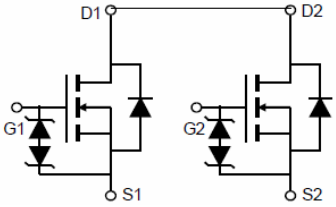
FNK N-Channel Enhancement Mode Power MOSFET

Description

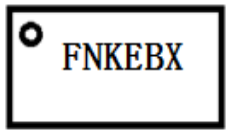
The FNK0203EB uses advanced trench technology and design to provide excellent $R_{DS(ON)}$ with low gate charge. It can be used in a wide variety of applications.



Schematic diagram

General Features

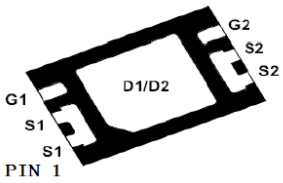
- V_{DS} =20V,I_D =9A
  $R_{DS(ON)}$ < 9.8mΩ @ V_{GS}=4.5V
  $R_{DS(ON)}$ < 14.5mΩ @ V_{GS}=2.5V
- High density cell design for ultra low Rdson
- Fully characterized avalanche voltage and current
- 2.5V Drive
- Common-drain type



Marking and pin assignment

Application

- Battery protection switch
- Mobile device battery charging and discharging



DFN2*3-6 top view

Package Marking and Ordering Information

Device Marking	Device	Device Package	Reel Size	Tape width	Quantity
FNKEBX	FNK0203EB	DFN 2x3	-	-	-

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

Parameter	Symbol	Limit	Unit
Drain-Source Voltage	V_{DS}	20	V
Gate-Source Voltage	V_{GS}	±10	V
Drain Current-Continuous	I_D	9	A
Pulsed Drain Current	I_{DM}	36	A
Maximum Power Dissipation	P_D	1.5	W
Operating Junction and Storage Temperature Range	T_J,T_{STG}	-55 To 150	℃

Thermal Characteristic

Thermal Resistance,Junction-to-Ambient (Note 2)	$R_{\theta JA}$	83	℃/W

Electrical Characteristics (TC=25℃unless otherwise noted)

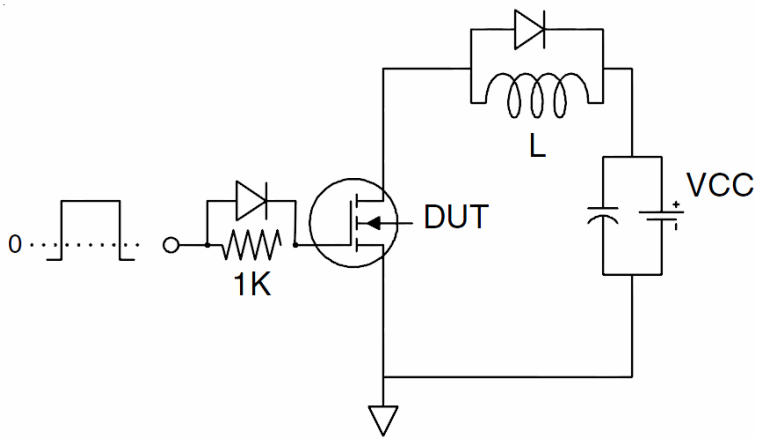
Parameter	Symbol	Condition	Min	Typ	Max	Unit
Off Characteristics						
Drain-Source Breakdown Voltage	BV_{DSS}	V_{GS}=0V I_D=250μA	20		-	V
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS}=20V,V_{GS}=0V	-	-	1	μA
Gate-Body Leakage Current	I_{GSS}	V_{GS}=±10V,V_{DS}=0V	-	-	±10	μA
On Characteristics (Note 3)						
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS}=V_{GS},I_D=250μA	0.5	0.7	1	V
Drain-Source On-State Resistance	$R_{DS(ON)}$	V_{GS}=4.5V, I_D=10A	-	7.4	9.8	mΩ
		V_{GS}=2.5V, I_D=2.5A	-	9.2	14.5	
Forward Transconductance	g_{FS}	V_{DS}=4.5V,I_D=5A	5	-	-	S
Dynamic Characteristics (Note4)						
Input Capacitance	C_{lss}	V_{DS}=10V,V_{GS}=0V, F=1.0MHz	-	1655	-	PF
Output Capacitance	C_{oss}		-	265	-	PF
Reverse Transfer Capacitance	C_{rss}		-	230	-	PF
Switching Characteristics (Note 4)						
Turn-on Delay Time	$t_{d(on)}$	V_{DD}=10V,I_D=5A V_{GS}=10V,R_{GEN}=50Ω	-	300	-	nS
Turn-on Rise Time	t_r		-	1000	-	nS
Turn-Off Delay Time	$t_{d(off)}$		-	4000	-	nS
Turn-Off Fall Time	t_f		-	2500	-	nS
Total Gate Charge	Q_g	V_{DS}=10V,I_D=10A, V_{GS}=10V	-	29	-	nC
Gate-Source Charge	Q_{gs}		-	5.2	-	nC
Gate-Drain Charge	Q_{gd}		-	6.3	-	nC
Drain-Source Diode Characteristics						
Diode Forward Voltage (Note 3)	V_{SD}	V_{GS}=0V,I_S=2.3A	-	-	1.2	V

Notes:

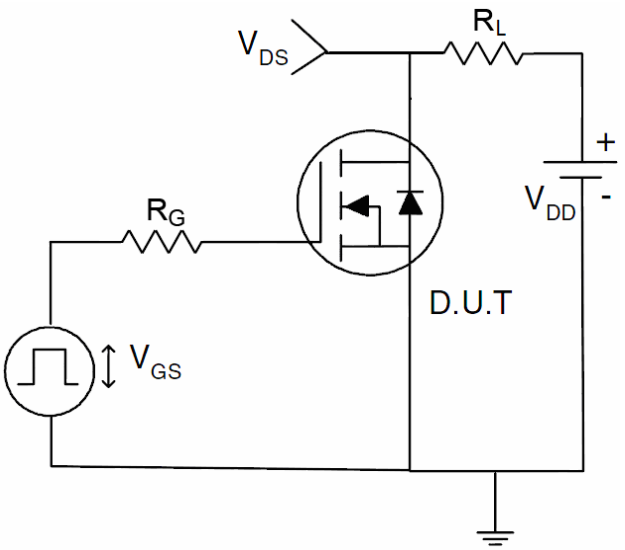
1. Repetitive Rating: Pulse width limited by maximum junction temperature.
2. Surface Mounted on FR4 Board, t ≤ 10 sec.
3. Pulse Test: Pulse Width ≤ 300μs, Duty Cycle ≤ 2%.
4. Guaranteed by design, not subject to production

Test Circuit

1) Gate Charge Test Circuit



2) Switch Time Test Circuit



Typical Electrical and Thermal Characteristics (Curves)

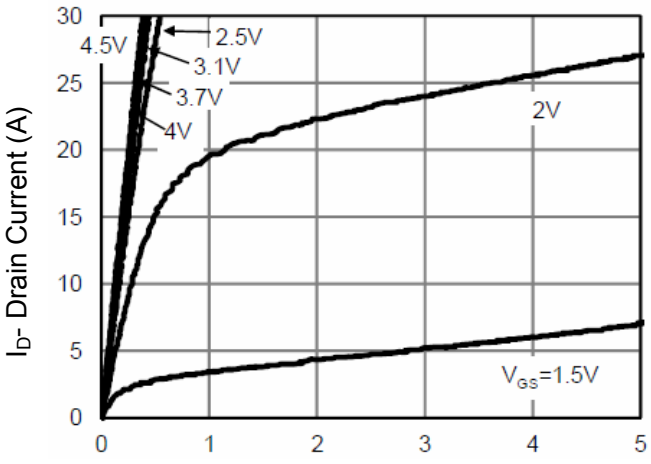


Figure 1 Output Characteristics

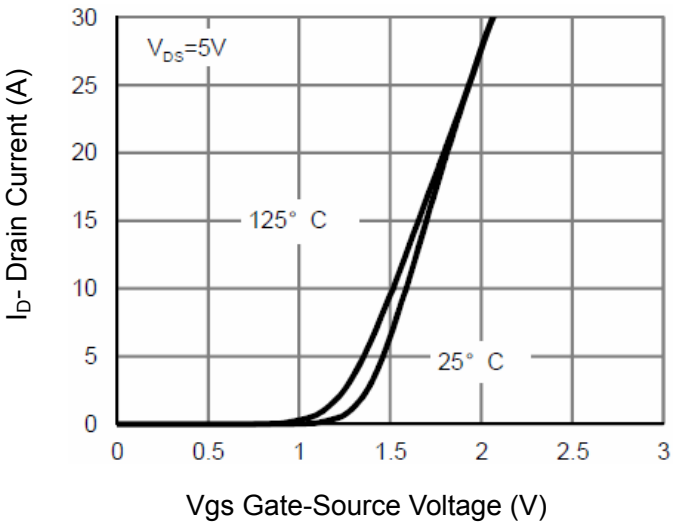


Figure 2 Transfer Characteristics

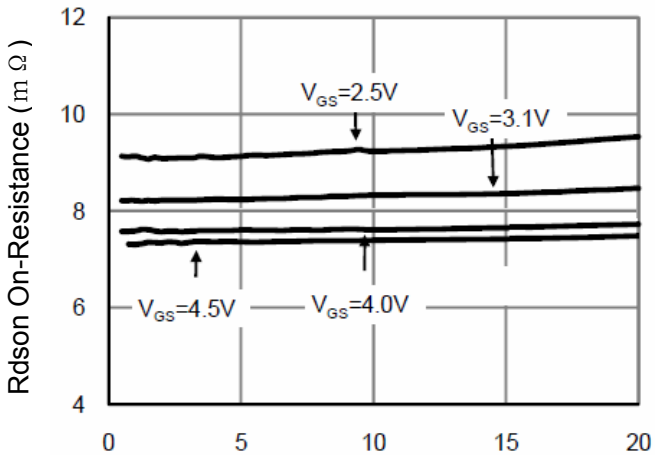


Figure 3 Rdson- Drain Current

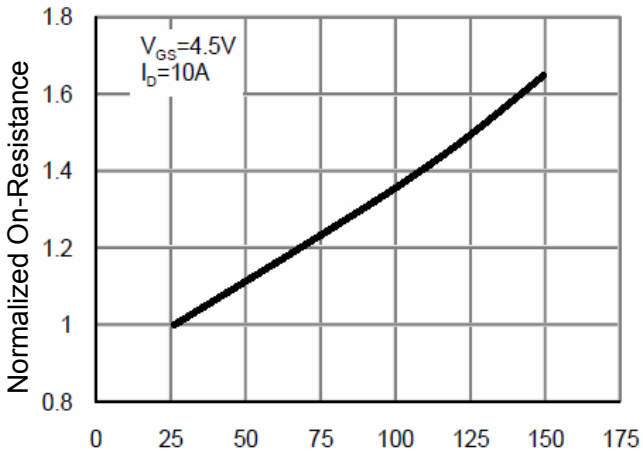


Figure 4 Rdson-Junction Temperature

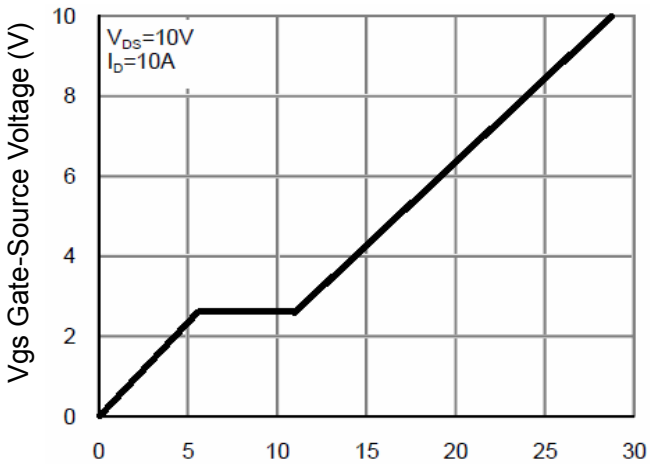


Figure 5 Gate Charge

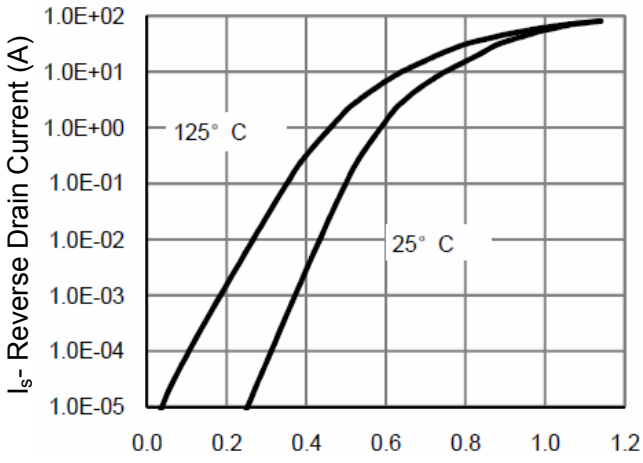


Figure 6 Source- Drain Diode Forward

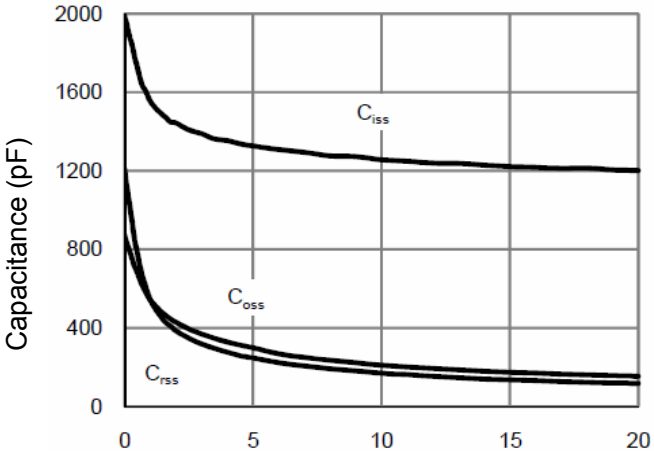


Figure 7 Capacitance vs Vds

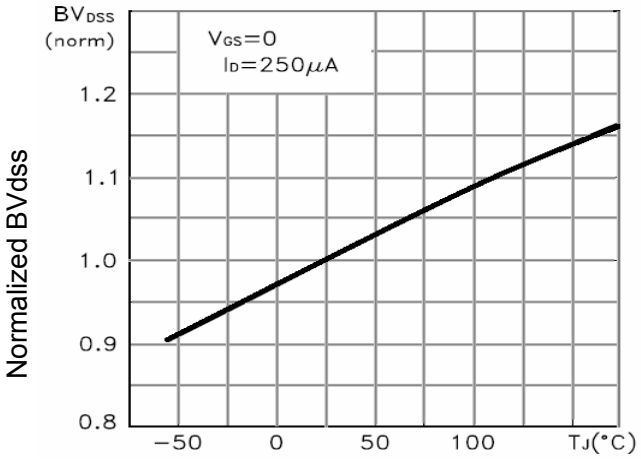


Figure 9 BV_{DSS} vs Junction Temperature

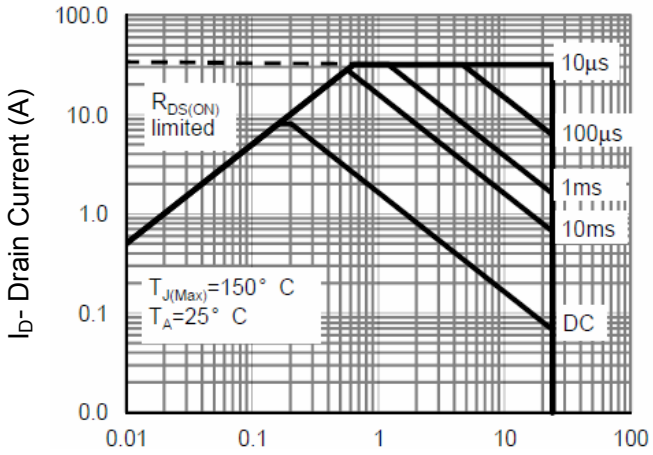


Figure 8 Safe Operation Area

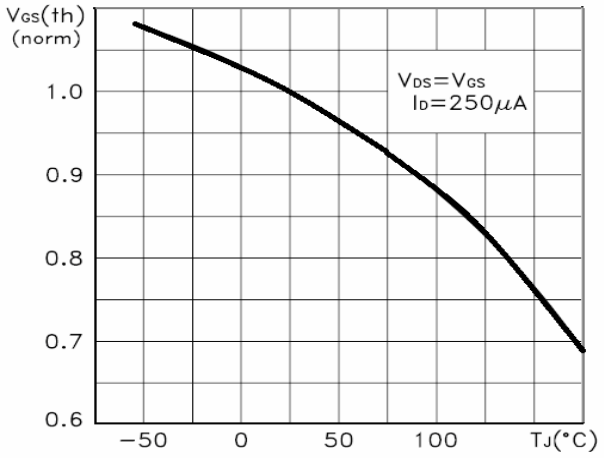


Figure 10 $V_{GS(th)}$ vs Junction Temperature

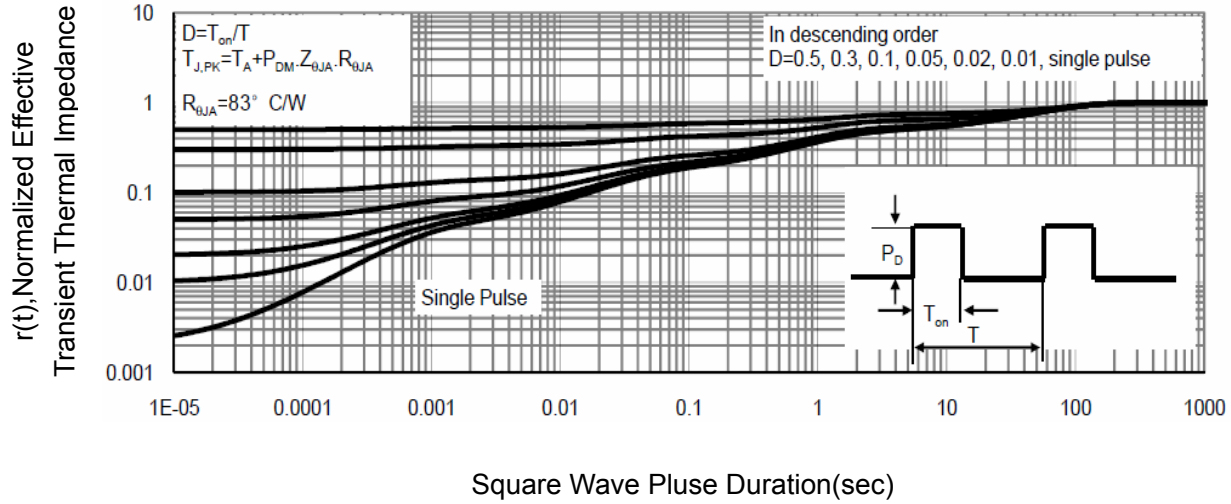
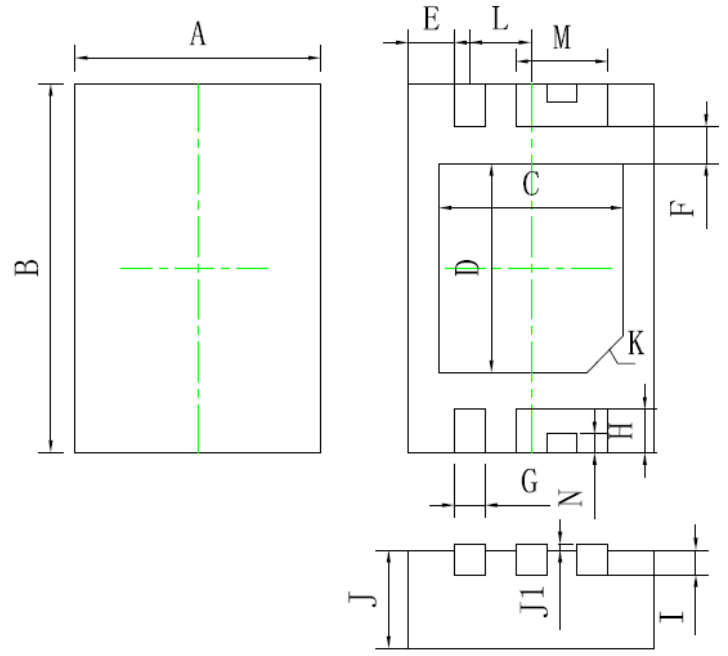


Figure 11 Normalized Maximum Transient Thermal Impedance

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

ATTENTION:

■ FNK reserves the right to make changes to the information herein for the improvement of the design and performance without further notice! Customers should obtain the latest relevant information before placing orders and should verify that such information is complete and current.

■ FNK assumes no responsibility for equipment failures that result from using products at values that exceed, even momentarily, rated values (such as maximum ratings, operating condition ranges, or other parameters) listed in products specifications of any and all FNK products described or contained herein.

■ Specifications of any and all FNK products described or contained herein stipulate the performance, characteristics, and functions of the described products in the independent state, and are not guarantees of the performance, characteristics, and functions of the described products as mounted in the customer's products or equipment. To verify symptoms and states that cannot be evaluated in an independent device, the customer should always evaluate and test devices mounted in the customer's products or equipment.

■ FNKstrives to supply high-quality high-reliability products. However, any and all semiconductor products fail with some probability. It is possible that these probabilistic failures could give rise to accidents or events that could endanger human lives, that could give rise to smoke or fire, or that could cause damage to other property. When designing equipment, adopt safety measures so that these kinds of accidents or events cannot occur. Such measures include but are not limited to protective circuits and error prevention circuits for safe design, redundant design, and structural design.

■ In the event that any or all FNK products(including technical data, services) described or contained herein are controlled under any of applicable local export control laws and regulations, such products must not be exported without obtaining the export license from the authorities concerned in accordance with the above law.

■ Any and all information described or contained herein are subject to change without notice due to product/technology improvement, etc. When designing equipment, refer to the "Delivery Specification" for the FNK product that you intend to use.

■ FNK will supply the best possible product for customers!