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November 2013

FQPF10N50CF

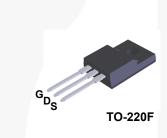
N-Channel QFET[®] FRFET[®] MOSFET 500 V, 10 A, 610 mΩ

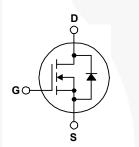
Description

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 electronic lamp ballasts.

Features

- + 10 A, 500 V, $R_{DS(on)}$ = 610 m Ω (Max.) @ V_{GS} = 10 V, I_D = 5 A
- Low Gate Charge (Typ. 43 nC)
- Low C_{rss} (Typ. 16 pF)
- 100% Avalanche Tested
- Fast Recovery Body Diode





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

Symbol	Parameter	FQPF10N50CF	Unit
V _{DSS}	Drain-Source Voltage	500	V
ID	Drain Current - Continuous (T _C = 25°C)	10*	Α
	- Continuous (T _C = 100°C)	6.35*	Α
I _{DM}	Drain Current - Pulsed (Note 1)	40*	A
V _{GSS}	Gate-Source voltage	± 30	V
E _{AS}	Single Pulsed Avalanche Energy (Note 2)	388	mJ
I _{AR}	Avalanche Current (Note 1)	10	Α
E _{AR}	Repetitive Avalanche Energy (Note 1)	14.3	mJ
dv/dt	Peak Diode Recovery dv/dt (Note 3)	4.5	V/ns
P _D	Power Dissipation $(T_{C} = 25^{\circ}C)$	48	W
	- Derate above 25°C	0.38	W/°C
T _{J,} T _{STG}	Operating and Storage Temperature Range	-55 to +150	°C
Τ _L	Maximum Lead Temperature for Soldering Purpose, 1/8" from Case for 5 Seconds	300	°C

*Drain current limited by maximum junction temperature

Thermal Characteristics

Symbol	Parameter	FQPF10N50CF	Unit	
R_{\thetaJC}	Thermal Resistance, Junction to Case, Max.	2.58	0.0.0.0	
R_{\thetaJA}	Thermal Resistance, Junction to Ambient, Max.	62.5	°C/W	

Device Marking Device		Package Reel Size		Та	ape Widt	h Qu	Quantity	
FQPF10N50CF FQPF10N50CF		TO-220F Tube		N/A		50 units		
Electric	al Char	racteristics T _c = 25°C un	less otherwise noted.					
Symbol		Parameter	Condit	tions	Min	Тур	Max	Unit
Off Charac	teristics							
BV _{DSS}	Drain-Sou	irce Breakdown Voltage	V _{GS} = 0 V, I _D = 250 μA		500			V
ΔΒV _{DSS} / ΔΤ _J	Breakdow Coefficien	n Voltage Temperature t	$I_D = 250 \ \mu\text{A}$, Referenced to 25°C			0.5		V/ºC
I _{DSS}	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-Bod	y Leakage Current, Forward	V _{GS} = 30 V, V _{DS} =	: 0 V			100	nA
I _{GSSR}	Gate-Bod	y Leakage Current, Reverse	V _{GS} = -30 V, V _{DS} = 0 V				-100	nA
On Charac	teristics							
V _{GS(th)}	Gate Thre	shold Voltage	$V_{DS} = V_{GS}, I_{D} = 250 \ \mu A$		2.0		4.0	V
R _{DS(on)}	Static Drain-Source On-Resistance $V_{GS} = 10 \text{ V}, I_D = 5 \text{ A}$			0.5	0.61	Ω		
9 _{FS}	Forward Transconductance $V_{DS} = 40 V, I_D = 5 A$			15		S		
Dynamic C	haracteris	tics						
C _{iss}	Input Cap	acitance	V _{DS} = 25 V, V _{GS} = 0 V, f = 1.0 MHz		-	1610	2096	pF
C _{oss}	Output Ca	apacitance				177	230	pF
C _{rss}	Reverse 7	ransfer Capacitance				16	24	pF
Switching	Characteri	stics						
t _{d(on)}	Turn-On E	Delay Time	$V_{DD} = 250 \text{ V}, \text{ I}_{D} = 10 \text{ A}$ $R_{G} = 25 \Omega$			29	67	ns
t _r	Turn-On F	Rise Time				80	170	ns
t _{d(off)}	Turn-Off	Delay Time				141	290	ns
t _f	Turn-Off F	all Time		(Note 4)		80	165	ns
Qg	Total Gate	Charge	V_{DS} = 400 V, I _D = 10 A V _{GS} = 10 V (Note 4)			43	56	nC
Q _{gs}	Gate-Sou	rce Charge				7.5		nC
Q _{gd}	Gate-Drai	n Charge				18.5		nC
Drain-Sou	ce Diode (Characteristics and Maximu	m Ratings					
I _S	Maximum	Continuous Drain-Source Die	ode Forward Curren	t			10	Α
I _{SM}	Maximum Pulsed Drain-Source Diode Forward Current					40	Α	
V _{SD}	Drain-Sou	rce Diode Forward Voltage	V _{GS} = 0 V, I _S = 10 A				1.4	V
t _{rr}	Reverse F	Recovery Time	$V_{GS} = 0 V, I_{S} = 10$	A		50	ł	ns
Q _{rr}	Reverse F	Recovery Charge	dl _F /dt =100 A/µs	dI _F /dt =100 Å/µs		0.1		μC

Notes:

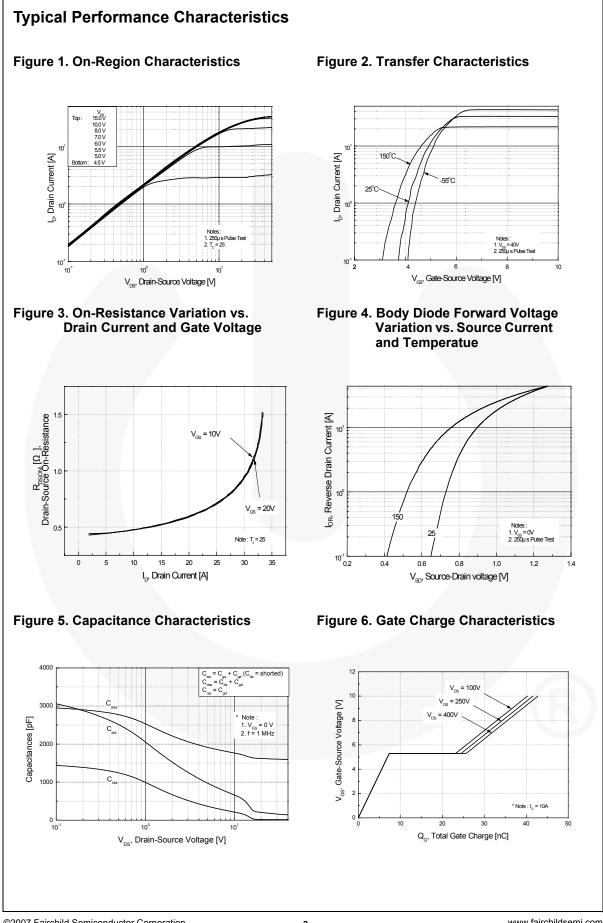
1. Repetitive Rating: Pulse width limited by maximum junction temperature

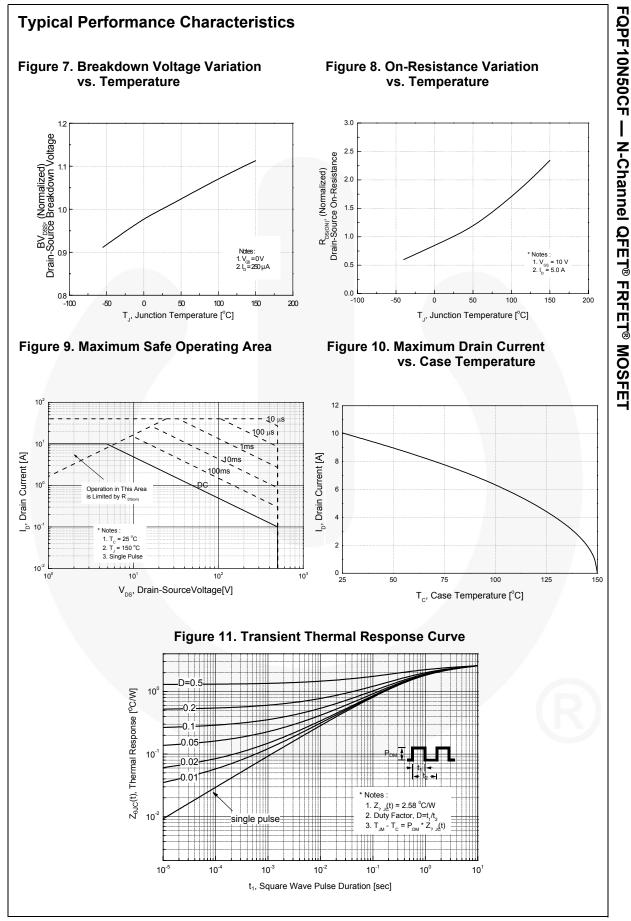
2. L = 7 mH, I_{AS} = 10 A, V_{DD} = 50 V, R_G = 25 $\Omega,$ starting T_J = 25°C

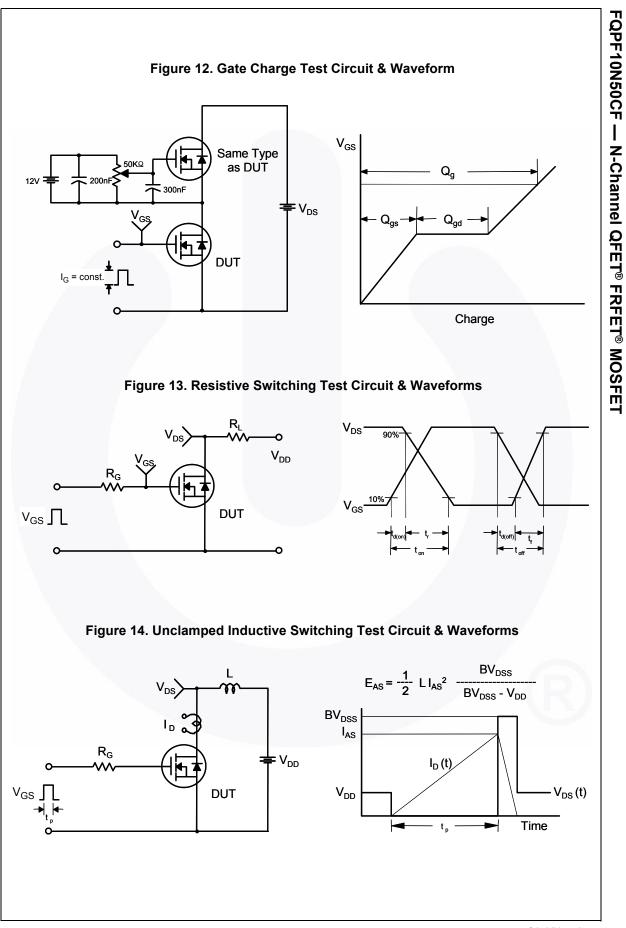
3. I_{SD} \leq 10 A, di/dt \leq 200 A/µs, V_{DD} \leq BV_{DSS,} starting ~ T_{J} = 25°C

4. Essentially independent of operating temperature.

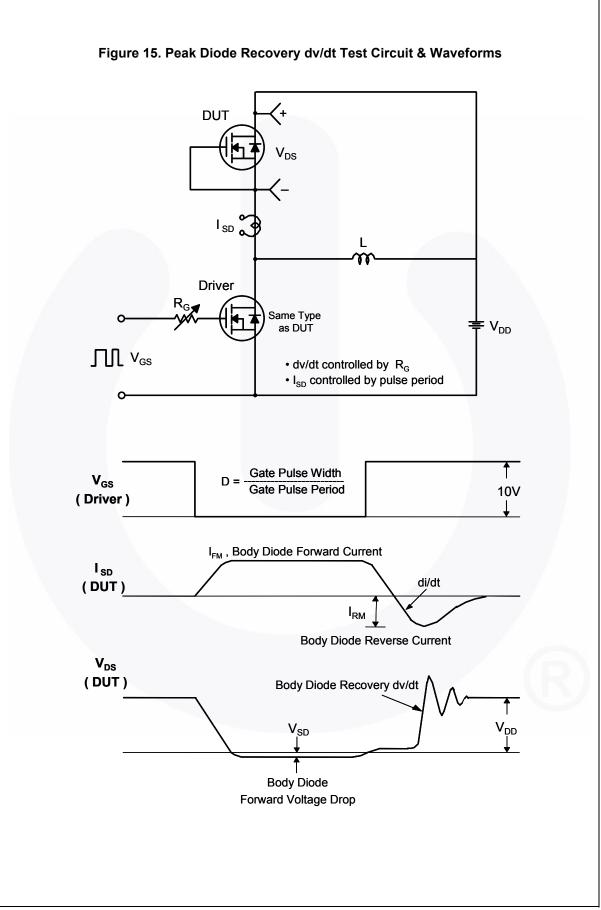
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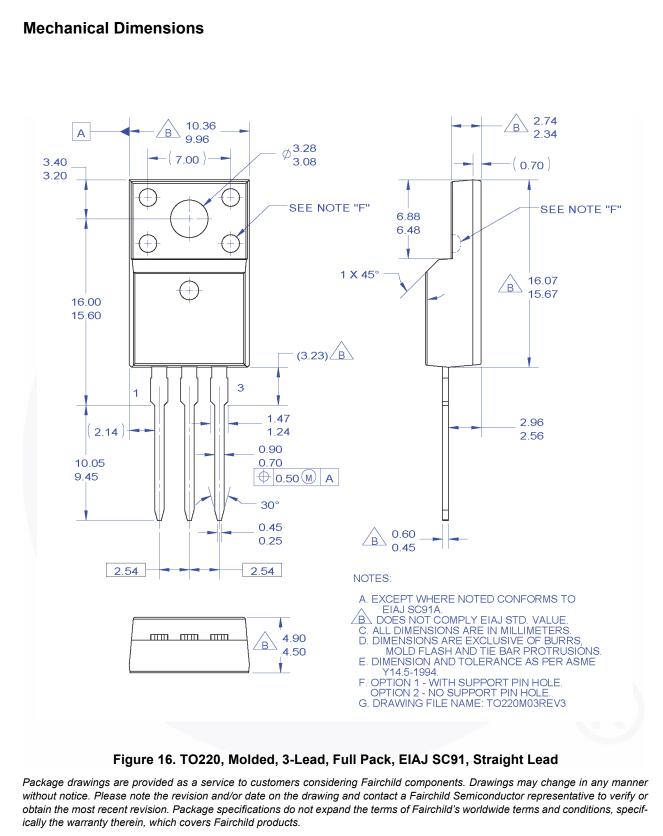






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FQPF10N50CF — N-Channel QFET[®] FRFET[®] MOSFET



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