

N-Ch 200V Fast Switching MOSFETs Product Summary

V_{DS}	200	V
$R_{DS(ON),typ}$	20	m Ω
I_D	80	A

General Description

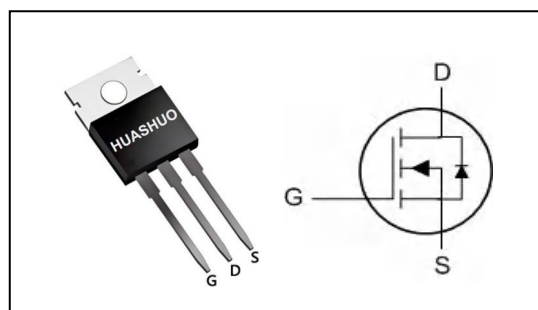
The HSP80N20 is the highest performance SGT N-ch MOSFETs with extreme high cell density, which provide excellent $R_{DS(on)}$ and gate charge for most of the synchronous buck converter applications.

The HSP80N20 meet the RoHS and Green Product requirement, 100% EAS guaranteed with full function reliability approved.

Features

- Power Switching application
- Green Device Available
- Excellent Cdv/dt effect decline
- Advanced high cell density SGT MOS Technology

TO-220 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, $V_{GS} @ 10V^1$	80	A
$I_D@T_C=100^\circ C$	Continuous Drain Current, $V_{GS} @ 10V^1$	55	A
I_{DM}	Pulsed Drain Current ²	280	A
EAS	Single Pulse Avalanche Energy ³	400	mJ
$P_D@T_C=25^\circ C$	Total Power Dissipation ³	370	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	---	62	$^\circ C/W$
$R_{\theta JC}$	Thermal Resistance Junction-Case ¹	---	0.45	$^\circ C/W$

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

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
BV_{DSS}	Drain-Source Breakdown Voltage	$V_{GS}=0V, I_D=250\mu A$	200	---	---	V
$R_{DS(ON)}$	Static Drain-Source On-Resistance ²	$V_{GS}=10V, I_D=30A$	---	20	24	m Ω
$V_{GS(th)}$	Gate Threshold Voltage	$V_{GS}=V_{DS}, I_D=250\mu A$	2	3.3	4	V
I_{DSS}	Drain-Source Leakage Current	$V_{DS}=200V, V_{GS}=0V, T_J=25^\circ\text{C}$	---	---	1	μA
		$V_{DS}=200V, V_{GS}=0V, T_J=55^\circ\text{C}$	---	---	5	
I_{GSS}	Gate-Source Leakage Current	$V_{GS}=\pm 20V, V_{DS}=0V$	---	---	± 100	nA
R_g	Gate Resistance	$V_{DS}=0V, V_{GS}=0V, f=1\text{MHz}$	---	1.1	---	Ω
Q_g	Total Gate Charge (10V)	$V_{DS}=100V, V_{GS}=10V, I_D=30A$	---	115	---	nC
Q_{gs}	Gate-Source Charge		---	32	---	
Q_{gd}	Gate-Drain Charge		---	20.3	---	
$T_{d(on)}$	Turn-On Delay Time	$V_{DD}=100V, V_{GS}=10V, R_G=2.5\Omega, I_D=30A$	---	27	---	ns
T_r	Rise Time		---	38	---	
$T_{d(off)}$	Turn-Off Delay Time		---	22	---	
T_f	Fall Time		---	23	---	
C_{iss}	Input Capacitance	$V_{DS}=50V, V_{GS}=0V, f=1\text{MHz}$	---	7490	---	pF
C_{oss}	Output Capacitance		---	267	---	
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	---	---	80	A
I_{SM}	Pulsed Source Current ^{2,5}		---	---	280	A
V_{SD}	Diode Forward Voltage ²	$V_{GS}=0V, I_S=30A, T_J=25^\circ\text{C}$	---	---	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 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.



Typical Characteristics

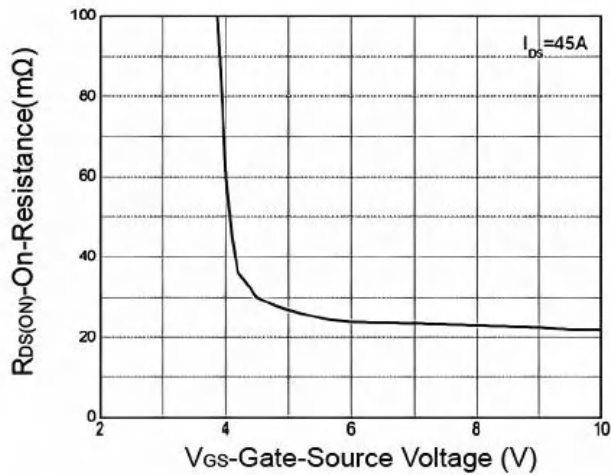


Fig.1 Gate-Source Vs. On-Resistance

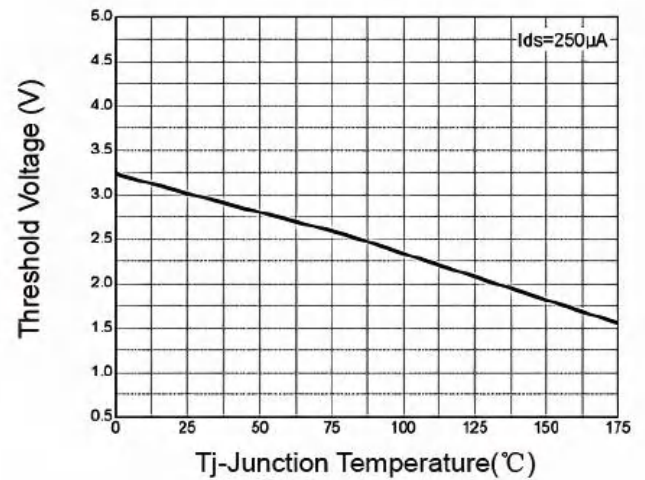


Fig.2 Gate-Source Forward

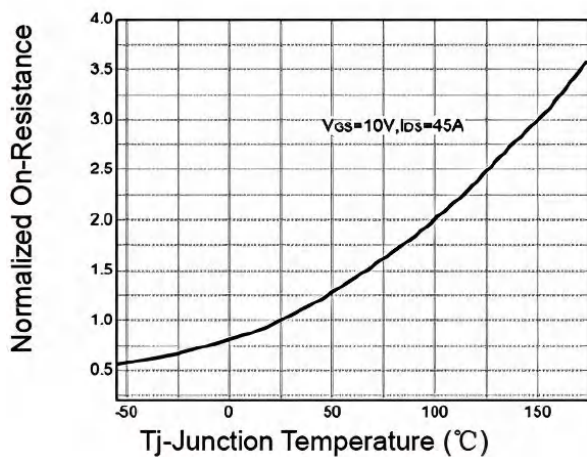


Fig.3 On-Resistance VS. Temperature

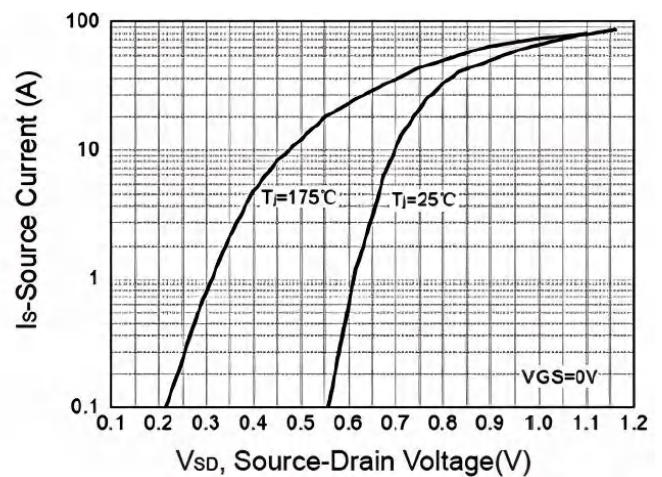


Fig.4 Source-Drain Diode Forward

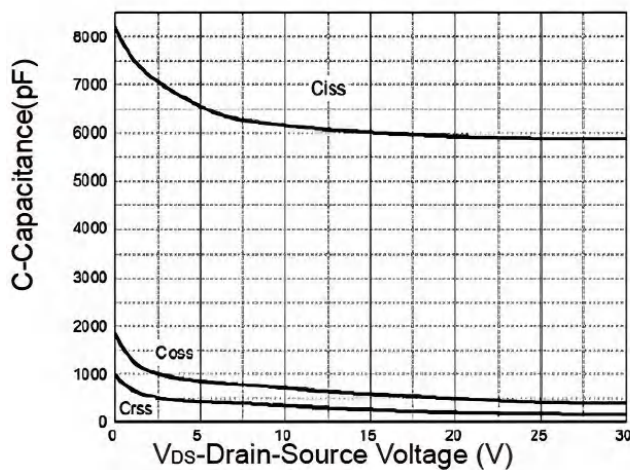


Fig.5 Capacitance Characteristics

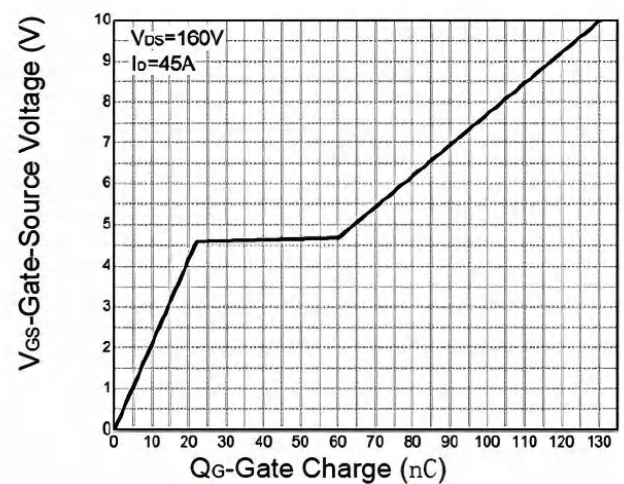


Fig.6 Gate Charge Characteristics

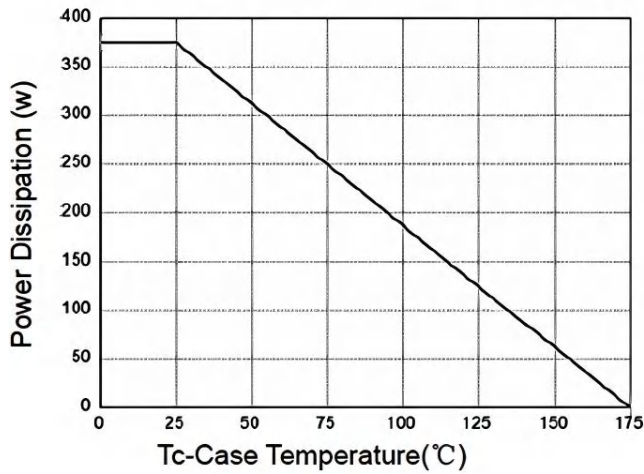


Fig.7 Power Dissipation

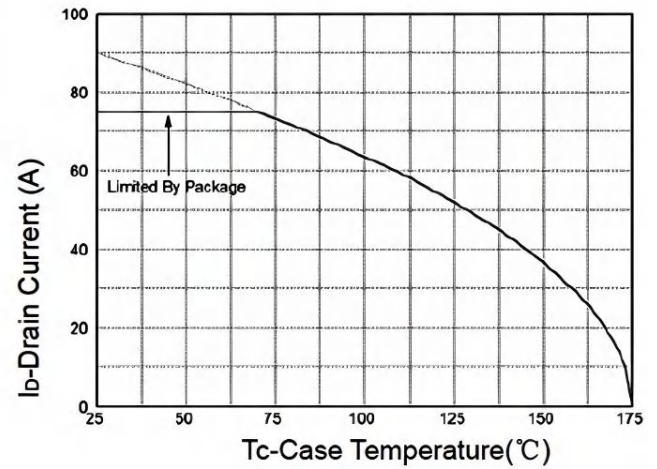


Fig.8 Drain Current

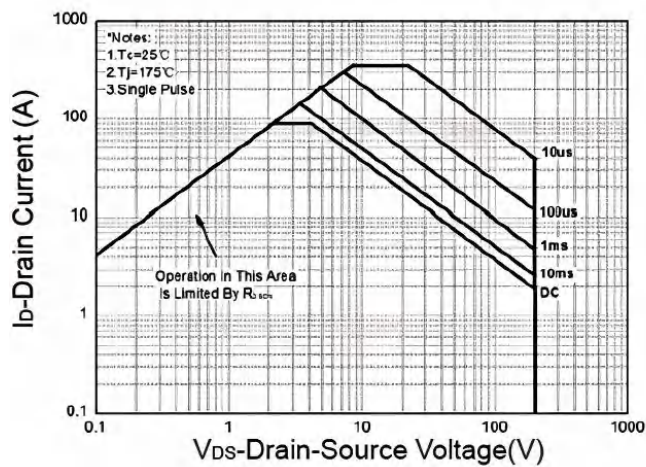


Fig.9 Safe Operation Area

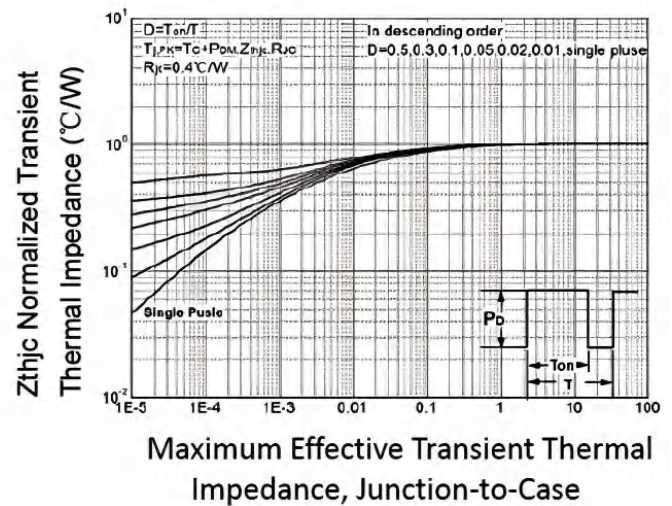


Fig.10 Thermal Transient Impedance

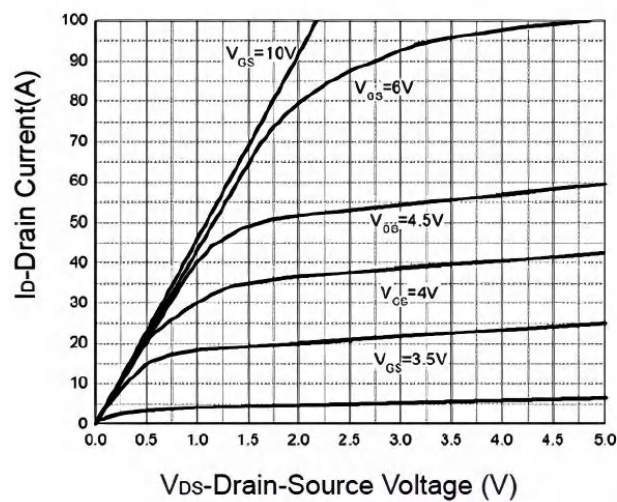


Fig.11 Output Characteristics

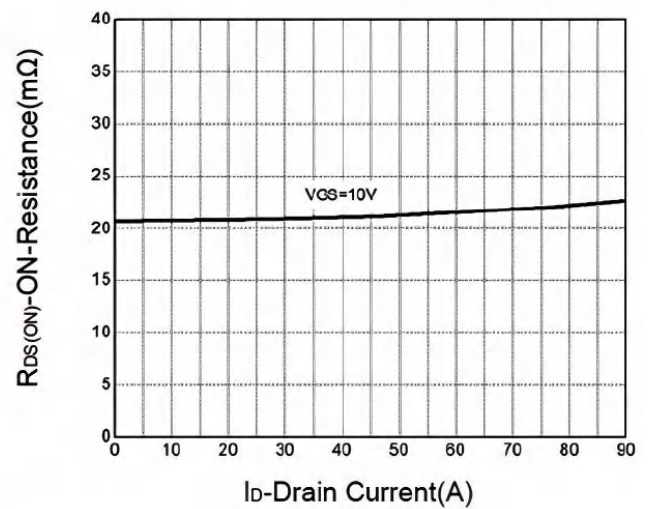


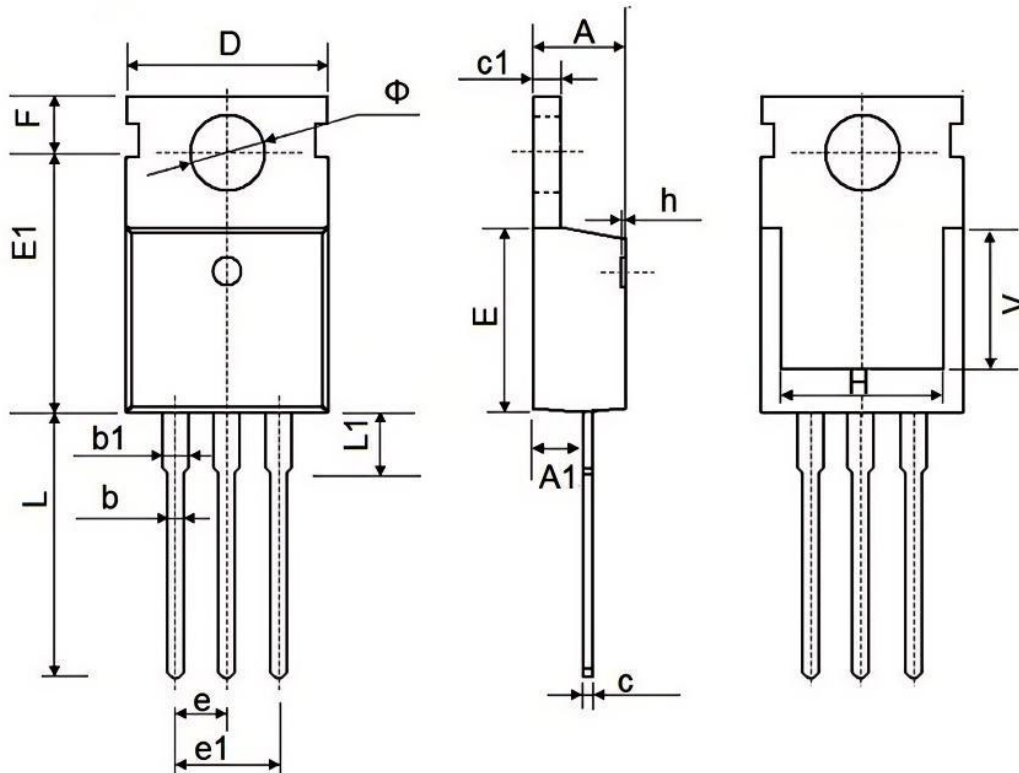
Fig.12 Drain-Source On Resistance



Ordering Information

Part Number	Package code	Packaging
HSP80N20	TO-220	1000/Box

TO-220 Package Outline



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	4.300	4.700	0.169	0.185
A1	2.200	2.600	0.087	0.102
b	0.700	0.950	0.028	0.037
b1	1.170	1.410	0.046	0.056
C	0.450	0.650	0.018	0.026
c1	1.200	1.400	0.047	0.055
D	9.600	10.400	0.378	0.409
E	8.8500	9.750	0.348	0.384
E1	12.650	12.950	0.498	0.510
e	2.540 TYP.		0.100TYP.	
e1	4.980	5.180	0.196	0.204
F	2.650	2.950	0.104	0.116
H	7.900	8.100	0.311	0.319
h	0.000	0.300	0.000	0.012
L	12.750	14.300	0.502	0.563
L1	2.850	3.950	0.112	0.156
V	7.500 REF.		0.295 REF.	
Φ	3.400	4.000	0.134	0.157



HSP80N20 Marking:

