

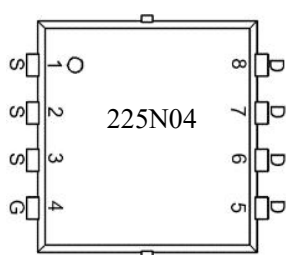
**Features**

- Split Gate Trench MOSFET technology
- Ultra-low on-resistance and gate-charge
- Excellent package for heat dissipation
- High density cell design for low $R_{DS(ON)}$

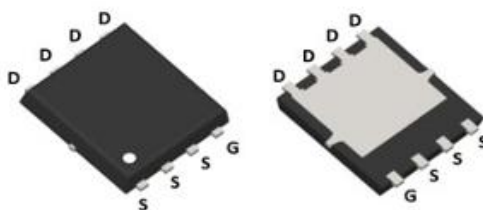
 B_{vds} **40V** **R_{dson}** **1m Ω** **I_D** **225A****Application**

- DC-DC Converters
- Motor controllers
- Synchronous-rectification applications
- Battery-driven electronic products

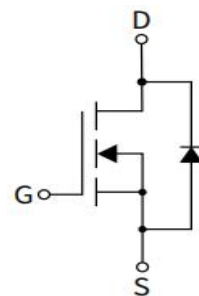
RoHS

Package

Marking and pin assignment



PDFN5x6-8L top view



Schematic diagram

Package Marking and Ordering Information

Device Marking	Device	Device Package	Quantity
225N04	S225N04F	PDFN5x6-8L	5000

Absolute Maximum Ratings ($T_C=25^{\circ}\text{C}$ unless otherwise specified)

Parameter		Symbol	Limit	Unit
Drain-Source Voltage		V_{DS}	40	V
Gate-Source Voltage		V_{GS}	± 20	V
Drain Current continuous ¹	$T_C = 25^{\circ}\text{C}$	I_D	225	A
	$T_C = 100^{\circ}\text{C}$	I_D	138	A
Pulsed Drain Current ⁴		I_{DM}	345	A
Single Pulsed Avalanche Energy ⁵		E_{AS}	69	mJ
Avalanche Current		I_{AS}	-	A
Total Power Dissipation ⁴		P_D	114	W
Junction Temperature Range		T_J	$-50 \sim 150$	$^{\circ}\text{C}$
Storage Temperature Range		T_{STG}	$-50 \sim 150$	$^{\circ}\text{C}$



Thermal Resistance Ratings

Parameter	Symbol	Typ.	Max.	Unit
Thermal Resistance Junction-to-Case	$R_{\theta JC}$	--	1.1	$^{\circ}\text{C}/\text{W}$
Thermal Resistance Junction-to-Ambient ³	$R_{\theta JA}$	--	43.2	$^{\circ}\text{C}/\text{W}$

Ordering Information

Ordering Number	Package	Pin Assignment			Packing
Halogen Free	PDFN5*6-8L	G	D	S	Tape Reel
HLS225N04F		4	5,6,7,8	1,2,3	

Electrical Characteristics ($T_c=25^{\circ}\text{C}$ unless otherwise specified)

