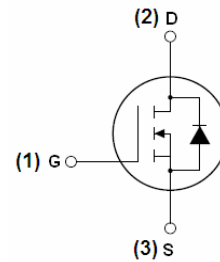


FNK N-Channel Enhancement Mode Power MOSFET

Description

The FNK08NS04E uses advanced trench technology and design to provide excellent $R_{DS(ON)}$ with low gate charge. This device is suitable for use in PWM, load switching and general purpose applications.



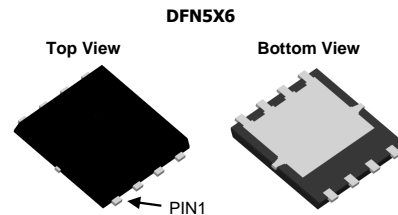
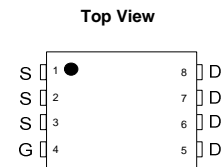
Schematic diagram

General Features

- $V_{DS} = 85V, I_D = 120A$
 $R_{DS(ON)} < 5.7m\Omega @ V_{GS} = 10V$ (Typ: 4.5m Ω)
- High density cell design for ultra low Rdson
- Fully characterized avalanche voltage and current
- Special designed for convertors and power controls
- Good stability and uniformity with high E_{AS}
- Excellent package for good heat dissipation
- Special process technology for high ESD capability

Application

- Automotive applications
- Hard switched and high frequency circuits
- Uninterruptible power supply



Package Marking and Ordering Information

Device Marking	Device	Device Package	Reel Size	Tape width	Quantity
FNK08NS04E	FNK08NS04E	DFN5*6-8L	-	-	-

Absolute Maximum Ratings ($T_C = 25^\circ C$ unless otherwise noted)

Parameter	Symbol	Limit	Unit
Drain-Source Voltage	V_{DS}	85	V
Gate-Source Voltage	V_{GS}	± 20	V
Drain Current-Continuous	I_D	120	A
Drain Current-Continuous($T_C = 100^\circ C$)	$I_D(100^\circ C)$	96	A
Pulsed Drain Current	I_{DM}	480	A
Maximum Power Dissipation	P_D	270	W
Peak diode recovery voltage	dv/dt	15	V/ns
Derating factor		1.8	W/ $^\circ C$

Single pulse avalanche energy ^(Note 5)	E_{AS}	1100	mJ
Operating Junction and Storage Temperature Range	T_J, T_{STG}	-55 To 175	°C

Thermal Characteristic

Thermal Resistance, Junction-to-Case ^(Note 2)	$R_{\theta JC}$	0.56	°C/W
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Electrical Characteristics ($T_C=25^\circ\text{C}$ unless otherwise noted)

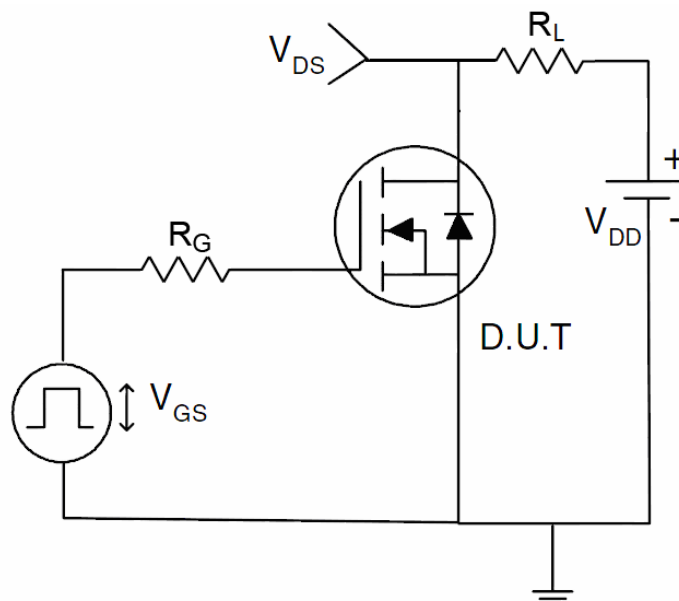
Parameter	Symbol	Condition	Min	Typ	Max	Unit
Off Characteristics						
Drain-Source Breakdown Voltage	BV_{DSS}	$V_{GS}=0V, I_D=250\mu A$	85	-	-	V
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS}=85V, V_{GS}=0V$	-	-	1	μA
Gate-Body Leakage Current	I_{GSS}	$V_{GS}=\pm 20V, V_{DS}=0V$	-	-	± 100	nA
On Characteristics ^(Note 3)						
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=250\mu A$	2	2.85	4	V
Drain-Source On-State Resistance	$R_{DS(on)}$	$V_{GS}=10V, I_D=40A$	-	4.5	5.7	m Ω
Forward Transconductance	g_{FS}	$V_{DS}=25V, I_D=40A$	110	-	-	S
Dynamic Characteristics ^(Note 4)						
Input Capacitance	C_{iss}	$V_{DS}=25V, V_{GS}=0V,$ $F=1.0\text{MHz}$	-	3775	-	PF
Output Capacitance	C_{oss}		-	1795	-	PF
Reverse Transfer Capacitance	C_{rss}		-	170	-	PF
Switching Characteristics ^(Note 4)						
Turn-on Delay Time	$t_{d(on)}$	$V_{DD}=30V, I_D=2A, R_L=15\Omega,$ $R_G=2.5\Omega, V_{GS}=10V$	-	22.5	-	nS
Turn-on Rise Time	t_r		-	15	-	nS
Turn-Off Delay Time	$t_{d(off)}$		-	70	-	nS
Turn-Off Fall Time	t_f		-	18.75	-	nS
Total Gate Charge	Q_g	$V_{DS}=30V, I_D=30A,$ $V_{GS}=10V$	-	200	-	nC
Gate-Source Charge	Q_{gs}		-	40	-	nC
Gate-Drain Charge	Q_{gd}		-	60	-	nC
Drain-Source Diode Characteristics						
Diode Forward Voltage ^(Note 3)	V_{SD}	$V_{GS}=0V, I_S=40A$	-	-	1.2	V
Diode Forward Current ^(Note 2)	I_S		-	-	150	A
Reverse Recovery Time	t_{rr}	$T_J=25^\circ\text{C}, I_F=75A$ $di/dt=100A/\mu s$ ^(Note 3)	-	-	45	nS
Reverse Recovery Charge	Q_{rr}		-	-	70	nC

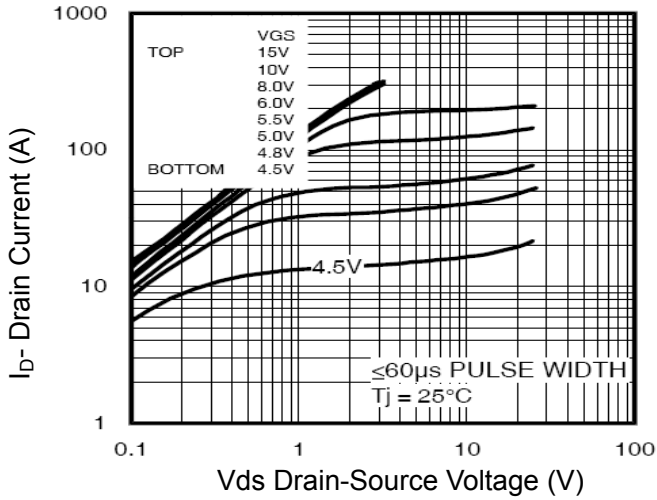
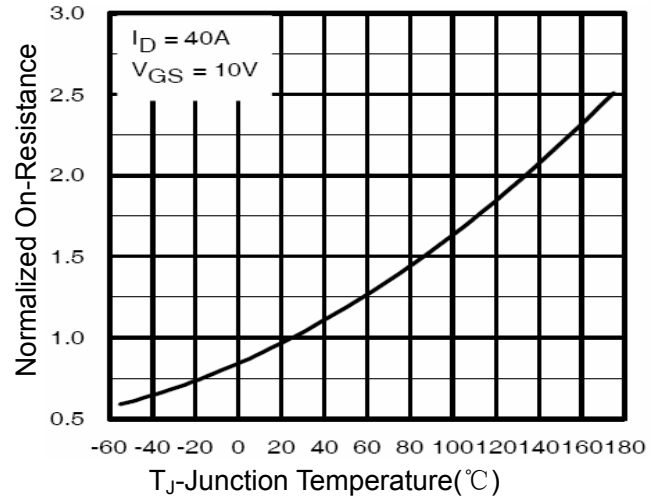
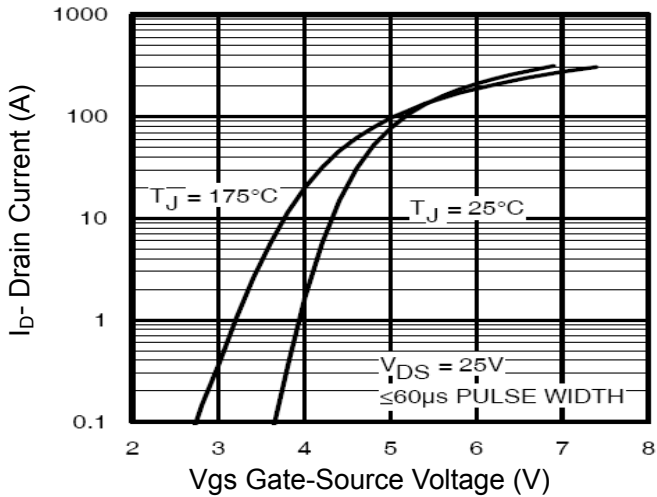
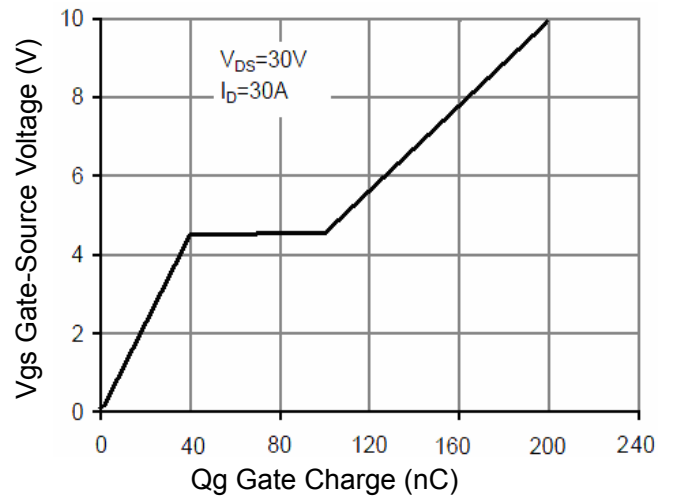
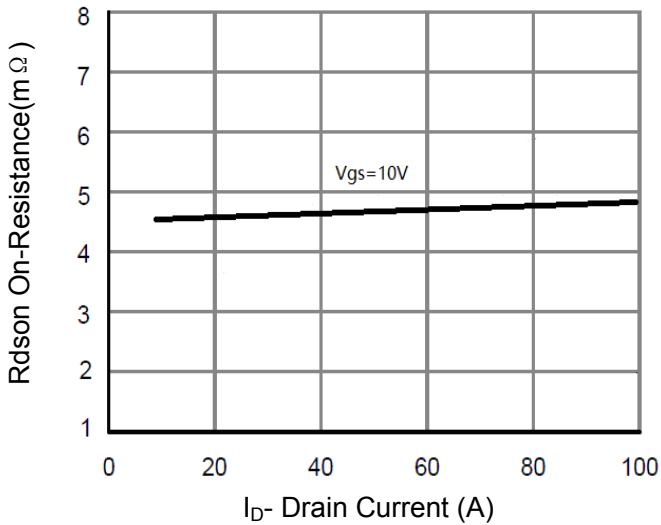
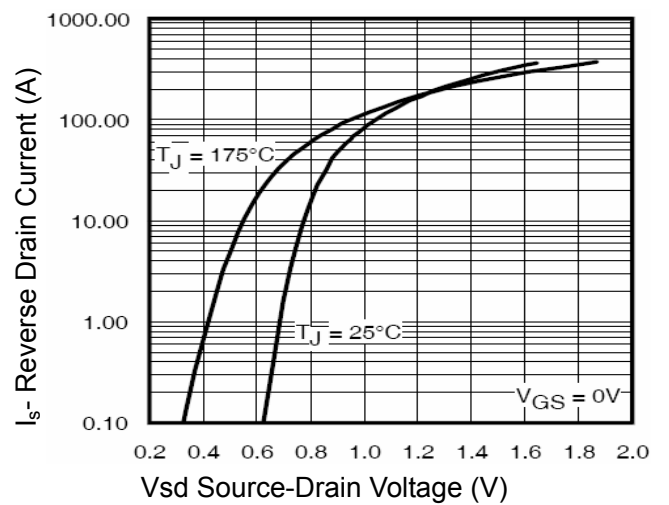
Notes:

1. Repetitive Rating: Pulse width limited by maximum junction temperature.
2. Surface Mounted on FR4 Board, $t \leq 10$ sec.
3. Pulse Test: Pulse Width $\leq 300\mu s$, Duty Cycle $\leq 2\%$.
4. Guaranteed by design, not subject to production
5. EAS condition: $T_J=25^\circ\text{C}, V_{DB}=40V, V_G=10V, L=0.5\text{mH}, R_g=25\Omega$

Test circuit
1) E_{AS} test Circuit

2) Gate charge test Circuit

3) Switch Time Test Circuit


Typical Electrical and Thermal Characteristics (Curves)

Figure 1 Output Characteristics

Figure 4 Rdson-Junction Temperature

Figure 2 Transfer Characteristics

Figure 5 Gate Charge

Figure 3 Rdson- Drain Current

Figure 6 Source- Drain Diode Forward

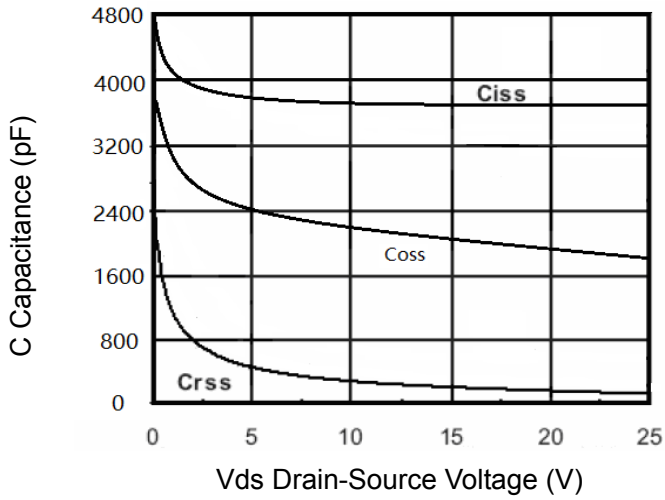


Figure 7 Capacitance vs Vds

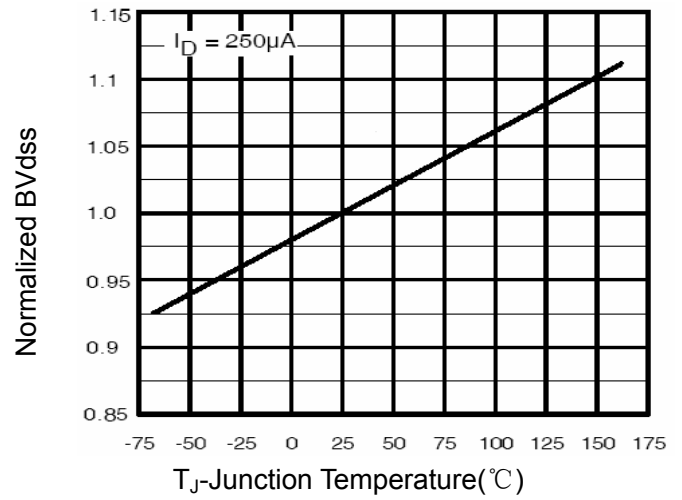


Figure 9 BV_{DSS} vs Junction Temperature

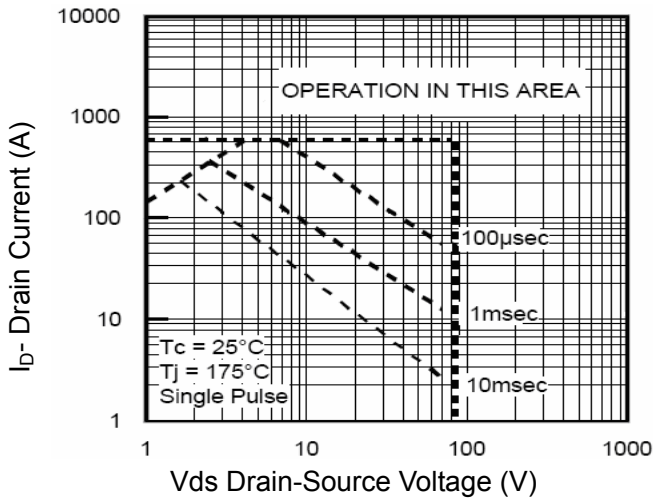


Figure 8 Safe Operation Area

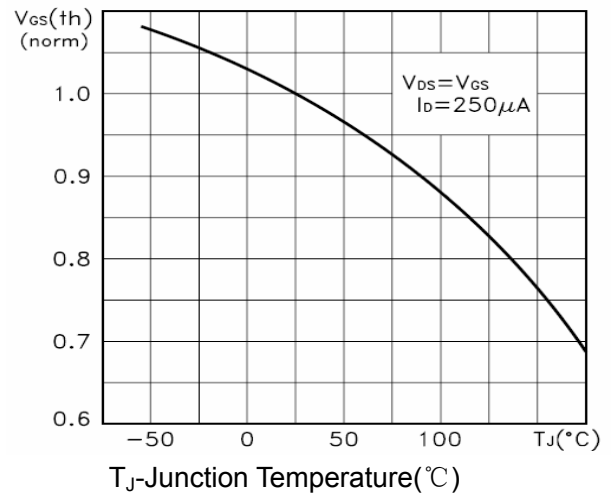


Figure 10 $V_{GS(th)}$ vs Junction Temperature

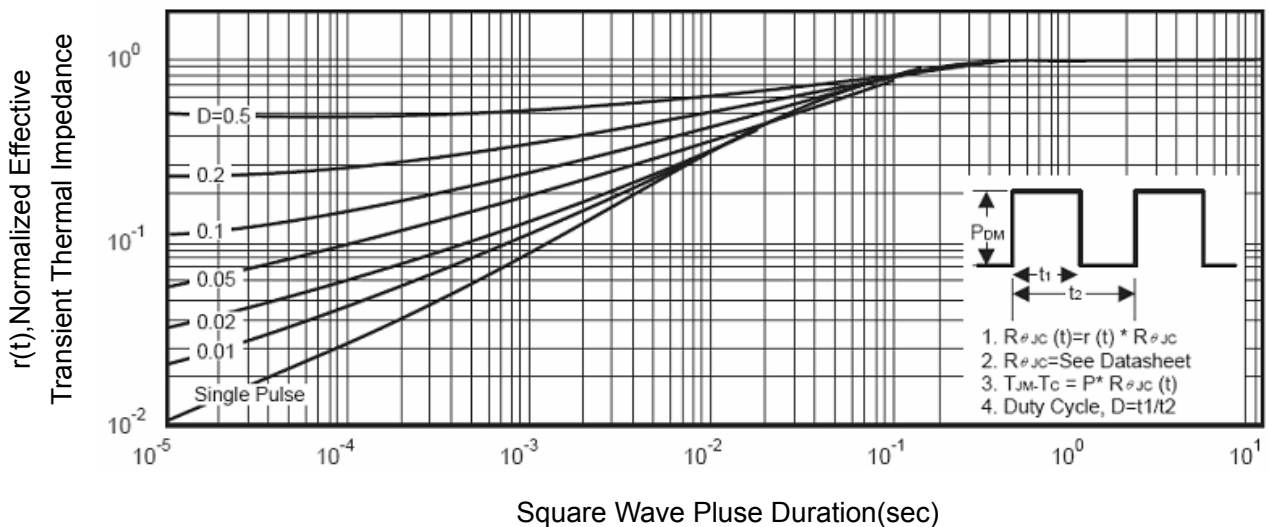
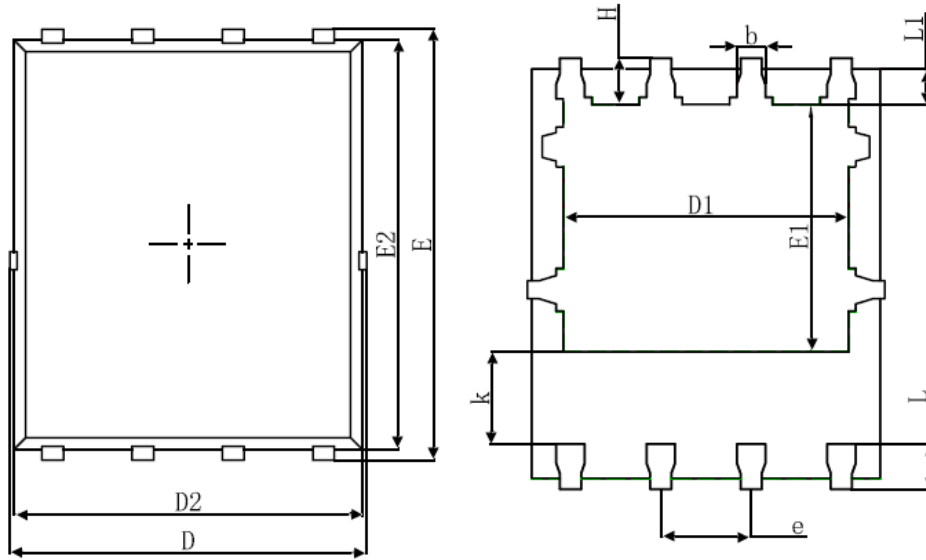


Figure 11 Normalized Maximum Transient Thermal Impedance

DFN5X6-8L Package Information



Top View
[顶视图]

Bottom View
[背视图]

Side View
[侧视图]

Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	0.900	1.000	0.035	0.039
A3	0.254REF.		0.010REF.	
D	4.944	5.096	0.195	0.201
E	5.974	6.126	0.235	0.241
D1	3.910	4.110	0.154	0.162
E1	3.375	3.575	0.133	0.141
D2	4.824	4.976	0.190	0.196
E2	5.674	5.826	0.223	0.229
k	1.190	1.390	0.047	0.055
b	0.350	0.450	0.014	0.018
e	1.270TYP.		0.050TYP.	
L	0.559	0.711	0.022	0.028
L1	0.424	0.576	0.017	0.023
H	0.574	0.726	0.023	0.029
θ	8°	12°	8°	12°

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- FNK will supply the best possible product for customers!