

General Description

The HSCE2631 is the high cell density trenched P-ch MOSFETs, which provide excellent $R_{DS(on)}$ and gate charge for most of the synchronous buck converter applications.

The HSCE2631 meet the RoHS and Green Product requirement with full function reliability approved.

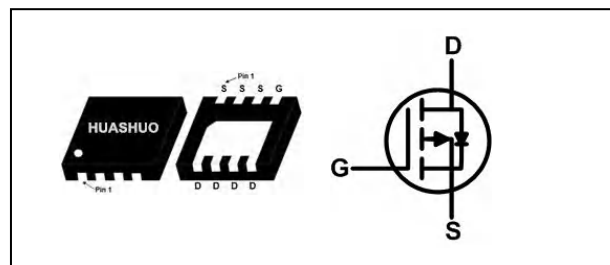
Features

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

Product Summary

V_{DS}	-20	V
$R_{DS(ON),typ}$	3.6	m Ω
I_D	-50	A

DFN3.3*3.3 Pin Configuration



Absolute Maximum Ratings

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	-20	V
V_{GS}	Gate-Source Voltage	± 12	V
$I_D@T_C=25^\circ C$	Continuous Drain Current, $V_{GS} @ -4.5V^1$	-50	A
$I_D@T_C=70^\circ C$	Continuous Drain Current, $V_{GS} @ -4.5V^1$	-39	A
I_{DM}	Pulsed Drain Current ²	-200	A
$P_D@T_C=25^\circ C$	Total Power Dissipation ³	83	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	Max.	Unit
$R_{\theta JA}$	Thermal Resistance Junction-Ambient ¹	55	$^\circ C/W$
$R_{\theta JA}$	Thermal Resistance Junction-Ambient ¹ ($t \leq 10s$)	20	$^\circ C/W$
$R_{\theta JC}$	Thermal Resistance Junction-Case ¹	1.5	$^\circ C/W$



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

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
BV_{DSS}	Drain-Source Breakdown Voltage	$V_{GS}=0V$, $I_D=-250\mu A$	-20	---	---	V
$\Delta BV_{DSS}/\Delta T_J$	BV_{DSS} Temperature Coefficient	Reference to 25°C , $I_D=-1\text{mA}$	---	-0.012	---	$V/^\circ\text{C}$
$R_{DS(ON)}$	Static Drain-Source On-Resistance ²	$V_{GS}=-4.5V$, $I_D=-20A$	---	3.6	5	$m\Omega$
		$V_{GS}=-2.5V$, $I_D=-20A$	---	4.7	6.5	
		$V_{GS}=-1.8V$, $I_D=-20A$	---	6.4	8.5	
$V_{GS(th)}$	Gate Threshold Voltage	$V_{GS}=V_{DS}$, $I_D=-250\mu A$	-0.35	-0.5	-1.0	V
$\Delta V_{GS(th)}$	$V_{GS(th)}$ Temperature Coefficient		---	2.94	---	$mV/^\circ\text{C}$
I_{DSS}	Drain-Source Leakage Current	$V_{DS}=-20V$, $V_{GS}=0V$, $T_J=25^\circ\text{C}$	---	---	-1	μA
I_{GSS}	Gate-Source Leakage Current	$V_{GS}=\pm 8V$, $V_{DS}=0V$	---	---	± 100	nA
R_g	Gate Resistance	$V_{DS}=0V$, $V_{GS}=0V$, $f=1\text{MHz}$	---	5	---	Ω
Q_g	Total Gate Charge (-4.5V)	$V_{DS}=-15V$, $V_{GS}=-4.5V$, $I_D=-20A$	---	76	---	nC
Q_{gs}	Gate-Source Charge		---	9.1	---	
Q_{gd}	Gate-Drain Charge		---	14	---	
$T_{d(on)}$	Turn-On Delay Time	$V_{DD}=-10V$, $V_{GS}=-4.5V$, $R_G=3.3\Omega$, $I_D=-20A$	---	12	---	ns
T_r	Rise Time		---	11	---	
$T_{d(off)}$	Turn-Off Delay Time		---	56	---	
T_f	Fall Time		---	16	---	
C_{iss}	Input Capacitance	$V_{DS}=-10V$, $V_{GS}=0V$, $f=1\text{MHz}$	---	4400	---	pF
C_{oss}	Output Capacitance		---	509	---	
C_{rss}	Reverse Transfer Capacitance		---	331	---	

Diode Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
I_S	Continuous Source Current ^{1,4}	$V_G=V_D=0V$, Force Current	---	---	-50	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	$I_F=-20A$, $dI/dt=100A/\mu s$,	---	55	---	nS
Q_{rr}	Reverse Recovery Charge	$T_J=25^\circ\text{C}$	---	365	---	nC

Note :

1.The data tested by surface mounted on a 1 inch² FR-4 board with 2OZ 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

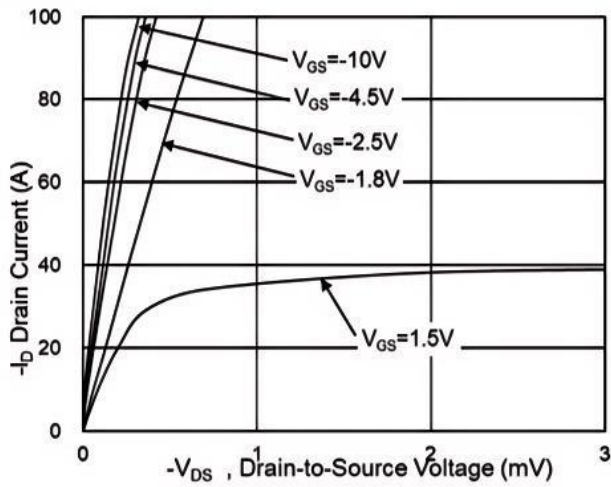


Fig.1 Typical Output Characteristics

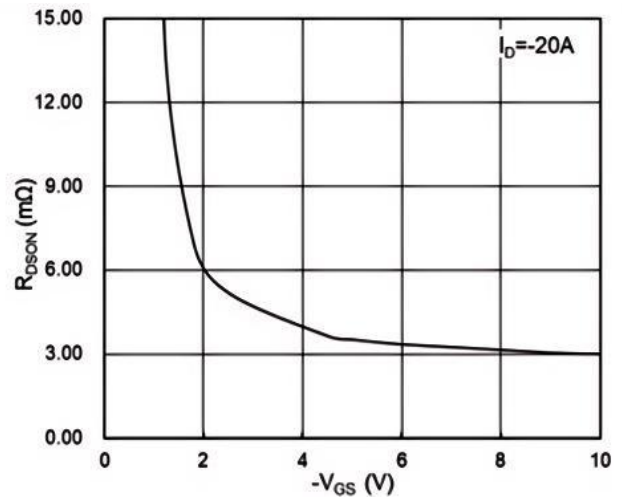


Fig.2 On-Resistance vs. G-S Voltage

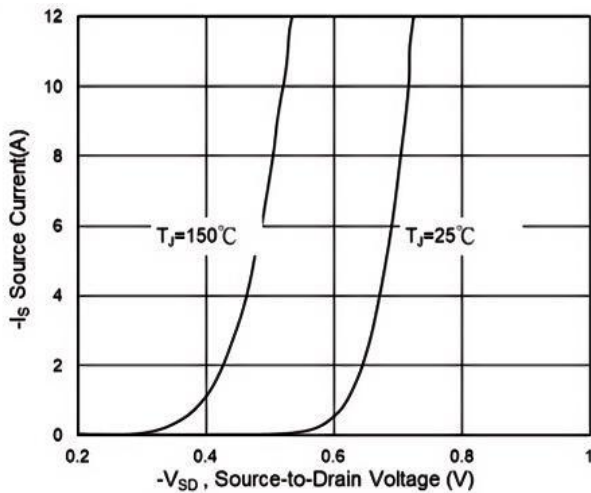


Fig.3 Forward Characteristics of Reverse

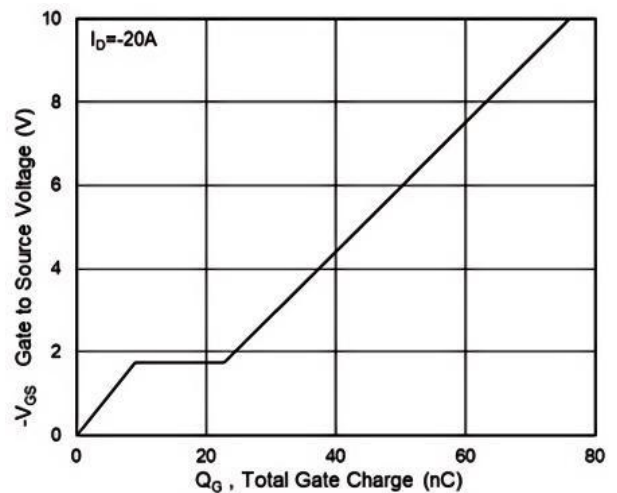


