

Dual N-Ch 60V Fast Switching MOSFETs
Description

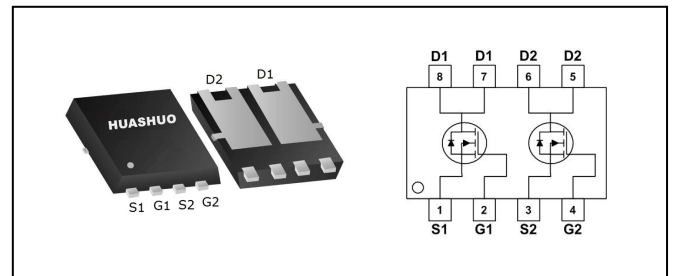
- Advanced Trench MOS Technology
- Low Gate Charge
- Low $R_{DS(ON)}$
- 100% EAS Guaranteed
- Green Device Available

Product Summary

V_{DS}	60	V
$R_{DS(ON),typ}$	10	m Ω
I_D	50	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	50	A
$I_D@T_C=100^{\circ}C$	Continuous Drain Current ¹	35	A
I_{DM}	Pulsed Drain Current ²	200	A
EAS	Single Pulse Avalanche Energy ³	26.5	mJ
I_{AS}	Avalanche Current	15	A
$P_D@T_C=25^{\circ}C$	Total Power Dissipation ⁴	50	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	---	60	$^{\circ}C/W$
$R_{\theta JC}$	Thermal Resistance Junction-Case ¹	---	2.5	$^{\circ}C/W$

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Electrical Characteristics ($T_J=25^\circ\text{C}$, unless otherwise noted)

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
BV_{DSS}	Drain-Source Breakdown Voltage	$V_{GS}=0V, I_D=250\mu A$	60	---	---	V
$R_{DS(ON)}$	Static Drain-Source On-Resistance ²	$V_{GS}=10V, I_D=15A$	---	10	12	$m\Omega$
		$V_{GS}=4.5V, I_D=15A$	---	14	16	
$V_{GS(th)}$	Gate Threshold Voltage	$V_{GS}=V_{DS}, I_D=250\mu A$	1.2	---	2.3	V
I_{DSS}	Drain-Source Leakage Current	$V_{DS}=48V, V_{GS}=0V, T_J=25^\circ\text{C}$	---	---	1	μA
		$V_{DS}=48V, V_{GS}=0V, T_J=55^\circ\text{C}$	---	---	5	
I_{GSS}	Gate-Source Leakage Current	$V_{GS}=\pm 20V, V_{DS}=0V$	---	---	± 100	nA
R_g	Gate Resistance	$V_{DS}=0V, V_{GS}=0V, f=1\text{MHz}$	---	1.3	---	Ω
Q_g	Total Gate Charge (4.5V)	$V_{DS}=30V, V_{GS}=10V, I_D=15A$	---	15	---	nC
Q_{gs}	Gate-Source Charge		---	3.5	---	
Q_{gd}	Gate-Drain Charge		---	4.2	---	
$T_{d(on)}$	Turn-On Delay Time	$V_{DD}=30V, V_{GS}=10V, R_G=3.3\Omega, I_D=15A$	---	7	---	ns
T_r	Rise Time		---	4.5	---	
$T_{d(off)}$	Turn-Off Delay Time		---	26	---	
T_f	Fall Time		---	5	---	
C_{iss}	Input Capacitance	$V_{DS}=30V, V_{GS}=0V, f=1\text{MHz}$	---	1270	---	pF
C_{oss}	Output Capacitance		---	478	---	
C_{rss}	Reverse Transfer Capacitance		---	40	---	

Diode Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
I_S	Continuous Source Current ^{1,5}	$V_G=V_D=0V, \text{Force Current}$	---	---	50	A
I_{SM}	Pulsed Source Current ^{2,5}		---	---	200	A
V_{SD}	Diode Forward Voltage ²	$V_{GS}=0V, I_S=A, T_J=25^\circ\text{C}$	---	---	1.2	V
t_{rr}	Reverse Recovery Time	$I_F=15A, dI/dt=100A/\mu s, T_J=25^\circ\text{C}$	---	22	---	nS
Q_{rr}	Reverse Recovery Charge	$T_J=25^\circ\text{C}$	---	72	---	nC

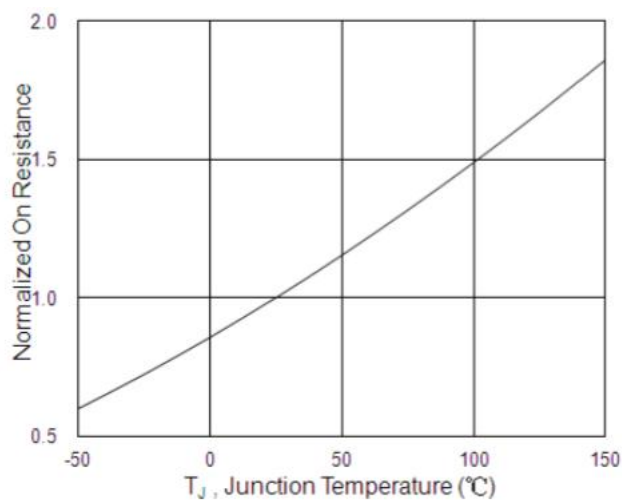
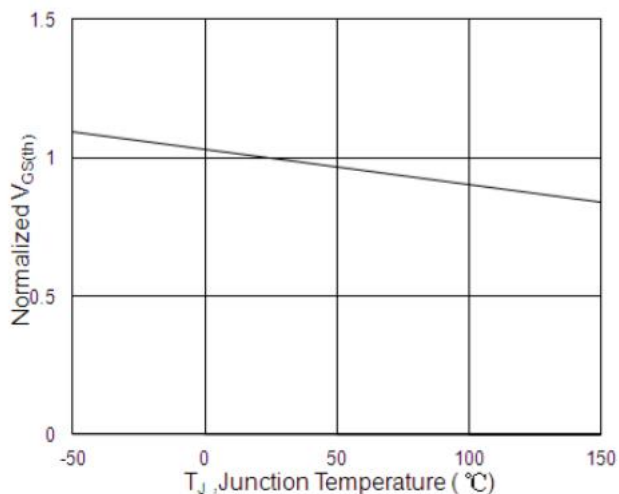
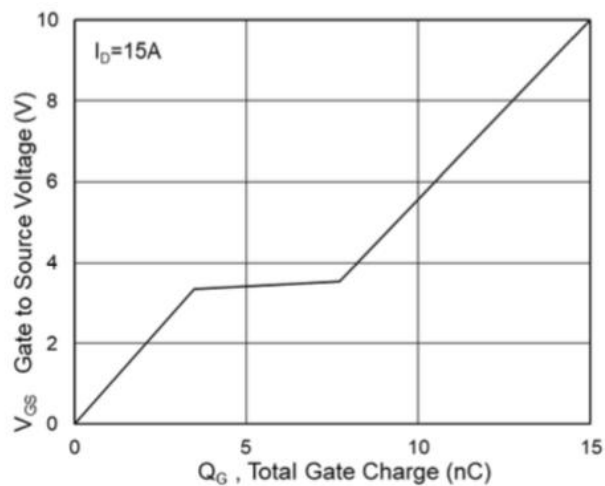
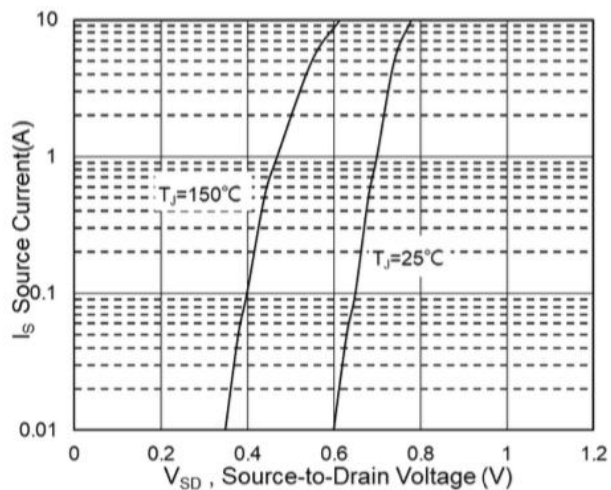
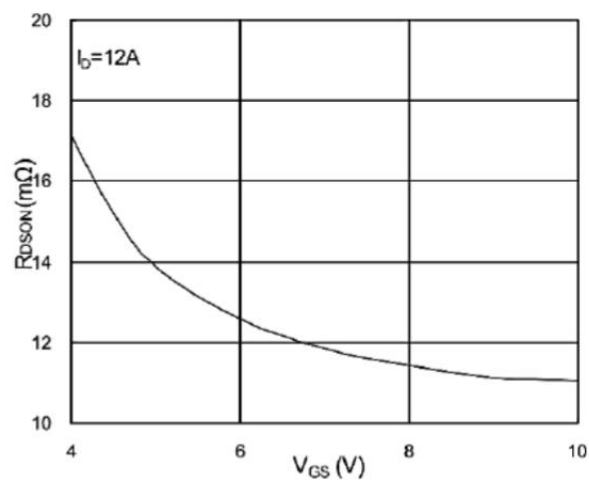
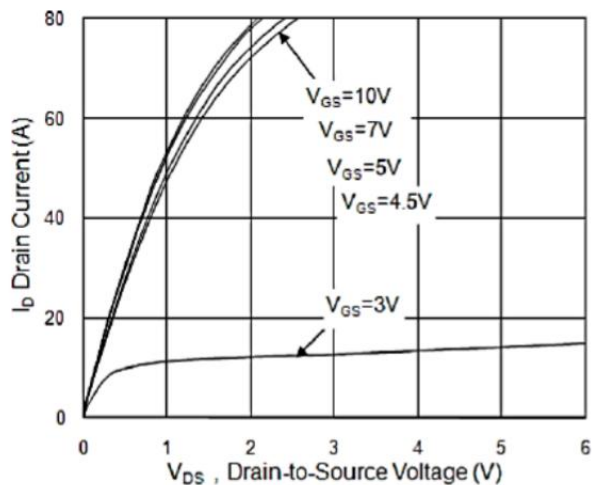
Note :

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 $\leq 300\mu s$, duty cycle $\leq 2\%$
3. The EAS data shows Max. rating . The test condition is $V_{DD}=25V, V_{GS}=10V, L=0.1mH, I_{AS}=15A$
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





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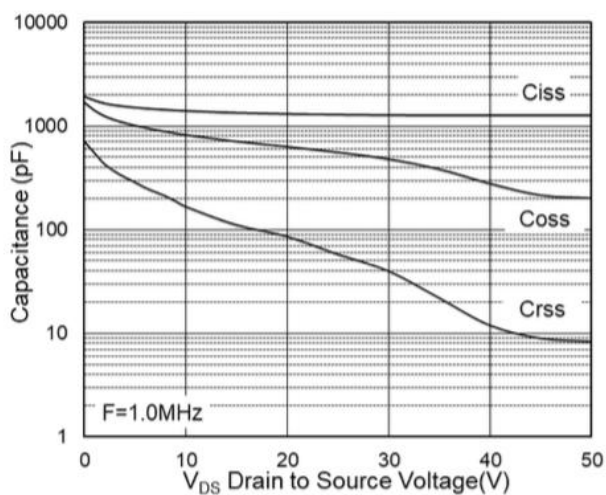


Fig.7 Capacitance

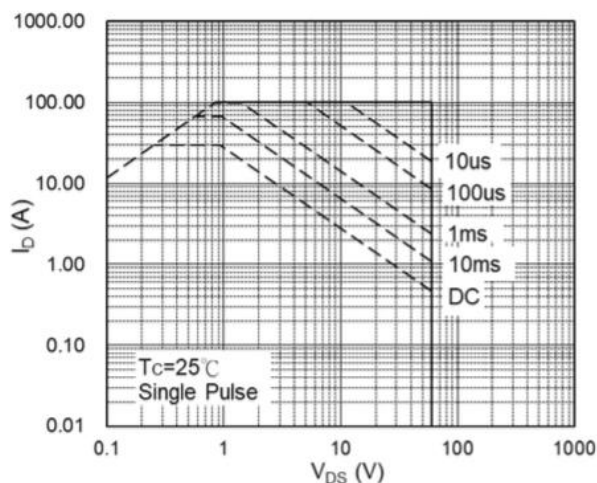


Fig.8 Safe Operating Area

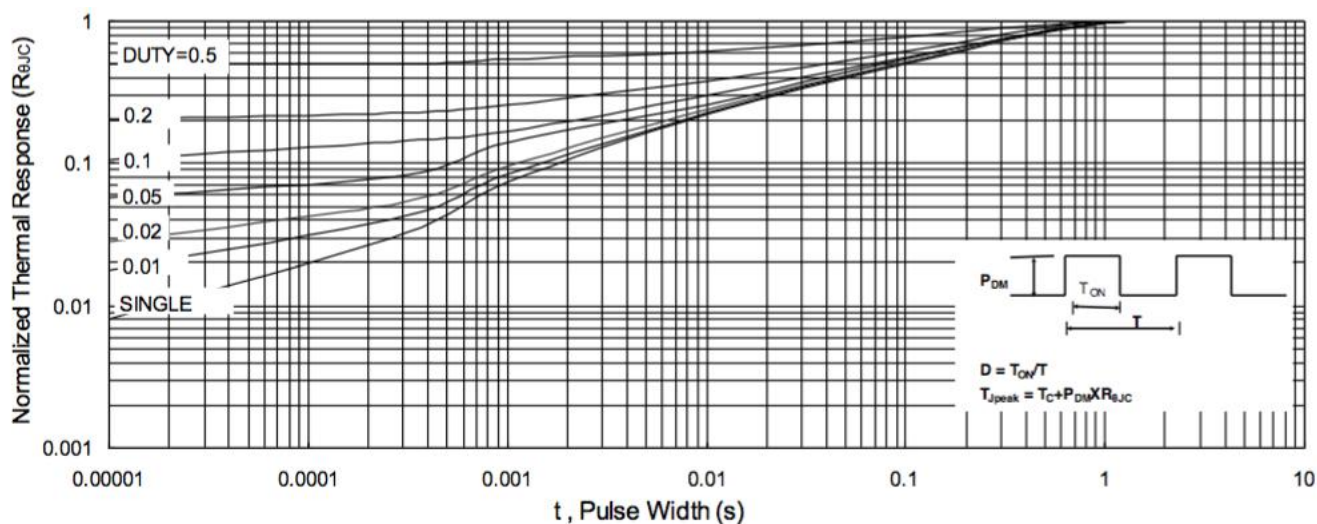


Fig.9 Normalized Maximum Transient Thermal Impedance

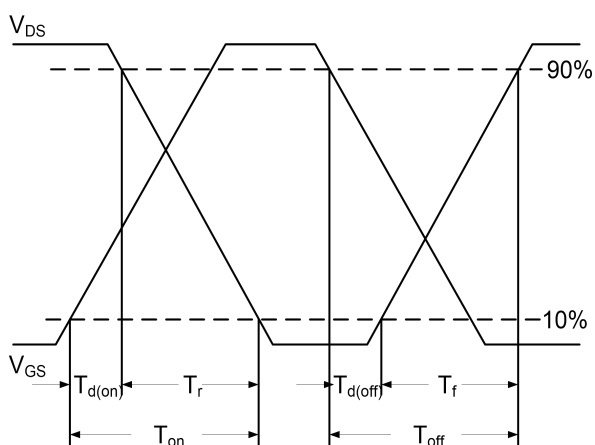


Fig.10 Switching Time Waveform

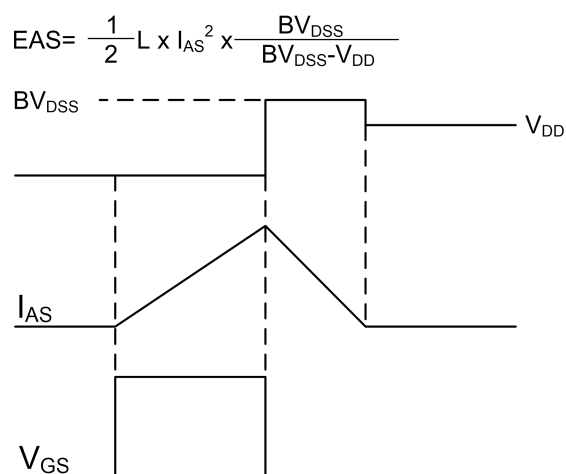
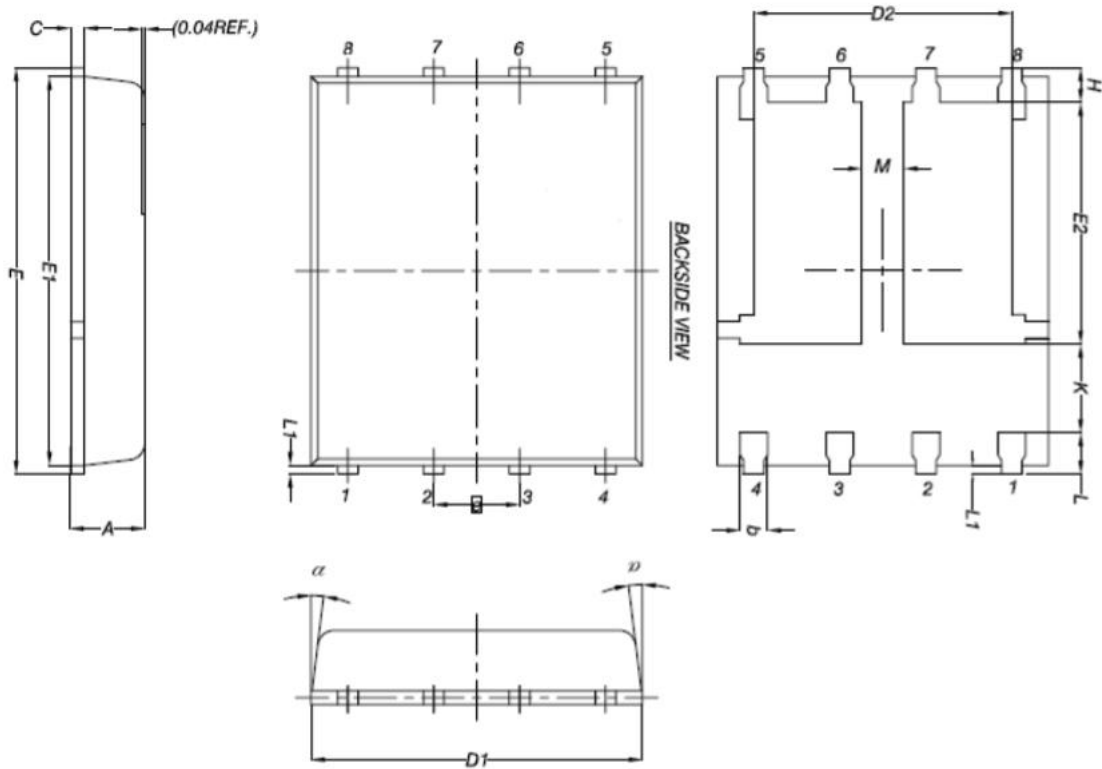


Fig.11 Unclamped Inductive Switching Waveform



PRPAK5x6-8L Dual EP2 Package Outline



SYMBOLS	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	0.90	1.17	0.035	0.046
b	0.33	0.51	0.013	0.020
C	0.20	0.30	0.008	0.012
D1	4.80	5.20	0.189	0.205
D2	3.61	3.96	0.142	0.156
E	5.90	6.15	0.232	0.242
E1	5.70	5.85	0.224	0.230
E2	3.30	3.78	0.130	0.149
e	1.27 BSC		0.05 BSC	
H	0.38	0.61	0.015	0.024
K	1.10	---	0.043	---
L	0.38	0.61	0.015	0.024
L1	0.05	0.25	0.002	0.010
M	0.50	---	0.020	---
α	0°	12°	0°	12°