

N-Ch 250V Fast Switching MOSFETs Product Summary

V_{DS}	250	V
$R_{DS(ON),max}$	44	m Ω
I_D	55	A

General Description

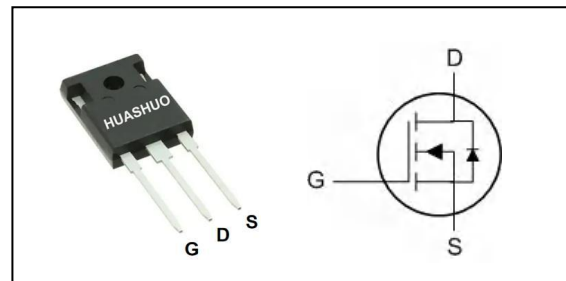
The HSX044N25 is the highest performance trench N-ch MOSFETs with extreme high cell density, which provide excellent $R_{DS(on)}$ and gate charge for most of the synchronous buck converter applications.

The HSX044N25 meet the RoHS and Green Product requirement, 100% EAS guaranteed with full function reliability approved.

Features

- Super Low Gate Charge
- Green Device Available
- Excellent $C_{dv/dt}$ effect decline
- Advanced high cell density Trench Technology

TO-247 Pin Configuration



Absolute Maximum Ratings

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	250	V
V_{GS}	Gate-Source Voltage	± 20	V
$I_D@T_C=25^\circ\text{C}$	Continuous Drain Current, $V_{GS} @ 10V^1$	55	A
$I_D@T_C=100^\circ\text{C}$	Continuous Drain Current, $V_{GS} @ 10V^1$	35	A
I_{DM}	Pulsed Drain Current ²	195	A
EAS	Single Pulse Avalanche Energy ³	165	mJ
$P_D@T_C=25^\circ\text{C}$	Total Power Dissipation ³	350	W
T_{STG}	Storage Temperature Range	-55 to 175	$^\circ\text{C}$
T_J	Operating Junction Temperature Range	-55 to 175	$^\circ\text{C}$

Thermal Data

Symbol	Parameter	Typ.	Max.	Unit
$R_{\theta JA}$	Thermal Resistance Junction-ambient ¹	---	45	$^\circ\text{C/W}$
$R_{\theta JC}$	Thermal Resistance Junction-Case ¹	---	0.4	$^\circ\text{C/W}$

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	250	---	---	V
R _{DS(ON)}	Static Drain-Source On-Resistance ²	V _{GS} =10V, I _D =5A	---	34	44	mΩ
V _{GS(th)}	Gate Threshold Voltage	V _{GS} =V _{DS} , I _D =250uA	3	4.1	5	V
I _{DSS}	Drain-Source Leakage Current	V _{DS} =150V, V _{GS} =0V, T _J =25°C	---	---	1	uA
		V _{DS} =150V, V _{GS} =0V, T _J =125°C	---	---	100	
I _{GSS}	Gate-Source Leakage Current	V _{GS} =±20V, V _{DS} =0V	---	---	±100	nA
g _{fs}	Forward Transconductance	V _{DS} =10V, I _D =20A	---	75	---	S
R _g	Gate Resistance	V _{DS} =0V, V _{GS} =0V, f=1MHz	---	1.5	---	Ω
Q _g	Total Gate Charge (10V)	V _{DS} =50V, V _{GS} =10V, I _D =40A	---	155	---	nC
Q _{gs}	Gate-Source Charge		---	23	---	
Q _{gd}	Gate-Drain Charge		---	45	---	
T _{d(on)}	Turn-On Delay Time	V _{DD} =50V, V _{GS} =10V, R _G =3.3Ω I _D =40A	---	33	---	ns
T _r	Rise Time		---	8.2	---	
T _{d(off)}	Turn-Off Delay Time		---	65	---	
T _f	Fall Time		---	6	---	
C _{iss}	Input Capacitance	V _{DS} =50V, V _{GS} =0V, f=1MHz	---	8547	---	pF
C _{oss}	Output Capacitance		---	429	---	
C _{rss}	Reverse Transfer Capacitance		---	85	---	

Diode Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
I _S	Continuous Source Current ^{1,5}	V _G =V _D =0V, Force Current	---	---	55	A
V _{SD}	Diode Forward Voltage ²	V _{GS} =0V, I _S =20A, T _J =25°C	---	---	1.2	V
t _{rr}	Reverse Recovery Time	I _F =40A, dI/dt=100A/μs, T _J =25°C	---	157	---	nS
Q _{rr}	Reverse Recovery Charge		---	1073	---	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 ≤ 300us, duty cycle ≤ 2%
- 3.The EAS data shows Max. rating. The test condition is V_{DD}=40V, V_{GS}=10V, L=0.5mH, R_g=25Ω
- 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

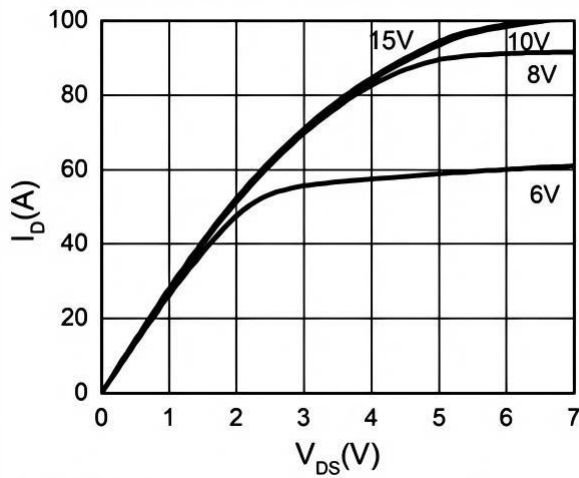


Fig.1 Typical Output Characteristics

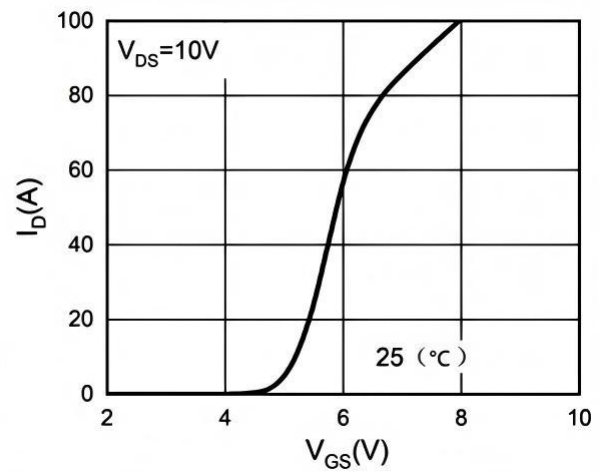


Fig.2 Transfer Characteristics

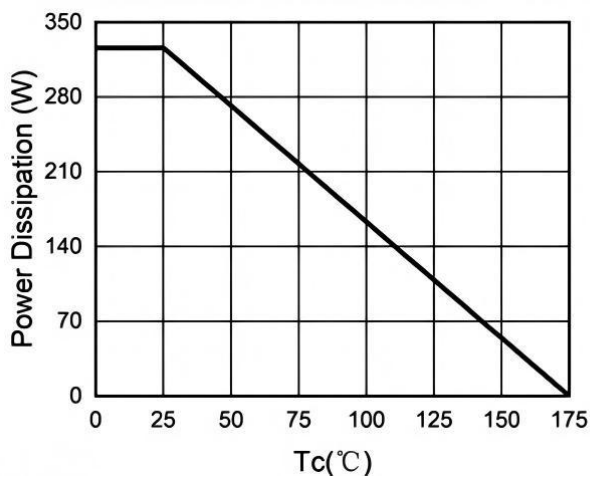


Fig.3 Power Dissipation

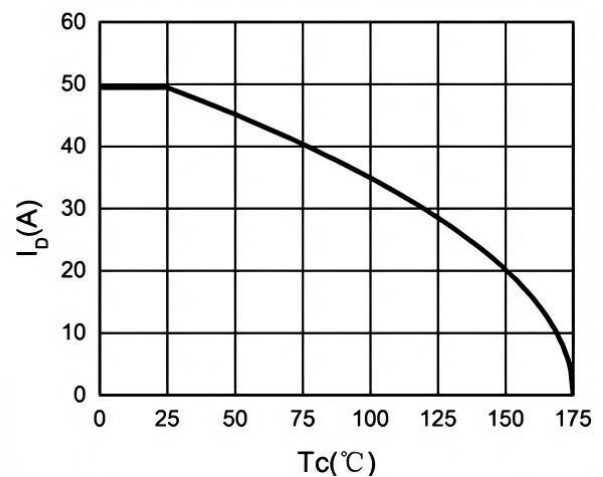


Fig.4 Drain Current

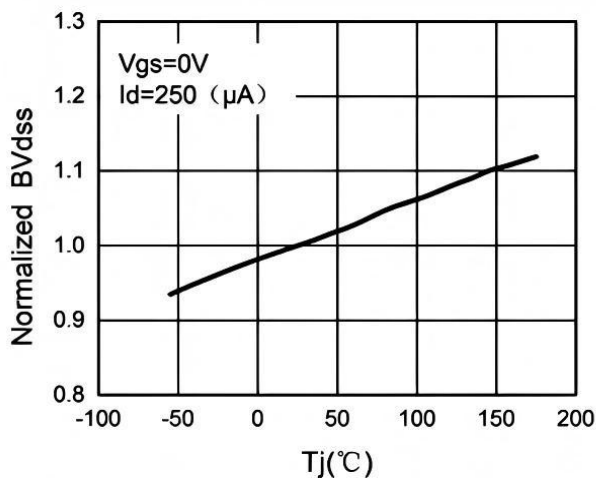


Fig.5 BV_{DS} vs Junction Temperature

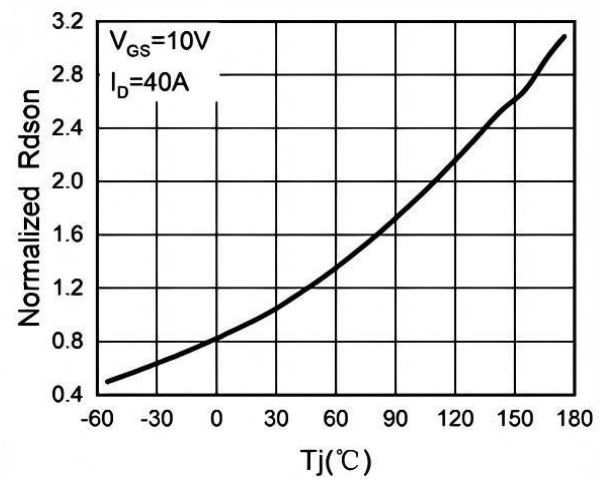


Fig.6 R_{DS(ON)} vs Junction Temperature



N-Ch 250V Fast Switching MOSFETs

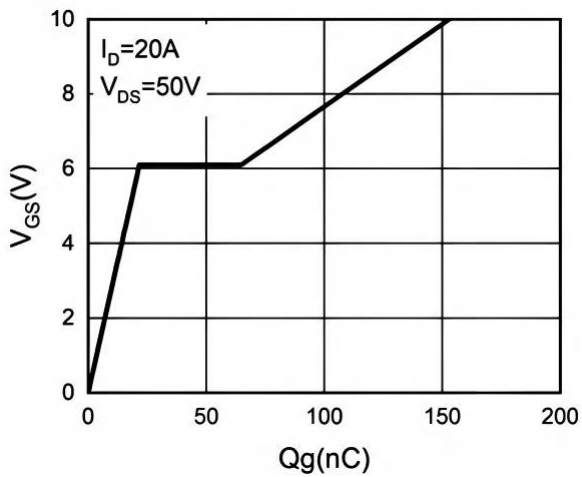


Fig.7 Gate Charge Waveforms

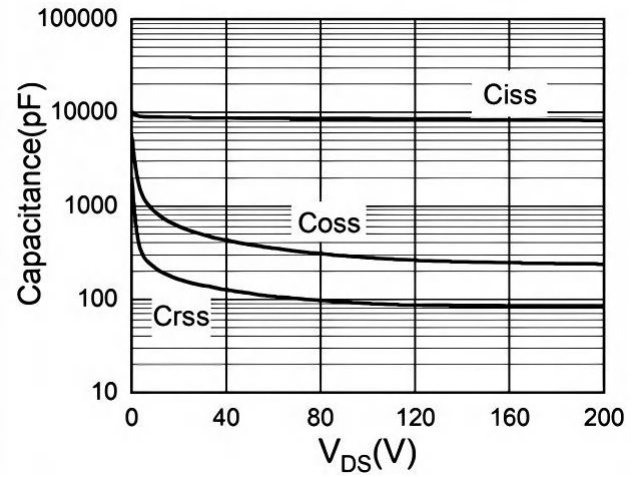


Fig.8 Capacitance

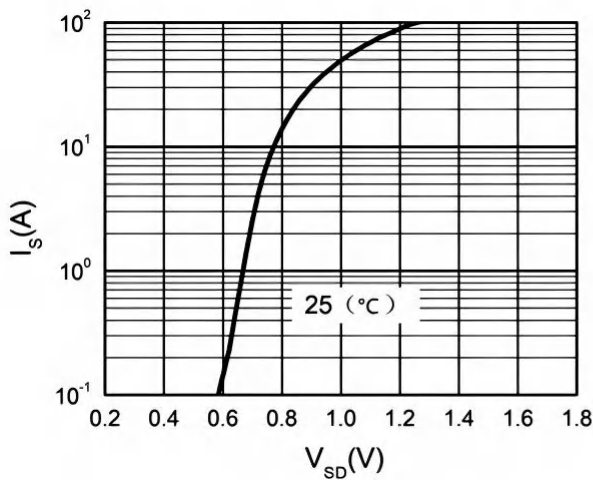


Fig.9 Body Diode Characteristics

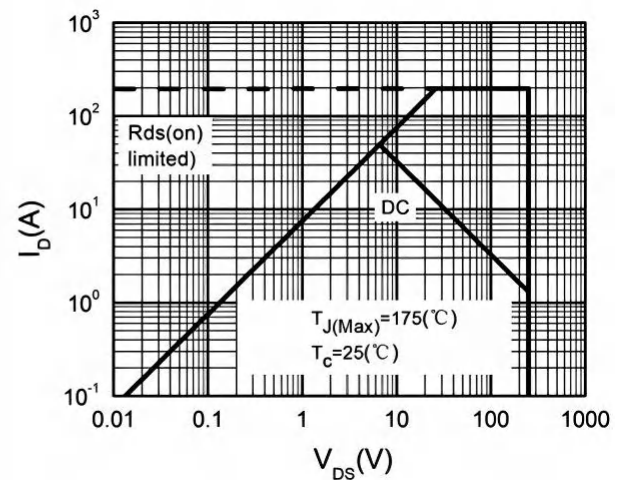


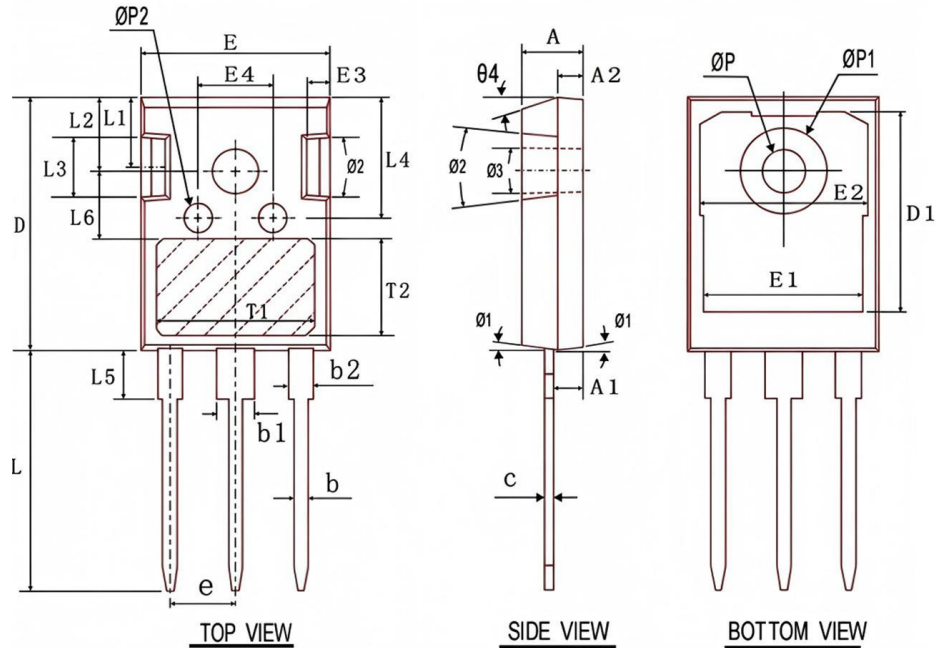
Fig.10 Maximum Safe Operating Area



Ordering Information

Part Number	Package code	Packaging
HSX044N25	TO-247	/Box

TO-247 Package Outline



COMMON DIMENSIONS OF MEASURE=MM			
SYMBOL	MIN	NOM	MAX
A	4.8	5	5.2
A 1	2.2	2.4	2.6
A 2	1.85	2	2.15
b	1.1	1.2	1.3
b 1	2.8	3	3.2
b 2	1.8	2	2.2
C	0.52	0.62	0.72
D	20.35	20.65	20.95
D 1	16.35	16.55	16.75
E	15.5	15.8	16.1
E 1	13.1	13.3	13.5
E2	13.8	14	14.2
E3	1.45	1.6	1.75
E4	6	6.2	6.4
L	19.8	20	20.2
L 1	5.88	5.98	6.08
L2	5.88	5.98	6.08
L3	4.9	5	5.1
L4	9.7	9.8	9.9
L5	4.1	4.3	4.5
Ø1	4 °	7 °	10 °
Ø2	11 °	14 °	17 °
Ø3	1 °	--	2 °
Ø4	10 °	15 °	20 °
ØP	3.35	3.6	3.85
ØP1	--	--	7.3
ØP2	2.25	2.5	2.75
e	5.44BSC		
T 1	12.80REF		
T2	7.80REF		
L6	5.50REF		



HSX044N25 Marking:

