

N-Ch 200V Fast Switching MOSFETs Product Summary

General Description

The HSH18N20 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.

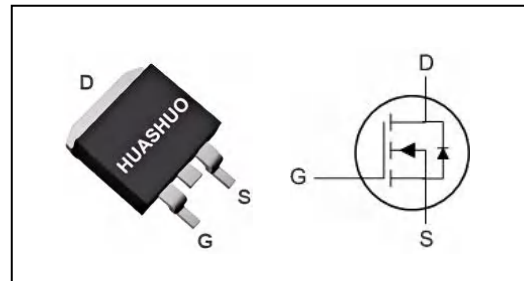
The HSH18N20 meet the RoHS and Green Product requirement, 100% EAS guaranteed with full function reliability approved.

V_{DS}	200	V
$R_{DS(ON),max}$	170	m Ω
I_D	18	A

Features

- Super Low Gate Charge
- 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
$I_D@T_C=25^\circ\text{C}$	Continuous Drain Current, $V_{GS} @ 10V^1$	18	A
$I_D@T_C=100^\circ\text{C}$	Continuous Drain Current, $V_{GS} @ 10V^1$	11.7	A
I_{DM}	Pulsed Drain Current ²	40	A
EAS	Single Pulse Avalanche Energy ³	15	mJ
I_{AS}	Avalanche Current	10	A
$P_D@T_C=25^\circ\text{C}$	Total Power Dissipation ³	83	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	---	60	$^\circ\text{C}/\text{W}$
$R_{\theta JC}$	Thermal Resistance Junction-Case ¹	---	1.1	$^\circ\text{C}/\text{W}$

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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	200	---	---	V
R _{DS(ON)}	Static Drain-Source On-Resistance ²	V _{GS} =10V, I _D =9A	---	---	170	mΩ
	Static Drain-Source On-Resistance ²	V _{GS} =4.5V, I _D =9A	---	---	180	mΩ
V _{GS(th)}	Gate Threshold Voltage	V _{GS} =V _{DS} , I _D =250uA	1.2	1.7	2.5	V
I _{DSS}	Drain-Source Leakage Current	V _{DS} =160V, V _{GS} =0V, T _J =25°C	---	---	1	uA
		V _{DS} =160V, V _{GS} =0V, T _J =55°C	---	---	5	
I _{GSS}	Gate-Source Leakage Current	V _{GS} =±20V, V _{DS} =0V	---	---	±100	nA
g _{fs}	Forward Transconductance	V _{DS} =5V, I _D =9A	---	22	---	S
R _g	Gate Resistance	V _{DS} =0V, V _{GS} =0V, f=1MHz	---	2	---	Ω
Q _g	Total Gate Charge (10V)	V _{DS} =80V, V _{GS} =10V, I _D =9A	---	45	---	nC
Q _{gs}	Gate-Source Charge		---	9	---	
Q _{gd}	Gate-Drain Charge		---	10.5	---	
T _{d(on)}	Turn-On Delay Time	V _{DD} =50V, V _{GS} =10V, R _G =3.3Ω I _D =9A	---	13	---	ns
T _r	Rise Time		---	8.2	---	
T _{d(off)}	Turn-Off Delay Time		---	25	---	
T _f	Fall Time		---	11	---	
C _{iss}	Input Capacitance	V _{DS} =25V, V _{GS} =0V, f=1MHz	---	2047	---	pF
C _{oss}	Output Capacitance		---	109	---	
C _{rss}	Reverse Transfer Capacitance		---	70	---	

Diode Characteristics

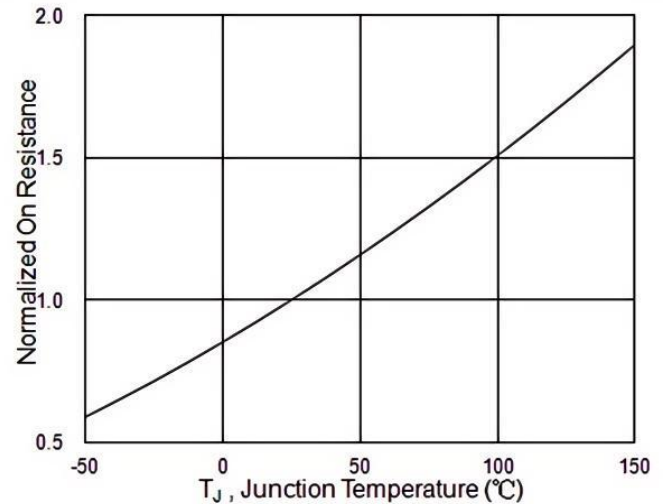
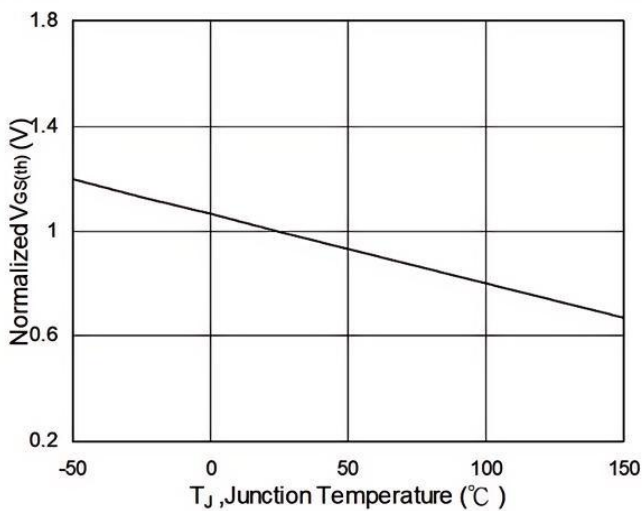
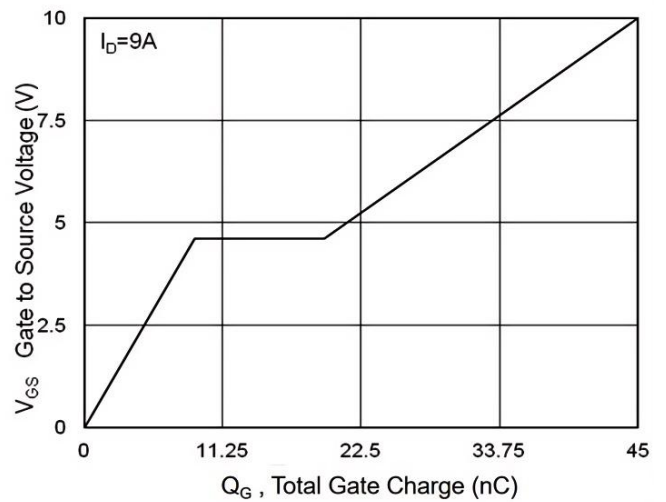
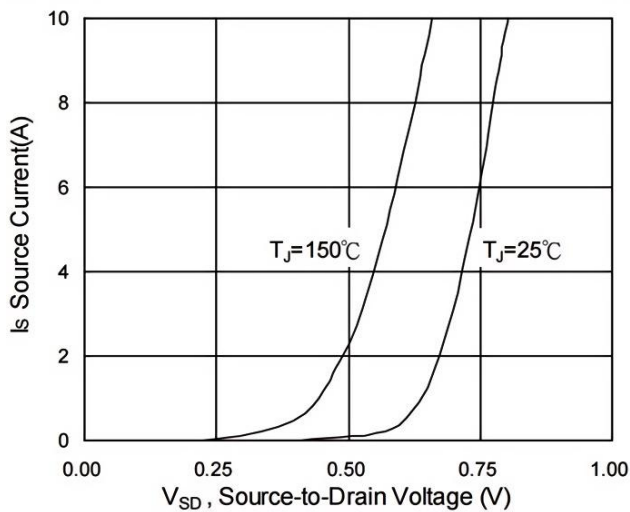
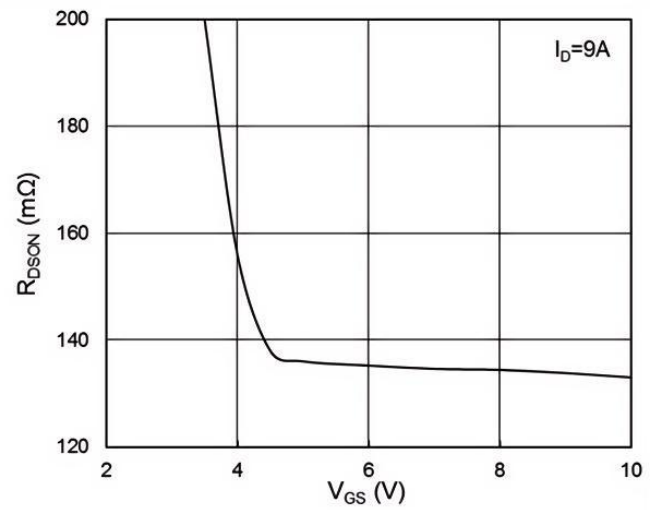
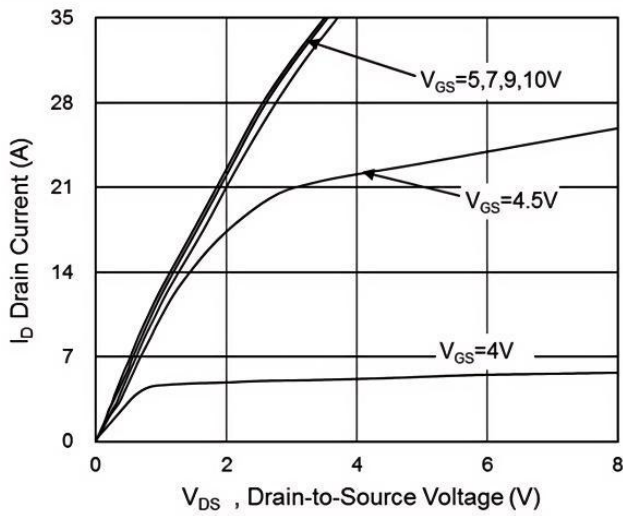
Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
I _S	Continuous Source Current ^{1,5}	V _G =V _D =0V, Force Current	---	---	18	A
I _{SM}	Pulsed Source Current ^{2,5}		---	---	40	A
V _{SD}	Diode Forward Voltage ²	V _{GS} =0V, I _S =1A, T _J =25°C	---	---	1.2	V
t _{rr}	Reverse Recovery Time	I _F =10A, dI/dt=100A/μs, T _J =25°C	---	37	---	nS
Q _{rr}	Reverse Recovery Charge	T _J =25°C	---	103	---	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 ≤ 300us , duty cycle ≤ 2%
- 3.The EAS data shows Max. rating . The test condition is V_{DD}=25V, V_{GS}=10V, L=0.3mH, I_{AS}=10A
- 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





N-Ch 200V Fast Switching MOSFETs

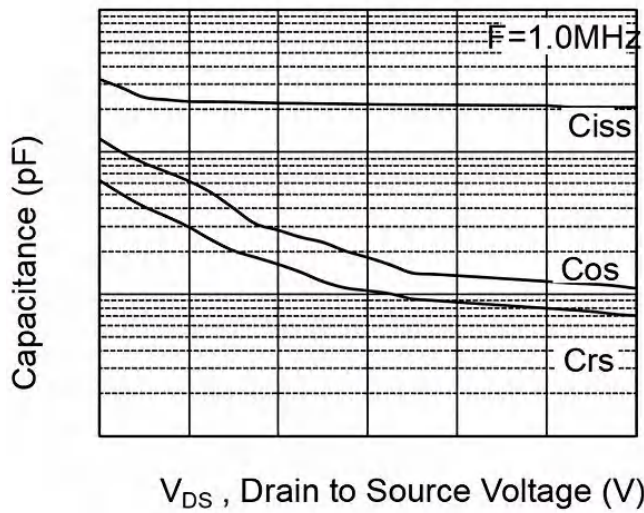


Fig.7 Capacitance

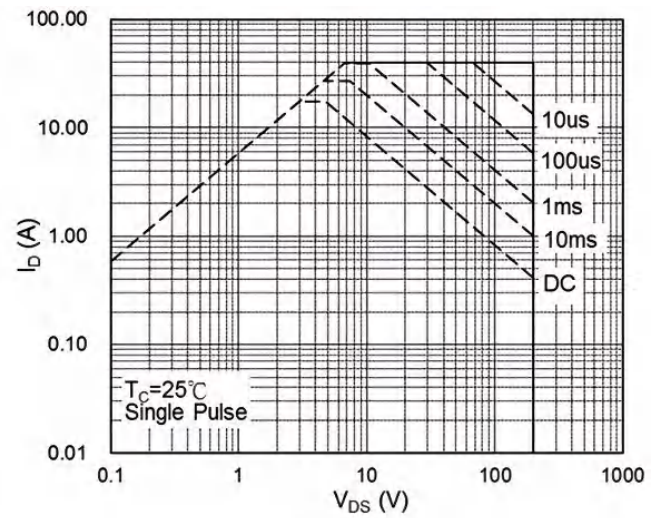


Fig.8 Safe Operating Area

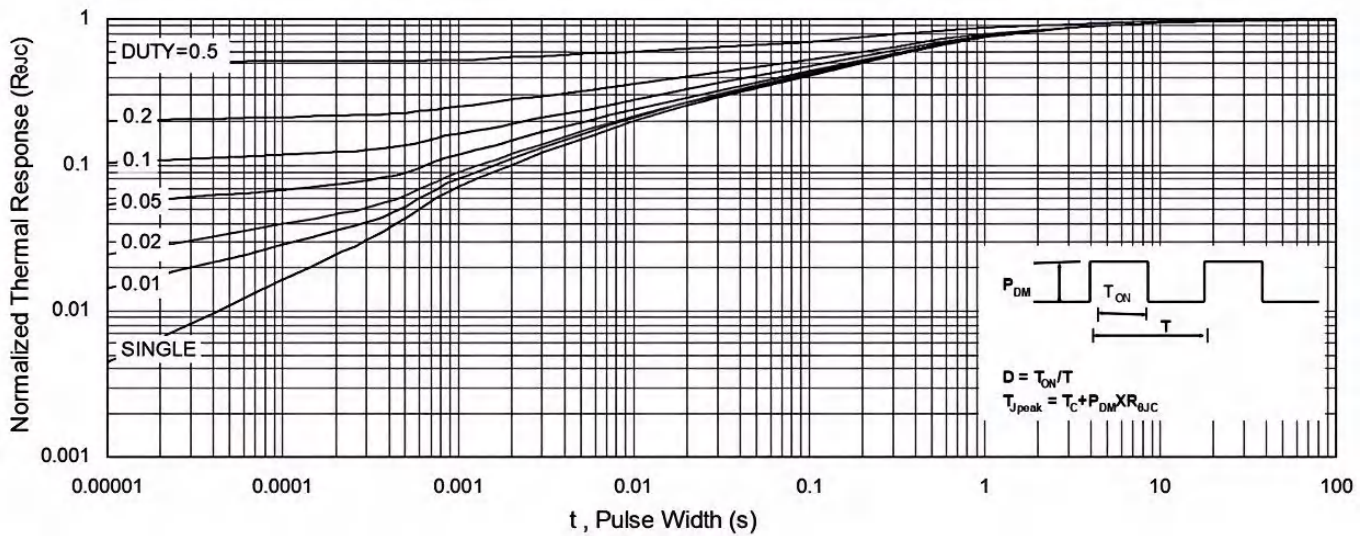


Fig.9 Normalized Maximum Transient Thermal Impedance

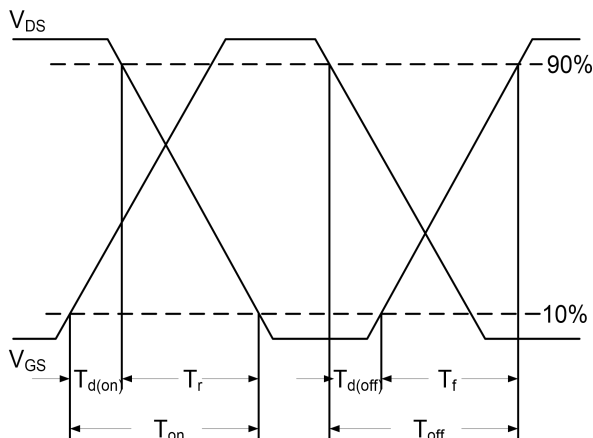


Fig.10 Switching Time Waveform

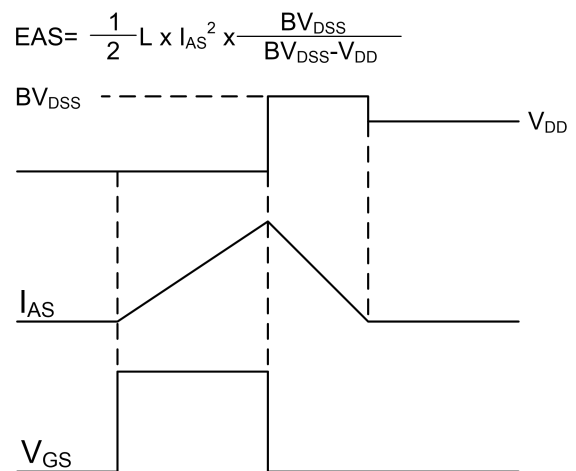


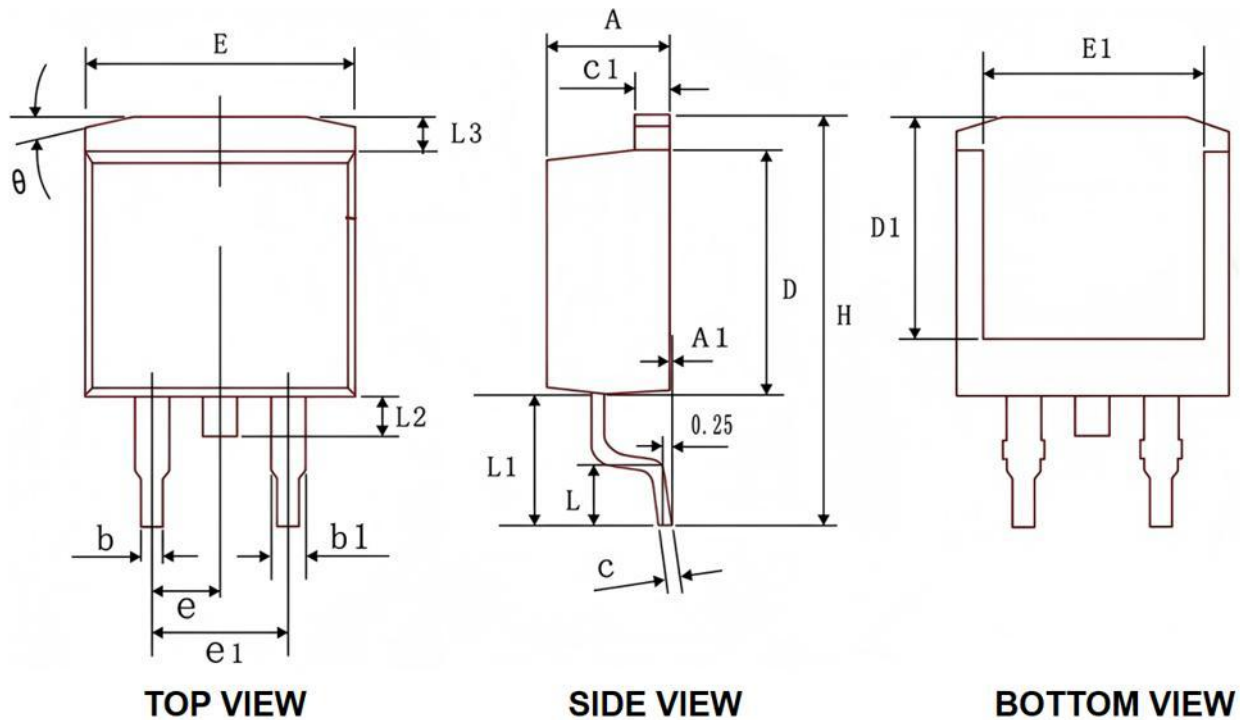
Fig.11 Unclamped Inductive Switching Waveform



Ordering Information

Part Number	Package code	Packaging
HSH18N20	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		



HSH18N20 Marking:

