HSM6032

Description

The HSM6032 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 HSM6032 meet the RoHS and Green Product requirement, 100% EAS guaranteed with full function reliability approved.

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

Product Summary

V_{DS}	60	V
$R_{DS(ON),max}$	8.5	mΩ
I_D	13	A

SOP8 Pin Configuration
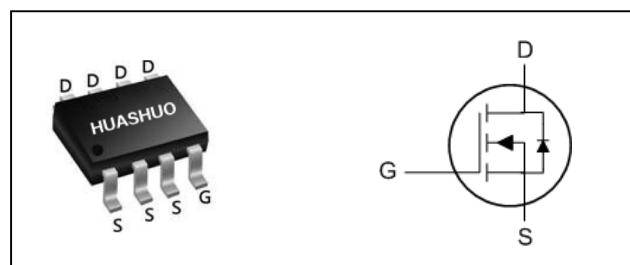
Absolute Maximum Ratings

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	60	V
V_{GS}	Gate-Source Voltage	±20	V
$I_D@T_A=25°C$	Continuous Drain Current, V_{GS} @ 10V[1]	13	A
$I_D@T_A=100°C$	Continuous Drain Current, V_{GS} @ 10V[1]	8	A
I_{DM}	Pulsed Drain Current[2]	60	A
EAS	Single Pulse Avalanche Energy[3]	80	mJ
I_{AS}	Avalanche Current	40	A
$P_D@T_A=25°C$	Total Power Dissipation[4]	2.7	W
T_{STG}	Storage Temperature Range	-55 to 150	°C
T_J	Operating Junction Temperature Range	-55 to 150	°C

Thermal Data

Symbol	Parameter	Typ.	Max.	Unit
$R_{θJA}$	Thermal Resistance Junction-ambient [1](t≤10S)	---	45	°C/W
	Thermal Resistance Junction-ambient [1](Steady State)	---	80	°C/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	60	---	---	V
$R_{DS(ON)}$	Static Drain-Source On-Resistance[2]	V_{GS}=10V , I_D=10A	---	---	8.5	mΩ
		V_{GS}=4.5V , I_D=8A	---	---	12	mΩ
$V_{GS(th)}$	Gate Threshold Voltage	V_{GS}=V_{DS} , I_D =250uA	1.2	---	2.5	V
I_{DSS}	Drain-Source Leakage Current	V_{DS}=48V , V_{GS}=0V , T_J=25℃	---	---	1	uA
		V_{DS}=48V , 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	---	50	---	S
Q_g	Total Gate Charge (10V)		---	57	---	nC
Q_{gs}	Gate-Source Charge	V_{DS}=48V , V_{GS}=10V , I_D=10A	---	8.7	---	
Q_{gd}	Gate-Drain Charge		---	14	---	
$T_{d(on)}$	Turn-On Delay Time		---	16.2	---	ns
T_r	Rise Time	V_{DD}=30V , V_{GS}=10V , R_G=3.3Ω, I_D=10A	---	41.2	---	
$T_{d(off)}$	Turn-Off Delay Time		---	56.4	---	
T_f	Fall Time		---	16.2	---	
C_{iss}	Input Capacitance		---	3307	---	pF
C_{oss}	Output Capacitance	V_{DS}=25V , V_{GS}=0V , f=1MHz	---	201	---	
C_{rss}	Reverse Transfer Capacitance		---	151	---	

Diode Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
I_S	Continuous Source Current[1,5]	V_G=V_D=0V , Force Current	---	---	10	A
I_{SM}	Pulsed Source Current[2,5]		---	---	60	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=10A , dI/dt=100A/μs , T_J=25℃	---	24	---	nS
Q_{rr}	Reverse Recovery Charge		---	15	---	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}=50V,V_{GS}=10V,L=0.1mH,I_{AS}=40A
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
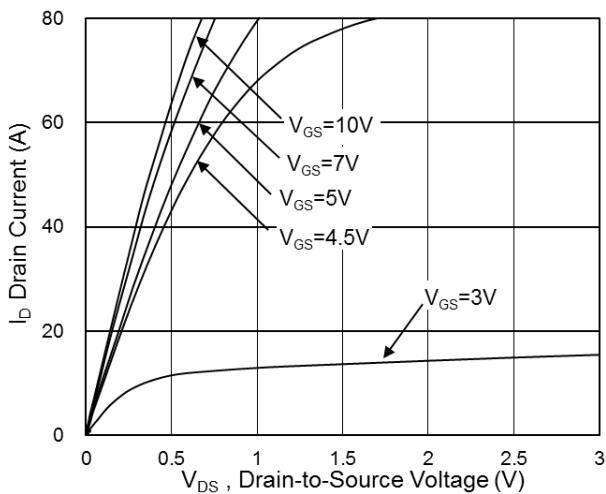
**Fig.1 Typical Output Characteristics**
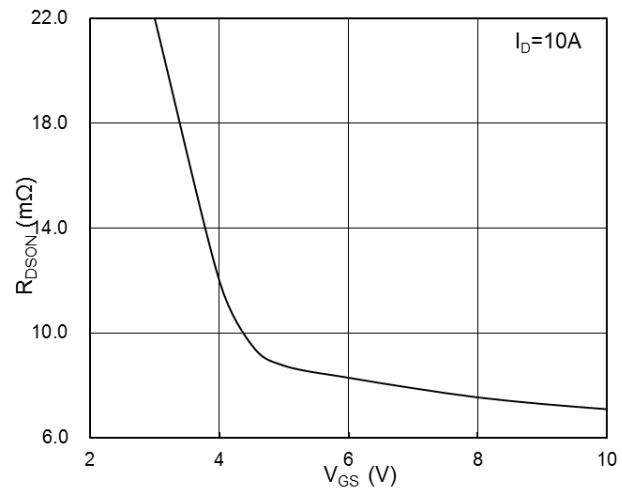
Fig.2 On-Resistance v.s Gate-Source Voltage
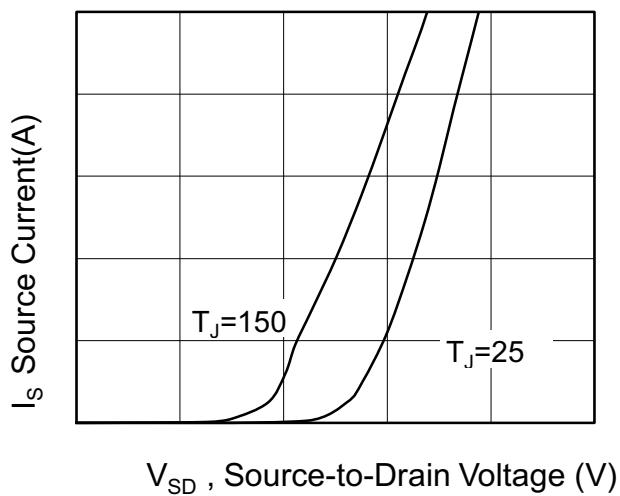
**Fig.3 Forward Characteristics of Reverse**
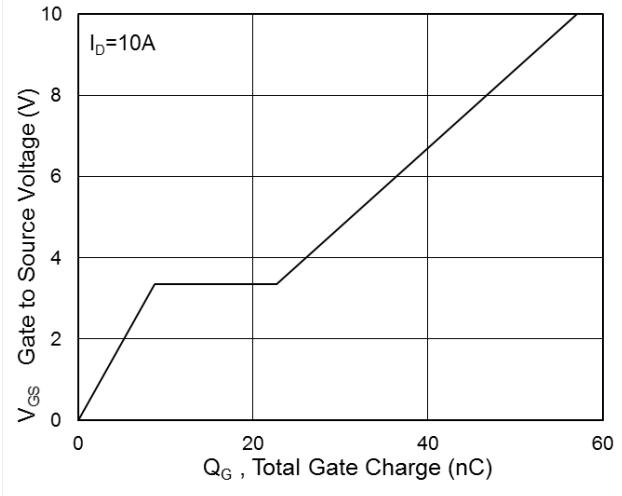
Fig.4 Gate-Charge Characteristics
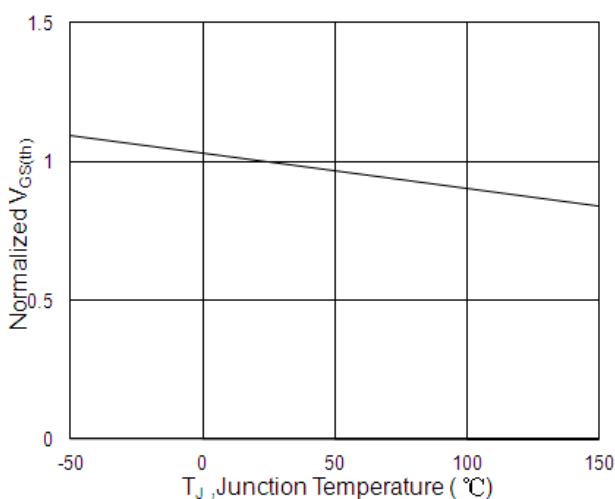
**Fig.5 Normalized $V_{GS(th)}$ vs. T_J**
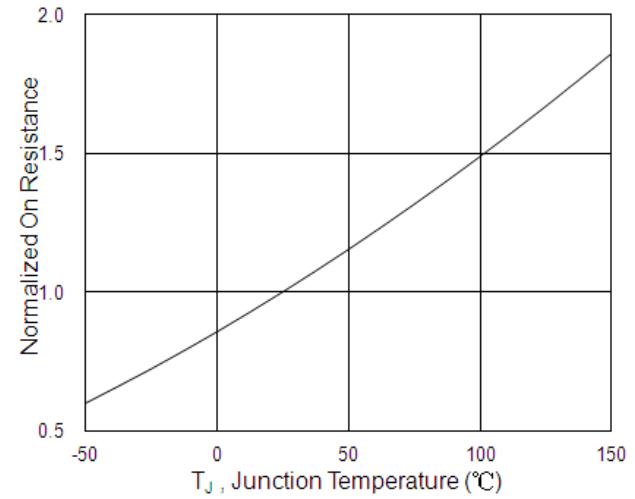
Fig.6 Normalized R_{DSON} vs. T_J
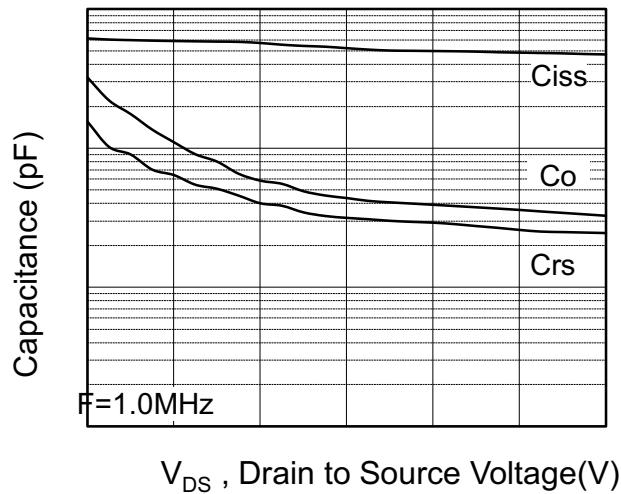
Fig.7 Capacitance
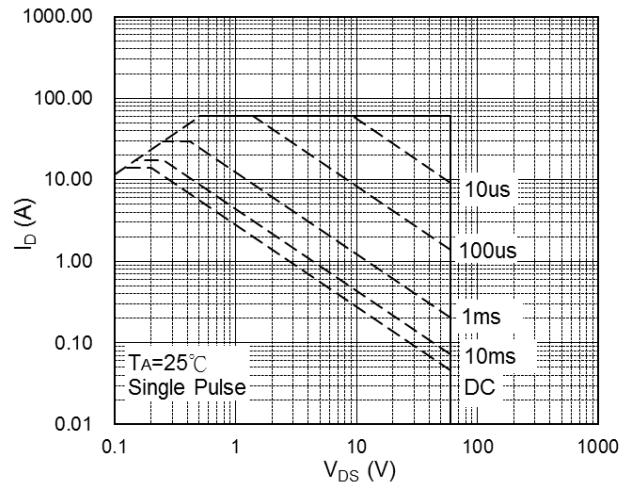
Fig.8 Safe Operating Area
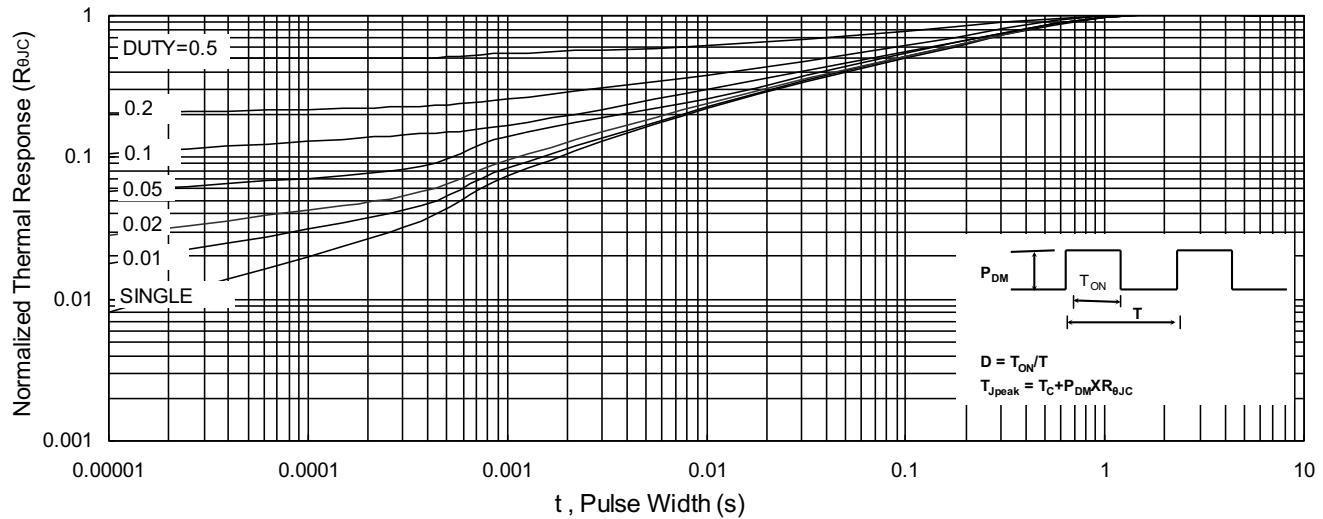
Fig.9 Normalized Maximum Transient Thermal Impedance

$$D = T_{ON}/T$$
$$T_{Jpeak} = T_C + P_{DM} \times R_{\theta JC}$$
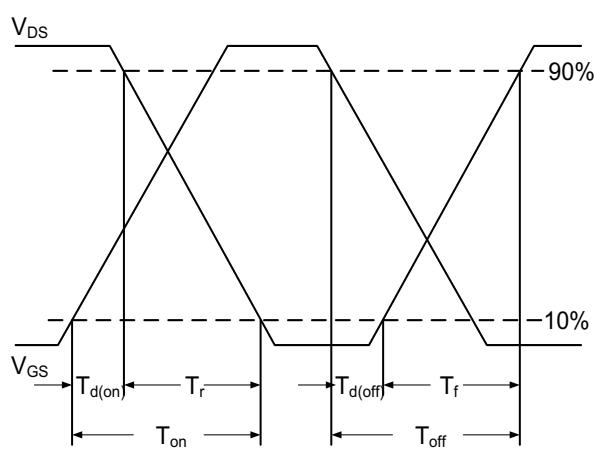
Fig.10 Switching Time Waveform

$$EAS = \frac{1}{2} L \times I_{AS}^2 \times \frac{BV_{DSS}}{BV_{DSS} - V_{DD}}$$
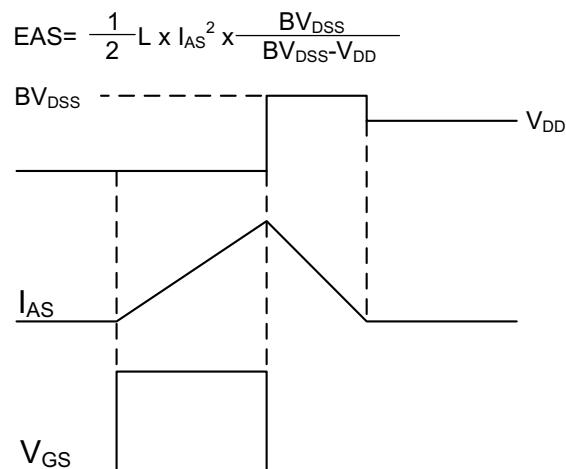
Fig.11 Unclamped Inductive Switching