

General Description

The HSBA90N12A uses SGT technology to provide excellent $R_{DS(on)}$, low gate charge and fast switching characteristics. This device is suitable for use as a wide variety of applications.

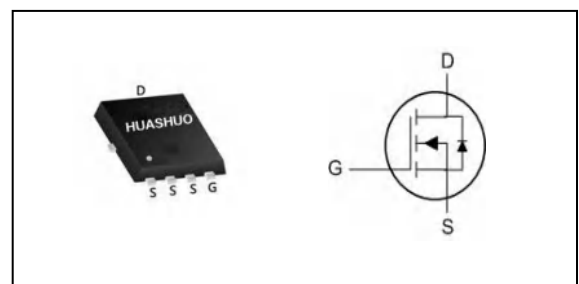
Product Summary

V_{DS}	120	V
$R_{DS(ON),typ}$	6.2	m Ω
I_D	90	A

Features

- 100% EAS Guaranteed
- Low $R_{DS(ON)}$
- Low Gate Charge
- RoHs and Halogen-Free Compliant

PRPAK5*6 Pin Configuration



Absolute Maximum Ratings

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	120	V
V_{GS}	Gate-Source Voltage	± 20	V
$I_D@T_C=25^\circ\text{C}$	Continuous Drain Current ^{1,6}	90	A
$I_D@T_C=100^\circ\text{C}$	Continuous Drain Current ^{1,6}	62	A
I_{DM}	Pulsed Drain Current ²	360	A
EAS	Single Pulse Avalanche Energy ³	508	mJ
I_{AS}	Avalanche Current	42	A
$P_D@T_C=25^\circ\text{C}$	Total Power Dissipation ⁴	140	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 ¹	---	55	$^\circ\text{C/W}$
$R_{\theta JC}$	Thermal Resistance Junction-Case ¹	---	1	$^\circ\text{C/W}$

N-Ch 120V 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	$V_{GS}=0V$, $I_D=250\mu A$	120	---	---	V
$R_{DS(ON)}$	Static Drain-Source On-Resistance ²	$V_{GS}=10V$, $I_D=20A$	---	6.2	7.8	$m\Omega$
$V_{GS(th)}$	Gate Threshold Voltage	$V_{GS}=V_{DS}$, $I_D=250\mu A$	2	3	4	V
I_{DSS}	Drain-Source Leakage Current	$V_{DS}=120V$, $V_{GS}=0V$, $T_J=25^{\circ}\text{C}$	---	---	1	μA
		$V_{DS}=120V$, $V_{GS}=0V$, $T_J=55^{\circ}\text{C}$	---	---	5	
I_{GSS}	Gate-Source Leakage Current	$V_{GS}=\pm 20V$, $V_{DS}=0V$	---	---	± 100	nA
g_{fs}	Forward Transconductance	$V_{DS}=5V$, $I_D=20A$	---	43	---	S
R_g	Gate Resistance	$V_{DS}=0V$, $V_{GS}=0V$, $f=1\text{MHz}$	---	2	---	Ω
Q_g	Total Gate Charge (10V)	$V_{DS}=60V$, $V_{GS}=10V$, $I_D=20A$	---	53	---	nC
Q_{gs}	Gate-Source Charge		---	12	---	
Q_{gd}	Gate-Drain Charge		---	18	---	
$T_{d(on)}$	Turn-On Delay Time	$V_{DD}=60V$, $V_{GS}=10V$, $R_G=6\Omega$, $I_D=20A$	---	10	---	ns
T_r	Rise Time		---	45	---	
$T_{d(off)}$	Turn-Off Delay Time		---	30	---	
T_f	Fall Time		---	11	---	
C_{iss}	Input Capacitance	$V_{DS}=60V$, $V_{GS}=0V$, $f=1\text{MHz}$	---	3320	---	pF
C_{oss}	Output Capacitance		---	345	---	
C_{rss}	Reverse Transfer Capacitance		---	18	---	

Diode Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
I_S	Continuous Source Current ^{1,5,6}	$V_G=V_D=0V$, Force Current	---	---	90	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	$I_F=20A$, $di/dt=100A/\mu s$, $T_J=25^{\circ}\text{C}$	---	89	---	nS
Q_{rr}	Reverse Recovery Charge		---	112	---	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 $V_{DD}=50V$, $V_{GS}=10V$, $L=0.5mH$, $I_{AS}=42A$

4. The power dissipation is limited by 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. The maximum current rating is package limited.



N-Ch 120V Fast Switching MOSFETs

Typical Characteristics

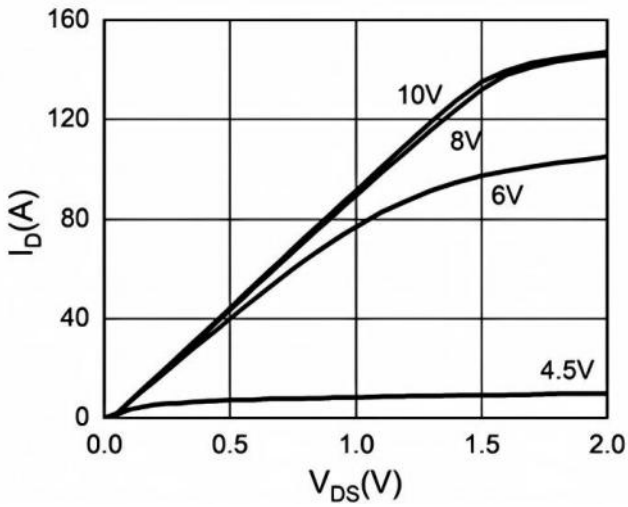


Fig.1 Typical Output Characteristics

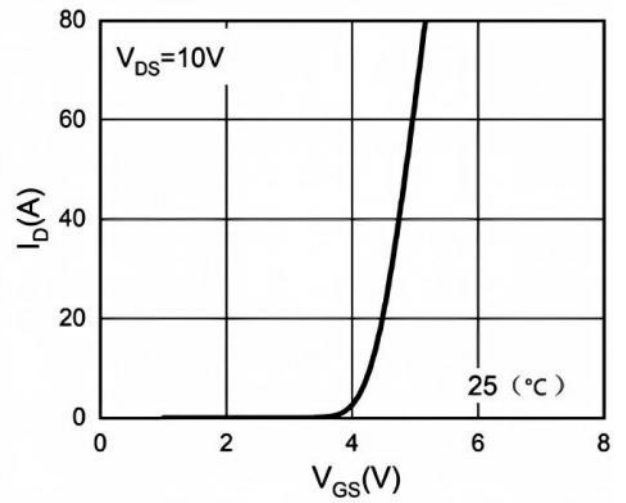


Fig.2 Transfer Characteristics

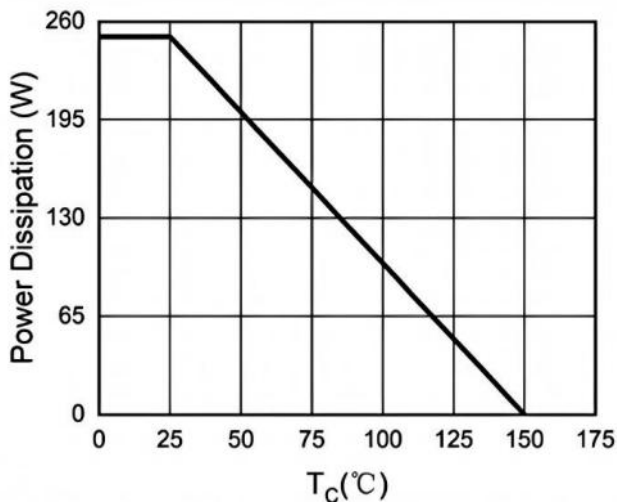


Fig.3 Power Dissipation

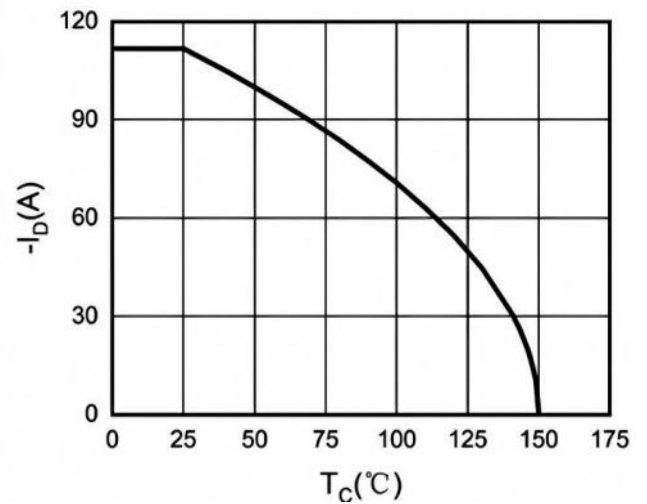


Fig.4 Drain Current

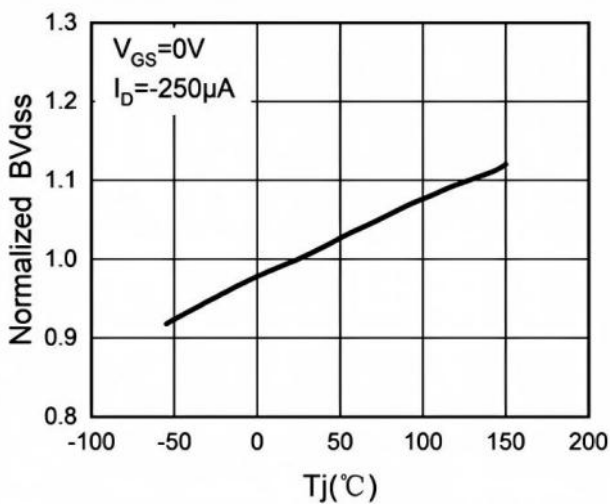


Fig.5 BV_DS vs Junction Temperature

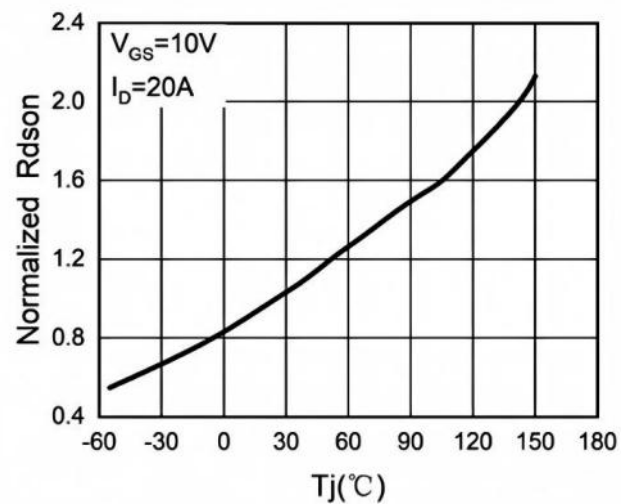


Fig.6 R_DS(ON) vs Junction Temperature



N-Ch 120V Fast Switching MOSFETs

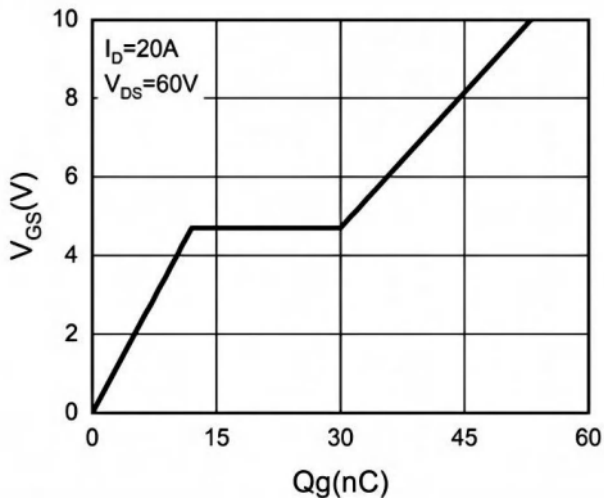


Fig.7 Gate Charge Waveforms

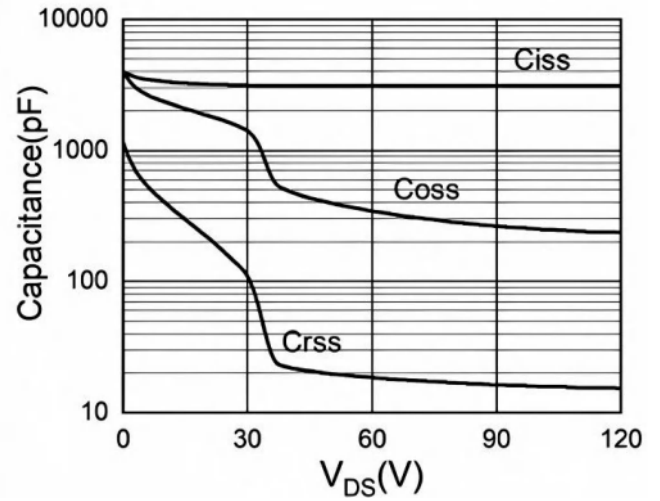


Fig.8 Capacitance

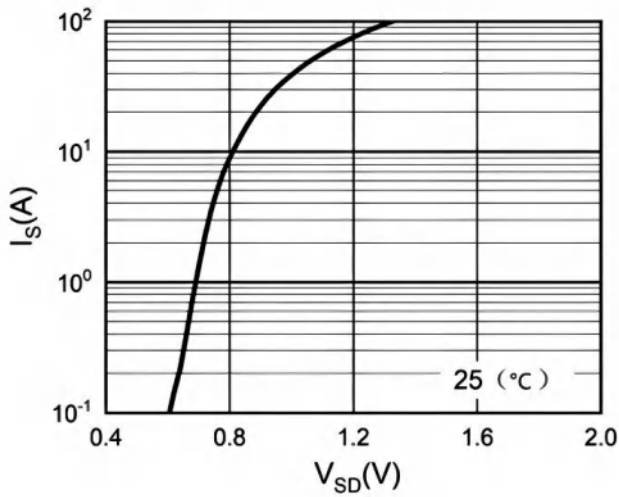


Fig.9 Body Diode Characteristics

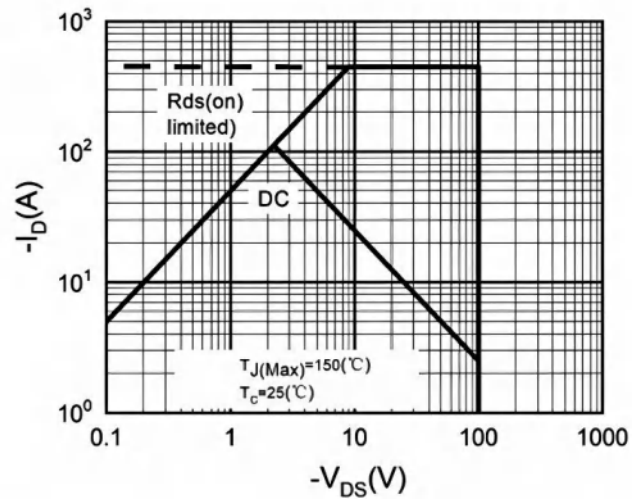
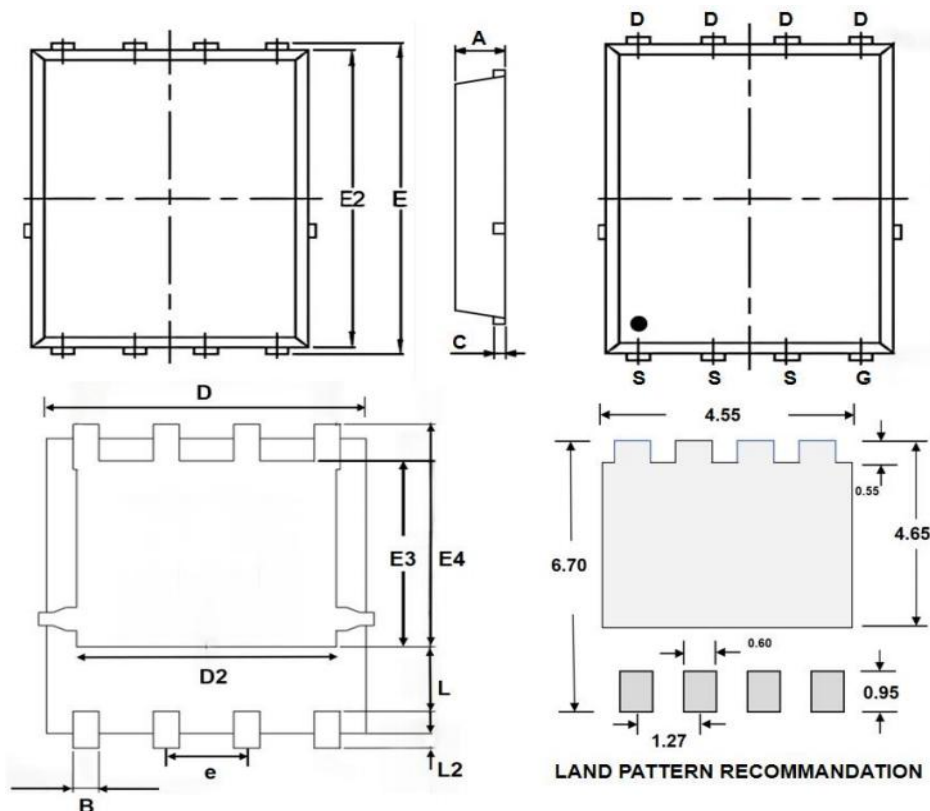


Fig.10 Maximum Safe Operating Area

Ordering Information

Part Number	Package code	Packaging
HSBA90N12A	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	--

HSBA90N12A Marking:

