



FXN28N50F Series

Rev.A

General Description

The FXN28N50F 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.

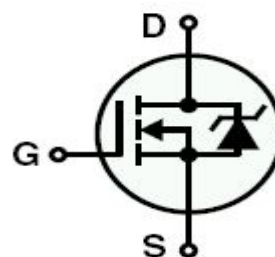
Features

- $V_{DS} = 500V$
- $ID = 28A @ V_{GS} = 10V$
- Very low on-resistance
- $R_{DS(ON)} < 0.2\Omega @ V_{GS} = 10V$
- 100% UIL Tested
- 100% Rg Tested
- 150 °C operating temperature



TO-220F Top View

N-channel



Schematic Diagram

Absolute Maximum Ratings (T_J = 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 | 28 | A |
| | Tc=25°C(package limited) | | 23 | |
| | Tc=100°C(silicon limited) | | 16.7 | |
| Pulsed Drain Current (2) | | IDM | 112 | |
| Power Dissipation | Tc=25°C | PD | 108 | W |
| | Tc=100°C | | 105 | |
| Single Pulse Avalanche Energy (3) | | EAS | 3020 | mJ |
| Junction and Storage Temperature Range | | TJ, Tstg | -55~175 | °C |

Thermal Characteristics

| Characteristics | Symbol | Rating | Unit |
|---|--------|--------|------|
| Thermal Resistance, Junction-to-Ambient (1) | RθJA | 100 | °C/W |
| Thermal Resistance, Junction-to-Case | RθJC | 1.16 | |



Electrical Characteristics (T_J = 25°C)

| Characteristics | Symbol | Test Condition | Min | Typ | Max | Unit |
|--|---------|--|-----|------|------|------|
| Static Characteristics | | | | | | |
| Drain-Source Breakdown Voltage | BVDSS | ID = 250μA, VGS = 0V | 500 | 540 | - | V |
| Gate Threshold Voltage | VGS(th) | VDS = VGS, ID = 250μA | 2 | 3 | 4 | |
| Drain Cut-Off Current | IDSS | VDS = 500V, VGS = 0V | - | - | 1 | μA |
| Gate Leakage Current | IGSS | VGS = ±30V, VDS = 0V | - | - | ±0.1 | |
| Drain-Source ON Resistance | RDS(ON) | VGS = 10V, ID = 14A | - | 0.17 | 0.20 | Ω |
| Forward Transconductance | gfs | VDS = 25V, ID = 14A | - | 30 | - | S |
| Dynamic Characteristics | | | | | | |
| Total Gate Charge | Qg | VDS = 400V, ID = 28A, VGS = 10V | - | 80 | - | nC |
| Gate-Source Charge | Qgs | | - | 22 | - | |
| Gate-Drain Charge | Qgd | | - | 19.2 | - | |
| Input Capacitance | Ciss | VDS = 300V, VGS = 0V, f = 1.0MHz | - | 4.2 | - | nF |
| Reverse Transfer Capacitance | Crss | | - | 0.18 | - | |
| Output Capacitance | Coss | | - | 1.42 | - | |
| Turn-On Delay Time | td(on) | VGS = 10V, VDS = 300V, ID = 28A, RG = 25Ω | - | 25 | - | ns |
| Rise Time | tr | | - | 38 | - | |
| Turn-Off Delay Time | td(off) | | - | 96 | - | |
| Fall Time | tf | | - | 35 | - | |
| Gate Resistance | Rg | f=1 MHz | - | - | - | Ω |
| Drain-Source Body Diode Characteristics | | | | | | |
| Source-Drain Diode Forward Voltage | VSD | IS = 28A, VGS = 0V | - | 1.0 | 1.5 | V |
| Body Diode Reverse Recovery Time | trr | IF = 28A, dI/dt = 100A/μs | - | 538 | - | ns |
| Body Diode Reverse Recovery Charge | Qrr | | - | 4.2 | - | μC |

Note

1. Surface mounted FR-4 board by JEDEC (jesd51-7)
2. Pulse width limited by T_{Jmax}
3. EAS is tested at starting T_J = 25°C, L = 10.5mH, I_{AS} = 28A, V_{GS} = 10V VDD=50V



Typical Characteristics (Tj=25C Noted)

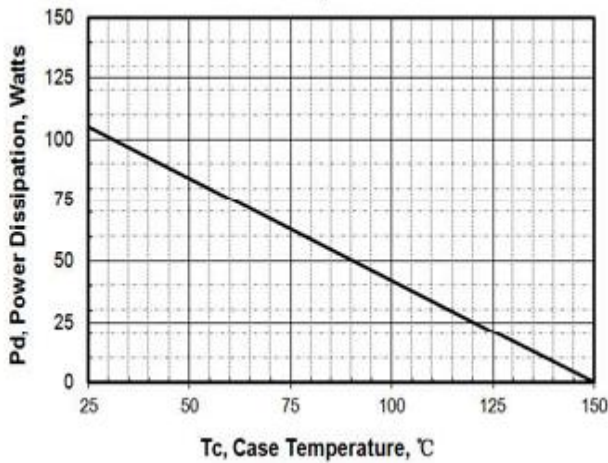


Figure 1. MAX. Power Dissipation VS Case Temperature

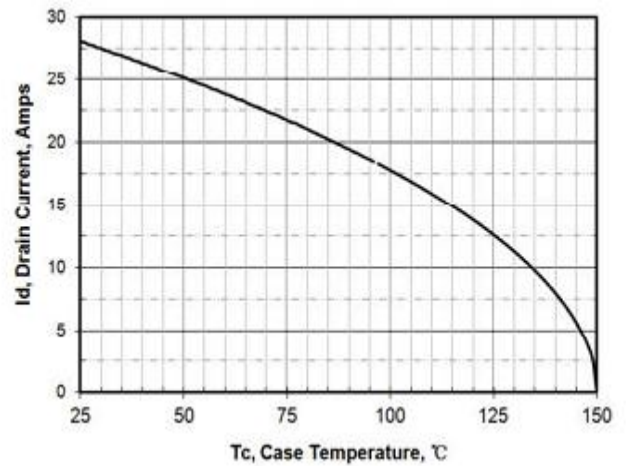


Figure 2. Maximum Continuous Drain Current vs Tc

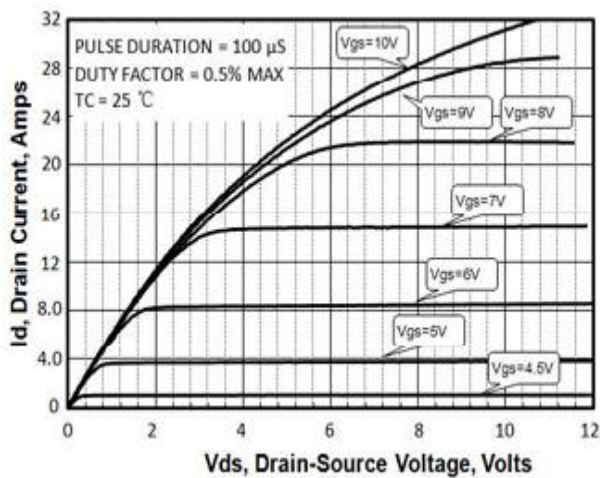


Figure 3. Output Characteristics

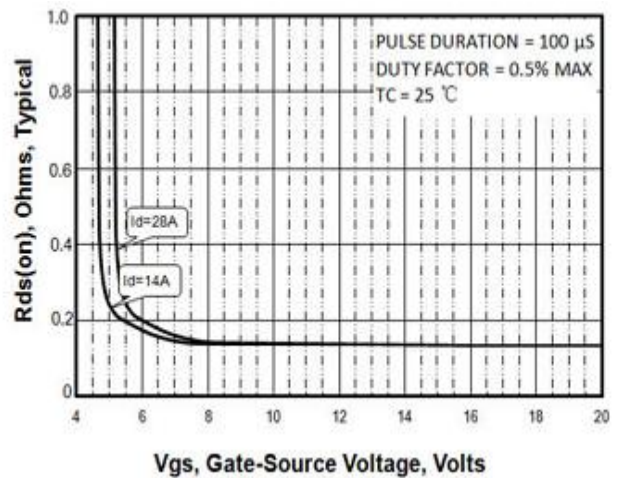


Figure 4. Rds(on) VS Gate Voltage

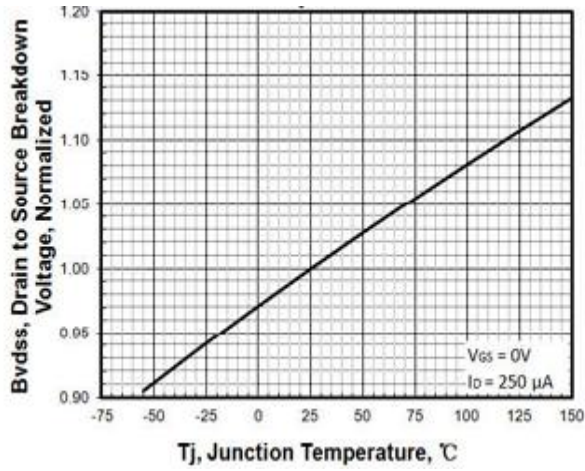


Figure 5. Breakdown Voltage VS Temperature

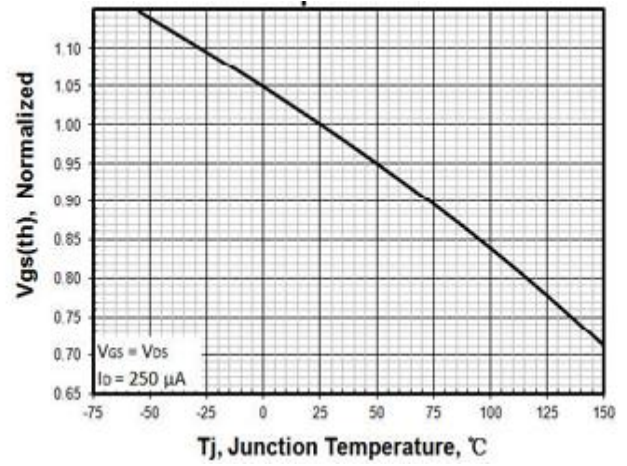


Figure 6. Threshold Voltage VS Temperature

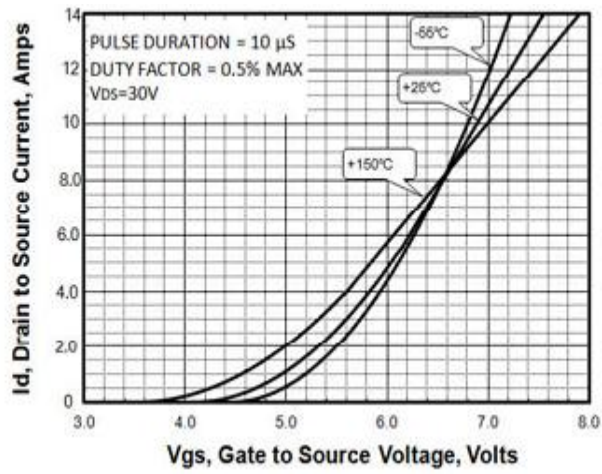


Figure 7. Transfer Characteristics

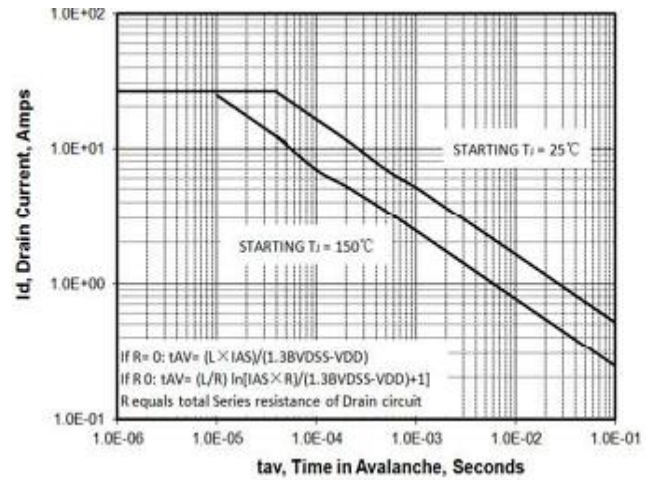


Figure 8. Unclamped Inductive Switching Capability

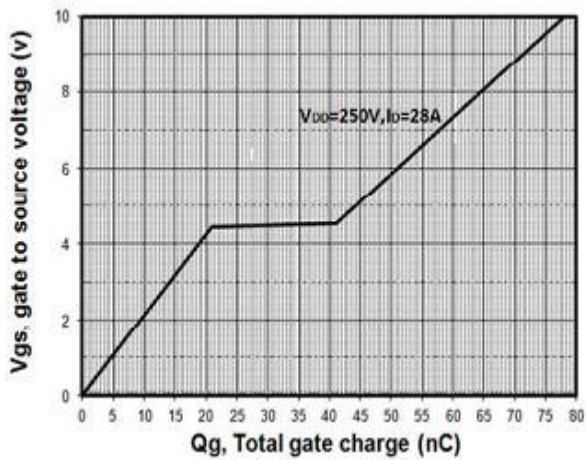


Figure 9. Typical Gate Charge

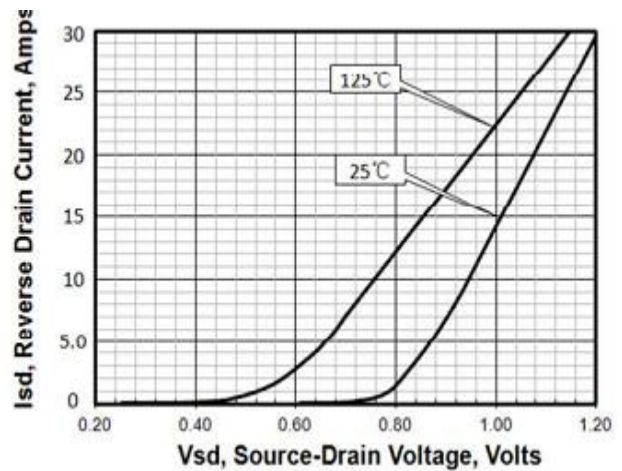


Figure 10. Body Diode Transfer characteristics

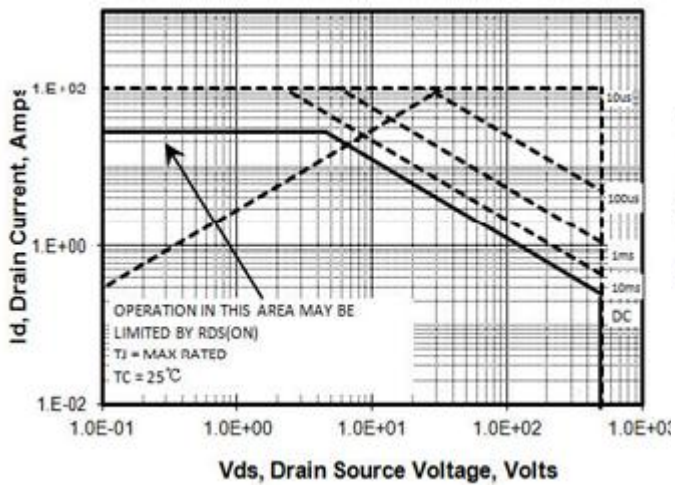


Figure 11. Maximum safe Operating Area

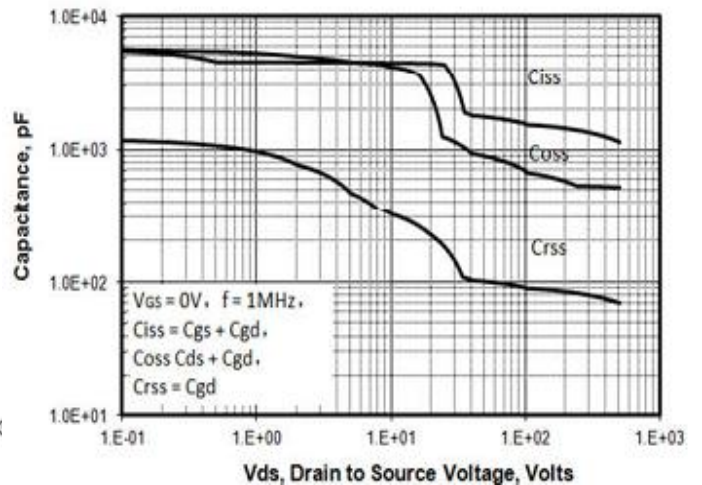
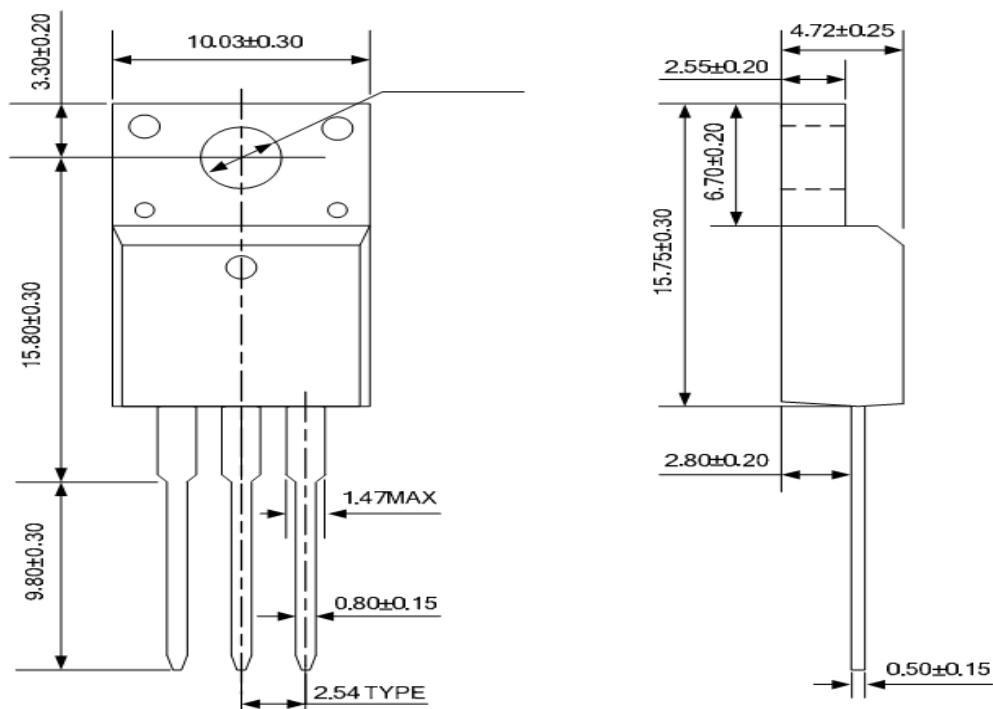


Figure 12. Capacitance VS Vds



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 | 0.500 | 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 | 12.500 | 12.950 | 0.498 | 0.510 |
| e | 2.540 TYP. | | 0.100TYP. | |
| e1 | 4.980 | 5.180 | 0.196 | 0.204 |
| F | 2.500 | 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 |