

## N-Ch 100V Fast Switching MOSFETs

### General Description

- 100% EAS Guaranteed
- Green Device Available
- Super Low  $R_{DS(ON)}$
- Advanced high cell density Trench technology

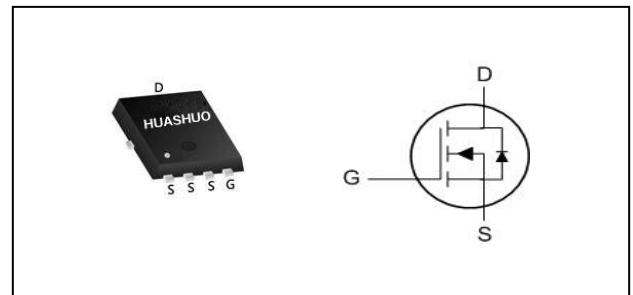
### Applications

- MOTOR Driver.
- BMS.
- High frequency switching and synchronous rectification.

### Product Summary

$V_{DS}$	100	V
$R_{DS(ON),typ}$	4.5	m $\Omega$
$I_D$	120	A

### PRPAK5\*6 Pin Configuration



### Absolute Maximum Ratings

Symbol	Parameter	Rating	Units
$V_{DS}$	Drain-Source Voltage	100	V
$V_{GS}$	Gate-Source Voltage	$\pm 20$	V
$I_D@T_C=25^\circ\text{C}$	Continuous Drain Current, $V_{GS} @ 10V^{1,6}$	120	A
$I_D@T_C=100^\circ\text{C}$	Continuous Drain Current, $V_{GS} @ 10V^{1,6}$	80	A
$I_{DM}$	Pulsed Drain Current <sup>2</sup>	480	A
EAS	Single Pulse Avalanche Energy <sup>3</sup>	525	mJ
$P_D@T_C=25^\circ\text{C}$	Total Power Dissipation <sup>4</sup>	170	W
$T_{STG}$	Storage Temperature Range	-55 to 150	$^\circ\text{C}$
$T_J$	Operating Junction Temperature Range	-55 to 150	$^\circ\text{C}$

### Thermal Data

Symbol	Parameter	Typ.	Max.	Unit
$R_{\theta JA}$	Thermal Resistance Junction-Ambient <sup>1</sup>	---	62	$^\circ\text{C/W}$
$R_{\theta JC}$	Thermal Resistance Junction-Case <sup>1</sup>	---	0.72	$^\circ\text{C/W}$

**N-Ch 100V Fast Switching MOSFETs**
**Electrical Characteristics ( $T_J=25\text{ }^\circ\text{C}$ , unless otherwise noted)**

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
$BV_{DSS}$	Drain-Source Breakdown Voltage	$V_{GS}=0V, I_D=250\mu A$	100	---	---	V
$R_{DS(ON)}$	Static Drain-Source On-Resistance <sup>2</sup>	$V_{GS}=10V, I_D=20A$	---	4.5	6.0	m $\Omega$
$V_{GS(th)}$	Gate Threshold Voltage	$V_{GS}=V_{DS}, I_D=250\mu A$	2.0	---	4.0	V
$I_{DSS}$	Drain-Source Leakage Current	$V_{DS}=100V, V_{GS}=0V, T_J=25^\circ\text{C}$	---	---	1	$\mu A$
		$V_{DS}=100V, V_{GS}=0V, T_J=125^\circ\text{C}$	---	---	10	
$I_{GSS}$	Gate-Source Leakage Current	$V_{GS}=\pm 20V, V_{DS}=0V$	---	---	$\pm 100$	nA
$g_{fs}$	Forward Transconductance	$V_{DS}=10V, I_D=20A$	---	26.5	---	S
$R_g$	Gate Resistance	$V_{DS}=0V, V_{GS}=0V, f=1\text{MHz}$	---	1.7	---	$\Omega$
$Q_g$	Total Gate Charge (10V)	$V_{DS}=50V, V_{GS}=10V, I_D=20A$	---	46	---	nC
$Q_{gs}$	Gate-Source Charge		---	13	---	
$Q_{gd}$	Gate-Drain Charge		---	9.5	---	
$T_{d(on)}$	Turn-On Delay Time	$V_{DD}=50V, V_{GS}=10V, R_G=3.0\Omega, I_D=20A$	---	25	---	ns
$T_r$	Rise Time		---	6.8	---	
$T_{d(off)}$	Turn-Off Delay Time		---	35	---	
$T_f$	Fall Time		---	7.5	---	
$C_{iss}$	Input Capacitance	$V_{DS}=50V, V_{GS}=0V, f=1\text{MHz}$	---	2925	---	pF
$C_{oss}$	Output Capacitance		---	1509	---	
$C_{rss}$	Reverse Transfer Capacitance		---	74	---	

**Diode Characteristics**

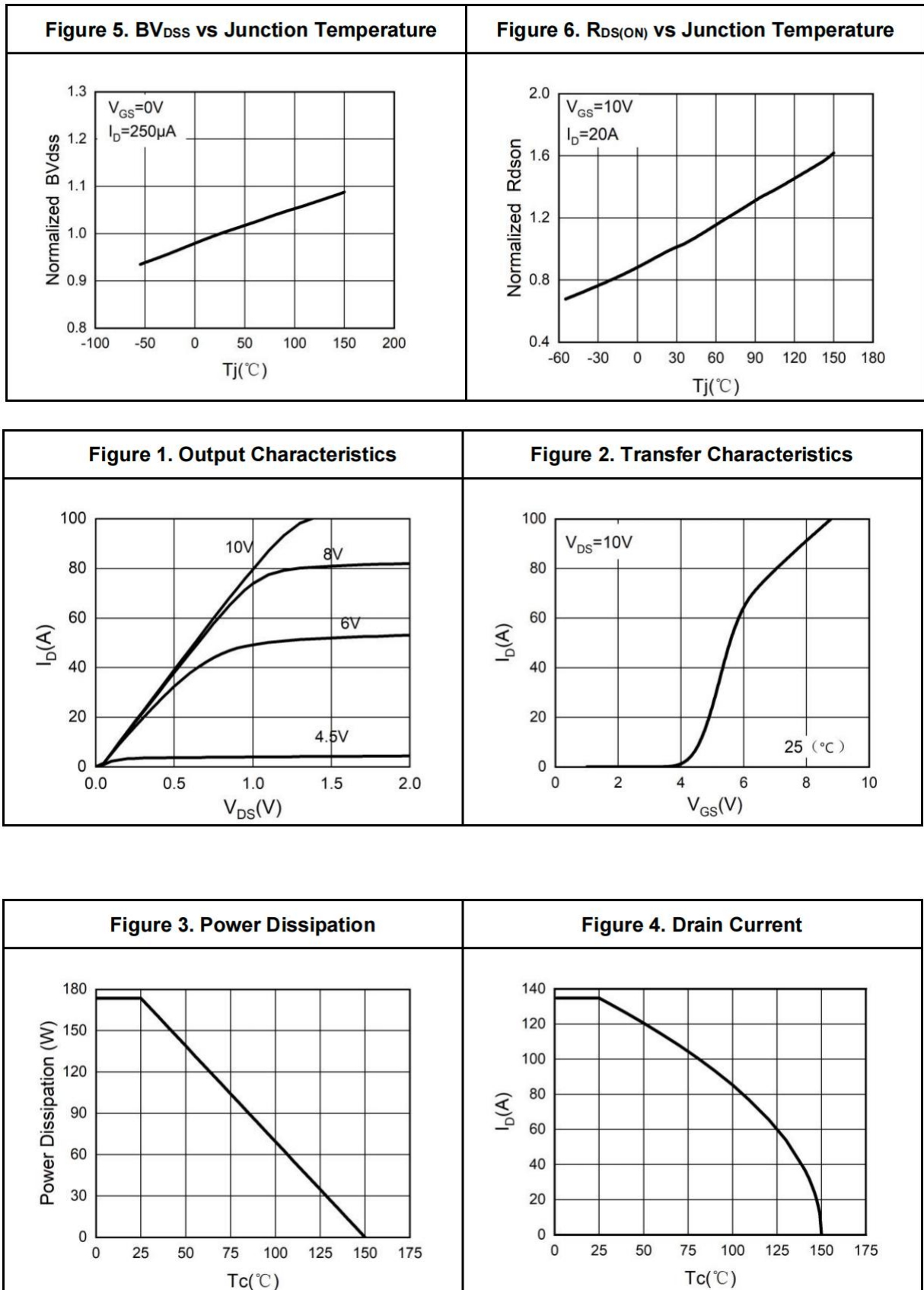
Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
$I_S$	Continuous Source Current <sup>1,5</sup>	$V_G=V_D=0V$ , Force Current	---	---	120	A
$V_{SD}$	Diode Forward Voltage <sup>2</sup>	$V_{GS}=0V, I_S=20A, T_J=25^\circ\text{C}$	---	---	1.2	V
$t_{rr}$	Reverse Recovery Time	$I_F=20A, dI/dt=100A/\mu s, T_J=25^\circ\text{C}$	---	49	---	nS
$Q_{rr}$	Reverse Recovery Charge		---	54	---	nC

