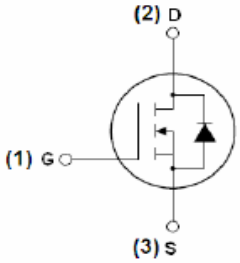
FNK10N02-A

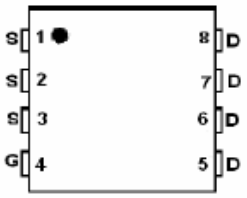
FNK N-Channel Enhancement Mode Power MOSFET

Description

The FNK10N02-A uses advanced trench technology to provide excellent $R_{DS(ON)}$ and low gate charge .It can be used in a wide variety of applications



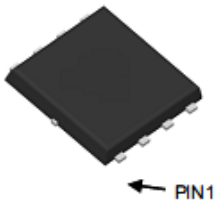
Schematic diagram

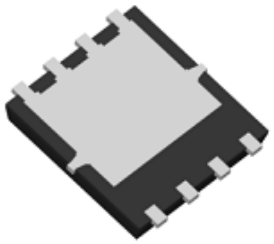


Marking and pin Assignment

General Features

- V_{DS} = 20V,I_D =180A
  $R_{DS(ON)}$ <2.25mΩ @ V_{GS}=10V
- High density cell design for ultra low Rdson
- Fully characterized avalanche voltage and current
- Excellent package for good heat dissipation
- Good stability and uniformity with high EAS
- Special process technology for high ESD capability





DFN5X6

Top View Bottom View

Application

- Load switching
- Power switching application
- Uninterruptible power supply

PACKAGE MARKING AND ORDERING INFORMATION

Device Marking	Device	Device Package	Reel Size	Tape width	Quantity
FNK10N02	FNK10N02-A	DFN5X6-8L	-	-	-

ABSOLUTE MAXIMUM RATINGS(TA=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@ Current-Pulsed (Note 1)	I_D(25℃)	180	A
	I_{DM}	720	A
Maximum Power Dissipation	P_D	83	W
Single pulse avalanche energy(Note 5)	EAS	504	mJ
Operating Junction and Storage Temperature Range	T_J,T_{STG}	-55 To 150	℃

THERMAL CHARACTERISTICS

Thermal Resistance,Junction-to-Ambient (Note 2)	$R_{\theta JA}$	1.5	℃/W

ELECTRICAL CHARACTERISTICS (TA=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			±100	nA
ON CHARACTERISTICS (Note 3)						
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS}=V_{GS},I_D=250μA	0.4	0.8	1.0	V
Drain-Source On-State Resistance	$R_{DS(ON)}$	V_{GS}=4.5 V, I_D=20A		1.95	2.25	mΩ
		V_{GS}=2.5V, I_D=10A		2.05	2.6	mΩ
Forward Transconductance	g_{FS}	V_{DS}=5V,I_D=30A	100			S
DYNAMIC CHARACTERISTICS (Note4)						
Input Capacitance	C_{lss}	V_{DS}=10V,V_{GS}=0V, F=1.0MHz		7870		PF
Output Capacitance	C_{oss}			1510		PF
Reverse Transfer Capacitance	C_{rss}			1300		PF
SWITCHING CHARACTERISTICS (Note 4)						
Delay Time	$t_{d(on)}$	V_{DS}=10V,V_{GS}=10V,R_{GEN}=3Ω RL=0.5Ω		12.5		nS
Turn-on Rise Time	t_r			35.5		nS
Turn-Off Delay Time	$t_{d(off)}$			40		nS
Turn-Off Fall Time	t_f			32.5		nS
Total Gate Charge	Q_g	V_{DS}=10V,I_D=30A,V_{GS}=4.5V		30.4		nC
Gate-Source Charge	Q_{gs}			9.5		nC
Gate-Drain Charge	Q_{gd}			19.8		nC
DRAIN-SOURCE DIODE CHARACTERISTICS						
Diode Forward Voltage (Note 3)	V_{SD}	V_{GS}=0V,I_S=20A			1.2	V
Diode Forward Current (Note 2)	Is				110	A
Reverse Recovery Time	trr	TJ = 25℃, IF = 30A di/dt = 100A/us(Note3)		35.3		nS
Reverse Recovery Charge	Qrr			30.7		nC

NOTES:

1. Repetitive Rating: Pulse width limited by maximum junction temperature.

2. Surface Mounted on 1in^2 FR4 Board, t ≤ 10 sec.

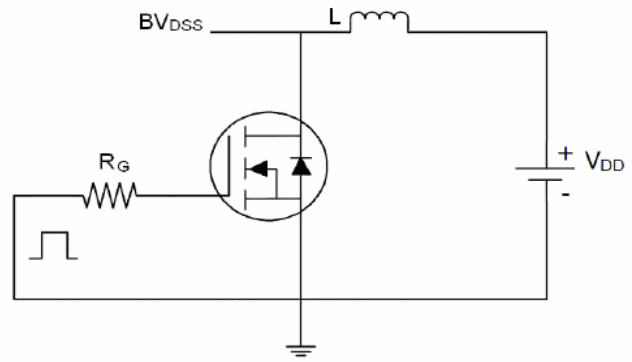
3. Pulse Test: Pulse Width ≤ 300μs, Duty Cycle ≤ 2%.

4. Guaranteed by design, not subject to production testing

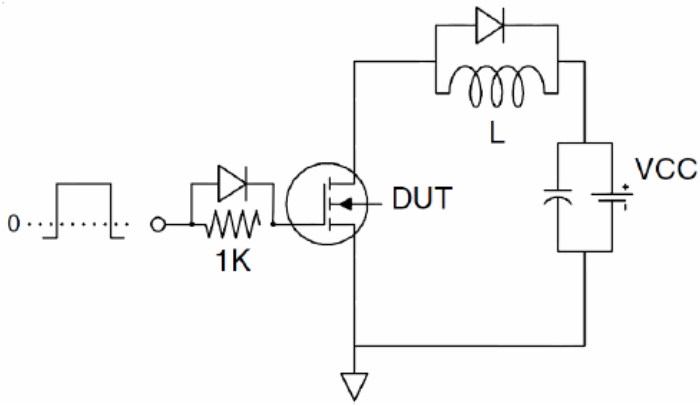
5.EAS condation:Tj=25℃,Vdd=20V.Vg=10V,L=0.5mH,Rg=25Ω

Test circuit

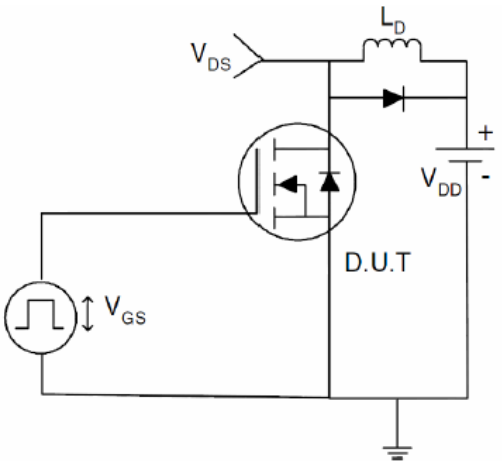
1) EAS Test Circuit



2)Gate Charge Test Circuit



3) Switch Time Test Circuit



Typical Electrical and Thermal Characteristics (Curves)

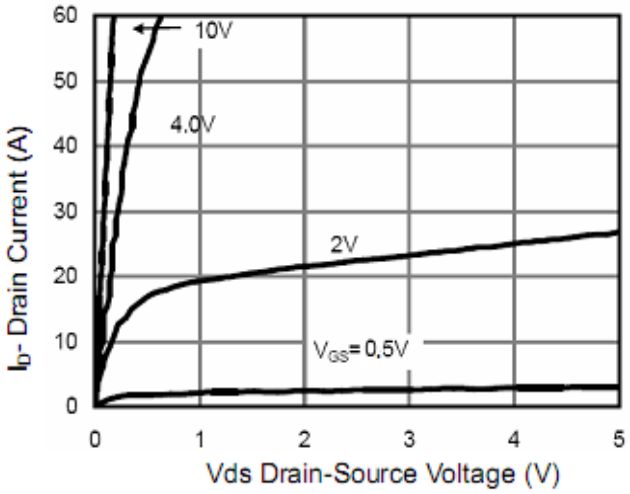


Figure 1 Output Characteristics

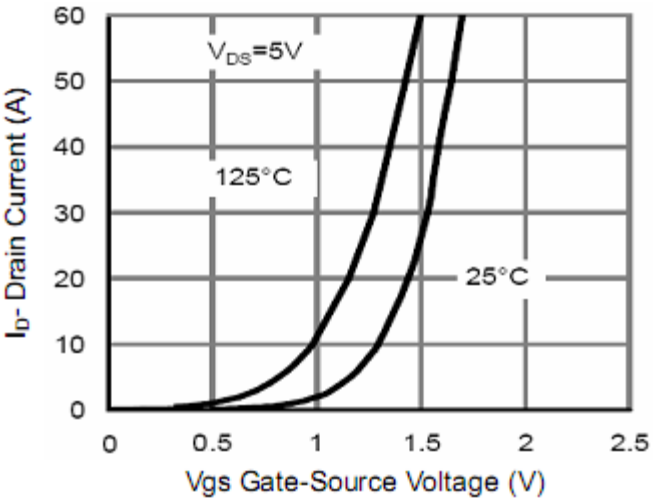


Figure 2 Transfer Characteristics

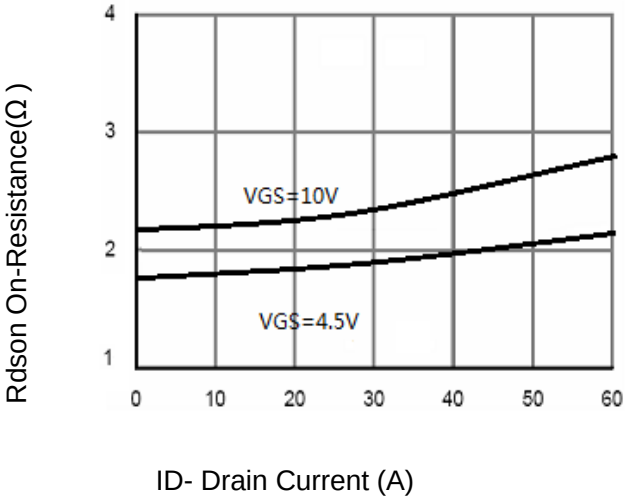


Figure 3 Power Dissipation

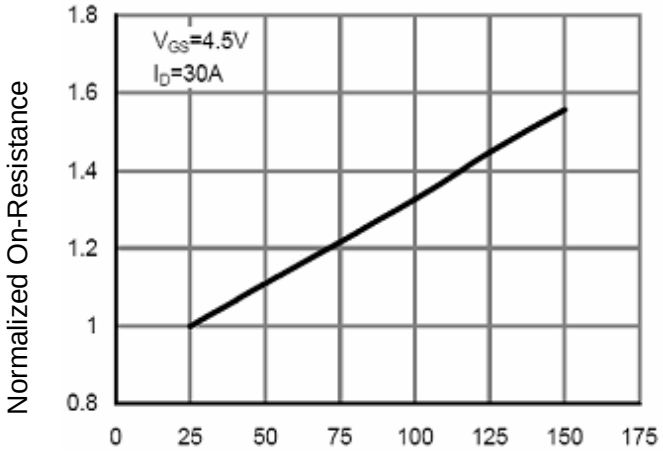


Figure 4 Rdson-Junction Temperature

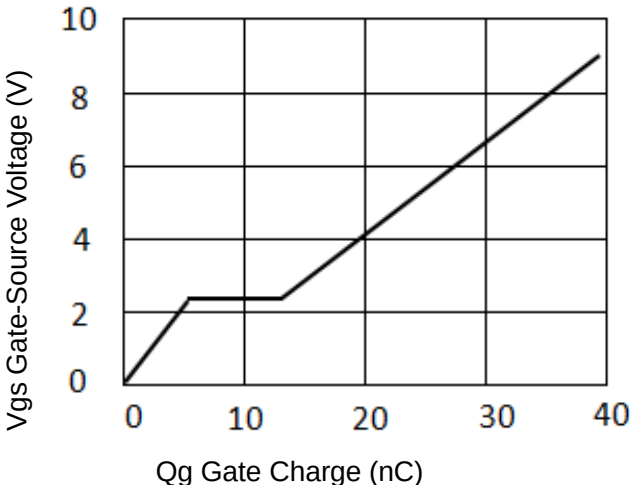


Figure 5 Gate Charge

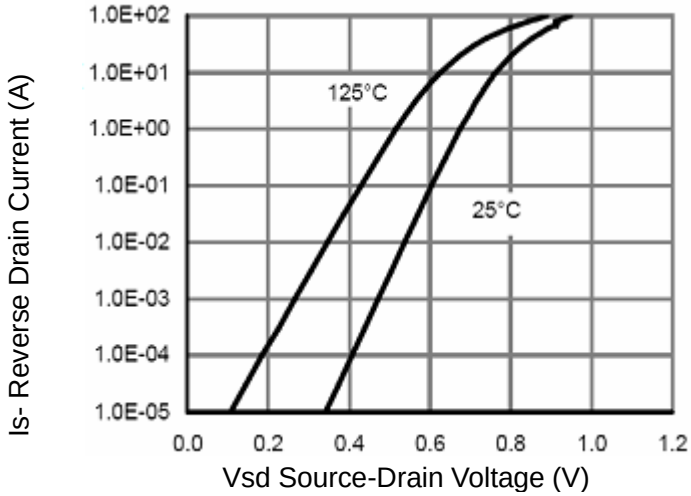


Figure 6 Source- Drain Diode Forward

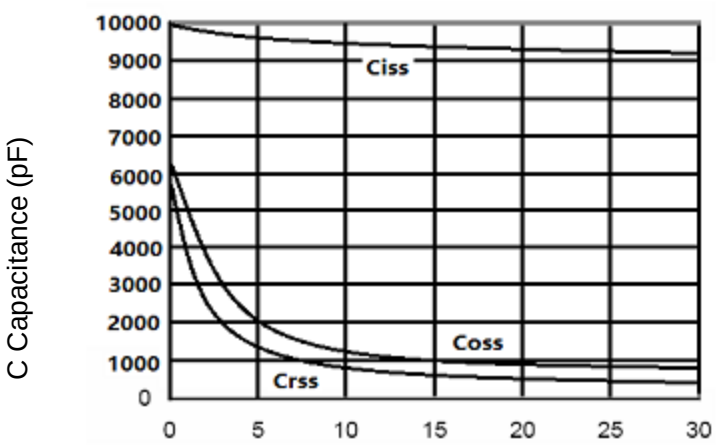


Figure 7 Capacitance vs Vds

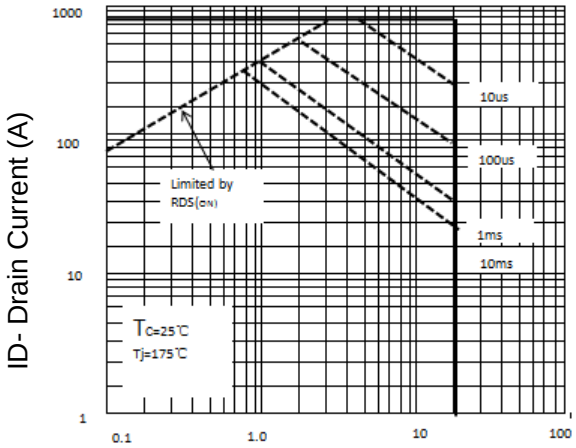


Figure 8 Safe Operation Area

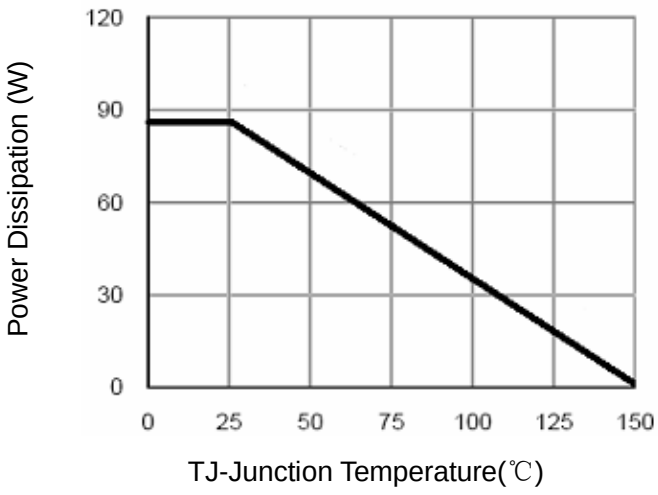


Figure 9 Power De-rating

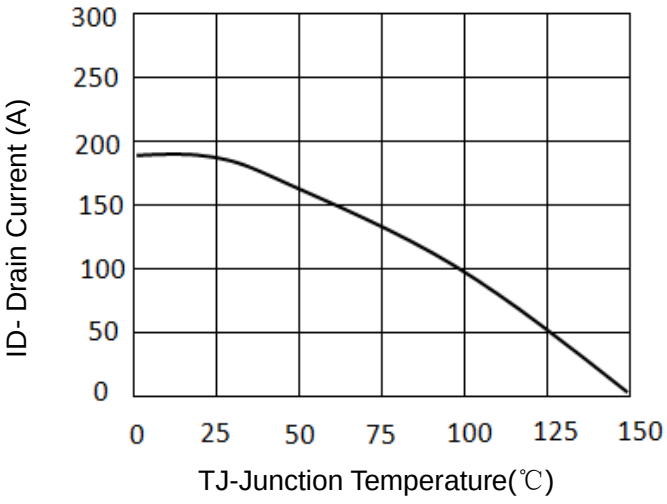


Figure 10 Current De-rating

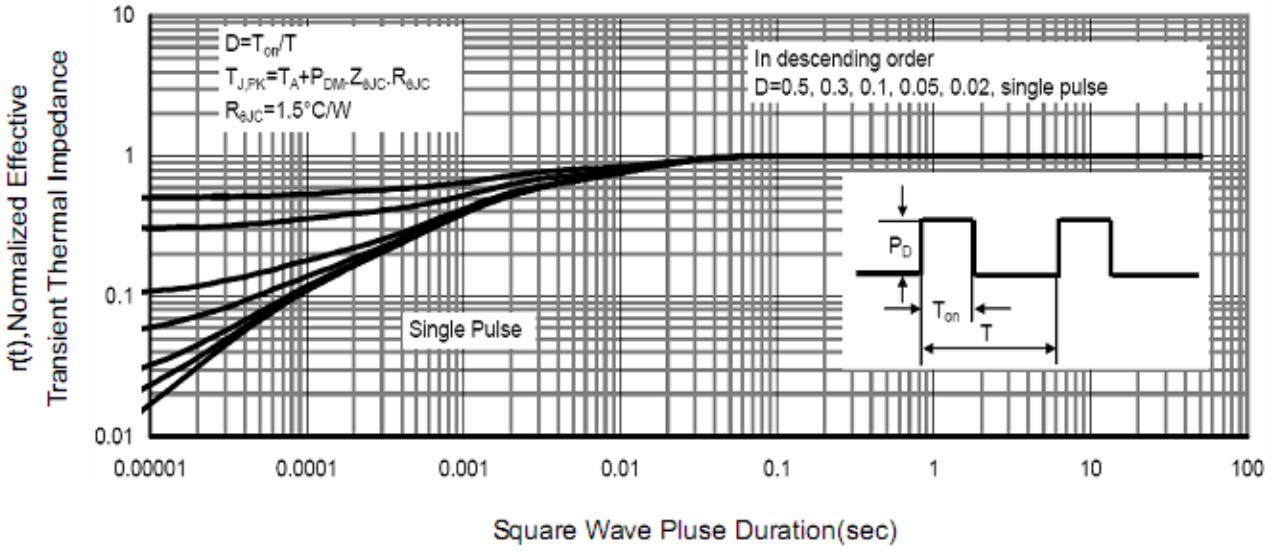
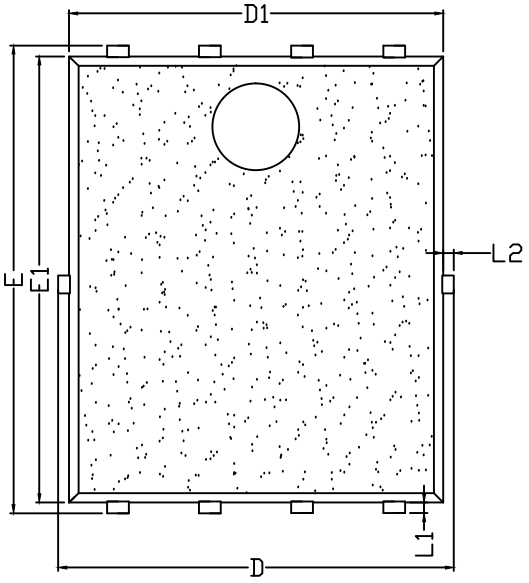
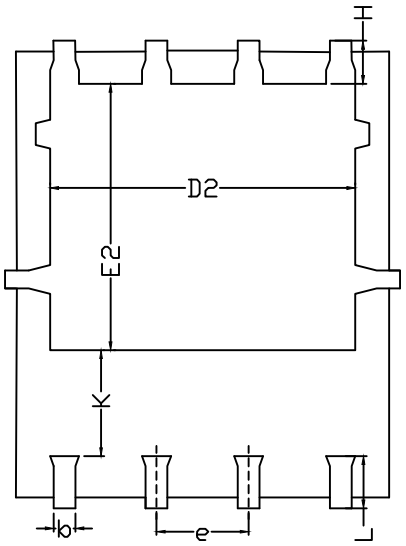
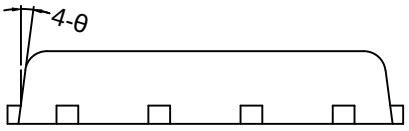


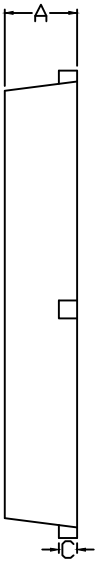
Figure 11 Normalized Maximum Transient Thermal Impedance

DFN5X6 Package Information









SYMBOL	mm		
	MIN	NOM	MAX
*A	0.90	0.95	1.00
*b	0.25	0.30	0.35
*c	0.20	0.25	0.30
D	5.15BSC		
*D1	4.90	5.00	5.10
D2	3.90	4.05	4.20
*e	1.17	1.27	1.37
E	6.15BSC		
*E1	5.75	5.85	5.95
E2	3.35	3.50	3.65
H	0.51	0.61	0.71
K	1.10	–	–
L	0.51	0.61	0.71
L1	0.06	0.13	0.20
L2	–	–	0.12
P	0.95	1.10	1.25
θ	9°	11°	13°

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