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December 2013

FQPF8N60CF

N-Channel QFET® FRFET® MOSFET

600 V, 6.26 A, 1.5 Ω

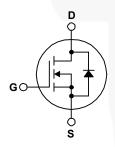
Description

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

- 6.26 A, 600 V, $R_{DS(on)} = 1.5 \Omega$ (Max.) @ $V_{GS} = 10 \text{ V}$, $I_D = 3.13 \text{ A}$
- Low Gate Charge (Typ. 28 nC)
- Low Crss (Typ. 12 pF)
- · 100% Avalanche Tested





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

Symbol	Parameter		FQPF8N60CFT	Unit	
V _{DSS}	Drain-Source Voltage		600	V	
I _D	Drain Current - Continuous (T _C = 25°C)		6.26*	Α	
	- Continuous (T _C = 100°C)		3.96*	A	
I _{DM}	Drain Current - Pulsed	(Note 1)	25*	A	
V_{GSS}	Gate-Source Voltage		± 30	V	
E _{AS}	Single Pulsed Avalanche Energy (Note 2)		160	mJ	
I _{AR}	Avalanche Current (N		6.26	А	
E _{AR}	Repetitive Avalanche Energy (Note 1)		14.7	mJ	
dv/dt	Peak Diode Recovery dv/dt	(Note 3)	4.5	V/ns	
P _D	Power Dissipation (T _C = 25°C)		48	W	
	- Derate above 25°C		0.38	W/°C	
T _J , T _{STG}	Operating and Storage Temperature Range		-55 to +150	°C	
T _L	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	FQPF8N60CFT	Unit
$R_{\theta JC}$	Thermal Resistance, Junction to Case, Max.	2.6	°C/W
$R_{\theta JA}$	Thermal Resistance, Junction to Ambient, Max. 62.5		*C/VV

Package Marking and Ordering Information

Part Number	Top Mark	Package	Packing Method	Reel Size	Tape Width	Quantity
FQPF8N60CFT	FQPF8N60CFT	TO-220F	Tube	N/A	N/A	50 units

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

Symbol	Parameter	Test Conditions	Min.	Тур.	Max.	Unit
Off Charac	teristics					
BV _{DSS}	Drain-Source Breakdown Voltage	V_{GS} = 0 V, I_{D} = 250 μ A	600			V
ΔBV _{DSS} / ΔT _J	Breakdown Voltage Temperature Coefficient	I _D = 250 μA, Referenced to 25°C		0.7		V/°C
I _{DSS}	Zero Gate Voltage Drain Current	V _{DS} = 600 V, V _{GS} = 0 V			10	μА
		V _{DS} = 480 V, T _C = 125°C			100	μА
I _{GSSF}	Gate-Body Leakage Current, Forward	$V_{GS} = 30 \text{ V}, V_{DS} = 0 \text{ V}$			100	nA
I _{GSSR}	Gate-Body Leakage Current, Reverse	V _{GS} = -30 V, V _{DS} = 0 V			-100	nA
On Charact	teristics					
V _{GS(th)}	Gate Threshold Voltage	$V_{DS} = V_{GS}, I_{D} = 250 \mu A$	2.0		4.0	٧
R _{DS(on)}	Static Drain-Source On-Resistance	V _{GS} = 10 V, I _D = 3.13 A		1.25	1.5	Ω
g _{FS}	Forward Transconductance	V _{DS} = 40 V, I _D = 3.13 A		8.7		S
Dynamic C	haracteristics					
C _{iss}	Input Capacitance	V _{DS} = 25 V, V _{GS} = 0 V,		965	1255	pF
C _{oss}	Output Capacitance	f = 1.0 MHz		105	135	pF
C _{rss}	Reverse Transfer Capacitance			12	16	pF
Switching C	Characteristics			I		
t _{d(on)}	Turn-On Delay Time	$V_{DD} = 300 \text{ V}, I_D = 6.26\text{A},$		16.5	45	ns
t _r	Turn-On Rise Time	$R_G = 25 \Omega$		60.5	130	ns
t _{d(off)}	Turn-Off Delay Time	, , , , , , , , , , , , , , , , , , ,		81	170	ns
t _f	Turn-Off Fall Time	(Note 4)	/	64.5	140	ns
Qg	Total Gate Charge	V _{DS} = 480 V, I _D = 6.26A,		28	36	nC
Q _{gs}	Gate-Source Charge	V _{GS} = 10 V	/	4.5		nC
Q_{gd}	Gate-Drain Charge	(Note 4)		12		nC
Drain-Sour	ce Diode Characteristics and Maximum Ratings			I	1/	
I _S	Maximum Continuous Drain-Source Diode Forward Current				6.26	Α
I _{SM}	Maximum Pulsed Drain-Source Diode Forward Current				25	Α
V _{SD}	Drain-Source Diode Forward Voltage	V _{GS} = 0 V, I _S = 6.26 A			1.4	V
t _{rr}	Reverse Recovery Time	V _{GS} = 0 V, I _S = 6.26 A,	4	82	/	ns
Q _{rr}	Reverse Recovery Charge	dI _F / dt = 100 A/μs		242		nC

NOTES

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

^{2.} L = 7.3 mH, I_{AS} = 6.26 A, V_{DD} = 50 V, R_G = 25 Ω , starting T_J = 25°C.

^{3.} $I_{SD} \le 6.26$ A, di/dt ≤ 200 A/ μ s, $V_{DD} \le BV_{DSS_i}$ Starting T_J = 25°C.

^{4.} Essentially independent of operating temperature.

Typical Performance Characteristics

Figure 1. On-Region Characteristics

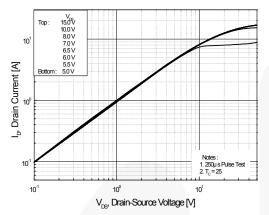


Figure 3. On-Resistance Variation vs.
Drain Current and Gate Voltage

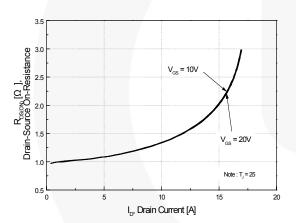


Figure 5. Capacitance Characteristics

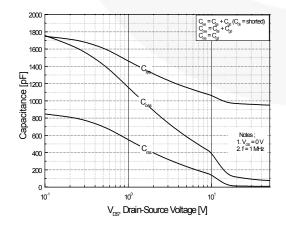


Figure 2. Transfer Characteristics

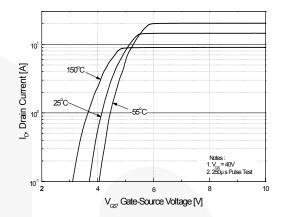


Figure 4. Body Diode Forward Voltage Variation vs. Source Current and Temperatue

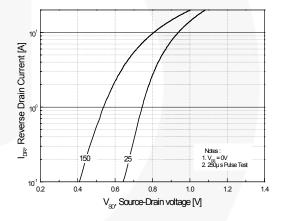
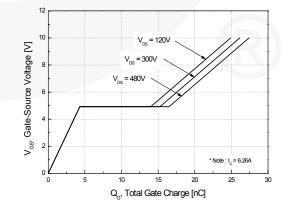


Figure 6. Gate Charge Characteristics



Typical Performance Characteristics (Continued)

Figure 7. Breakdown Voltage Variation vs. Temperature

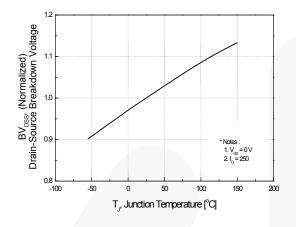


Figure 8. On-Resistance Variation vs. Temperature

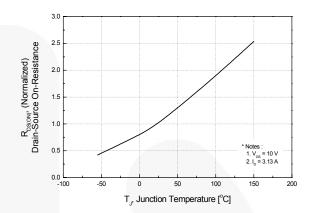
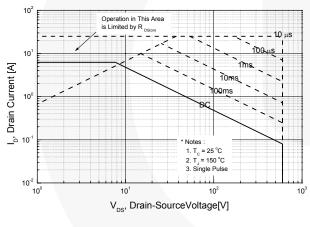


Figure 9. Maximum Safe Operating Area

Figure 10. Maximum Drain Current vs. Case Temperature



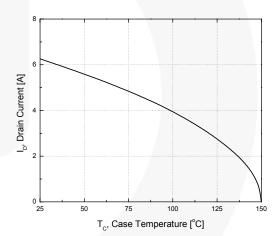
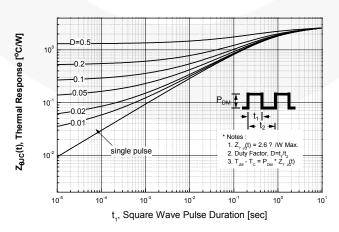


Figure 11. Transient Thermal Response Curve



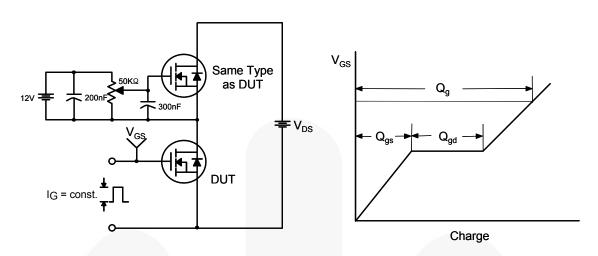


Figure 12. Gate Charge Test Circuit & Waveform

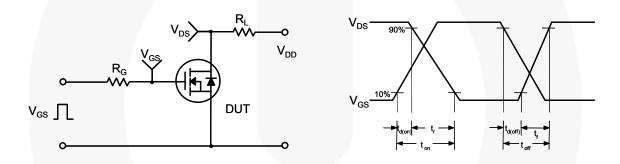


Figure 13. Resistive Switching Test Circuit & Waveforms

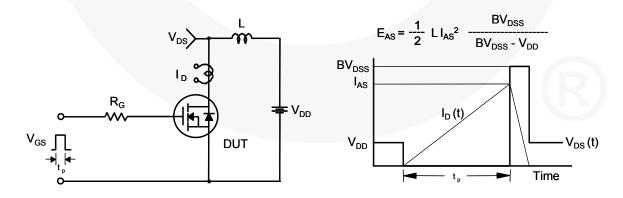


Figure 14. Unclamped Inductive Switching Test Circuit & Waveforms

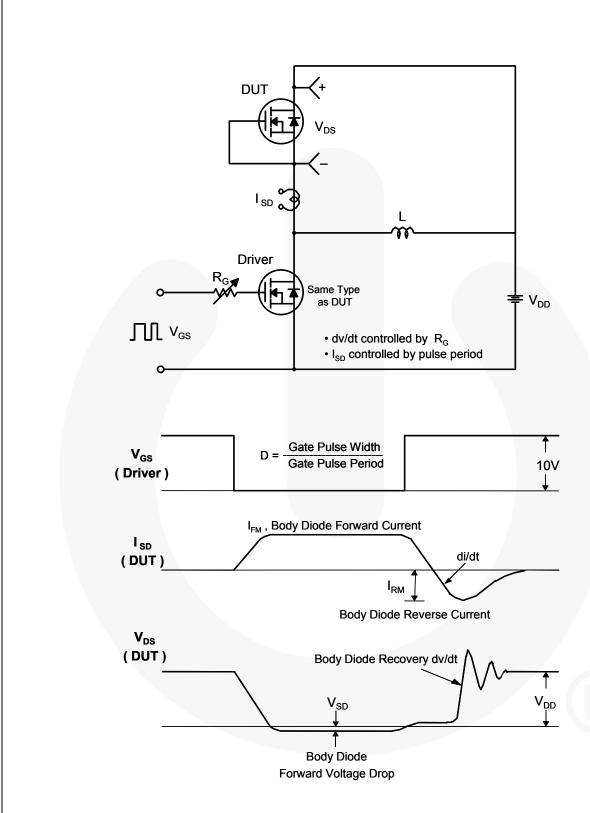


Figure 15. Peak Diode Recovery dv/dt Test Circuit & Waveforms

Mechanical Dimensions

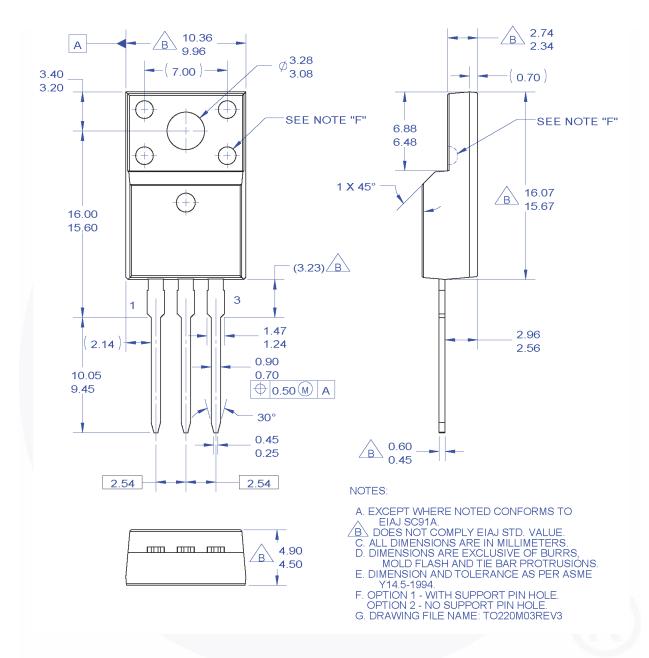


Figure 16. TO220, Molded, 3-Lead, Full Pack, EIAJ SC91, Straight Lead

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