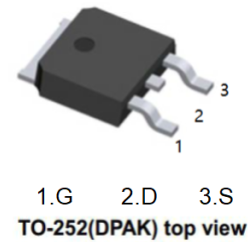


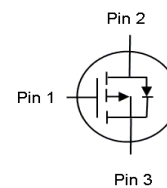
Features

- 175 °C operating temperature
- 100% Avalanche tested
- Pb-free; RoHS compliant, halogen free
- applications: power management



Product Summary

- $V_{DS(V)} = -30V$
- $I_D = -70A$ ($V_{GS} = -10V$)
- $R_{DS(ON)} < 6.8m\Omega$ ($V_{GS} = -10V$)
- $R_{DS(ON)} < 11m\Omega$ ($V_{GS} = -4.5V$)



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

Parameter	Symbol	Conditions	Value	Unit
Continuous drain current	I_D	$T_C = 25\text{ °C}$	-70	A
		$T_C = 100\text{ °C}$	-70	
		$T_C = 25\text{ °C}^{2)}$	-280	
Pulsed drain current	$I_{D,pulse}$	$T_C = 25\text{ °C}^{2)}$	-280	
Avalanche energy, single pulse	E_{AS}	$I_D = -70\text{ A}$, $R_{GS} = 25\text{ }\Omega$	149	mJ
Gate source voltage	V_{GS}		± 20	V
Power dissipation	P_{tot}	$T_C = 25\text{ °C}$	100	W
Operating and storage temperature	T_j, T_{stg}		-55 ... 175	°C
ESD class		JESD22-A114 HBM	tbd	
Soldering temperature			260	°C
IEC climatic category; DIN IEC 68-1			55/175/56	

¹⁾ J-STD20 and JESD22

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

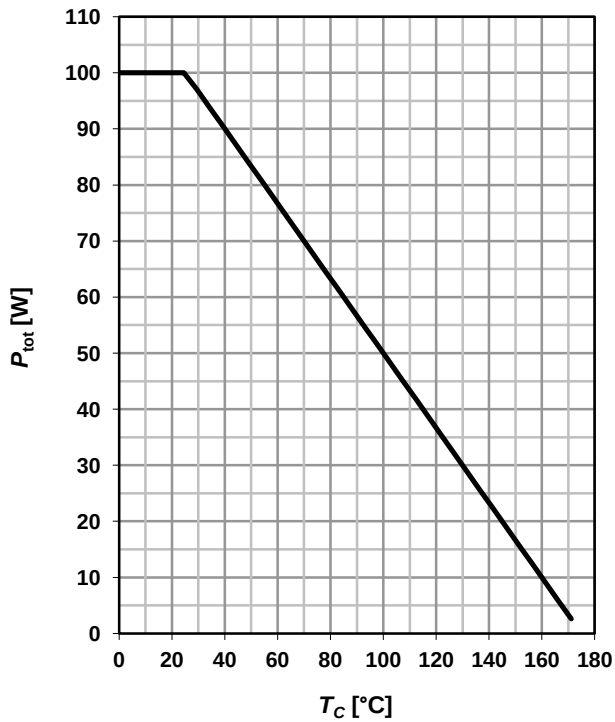
Parameter	Symbol	Conditions	Values			Unit
			min.	typ.	max.	
Thermal resistance, junction - case	R_{thJC}				1.5	K/W
Thermal resistance, junction - ambient	R_{thJA}	6 cm ² cooling area ²⁾			50	
Drain-source breakdown voltage	$V_{(BR)DSS}$	$V_{GS}=0\text{ V}$, $I_D=-250\mu\text{A}$	-30			V
Gate threshold voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}$, $I_D=-150\mu\text{A}$	-1.0	-1.5	-2.0	
Zero gate voltage drain current	I_{DSS}	$V_{DS}=-30\text{ V}$, $V_{GS}=0\text{ V}$, $T_j=25\text{ }^{\circ}\text{C}$		-0.1	-1	μA
		$V_{DS}=-30\text{ V}$, $V_{GS}=0\text{ V}$, $T_j=150\text{ }^{\circ}\text{C}$		-10	-100	
Gate-source leakage current	I_{GSS}	$V_{GS}=-20\text{ V}$, $V_{DS}=0\text{ V}$		-10	-100	nA
Drain-source on-state resistance	$R_{DS(on)}$	$V_{GS}=-4.5\text{ V}$, $I_D=-45\text{ A}$		7.0	11.0	m Ω
		$V_{GS}=-10\text{ V}$, $I_D=-70\text{ A}$		5.0	6.8	
Gate resistance	R_G			5.8		Ω
Transconductance	g_{fs}	$ V_{DS} >2 I_D R_{DS(on)max}$, $I_D=-70\text{ A}$	50	100		S