Parameter	Symbol	Condition	Min	Typ	Max	Unit
Drain-Source Breakdown Voltage	BV_{DSS}	$V_{GS}=0V, I_D=250\mu A$	40	-	-	V
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS}=40V, V_{GS}=0V$	-	-	1	μA
Gate to Body Leakage Current	I_{GSS}	$V_{DS}=0V, V_{GS}=\pm 20V$	-	-	± 100	nA
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=250\mu A$	1.4	-	2.4	V
Static Drain-Source on-Resistance	$R_{DS(on)}$	$V_{GS}=10V, I_D=20A$	-	1	1.4	m Ω
Gate Resistance	R_g	$f=1\text{MHz}$	-	1.5	-	Ω
Input Capacitance	C_{iss}	$V_{DS}=20V, V_{GS}=0V,$ $f=150\text{KHz}$	-	6461	-	pF
Output Capacitance	C_{oss}		-	3257	-	
Reverse Transfer Capacitance	C_{rss}		-	196	-	
Total Gate Charge	Q_g	$V_{DD}=20V, I_D=20A,$ $V_{GS}=4.5V$	-	55	-	nC
Gate-Source Charge	Q_{gs}		-	15	-	
Gate-Drain Charge	Q_{gd}		-	19	-	
Turn-on Delay Time	$t_{d(on)}$	$V_{DD}=20V, I_D=20A,$ $R_G=3\Omega, V_{GS}=4.5V$	-	24	-	nS
Turn-on Rise Time	t_r		-	84	-	
Turn-Off Delay Time	$t_{d(off)}$		-	62	-	
Turn-Off Fall Time	t_f		-	20	-	
Drain-Source Diode Forward Voltage	V_{SD}	$I_S=50A, V_{GS}=0V$	-	-	1.2	V
Body Diode Reverse Recovery Time	t_{rr}	$I_S=20A, di/dt=100A/\mu s, V_{GS}=0V$	-	171	-	nS
Body Diode Reverse Recovery Charge	Q_{rr}		-	381	-	nC

Notes:

1. Rated according to $R_{\theta JC}$
2. Rated according to $R_{\theta JA}$
3. Surface mounted on 1 inch² FR4 board, 2 oz Cu
4. Limited by maximum T_J
5. Starting $T_J=25^{\circ}\text{C}$, $V_{DD}=30V$, $V_{GS}=10V$, $L=0.5\text{mH}$
6. Pulse width limited by maximum T_J



Typical Performance Characteristics

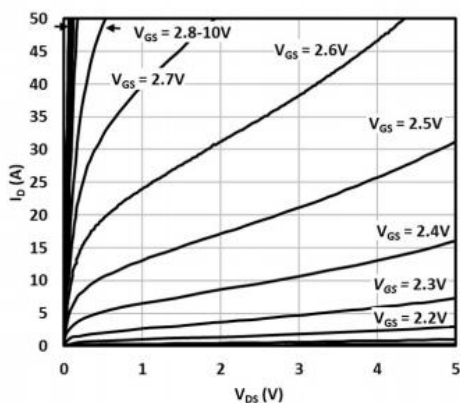


Fig. 1 Output characteristics

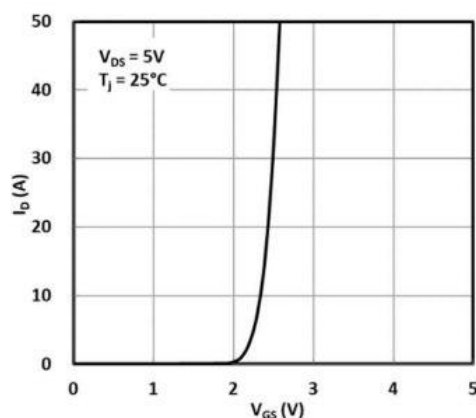


Fig. 2 Transfer characteristics

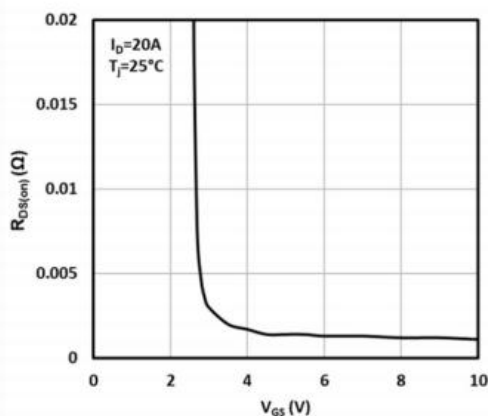


Fig.3 On-resistance vs. gate voltage

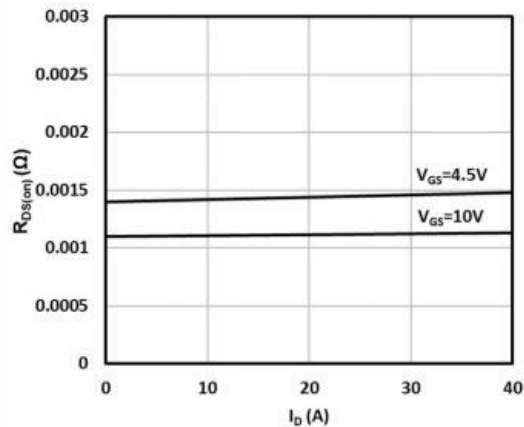


Fig.4 On-resistance vs. drain current

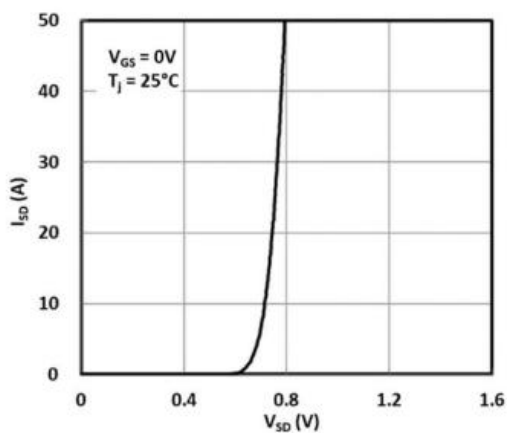


Fig.5 Source-to-drain diode forward characteristics

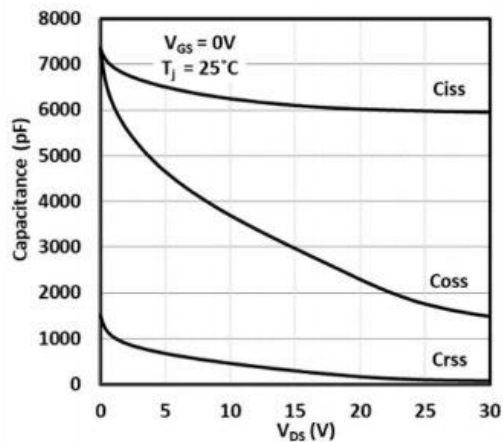


Fig.6 Capacitance vs. drain-to-source voltage

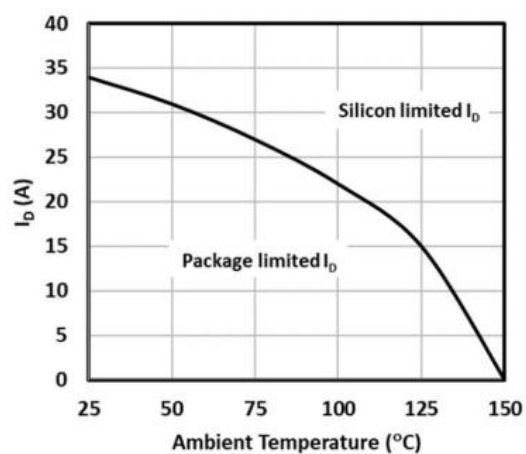
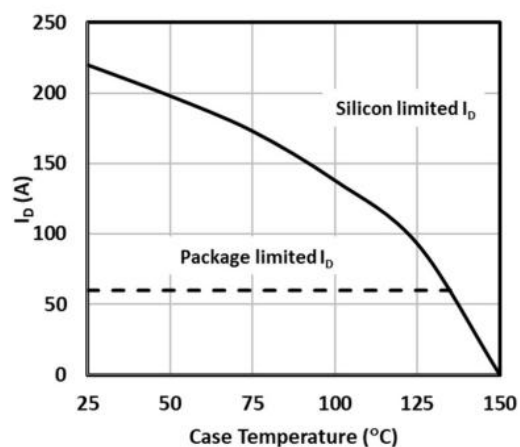
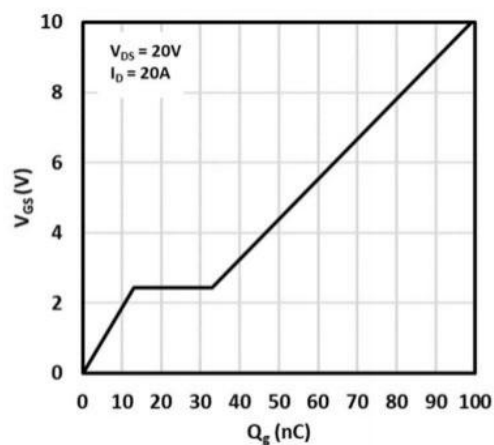
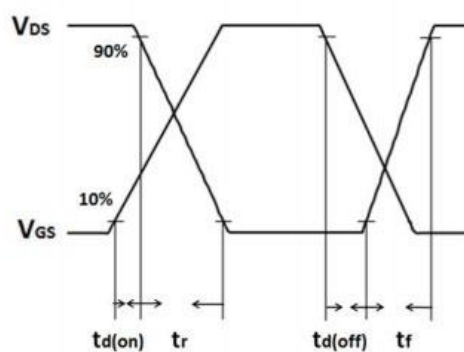
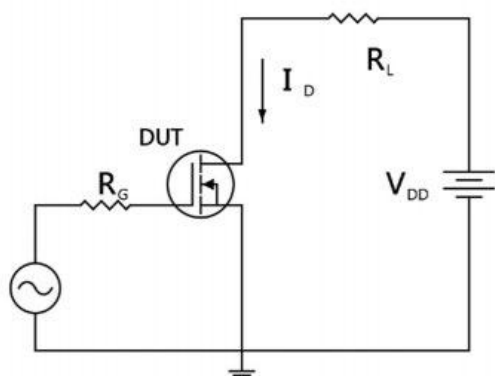
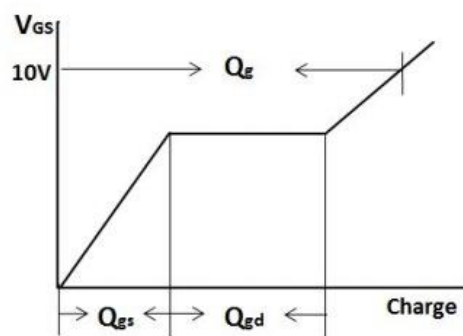
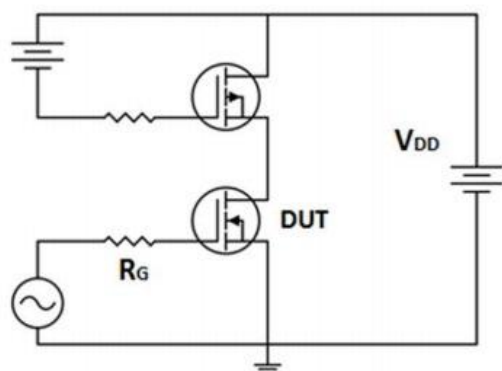


Fig. 9 Maximum drain current vs. ambient temperature

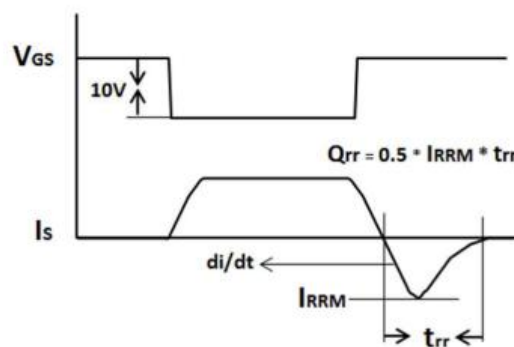
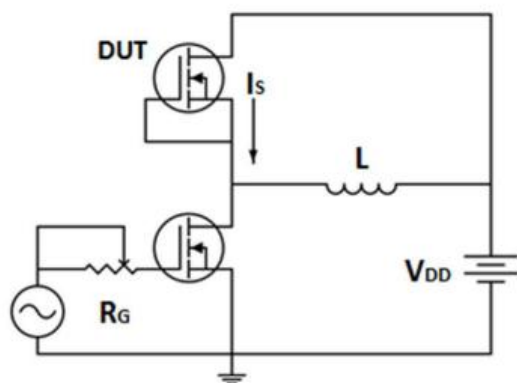
Test circuits and waveforms



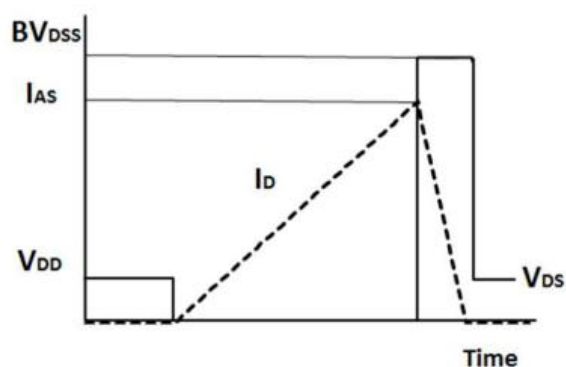
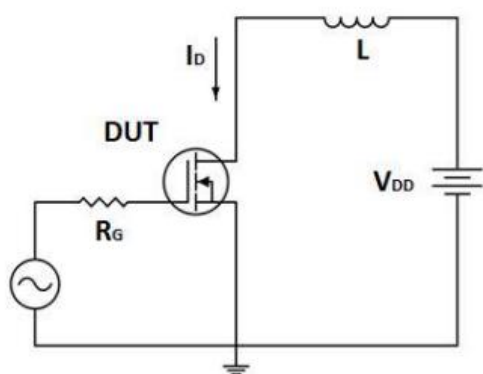
Resistive switching time test circuit & waveforms



Gate charge test circuit & waveform



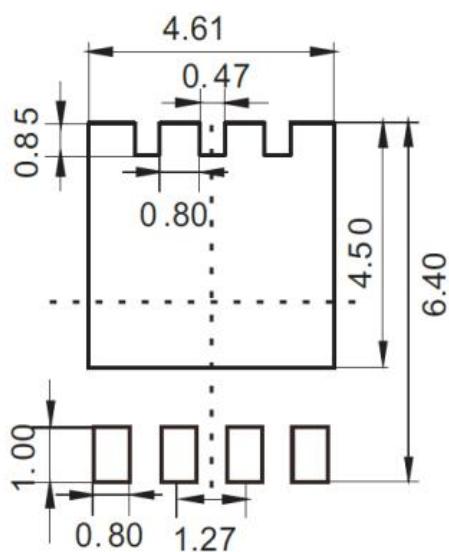
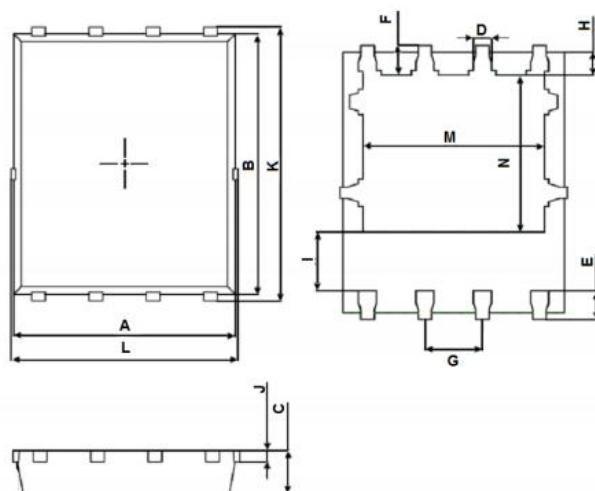
Peak diode recovery dv/dt test circuit & waveforms



Unclamped inductive switching test circuit & waveforms



Package Mechanical Data PDFN5x6-8L



PDFN5×6-8L		
Dimension	Min.	Max.
A	4.824	4.976
B	5.674	5.826
C	0.900	1.000
D	0.350	0.450
E	0.559	0.711
F	0.574	0.726
G	1.250	1.290
H	0.424	0.576
I	1.190	1.390
J	0.154	0.354
K	5.974	6.126
L	4.944	5.096
M	3.910	4.110
N	3.375	3.575



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