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IPB030N08N3 G


OptiMOS™ 3 Power-Transistor

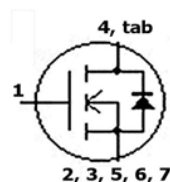
Features

- Ideal for high frequency switching and sync. rec.
- Optimized technology for motor drive applications
- Excellent gate charge x $R_{DS(on)}$ product (FOM)
- Very low on-resistance $R_{DS(on)}$
- Superior thermal resistance
- N-channel, normal level
- 100% avalanche tested
- Pb-free plating; RoHS compliant
- Qualified according to JEDEC¹⁾ for target applications
- Halogen-free according to IEC61249-2-21

Product Summary

V_{DS}	80	V
$R_{DS(on),max}$	3.0	m Ω
I_D	160	A

Type	IPB030N08N3 G
	
Package	PG-TO263-7
Marking	030N08N



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

Parameter	Symbol	Conditions	Value	Unit
Continuous drain current	I_D	$T_C=25\text{ °C}^{2)}$	160	A
		$T_C=100\text{ °C}$	137	
Pulsed drain current ²⁾	$I_{D,pulse}$	$T_C=25\text{ °C}$	640	
Avalanche energy, single pulse ³⁾	E_{AS}	$I_D=100\text{ A}$, $R_{GS}=25\text{ }\Omega$	510	mJ
Gate source voltage	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	

¹⁾J-STD20 and JESD22

²⁾ See figure 3 for more detailed information

³⁾ See figure 13 for more detailed information



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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 ⁴⁾	-	-	40	

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

Static characteristics

Drain-source breakdown voltage	$V_{(BR)DSS}$	$V_{GS}=0\text{ V}, I_D=1\text{ mA}$	80	-	-	V
Gate threshold voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=155\text{ }\mu\text{A}$	2	2.8	3.5	
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	$R_{DS(on)}$	$V_{GS}=10\text{ V}, I_D=100\text{ A}$	-	2.5	3.0	m Ω
		$V_{GS}=6\text{ V}, I_D=50\text{ A}$	-	3.3	5.5	
Gate resistance	R_G		-	1.9	-	Ω
Transconductance	g_{fs}	$ V_{DS} >2 I_D R_{DS(on)max}, I_D=100\text{ A}$	79	157	-	S

⁴⁾ 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.



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Parameter	Symbol	Conditions	Values			Unit
			min.	typ.	max.	

Dynamic characteristics

Input capacitance	C_{iss}	$V_{GS}=0\text{ V}, V_{DS}=40\text{ V}, f=1\text{ MHz}$	-	6100	8110	pF
Output capacitance	C_{oss}		-	1640	2180	
Reverse transfer capacitance	C_{rss}		-	59	-	
Turn-on delay time	$t_{d(on)}$	$V_{DD}=40\text{ V}, V_{GS}=10\text{ V}, I_D=100\text{ A}, R_G=1.6\ \Omega$	-	23	-	ns
Rise time	t_r		-	79	-	
Turn-off delay time	$t_{d(off)}$		-	45	-	
Fall time	t_f		-	14	-	

Gate Charge Characteristics⁵⁾

Gate to source charge	Q_{gs}	$V_{DD}=40\text{ V}, I_D=100\text{ A}, V_{GS}=0\text{ to }10\text{ V}$	-	30	-	nC
Gate to drain charge	Q_{gd}		-	18	-	
Switching charge	Q_{sw}		-	31	-	
Gate charge total	Q_g		-	88	117	
Gate plateau voltage	$V_{plateau}$		-	5.0	-	
Output charge	Q_{oss}	$V_{DD}=40\text{ V}, V_{GS}=0\text{ V}$	-	119	158	nC

Reverse Diode

Diode continuous forward current	I_S	$T_C=25\text{ }^\circ\text{C}$	-	-	160	A
Diode pulse current	$I_{S,pulse}$		-	-	640	
Diode forward voltage	V_{SD}	$V_{GS}=0\text{ V}, I_F=100\text{ A}, T_j=25\text{ }^\circ\text{C}$	-	1.0	1.2	V
Reverse recovery time	t_{rr}	$V_R=40\text{ V}, I_F=100\text{ A}, di_F/dt=100\text{ A}/\mu\text{s}$	-	73	-	ns
Reverse recovery charge	Q_{rr}		-	136	-	nC

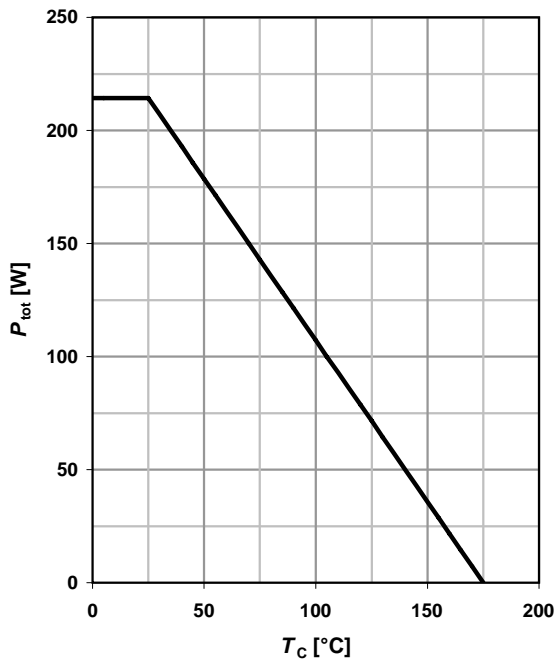
⁵⁾ See figure 16 for gate charge parameter definition



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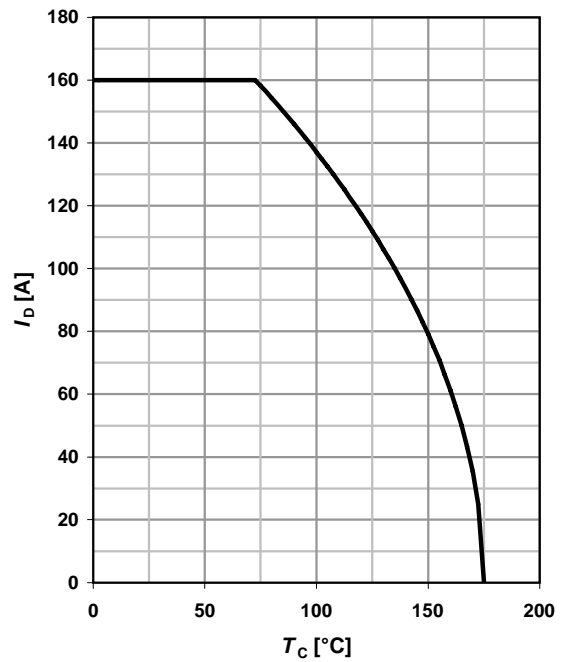
1 Power dissipation

