

Description

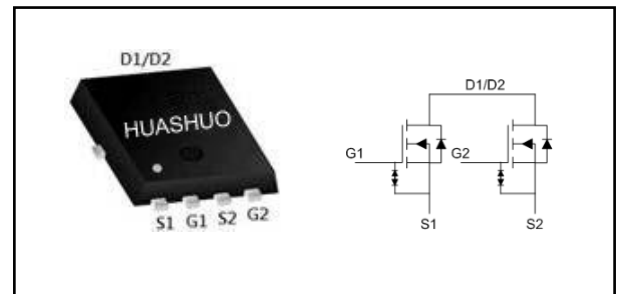
The HSBE2738 is the low RDSON trench N-CH MOSFETs with robust ESD protection. This product is suitable for Lithium-ion battery pack applications.

The HSBE2738 meet the RoHS and Green Product requirement with full function reliability approved.

- Low drain-source ON resistance
- Green Device Available
- ESD Protected Embedded

Product Summary

V_{DS}	20	V
$R_{DS(ON),max}$	9.5	m Ω
I_D	12	A

PRPAK3X3 NEP Pin Configuration

Absolute Maximum Ratings

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	20	V
V_{GS}	Gate-Source Voltage	± 12	V
$I_D@T_A=25^\circ C$	Continuous Drain Current ₁	12	A
$I_D@T_A=70^\circ C$	Continuous Drain Current ₁	9.6	A
I_{DM}	Pulsed Drain Current ₂	72	A
$P_D@T_A=25^\circ C$	Total Power Dissipation ₃	1.47	W
T_{STG}	Storage Temperature Range	-55 to 150	$^\circ C$
T_J	Operating Junction Temperature Range	-55 to 150	$^\circ C$

Thermal Data

Symbol	Parameter	Max.	Unit
$R_{\theta JA}$	Thermal Resistance Junction-Ambient ₁	95	$^\circ C/W$



N-Ch 20V Fast Switching MOSFETs

Electrical Characteristics (T_J=25 °C, unless otherwise noted)

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
B _V DSS	Drain-Source Breakdown Voltage	V _{GS} =0V, I _D =250uA	20	---	---	V
ΔB _V DSS/ΔT _J	B _V DSS Temperature Coefficient	Reference to 25°C, I _D =1mA	---	0.014	---	V/°C
R _{DS(ON)}	Static Drain-Source On-Resistance ²	V _{GS} =4.5V, I _D =3A	---	8	9.5	mΩ
		V _{GS} =4.0V, I _D =3A	---	8.5	9.8	mΩ
		V _{GS} =3.1V, I _D =3A	---	10.5	12.5	mΩ
		V _{GS} =2.5V, I _D =3A	---	12	15	mΩ
V _{GS(th)}	Gate Threshold Voltage	V _{GS} =V _{DS} , I _D =250uA	0.5	---	1.5	V
ΔV _{GS(th)}	V _{GS(th)} Temperature Coefficient		---	-2.09	---	mV/°C
I _{DSS}	Drain-Source Leakage Current	V _{DS} =16V, V _{GS} =0V, T _J =25°C	---	---	1	uA
I _{GSS}	Gate-Source Leakage Current	V _{GS} =±8V, V _{DS} =0V	---	---	±5	uA
R _g	Gate Resistance	V _{DS} =0V, V _{GS} =0V, f=1MHz	---	1.83	---	Ω
Q _g	Total Gate Charge (4.5V)	V _{DS} =15V, V _{GS} =4.5V, I _D =10A	---	13	---	nC
Q _{gs}	Gate-Source Charge		---	2.3	---	
Q _{gd}	Gate-Drain Charge		---	7.2	---	
T _{d(on)}	Turn-On Delay Time	V _{DD} =15V, V _{GS} =4.5V, R _G =6Ω, I _D =6A	---	22	---	ns
T _r	Rise Time		---	85	---	
T _{d(off)}	Turn-Off Delay Time		---	125	---	
T _f	Fall Time		---	46	---	
C _{iss}	Input Capacitance	V _{DS} =10V, V _{GS} =0V, F=1MHz	---	735	---	pF
C _{oss}	Output Capacitance		---	256	---	
C _{rss}	Reverse Transfer Capacitance		---	230	---	

Diode Characteristics

Symbol	Parameter	Conditions	Max.	Unit
I _S	Continuous Source Current ^{1,6}	V _G =V _D =0V, Force Current	12	A
V _{SD}	Diode Forward Voltage ²	V _{GS} =0V, I _S =1A, T _J =25°C	1.2	V

Note :

- 1.The data tested by surface mounted on a 1 inch² FR-4 board with 2OZ copper.
- 2.The data tested by pulsed , pulse width ≤ 300us , duty cycle ≤ 2%
- 3.The power dissipation is limited by 150°C junction temperature.
- 4.The data is theoretically the same as I_D and I_{DM} , in real applications , should be limited by total power dissipation.



N-Ch 20V Fast Switching MOSFETs

Typical Characteristics

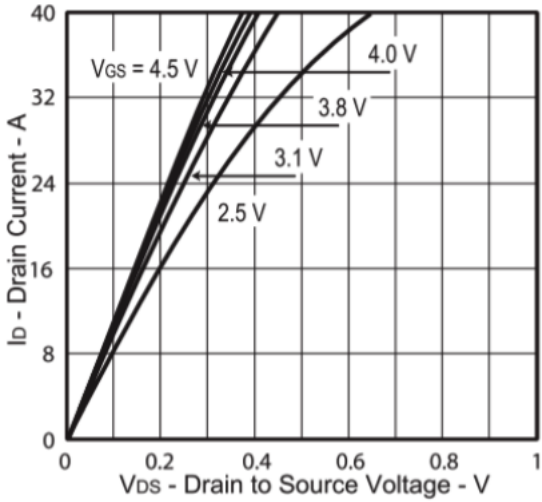


Fig.1 Typical Output Characteristics

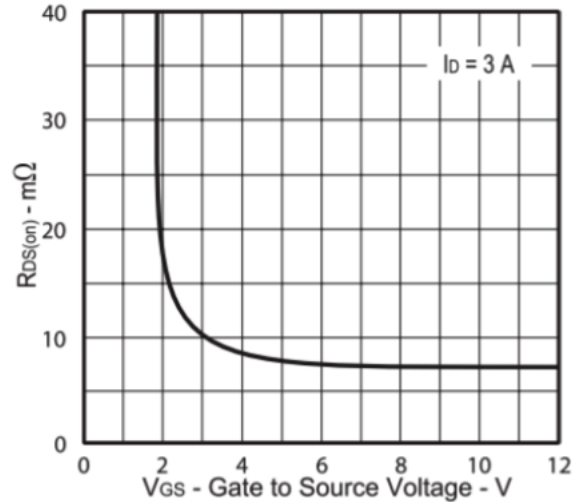


Fig.2 On-Resistance vs. Gate-Source Voltage

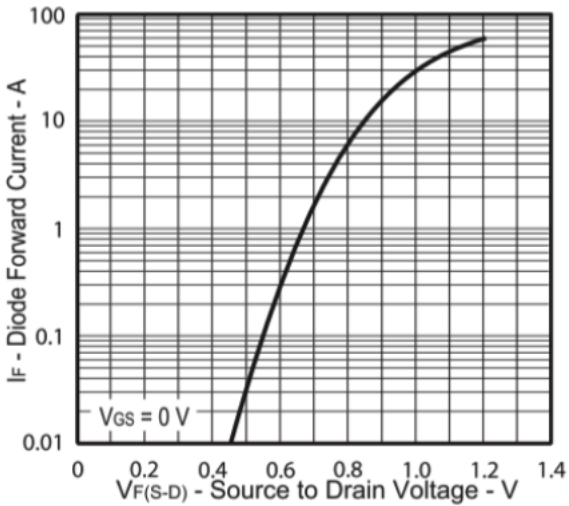


Fig.3 Forward Characteristics of Reverse

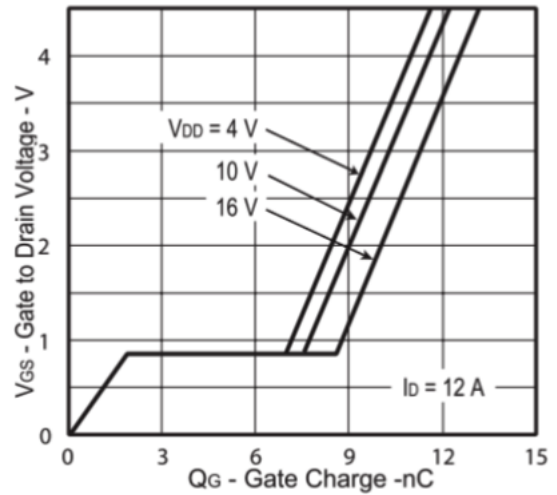


Fig.4 Gate-Charge Characteristics

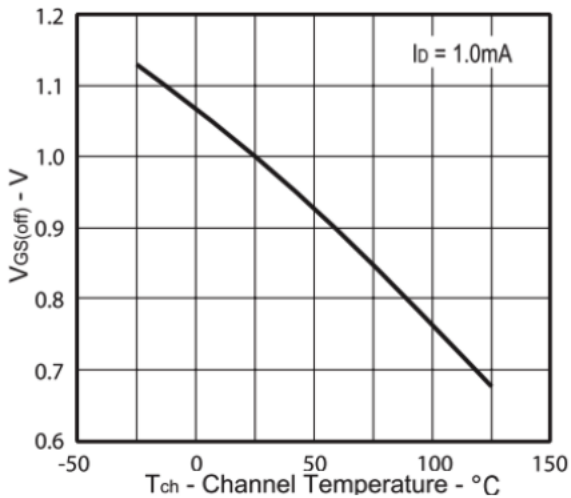


Fig.5 $V_{GS(th)}$ vs. T_{Ch}

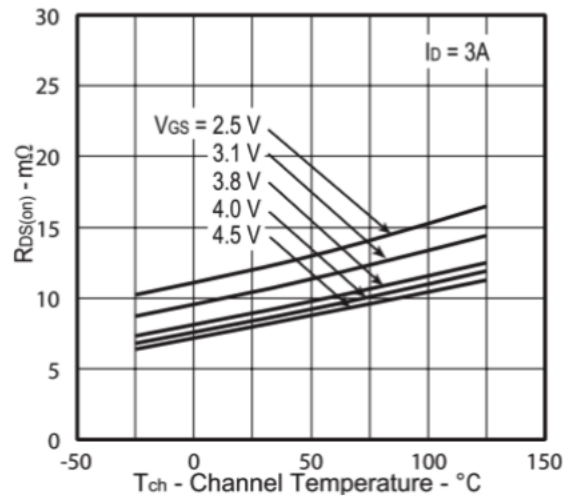


Fig.6 Normalized $R_{DS(on)}$ vs. T_{Ch}



N-Ch 20V Fast Switching MOSFETs

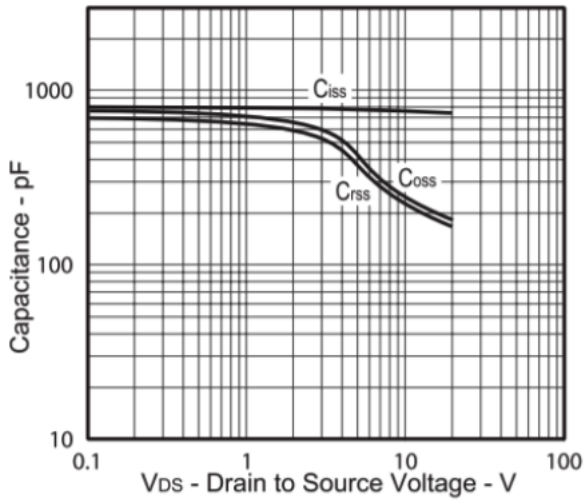


Fig.7 Capacitance

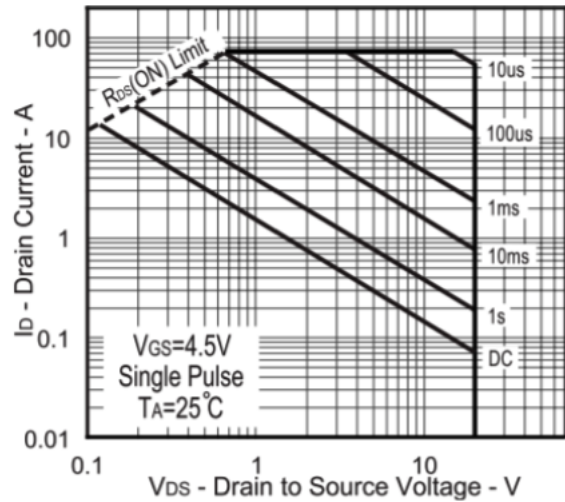


Fig.8 Safe Operating Area

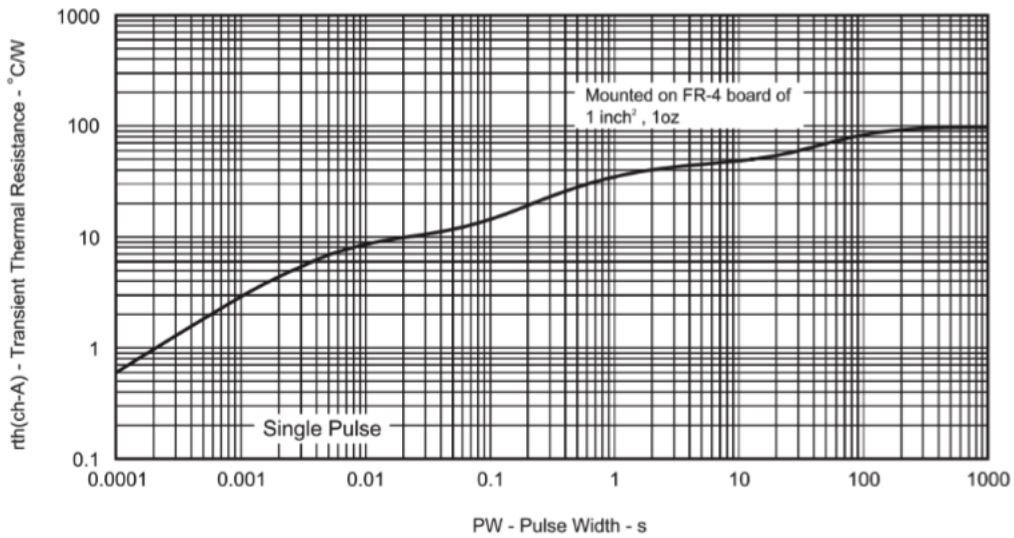


Fig.9 Normalized Maximum Transient Thermal Impedance

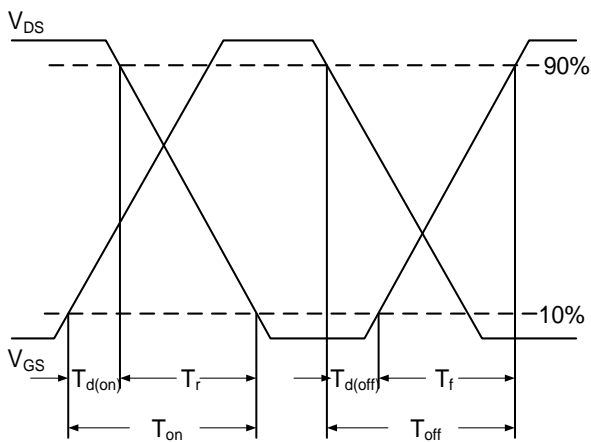


