

N-Ch 60V Fast Switching MOSFETs
Description

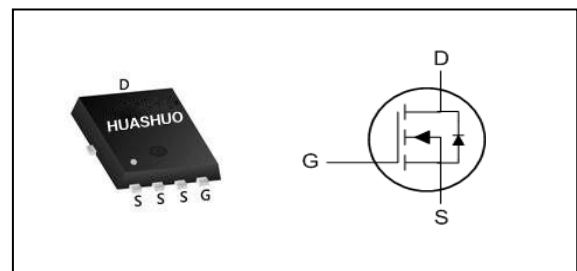
- Advanced Trench MOS Technology
- Low Gate Charge
- Low $R_{DS(ON)}$
- 100% EAS Guaranteed
- Green Device Available

Product Summary

V_{DS}	60	V
$R_{DS(ON),typ}$	4.4	$m\Omega$
I_D	78	A

Application

- Motor Control.
- DC/DC Converter.
- Synchronous rectifier applications.

PRPAK5X6 Pin Configuration

Absolute Maximum Ratings

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	60	V
V_{GS}	Gate-Source Voltage	± 20	V
$I_D@T_C=25^\circ C$	Continuous Drain Current ¹	78	A
$I_D@T_C=100^\circ C$	Continuous Drain Current ¹	57	A
I_{DM}	Pulsed Drain Current ²	210	A
EAS	Single Pulse Avalanche Energy ³	93	mJ
I_{AS}	Avalanche Current	43	A
$P_D@T_C=25^\circ C$	Total Power Dissipation ⁴	75	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	Typ.	Max.	Unit
$R_{\theta JA}$	Thermal Resistance Junction-Ambient ¹	---	55	$^\circ C/W$
$R_{\theta JC}$	Thermal Resistance Junction-Case ¹	---	1.8	$^\circ C/W$

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

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
B _{VDS}	Drain-Source Breakdown Voltage	V _{GS} =0V, I _D =250uA	60	---	---	V
R _{DS(ON)}	Static Drain-Source On-Resistance ²	V _{GS} =10V, I _D =30A	---	4.4	5.2	mΩ
		V _{GS} =4.5V, I _D =20A	---	6.4	7.8	
V _{GS(th)}	Gate Threshold Voltage	V _{GS} =V _{DS} , I _D =250uA	1.2	1.65	2.3	V
I _{DSS}	Drain-Source Leakage Current	V _{DS} =48V, V _{GS} =0V, T _J =25°C	---	---	1	uA
		V _{DS} =48V, V _{GS} =0V, T _J =55°C	---	---	5	
I _{GSS}	Gate-Source Leakage Current	V _{GS} =±20V, V _{DS} =0V	---	---	±100	nA
R _g	Gate Resistance	V _{DS} =0V, V _{GS} =0V, f=1MHz	---	1.3	---	Ω
Q _g	Total Gate Charge (4.5V)	V _{DS} =30V, V _{GS} =10V, I _D =20A	---	33	---	nC
Q _{gs}	Gate-Source Charge		---	18	---	
Q _{gd}	Gate-Drain Charge		---	6	---	
T _{d(on)}	Turn-On Delay Time	V _{DD} =30V, V _{GS} =10V, R _G =3.3Ω, I _D =20A	---	7.5	---	ns
T _r	Rise Time		---	6	---	
T _{d(off)}	Turn-Off Delay Time		---	29	---	
T _f	Fall Time		---	7.5	---	
C _{iss}	Input Capacitance	V _{DS} =30V, V _{GS} =0V, f=1MHz	---	1670	---	pF
C _{oss}	Output Capacitance		---	438	---	
C _{rss}	Reverse Transfer Capacitance		---	25	---	

Diode Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
I _S	Continuous Source Current ^{1,5}	V _G =V _D =0V, Force Current	---	---	78	A
I _{SM}	Pulsed Source Current ^{2,5}		---	---	210	A
V _{SD}	Diode Forward Voltage ²	V _{GS} =0V, I _S =A, T _J =25°C	---	---	1.2	V
t _{rr}	Reverse Recovery Time	I _F =15A, di/dt=100A/μs, T _J =25°C	---	23	---	nS
Q _{rr}	Reverse Recovery Charge		---	60	---	nC

Note :

- 1.The data tested by surface mounted on a 1 inch² FR-4 board with 20Z copper.
- 2.The data tested by pulsed , pulse width ≤ 300us , duty cycle ≤ 2%
- 3.The EAS data shows Max. rating . The test condition is V_{DD}=25V, V_{GS}=10V, L=0.1mH, I_{AS}=43A
- 4.The power dissipation is limited by 150°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.



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Typical Characteristics

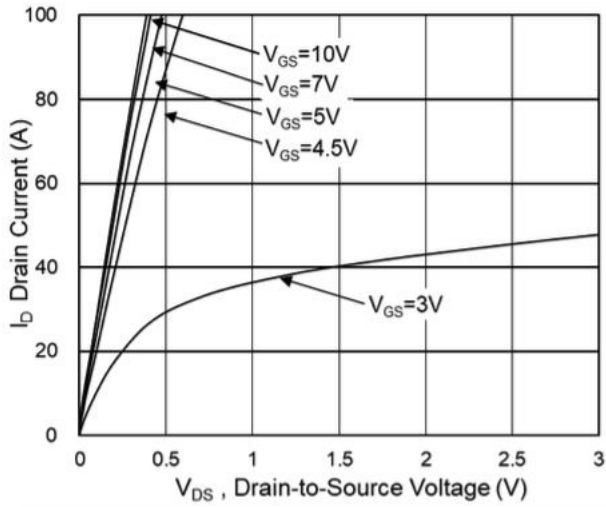


Fig.1 Typical Output Characteristics

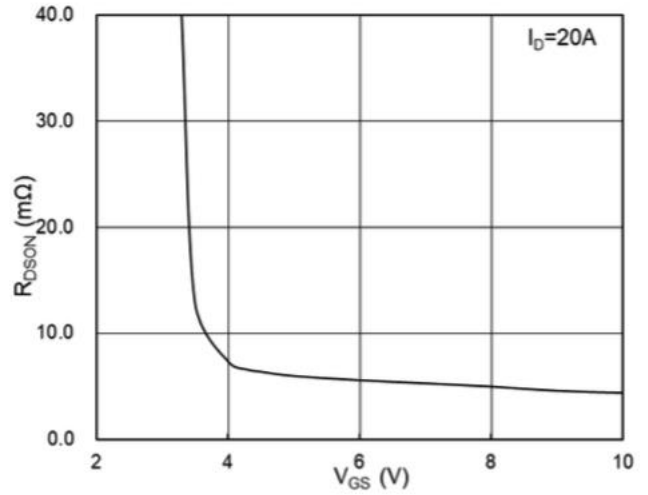


Fig.2 On-Resistance vs. Gate-Source

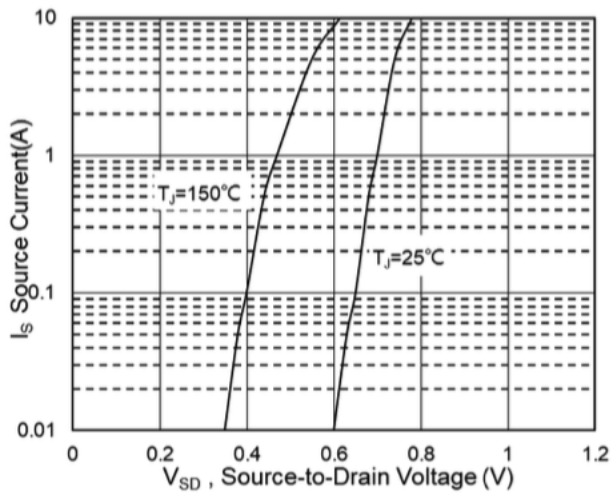


Fig.3 Source Drain Forward Characteristics

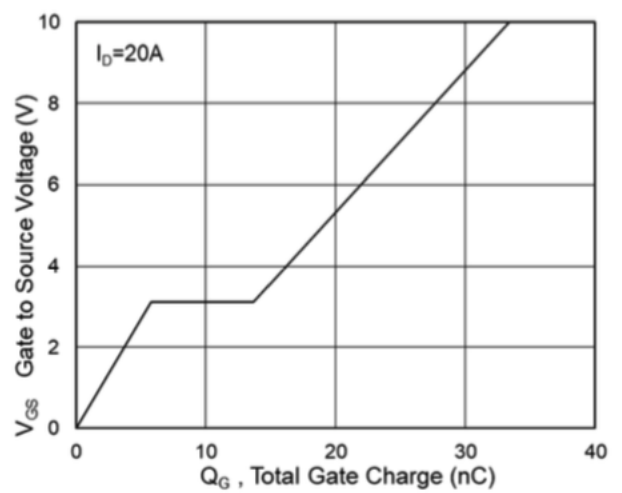


Fig.4 Gate-Charge Characteristics

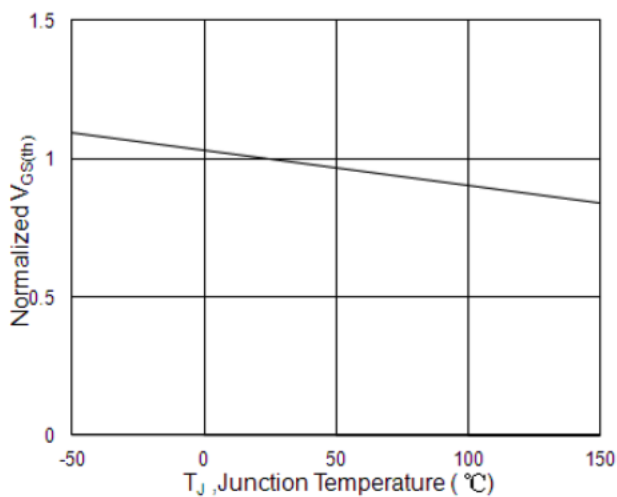


Fig.5 Normalized $V_{GS(th)}$ vs. T_J

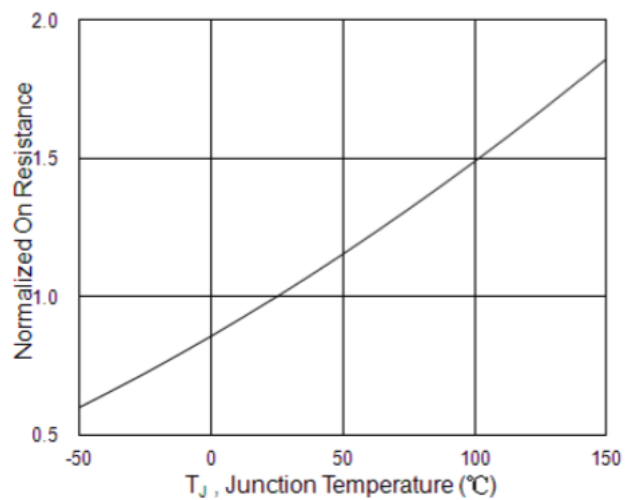


Fig.6 Normalized $R_{DS(on)}$ vs. T_J



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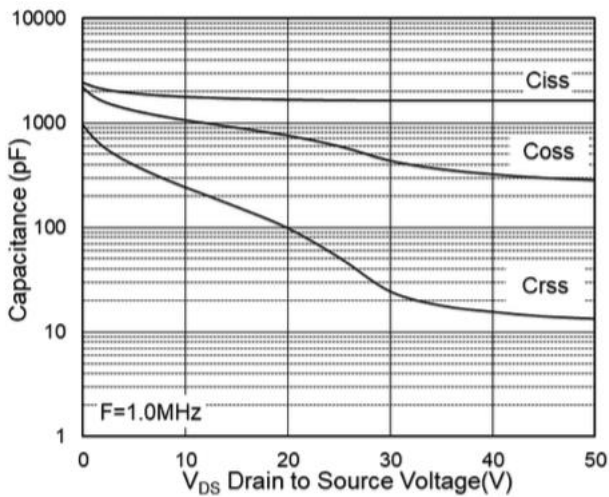


Fig.7 Capacitance

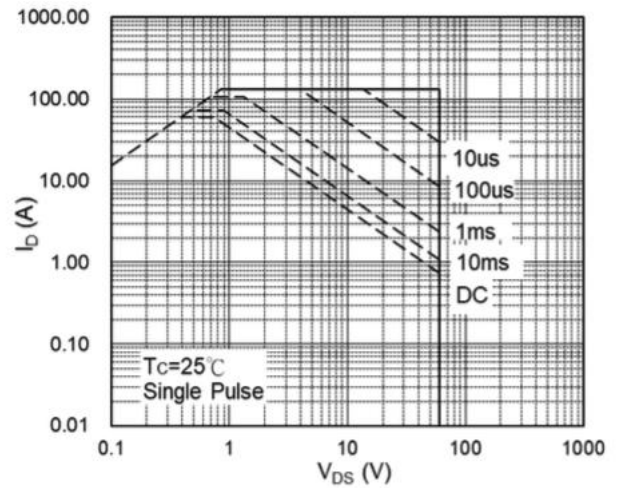


Fig.8 Safe Operating Area

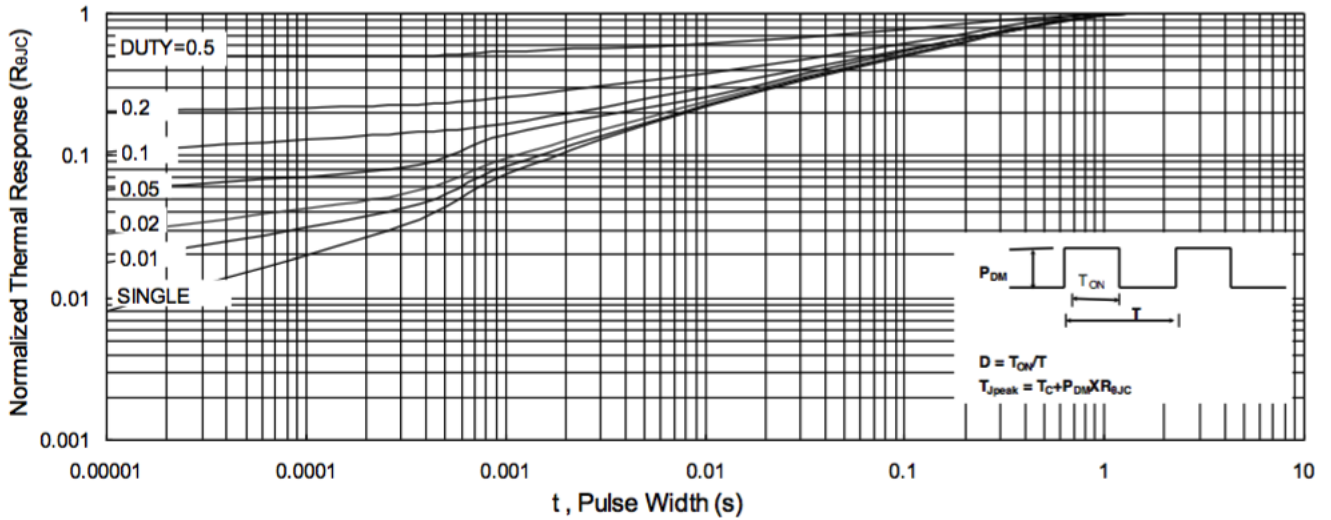


Fig.9 Normalized Maximum Transient Thermal Impedance

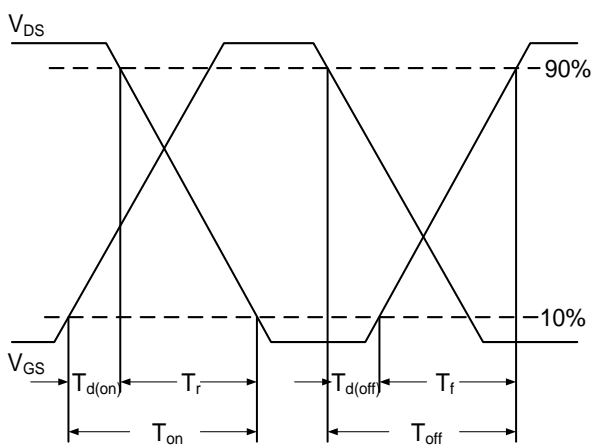


Fig.10 Switching Time Waveform

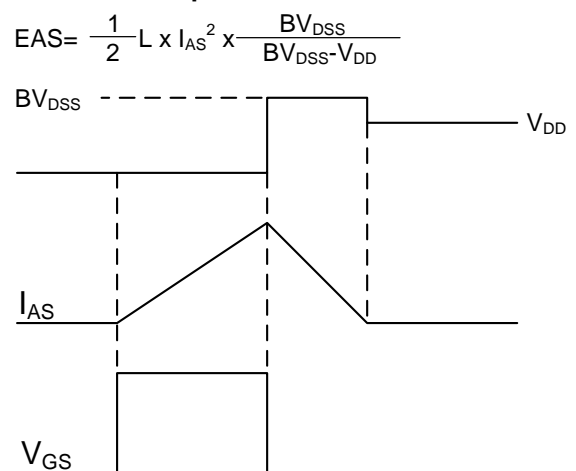
