



Description

The HSH120N20 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.

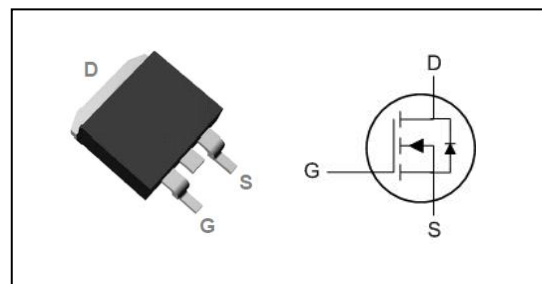
The HSH120N20 meet the RoHS and Green Product requirement, 100% EAS guaranteed with full function reliability approved.

- Power Switching application
- Green Device Available
- Excellent Cdv/dt effect decline
- Advanced high cell density Trench technology

Product Summary

V _{DS}	200	V
R _{DS(ON),typ}	8.9	mΩ
I _D	120	A

TO263 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°C	Continuous Drain Current, V _{GS} @ 10V ¹	120	A
I _D @T _C =100°C	Continuous Drain Current, V _{GS} @ 10V ¹	92	A
I _{DM}	Pulsed Drain Current ²	520	A
EAS	Single Pulse Avalanche Energy ³	845	mJ
P _D @T _C =25°C	Total Power Dissipation ³	500	W
T _{STG}	Storage Temperature Range	-55 to 150	°C
T _J	Operating Junction Temperature Range	-55 to 150	°C

Thermal Data

Symbol	Parameter	Typ.	Max.	Unit
R _{θJA}	Thermal Resistance Junction-ambient ¹	---	60	°C/W
R _{θJC}	Thermal Resistance Junction-Case ¹	---	0.36	°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	200	---	---	V
R _{DS(ON)}	Static Drain-Source On-Resistance ²	V _{GS} =10V, I _D =20A	---	8.9	11	mΩ
V _{GS(th)}	Gate Threshold Voltage	V _{GS} =V _{DS} , I _D =250uA	2.5	3.3	4.5	V
I _{DSS}	Drain-Source Leakage Current	V _{DS} =200V, V _{GS} =0V, T _J =25°C	---	---	1	uA
		V _{DS} =200V, V _{GS} =0V, T _J =55°C	---	---	5	
I _{GSS}	Gate-Source Leakage Current	V _{GS} = ± 20V, V _{DS} =0V	---	---	± 100	nA
R _g	Gate Resistance	V _{DS} =0V, V _{GS} =0V, f=1MHz	---	5.0	---	Ω
Q _g	Total Gate Charge (10V)	V _{DS} =100V, V _{GS} =10V, I _D =20A	---	46	---	nC
Q _{gs}	Gate-Source Charge		---	20	---	
Q _{gd}	Gate-Drain Charge		---	12	---	
T _{d(on)}	Turn-On Delay Time	V _{DD} =100V, V _{GS} =10V, R _G =2.5Ω I _D =20A	---	21	---	ns
T _r	Rise Time		---	22	---	
T _{d(off)}	Turn-Off Delay Time		---	32	---	
T _f	Fall Time		---	23	---	
C _{iss}	Input Capacitance	V _{DS} =50V, V _{GS} =0V, f=1MHz	---	3520	---	pF
C _{oss}	Output Capacitance		---	467	---	
C _{rss}	Reverse Transfer Capacitance		---	37	---	

Diode Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
I _S	Continuous Source Current ^{1,5}	V _G =V _D =0V, Force Current	---	---	120	A
V _{SD}	Diode Forward Voltage ²	V _{GS} =0V, I _S =30A, T _J =25°C	---	---	1.2	V
T _{rr}	Body Diode Reverse Recovery Time	I _F = 15A, dI _F /dt = 100A/s	---	133	---	ns
Q _{rr}	Body Diode Reverse Recovery Charge	I _F = 15A, dI _F /dt = 100A/s	---	677	---	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=0.5mH
- 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.



N-Ch 200V Fast Switching MOSFETs

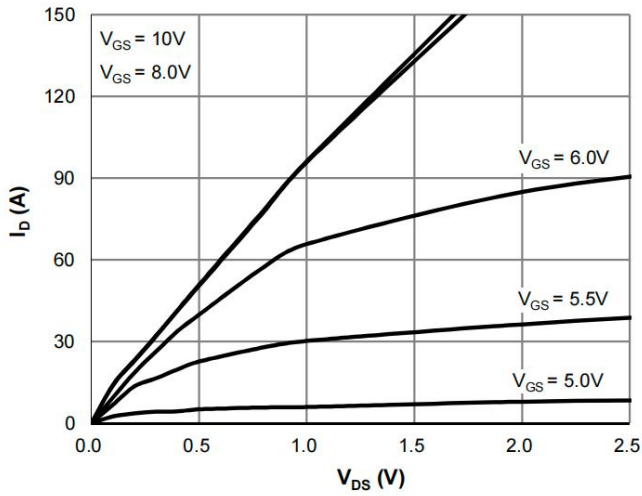


Figure 1: Saturation Characteristics

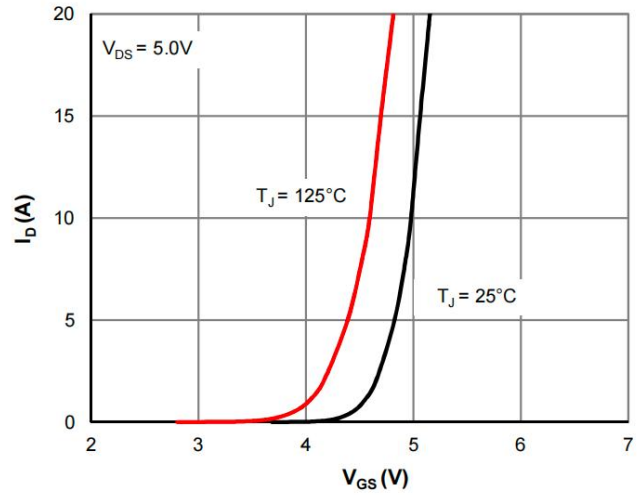


Figure 2: Transfer Characteristics

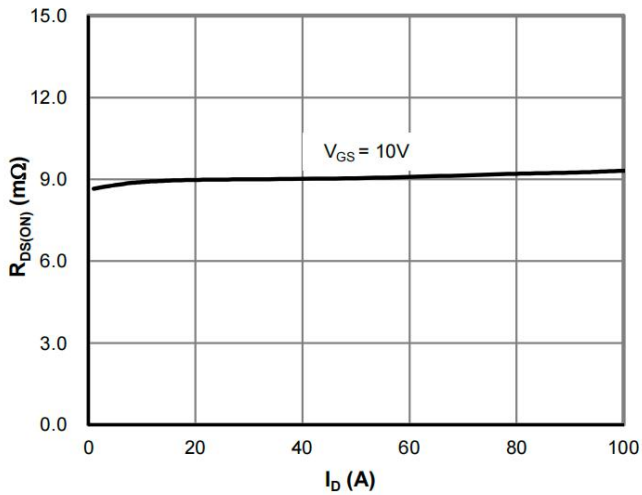


Figure 3: $R_{DS(ON)}$ vs. Drain Current

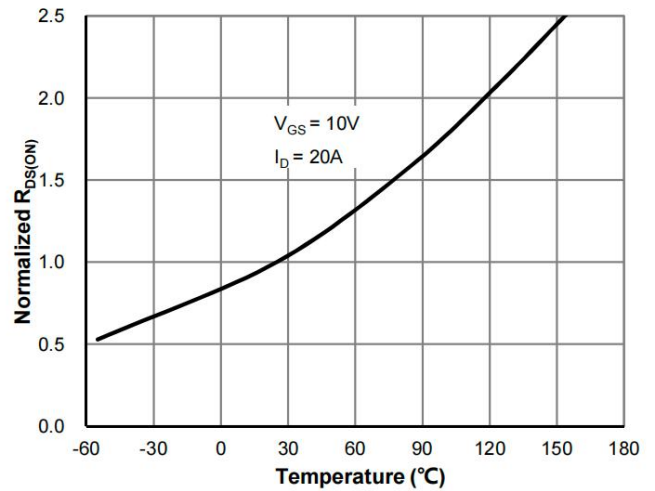


Figure 4: $R_{DS(ON)}$ vs. Junction Temperature

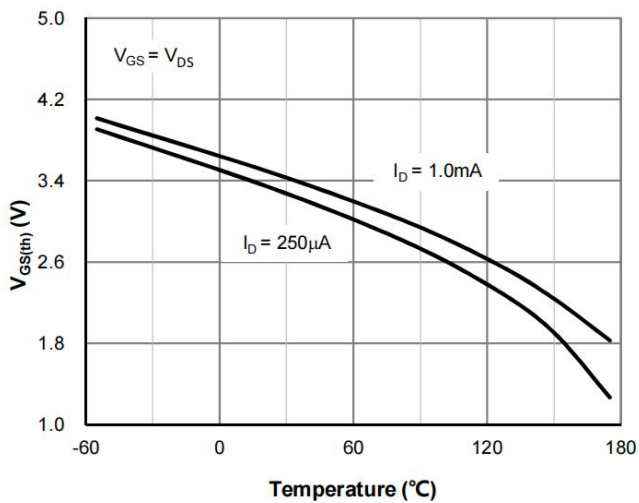


Figure 5: $V_{GS(th)}$ vs. Junction Temperature

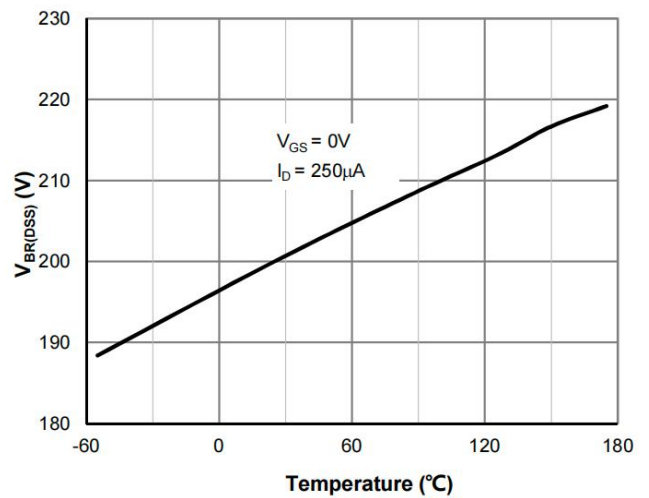


Figure 6: $V_{BR(DSS)}$ vs. Junction Temperature

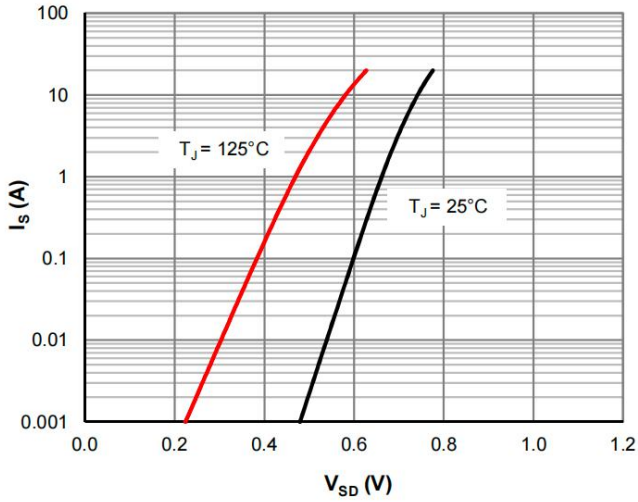


Figure 7: Body-Diode Characteristics

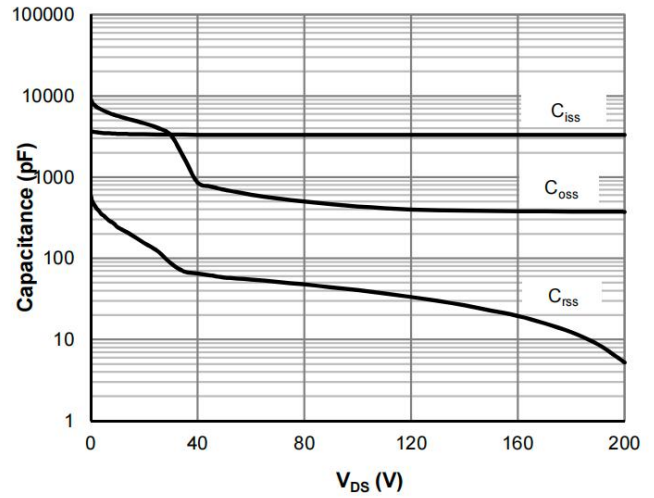


Figure 8: Capacitance Characteristics

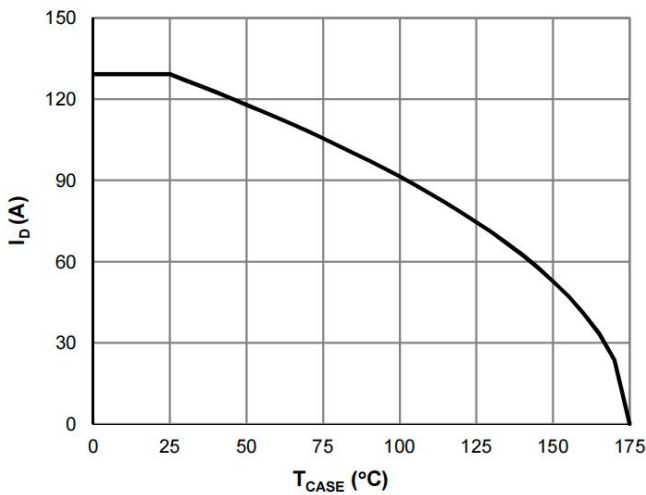


Figure 9: Current De-rating

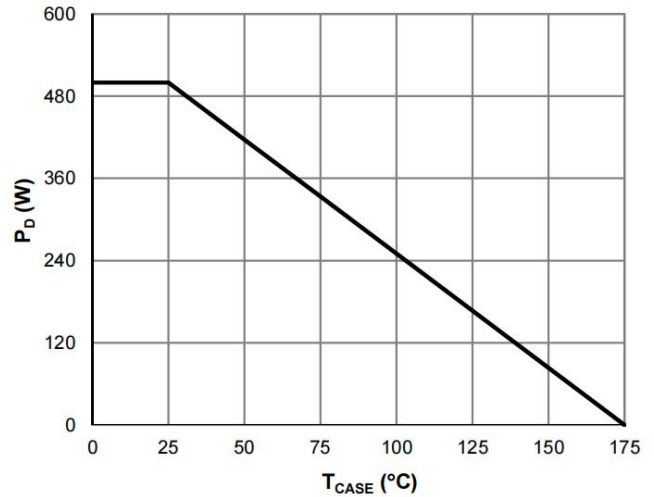


Figure 10: Power De-rating

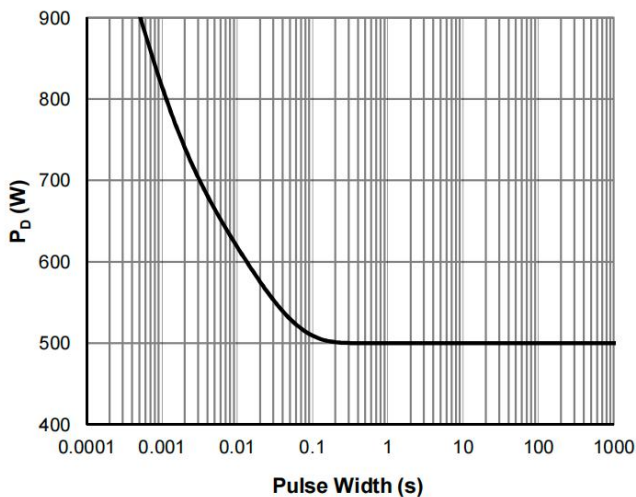


Figure 11: Single Pulse Power Rating, Junction-to-Case

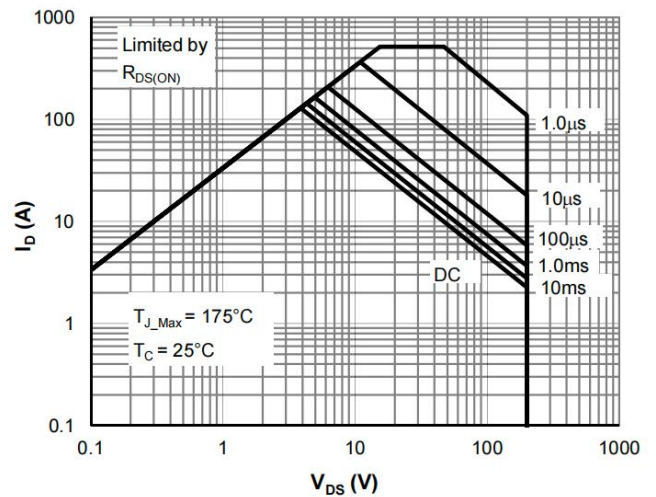


Figure 12: Maximum Safe Operating Area

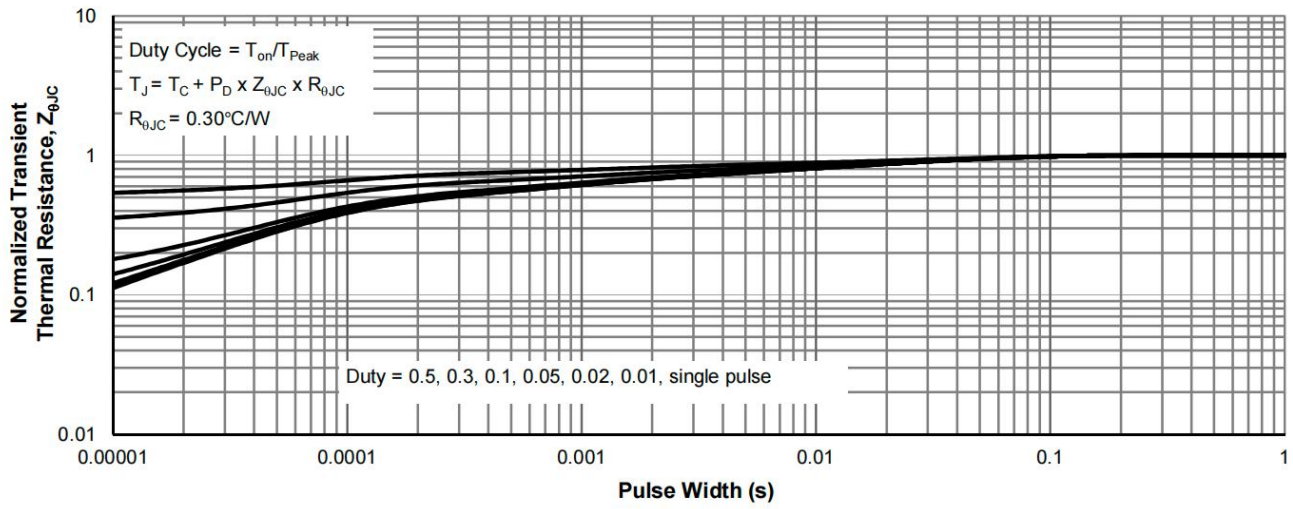
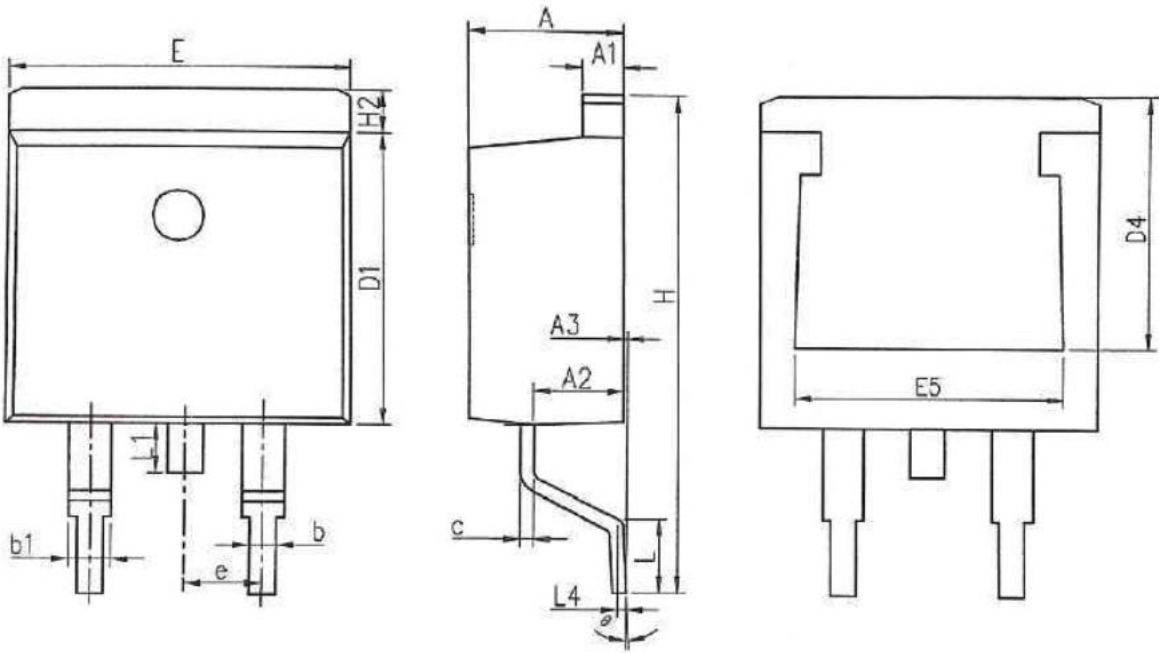


Figure 13: Normalized Maximum Transient Thermal Impedance



SYMBOLS	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	4.370	4.770	0.172	0.188
A1	1.220	1.420	0.048	0.056
A2	2.200	2.890	0.087	0.114
A3	0.000	0.250	0.000	0.010
b	0.700	0.960	0.028	0.038
b1	1.170	1.470	0.046	0.058
c	0.300	0.530	0.012	0.021
D1	8.500	9.300	0.335	0.366
D4	6.600	-	0.260	-
E	9.860	10.36	0.388	0.408
E5	7.060	-	0.278	-
e	2.540 BSC		0.100 BSC	
H	14.70	15.70	0.579	0.618
H2	1.070	1.470	0.042	0.058
L	2.000	2.600	0.079	0.102
L1	1.400	1.750	0.055	0.069
L4	0.250 BSC		0.010 BSC	
Θ	0°	9°	0°	9°

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