THE DATASHEET OF

SPB80N06S08ATMA1

SIPMOS® Power-Transistor

Features

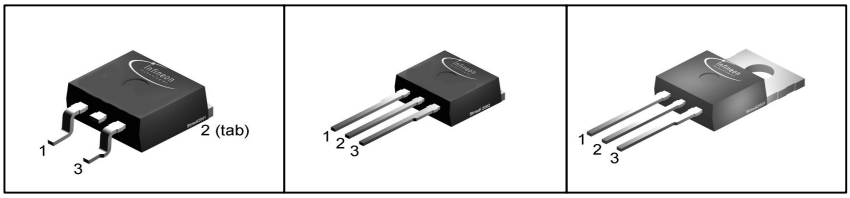
- N-channel - Normal Level -Enhancement mode
- Automotive AEC Q101 qualified
- MSL1 up to 260°C peak reflow
- 175°C operating temperature
- Avalanche test
- Repetive Avalanche up to T_{jmax} = 175 °C
- d*v*/d*t* rated

Product Summary

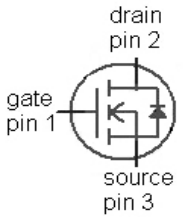
V_{DS}	55	V
$R_{DS(on),max}$ (SMD version)	7.7	mΩ
I_D	80	A

Green Package

PG-TO263-3-2 PG-TO262-3-1 PG-TO220-3-1



Type	Package	Ordering Code	Marking
SPB80N06S-08	PG-TO263-3-2	SP0000-84808	1N0608
SPI80N06S-08	PG-TO262-3-1	SP0000-82518	1N0608
SPP80N06S-08	PG-TO220-3-1	SP0000-84809	1N0608



Maximum ratings, at T_j=25 °C, unless otherwise specified

Parameter	Symbol	Conditions	Value	Unit
Continuous drain current[1)]	I_D	T_C=25 °C, V_{GS}=10 V	80	A
		T_C=100 °C, V_{GS}=10 V	80	
Pulsed drain current[2)]	$I_{D,pulse}$	T_C=25 °C	320	
Avalanche energy, single pulse	E_{AS}	I_D=80 A, R_{GS}=25 Ω, V_{DD}=25 V	700	mJ
Avalanche energy, periodic[2)]	E_{AR}	T_j=175 °C	30	
Reverse diode d*v*/d*t*[2)]	d*v*/d*t*	I_D=80 A, V_{DS}=40 V, d*i*/d*t*=200 A/µs, $T_{j,max}$=175 °C	6	kV/µs
Gate source voltage	V_{GS}		±20	V
Power dissipation	P_{tot}	T_C=25 °C	300	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[2]						
Thermal resistance, junction - case	R_{thJC}		-	0.38	0.5	K/W
Thermal resistance, junction - ambient, leaded	R_{thJA}		-	-	62	
SMD version, device on PCB	R_{thJA}	minimal footprint	-	-	62	
		6 cm2 cooling area[3]	-	-	40	
Electrical characteristics, at T_j=25 °C, unless otherwise specified						
Static characteristics						
Drain-source breakdown voltage	$V_{(BR)DSS}$	V_{GS}=0 V, I_D=1 mA	55	-	-	V
Gate threshold voltage	$V_{GS(th)}$	V_{DS}=V_{GS}, I_D=240 µA	2.1	3.0	4	
Zero gate voltage drain current	I_{DSS}	V_{DS}=25 V, V_{GS}=0 V, T_j=25 °C	-	0.1	1	µA
		V_{DS}=25 V, V_{GS}=0 V, T_j=150 °C[2]	-	10	100	
Gate-source leakage current	I_{GSS}	V_{GS}=20 V, V_{DS}=0 V	-	10	100	nA
Drain-source on-state resistance	$R_{DS(on)}$	V_{GS}=10 V, I_D=80 A	-	6.5	8	mΩ
		V_{GS}=10 V, I_D=80 A SMD version	-	6.2	7.7	
Transconductance[2]	g_{fs}	$\|V_{DS}\|>2\|I_D\|R_{DS(on)max}$, I_D=80 A	-	73	-	S

footnote on page 3

Parameter	Symbol	Conditions	Values			Unit
			min.	typ.	max.	
Dynamic characteristics[2]						
Input capacitance	C_{iss}	V_{GS}=0 V, V_{DS}=25 V, f=1 MHz	-	3660	-	pF
Output capacitance	C_{oss}		-	1075	-	
Reverse transfer capacitance	C_{rss}		-	540	-	
Turn-on delay time	$t_{d(on)}$	V_{DD}=30 V, I_D=80 A, V_{GS}=10 V, R_G=2.4 Ω	-	22	-	ns
Rise time	t_r		-	53	-	
Turn-off delay time	$t_{d(off)}$		-	54	-	
Fall time	t_f		-	32	-	
Gate Charge Characteristics[2]						
Gate to source charge	Q_{gs}	V_{DD}=44 V, I_D=80 A, V_{GS}=0 to 10 V	-	19	-	nC
Gate to drain charge	Q_{gd}		-	62	-	
Gate charge total	Q_g		-	125	187	
Gate plateau voltage	$V_{plateau}$		-	5.4	-	V
Reverse Diode[2]						
Diode continous forward current	I_S	T_C=25 °C	-	-	80	A
Diode pulse current	$I_{S,pulse}$		-	-	320	
Diode forward voltage	V_{SD}	V_{GS}=0 V, I_F=80 A, T_j=25 °C	-	0.9	1.3	V
Reverse recovery time	t_{rr}	V_R=27.5 V, I_F=I_S, di_F/dt=100 A/µs	-	105		ns
Reverse recovery charge	Q_{rr}		-	30	-	nC

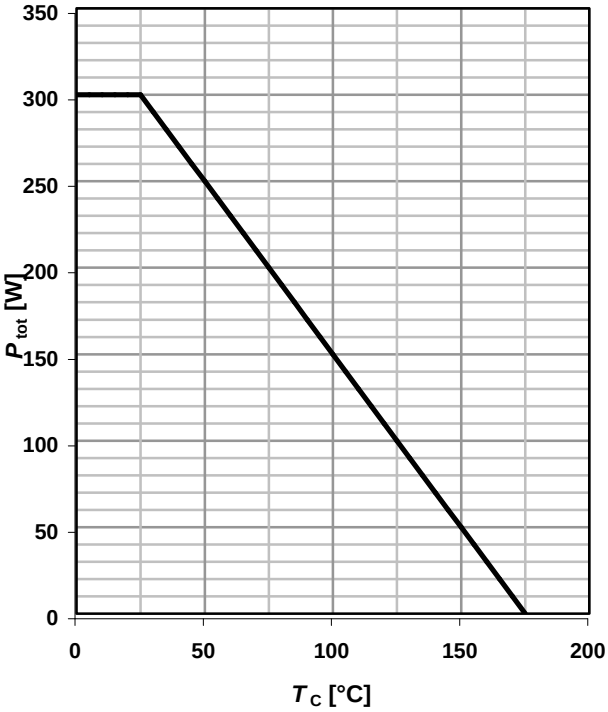
[1] Current is limited by bondwire; with an R_{thJC}=0.5 K/W the chip is able to carry 132A at 25°C. For detailed information see Application Note APPS071E at *www.infineon.com/optimos*

[2] Defined by design not subjected to production test.

[3] Device on 40 mm x 40 mm x 1.5 mm epoxy PCB FR4 with 6 cm^2 (one layer, 70 µm thick) copper area for drain connection. PCB is vertical in still air.

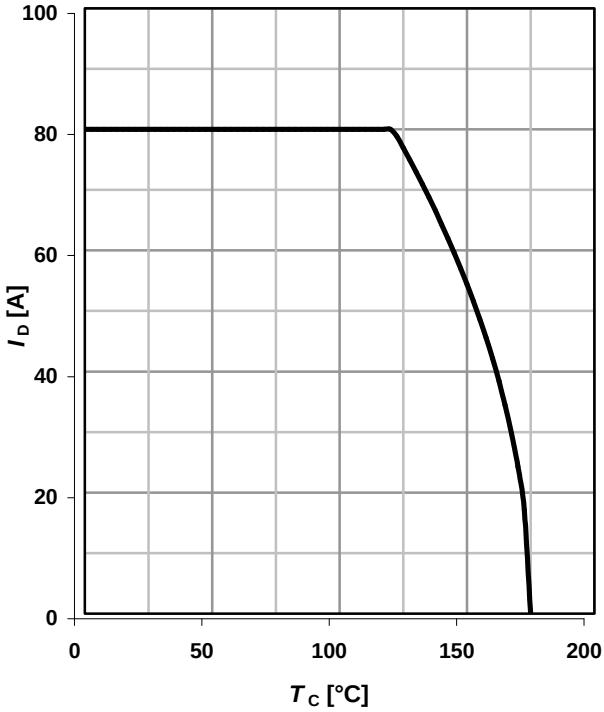
1 Power dissipation

$P_{tot}=f(T_C)$



2 Drain current

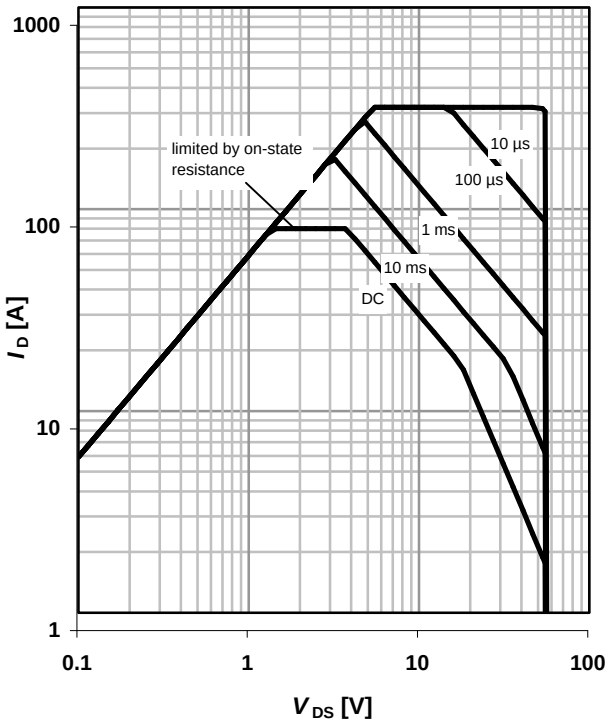
$I_D=f(T_C)$; V_{GS}=10 V



3 Safe operating area

$I_D=f(V_{DS})$; T_C=25 °C; D=0

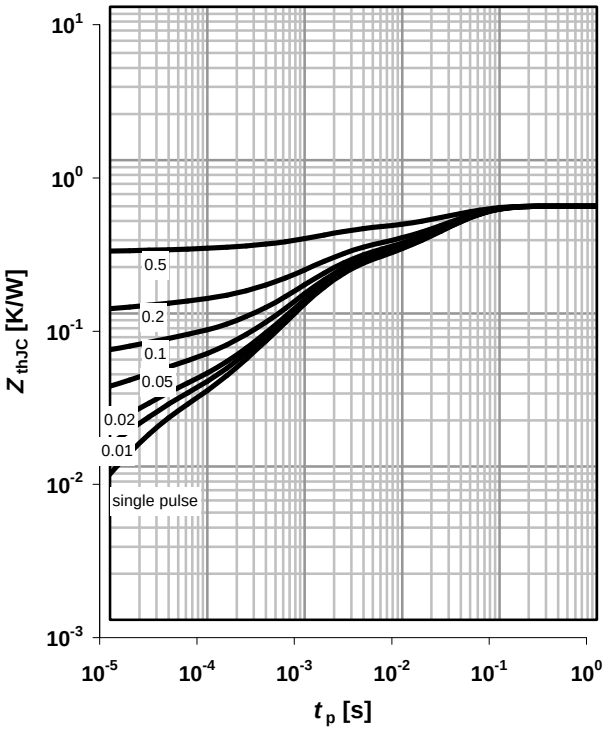
parameter: t_p



4 Max. transient thermal impedance

$Z_{thJC}=f(t_p)$

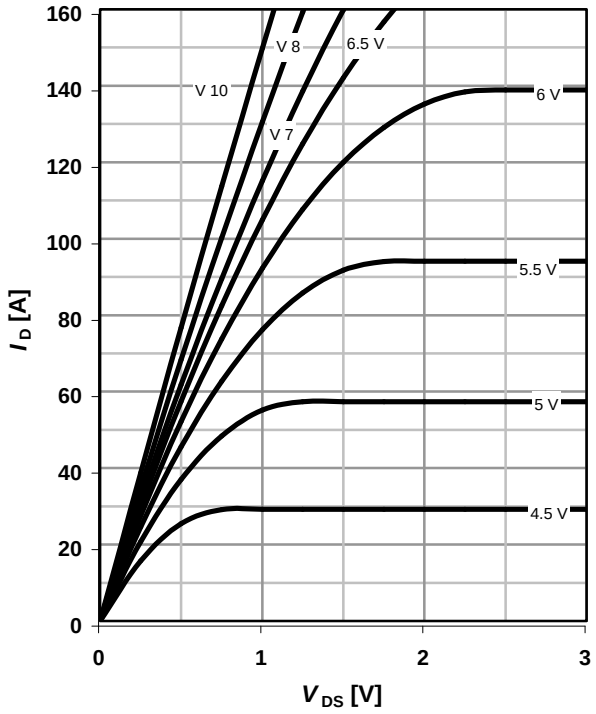
parameter: $D=t_p/T$



5 Typ. output characteristics

$I_D=f(V_{DS})$; $T_j=25$ °C

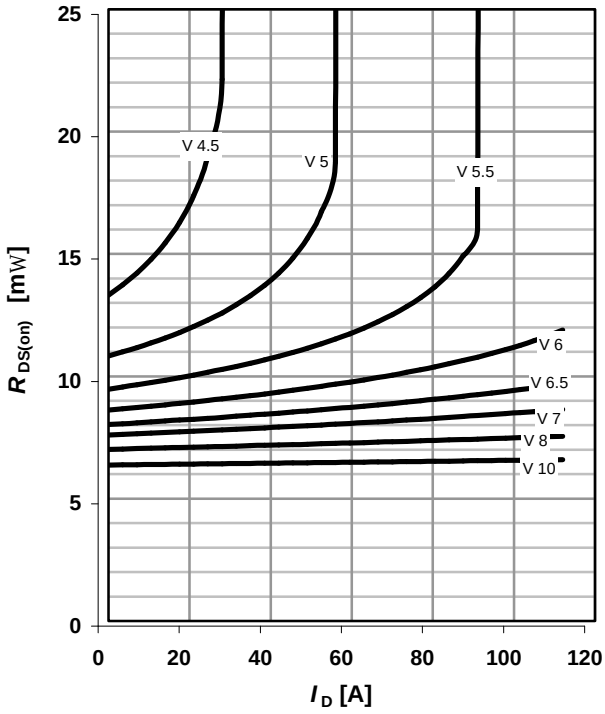
parameter: V_{GS}



6 Typ. drain-source on resistance

$R_{DS(on)}=f(I_D)$; $T_j=25$ °C

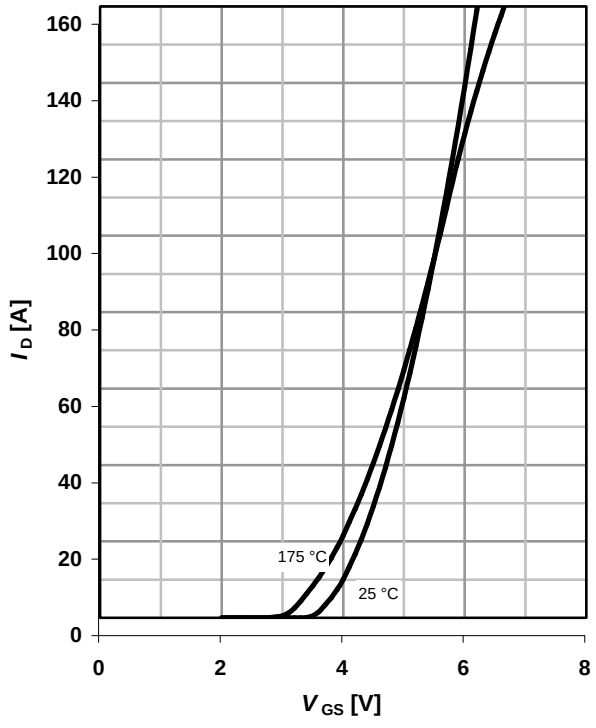
parameter: V_{GS}



7 Typ. transfer characteristics

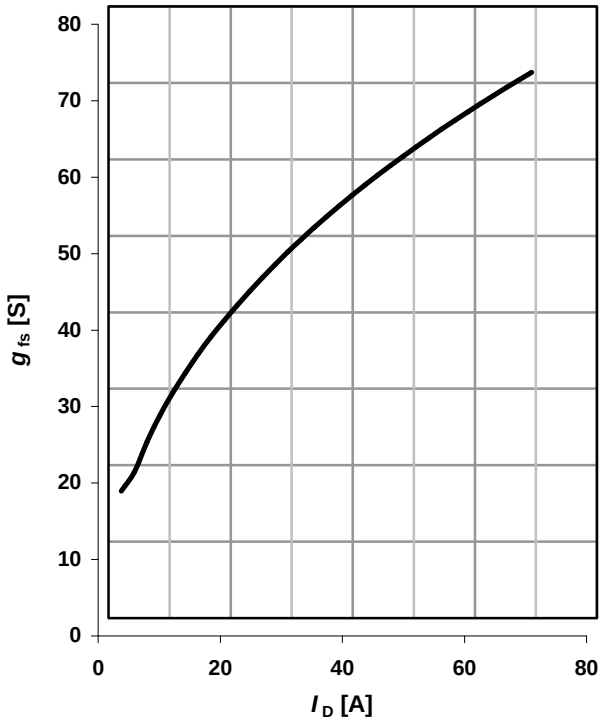
$I_D=f(V_{GS})$; $|V_{DS}|>2|I_D|R_{DS(on)max}$

parameter: T_j



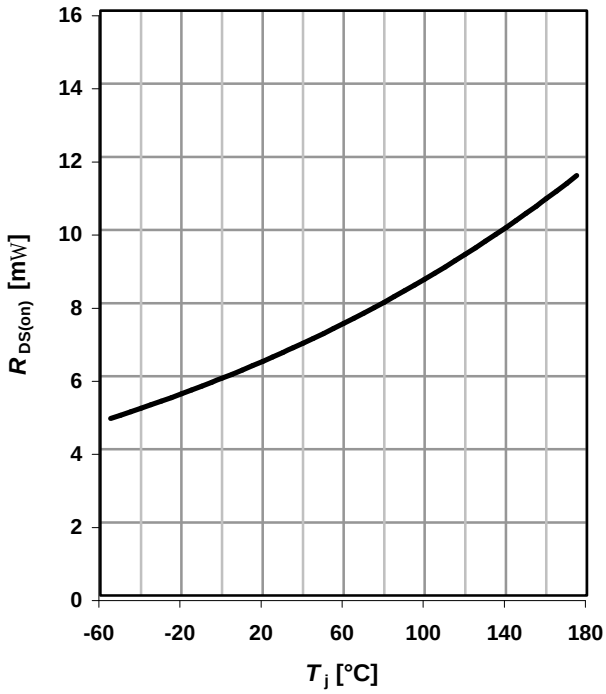
8 Typ. forward transconductance

$g_{fs}=f(I_D)$; $T_j=25$ °C



9 Typical Drain-source on-state resistance

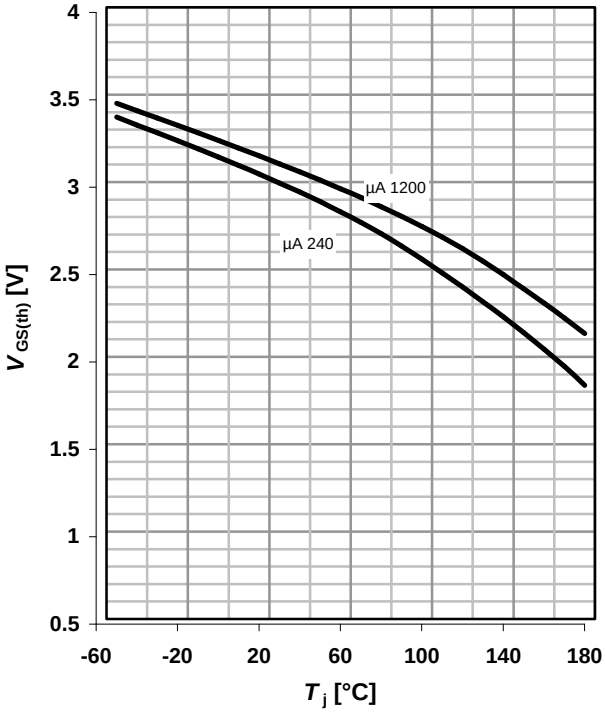
$R_{DS(on)}=f(T_j)$; $I_D=80$ A; $V_{GS}=10$ V



10 Typ. gate threshold voltage

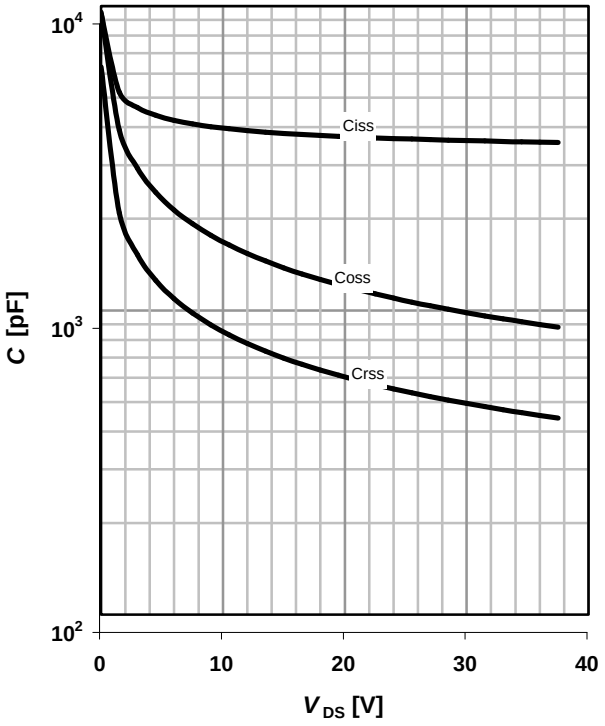
$V_{GS(th)}=f(T_j)$; $V_{GS}=V_{DS}$

parameter: I_D



11 Typ. capacitances

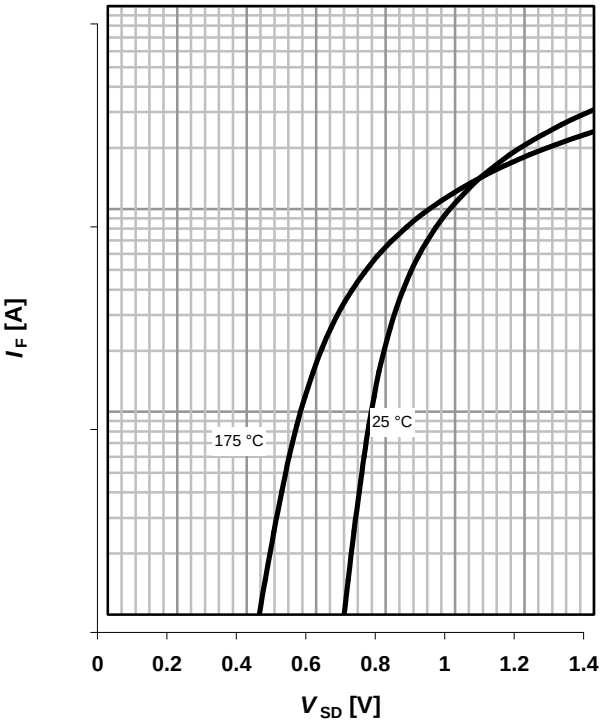
$C=f(V_{DS})$; $V_{GS}=0$ V; $f=1$ MHz



12 Forward characteristics of reverse diode

$I_F=f(V_{SD})$

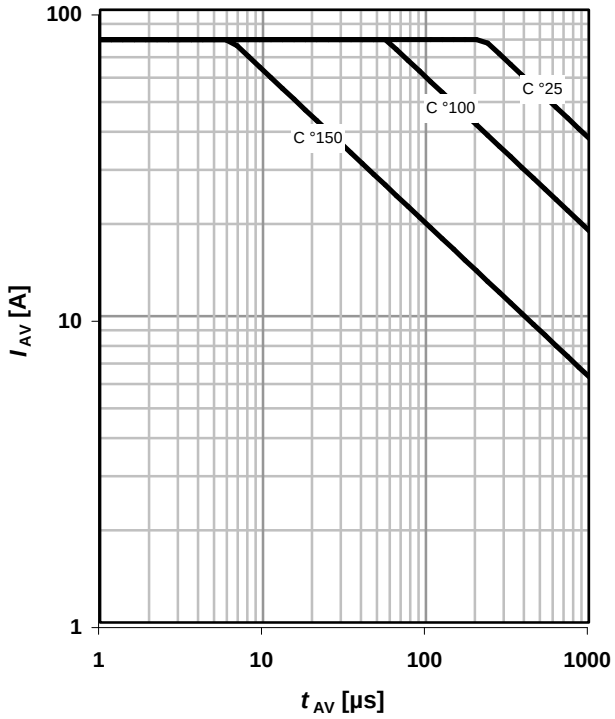
parameter: T_j



13 Typ. Avalanche characteristics

I_{AS}=f(t_{AV}); R_{GS}=25 Ω

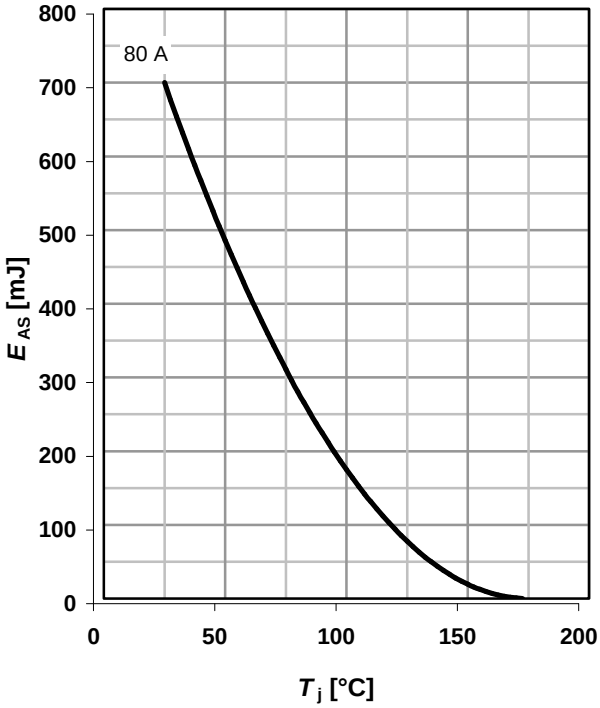
parameter: $T_{j(start)}$



14 Typ. Avalanche Energy

E_{AS}=f(T_j); V_{DD} = 25 V; R_{GS}=25 Ω

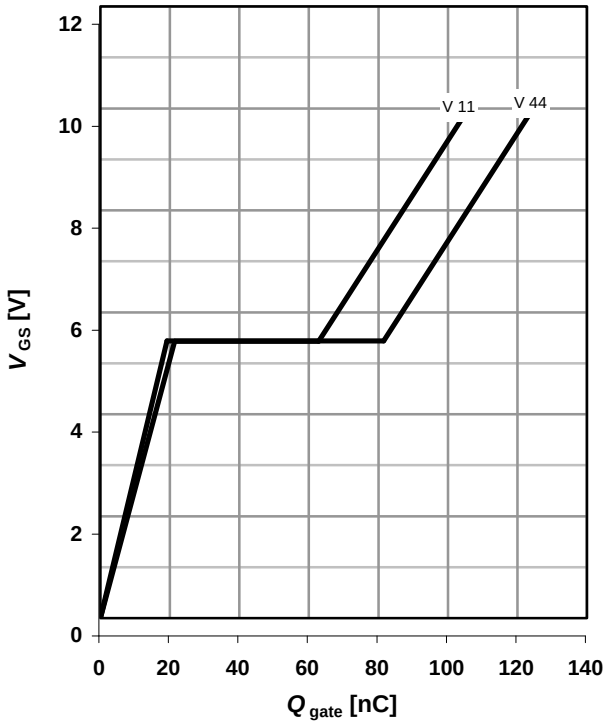
parameter: I_D



15 Typ. gate charge

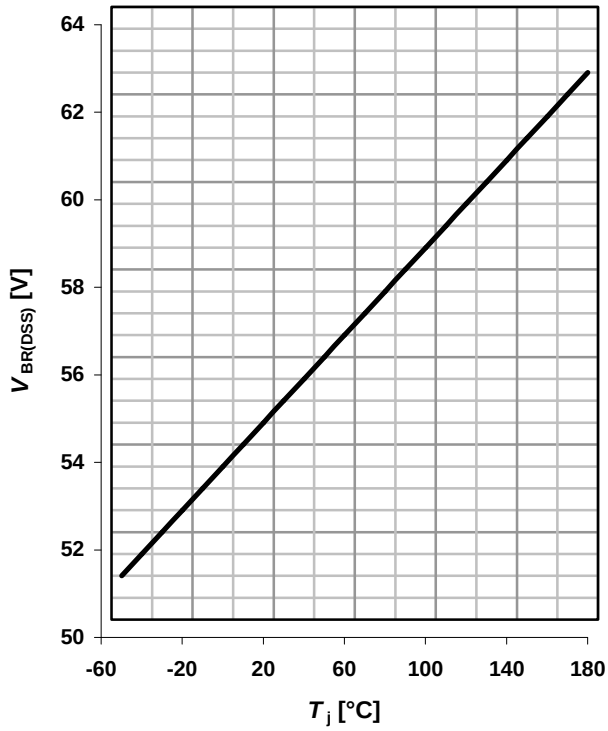
V_{GS}=f(Q_{gate}); I_D=80 A pulsed

parameter: V_{DD}



16 Drain-source breakdown voltage

$V_{BR(DSS)}$=f(T_j); I_D=250 µA



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