$P_{tot}=f(T_C)$



2 Drain current

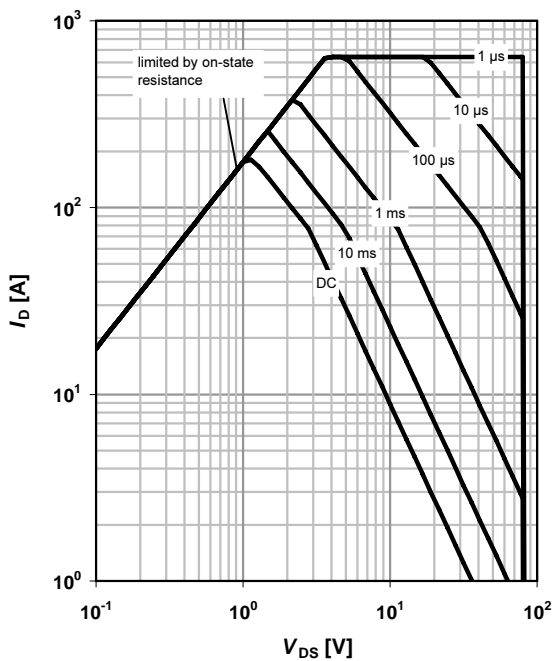
$I_D=f(T_C); V_{GS} \geq 10\text{ V}$



3 Safe operating area

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

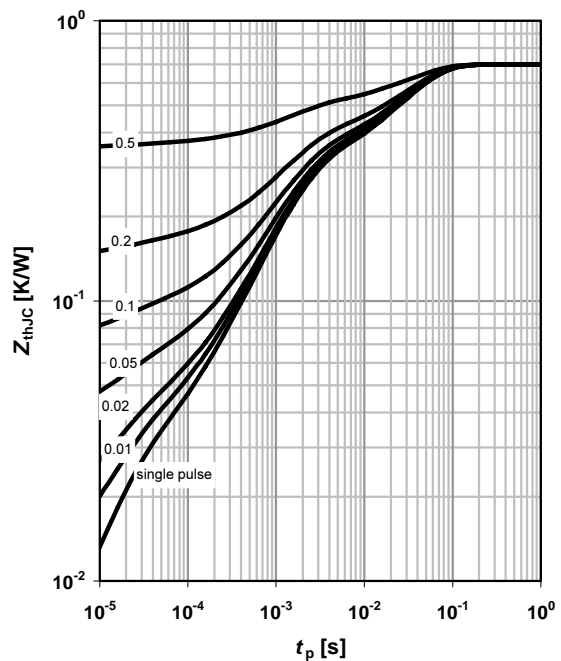
parameter: t_p



4 Max. transient thermal impedance

$Z_{thJC}=f(t_p)$

parameter: $D=t_p/T$



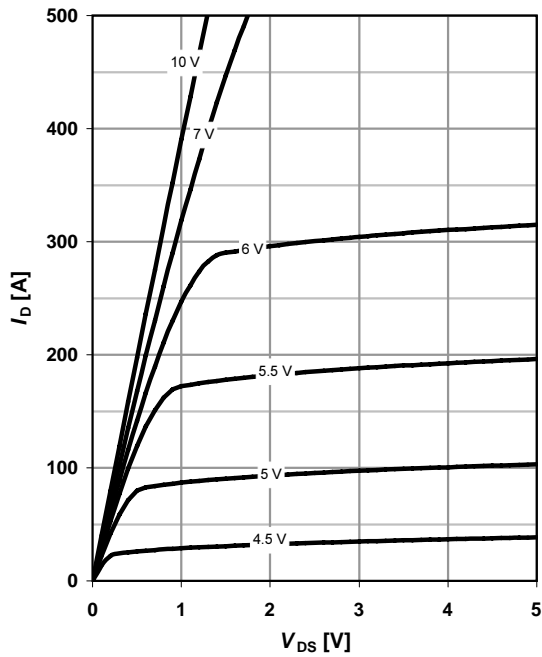


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5 Typ. output characteristics

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

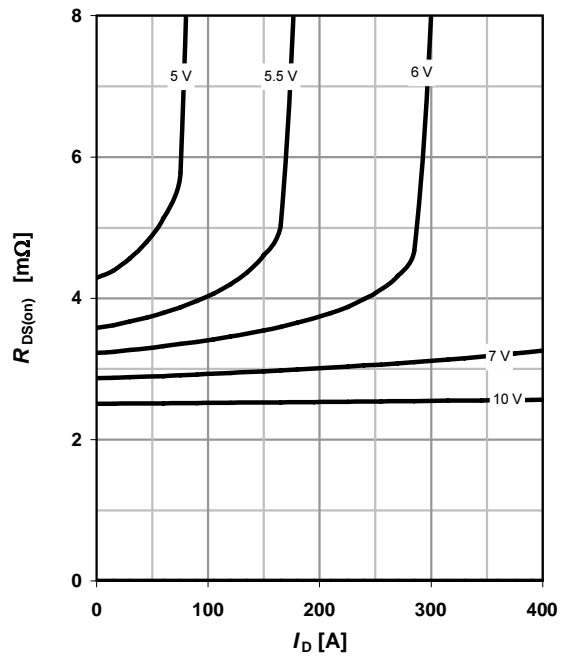
parameter: V_{GS}



6 Typ. drain-source on resistance

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

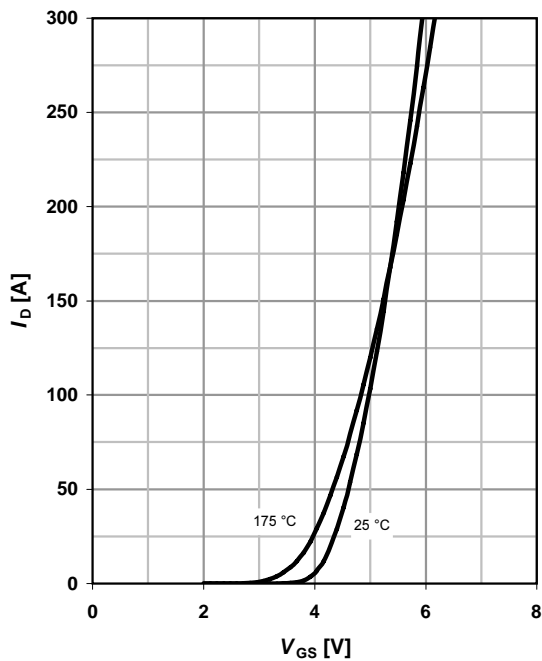
parameter: V_{GS}



7 Typ. transfer characteristics

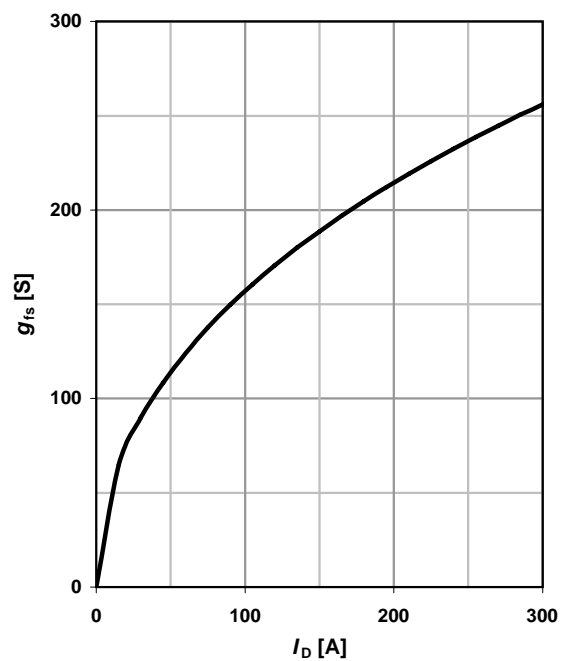
$I_D = f(V_{GS}); |V_{DS}| > 2|I_D|R_{DS(on)max}$

parameter: T_j



8 Typ. forward transconductance

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

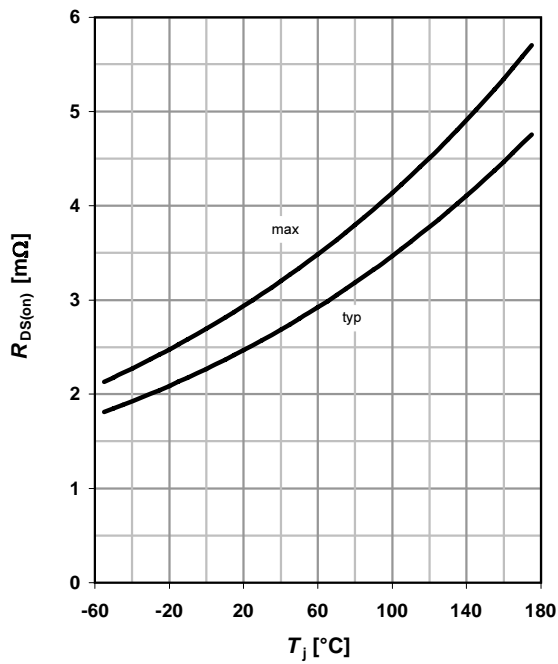




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9 Drain-source on-state resistance

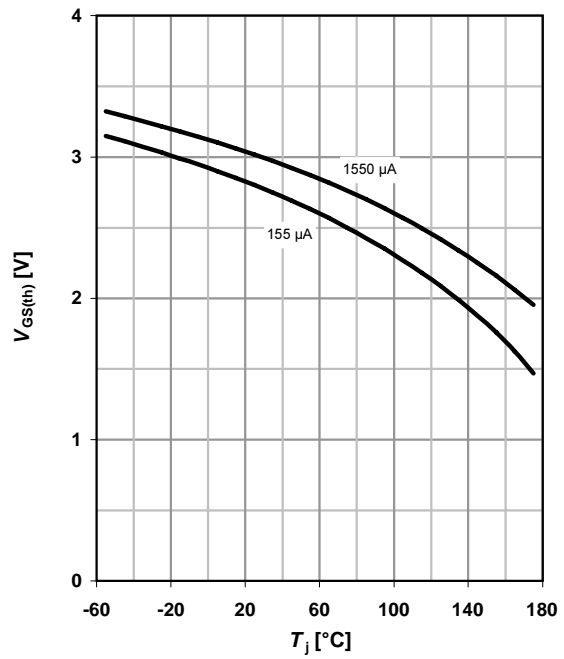
$R_{DS(on)}=f(T_j); I_D=100\text{ A}; V_{GS}=10\text{ V}$



