



## Description

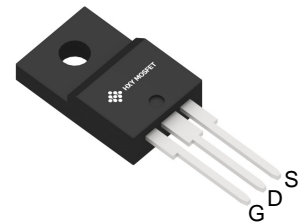
The 18N50F can be used in various power switching circuit for system miniaturization and higher efficiency. The package form is TO-220/TO-220F, which accords with the RoHS standard.

## General Features

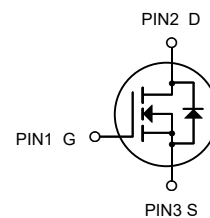
$V_{DS} = 500V, I_D = 18A$   
 $R_{DS(ON)} < 0.38\Omega @ V_{GS}=10V$

## Application

- Power switch circuit of adaptor and charger.



TO-220F



N-Channel MOSFET

## Package Marking and Ordering Information

Product ID	Pack	Marking	Units Tube
18N50F	TO-220F	18N50 XXX YYYY	50

## Absolute Maximum Ratings@T =25°C(unless otherwise specified)

Symbol	Parameter	Limit	Unit
$V_{DSS}$	Drain-to-Source Voltage <sup>[1]</sup>	500	V
$V_{GSS}$	Gate-to-Source Voltage	$\pm 30$	
$I_D @ T_c = 100^\circ C$	Continuous Drain Current @ $T_c = 100^\circ C$	18	A
$I_{DM}$	Pulsed Drain Current at $V_{GS} = 10V$ <sup>[2]</sup>	72	
$E_{AS}$	Single Pulse Avalanche Energy	710	mJ
$P_D$	Power Dissipation	65	W
$T_L$ $T_{PAK}$	Maximum Temperature for Soldering Leads at 0.063in (1.6mm) from Case for 10 seconds, Package Body for 10 seconds	300 260	$^\circ C$
$T_J \& T_{STG}$	Operating and Storage Temperature Range	-55 to 150	
$R_{\theta JC}$	Thermal Resistance, Junction-to-Case	1.92	$^\circ C/W$
$R_{\theta JA}$	Thermal Resistance, Junction-to-Ambient	62.5	

Caution: Stresses greater than those listed in the "Absolute Maximum Ratings" may cause permanent damage to the device.



**Electrical Characteristics**  $T_J = 25^\circ\text{C}$  unless otherwise specified

Symbol	Parameter	Min.	Typ.	Max.	Unit	Test Conditions
$BV_{DSS}$	Drain-to-Source Breakdown Voltage	500	--	--	V	$V_{GS}=0V, I_D=250\mu A$
$I_{DSS}$	Drain-to-Source Leakage Current	--	--	1	$\mu A$	$V_{DS}=500V, V_{GS}=0V$
		--	--	100		$V_{DS}=400V, V_{GS}=0V, T_J=125^\circ\text{C}$
$I_{GSS}$	Gate-to-Source Leakage Current	--	--	+100	$nA$	$V_{GS}=30V, V_{DS}=0V$
		--	--	-100		$V_{GS}=-30V, V_{DS}=0V$
$R_{DS(ON)}$	Static Drain-to-Source On-Resistance	--	0.30	0.38	$\Omega$	$V_{GS}=10V, I_D=6.5A$
$V_{GS(TH)}$	Gate Threshold Voltage	2.0	--	4.0	V	$V_{DS}=V_{GS}, I_D=250\mu A$
gfs	Forward Transconductance	--	11	--	S	$V_{DS}=30V, I_D=13A$
$C_{iss}$	Input Capacitance	--	2100	--	$pF$	$V_{GS}=0V, V_{DS}=25V, f=1.0MHz$
$C_{rss}$	Reverse Transfer Capacitance	--	190	--		
$C_{oss}$	Output Capacitance	--	100	--		
$Q_g$	Total Gate Charge	--	48	--	$nC$	$V_{DD}=400V, I_D=18A, V_{GS}=10V$
$Q_{gs}$	Gate-to-Source Charge	--	11	--		
$Q_{gd}$	Gate-to-Drain (Miller) Charge	--	3.1	--		
$t_{d(ON)}$	Turn-on Delay Time	--	110	--	$ns$	$V_{DD}=300V, I_D=18A, V_{GS}=10V, R_g=25\Omega$
$t_{rise}$	Rise Time	--	70	--		
$t_{d(OFF)}$	Turn-Off Delay Time	--	190	--		
$t_{fall}$	Fall Time	--	100	--		
$I_{SD}$	Continuous Source Current <sup>[2]</sup>	--	--	13	$A$	Integral pn-diode in MOSFET
$I_{SM}$	Pulsed Source Current <sup>[2]</sup>	--	--	52		
$V_{SD}$	Diode Forward Voltage	--	--	1.5	V	$I_S=18A, V_{GS}=0V$
$t_{rr}$	Reverse Recovery Time	--	550	--	$ns$	$V_{GS}=0V, I_f=18A, di/dt=100A/\mu s$
$Q_{rr}$	Reverse Recovery Charge	--	5.5	--	$\mu C$	

**Note:**

[1]  $T_J = +25^\circ\text{C}$  to  $+150^\circ\text{C}$

[2] Pulse width  $\leq 380\mu s$ ; duty cycles  $\leq 2\%$ .



## Typical Characteristics

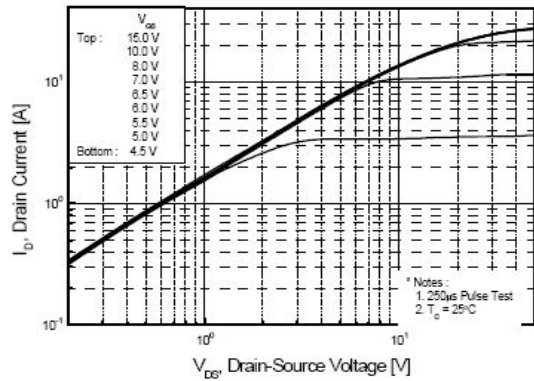


Fig1 Typical Output Characteristics,  $T_c=25^\circ\text{C}$

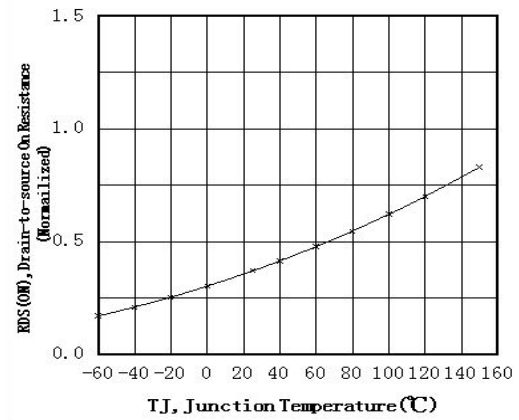


Fig2 On-Resistance Vs. Drain Current and Gate Voltage

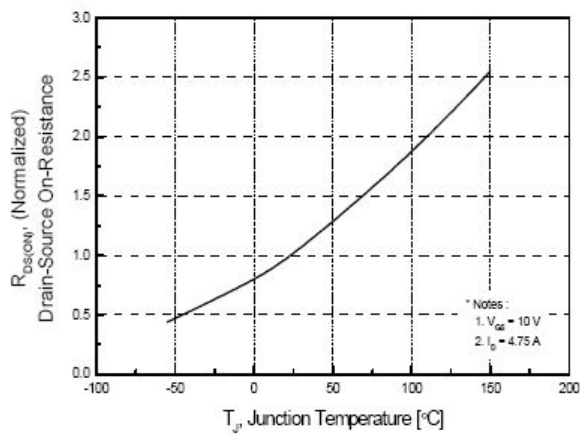


Fig3 Normalized On-Resistance Vs. Temperature

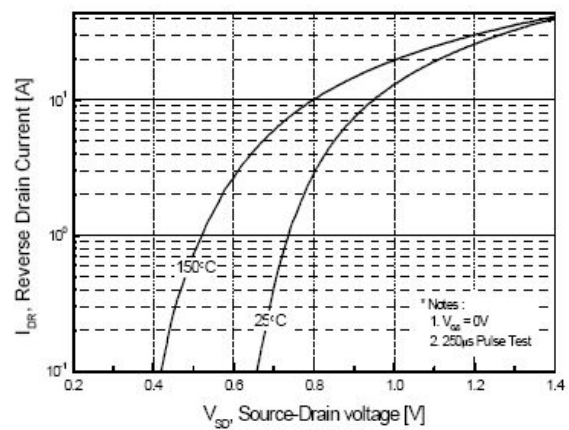


Fig4 Typical Source-Drain Diode Forward Voltage

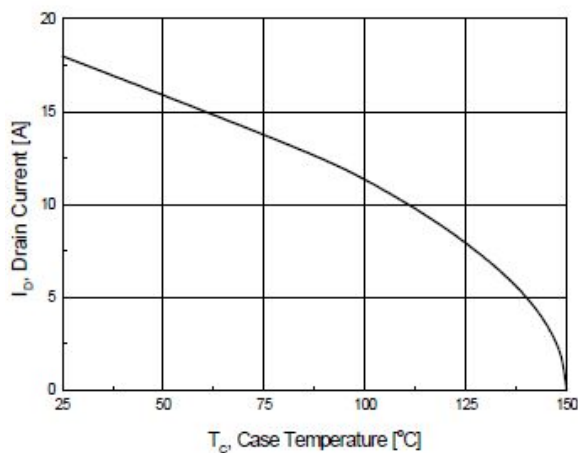


Fig5 Maximum Drain Current Vs. Case Temperature

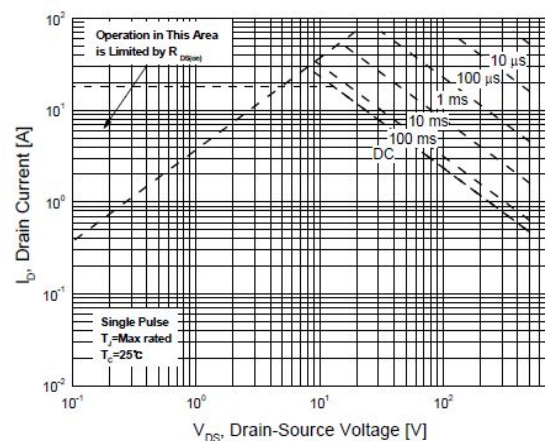
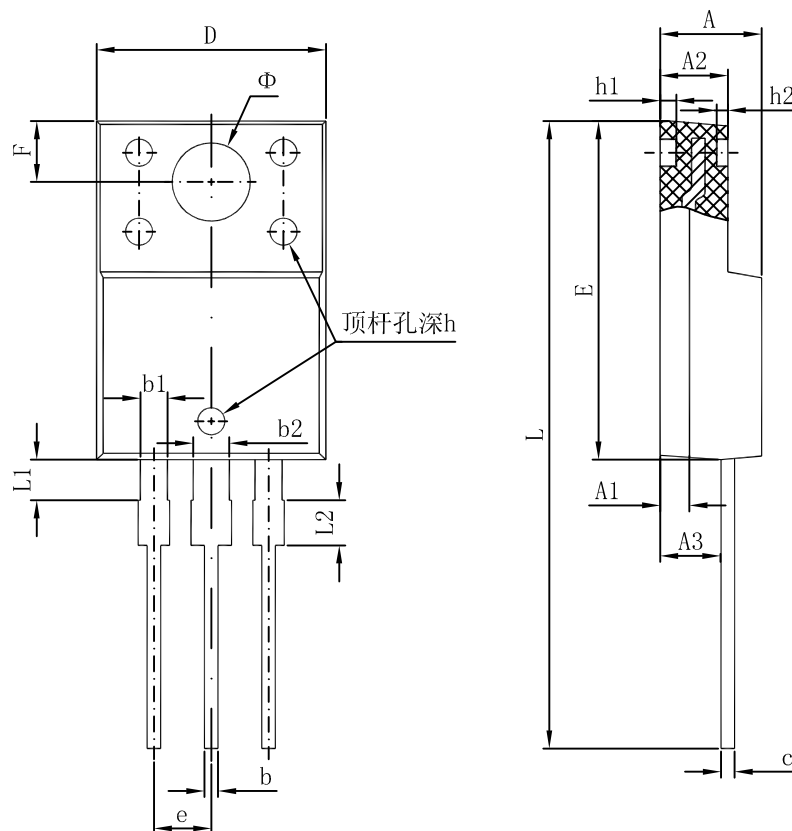


Fig6 Maximum Safe Operating Area



Package Dimension TO-220F



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	4.300	4.700	0.169	0.185
A1	1.300 REF.		0.051 REF.	
A2	2.800	3.200	0.110	0.126
A3	2.500	2.900	0.098	0.114
b	0.500	0.750	0.020	0.030
b1	1.100	1.350	0.043	0.053
b2	1.500	1.750	0.059	0.069
c	0.500	0.750	0.020	0.030
D	9.960	10.360	0.392	0.408
E	14.800	15.200	0.583	0.598
e	2.540 TYP.		0.100 TYP.	
F	2.700 REF.		0.106 REF.	
$\Phi$	3.500 REF.		0.138 REF.	
h	0.000	0.300	0.000	0.012
h1	0.800 REF.		0.031 REF.	
h2	0.500 REF.		0.020 REF.	
L	28.000	28.400	1.102	1.118
L1	1.700	1.900	0.067	0.075
L2	1.900	2.100	0.075	0.083



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