HUASHUO SEMICONDUCTOR

HSH3129

P-Ch 30V Fast Switching MOSFETs

Description

The HSH3129 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 HSH3129 meet the RoHS and Green Product requirement, 100% EAS guaranteed with full function reliability approved.

- Super Low Gate Charge
- 100% EAS Guaranteed
- Green Device Available
- Excellent CdV/dt effect decline
- Advanced high cell density Trench technology

Product Summary

V_{DS}	-30	V
$R_{DS(ON),typ}$	1.4	mΩ
I_D	-220	A

TO-263 Pin Configuration
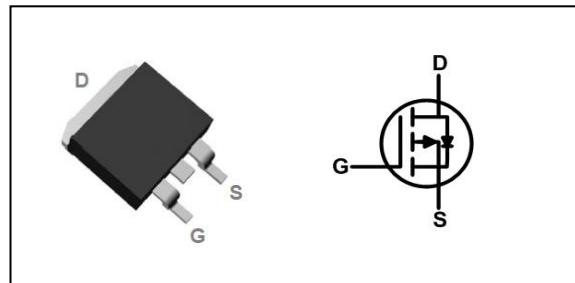
Absolute Maximum Ratings

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	-30	V
V_{GS}	Gate-Source Voltage	± 20	V
$I_D@T_C$=25℃	Continuous Drain Current, V_{GS} @ -10V[1,6]	-220	A
$I_D@T_C$=100℃	Continuous Drain Current, V_{GS} @ -10V[1,6]	-140	A
I_{DM}	Pulsed Drain Current[2]	-880	A
EAS	Single Pulse Avalanche Energy[3]	1350	mJ
I_{AS}	Avalanche Current	-95	A
$P_D@T_C$=25℃	Total Power Dissipation[4]	200	W
T_{STG}	Storage Temperature Range	-55 to 150	℃
T_J	Operating Junction Temperature Range	-55 to 150	℃

Thermal Data

Symbol	Parameter	Typ.	Max.	Unit
$R_{\theta JA}$	Thermal Resistance Junction-ambient [1](Steady State)	---	62	℃/W
$R_{\theta JC}$	Thermal Resistance Junction-case [1]	---	0.85	℃/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	-30	---	---	V
R$_{DS(ON)}$	Static Drain-Source On-Resistance[2]	V$_{GS}$=-10V , I$_D$=-30A	---	1.4	1.8	mΩ
		V$_{GS}$=-4.5V , I$_D$=-20A	---	1.8	2.4	mΩ
V$_{GS(th)}$	Gate Threshold Voltage	V$_{GS}$=V$_{DS}$, I$_D$ =-250uA	-1.0	---	-2.5	V
I$_{DSS}$	Drain-Source Leakage Current	V$_{DS}$=-30V , V$_{GS}$=0V , T$_J$=25℃	---	---	-1	uA
		V$_{DS}$=-30V , V$_{GS}$=0V , T$_J$=125℃	---	---	-100	
I$_{GSS}$	Gate-Source Leakage Current	V$_{GS}$= ± 20V , V$_{DS}$=0V	---	---	± 100	nA
Rg	Gate resistance	V$_{DS}$=0V , V$_{GS}$=0V , f=1MHz		1.8		Ω
Q$_g$	Total Gate Charge (-10V)		---	420	---	nC
Q$_{gs}$	Gate-Source Charge	V$_{DS}$=-15V , V$_{GS}$=-10V , I$_D$=-20A	---	48	---	
Q$_{gd}$	Gate-Drain Charge		---	62	---	
T$_{d(on)}$	Turn-On Delay Time		---	17	---	ns
T$_r$	Rise Time	V$_{DD}$=-15V , V$_{GS}$=-10V , R$_G$=3Ω,	---	6	---	
T$_{d(off)}$	Turn-Off Delay Time	I$_D$=-10A	---	21	---	
T$_f$	Fall Time		---	39	---	
C$_{iss}$	Input Capacitance		---	25400	---	pF
C$_{oss}$	Output Capacitance	V$_{DS}$=-15V , V$_{GS}$=0V , f=1MHz	---	2580	---	
C$_{rss}$	Reverse Transfer Capacitance		---	2410	---	

Diode Characteristics

| Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
I$_S$	Continuous Source Current[1,5]	V$_G$=V$_D$=0V , Force Current	---	---	-220	A
V$_{SD}$	Diode Forward Voltage[2]	V$_{GS}$=0V , I$_S$=-20A , T$_J$=25℃	---	---	-1.2	V
t$_{rr}$	Reverse Recovery Time	I$_F$=-20A , di/dt=100A/μs ,	---	50	---	nS
Q$_{rr}$	Reverse Recovery Charge	T$_J$=25℃	---	120	---	nC

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 EAS data shows Max. rating . The test condition is V$_{DD}$=-30V,V$_{GS}$=-10V,L=0.5mH,I$_{AS}$=-95A

4.The power dissipation is limited by 150℃ junction temperature

5.The data is theoretically the same as I$_D$ and I$_{DM}$, in real applications , should be limited by total power dissipation

6.The maximum current rating is package limited.

Typical Characteristics

Figure 1. Output Characteristics

Figure 2. Transfer Characteristics

Figure 3. Power Dissipation

Figure 4. Drain Current

Figure 5. BV$_{DSS}$ vs Junction Temperature

Figure 6. R$_{DS(ON)}$ vs Junction Temperature
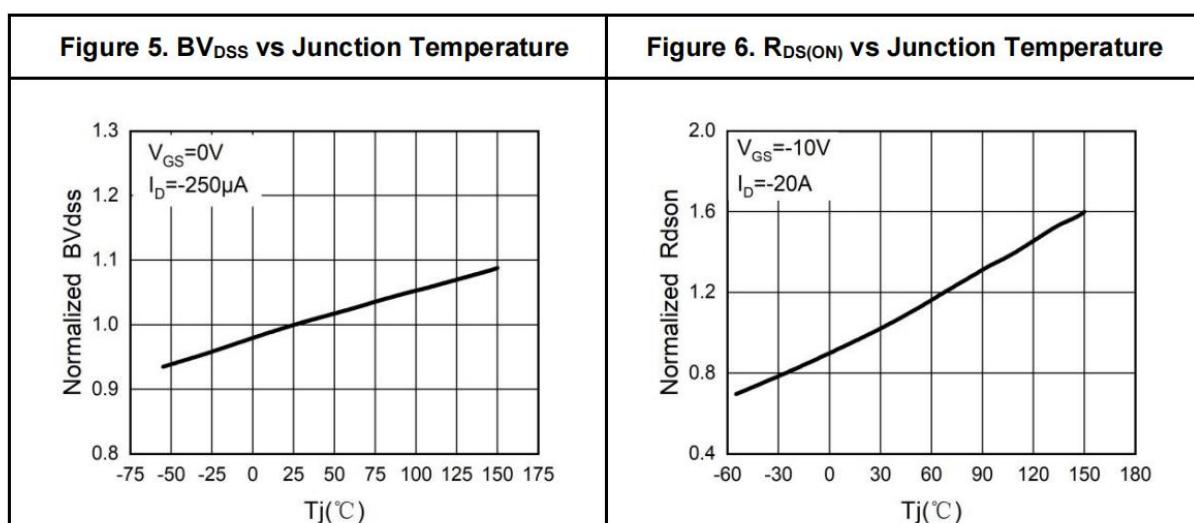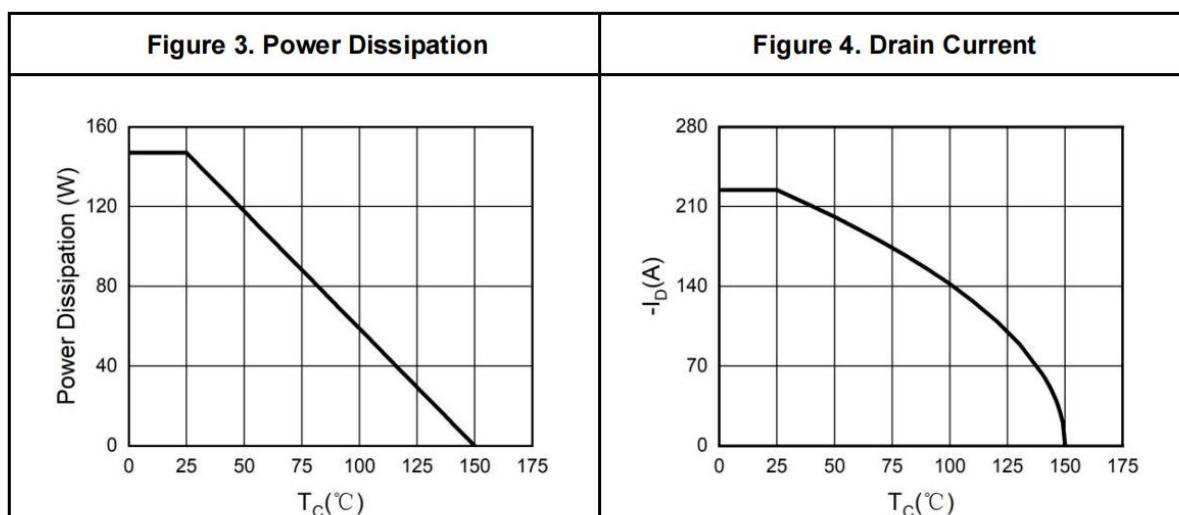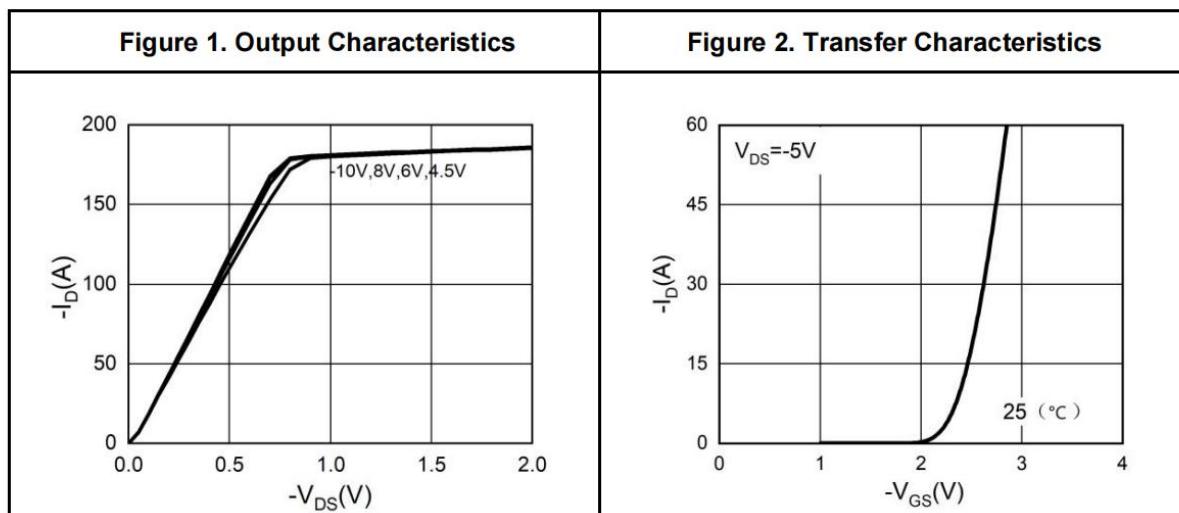
Figure 7. Gate Charge Waveforms

I_D=-20A
V_{DS}=-15V
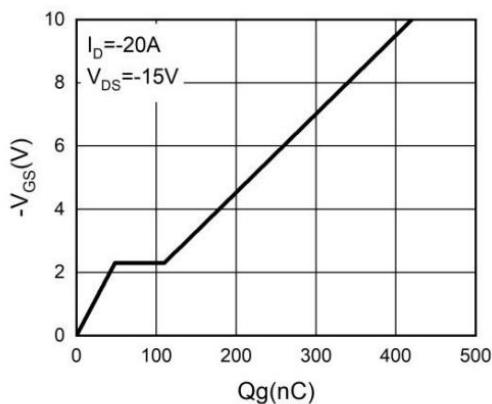
Figure 8. Capacitance
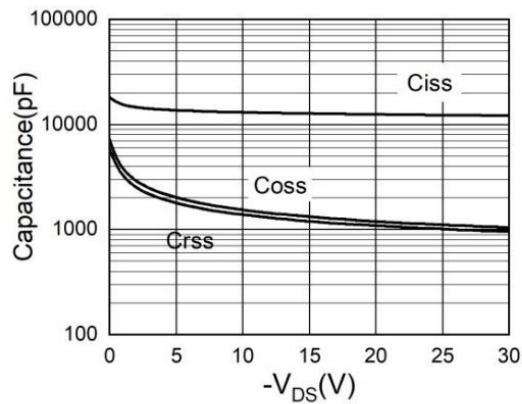
Figure 9. Body-Diode Characteristics

25 (℃)
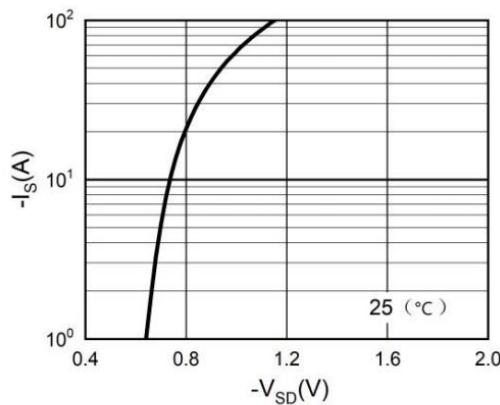
Figure 10. Maximum Safe Operating Area

Rds(on) limited)   DC

$T_{J(Max)}$=150(℃)
T_c=25(℃)
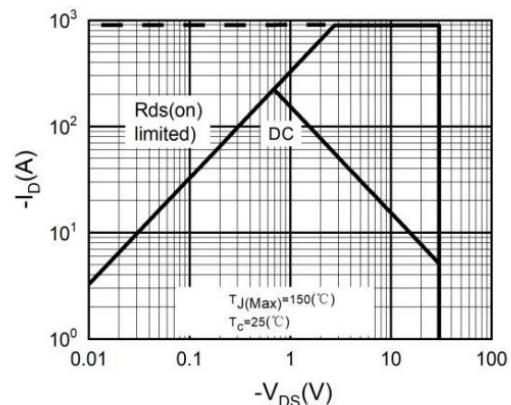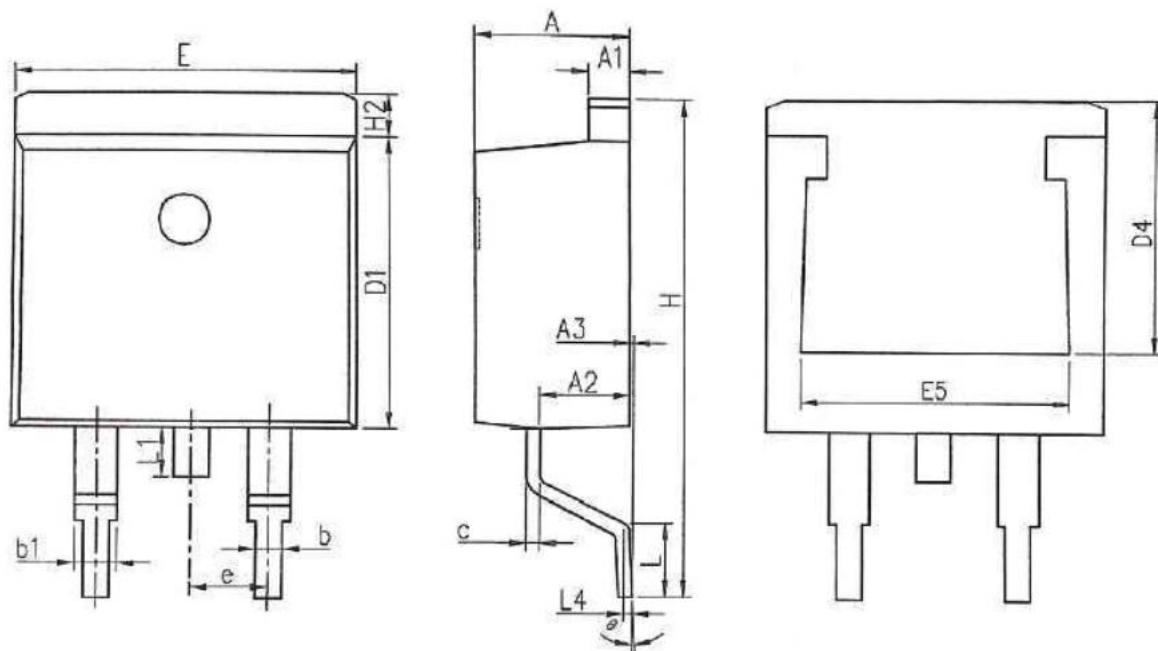
SYMBOLS	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	4.370	4.770	0.172	0.188
A1	1.220	1.420	0.048	0.056
A2	2.200	2.890	0.087	0.114
A3	0.000	0.250	0.000	0.010
b	0.700	0.960	0.028	0.038
b1	1.170	1.470	0.046	0.058
c	0.300	0.530	0.012	0.021
D1	8.500	9.300	0.335	0.366
D4	6.600	-	0.260	-
E	9.860	10.36	0.388	0.408
E5	7.060	-	0.278	-
e	2.540 BSC		0.100 BSC	
H	14.70	15.70	0.579	0.618
H2	1.070	1.470	0.042	0.058
L	2.000	2.600	0.079	0.102
L1	1.400	1.750	0.055	0.069
L4	0.250 BSC		0.010 BSC	
Θ	0°	9°	0°	9°