10 Typ. gate threshold voltage

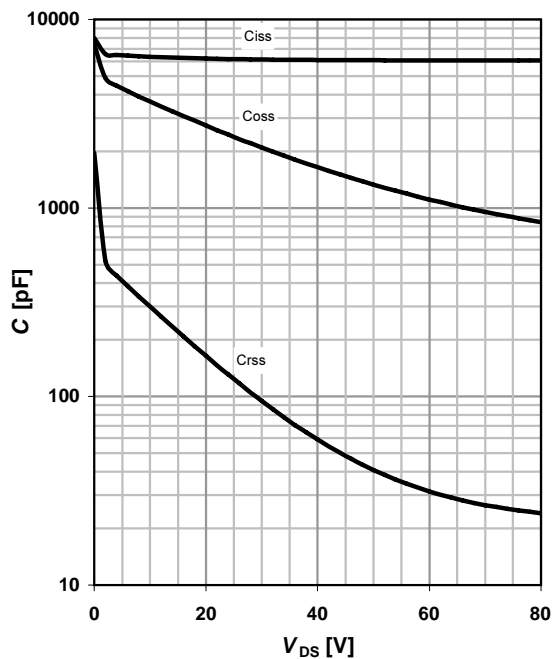
$V_{GS(th)}=f(T_j); V_{GS}=V_{DS}$

parameter: I_D



11 Typ. capacitances

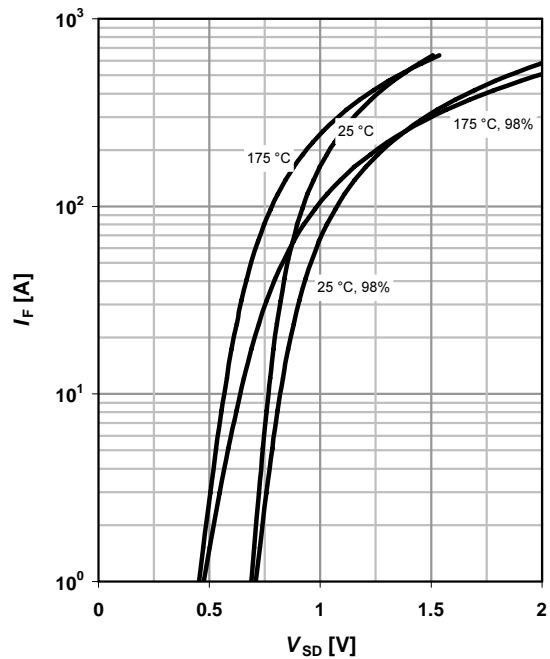
$C=f(V_{DS}); V_{GS}=0\text{ V}; f=1\text{ MHz}$



12 Forward characteristics of reverse diode

$I_F=f(V_{SD})$

parameter: T_j



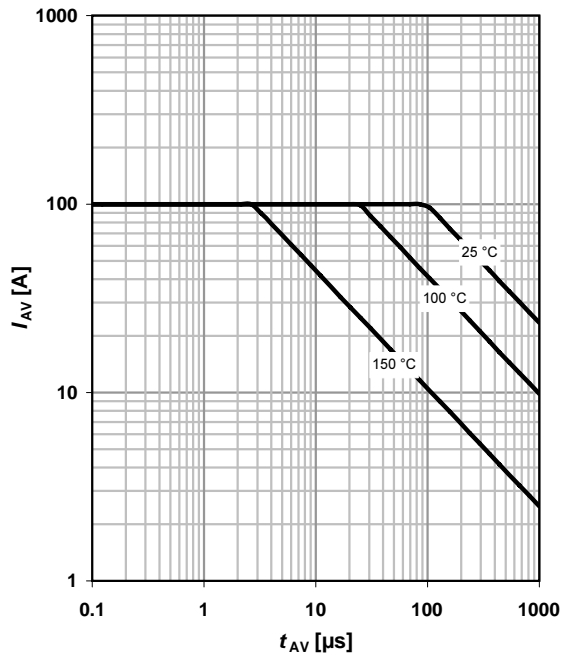


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13 Avalanche characteristics

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

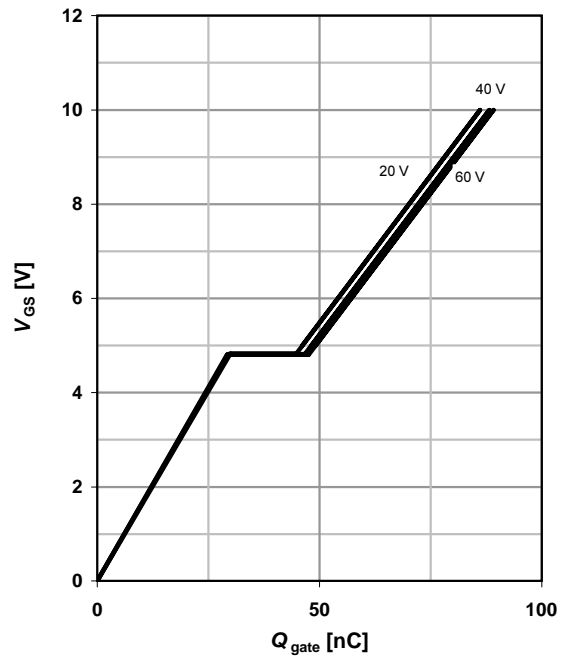
parameter: $T_{j(start)}$



14 Typ. gate charge

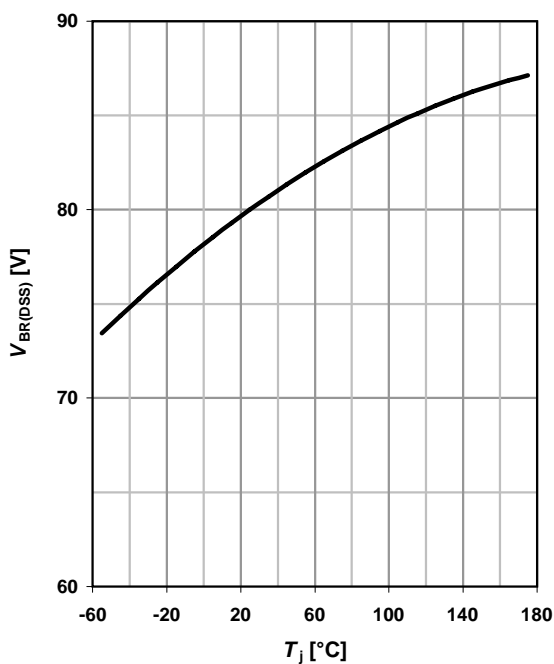
$V_{GS}=f(Q_{gate}); I_D=100 \text{ A pulsed}$

parameter: V_{DD}

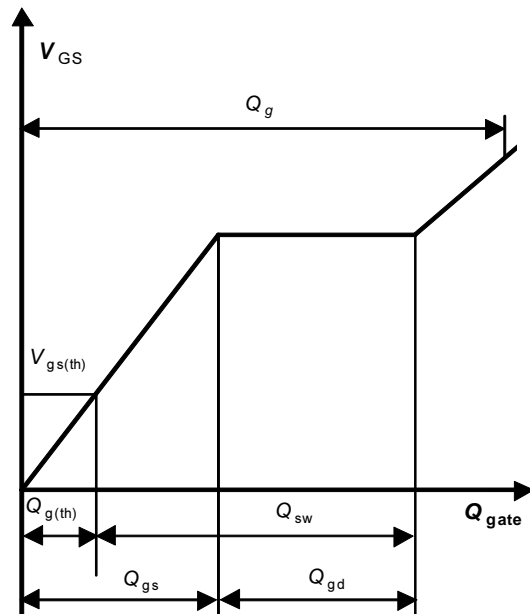


15 Drain-source breakdown voltage

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



16 Gate charge waveforms





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