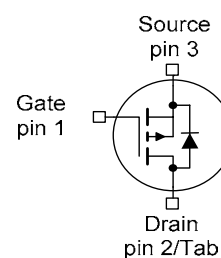
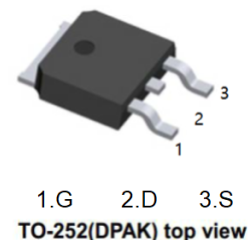


Features

- P-channel - Logic Level - Enhancement mode
- AEC qualified
- 175°C operating temperature
- Green Product (RoHS compliant)
- Intended for reverse battery protection
- $V_{DS}(V) = -30V$
- $I_D = -50A$ ($V_{GS} = 10V$)
- $R_{DS(ON)} < 10.5m\Omega$ ($V_{GS} = -10V$)
- $R_{DS(ON)} < 18m\Omega$ ($V_{GS} = -4.5V$)



Maximum ratings, at $T_j = 25^\circ C$, unless otherwise specified

Parameter	Symbol	Conditions	Value	Unit
Continuous drain current	I_D	$T_C = 25^\circ C$, $V_{GS} = -10V^{(1)}$	-50	A
		$T_C = 100^\circ C$, $V_{GS} = -10V^{(2)}$	-42	
		$T_C = 25^\circ C$	-200	
Pulsed drain current ⁽²⁾	$I_{D,pulse}$	$T_C = 25^\circ C$	-200	
Avalanche energy, single pulse	E_{AS}	$I_D = -25A$	100	mJ
Avalanche current, single pulse	I_{AS}		-50	A
Gate source voltage	V_{GS}		+5/-16	V
Power dissipation	P_{tot}	$T_C = 25^\circ C$	58	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}				2.6	K/W
SMD version, device on PCB	R_{thJA}	minimal footprint			62	
		6 cm ² cooling area ³⁾			40	
Drain-source breakdown voltage	$V_{(BR)DSS}$	$V_{GS}=0V, I_D=-1mA$	-30			V
Gate threshold voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=-85\mu A$	-1.0	-1.5	-2.0	
Zero gate voltage drain current	I_{DSS}	$V_{DS}=-24V, V_{GS}=0V, T_j=25^{\circ}\text{C}$		-0.02	-1	μA
		$V_{DS}=-24V, V_{GS}=0V, T_j=125^{\circ}\text{C}^{2)}$		-7	-70	
Gate-source leakage current	I_{GSS}	$V_{GS}=-16V, V_{DS}=0V$			-100	nA
Drain-source on-state resistance	$R_{DS(on)}$	$V_{GS}=-4.5V, I_D=-25A$		13.0	18.0	m Ω
		$V_{GS}=-10V, I_D=-50A$		8.3	10.5	

Parameter	Symbol	Conditions	Values			Unit
			min.	typ.	max.	
Input capacitance	C_{iss}	$V_{GS}=0V, V_{DS}=-25V,$ $f=1MHz$		2900	3770	pF
Output capacitance	C_{oss}			835	1090	
Reverse transfer capacitance	C_{rss}			21	42	
Turn-on delay time	$t_{d(on)}$	$V_{DD}=-15V,$ $V_{GS}=-10V, I_D=-50A,$ $R_G=3.5\Omega$		7		ns
Rise time	t_r			3		
Turn-off delay time	$t_{d(off)}$			45		
Fall time	t_f			14		
Gate to source charge	Q_{gs}	$V_{DD}=-24V, I_D=-50A,$ $V_{GS}=0 \text{ to } -10V$		11	14	nC
Gate to drain charge	Q_{gd}			5	10	
Gate charge total	Q_g			42	55	
Gate plateau voltage	$V_{plateau}$			-3.6		V
Diode continuous forward current ²⁾	I_S	$T_C=25^\circ C$			-50	A
Diode pulse current ²⁾	$I_{S,pulse}$				-200	
Diode forward voltage	V_{SD}	$V_{GS}=0V, I_F=-50A,$ $T_J=25^\circ C$		-1.0	-1.3	V
Reverse recovery time ²⁾	t_{rr}	$V_R=-15V, I_F=40A,$ $di_F/dt=-100A/\mu s$		35		ns
Reverse recovery charge ²⁾	Q_{rr}			26		nC

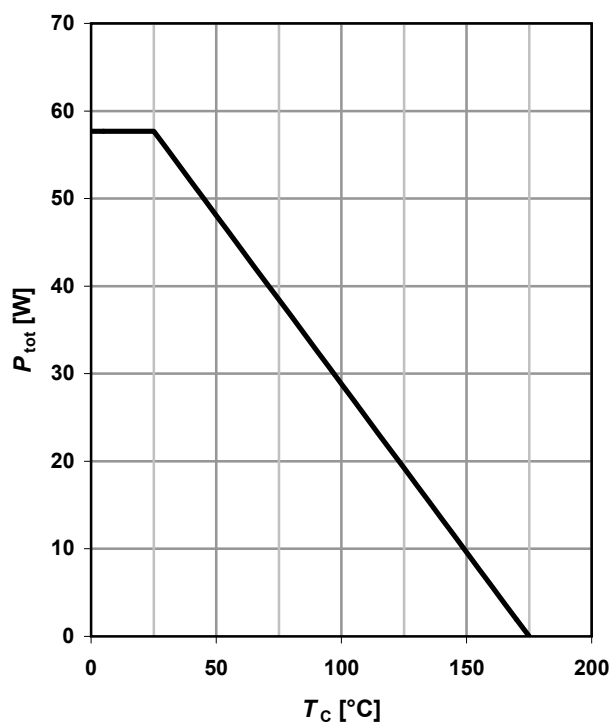
¹⁾ Current is limited by bondwire; with an $R_{thJC} = 2.6K/W$ the chip is able to carry 60A at 25°C.

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

⁵⁾ 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.

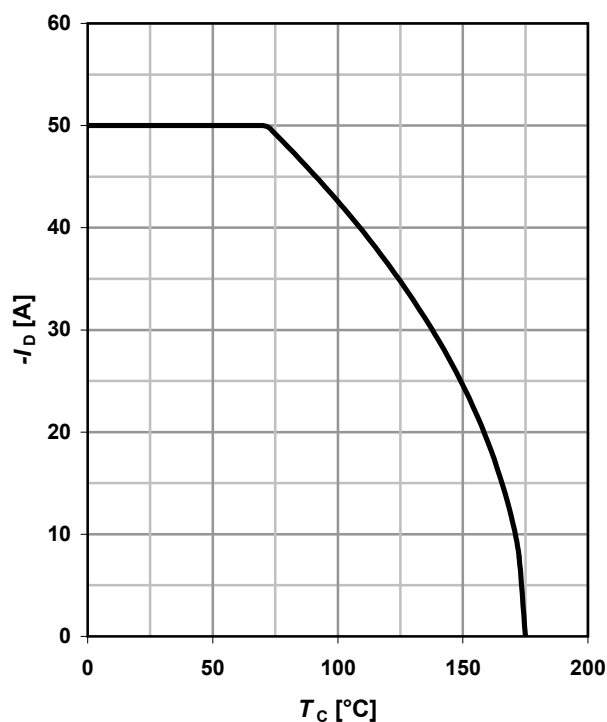
1 Power dissipation

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



2 Drain current

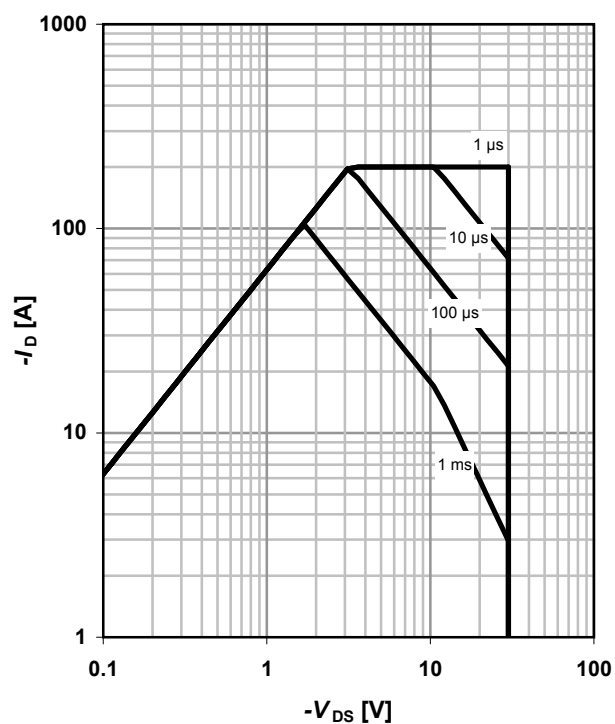
$$I_D = f(T_C); V_{\text{GS}} \leq -6\text{V}$$



3 Safe operating area

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

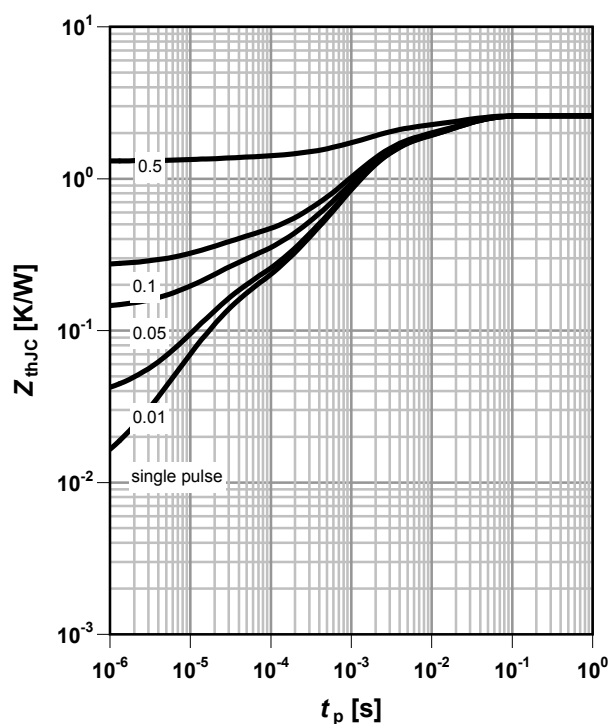
parameter: t_p



4 Max. transient thermal impedance

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

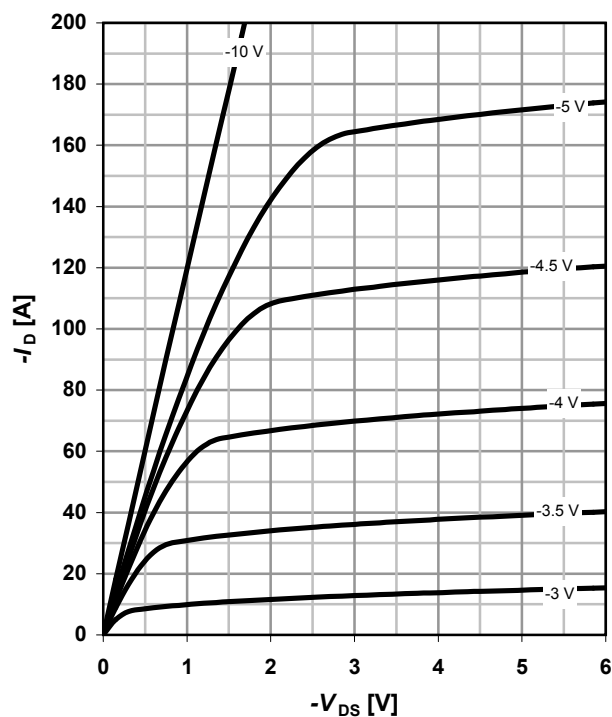
parameter: $D = t_p/T$



5 Typ. output characteristics

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

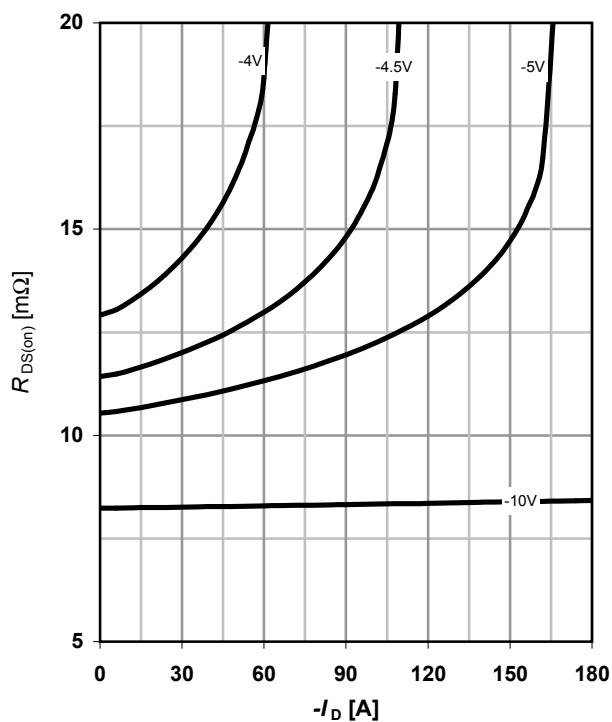
parameter: V_{GS}



6 Typ. drain-source on-state resistance

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

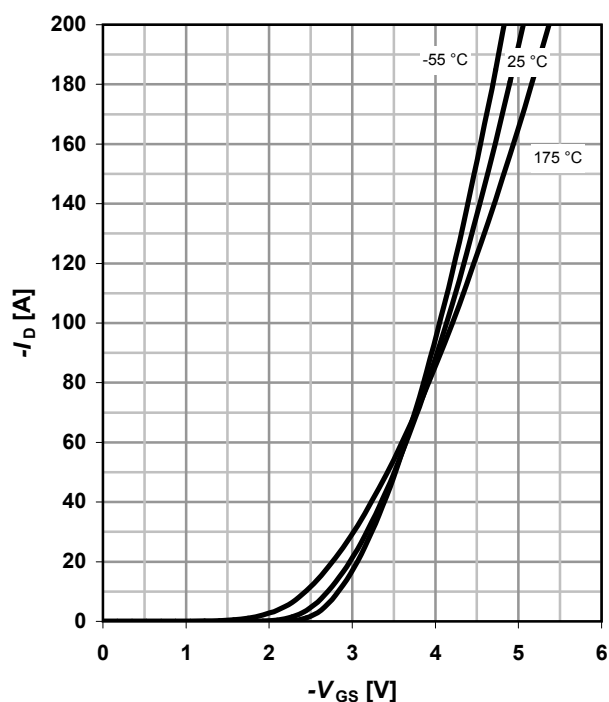
parameter: V_{GS}



7 Typ. transfer characteristics

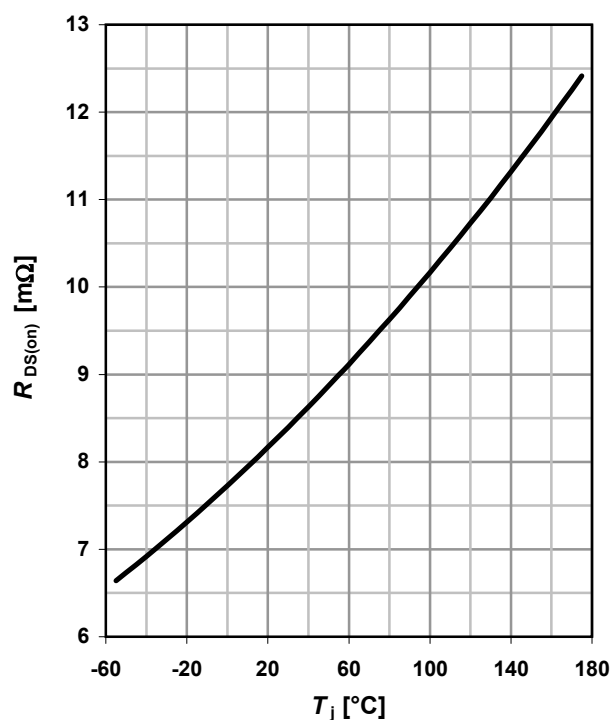
$I_D = f(V_{GS}); V_{DS} = -6V$

parameter: T_j



8 Typ. drain-source on-state resistance

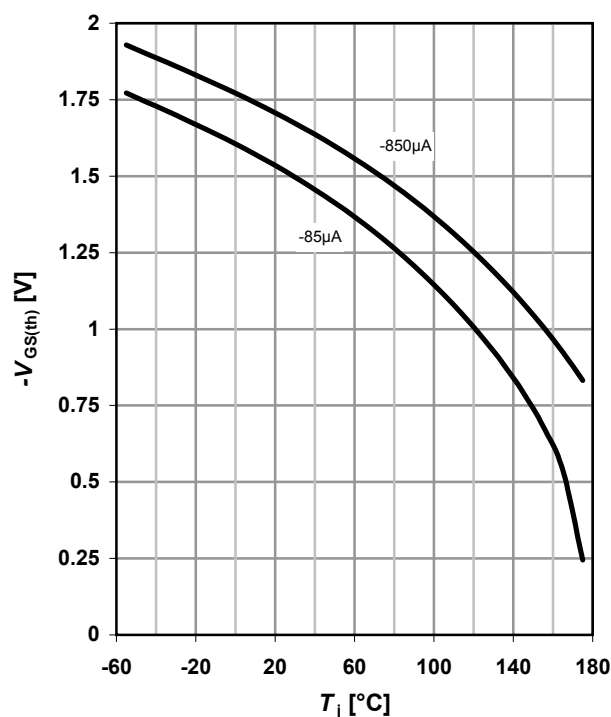
$R_{DS(on)} = f(T_j); I_D = -50A; V_{GS} = -10V$



9 Typ. gate threshold voltage

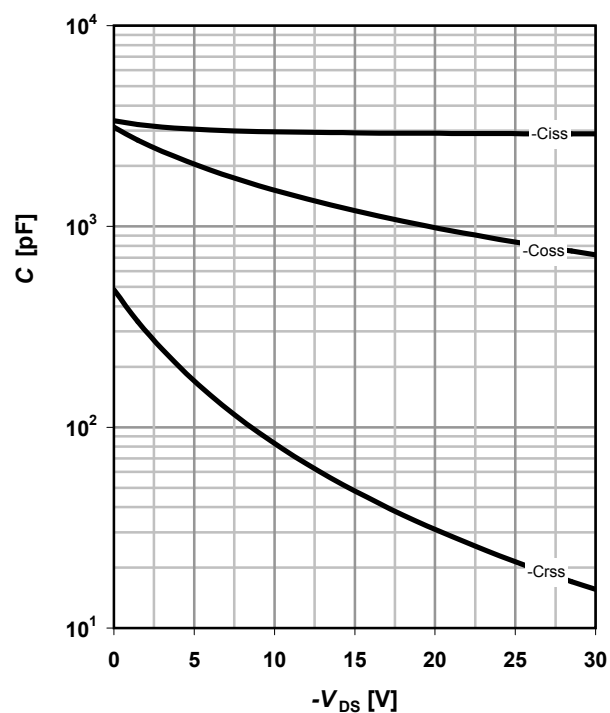
$$V_{GS(th)} = f(T_j); V_{GS} = V_{DS}$$

parameter: I_D



10 Typ. capacitances

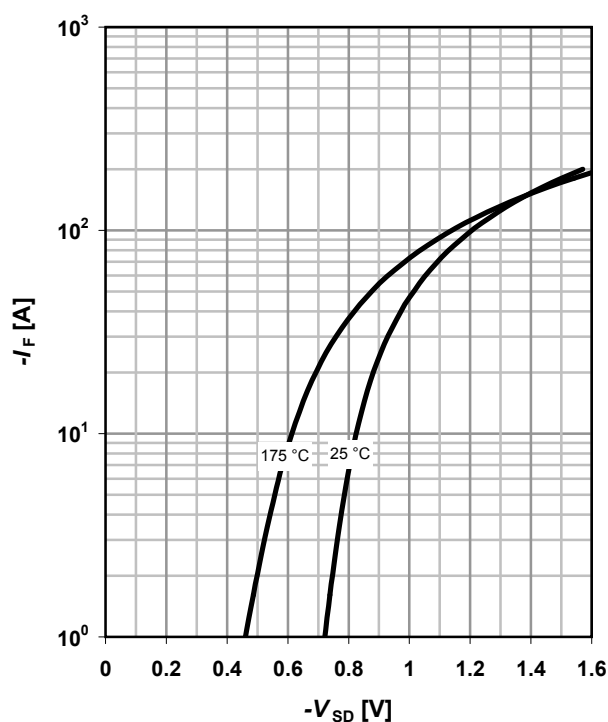
$$C = f(V_{DS}); V_{GS} = 0 V; f = 1 MHz$$



11 Typical forward diode characteristics

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

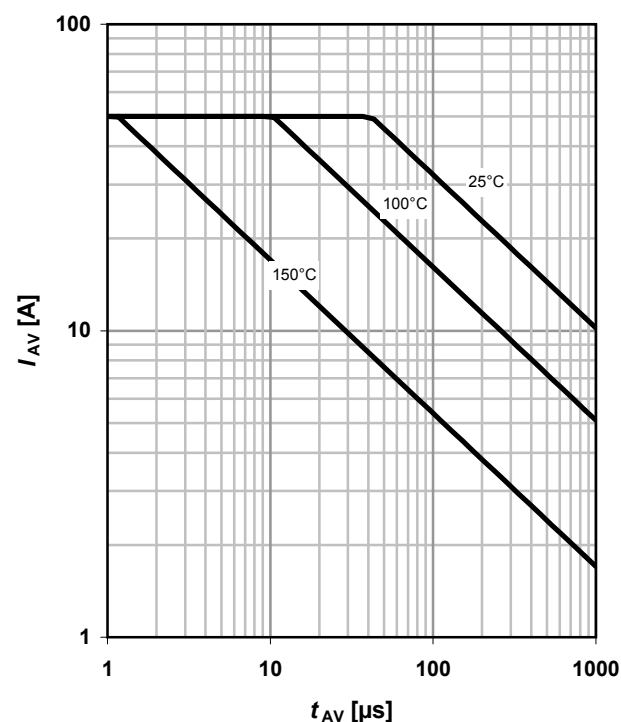
parameter: T_j



12 Avalanche characteristics

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

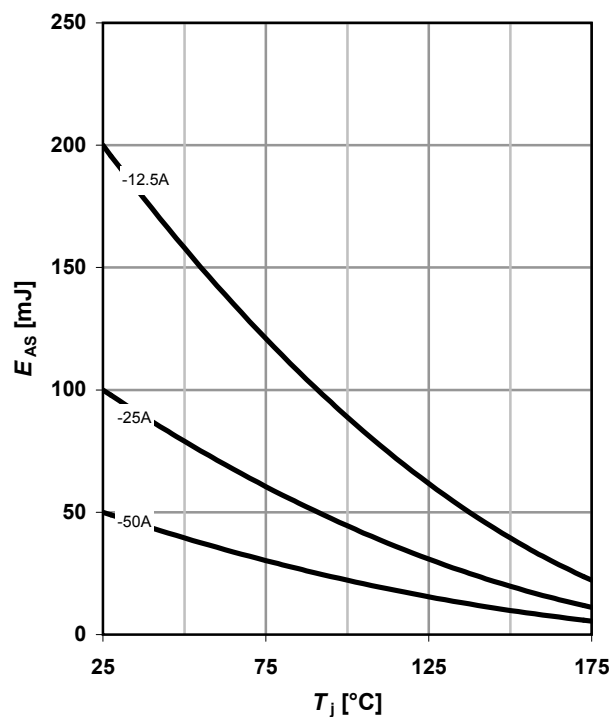
parameter: $T_{j(start)}$



13 Avalanche energy

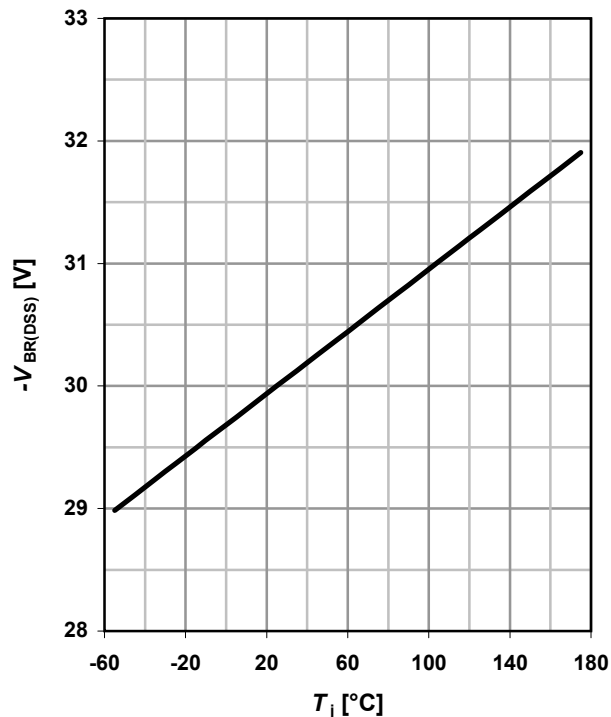
$$E_{AS} = f(T_j)$$

parameter: I_D



14 Drain-source breakdown voltage

