

Description

The HSP120N08 is the high cell density trenched N-ch MOSFETs, which provide excellent RDSON and gate charge for most of the synchronous buck converter applications.

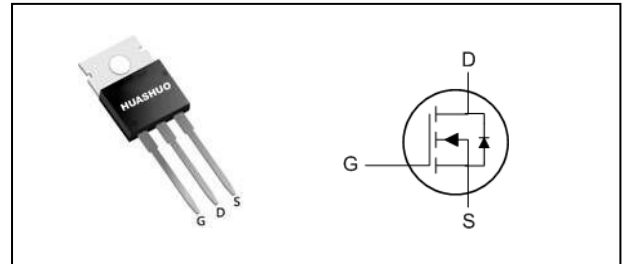
The HSP120N08 meet the RoHS and Green Product requirement, 100% EAS guaranteed with full function reliability approved.

- 100% EAS Guaranteed
- Motor Drives
- SR(Synchronous rectification)
- DC/DC Converter
- Advanced high cell density Trench technology

Product Summary

V_{DS}	80	V
$R_{DS(ON),TYP}$	4.7	m Ω
I_D	120	A

TO-220 Pin Configuration



Absolute Maximum Ratings

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	80	V
V_{GS}	Gate-Source Voltage	± 20	V
$I_D@T_C=25^\circ C$	Continuous Drain Current, $V_{GS} @ 10V^{1,6}$	120	A
$I_D@T_C=100^\circ C$	Continuous Drain Current, $V_{GS} @ 10V^{1,6}$	100	A
I_{DM}	Pulsed Drain Current ²	480	A
EAS	Single Pulse Avalanche Energy ³	560	mJ
$P_D@T_C=25^\circ C$	Total Power Dissipation ⁴	220	W
T_{STG}	Storage Temperature Range	-55 to 175	$^\circ C$
T_J	Operating Junction Temperature Range	-55 to 175	$^\circ C$

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	---	0.7	$^\circ C/W$



Electrical Characteristics (T_J=25 °C, unless otherwise noted)

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
B _{VDS}	Drain-Source Breakdown Voltage	V _{GS} =0V, I _D =250uA	80	92	---	V
R _{DS(ON)}	Static Drain-Source On-Resistance ²	V _{GS} =10V, I _D =50A	---	4.7	5.7	mΩ
V _{GS(th)}	Gate Threshold Voltage	V _{GS} =V _{DS} , I _D =250uA	2	3	4	V
I _{DSS}	Drain-Source Leakage Current	V _{DS} =80V, V _{GS} =0V, T _J =25°C	---	---	1	uA
		V _{DS} =64V, V _{GS} =0V, T _J =25°C	---	---	100	
I _{GSS}	Gate-Source Leakage Current	V _{GS} =±20V, V _{DS} =0V	---	---	±100	nA
g _{fs}	Forward Transconductance	V _{DS} =5V, I _D =30A	---	80	---	S
R _g	Gate Resistance	V _{DS} =0V, V _{GS} =0V, f=1MHz	---	1.6	---	Ω
Q _g	Total Gate Charge (10V)	V _{DD} =40V, V _{GS} =10V, I _D =25A	---	66	---	nC
Q _{gs}	Gate-Source Charge		---	25	---	
Q _{gd}	Gate-Drain Charge		---	14	---	
T _{d(on)}	Turn-On Delay Time	V _{DD} =40V, V _{GS} =10V, R _G =3Ω, I _D =25A	---	20	---	ns
T _r	Rise Time		---	39	---	
T _{d(off)}	Turn-Off Delay Time		---	44	---	
T _f	Fall Time		---	22	---	
C _{iss}	Input Capacitance	V _{DS} =40V, V _{GS} =0V, f=1MHz	---	4033	---	pF
C _{oss}	Output Capacitance		---	548	---	
C _{rss}	Reverse Transfer Capacitance		---	35	---	

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 =50A, T _J =25°C	---	---	1.2	V
t _{rr}	Reverse Recovery Time	I _F =20A, dI/dt=500A/μs, T _J =25°C	---	60	---	nS
Q _{rr}	Reverse Recovery Charge		---	340	---	nC



Figure 1. Typ. Output Characteristics ($T_j=25^\circ\text{C}$)

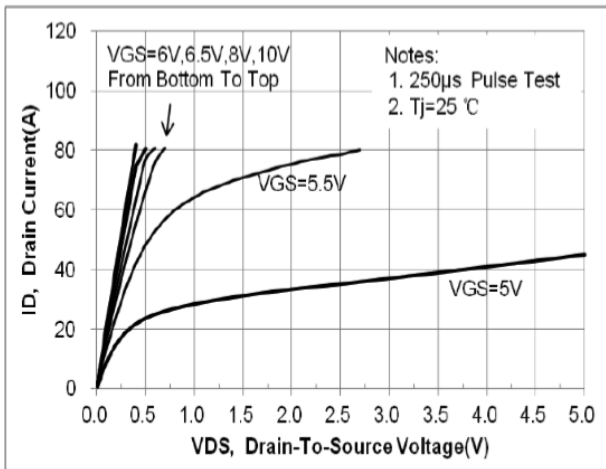


Figure 3. On-Resistance vs. Drain Current and Gate Voltage Figure

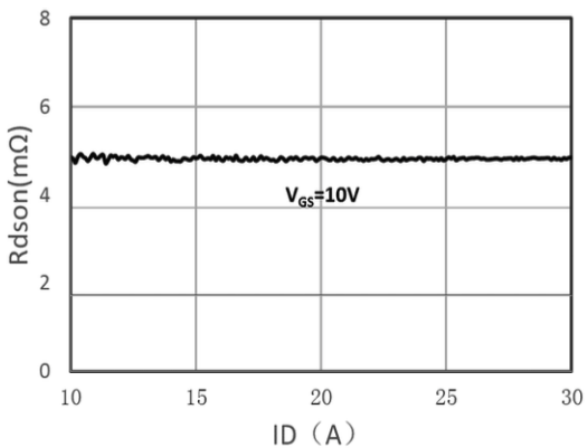


Figure 5. On-Resistance vs. Gate-Source Voltage (Junction Temperature)

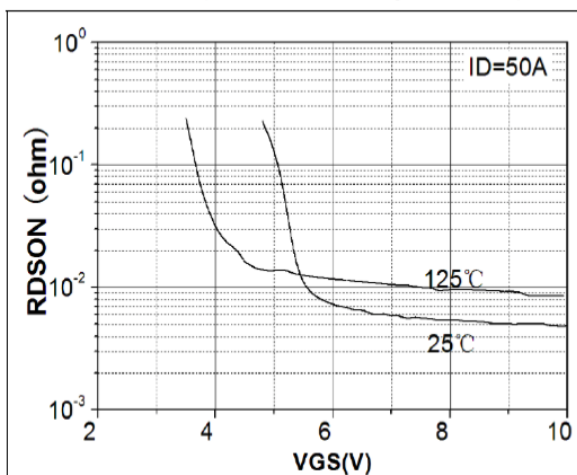


Figure 2. Transfer Characteristics (Junction Temperature)

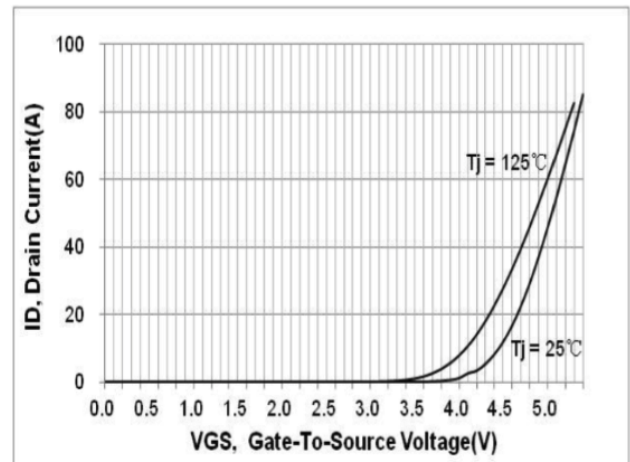


Figure 4. On-Resistance vs. Junction Temperature

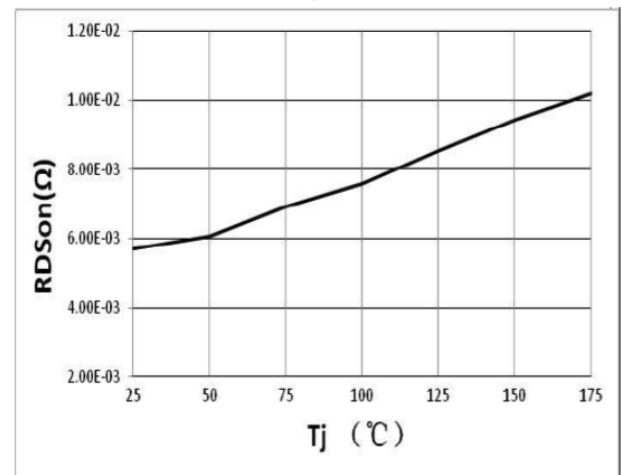


Figure 6. Body-Diode Characteristics (Junction Temperature)

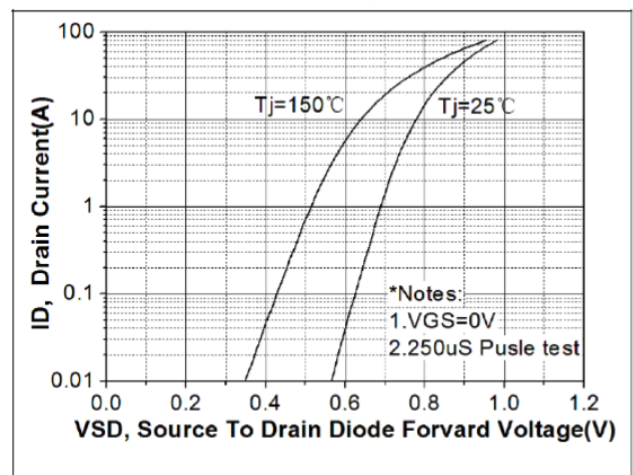




Figure 7. Gate-Charge Characteristics

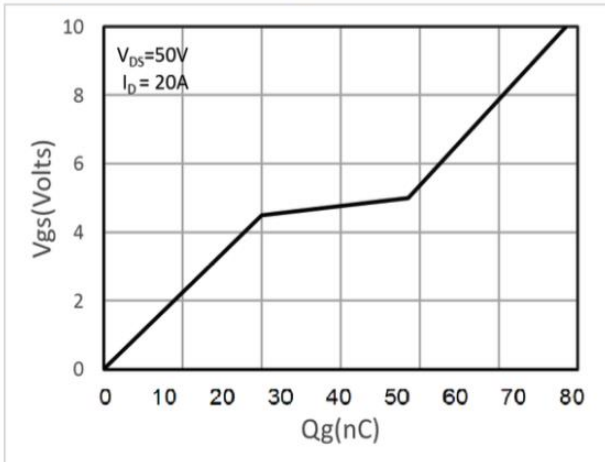


Figure 8. Capacitance Characteristics

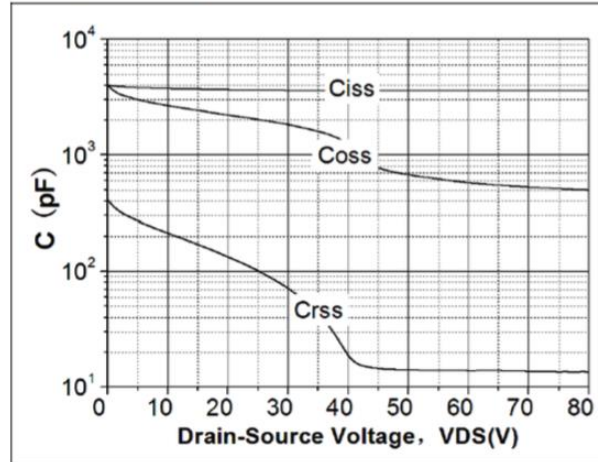


Figure 9: Normalized Maximum Transient Thermal Impedance (R_{thJC})

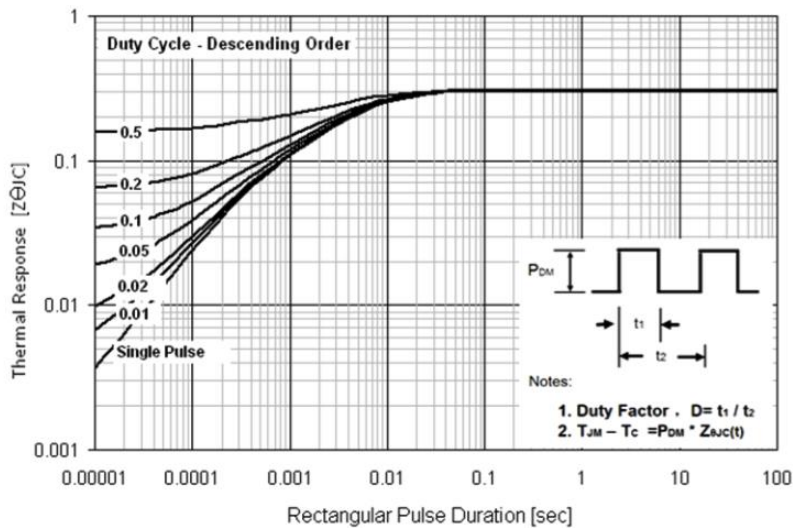
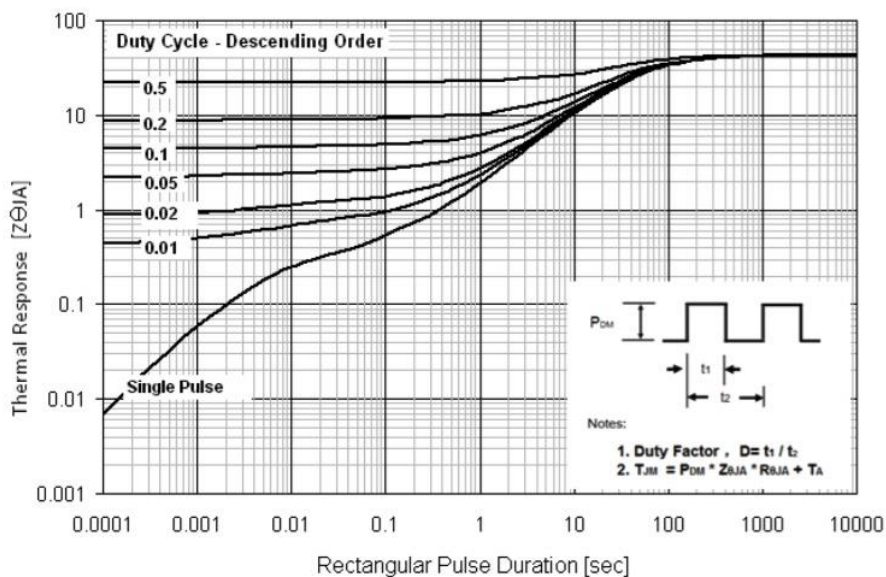


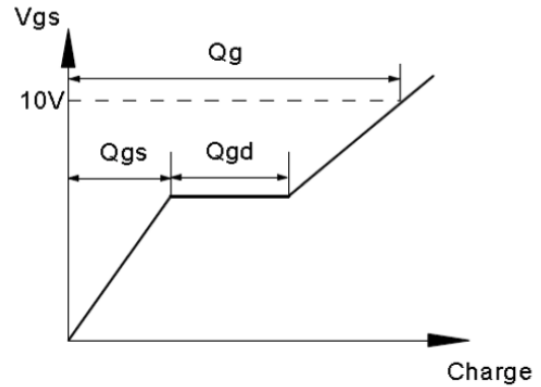
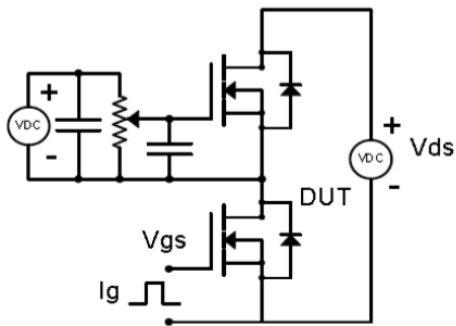
Figure 10: Normalized Maximum Transient Thermal Impedance (R_{thJA})



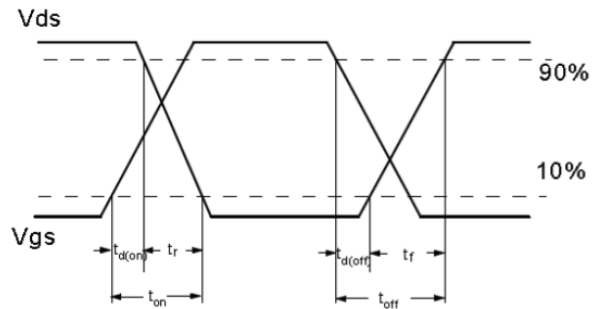
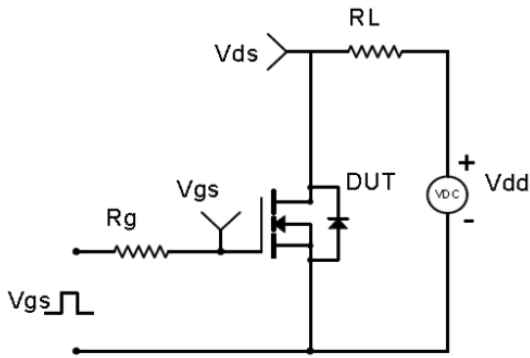


Test Circuit & Waveform

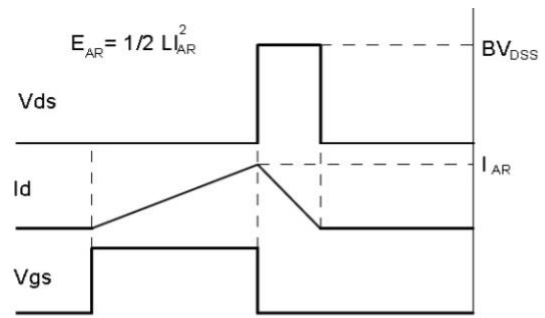
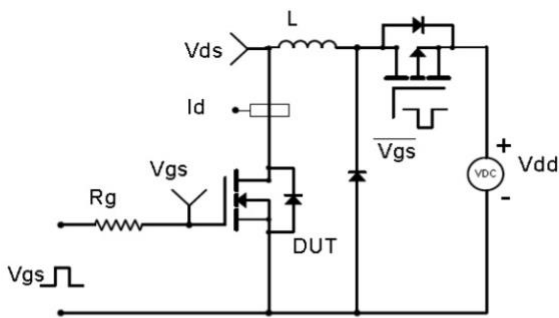
Gate Charge Test Circuit & Waveform



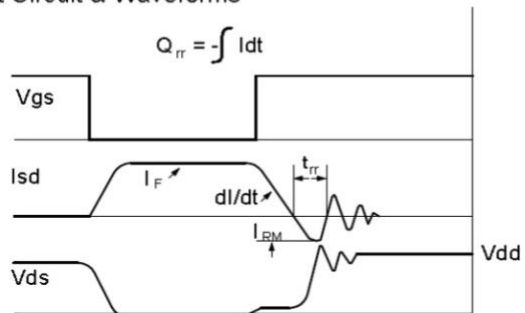
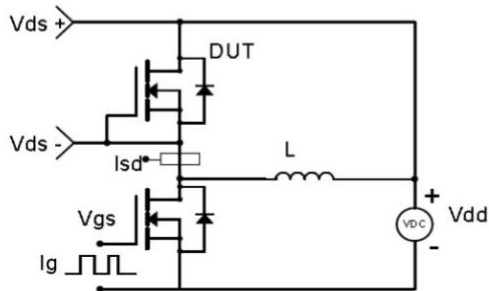
Resistive Switching Test Circuit & Waveforms



Unclamped Inductive Switching (UIS) Test Circuit & Waveforms

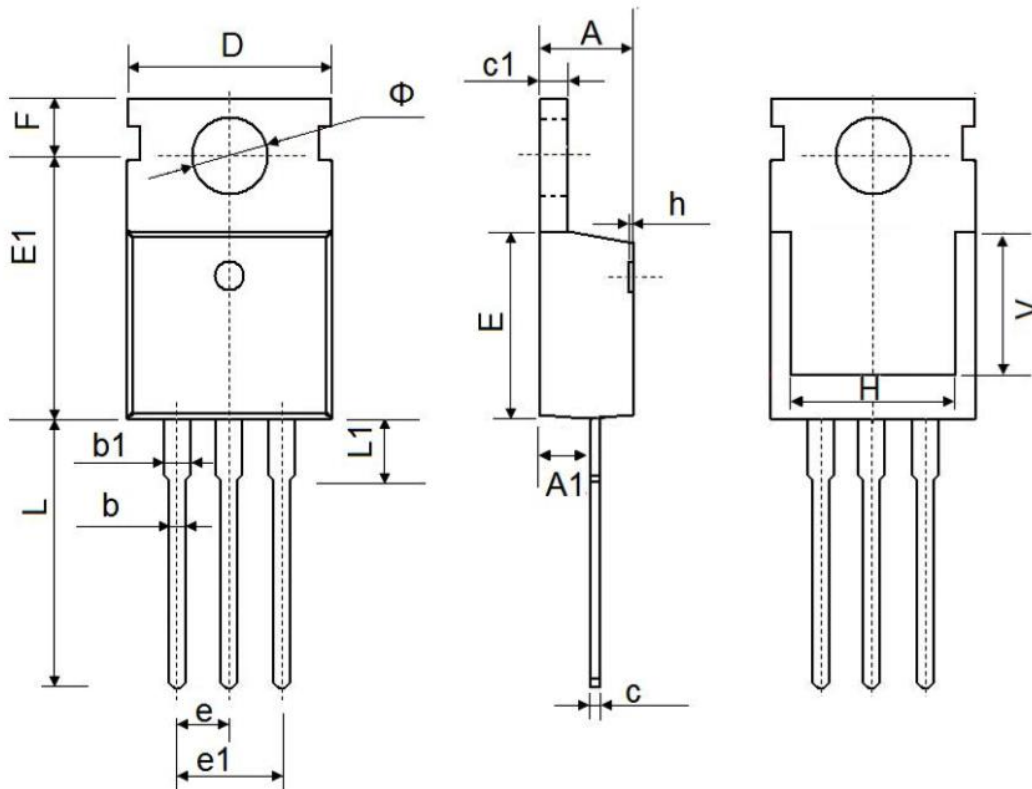


Diode Recovery Test Circuit & Waveforms





TO-220 Package Information



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