

General Description

The HSBA4117 is the high cell density trench P-ch MOSFETs, which provide excellent $R_{DS(on)}$ and gate charge for most of the synchronous buck converter applications.

The HSBA4117 meet the RoHS and Green Product requirement, 100% EAS guaranteed with full function reliability approved.

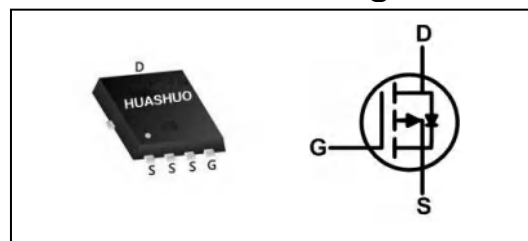
Product Summary

V_{DS}	-40	V
$R_{DS(ON),typ}$	8	m Ω
I_D	-65	A

Features

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

PRPAK5*6 Pin Configuration



Absolute Maximum Ratings

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	-40	V
V_{GS}	Gate-Source Voltage	± 20	V
$I_D@T_C=25^\circ C$	Continuous Drain Current, $V_{GS} @ -10V^1$	-65	A
$I_D@T_C=100^\circ C$	Continuous Drain Current, $V_{GS} @ -10V^1$	-41	A
I_{DM}	Pulsed Drain Current ²	-260	A
EAS	Single Pulse Avalanche Energy ³	360	mJ
I_{AS}	Avalanche Current	-56	A
$P_D@T_C=25^\circ C$	Total Power Dissipation ⁴	65	W
$P_D@T_A=25^\circ C$	Total Power Dissipation ⁴	2.3	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	---	58	$^\circ C/W$
$R_{\theta JC}$	Thermal Resistance Junction-Case ¹	---	1.4	$^\circ C/W$

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	$V_{GS}=0V$, $I_D=-250\mu A$	-40	---	---	V
$R_{DS(ON)}$	Static Drain-Source On-Resistance ²	$V_{GS}=-10V$, $I_D=-20A$	---	8	10	$m\Omega$
		$V_{GS}=-4.5V$, $I_D=-15A$	---	10	12.5	
$V_{GS(th)}$	Gate Threshold Voltage	$V_{GS}=V_{DS}$, $I_D=-250\mu A$	-1.0	-1.65	-2.5	V
I_{DSS}	Drain-Source Leakage Current	$V_{DS}=-40V$, $V_{GS}=0V$, $T_J=25^{\circ}\text{C}$	---	---	1	μA
		$V_{DS}=-40V$, $V_{GS}=0V$, $T_J=55^{\circ}\text{C}$	---	---	5	
I_{GSS}	Gate-Source Leakage Current	$V_{GS}=\pm 20V$, $V_{DS}=0V$	---	---	± 100	nA
g_{fs}	Forward Transconductance	$V_{DS}=-5V$, $I_D=-10A$	---	48	---	S
R_g	Gate Resistance	$V_{DS}=0V$, $V_{GS}=0V$, $f=1\text{MHz}$	---	10.6	---	Ω
Q_g	Total Gate Charge	$V_{DS}=-20V$, $V_{GS}=-10V$, $I_D=-10A$	---	59	---	nC
Q_{gs}	Gate-Source Charge		---	8.7	---	
Q_{gd}	Gate-Drain Charge		---	15	---	
$T_{d(on)}$	Turn-On Delay Time	$V_{DD}=-20V$, $V_{GS}=-10V$, $R_G=3.3\Omega$, $I_D=-10A$	---	16	---	ns
T_r	Rise Time		---	42	---	
$T_{d(off)}$	Turn-Off Delay Time		---	170	---	
T_f	Fall Time		---	96	---	
C_{iss}	Input Capacitance	$V_{DS}=-20V$, $V_{GS}=0V$, $f=1\text{MHz}$	---	3670	---	pF
C_{oss}	Output Capacitance		---	313	---	
C_{rss}	Reverse Transfer Capacitance		---	225	---	

Diode Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
I_S	Continuous Source Current ^{1,5}	$V_G=V_D=0V$, Force Current	---	---	-65	A
I_{SM}	Pulsed Source Current ^{2,5}		---	---	-260	A
V_{SD}	Diode Forward Voltage ²	$V_{GS}=0V$, $I_S=-1A$, $T_J=25^{\circ}\text{C}$	---	---	-1.2	V
t_{rr}	Reverse Recovery Time	$I_f=20A$, $dI/dt=100A/\mu s$	---	15	---	ns
Q_{rr}	Reverse Recovery Charge	$I_f=20A$, $dI/dt=100A/\mu s$	---	4.7	---	nC

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 $\leq 300\mu s$, duty cycle $\leq 2\%$

3.The EAS data shows Max. rating . The test condition is $V_{DD}=-25V$, $V_{GS}=-10V$, $L=0.1\text{mH}$, $I_{AS}=-56A$

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.

Typical Characteristics

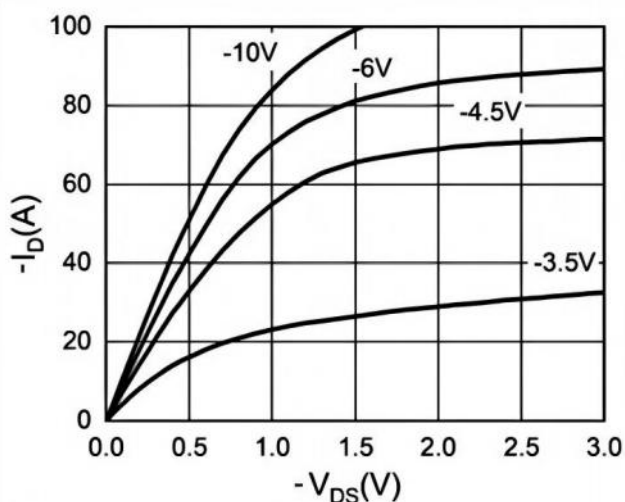


Fig.1 Typical Output Characteristics

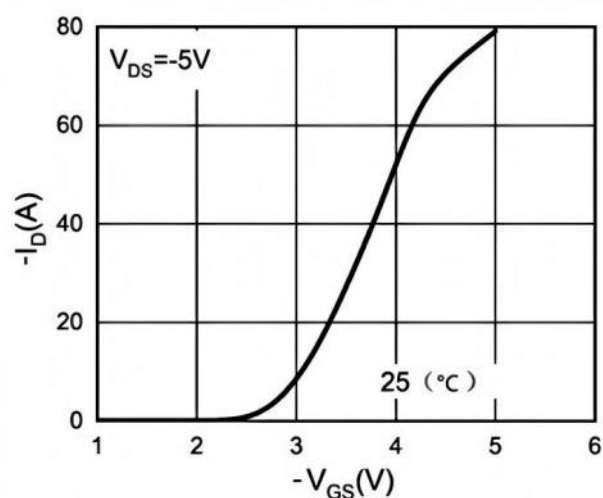


Fig.2 Transfer Characteristics

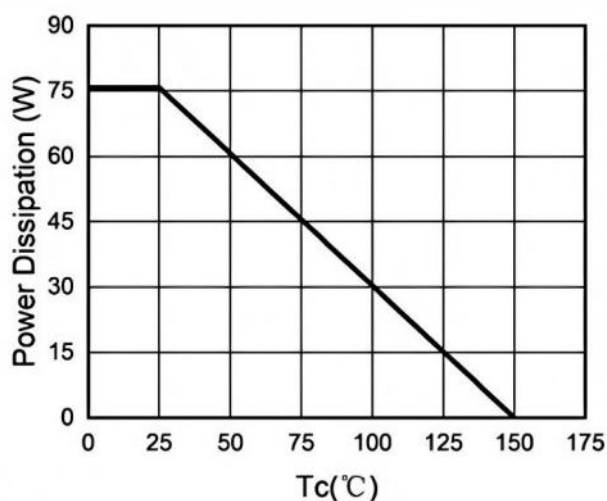


Fig.3 Power Dissipation

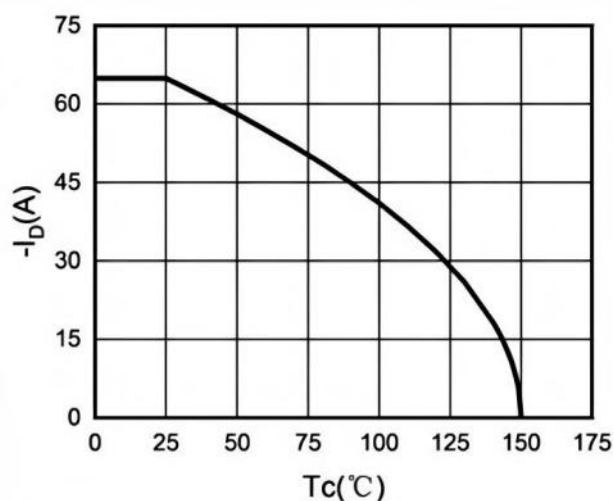


Fig.4 Drain Current

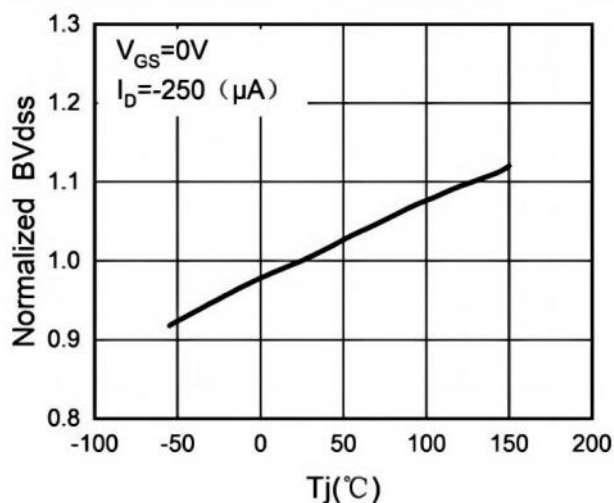


Fig.5 BV_{DS} vs Junction Temperature

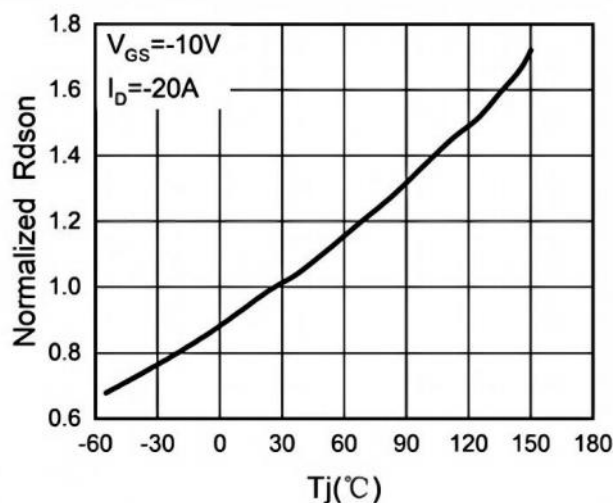


Fig.6 $R_{DS(ON)}$ vs Junction Temperature



P-Ch 40V Fast Switching MOSFETs

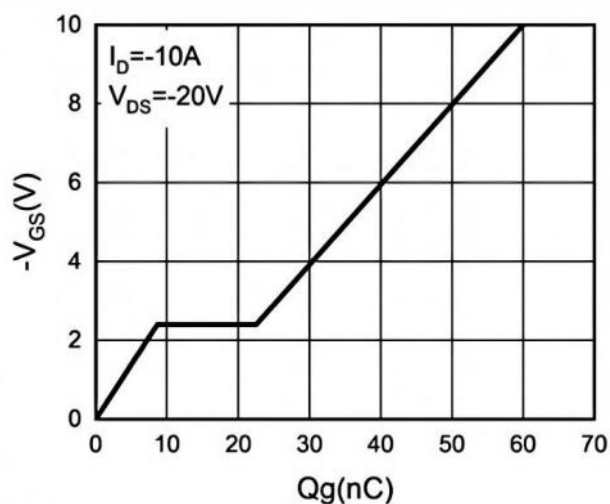


Fig.7 Gate Charge Waveforms

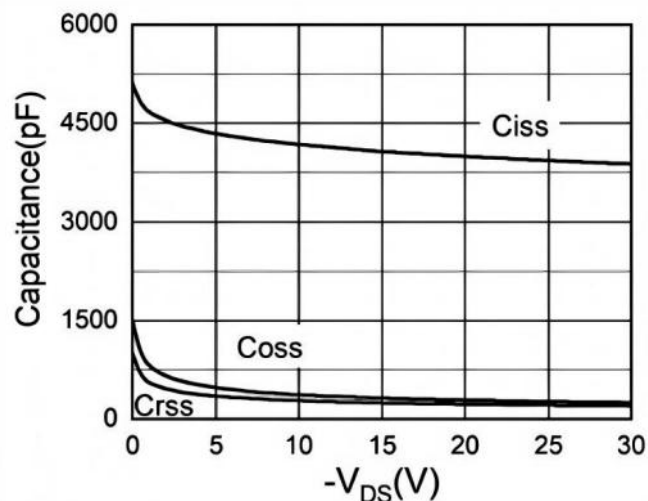


Fig.8 Capacitance

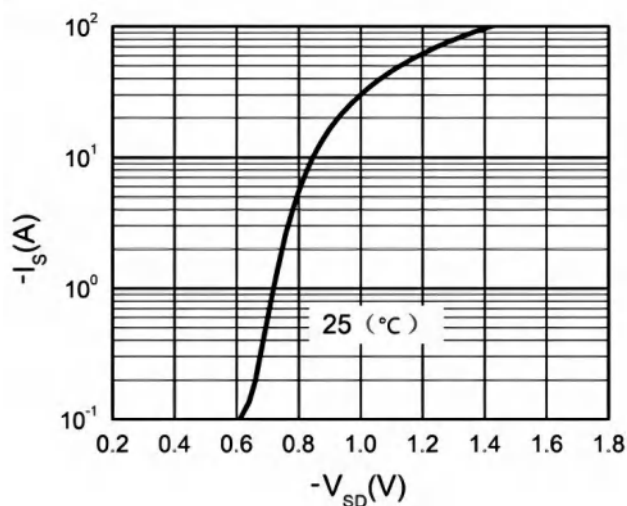


Fig.9 Body Diode Characteristics

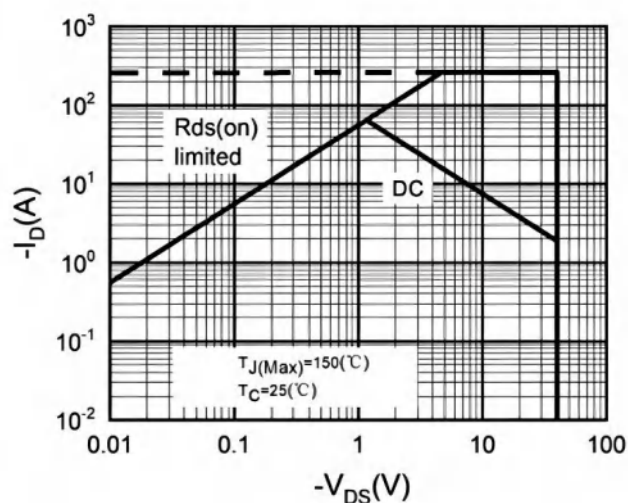
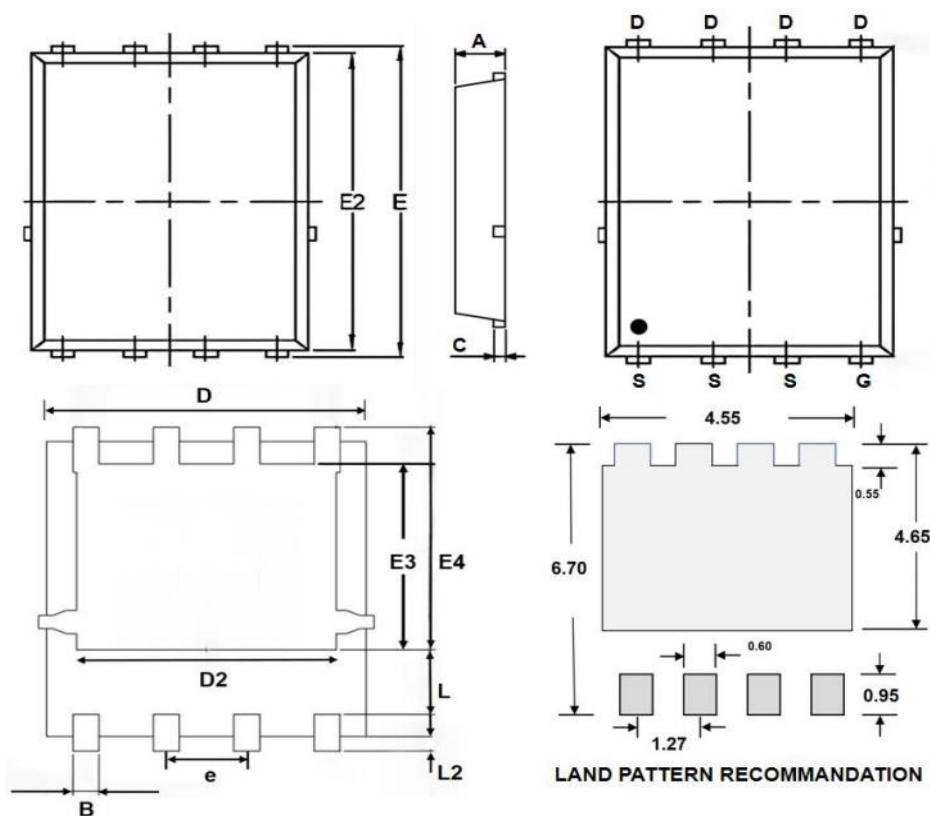


Fig.10 Maximum Safe Operating Area

Ordering Information

Part Number	Package code	Packaging
HSBA4117	PRPAK5*6	3000/Tape&Reel

PRPAK5*6 Package Outline



SYMBOLS	MILLIMETERS			INCHES		
	MIN	NOM	MAX	MIN	NOM	MAX
A	0.80	--	1.20	0.031	--	0.047
B	0.25	--	0.51	0.012	--	0.020
C	0.15	--	0.35	0.006	--	0.014
D	4.80	--	5.45	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	--	6.06	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	--

HSBA4117 Marking:

