

Parameter	Symbol	Conditions	Values			Unit
			min.	typ.	max.	

Thermal characteristics¹⁾

Thermal resistance, junction - case	R_{thJC}	-	-	-	3.5	K/W
SMD version, device on PCB	R_{thJA}	minimal footprint	-	100	-	
		6 cm ² cooling area ²⁾	-	60	-	

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

Static characteristics

Drain-source breakdown voltage	$V_{(BR)DSS}$	$V_{GS}=0\text{ V}, I_D=1\text{ mA}$	55	-	-	V
Gate threshold voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=14\text{ }\mu\text{A}$	1.2	1.6	2.0	
Zero gate voltage drain current ³⁾	I_{DSS}	$V_{DS}=55\text{ V}, V_{GS}=0\text{ V}, T_j=25\text{ °C}$	-	0.01	1	μA
		$V_{DS}=55\text{ V}, V_{GS}=0\text{ V}, T_j=125\text{ °C}^{2)}$	-	1	100	
Gate-source leakage current ³⁾	I_{GSS}	$V_{GS}=20\text{ V}, V_{DS}=0\text{ V}$	-	1	100	nA
Drain-source on-state resistance ³⁾	$R_{DS(on)}$	$V_{GS}=4.5\text{ V}, I_D=7.5\text{ A}$	-	67	79	m Ω
		$V_{GS}=10\text{ V}, I_D=15\text{ A}$	-	53	65	

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Dynamic characteristics¹⁾

Input capacitance ³⁾	C_{iss}	$V_{GS}=0\text{ V}, V_{DS}=25\text{ V},$ $f=1\text{ MHz}$	-	315	410	pF
Output capacitance ³⁾	C_{oss}		-	90	120	
Reverse transfer capacitance ³⁾	C_{rss}		-	35	50	
Turn-on delay time	$t_{d(on)}$	$V_{DD}=27.5\text{ V},$ $V_{GS}=10\text{ V}, I_D=20\text{ A},$ $R_G=11\ \Omega$	-	2	-	ns
Rise time	t_r		-	3	-	
Turn-off delay time	$t_{d(off)}$		-	10	-	
Fall time	t_f		-	7	-	

Gate Charge Characteristics^{1, 3)}

Gate to source charge	Q_{gs}	$V_{DD}=44\text{ V}, I_D=20\text{ A},$ $V_{GS}=0\text{ to }10\text{ V}$	-	1.2	1.6	nC
Gate to drain charge	Q_{gd}		-	3.5	5.3	
Gate charge total	Q_g		-	9.4	12	
Gate plateau voltage	$V_{plateau}$		-	3.9	-	V

Reverse Diode

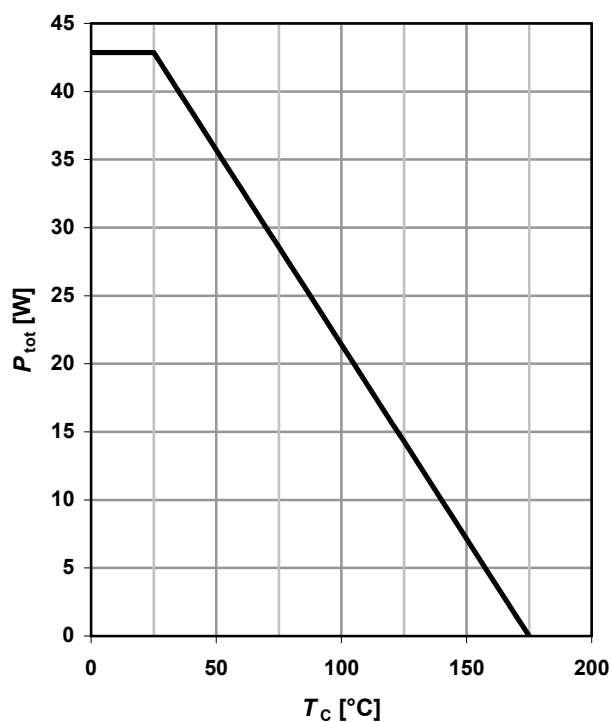
Diode continuous forward current ¹⁾ one channel active	I_S	$T_C=25\text{ °C}$	-	-	20	A
Diode pulse current ¹⁾ one channel active	$I_{S,pulse}$		-	-	80	
Diode forward voltage	V_{SD}	$V_{GS}=0\text{ V}, I_F=15\text{ A},$ $T_J=25\text{ °C}$	-	1.0	1.3	V
Reverse recovery time ¹⁾	t_{rr}	$V_R=27.5\text{ V}, I_F=I_S,$ $di_F/dt=100\text{ A}/\mu\text{s}$	-	30	-	ns
Reverse recovery charge ^{1, 3)}	Q_{rr}		-	28	-	nC

¹⁾ Specified by design. Not subject to production test.

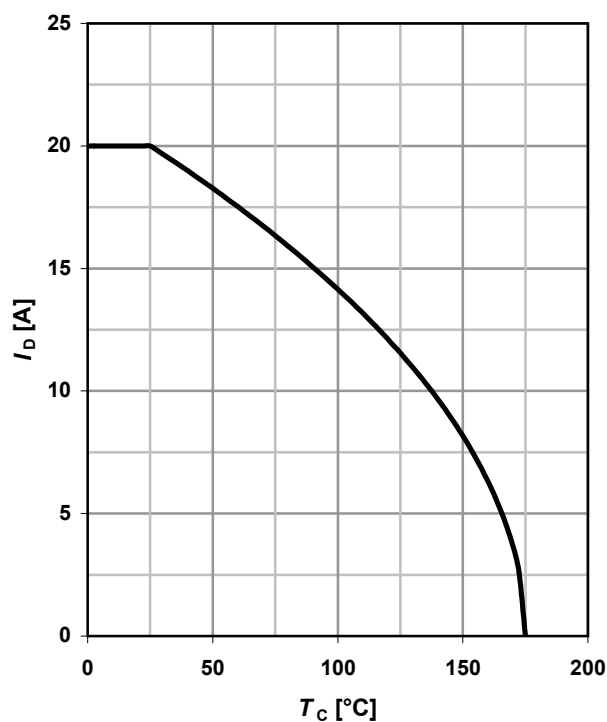
²⁾ Device on 40 mm x 40 mm x 1.5 mm epoxy PCB FR4 with 6 cm² (one layer, 70 µm thick) copper area for drain connection. PCB is vertical in still air.

³⁾ Per channel

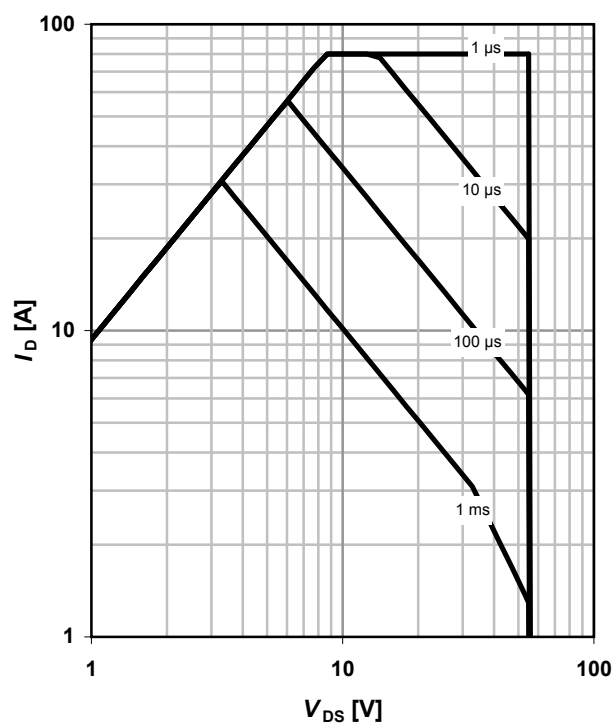
1 Power dissipation

 $P_{\text{tot}} = f(T_C); V_{\text{GS}} \geq 6 \text{ V}; \text{ one channel active}$


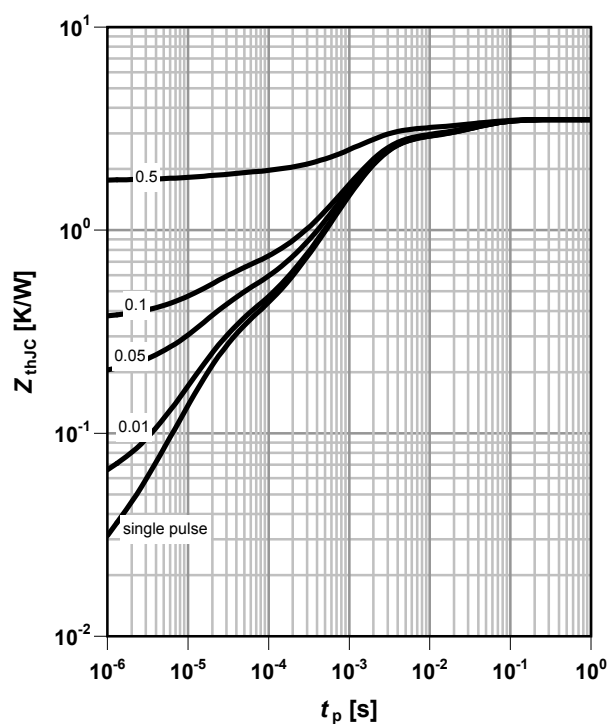
2 Drain current

 $I_D = f(T_C); V_{\text{GS}} \geq 6 \text{ V}; \text{ one channel active}$


3 Safe operating area

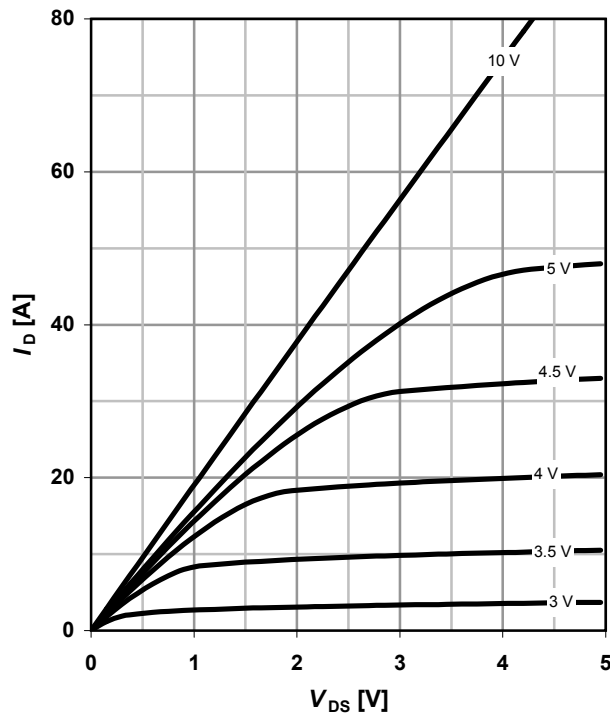
 $I_D = f(V_{\text{DS}}); T_C = 25^\circ\text{C}; D = 0; \text{ one channel active}$
 parameter: t_p


4 Max. transient thermal impedance

 $Z_{\text{thJC}} = f(t_p)$
 parameter: $D = t_p / T$


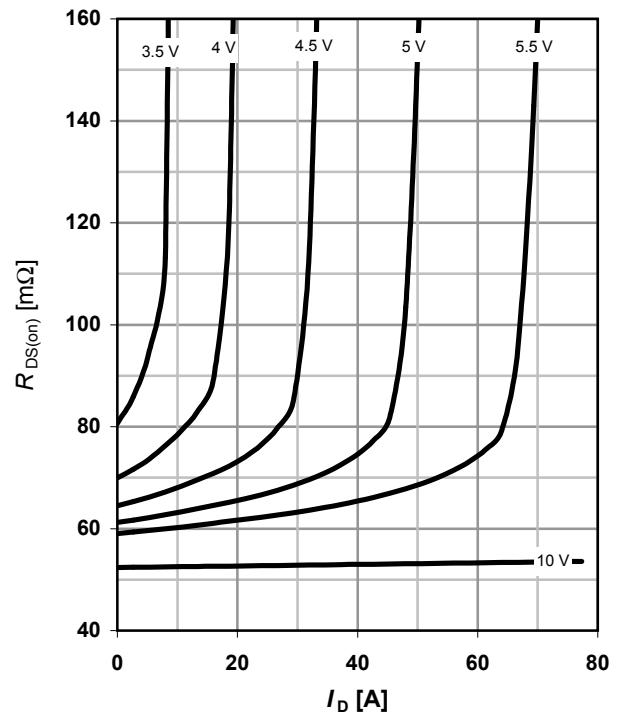
5 Typ. output characteristics³⁾

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

parameter: V_{GS}


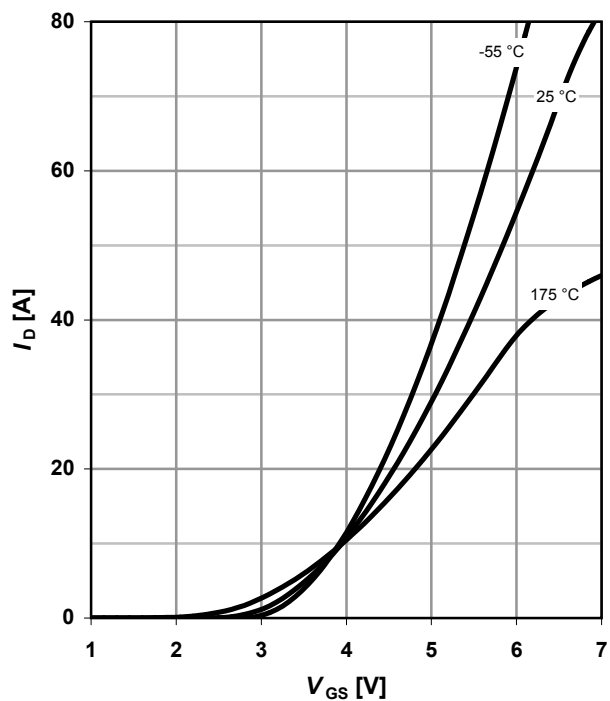
6 Typ. drain-source on-state resistance³⁾

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

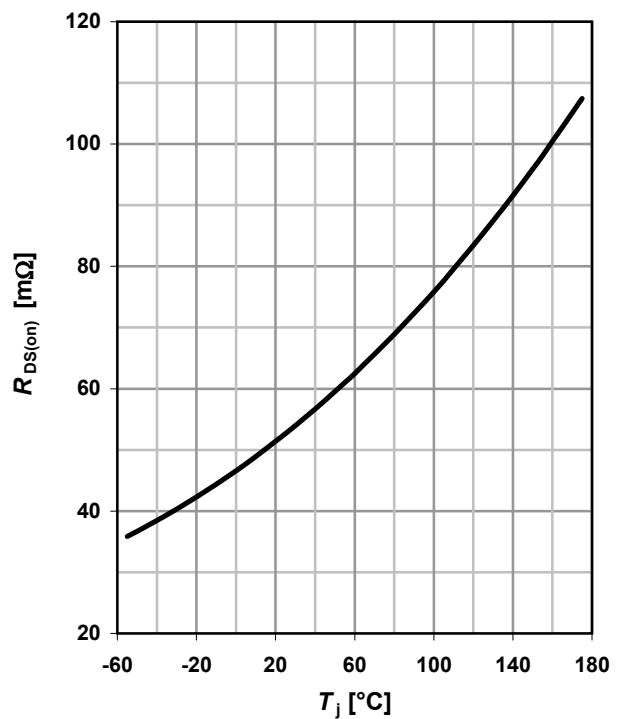
parameter: V_{GS}


7 Typ. transfer characteristics³⁾

 $I_D = f(V_{GS}); V_{DS} = 6\text{V}$

parameter: T_j


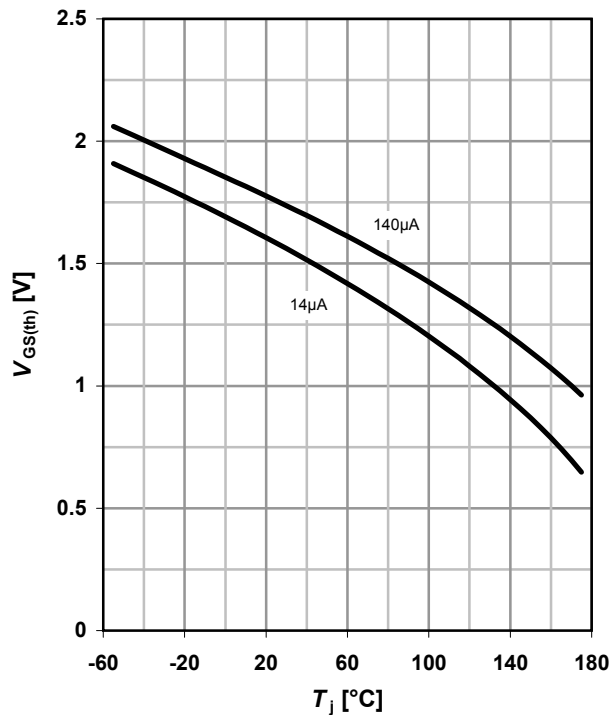
8 Typ. drain-source on-state resistance³⁾

 $R_{DS(on)} = f(T_j); I_D = 15\text{A}; V_{GS} = 10\text{V}$


9 Typ. gate threshold voltage

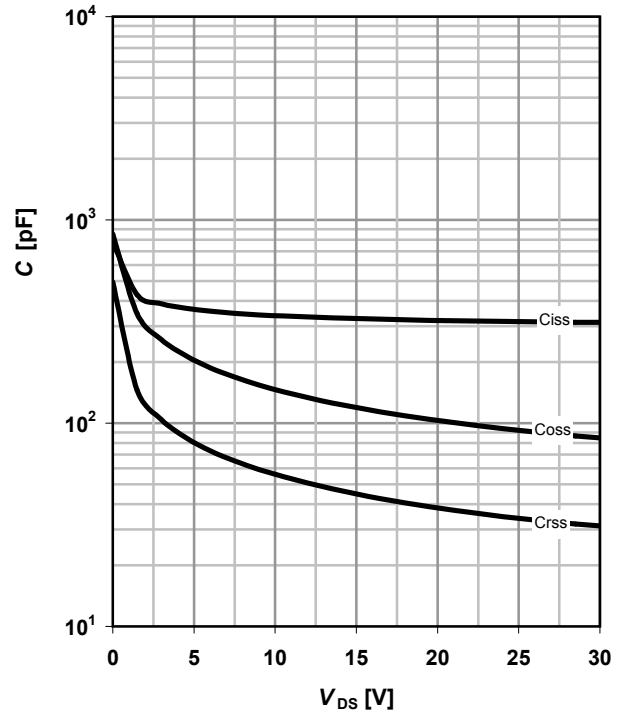
$$V_{GS(th)} = f(T_j); V_{GS} = V_{DS}$$

parameter: I_D



10 Typ. Capacitances³⁾

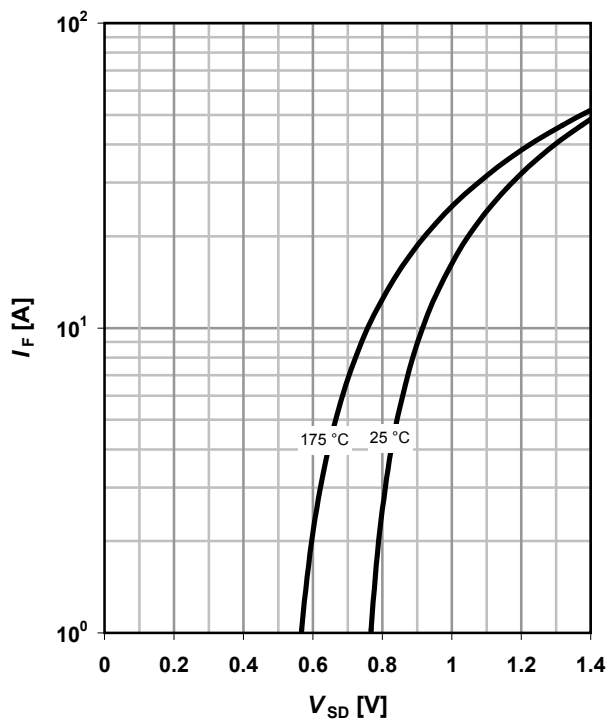
$$C = f(V_{DS}); V_{GS} = 0 \text{ V}; f = 1 \text{ MHz}$$



11 Typical forward diode characteristics³⁾

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

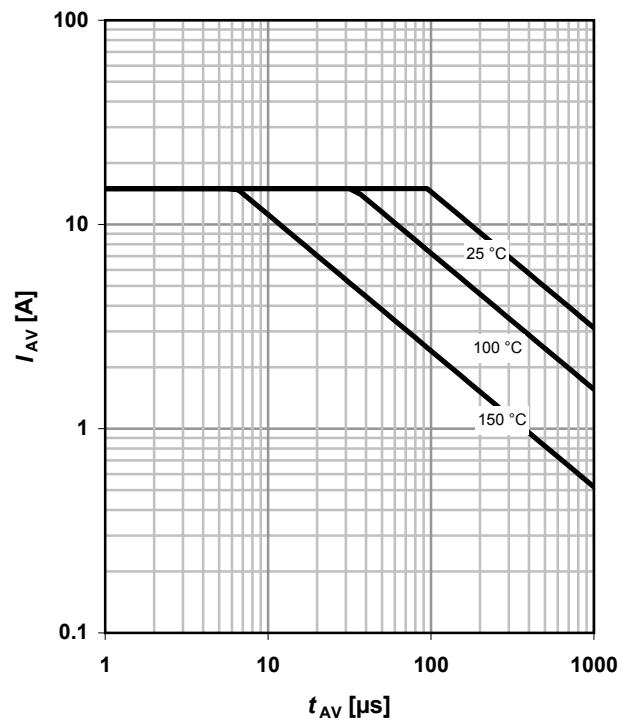
parameter: T_j



12 Avalanche characteristics³⁾

$$I_{AS} = f(t_{AV})$$

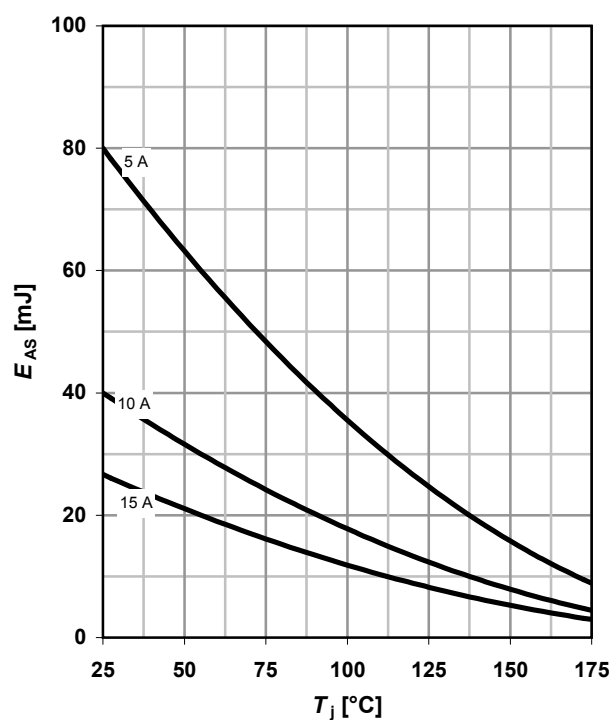
parameter: $T_{j(start)}$



13 Avalanche energy³⁾

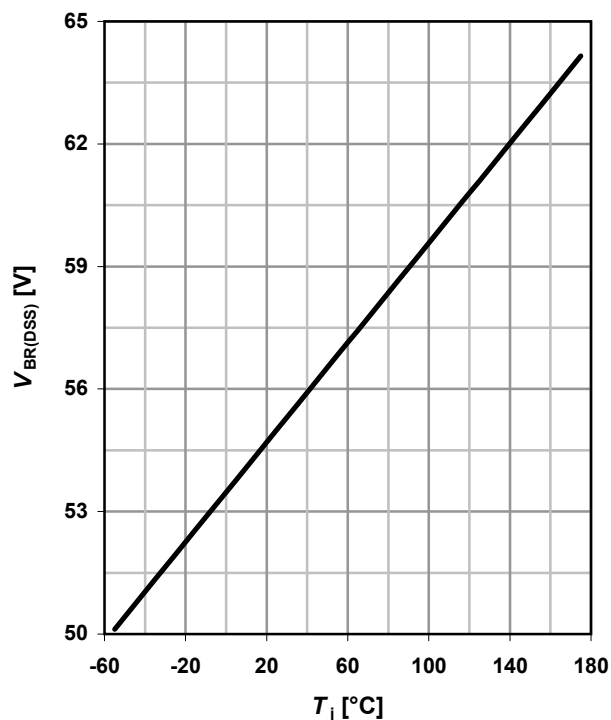
$$E_{AS} = f(T_j)$$

parameter: I_D



14 Drain-source breakdown voltage

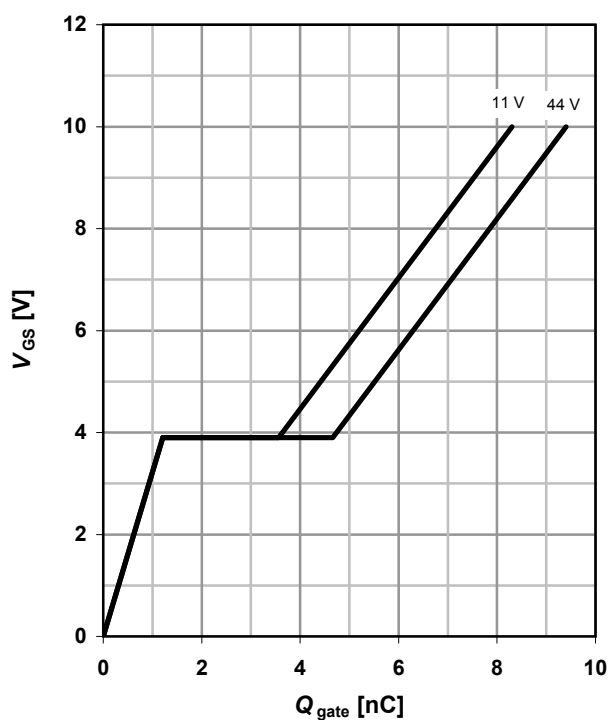
$$V_{BR(DSS)} = f(T_j); I_D = 1\text{ mA}$$



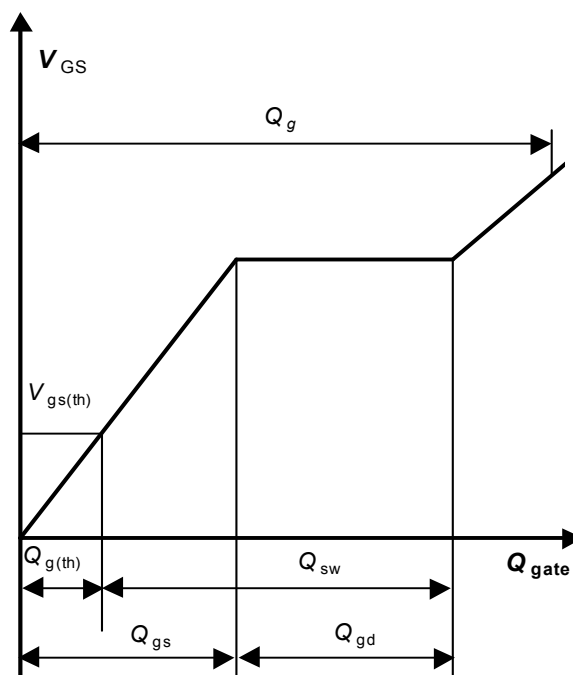
15 Typ. gate charge³⁾

$$V_{GS} = f(Q_{gate}); I_D = 20\text{ A pulsed}$$

parameter: V_{DD}



16 Gate charge waveforms



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Revision History

Version	Date	Changes
Revision 1.0	07.09.2009	Final Data Sheet