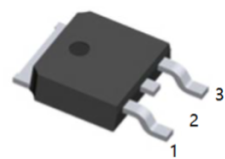
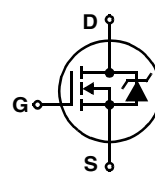


Features

- $V_{DS}(V) = 60V$
- $I_D = 50A$ ($V_{GS} = 10V$)
- $R_{DS(ON)} < 14.4m\Omega$ ($V_{GS} = 10V$)
- 175°C operating temperature



1.G 2.D 3.S
TO-252(DPAK) top view



MOSFET Maximum Ratings at $T_j=25\text{ }^\circ\text{C}$, unless otherwise specified

Parameter	Symbol	Conditions	Value	Unit
Continuous drain current	I_D	$T_C=25\text{ }^\circ\text{C}$, $V_{GS}=10\text{ V}$	50 ¹⁾	A
		$T_C=100\text{ }^\circ\text{C}$, $V_{GS}=10\text{ V}^{2)}$	49	
Pulsed drain current ²⁾	$I_{D,pulse}$	$T_C=25\text{ }^\circ\text{C}$	200	
Avalanche energy, single pulse	E_{AS}	$I_D=50A$	240	mJ
Gate source voltage	V_{GS}		± 20	V
Power dissipation	P_{tot}	$T_C=25\text{ }^\circ\text{C}$	136	W
Operating and storage temperature	T_j, T_{stg}		-55 ... +175	°C
IEC climatic category; DIN IEC 68-1			55/175/56	

Parameter	Symbol	Conditions	Values			Unit
			min.	typ.	max.	
Thermal characteristics						
Thermal resistance, junction - case	R_{thJC}		-	-	1.1	K/W
Thermal resistance, junction - ambient, leaded	R_{thJA}		-	-	100	
SMD version, device on PCB	R_{thJA}	minimal footprint	-	-	75	
		6 cm ² cooling area ³⁾	-	-	50	

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

Drain-source breakdown voltage	$V_{(BR)DSS}$	$V_{GS}=0\text{ V}$, $I_D=1\text{ mA}$	60	-	-	V
Gate threshold voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}$, $I_D=80\text{ }\mu\text{A}$	2.1	3.0	4.0	
Zero gate voltage drain current	I_{DSS}	$V_{DS}=55\text{ V}$, $V_{GS}=0\text{ V}$, $T_j=25\text{ }^\circ\text{C}$	-	0.01	1	μA
		$V_{DS}=55\text{ V}$, $V_{GS}=0\text{ V}$, $T_j=125\text{ }^\circ\text{C}^{2)}$	-	1	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	$R_{DS(on)}$	$V_{GS}=10\text{ V}$, $I_D=32\text{ A}$,	-	10.8	14.4	m Ω

Parameter	Symbol	Conditions	Values			Unit
			min.	typ.	max.	

Dynamic characteristics²⁾

Input capacitance	C_{iss}	$V_{GS}=0\text{ V}, V_{DS}=25\text{ V}, f=1\text{ MHz}$	-	1485	-	pF
Output capacitance	C_{oss}		-	464	-	
Reverse transfer capacitance	C_{rss}		-	167	-	
Turn-on delay time	$t_{d(on)}$	$V_{DD}=30\text{ V}, V_{GS}=10\text{ V}, I_D=50\text{ A}, R_G=7.5\ \Omega$	-	13	-	ns
Rise time	t_r		-	29	-	
Turn-off delay time	$t_{d(off)}$		-	30	-	
Fall time	t_f		-	19	-	

Gate Charge Characteristics²⁾

Gate to source charge	Q_{gs}	$V_{DD}=44\text{ V}, I_D=50\text{ A}, V_{GS}=0\text{ to }10\text{ V}$	-	8	11	nC
Gate to drain charge	Q_{gd}		-	16	24	
Gate charge total	Q_g		-	39	52	
Gate plateau voltage	$V_{plateau}$		-	5.4	-	V

Reverse Diode

Diode continuous forward current ²⁾	I_S	$T_C=25\text{ °C}$	-	-	50	A
Diode pulse current ²⁾	$I_{S,pulse}$		-	-	200	
Diode forward voltage	V_{SD}	$V_{GS}=0\text{ V}, I_F=50\text{ A}, T_J=25\text{ °C}$	-	1	1.3	V
Reverse recovery time ²⁾	t_{rr}	$V_R=30\text{ V}, I_F=I_S, di_F/dt=100\text{ A}/\mu\text{s}$	-	45	-	ns
Reverse recovery charge ²⁾	Q_{rr}	$V_R=30\text{ V}, I_F=I_S, di_F/dt=100\text{ A}/\mu\text{s}$	-	74	-	nC

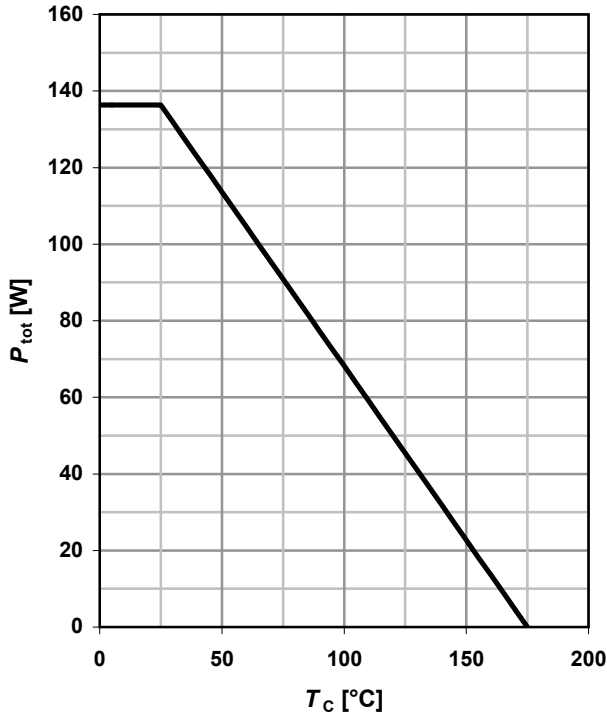
¹⁾ Current is limited by bondwire; with an $R_{thJC}=1.1\text{ K/W}$ the chip is able to carry 69 A.

²⁾ Defined by design. Not subject to production test.

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.

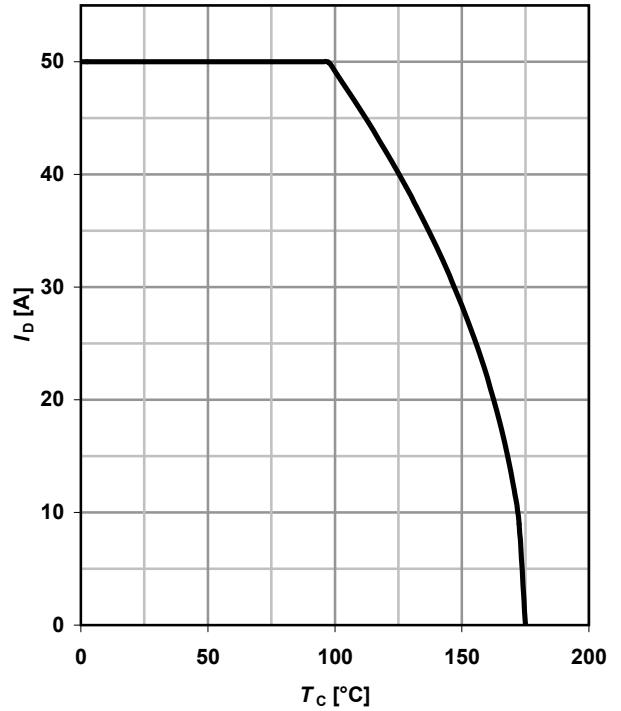
1 Power dissipation

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



2 Drain current

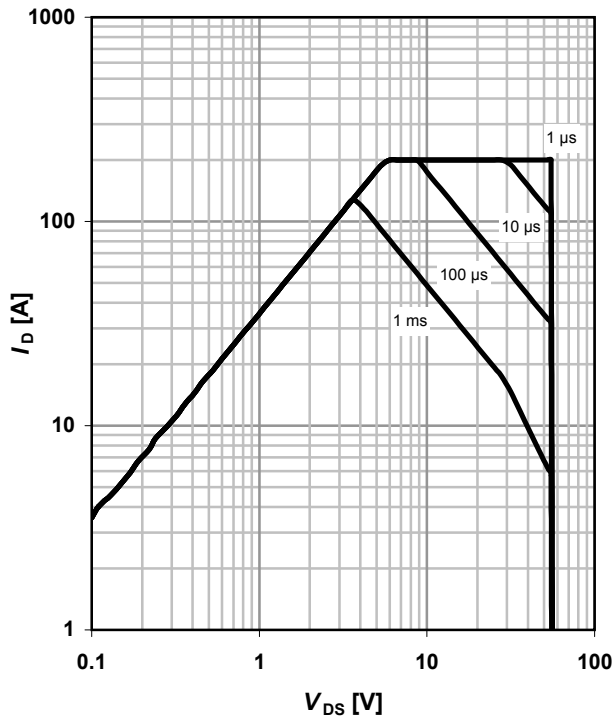
$I_D = f(T_C); V_{GS} \geq 10 V$



3 Safe operating area

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

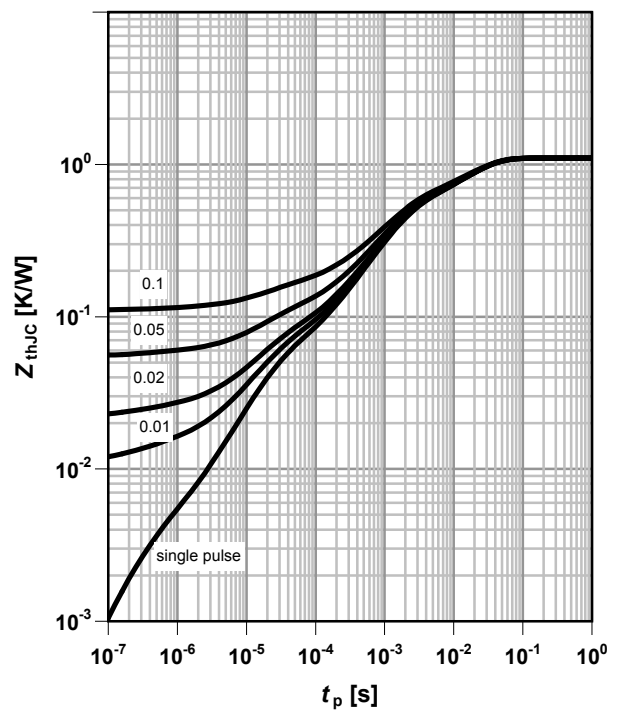
parameter: t_p



4 Max. transient thermal impedance

$Z_{thJC} = f(t_p)$

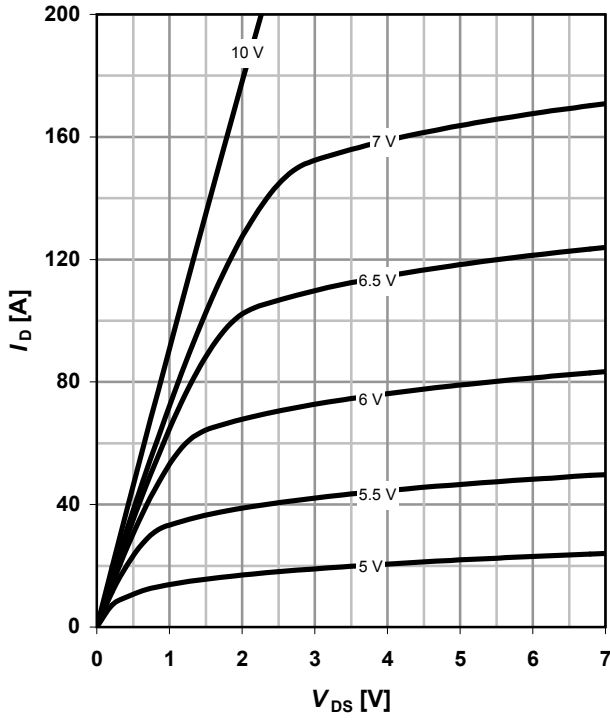
parameter: $D = t_p/T$



5 Typ. output characteristics

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

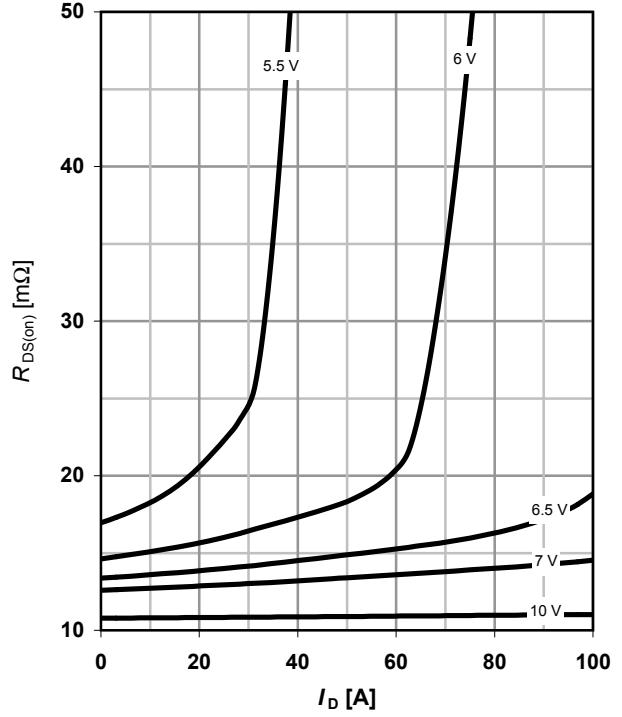
parameter: V_{GS}



6 Typ. drain-source on-state resistance

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

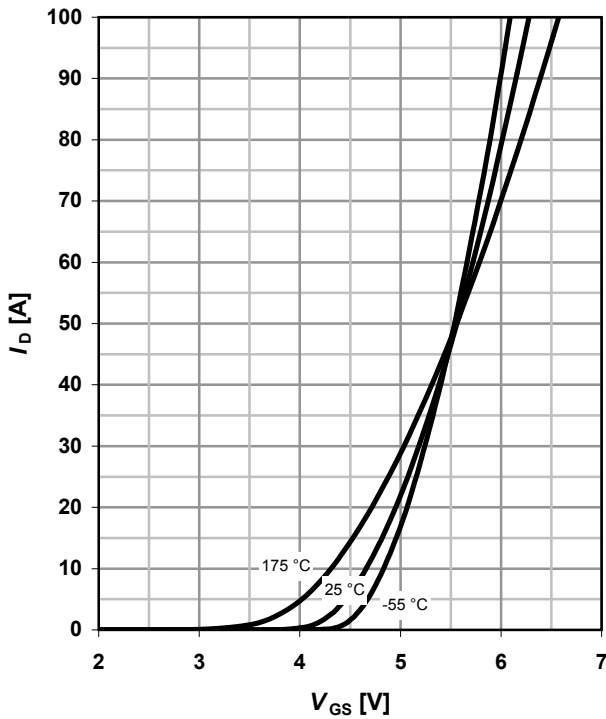
parameter: V_{GS}



7 Typ. transfer characteristics

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

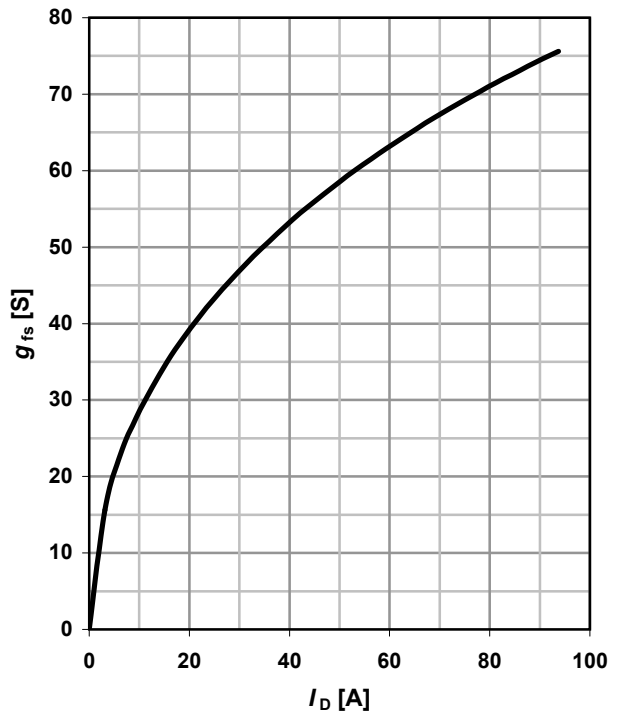
parameter: T_j



8 Typ. Forward transconductance

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

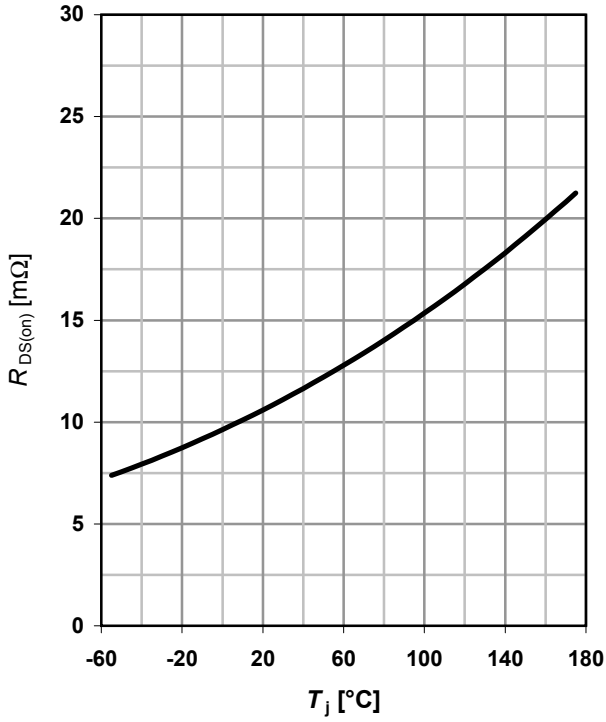
parameter: g_{fs}



9 Typ. Drain-source on-state resistance

$R_{DS(ON)} = f(T_j)$

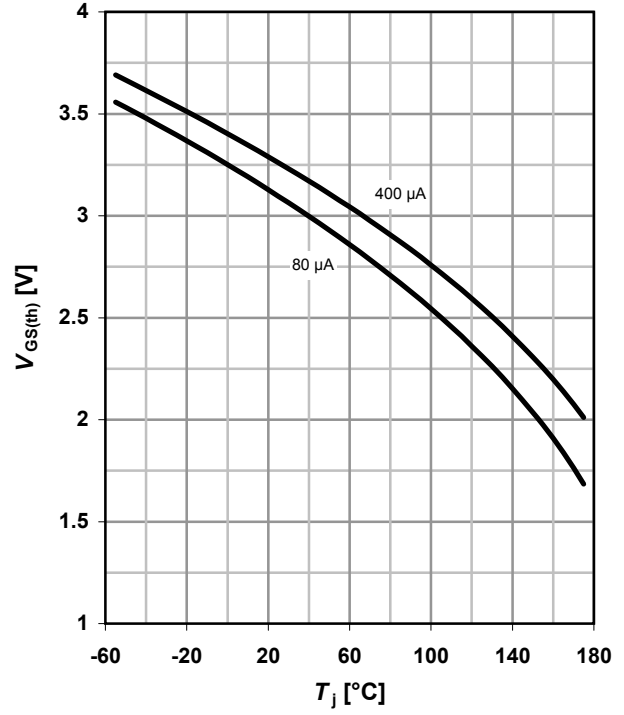
parameter: $I_D = 32 \text{ A}$; $V_{GS} = 10 \text{ V}$



10 Typ. gate threshold voltage

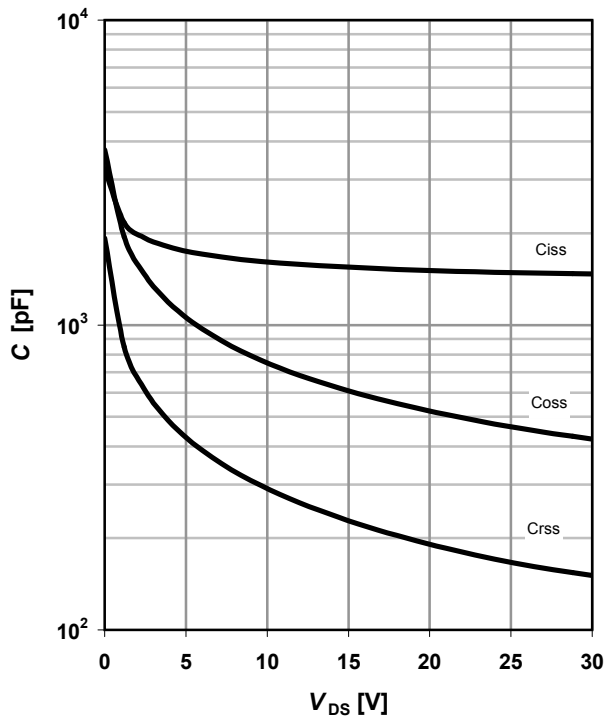
$V_{GS(th)} = f(T_j)$; $V_{GS} = V_{DS}$

parameter: I_D



11 Typ. capacitances

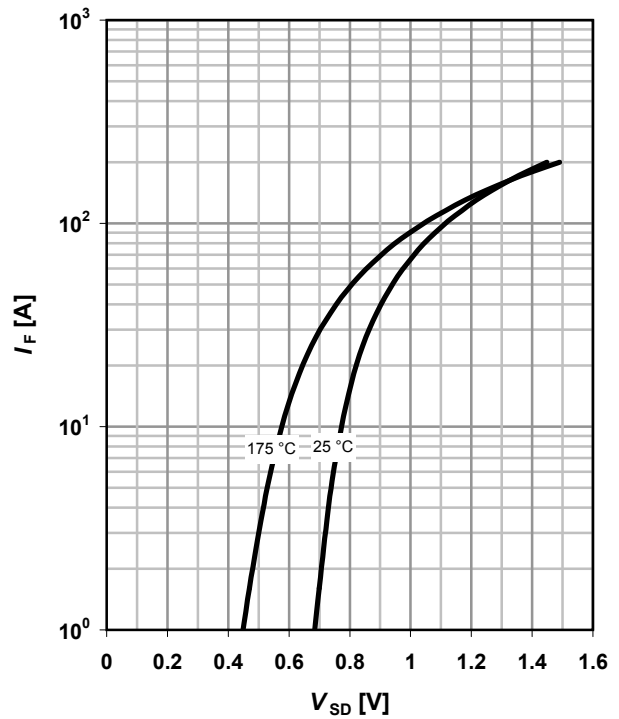
$C = f(V_{DS})$; $V_{GS} = 0 \text{ V}$; $f = 1 \text{ MHz}$



12 Typical forward diode characteristics

$I_F = f(V_{SD})$

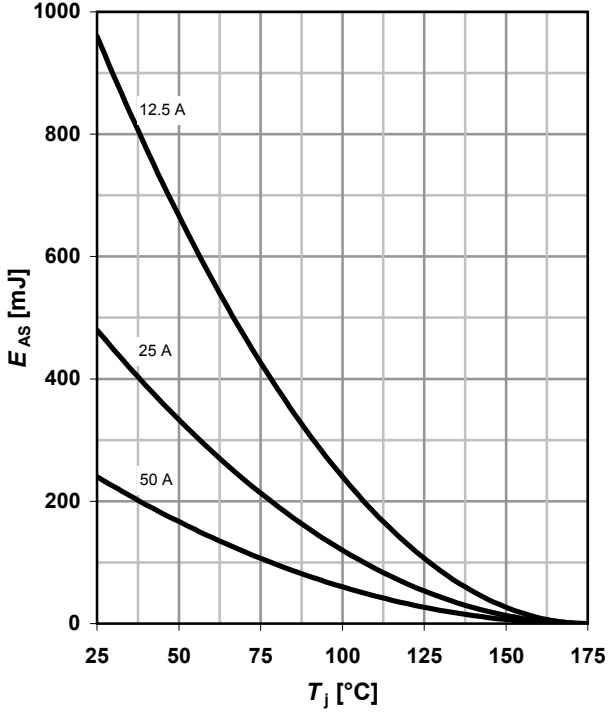
parameter: T_j



13 Typical avalanche energy

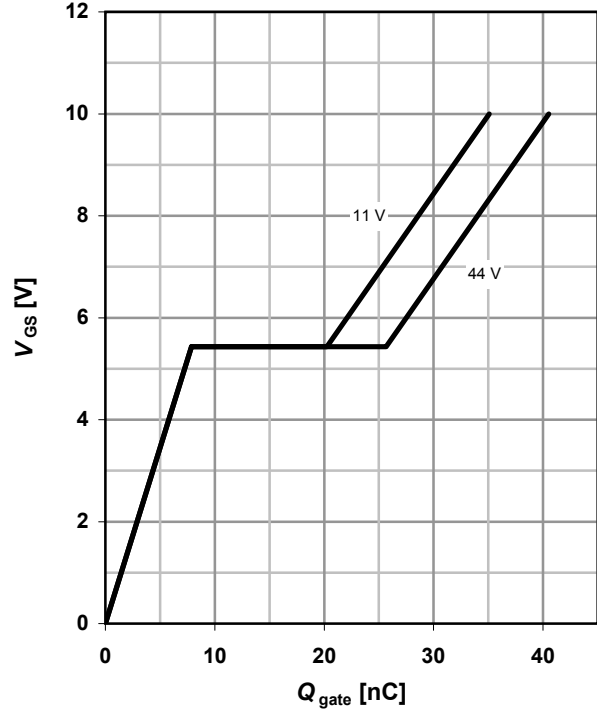
$$E_{AS} = f(T_j)$$

parameter: I_D



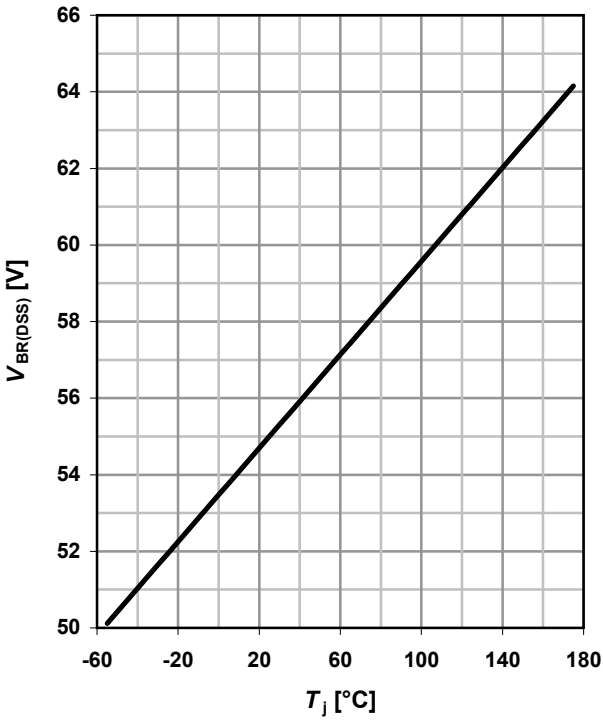
14 Typ. gate charge

$$V_{GS} = f(Q_{gate}); I_D = 50 \text{ A pulsed}$$

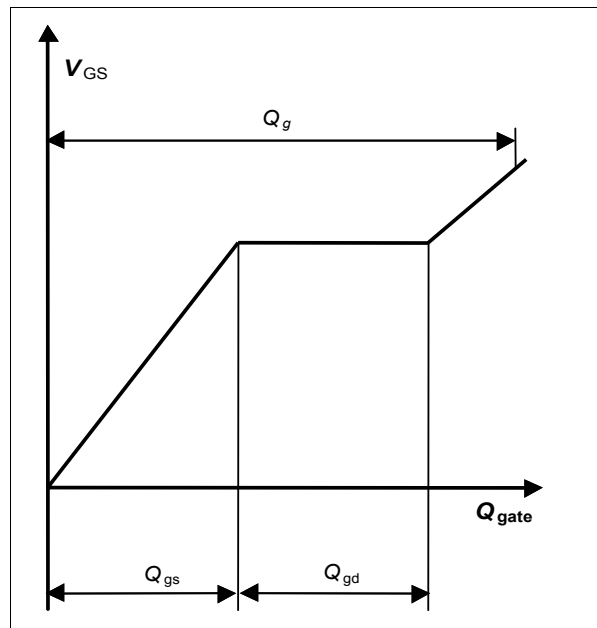


15 Typ. drain-source breakdown voltage

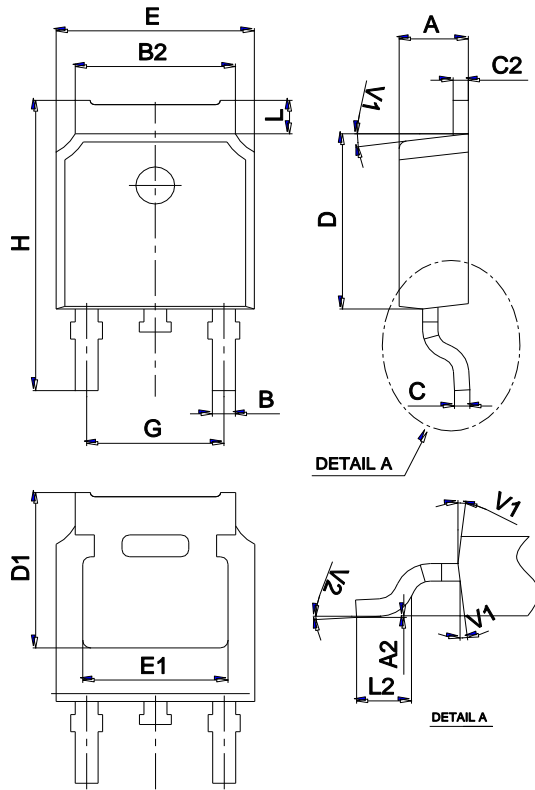
$$V_{BR(DSS)} = f(T_j); I_D = 1 \text{ mA}$$



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 IPD50N06S2-14	TO-252	2500	Tape and reel

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[DMNH15H110SK3-13](#) [SLF10N65ABV2](#) [BSO203SP](#) [BSO211P](#)