HUASHUO SEMICONDUCTOR

HSMA4086

N-Ch 40V Fast Switching MOSFETs

General Description

- 100% UIS Tested
- Advanced Trench Technology
- Low Gate Charge
- High Current Capability
- RoHS and Halogen-Free Compliant

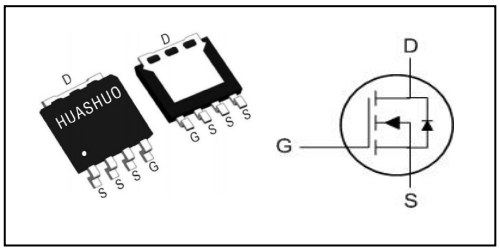
Product Summary

V_{DS}	40	V
$R_{DS(ON),TYP}$	0.5	mΩ
I_D	330	A

Applications

- SMPS Synchronous Rectification
- DC/DC Converters
- Or-ing

LFPAK5X6 Pin Configuration



Absolute Maximum Ratings

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	40	V
V_{GS}	Gate-Source Voltage	± 20	V
I_D@T_C=25℃	Continuous Drain Current, V_{GS} @ 10V[1,6]	330	A
I_D@T_C=100℃	Continuous Drain Current, V_{GS} @ 10V[1,6]	200	A
I_D@T_A=25℃	Continuous Drain Current, V_{GS} @ 10V[1]	45	A
I_D@T_A=100℃	Continuous Drain Current, V_{GS} @ 10V[1]	35	A
I_{DM}	Pulsed Drain Current[2]	530	A
EAS	Single Pulse Avalanche Energy[3]	580	mJ
I_{AS}	Avalanche Current	106	A
P_D@T_C=25℃	Total Power Dissipation[4]	140	W
P_D@T_A=25℃	Total Power Dissipation[4]	2.5	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
$R_{\theta JA}$	Thermal Resistance Junction-Ambient [1]	---	50	℃/W
$R_{\theta JC}$	Thermal Resistance Junction-Case[1]	---	0.9	℃/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	40	---	---	V
$R_{DS(ON)}$	Static Drain-Source On-Resistance[2]	V_{GS}=10V , I_D=20A	---	0.5	0.9	mΩ
		V_{GS}=4.5V , I_D=20A	---	0.85	1.2	
$V_{GS(th)}$	Gate Threshold Voltage	V_{GS}=V_{DS} , I_D =250uA	1.2	1.7	2.2	V
I_{DSS}	Drain-Source Leakage Current	V_{DS}=32V , V_{GS}=0V , T_J=25℃	---	---	1	uA
		V_{DS}=32V , V_{GS}=0V , T_J=55℃	---	---	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	---	1.3	---	Ω
Q_g	Total Gate Charge (10V)	V_{DS}=20V , V_{GS}=10V , I_D=20A	---	128	---	nC
Q_g	Total Gate Charge (4.5V)			67		
Q_{gs}	Gate-Source Charge		---	17	---	
Q_{gd}	Gate-Drain Charge		---	29	---	
$T_{d(on)}$	Turn-On Delay Time	V_{DD}=20V , V_{GS}=10V , R_G=1.5Ω, I_D=20A	---	22	---	ns
T_r	Rise Time		---	149	---	
$T_{d(off)}$	Turn-Off Delay Time		---	55	---	
T_f	Fall Time		---	17	---	
C_{iss}	Input Capacitance	V_{DS}=20V , V_{GS}=0V , f=1MHz	---	6810	---	pF
C_{oss}	Output Capacitance		---	2119	---	
C_{rss}	Reverse Transfer Capacitance		---	222	---	

Diode Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
I_S	Continuous Source Current[1,6]	V_G=V_D=0V , Force Current	---	---	100	A
V_{SD}	Diode Forward Voltage[2]	V_{GS}=0V , I_S=1A , T_J=25℃	---	---	1.2	V
T_{rr}	Reverse Recovery Time	I_F=20A , di/dt=100A/μs , T_J=25℃	---	77	---	nS
Q_{rr}	Reverse Recovery Charge		---	91	---	nC

Note :

1.The data tested by surface mounted on a 1 inch^2 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=0.1mH,I_{AS}=106A

4.The power dissipation is limited by 150℃ 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.

6.Package limitation current is 100A.

Typical Characteristics

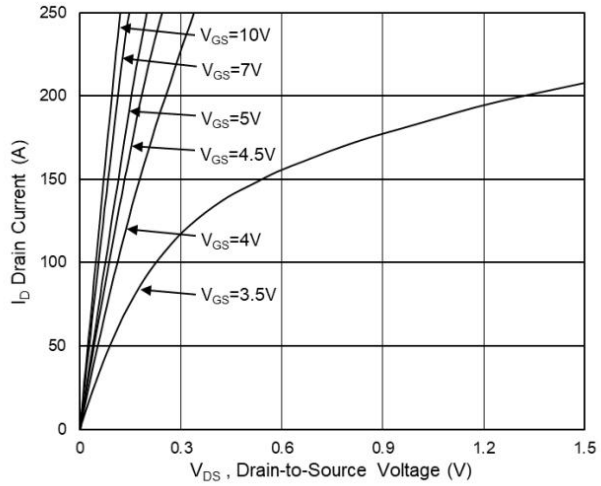


Fig.1 Typical Output Characteristics

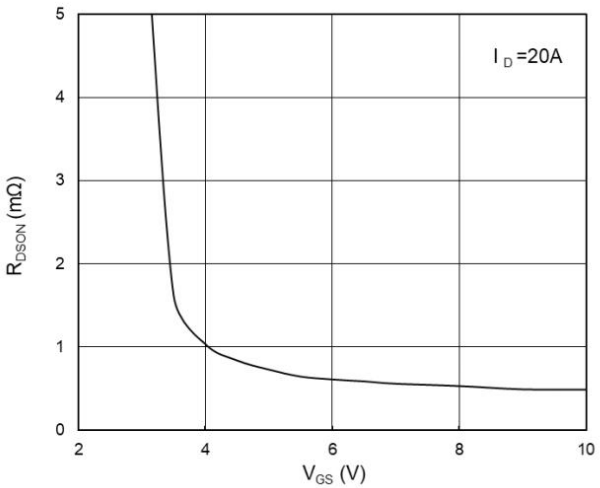


Fig.2 On-Resistance vs G-S Voltage

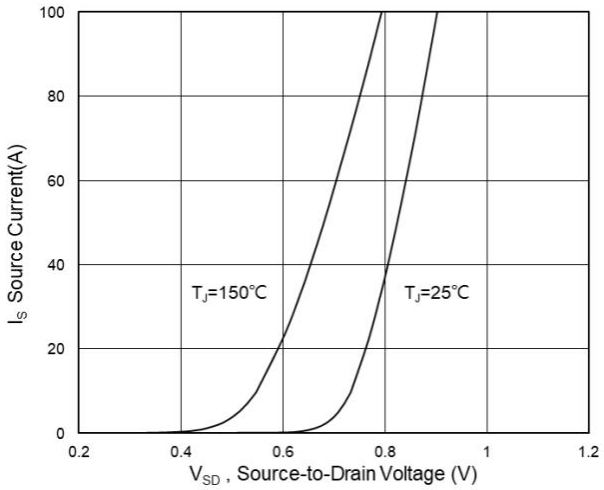


Fig.3 Source Drain Forward Characteristics

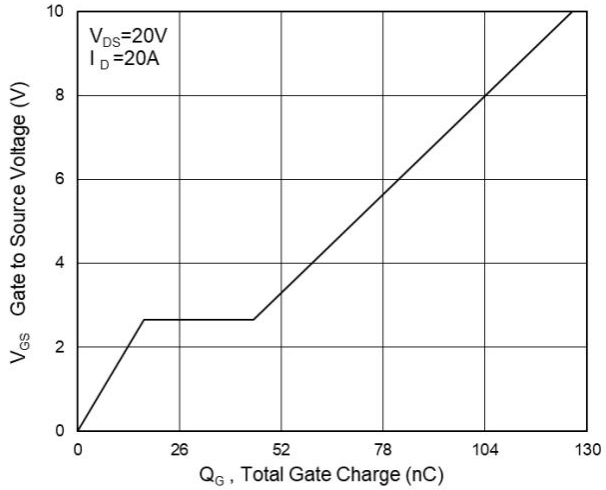


Fig.4 Gate-Charge Characteristics

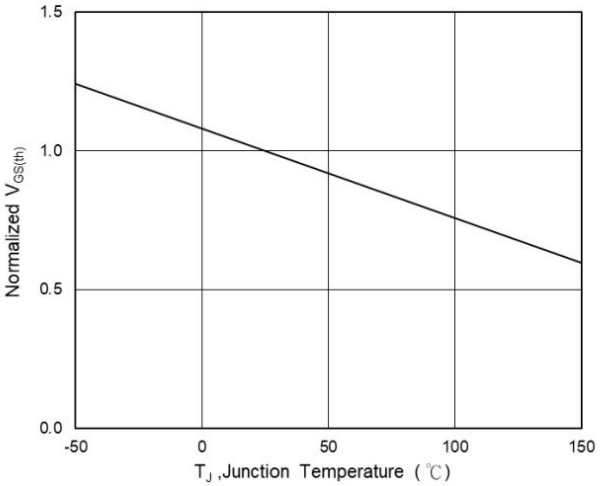


Fig.5 Normalized $V_{GS(th)}$ vs T_J

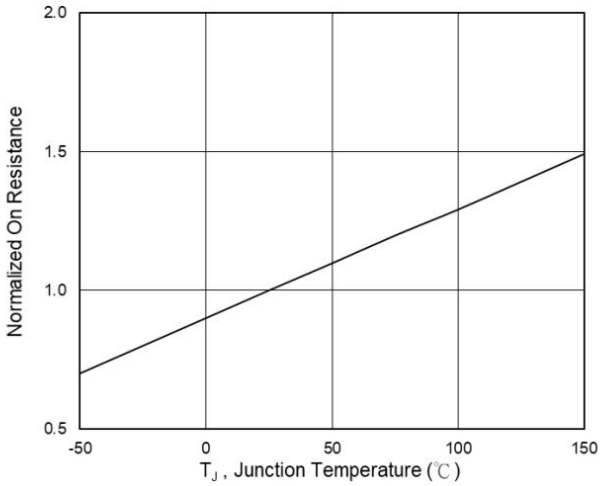


Fig.6 Normalized R_{DSON} vs T_J

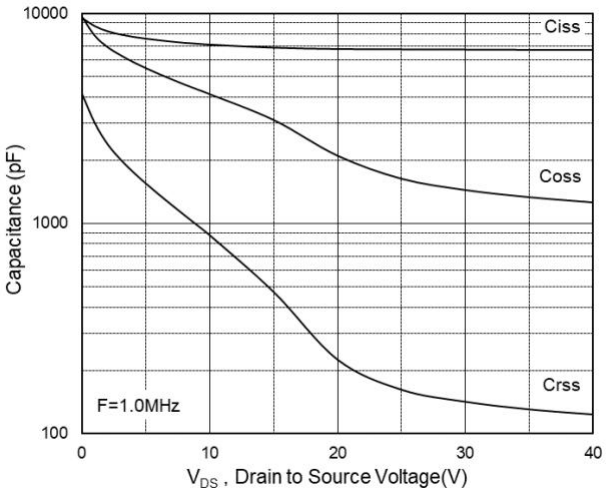


Fig.7 Capacitance

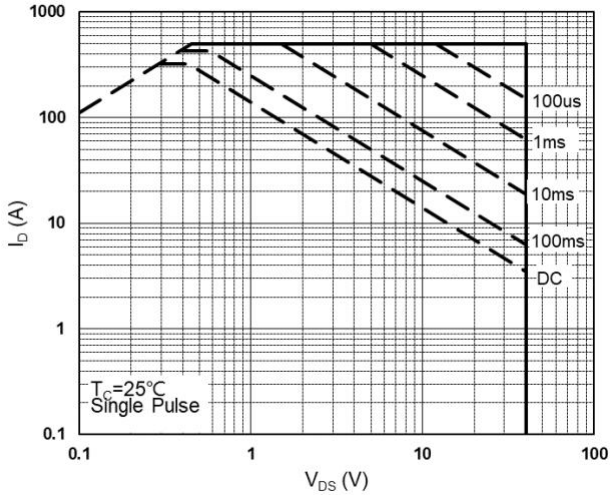


Fig.8 Safe Operating Area

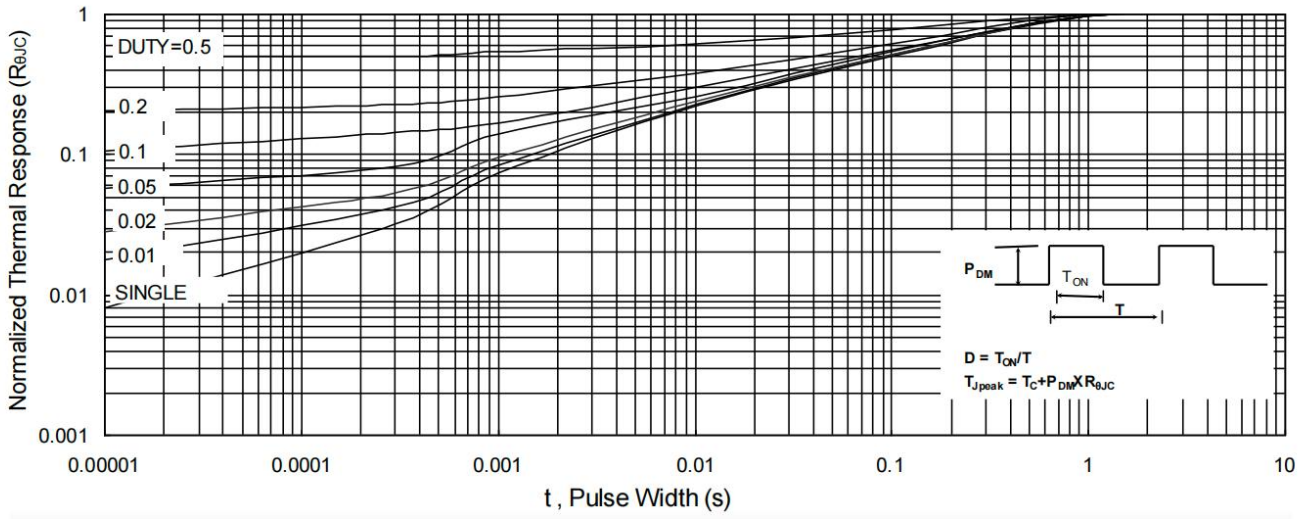


Fig.9 Normalized Maximum Transient Thermal Impedance

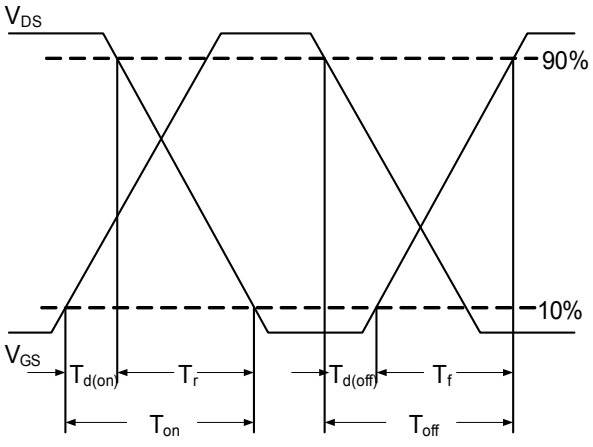


Fig.10 Switching Time Waveform

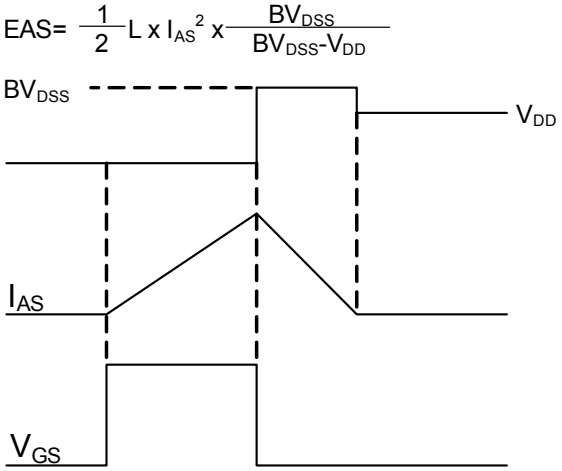


Fig.11 Unclamped Inductive Switching