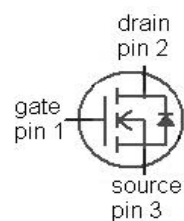
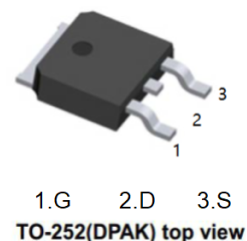


Features

- Excellent gate charge x $R_{DS(on)}$ product (FOM)
- Very low on-resistance $R_{DS(on)}$
- 175 °C operating temperature
- Ideal for high-frequency switching and synchronous rectification
- $V_{DS(V)} = 100V$
- $I_D = 90A$ ($V_{GS} = 10V$)
- $R_{DS(ON)} < 6.8m\Omega$ ($V_{GS} = 10V$)



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

Parameter	Symbol	Conditions	Value	Unit
Continuous drain current	I_D	$T_C = 25\text{ °C}^{2)}$	90	A
		$T_C = 100\text{ °C}$	72	
Pulsed drain current ²⁾	$I_{D,pulse}$	$T_C = 25\text{ °C}$	360	
Avalanche energy, single pulse	E_{AS}	$I_D = 90\text{ A}$, $R_{GS} = 25\text{ }\Omega$	130	mJ
Gate source voltage	V_{GS}		± 20	V
Power dissipation	P_{tot}	$T_C = 25\text{ °C}$	150	W
Operating and storage temperature	T_j, T_{stg}		-55 ... 175	°C
IEC climatic category; DIN IEC 68-1			55/175/56	

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

Parameter	Symbol	Conditions	Values			Unit
			min.	typ.	max.	
Thermal resistance, junction - case	R_{thJC}				1	K/W
Thermal resistance, junction - ambient	R_{thJA}	minimal footprint			62	
		6 cm ² cooling area ³⁾			40	
Drain-source breakdown voltage	$V_{(BR)DSS}$	$V_{GS}=0\text{ V}$, $I_D=1\text{ mA}$	100			V
Gate threshold voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}$, $I_D=90\text{ }\mu\text{A}$	2	2.7	3.5	
Zero gate voltage drain current	I_{DSS}	$V_{DS}=100\text{ V}$, $V_{GS}=0\text{ V}$, $T_j=25\text{ }^{\circ}\text{C}$		0.1	1	μA
		$V_{DS}=100\text{ V}$, $V_{GS}=0\text{ V}$, $T_j=125\text{ }^{\circ}\text{C}$		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	$R_{DS(on)}$	$V_{GS}=10\text{ V}$, $I_D=90\text{ A}$		5.7	6.8	m Ω
		$V_{GS}=6\text{ V}$, $I_D=45\text{ A}$		7.1	12.3	
Gate resistance	R_G			1.6		Ω
Transconductance	g_{fs}	$ V_{DS} >2 I_D R_{DS(on)max}$, $I_D=90\text{ A}$	54	107		S

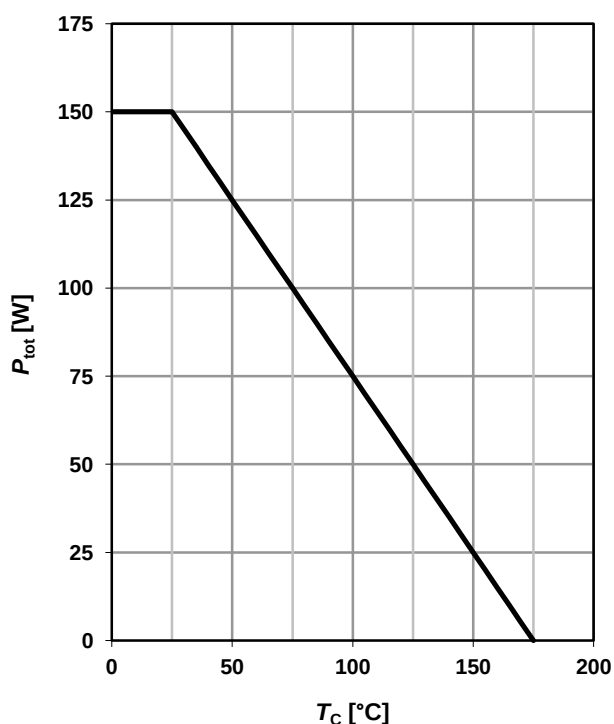
³⁾ Device on 40 mm x 40 mm x 1.5 mm epoxy PCB FR4 with 6 cm² (one layer, 70 μm thick) copper area for drain connection. PCB is vertical in still air.

Parameter	Symbol	Conditions	Values			Unit
			min.	typ.	max.	
Input capacitance	C_{iss}	$V_{GS}=0\text{ V}, V_{DS}=50\text{ V}, f=1\text{ MHz}$		3690	4910	pF
Output capacitance	C_{oss}			646		
Reverse transfer capacitance	C_{rss}			25		
Turn-on delay time	$t_{d(on)}$	$V_{DD}=50\text{ V}, V_{GS}=10\text{ V}, I_D=80\text{ A}, R_{G,ext}=3.6\ \Omega$		19		ns
Rise time	t_r			37		
Turn-off delay time	$t_{d(off)}$			37		
Fall time	t_f			9		
Gate to source charge	Q_{gs}	$V_{DD}=50\text{ V}, I_D=90\text{ A}, V_{GS}=0\text{ to }10\text{ V}$		18		nC
Gate to drain charge	Q_{gd}			10		
Switching charge	Q_{sw}			17		
Gate charge total	Q_g			51	68	
Gate plateau voltage	$V_{plateau}$			4.9		V
Output charge	Q_{oss}	$V_{DD}=50\text{ V}, V_{GS}=0\text{ V}$		68	91	nC
Diode continuous forward current	I_S	$T_C=25\text{ }^\circ\text{C}$			90	A
Diode pulse current	$I_{S,pulse}$				360	
Diode forward voltage	V_{SD}	$V_{GS}=0\text{ V}, I_F=90\text{ A}, T_J=25\text{ }^\circ\text{C}$		1	1.2	V
Reverse recovery time	t_{rr}	$V_R=15\text{ V}, I_F=80\text{ A}, di_F/dt=100\text{ A}/\mu\text{s}$		73		ns
Reverse recovery charge	Q_{rr}			139		nC

⁶⁾ See figure 16 for gate charge parameter definition

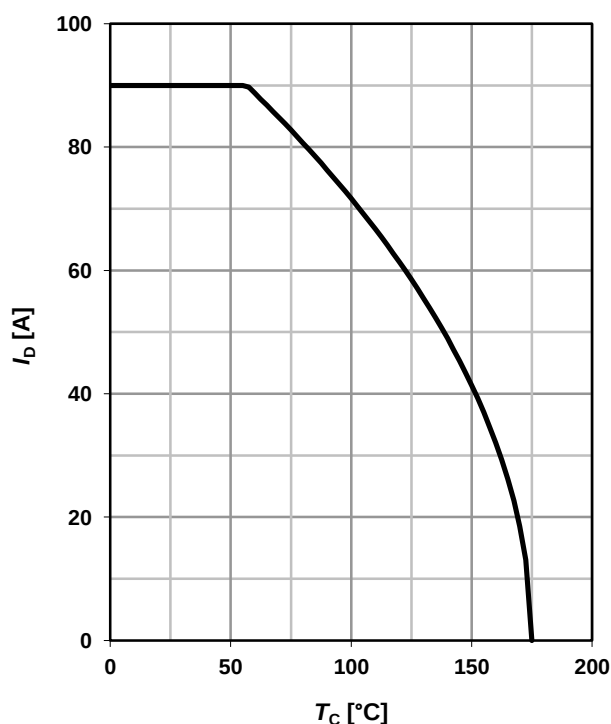
1 Power dissipation

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



2 Drain current

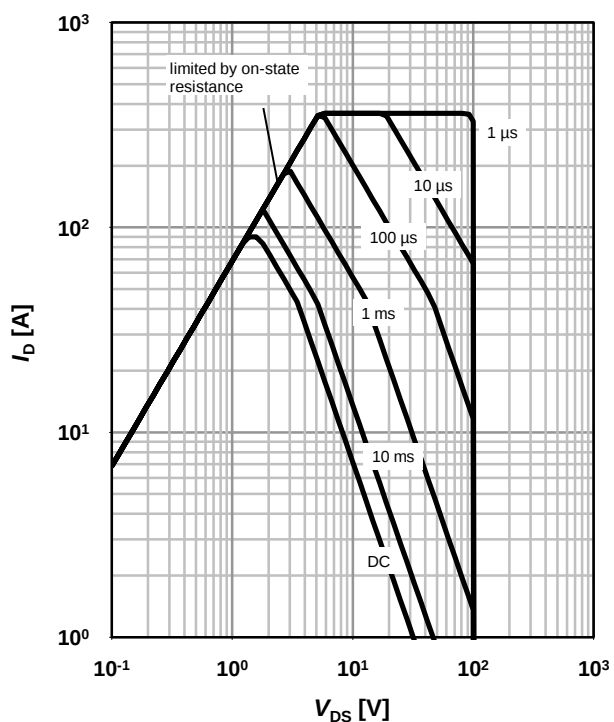
$$I_D = f(T_C); V_{GS} \geq 10 \text{ V}$$



3 Safe operating area

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

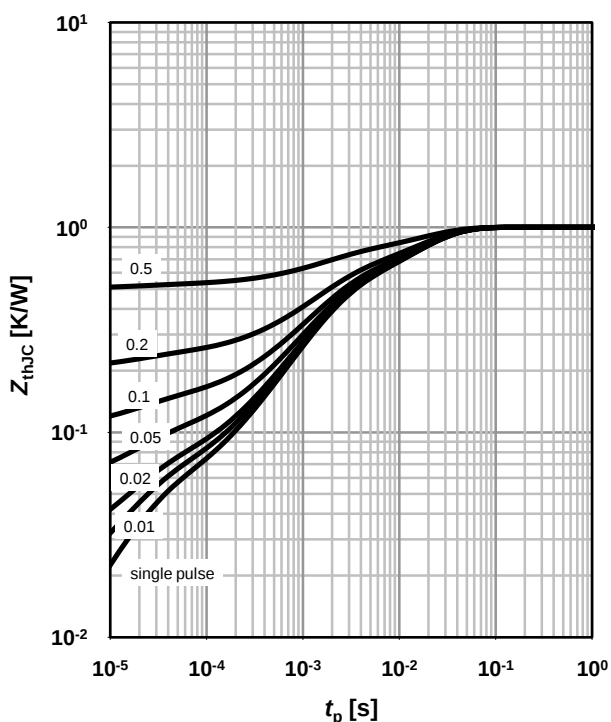
parameter: t_p



4 Max. transient thermal impedance

$$Z_{\text{thJC}} = f(t_p)$$

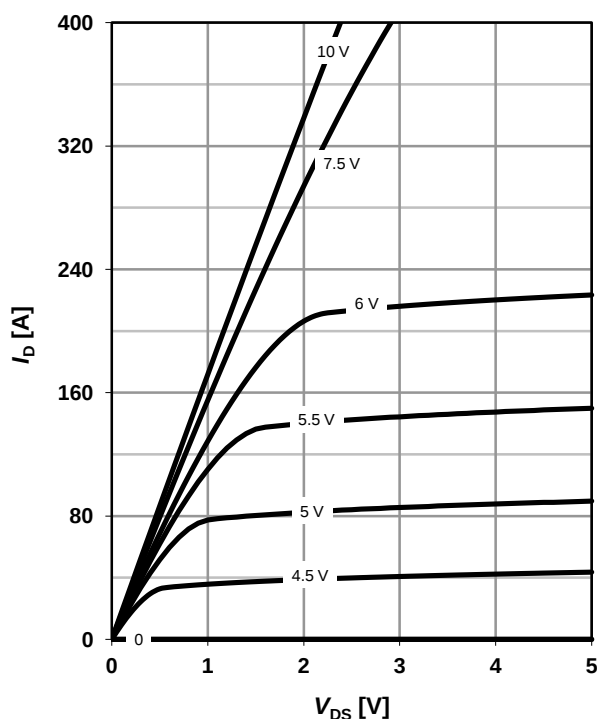
parameter: $D = t_p/T$



5 Typ. output characteristics

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

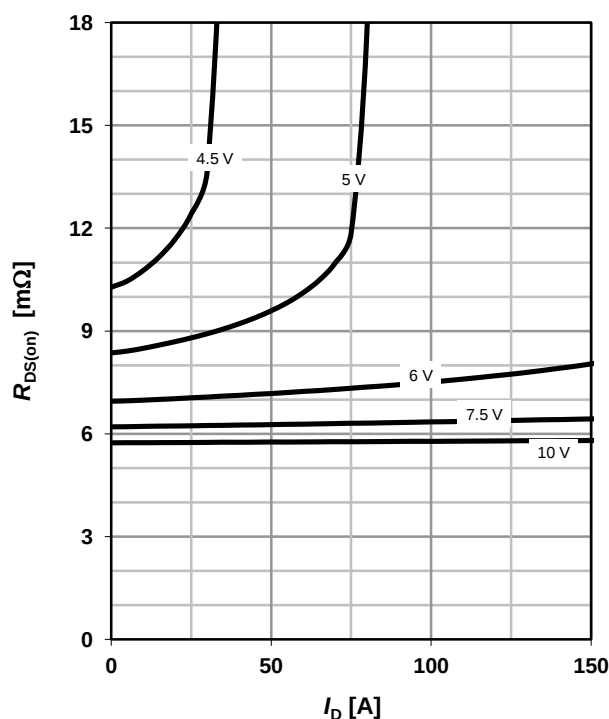
parameter: V_{GS}



6 Typ. drain-source on resistance

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

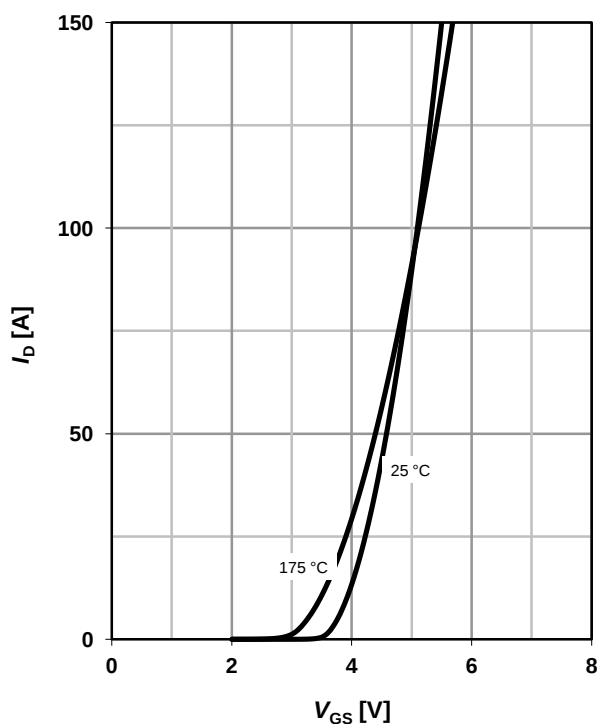
parameter: V_{GS}



7 Typ. transfer characteristics

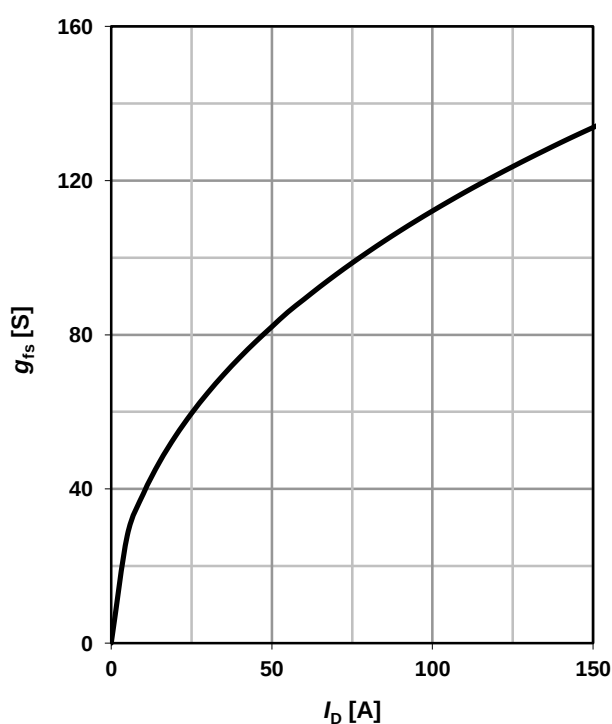
$I_D = f(V_{GS}); |V_{DS}| > 2|I_D|R_{DS(on)max}$

parameter: T_j



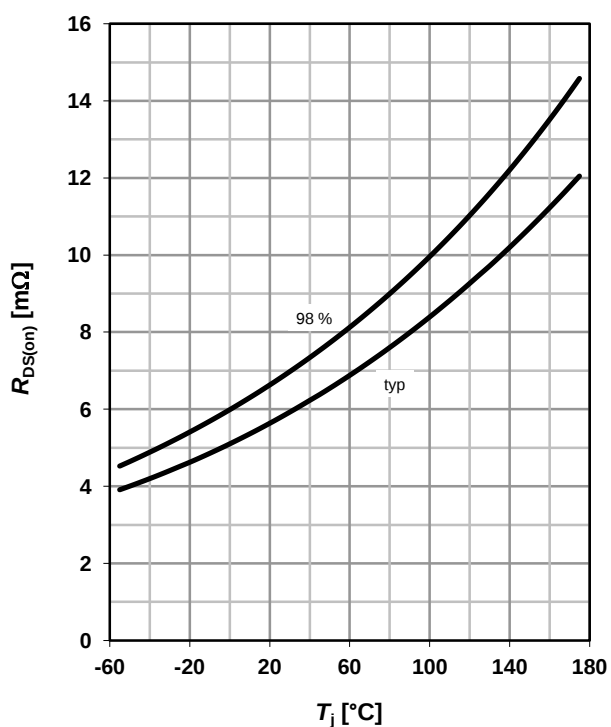
8 Typ. forward transconductance

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



9 Drain-source on-state resistance

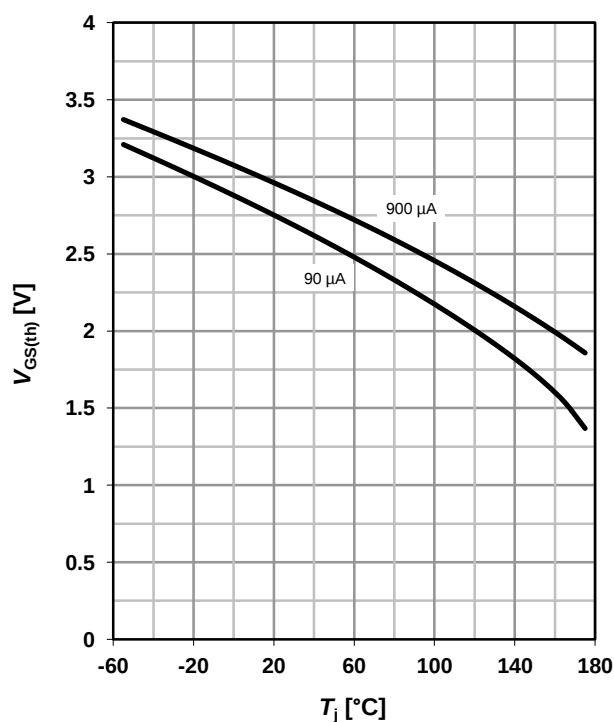
$$R_{DS(on)} = f(T_j); I_D = 90 \text{ A}; V_{GS} = 10 \text{ V}$$



