HUASHUO SEMICONDUCTOR

HSMA3078

N-Ch 30V Fast Switching MOSFETs

General Description

- 100% UIS Tested
- Advance SGT MOS Technology
- Low Gate Charge
- High Current Capability
- RoHS and Halogen-Free Compliant

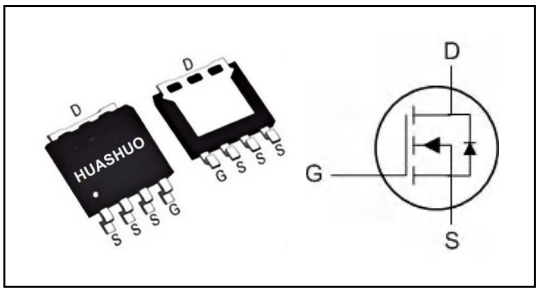
Product Summary

V_{DS}	30	V
$R_{DS(ON),typ}$	0.35	mΩ
I_D	390	A

Application

- Power Management in Desktop Computer
- DC/DC Converters

LFPAK5X6 Pin Configuration



Absolute Maximum Ratings

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	30	V
V_{GS}	Gate-Source Voltage	±20	V
I_D@T_C=25℃	Continuous Drain Current, V_{GS} @ 10V[1,6]	390	A
I_D@T_C=100℃	Continuous Drain Current, V_{GS} @ 10V[1,6]	245	A
I_D@T_A=25℃	Continuous Drain Current, V_{GS} @ 10V[1,6]	53	A
I_D@T_A=70℃	Continuous Drain Current, V_{GS} @ 10V[1,6]	41	A
I_D@T_A=100℃	Continuous Drain Current, V_{GS} @ 10V[1,6]	33	A
I_{DM}	Pulsed Drain Current[2]	700	A
EAS	Single Pulse Avalanche Energy[3]	129	mJ
I_{AS}	Avalanche Current	50	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	30	---	---	V
$R_{DS(ON)}$	Static Drain-Source On-Resistance[2]	V_{GS}=10V , I_D=30A	---	0.35	0.6	mΩ
		V_{GS}=4.5V , I_D=30A	---	0.6	0.9	
$V_{GS(th)}$	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}=24V , V_{GS}=0V , T_J=25℃	---	---	1	uA
		V_{DS}=24V , 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	---	2.5	---	Ω
Q_g	Total Gate Charge (10V)	V_{DS}=15V , V_{GS}=10V , I_D=30A	---	155	---	nC
Q_g	Total Gate Charge (4.5V)			80		
Q_{gs}	Gate-Source Charge		---	26	---	
Q_{gd}	Gate-Drain Charge		---	30	---	
$T_{d(on)}$	Turn-On Delay Time	V_{DD}=20V , V_{GS}=10V , R_G=3Ω, I_D=30A	---	16	---	ns
T_r	Rise Time		---	59	---	
$T_{d(off)}$	Turn-Off Delay Time		---	135	---	
T_f	Fall Time		---	114	---	
C_{iss}	Input Capacitance	V_{DS}=15V , V_{GS}=0V , f=1MHz	---	8987	---	pF
C_{oss}	Output Capacitance		---	3930	---	
C_{rss}	Reverse Transfer Capacitance		---	728	---	

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	IF=30A , dI/dt=100A/μs , T_J=25℃	---	104	---	nS
Q_{rr}	Reverse Recovery Charge		---	183	---	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=0.1mH,I_{AS}=50A
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

