HSSC3139

P-Ch 20V Fast Switching MOSFETs

Description

The HSSC3139 is the high cell density trenched P-ch MOSFETs, which provide excellent RDSON and gate charge for most of the synchronous buck converter applications.

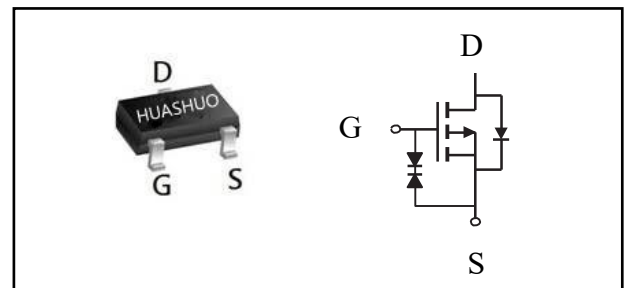The HSSC3139 meet the RoHS and Green Product requirement with full function reliability approved.

Product Summary

V_{DS}	-20	V
$R_{DS(ON),typ}$	400	mΩ
I_D	-0.65	A

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

SOT 723 Pin Configurations

Absolute Maximum Ratings

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	-20	V
V_{GS}	Gate-Source Voltage	$\pm$12	V
I_D@T_A=25°C	Continuous Drain Current, V_{GS} @ -4.5V[1]	-0.65	A
I_{DM}	Pulsed Drain Current[2]	-1.2	A
P_D@T_A=25°C	Total Power Dissipation[3]	0.15	W
T_{STG}	Storage Temperature Range	-55 to 150	$^{\circ}$C
T_J	Operating Junction Temperature Range	-55 to 150	$^{\circ}$C

Thermal Data

Symbol	Parameter	Typ.	Max.	Unit
$R_{\theta JA}$	Thermal Resistance Junction-Ambient [1]	---	830	$^{\circ}$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
$\triangle BV_{DSS}/\triangle T_J$	BV_{DSS} Temperature Coefficient	Reference to 25℃ , I_D=-1mA	---	-0.014	---	V/℃
$R_{DS(ON)}$	Static Drain-Source On-Resistance2	V_{GS}=-4.5V , I_D=-1A	---	400	500	mΩ
		V_{GS}=-2.5V , I_D=-0.8A	---	600	700	
		V_{GS}=-1.8V , I_D=-0.5A	---	900	---	
$V_{GS(th)}$	Gate Threshold Voltage	V_{GS}=V_{DS} , I_D =-250uA	-0.35	---	-1.1	V
$\triangle V_{GS(th)}$	$V_{GS(th)}$ Temperature Coefficient		---	3.95	---	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}=±10V , V_{DS}=0V	---	---	±20	nA
gfs	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	---	1.2	---	nC
Q_{gs}	Gate-Source Charge		---	0.05		
Q_{gd}	Gate-Drain Charge		---	0.13		
$T_{d(on)}$	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		---	19	---	
C_{iss}	Input Capacitance	V_{DS}=-15V , V_{GS}=0V , f=1MHz	---	150		pF
C_{oss}	Output Capacitance		---	20		
C_{rss}	Reverse Transfer Capacitance		---	11		

Diode Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
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 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℃ 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.
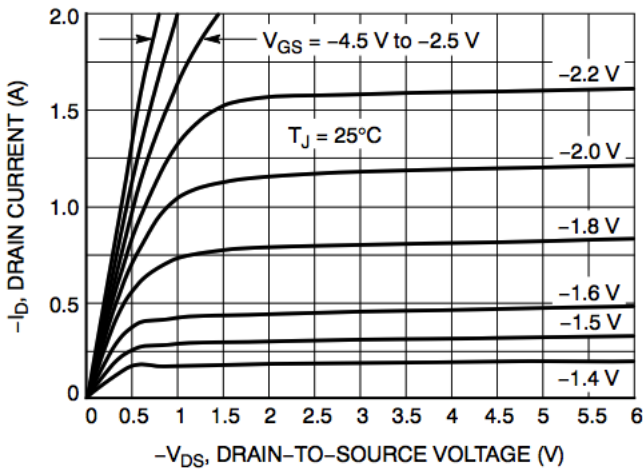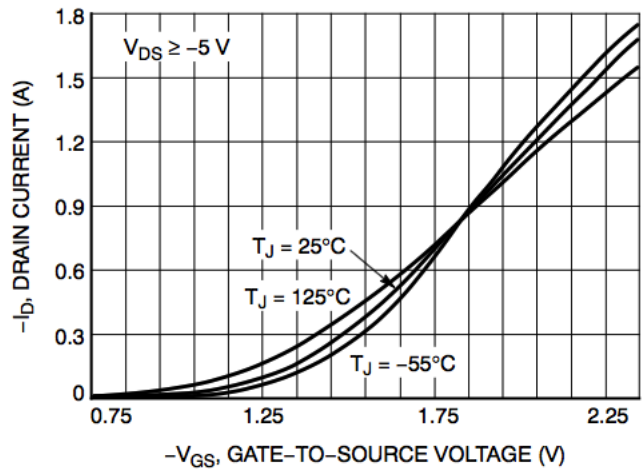
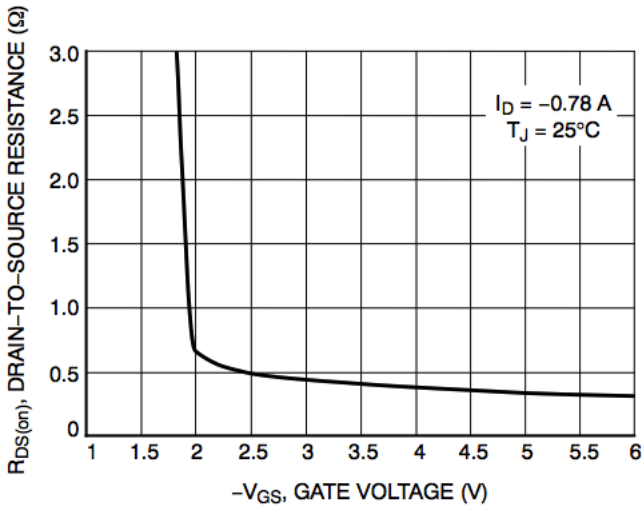Figure 1. On–Region Characteristics

Figure 2. Transfer Characteristics

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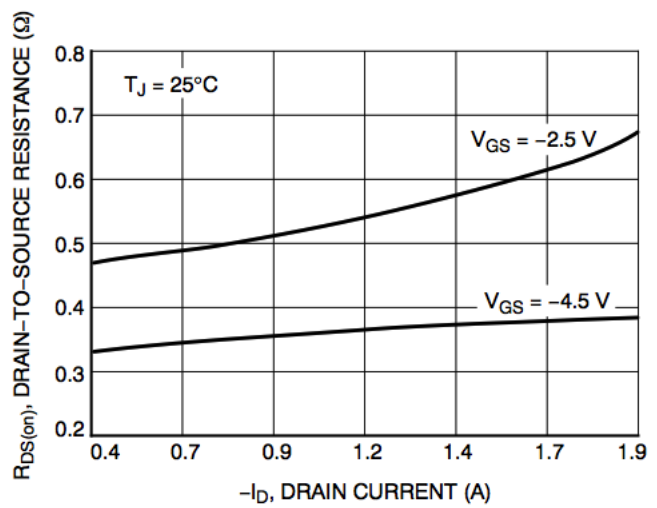

Figure 4. On–Resistance vs. Drain Current and Gate Voltage
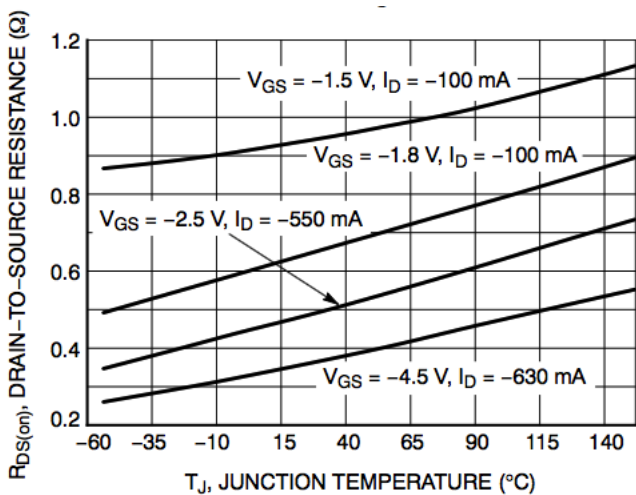

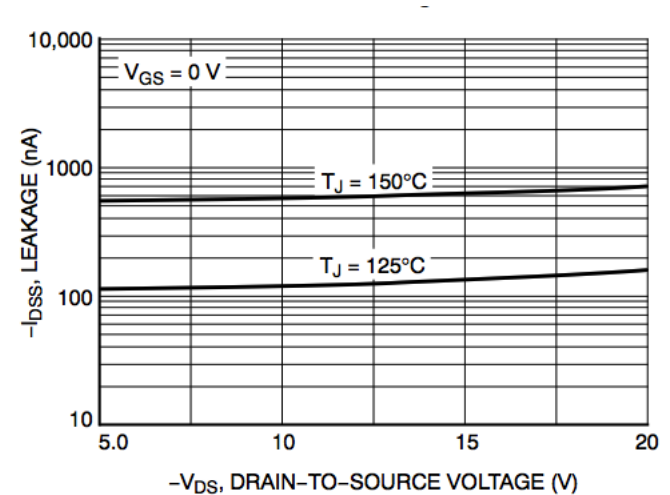Figure 5. On–Resistance Variation with Temperature

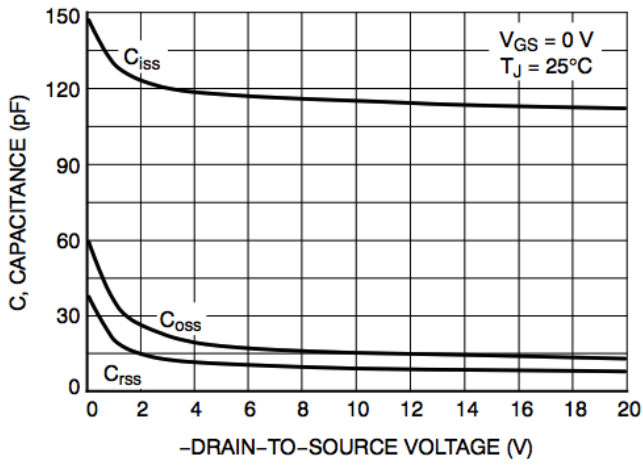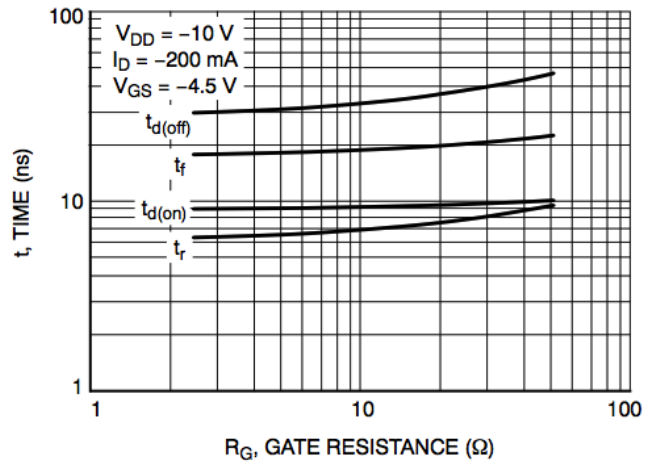Figure 6. Drain-to-Source Leakage Current vs. Voltage

Figure 7. Capacitance Variation

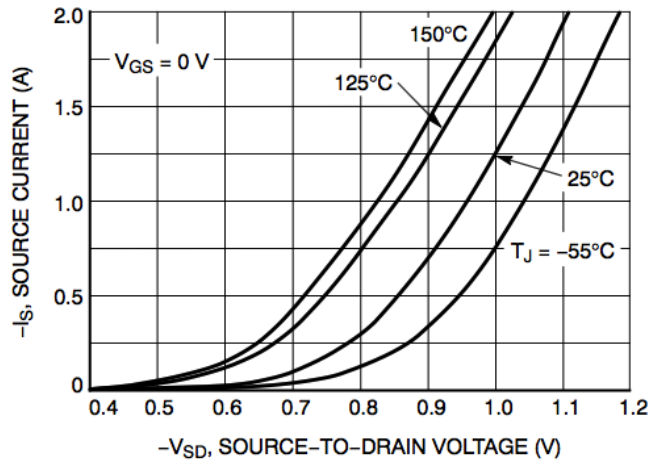**Figure 8. Resistive Switching Time Variation vs. Gate Resistance**
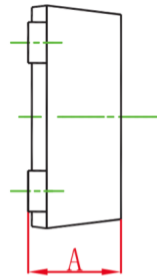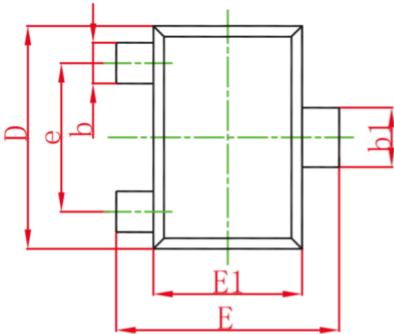

Figure 9. Diode Forward Voltage vs. Current

Ordering Information

Part Number	Package code	Packaging
HSSC3139	SOT-723	8000/Tape&Reel

Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	0.430	0.500	0.017	0.020
A1	0.000	0.050	0.000	0.002
b	0.170	0.270	0.007	0.011
b1	0.270	0.370	0.011	0.015
c	0.080	0.150	0.003	0.006
D	1.150	1.250	0.045	0.049
E	1.150	1.250	0.045	0.049
E1	0.750	0.850	0.030	0.033
e	0.800TYP.		0.031TYP.	
θ	7° REF.		7° REF.	