HUASHUO SEMICONDUCTOR

HSCE1218

P-Ch 12V Fast Switching MOSFETs

Description

The HSCE1218 is the high cell density trenched P-ch MOSFETs, which provide excellent RDSON and gate charge for most of the synchronous buck converter applications.

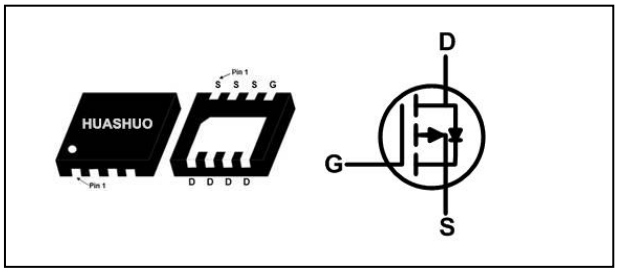
The HSCE1218 meet the RoHS and Green Product requirement with full function reliability approved.

Product Summary

V_{DS}	-12	V
$R_{DS(ON),typ}$	3.2	mΩ
I_D	-60	A

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

DFN3.3*3.3 Pin Configuration



Absolute Maximum Ratings

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	-12	V
V_{GS}	Gate-Source Voltage	± 12	V
I_D@T_C=25℃	Continuous Drain Current, V_{GS} @ -4.5V[1]	-60	A
I_D@T_C=70℃	Continuous Drain Current, V_{GS} @ -4.5V[1]	-32	A
I_{DM}	Pulsed Drain Current[2]	-240	A
P_D@T_C=25℃	Total Power Dissipation[3]	83	W
T_{STG}	Storage Temperature Range	-55 to 150	℃
T_J	Operating Junction Temperature Range	-55 to 150	℃

Thermal Data

Symbol	Parameter	Max.	Unit
$R_{\theta JA}$	Thermal Resistance Junction-Ambient [1]	55	℃/W
$R_{\theta JA}$	Thermal Resistance Junction-Ambient [1] (t ≤10s)	20	℃/W
$R_{\theta JC}$	Thermal Resistance Junction-Case[1]	1.5	℃/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	-12	---	---	V
$\triangle BV_{DSS}/\triangle T_J$	BV_{DSS} Temperature Coefficient	Reference to 25℃ , I_D=-1mA	---	-0.012	---	V/℃
$R_{DS(ON)}$	Static Drain-Source On-Resistance[2]	V_{GS}=-4.5V , I_D=-20A	---	3.2	4	mΩ
		V_{GS}=-2.5V , I_D=-20A	---	4.3	5.6	
$V_{GS(th)}$	Gate Threshold Voltage	V_{GS}=V_{DS} , I_D =-250uA	-0.5	-0.65	-1.0	V
$\triangle V_{GS(th)}$	$V_{GS(th)}$ Temperature Coefficient		---	2.94	---	mV/℃
I_{DSS}	Drain-Source Leakage Current	V_{DS}=-12V , V_{GS}=0V , T_J=25℃	---	---	-1	uA
I_{GSS}	Gate-Source Leakage Current	V_{GS}= ± 12V , V_{DS}=0V	---	---	± 100	nA
Rg	Gate Resistance	V_{DS}=-0V , V_{GS}=0V, f=1MHz	---	7.3	---	Ω
Q_g	Total Gate Charge (-4.5V)	V_{DS}=-6V , V_{GS}=-4.5V , I_D=-20A	---	41	---	nC
Q_{gs}	Gate-Source Charge		---	10	---	
Q_{gd}	Gate-Drain Charge		---	14	---	
$T_{d(on)}$	Turn-On Delay Time	V_{DD}=-6V , V_{GS}=-4.5V , R_G=3.3Ω, I_D=-20A	---	12	---	ns
T_r	Rise Time		---	7	---	
$T_{d(off)}$	Turn-Off Delay Time		---	216	---	
T_f	Fall Time		---	96	---	
C_{iss}	Input Capacitance	V_{DS}=-6V , V_{GS}=0V , f=1MHz	---	6910	---	pF
C_{oss}	Output Capacitance		---	1420	---	
C_{rss}	Reverse Transfer Capacitance		---	1130	---	

Diode Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
I_S	Continuous Source Current[1,4]	V_G=V_D=0V , Force Current	---	---	-60	A
V_{SD}	Diode Forward Voltage[2]	V_{GS}=0V , I_S=-1A , T_J=25℃	---	---	-1.2	V
t_{rr}	Reverse Recovery Time	IF=-20A , dI/dt=100A/μs , T_J =25℃	---	25	---	nS
Q_{rr}	Reverse Recovery Charge		---	11	---	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 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

Figure 1. Output Characteristics

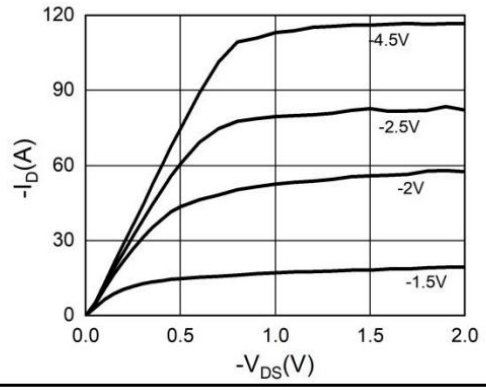


Figure 2. Transfer Characteristics

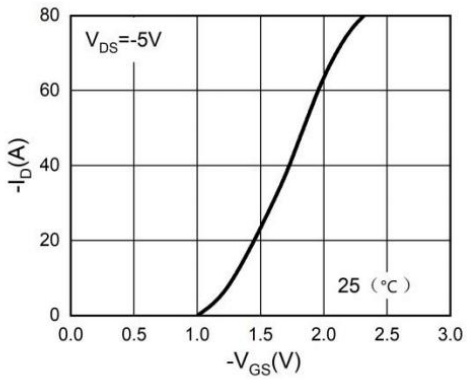


Figure 3. Power Dissipation

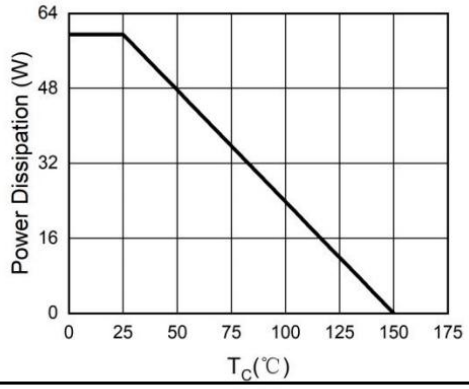


Figure 4. Drain Current

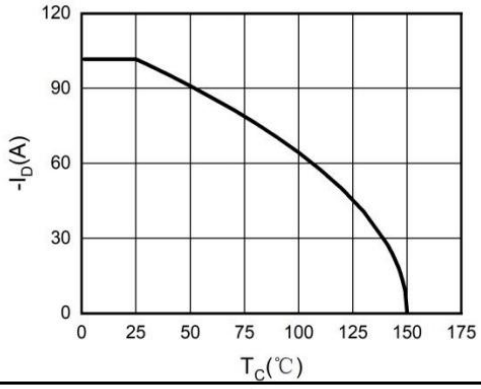


Figure 5. BV_{DSS} vs Junction Temperature

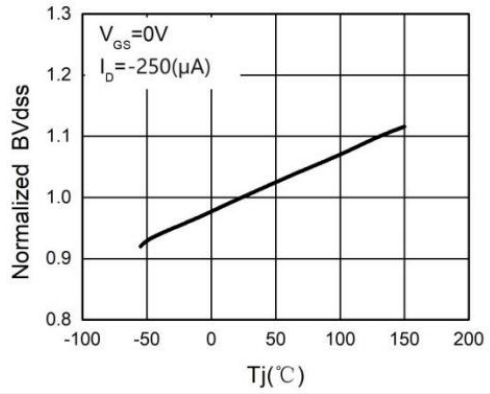


Figure 6. $R_{DS(ON)}$ vs Junction Temperature

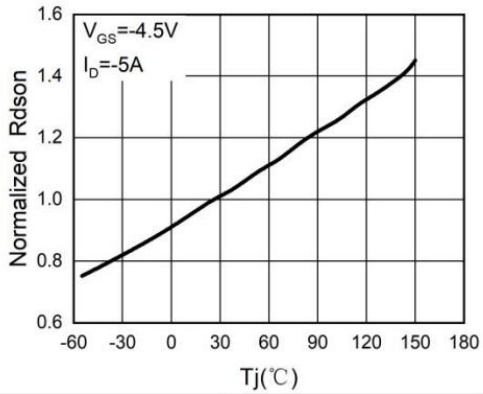


Figure 7. Gate Charge Waveforms

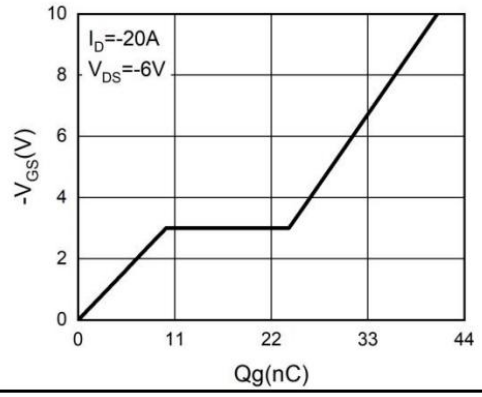


Figure 8. Capacitance

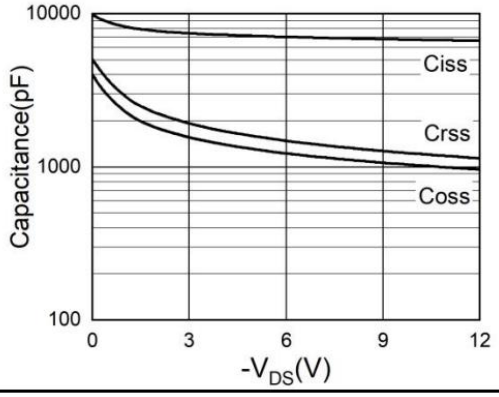


Figure 9. Body-Diode Characteristics

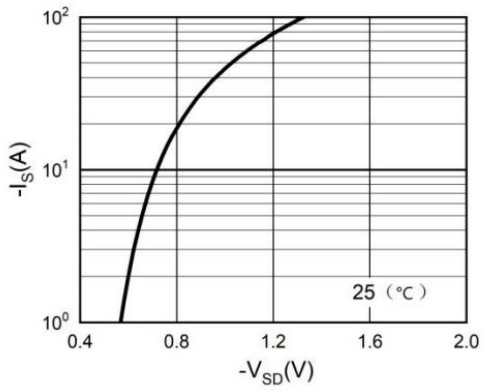
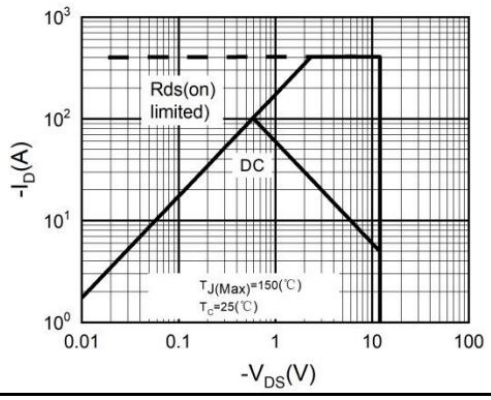
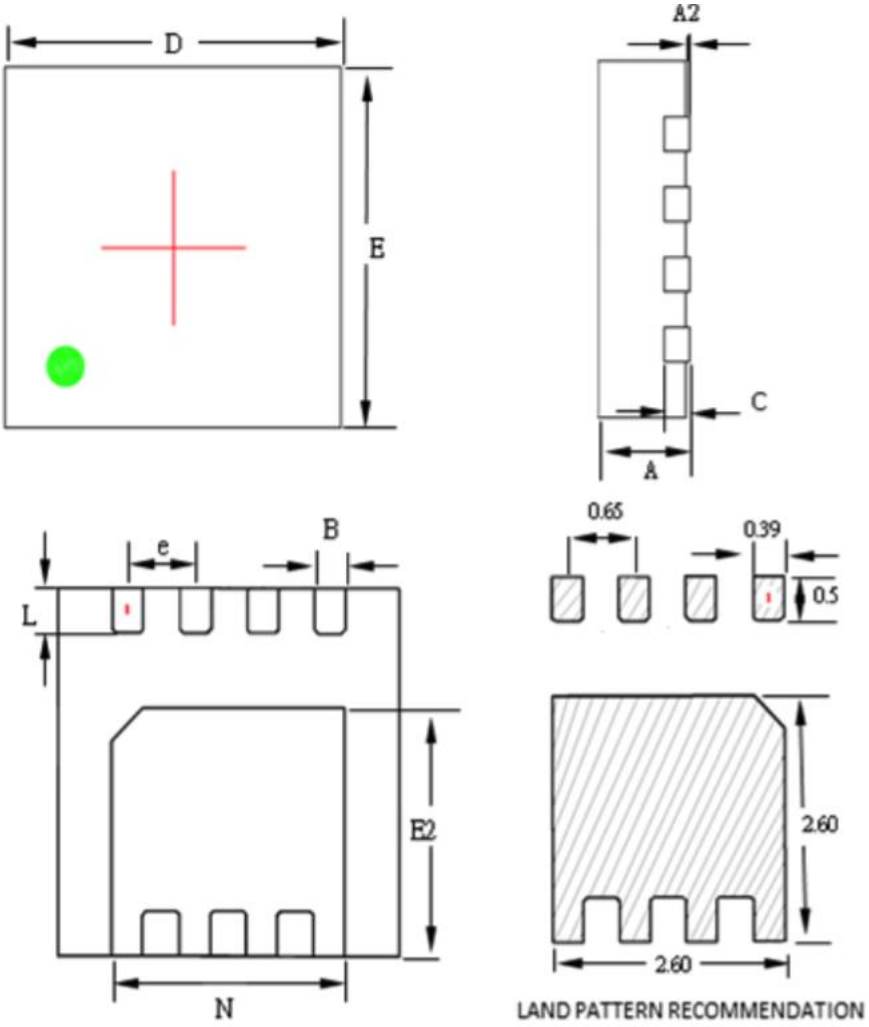


Figure 10. Maximum Safe Operating Area





LAND PATTERN RECOMMENDATION

SYMBOLS	MILLIMETERS			INCHES		
	MIN	NOM	MAX	MIN	NOM	MAX
A	0.70	0.75	0.80	0.028	0.030	0.031
A2	0.00	--	0.05	0.000	--	0.002
B	0.24	0.30	0.35	0.009	0.012	0.014
C	0.10	0.15	0.25	0.004	0.006	0.010
D	3.15	3.30	3.40	0.124	0.130	0.134
E	3.15	3.30	3.40	0.124	0.130	0.134
E2	2.15	2.25	2.35	0.085	0.089	0.093
L	0.35	0.40	0.45	0.014	0.016	0.018
N	2.10	2.25	2.35	0.083	0.089	0.093
e	--	0.65	--	--	0.026	--