HUASHUO SEMICONDUCTOR

HSS3414A

N-Ch 20V Fast Switching MOSFETs

Description

The HSS3414A 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.

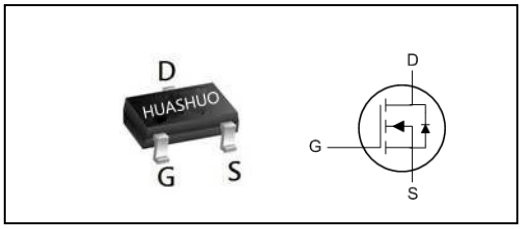
The HSS3414A meet the RoHS and Green Product requirement with full function reliability approved.

Product Summary

V_{DS}	20	V
$R_{DS(ON),max}$	26	mΩ
I_D	6	A

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

SOT23 Pin Configuration



Absolute Maximum Ratings

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	20	V
V_{GS}	Gate-Source Voltage	±12	V
I_D@T_A=25°C	Continuous Drain Current, V_{GS} @ 4.5V[1]	6.0	A
I_D@T_A=70°C	Continuous Drain Current, V_{GS} @ 4.5V[1]	5.0	A
I_{DM}	Pulsed Drain Current[2]	17	A
P_D@T_A=25°C	Total Power Dissipation[3]	1	W
P_D@T_A=70°C	Total Power Dissipation[3]	0.66	W
T_{STG}	Storage Temperature Range	-55 to 150	°C
T_J	Operating Junction Temperature Range	-55 to 150	°C

Thermal Data

Symbol	Parameter	Max.	Unit
$R_{\theta JA}$	Thermal Resistance Junction-ambient [1]	120	°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	20	---	---	V
$\triangle BV_{DSS}/\triangle T_J$	BVDSS Temperature Coefficient	Reference to 25℃ , I_D=1mA	---	0.018	---	V/℃
$R_{DS(ON)}$	Static Drain-Source On-Resistance2	V_{GS}=4.5V , I_D=4A	---	21	26	mΩ
		V_{GS}=2.5V , I_D=3A	---	28	35	
		V_{GS}=1.8V , I_D=2A	---	40	50	
$V_{GS(th)}$	Gate Threshold Voltage	V_{GS}=V_{DS} , I_D =250uA	0.35	---	1.0	V
$\triangle V_{GS(th)}$	$V_{GS(th)}$ Temperature Coefficient		---	-3.1	---	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=4A	---	30	---	S
Q_g	Total Gate Charge (4.5V)	V_{DS}=15V , V_{GS}=4.5V , I_D=4A	---	8.6	---	nC
Q_{gs}	Gate-Source Charge		---	1.37	---	
Q_{gd}	Gate-Drain Charge		---	2.3	---	
$T_{d(on)}$	Turn-On Delay Time	V_{DS}=10V , V_{GS}=4.5V , R_G=3.3Ω I_D=4A	---	5.2	---	ns
T_r	Rise Time		---	34	---	
$T_{d(off)}$	Turn-Off Delay Time		---	23	---	
T_f	Fall Time		---	9.2	---	
C_{iss}	Input Capacitance	V_{DS}=15V , V_{GS}=0V , f=1MHz	---	670	---	pF
C_{oss}	Output Capacitance		---	75	---	
C_{rss}	Reverse Transfer Capacitance		---	68	---	

Diode Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
I_S	Continuous Source Current1,4	V_G=V_D=0V , Force Current	---	---	6	A
I_{SM}	Pulsed Source Current2,4		---	---	17	A
V_{SD}	Diode Forward Voltage2	V_{GS}=0V , I_S=1A , T_J=25℃	---	---	1.2	V

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.

