

Description

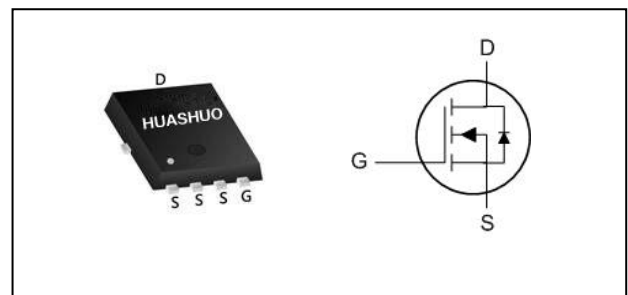
The HSBA90N02 is the high cell density trenched N-ch MOSFETs, which provide excellent RDSON and gate charge for most of the synchronous buck converter applications.

The HSBA90N02 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
- Battery protection
- Power management

Product Summary

V_{DS}	20	V
$R_{DS(ON),typ}$	2.9	m Ω
I_D	90	A

PRPAK5*6 Pin Configuration

Absolute Maximum Ratings

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	20	V
V_{GS}	Gate-Source Voltage	± 12	V
$I_D@T_C=25^\circ\text{C}$	Continuous Drain Current, $V_{GS} @ 10V^1$	90	A
$I_D@T_C=100^\circ\text{C}$	Continuous Drain Current, $V_{GS} @ 10V^1$	63	A
I_{DM}	Pulsed Drain Current ²	350	A
EAS	Single Pulse Avalanche Energy ³	195	mJ
$P_D@T_C=25^\circ\text{C}$	Total Power Dissipation ⁴	60	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 (Steady State) ¹	---	62	$^\circ\text{C/W}$
$R_{\theta JC}$	Thermal Resistance Junction-Case ¹	---	2.1	$^\circ\text{C/W}$



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

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
BV _{DSS}	Drain-Source Breakdown Voltage	V _{GS} =0V, I _D =250uA	20	---	---	V
ΔBV _{DSS} /ΔT _J	BVDSS Temperature Coefficient	Reference to 25°C, I _D =1mA	---	0.028	---	V/°C
R _{DS(ON)}	Static Drain-Source On-Resistance ²	V _{GS} =4.5V, I _D =20A	---	2.9	3.8	mΩ
		V _{GS} =2.5V, I _D =15A	---	3.4	4.5	
V _{GS(th)}	Gate Threshold Voltage	V _{GS} =V _{DS} , I _D =250uA	0.5	---	1.0	V
ΔV _{GS(th)}	V _{GS(th)} Temperature Coefficient		---	-6.16	---	mV/°C
I _{DSS}	Drain-Source Leakage Current	V _{DS} =20V, V _{GS} =0V, T _J =25°C	---	---	1	uA
		V _{DS} =20V, V _{GS} =0V, T _J =55°C	---	---	5	
I _{GSS}	Gate-Source Leakage Current	V _{GS} = ± 12V, V _{DS} =0V	---	---	± 100	nA
g _{fs}	Forward Transconductance	V _{DS} =10V, I _D =20A	---	99	---	S
R _g	Gate Resistance	V _{DS} =0V, V _{GS} =0V, f=1MHz	---	1.7	---	Ω
Q _g	Total Gate Charge (4.5V)	V _{DS} =20V, V _{GS} =10V, I _D =20A	---	37	---	nC
Q _{gs}	Gate-Source Charge		---	5.5	---	
Q _{gd}	Gate-Drain Charge		---	8.2	---	
T _{d(on)}	Turn-On Delay Time	V _{DD} =10V, V _{GS} =4.5V, R _G =3.3Ω I _D =20A	---	10	---	ns
T _r	Rise Time		---	5.5	---	
T _{d(off)}	Turn-Off Delay Time		---	49	---	
T _f	Fall Time		---	5.3	---	
C _{iss}	Input Capacitance	V _{DS} =10V, V _{GS} =0V, f=1MHz	---	3050	---	pF
C _{oss}	Output Capacitance		---	360	---	
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, Force Current	---	---	90	A
I _{SM}	Pulsed Source Current ^{2,5}		---	---	350	A
V _{SD}	Diode Forward Voltage ²	V _{GS} =0V, I _S =20A, T _J =25°C	---	---	1.0	V
t _{rr}	Reverse Recovery Time	I _F =20A, dI/dt=100A/μs, T _J =25°C	---	16	---	nS
Q _{rr}	Reverse Recovery Charge		---	6.6	---	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}=10V, V_{GS}=10V, L=0.5mH
- 4.The power dissipation is limited by 175°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

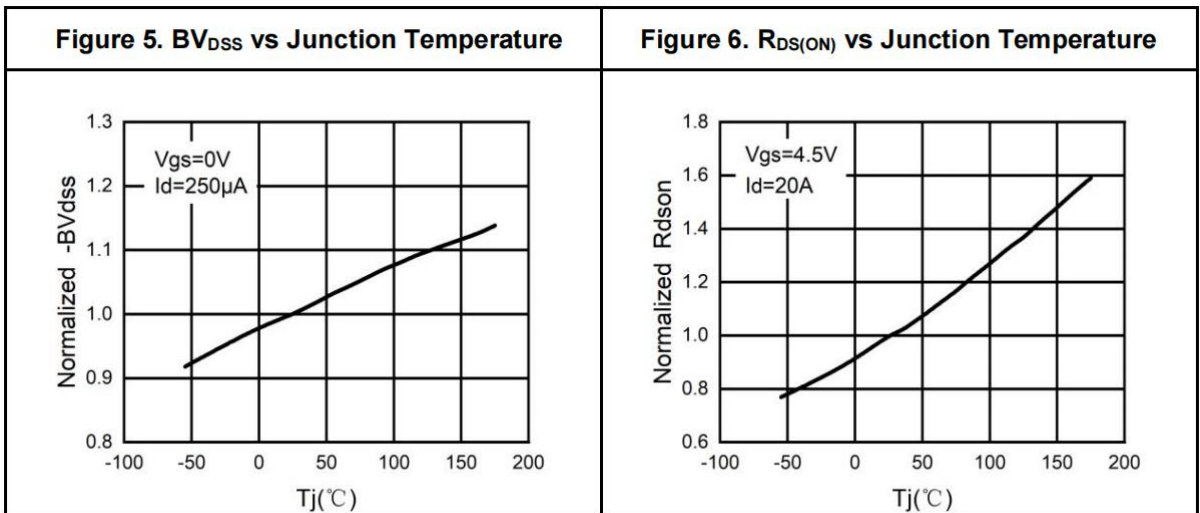
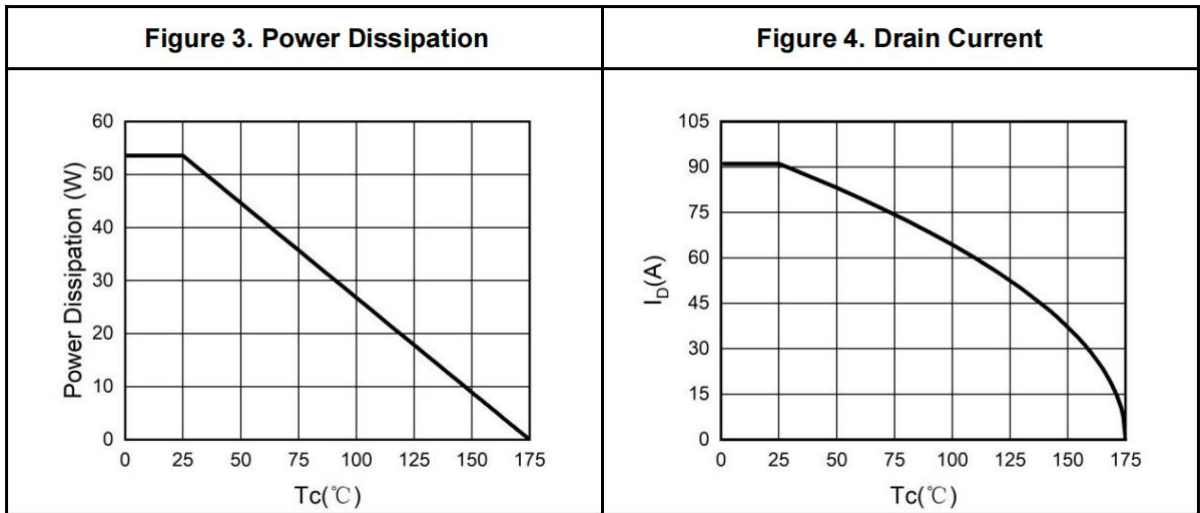
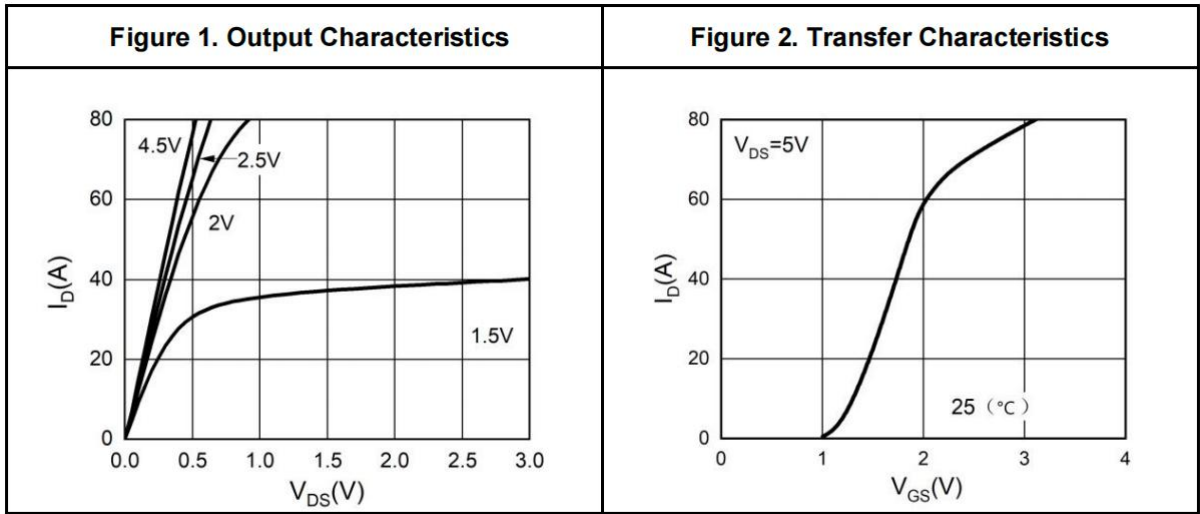




Figure 7. Gate Charge Waveforms

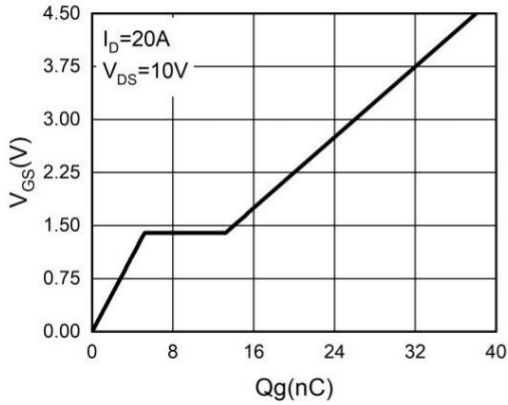


Figure 8. Capacitance

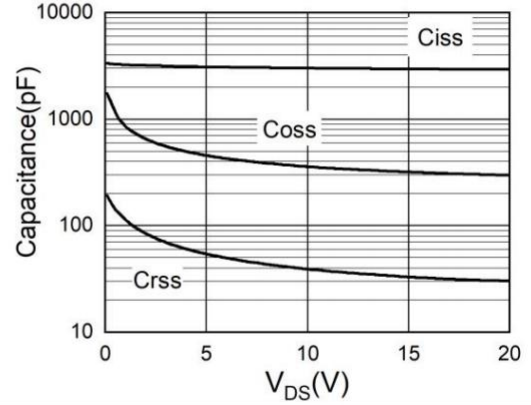


Figure 9. Body-Diode Characteristics

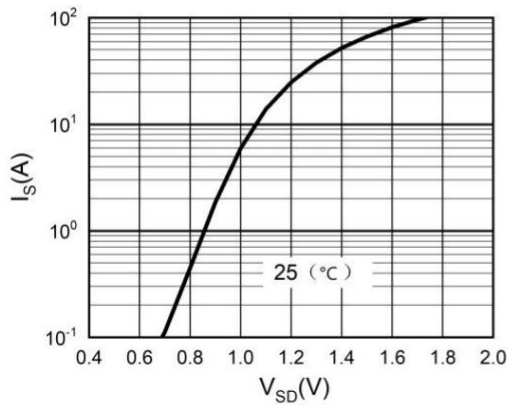
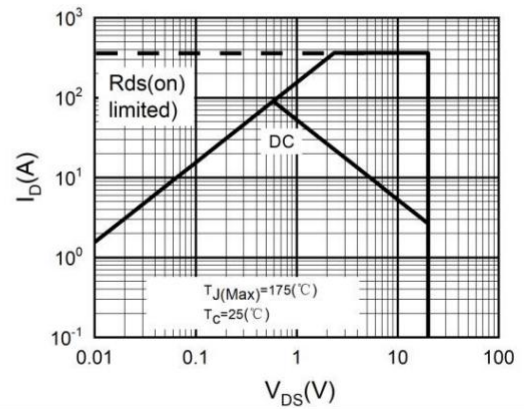


Figure 10. Maximum Safe Operating Area

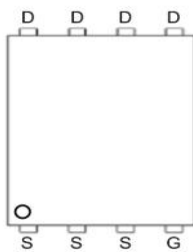
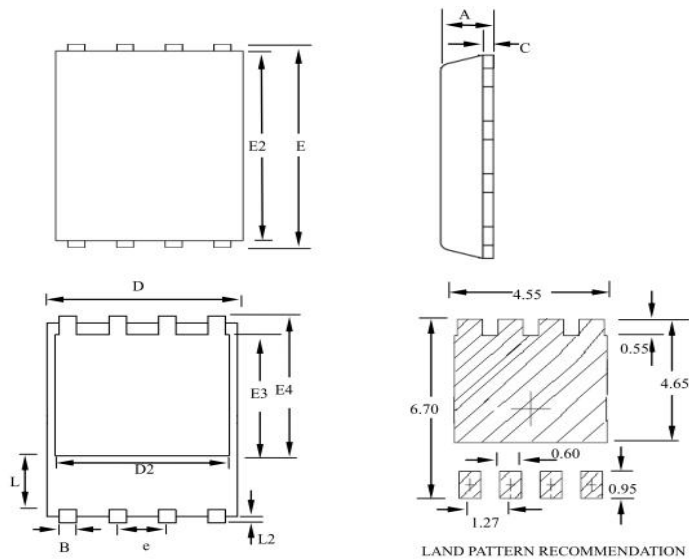




Ordering Information

Part Number	Package code	Packaging
HSBA90N02	PRPAK5*6	3000/Tape&Reel

PRPAK5*6 Outline



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	--