HUASHUO SEMICONDUCTOR

HSL0004

N-Ch 100V Fast Switching MOSFETs

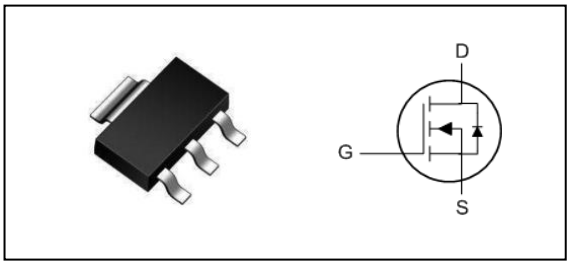
Description

The HSL0004 is the high cell density trenched N-ch MOSFETs, which provides excellent RDSON and efficiency for most of the small power switching and load switch applications. The HSL0004 meets the RoHS and Green Product requirement with full function reliability approved.

Product Summary

V_{DS}	100	V
$R_{DS(ON),typ}$	90	mΩ
I_D	3	A

SOT223 Pin Configuration



- Green Device Available
- Super Low Gate Charge
- Excellent Cdv/dt effect decline
- Advanced high cell density Trench technology

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} @ 10V1	3	A
I_D@T_A=70℃	Continuous Drain Current, V_{GS} @ 10V1	2.5	A
I_{DM}	Pulsed Drain Current2	10	A
P_D@T_A=25℃	Total Power Dissipation3	1.5	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	---	85	℃/W
$R_{\theta JC}$	Thermal Resistance Junction-Case1	---	30	℃/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-Resistance2	V_{GS}=10V , I_D=2A	---	90	112	mΩ
		V_{GS}=4.5V , I_D=1A	---	95	120	mΩ
$V_{GS(th)}$	Gate Threshold Voltage	V_{GS}=V_{DS} , I_D =250uA	1.0	1.5	2.5	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=2A	---	20	---	S
R_g	Gate Resistance	V_{DS}=0V , V_{GS}=0V , f=1MHz	---	2	4	Ω
Q_g	Total Gate Charge (10V)	V_{DS}=80V , V_{GS}=10V , I_D=2A	---	26.2	36.7	nC
Q_{gs}	Gate-Source Charge		---	3.8	5.32	
Q_{gd}	Gate-Drain Charge		---	4.8	6.7	
$T_{d(on)}$	Turn-On Delay Time	V_{DD}=50V , V_{GS}=10V , R_G=3.3Ω I_D=2A	---	4.2	8.4	ns
T_r	Rise Time		---	7.6	14	
$T_{d(off)}$	Turn-Off Delay Time		---	41	82	
T_f	Fall Time		---	14	28	
C_{iss}	Input Capacitance	V_{DS}=15V , V_{GS}=0V , f=1MHz	---	1535	2149	pF
C_{oss}	Output Capacitance		---	60	84	
C_{rss}	Reverse Transfer Capacitance		---	37	52	

Diode Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
I_S	Continuous Source Current1,4	V_G=V_D=0V , Force Current	---	---	2.5	A
V_{SD}	Diode Forward Voltage2	V_{GS}=0V , I_S=1A , T_J=25℃	---	---	1.2	V
t_{rr}	Reverse Recovery Time	I_F=2A , dI/dt=100A/μs , T_J=25℃	---	35	---	nS
Q_{rr}	Reverse Recovery Charge		---	17	---	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 power dissipation is limited by 150℃ junction temperature
4. The data is theoretically the same as I_D and I_{DM} , in real applications , should be limited by total power dissipation.

