HUASHUO SEMICONDUCTOR

HSM0040

N-Ch 100V Fast Switching MOSFETs

Description

The HSM0040 is the high cell density trenched N-ch MOSFETs, which provide excellent RDSON and gate charge for most of the synchronous buck converter applications.

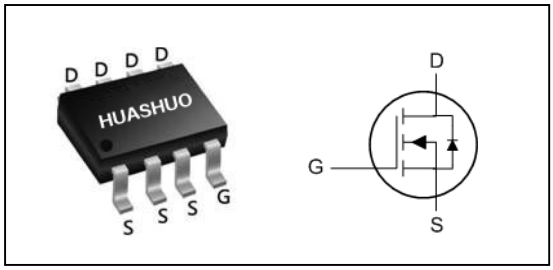
The HSM0040 meet the RoHS and Green Product requirement, 100% EAS guaranteed with full function reliability approved.

- 100% EAS Guaranteed
- Green Device Available
- Super Low Gate Charge
- Excellent CdV/dt effect decline
- Advanced high cell density Trench technology

Product Summary

V_{DS}	100	V
$R_{DS(ON),max}$	14	mΩ
I_D	11	A

SOP8 Pin Configuration



Absolute Maximum Ratings

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	100	V
V_{GS}	Gate-Source Voltage	±20	V
I_D@T_A=25℃	Continuous Drain Current, V_{GS} @ 10V[1]	11	A
I_D@T_A=70℃	Continuous Drain Current, V_{GS} @ 10V[1]	8	A
I_{DM}	Pulsed Drain Current[2]	50	A
EAS	Single Pulse Avalanche Energy[3]	101	mJ
I_{AS}	Avalanche Current	45	A
P_D@T_A=25℃	Total Power Dissipation[4]	3.1	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](t≦10s)	---	40	℃/W
	Thermal Resistance Junction-Ambient [1]	---	75	℃/W
$R_{\theta JC}$	Thermal Resistance Junction-Case[1]	---	24	℃/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	100	---	---	V
$R_{DS(ON)}$	Static Drain-Source On-Resistance[2]	V_{GS}=10V , I_D=10A	---	---	14	mΩ
	Static Drain-Source On-Resistance[2]	V_{GS}=4.5V , I_D=8A	---	---	17	
$V_{GS(th)}$	Gate Threshold Voltage	V_{GS}=V_{DS} , I_D =250uA	1.2	---	2.4	V
I_{DSS}	Drain-Source Leakage Current	V_{DS}=80V , V_{GS}=0V , T_J=25℃	---	---	1	uA
		V_{DS}=80V , V_{GS}=0V , T_J=55℃	---	---	5	
I_{GSS}	Gate-Source Leakage Current	V_{GS}=±20V , V_{DS}=0V	---	---	±100	nA
gfs	Forward Transconductance	V_{DS}=5V , I_D=10A	---	43	---	S
R_g	Gate Resistance	V_{DS}=0V , V_{GS}=0V , f=1MHz	---	0.7	---	Ω
Qg	Total Gate Charge (10V)	V_{DS}=80V , V_{GS}=10V , I_D=10A	---	75	---	nC
Qgs	Gate-Source Charge		---	15.5	---	
Qgd	Gate-Drain Charge		---	20.3	---	
Td(on)	Turn-On Delay Time	V_{DD}=40V , V_{GS}=10V , R_G=3.3Ω, I_D=10A	---	18.5	---	ns
Tr	Rise Time		---	8.8	---	
Td(off)	Turn-Off Delay Time		---	58.8	---	
Tf	Fall Time		---	15.8	---	
Ciss	Input Capacitance	V_{DS}=25V , V_{GS}=0V , f=1MHz	---	4708	---	pF
Coss	Output Capacitance		---	326	---	
Crss	Reverse Transfer Capacitance		---	247	---	

Diode Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
I_S	Continuous Source Current[1,5]	V_G=V_D=0V , Force Current	---	---	11	A
I_{SM}	Pulsed Source Current[2,5]		---	---	50	A
V_{SD}	Diode Forward Voltage[2]	V_{GS}=0V , I_S=A , T_J=25℃	---	---	1.2	V
t_{rr}	Reverse Recovery Time	I_F=10A , dI/dt=100A/μs , T_J=25℃	---	28	---	nS
Q_{rr}	Reverse Recovery Charge		---	50	---	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}=45A

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.

Typical Characteristics

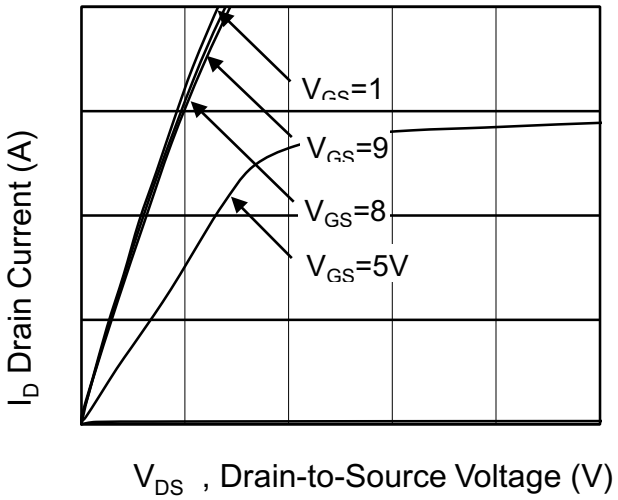


Fig.1 Typical Output Characteristics

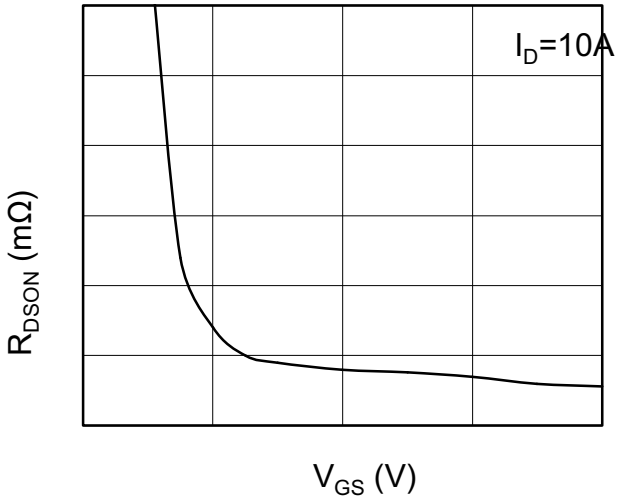


Fig.2 On-Resistance v.s Gate-Source

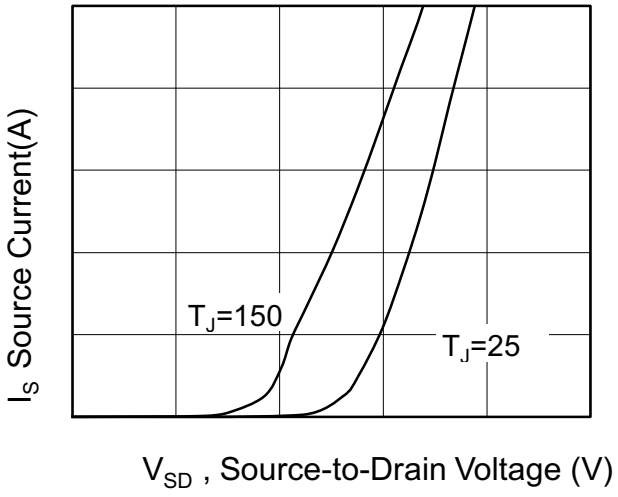


Fig.3 Forward Characteristics of Reverse

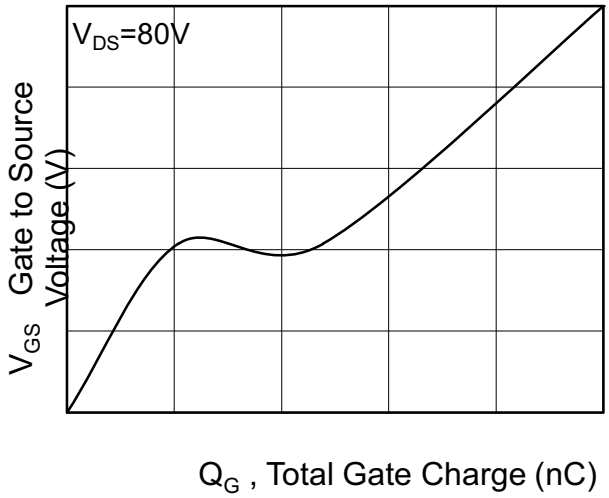


Fig.4 Gate-Charge Characteristics

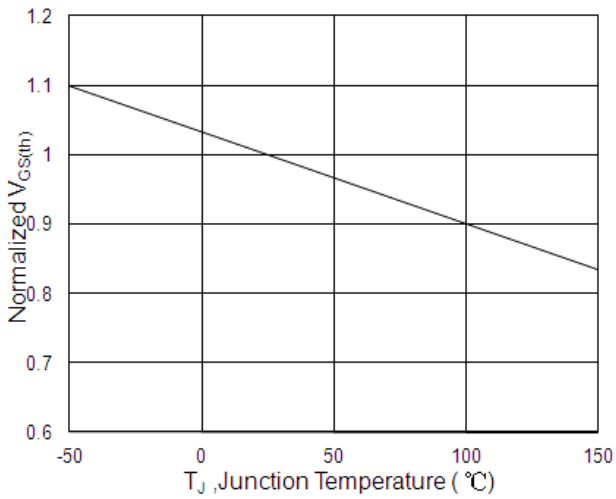


Fig.5 Normalized $V_{GS(th)}$ vs. T_J

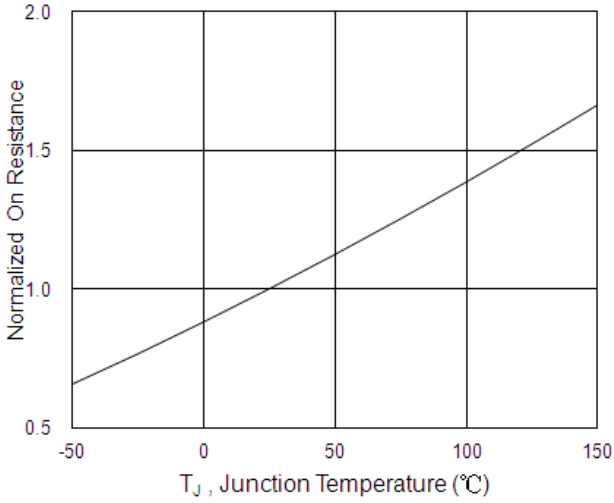


Fig.6 Normalized R_{DSON} vs. T_J

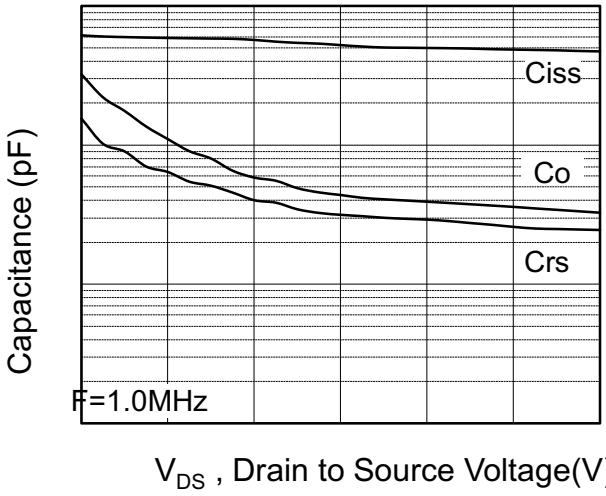


Fig.7 Capacitance

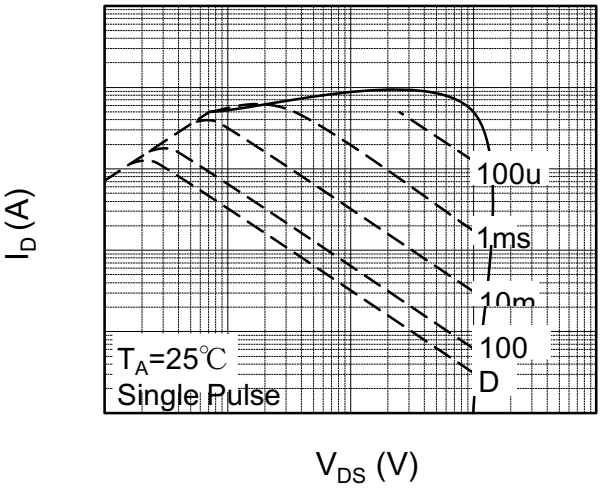


Fig.8 Safe Operating Area

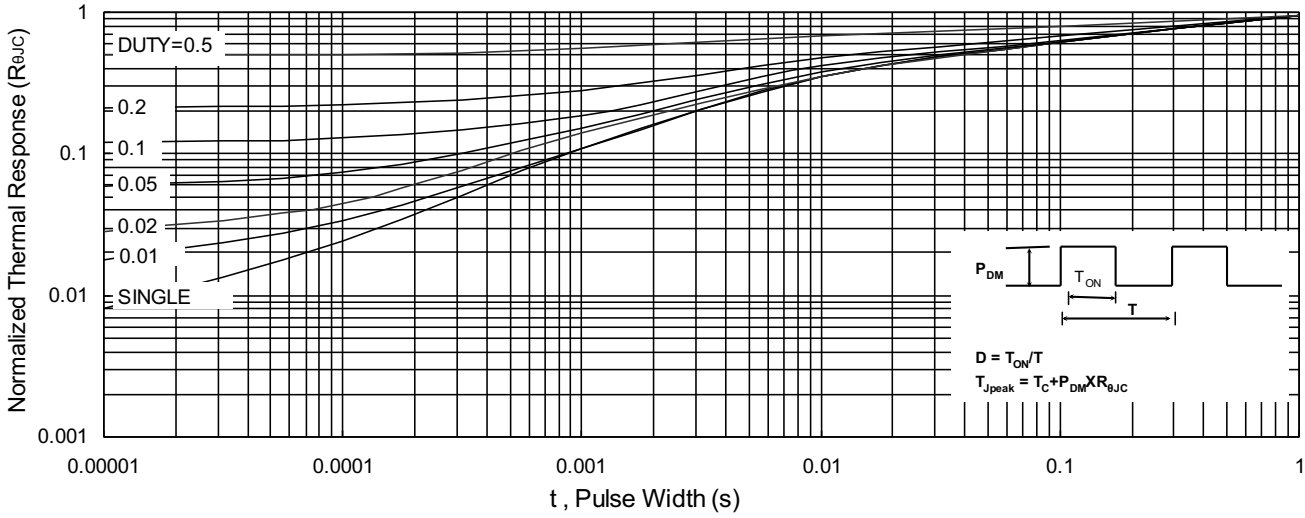


Fig.9 Normalized Maximum Transient Thermal Impedance

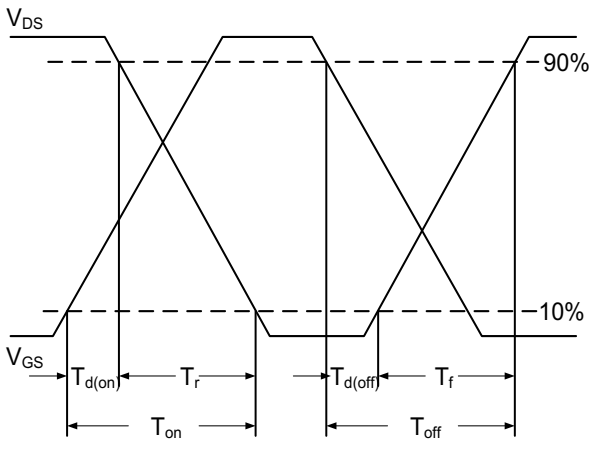


Fig.10 Switching Time Waveform

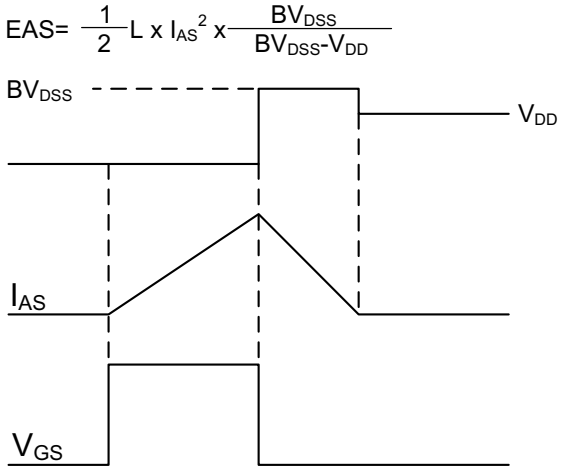
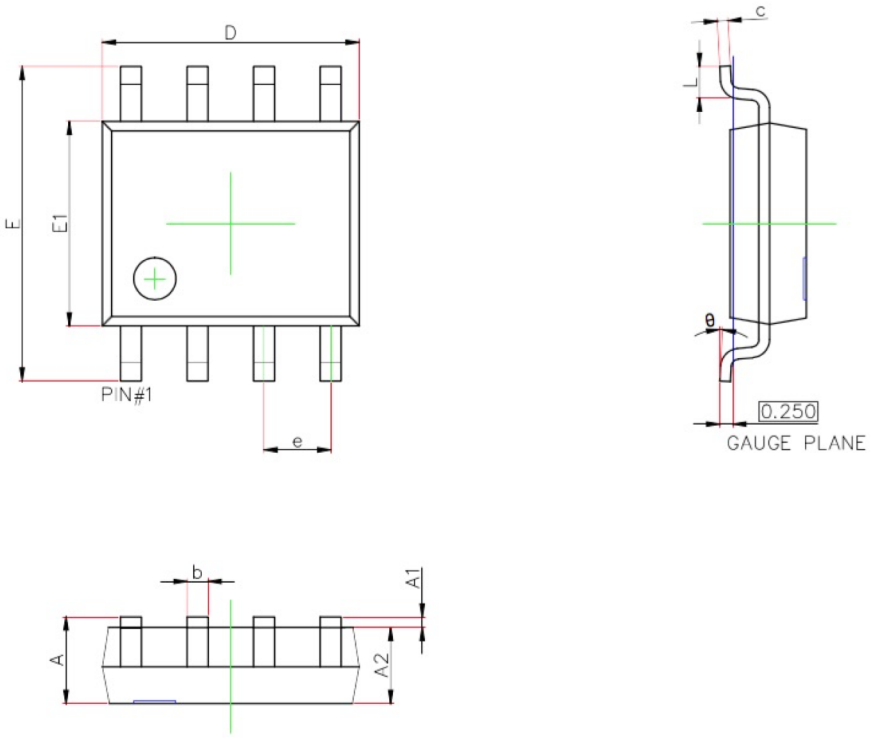


Fig.11 Unclamped Inductive Switching Waveform

Ordering Information

Part Number	Package code	Packaging
HSM0040	SOP-8	2500/Tape&Reel

SOP8PACKAGE OUTLINE DIMENSIONS



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	1.350	1.750	0.053	0.069
A1	0.100	0.250	0.004	0.010
A2	1.350	1.550	0.053	0.061
b	0.330	0.510	0.013	0.020
c	0.170	0.250	0.007	0.010
D	4.800	5.000	0.189	0.197
e	1.270 （BSC）		0.050 （BSC）	
E	5.800	6.200	0.228	0.244
E1	3.800	4.000	0.150	0.157
L	0.400	1.270	0.016	0.050
θ	0°	8°	0°	8°