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.

Parameter	Symbol	Conditions	Values			Unit
			min.	typ.	max.	
Input capacitance	C_{iss}	$V_{GS}=0\text{ V}, V_{DS}=-15\text{ V},$ $f=1\text{ MHz}$		5150	7720	pF
Output capacitance	C_{oss}			2090	3140	
Reverse transfer capacitance	C_{rss}			160	240	
Turn-on delay time	$t_{d(on)}$	$V_{DD}=-15\text{ V}, V_{GS}=-10\text{ V},$ $I_D=-70\text{ A},$ $R_{G,ext}=6\ \Omega$		11	16.5	ns
Rise time	t_r			100	150	
Turn-off delay time	$t_{d(off)}$			84	126	
Fall time	t_f			31	47	
Gate to source charge	Q_{gs}	$V_{DD}=-15\text{ V}, I_D=-70\text{ A},$ $V_{GS}=0\text{ to }-10\text{ V}$		19	25	nC
Gate charge at threshold	$Q_{g(th)}$			8	11	
Gate to drain charge	Q_{gd}			8	13	
Switching charge	Q_{sw}			19	27	
Gate charge total	Q_g			68	91	
Gate plateau voltage	$V_{plateau}$			3.7		V
Output charge	Q_{oss}	$V_{DD}=-15\text{ V}, V_{GS}=0\text{ V}$		48	64	nC
Diode continuous forward current	I_S	$T_C=25\text{ }^\circ\text{C}$			30	A
Diode pulse current	$I_{S,pulse}$				280	
Diode forward voltage	V_{SD}	$V_{GS}=0\text{ V}, I_F=-70\text{ A},$ $T_J=25\text{ }^\circ\text{C}$			-1.2	V
Reverse recovery time	t_{rr}	$V_R=15\text{ V}, I_F=-70\text{ A},$ $di_F/dt=100\text{ A}/\mu\text{s}$		46	69	ns
Reverse recovery charge	Q_{rr}			44		

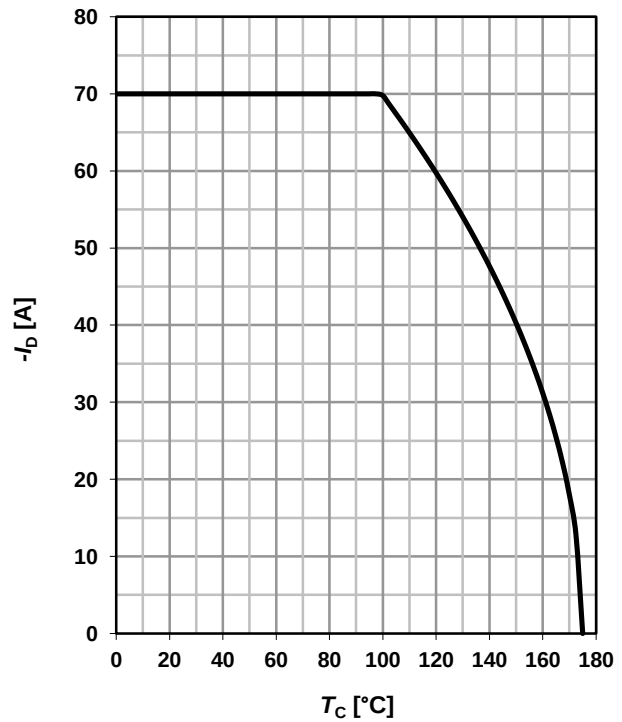
1 Power dissipation

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



2 Drain current

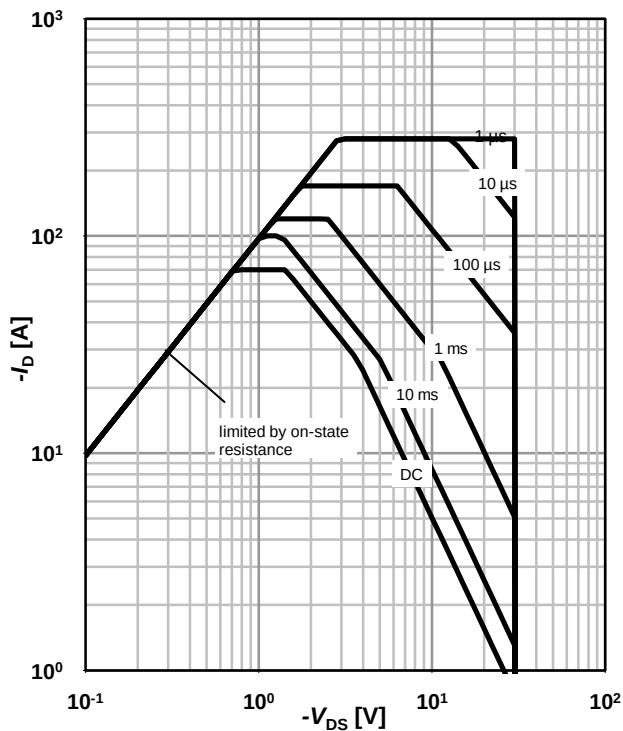
$$I_D = f(T_C); |V_{GS}| \geq 10 \text{ V}$$



3 Safe operating area

$$I_D = f(V_{DS}); T_C = 25 \text{ °C}^1; D = 0$$

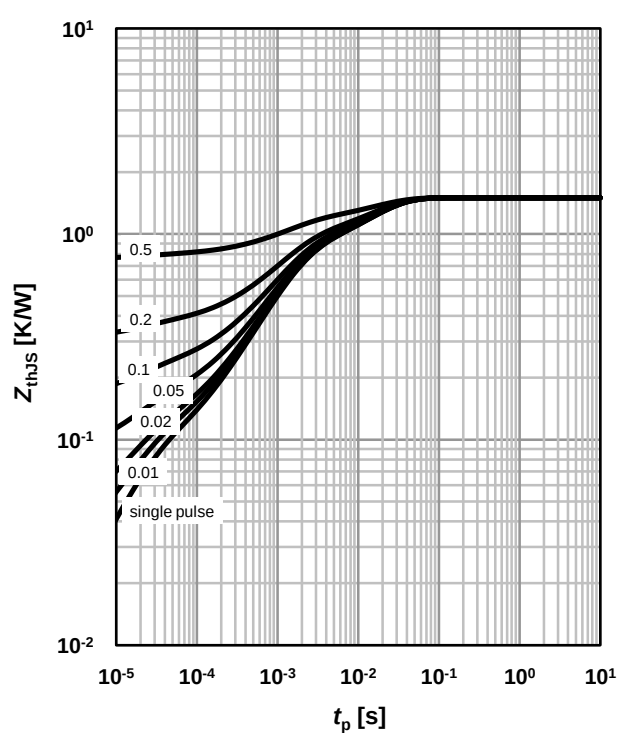
parameter: t_p



4 Max. transient thermal impedance

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

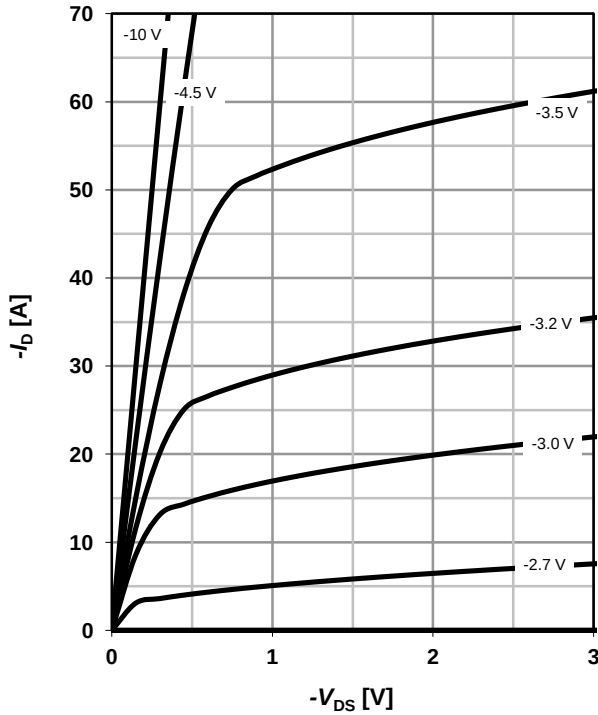
parameter: $D = t_p/T$



5 Typ. output characteristics

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

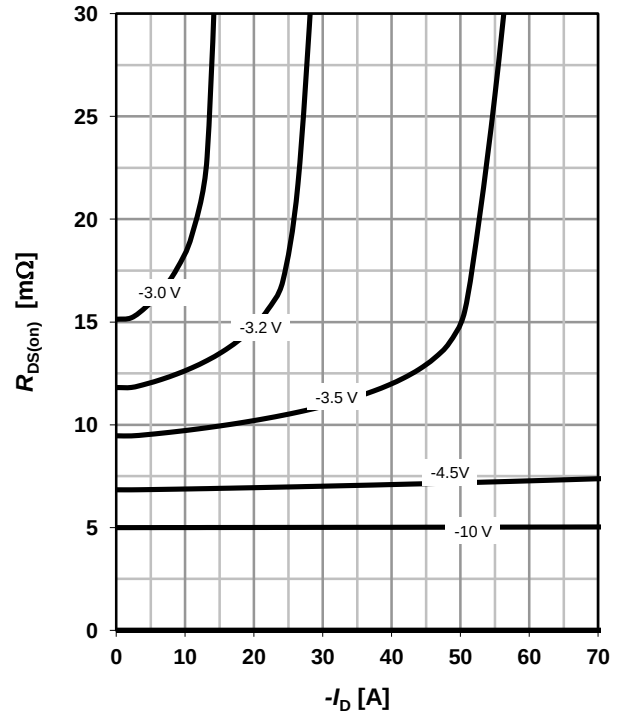
parameter: V_{GS}



6 Typ. drain-source on resistance

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

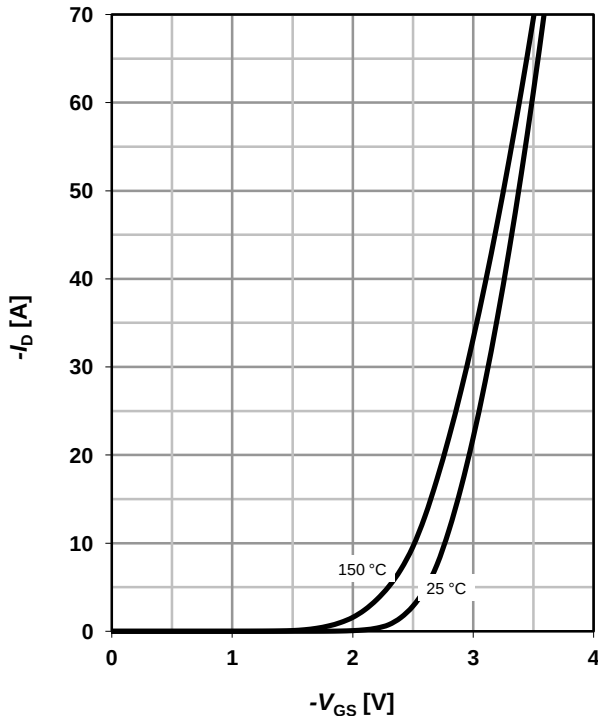
parameter: V_{GS}



7 Typ. transfer characteristics

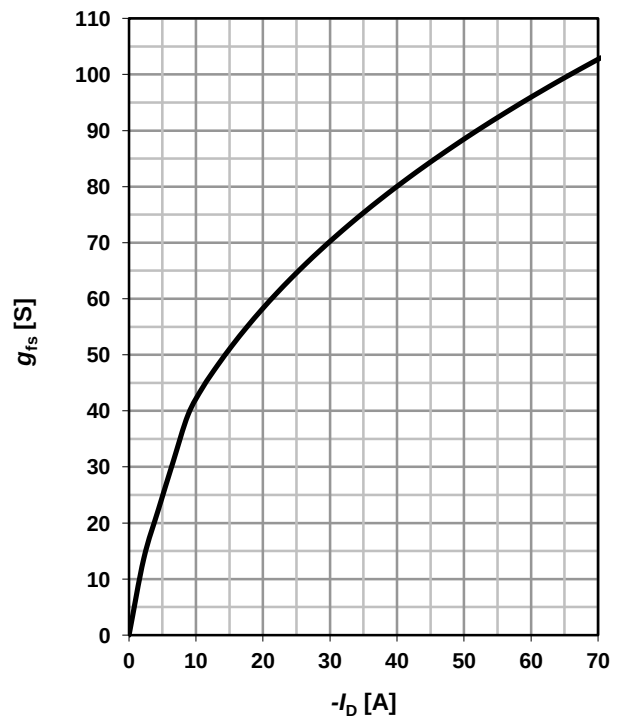
$I_D = f(V_{GS}); |V_{DS}| > 2|I_D|R_{DS(on)max}$

