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

Features

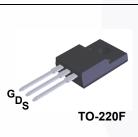
- R_{DS(on)} = 420 mΩ (Typ.) @ V_{GS} = 10 V, I_D = 6 A
- Low Gate Charge (Typ. 30 nC)
- Low C_{rss} (Typ. 14.5 pF)
- · 100% Avalanche Tested
- Improved dv/dt Capability
- RoHS Compliant

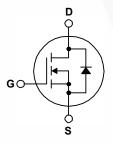
Applications

- 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

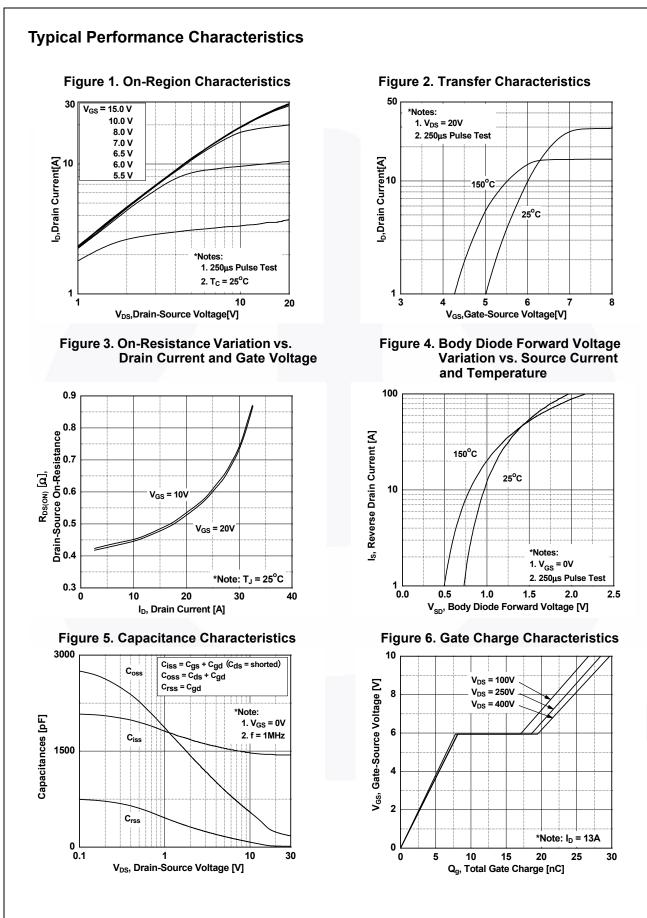
Symbol	Parameter	FDPF13N50FT	Unit
$R_{\theta JC}$	Thermal Resistance, Junction to Case, Max.	3.0	°C/W
$R_{ extsf{ heta}JA}$	Thermal Resistance, Junction to Ambient, Max.	62.5	- C/VV

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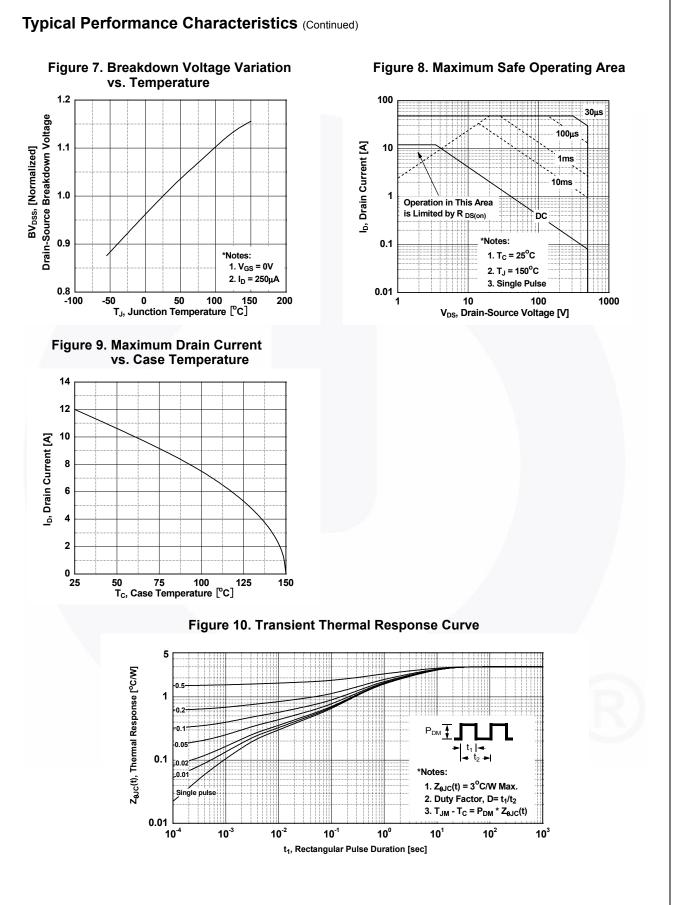
November 2013

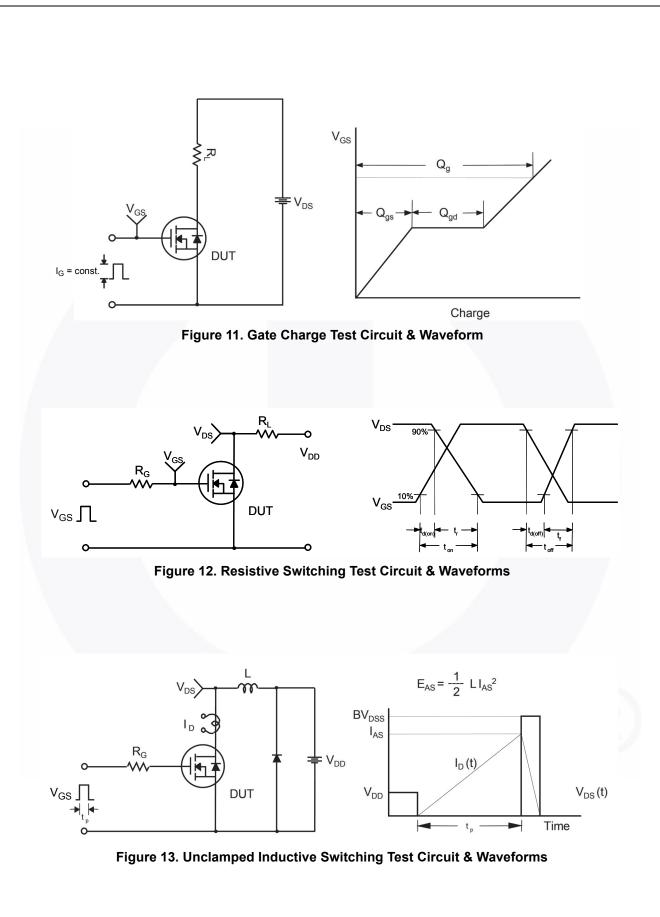
FDPF13N	•		Package	Packing Method	Reel Size	Ta	ape Width	Qu	antity
			TO-220F	<u> </u>			N/A	50	50 units
Electrica	l Chara	Interistics $T_{\rm C} = 25^{\circ}{\rm C}$	unless othe	rwise noted.					
Symbol		Parameter		Test Condition	s	Min.	Тур.	Max.	Unit
Off Charac	teristics								
BV _{DSS}	Drain to 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

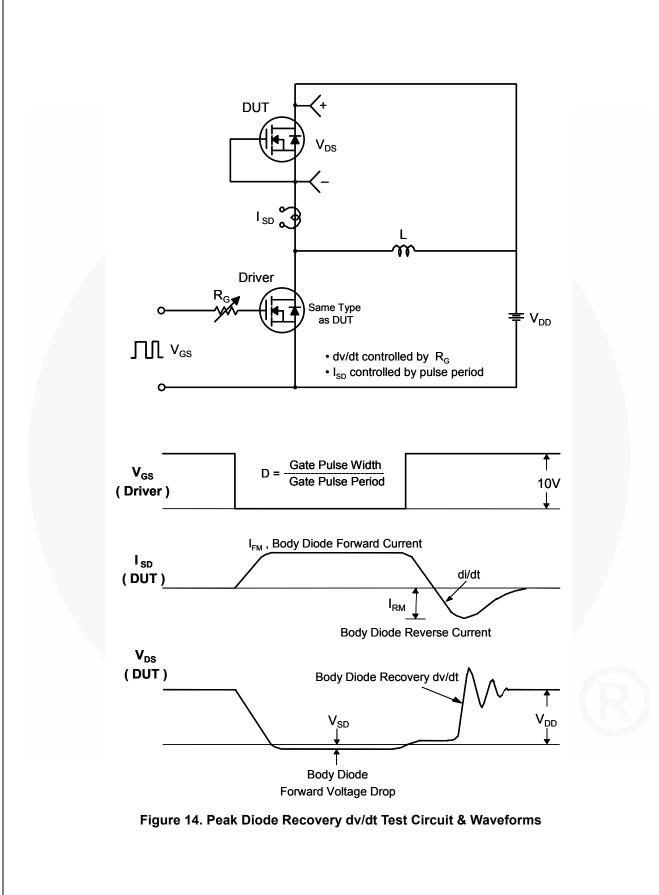
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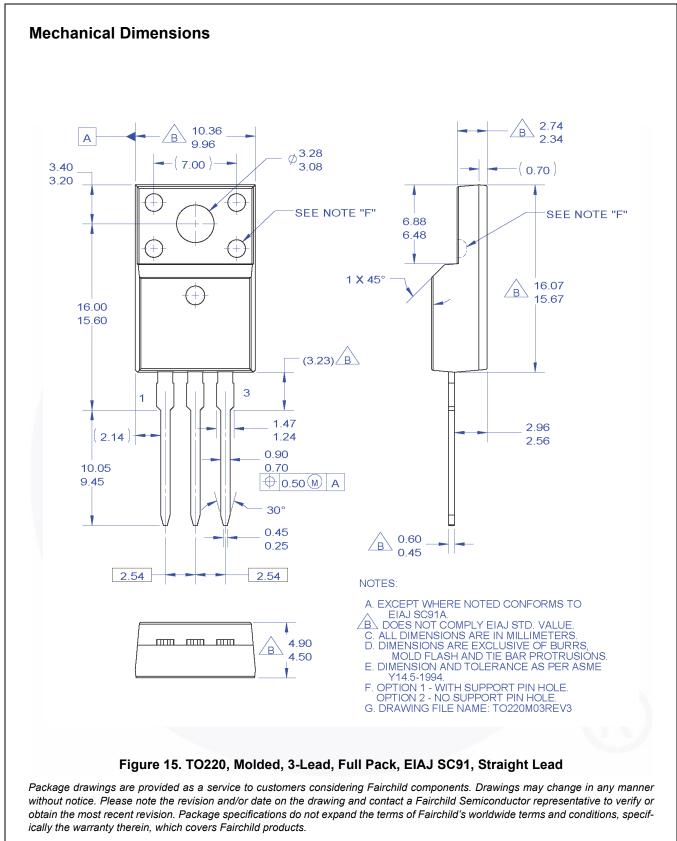


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