



Description

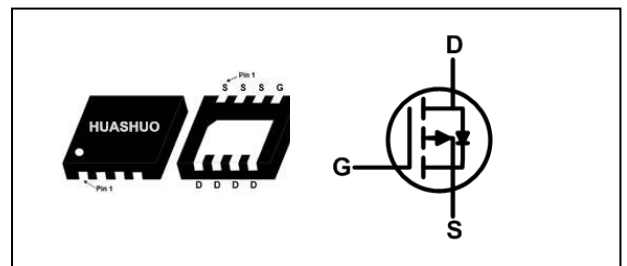
The HSCE2631 is the high cell density trenched P-ch MOSFETs, which provide excellent RDSON and gate charge for most of the synchronous buck converter applications. The HSCE2631 meet the RoHS and Green Product requirement with full function reliability approved.

- 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	mΩ
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°C	Continuous Drain Current, V _{GS} @ -4.5V ¹	-50	A
I _D @T _C =70°C	Continuous Drain Current, V _{GS} @ -4.5V ¹	-39	A
I _{DM}	Pulsed Drain Current ²	-200	A
P _D @T _C =25°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 _{θJA}	Thermal Resistance Junction-Ambient ¹	55	°C/W
R _{θJA}	Thermal Resistance Junction-Ambient ¹ (t ≤10s)	20	°C/W
R _{θJC}	Thermal Resistance Junction-Case ¹	1.5	°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	-20	---	---	V
ΔBV _{DSS} /ΔT _J	BV _{DSS} Temperature Coefficient	Reference to 25°C, I _D =-1mA	---	-0.012	---	V/°C
R _{DS(ON)}	Static Drain-Source On-Resistance ²	V _{GS} =-4.5V, I _D =-20A	---	3.6	5	mΩ
		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 =-250uA	-0.35	-0.5	-1.0	V
ΔV _{GS(th)}	V _{GS(th)} Temperature Coefficient		---	2.94	---	mV/°C
I _{DSS}	Drain-Source Leakage Current	V _{DS} =-20V, V _{GS} =0V, T _J =25°C	---	---	-1	uA
I _{GSS}	Gate-Source Leakage Current	V _{GS} =±8V, V _{DS} =0V	---	---	±100	nA
R _g	Gate Resistance	V _{DS} =-0V, V _{GS} =0V, f=1MHz	---	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 =3.3Ω, 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=1MHz	---	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°C	---	---	-1.2	V
t _{rr}	Reverse Recovery Time	I _F -20A, dI/dt=100A/μs, T _J =25°C	---	55	---	nS
Q _{rr}	Reverse Recovery Charge		---	365	---	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 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

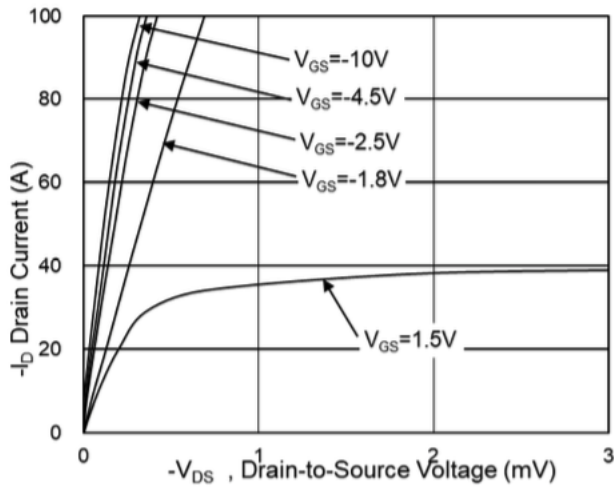


Fig.1 Typical Output Characteristics

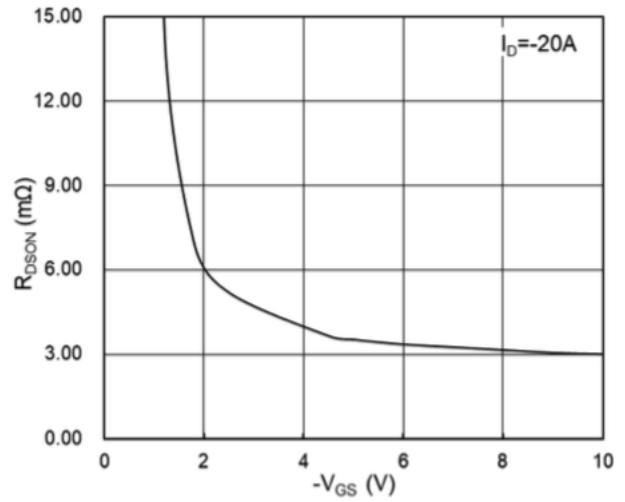


Fig.2 On-Resistance vs. G-S Voltage

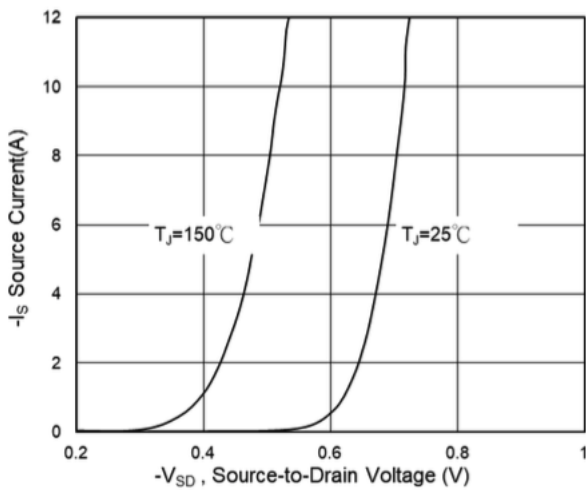


Fig.3 Forward Characteristics of Reverse

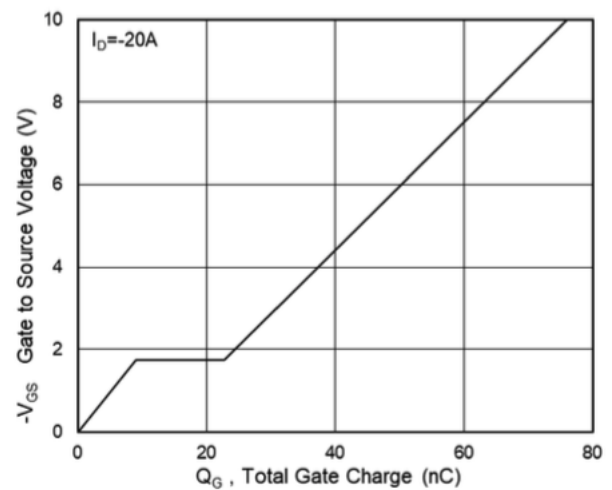


Fig.4 Gate-charge Characteristics

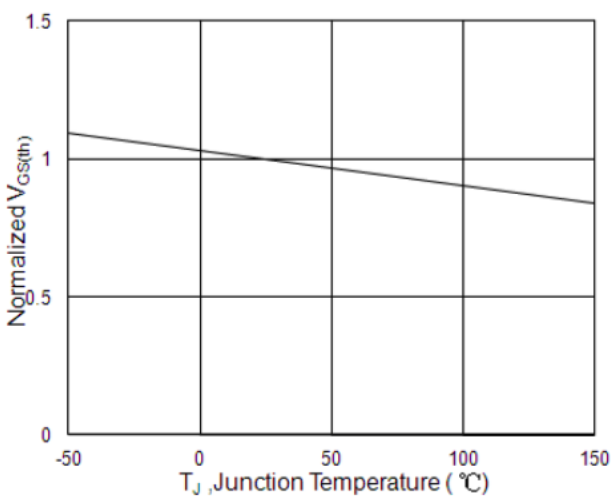


Fig.5 Normalized $V_{GS(th)}$ vs. T_J

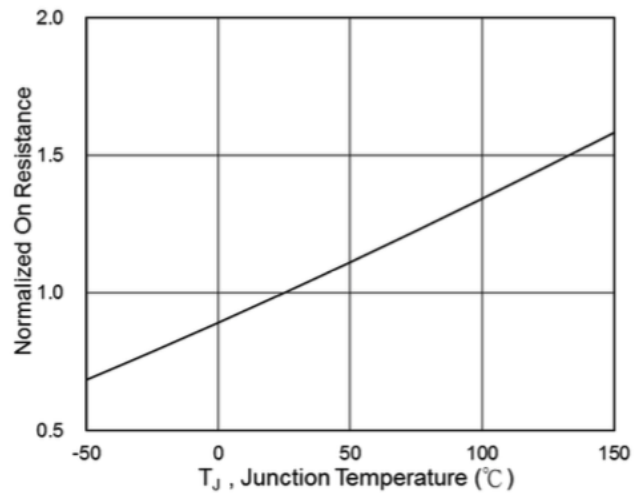


Fig.6 Normalized $R_{DS(on)}$ vs. T_J

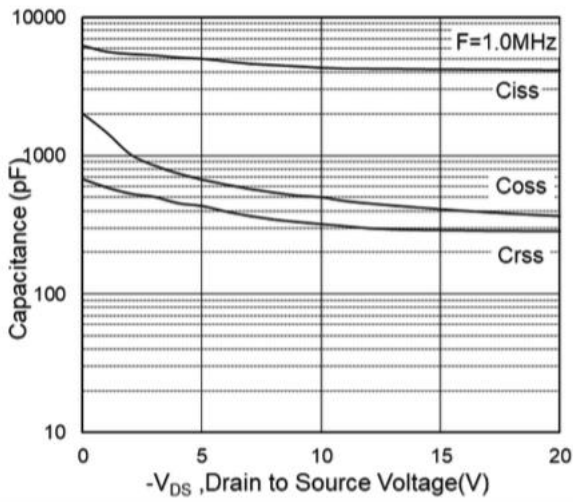


Fig.7 Capacitance

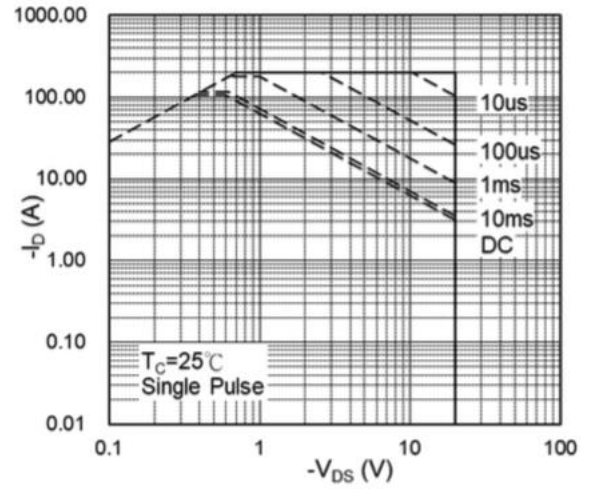


Fig.8 Safe Operating Area

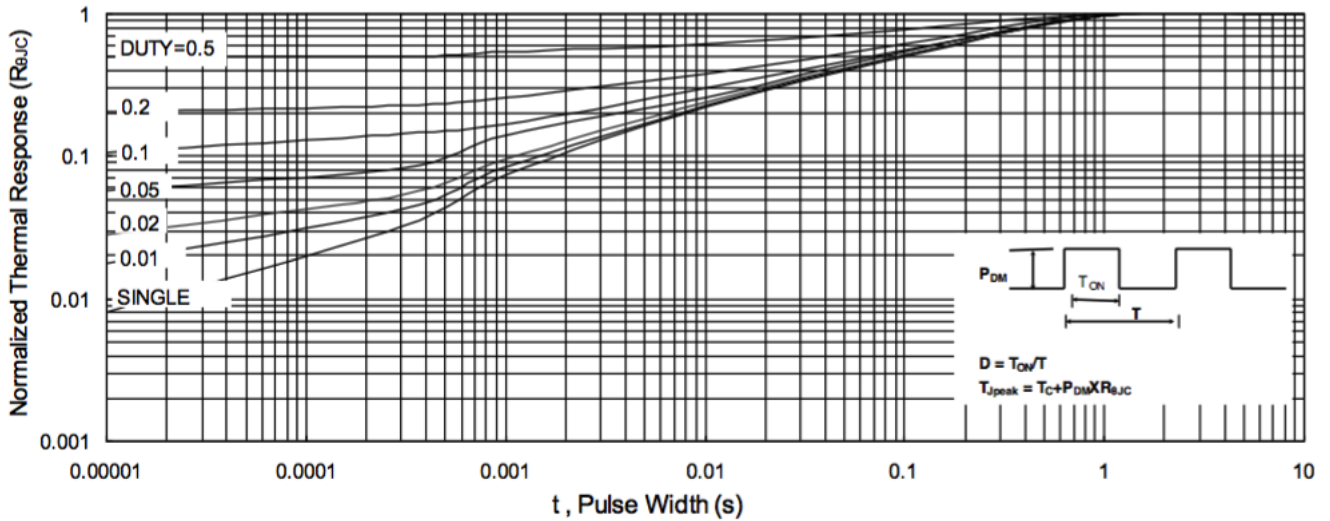


Fig.9 Normalized Maximum Transient Thermal Impedance

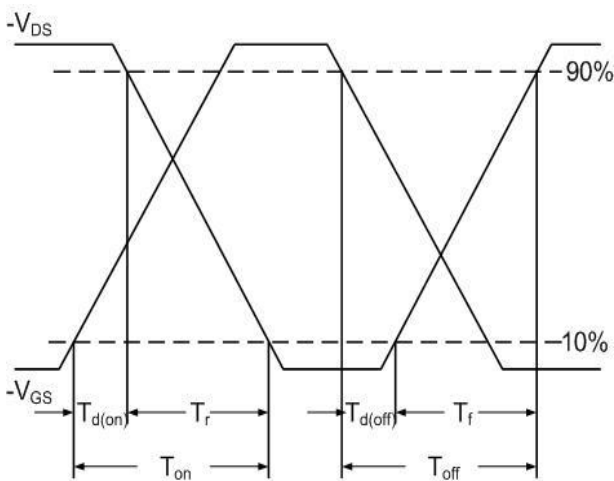


Fig.10 Switching Time Waveform

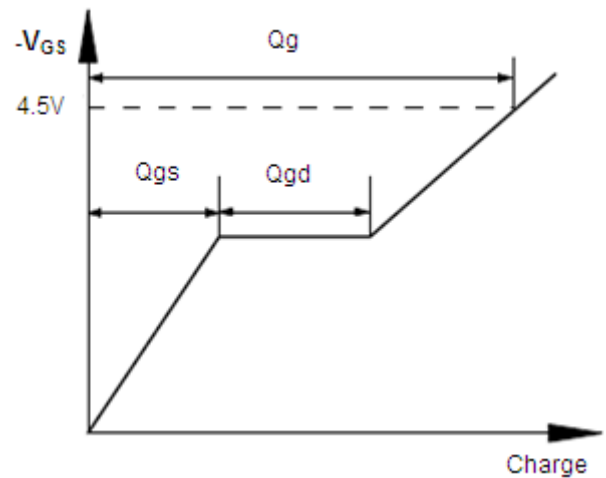
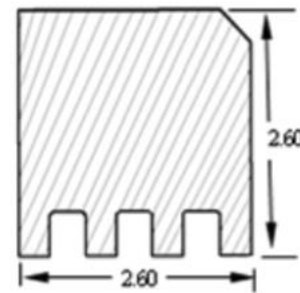
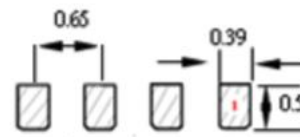
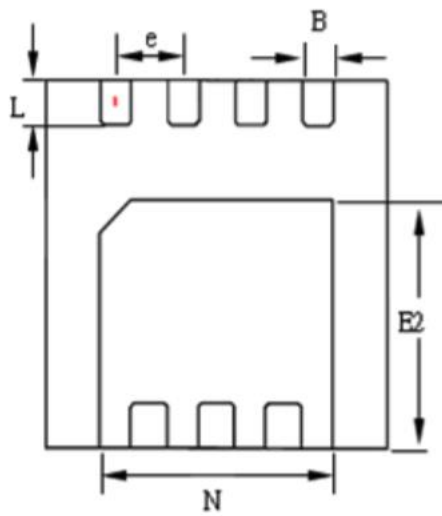
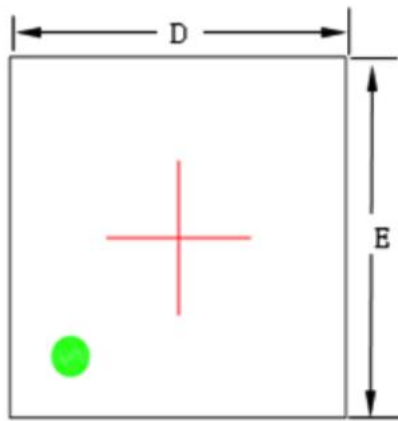


Fig.11 Gate Charge Waveform



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	--