HUASHUO SEMICONDUCTOR

HSS2307

P-Ch 20V Fast Switching MOSFETs

Description

The HSS2307 is the high cell density trenched P-ch MOSFETs, which provide excellent RDSON and gate charge for most of the synchronous buck converter applications.

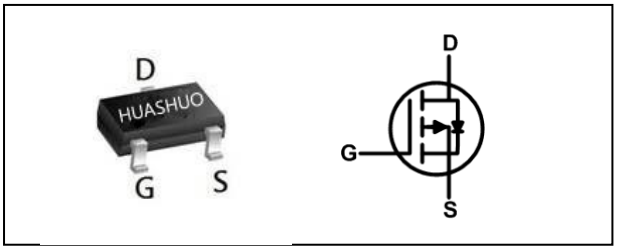
The HSS2307 meet the RoHS and Green Product requirement with full function reliability approved.

Product Summary

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

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

SOT 23 Pin Configurations



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	A
I_D@T_A=70°C	Continuous Drain Current, V_{GS} @ -4.5V[1]	-4	A
I_{DM}	Pulsed Drain Current[2]	-24	A
P_D@T_A=25°C	Total Power Dissipation[3]	1.4	W
P_D@T_A=70°C	Total Power Dissipation[3]	0.9	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]	---	125	°C/W
$R_{\theta JA}$	Thermal Resistance Junction-Ambient [1] (t ≤10s)	---	90	°C/W

Electrical Characteristics (T_J=25 ℃, unless otherwise noted)

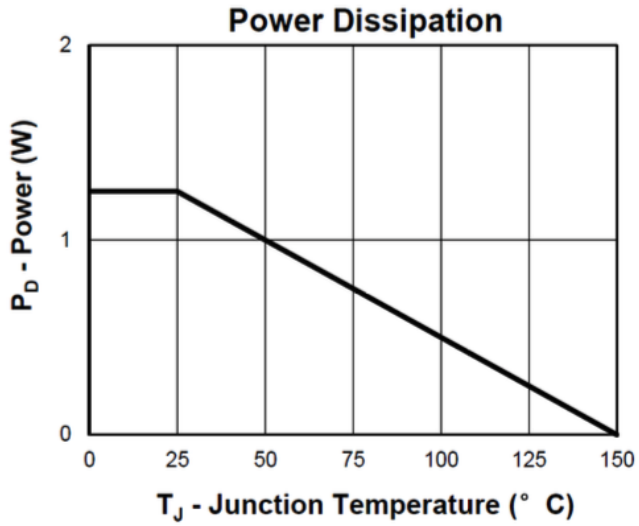
Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
BV_{DSS}	Drain-Source Breakdown Voltage	V_{GS}=0V , I_D=-250uA	-20	---	---	V
$\triangle BV_{DSS}/\triangle T_J$	BV_{DSS} Temperature Coefficient	Reference to 25℃ , I_D=-1mA	---	-0.014	---	V/℃
$R_{DS(ON)}$	Static Drain-Source On-Resistance2	V_{GS}=-4.5V , I_D=-6A	---	20	25	mΩ
		V_{GS}=-2.5V , I_D=-5A	---	25	30	
		V_{GS}=-1.8V , I_D=-3A	---	38	45	
$V_{GS(th)}$	Gate Threshold Voltage	V_{GS}=V_{DS} , I_D =-250uA	-0.5	-0.7	-1.0	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}=±12V , V_{DS}=0V	---	---	±100	nA
gfs	Forward Transconductance	V_{DS}=-5V , I_D=-6A	---	8	---	S
Q_g	Total Gate Charge (-4.5V)	V_{DS}=-10V , V_{GS}=-4.5V , I_D=-6A	---	17	---	nC
Q_{gs}	Gate-Source Charge		---	4.3	---	
Q_{gd}	Gate-Drain Charge		---	4.3	---	
$T_{d(on)}$	Turn-On Delay Time	V_{DD}=-10V , V_{GS}=-4.5V , R_G=3.3Ω, I_D=-3A	---	23	---	ns
T_r	Rise Time		---	31	---	
$T_{d(off)}$	Turn-Off Delay Time		---	70	---	
T_f	Fall Time		---	50	---	
C_{iss}	Input Capacitance	V_{DS}=-10V , V_{GS}=0V , f=1MHz	---	2100	---	pF
C_{oss}	Output Capacitance		---	489	---	
C_{rss}	Reverse Transfer Capacitance		---	304	---	

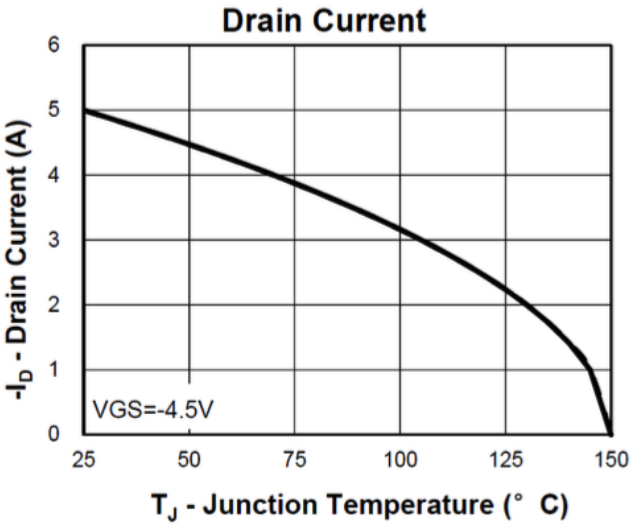
Diode Characteristics

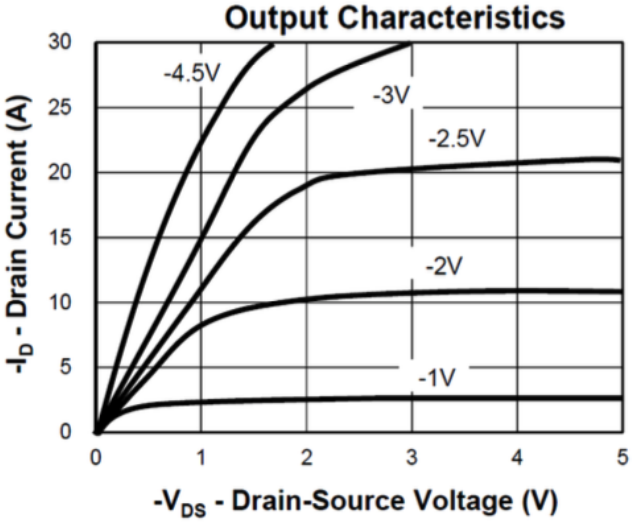
Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
I_S	Continuous Source Current1,4	V_G=V_D=0V , Force Current	---	---	-6	A
I_{SM}	Pulsed Source Current2,4		---	---	-24	A
V_{SD}	Diode Forward Voltage2	V_{GS}=0V , I_S=-1A , T_J=25℃	---	---	-1.2	V

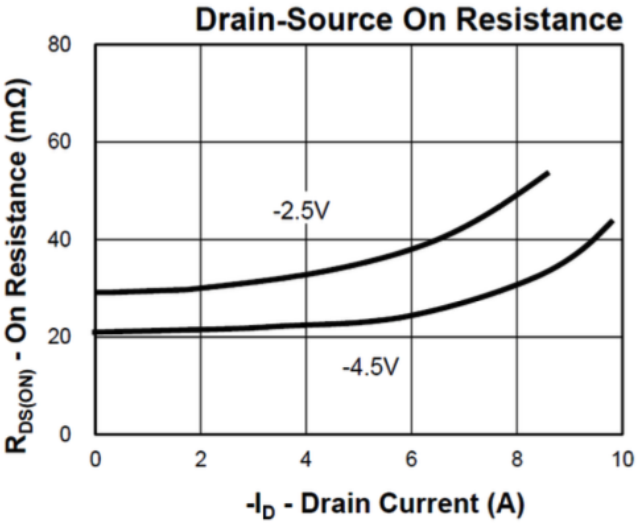
Note :
1.The data tested by surface mounted on a 1 inch^2 FR-4 board with 2OZ copper.
2.The data tested by pulsed , pulse width ≦ 300us , duty cycle ≦ 2%
3.The power dissipation is limited by 150℃ junction temperature
4.The data is theoretically the same as I_D and I_{DM} , in real applications , should be limited by total power dissipation.

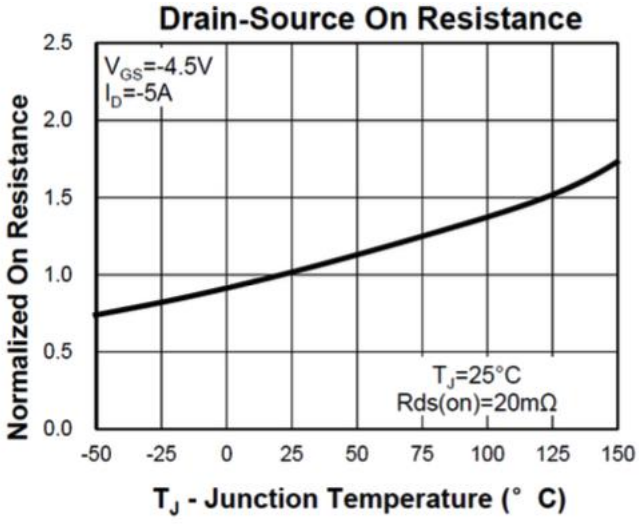
Typical Characteristics

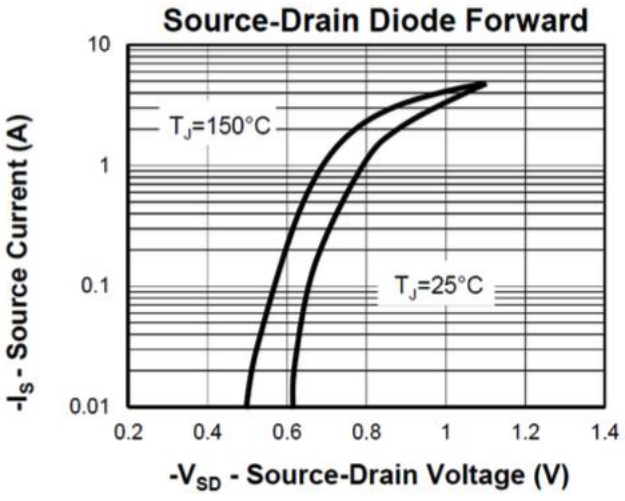


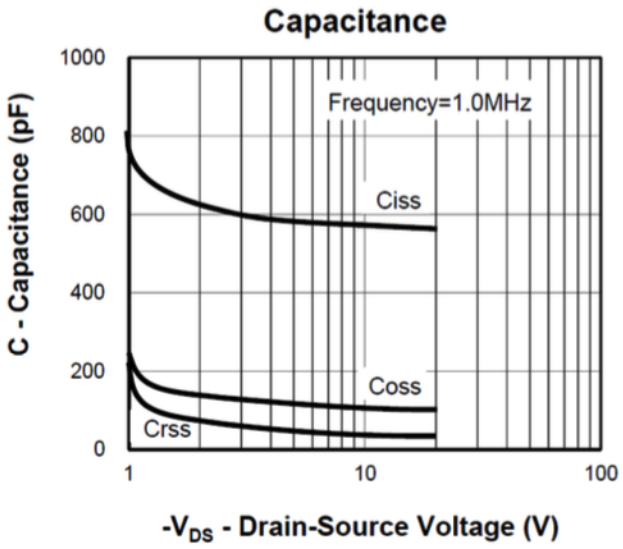


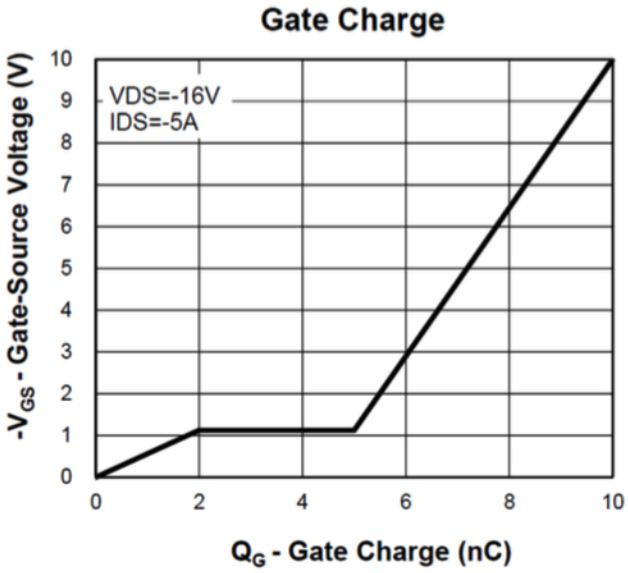


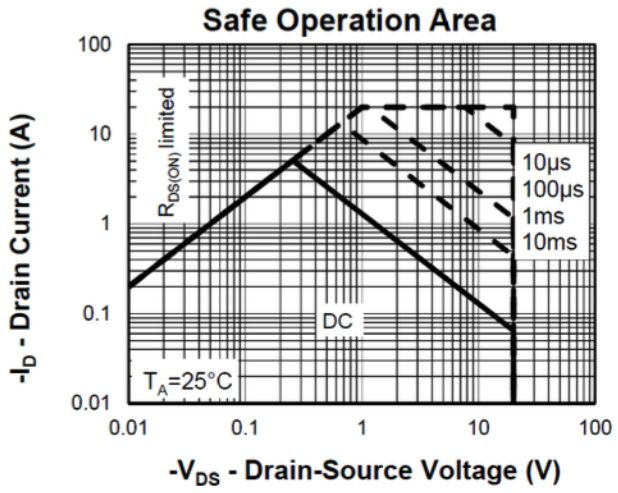


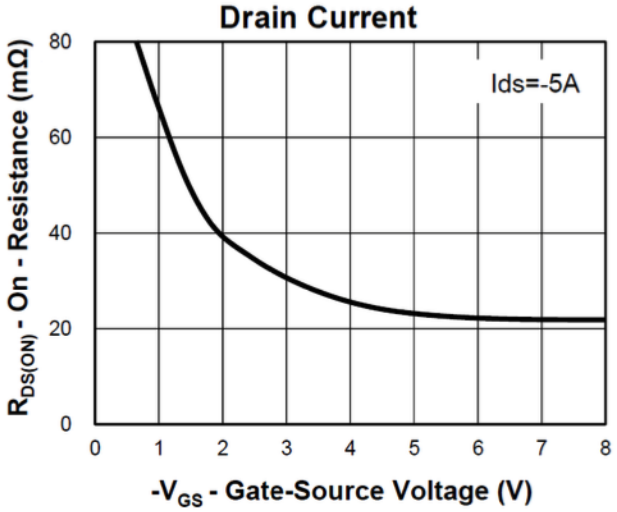


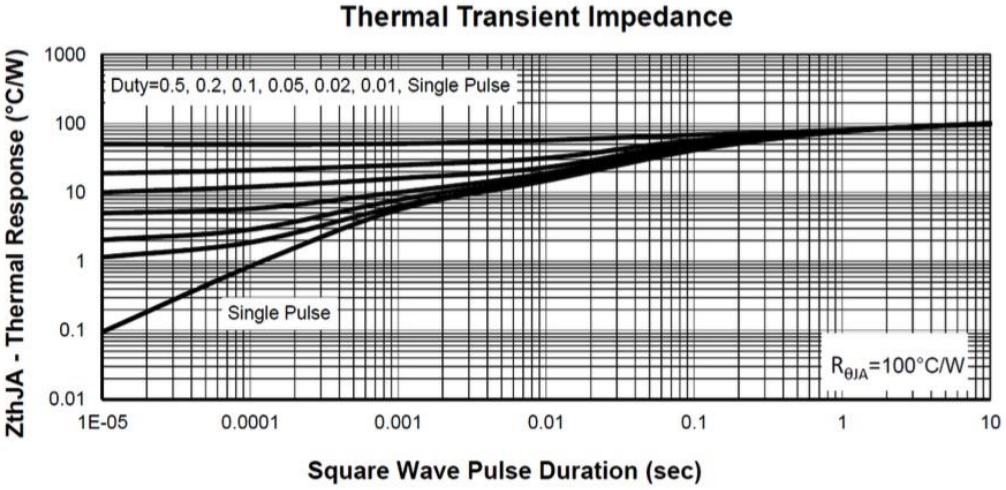



Capacitance
C - Capacitance (pF)
1000
800
600
400
200
0
Frequency=1.0MHz
Ciss
Coss
Crss
1
10
100
-VDS - Drain-Source Voltage (V)


Gate Charge
-VGS - Gate-Source Voltage (V)
10
9
8
7
6
5
4
3
2
1
0
VDS=-16V
IDS=-5A
0
2
4
6
8
10
QG - Gate Charge (nC)

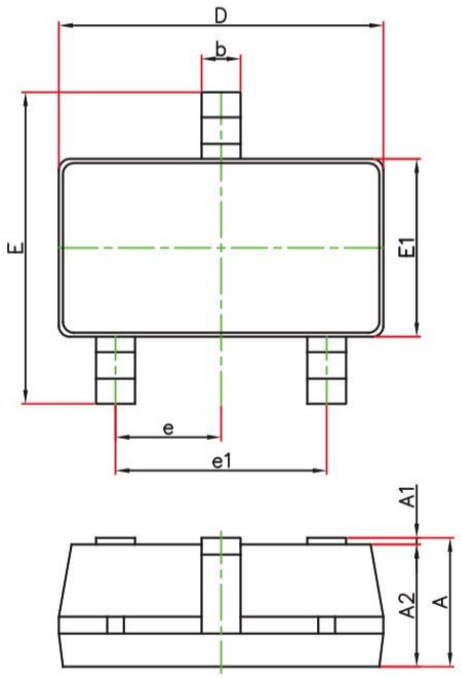

Safe Operation Area
-ID - Drain Current (A)
100
10
1
0.1
0.01
RDS(ON) limited
10μs
100μs
1ms
10ms
DC
TA=25°C
0.01
0.1
1
10
100
-VDS - Drain-Source Voltage (V)

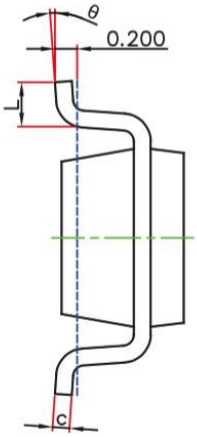

Drain Current
RDS(ON) - On - Resistance (mΩ)
80
60
40
20
0
Ids=-5A
0
1
2
3
4
5
6
7
8
-VGS - Gate-Source Voltage (V)


Thermal Transient Impedance
ZthJA - Thermal Response (°C/W)
1000
100
10
1
0.1
0.01
Duty=0.5, 0.2, 0.1, 0.05, 0.02, 0.01, Single Pulse
Single Pulse
RθJA=100°C/W
1E-05
0.0001
0.001
0.01
0.1
1
10
Square Wave Pulse Duration (sec)

Ordering Information

Part Number	Package code	Packaging
HSS2307	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
θ	0°	8°	0°	8°