



General Description

The HSCE1218 is the high cell density trenched P-ch MOSFETs, which provide excellent RDS(ON) 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.

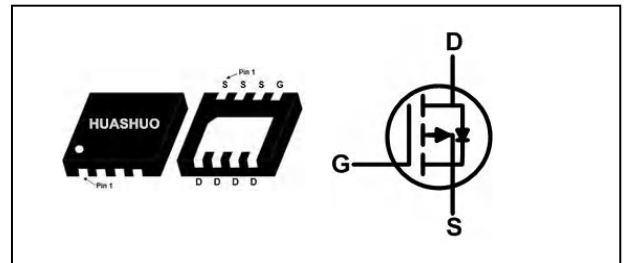
Features

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

Product Summary

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

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
$I_D@T_C=25^{\circ}C$	Continuous Drain Current, $V_{GS} @ -4.5V^1$	-60	A
$I_D@T_C=70^{\circ}C$	Continuous Drain Current, $V_{GS} @ -4.5V^1$	-32	A
I_{DM}	Pulsed Drain Current ²	-240	A
$P_D@T_C=25^{\circ}C$	Total Power Dissipation ³	83	W
T_{STG}	Storage Temperature Range	-55 to 150	°C
T_J	Operating Junction Temperature Range	-55 to 150	°C

Thermal Data

Symbol	Parameter	Max.	Unit
$R_{\theta JA}$	Thermal Resistance Junction-Ambient ¹	55	°C/W
$R_{\theta JA}$	Thermal Resistance Junction-Ambient ¹ (t ≤ 10s)	20	°C/W
$R_{\theta JC}$	Thermal Resistance Junction-Case ¹	1.5	°C/W



Electrical Characteristics ($T_J=25^\circ\text{C}$, unless otherwise noted)

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
BV_{DSS}	Drain-Source Breakdown Voltage	$V_{GS}=0V$, $I_D=-250\mu A$	-12	---	---	V
$\Delta BV_{DSS}/\Delta T_J$	BV_{DSS} Temperature Coefficient	Reference to 25°C , $I_D=-1mA$	---	-0.012	---	$V/^\circ\text{C}$
$R_{DS(ON)}$	Static Drain-Source On-Resistance ²	$V_{GS}=-4.5V$, $I_D=-20A$	---	3.2	4	$m\Omega$
		$V_{GS}=-2.5V$, $I_D=-20A$	---	4.3	5.6	
$V_{GS(th)}$	Gate Threshold Voltage	$V_{GS}=V_{DS}$, $I_D=-250\mu A$	-0.5	-0.65	-1.0	V
$\Delta V_{GS(th)}$	$V_{GS(th)}$ Temperature Coefficient		---	2.94	---	$mV/^\circ\text{C}$
I_{DSS}	Drain-Source Leakage Current	$V_{DS}=-12V$, $V_{GS}=0V$, $T_J=25^\circ\text{C}$	---	---	-1	μA
I_{GSS}	Gate-Source Leakage Current	$V_{GS}=\pm 12V$, $V_{DS}=0V$	---	---	± 100	nA
R_g	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	$V_{DD}=-6V$, $V_{GS}=-4.5V$, $R_G=3.3\Omega$, $I_D=-20A$	---	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	$V_{GS}=0V$, $I_S=-1A$, $T_J=25^\circ\text{C}$	---	---	-1.2	V
t_{rr}	Reverse Recovery Time	$I_F=-20A$, $dI/dt=100A/\mu s$, $T_J=25^\circ\text{C}$	---	25	---	nS
Q_{rr}	Reverse Recovery Charge		---	11	---	nC

Note :

1.The data tested by surface mounted on a 1 inch² FR-4 board with 20Z copper.

2.The data tested by pulsed , pulse width $\leq 300\mu s$, duty cycle $\leq 2\%$

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

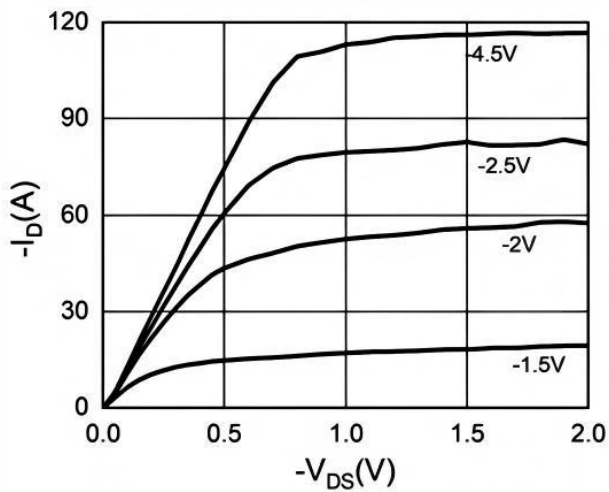


Figure 1. Output Characteristics

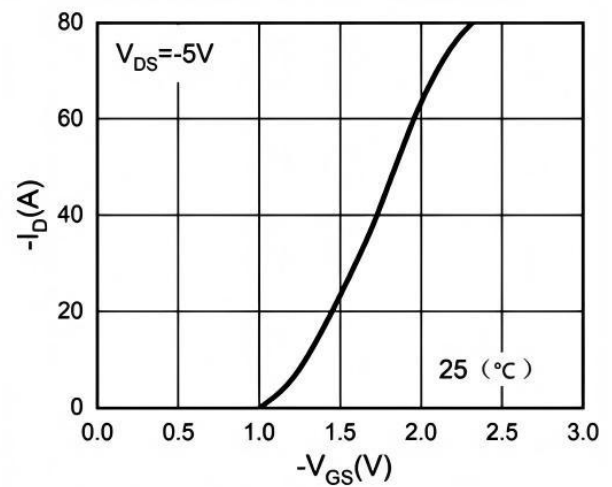


Figure 2. Transfer Characteristics

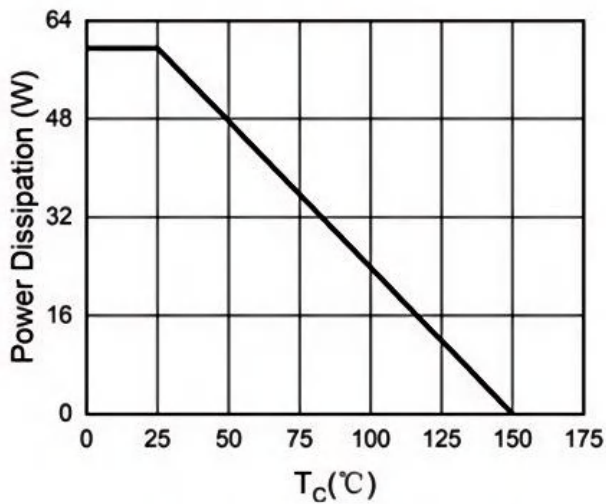


Figure 3. Power Dissipation

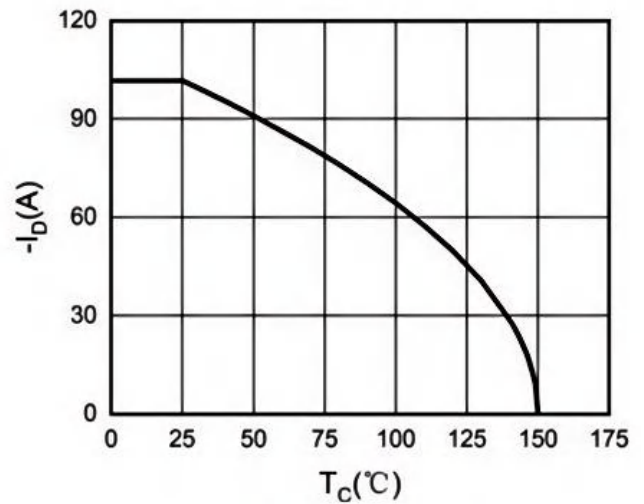


Figure 4. Drain Current

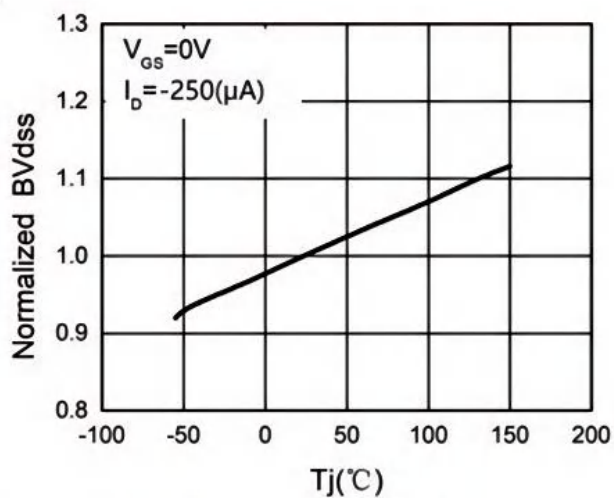


Figure 5. BV_{DS} vs Junction Temperature

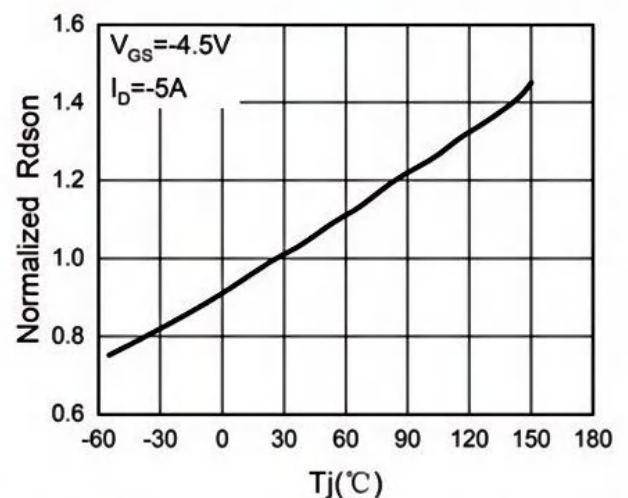


Figure 6. $R_{DS(ON)}$ vs Junction Temperature

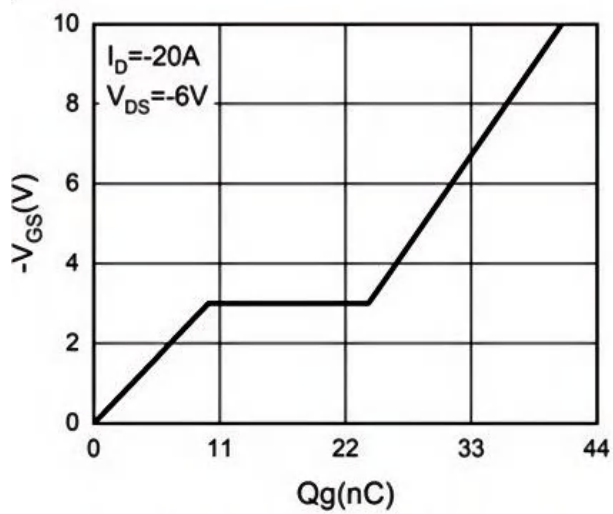


Figure 7. Gate Charge Waveforms

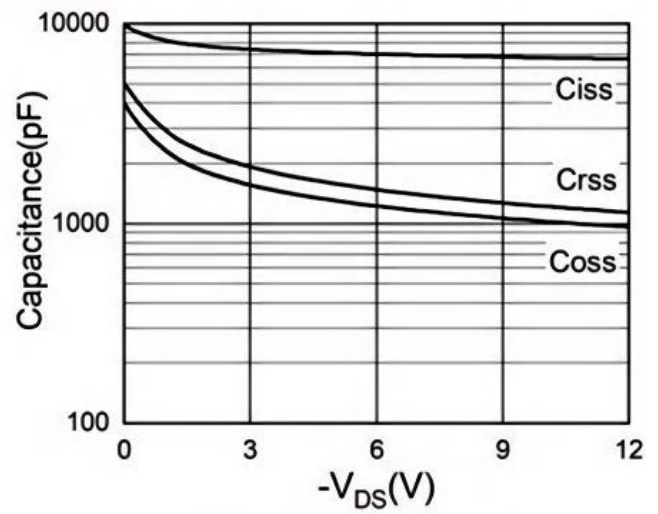


Figure 8. Capacitance

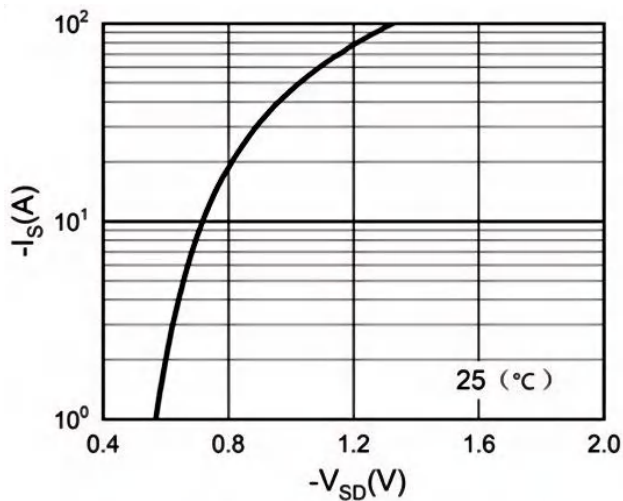


Figure 9. Body-Diode Characteristics

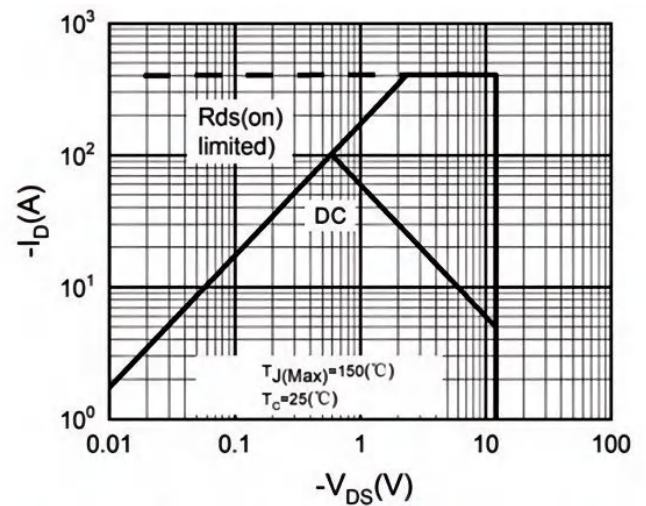


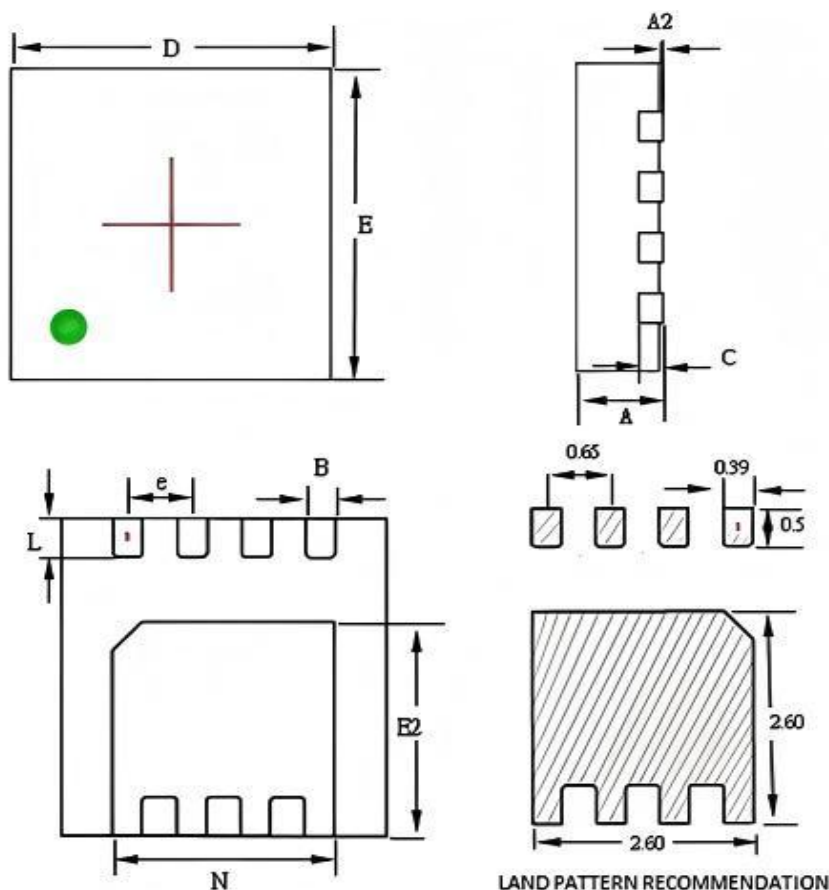
Figure 10. Maximum Safe Operating Area



Ordering Information

Part Number	Package code	Packaging
HSCE1218	DFN3.3x3.3 8L	3000/Tape&Reel

DFN3.3x3.3 8L Package Outline



SYMBOLS	MILLIMETERS			INCHES		
	MIN	NOM	MAX	MIN	NOM	MAX
A	0.7	0.75	0.8	0.028	0.295	0.031
A2	0	--	0.05	0.000	--	0.002
B	0.24	0.3	0.35	0.009	0.012	0.014
C	0.1	0.15	0.25	0.004	0.006	0.010
D	3.15	3.3	3.4	0.124	0.130	0.134
E	3.15	3.3	3.4	0.124	0.130	0.134
E2	2.15	2.25	2.35	0.085	0.089	0.093
L	0.35	0.4	0.45	0.014	0.016	0.018
N	2.1	2.25	2.35	0.083	0.089	0.093
e	--	0.65	--	--	0.026	--



HSCE1218 Marking:

