

General Description

The HSCE4117 is the high cell density trench P-ch MOSFETs, which provide excellent RDS(on) and gate charge for most of the synchronous buck converter applications.

The HSCE4117 meet the RoHS and Green Product requirement, 100% EAS guaranteed with full function reliability approved.

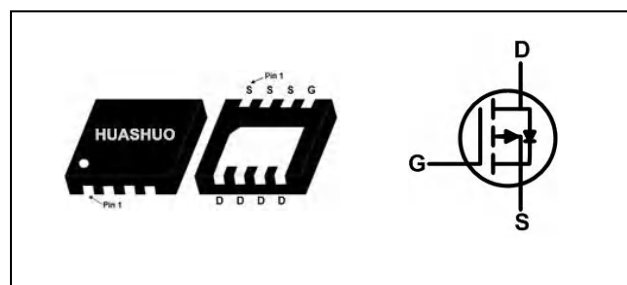
Features

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

Product Summary

V_{DS}	-40	V
$R_{DS(ON),typ}$	8.2	m Ω
I_D	-50	A

DFN3.3*3.3 Pin Configuration



Absolute Maximum Ratings

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	-40	V
V_{GS}	Gate-Source Voltage	± 20	V
$I_D@T_C=25^{\circ}C$	Continuous Drain Current, V_{GS} @ -10V ¹	-50	A
$I_D@T_C=100^{\circ}C$	Continuous Drain Current, V_{GS} @ -10V ¹	-39	A
I_{DM}	Pulsed Drain Current ²	-200	A
EAS	Single Pulse Avalanche Energy ³	360	mJ
I_{AS}	Avalanche Current	-56	A
$P_D@T_C=25^{\circ}C$	Total Power Dissipation ⁴	52	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	---	55	$^{\circ}C/W$
$R_{\theta JC}$	Thermal Resistance Junction-Case ¹	---	2.4	$^{\circ}C/W$

Electrical Characteristics (T_J=25 °C, unless otherwise noted)

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
BV _{DSS}	Drain-Source Breakdown Voltage	V _{GS} =0V, I _D =-250uA	-40	---	---	V
R _{DS(ON)}	Static Drain-Source On-Resistance ²	V _{GS} =-10V, I _D =-20A	---	8.2	10	mΩ
		V _{GS} =-4.5V, I _D =-15A	---	10.5	12.5	
V _{GS(th)}	Gate Threshold Voltage	V _{GS} =V _{DS} , I _D =-250uA	-1.0	-1.65	-2.5	V
I _{DSS}	Drain-Source Leakage Current	V _{DS} =-40V, V _{GS} =0V, T _J =25°C	---	---	1	uA
		V _{DS} =-40V, V _{GS} =0V, T _J =55°C	---	---	5	
I _{GSS}	Gate-Source Leakage Current	V _{GS} =±20V, V _{DS} =0V	---	---	±100	nA
g _{fs}	Forward Transconductance	V _{DS} =-5V, I _D =-10A	---	48	---	S
R _g	Gate Resistance	V _{DS} =0V, V _{GS} =0V, f=1MHz	---	10.6	---	Ω
Q _g	Total Gate Charge	V _{DS} =-20V, V _{GS} =-10V, I _D =-10A	---	59	---	nC
Q _{gs}	Gate-Source Charge		---	8.7	---	
Q _{gd}	Gate-Drain Charge		---	15	---	
T _{d(on)}	Turn-On Delay Time	V _{DD} =-20V, V _{GS} =-10V, R _G =3.3Ω, I _D =-10A	---	16	---	ns
T _r	Rise Time		---	42	---	
T _{d(off)}	Turn-Off Delay Time		---	170	---	
T _f	Fall Time		---	96	---	
C _{iss}	Input Capacitance	V _{DS} =-20V, V _{GS} =0V, f=1MHz	---	3670	---	pF
C _{oss}	Output Capacitance		---	313	---	
C _{rss}	Reverse Transfer Capacitance		---	225	---	

Diode Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
I _S	Continuous Source Current ^{1,5}	V _G =V _D =0V, Force Current	---	---	-50	A
I _{SM}	Pulsed Source Current ^{2,5}		---	---	-200	A
V _{SD}	Diode Forward Voltage ²	V _{GS} =0V, I _S =-1A, T _J =25°C	---	---	-1.2	V
t _{rr}	Reverse Recovery Time	I _f =20A, dI/dt=100A/us	---	15	---	ns
Q _{rr}	Reverse Recovery Charge	I _f =20A, dI/dt=100A/us	---	4.7	---	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 ≤ 300us , duty cycle ≤ 2%

3.The EAS data shows Max. rating . The test condition is V_{DD}=-25V, V_{GS}=-10V, L=0.1mH, I_{AS}=-56A

4.The power dissipation is limited by 150°C 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.

Typical Characteristics

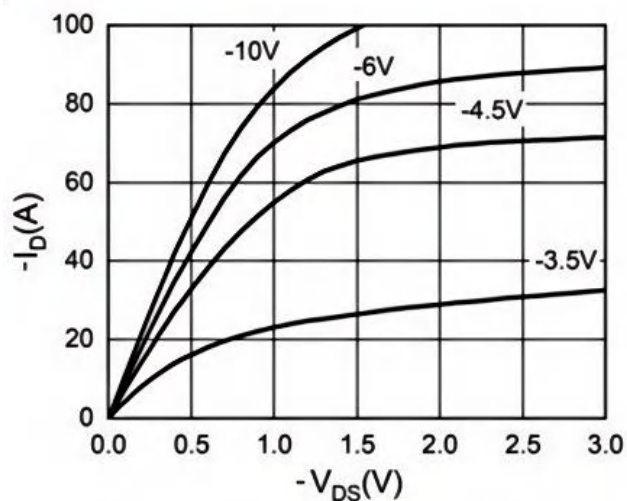


Figure 1. Output Characteristics

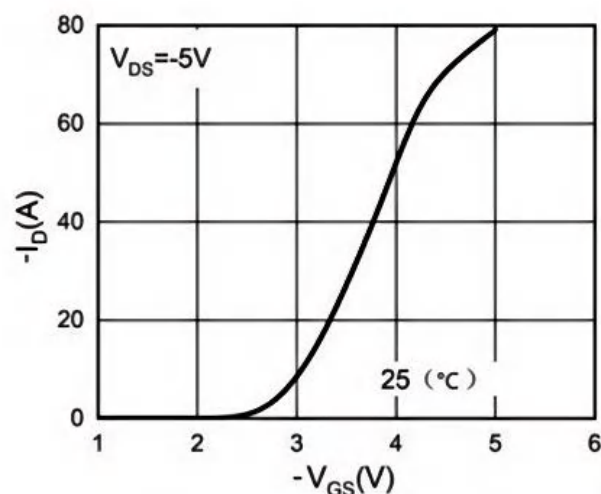


Figure 2. Transfer Characteristics

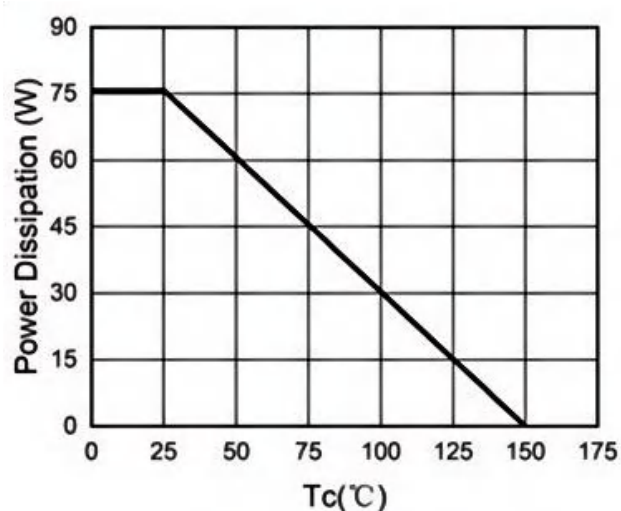


Figure 3. Power Dissipation

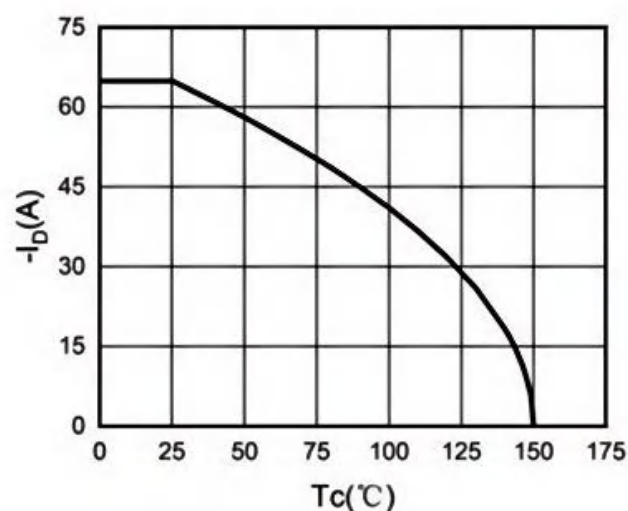


Figure 4. Drain Current

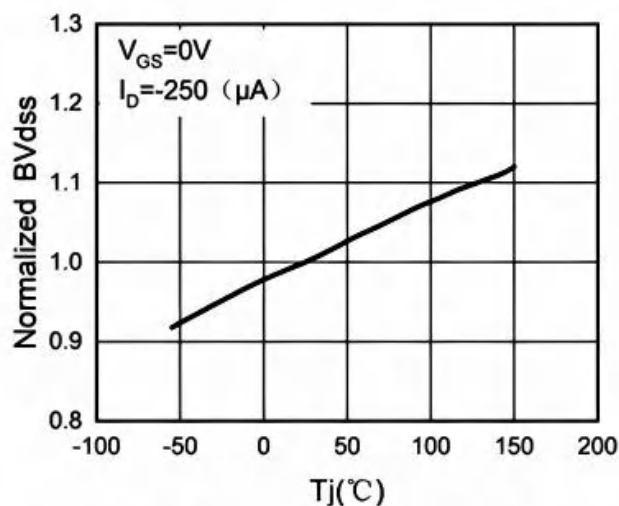


Figure 5. BV_{DS} vs Junction Temperature

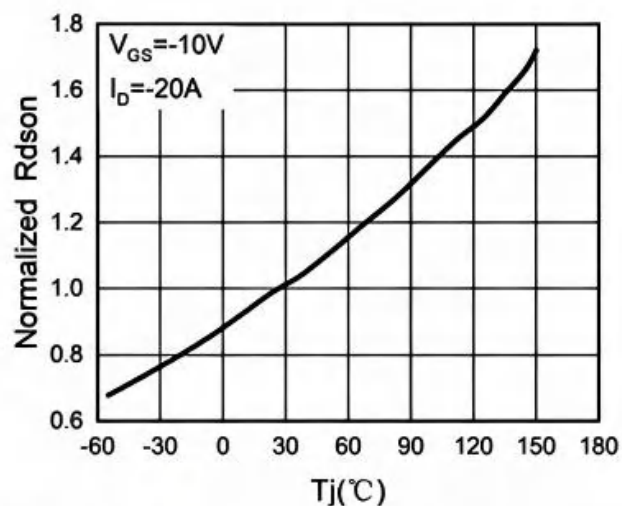


Figure 6. $R_{DS(on)}$ vs Junction Temperature

P-Ch 40V Fast Switching MOSFETs

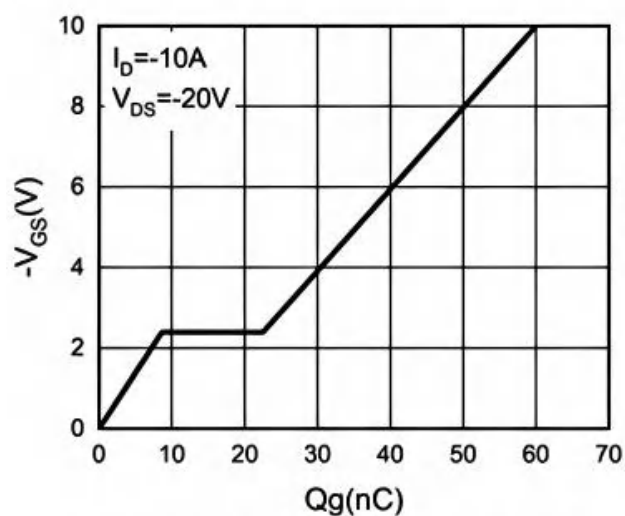


Figure 7. Gate Charge Waveforms

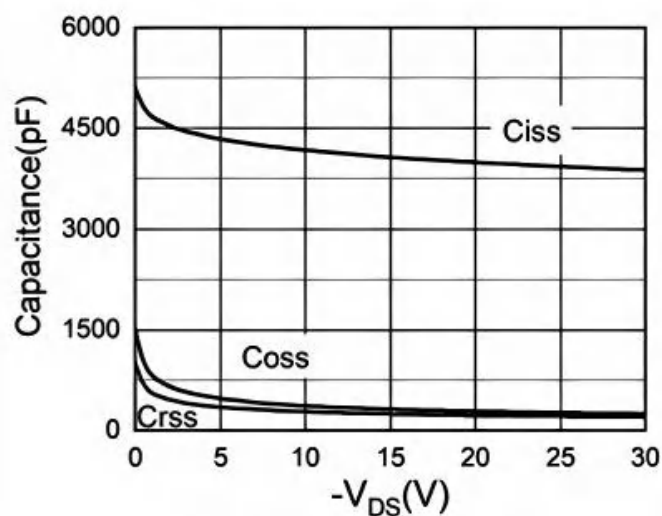


Figure 8. Capacitance

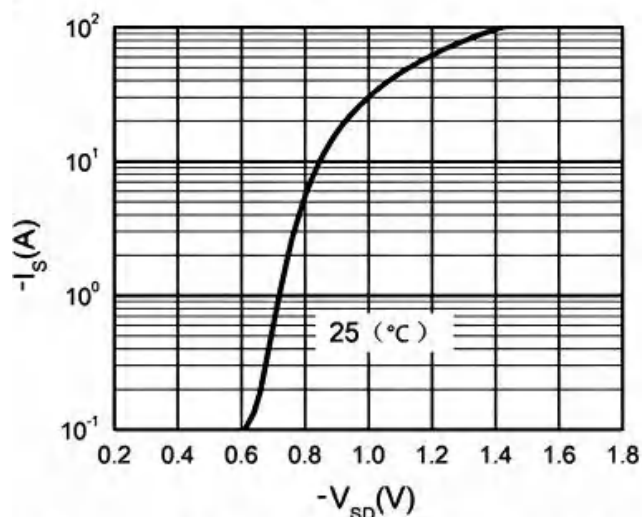


Figure 9. Body-Diode Characteristics

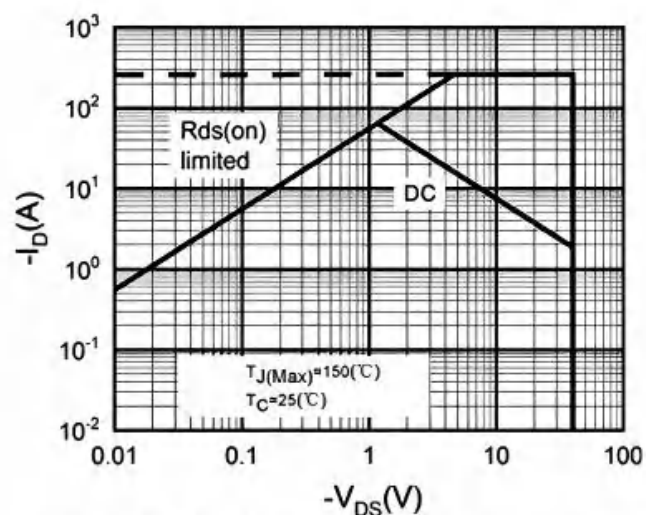
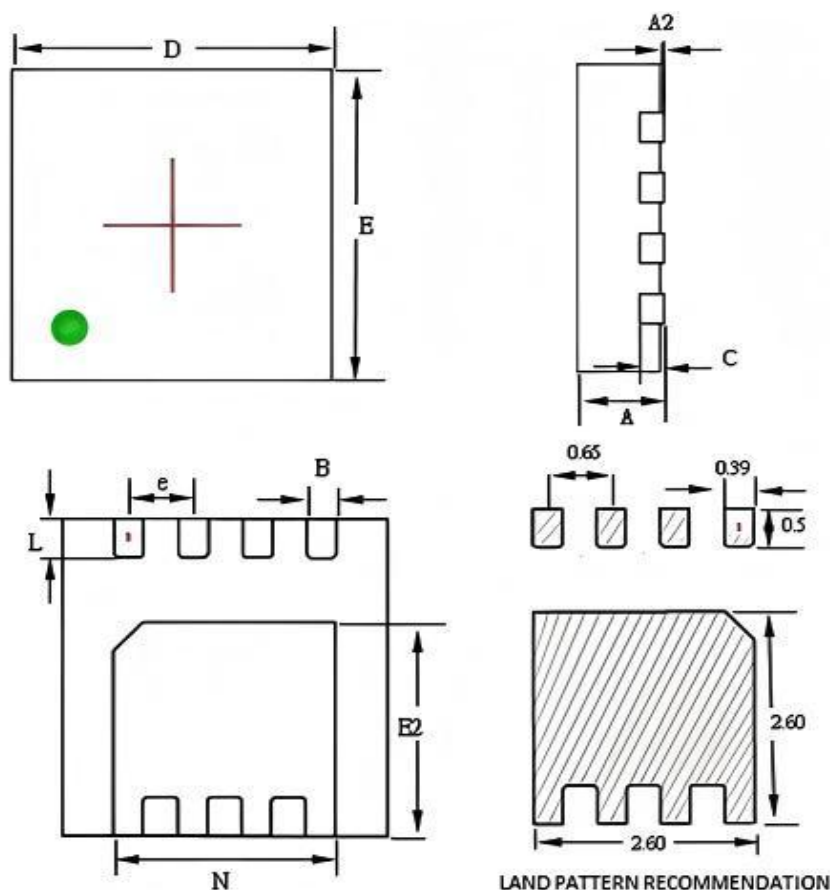


Figure 10. Maximum Safe Operating Area

Ordering Information

Part Number	Package code	Packaging
HSCE4117	DFN3.3*3.3 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	--

HSCE4117 Marking:

