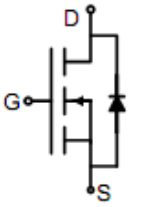
FNK N-Channel Enhancement Mode Power MOSFET

Description

The FNK03N045K uses advanced trench technology and provide excellent $R_{DS(ON)}$ with low gate charge, it can be used in a wide variety of applications.



Schematic diagram

Marking and pin assignment

TO-252-2L top view

General Features

- V_{DS} = 30V,I_D =80 A
  $R_{DS(ON)}$ <8.0mΩ @ V_{GS}=10V
  $R_{DS(ON)}$ <14mΩ @ V_{GS}=4.5V
- High density cell design for ultra low Rdson
- Fully characterized avalanche voltage and current
- Good stability and uniformity with high EAS
- Excellent package for good heat dissipation

Application

- Power switching application
- Hard switched and High frequency circuits
- Uninterruptible power supply

PACKAGE MARKING AND ORDERING INFORMATION

Device Marking	Device	Device Package	Reel Size	Tape width	Quantity
03N045K	FNK03N045K	TO -252			

ABSOLUTE MAXIMUM RATINGS(TA=25℃unless otherwise noted)

Parameter	Symbol	Limit	Unit
Drain-Source Voltage	V_{DS}	30	V
Gate-Source Voltage	V_{GS}	±20	V
Drain Current-Continuous@ Current-Pulsed (Note 1)	I_D(25℃)	80	A
	I_{DM}	320	A
Maximum Power Dissipation	P_D	108	W
Single pulse avalanche energy(Note 5)	EAS	30	mJ

Operating Junction and Storage Temperature Range	T_J,T_{STG}	-55 To 150	℃

THERMAL CHARACTERISTICS

Thermal Resistance,Junction-to-Case (Note 2)	$R_{\theta Jc}$	1.15	℃/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	30			V
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS}=30V,V_{GS}=0V			1	μA
Gate-Body Leakage Current	I_{GSS}	V_{GS}=±20V,V_{DS}=0V			±100	nA
ON CHARACTERISTICS (Note 3)						
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS}=V_{GS},I_D=250μA	1.08	1.65	2.38	V
Drain-Source On-State Resistance	$R_{DS(ON)}$	V_{GS}=10V, I_D=10A		5.5	8.0	mΩ
Drain-Source On-State Resistance	$R_{DS(ON)}$	V_{GS}=4.5V, I_D=6A		7.5	14	mΩ
DYNAMIC CHARACTERISTICS (Note4)						
Input Capacitance	C_{lss}	V_{DS}=15V,V_{GS}=0V, F=1.0MHz		1200		PF
Output Capacitance	C_{oss}			200		PF
Reverse Transfer Capacitance	C_{rss}			130		PF
SWITCHING CHARACTERISTICS (Note 4)						
Delay Time	$t_{d(on)}$	V_{DS}=15V, V_{DS}=15V,R_{GEN}=6Ω R_L=1Ω,ID=14A		3		nS
Turn-on Rise Time	t_r			80		nS
Turn-Off Delay Time	$t_{d(off)}$			30		nS
Turn-Off Fall Time	t_f			10		nS
Total Gate Charge	Q_g	V_{DS}=15V,I_D=20A,V_{GS}=15V		26		nC
Gate-Source Charge	Q_{gs}			11		nC
Gate-Drain Charge	Q_{gd}			9		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)	Is				40	A
Reverse Recovery Time	trr	TJ = 25℃, IF =1A di/dt = 100A/us (Note3)		78		ns
Reverse Recovery Charge	Qrr			51		nc

NOTES:

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

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

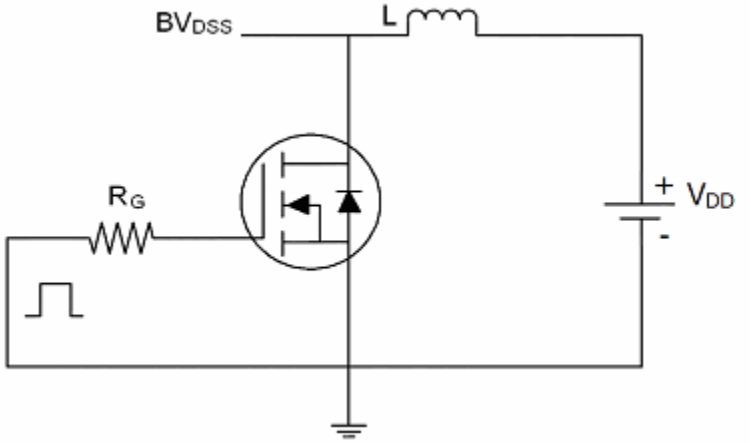
3. Pulse Test: Pulse Width ≤ 300μs, Duty Cycle ≤ 2%.

4. Guaranteed by design, not subject to production testing

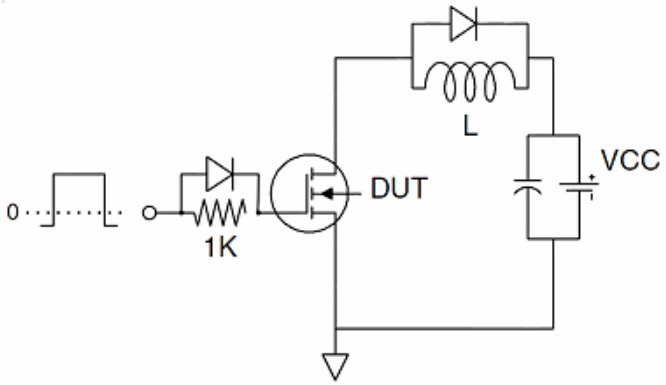
5.EAS condition Tj=25 ,VDD=15V,VG=10V,L=0.5mH,Rg=25

Test circuit

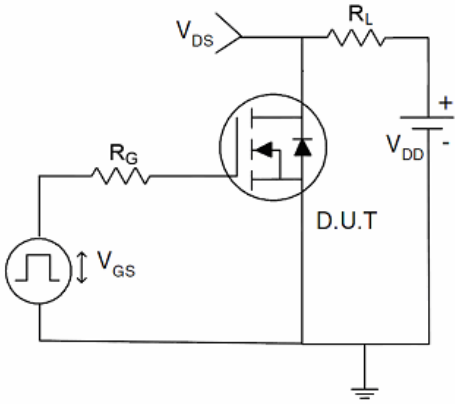
1) EAS test Circuits



2) Gate charge test Circuit



3) Switch Time Test Circuit



TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

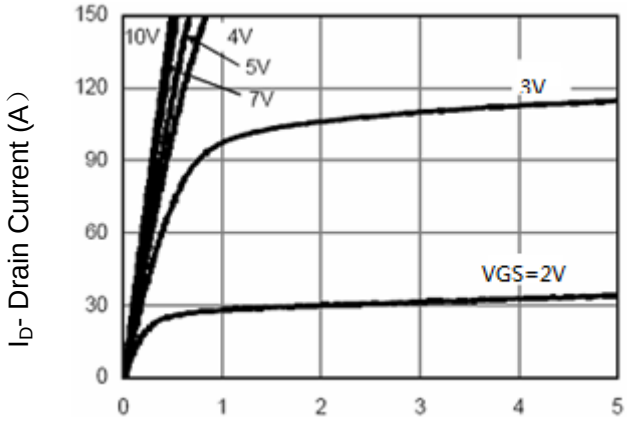


Figure 1 Output Characteristics

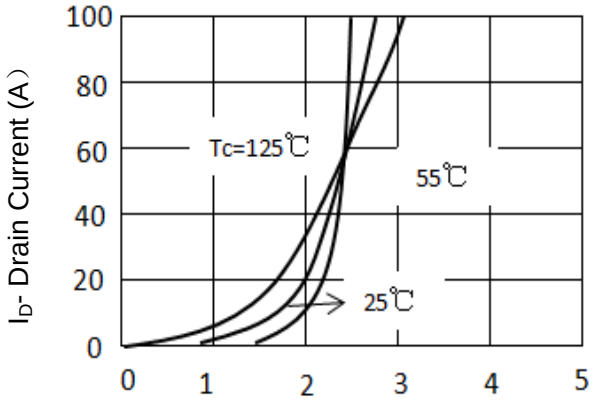


Figure2 Transfer Characteristics

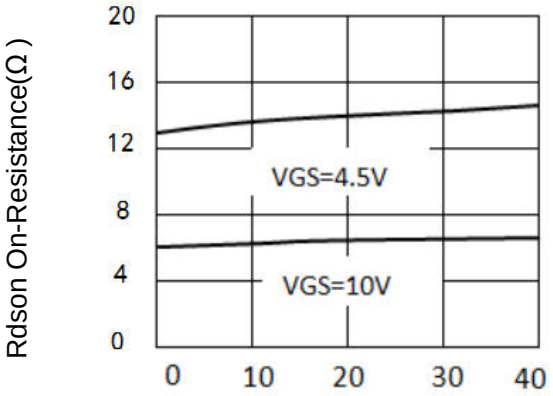


Figure 3 Drain-Source On-Resistance

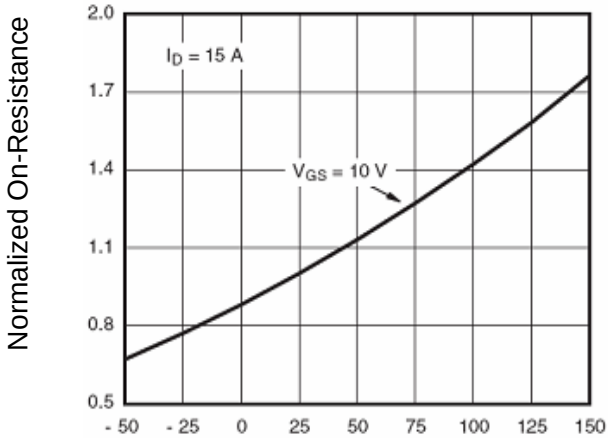


Figure 4 Rdson-Junction Temperature

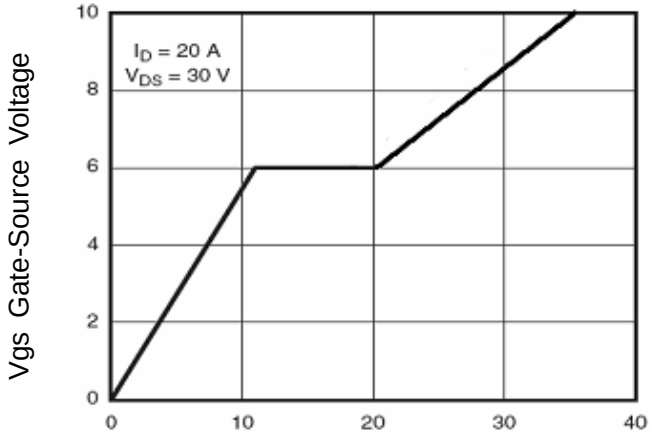


Figure 5 Gate Charge

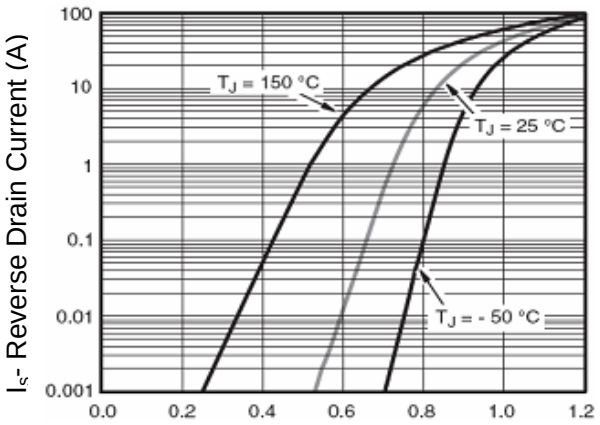


Figure 6 Source- Drain Diode Forward

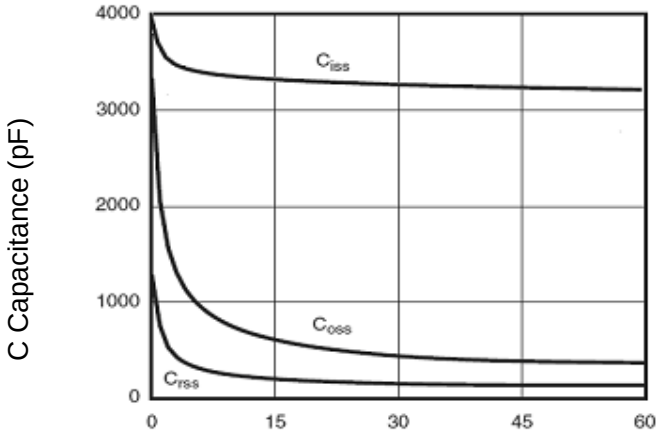


Figure 7 Capacitance vs Vds

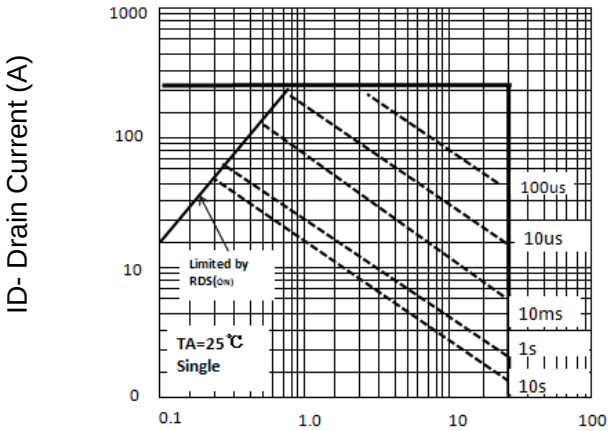


Figure 8 Safe Operation Area

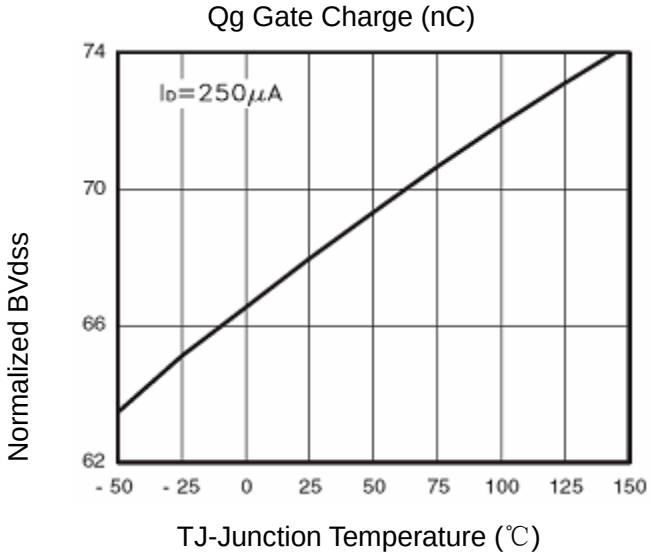


Figure 9 BVDSS vs JunctionTemperature

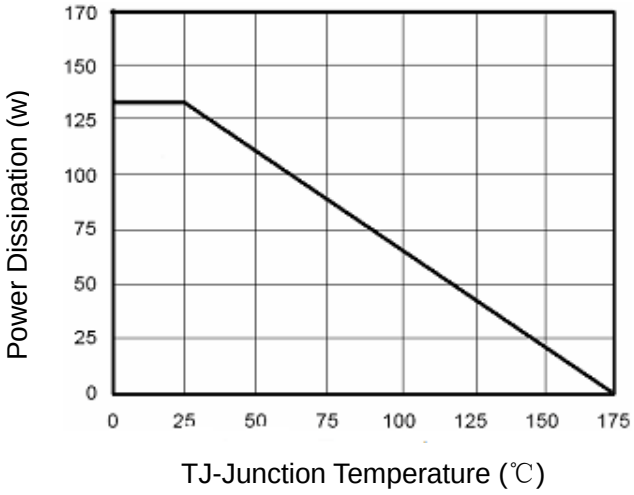


Figure 10 Power De-rating

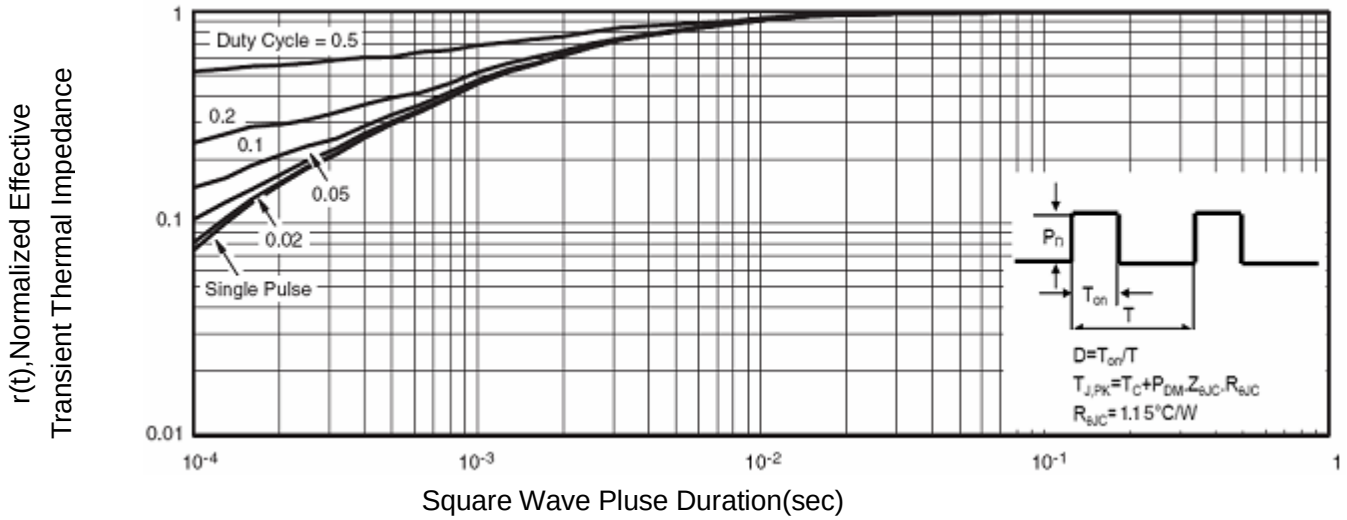
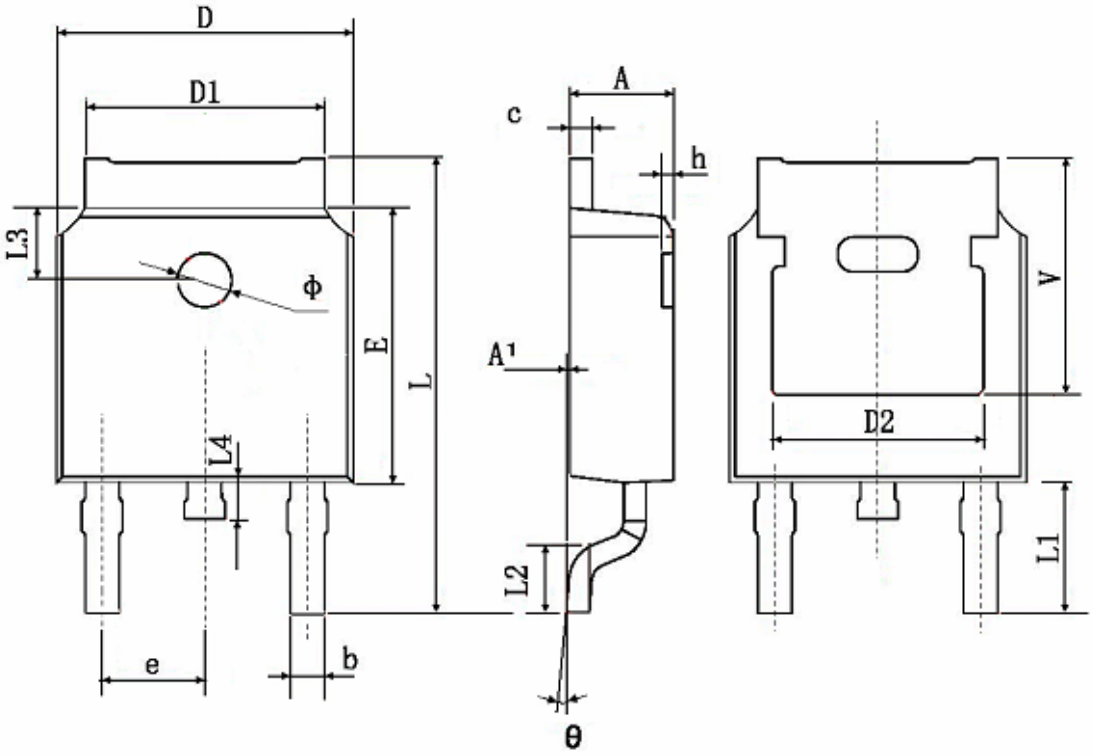


Figure 11 Normalized Maximum Transient Thermal Impedance

TO-252 PACKAGE INFORMATION



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	2.200	2.400	0.087	0.094
A1	0.000	0.127	0.000	0.005
b	0.660	0.860	0.026	0.034
c	0.460	0.580	0.018	0.023
D	6.500	6.700	0.256	0.264
D1	5.100	5.460	0.201	0.215
D2	4.830 TYP.		0.190 TYP.	
E	6.000	6.200	0.236	0.244
e	2.186	2.386	0.086	0.094
L	9.800	10.400	0.386	0.409
L1	2.900 TYP.		0.114 TYP.	
L2	1.400	1.700	0.055	0.067
L3	1.600 TYP.		0.063 TYP.	
L4	0.600	1.000	0.024	0.039
Φ	1.100	1.300	0.043	0.051
θ	0°	8°	0°	8°
h	0.000	0.300	0.000	0.012
V	5.350 TYP.		0.211 TYP.	

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