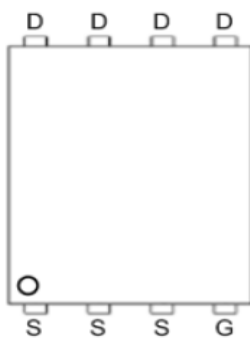
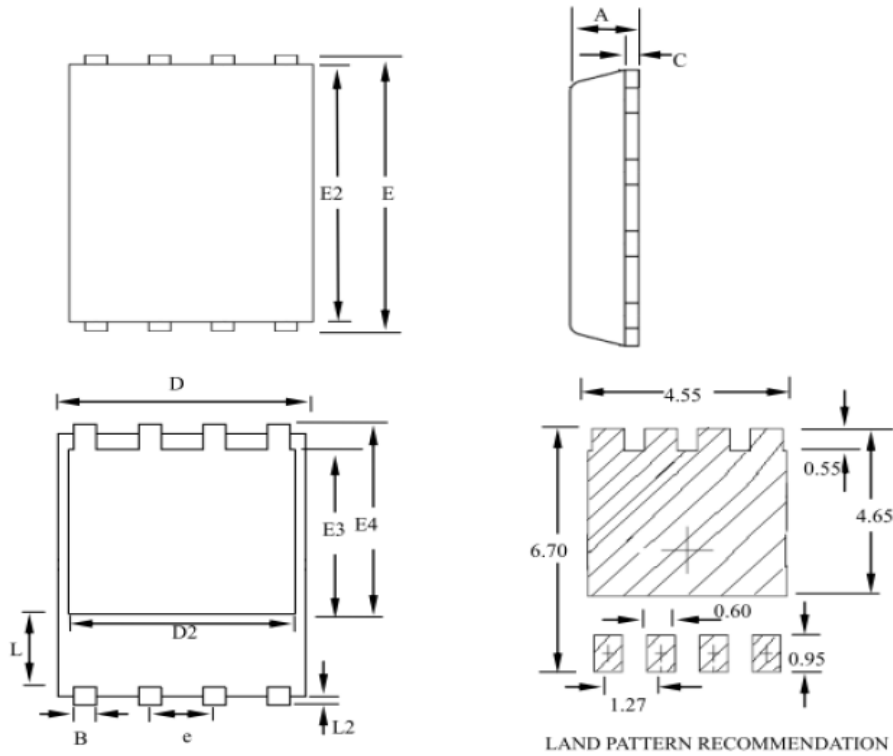


Fig.11 Unclamped Inductive Switching Waveform

Ordering Information

Part Number	Package code	Packaging
HSBA6066	PRPAK5*6	3000/Tape&Reel



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	--