

N-Ch 200V Fast Switching MOSFETs Product Summary

General Description

The HSH200N02 is the highest performance trench N-ch MOSFETs with extreme high cell density, which provide excellent $R_{DS(on)}$ and gate charge for most of the synchronous buck converter applications.

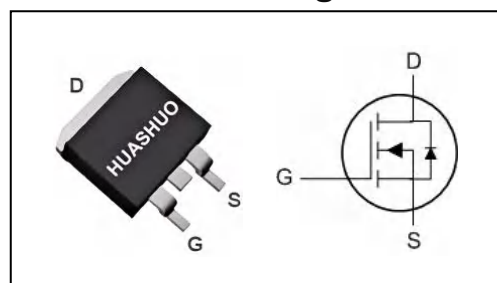
The HSH200N02 meet the RoHS and Green Product requirement, 100% EAS guaranteed with full function reliability approved.

V_{DS}	200	V
$R_{DS(on),typ}$	27	m Ω
I_D	70	A

Features

- Power Switching application
- Green Device Available
- Excellent $C_{dv/dt}$ effect decline
- Advanced high cell density Trench Technology

TO-263 Pin Configuration



Absolute Maximum Ratings

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	200	V
V_{GS}	Gate-Source Voltage	± 20	V
$I_D@T_C=25^{\circ}C$	Continuous Drain Current, $V_{GS} @ 10V^1$	70	A
$I_D@T_C=100^{\circ}C$	Continuous Drain Current, $V_{GS} @ 10V^1$	46	A
I_{DM}	Pulsed Drain Current ²	252	A
EAS	Single Pulse Avalanche Energy ³	580	mJ
$P_D@T_C=25^{\circ}C$	Total Power Dissipation ³	200	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	---	60	$^{\circ}C/W$
$R_{\theta JC}$	Thermal Resistance Junction-Case ¹	---	0.55	$^{\circ}C/W$

N-Ch 200V Fast Switching MOSFETs
Electrical Characteristics ($T_J=25^\circ\text{C}$, unless otherwise noted)

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
BV_{DSS}	Drain-Source Breakdown Voltage	$V_{GS}=0V$, $I_D=250\mu A$	200	---	---	V
$R_{DS(ON)}$	Static Drain-Source On-Resistance ²	$V_{GS}=10V$, $I_D=30A$	---	27	33	$m\Omega$
$V_{GS(th)}$	Gate Threshold Voltage	$V_{GS}=V_{DS}$, $I_D=250\mu A$	2	3	4	V
I_{DSS}	Drain-Source Leakage Current	$V_{DS}=160V$, $V_{GS}=0V$, $T_J=25^\circ\text{C}$	---	---	1	μA
		$V_{DS}=160V$, $V_{GS}=0V$, $T_J=55^\circ\text{C}$	---	---	5	
I_{GSS}	Gate-Source Leakage Current	$V_{GS}=\pm 20V$, $V_{DS}=0V$	---	---	± 100	nA
R_g	Gate Resistance	$V_{DS}=0V$, $V_{GS}=0V$, $f=1\text{MHz}$	---	3	---	Ω
Q_g	Total Gate Charge (10V)	$V_{DS}=100V$, $V_{GS}=10V$, $I_D=30A$	---	110	---	nC
Q_{gs}	Gate-Source Charge		---	32	---	
Q_{gd}	Gate-Drain Charge		---	38	---	
$T_{d(on)}$	Turn-On Delay Time	$V_{DD}=100V$, $V_{GS}=10V$, $R_G=2.5\Omega$ $I_D=30A$	---	30	---	ns
T_r	Rise Time		---	18	---	
$T_{d(off)}$	Turn-Off Delay Time		---	22	---	
T_f	Fall Time		---	33	---	
C_{iss}	Input Capacitance	$V_{DS}=25V$, $V_{GS}=0V$, $f=1\text{MHz}$	---	5082	---	pF
C_{oss}	Output Capacitance		---	343	---	
C_{rss}	Reverse Transfer Capacitance		---	129	---	

Diode Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
I_S	Continuous Source Current ^{1,5}	$V_G=V_D=0V$, Force Current	---	---	70	A
I_{SM}	Pulsed Source Current ^{2,5}		---	---	252	A
V_{SD}	Diode Forward Voltage ²	$V_{GS}=0V$, $I_S=30A$, $T_J=25^\circ\text{C}$	---	---	1.2	V
t_{rr}	Reverse Recovery Time	$I_F=30A$, $dI/dt=100A/\mu s$, $T_J=25^\circ\text{C}$	---	47	---	nS
Q_{rr}	Reverse Recovery Charge		---	81	---	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 $V_{DD}=25V$, $V_{GS}=10V$, $L=0.3mH$
- 4.The power dissipation is limited by 150°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

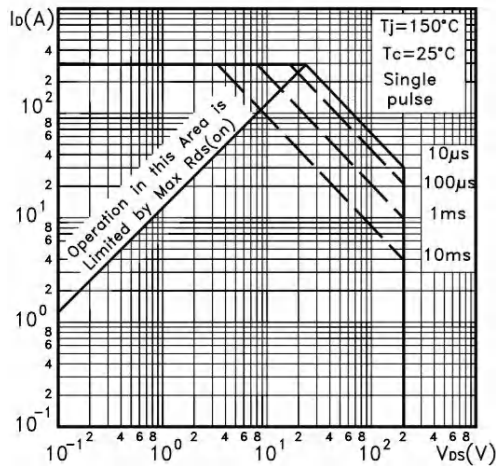


Fig.1 Safe operating area for TO-220

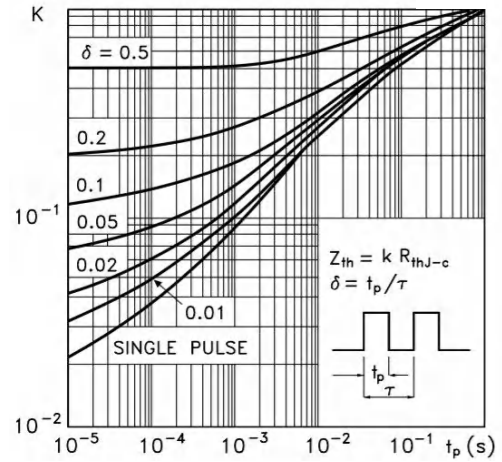


Fig.2 Thermal impedance for TO-220

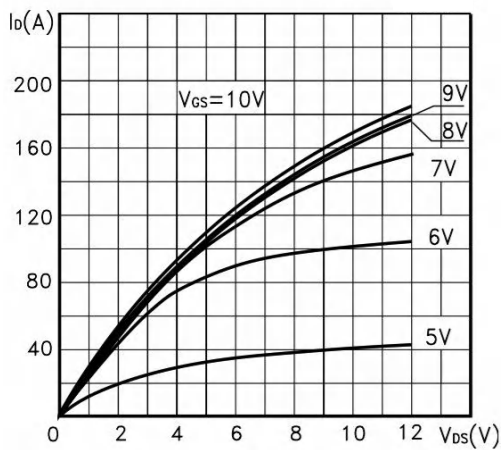


Fig.3 Output characteristics

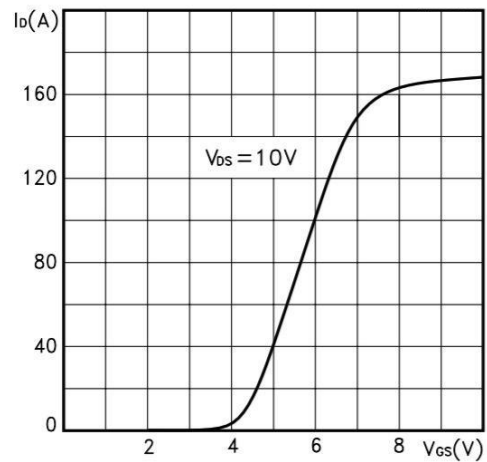


Fig.4 Transfer characteristics

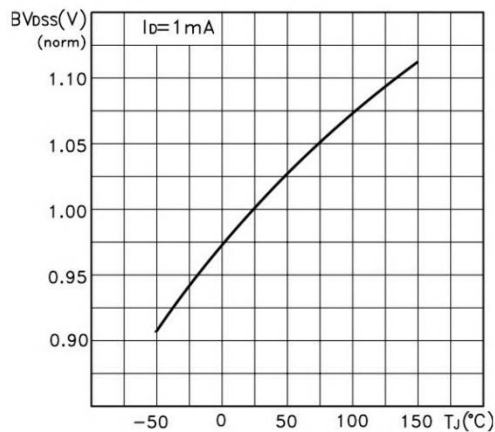


Fig.5 Normalized BVDSS vs temperature

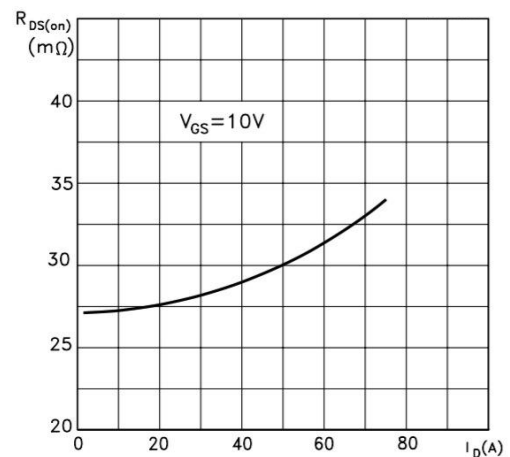


Fig.6 Static drain-source on resistance

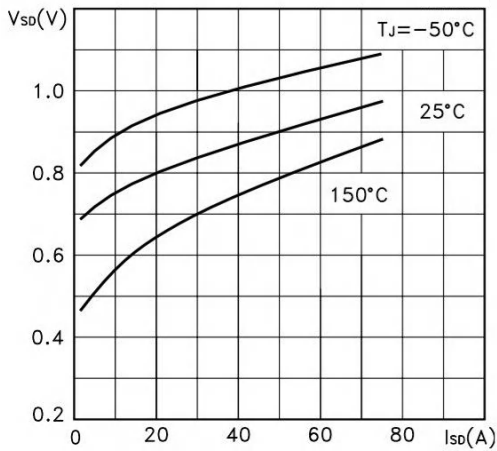


Fig.7 Source-drain diode forward characteristics

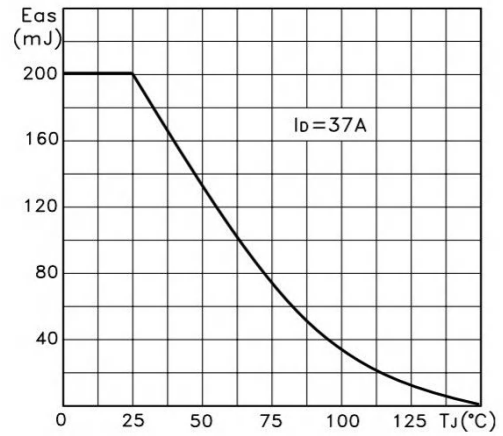


Fig.8 Avalanche energy vs starting T_J

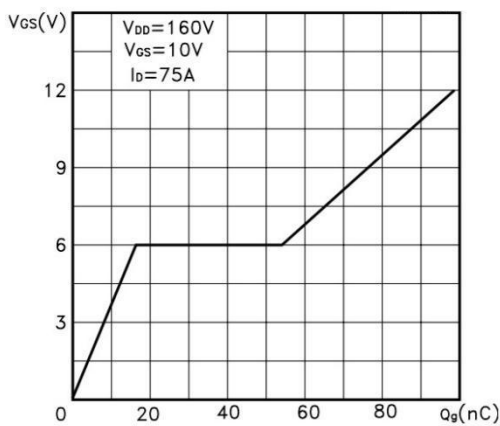


Fig.9 Gate charge vs gate-source voltage

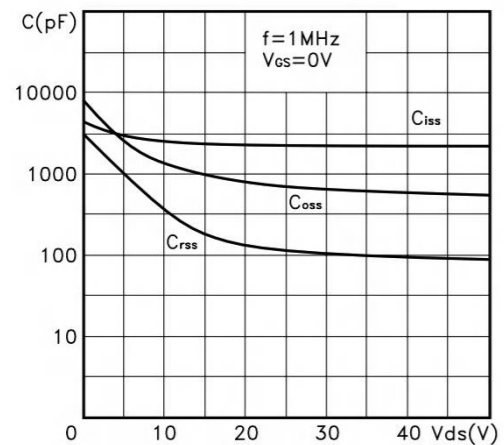


Fig.10 Capacitance variations

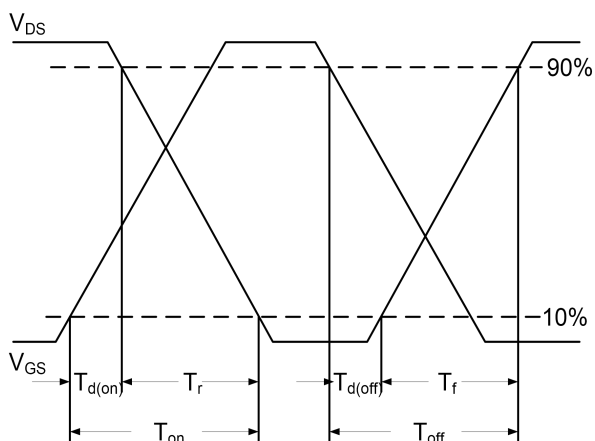


Fig.11 Switching Time Waveform

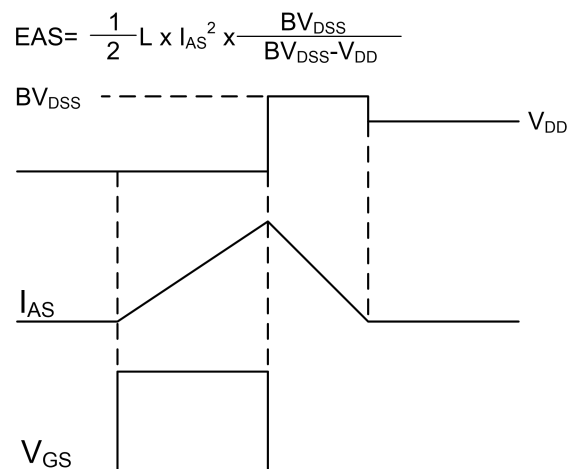


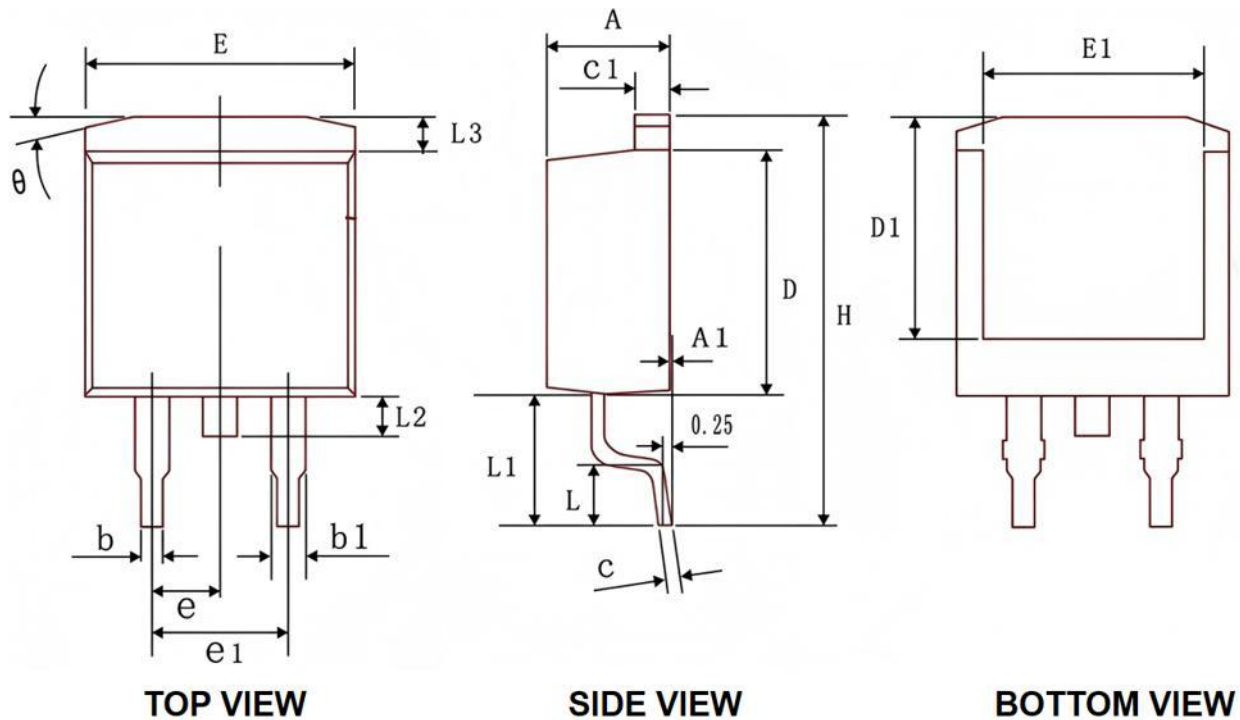
Fig.12 Unclamped Inductive Switching Waveform



Ordering Information

Part Number	Package code	Packaging
HSH200N02	TO-263	800/Tape&Reel

TO-263 Package Outline



COMMON DIMENSIONS(UNIT OF MEASURE - MM)

SYMBOL	MIN	NOM	MAX
A	4.37	4.57	4.77
A1	0.00	-	0.25
b	0.70	0.83	0.96
b1	1.00	1.24	1.47
C	0.35	0.45	0.55
C1	1.25	1.30	1.35
D	8.50	8.90	9.30
D1	7.50	8.00	8.50
H	14.7	15.20	15.7
E	9.80	10.08	10.4
E1	7.35	7.80	8.25
e1	4.93	5.08	5.23
L	2.00	2.30	2.60
L1	4.50	4.75	5.00
L2	1.30	1.53	1.75
L3	1.10	1.29	1.47
e	2.54 BSC		
θ	13°TYP		



HSH200N02 Marking:

