

# 1000V,8A N-ch Planar MOSFET

# **General Features**

The **FNKP08N100A** provide excellent  $R_{DS(ON)}$ , low gate charge and operation with low gate voltages. This device is suitable for use as a load switch or in PWM applications.



# **Product summary**

- $R_{DS(ON)} \le 1.9 \ \Omega @ V_{GS}=10V, I_D=4.0A$
- · Fast Switching Capability
- Avalanche Energy Specified



ABSOLUTE MAXIMUM RATINGS	$(T_C = 25^{\circ}C, \text{ unless otherwise specified})$

PARAMETER		SYMBOL	RATINGS	UNIT
Drain-Source Voltage		V <sub>DSS</sub>	1000	V
Gate-Source Voltage		V <sub>GSS</sub>	±30	V
Drain Current	Continuous	Ι <sub>D</sub>	8	А
	Pulsed (Note 2)	I <sub>DM</sub>	32	А
Avalanche Energy Single Pulsed (Note 3)		E <sub>AS</sub>	252	mJ
Peak Diode Recovery dv/dt (Note 4)		dv/dt	2.7	V/ns
Power Dissipation		PD	150	W
Junction Temperature		TJ	+150	°C
Storage Temperature		T <sub>STG</sub>	-55 ~ +150	°C

Notes: 1. Absolute maximum ratings are those values beyond which the device could be permanently damaged. Absolute maximum ratings are stress ratings only and functional device operation is not implied.

- 2. Repetitive Rating : Pulse width limited by maximum junction temperature.
- 3. L=30mH, I<sub>AS</sub>=4.1A, V<sub>DD</sub>=50V, R<sub>G</sub>=25  $\Omega$ , Starting T<sub>J</sub> = 25°C
- 4. I<sub>SD</sub> $\leq$  8.0A, di/dt $\leq$ 200A/µs, V<sub>DD</sub>  $\leq$  BV<sub>DSS</sub>, Starting T<sub>J</sub> = 25°C



#### ELECTRICAL CHARACTERISTICS (T<sub>J</sub> =25°C, unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
OFF CHARACTERISTICS						
Drain-Source Breakdown Voltage	BV <sub>DSS</sub>	V <sub>GS</sub> =0V, I <sub>D</sub> =250µA				V
Drain-Source Leakage Current	I <sub>DSS</sub>	V <sub>DS</sub> =1000V, V <sub>GS</sub> =0V			10	μA
Gate-Source Leakage Current	I <sub>GSS</sub>	$V_{GS}=\pm 30V, V_{DS}=0V$			±100	nA
ON CHARACTERISTICS						
Gate Threshold Voltage	V <sub>GS(TH)</sub>	V <sub>DS</sub> =V <sub>GS</sub> , I <sub>D</sub> =250µA	3.0		5.0	V
Static Drain-Source On-State Resistance	R <sub>DS(ON)</sub>	V <sub>GS</sub> =10V, I <sub>D</sub> =4.0A			1.9	Ω
DYNAMIC CHARACTERISTICS						
Input Capacitance	C <sub>ISS</sub>			1500		pF
Output Capacitance	C <sub>OSS</sub>	V <sub>GS</sub> =0V, V <sub>DS</sub> =25V, f=1MHz		130		pF
Reverse Transfer Capacitance				3		pF
SWITCHING CHARACTERISTICS			-	-		-
Total Gate Charge	$Q_{G}$			34		nC
Gate-Source Charge	Q <sub>GS</sub>	$V_{DS} = 1000$ , $V_{GS} = 100$ , $I_D = 6A$		8		nC
Gate-Drain Charge	Q <sub>DD</sub>			4		nC
Turn-On Delay Time	t <sub>D(ON)</sub>			23		ns
Turn-On Rise Time	t <sub>R</sub>	$V_{DD}$ =100V, $V_{GS}$ =10V, $I_{D}$ =8A,		17		ns
Turn-Off Delay Time	t <sub>D(OFF)</sub>	R <sub>G</sub> =25Ω (Note 1, 2)		74		ns
Turn-Off Fall Time	t <sub>F</sub>			36		ns
SOURCE- DRAIN DIODE RATINGS AND C	HARACTER	STICS				
Maximum Continuous Drain-Source Diode	la				Q	۸
Forward Current	15				0	~
Maximum Pulsed Drain-Source Diode	lev				16	Δ
Forward Current	12101				10	~
Drain-Source Diode Forward Voltage	V <sub>SD</sub>	I <sub>S</sub> =8A, V <sub>GS</sub> =0V			1.4	V
Body Diode Reverse Recovery Time	t <sub>rr</sub>	I <sub>S</sub> =8A, V <sub>GS</sub> =0V, dI <sub>F</sub> /dt=100A/µs		600		nS
Body Diode Reverse Recovery Charge	Qrr			7		μC

Notes: 1. Pulse Test: Pulse width  $\leq$  300µs, Duty cycle $\leq$ 2%.

2. Essentially independent of operating temperature.



#### TEST CIRCUITS AND WAVEFORMS



Peak Diode Recovery dv/dt Waveforms



# TEST CIRCUITS AND WAVEFORMS



Switching Test Circuit



Switching Waveforms



Gate Charge Test Circuit



Unclamped Inductive Switching Test Circuit



Gate Charge Waveform



Unclamped Inductive Switching Waveforms



# TYPICAL CHARACTERISTICS





1 1.1

8

10

# **TYPICAL CHARACTERISTICS (Cont.)**



150





### **TYPICAL CHARACTERISTICS (Cont.)**







# **TO-220Package Information**

Symbol	Dimensions In Millimeters		Dimensions In Inches		
	Min.	Max.	Min.	Max.	
А	4.400	4.600	0.173	0.181	
A1	2.250	2.550	0.089	0.100	
b	0.710	0.910 0.028		0.036	
b1	1.170	1.370	0.046	0.054	
с	0.330	0.650	0.013	0.026	
c1	1.200	1.400	0.047	0.055	
D	9.910	10.250	0.390	0.404	
E	8.9500	9.750	0.352	0.384	
E1	12.650	12.950	0.498	0.510	
е	2.540 TYP.		0.100 TYP.		
e1	4.980	5.180	0.196	0.204	
F	2.650	2.950	0.104	0.116	
Н	7.900	8.100	0.311	0.319	
h	0.000	0.300	0.000	0.012	
L	12.900	13.400	0.508	0.528	
L1	2.850	3.250	0.112	0.128	
V	7.500 REF.		0.295 REF.		
Φ	3.400	3.800	0.134	0.150	



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