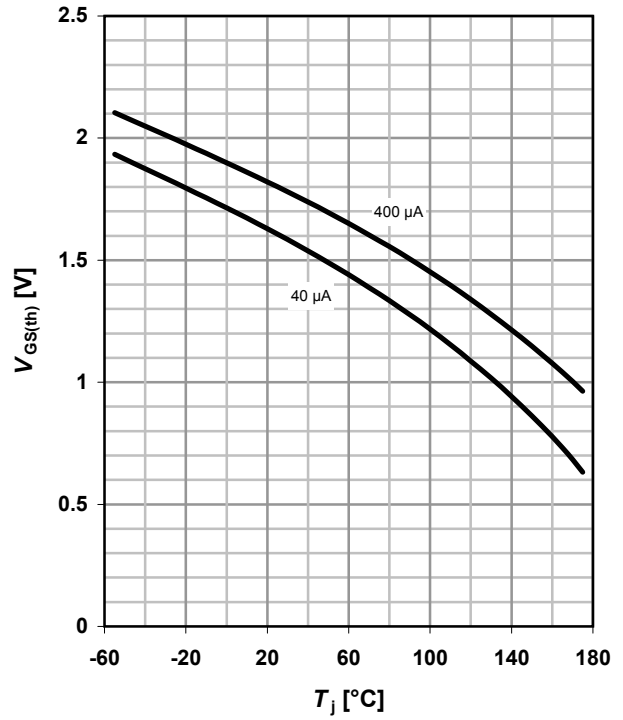
$R_{DS(on)} = f(T_j); I_D = 30 \text{ A}; V_{GS} = 10 \text{ V}$



**10 Typ. gate threshold voltage**

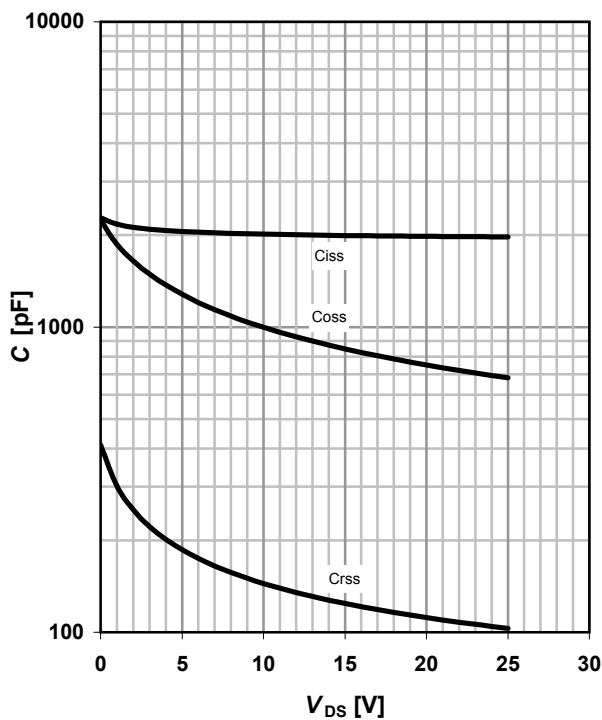
$V_{GS(th)} = f(T_j); V_{GS} = V_{DS}$

parameter:  $I_D$



**11 Typ. Capacitances**

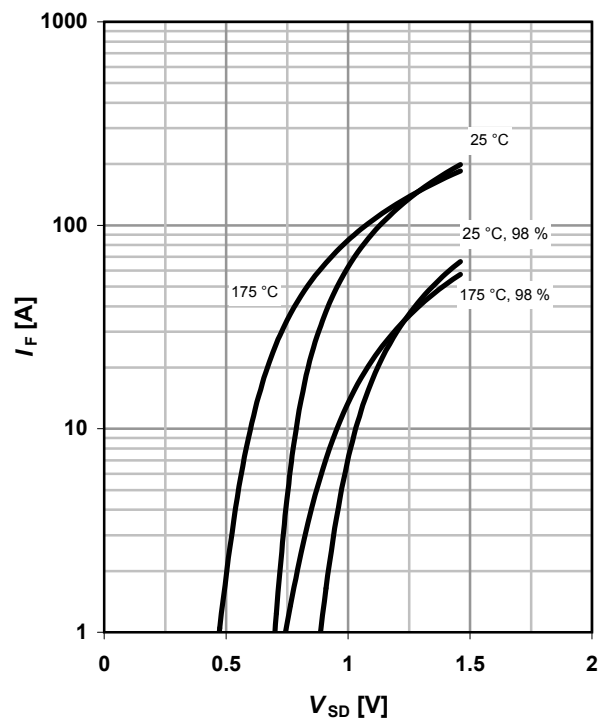
$C = f(V_{DS}); V_{GS} = 0 \text{ V}; f = 1 \text{ MHz}$



**12 Forward characteristics of reverse diode**

$I_F = f(V_{SD})$

parameter:  $T_j$



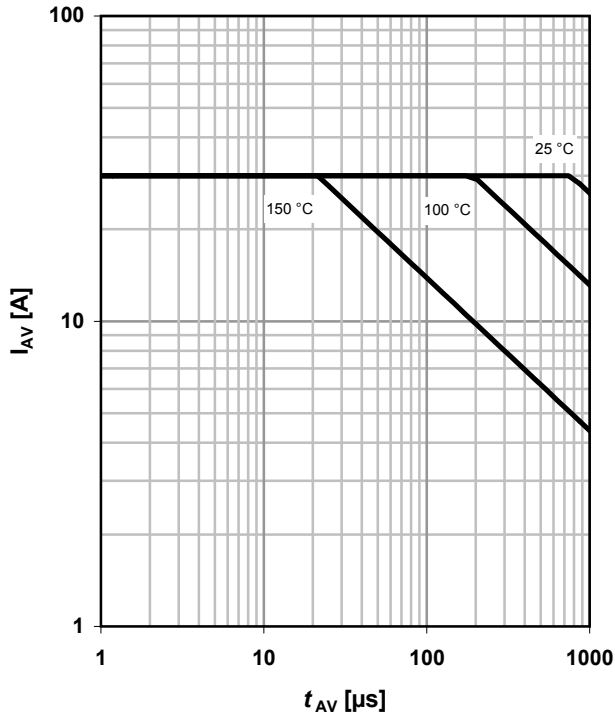




**13 Avalanche characteristics**

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

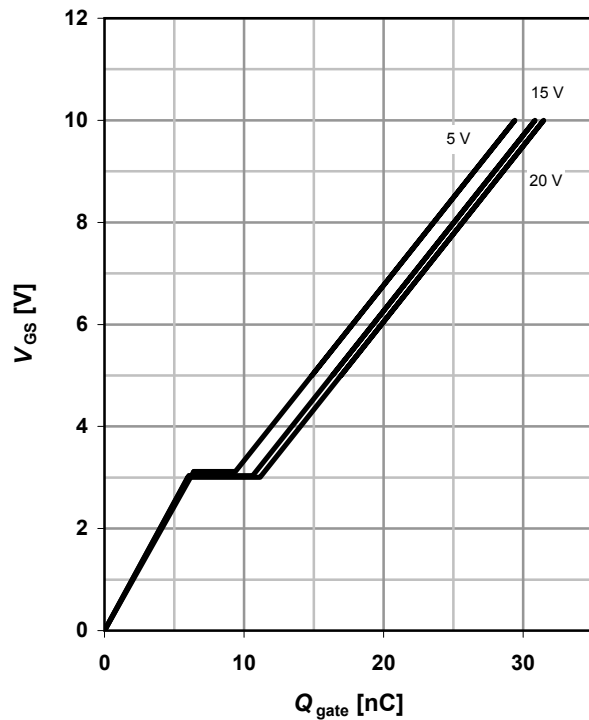
parameter:  $T_{j(start)}$



**14 Typ. gate charge**

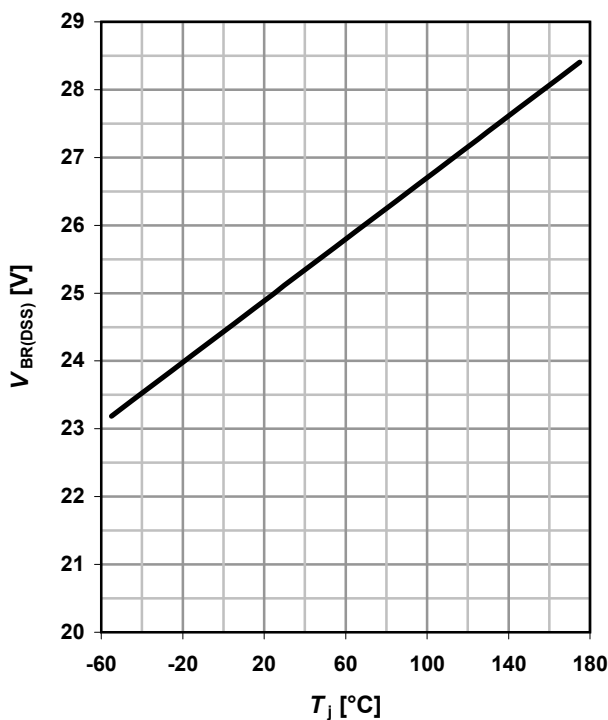
$V_{GS}=f(Q_{gate}); I_D=15\ A\ pulsed$

parameter:  $V_{DD}$

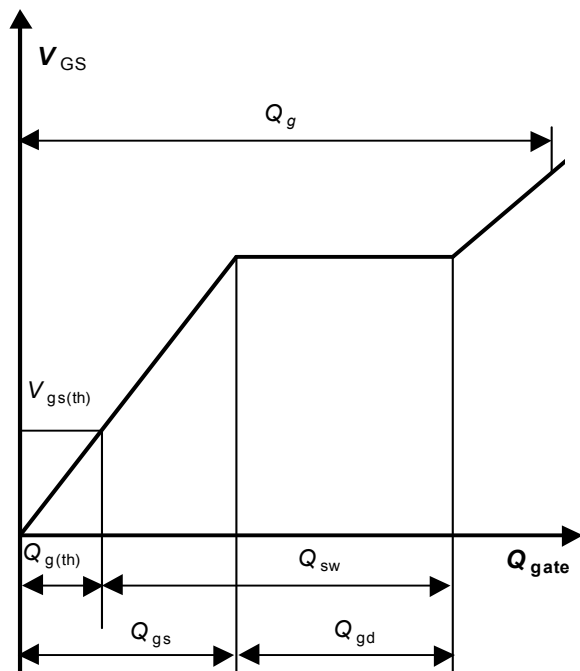


**15 Drain-source breakdown voltage**

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



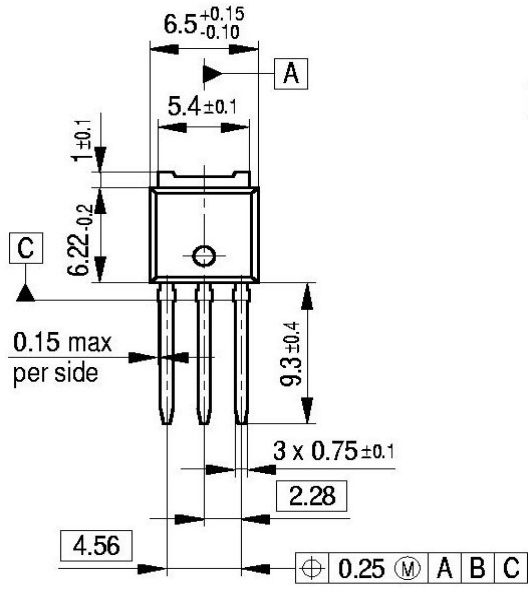
**16 Gate charge waveforms**





Package Outline

P-TO251-3-1: Outline



Packaging:



All metal surfaces tin plated, except area of cut.



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