

SIPMOS® Small-Signal-Transistor

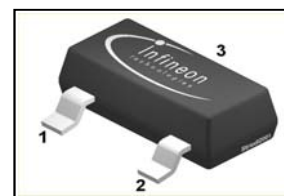
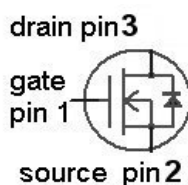
Features

- N-channel
- Depletion mode
- dv/dt rated
- Available with $V_{GS(th)}$ indicator on reel
- Pb-free lead plating; RoHS compliant
- Qualified according to AEC Q101
- Halogen-free according to IEC61249-2-21

Product Summary

V_{DS}	600	V
$R_{DS(on),max}$	700	Ω
$I_{DSS,min}$	0.007	A

PG-SOT-23



Type	Package	Pb-free	Tape and Reel Information	Marking
BSS126	PG-SOT-23	Yes	H6327: 3000 pcs/reel	SHs
BSS126	PG-SOT-23	Yes	H6906: 3000 pcs/reel sorted in $V_{GS(th)}$ bands ¹⁾	SHs

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

Parameter	Symbol	Conditions	Value	Unit
Continuous drain current	I_D	$T_A=25\text{ °C}$	0.021	A
		$T_A=70\text{ °C}$	0.017	
Pulsed drain current	$I_{D,pulse}$	$T_A=25\text{ °C}$	0.085	
Reverse diode dv/dt	dv/dt	$I_D=0.016\text{ A}$, $V_{DS}=20\text{ V}$, $di/dt=200\text{ A}/\mu\text{s}$, $T_{j,max}=150\text{ °C}$	6	kV/ μs
Gate source voltage	V_{GS}		± 20	V
ESD sensitivity (HBM) as per JESD22-A114			Class 0 (0 >250 V)	
Power dissipation	P_{tot}	$T_A=25\text{ °C}$	0.50	W
Operating and storage temperature	T_j, T_{stg}		-55 ... 150	°C
IEC climatic category; DIN IEC 68-1			55/150/56	

¹⁾ see table on next page and diagram 11

Parameter	Symbol	Conditions	Values			Unit
			min.	typ.	max.	

Thermal characteristics

Thermal resistance, junction - ambient	R_{thJA}	minimal footprint	-	-	250	K/W
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Electrical characteristics, at $T_j=25\text{ °C}$, unless otherwise specified
Static characteristics

Drain-source breakdown voltage	$V_{(BR)DSS}$	$V_{GS}=-5\text{ V}, I_D=250\text{ }\mu\text{A}$	600	-	-	V
Gate threshold voltage	$V_{GS(th)}$	$V_{DS}=3\text{ V}, I_D=8\text{ }\mu\text{A}$	-2.7	-2.0	-1.6	
Drain-source cutoff current	$I_{D(off)}$	$V_{DS}=600\text{ V},$ $V_{GS}=-5\text{ V}, T_j=25\text{ °C}$	-	-	0.1	μA
		$V_{DS}=600\text{ V},$ $V_{GS}=-5\text{ V}, T_j=125\text{ °C}$	-	-	10	
Gate-source leakage current	I_{GSS}	$V_{GS}=20\text{ V}, V_{DS}=0\text{ V}$	-	-	100	nA
On-state drain current	I_{DSS}	$V_{GS}=0\text{ V}, V_{DS}=25\text{ V}$	7	-	-	mA
Drain-source on-state resistance	$R_{DS(on)}$	$V_{GS}=0\text{ V}, I_D=3\text{ mA}$	-	320	700	Ω
		$V_{GS}=10\text{ V}, I_D=16\text{ mA}$	-	280	500	
Transconductance	g_{fs}	$ V_{DS} >2 I_D R_{DS(on)max},$ $I_D=0.01\text{ A}$	0.008	0.017	-	S

Threshold voltage $V_{GS(th)}$ sorted in bands²⁾

J	$V_{GS(th)}$	$V_{DS}=3\text{ V}, I_D=8\text{ }\mu\text{A}$	-1.8	-	-1.6	V
K			-1.95	-	-1.75	
L			-2.1	-	-1.9	
M			-2.25	-	-2.05	
N			-2.4	-	-2.2	

²⁾ Each reel contains transistors out of one band whose identifying letter is printed on the reel label. A specific band cannot be ordered separately.

Parameter	Symbol	Conditions	Values			Unit
			min.	typ.	max.	

Dynamic characteristics

$I_D=f(V_{GS}); V_{DS}=3\text{ V}; T_j=25\text{ °C}$	C_{iss}	$V_{GS}=-5\text{ V}, V_{DS}=25\text{ V},$ $f=1\text{ MHz}$	-	21	28	pF
Output capacitance	C_{oss}		-	2.4	3.2	
Reverse transfer capacitance	C_{rss}		-	1.0	1.5	
Turn-on delay time	$t_{d(on)}$	$V_{DD}=300\text{ V},$ $V_{GS}=-3\ldots 7\text{ V},$ $I_D=0.01\text{ A}, R_G=6\text{ }\Omega$	-	6.1	9.2	ns
Rise time	t_r		-	9.7	14.5	
Turn-off delay time	$t_{d(off)}$		-	14	21	
Fall time	t_f		-	115	170	

Gate Charge Characteristics

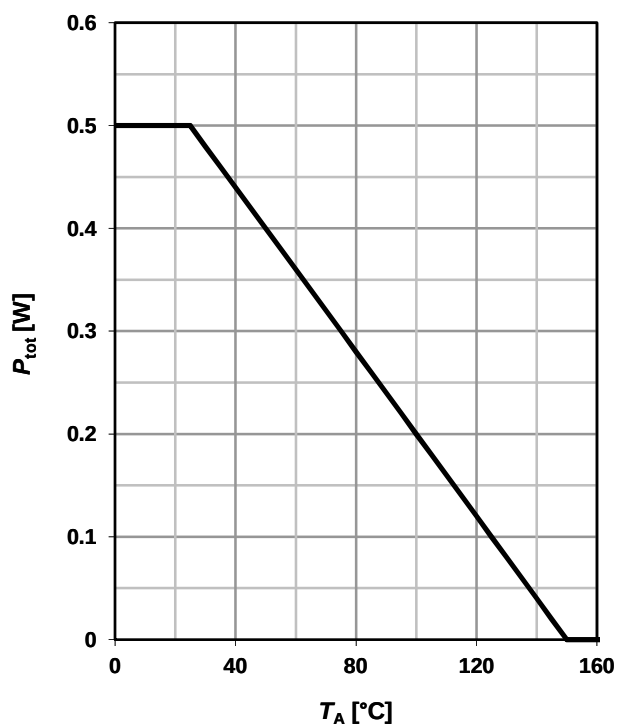
Gate to source charge	Q_{gs}	$V_{DD}=400\text{ V},$ $I_D=10\text{ mA},$ $V_{GS}=-3\text{ to }5\text{ V}$	-	0.05	0.08	nC
Gate to drain charge	Q_{gd}		-	1.2	1.8	
Gate charge total	Q_g		-	1.4	2.1	
Gate plateau voltage	$V_{plateau}$		-	0.10	-	V

Reverse Diode

Diode continuous forward current	I_S	$T_A=25\text{ °C}$	-	-	0.016	A
Diode pulse current	$I_{S,pulse}$		-	-	0.064	
Diode forward voltage	V_{SD}	$V_{GS}=-5\text{ V}, I_F=16\text{ mA},$ $T_j=25\text{ °C}$	-	0.81	1.2	V
Reverse recovery time	t_{rr}	$V_R=300\text{ V}, I_F=0.01\text{ A},$ $di_F/dt=100\text{ A}/\mu\text{s}$	-	160	240	ns
Reverse recovery charge	Q_{rr}		-	13.2	19.8	nC

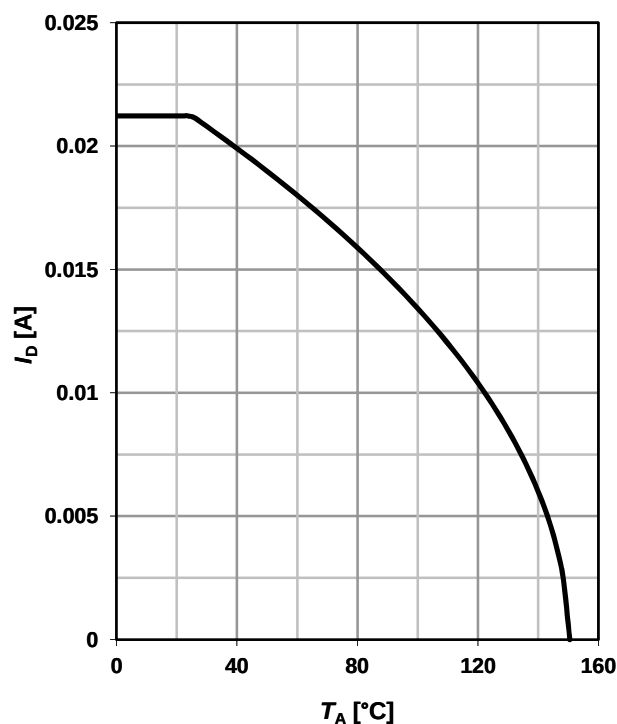
1 Power dissipation

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



2 Drain current

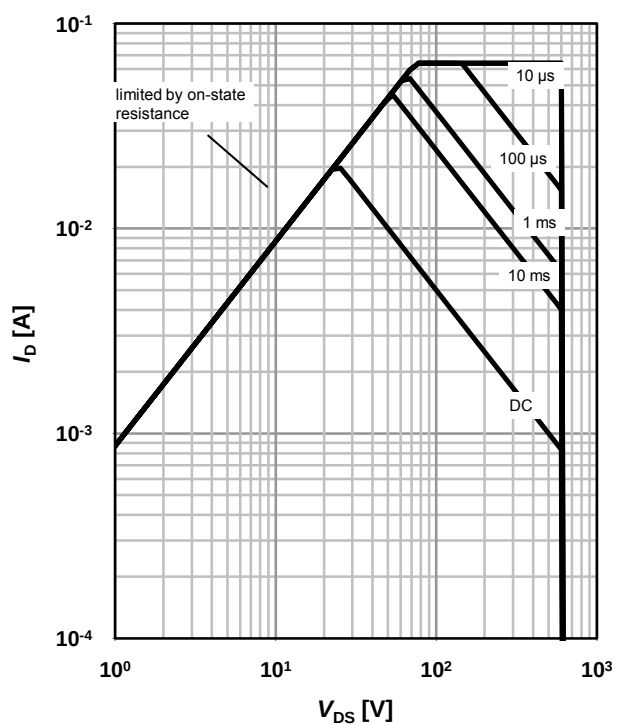
$$I_D = f(T_A); V_{GS} \geq 10 \text{ V}$$



3 Safe operating area

$$I_D = f(V_{GS}); V_{DS} = 3 \text{ V}; T_j = 25^\circ \text{C}$$

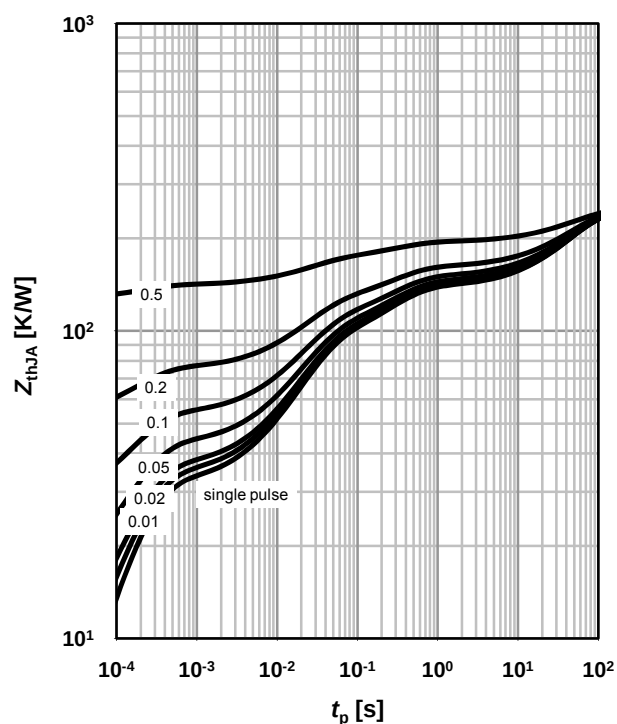
parameter: t_p



4 Max. transient thermal impedance

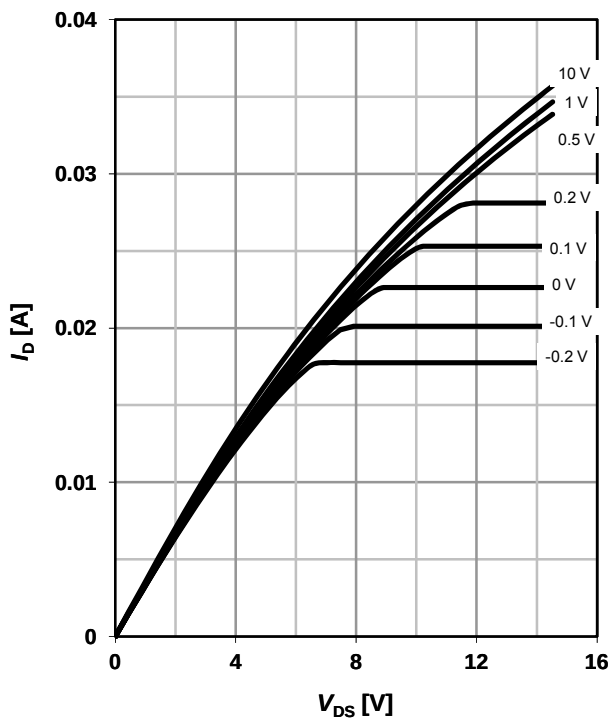
$$Z_{thJA} = f(t_p)$$

parameter: $D = t_p/T$



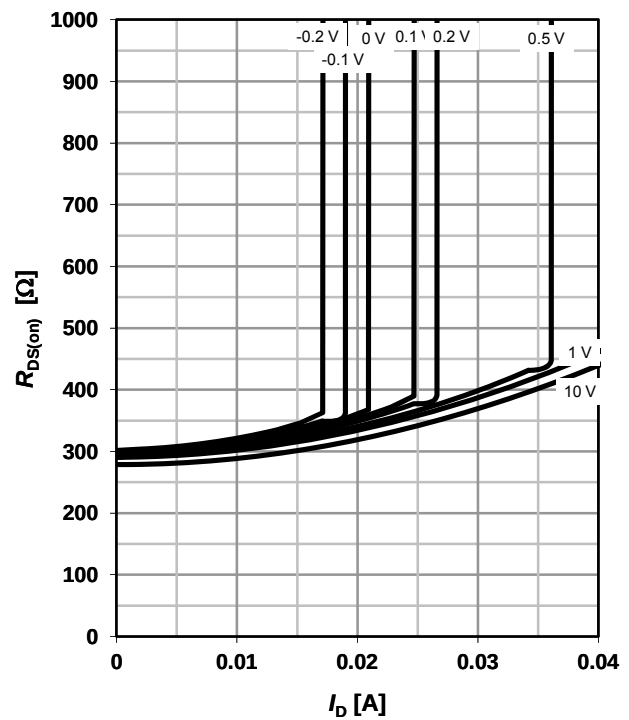
5 Typ. output characteristics

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

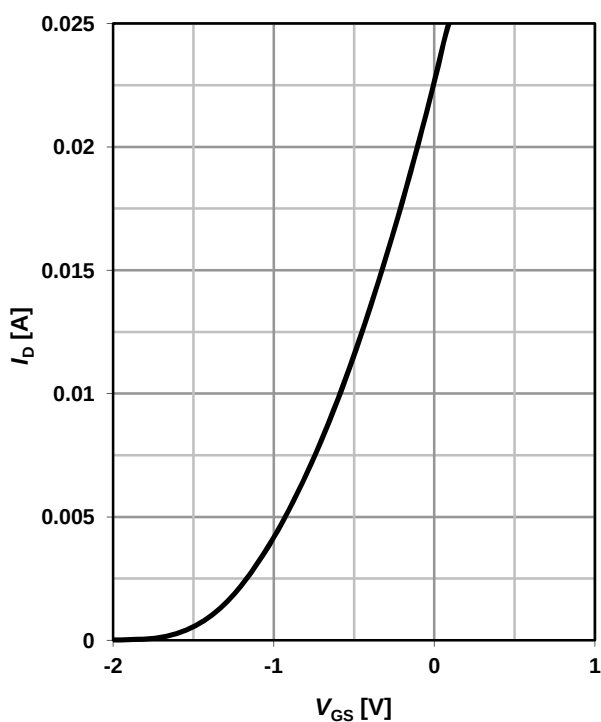
parameter: V_{GS}


6 Typ. drain-source on resistance

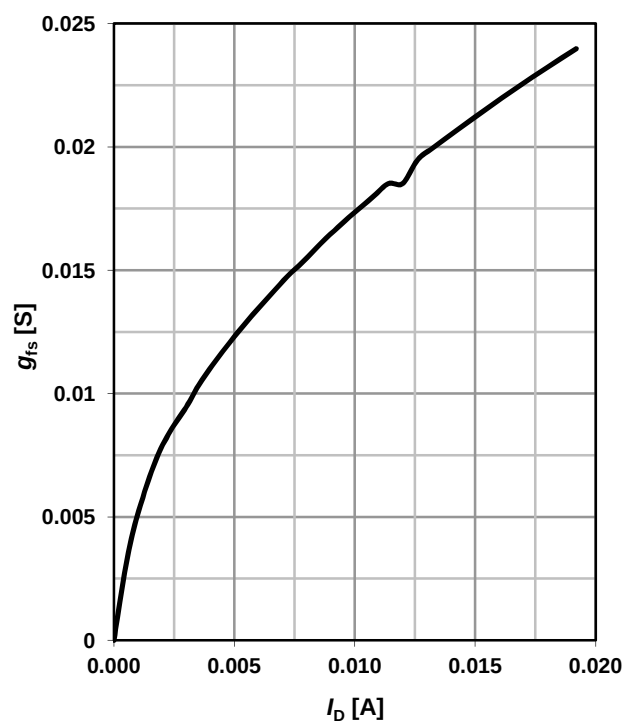
 $R_{DS(on)} = f(I_D); T_j = 25^\circ\text{C}$

parameter: V_{GS}


7 Typ. transfer characteristics

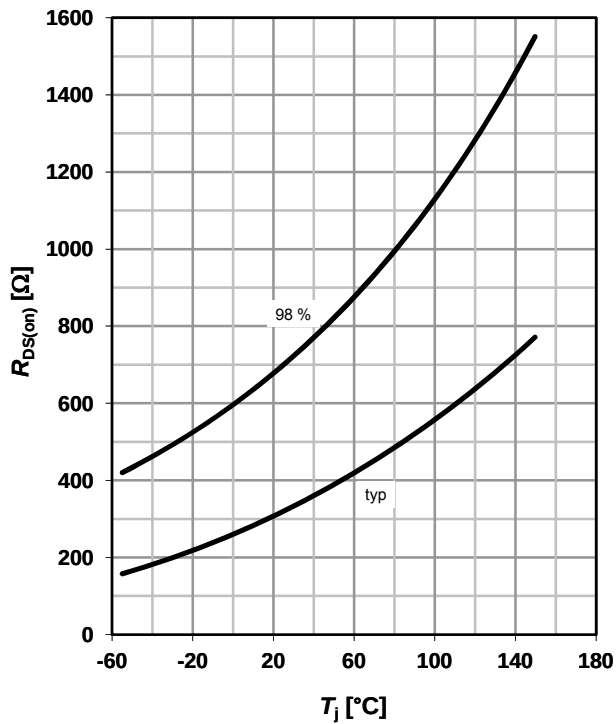
 $I_D = f(V_{GS}); V_{DS} = 3\text{ V}; T_j = 25^\circ\text{C}$


8 Typ. forward transconductance

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


9 Drain-source on-state resistance

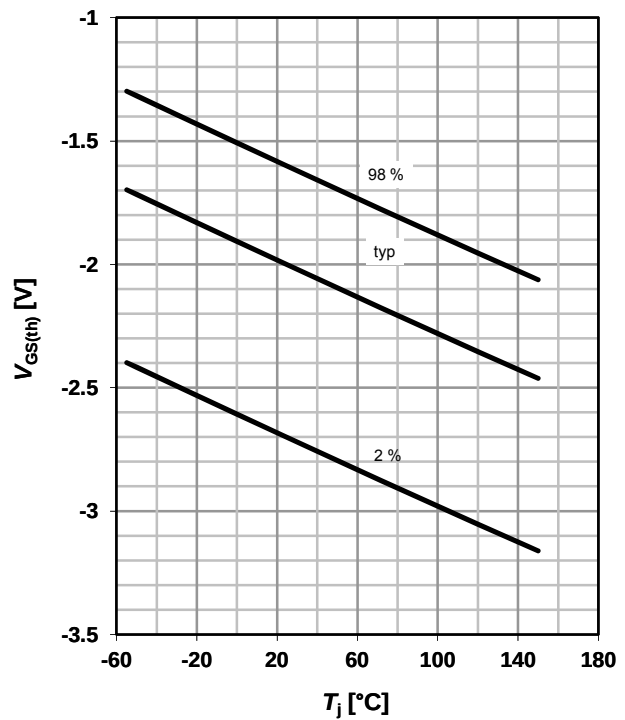
$R_{DS(on)} = f(T_j); I_D = 0.016 \text{ mA}; V_{GS} = 0 \text{ V}$



10 Typ. gate threshold voltage

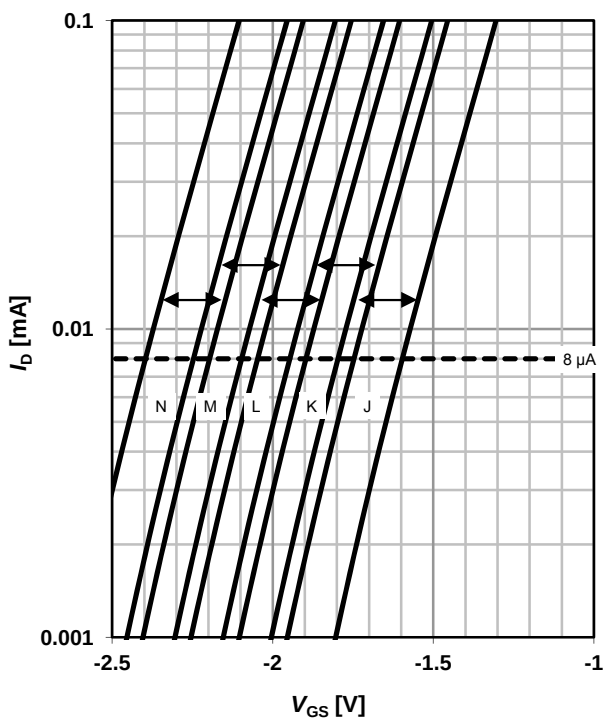
$V_{GS(th)} = f(T_j); V_{DS} = 3 \text{ V}; I_D = 8 \text{ } \mu\text{A}$

parameter: I_D



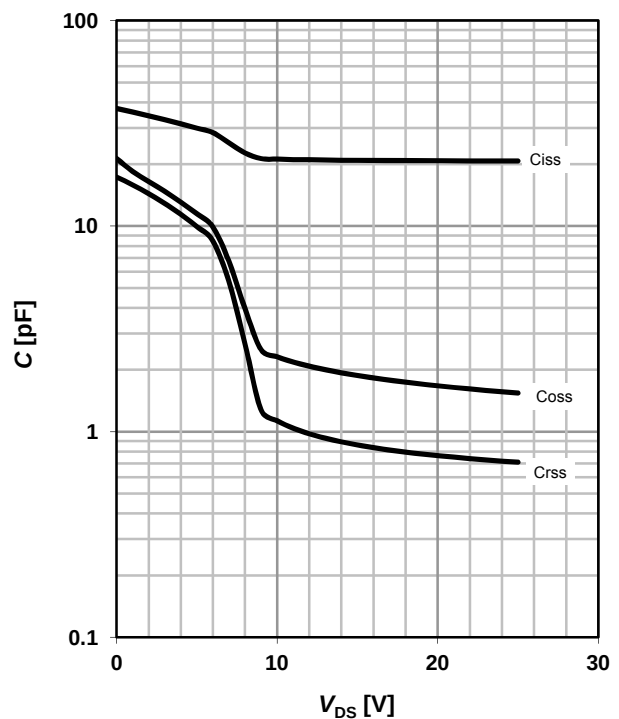
11 Threshold voltage bands

$I_D = f(V_{GS}); V_{DS} = 3 \text{ V}; T_j = 25 \text{ } ^\circ\text{C}$



12 Typ. capacitances

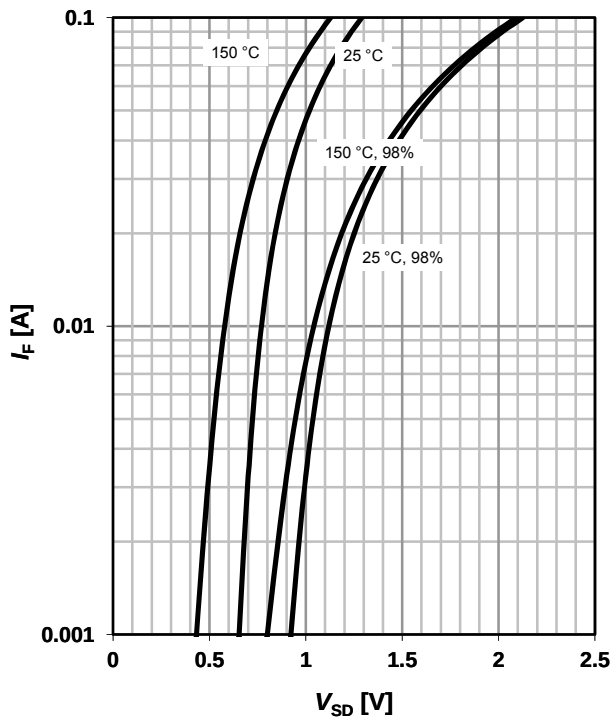
$C = f(V_{DS}); V_{GS} = -3 \text{ V}; f = 1 \text{ MHz}$



13 Forward characteristics of reverse diode

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

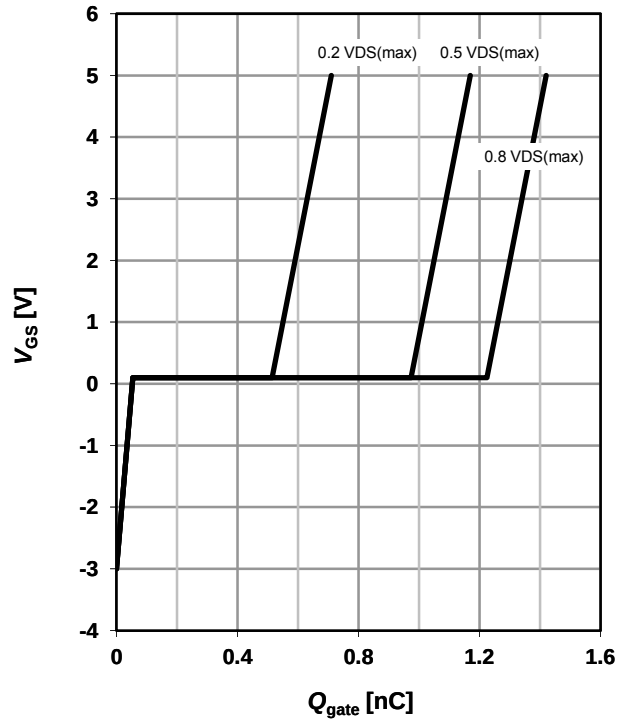
parameter: T_j



15 Typ. gate charge

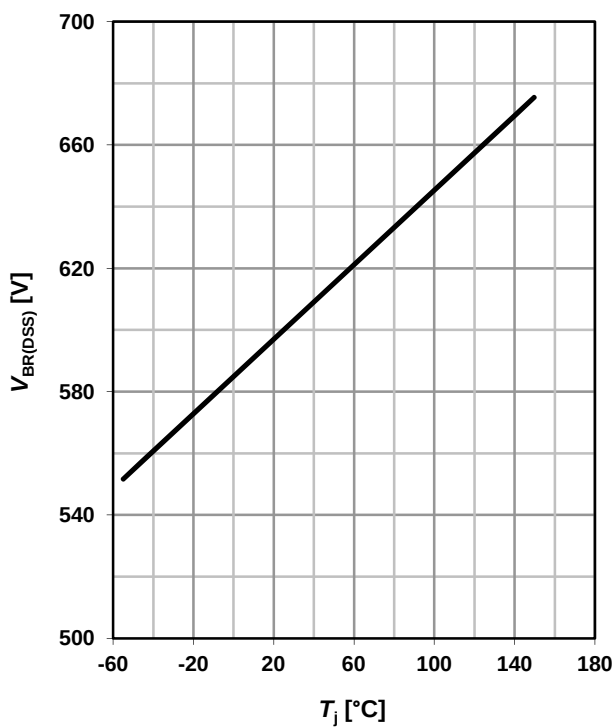
$$V_{GS} = f(Q_{\text{gate}}); I_D = 0.1\text{ A pulsed}$$

parameter: V_{DD}



16 Drain-source breakdown voltage

$$I_D = f(V_{GS}); V_{DS} = 3\text{ V}; T_j = 25\text{ }^{\circ}\text{C}$$



[illegible]

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