

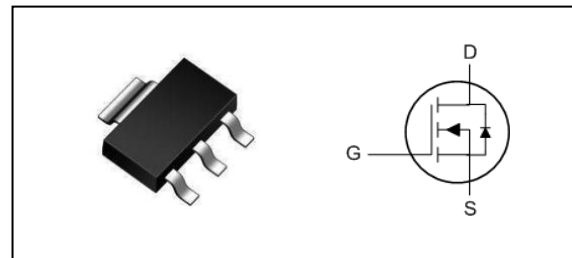
N-Ch 100V Fast Switching MOSFETs
Description

The HSL0004 is the high cell density trenched N-ch MOSFETs, which provides excellent R_{DS(ON)} 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.

- Green Device Available
- Super Low Gate Charge
- Excellent C_{dv/dt} effect decline
- Advanced high cell density Trench technology

Product Summary

V _{DS}	100	V
R _{DS(ON),typ}	90	mΩ
I _D	3	A

SOT223 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°C	Continuous Drain Current, V _{GS} @ 10V ₁	3	A
I _D @T _A =70°C	Continuous Drain Current, V _{GS} @ 10V ₁	2.5	A
I _{DM}	Pulsed Drain Current ₂	10	A
P _D @T _A =25°C	Total Power Dissipation ₃	1.5	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	---	85	°C/W
R _{θJC}	Thermal Resistance Junction-Case ₁	---	30	°C/W

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Electrical Characteristics (T_J=25 °C, unless otherwise noted)

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
B _{VDS}	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 =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°C	---	---	1	uA
		V _{DS} =80V, V _{GS} =0V, T _J =55°C	---	---	5	
I _{GSS}	Gate-Source Leakage Current	V _{GS} =±20V, V _{DS} =0V	---	---	±100	nA
g _{fs}	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 Current ^{1,4}	V _G =V _D =0V, Force Current	---	---	2.5	A
V _{SD}	Diode Forward Voltage ²	V _{GS} =0V, I _S =1A, T _J =25°C	---	---	1.2	V
t _{rr}	Reverse Recovery Time	I _F =2A, di/dt=100A/μs, T _J =25°C	---	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°C 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

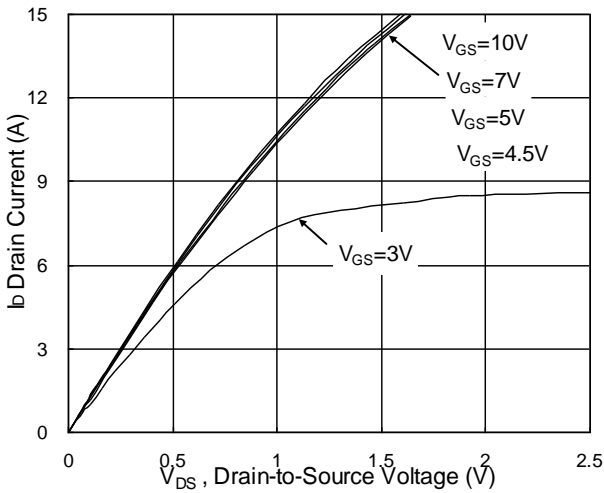


Fig.1 Typical Output Characteristics

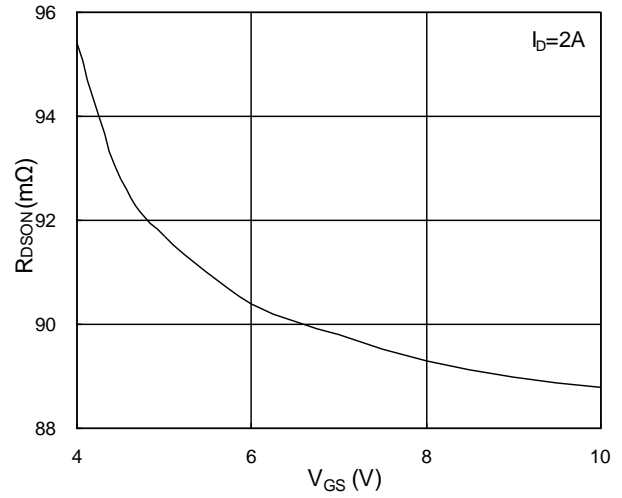


Fig.2 On-Resistance vs G-S Voltage

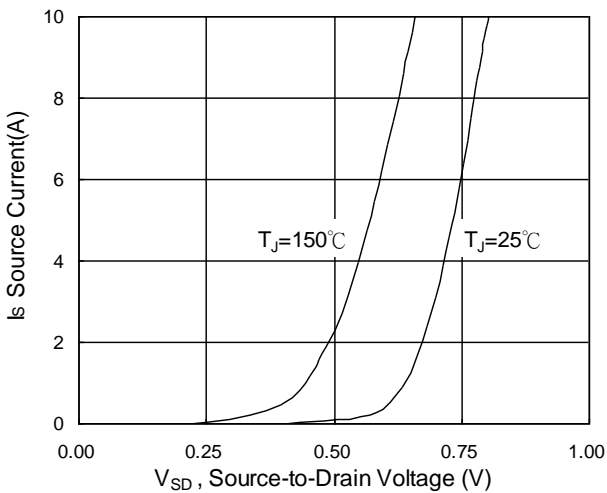


Fig.3 Source Drain Forward Characteristics

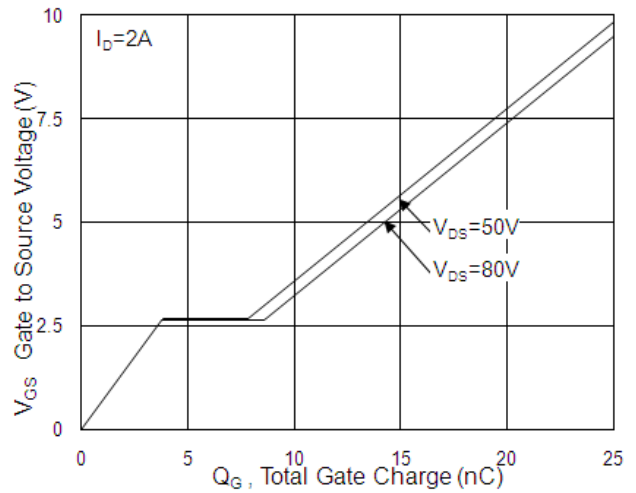


Fig.4 Gate-Charge Characteristics

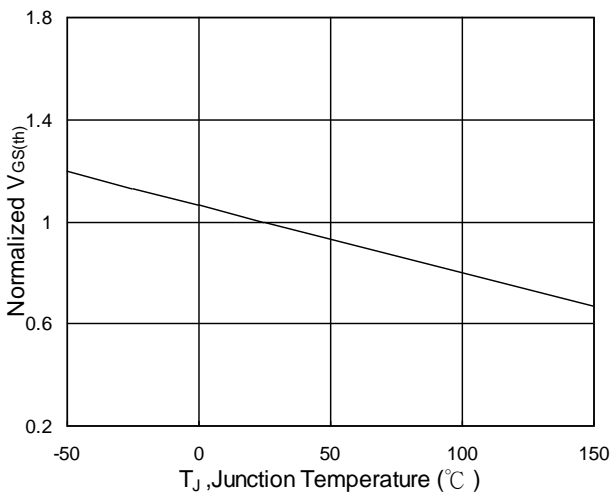


Fig.5 Normalized $V_{GS(th)}$ vs T_J

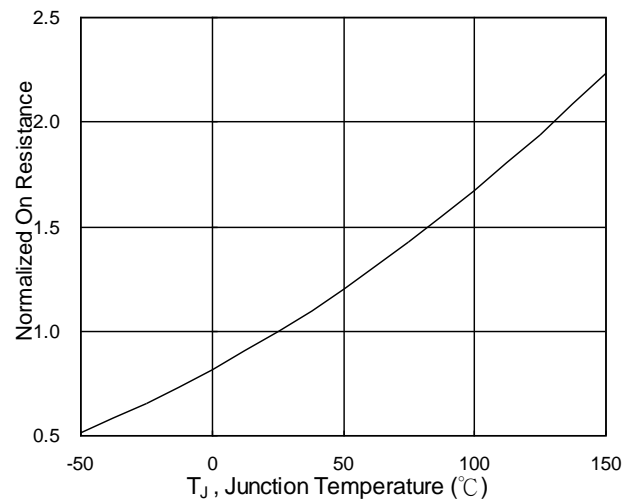


Fig.6 Normalized $R_{DS(on)}$ vs T_J

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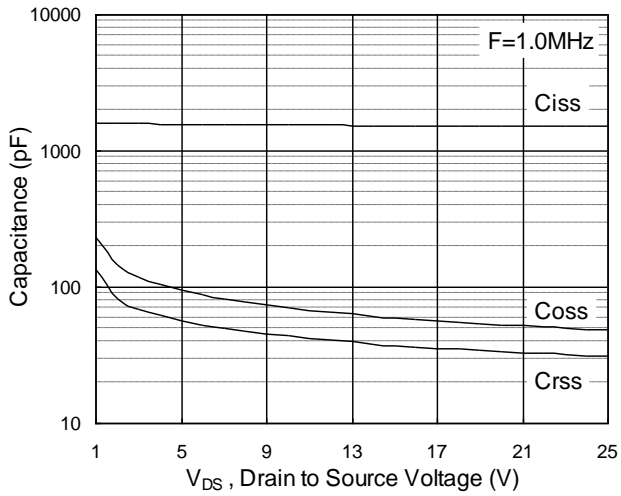


Fig.7 Capacitance

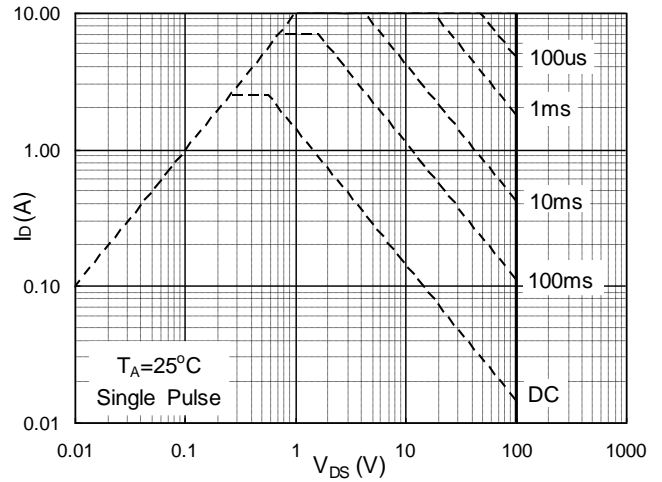


Fig.8 Safe Operating Area

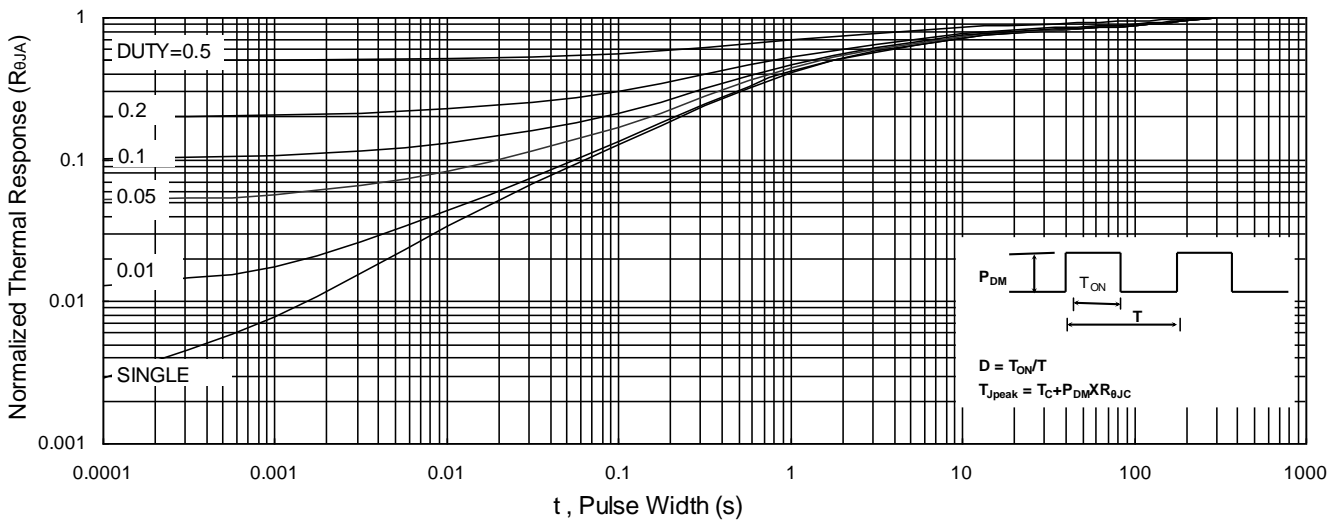


Fig.9 Normalized Maximum Transient Thermal Impedance

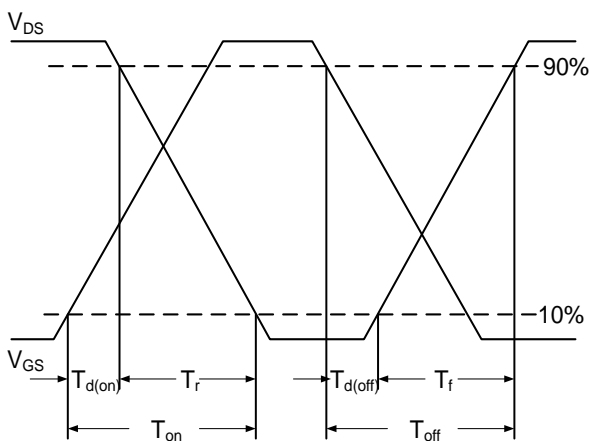


Fig.10 Switching Time Waveform

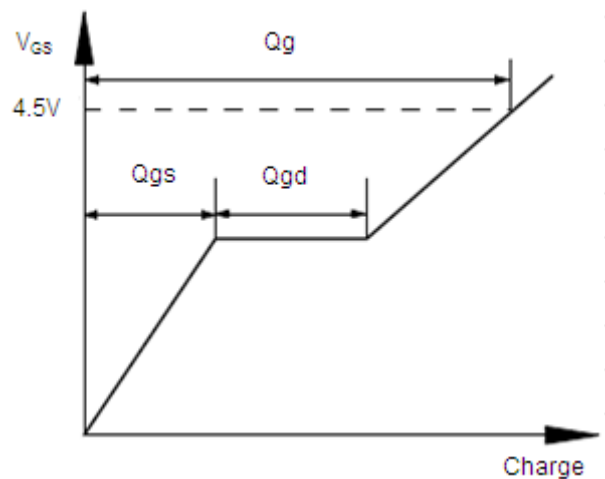


Fig.11 Gate Charge Waveform