FNK N-Channel Enhancement Mode Power MOSFET

Description

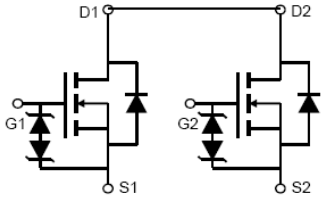
The FNK0203EB uses advanced trench technology to provide excellent $R_{DS(ON)}$, low gate charge and operation with gate voltages as low as 1.8V. This device is suitable for use as a load switch or in PWM applications .It is ESD protested.

General Features

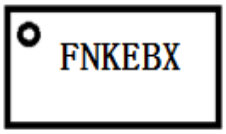
- V_{DS} = 20V,I_D =15A
  $R_{DS(ON)}$ <13.5mΩ @ V_{GS}=2.5V
  $R_{DS(ON)}$ < 9.5mΩ @ V_{GS}=4.5V
  ESD Rating: 2500V HBM
- High power and current handing capability
- Lead free product is acquired
- Surface mount package

Application

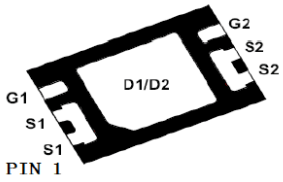
- Uni-directional load switch
- Bi-directional load switch



Schematic diagram



Marking and pin assignment



DFN2*3-6 top view

Package Marking and Ordering Information

Device Marking	Device	Device Package	Reel Size	Tape width	Quantity
FNKEBX	FNK0203EB	**DFN2*3-6**	-	-	-

Absolute Maximum Ratings (T_A=25℃unless otherwise noted)

Parameter	Symbol	Limit	Unit
Drain-Source Voltage	V_{DS}	20	V
Gate-Source Voltage	V_{GS}	±12	V
Drain Current-Continuous	I_D	10	A
Drain Current-Continuous(T_C=70℃)	I_D (70℃)	8	A
Pulsed Drain Current	I_{DM}	85	A
Maximum Power Dissipation	P_D	1.7	W
Operating Junction and Storage Temperature Range	T_J,T_{STG}	-55 To 150	℃

Thermal Characteristic

Thermal Resistance,Junction-to-Case(Note 2)	$R_{\theta JC}$	5.5	/W℃

Electrical Characteristics (T_A=25℃unless otherwise noted)

Parameter	Symbol	Condition	Min	Typ	Max	Unit
Off Characteristics						
Drain-Source Breakdown Voltage	BV_{DSS}	V_{GS}=0V I_D=250μA	20		-	V
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS}=20V,V_{GS}=0V	-	-	1	μA
Gate-Body Leakage Current	I_{GSS}	V_{GS}=±12V,V_{DS}=0V	-	-	±10	μA
On Characteristics (Note 3)						
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS}=V_{GS},I_D=250μA	0.4	0.65	1.0	V
Drain-Source On-State Resistance	$R_{DS(ON)}$	V_{GS}=4.5V, I_D=10A	5.5	7.4	9.5	mΩ
		V_{GS}=3.7V, I_D=4A	6	8	10.5	mΩ
		V_{GS}=2.5V, I_D=4A	6.8	9.2	13.5	mΩ
Forward Transconductance	g_{FS}	V_{DS}=5V,I_D=10A		65	-	S
Dynamic Characteristics (Note4)						
Input Capacitance	C_{lss}	V_{DS}=10V,V_{GS}=0V, F=1.0MHz	-	1250	-	PF
Output Capacitance	C_{oss}		-	220	-	PF
Reverse Transfer Capacitance	C_{rss}		-	168	-	PF
Switching Characteristics (Note 4)						
Turn-on Delay Time	$t_{d(on)}$	V_{DD}=10V,I_D=2A,R_L=1Ω V_{GS}=4.5V,R_G=3Ω	-	11	-	nS
Turn-on Rise Time	t_r		-	2.6	-	nS
Turn-Off Delay Time	$t_{d(off)}$		-	7	-	nS
Turn-Off Fall Time	t_f		-	7.4	-	nS
Total Gate Charge	Q_g	V_{DS}=10V,I_D=10A, V_{GS}=4.5V	-	11		nC
Gate-Source Charge	Q_{gs}		-	2.6		nC
Gate-Drain Charge	Q_{gd}		-	7		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		-	-	2.5	A
Reverse Recovery Time	t_{rr}	TJ = 25°C, IF = 40A di/dt = 100A/μs(Note3)	8.5	11	13.5	nS
Reverse Recovery Charge	Qrr		12	15	18	nC

Notes:

1. Repetitive Rating: Pulse width limited by maximum junction temperature.
2. Surface Mounted on FR4 Board, t ≤ 10 sec.
3. Pulse Test: Pulse Width ≤ 300μs, Duty Cycle ≤ 2%.
4. Guaranteed by design, not subject to production

TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

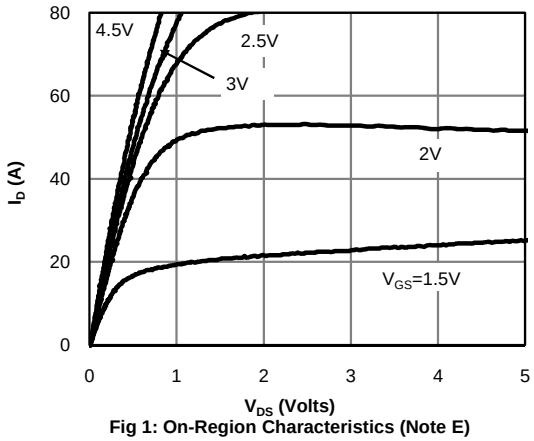


Fig 1: On-Region Characteristics (Note E)

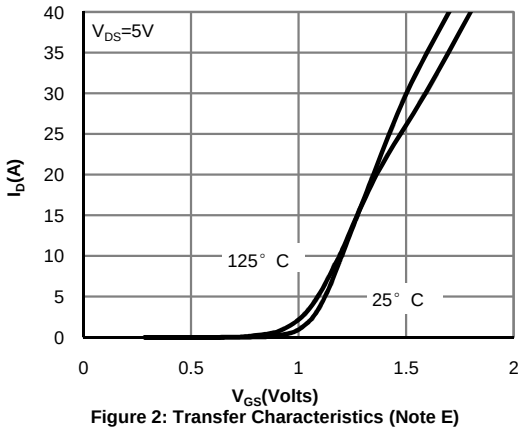


Figure 2: Transfer Characteristics (Note E)

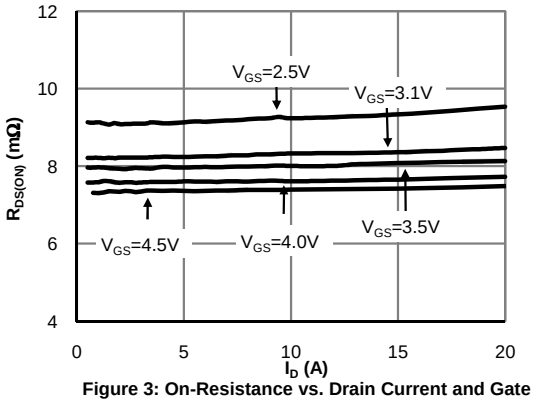


Figure 3: On-Resistance vs. Drain Current and Gate Voltage (Note E)

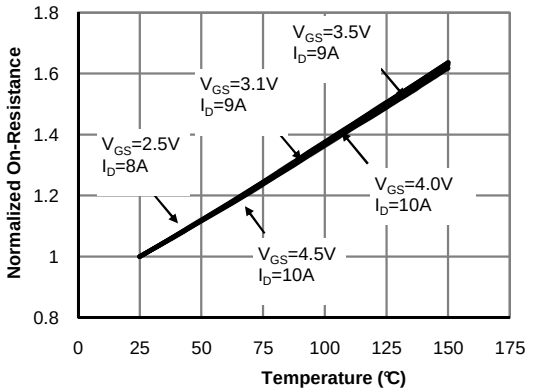


Figure 4: On-Resistance vs. Junction Temperature (Note E)

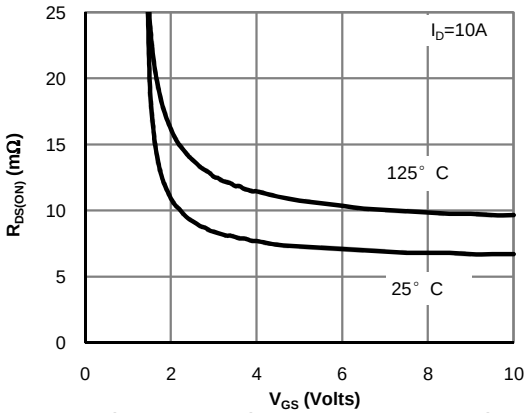


Figure 5: On-Resistance vs. Gate-Source Voltage (Note E)

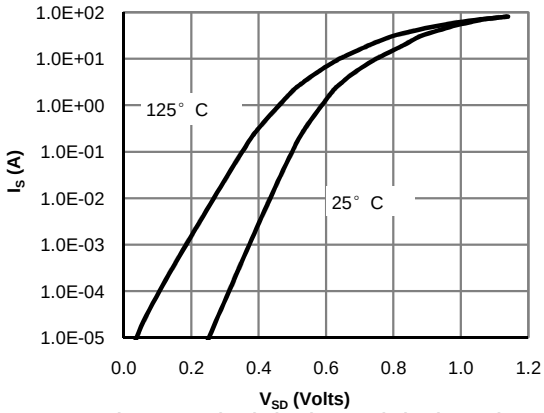


Figure 6: Body-Diode Characteristics (Note E)

TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

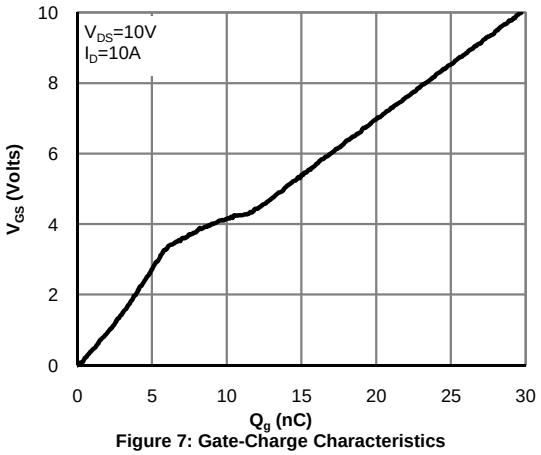


Figure 7: Gate-Charge Characteristics

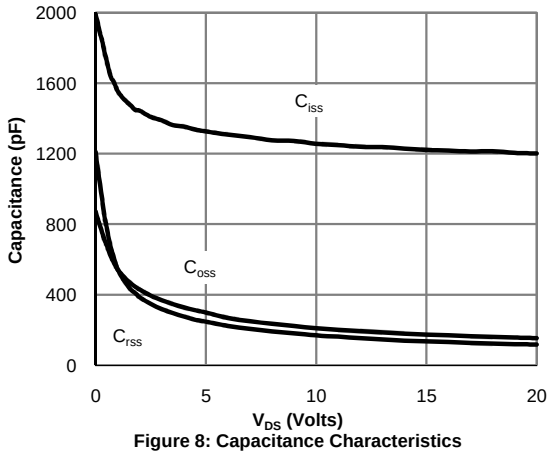


Figure 8: Capacitance Characteristics

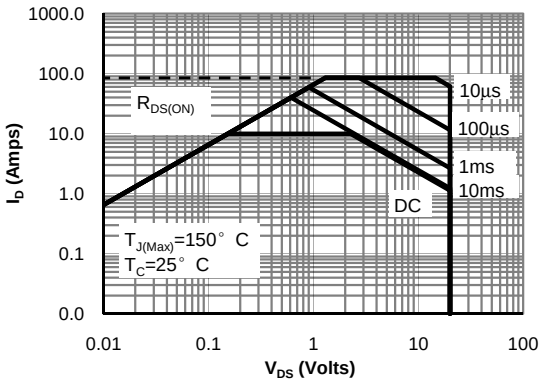


Figure 9: Maximum Forward Biased Safe Operating Area (Note F)

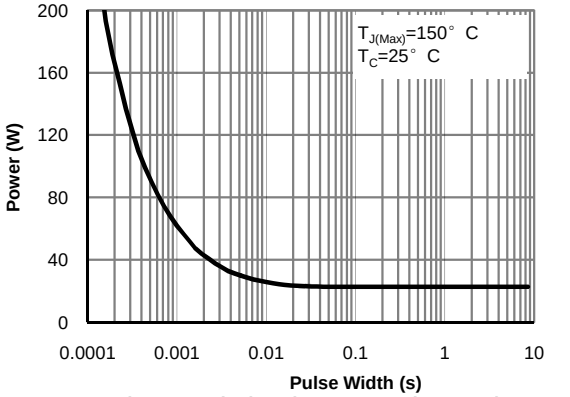


Figure 10: Single Pulse Power Rating Junction-to-Ca (Note F)

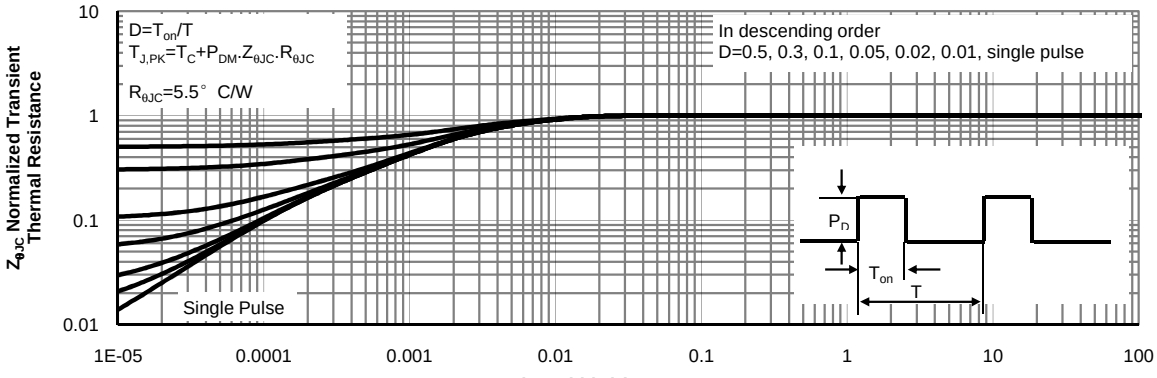


Figure 11: Normalized Maximum Transient Thermal Impedance (Note F)

TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

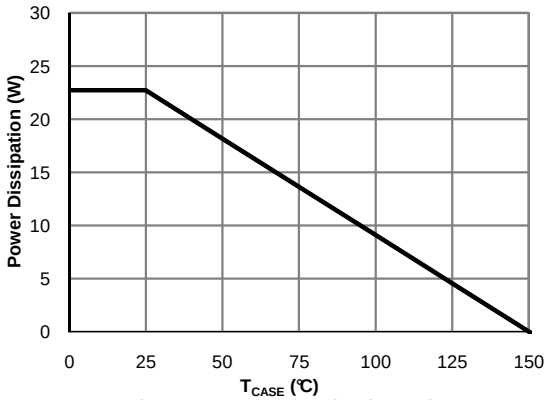


Figure 12: Power De-rating (Note F)

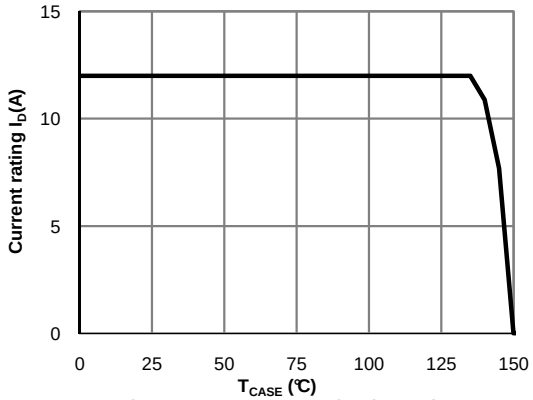


Figure 13: Current De-rating (Note F)

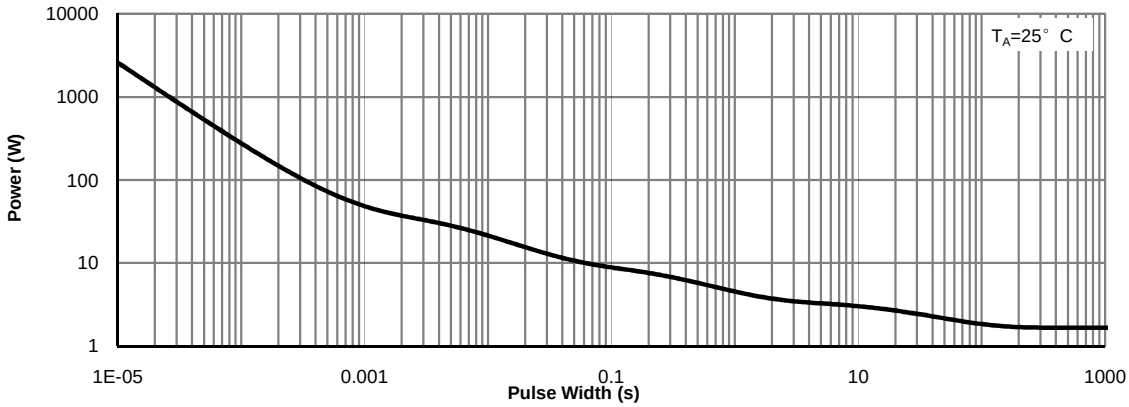


Figure 14: Single Pulse Power Rating Junction-to-Ambient (Note H)

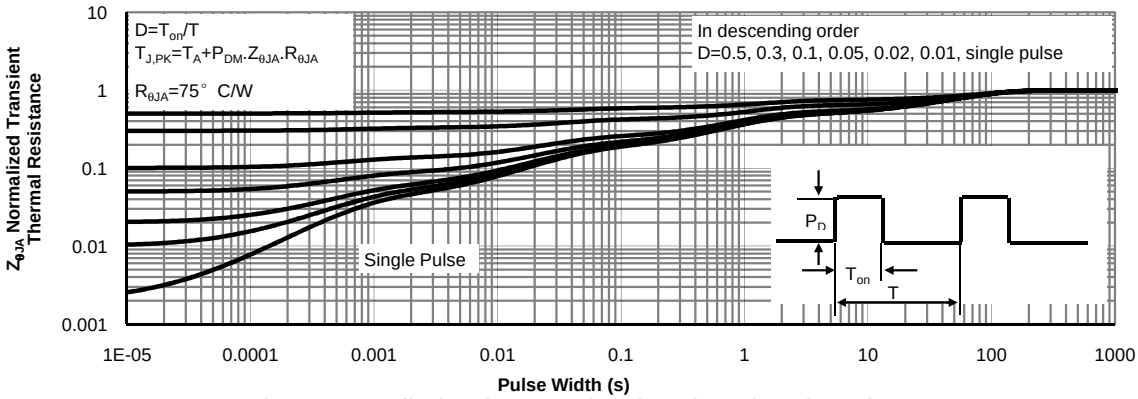
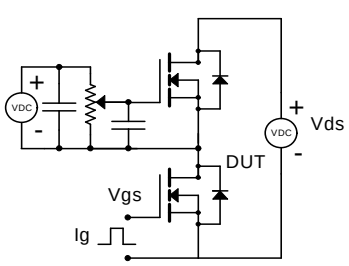
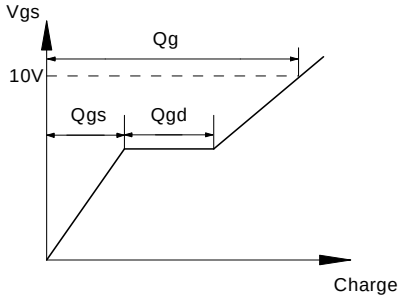


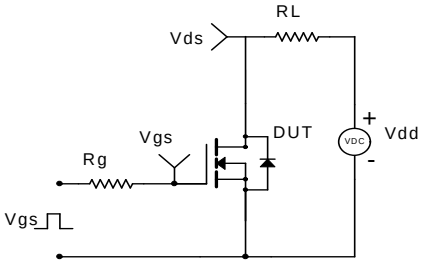
Figure 15: Normalized Maximum Transient Thermal Impedance (Note H)

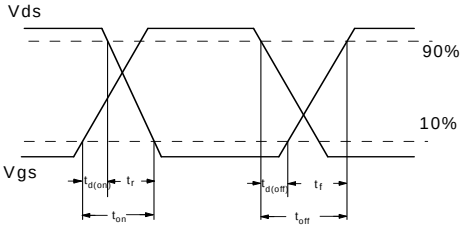
Gate Charge Test Circuit & Waveform



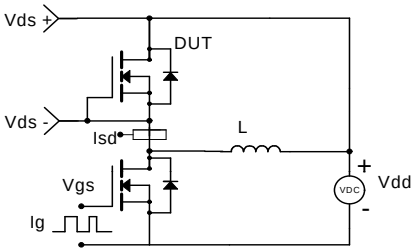


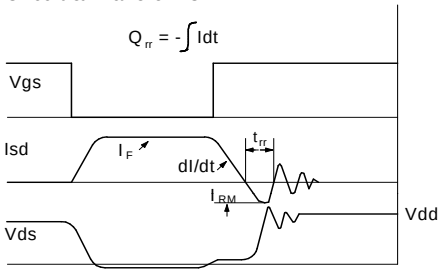
Resistive Switching Test Circuit & Waveforms



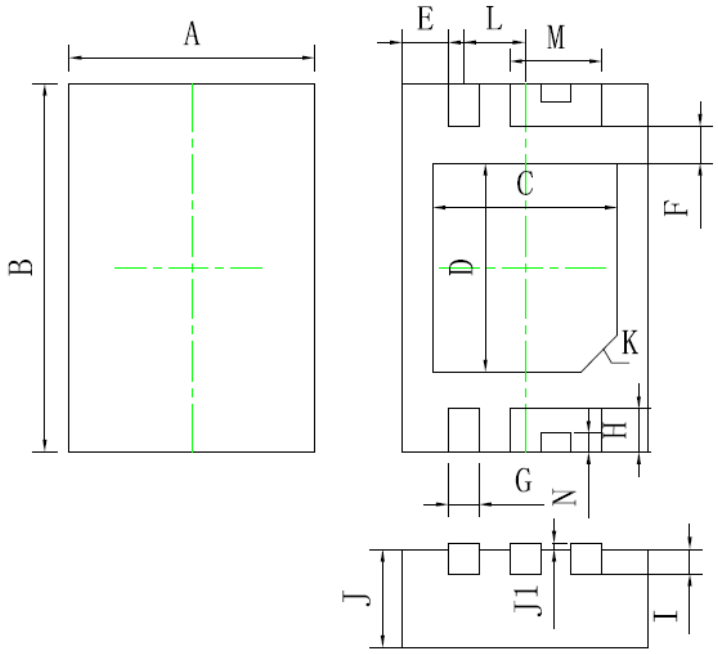


Diode Recovery Test Circuit & Waveforms





封装外形尺寸图



符号	单位：mm		
	MIN	NOM	MAX
A	1.95	2.00	2.05
B	2.95	3.00	3.05
C	1.45	1.50	1.55
D	1.65	1.70	1.75
E	0.33	0.38	0.43
F	0.25	0.30	0.35
G	0.20	0.25	0.30
H	0.35	0.40	0.45
I	0.2 BSC		
J	0.75	0.80	0.85
J1	0-0.05		
K	0.3×45° BSC		
L	0.5 BSC		
M	0.70	0.75	0.80
N	0.10	0.15	0.20

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