

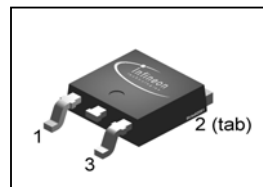
**SIPMOS® Power-Transistor**
**Features**

- P-Channel
- Enhancement mode
- Avalanche rated
- $dv/dt$  rated
- 175°C operating temperature
- Pb-free lead plating; RoHS compliant (PG-TO252)

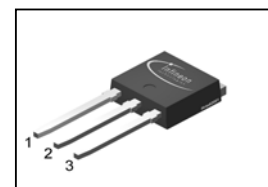

**Product Summary**

$V_{DS}$	-60	V
$R_{DS(on),max}$	0.3	$\Omega$
$I_D$	-8.8	A

PG-TO252-3



P-TO251-3



Type	Package	Tape and reel information	Marking	Lead free	Packing
SPU08P06P	P-TO251-3			No	
SPD08P06P	PG-TO252-3			Yes	

Parameter	Symbol	Conditions	Value	Unit
			steady state	
Continuous drain current	$I_D$	$T_A=25\text{ °C}$	-8.83	A
		$T_A=100\text{ °C}$	-6.25	
Pulsed drain current	$I_{D,pulse}$	$T_A=25\text{ °C}$	-35.32	
Avalanche energy, single pulse	$E_{AS}$	$I_D=8.83\text{ A}, R_{GS}=25\text{ }\Omega$	70	mJ
Avalanche energy, periodic limited by $T_{j,max}$	$E_{AR}$		4.2	
Reverse diode $dv/dt$	$dv/dt$	$I_D=8.83\text{ A}, V_{DS}=48\text{ V}, di/dt=-200\text{ A}/\mu\text{s}, T_{j,max}=175\text{ °C}$	-6	kV/ $\mu\text{s}$
Gate source voltage	$V_{GS}$		$\pm 20$	V
Power dissipation	$P_{tot}$	$T_A=25\text{ °C}$	42	W
Operating and storage temperature	$T_j, T_{stg}$		"-55 ... +175"	°C
ESD class				
Soldering temperature			260 °C	
IEC climatic category; DIN IEC 68-1			55/175/56	

Parameter	Symbol	Conditions	Values			Unit
			min.	typ.	max.	

**Thermal characteristics**

Thermal resistance, junction - case	$R_{thJC}$		-	-		K/W
Thermal resistance, junction - ambient, leaded	$R_{thJA}$		-	-	110	
SMD version, device on PCB:	$R_{thJA}$	minimal footprint	-	-	250	K/W
		6 cm <sup>2</sup> cooling area <sup>1)</sup>	-	-	70	

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

**Static characteristics**

Drain-source breakdown voltage	$V_{(BR)DSS}$	$V_{GS}=0\text{ V}, I_D=-250\text{ }\mu\text{A}$	-60	-	-	V
Gate threshold voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=-250\text{ }\mu\text{A}$	-2.1	-3.0	-4	
Zero gate voltage drain current	$I_{DSS}$	$V_{DS}=-60\text{ V}, V_{GS}=0\text{ V}, T_j=25\text{ }^\circ\text{C}$	-	-0.1	-1	$\mu\text{A}$
		$V_{DS}=-60\text{ V}, V_{GS}=0\text{ V}, T_j=150\text{ }^\circ\text{C}$	-	-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	$R_{DS(on)}$	$V_{GS}=-6.2\text{ V}, I_D=-10\text{ A}$	-	230	300	m $\Omega$
Transconductance	$g_{fs}$	$ V_{DS} >2 I_D R_{DS(on)max}, I_D=-6.2\text{ A}$	2.5	4.9	-	S

<sup>1)</sup> Device on 40mm\*40mm\*1.5mm epoxy PCB FR4 with 6 cm<sup>2</sup> ( one layer, 70 $\mu$ , thick) copper area for drain connection. PCB is vertical without blown air.

Parameter	Symbol	Conditions	Values			Unit
			min.	typ.	max.	

**Dynamic characteristics**

Input capacitance	$C_{iss}$	$V_{GS}=0\text{ V}, V_{DS}=-25\text{ V},$ $f=1\text{ MHz}$	-	335	420	pF
Output capacitance	$C_{oss}$		-	105	135	
Reverse transfer capacitance	$C_{rss}$		-	65	95	
Turn-on delay time	$t_{d(on)}$	$V_{DD}=-30\text{ V}, V_{GS}=-$ $10\text{ V}, I_D=-6.2\text{ A},$ $R_G=6\ \Omega$	-	16.0	24.0	
Rise time	$t_r$		-	46.0	69	
Turn-off delay time	$t_{d(off)}$		-	48	72	
Fall time	$t_f$		-	14	21	

**Gate Charge Characteristics**

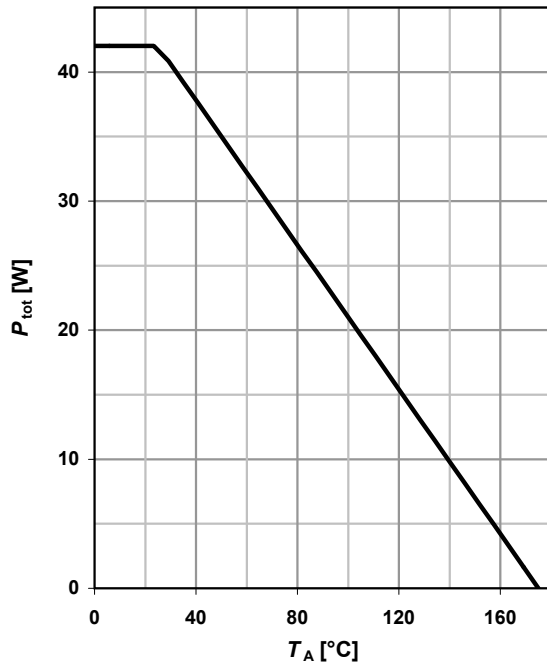
Gate to source charge	$Q_{gs}$	$V_{DD}=-48\text{ V}, I_D=-8.8\text{ A},$ $V_{GS}=0\text{ to }-10\text{ V}$	-	-1.9	-2.6	nC
Gate to drain charge	$Q_{gd}$		-	-5	-8	
Gate charge total	$Q_g$		-	-10	-13	
Gate plateau voltage	$V_{plateau}$		-	-6	-	V

**Reverse Diode**

Diode continuous forward current	$I_S$	$T_A=25\text{ }^\circ\text{C}$	-	-	-8.80	A
Diode pulse current	$I_{S,pulse}$		-	-	-35.3	
Diode forward voltage	$V_{SD}$	$V_{GS}=0\text{ V}, I_F=-8.83\text{ A},$ $T_j=25\text{ }^\circ\text{C}$	-	-0.98	-1.55	V
Reverse recovery time	$t_{rr}$	$V_R=30\text{ V}, I_F= I_S ,$ $di_F/dt=100\text{ A}/\mu\text{s}$	-	60	90	ns
Reverse recovery charge	$Q_{rr}$		-	100	150	

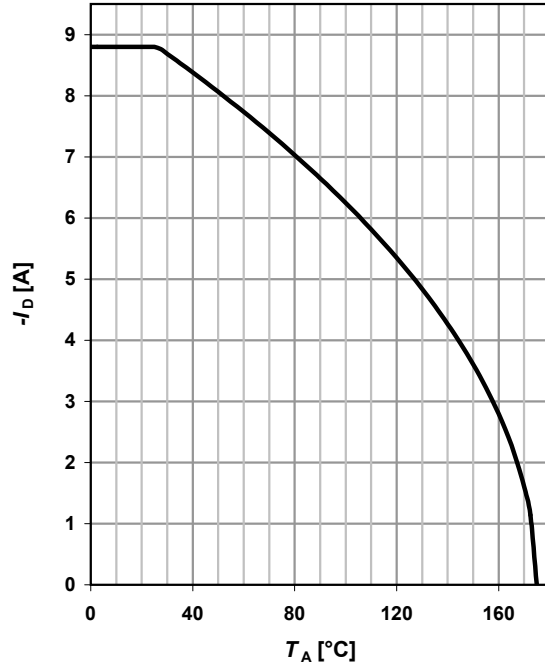
**1 Power dissipation**

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



**2 Drain current**

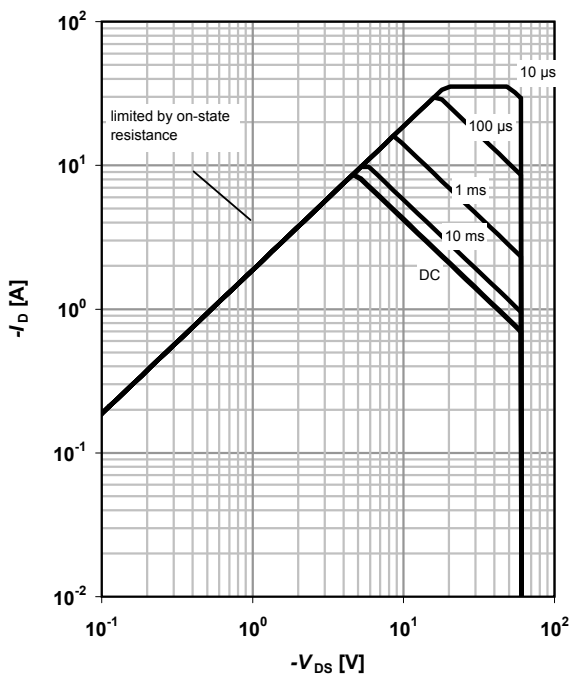
$$I_D = f(T_A); |V_{GS}| \geq 10 \text{ V}$$



**3 Safe operating area**

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

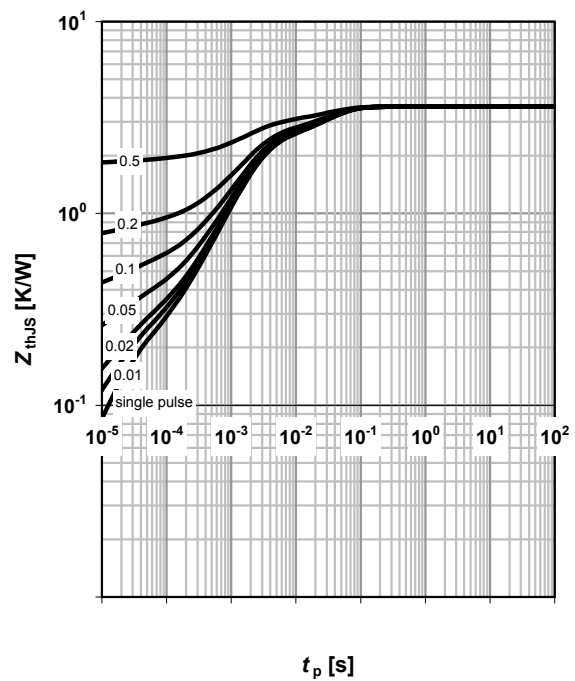
parameter:  $t_p$



**4 Max. transient thermal impedance**

$$Z_{\text{thJA}} = f(t_p)$$

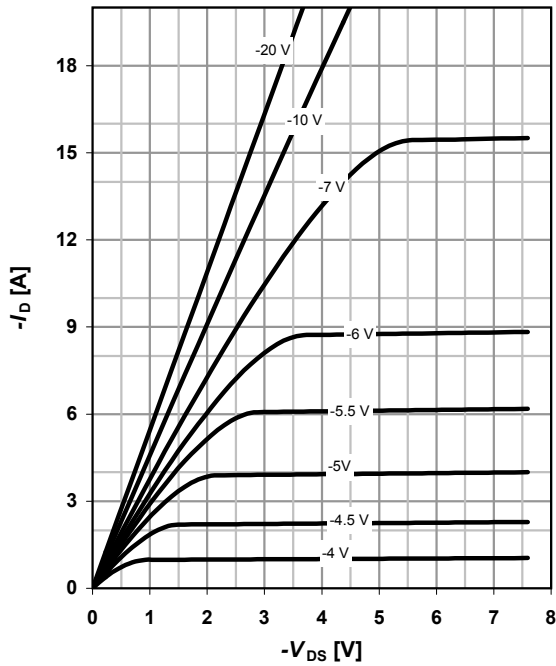
parameter:  $D = t_p / T$



**5 Typ. output characteristics**

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

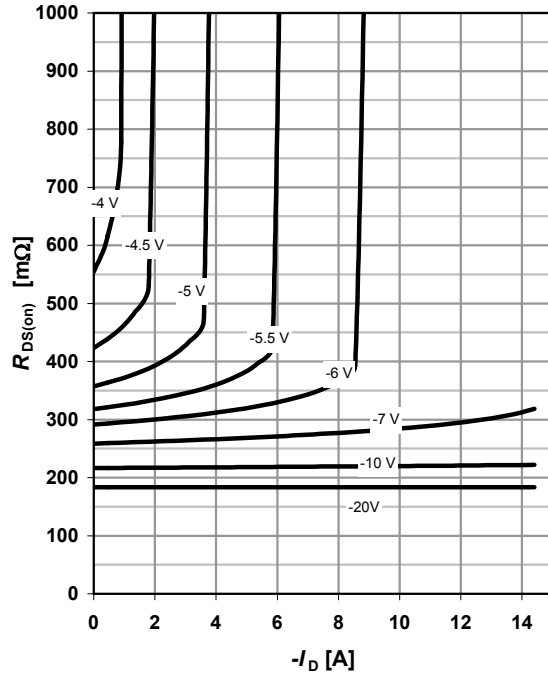
parameter:  $V_{GS}$



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

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

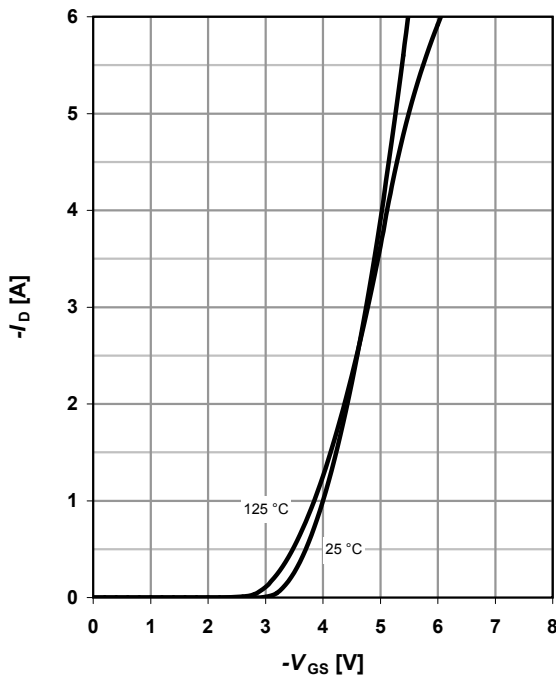
parameter:  $V_{GS}$



**7 Typ. transfer characteristics**

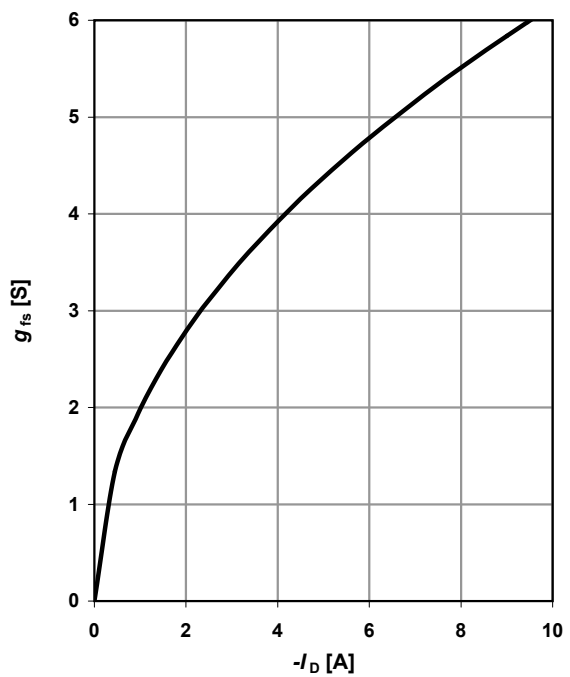
$I_D = f(V_{GS}); |V_{DS}| > 2|I_D|R_{DS(on)max}$

parameter:  $T_j$



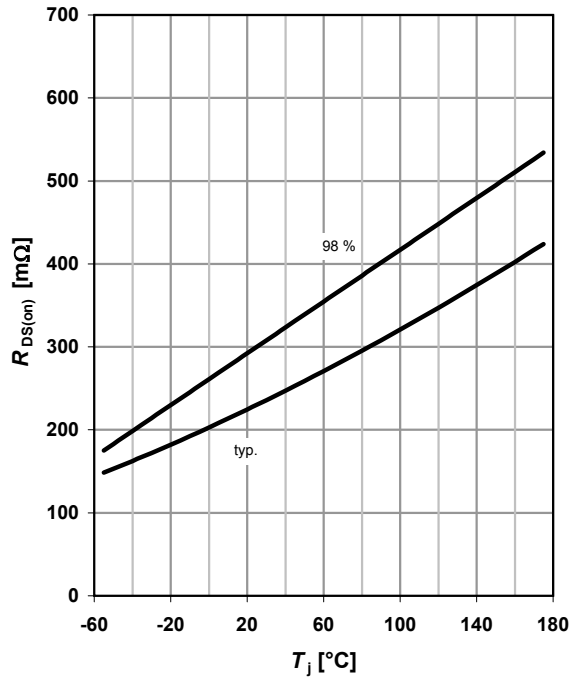
**8 Typ. forward transconductance**

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



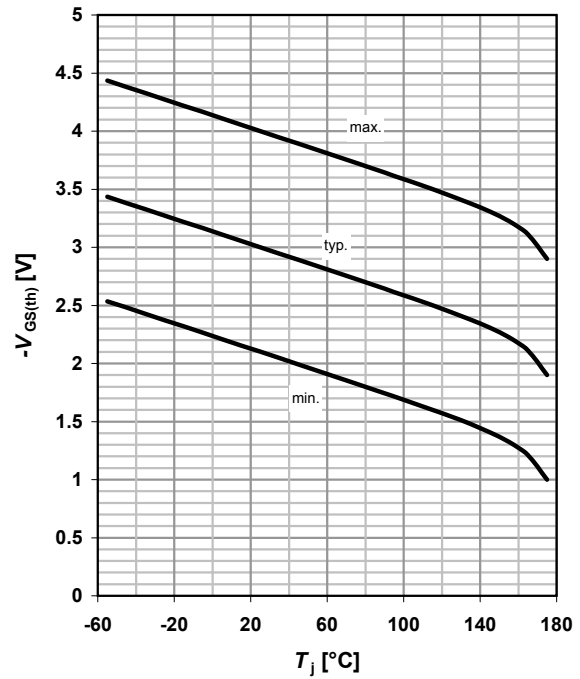
**9 Drain-source on-state resistance**

$R_{DS(on)} = f(T_j); I_D = -6.2 \text{ A}; V_{GS} = -10 \text{ V}$



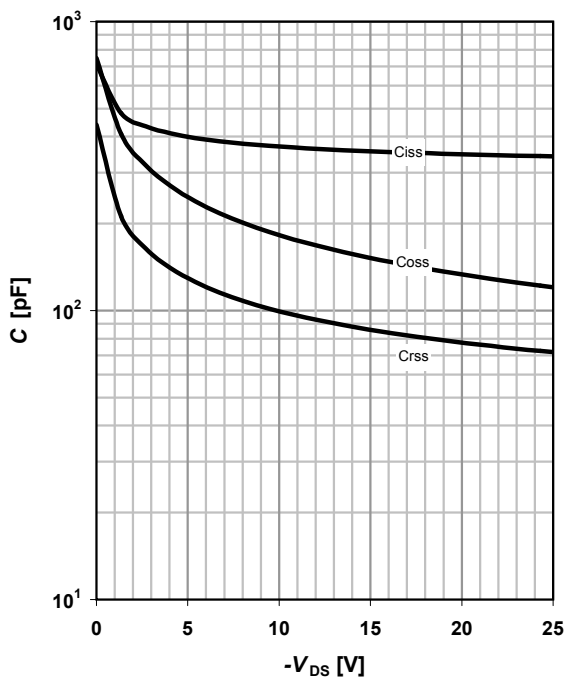
**10 Typ. gate threshold voltage**

$V_{GS(th)} = f(T_j); V_{GS} = V_{DS}; I_D = -250 \mu\text{A}$



**11 Typ. capacitances**

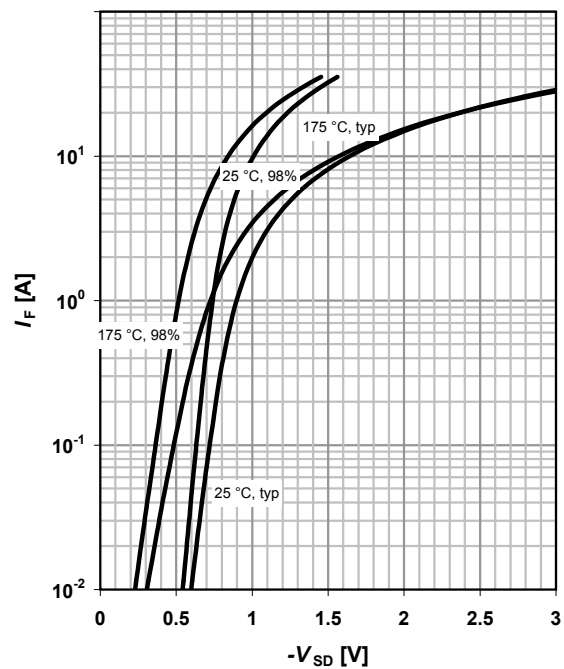
$C = f(V_{DS}); V_{GS} = 0 \text{ V}; f = 1 \text{ MHz}$



**12 Forward characteristics of reverse diode**

$I_F = f(V_{SD})$

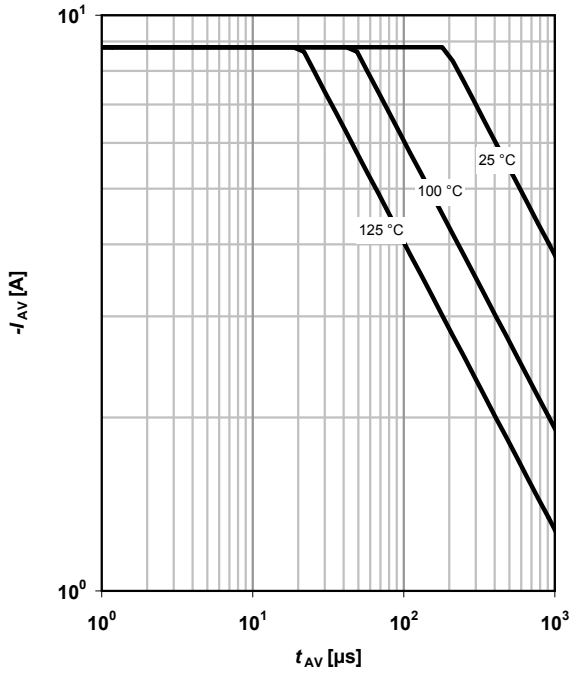
parameter:  $T_j$



**13 Avalanche characteristics**

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

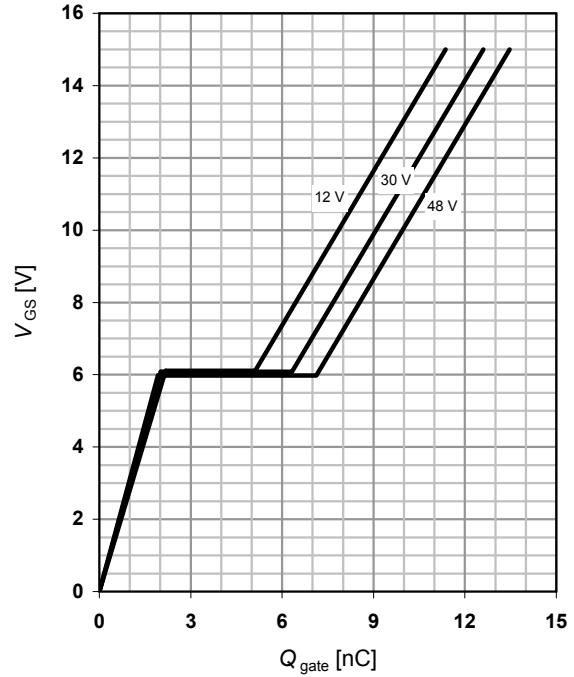
parameter:  $T_{j(start)}$



**14 Typ. gate charge**

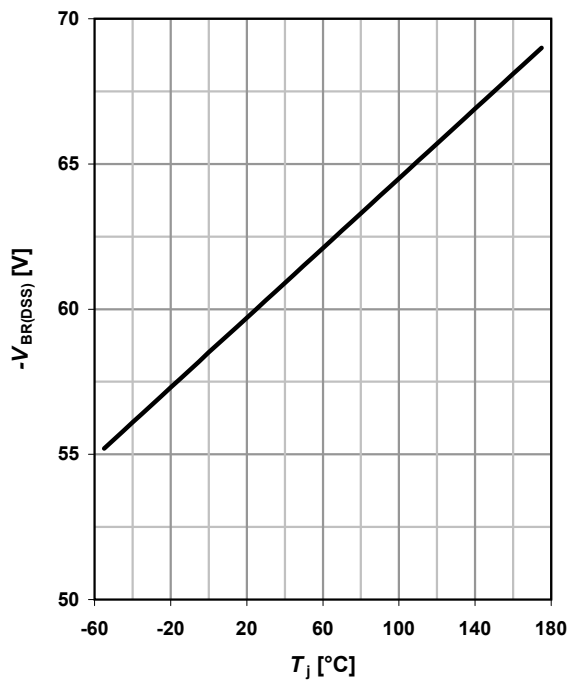
$V_{GS}=f(Q_{gate}); I_D=-8.8 \text{ A pulsed}$

parameter:  $V_{DD}$



**15 Drain-source breakdown voltage**

$V_{BR(DSS)}=f(T_j); I_D=-250 \mu\text{A}$



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