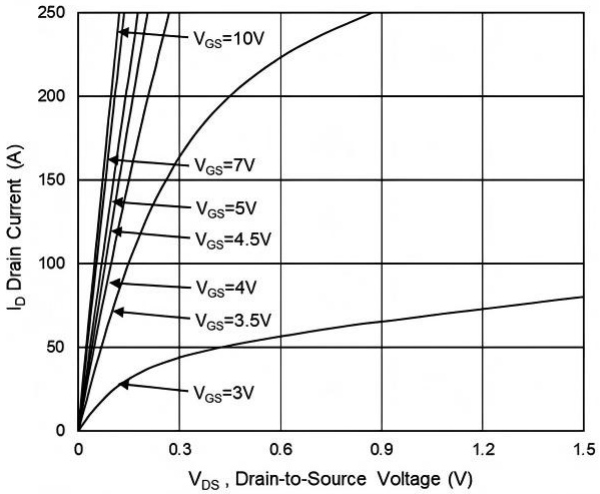


Fig.1 Typical Output Characteristics

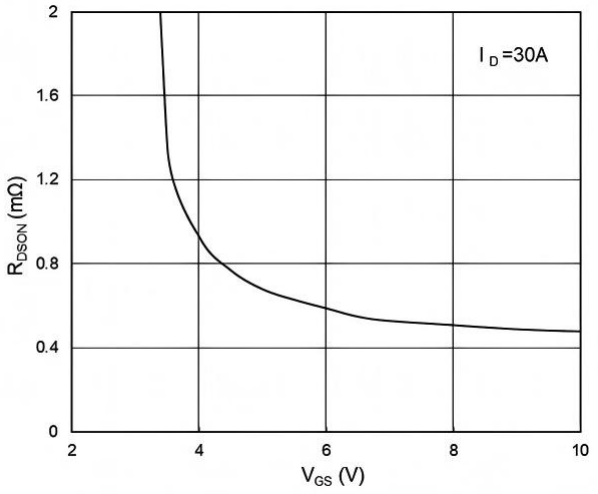


Fig.2 On-Resistance vs G-S Voltage

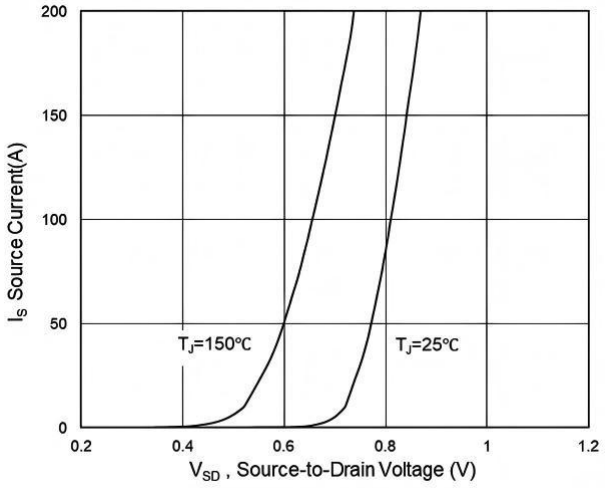


Fig.3 Source Drain Forward Characteristics

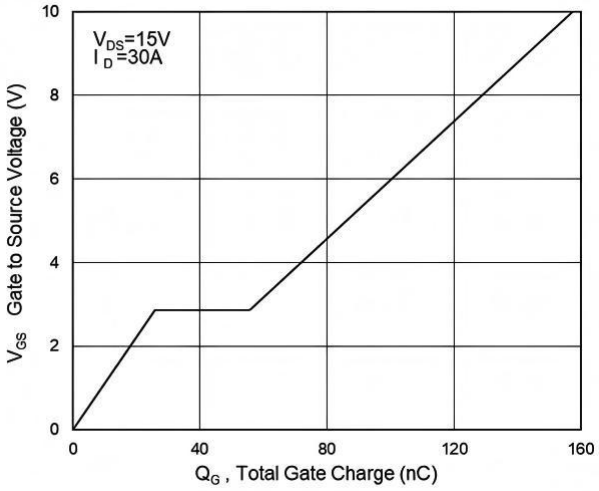


Fig.4 Gate-Charge Characteristics

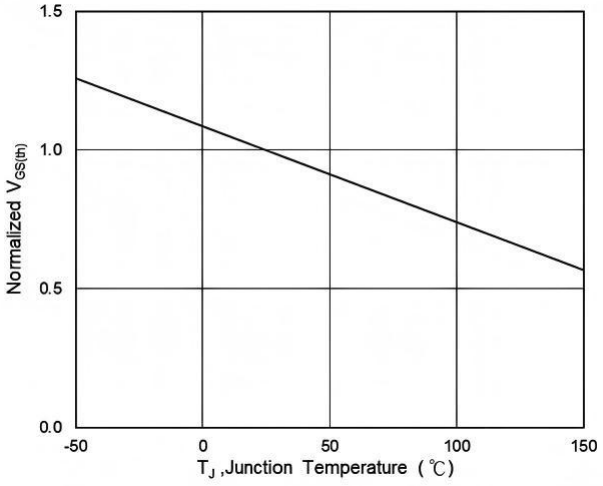


Fig.5 Normalized $V_{GS(th)}$ vs T_J

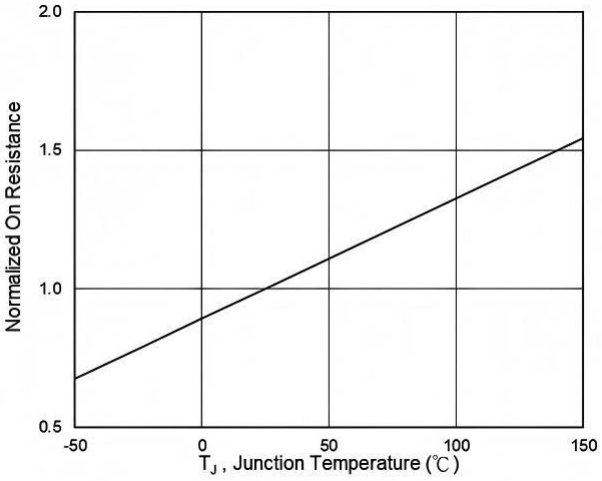


Fig.6 Normalized R_{DSON} vs T_J

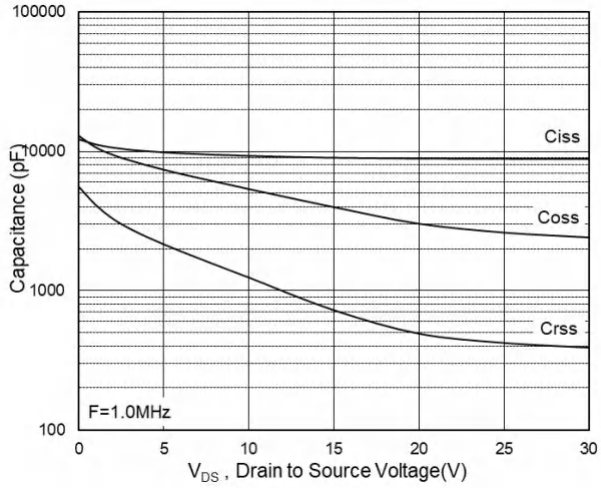


Fig.7 Capacitance

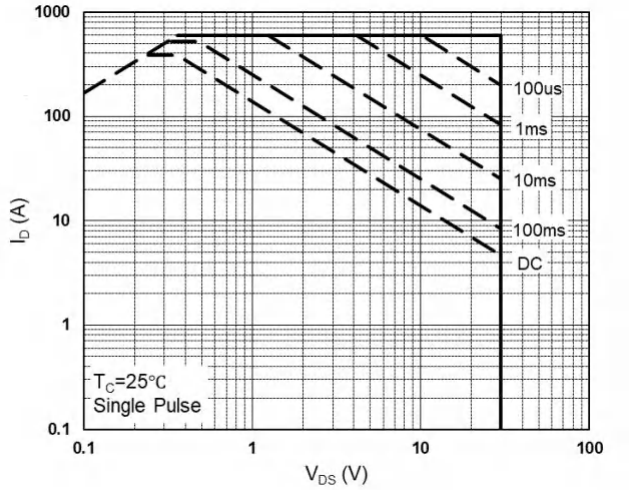


Fig.8 Safe Operating Area

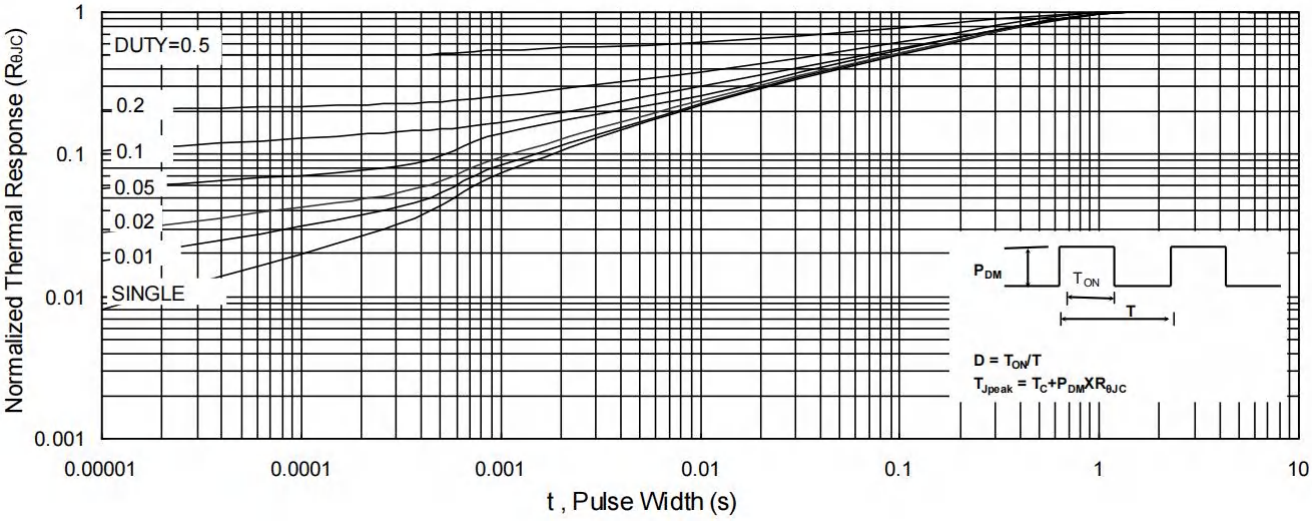


Fig.9 Normalized Maximum Transient Thermal Impedance

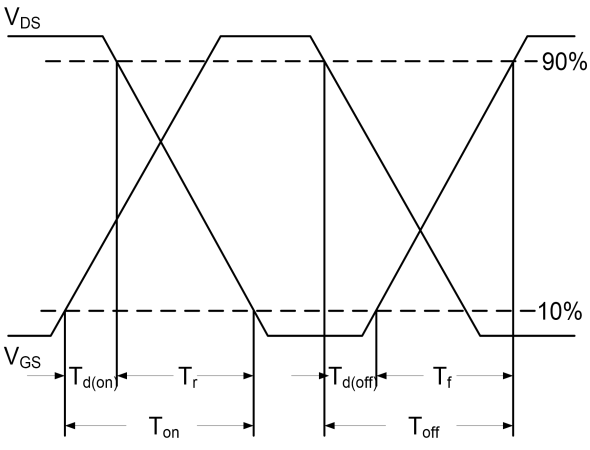


Fig.10 Switching Time Waveform

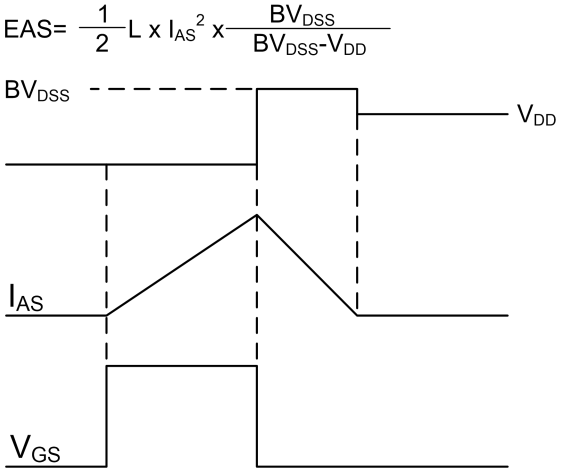
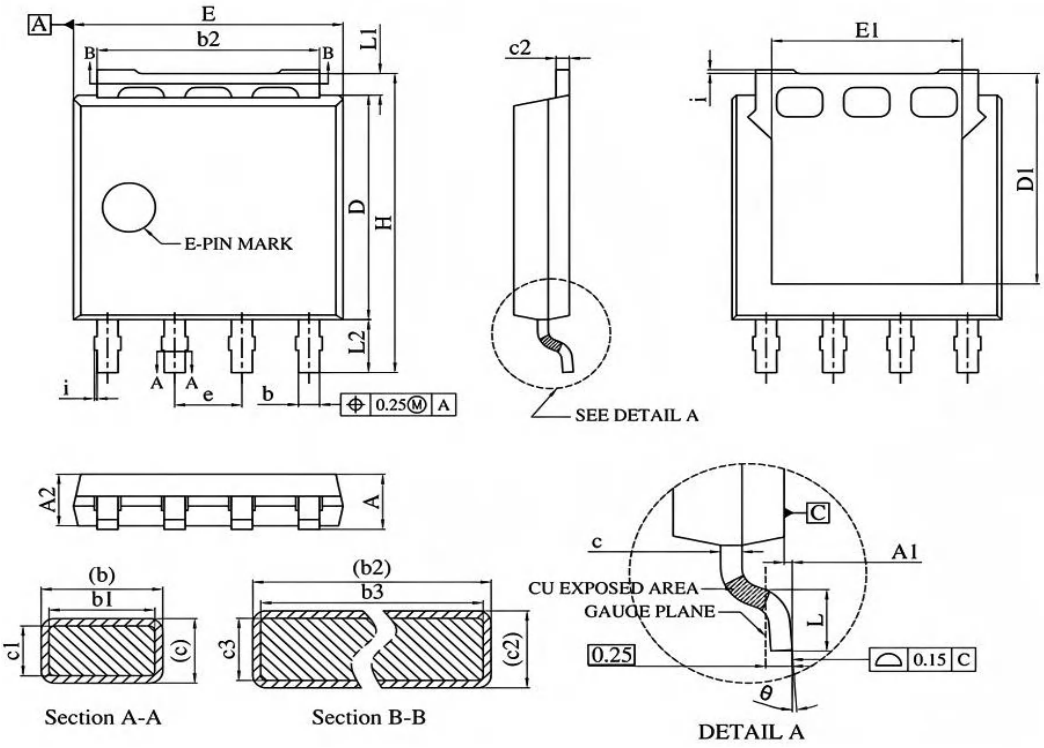


Fig.11 Unclamped Inductive Switching Waveform

Ordering Information

Part Number	Package code	Packaging
HSMA3078	LFPAK5*6	2000/Tape&Reel

LFPAK5*6 Package Outline



COMMON DIMENSIONS(MM)			
SYMBOLS	MIN	NOM	MAX
A	1.00	-	1.20
A1	0	-	0.15
A2	0.98	1.05	1.12
b	0.35	0.40	0.50
b1	0.32	0.43	0.54
b2	4.02	4.21	4.40
b3	4.00	4.19	4.37
c	0.18	0.20	0.25
c1	0.17	0.20	0.23
c2	0.23	0.25	0.30
c3	0.22	0.25	0.28
D	4.45	-	4.70
D1	4.20	-	4.45
E	4.95	-	5.40
E1	3.50	-	3.70
e	1.27 BSC.		
H	5.95	-	6.25
i	-	-	0.25
L	0.40	-	0.85
L1	0.270	-	0.57
L2	0.80	-	1.30
θ	0°	-	8°

HSMA3078 Marking: