

General Description

The HSST3139 is the high cell density trench P-ch MOSFETs, which provide excellent RDS(on) and gate charge for most of the synchronous buck converter applications.

The HSST3139 meet the RoHS and Green Product requirement with full function reliability approved.

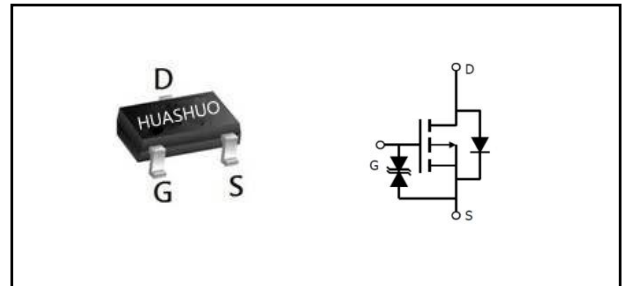
Features

- Super Low Gate Charge
- Low Threshold
- High-Side Switching
- Advanced high cell density Trench Technology

Product Summary

V_{DS}	-20	V
$R_{DS(ON),typ}$	230	mΩ
I_D	-1.0	A

SOT-523 Pin Configurations



Absolute Maximum Ratings

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	-20	V
V_{GS}	Gate-Source Voltage	±8	V
$I_D@T_A=25^{\circ}C$	Continuous Drain Current, V_{GS} @ -4.5V ¹	-1	A
I_{DM}	Pulsed Drain Current ²	-4	A
$P_D@T_A=25^{\circ}C$	Total Power Dissipation ³	0.75	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
$R_{\theta JA}$	Thermal Resistance Junction-Ambient ¹	---	100	°C/W



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

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
BV _{DSS}	Drain-Source Breakdown Voltage	V _{GS} =0V, I _D =-250uA	-20	---	---	V
ΔBV _{DSS} /ΔT _J	BV _{DSS} Temperature Coefficient	Reference to 25°C, I _D =-1mA	---	-0.014	---	V/°C
R _{DS(ON)}	Static Drain-Source On-Resistance ²	V _{GS} =-4.5V, I _D =-1A	---	190	230	mΩ
		V _{GS} =-2.5V, I _D =-0.8A	---	240	290	
V _{GS(th)}	Gate Threshold Voltage	V _{GS} =V _{DS} , I _D =-250uA	-0.5	-0.7	-1	V
ΔV _{GS(th)}	V _{GS(th)} Temperature Coefficient		---	3.95	---	mV/°C
I _{DSS}	Drain-Source Leakage Current	V _{DS} =-16V, V _{GS} =0V, T _J =25°C	---	---	-1	uA
		V _{DS} =-16V, V _{GS} =0V, T _J =55°C	---	---	-5	
I _{GSS}	Gate-Source Leakage Current	V _{GS} =±10V, V _{DS} =0V	---	---	±20	nA
g _{fs}	Forward Transconductance	V _{DS} =-10V, I _D =-0.5A	0.7	---	---	S
Q _g	Total Gate Charge (-4.5V)	V _{DS} =-10V, V _{GS} =-4.5V, I _D =-0.6A	---	6	---	nC
Q _{gs}	Gate-Source Charge		---	1.2	---	
Q _{gd}	Gate-Drain Charge		---	1.1	---	
T _{d(on)}	Turn-On Delay Time	V _{DD} =-10V, V _{GS} =-4.5V, R _G =10Ω, I _D =-0.2A	---	9	---	ns
T _r	Rise Time		---	6	---	
T _{d(off)}	Turn-Off Delay Time		---	30	---	
T _f	Fall Time		---	11	---	
C _{iss}	Input Capacitance	V _{DS} =-15V, V _{GS} =0V, f=1MHz	---	530	---	pF
C _{oss}	Output Capacitance		---	160	---	
C _{rss}	Reverse Transfer Capacitance		---	131	---	

Diode Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
V _{SD}	Diode Forward Voltage ²	V _{GS} =0V, I _S =-1A, T _J =25°C	---	---	-1.2	V

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

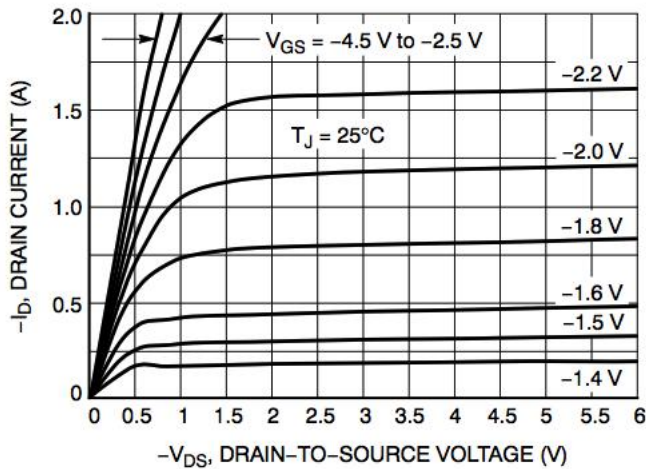


Figure 1. On-Region Characteristics

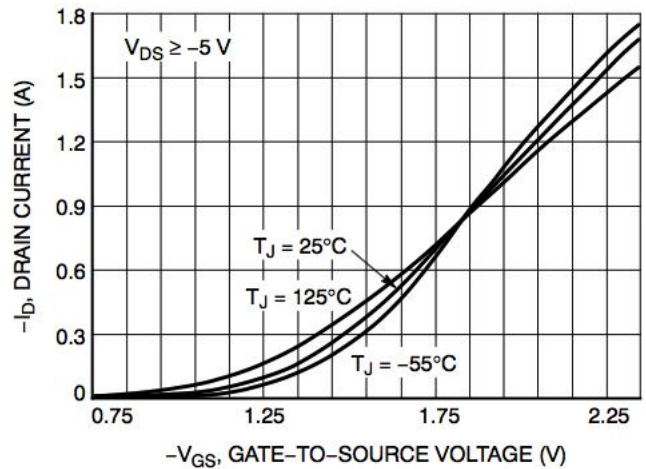


Figure 2. Transfer Characteristics

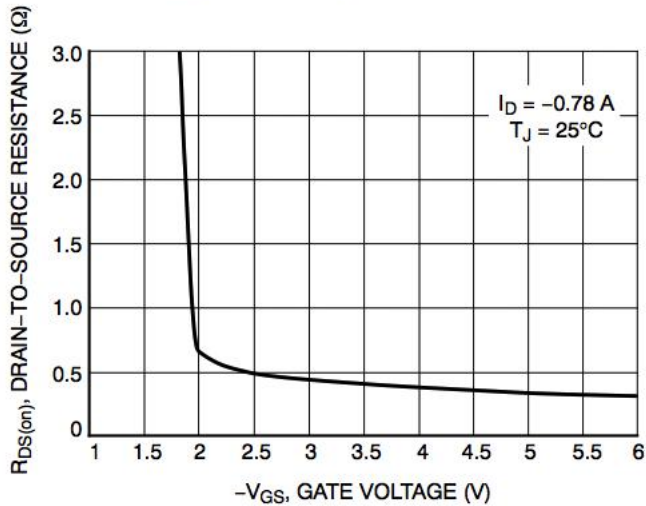


Figure 3. On-Resistance vs. Gate-to-Source Voltage

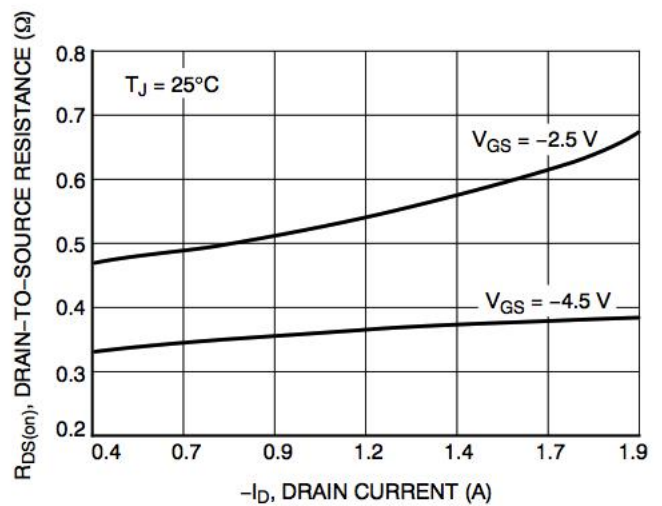


Figure 4. On-Resistance vs. Drain Current and Gate Voltage

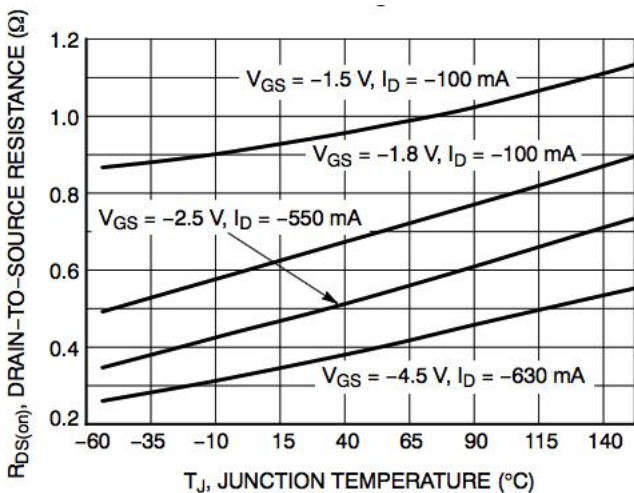


Figure 5. On-Resistance Variation with Temperature

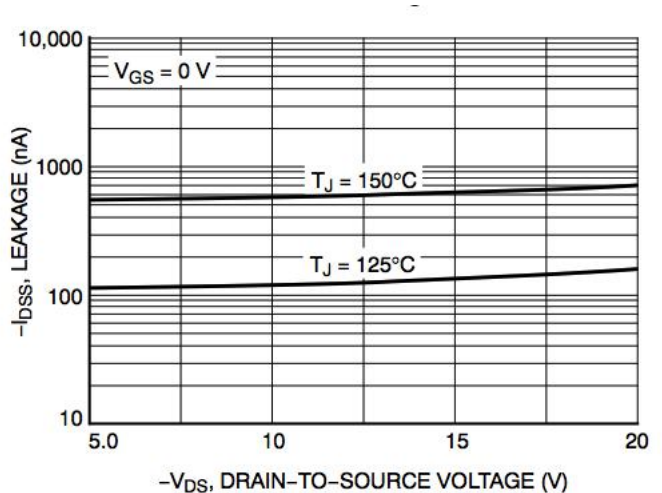


Figure 6. Drain-to-Source Leakage Current vs. Voltage

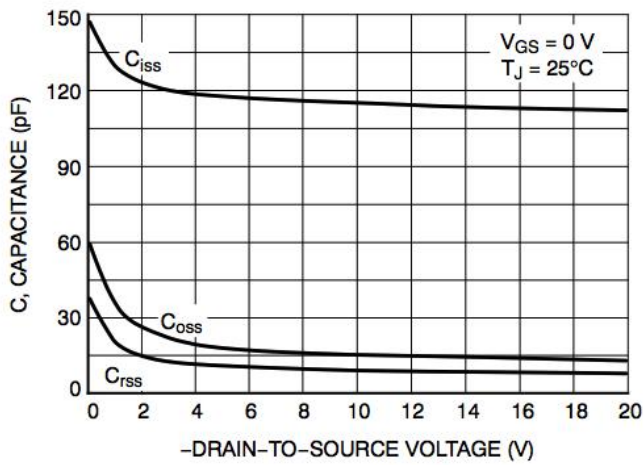


Figure 7. Capacitance Variation

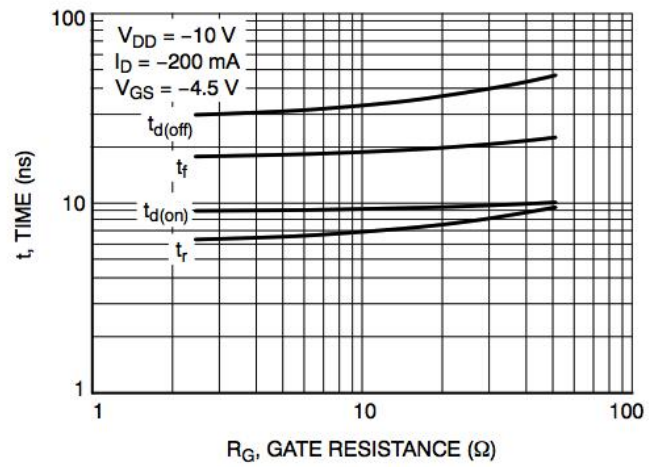


Figure 8. Resistive Switching Time Variation vs. Gate Resistance

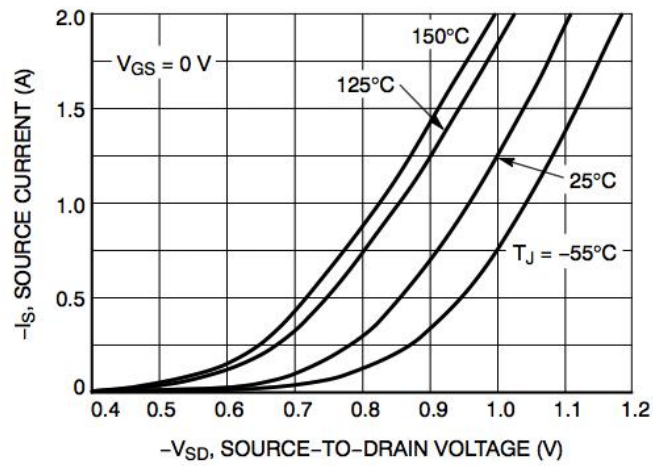


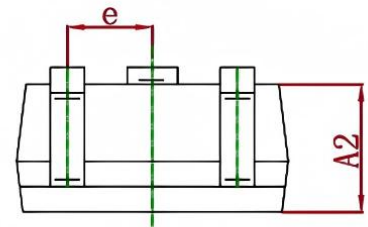
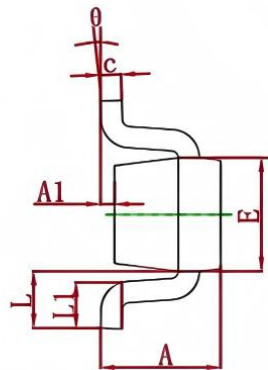
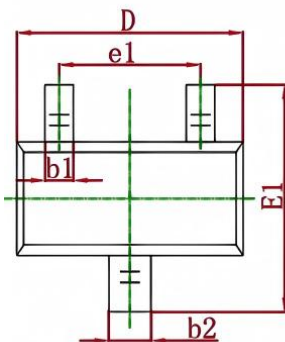
Figure 9. Diode Forward Voltage vs. Current



Ordering Information

Part Number	Package code	Packaging
HSST3139	SOT-523	3000/Tape&Reel

SOT-523 Package Outline



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	0.700	0.900	0.028	0.035
A1	0.000	0.100	0.000	0.004
A2	0.700	0.800	0.028	0.031
b1	0.150	0.250	0.006	0.010
b2	0.250	0.350	0.010	0.014
C	0.100	0.200	0.004	0.008
D	1.500	1.700	0.059	0.067
E	0.700	0.900	0.028	0.035
E1	1.450	1.750	0.057	0.069
e	0.500 TYP.		0.020 TYP.	
e1	0.900	1.100	0.035	0.043
L	0.400 REF.		0.016 REF.	
L1	0.260	0.460	0.010	0.018
θ	0°	8°	0°	8°



HSST3139 TOP Marking

