

**Description**

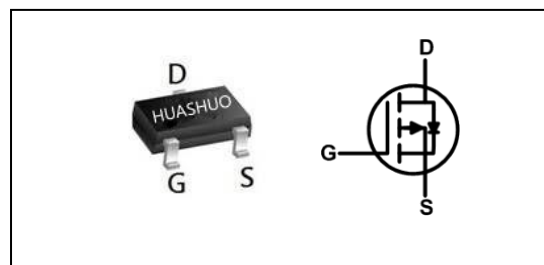
The HSS2319 is the high cell density trenched P-ch MOSFETs, which provides excellent R<sub>DS(ON)</sub> and efficiency for most of the small power switching and load switch applications.

The HSS2319 meet the RoHS and Green Product requirement with full function reliability approved.

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

**Product Summary**

V <sub>DS</sub>	-40	V
R <sub>DS(ON),max</sub>	70	mΩ
I <sub>D</sub>	-3.2	A

**SOT 23 Pin Configuration**

**Absolute Maximum Ratings**

Symbol	Parameter	Rating		Units
		10s	Steady State	
V <sub>DS</sub>	Drain-Source Voltage	-40		V
V <sub>GS</sub>	Gate-Source Voltage	±20		V
I <sub>D</sub> @T <sub>A</sub> =25°C	Continuous Drain Current, V <sub>GS</sub> @ -4.5V <sub>1</sub>	-3.7	-3.2	A
I <sub>D</sub> @T <sub>A</sub> =70°C	Continuous Drain Current, V <sub>GS</sub> @ -4.5V <sub>1</sub>	-3.0	-2.6	A
I <sub>DM</sub>	Pulsed Drain Current <sub>2</sub>	-16.1		A
P <sub>D</sub> @T <sub>A</sub> =25°C	Total Power Dissipation <sub>3</sub>	1.32	1	W
P <sub>D</sub> @T <sub>A</sub> =70°C	Total Power Dissipation <sub>3</sub>	0.84	0.64	W
T <sub>STG</sub>	Storage Temperature Range	-55 to 150		°C
T <sub>J</sub>	Operating Junction Temperature Range	-55 to 150		°C

**Thermal Data**

Symbol	Parameter	Typ.	Max.	Unit
R <sub>θJA</sub>	Thermal Resistance Junction-Ambient <sub>1</sub>	---	125	°C/W
R <sub>θJA</sub>	Thermal Resistance Junction-Ambient <sub>1</sub> (t ≤ 10s)	---	95	°C/W
R <sub>θJC</sub>	Thermal Resistance Junction-Case <sub>1</sub>	---	80	°C/W

**Electrical Characteristics (T<sub>J</sub>=25 °C, unless otherwise noted)**

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
BV <sub>DSS</sub>	Drain-Source Breakdown Voltage	V <sub>GS</sub> =0V, I <sub>D</sub> =-250uA	-40	---	---	V
ΔBV <sub>DSS</sub> /ΔT <sub>J</sub>	BV <sub>DSS</sub> Temperature Coefficient	Reference to 25°C, I <sub>D</sub> =-1mA	---	-0.018	---	V/°C
R <sub>DS(ON)</sub>	Static Drain-Source On-Resistance <sub>2</sub>	V <sub>GS</sub> =-4.5V, I <sub>D</sub> =-3A	---	---	70	mΩ
		V <sub>GS</sub> =-2.5V, I <sub>D</sub> =-2A	---	---	100	
V <sub>GS(th)</sub>	Gate Threshold Voltage	V <sub>GS</sub> =V <sub>DS</sub> , I <sub>D</sub> =-250uA	-1.0	---	-2.5	V
ΔV <sub>GS(th)</sub>	V <sub>GS(th)</sub> Temperature Coefficient		---	2.5	---	mV/°C
I <sub>DSS</sub>	Drain-Source Leakage Current	V <sub>DS</sub> =-24V, V <sub>GS</sub> =0V, T <sub>J</sub> =25°C	---	---	-1	uA
		V <sub>DS</sub> =-24V, V <sub>GS</sub> =0V, T <sub>J</sub> =55°C	---	---	-5	
I <sub>GSS</sub>	Gate-Source Leakage Current	V <sub>GS</sub> =±20V, V <sub>DS</sub> =0V	---	---	±100	nA
g <sub>fs</sub>	Forward Transconductance	V <sub>DS</sub> =-5V, I <sub>D</sub> =-3A	---	5.8	---	S
Q <sub>g</sub>	Total Gate Charge (-4.5V)	V <sub>DS</sub> =-32V, V <sub>GS</sub> =-4.5V, I <sub>D</sub> =-3A	---	6.4	---	nC
Q <sub>gs</sub>	Gate-Source Charge		---	2.1	---	
Q <sub>gd</sub>	Gate-Drain Charge		---	2.5	---	
T <sub>d(on)</sub>	Turn-On Delay Time	V <sub>DD</sub> =-20V, V <sub>GS</sub> =-4.5V, R <sub>G</sub> =3.3Ω, I <sub>D</sub> =-3A	---	4.2	---	ns
T <sub>r</sub>	Rise Time		---	23	---	
T <sub>d(off)</sub>	Turn-Off Delay Time		---	26.8	---	
T <sub>f</sub>	Fall Time		---	20.6	---	
C <sub>iss</sub>	Input Capacitance	V <sub>DS</sub> =-15V, V <sub>GS</sub> =0V, f=1MHz	---	620	---	pF
C <sub>oss</sub>	Output Capacitance		---	65	---	
C <sub>rss</sub>	Reverse Transfer Capacitance		---	53	---	

**Diode Characteristics**

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
I <sub>S</sub>	Continuous Source Current <sub>1,4</sub>	V <sub>G</sub> =V <sub>D</sub> =0V, Force Current	---	---	-3.2	A
I <sub>SM</sub>	Pulsed Source Current <sub>2,4</sub>		---	---	-16.1	A
V <sub>SD</sub>	Diode Forward Voltage <sub>2</sub>	V <sub>GS</sub> =0V, I <sub>S</sub> =-1A, T <sub>J</sub> =25°C	---	---	-1	V

Note :

1.The data tested by surface mounted on a 1 inch<sup>2</sup> FR-4 board with 2OZ copper.

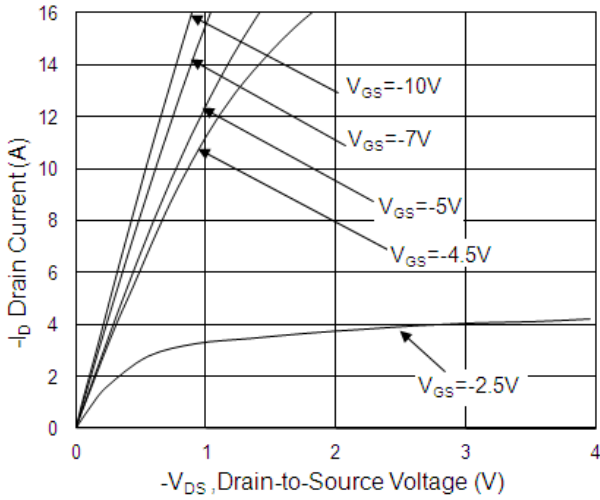
2.The data tested by pulsed, pulse width ≤ 300us, duty cycle ≤ 2%

3.The power dissipation is limited by 150°C junction temperature

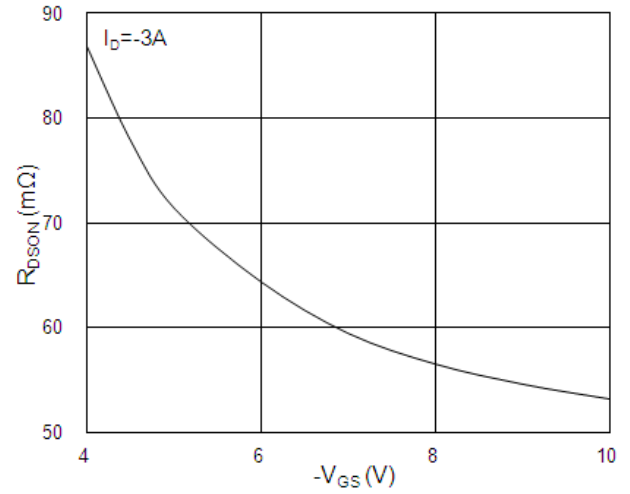
4.The data is theoretically the same as I<sub>D</sub> and I<sub>DM</sub>, in real applications, should be limited by total power dissipation.

**P-Ch 40V Fast Switching MOSFETs**

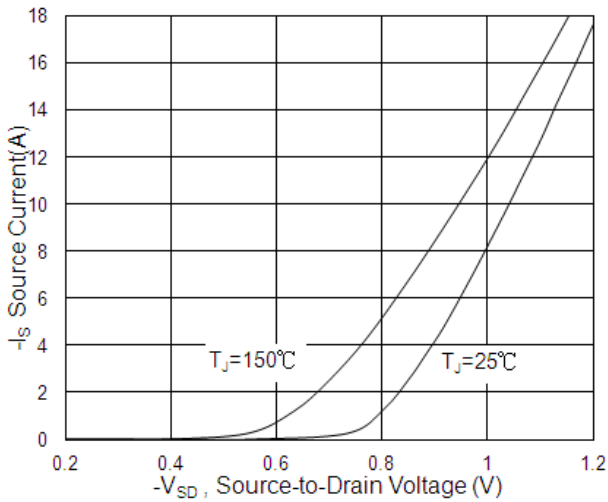
**Typical Characteristics**



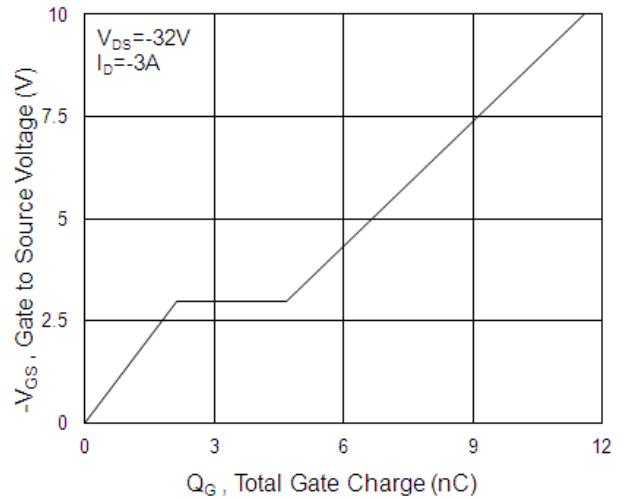
**Fig.1 Typical Output Characteristics**



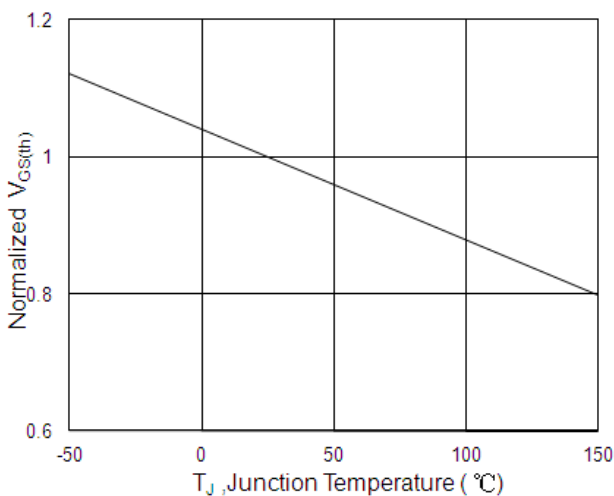
**Fig.2 On-Resistance vs. G-S Voltage**



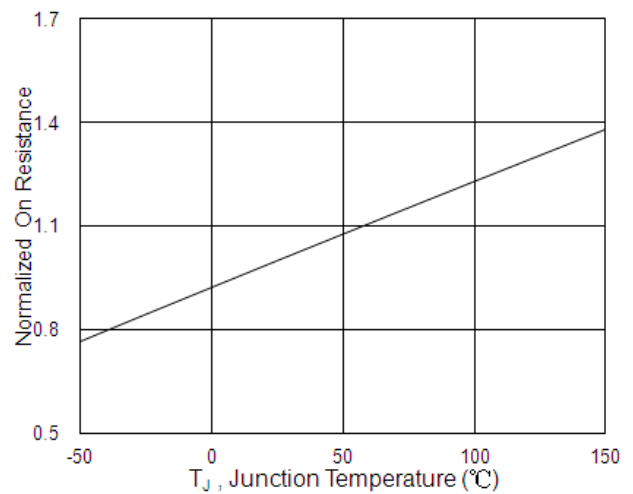
**Fig.3 Forward Characteristics Of Reverse**



**Fig.4 Gate-Charge Characteristics**

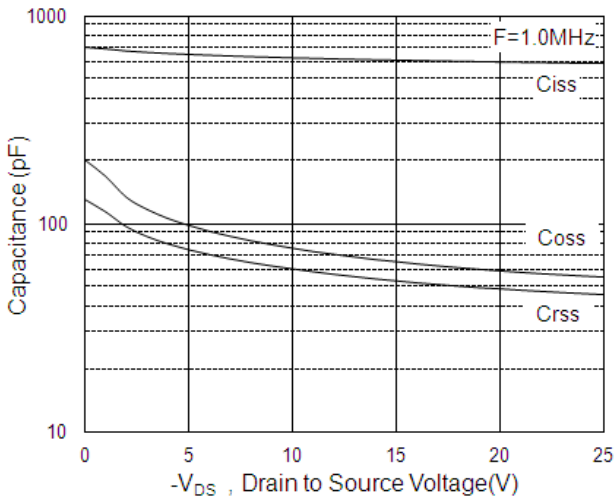


**Fig.5 Normalized  $V_{GS(th)}$  vs.  $T_J$**

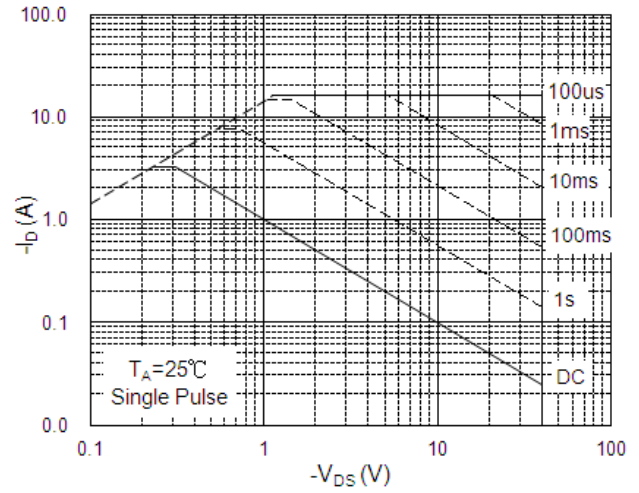


**Fig.6 Normalized  $R_{DS(on)}$  vs.  $T_J$**

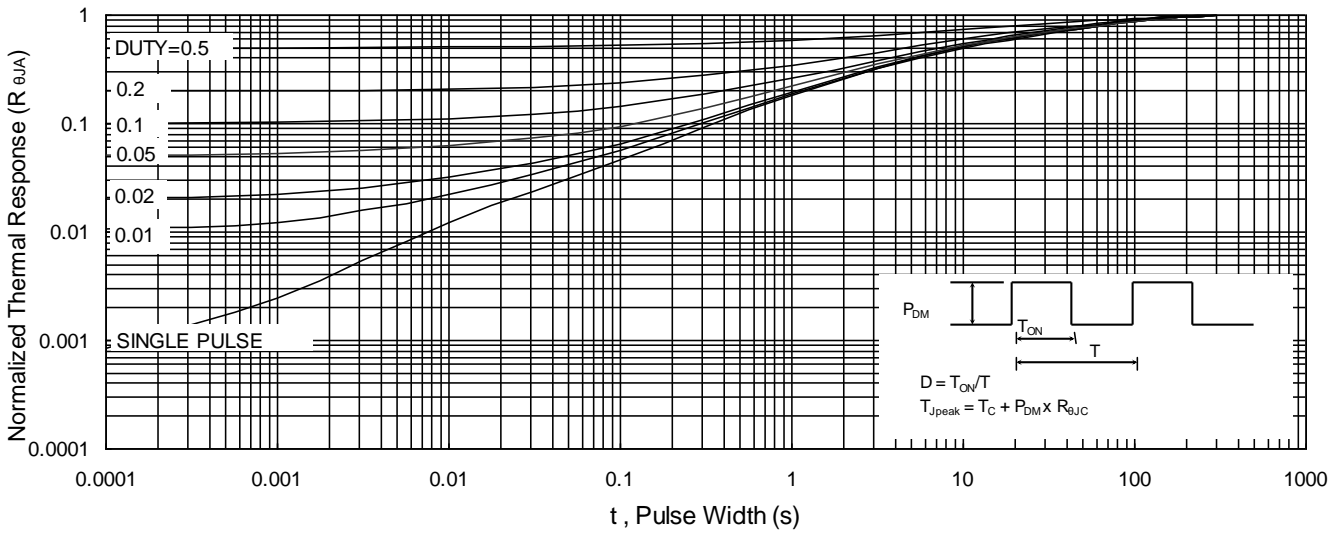
**P-Ch 40V Fast Switching MOSFETs**



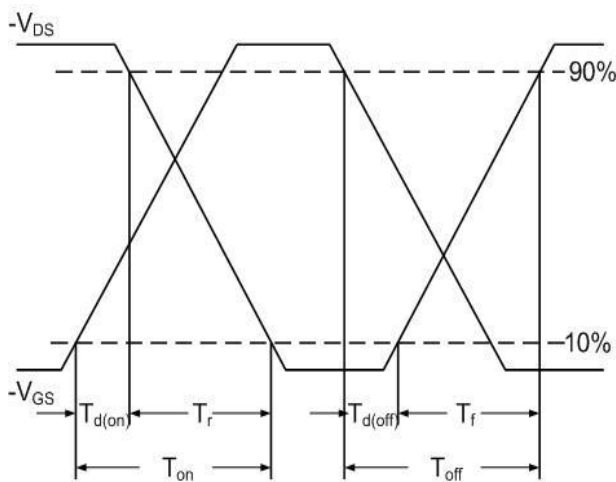
**Fig.7 Capacitance**



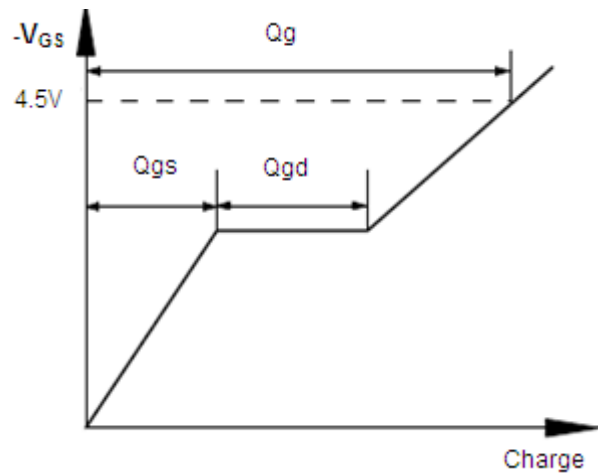
**Fig.8 Safe Operating Area**



**Fig.9 Normalized Maximum Transient Thermal Impedance**



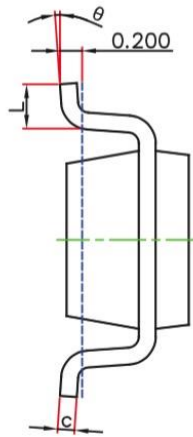
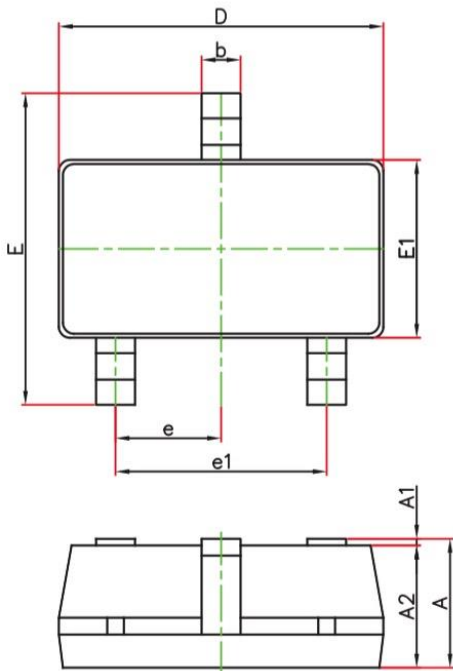
**Fig.10 Switching Time Waveform**



**Fig.11 Gate Charge Waveform**

## Ordering Information

Part Number	Package code	Packaging
HSS2319	SOT-23L	3000/Tape&Reel



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	1.050	1.250	0.041	0.049
A1	0.000	0.100	0.000	0.004
A2	1.050	1.150	0.041	0.045
b	0.300	0.500	0.012	0.020
c	0.100	0.200	0.004	0.008
D	2.820	3.020	0.111	0.119
E1	1.500	1.700	0.059	0.067
E	2.650	2.950	0.104	0.116
e	0.950(BSC)		0.037(BSC)	
e1	1.800	2.000	0.071	0.079
L	0.300	0.600	0.012	0.024
$\theta$	0°	8°	0°	8°

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