Typical Characteristics

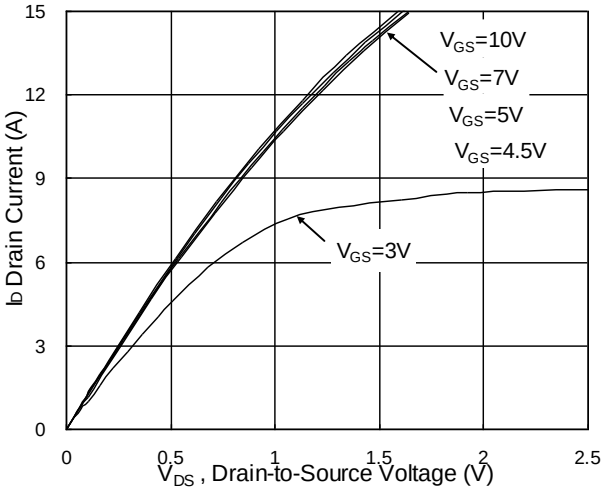


Fig.1 Typical Output Characteristics

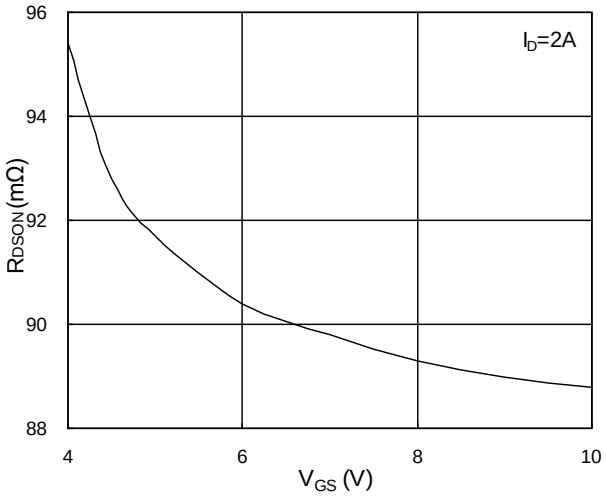


Fig.2 On-Resistance vs G-S Voltage

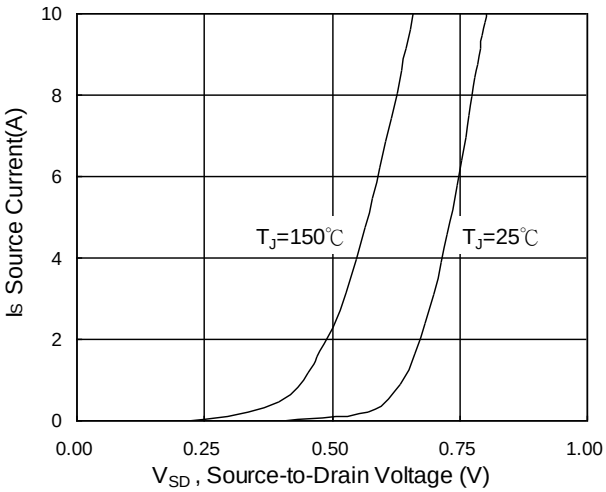


Fig.3 Source Drain Forward Characteristics

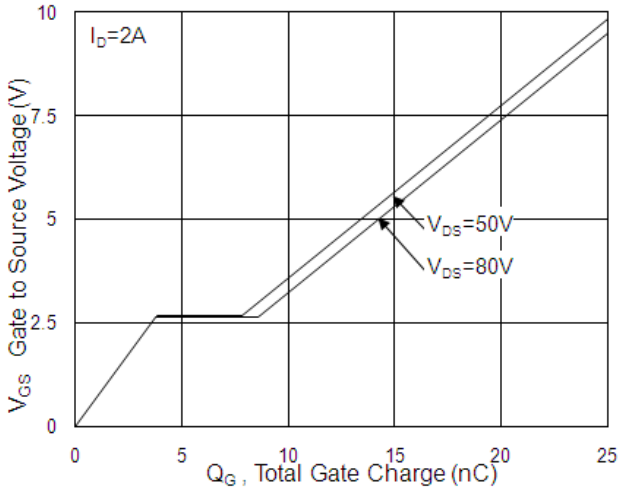


Fig.4 Gate-Charge Characteristics

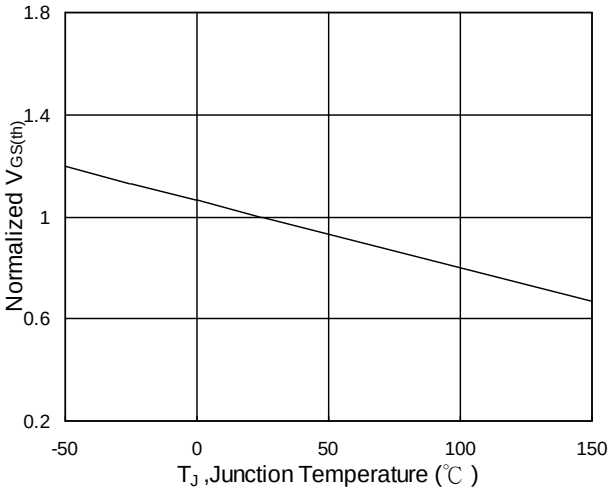


Fig.5 Normalized $V_{GS(th)}$ vs T_J

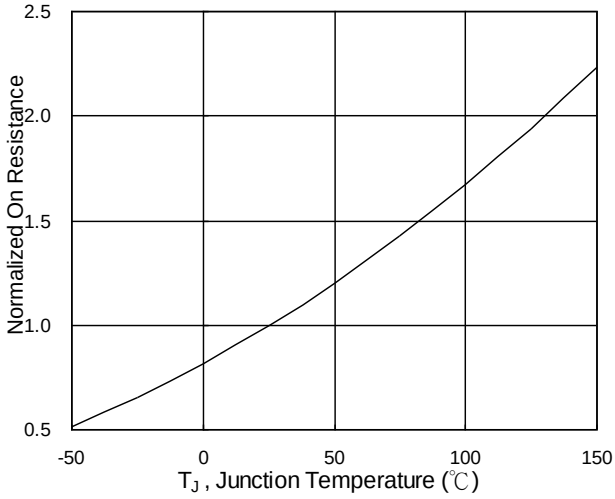


Fig.6 Normalized R_{DSON} vs T_J

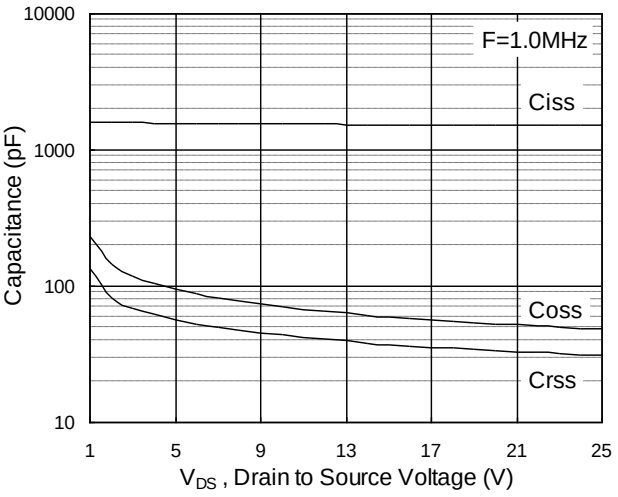


Fig.7 Capacitance

