HSBA6214

Dual N-Ch 60V Fast Switching MOSFETs

Description

The HSBA6214 is the high cell density trenched N-ch MOSFETs, which provide excellent RDSON and gate charge for most of the synchronous buck converter applications.

The HSBA6214 meet the RoHS and Green Product requirement, 100% EAS guaranteed with full function reliability approved.

- 100% EAS Guaranteed
- Green Device Available
- Super Low Gate Charge
- Excellent CdV/dt effect decline
- Advanced high cell density Trench technology

Product Summary

V_{DS}	60	V
$R_{DS(ON),typ}$	35	mΩ
I_D	17	A

PRPAK5*6 Pin Configuration
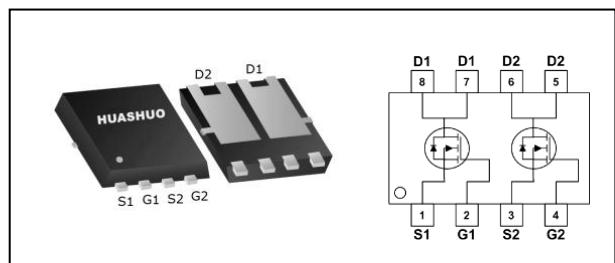
Absolute Maximum Ratings

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	60	V
V_{GS}	Gate-Source Voltage	± 20	V
$I_D@T_C=25°C$	Continuous Drain Current, V_{GS} @ 10V[1]	17	A
$I_D@T_C=70°C$	Continuous Drain Current, V_{GS} @ 10V[1]	11	A
I_{DM}	Pulsed Drain Current[2]	40	A
EAS	Single Pulse Avalanche Energy[3]	22	mJ
I_{AS}	Avalanche Current	21	A
$P_D@T_A=25°C$	Total Power Dissipation[4]	2	W
T_{STG}	Storage Temperature Range	-55 to 150	°C
T_J	Operating Junction Temperature Range	-55 to 150	°C

Thermal Data

Symbol	Parameter	Typ.	Max.	Unit
$R_{θJA}$	Thermal Resistance Junction-ambient [1]	---	62	°C/W
$R_{θJC}$	Thermal Resistance Junction-Case[1]	---	5	°C/W

Electrical Characteristics (T$_J$=25 ℃, unless otherwise noted)

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
BV$_{DSS}$	Drain-Source Breakdown Voltage	V$_{GS}$=0V , I$_D$=250uA	60	---	---	V
△BV$_{DSS}$/△T$_J$	BVDSS Temperature Coefficient	Reference to 25℃ , I$_D$=1mA	---	0.044	---	V/℃
R$_{DS(ON)}$	Static Drain-Source On-Resistance[2]	V$_{GS}$=10V , I$_D$=15A	---	35	42	mΩ
		V$_{GS}$=4.5V , I$_D$=7A	---	40	52	
V$_{GS(th)}$	Gate Threshold Voltage	V$_{GS}$=V$_{DS}$, I$_D$ =250uA	1.0	---	2.5	V
△V$_{GS(th)}$	V$_{GS(th)}$ Temperature Coefficient		---	-4.8	---	mV/℃
I$_{DSS}$	Drain-Source Leakage Current	V$_{DS}$=48V , V$_{GS}$=0V , T$_J$=25℃	---	---	1	uA
		V$_{DS}$=48V , V$_{GS}$=0V , T$_J$=55℃		---	5	
I$_{GSS}$	Gate-Source Leakage Current	V$_{GS}$=±20V , V$_{DS}$=0V	---	---	±100	nA
gfs	Forward Transconductance	V$_{DS}$=5V , I$_D$=15A	---	25.3	---	S
R$_g$	Gate Resistance	V$_{DS}$=0V , V$_{GS}$=0V , f=1MHz	---	2.5	---	Ω
Q$_g$	Total Gate Charge (4.5V)	V$_{DS}$=48V , V$_{GS}$=10V , I$_D$=15A	---	19	---	nC
Q$_{gs}$	Gate-Source Charge		---	2.6	---	
Q$_{gd}$	Gate-Drain Charge		---	4.1	---	
T$_{d(on)}$	Turn-On Delay Time	V$_{DD}$=30V , V$_{GS}$=10V , R$_G$=3.3Ω I$_D$=15A	---	3	---	ns
T$_r$	Rise Time		---	34	---	
T$_{d(off)}$	Turn-Off Delay Time		---	23	---	
T$_f$	Fall Time		---	6	---	
C$_{iss}$	Input Capacitance	V$_{DS}$=15V , V$_{GS}$=0V , f=1MHz	---	1027	---	pF
C$_{oss}$	Output Capacitance		---	65	---	
C$_{rss}$	Reverse Transfer Capacitance		---	46	---	

Diode Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
I$_S$	Continuous Source Current[1,5]	V$_G$=V$_D$=0V , Force Current	---	---	17	A
V$_{SD}$	Diode Forward Voltage[2]	V$_{GS}$=0V , I$_S$=1A , T$_J$=25℃	---	---	1.2	V
t$_{rr}$	Reverse Recovery Time	I$_F$=4A , dI/dt=100A/μs , T$_J$=25℃	---	12.1	---	nS
Q$_{rr}$	Reverse Recovery Charge		---	6.7	---	nC

Note :

1.The data tested by surface mounted on a 1 inch[2] FR-4 board with 2OZ 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$_{AS}$=21A

4.The power dissipation is limited by 150℃ 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.

**HUASHUO SEMICONDUCTOR**

Typical Characteristics
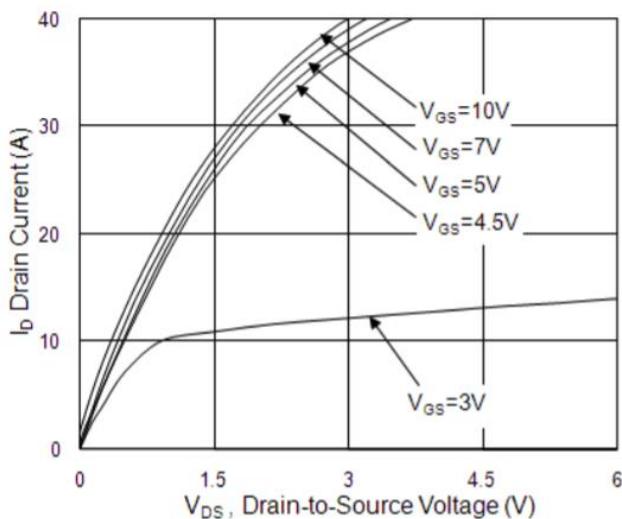
**Fig.1 Typical Output Characteristics**
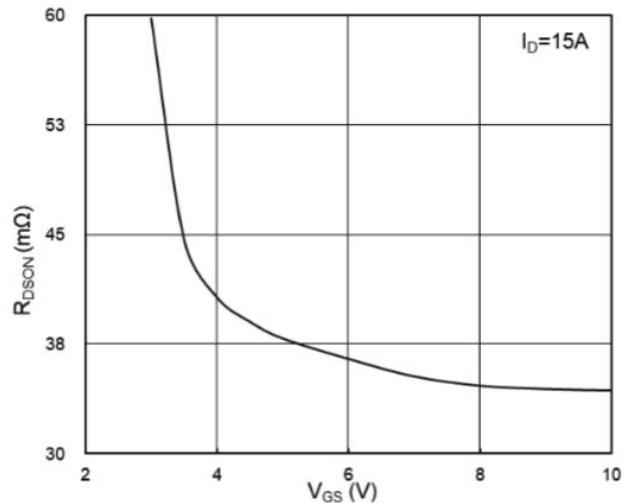

Fig.2 On-Resistance vs. Gate-Source
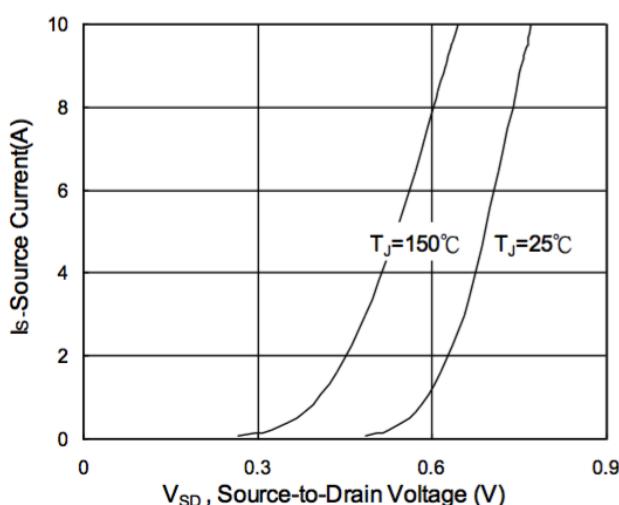
**Fig.3 Forward Characteristics Of Reverse**
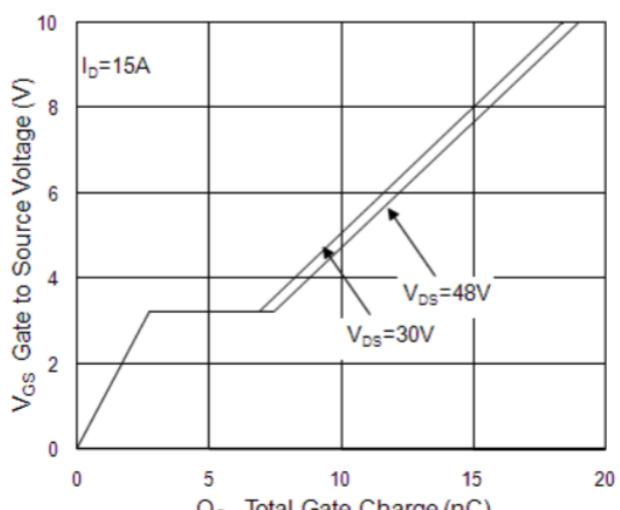
Fig.4 Gate-Charge Characteristics
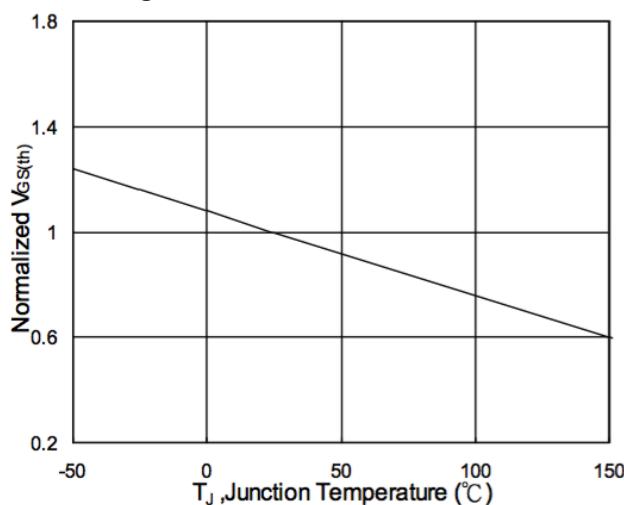
Fig.5 Normalized $V_{GS(th)}$ vs. T_J
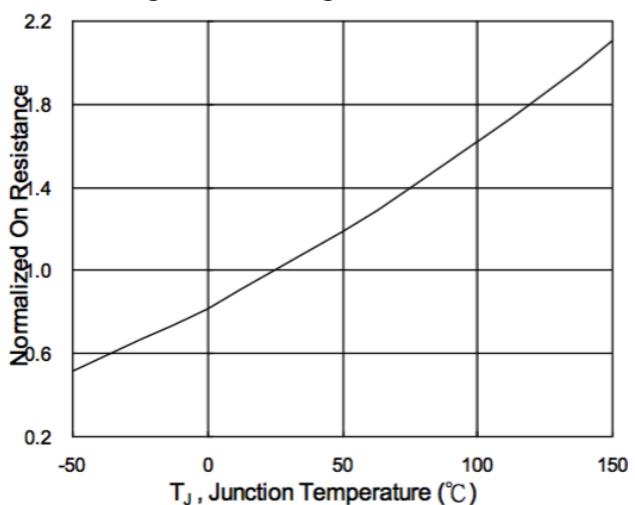

Fig.6 Normalized R_{DSON} vs. T_J
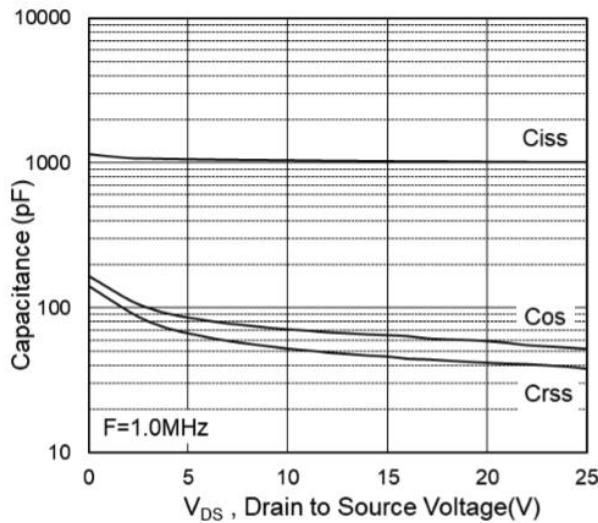
Fig.7 Capacitance
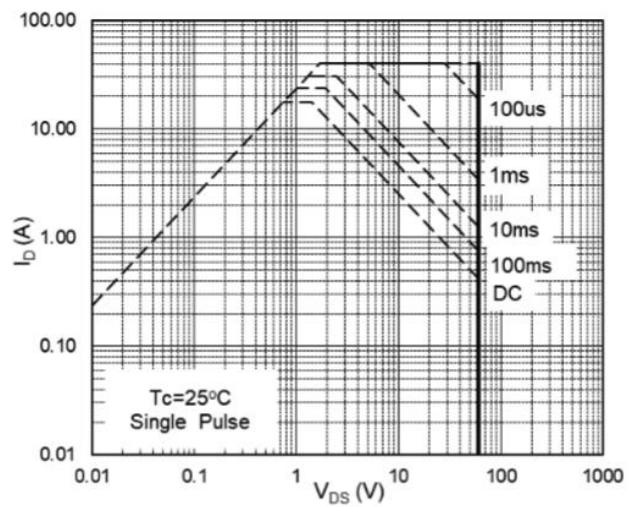
Fig.8 Safe Operating Area
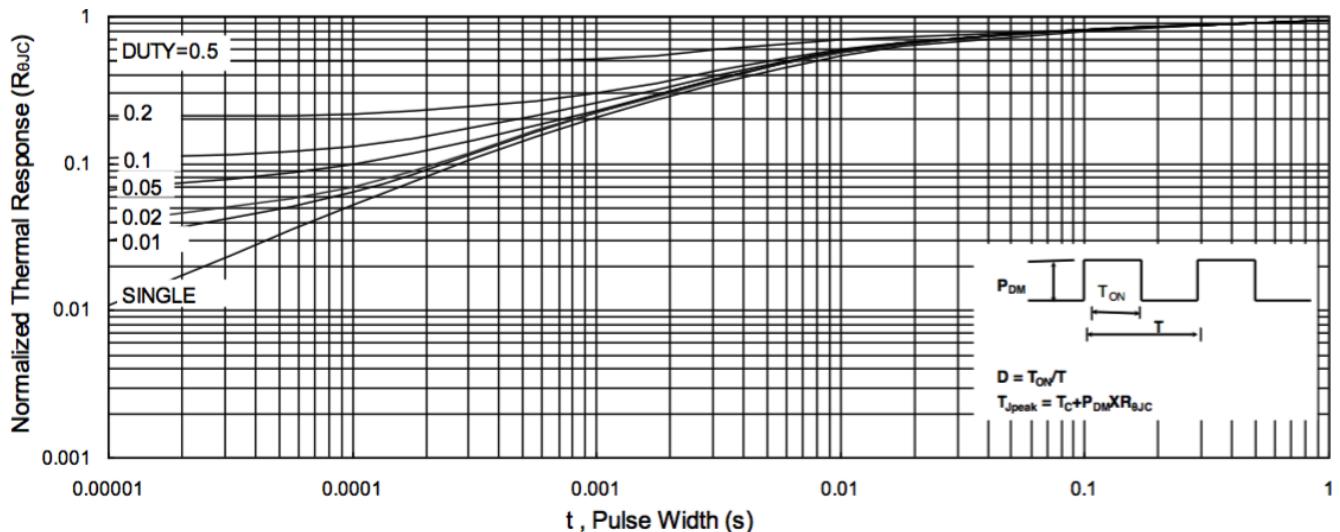
Fig.9 Normalized Maximum Transient Thermal Impedance

$$EAS= \frac{1}{2}L \times I_{AS}^{2} \times \frac{BV_{DSS}}{BV_{DSS}-V_{DD}}$$
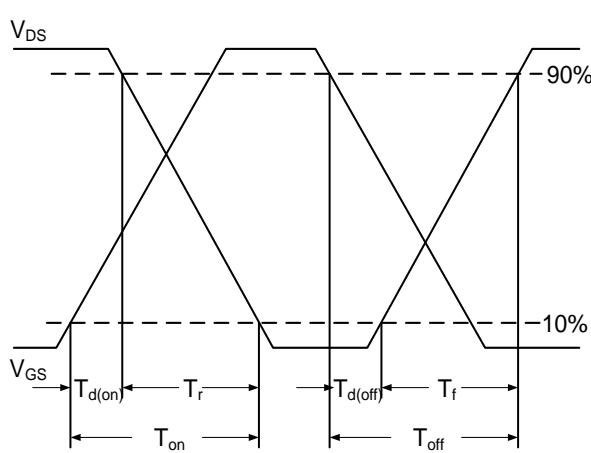
Fig.10 Switching Time Waveform
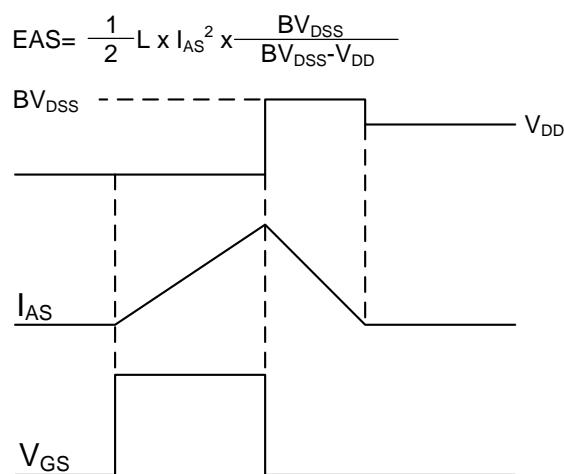
Fig.11 Unclamped Inductive Switching

PRPAK5x6-8L Dual EP2 Package Outline
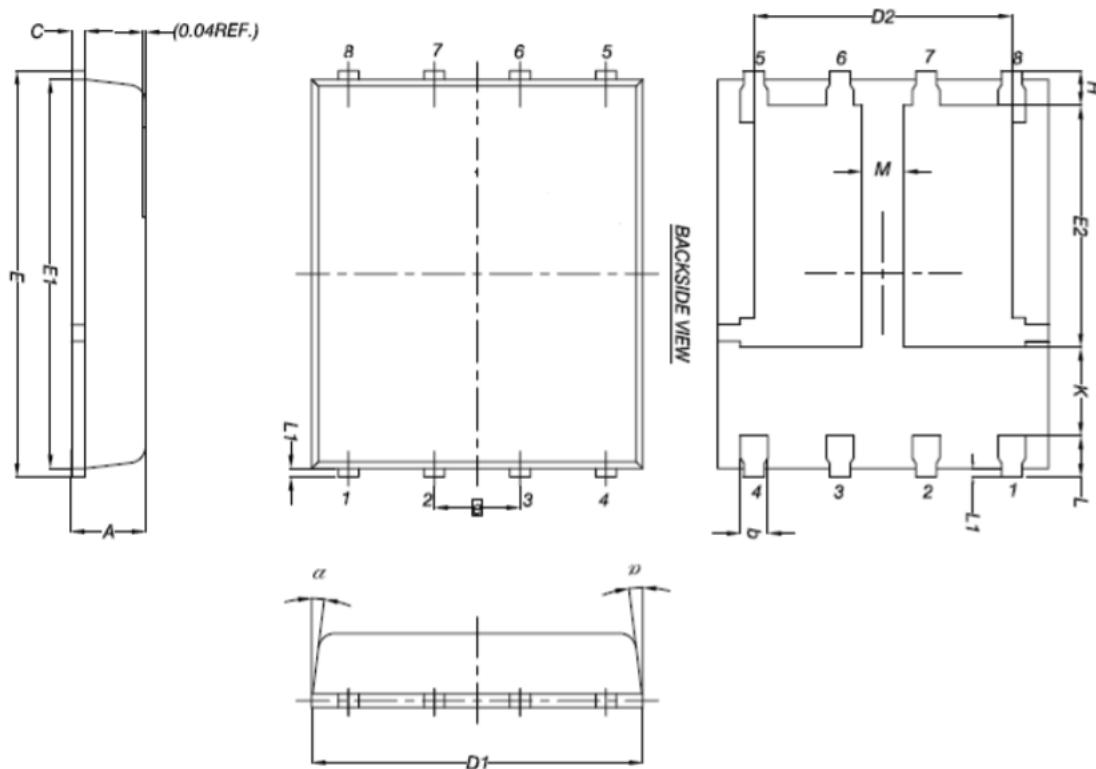
SYMBOLS	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	0.90	1.17	0.035	0.046
b	0.33	0.51	0.013	0.020
C	0.20	0.30	0.008	0.012
D1	4.80	5.20	0.189	0.205
D2	3.61	3.96	0.142	0.156
E	5.90	6.15	0.232	0.242
E1	5.70	5.85	0.224	0.230
E2	3.30	3.78	0.130	0.149
e	1.27 BSC		0.05 BSC	
H	0.38	0.61	0.015	0.024
K	1.10	---	0.043	---
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°