

General Description

The HSM20N02 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 HSM20N02 meet the RoHS and Green Product requirement, 100% EAS guaranteed with full function reliability approved.

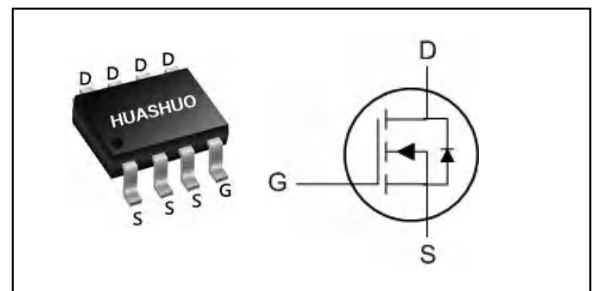
Features

- 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	20	A

SOP-8 Pin Configuration



Absolute Maximum Ratings

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	20	V
V_{GS}	Gate-Source Voltage	± 12	V
$I_D@T_C=25^{\circ}C$	Continuous Drain Current, $V_{GS} @ 10V^1$	20	A
$I_D@T_C=70^{\circ}C$	Continuous Drain Current, $V_{GS} @ 10V^1$	16	A
I_{DM}	Pulsed Drain Current ²	140	A
EAS	Single Pulse Avalanche Energy ³	160	mJ
$P_D@T_C=25^{\circ}C$	Total Power Dissipation ⁴	3.1	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 (Steady State) ¹	---	75	$^{\circ}C/W$
$R_{\theta JA}$	Thermal Resistance Junction-Ambient ¹ ($t \leq 10s$)	---	40	$^{\circ}C/W$
$R_{\theta JC}$	Thermal Resistance Junction-Case ¹	---	24	$^{\circ}C/W$



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

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
BV_{DSS}	Drain-Source Breakdown Voltage	$V_{GS}=0V$, $I_D=250\mu A$	20	---	---	V
$R_{DS(ON)}$	Static Drain-Source On-Resistance ²	$V_{GS}=4.5V$, $I_D=20A$	---	2.9	5.5	$m\Omega$
		$V_{GS}=2.5V$, $I_D=10A$	---	3.5	7	
$V_{GS(th)}$	Gate Threshold Voltage	$V_{GS}=V_{DS}$, $I_D=250\mu A$	0.5	0.75	1.2	V
$\Delta V_{GS(th)}$	$V_{GS(th)}$ Temperature Coefficient		---	-6.16	---	$mV/^\circ C$
I_{DSS}	Drain-Source Leakage Current	$V_{DS}=20V$, $V_{GS}=0V$, $T_J=25^\circ C$	---	---	1	μA
		$V_{DS}=20V$, $V_{GS}=0V$, $T_J=55^\circ C$	---	---	5	
I_{GSS}	Gate-Source Leakage Current	$V_{GS}=\pm 12V$, $V_{DS}=0V$	---	---	± 100	nA
Q_g	Total Gate Charge (4.5V)	$V_{DS}=10V$, $V_{GS}=4.5V$, $I_D=10A$	---	83	---	nC
Q_{gs}	Gate-Source Charge		---	5	---	
Q_{gd}	Gate-Drain Charge		---	11	---	
$T_{d(on)}$	Turn-On Delay Time	$V_{DD}=10V$, $V_{GS}=4.5V$, $R_G=3.3\Omega$ $I_D=2A$	---	7	---	ns
T_r	Rise Time		---	18	---	
$T_{d(off)}$	Turn-Off Delay Time		---	30	---	
T_f	Fall Time		---	16	---	
C_{iss}	Input Capacitance	$V_{DS}=10V$, $V_{GS}=0V$, $f=1MHz$	---	3400	---	pF
C_{oss}	Output Capacitance		---	500	---	
C_{rss}	Reverse Transfer Capacitance		---	80	---	

Diode Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
I_S	Continuous Source Current ^{1,5}	$V_G=V_D=0V$, Force Current	---	---	20	A
V_{SD}	Diode Forward Voltage ²	$V_{GS}=0V$, $I_S=10A$, $T_J=25^\circ C$	---	---	1.2	V

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 power dissipation is limited by $175^\circ C$ junction temperature

4.The data is theoretically the same as I_D and I_{DM} , in real applications , should be limited by total power dissipation.



Typical Characteristics

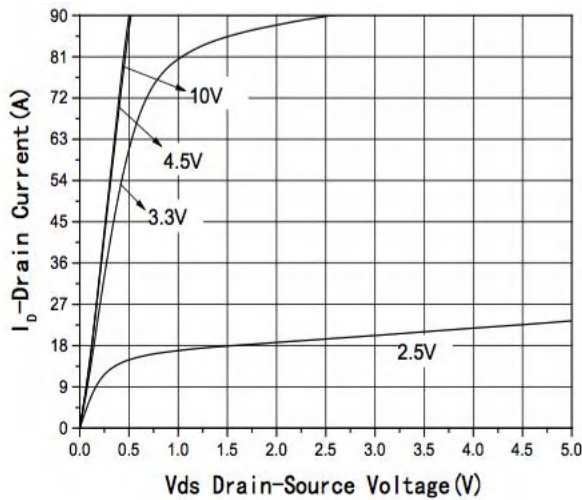


Fig1 Output Characteristics

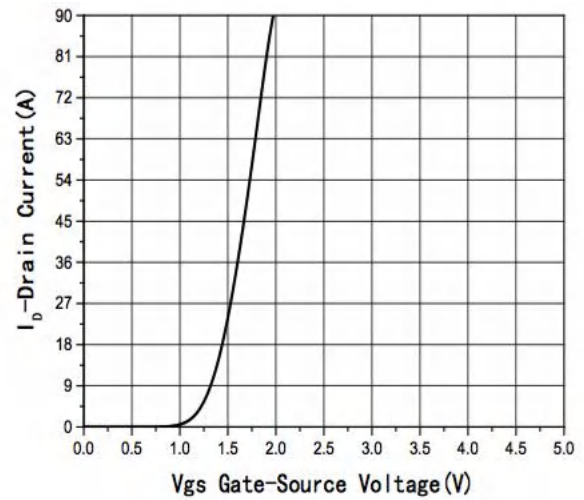


Fig2 Transfer Characteristics

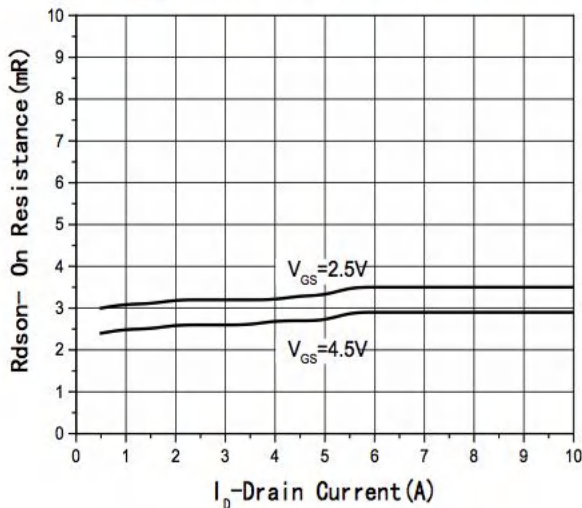


Fig3 Rdson-Drain current

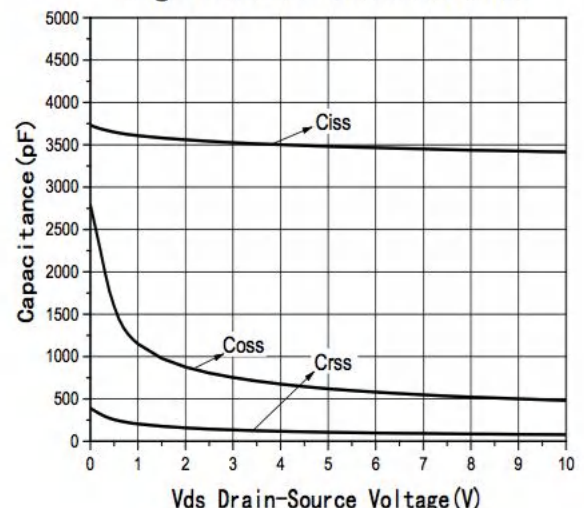


Fig4 Capacitance vs Vds

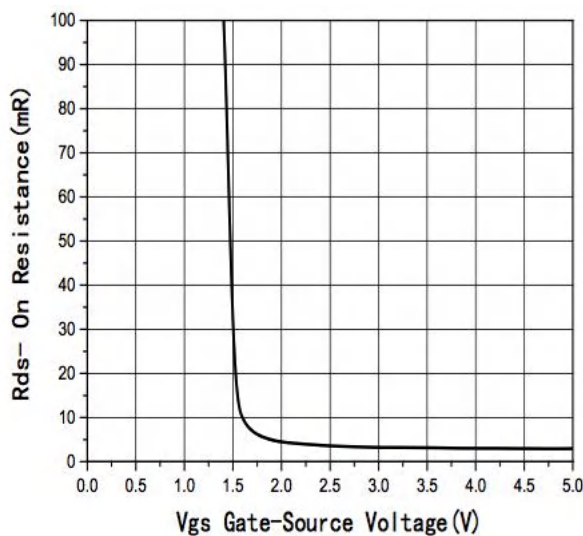


Fig5 Rdson-Gate Drain voltage

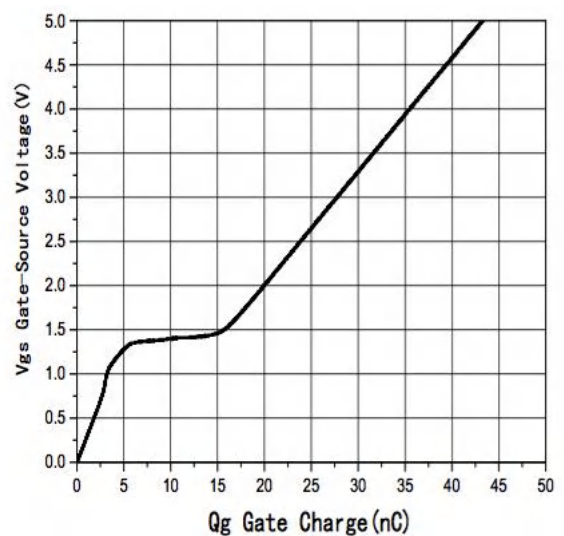


Fig6 Gate Charge

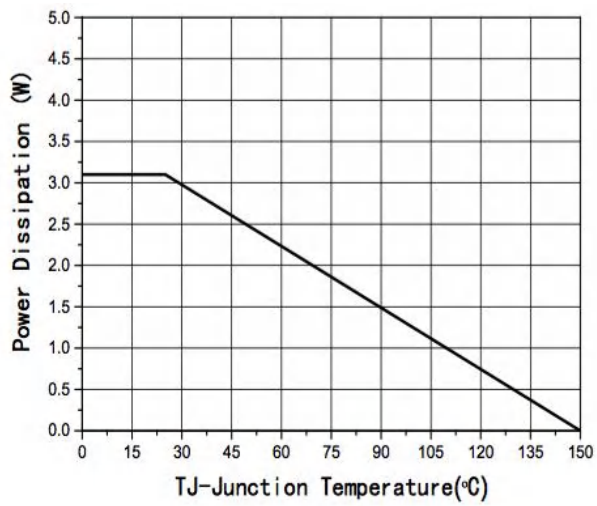


Fig7 Power De-rating

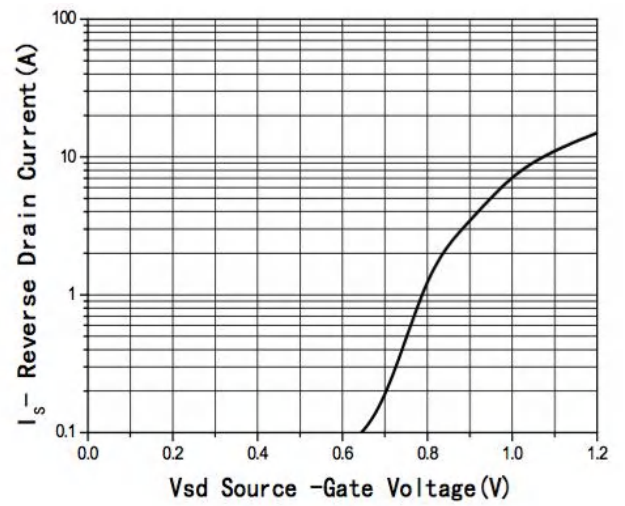


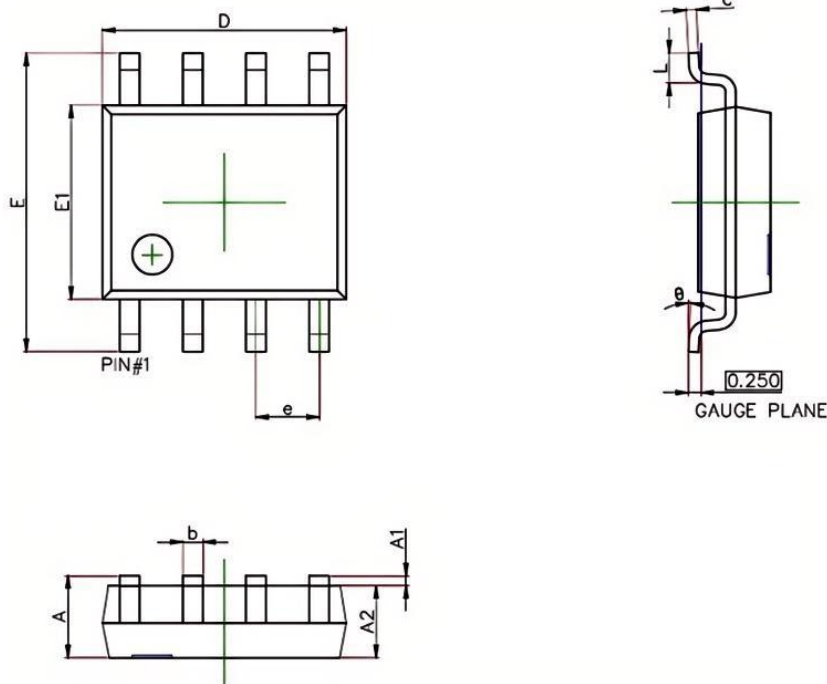
Fig8 Source-Drain Diode Forward



Ordering Information

Part Number	Package code	Packaging
HSM20N02	SOP-8	4000/Tape&Reel

SOP-8 Package Outline



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	1.350	1.750	0.053	0.069
A1	0.100	0.250	0.004	0.010
A2	1.350	1.550	0.053	0.061
b	0.330	0.510	0.013	0.020
C	0.170	0.250	0.007	0.010
D	4.800	5.000	0.189	0.197
e	1.270 (BSC)		0.050(BSC)	
E	5.800	6.200	0.228	0.244
E1	3.800	4.000	0.150	0.157
L	0.400	1.270	0.016	0.050
θ	0°	8°	0°	8°



HSM20N02 Marking:

