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FDP18N50 / FDPF18N50 / FDPF18N50T N-Channel UniFETTM MOSFET

500 V, 18 A, 265 m Ω

Features

- + $R_{DS(on)}$ = 220 m Ω (Typ.) @ V_{GS} = 10 V, I_D = 9 A
- Low Gate Charge (Typ. 45 nC)
- Low C_{rss} (Typ. 25 pF)
- 100% Avalanche Tested

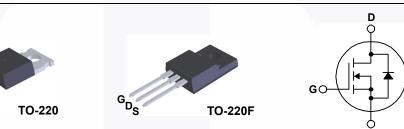
Applications

- 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. 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.

November 2013



Absolute Maximum Ratings T_C = 25°C unless otherwise noted

Symbol	Para	imeter	FDP18N50	FDPF18N50 / FDPF18N50T	Unit	
V _{DSS}	Drain-Source Voltage		5	500		
I _D	Drain Current	- Continuous ($T_C = 25^{\circ}C$) - Continuous ($T_C = 100^{\circ}C$)	18 10.8	18 * 10.8 *	A A	
I _{DM}	Drain Current	- Pulsed (Note 1)	72	72 *	А	
V _{GSS}	Gate-Source voltage		±30		V	
E _{AS}	Single Pulsed Avalanche Energy (Note 2)		945		mJ	
I _{AR}	Avalanche Current	(Note 1)	18		А	
E _{AR}	Repetitive Avalanche Energy (Note 1)		23.5		mJ	
dv/dt	Peak Diode Recovery dv/dt (Note 3)		4.5		V/ns	
P _D	Power Dissipation	(T _C = 25°C) - Derate Above 25°C	235 1.88	38.5 0.3	W W/°C	
T _{J,} T _{STG}	Operating and Storage Temperature Range		-55 to +150		°C	
Τ _L	Maximum Lead Temperature 1/8" from Case for 5 Second	0	300		°C	

* Drain current limited by maximum junction temperature

Thermal Characteristics

Symbol	Parameter	FDP18N50	FDPF18N50 / FDPF18N50T	Unit
$R_{ extsf{ heta}JC}$	Thermal Resistance, Junction-to-Case, Max.	0.53	3.3	°C/W
R_{\thetaJA}	Thermal Resistance, Junction-to-Ambient, Max.	62.5	62.5	°C/W

Package	Marking	and	Ordering	Information
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Part Number	Top Mark	Package	Packing Method	Reel Size	Tape Width	Quantity
FDP18N50	FDP18N50	TO-220	Tube	N/A	N/A	50 units
FDPF18N50	FDPF18N50	TO-220F	Tube	N/A	N/A	50 units
FDPF18N50T	FDPF18N50T	TO-220F	Tube	N/A	N/A	50 units

Electrical Characteristics $T_C = 25^{\circ}C$ unless otherwise noted.

Symbol	Parameter	Conditions	Min.	Тур.	Мах	Unit
Off Charac	cteristics	•		4	1	Į
BV _{DSS}	Drain-Source Breakdown Voltage	V _{GS} = 0 V, I _D = 250 μA				V
ΔBV_{DSS} / ΔT_{J}	Breakdown Voltage Temperature Coefficient	I_D = 250 µA, Referenced to 25°C		0.5		V/°C
I _{DSS}	Zero Gate Voltage Drain Current	$V_{DS} = 500 V, V_{GS} = 0 V$ $V_{DS} = 400 V, T_{C} = 125^{\circ}C$			1 10	μΑ μΑ
I _{GSSF}	Gate-Body Leakage Current, Forward	V _{GS} = 30 V, V _{DS} = 0 V			100	nA
I _{GSSR}	Gate-Body Leakage Current, Reverse	V _{GS} = -30 V, V _{DS} = 0 V			-100	nA
On Charac	teristics					
V _{GS(th)}	Gate Threshold Voltage	$V_{DS} = V_{GS}, I_{D} = 250 \ \mu A$	3.0		5.0	V
R _{DS(on)}	Static Drain-Source On-Resistance	$V_{GS} = 10 \text{ V}, \text{ I}_{D} = 9 \text{ A}$		0.220	0.265	Ω
9 _{FS}	Forward Transconductance	V _{DS} = 40 V, I _D = 9 A		25		S
Dynamic C	Characteristics				1	
C _{iss}	Input Capacitance	V _{DS} = 25 V, V _{GS} = 0 V, f = 1 MHz		2200	2860	pF
C _{oss}	Output Capacitance			330	430	pF
C _{rss}	Reverse Transfer Capacitance			25	40	pF
Switching	Characteristics					
t _{d(on)}	Turn-On Delay Time	V_{DD} = 250 V, I _D = 18 A, V_{GS} = 10 V, R _G = 25 Ω (Note 4)		55	120	ns
t _r	Turn-On Rise Time			165	340	ns
t _{d(off)}	Turn-Off Delay Time			95	200	ns
t _f	Turn-Off Fall Time			90	190	ns
Qg	Total Gate Charge	V _{DS} = 400 V, I _D = 18 A,		45	60	nC
Q _{gs}	Gate-Source Charge	V _{GS} = 10 V		12.5		nC
Q _{gd}	Gate-Drain Charge	(Note 4)		19		nC
Drain-Sou	rce Diode Characteristics and Maximur	n Ratings				
I _S Maximum Continuous Drain-Source Diode Forward Current					18	Α
I _{SM}	Maximum Pulsed Drain-Source Diode Forward Current				72	А
V _{SD}	Drain-Source Diode Forward Voltage	V _{GS} = 0 V, I _S = 18 A			1.4	V
t _{rr}	Reverse Recovery Time	V _{GS} = 0 V, I _S = 18 A,		500		ns
Q _{rr}	Reverse Recovery Charge	dI _F /dt =100 A/µs		5.4		μC

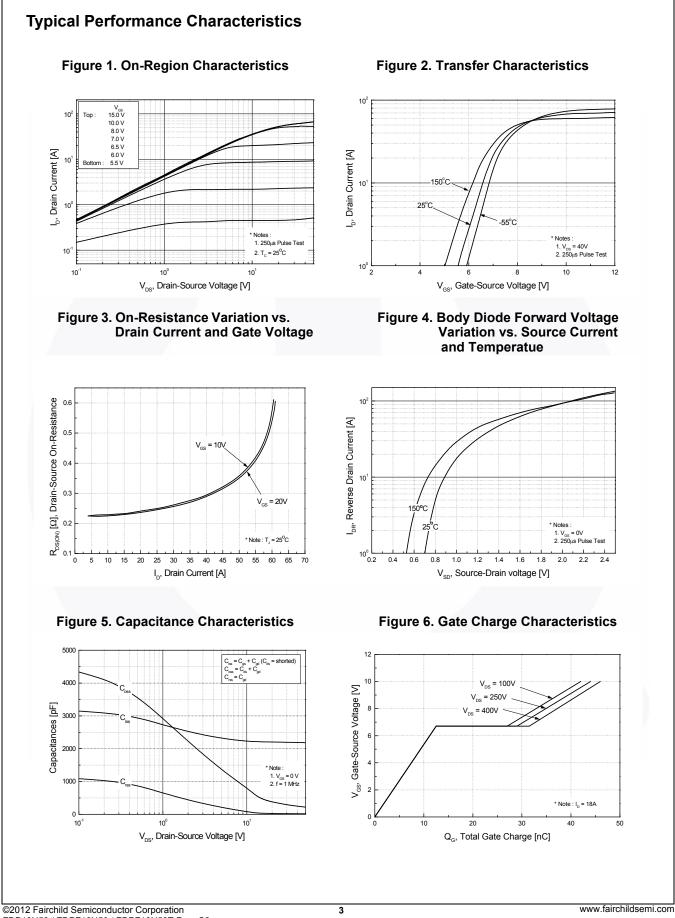
Notes:

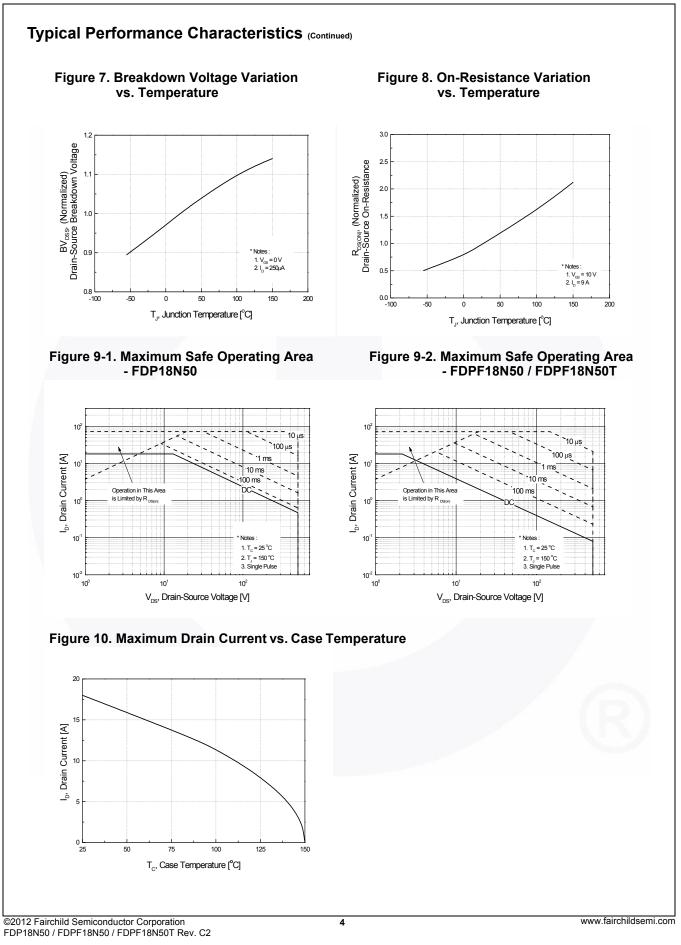
1. Repetitive rating: pulse-width limited by maximum junction temperature.

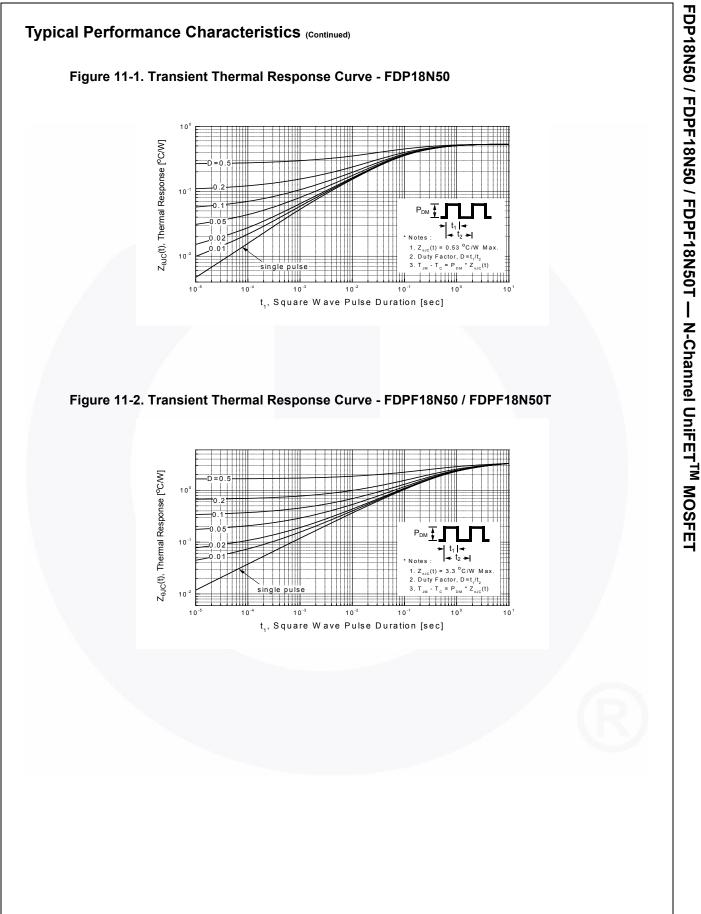
2. L = 5.2 mH, I_{AS} = 18 A, V_{DD} = 50 V, R_G = 25 Ω , starting T_J = 25°C.

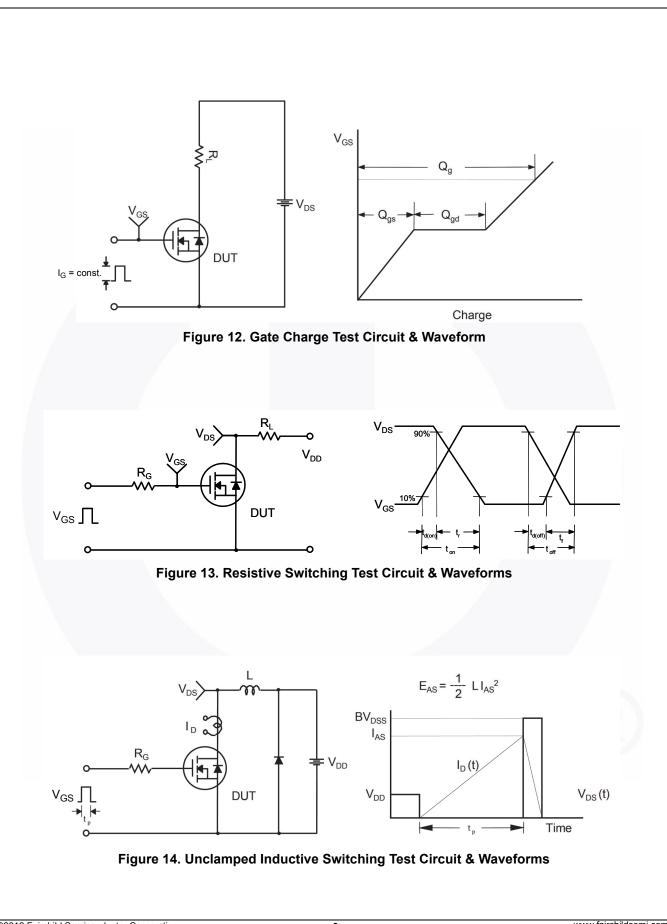
3. I_{SD} \leq 18 A, di/dt \leq 200 A/µs, V_{DD} \leq BV_{DSS}, starting T_J = 25°C.

4. Essentially independent of operating temperature typical characteristics.



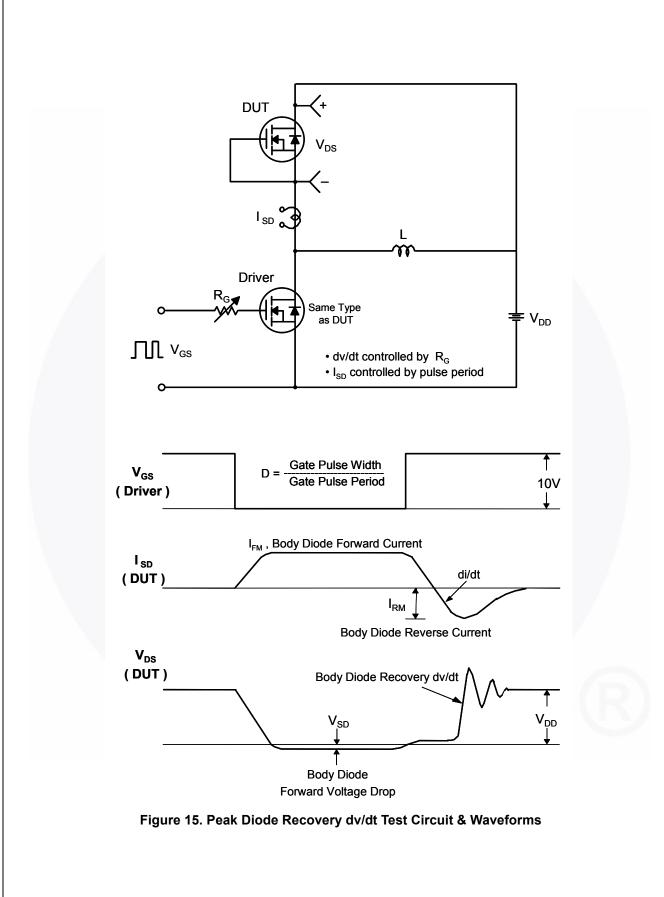


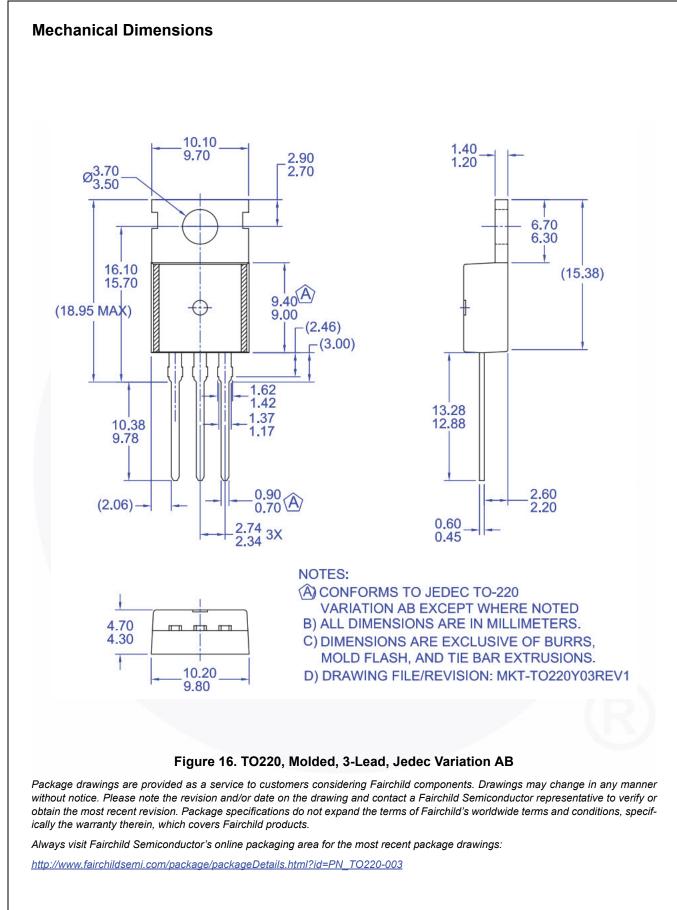


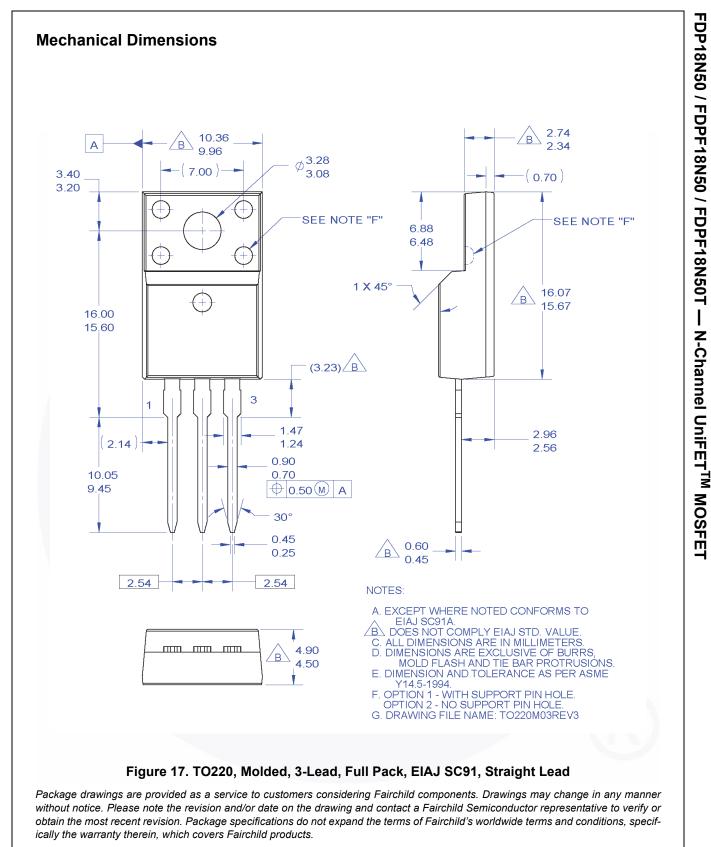


FDP18N50 / FDPF18N50 / FDPF18N50T — N-Channel UniFETTM MOSFET

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