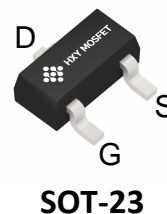




Description

The HSI2309A is the high cell density trench P-ch MOSFETs, which provides excellent RDSON and efficiency for most of the small power switching and load switch applications. The HSI2309A meet the RoHS and Green Product requirement with full function reliability approved.



General Features

$V_{DS} = -60V, I_D = -2A$

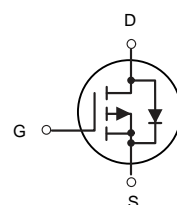
$R_{DS(ON)} < 200m\Omega @ V_{GS} = -10V$

$R_{DS(ON)} < 300m\Omega @ V_{GS} = -4.5V$

Application

Load switch

PWM application



P-Channel MOSFET

Package Marking and Ordering Information

Product ID	Pack	Brand	Qty(PCS)
HSI2309A	SOT-23	HXY MOSFET	3000

Absolute Maximum Ratings (TA=25°C unless otherwise noted)

Symbol	Parameter	Limit	Unit
V_{DS}	Drain-Source Voltage	-60	V
V_{GS}	Gate-Source Voltage	± 20	V
I_D	Drain Current-Continuous	-2	A
I_{DM}	Drain Current-Pulsed (Note 1)	-5.2	A
P_D	Maximum Power Dissipation	1	W
T_J, T_{STG}	Operating Junction and Storage Temperature Range	-55 To 150	°C
$R_{\theta JA}$	Thermal Resistance, Junction-to-Ambient (Note 2)	83.3	°C/W



Electrical Characteristics ($T_c=25^{\circ}\text{C}$ unless otherwise noted)

Symbol	Parameter	Condition	Min	Typ	Max	Unit
$V_{(BR)DSS}$	Drain-Source Breakdown Voltage	$V_{GS}=0V, I_D=-250\mu A$	-60	--	--	V
I_{DSS}	Zero Gate Voltage Drain Current($T_A=25^{\circ}\text{C}$)	$V_{DS}=-60V, V_{GS}=0V$	--	--	-1	μA
	Zero Gate Voltage Drain Current($T_A=125^{\circ}\text{C}$)	$V_{DS}=-60V, V_{GS}=0V$	--	--	-100	μA
I_{GSS}	Gate-Body Leakage Current	$V_{GS}=\pm 20V, V_{DS}=0V$	--	--	± 100	nA
$V_{GS(TH)}$	Gate Threshold Voltage	$V_{DS}=V_{GS}, I_D=-250\mu A$	-1.0	-1.5	-2.5	V
$R_{DS(ON)}$	Drain-Source On-State Resistance②	$V_{GS}=-10V, I_D=-2A$	--	160	200	m Ω
$R_{DS(ON)}$	Drain-Source On-State Resistance②	$V_{GS}=-4.5V, I_D=-1A$	--	200	300	m Ω
C_{iss}	Input Capacitance	$V_{DS}=-30V, V_{GS}=0V,$ $f=1\text{MHz}$	--	310	--	pF
C_{oss}	Output Capacitance		--	22	--	pF
C_{rss}	Reverse Transfer Capacitance		--	15	--	pF
Q_g	Total Gate Charge	$V_{DS}=-30V$ $I_D=-2A,$ $V_{GS}=-10V$	--	5.4	--	nC
Q_{gs}	Gate Source Charge		--	1.1	--	nC
Q_{gd}	Gate Drain Charge		--	1.6	--	nC
$t_{d(on)}$	Turn on Delay Time	$V_{DD}=-30V,$ $I_D=-2A,$ $R_G=3.3\Omega,$ $V_{GS}=-10V$	--	41	--	ns
t_r	Turn on Rise Time		--	22	--	ns
$t_{d(off)}$	Turn Off Delay Time		-	25	--	ns
t_f	Turn Off Fall Time		--	32	--	ns
I_{SD}	Source drain current(Body Diode)	$T_A=25^{\circ}\text{C}$	--	--	-2.0	A
V_{SD}	Forward on voltage②	$T_j=25^{\circ}\text{C}, I_{SD}=-2A,$ $V_{GS}=0V$	--	-0.84	-1.2	V

Notes:

① Pulse width limited by maximum allowable junction temperature

② Pulse test ; Pulse width $\leq 300\mu s$, duty cycle $\leq 2\%$.



Typical Electrical and Thermal Characteristics (Curves)

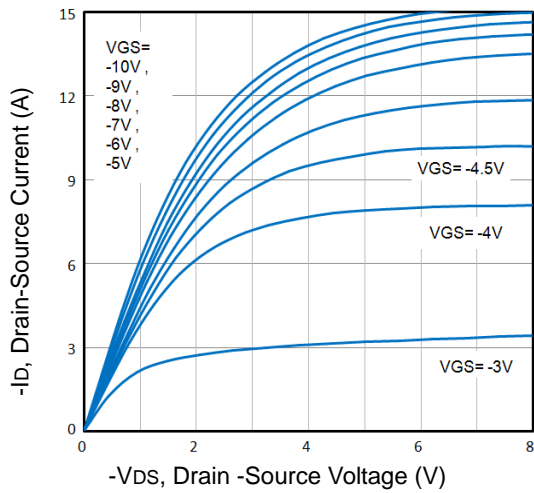


Fig1. Typical Output Characteristics

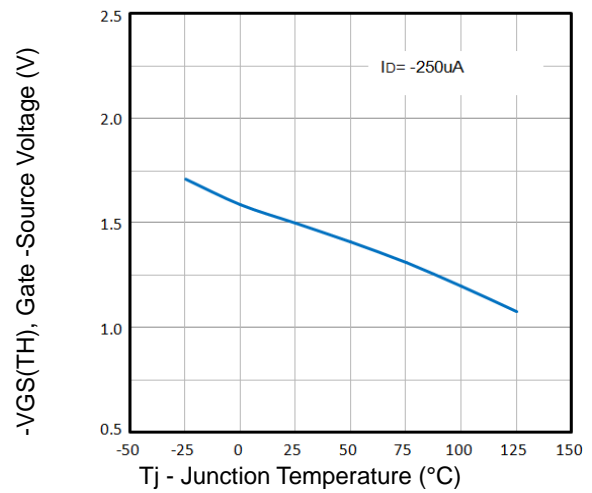


Fig2. Normalized Threshold Voltage Vs. Temperature

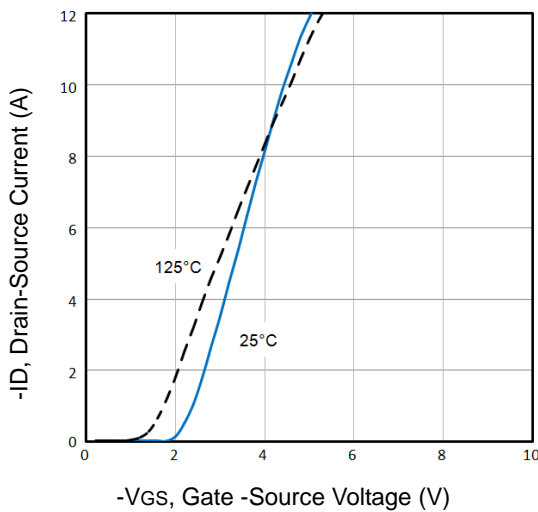


Fig3. Typical Transfer Characteristics

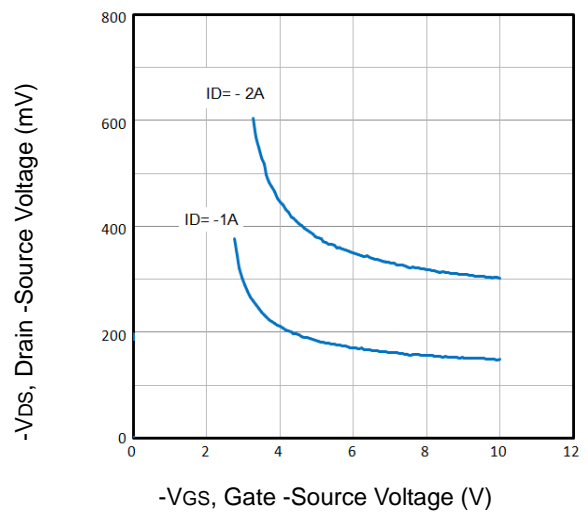


Fig4. Drain-Source Voltage vs Gate-Source Voltage

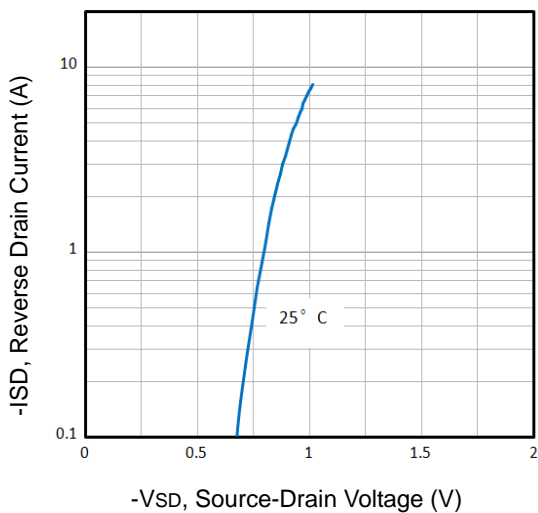


Fig5. Typical Source-Drain Diode Forward Voltage

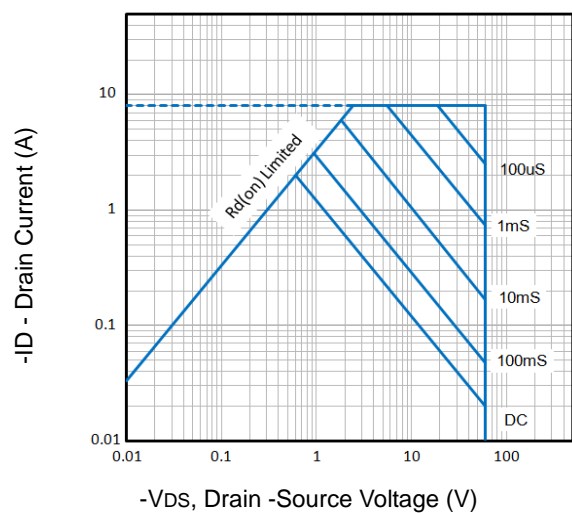


Fig6. Maximum Safe Operating Area

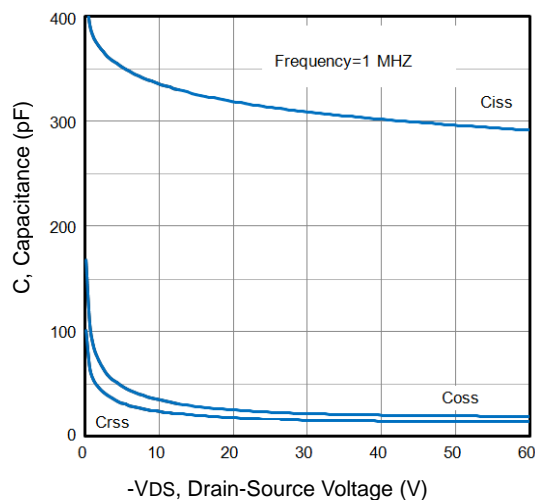


Fig7. Typical Capacitance Vs. Drain-Source Voltage

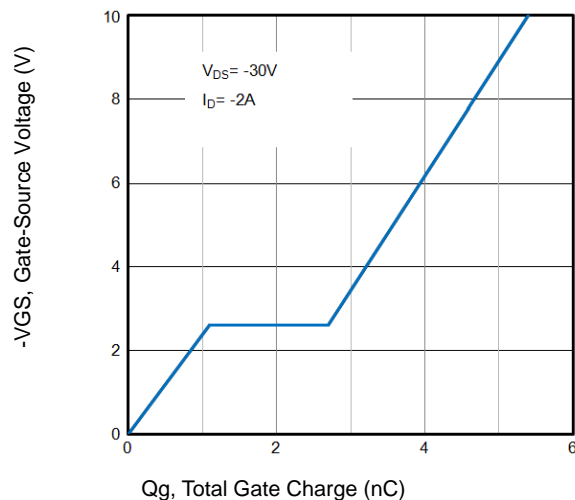


Fig8. Typical Gate Charge Vs. Gate-Source Voltage

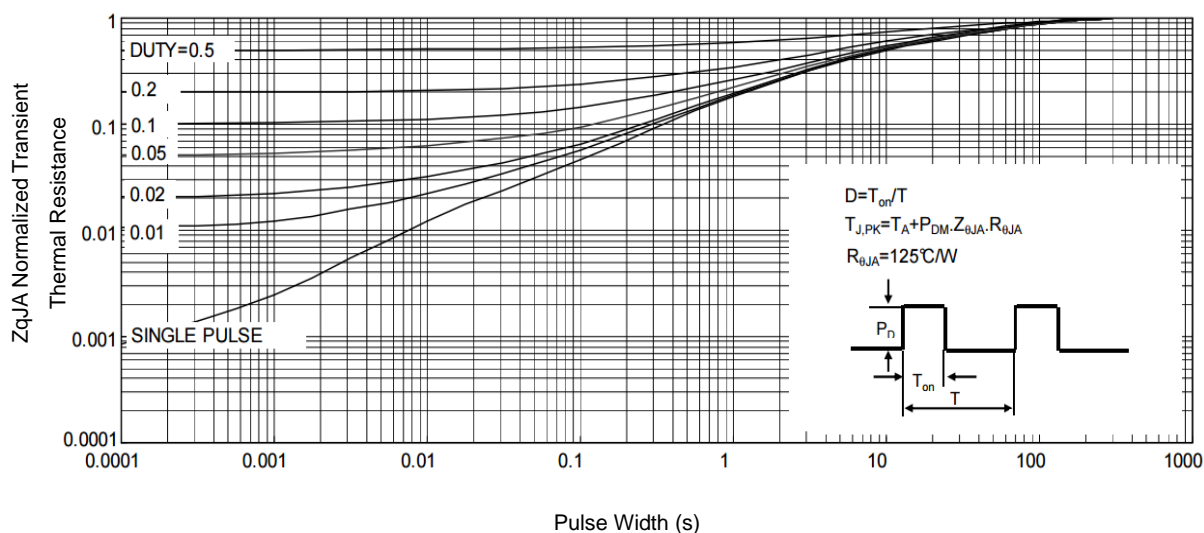


Fig9. Normalized Maximum Transient Thermal Impedance

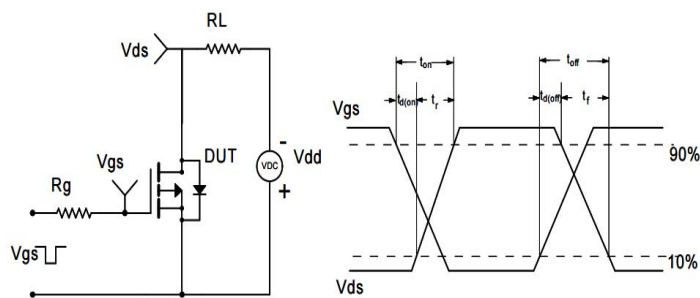
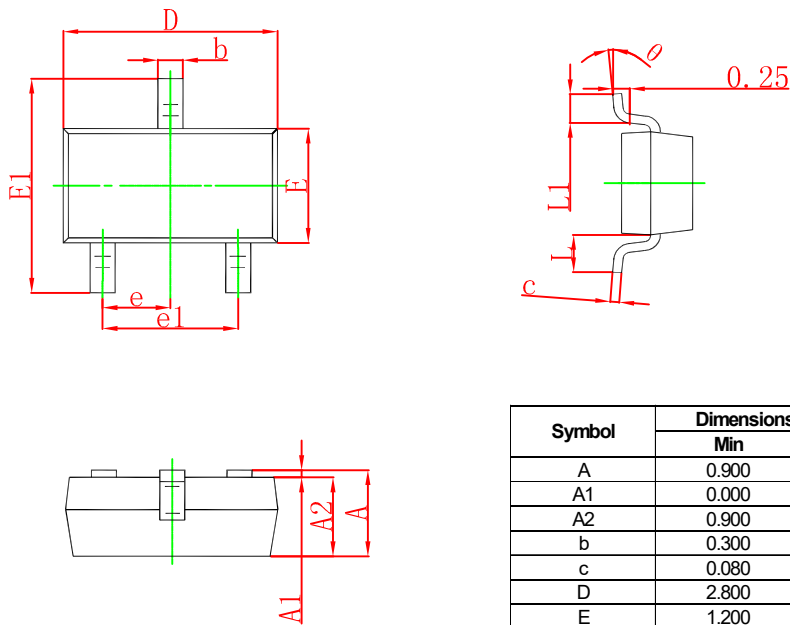


Fig10. Switching Time Test Circuit and waveforms

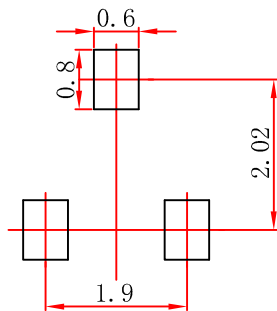


SOT-23 Package Outline Dimensions



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°

SOT-23 Suggested Pad Layout



Note:
1.Controlling dimension:in millimeters.
2.General tolerance:± 0.05mm.
3.The pad layout is for reference purposes only.



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