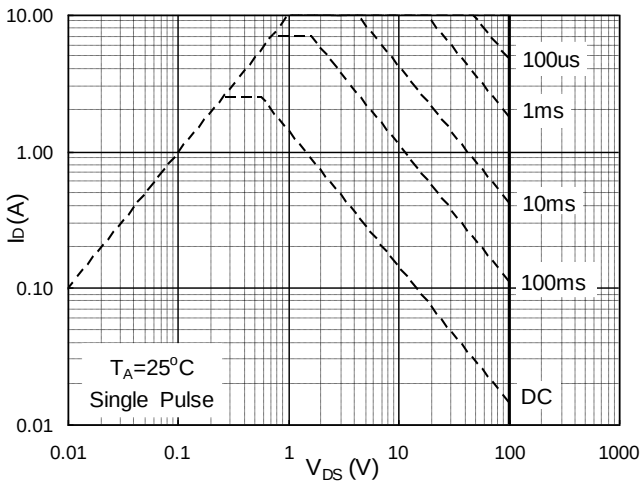


Fig.8 Safe Operating Area

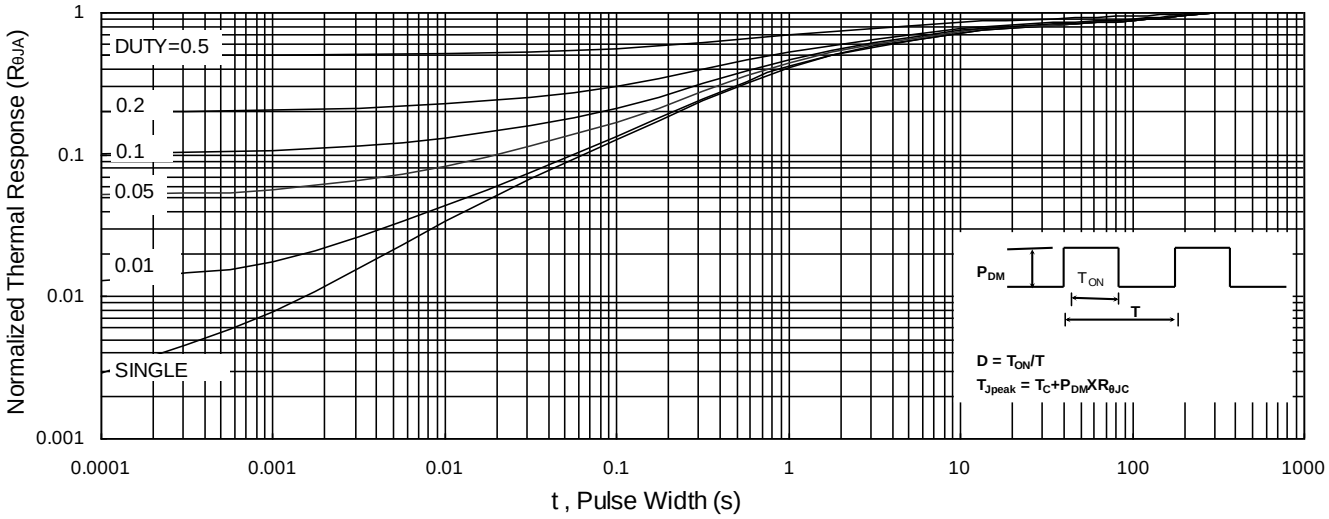


Fig.9 Normalized Maximum Transient Thermal Impedance

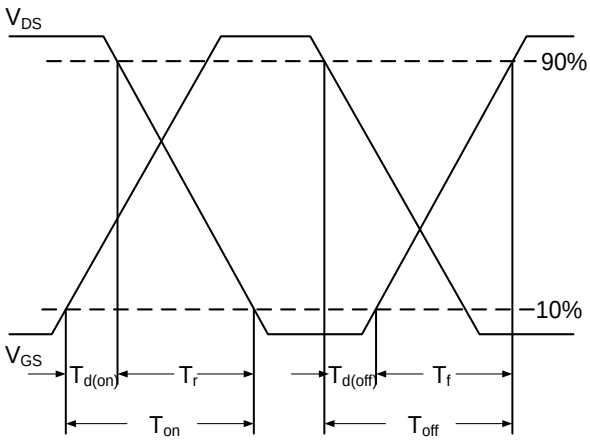


Fig.10 Switching Time Waveform

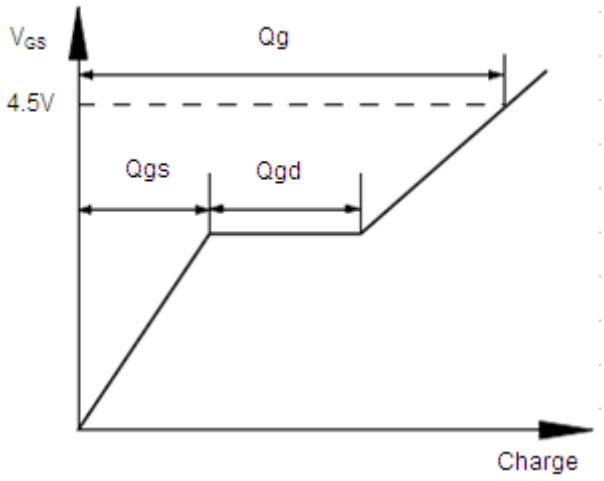


Fig.11 Gate Charge Waveform