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FDPF13N50FT N-Channel UniFETTM FRFET[®] MOSFET **500 V, 12 A, 540 m**Ω

Features

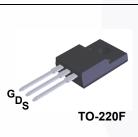
- R_{DS(on)} = 420 mΩ (Typ.) @ V_{GS} = 10 V, I_D = 6 A
- Low Gate Charge (Typ. 30 nC)
- Low C_{rss} (Typ. 14.5 pF)
- · 100% Avalanche Tested
- Improved dv/dt Capability
- RoHS Compliant

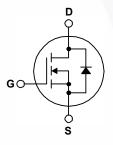
Applications

- LCD/LED/PDP TV
- Lighting
- Uninterruptible Power Supply

Description

UniFETTM MOSFET is Fairchild Semiconductor's high voltage MOSFET family based on planar stripe and DMOS technology. This MOSFET is tailored to reduce on-state resistance, and to provide better switching performance and higher avalanche energy strength. The body diode's reverse recovery performance of UniFET FRFET[®] MOSFET has been enhanced by lifetime control. Its trr is less than 100nsec and the reverse dv/ dt immunity is 15V/ns while normal planar MOSFETs have over 200nsec and 4.5V/nsec respectively. Therefore, it can remove additional component and improve system reliability in certain applications in which the performance of MOSFET's body diode is significant. This device family is suitable for switching power converter applications such as power factor correction (PFC), flat panel display (FPD) TV power, ATX and electronic lamp ballasts.





MOSFET Maximum Ratings T_C = 25°C unless otherwise noted.

| Symbol | Parameter | | FDPF13N50FT | Unit | |
|-----------------------------------|--|---|---|------|------|
| V _{DSS} | Drain to Source Voltage | | 500 | V | |
| V _{GSS} | Gate to Source Voltage | | ±30 | V | |
| ID | Drain Current | - Continuous (T _C = 25°C) | - Continuous (T _C = 25 ^o C) | | |
| | | - Continuous (T _C = 100 ^o C |) | 7.2* | — A |
| I _{DM} | Drain Current | - Pulsed | - Pulsed (Note 1) | | А |
| E _{AS} | Single Pulsed Avalanche Energy (Note 2) | | 684 | mJ | |
| I _{AR} | Avalanche Current (Note 1) | | (Note 1) | 12 | А |
| E _{AR} | Repetitive Avalanche Energy (Note 1) | | 19.5 | mJ | |
| dv/dt | Peak Diode Recovery dv/dt (Note 3) | | (Note 3) | 20 | V/ns |
| P _D | Dewer Dissinction | (T _C = 25 ^o C) | | 42 | W |
| | Power Dissipation | - Derate Above 25°C | | 0.33 | W/ºC |
| T _J , T _{STG} | Operating and Storage Temperature Range | | -55 to +150 | °C | |
| TI | Maximum Lead Temperature for Soldering, 1/8" from Case for 5 Seconds | | | 300 | °C |

Drain current limited by maximum junction temperature.

Thermal Characteristics

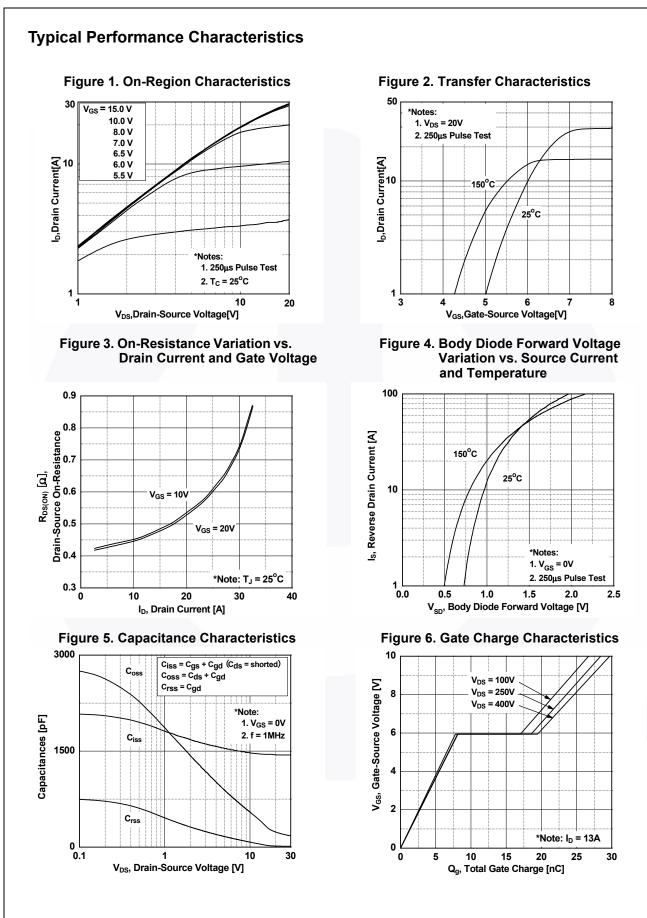
| Symbol | Parameter | FDPF13N50FT | Unit |
|-----------------------|---|-------------|--------|
| $R_{\theta JC}$ | Thermal Resistance, Junction to Case, Max. | 3.0 | °C/W |
| $R_{	extsf{	heta}JA}$ | Thermal Resistance, Junction to Ambient, Max. | 62.5 | - C/VV |

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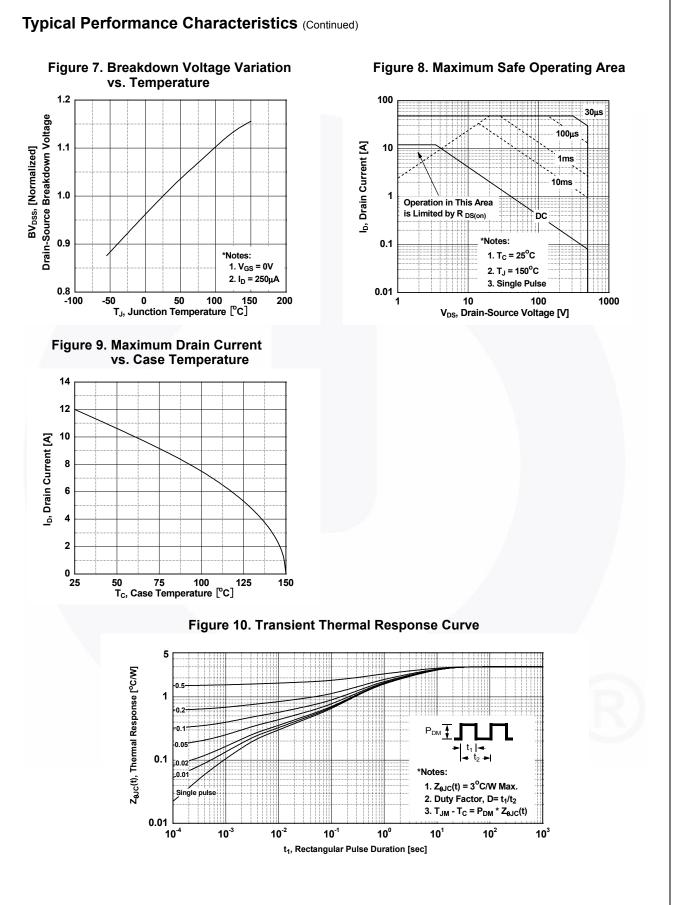
November 2013

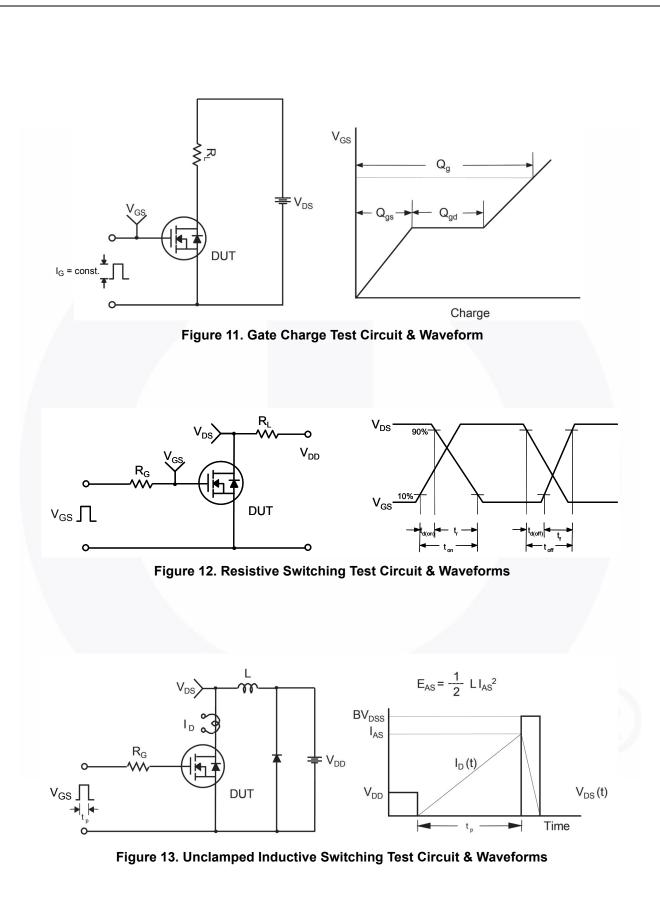
| FDPF13N | • | | Package | Packing Method | Reel Size | Ta | ape Width | Qu | antity |
|------------------------------------|-----------------------------------|--|---|--|-----------|------|-----------|----------|----------|
| | | | TO-220F | <u> </u> | | | N/A | 50 | 50 units |
| Electrica | l Chara | Interistics $T_{\rm C} = 25^{\circ}{\rm C}$ | unless othe | rwise noted. | | | | | |
| Symbol | | Parameter | | Test Condition | s | Min. | Тур. | Max. | Unit |
| Off Charac | teristics | | | | | | | | |
| BV _{DSS} | Drain to Source Breakdown Voltage | | | I _D = 250 μA, V _{GS} = 0 V, T _J = 25 ^o C | | | - | - | V |
| ΔBV _{DSS} | Breakdown Voltage Temperature | | | $I_D = 250 \ \mu$ A, Referenced to 25° C $V_{DS} = 500 \ V, V_{GS} = 0 \ V$ | | _ | 0.7 | | V/ºC |
| $/\Delta T_J$ | Coefficier | Coefficient Zero Gate Voltage Drain Current | | | | - | 0.7 | - 10 | - μA |
| I _{DSS} | Zero Gat | | | | | | | | |
| | | _ | | $= 400 \text{ V}, \text{ T}_{\text{C}} = 125^{\circ}\text{C}$ | | - | - | 100 | |
| GSS | Gate to Body Leakage Current | | V _{GS} | $s = \pm 20 \text{ V}, \text{ V}_{\text{DS}} = 0 \text{ V}$ | | - | - | ±100 | nA |
| On Charac | teristics | | | | | | | | |
| V _{GS(th)} | Gate Thr | eshold Voltage | V _G | $_{S} = V_{DS}, I_{D} = 250 \ \mu A$ | | 3.0 | - | 5.0 | V |
| R _{DS(on)} | Static Dra | ain to Source On Resistance | | _S = 10 V, I _D = 6 A | | - | 0.42 | 0.54 | Ω |
| 9 _{FS} | Forward | Transconductance | V _{DS} | _s = 20 V, I _D = 6 A | | - | 13.3 | - | S |
| Dynamic C | haracte | ristics | | | | | | | |
| C _{iss} | | Capacitance | | | | - | 1450 | 1930 | pF |
| C _{oss} | Output C | apacitance | | $V_{DS} = 25 V, V_{GS} = 0 V,$ f = 1 MHz $V_{DS} = 400 V, I_D = 13 A,$ $V_{GS} = 10 V$ (Note 4) | | - | 198 | 265 | pF |
| C _{rss} | Reverse | Transfer Capacitance | T = | | | - | 14.5 | 22 | pF |
| Q _{g(tot)} | Total Gat | e Charge at 10V | Vng | | | - | 30 | 39 | nC |
| Q _{gs} | Gate to S | Source Gate Charge | | | | - | 8 | - | nC |
| Q _{gd} | Gate to D | Frain "Miller" Charge | | | | - | 12 | - | nC |
| Switching | Characte | eristics | | | | | | | |
| t _{d(on)} | | Delay Time | | | | - | 28 | 65 | ns |
| t _r | | Rise Time | V _{DD} = 250 V, I _D = 13 A, | | | - | 54 | 120 | ns |
| t _{d(off)} | Turn-Off I | Delay Time | V _G s | $V_{GS} = 10 \text{ V}, \text{ R}_{G} = 25 \Omega$ | | - | 75 | 160 | ns |
| t _f | Turn-Off | Fall Time | | | (Note 4) | - | 47 | 105 | ns |
| Drain Sour | | e Characteristics | | | | | <u> </u> | | |
| | | Continuous Drain to Source | Diada Far | word Current | | - | | 10 | • |
| I _S | | Pulsed Drain to Source Dio | | | | | - | 12 48 | A |
| I _{SM} | | Source Diode Forward Voltag | | | | - | - | 1.5 | V |
| V _{SD} t _{rr} | | Recovery Time | | $\begin{array}{llllllllllllllllllllllllllllllllllll$ | | - | 154 | - | ns |
| Q _{rr} | | Recovery Charge | | | | - | 0.45 | | μC |

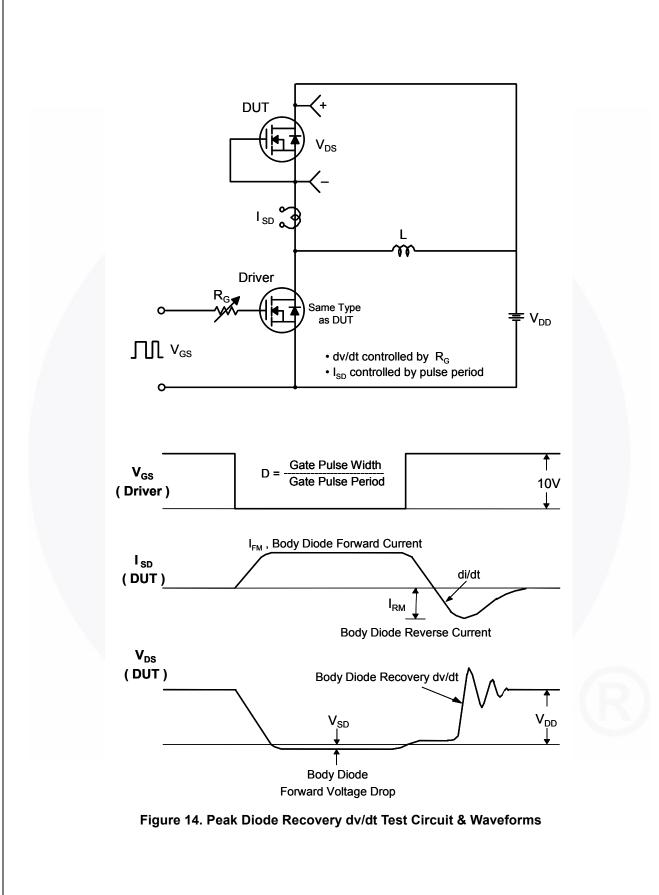
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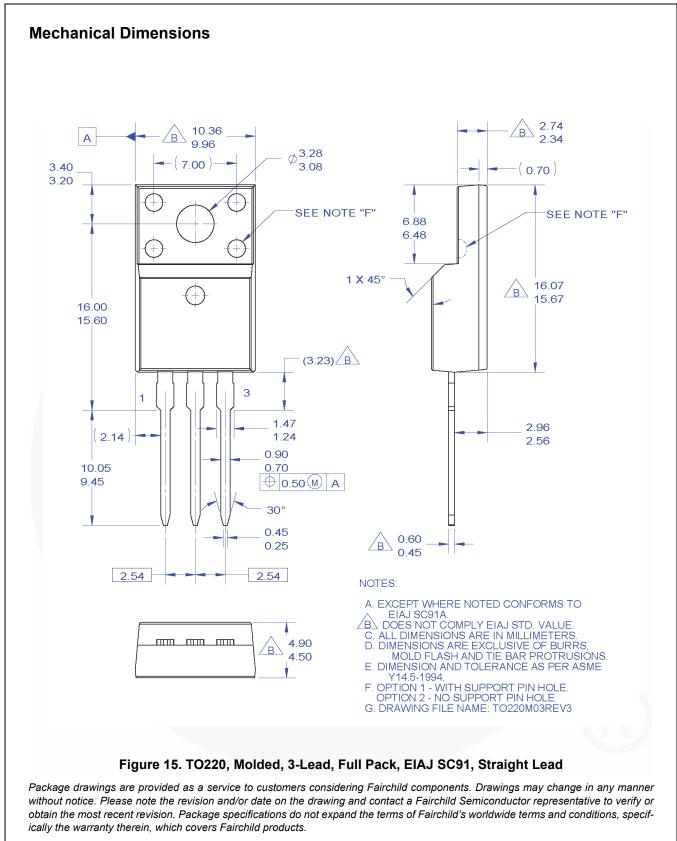


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http://www.fairchildsemi.com/package/packageDetails.html?id=PN_TF220-003



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