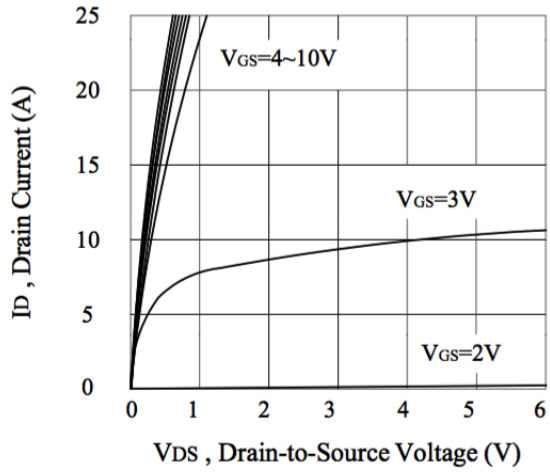


Figure 1. Output Characteristics

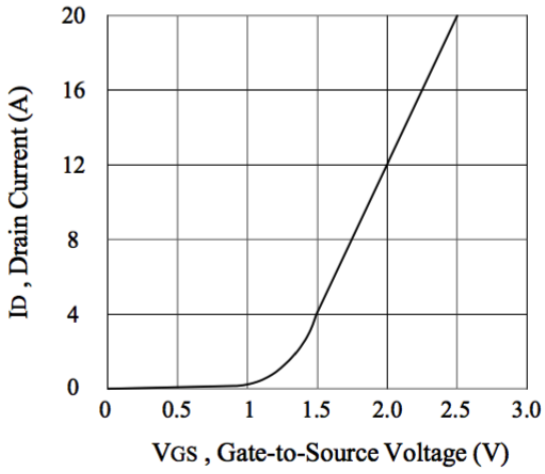


Figure 2. Transfer Characteristics

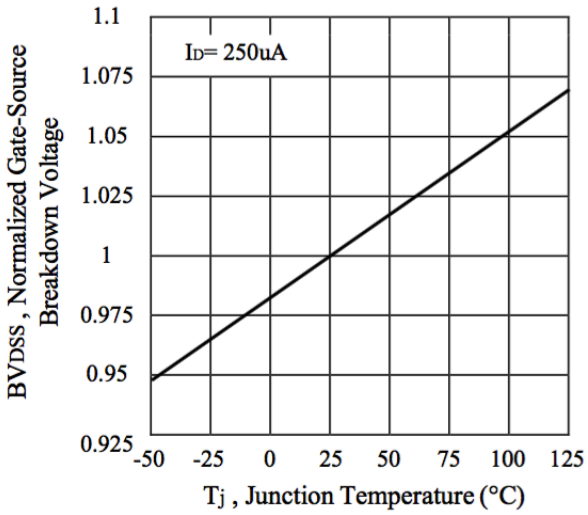


Figure 3. Breakdown Voltage Variation with Temperature

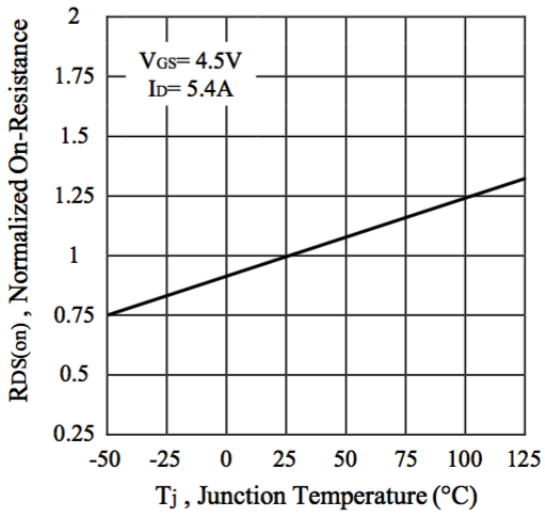


Figure 4. On-Resistance Variation with Temperature

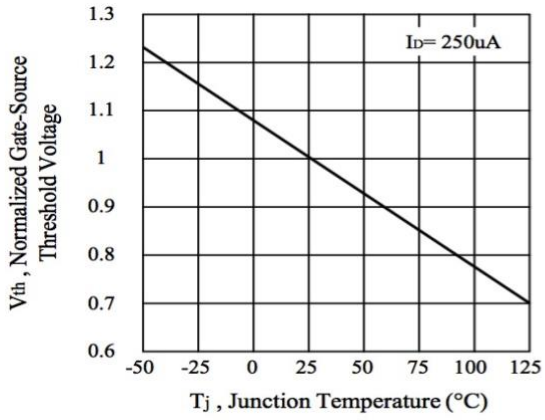


Figure 5. Gate Threshold Variation with Temperature

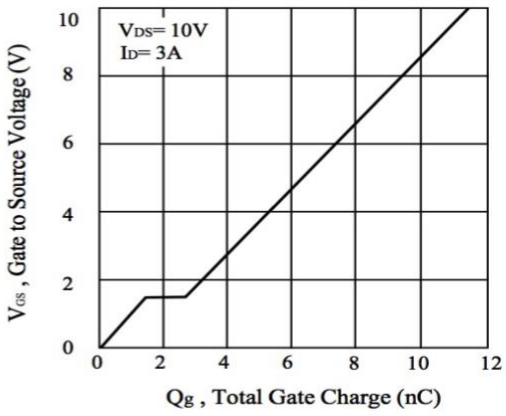


Figure 6. Gate Charge