Fig.4 Gate-charge Characteristics

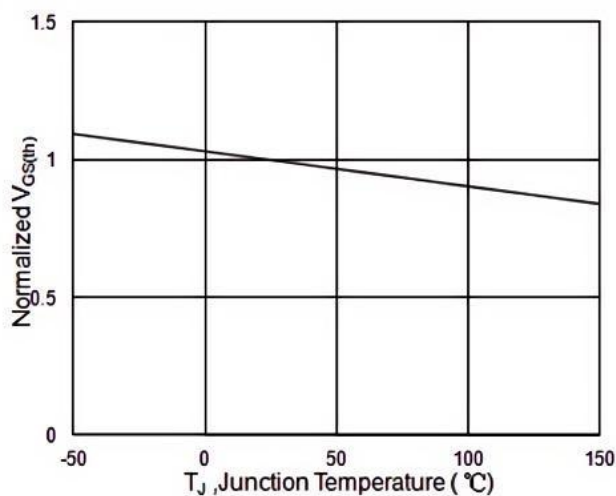


Fig.5 Normalized $V_{GS(th)}$ vs. T_J

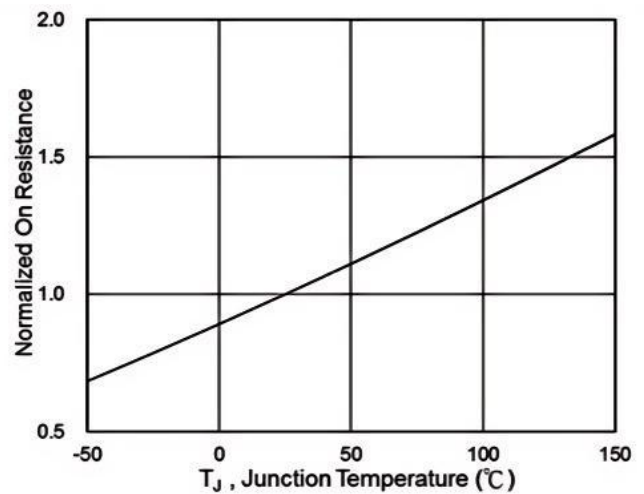


Fig.6 Normalized $R_{DS(on)}$ vs. T_J

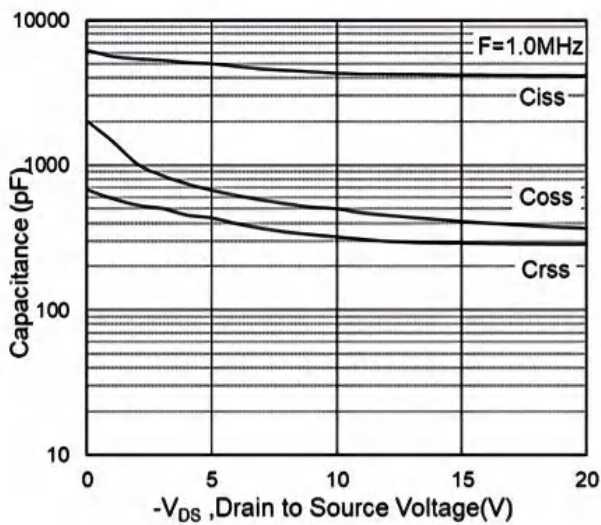


Fig.7 Capacitance

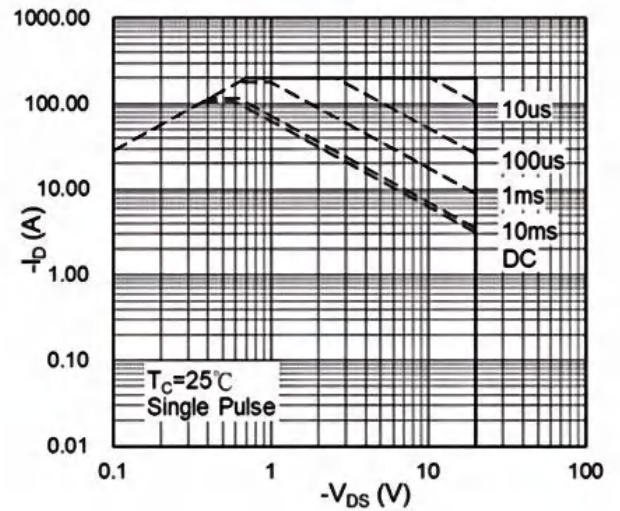


Fig.8 Safe Operating Area

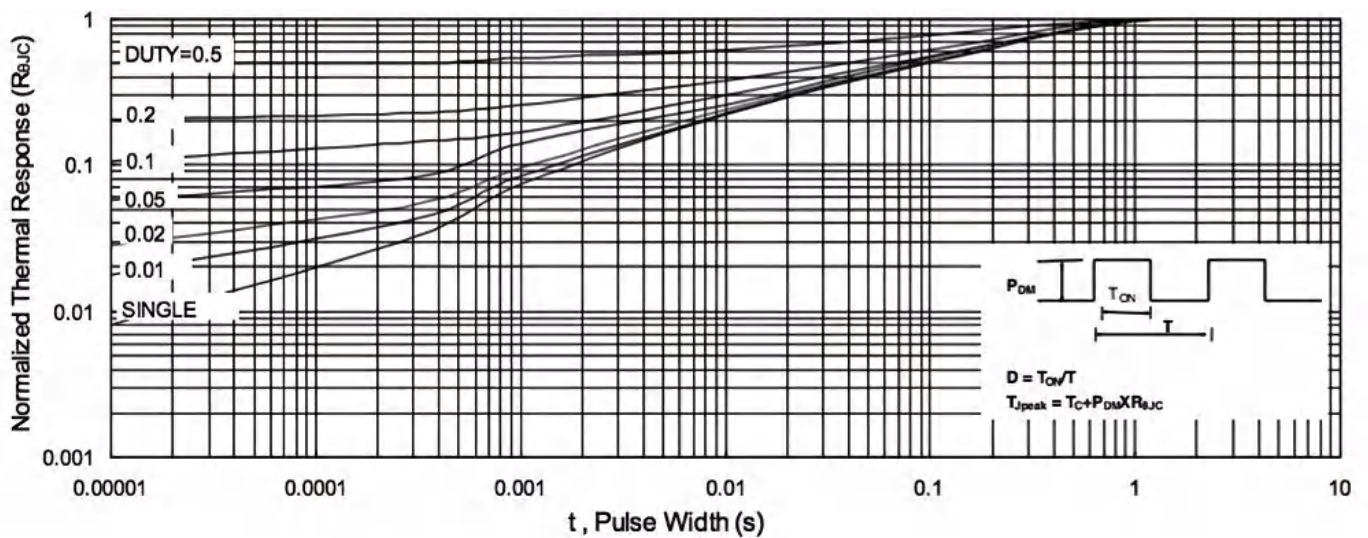


Fig.9 Normalized Maximum Transient Thermal Impedance

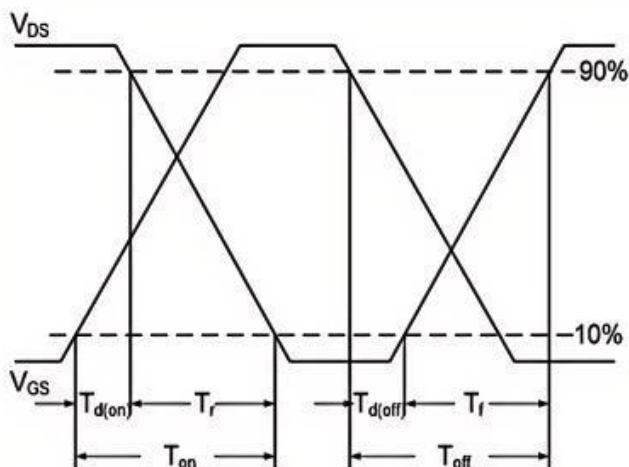


Fig.10 Switching Time Waveform

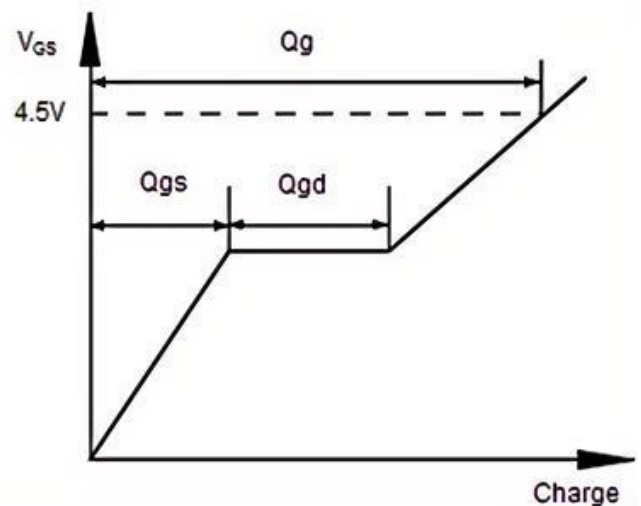


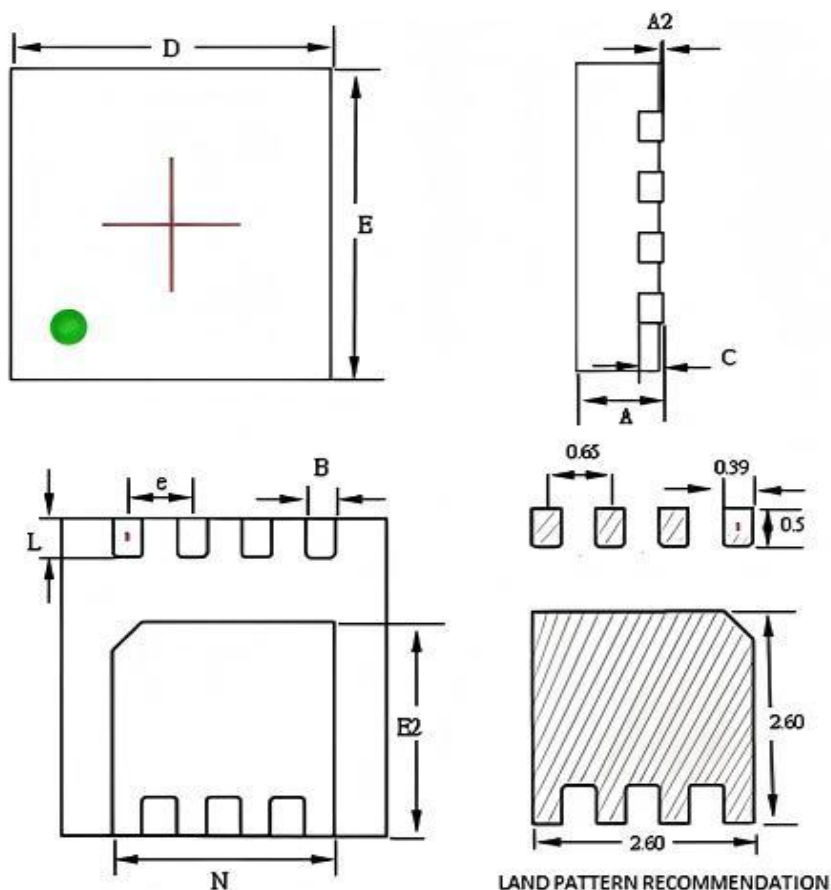
Fig.11 Gate Charge Waveform



Ordering Information

Part Number	Package code	Packaging
HSCE2631	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	--



HSCE2631 Marking:

