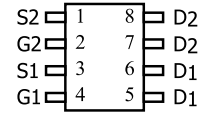


Dual N-Channel Enhancement Mode Field Effect Transistor

General Description

The FNK10N25E uses advanced trench technology to provide excellent $R_{DS(on)}$ and low gate charge. They offer operation over a wide gate drive range from 1.8V to 8V. The two devices may be used individually, in parallel or to form a bidirectional blocking switch.

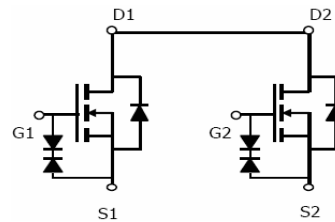
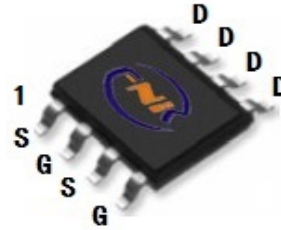


Features

$$V_{DS} (V) = 20V$$

$$R_{DS(on)} < 8\text{ m}\Omega (V_{GS} = 4.5V)$$

$$R_{DS(on)} < 10\text{ m}\Omega (V_{GS} = 2.5V)$$



Schematic diagram

Absolute Maximum Ratings $T_A=25^\circ\text{C}$ 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	$T_A=25^\circ\text{C}$	13	A
	$T_A=70^\circ\text{C}$	11	
Pulsed Drain Current ^B	I_{DM}	30	
Power Dissipation	$T_A=25^\circ\text{C}$	2	W
	$T_A=70^\circ\text{C}$	1.28	
Junction and Storage Temperature Range	T_J, T_{STG}	-55 to 150	$^\circ\text{C}$

Thermal Characteristics

Parameter	Symbol	Typ	Max	Units
Maximum Junction-to-Ambient ^A	$R_{\theta JA}$	$t \leq 10\text{s}$	56	62.5
Maximum Junction-to-Ambient ^A		Steady-State	81	110
Maximum Junction-to-Lead ^C	$R_{\theta JL}$	Steady-State	40	48

Electrical Characteristics (T_J=25°C 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} =20V, V _{GS} =0V T _J =55°C			1 5	μA
I _{GSS}	Gate-Body leakage current	V _{DS} =0V, V _{GS} =±10V			100	nA
V _{GS(th)}	Gate Threshold Voltage	V _{DS} =V _{GS} , I _D =250μA	0.5	0.7	1.0	V
I _{D(ON)}	On state drain current	V _{GS} =10V, V _{DS} =5V	13			A
R _{DS(ON)}	Static Drain-Source On-Resistance	V _{GS} =4.5V, I _D =1A		6	8	mΩ
		V _{GS} =2.5V, I _D =0.5A		8	10.5	mΩ
g _{FS}	Forward Transconductance	V _{DS} =10V, I _D =4.5A		11		S
V _{SD}	Diode Forward Voltage	I _S =1.5A, V _{GS} =0V		0.76	1.2	V
I _S	Maximum Body-Diode Continuous Current				2.7	A
DYNAMIC PARAMETERS						
C _{iss}	Input Capacitance	V _{GS} =0V, V _{DS} =10V, f=1MHz		436		pF
C _{oss}	Output Capacitance			66		pF
C _{rss}	Reverse Transfer Capacitance			44		pF
R _g	Gate resistance	V _{GS} =0V, V _{DS} =0V, f=1MHz		3		Ω
SWITCHING PARAMETERS						
Q _g	Total Gate Charge	V _{GS} =4.5V, V _{DS} =10V, I _D =5A		5.54		nC
Q _{gs}	Gate Source Charge			1.26		nC
Q _{gd}	Gate Drain Charge			0.52		nC
t _{D(on)}	Turn-On DelayTime	V _{GS} =5V, V _{DS} =10V, R _L =2Ω, R _{GEN} =6Ω		5		ns
t _r	Turn-On Rise Time			7		ns
t _{D(off)}	Turn-Off DelayTime			29		ns
t _f	Turn-Off Fall Time			6.2		ns
t _{rr}	Body Diode Reverse Recovery Time		I _F =5A, di/dt=100A/μs		13.7	
Q _{rr}	Body Diode Reverse Recovery Charge	I _F =5A, di/dt=100A/μs		3.8		nC

A: The value of R_{θJA} is measured with the device mounted on 1in² FR-4 board with 2oz. Copper, in a still air environment with T_A=25°C. The value in any a 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_{θJA} is the sum of the thermal impedance from junction to lead R_{θJL} and lead to ambient.

D. The static characteristics in Figures 1 to 6 are obtained using 80μs pulses, duty cycle 0.5% max.

E. These tests are performed with the device mounted on 1 in² FR-4 board with 2oz. Copper, in a still air environment with T_A=25°C. The SOA curve provides a single pulse rating.

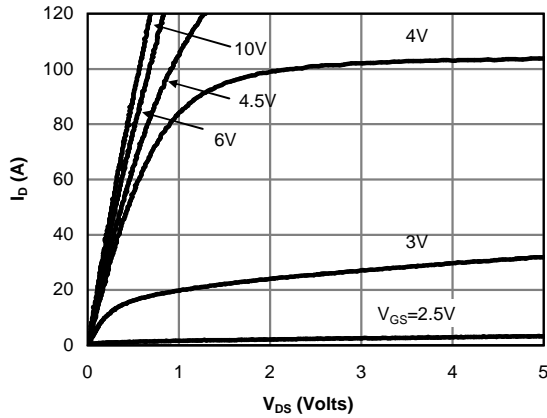


Figure 1: On-Region Characteristics (Note E)

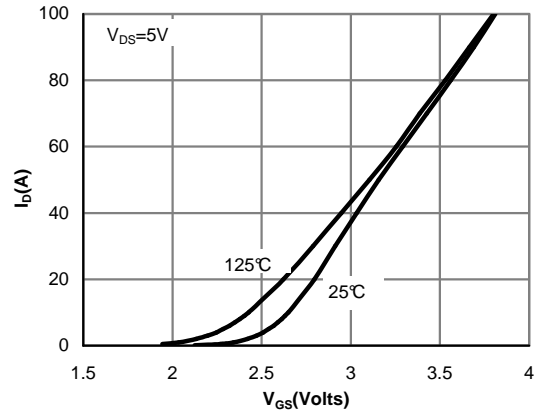


Figure 2: Transfer Characteristics (Note E)

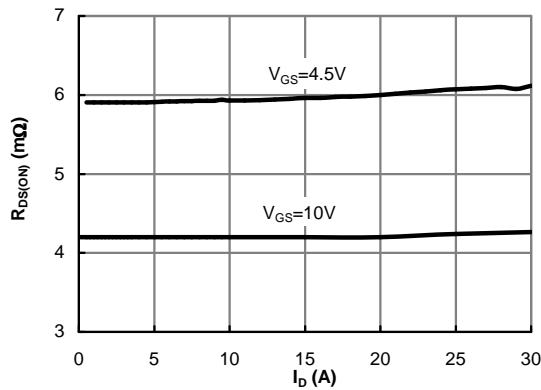


Figure 3: On-Resistance vs. Drain Current and Gate Voltage (Note E)

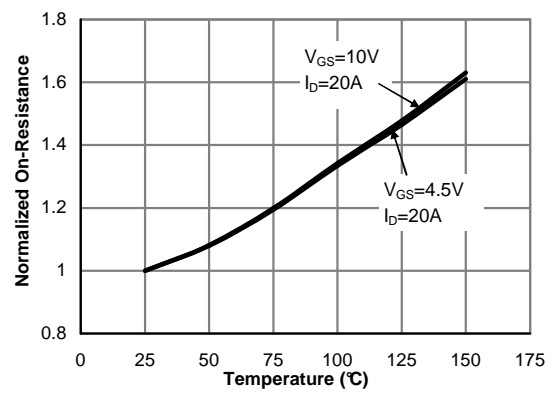


Figure 4: On-Resistance vs. Junction Temperature (Note E)

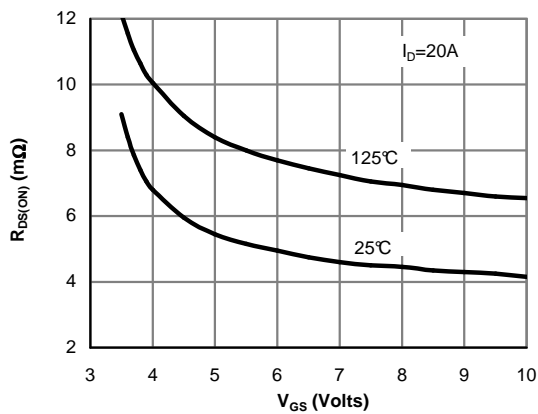


Figure 5: On-Resistance vs. Gate-Source Voltage (Note E)

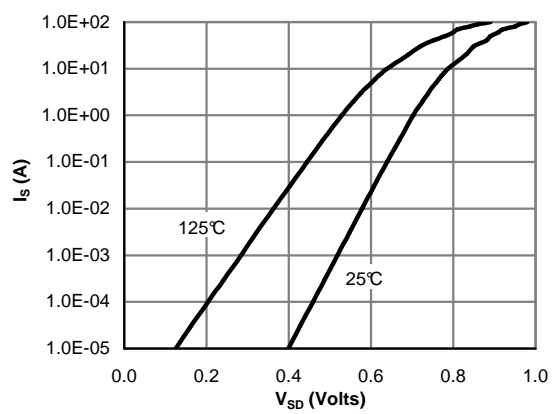


Figure 6: Body-Diode Characteristics (Note E)

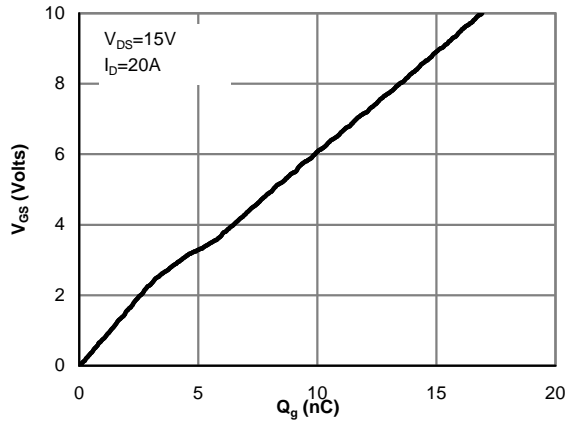


Figure 7: Gate-Charge Characteristics

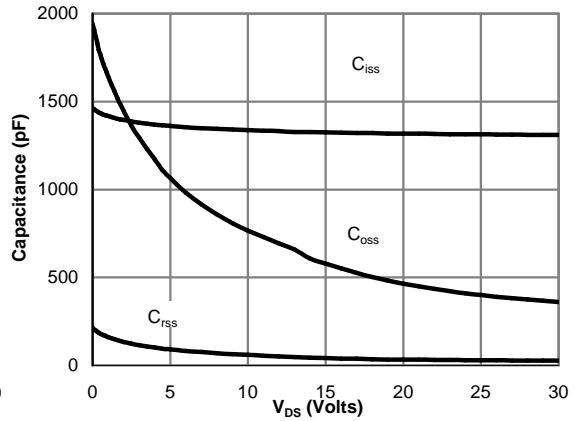


Figure 8: Capacitance Characteristics

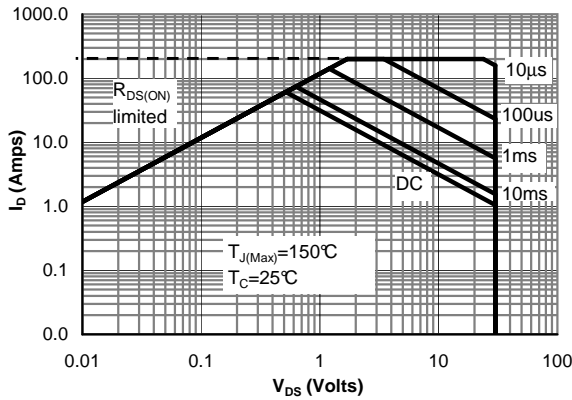


Figure 9: Maximum Forward Biased Safe Operating Area (Note F)

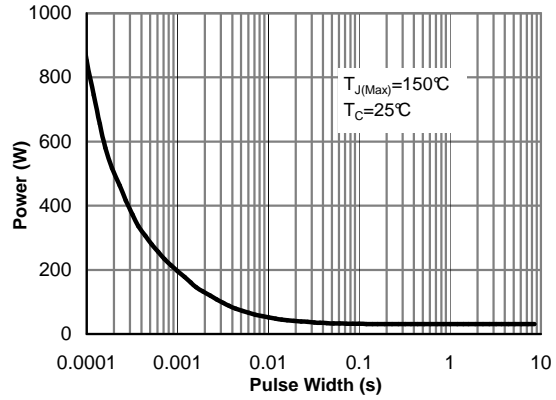


Figure 10: Single Pulse Power Rating Junction-to-Case (Note F)

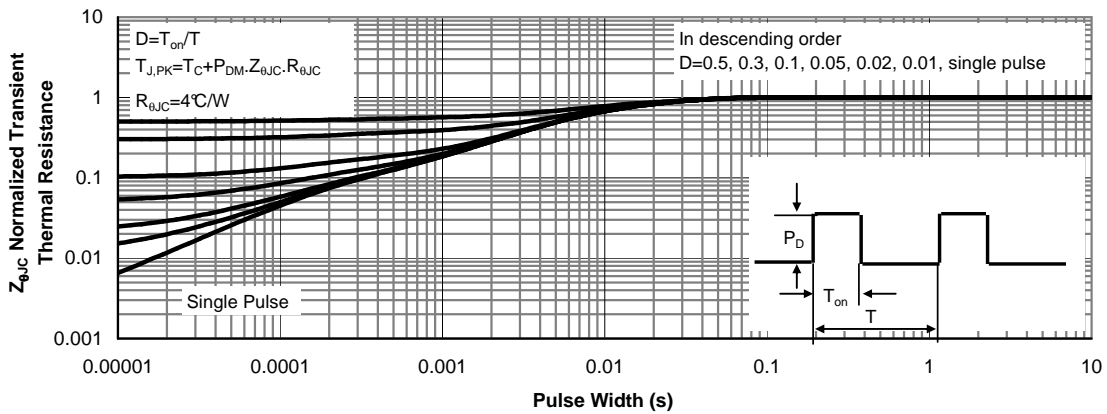


Figure 11: Normalized Maximum Transient Thermal Impedance (Note F)

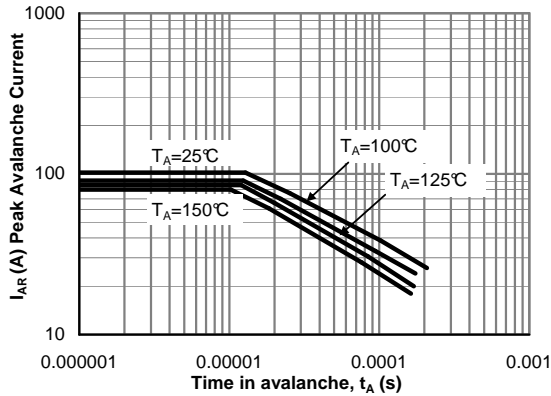


Figure 12: Single Pulse Avalanche capability (Note C)

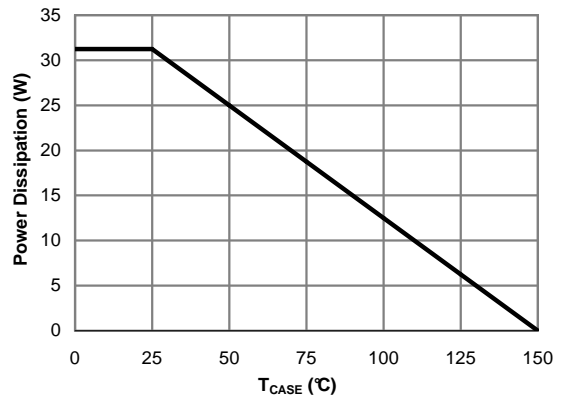


Figure 13: Power De-rating (Note F)

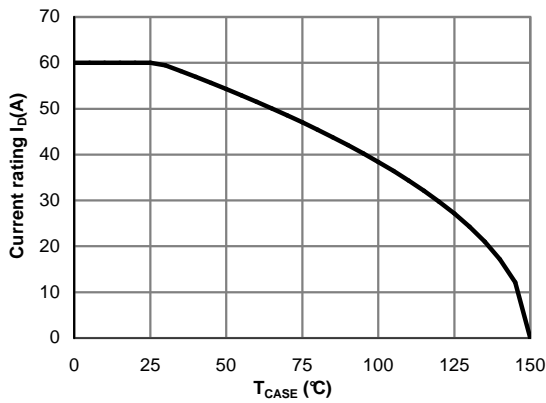


Figure 14: Current De-rating (Note F)

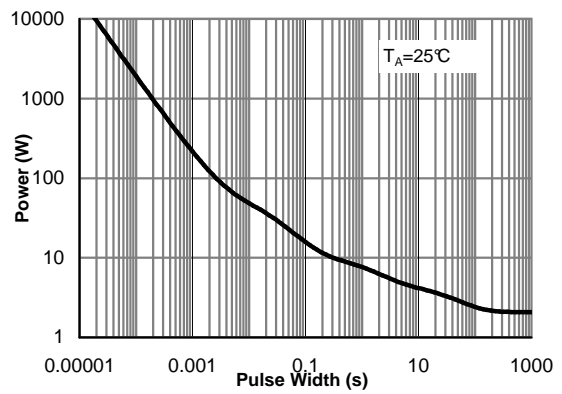


Figure 15: Single Pulse Power Rating Junction-to-Ambient (Note H)

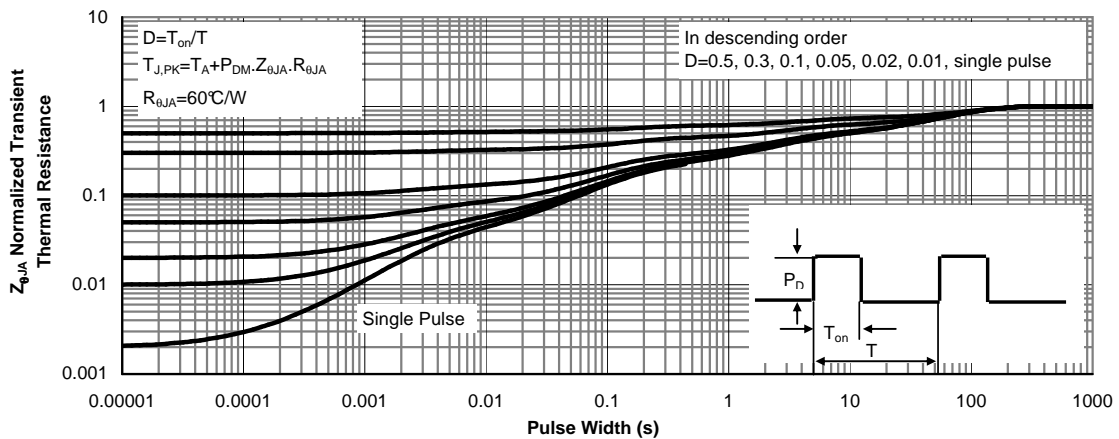
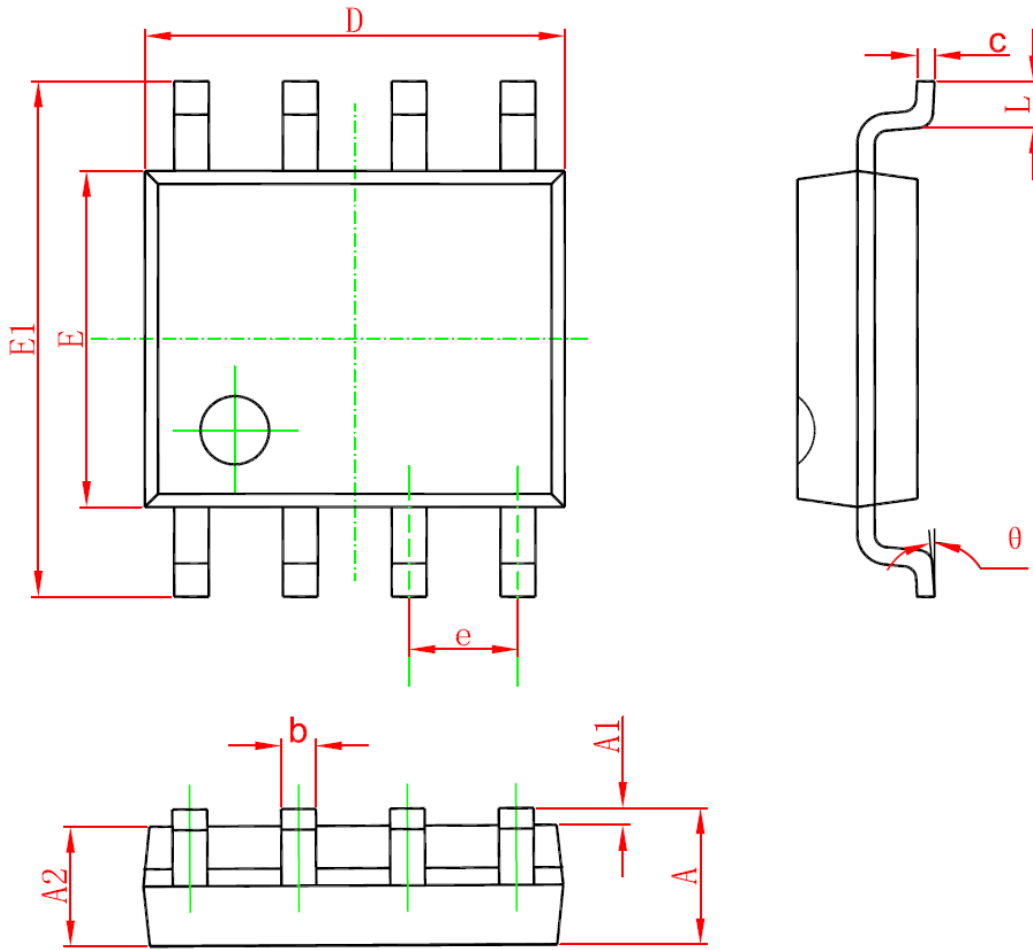


Figure 16: Normalized Maximum Transient Thermal Impedance (Note H)

SOP-8 Package Information



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	1.350	1.750	0.053	0.069
A1	0.100	0.250	0.004	0.010
A2	1.350	1.550	0.053	0.061
b	0.330	0.510	0.013	0.020
c	0.170	0.250	0.006	0.010
D	4.700	5.100	0.185	0.200
E	3.800	4.000	0.150	0.157
E1	5.800	6.200	0.228	0.244
e	1.270 (BSC)		0.050 (BSC)	
L	0.400	1.270	0.016	0.050
θ	0°	8°	0°	8°