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FQPF9N50CF N-Channel QFET® FRFET® MOSFET

500 V, 9 A, 850 mΩ

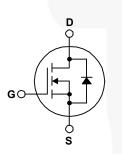
Description

This N-Channel enhancement mode power MOSFET is produced using Fairchild Semiconductor's proprietary planar stripe and DMOS technology. This advanced MOSFET technology has been especially tailored to reduce on-state resistance, and to provide superior switching performance and high avalanche energy strength. These devices are suitable for switched mode power supplies, active power factor correction (PFC), and • Fast Recovery Body Diode (Typ. 100 ns) electronic lamp ballasts.

Features

- 9 A, 500 V, R_{DS(on)} = 850 mΩ (Max.) @ V_{GS} = 10 V, I_D = 4.5 A
- Low Gate Charge (Typ. 28 nC)
- Low Crss (Typ. 24 pF)
- 100% Avalanche Tested





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

Symbol	Parameter		FQPF9N50CF	Unit	
V _{DSS}	Drain-Source Voltage		500	V	
I _D	Drain Current - Continuous ($T_c = 25^{\circ}C$)		9*	А	
	- Continuous (T _C = 100°C)		5.4*	А	
I _{DM}	Drain Current - Pulsed	(Note 1)	36*	A	
V _{GSS}	Gate-Source Voltage		± 30	V	
E _{AS}	Single Pulsed Avalanche Energy	(Note 2)	360	mJ	
I _{AR}	Avalanche Current	(Note 1)	9	А	
E _{AR}	Repetitive Avalanche Energy	(Note 1)	4.4	mJ	
dv/dt	Peak Diode Recovery dv/dt (Not		4.5	V/ns	
P _D	Power Dissipation ($T_C = 25^{\circ}C$)		44	W	
	- Derate above 25°C		0.35	W/°C	
T _J , T _{STG}	Operating and Storage Temperature Range		-55 to +150	°C	
TL	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	FQPF9N50CF	Unit	
$R_{ extsf{ heta}JC}$	Thermal Resistance, Junction to Case, Max.	2.86	°C/W	
R_{\thetaJA}	Thermal Resistance, Junction to Ambient, Max.	62.5	°C/VV	

December 2013

Package Marking and Ordering Information

Part Number	Top Mark	Package	Packing Method	Reel Size	Tape Width	Quantity
FQPF9N50CF	FQPF9N50CF	TO-220F	Tube	N/A	N/A	50 units

Electrical Characteristics T_C = 25°C unless otherwise noted.

Symbol	Parameter	Test Conditions	Min.	Тур.	Max.	Unit
Off Charac	teristics			Į	Į	4
BV _{DSS}	Drain-Source Breakdown Voltage	V_{GS} = 0 V, I _D = 250 μ A	500			V
ΔBV_{DSS} / ΔT_{J}	Breakdown Voltage Temperature Coefficient	$I_D = 250 \ \mu$ A, Referenced to 25°C		0.57		V/°C
I _{DSS} Zero (Zero Gate Voltage Drain Current	V _{DS} = 500 V, V _{GS} = 0 V			10	μA
		V _{DS} = 400 V, T _C = 125°C			100	μA
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	$V_{DS} = V_{GS}, I_D = 250 \ \mu A$	2.0		4.0	
R _{DS(on)}	Static Drain-Source On-Resistance	V _{GS} = 10 V, I _D = 4.5 A		0.70	0.85	Ω
9 _{FS}	Forward Transconductance	V _{DS} = 40 V, I _D = 4.5 A		6.5		S
Dynamic C	haracteristics					
C _{iss}	Input Capacitance	$V_{DS} = 25 V, V_{GS} = 0 V,$		790	1030	p₽
C _{oss}	Output Capacitance	f = 1.0 MHz		130	170	pF
C _{rss}	Reverse Transfer Capacitance			24	30	pF
Switching (Characteristics					
t _{d(on)}	Turn-On Delay Time	V _{DD} = 250 V, I _D = 9A,		18	45	ns
t _r	Turn-On Rise Time	$R_{G} = 25 \Omega$		65	140	ns
t _{d(off)}	Turn-Off Delay Time			93	195	ns
t _f	Turn-Off Fall Time	(Note 4)		64	125	ns
Qg	Total Gate Charge	V _{DS} = 400 V, I _D = 9A,		28	35	nC
Q _{gs}	Gate-Source Charge	V _{GS} = 10 V	-	4		nC
Q _{gd}	Gate-Drain Charge	(Note 4)	7	15		nC
Drain-Sour	ce Diode Characteristics and Maximum Ratings	5			1	
I _S	Maximum Continuous Drain-Source Diode Forward Current				9*	Α
I _{SM}	Maximum Pulsed Drain-Source Diode Forward Current				36*	Α
V _{SD}	Drain-Source Diode Forward Voltage	V _{GS} = 0 V, I _S = 9 A			1.4	V
t _{rr}	Reverse Recovery Time	V _{GS} = 0 V, I _S = 9 A,		100	-	ns
Q _{rr}	Reverse Recovery Charge	dI _F / dt = 100 A/μs		0.3		μC

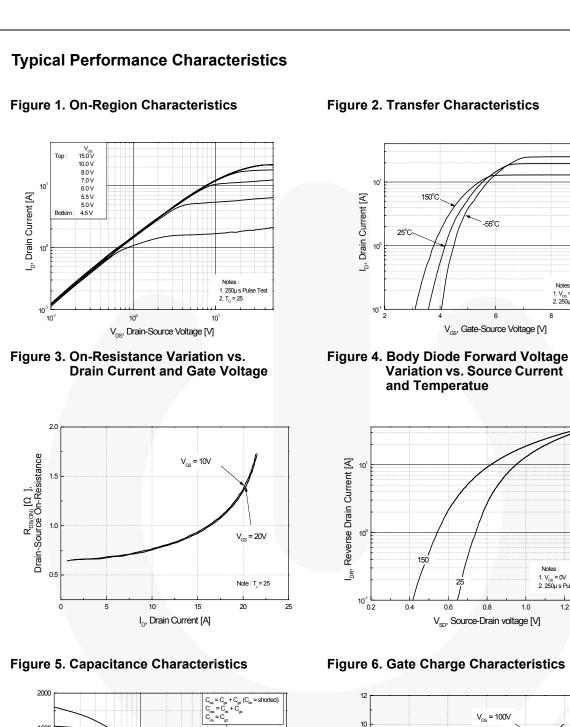
NOTES:

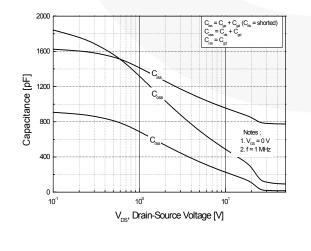
1. Repetitive rating : pulse-width limited by maximum junction temperature.

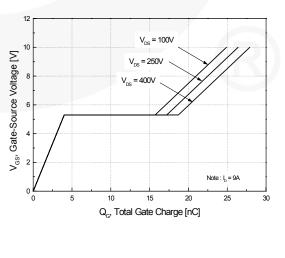
2. L = 8 mH, I_{AS} = 9 A, V_{DD} = 50 V, R_G = 25 Ω , starting T_J = 25°C.

3. I_{SD} \leq 11 A, di/dt \leq 200 A/µs, V_{DD} \leq BV_{DSS,} Starting ~T_J = 25°C.

4. Essentially independent of operating temperature.







0.8

-55°C

Notes : 1. V_{DS} = 40V 2. 250µ s Pulse Test

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Notes :

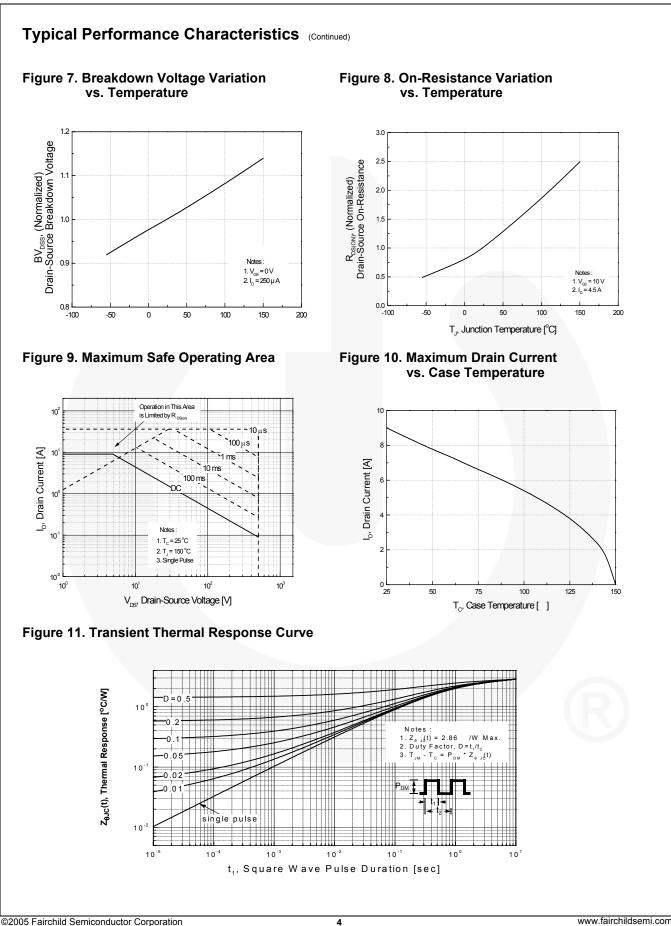
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1. V_{GS} = 0V 2. 250µ s Pulse Test

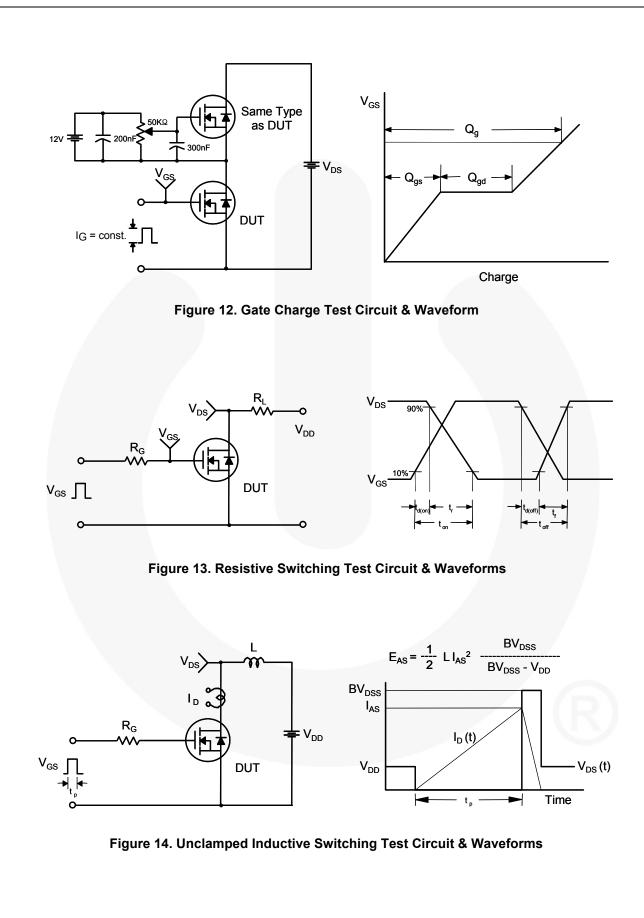
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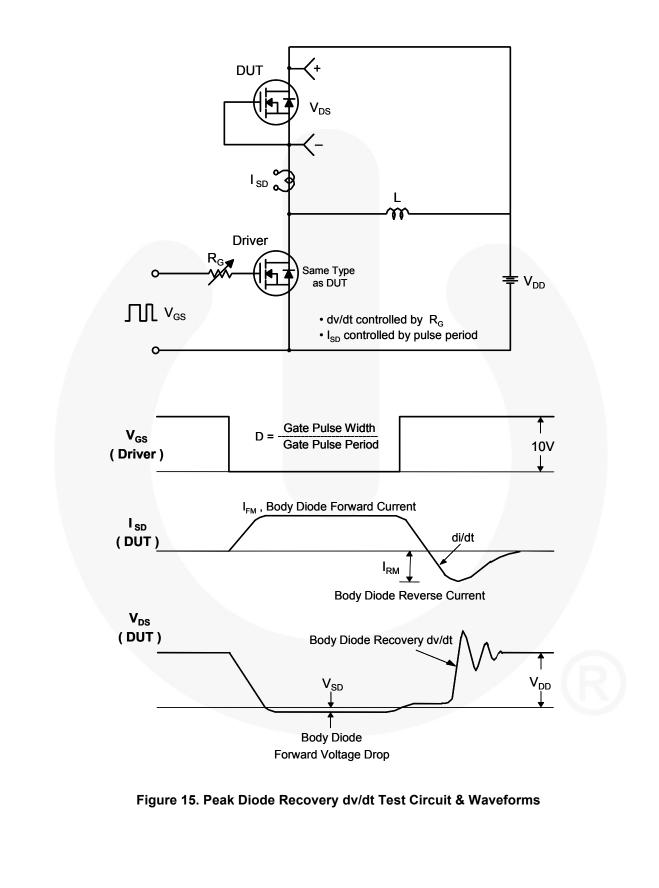
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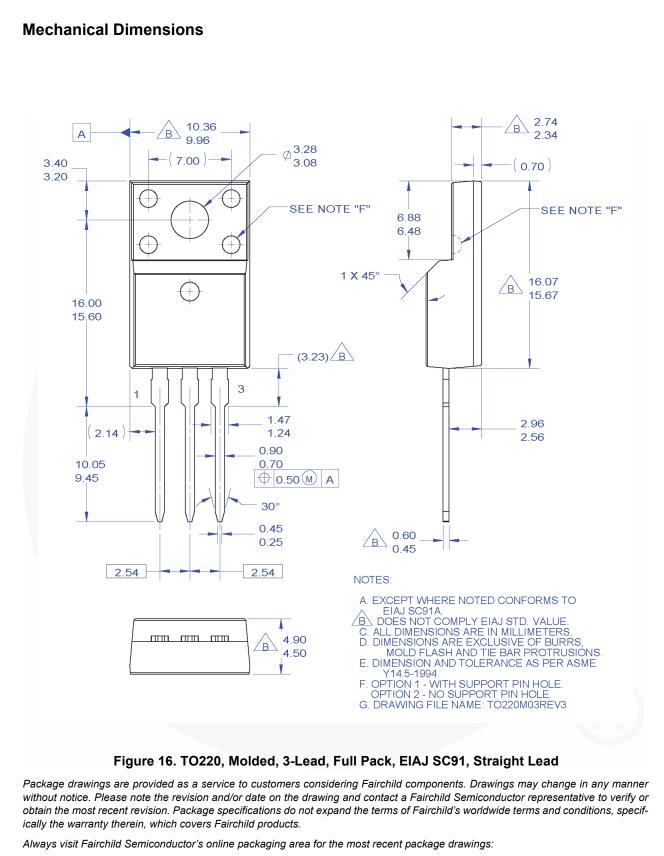


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FQPF9N50CF — N-Channel QFET® FRFET® MOSFET





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