HGS20N025A 25V N-Channel MOSFET

Description

HGS **N-channel Enhancement Mode Power MOSFET**

Features

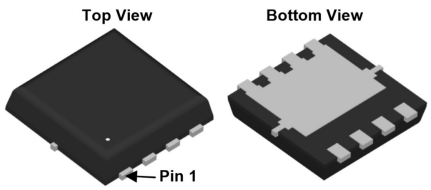
- 25V,20A
  $R_{DS(ON)}$<18mΩ @ V_{GS} =10V
  $R_{DS(ON)}$<30mΩ @ V_{GS} =4.5V
- Advanced Trench Technology
- Provide Excellent $R_{DS(ON)}$ and Low Gate Charge
- Lead free product is acquired

Application

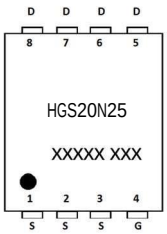
- Load Switch
- PWM Application
- Power management

RoHS COMPLIANT

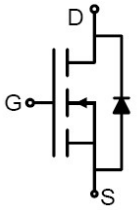
100% UIS TESTED!
100% ΔVds TESTED!



PDFN3.3X3.3-8L



Marking and pin Assignment



Schematic Diagram

Package Marking and Ordering Information

Device Marking	Device	OUTLINE	Device Package	Reel Size	Reel (PCS)	Per Carton (PCS)
HGS20N025A	HGS20N025A	TAPING	PDFN3.3X3.3-8L	13inch	5000	50000

Absolute Maximum Ratings (T_C=25℃ unless otherwise specified)

Symbol	Parameter		Max.	Units
V_{DSS}	Drain-Source Voltage		25	V
V_{GSS}	Gate-Source Voltage		±20	V
I_D	Continuous Drain Current	T_C = 25℃	20	A
		T_C = 100℃	16	A
I_{DM}	Pulsed Drain Current note1		80	A
E_{AS}	Single Pulsed Avalanche Energy note2		28	mJ
P_D	Power Dissipation	T_C = 25℃	10	W
$R_{\theta JC}$	Thermal Resistance, Junction to Case		25	℃/W
T_J, T_{STG}	Operating and Storage Temperature Range		-55 to +150	℃

Electrical Characteristics (T_J=25℃ unless otherwise specified)

Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Units
Off Characteristic						
$V_{(BR)DSS}$	Drain-Source Breakdown Voltage	V_{GS}=0V,I_D=250μA	25	-	-	V
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS} =25V, V_{GS} = 0V,	-	-	1.0	μA
I_{GSS}	Gate to Body Leakage Current	V_{DS} =0V,V_{GS} = ±20V	-	-	±100	nA
On Characteristics						
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS}= V_{GS}, I_D=250μA	1.2	1.5	2.5	V
$R_{DS(on)}$	Static Drain-Source on-Resistance note3	V_{GS} =10V, I_D =10A	-	13.5	18	mΩ
		V_{GS} =4.5V, I_D =7A	-	21	30	
Dynamic Characteristics						
C_{iss}	Input Capacitance	V_{DS} =15V, V_{GS} =0V, f = 1.0MHz	-	613	-	pF
C_{oss}	Output Capacitance		-	96	-	pF
C_{rss}	Reverse Transfer Capacitance		-	72	-	pF
Q_g	Total Gate Charge	V_{DS} =15V, I_D =10A, V_{GS} =4.5V	-	11	-	nC
Q_{gs}	Gate-Source Charge		-	3.8	-	nC
Q_{gd}	Gate-Drain(“Miller”) Charge		-	9	-	nC
Switching Characteristics						
$t_{d(on)}$	Turn-on Delay Time	V_{DS}=15V, I_D=10A, R_{GEN}=5Ω, V_{GS} =10V	-	4	-	ns
t_r	Turn-on Rise Time		-	12	-	ns
$t_{d(off)}$	Turn-off Delay Time		-	23	-	ns
t_f	Turn-off Fall Time		-	7.3	-	ns
Drain-Source Diode Characteristics and Maximum Ratings						
I_S	Maximum Continuous Drain to Source Diode Forward Current		-	-	17	A
I_{SM}	Maximum Pulsed Drain to Source Diode Forward Current		-	-	68	A
V_{SD}	Drain to Source Diode Forward Voltage	V_{GS} = 0V, I_S=20A	-	-	1	V
trr	Body Diode Reverse Recovery Time	I_F=20A,dI/dt=100A/μs	-	16	-	ns
Qrr	Body Diode Reverse Recovery Charge		-	3.7	-	nC

Notes:1. Repetitive Rating: Pulse Width Limited by Maximum Junction Temperature

2. EAS condition: T_J=25℃, V_G=10V, R_G=25Ω，L=0.1mH，I_{AS}=9A

3. Pulse Test: Pulse Width≤300μs, Duty Cycle≤0.5%

Figure1: Output Characteristics

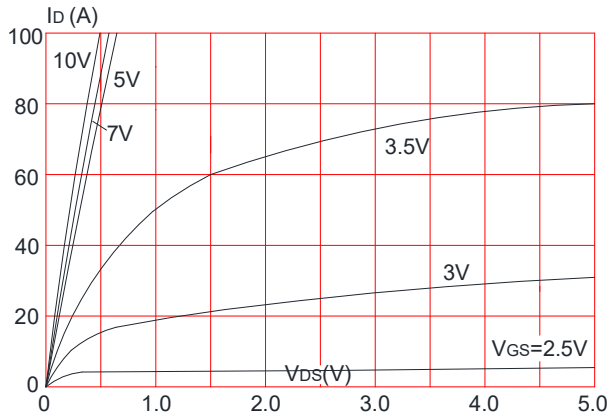


Figure 2: Typical Transfer Characteristics

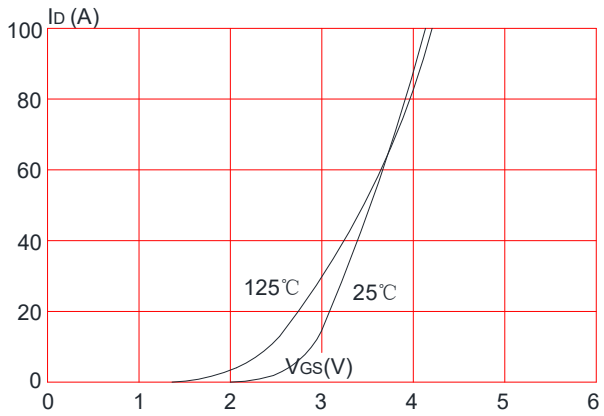


Figure 3: On-resistance vs. Drain Current

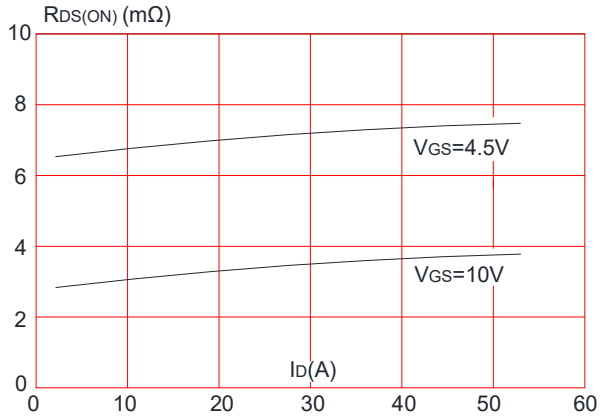


Figure 4: Body Diode Characteristics

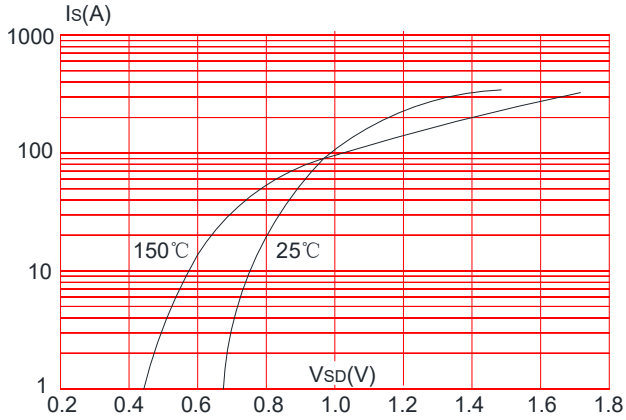


Figure 5: Gate Charge Characteristics

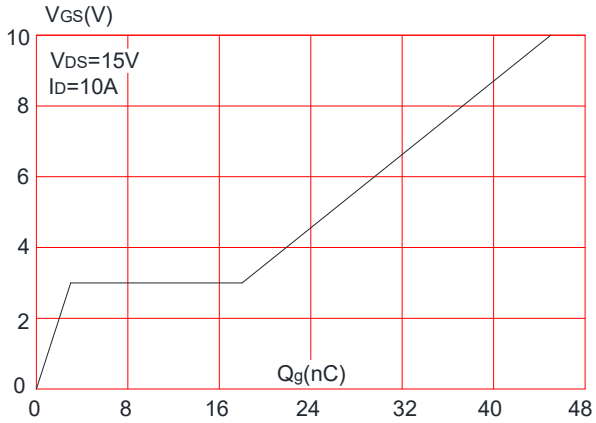


Figure 6: Capacitance Characteristics

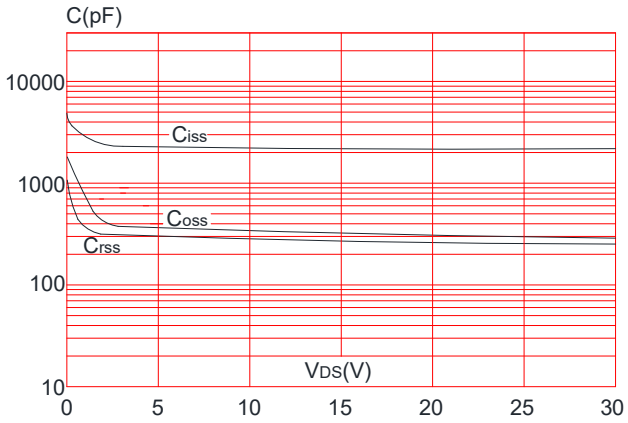


Figure 7: Normalized Breakdown Voltage vs. Junction Temperature

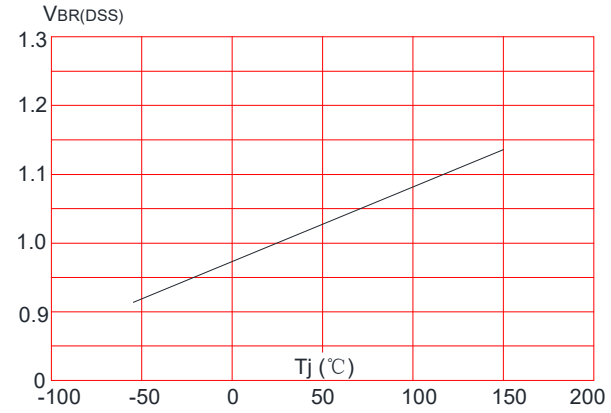


Figure 8: Normalized on Resistance vs. Junction Temperature

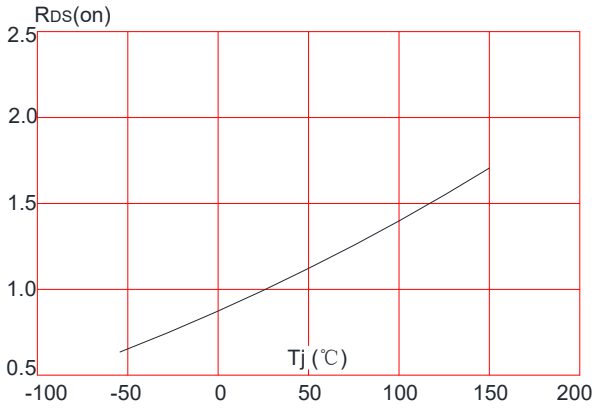


Figure 9: Maximum Safe Operating Area

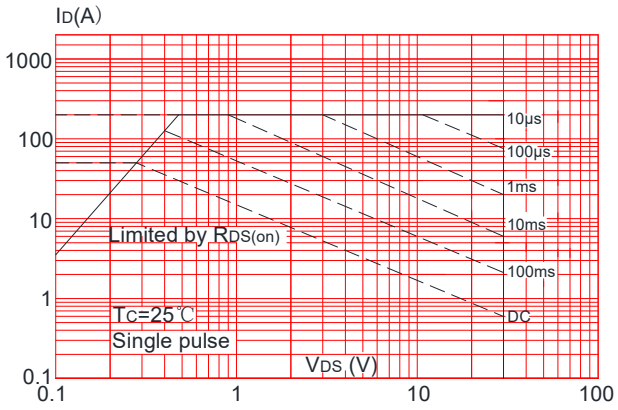


Figure 10: Maximum Continuous Drain Current vs. Case Temperature

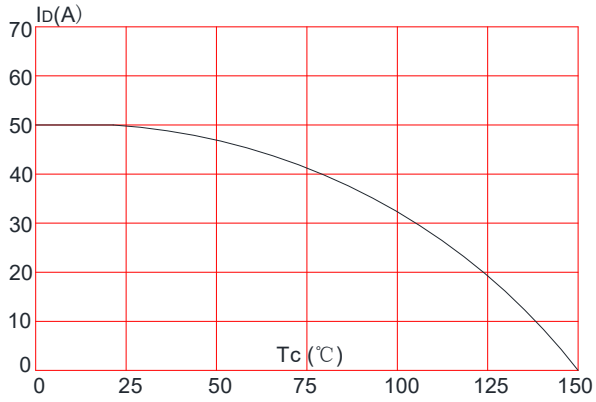
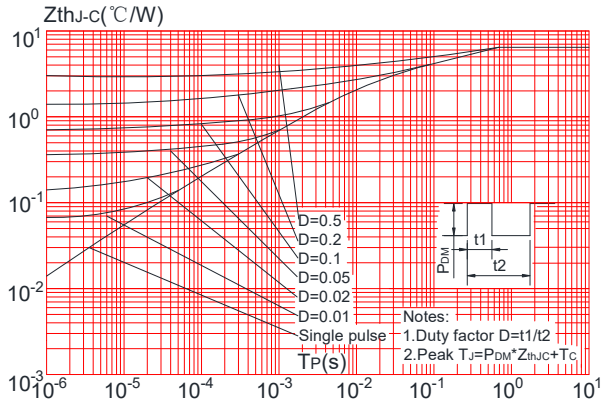


Figure.11: Maximum Effective Transient Thermal Impedance, Junction-to-Case (PDFN3.3*3.3-8L)



Test Circuit

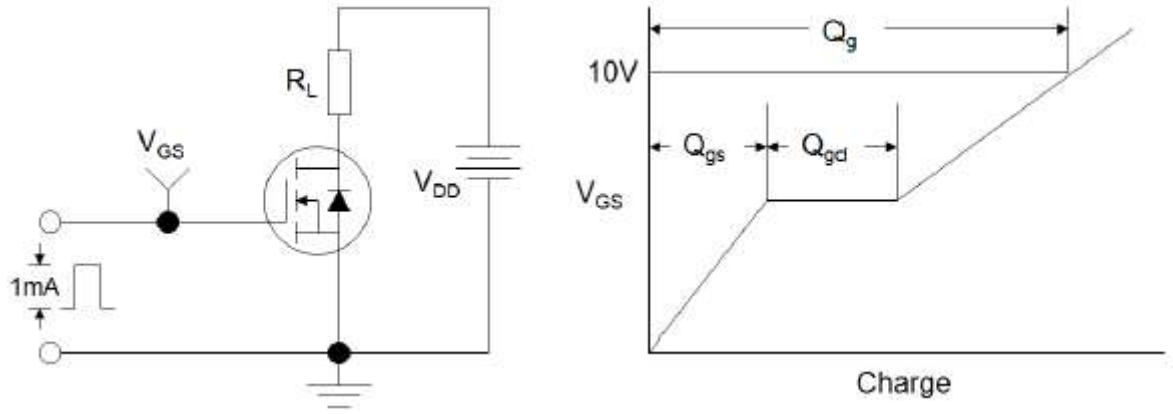


Figure1:Gate Charge Test Circuit & Waveform

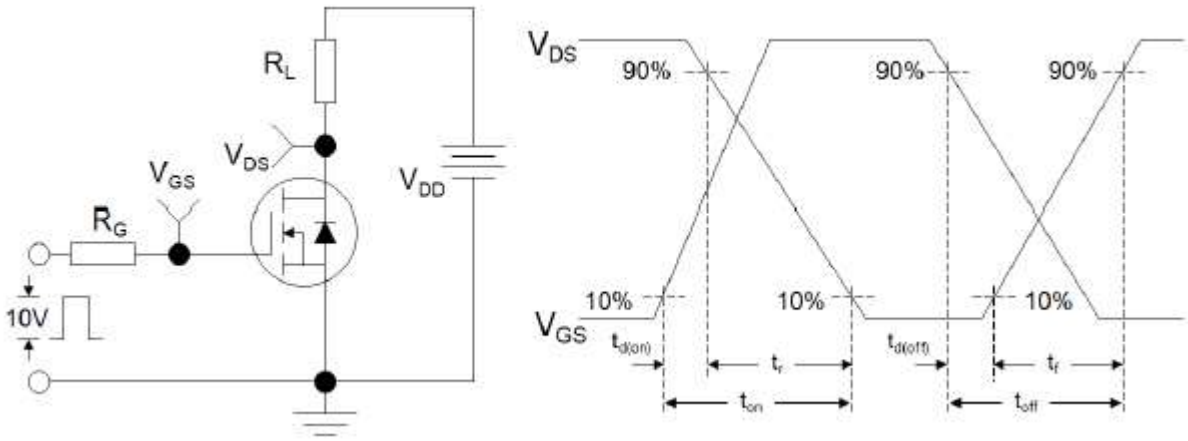


Figure 2: Resistive Switching Test Circuit & Waveforms

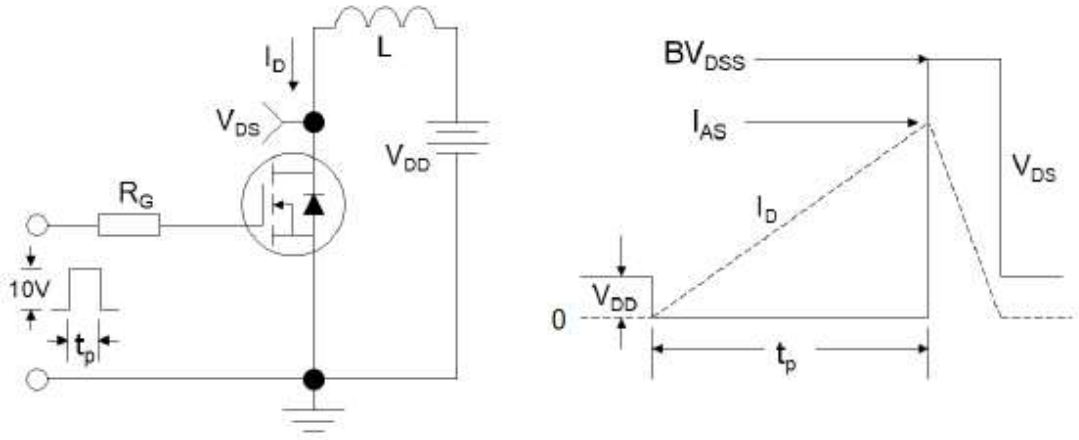
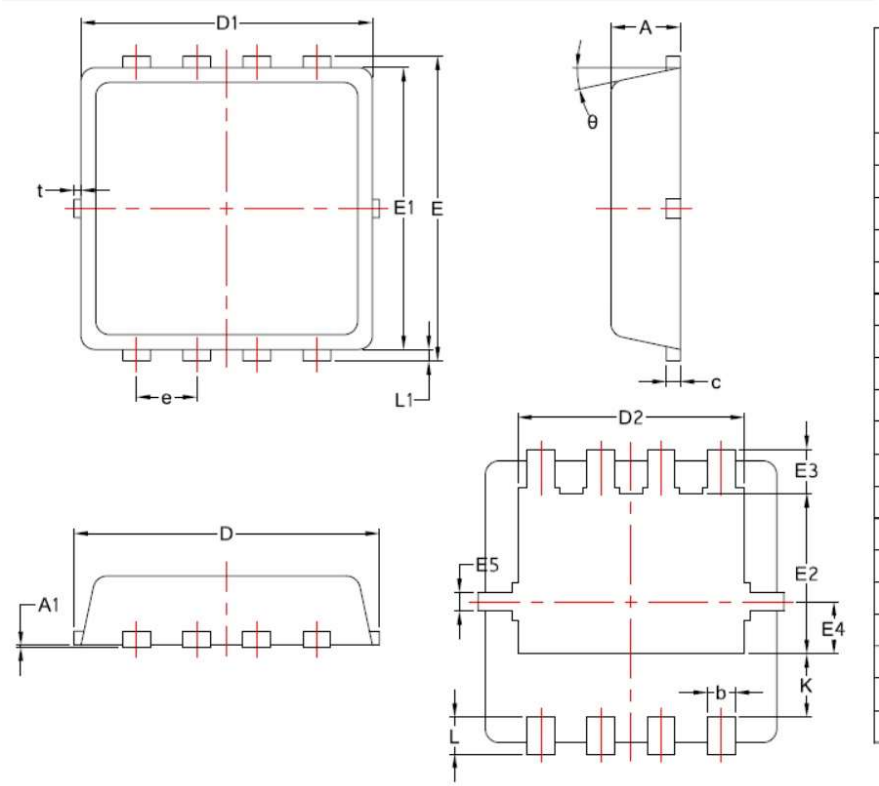


Figure 3:Unclamped Inductive Switching Test Circuit & Waveforms

Package Mechanical Data- PDFN3.3X3.3-8L



SYMBOL	COMMON MM		
	MIN	NOM	MAX
A	0.70	0.75	0.85
A1	/	/	0.05
b	0.20	0.30	0.40
c	0.10	0.152	0.25
D	3.15	3.30	3.45
D1	3.00	3.15	3.25
D2	2.29	2.45	2.65
E	3.15	3.30	3.45
E1	2.90	3.05	3.20
E2	1.54	1.74	1.94
E3	0.28	0.48	0.65
E4	0.37	0.57	0.77
E5	0.10	0.20	0.30
e	0.60	0.65	0.70
K	0.59	0.69	0.89
L	0.30	0.40	0.50
L1	0.06	0.125	0.20
t	0	0.075	0.13
θ	10°	12°	14°