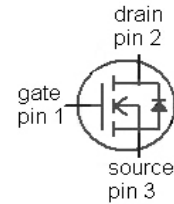


OptiMOS[®] 2 Power-Transistor
Features

- N-channel, logic level
- Excellent gate charge $\times R_{DS(on)}$ product (FOM)
- Very low on-resistance $R_{DS(on)}$
- 175 °C operating temperature
- Pb-free lead plating; RoHS compliant
- Qualified according to JEDEC¹⁾ for target application
- Ideal for high-frequency switching and synchronous rectification

Product Summary

V_{DS}	100	V
$R_{DS(on),max}$	6.2	m Ω
I_D	100	A



Type	IPP06CN10L G
Package	PG-TO220-3
Marking	06CN10L

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

Parameter	Symbol	Conditions	Value	Unit
Continuous drain current	I_D	$T_C=25\text{ °C}^{2)}$	100	A
		$T_C=100\text{ °C}$	92	
Pulsed drain current ³⁾	$I_{D,pulse}$	$T_C=25\text{ °C}$	400	
Avalanche energy, single pulse	E_{AS}	$I_D=100\text{ A}$, $R_{GS}=25\text{ }\Omega$	480	mJ
Reverse diode dv/dt	dv/dt	$I_D=100\text{ A}$, $V_{DS}=80\text{ V}$, $di/dt=100\text{ A}/\mu\text{s}$, $T_{j,max}=175\text{ °C}$	6	kV/ μs
Gate source voltage ⁴⁾	V_{GS}		± 20	V
Power dissipation	P_{tot}	$T_C=25\text{ °C}$	214	W
Operating and storage temperature	T_j , T_{stg}		-55 ... 175	°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}		-	-	0.7	K/W
Thermal resistance, junction - ambient	R_{thJA}	minimal footprint	-	-	62	
		6 cm ² cooling area ⁵⁾	-	-	40	

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

Drain-source breakdown voltage	$V_{(BR)DSS}$	$V_{GS}=0\text{ V}, I_D=1\text{ mA}$	100	-	-	V
Gate threshold voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=180\text{ }\mu\text{A}$	1.2	1.85	2.4	
Zero gate voltage drain current	I_{DSS}	$V_{DS}=80\text{ V}, V_{GS}=0\text{ V}, T_j=25\text{ }^\circ\text{C}$	-	0.1	1	μA
		$V_{DS}=80\text{ V}, V_{GS}=0\text{ V}, T_j=125\text{ }^\circ\text{C}$	-	10	100	
Gate-source leakage current	I_{GSS}	$V_{GS}=20\text{ V}, V_{DS}=0\text{ V}$	-	1	100	nA
Drain-source on-state resistance	$R_{DS(on)}$	$V_{GS}=4.5\text{ V}, I_D=50\text{ A}$	-	5.9	7.9	m Ω
		$V_{GS}=10\text{ V}, I_D=100\text{ A}$	-	5.1	6.2	
Gate resistance	R_G		-	1.5	-	Ω
Transconductance	g_{fs}	$ V_{DS} >2 I_D R_{DS(on)max}, I_D=100\text{ A}$	96	192	-	S

¹⁾J-STD20 and JESD22

²⁾ Current is limited by bondwire; with an $R_{thJC}=0.7\text{ K/W}$ the chip is able to carry 124 A.

³⁾ See figure 3

⁴⁾ $T_{jmax}=150\text{ }^\circ\text{C}$ and duty cycle $D=0.01$ for $V_{gs}<-5\text{ V}$
⁵⁾ 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.

Parameter	Symbol	Conditions	Values			Unit
			min.	typ.	max.	

Dynamic characteristics

Input capacitance	C_{iss}	$V_{GS}=0\text{ V}, V_{DS}=50\text{ V},$ $f=1\text{ MHz}$	-	8940	11900	pF
Output capacitance	C_{oss}		-	1130	1500	
Reverse transfer capacitance	C_{rss}		-	58	-	
Turn-on delay time	$t_{d(on)}$	$V_{DD}=50\text{ V}, V_{GS}=10\text{ V},$ $I_D=50\text{ A}, R_G=1.6\ \Omega$	-	17	-	ns
Rise time	t_r		-	27	-	
Turn-off delay time	$t_{d(off)}$		-	26	-	
Fall time	t_f		-	7	-	

Gate Charge Characteristics⁶⁾

Gate to source charge	Q_{gs}	$V_{DD}=50\text{ V}, I_D=100\text{ A},$ $V_{GS}=0\text{ to }10\text{ V}$	-	31	-	nC
Gate to drain charge	Q_{gd}		-	21	-	
Switching charge	Q_{sw}		-	25	-	
Gate charge total	Q_g		-	124	-	
Gate plateau voltage	$V_{plateau}$		-	3.5	-	V
Output charge	Q_{oss}	$V_{DD}=50\text{ V}, V_{GS}=0\text{ V}$	-	116	-	nC

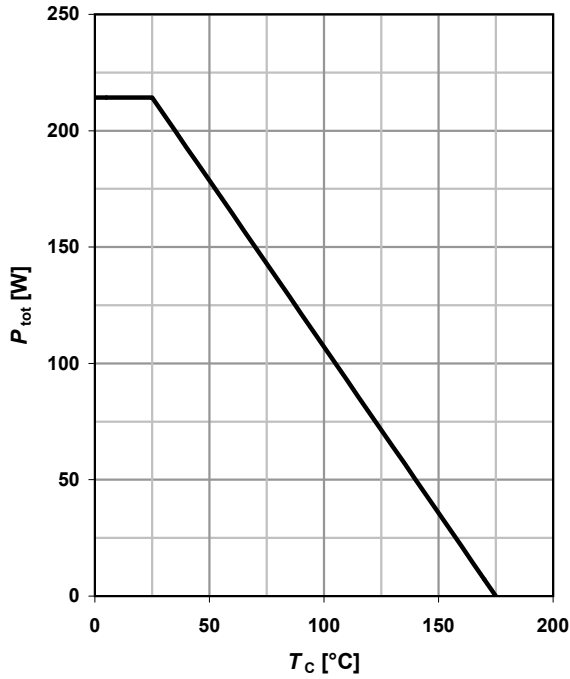
Reverse Diode

Diode continuous forward current	I_S	$T_C=25\text{ }^\circ\text{C}$	-	-	100	A
Diode pulse current	$I_{S,pulse}$		-	-	400	
Diode forward voltage	V_{SD}	$V_{GS}=0\text{ V}, I_F=100\text{ A},$ $T_j=25\text{ }^\circ\text{C}$	-	1	1.2	V
Reverse recovery time	t_{rr}	$V_R=50\text{ V}, I_F=I_S,$ $di_F/dt=100\text{ A}/\mu\text{s}$	-	98	-	ns
Reverse recovery charge	Q_{rr}		-	307	-	nC

⁶⁾ See figure 16 for gate charge parameter definition

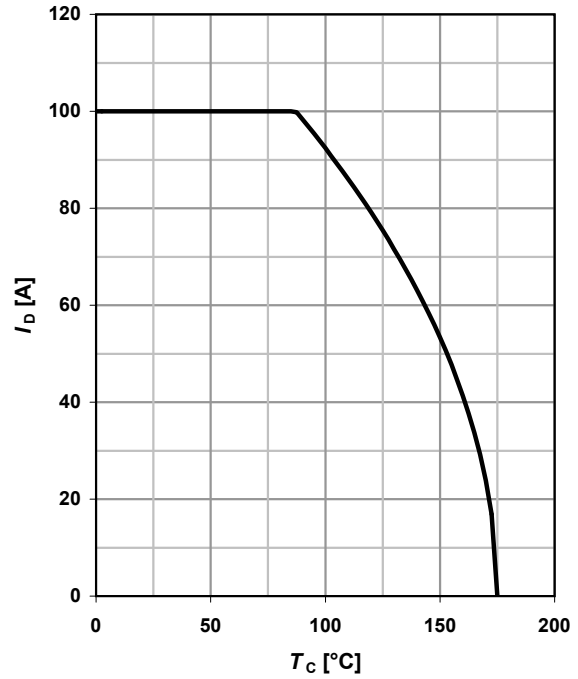
1 Power dissipation

$$P_{tot} = f(T_C)$$



2 Drain current

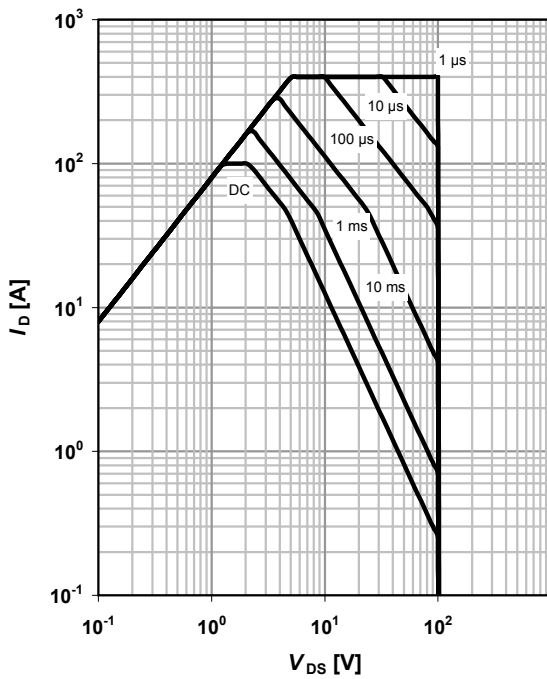
$$I_D = f(T_C); V_{GS} \geq 10 \text{ V}$$



3 Safe operating area

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

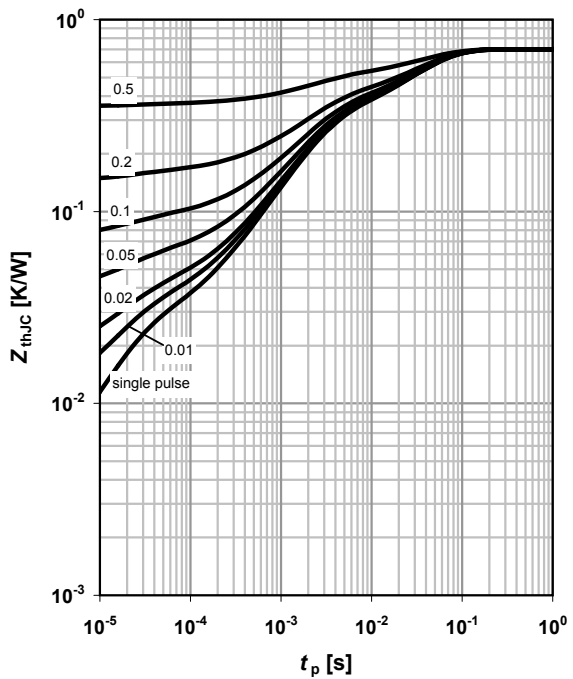
parameter: t_p



4 Max. transient thermal impedance

$$Z_{thJC} = f(t_p)$$

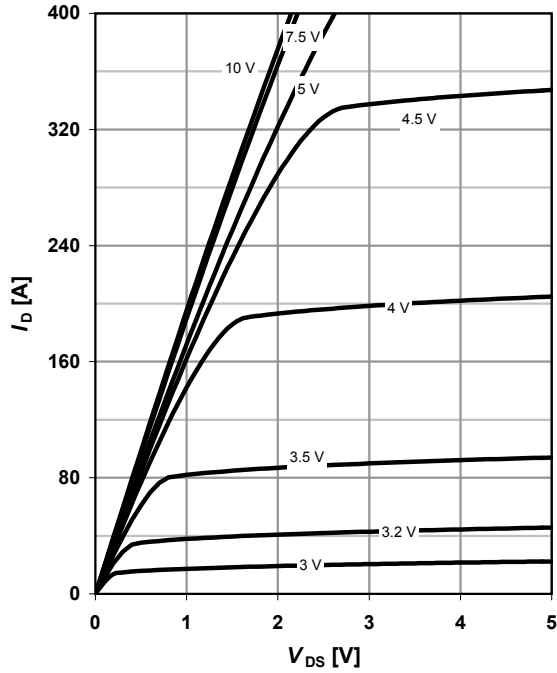
parameter: $D = t_p / T$



5 Typ. output characteristics

$I_D = f(V_{DS}); T_j = 25\text{ °C}$

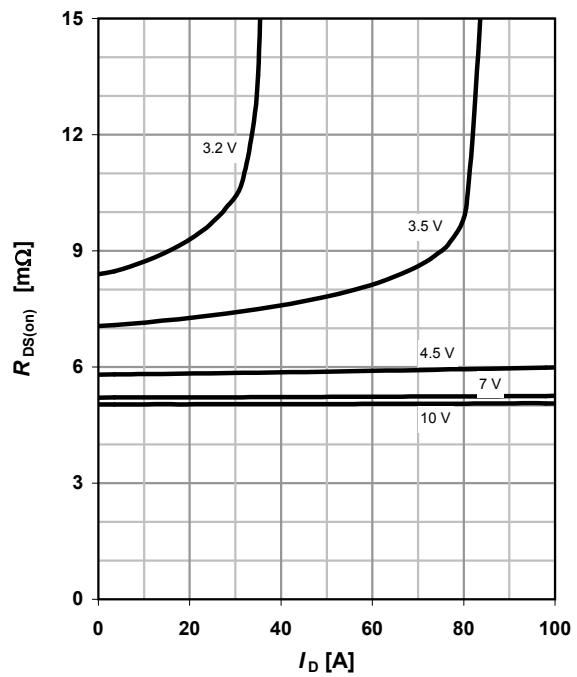
parameter: V_{GS}



6 Typ. drain-source on resistance

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

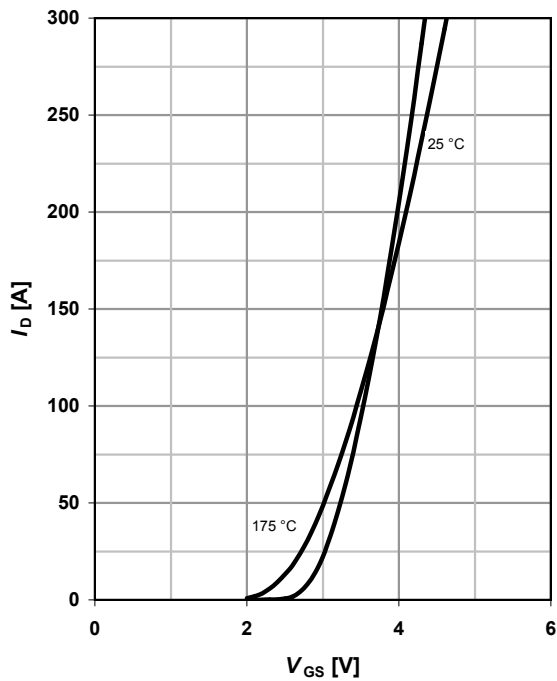
parameter: V_{GS}



7 Typ. transfer characteristics

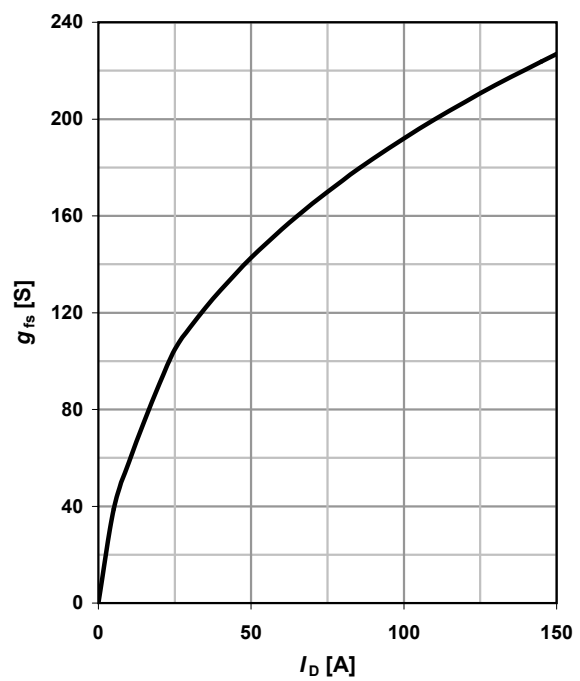
$I_D = f(V_{GS}); |V_{DS}| > 2|I_D|R_{DS(on)max}$

parameter: T_j



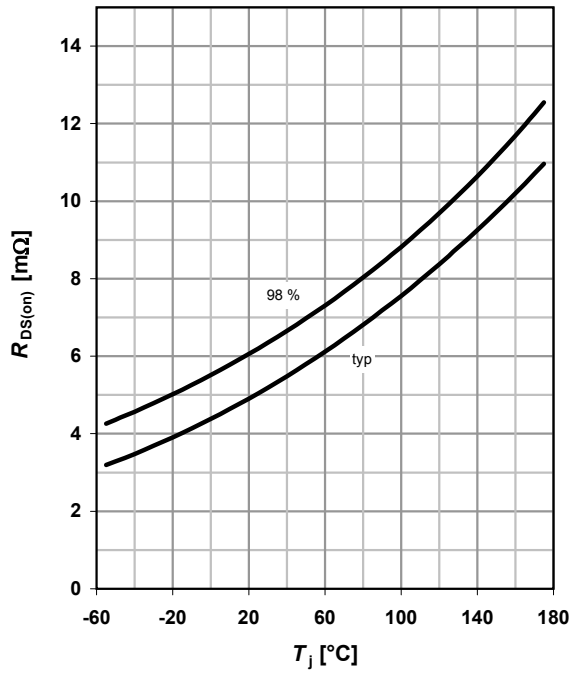
8 Typ. forward transconductance

$g_{fs} = f(I_D); T_j = 25\text{ °C}$

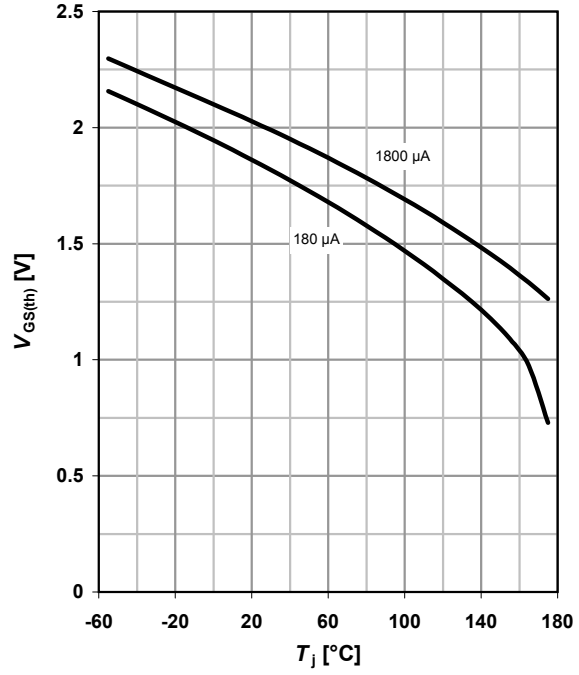


9 Drain-source on-state resistance

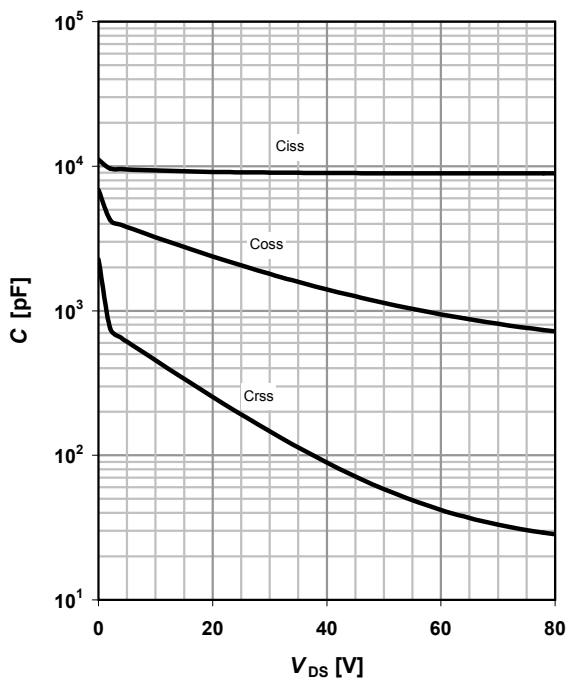
$$R_{DS(on)} = f(T_j); I_D = 100 \text{ A}; V_{GS} = 10 \text{ V}$$


10 Typ. gate threshold voltage

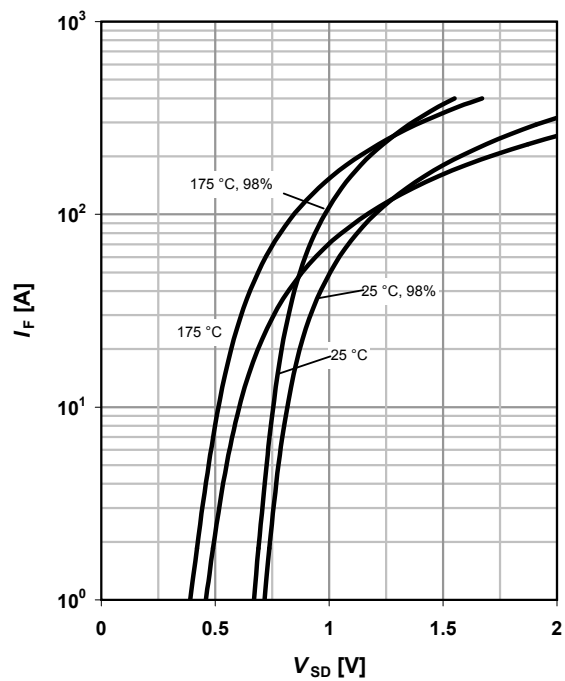
$$V_{GS(th)} = f(T_j); V_{GS} = V_{DS}$$

 parameter: I_D

11 Typ. capacitances

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

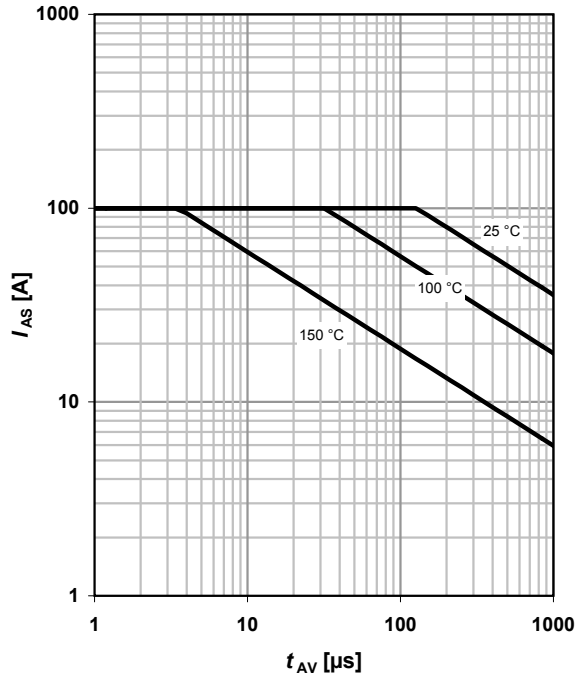

12 Forward characteristics of reverse diode

$$I_F = f(V_{SD})$$

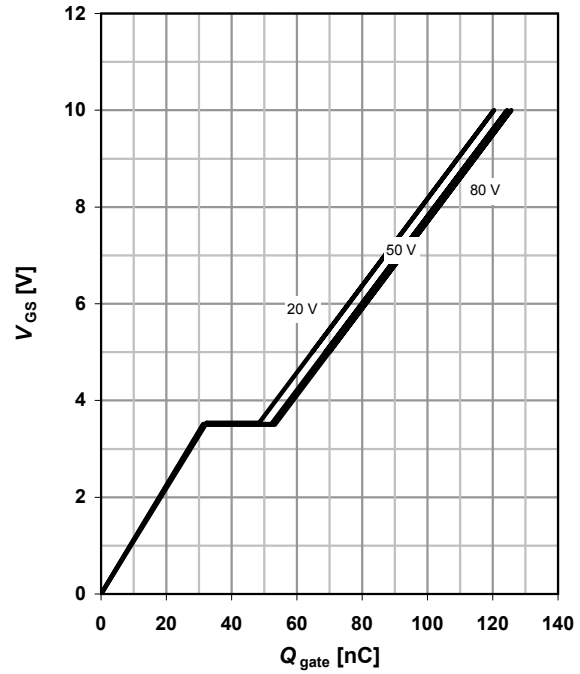
 parameter: T_j


13 Avalanche characteristics

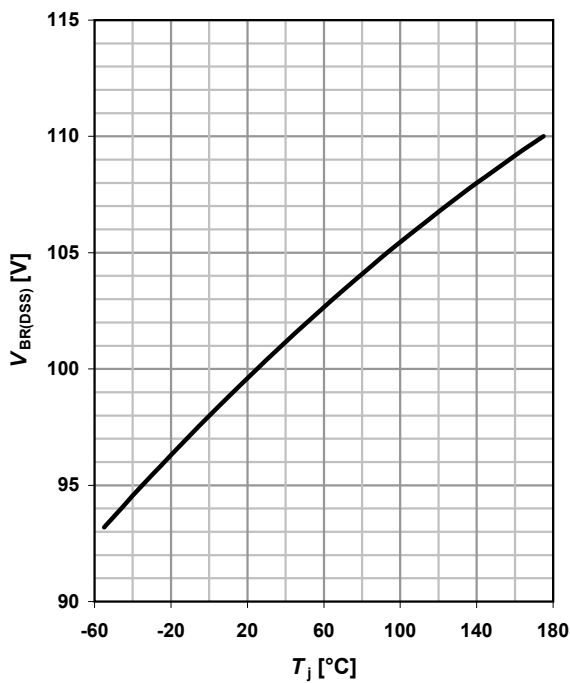
$$I_{AS} = f(t_{AV}); R_{GS} = 25 \Omega$$

 parameter: $T_{j(\text{start})}$

14 Typ. gate charge

$$V_{GS} = f(Q_{\text{gate}}); I_D = 100 \text{ A pulsed}$$

 parameter: V_{DD}

15 Drain-source breakdown voltage

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


16 Gate charge waveforms


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