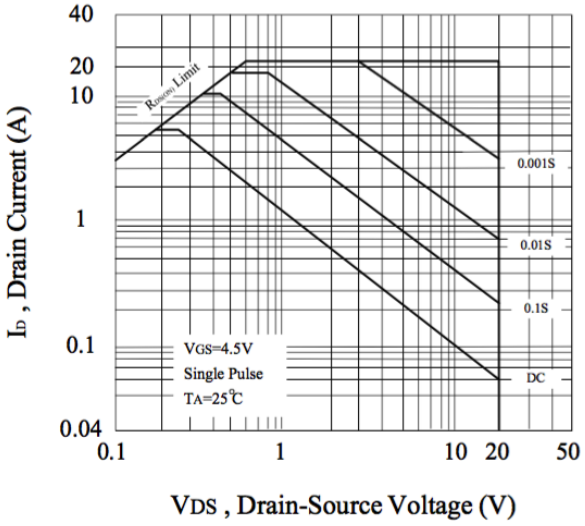


Figure 7. Maximum Safe Operating Area

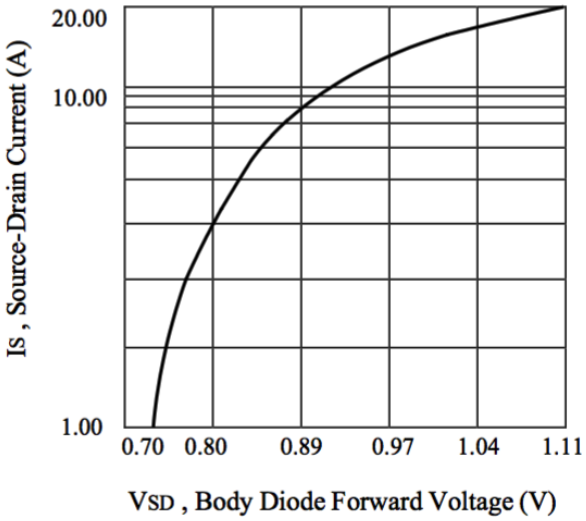


Figure 8. Body Diode Forward Voltage Variation with Source Current

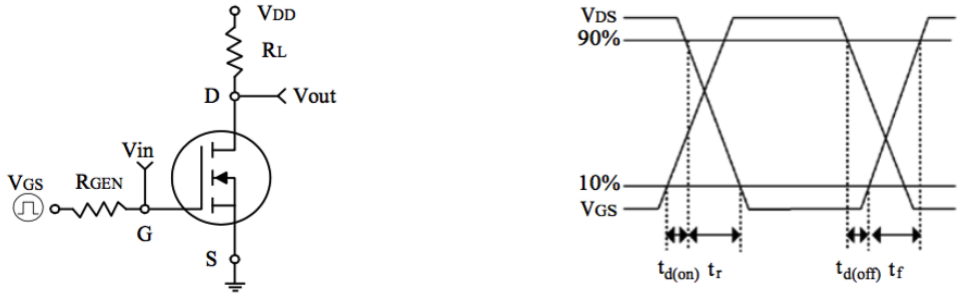


Figure 9. Switching Test Circuit and Switching Waveforms

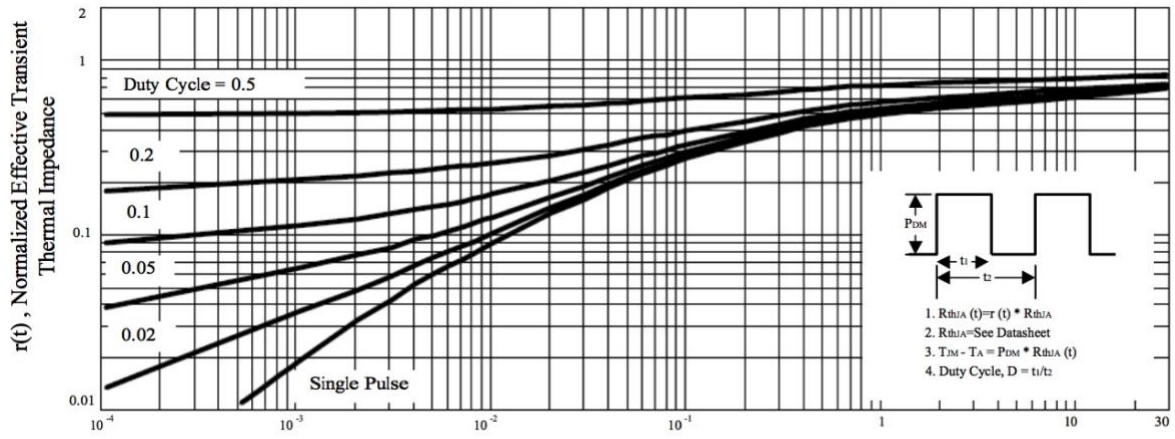
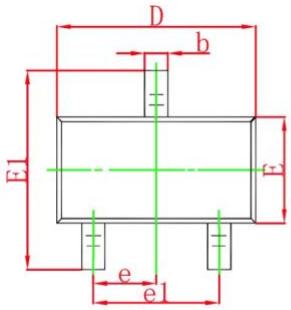
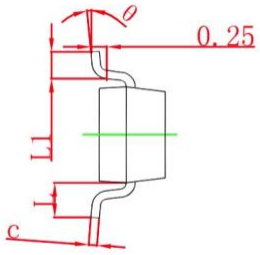


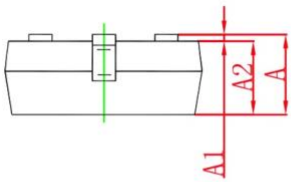
Figure 10. Normalized Thermal Transient Impedance Curve

Ordering Information

Part Number	Package code	Packaging
HSS3414A	SOT-23	3000/Tape&Reel







Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	0.900	1.150	0.035	0.045
A1	0.000	0.100	0.000	0.004
A2	0.900	1.050	0.035	0.041
b	0.300	0.500	0.012	0.020
c	0.080	0.150	0.003	0.006
D	2.800	3.000	0.110	0.118
E	1.200	1.400	0.047	0.055
E1	2.250	2.550	0.089	0.100
e	0.950 TYP		0.037 TYP	
e1	1.800	2.000	0.071	0.079
L	0.550 REF		0.022 REF	
L1	0.300	0.500	0.012	0.020
θ	0°	8°	0°	8°

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