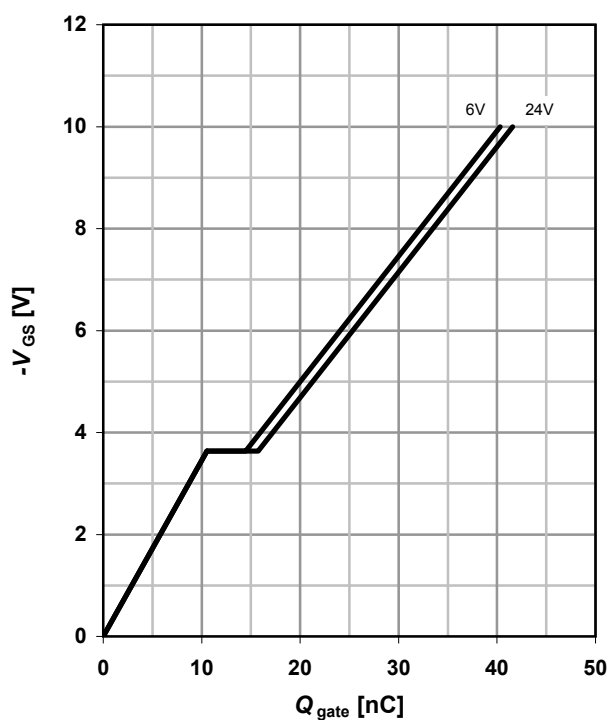
$$V_{BR(DSS)} = f(T_j); I_D = -1mA$$



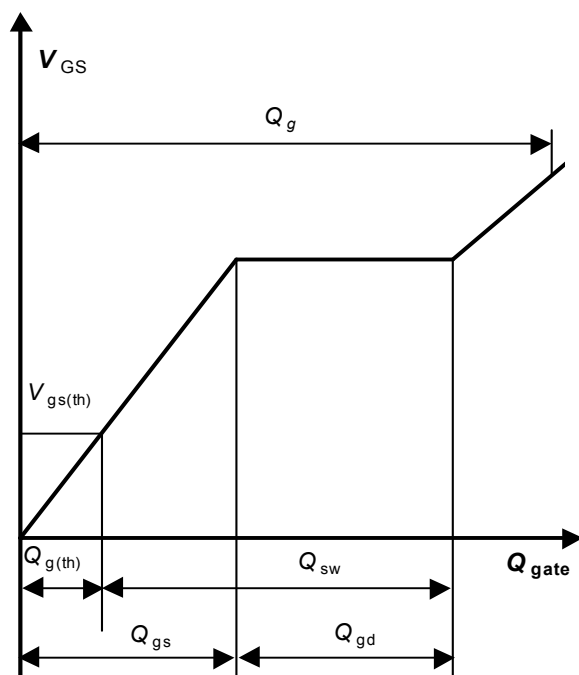
15 Typ. gate charge

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

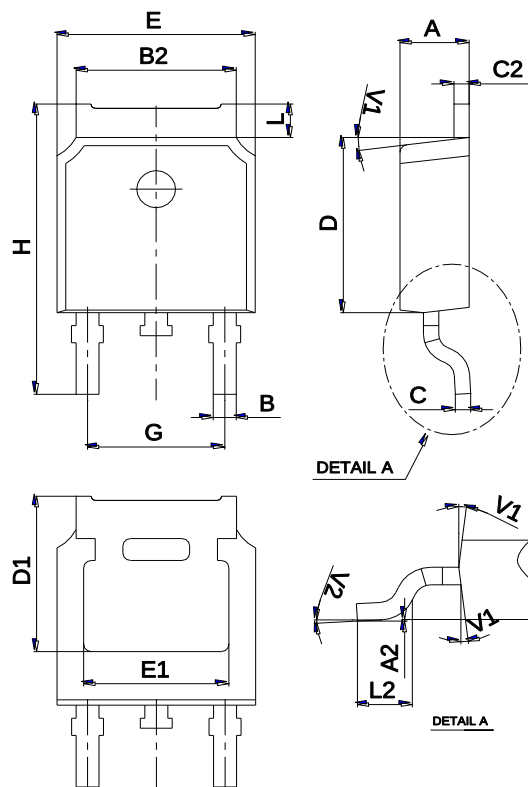
parameter: V_{DD}



16 Gate charge waveforms

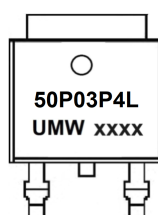


Package Mechanical Data TO-252



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 IPD50P03P4L-11	TO-252	2500	Tape and reel