Description

The HSS2301A is the high cell density trenched P-ch MOSFETs, which provides excellent RDSON and efficiency for most of the small power switching and load switch applications.

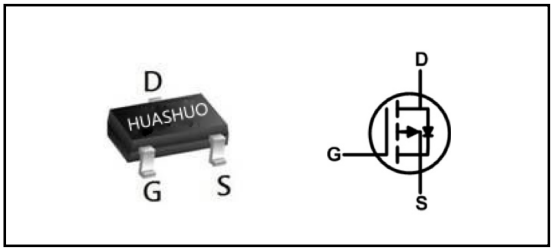
The HSS2301A meets the RoHS and Green Product requirement with full function reliability approved.

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

Product Summary

V_{DS}	-20	V
$R_{DS(ON),max}$	90	mΩ
I_D	-2.8	A

SOT23 Pin Configuration



Absolute Maximum Ratings

Symbol	Parameter	Rating		Units
		10s	Steady State	
V_{DS}	Drain-Source Voltage	-20		V
V_{GS}	Gate-Source Voltage	±12		V
I_D@T_A=25℃	Continuous Drain Current, V_{GS} @ -4.5V[1]	-2.8	-2.5	A
I_D@T_A=70℃	Continuous Drain Current, V_{GS} @ -4.5V[1]	-2.3	-2.1	A
I_{DM}	Pulsed Drain Current[2]	-8		A
P_D@T_A=25℃	Total Power Dissipation[3]	1.25	1	W
P_D@T_A=70℃	Total Power Dissipation[3]	0.75	0.64	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]	---	125	℃/W
$R_{\theta JA}$	Thermal Resistance Junction-Ambient [1] (t ≤10s)	---	95	℃/W
$R_{\theta JC}$	Thermal Resistance Junction-Case[1]	---	80	℃/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	-20	---	---	V
$\triangle BV_{DSS}/\triangle T_J$	BVDSS Temperature Coefficient	Reference to 25℃ , I_D=-1mA	---	-0.01	---	V/℃
$R_{DS(ON)}$	Static Drain-Source On-Resistance[2]	V_{GS}=-4.5V , I_D=-2.8A	---	75	90	mΩ
		V_{GS}=-2.5V , I_D=-2.0A	---	90	140	
$V_{GS(th)}$	Gate Threshold Voltage	V_{GS}=V_{DS} , I_D =-250uA	-0.45	-0.65	-0.95	V
$\triangle V_{GS(th)}$	$V_{GS(th)}$ Temperature Coefficient		---	2.98	---	mV/℃
I_{DSS}	Drain-Source Leakage Current	V_{DS}=-16V , V_{GS}=0V , T_J=25℃	---	---	-1	uA
		V_{DS}=-16V , V_{GS}=0V , T_J=55℃	---	---	-5	
I_{GSS}	Gate-Source Leakage Current	V_{GS}=±12V , V_{DS}=0V	---	---	±100	nA
gfs	Forward Transconductance	V_{DS}=-5V , I_D=-2.8A	---	9	---	S
Q_g	Total Gate Charge (-4.5V)	V_{DS}=-6V , V_{GS}=-4.5V , I_D=-2.8A	---	6.72	---	nC
Q_{gs}	Gate-Source Charge		---	1.12	---	
Q_{gd}	Gate-Drain Charge		---	1.04	---	
$T_{d(on)}$	Turn-On Delay Time	V_{DD}=-6V , V_{GS}=-4.5V , R_G=6Ω I_D=-1A, R_L=6Ω	---	8.6	---	ns
T_r	Rise Time		---	3	---	
$T_{d(off)}$	Turn-Off Delay Time		---	39.2	---	
T_f	Fall Time		---	11.2	---	
C_{iss}	Input Capacitance	V_{DS}=-6V , V_{GS}=0V , f=1MHz	---	664	---	pF
C_{oss}	Output Capacitance		---	154	---	
C_{rss}	Reverse Transfer Capacitance		---	129	---	

Diode Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
I_S	Continuous Source Current[1,4]	V_G=V_D=0V , Force Current	---	---	-2.8	A
I_{SM}	Pulsed Source Current[2,4]		---	---	-8	A
V_{SD}	Diode Forward Voltage[2]	V_{GS}=0V , I_S=-1A , T_J=25℃	---	---	-1	V
t_{rr}	Reverse Recovery Time	IF=-2.8A , dI/dt=100A/μs , T_J=25℃	---	8.4	---	nS
Q_{rr}	Reverse Recovery Charge		---	3.3	---	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 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.

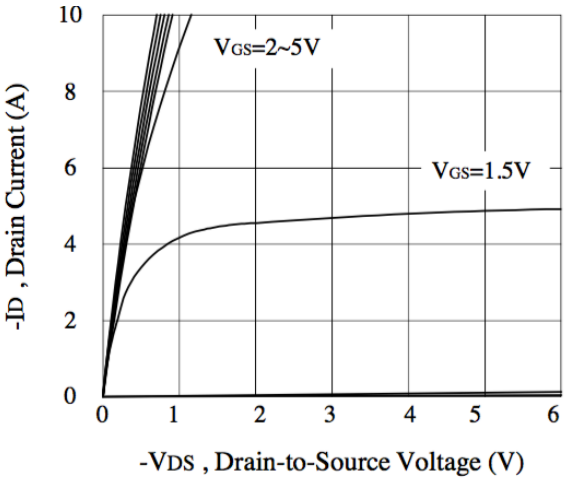


Figure 1. Output Characteristics

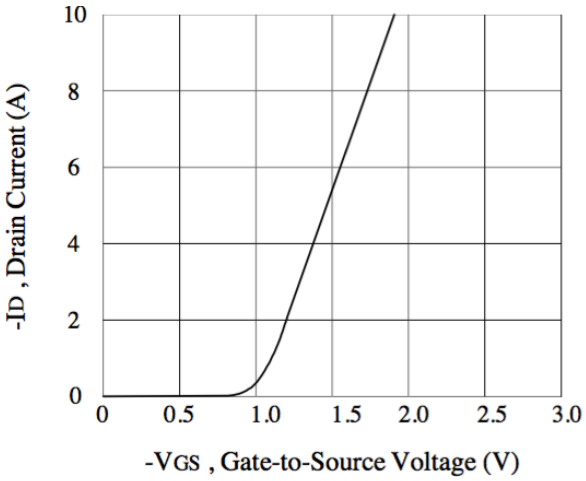


Figure 2. Transfer Characteristics

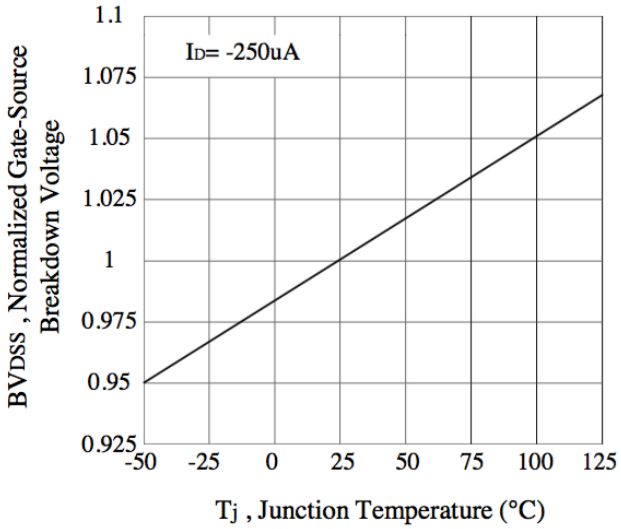


Figure 3. Breakdown Voltage Variation with Temperature

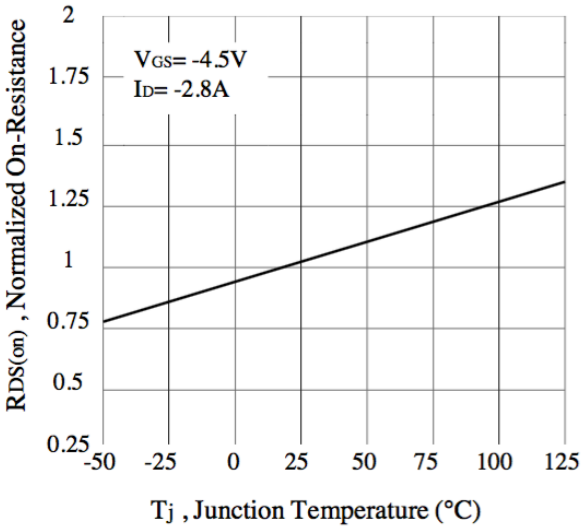


Figure 4. On-Resistance Variation with Temperature

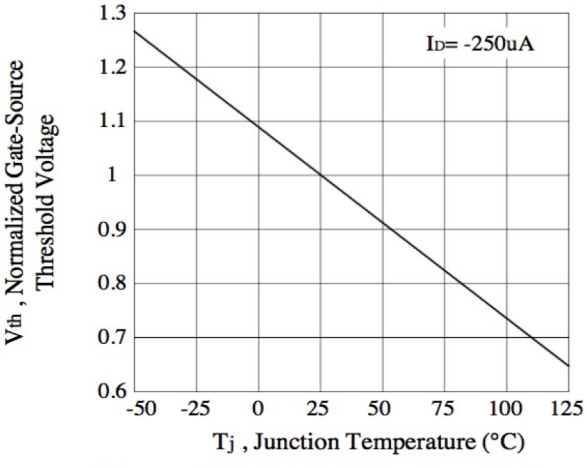


Figure 5. Gate Threshold Variation with Temperature

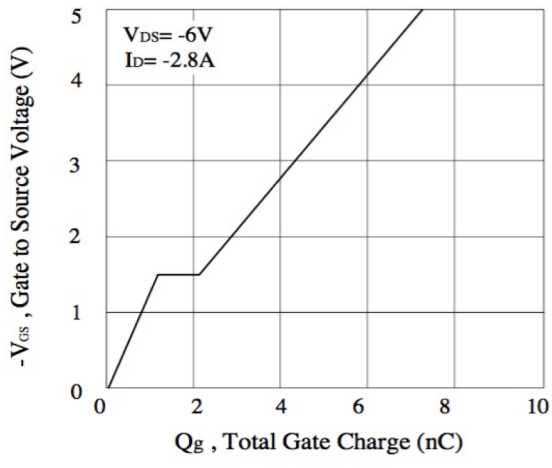


Figure 6. Gate Charge

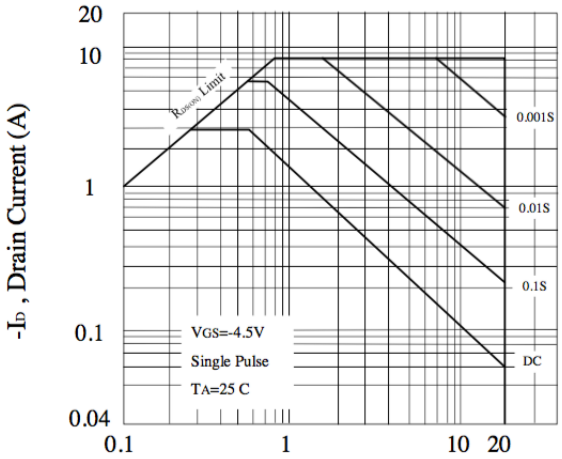


Figure 7. Maximum Safe Operating Area

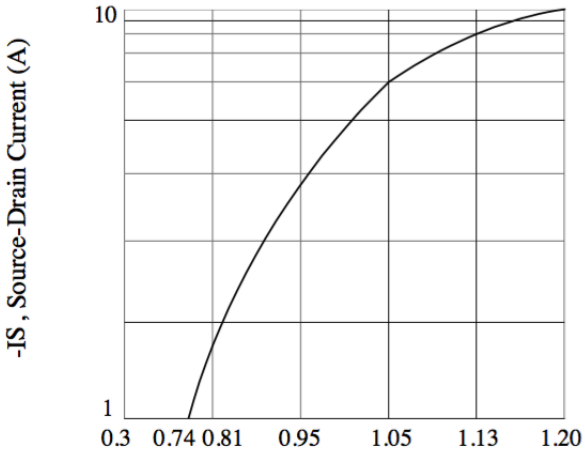
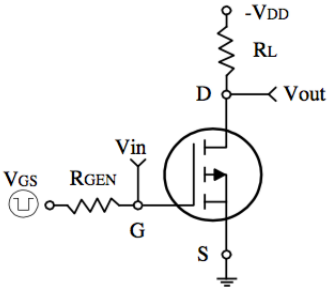


Figure 8. Body Diode Forward Voltage Variation with Source Current



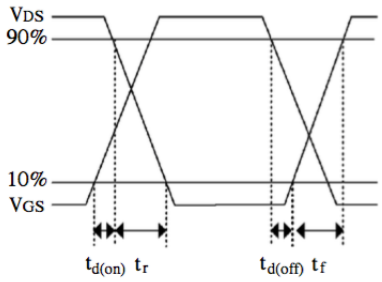


Figure 9. Switching Test Circuit and Switching Waveforms