



FXN20N50F Series

Rev.A

General Description

The FXN20N50F uses advanced Silicon's MOSFET Technology, which provides high performance in on-state resistance, fast switching performance, and excellent quality.

These devices can also be utilized in industrial applications such as Low Power Drives SMPS, DC/DC converter, and general purpose applications.

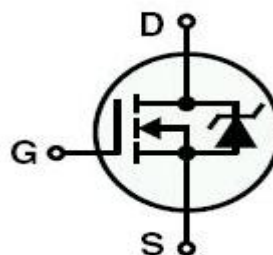
Features

$V_{DS} = 500V$
 $ID = 20A @ V_{GS} = 10V$
Very low on-resistance
 $R_{DS(ON)} < 0.28\Omega @ V_{GS} = 10V$
100% UIL Tested
100% Rg Tested
150 °C operating temperature



TO-220F Top View

N-channel



Schematic Diagram

Absolute Maximum Ratings (TJ =25°C)

Characteristics		Symbol	Rating	Unit
Drain-Source Voltage		VDSS	500	V
Gate-Source Voltage		VGSS	±30	V
Continuous Drain Current (1)	Tc=25°C(silicon limited)	ID	20	A
	Tc=25°C(package limited)		16.4	
	Tc=100°C(silicon limited)		12.2	
Pulsed Drain Current (2)		IDM	72	
Power Dissipation	Tc=25°C	PD	175	W
	Tc=100°C		138	
Single Pulse Avalanche Energy (3)		EAS	1520	mJ
Junction and Storage Temperature Range		TJ, Tstg	-55~175	°C

Thermal Characteristics

Characteristics	Symbol	Rating	Unit
Thermal Resistance, Junction-to-Ambient (1)	RθJA	62.5	°C/W
Thermal Resistance, Junction-to-Case	RθJC	2.08	



Electrical Characteristics (T_J = 25°C)

Characteristics	Symbol	Test Condition	Min	Typ	Max	Unit
Static Characteristics						
Drain-Source Breakdown Voltage	BV _{DSS}	I _D = 250μA, V _{GS} = 0V	500	540	-	V
Gate Threshold Voltage	V _{GS(th)}	V _{DS} = V _{GS} , I _D = 250μA	2	3	4	
Drain Cut-Off Current	I _{DSS}	V _{DS} = 30V, V _{GS} = 0V	-	-	1	μA
Gate Leakage Current	I _{GSS}	V _{GS} = ±30V, V _{DS} = 0V	-	-	±0.1	
Drain-Source ON Resistance	R _{DS(ON)}	V _{GS} = 10V, I _D = 10A	-	0.24	0.28	Ω
Forward Transconductance	g _{fs}	V _{DS} = 10V, I _D = 10A	-	18	-	S
Dynamic Characteristics						
Total Gate Charge	Q _g	V _{DS} = 400V, I _D = 20A, V _{GS} = 10V	-	65	-	nC
Gate-Source Charge	Q _{gs}		-	14	-	
Gate-Drain Charge	Q _{gd}		-	24	-	
Input Capacitance	C _{iss}	V _{DS} = 25V, V _{GS} = 0V, f = 1.0MHz	-	2670	-	pF
Reverse Transfer Capacitance	C _{rss}		-	235	-	
Output Capacitance	C _{oss}		-	360	-	
Turn-On Delay Time	t _{d(on)}	V _{GS} = 10V, V _{DS} = 400V, I _D = 20A, R _G = 25Ω	-	35	-	ns
Rise Time	t _r		-	75	-	
Turn-Off Delay Time	t _{d(off)}		-	165	-	
Fall Time	t _f		-	85	-	
Gate Resistance	R _g	f = 1 MHz	-	-	-	Ω
Drain-Source Body Diode Characteristics						
Source-Drain Diode Forward Voltage	V _{SD}	I _S = 20A, V _{GS} = 0V	-	0.9	1.2	V
Body Diode Reverse Recovery Time	t _{rr}	I _F = 20A, dI/dt = 100A/μs	-	460	-	ns
Body Diode Reverse Recovery Charge	Q _{rr}		-	65	-	μC

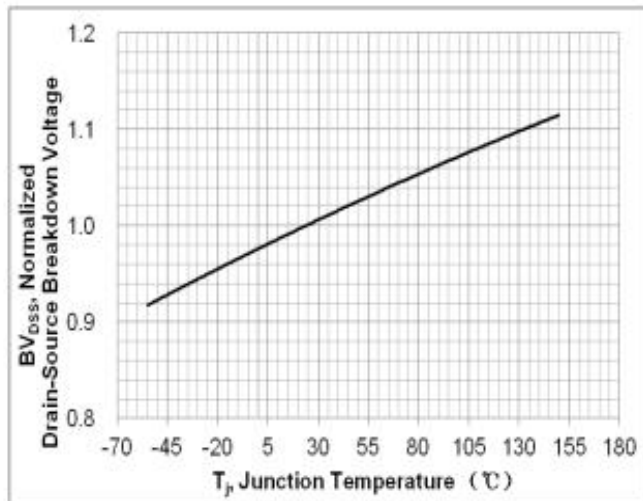
Note

1. Surface mounted FR-4 board by JEDEC (jesd51-7)
2. Pulse width limited by T_{Jmax}
3. E_{AS} is tested at starting T_J = 25°C, L = 6.05mH, I_{AS} = 19.2A, V_{GS} = 10V VDD=50V



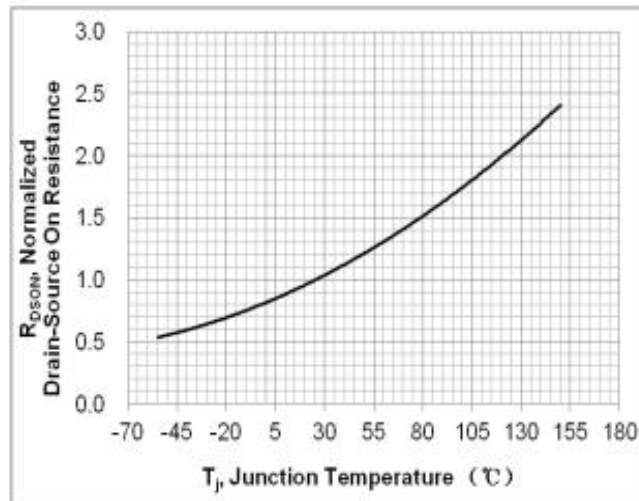
Typical Characteristics (T_J=25°C Noted)

Figure 1. Max BVDss vs Junction Temperature



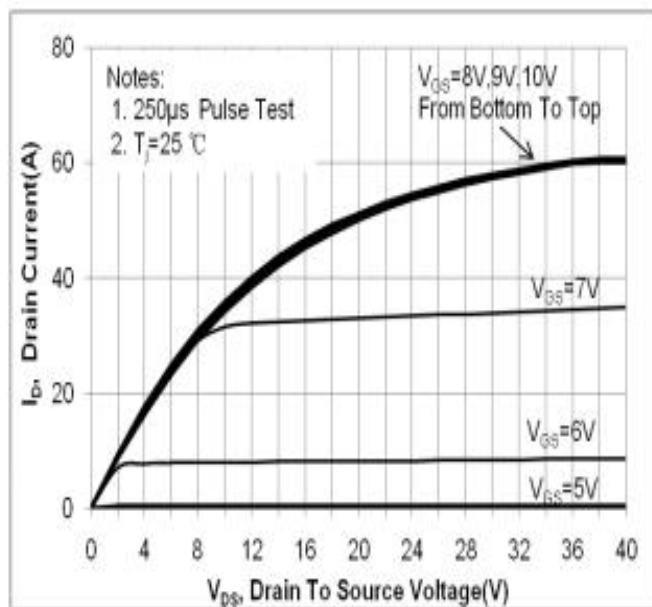
T_J-Junction Temperature(°C)

Figure 2. Drain Current



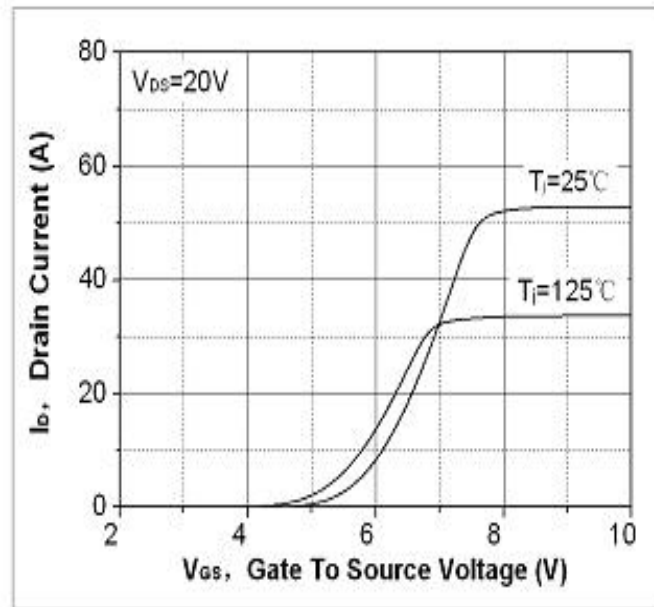
T_J-Junction Temperature(°C)

Figure 3. On-state characteristics



V_{DS} VS V_{GS}

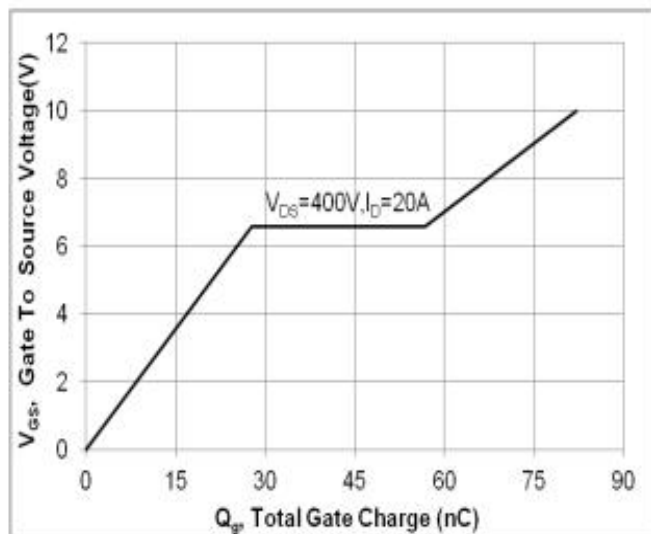
Figure 4. Transfer Characteristics



V_{GS} VS I_{DS}

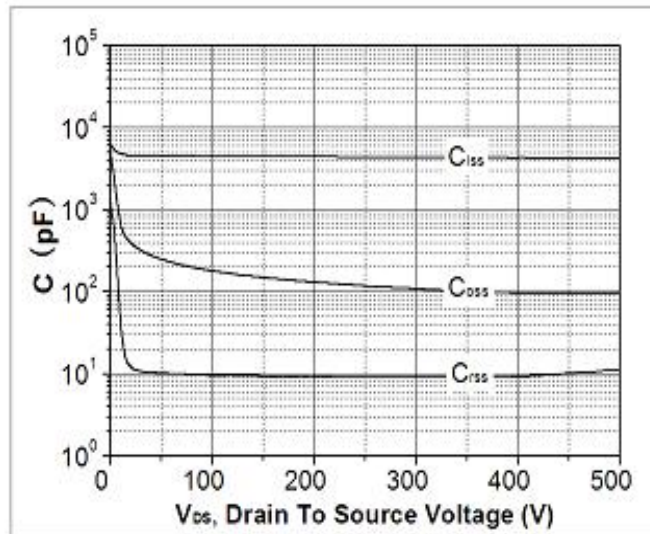


Figure 5. Gate Charge Waveforms



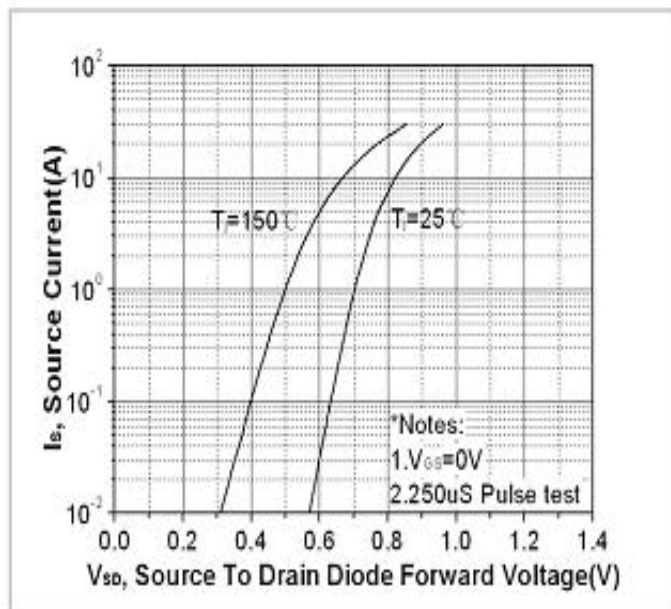
Qg (nc)

Figure 6. Capacitance



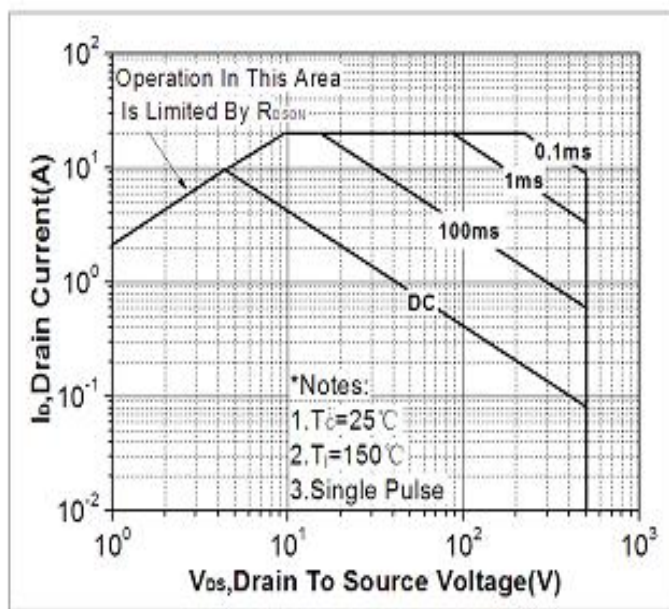
V_{DS} vs Ciss Crss Coss

Figure 7. Body-Diode Characteristics



Vsd (V)

Figure 8. Maximum Safe Operating Area



VDS VS ID



Figure 9. Normalized Maximum Transient Thermal Impedance

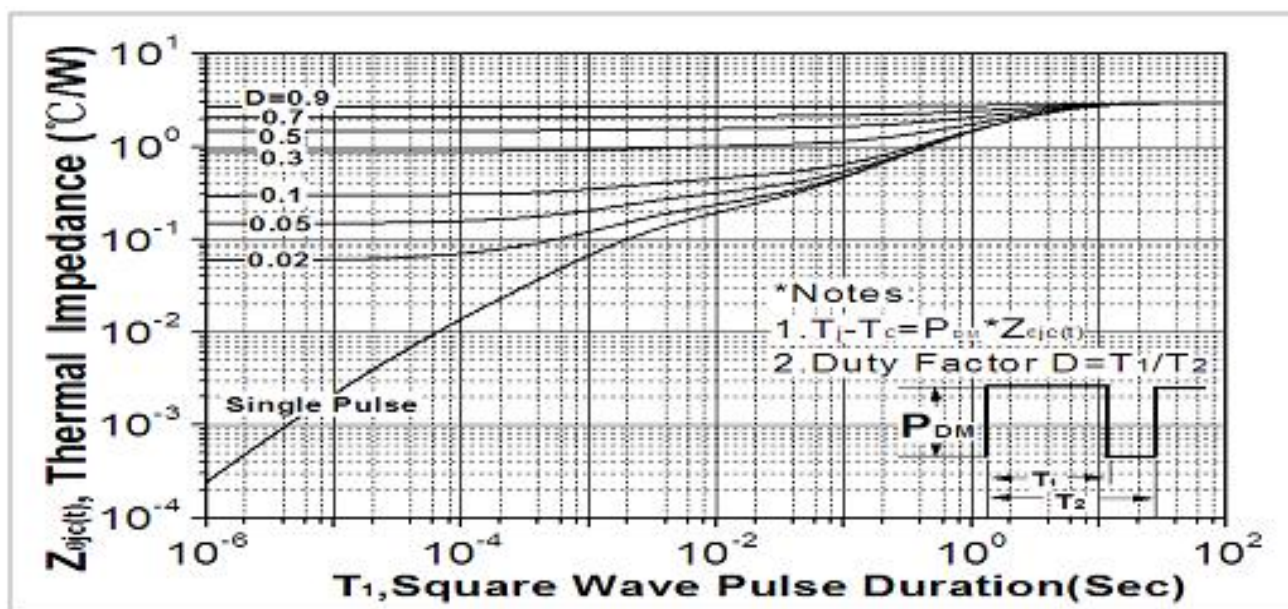
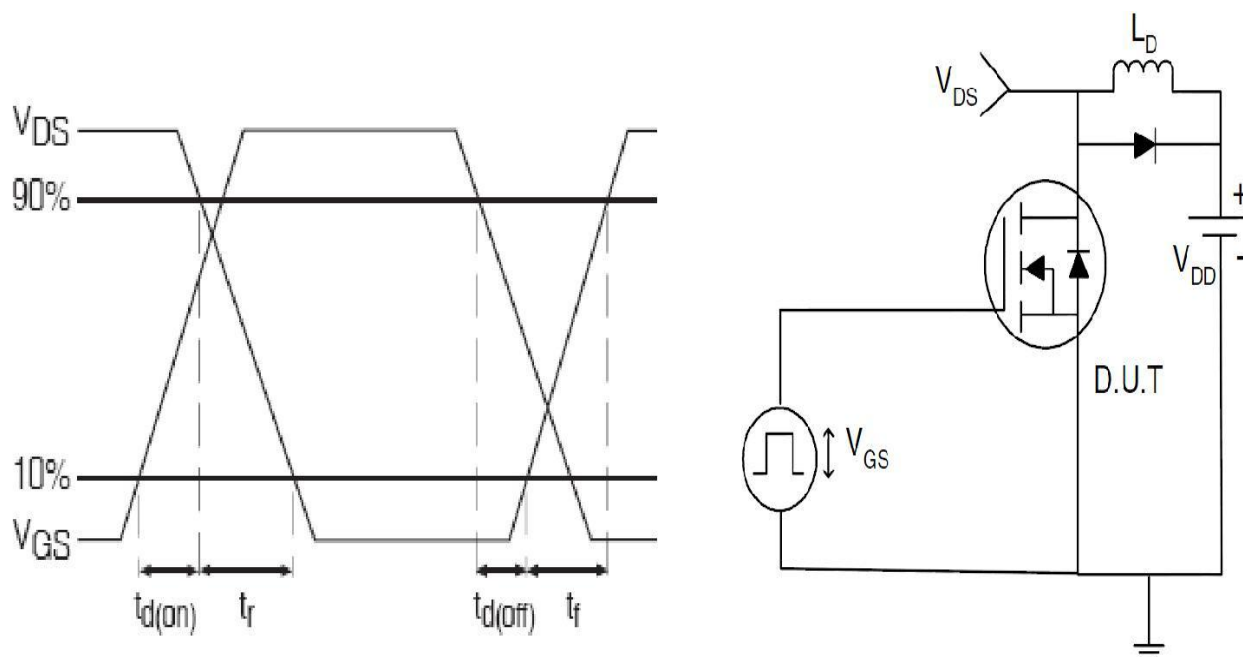
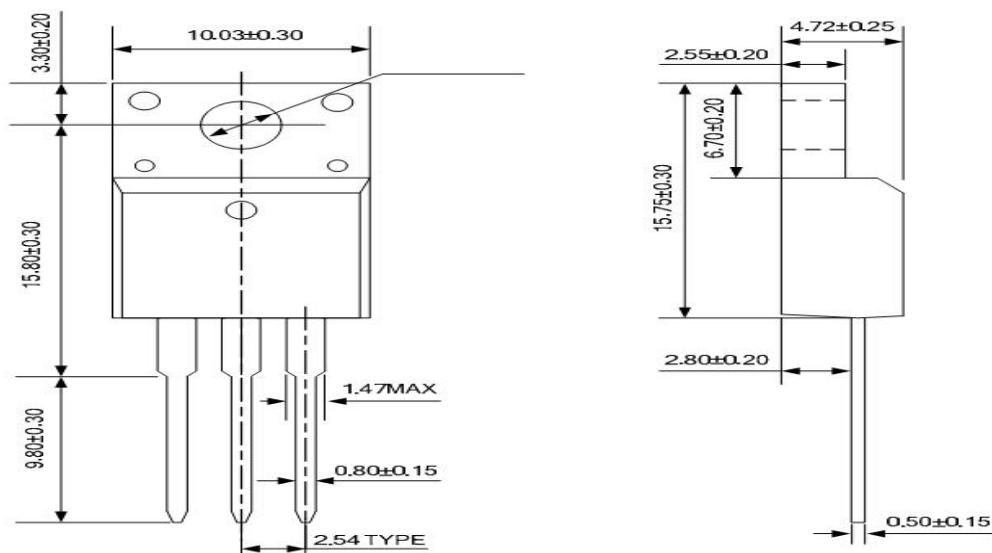


Figure 10. Switch Time Test Circuit:





TO-220F Package Information



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max
A	4.300	4.700	0.169	0.185
A1	2.200	2.600	0.087	0.102
b	0.700	0.950	0.028	0.037
b1	1.170	1.410	0.046	0.056
c	0.450	0.650	0.018	0.026
c1	1.200	1.400	0.047	0.055
D	9.600	10.400	0.378	0.409
E	8.8500	9.750	0.348	0.384
E1	12.650	12.950	0.498	0.510
e	2.540 TYP.		0.100TYP.	
e1	4.980	5.180	0.196	0.204
F	2.650	2.950	0.104	0.116
H	7.900	8.100	0.311	0.319
h	0.000	0.300	0.000	0.012
L	12.750	14.300	0.502	0.563
L1	2.850	3.950	0.112	0.156
V	7.500 REF.		0.295 REF.	
Φ	3.400	4.000	0.134	0.157