HUASHUO SEMICONDUCTOR

HSP8N50

Description

HSP8N50 is Fortunatus high voltage MOSFET family based on advanced planar stripe DMOS technology. This advanced MOSFET family has optimized on-state resistance, and also provides superior switching performance and higher avalanche energy strength. This device family is suitable for high efficiency switch mode power supplies.

- High Efficiency
- 100% EAS Guaranteed
- Improved dv/dt,di/dt capability
- Green Device
- Low Crss(typical 10pF)

Product Summary

V_{DS}	500	V
$R_{DS(ON),typ}$	850	mΩ
I_D	8	A

TO220 Pin Configuration

Absolute Maximum Ratings

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	500	V
V_{GS}	Gate-Source Voltage	±30	V
I_D@T_C=25℃	Continuous Drain Current, V_{GS} @ 10V[1]	8	A
I_D@T_C=100℃	Continuous Drain Current, V_{GS} @ 10V[1]	5.1	A
I_{DM}	Pulsed Drain Current[2]	32	A
Dv/dt	Peak Diode Recovery dv/dt (Note3)	3.5	V/ns
EAS	Single Pulse Avalanche Energy[3]	320	mJ
P_D@T_C=25℃	Total Power Dissipation[4]	142	W
T_{STG}	Storage Temperature Range	-55 to 150	℃
T_J	Operating Junction Temperature Range	-55 to 150	℃

Thermal Data

Symbol	Parameter	Typ.	Max.	Unit
$R_{θJA}$	Thermal Resistance Junction-Ambient [1]	---	62.5	℃/W
$R_{θJC}$	Thermal Resistance Junction-Case[1]	---	0.88	℃/W

Electrical Characteristics (T$_J$=25 ℃, unless otherwise noted)

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
BV$_{DSS}$	Drain-Source Breakdown Voltage	V$_{GS}$=0V , I$_D$=250uA	500	---	---	V
△BV$_{DSS}$/△T$_J$	BVDSS Temperature Coefficient	Reference to 25℃ , I$_D$=1mA	---	0.0193	---	V/℃
R$_{DS(ON)}$	Static Drain-Source On-Resistance2	V$_{GS}$=10V , I$_D$=4A	---	---	850	mΩ
V$_{GS(th)}$	Gate Threshold Voltage	V$_{GS}$=V$_{DS}$, I$_D$ =250uA	2	---	4	V
△V$_{GS(th)}$	V$_{GS(th)}$ Temperature Coefficient		---	-3.97	---	mV/℃
I$_{DSS}$	Drain-Source Leakage Current	V$_{DS}$=500V , V$_{GS}$=0V , T$_J$=25℃	---	---	1	uA
		V$_{DS}$=400V , V$_{GS}$=0V , T$_J$=125℃	---	---	100	
Gfs	Forward Transconductance (Note4)	VDS=50V, ID=4A	---	7.2	---	S
I$_{GSS}$	Gate-Source Leakage Current	V$_{GS}$=±30V , V$_{DS}$=0V	---	---	±100	nA
Q$_g$	Total Gate Charge (4.5V)	V$_{DD}$=400V , V$_{GS}$=10V , I$_D$=8A	---	23	---	nC
Q$_{gs}$	Gate-Source Charge		---	6.2	---	
Q$_{gd}$	Gate-Drain Charge		---	11	---	
T$_{d(on)}$	Turn-On Delay Time	V$_{DD}$=250V , V$_{GS}$=10V , R$_G$=10Ω I$_D$=8A	---	24	---	ns
T$_r$	Rise Time		---	16	---	
T$_{d(off)}$	Turn-Off Delay Time		---	40	---	
T$_f$	Fall Time		---	16	---	
C$_{iss}$	Input Capacitance	V$_{DS}$=25V , V$_{GS}$=0V , f=1MHz	---	980	---	pF
C$_{oss}$	Output Capacitance		---	110	---	
C$_{rss}$	Reverse Transfer Capacitance		---	10	---	

Diode Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
I$_S$	Continuous Source Current1,5	V$_G$=V$_D$=0V , Force Current	---	---	8	A
I$_{SM}$	Pulsed Source Current2,5		---	---	32	A
V$_{SD}$	Diode Forward Voltage2	V$_{GS}$=0V , I$_S$=1A , T$_J$=25℃	---	---	1.4	V
t$_{rr}$	Reverse Recovery Time	I$_F$=8A , dI/dt=100A/µs , T$_J$=25℃	---	360	---	nS
Q$_{rr}$	Reverse Recovery Charge		---	3.5	---	nC

Typical Characteristics

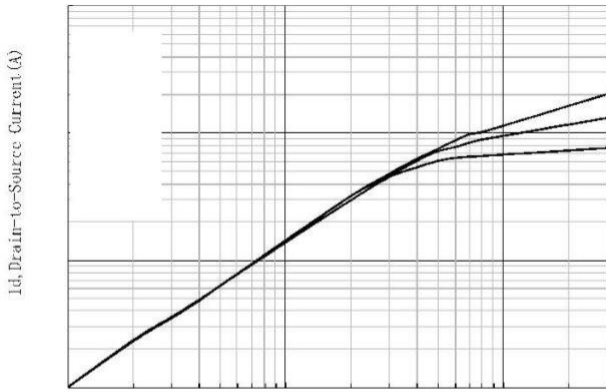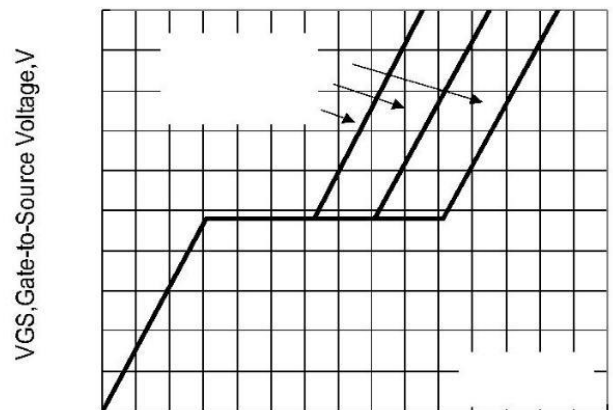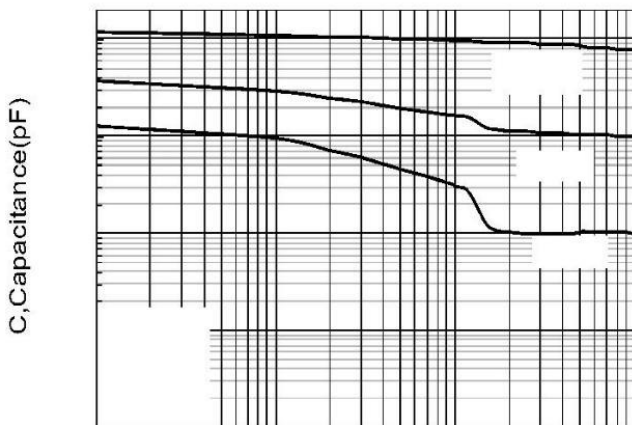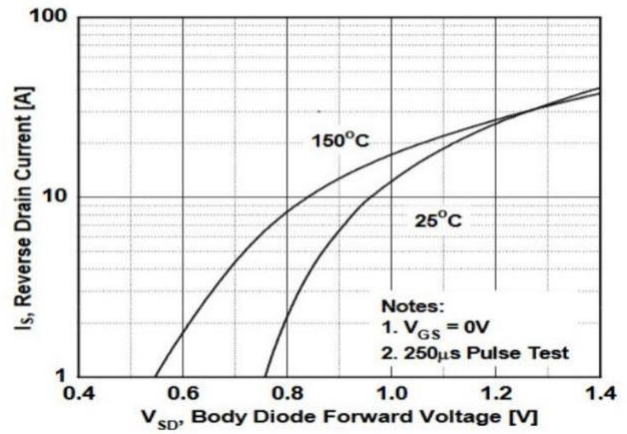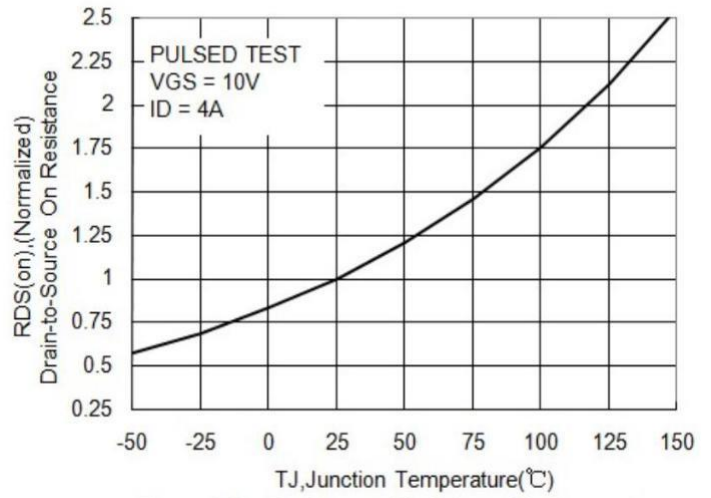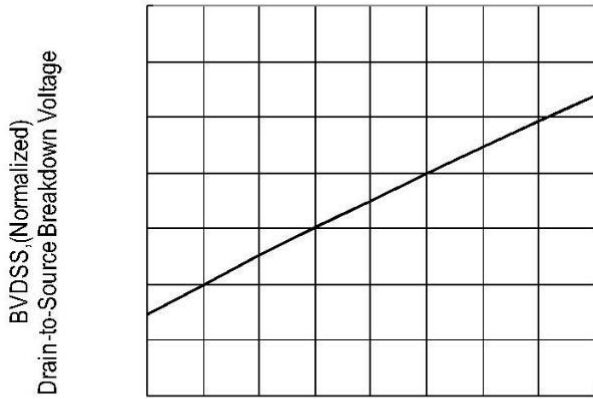

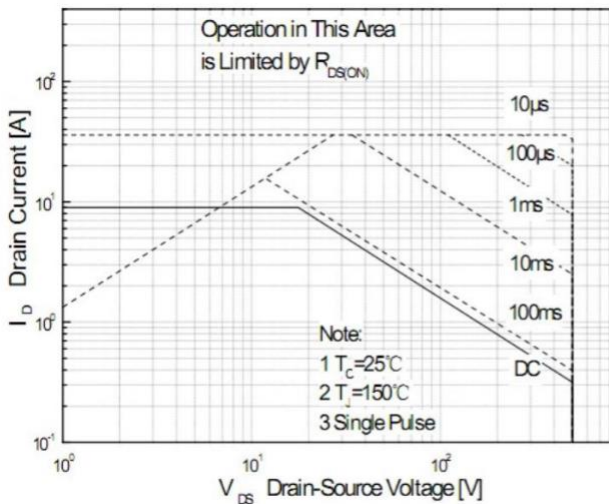Figure 3.On-Resistance versus Drain Current

Figure 8. On-Resistance Variation with Temperature
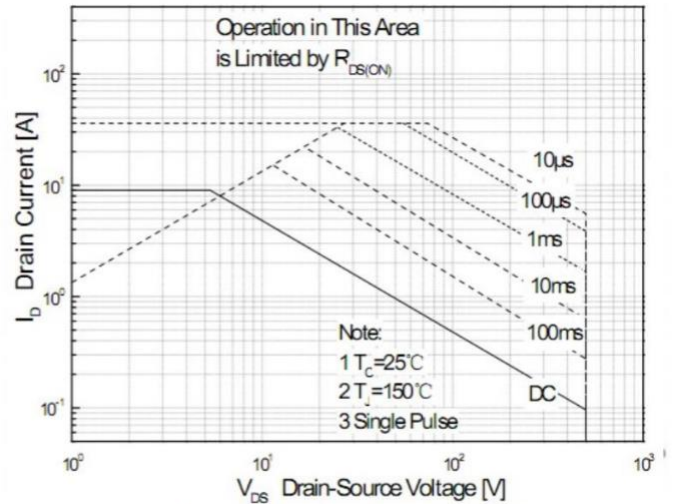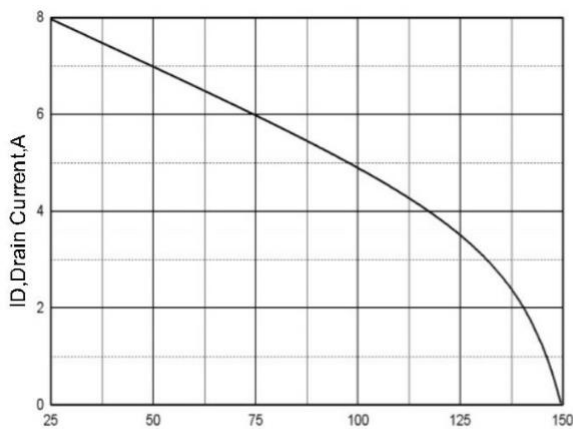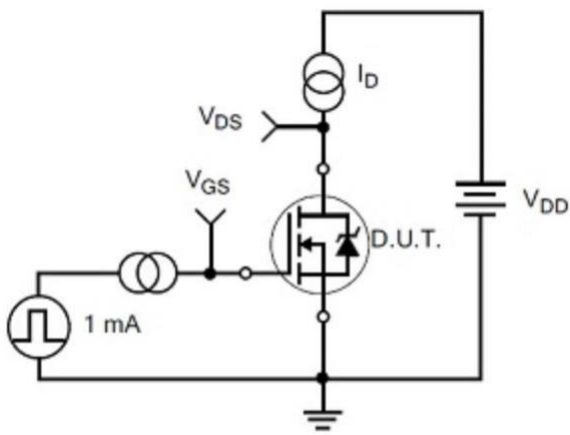
Figure 9. Maximum Safe Operating Area
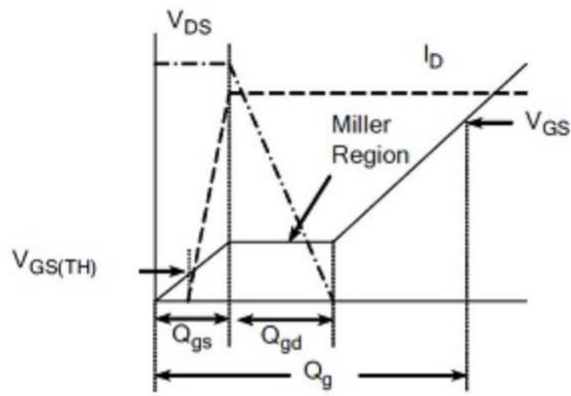For FX8N50BUG/DG/PG
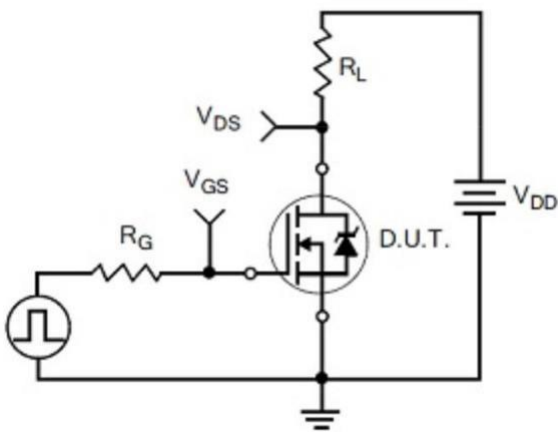
Figure 9. Maximum Safe Operating Area
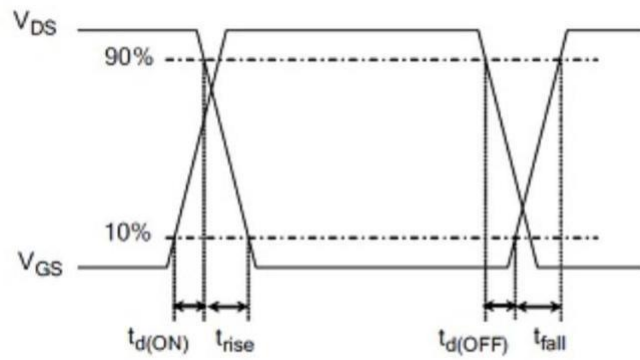For FX8N50BFG
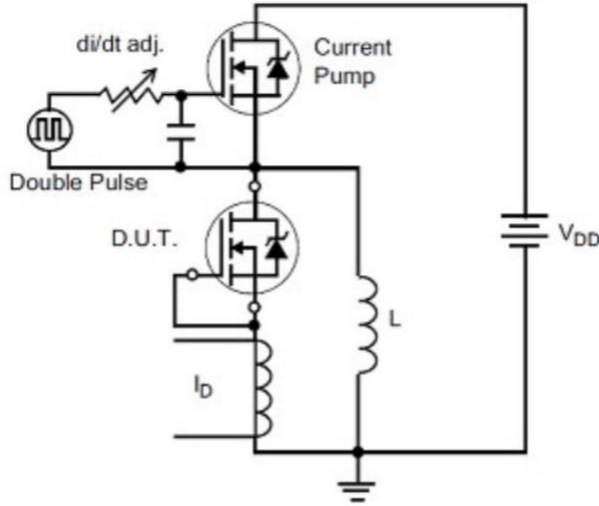
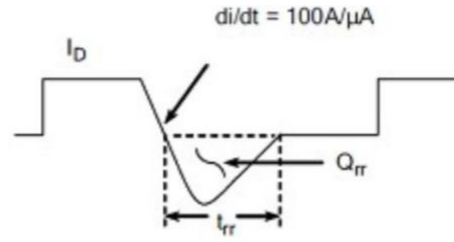Gate Charge Test Circuit

Gate Charge Waveform
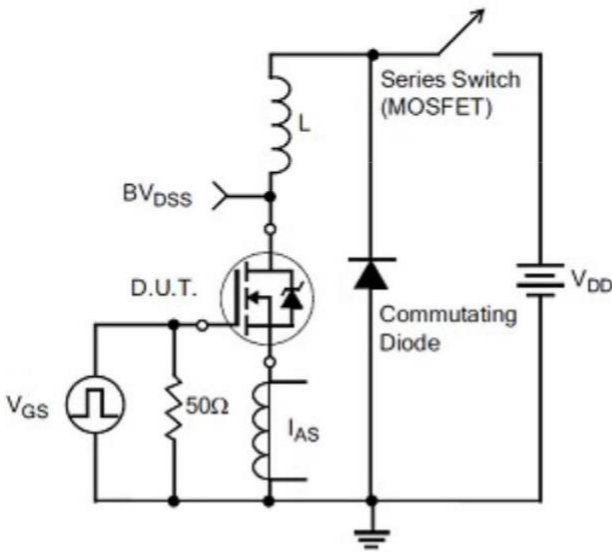
Resistive Switching Test Circuit
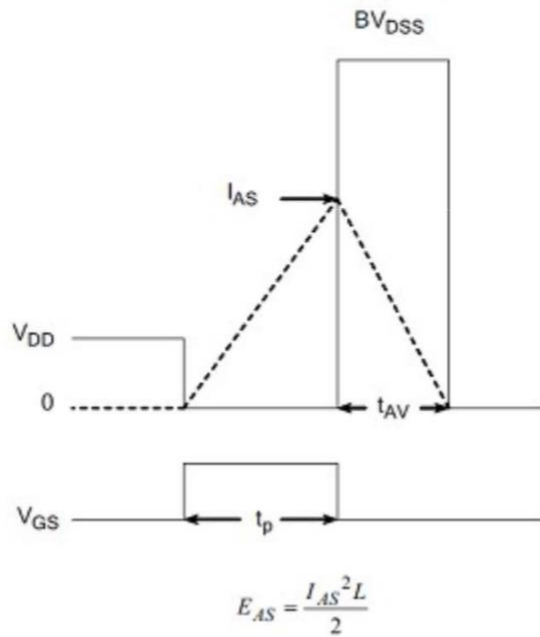
Resistive Switching Waveforms

Diode Reverse Recovery Test Circuit

Diode Reverse Recovery Waveform

Unclamped Inductive Switching Test Circuit

Unclamped Inductive Switching Waveforms

$$E_{AS} = \frac{I_{AS}^2 L}{2}$$