

Parameter	Symbol	Conditions	Values			Unit
			min.	typ.	max.	
<b>Thermal characteristics</b>						
Thermal resistance, junction - case	$R_{thJC}$		-	-	0.5	K/W
Thermal resistance, junction - ambient	$R_{thJA}$	minimal footprint	-	-	62	
		6 cm <sup>2</sup> cooling area <sup>2)</sup>	-	-	40	

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

**Static characteristics**

Drain-source breakdown voltage	$V_{(BR)DSS}$	$V_{GS}=0\text{ V}, I_D=1\text{ mA}$	200	-	-	V
Gate threshold voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=270\text{ }\mu\text{A}$	2	3	4	
Zero gate voltage drain current	$I_{DSS}$	$V_{DS}=160\text{ V}, V_{GS}=0\text{ V}, T_j=25\text{ °C}$	-	0.1	1	$\mu\text{A}$
		$V_{DS}=160\text{ V}, V_{GS}=0\text{ V}, T_j=125\text{ °C}$	-	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	$R_{DS(on)}$	$V_{GS}=10\text{ V}, I_D=88\text{ A},$ (TO220)	-	9.9	11	m $\Omega$
		$V_{GS}=10\text{ V}, I_D=88\text{ A},$ (TO263)	-	9.6	10.7	

<sup>2)</sup> Device on 40 mm x 40 mm x 1.5 mm epoxy PCB FR4 with 6 cm<sup>2</sup> (one layer, 70  $\mu\text{m}$  thick) copper area for drain connection. PCB is vertical in still air.

Parameter	Symbol	Conditions	Values			Unit
			min.	typ.	max.	

**Dynamic characteristic<sup>4)</sup>**

Input capacitance	$C_{iss}$	$V_{GS}=0\text{ V}, V_{DS}=100\text{ V},$ $f=1\text{ MHz}$	-	5340	7100	pF
Output capacitance	$C_{oss}$		-	401	533	
Reverse transfer capacitance	$C_{rss}$		-	5	-	
Turn-on delay time	$t_{d(on)}$	$V_{DD}=100\text{ V},$ $V_{GS}=10\text{ V}, I_D=44\text{ A},$ $R_G=1.6\ \Omega$	-	18	-	ns
Rise time	$t_r$		-	26	-	
Turn-off delay time	$t_{d(off)}$		-	41	-	
Fall time	$t_f$		-	11	-	

**Gate Charge Characteristics<sup>3)</sup>**

Gate to source charge	$Q_{gs}$	$V_{DD}=100\text{ V}, I_D=44\text{ A},$ $V_{GS}=0\text{ to }10\text{ V}$	-	23	-	nC
Gate to drain charge	$Q_{gd}$		-	8	-	
Switching charge	$Q_{sw}$		-	15	-	
Gate charge total	$Q_g$		-	65	87	
Gate plateau voltage	$V_{plateau}$		-	4.4	-	V
Output charge	$Q_{oss}$	$V_{DD}=100\text{ V}, V_{GS}=0\text{ V}$	-	162	216	nC

**Reverse Diode<sup>4)</sup>**

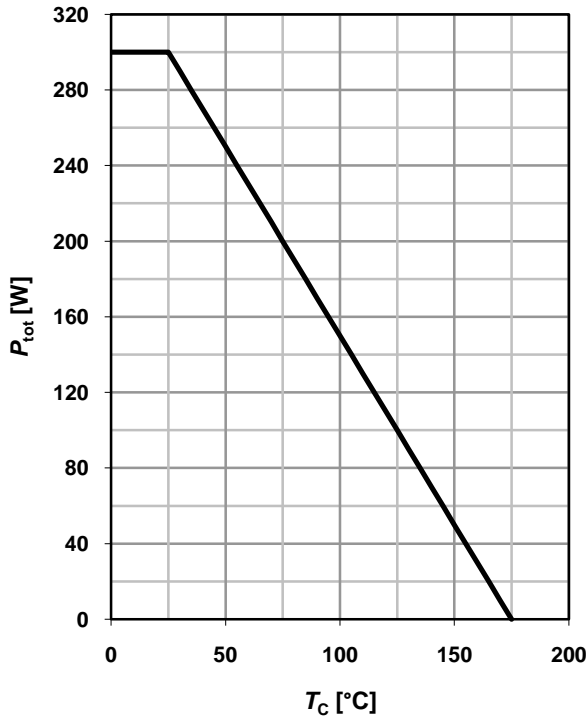
Diode continuous forward current	$I_S$	$T_C=25\text{ }^\circ\text{C}$	-	-	88	A
Diode pulse current	$I_{S,pulse}$		-	-	352	
Diode forward voltage	$V_{SD}$	$V_{GS}=0\text{ V}, I_F=88\text{ A},$ $T_j=25\text{ }^\circ\text{C}$	-	1	1.2	V
Reverse recovery time	$t_{rr}$	$V_R=100\text{ V}, I_F=44\text{ A},$ $di_F/dt=100\text{ A}/\mu\text{s}$	-	142	-	ns
Reverse recovery charge	$Q_{rr}$		-	640	-	nC

<sup>3)</sup> See figure 16 for gate charge parameter definition

<sup>4)</sup> Not subjected to production test - verified by design/characterization

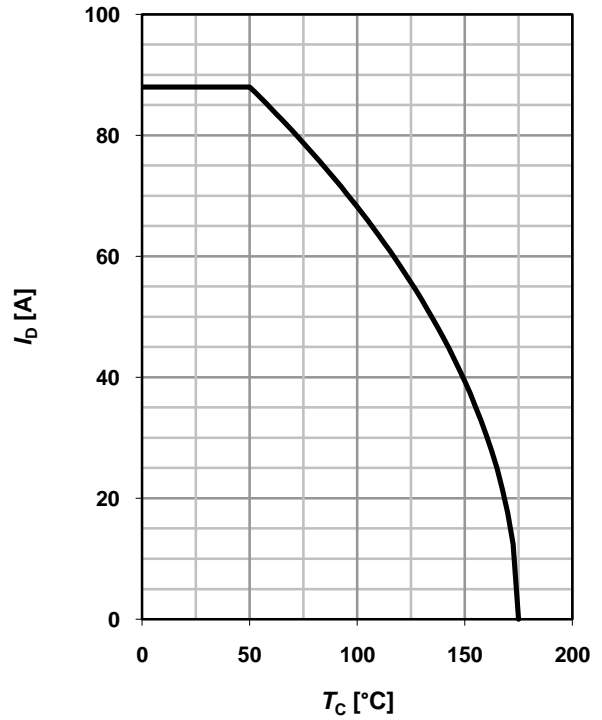
**1 Power dissipation**

$P_{tot}=f(T_C)$



**2 Drain current**

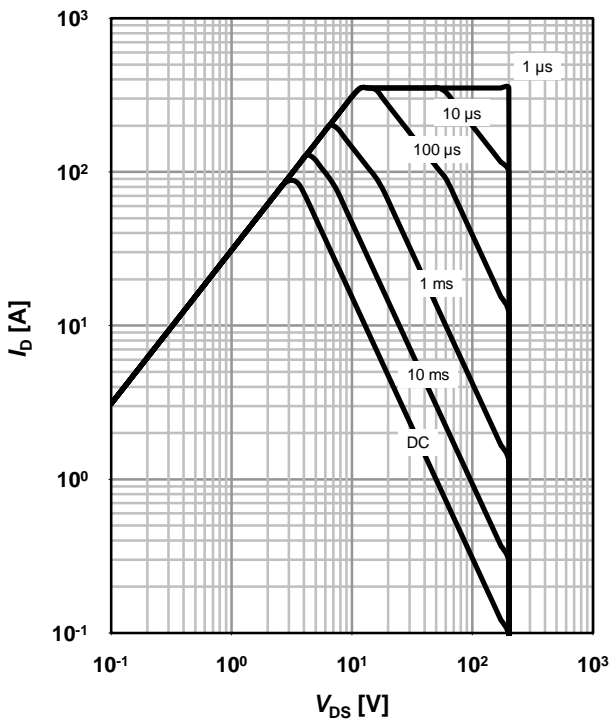
$I_D=f(T_C); V_{GS} \geq 10\text{ V}$



**3 Safe operating area**

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

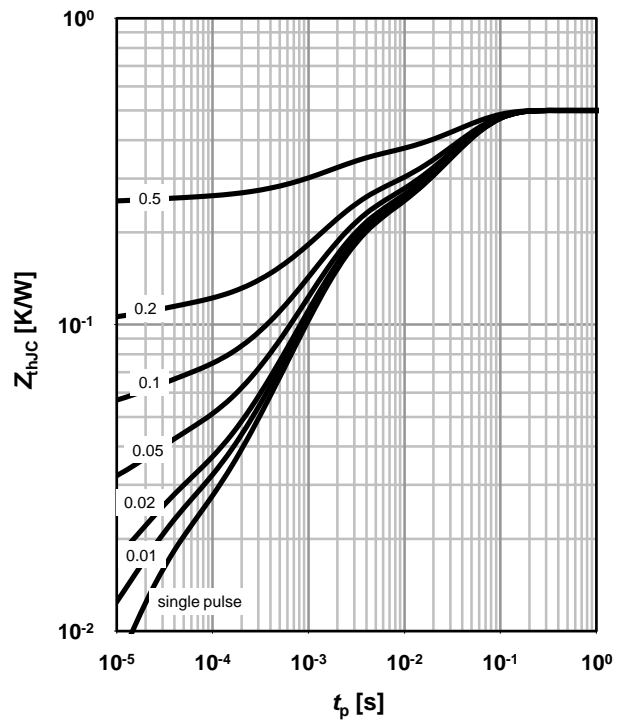
parameter:  $t_p$



**4 Max. transient thermal impedance**

$Z_{thJC}=f(t_p)$

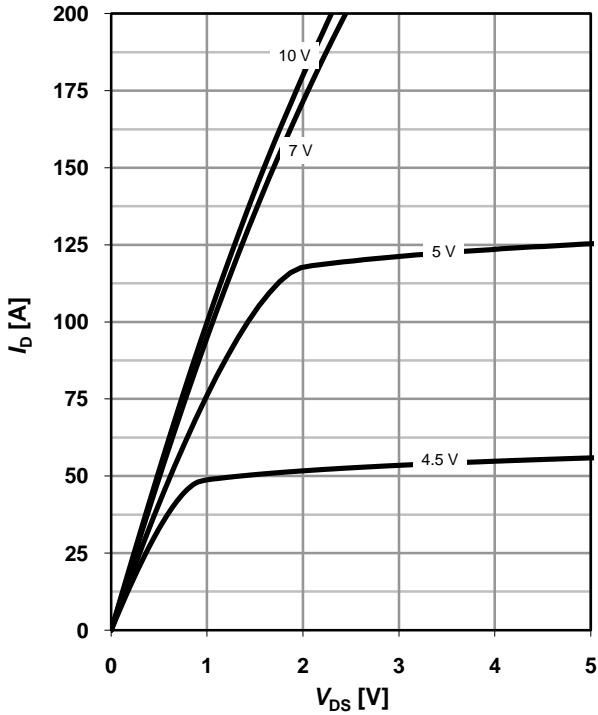
parameter:  $D=t_p/T$



**5 Typ. output characteristics**

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

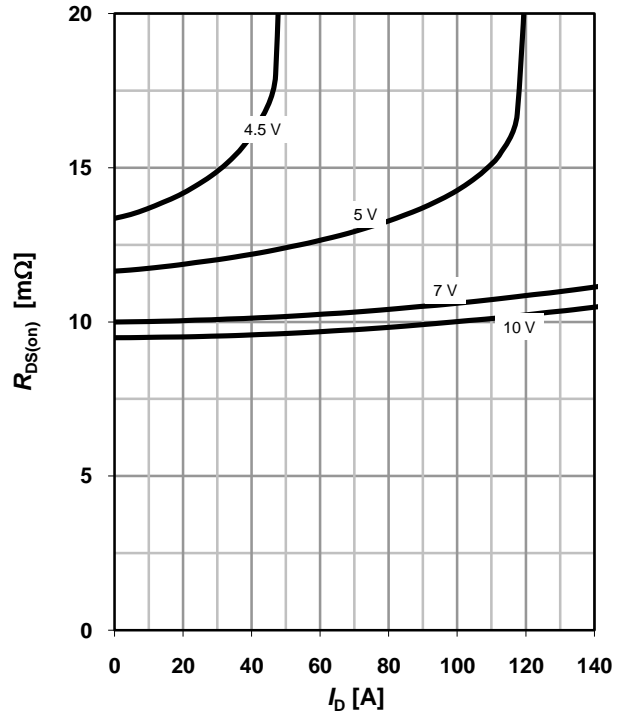
parameter:  $V_{GS}$



**6 Typ. drain-source on resistance**

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

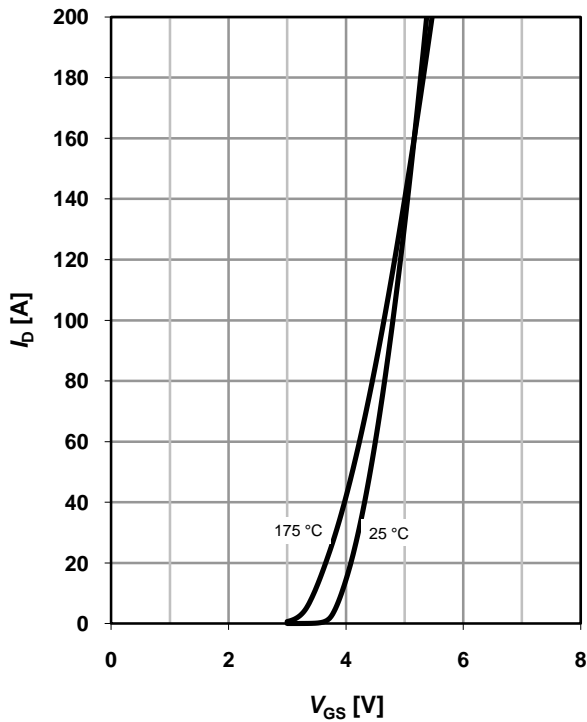
parameter:  $V_{GS}$



**7 Typ. transfer characteristics**

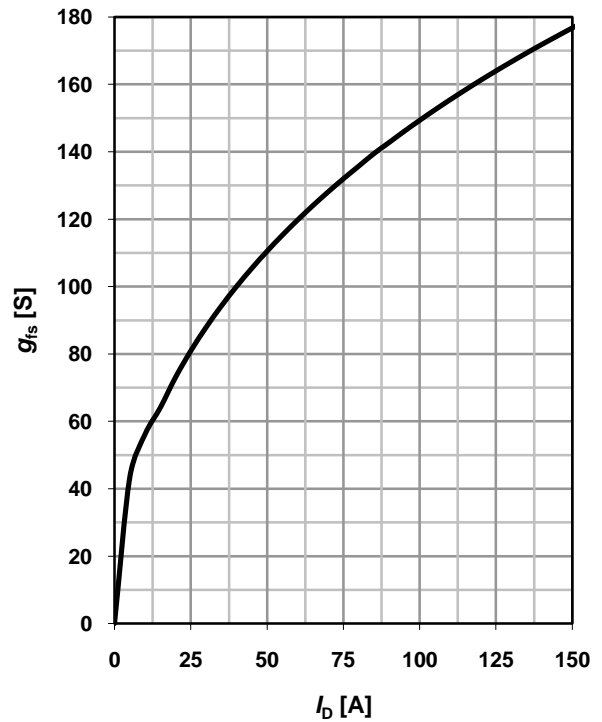
$I_D=f(V_{GS}); |V_{DS}|>2|I_D|R_{DS(on)max}$

parameter:  $T_j$



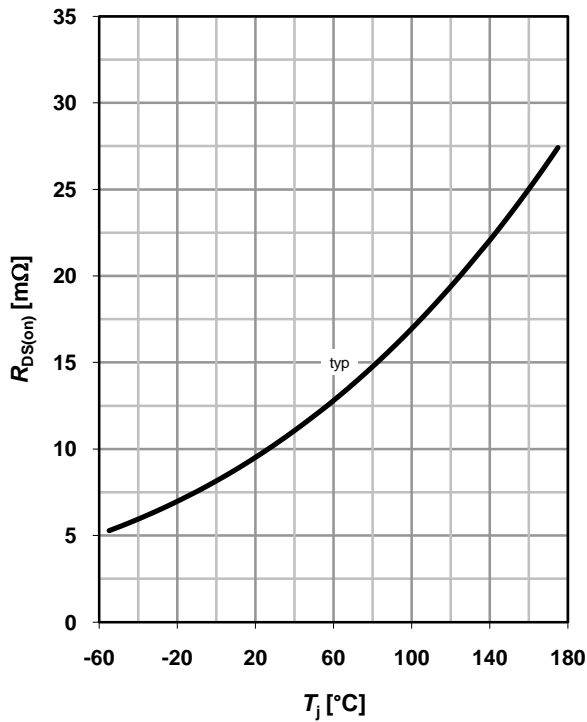
**8 Typ. forward transconductance**

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



**9 Drain-source on-state resistance**

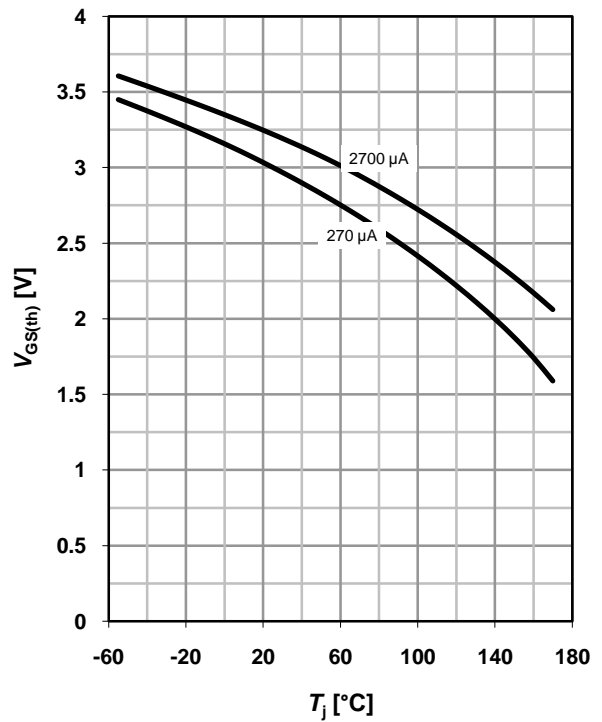
$R_{DS(on)}=f(T_j); I_D=88\text{ A}; V_{GS}=10\text{ V}$



**10 Typ. gate threshold voltage**

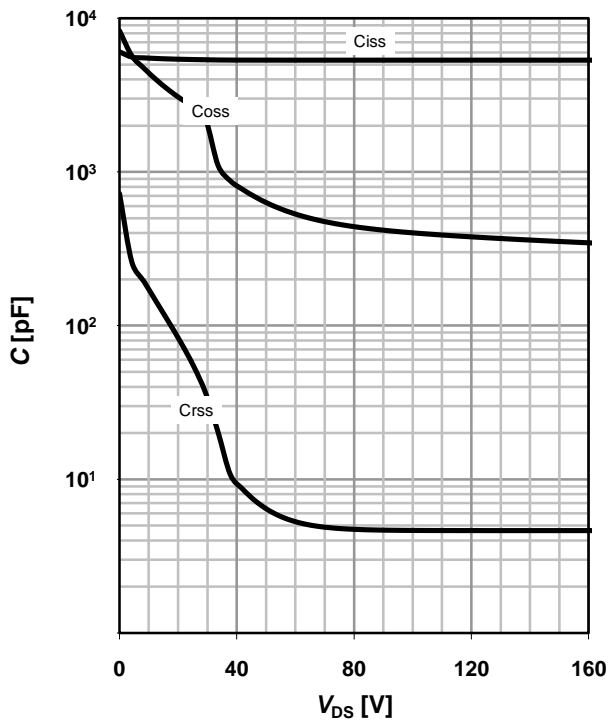
$V_{GS(th)}=f(T_j); V_{GS}=V_{DS}$

parameter:  $I_D$



**11 Typ. capacitances**

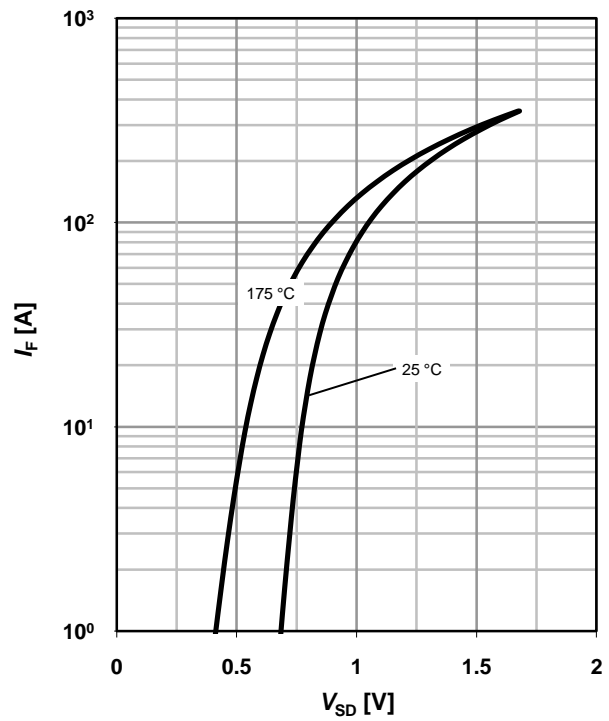
$C=f(V_{DS}); V_{GS}=0\text{ V}; f=1\text{ MHz}$



**12 Forward characteristics of reverse diode**

$I_F=f(V_{SD})$

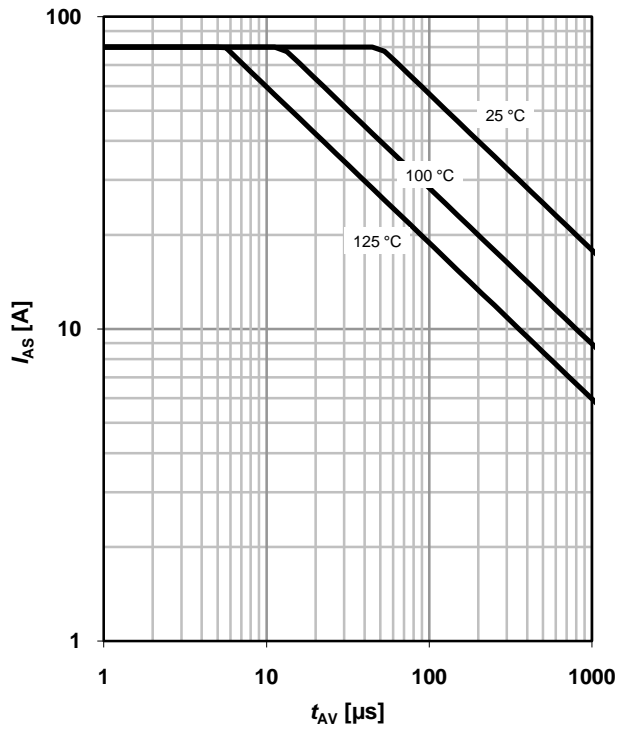
parameter:  $T_j$



**13 Avalanche characteristics**

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

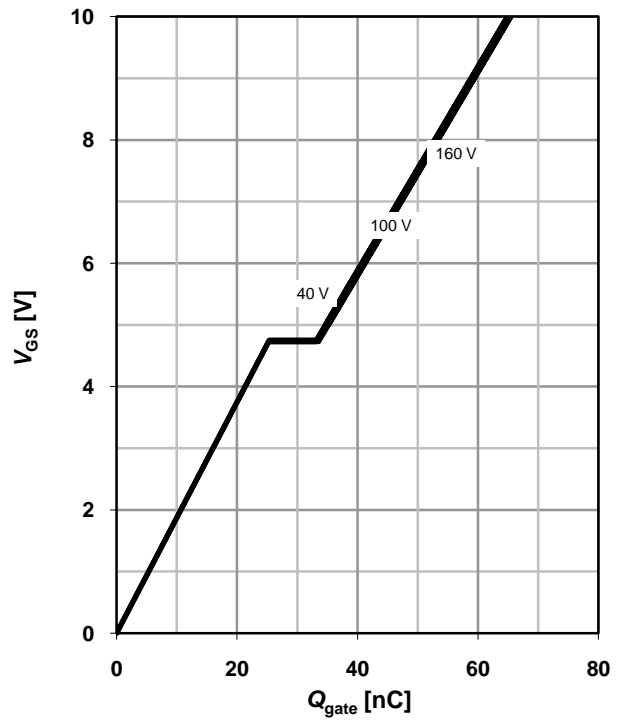
parameter:  $T_{j(\text{start})}$



**14 Typ. gate charge**

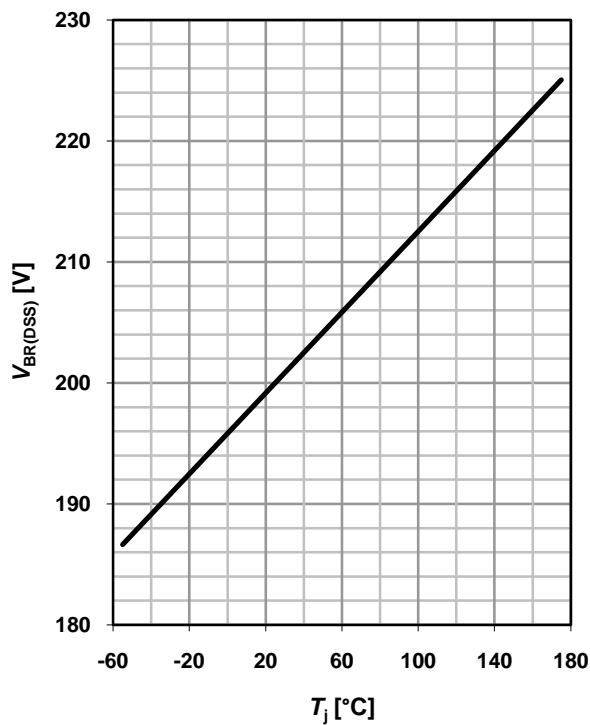
$V_{GS}=f(Q_{\text{gate}}); I_D=44 \text{ A pulsed}$

parameter:  $V_{DD}$

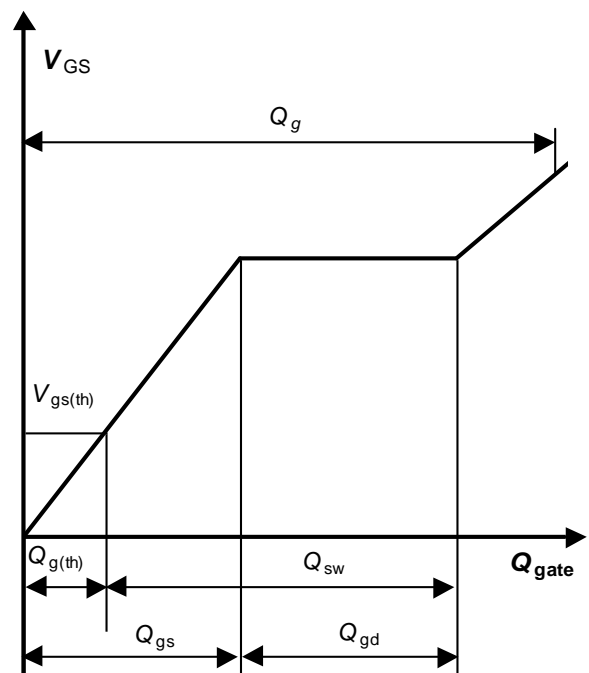


**15 Drain-source breakdown voltage**

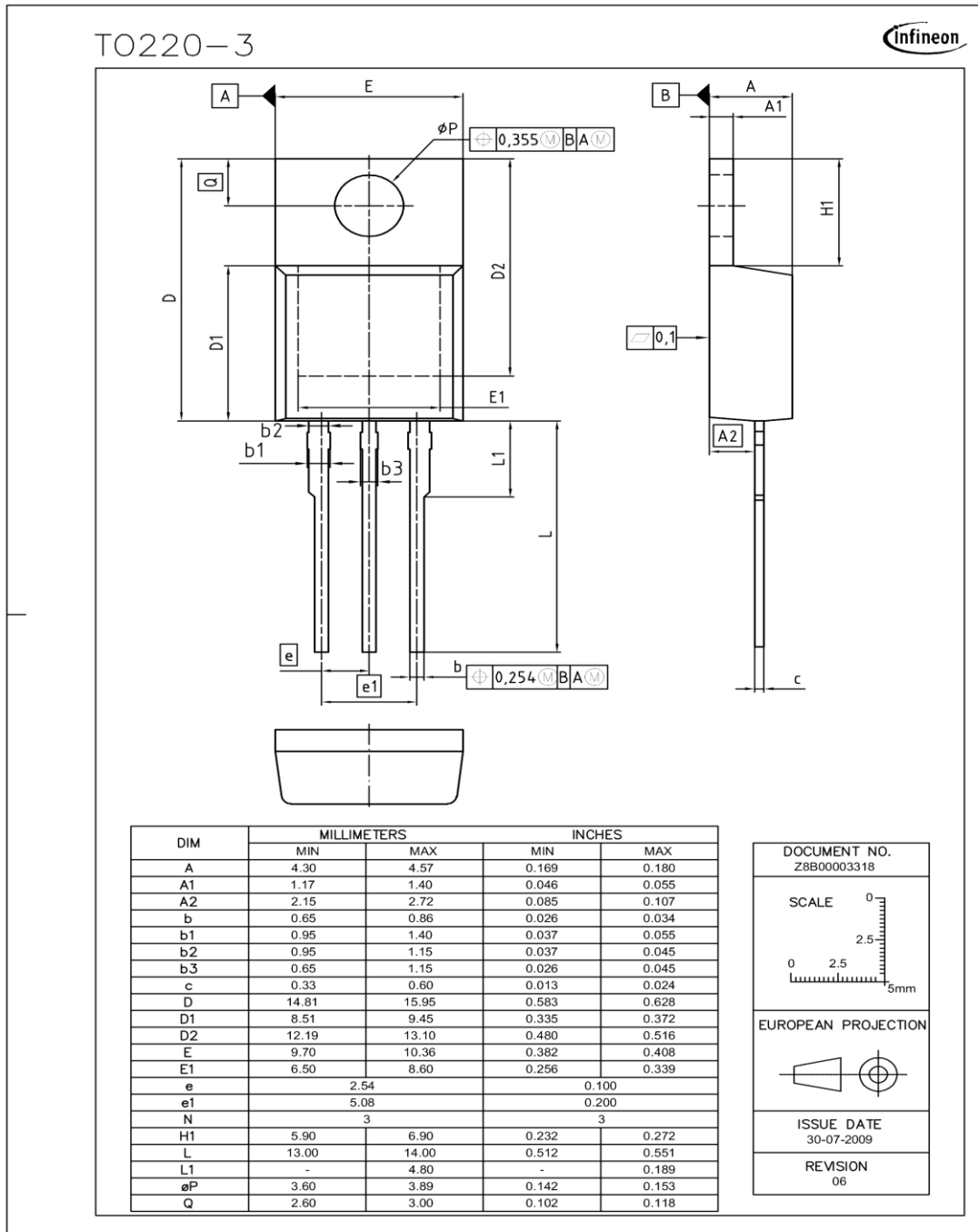
$V_{BR(DSS)}=f(T_j); I_D=1 \text{ mA}$



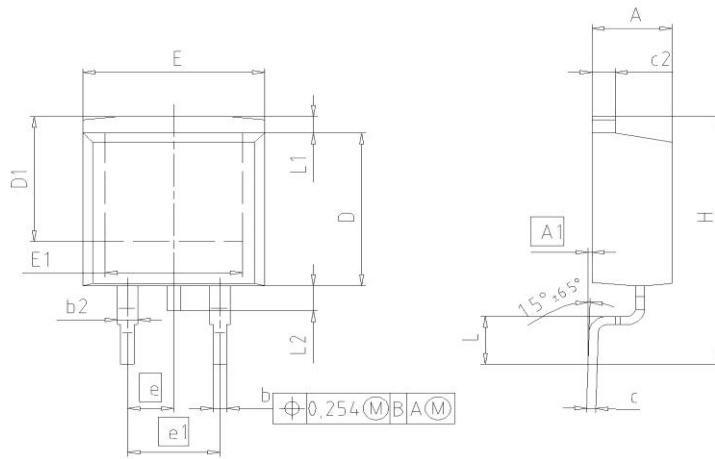
**16 Gate charge waveforms**



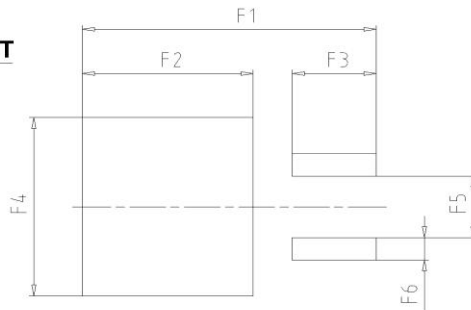
PG-TO220-3: Outline



PG-TO263-3: Outline



**FOOTPRINT**



DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	4.30	4.57	0.169	0.180
A1	0.00	0.25	0.000	0.010
b	0.65	0.85	0.026	0.033
b2	0.95	1.15	0.037	0.045
c	0.33	0.65	0.013	0.026
c2	1.17	1.40	0.046	0.055
D	8.51	9.45	0.335	0.372
D1	7.10	7.90	0.280	0.311
E	9.80	10.31	0.386	0.406
E1	6.50	8.60	0.256	0.339
e	2.54		0.100	
e1	5.08		0.200	
N	2		2	
H	14.61	15.88	0.575	0.625
L	2.29	3.00	0.090	0.118
L1	0.70	1.60	0.028	0.063
L2	1.00	1.78	0.039	0.070
F1	16.05	16.25	0.632	0.640
F2	9.30	9.50	0.366	0.374
F3	4.50	4.70	0.177	0.185
F4	10.70	10.90	0.421	0.429
F5	3.65	3.85	0.144	0.152
F6	1.25	1.45	0.049	0.057

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