Note :

- 1.The data tested by surface mounted on a 1 inch<sup>2</sup> FR-4 board with 2OZ copper.
- 2.The data tested by pulsed , pulse width  $\leq 300\mu s$  , duty cycle  $\leq 2\%$
- 3.The EAS data shows Max. rating . The test condition is  $V_{DD}=100V, V_{GS}=10V, L=0.5mH$
- 4.The power dissipation is limited by 150 $^\circ\text{C}$  junction temperature
- 5.The data is theoretically the same as  $I_D$  and  $I_{DM}$  , in real applications , should be limited by total power dissipation.
- 6.Package limitation current.

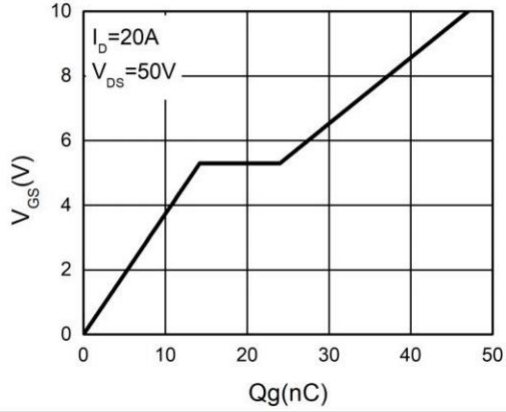


**Typical Characteristics**

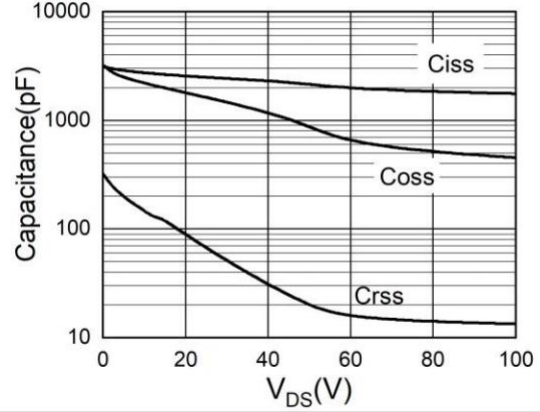




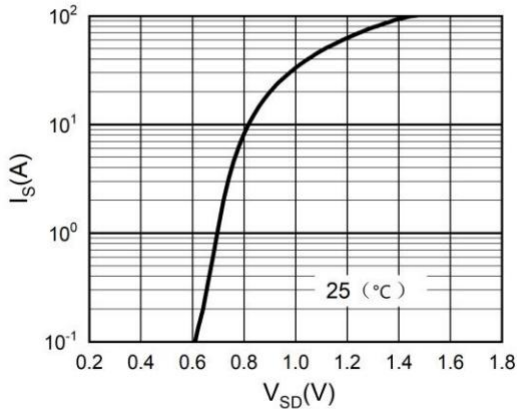
**Figure 7. Gate Charge Waveforms**



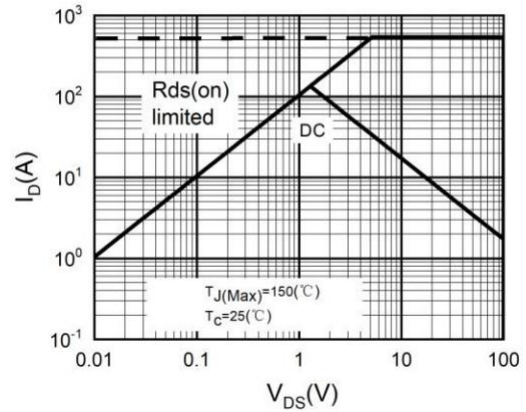
**Figure 8. Capacitance**



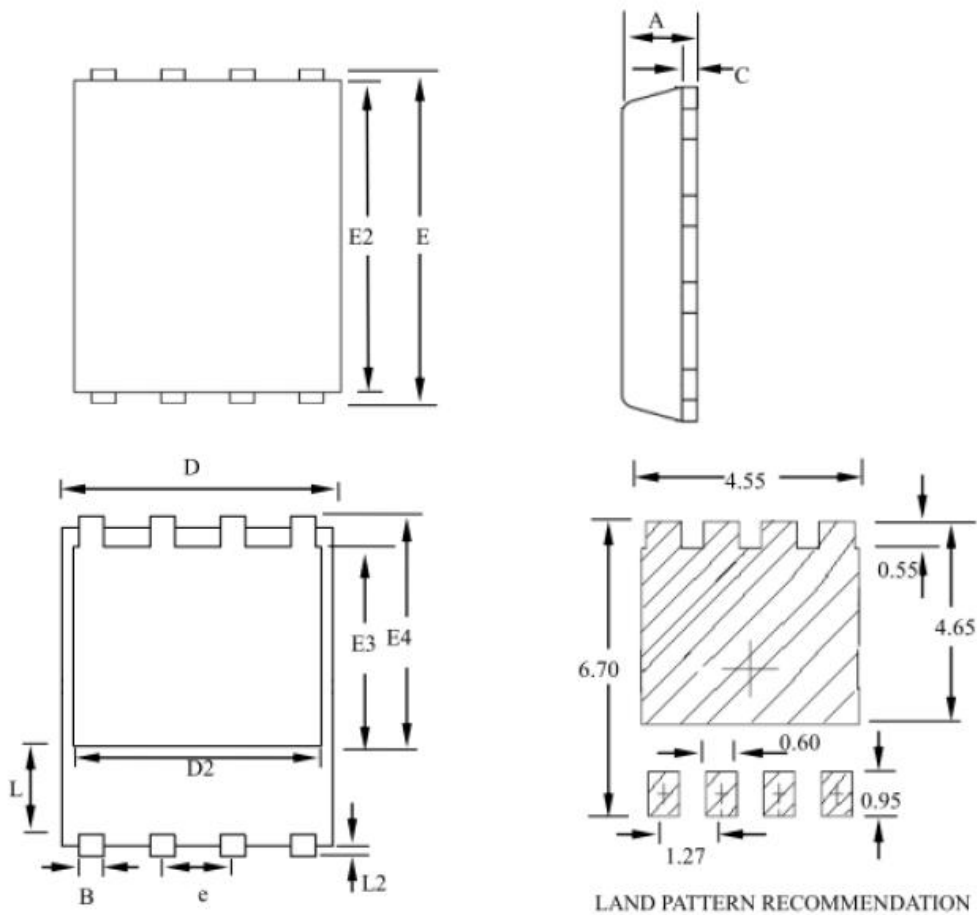
**Figure 9. Body-Diode Characteristics**



**Figure 10. Maximum Safe Operating Area**



## PRPAK5X6 Package Outline Dimensions



SYMBOLS	MILLIMETERS			INCHES		
	MIN	NOM	MAX	MIN	NOM	MAX
A	0.80	--	1.20	0.031	--	0.047
B	0.30	--	0.51	0.012	--	0.020
C	0.15	--	0.35	0.006	--	0.014
D	4.80	--	5.30	0.189	--	0.209
D2	3.61	--	4.35	0.142	--	0.171
E	5.90	--	6.35	0.232	--	0.250
E2	5.42	--	5.90	0.213	--	0.232
E3	3.23	--	3.90	0.127	--	0.154
E4	3.69	--	4.55	0.145	--	0.179
L	0.61	--	1.80	0.024	--	0.071
L2	0.05	--	0.36	0.002	--	0.014
e	--	1.27	--	--	0.050	--