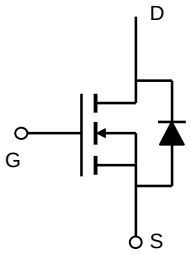
FNK02N08E

20V N-Channel MOSFET

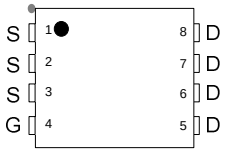
General Description

The FNK02N08E uses advanced trench technology to provide excellent $R_{DS(ON)}$, low gate charge and operation with gate voltages as low as 0.5V while retaining a 12V $V_{GS(MAX)}$ rating.This device is suitable for use as load switch and general purpose FET application.



Product Summary

V_{DS} (V) = 20V
I_D = 20A
$R_{DS(ON)}$ < 7.5mΩ (V_{GS} = 4.5V)
$R_{DS(ON)}$ < 12mΩ (V_{GS} = 2.5V)



Top View

Marking and pin Assignment

Package Marking And Ordering Information

Device Marking	Device	Device Package	Reel Size	Tape width	Quantity
FNK02N08E	FNK02N08E	DFN3.3x3.3	Ø330mm	12mm	5000 units

Absolute Maximum Ratings T_A=25℃ unless otherwise noted				
Parameter		**Symbol**	**Maximum**	**Units**
Drain-Source Voltage		V_{DS}	20	V
Gate-Source Voltage		V_{GS}	±12	V
Continuous Drain Current [A]	T_A=25℃	I_D	100	A
	T_A=70℃		92	
Pulsed Drain Current [B]		I_{DM}	400	
Power Dissipation [A]	T_A=25℃	P_D	3.1	W
	T_A=70℃		2	
Junction and Storage Temperature Range		T_J, T_{STG}	-55 to 150	℃

Thermal Characteristics					
Parameter		**Symbol**	**Typ**	**Max**	**Units**
Maximum Junction-to-Ambient [A]	t ≤ 10s	$R_{\theta JA}$	30	40	℃/W
Maximum Junction-to-Ambient [A]	Steady-State		65	80	℃/W
Maximum Junction-to-Lead [C]	Steady-State	$R_{\theta JL}$	20	25	℃/W

Electrical Characteristics (T_J=25℃ unless otherwise noted)

Symbol	Parameter	Conditions	Min	Typ	Max	Units
STATIC PARAMETERS						
BV_{DSS}	Drain-Source Breakdown Voltage	I_D=250μA, V_{GS}=0V	20			V
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS}=16V, V_{GS}=0V			10	μA
		T_J=55℃			25	
I_{GSS}	Gate-Body leakage current	V_{DS}=0V, V_{GS}=±10V			10	μA
BV_{GSO}	Gate-Source Breakdown Voltage	V_{DS}=0V, I_G=±250uA	±12			V
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS}=V_{GS} I_D=250μA	0.45	0.7	1	V
$I_{D(ON)}$	On state drain current	V_{GS}=4.5V, V_{DS}=5V	100			A
$R_{DS(ON)}$	Static Drain-Source On-Resistance	V_{GS}=4.5V, I_D=15A		4.3	7.5	mΩ
		T_J=125℃		7.8	12	
		V_{GS}=2.5V, I_D=10A		5.1	12	mΩ
g_{FS}	Forward Transconductance	V_{DS}=5V, I_D=12A		37		S
V_{SD}	Diode Forward Voltage	I_S=1A,V_{GS}=0V		0.73	1	V
I_S	Maximum Body-Diode Continuous Current				4.8	A
DYNAMIC PARAMETERS						
C_{iss}	Input Capacitance	V_{GS}=0V, V_{DS}=10V, f=1MHz		1810		pF
C_{oss}	Output Capacitance			232		pF
C_{rss}	Reverse Transfer Capacitance			200		pF
R_g	Gate resistance	V_{GS}=0V, V_{DS}=0V, f=1MHz		1.6		Ω
SWITCHING PARAMETERS						
Q_g	Total Gate Charge	V_{GS}=4.5V, V_{DS}=10V, I_D=12A		17.9		nC
Q_{gs}	Gate Source Charge			1.5		nC
Q_{gd}	Gate Drain Charge			4.7		nC
$t_{D(on)}$	Turn-On DelayTime	V_{GS}=10V, V_{DS}=10V, R_L=1.0Ω, R_{GEN}=3Ω		2.5		ns
t_r	Turn-On Rise Time			7.2		ns
$t_{D(off)}$	Turn-Off DelayTime			49		ns
t_f	Turn-Off Fall Time			10.8		ns
t_{rr}	Body Diode Reverse Recovery Time	I_F=12A, dI/dt=100A/μs		20.2		ns
Q_{rr}	Body Diode Reverse Recovery Charge	I_F=12A, dI/dt=100A/μs		8		nC

A: The value of $R_{\theta JA}$ is measured with the device mounted on 1in^2 FR-4 board with 2oz. Copper, in a still air environment with T_A=25℃. The value in any given application depends on the user's specific board design. The current rating is based on the t ≤ 10s thermal resistance rating.

B: Repetitive rating, pulse width limited by junction temperature.

C. The $R_{\theta JA}$ is the sum of the thermal impedence from junction to lead $R_{\theta JL}$ and lead to ambient.

D. The static characteristics in Figures 1 to 6 are obtained using 300 μs pulses, duty cycle 0.5% max.

E. These tests are performed with the device mounted on 1 in^2 FR-4 board with 2oz. Copper, in a still air environment with T_A=25℃. The SOA

TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

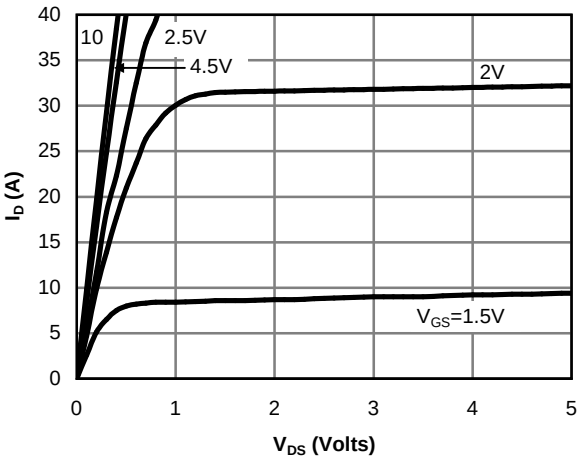


Fig 1: On-Region Characteristics

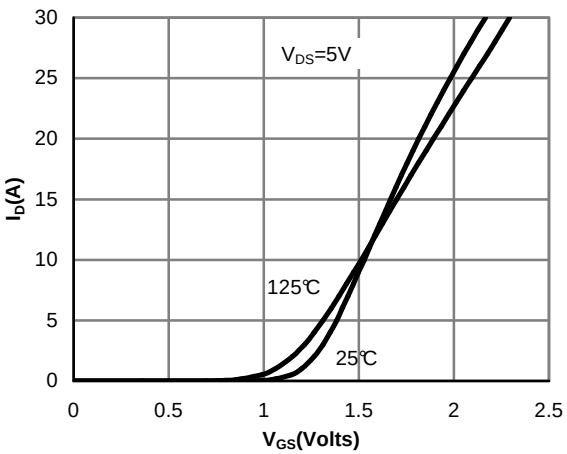


Figure 2: Transfer Characteristics

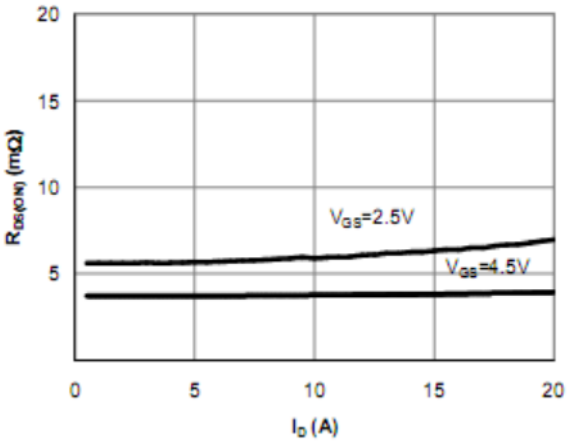


Figure 3: On-Resistance vs. Drain Current and Gate Voltage

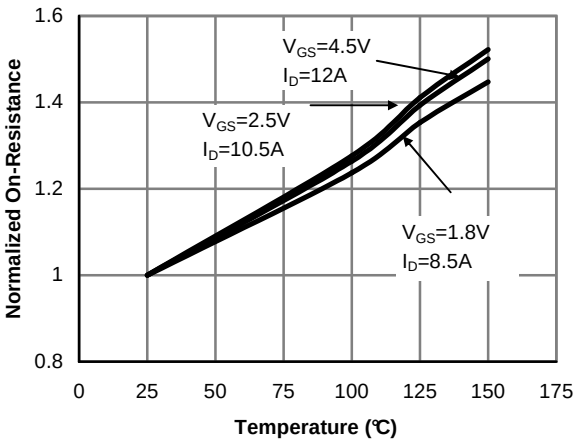


Figure 4: On-Resistance vs. Junction Temperature

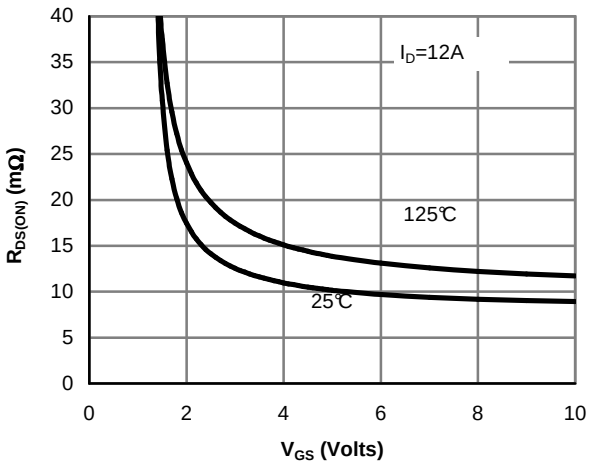


Figure 5: On-Resistance vs. Gate-Source Voltage

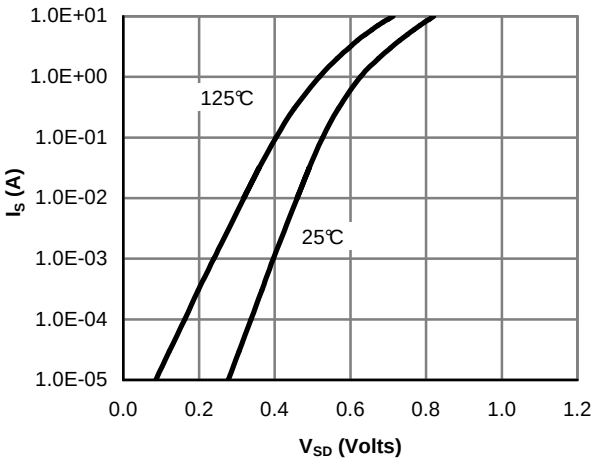


Figure 6: Body-Diode Characteristics

TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

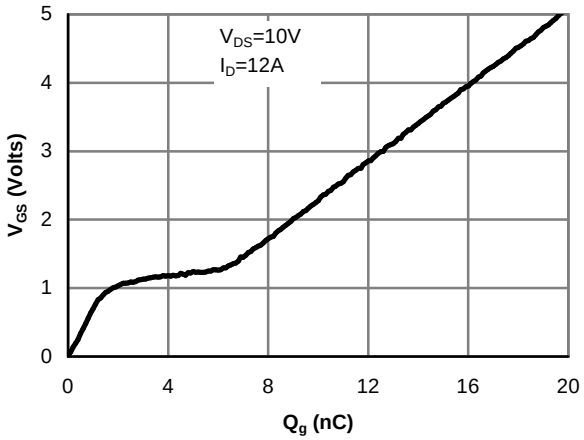


Figure 7: Gate-Charge Characteristics

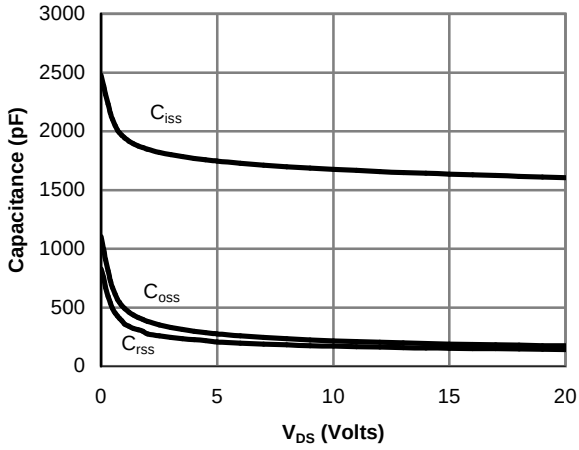


Figure 8: Capacitance Characteristics

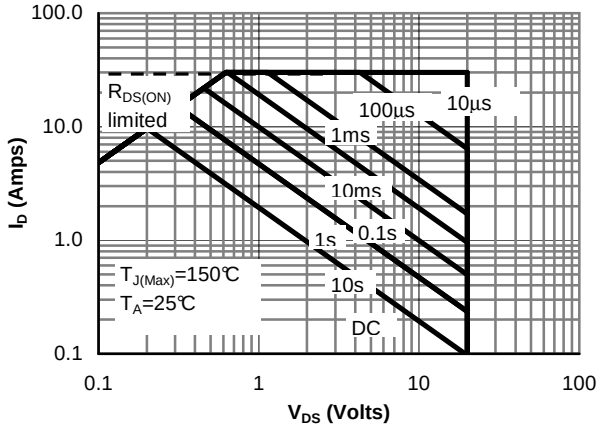


Figure 9: Maximum Forward Biased Safe Operating Area (Note E)

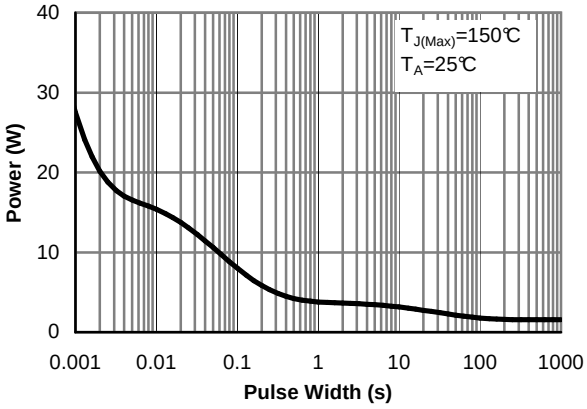


Figure 10: Single Pulse Power Rating Junction-to-Ambient (Note E)

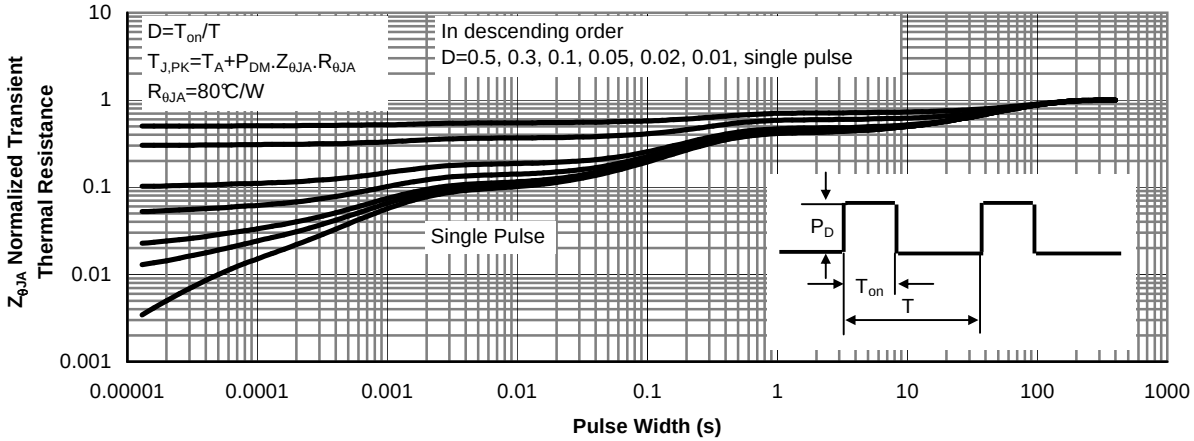
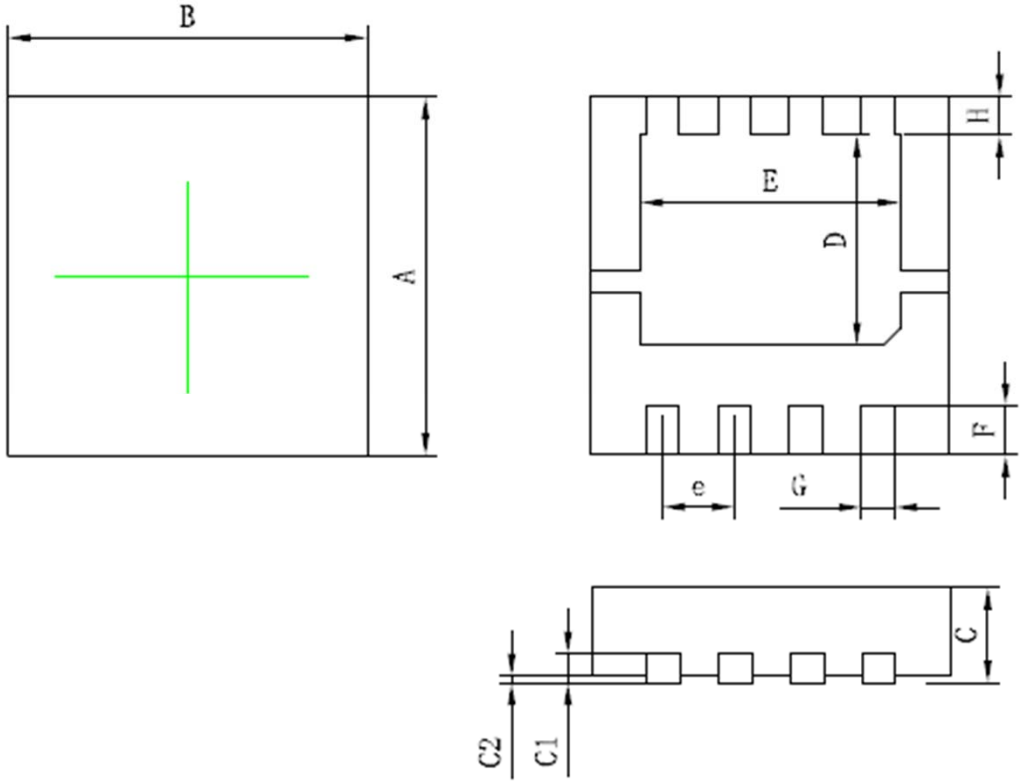


Figure 11: Normalized Maximum Transient Thermal Impedance

DFN3333 Package Information



SYMBOL	MILLIMETER		
	MIN	NOM	MAX
A	3.15	3.25	3.35
B	3.15	3.25	3.35
C	0.75	0.80	0.85
C1	0.18	0.20	0.22
C2			0.05
D	1.80	1.90	2.00
E	2.20	2.35	2.50
F	0.40	0.45	0.50
G	0.25	0.30	0.35
H	0.30	0.35	0.40
e	0.65 BSC		

单位：**mm**

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