10 Typ. gate threshold voltage

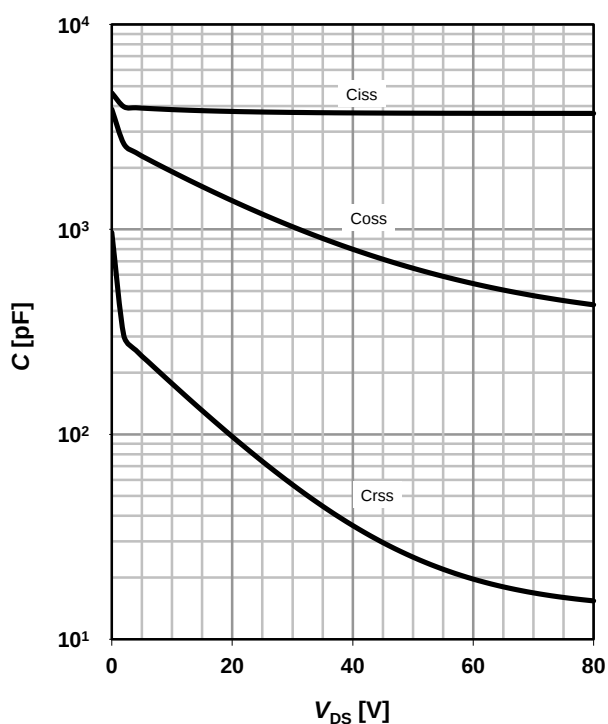
$$V_{GS(th)} = f(T_j); V_{GS} = V_{DS}$$

parameter: I_D



11 Typ. capacitances

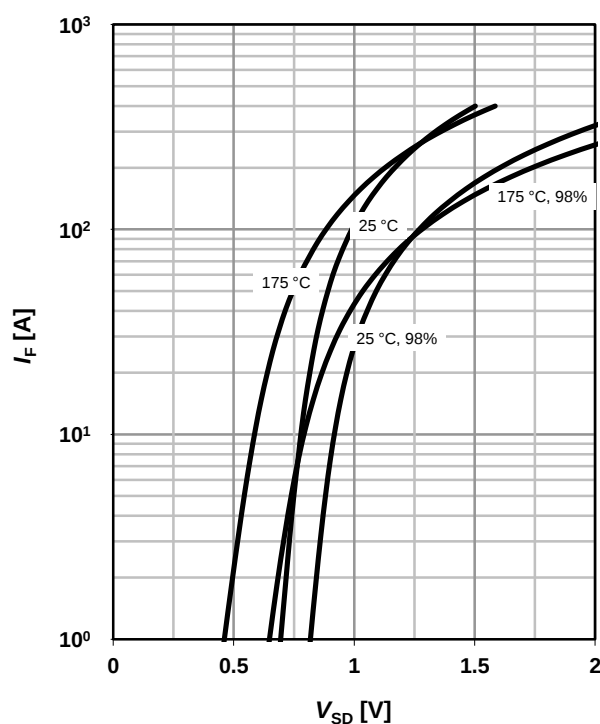
$$C = f(V_{DS}); V_{GS} = 0 \text{ V}; f = 1 \text{ MHz}$$



12 Forward characteristics of reverse diode

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

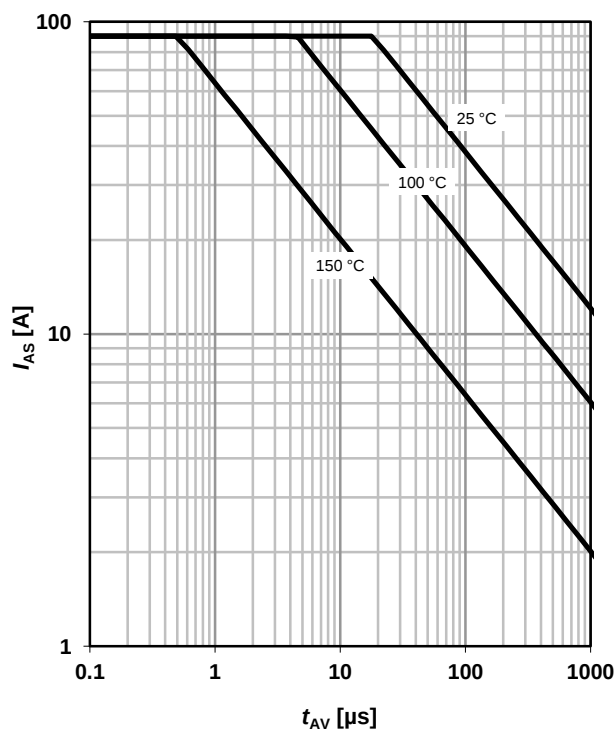
parameter: T_j



13 Avalanche characteristics

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

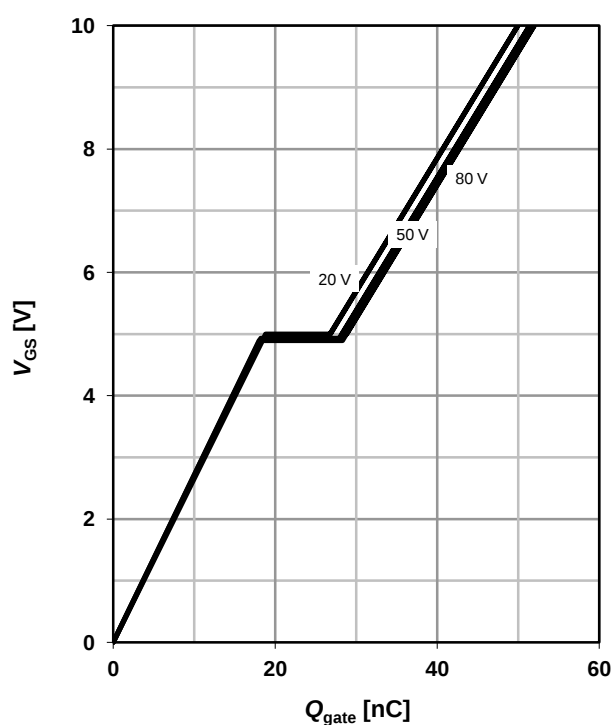
parameter: $T_{j(start)}$



14 Typ. gate charge

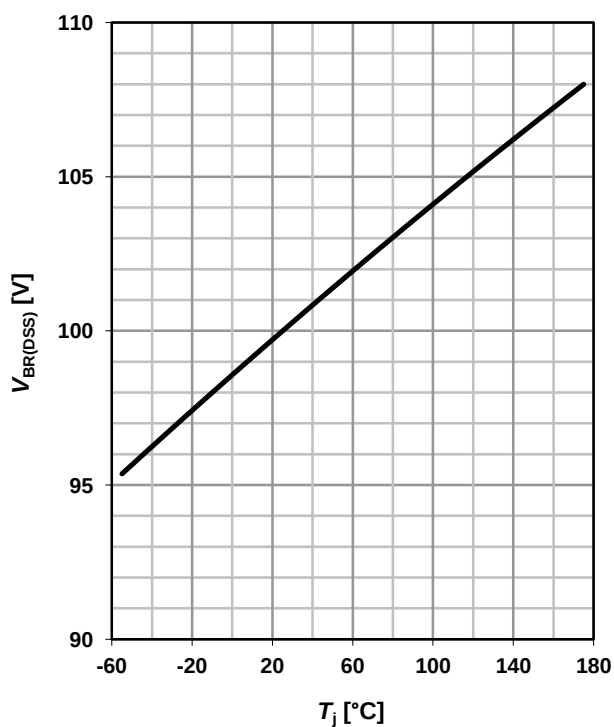
$V_{GS}=f(Q_{gate}); I_D=90\ A\ pulsed$

parameter: V_{DD}

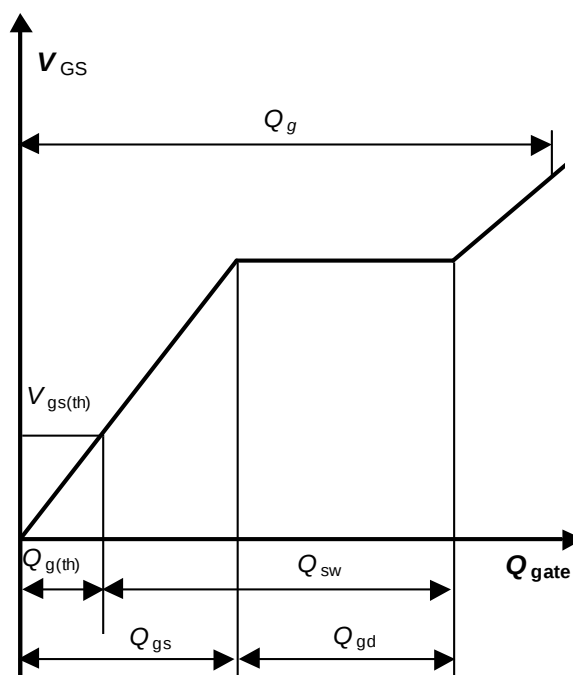


15 Drain-source breakdown voltage

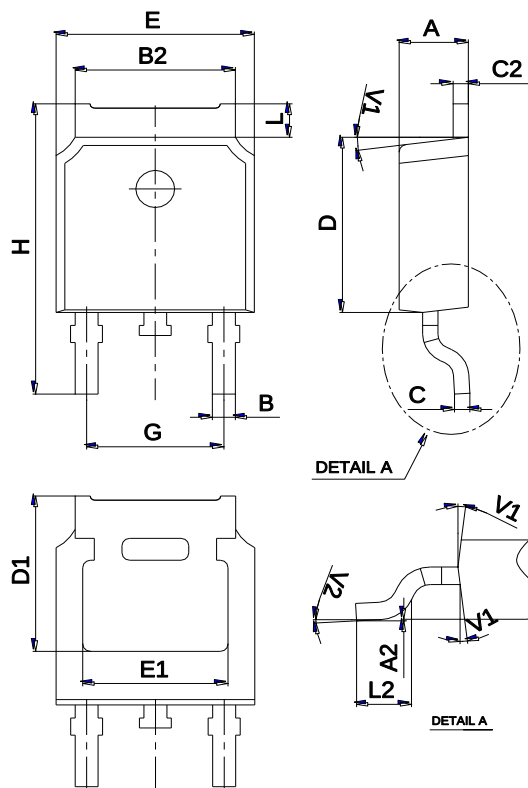
$V_{BR(DSS)}=f(T_j); I_D=1\ mA$



16 Gate charge waveforms

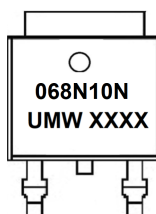


Package Mechanical Data TO-252



Ref.	Dimensions					
	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	2.10		2.50	0.083		0.098
A2	0		0.10	0		0.004
B	0.66		0.86	0.026		0.034
B2	5.18		5.48	0.202		0.216
C	0.40		0.60	0.016		0.024
C2	0.44		0.58	0.017		0.023
D	5.90		6.30	0.232		0.248
D1	5.30REF			0.209REF		
E	6.40		6.80	0.252		0.268
E1	4.63			0.182		
G	4.47		4.67	0.176		0.184
H	9.50		10.70	0.374		0.421
L	1.09		1.21	0.043		0.048
L2	1.35		1.65	0.053		0.065
V1		7°			7°	
V2	0°		6°	0°		6°

Marking



Ordering information

Order code	Package	Baseqty	Deliverymode
UMW IPD068N10N3G	TO-252	2500	Tape and reel