

FNK N-Channel Enhancement Mode Power MOSFET

Description

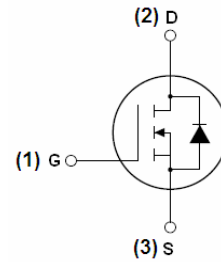
The FNK01N17T uses advanced trench technology and design to provide excellent $R_{DS(ON)}$ with low gate charge. It can be used in a wide variety of applications.

General Features

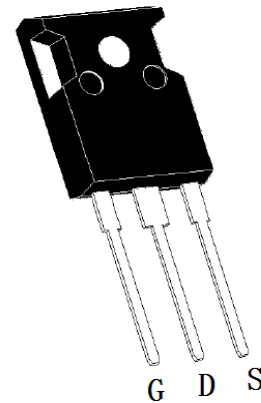
- $V_{DS} = 100V, I_D = 170A$
 $R_{DS(ON)} < 5.0m\Omega @ V_{GS} = 10V$ (Typ: 4.1m Ω)
- High density cell design for ultra low Rdson
- Fully characterized avalanche voltage and current
- Good stability and uniformity with high E_{AS}
- Excellent package for good heat dissipation
- Special process technology for high ESD capability

Application

- Power switching application
- Load switching
- Uninterruptible power supply



Schematic diagram



TO-247 top view

Package Marking and Ordering Information

Device Marking	Device	Device Package	Reel Size	Tape width	Quantity
FNK01N17T	FNK01N17T	TO-247	-	-	-

Absolute Maximum Ratings ($T_C = 25^\circ C$ unless otherwise noted)

Parameter	Symbol	Limit	Unit
Drain-Source Voltage	V_{DS}	100	V
Gate-Source Voltage	V_{GS}	± 20	V
Drain Current-Continuous	I_D	170	A
Drain Current-Continuous ($T_C = 100^\circ C$)	$I_D(100^\circ C)$	113	A
Pulsed Drain Current	I_{DM}	680	A
Maximum Power Dissipation	P_D	370	W
Derating factor		2.5	W/ $^\circ C$
Single pulse avalanche energy ^(Note 5)	E_{AS}	635	mJ

Parameter	Symbol	Limit	Unit
Operating Junction and Storage Temperature Range	T_J, T_{STG}	-55 To 175	°C

Thermal Characteristic

Thermal Resistance, Junction-to-Case ^(Note 2)	$R_{\theta JC}$	0.4	°C/W
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Electrical Characteristics ($T_C=25^\circ\text{C}$ unless otherwise noted)

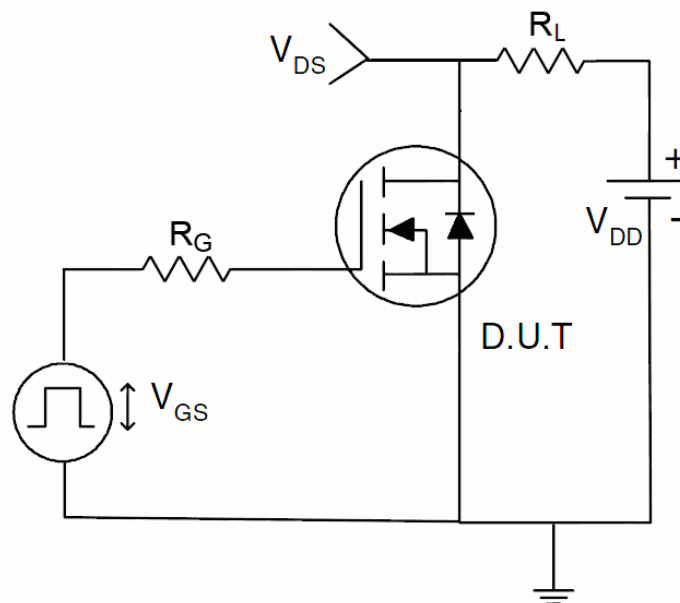
Parameter	Symbol	Condition	Min	Typ	Max	Unit
Off Characteristics						
Drain-Source Breakdown Voltage	BV_{DSS}	$V_{GS}=0V, I_D=250\mu A$	100	-	-	V
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS}=100V, V_{GS}=0V$	-	-	1	μA
Gate-Body Leakage Current	I_{GSS}	$V_{GS}=\pm 20V, V_{DS}=0V$	-	-	±100	nA
On Characteristics ^(Note 3)						
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=250\mu A$	2	3.1	4	V
Drain-Source On-State Resistance	$R_{DS(on)}$	$V_{GS}=10V, I_D=20A$	-	4.1	5.0	mΩ
Forward Transconductance	g_{FS}	$V_{DS}=5V, I_D=20A$	70	-	-	S
Dynamic Characteristics ^(Note 4)						
Input Capacitance	C_{iss}	$V_{DS}=25V, V_{GS}=0V,$ $F=1.0\text{MHz}$	-	7895	-	PF
Output Capacitance	C_{oss}		-	900	-	PF
Reverse Transfer Capacitance	C_{rss}		-	562	-	PF
Switching Characteristics ^(Note 4)						
Turn-on Delay Time	$t_{d(on)}$	$V_{DD}=50V, R_L=2.5\Omega$ $V_{GS}=10V, R_{GEN}=3\Omega$	-	28	-	nS
Turn-on Rise Time	t_r		-	22	-	nS
Turn-Off Delay Time	$t_{d(off)}$		-	43.5	-	nS
Turn-Off Fall Time	t_f		-	14.5	-	nS
Total Gate Charge	Q_g	$V_{DS}=50V, I_D=20A,$ $V_{GS}=10V$	-	139	-	nC
Gate-Source Charge	Q_{gs}		-	34	-	nC
Gate-Drain Charge	Q_{gd}		-	56	-	nC
Drain-Source Diode Characteristics						
Diode Forward Voltage ^(Note 3)	V_{SD}	$V_{GS}=0V, I_S=20A$	-	0.85	1.2	V
Diode Forward Current ^(Note 2)	I_S		-	-	160	A
Reverse Recovery Time	t_{rr}	$T_J = 25^\circ\text{C}, I_F = 20A$ $di/dt = 100A/\mu s$ ^(Note 3)	-	60	90	nS
Reverse Recovery Charge	Q_{rr}		-	177	200	nC

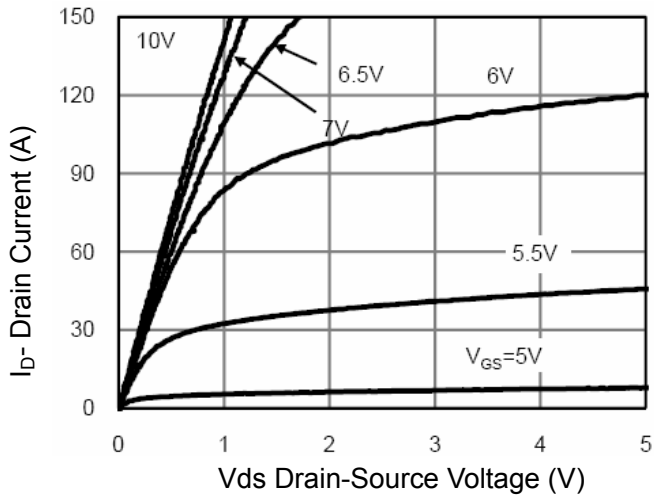
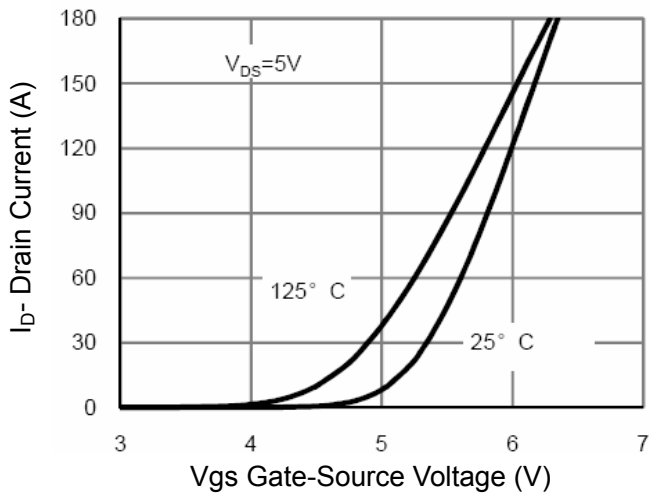
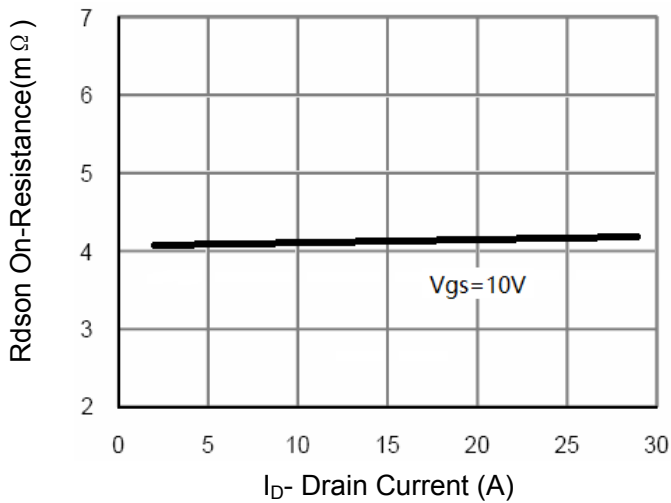
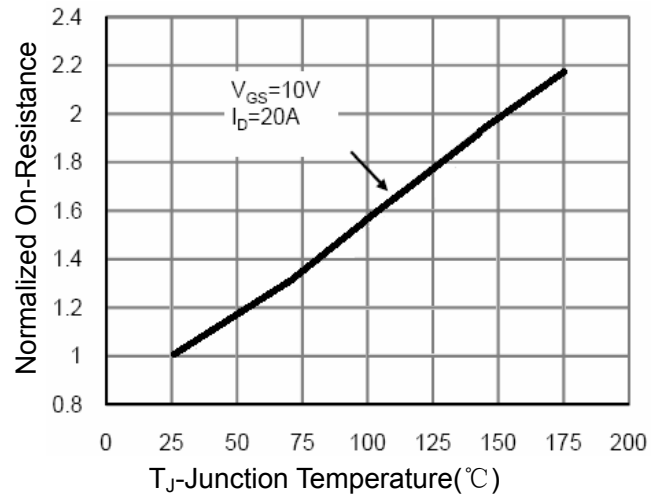
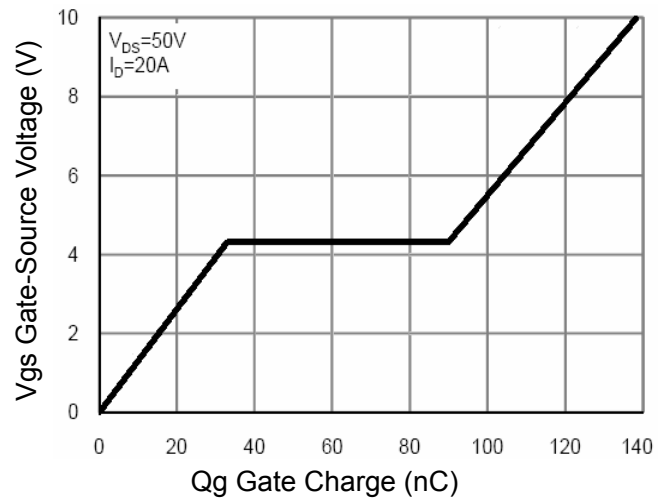
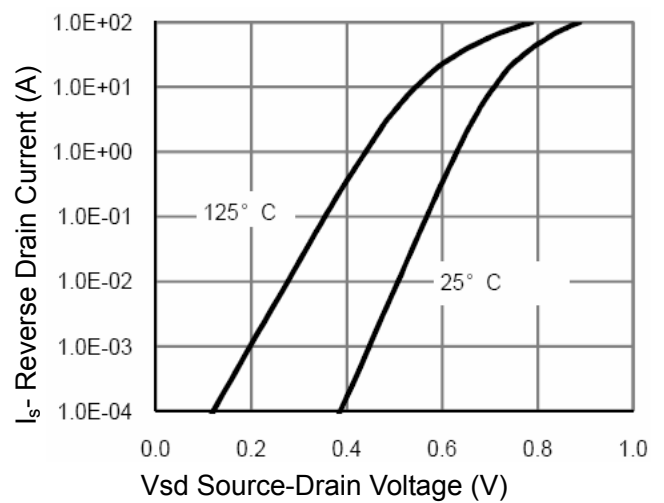
Notes:

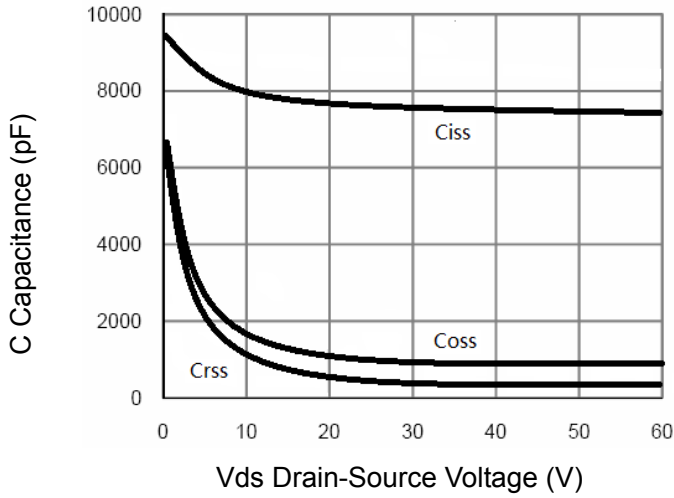
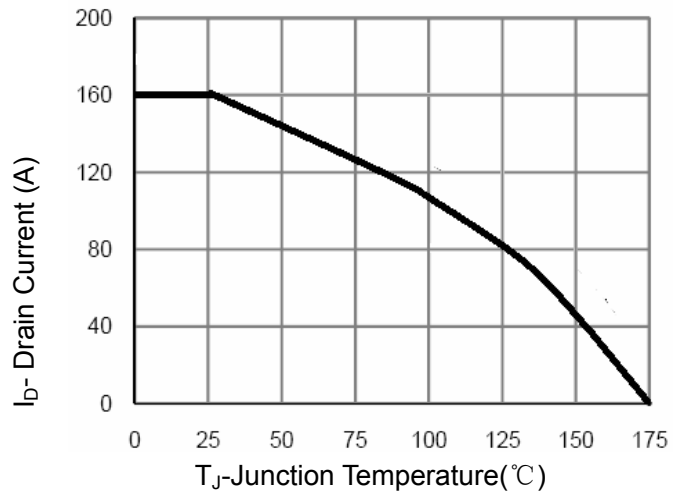
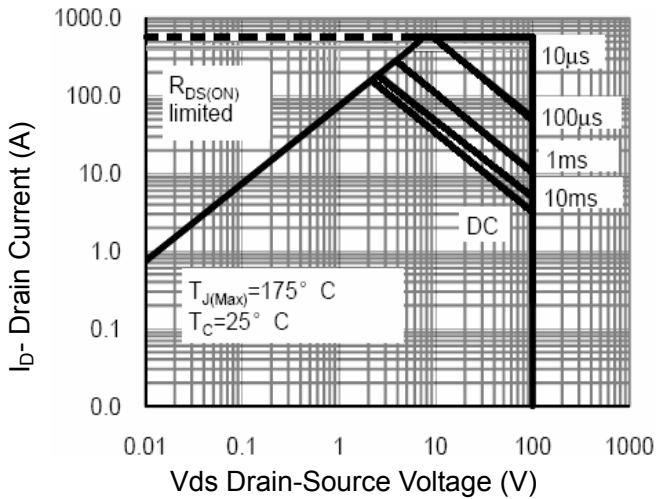
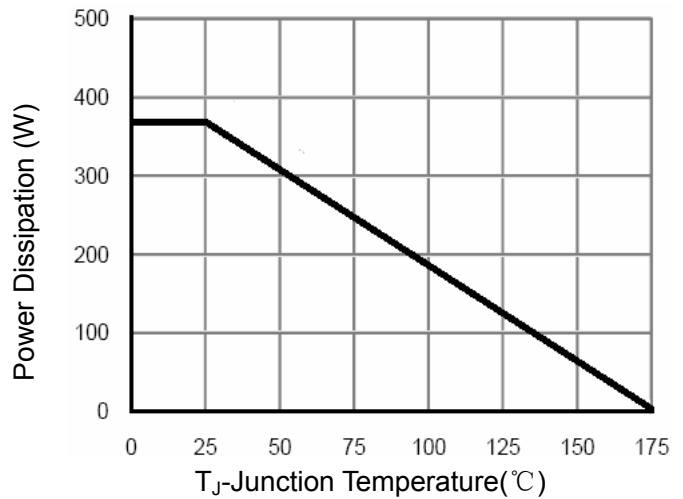
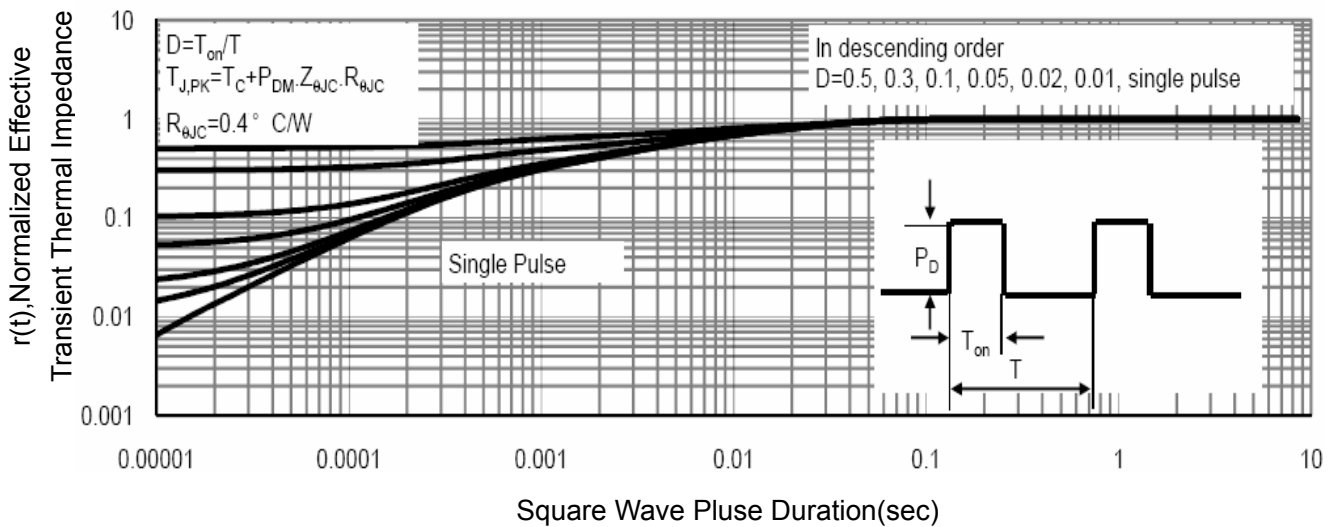
1. Repetitive Rating: Pulse width limited by maximum junction temperature.
2. Surface Mounted on FR4 Board, $t \leq 10$ sec.
3. Pulse Test: Pulse Width $\leq 300\mu s$, Duty Cycle $\leq 2\%$.
4. Guaranteed by design, not subject to production
5. EAS condition: $T_J=25^\circ\text{C}, V_{DD}=50V, V_G=10V, L=1\text{mH}, R_g=25\Omega$

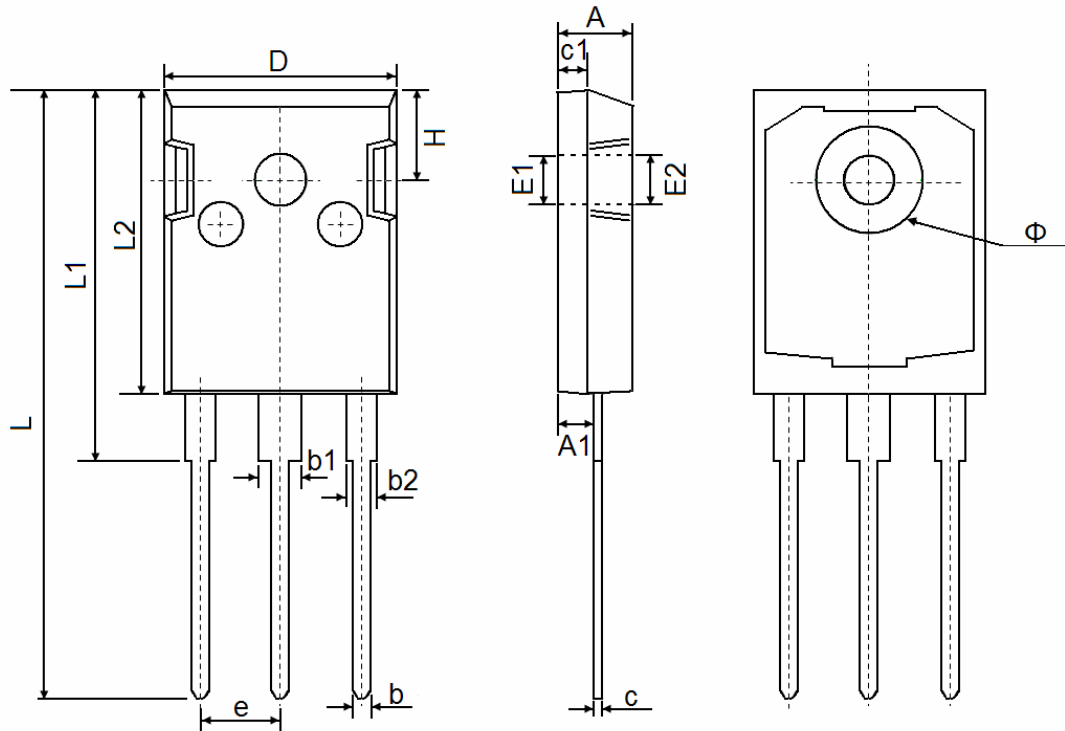
Test Circuit
1) E_{AS} test Circuit

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 $R_{DS(on)}$ - Drain Current

Figure 4 $R_{DS(on)}$ -Junction Temperature

Figure 5 Gate Charge

Figure 6 Source- Drain Diode Forward


Figure 7 Capacitance vs Vds

Figure 9 ID Current- Junction Temperature

Figure 8 Safe Operation Area

Figure 10 Power De-rating

Figure 11 Normalized Maximum Transient Thermal Impedance

TO-247 Package Information


Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	4.850	5.150	0.191	0.200
A1	2.200	2.600	0.087	0.102
b	1.000	1.400	0.039	0.055
b1	2.800	3.200	0.110	0.126
b2	1.800	2.200	0.071	0.087
c	0.500	0.700	0.020	0.028
c1	1.900	2.100	0.075	0.083
D	15.450	15.750	0.608	0.620
E1	3.500 REF		0.138 REF	
E2	3.600 REF		0.142 REF	
L	40.900	41.300	1.610	1.626
L1	24.800	25.100	0.976	0.988
L2	20.300	20.600	0.799	0.811
Φ	7.100	7.300	0.280	0.287
e	5.450 TYP		0.215 TYP	
H	5.980 REF		0.235 REF	

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