parameter: T_j



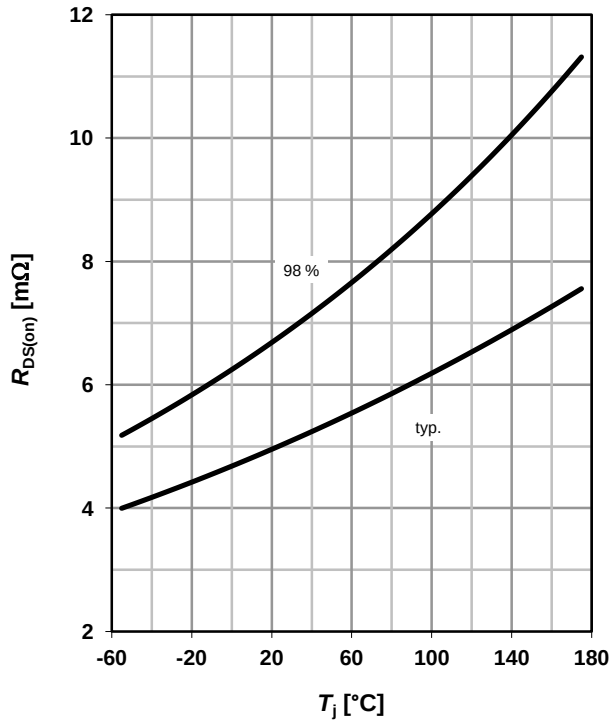
8 Typ. forward transconductance

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



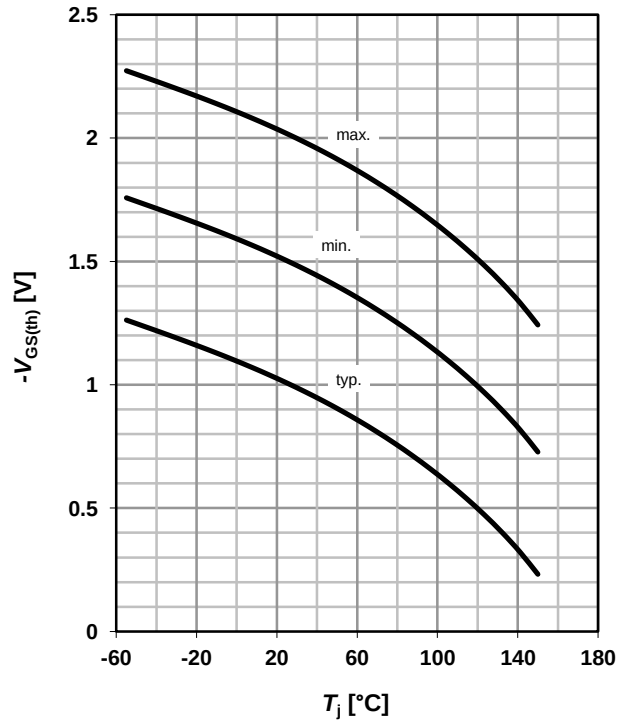
9 Drain-source on-state resistance

$$R_{DS(on)} = f(T_j); I_D = -70 \text{ A}; V_{GS} = -10 \text{ V}$$



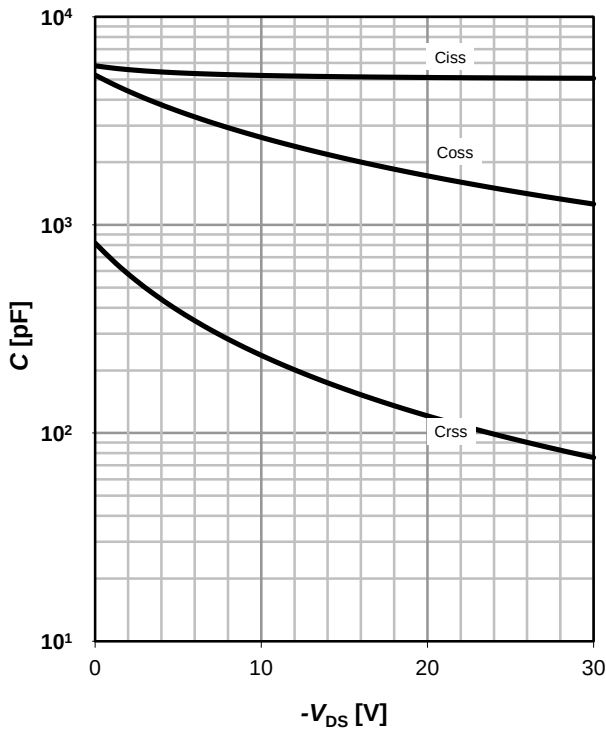
10 Typ. gate threshold voltage

$$V_{GS(th)} = f(T_j); V_{GS} = V_{DS}; I_D = -150 \mu\text{A}$$



11 Typ. capacitances

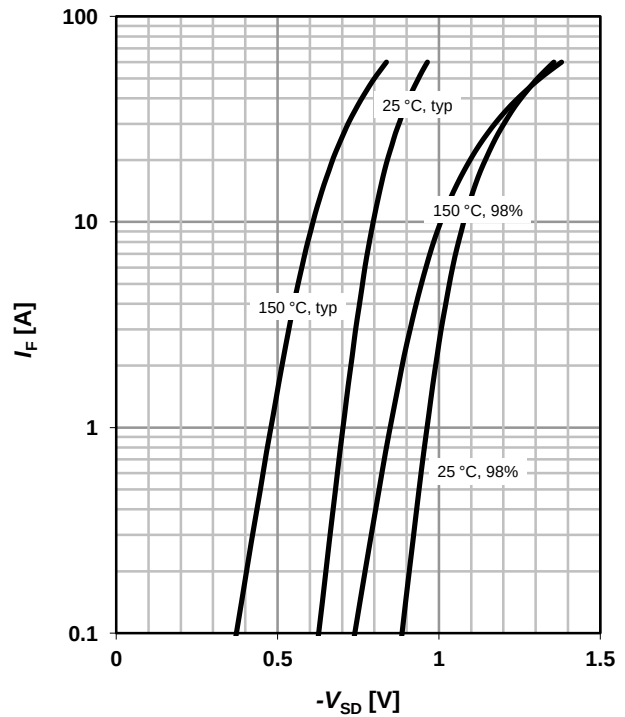
$$C = f(V_{DS}); V_{GS} = 0 \text{ V}; f = 1 \text{ MHz}$$



12 Forward characteristics of reverse diode

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

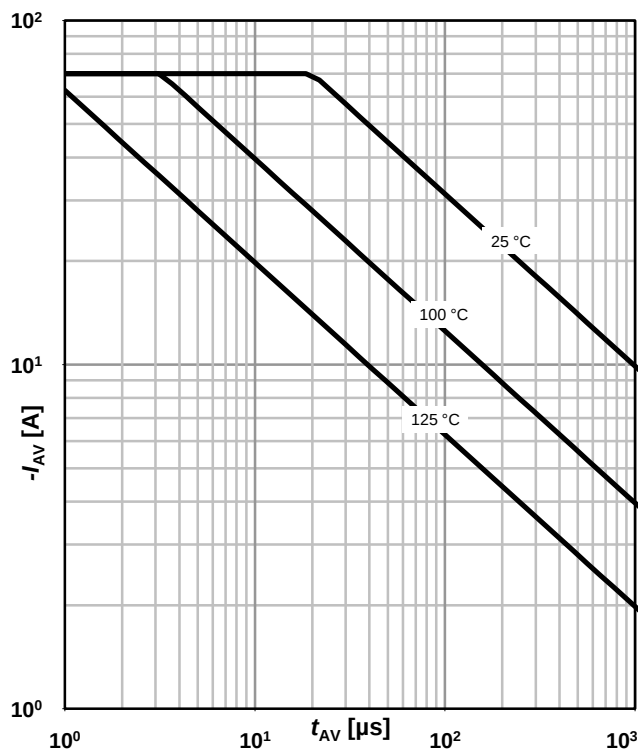
parameter: T_j



13 Avalanche characteristics

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

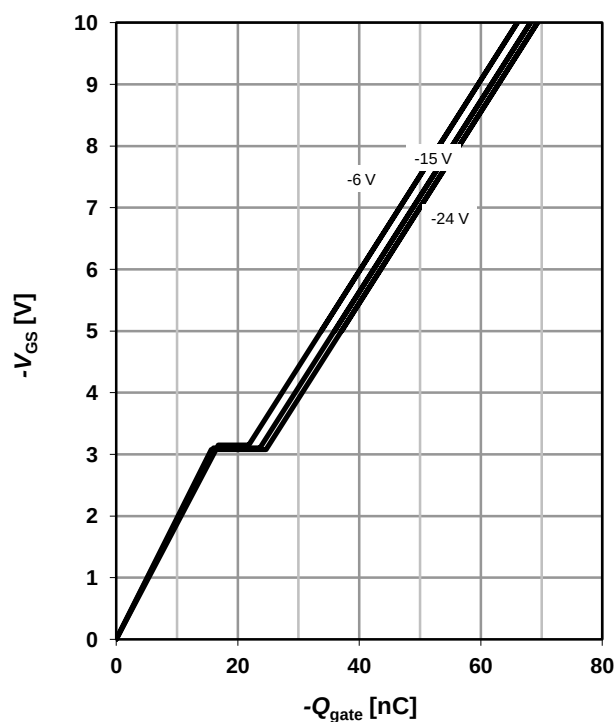
parameter: $T_{j(start)}$



14 Typ. gate charge

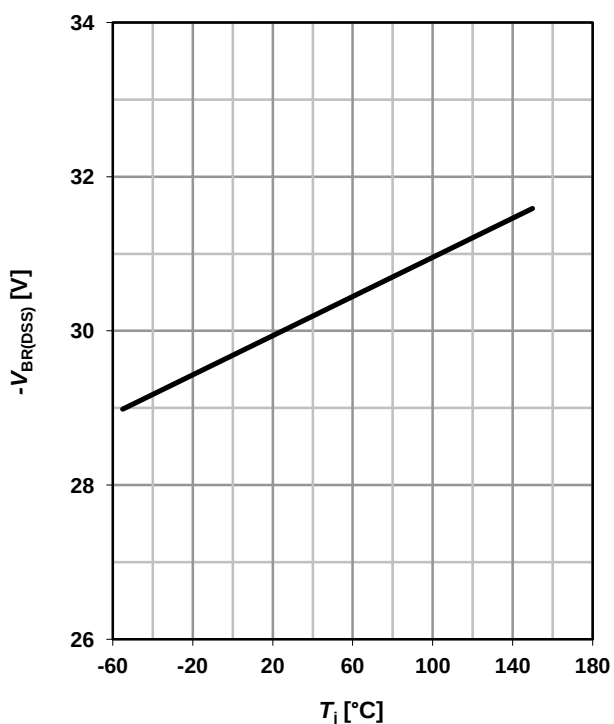
$V_{GS}=f(Q_{gate}); I_D=-70\text{ A pulsed}$

parameter: V_{DD}

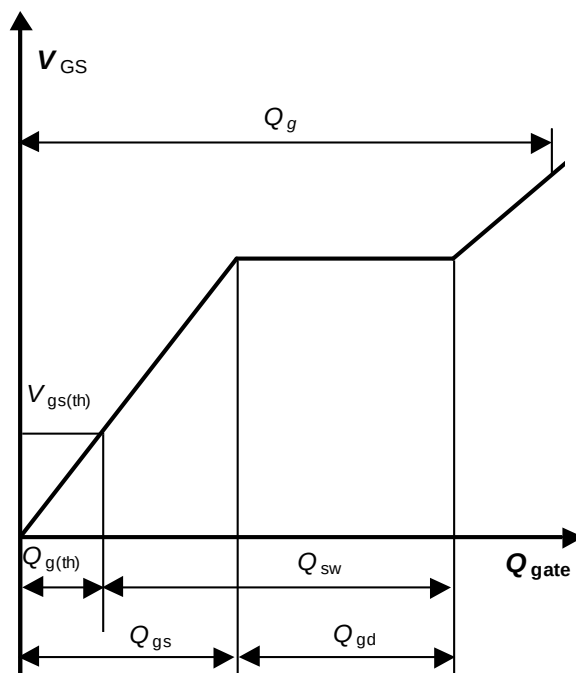


15 Drain-source breakdown voltage

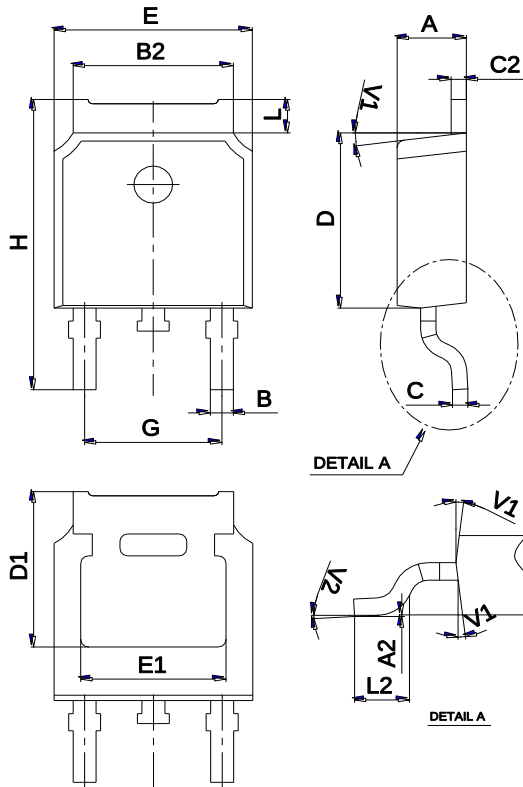
$V_{BR(DSS)}=f(T_j); I_D=-250\ \mu\text{A}$



16 Gate charge waveforms

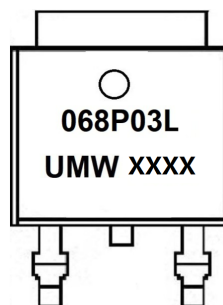


Package Mechanical Data TO-252



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 IPD068P03L3G	TO-252	2500	Tape and reel