Fig.10 Switching Time Waveform

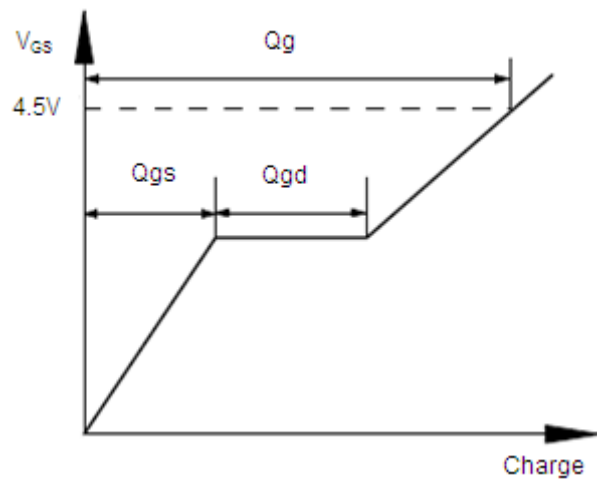
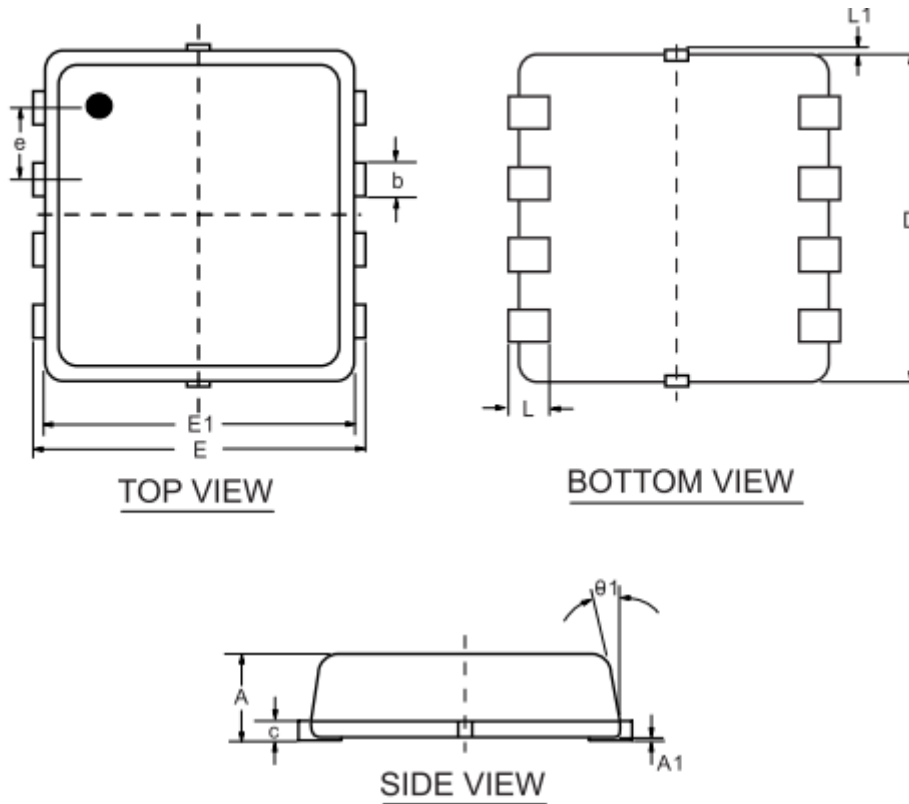


Fig.11 Gate Charge Waveform



PRPAK3X3 NEP Package Outline Dimensions



SYMBOLS	MILLIMETERS		
	MIN	NOM	MAX
A	0.700	0.800	0.900
A1	0.000	—	0.050
b	0.240	0.300	0.350
c	0.080	0.152	0.250
D	2.800	2.900	3.000
E	2.700	2.800	2.900
E1	2.200	2.300	2.400
e	0.650 BSC		
L	0.200	0.375	0.450
L1	0.000	—	0.100
$\theta 1$	0°	10°	12°

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