



FQPF8N60CF

600V N-Channel MOSFET

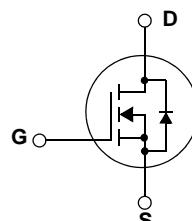
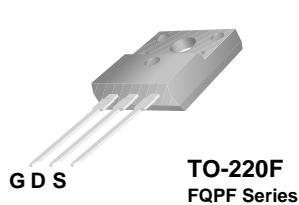
Features

- 6.26A, 600V, $R_{DS(on)}$ = 1.5Ω @ V_{GS} = 10 V
- Low gate charge (typical 28 nC)
- Low Crss (typical 12 pF)
- Fast switching
- 100% avalanche tested
- Improved dv/dt capability

Description

These N-Channel enhancement mode power field effect transistors are produced using Fairchild's proprietary, planar stripe, DMOS technology.

This advanced technology has been especially tailored to minimize on-state resistance, provide superior switching performance, and withstand high energy pulse in the avalanche and commutation mode. These devices are well suited for high efficient switched mode power supplies, active power factor correction, electronic lamp ballast based on half bridge topology.



Absolute Maximum Ratings

Symbol	Parameter	FQPF8N60CFT	Units
V_{DSS}	Drain-Source Voltage	600	V
I_D	Drain Current - Continuous ($T_C = 25^\circ\text{C}$)	6.26*	A
	- Continuous ($T_C = 100^\circ\text{C}$)	3.96*	A
I_{DM}	Drain Current - Pulsed	(Note 1)	A
V_{GSS}	Gate-Source Voltage	± 30	V
E_{AS}	Single Pulsed Avalanche Energy	(Note 2)	mJ
I_{AR}	Avalanche Current	(Note 1)	A
E_{AR}	Repetitive Avalanche Energy	(Note 1)	mJ
dv/dt	Peak Diode Recovery dv/dt	(Note 3)	V/ns
P_D	Power Dissipation ($T_C = 25^\circ\text{C}$)	48	W
	- Derate above 25°C	0.38	W/ $^\circ\text{C}$
T_J, T_{STG}	Operating and Storage Temperature Range	-55 to +150	$^\circ\text{C}$
T_L	Maximum lead temperature for soldering purposes, 1/8" from case for 5 seconds	300	$^\circ\text{C}$

* Drain current limited by maximum junction temperature

Thermal Characteristics

Symbol	Parameter	FQPF8N60CF	Units
$R_{\theta JC}$	Thermal Resistance, Junction-to-Case	2.6	$^\circ\text{C/W}$
$R_{\theta JA}$	Thermal Resistance, Junction-to-Ambient	62.5	$^\circ\text{C/W}$

Package Marking and Ordering Information

Device Marking	Device	Package	Reel Size	Tape Width	Quantity
FQPF8N60CFT	FQPF8N60CFT	TO-220F	--	--	50

Electrical Characteristics

$T_C = 25^\circ\text{C}$ unless otherwise noted

Symbol	Parameter	Test Conditions	Min	Typ	Max	Units
Off Characteristics						
BV_{DSS}	Drain-Source Breakdown Voltage	$V_{\text{GS}} = 0 \text{ V}, I_D = 250 \mu\text{A}$	600	--	--	V
$\Delta \text{BV}_{\text{DSS}}/\Delta T_J$	Breakdown Voltage Temperature Coefficient	$I_D = 250 \mu\text{A}$, Referenced to 25°C	--	0.7	--	$\text{V}/^\circ\text{C}$
I_{DSS}	Zero Gate Voltage Drain Current	$V_{\text{DS}} = 600 \text{ V}, V_{\text{GS}} = 0 \text{ V}$	--	--	10	μA
		$V_{\text{DS}} = 480 \text{ V}, T_C = 125^\circ\text{C}$	--	--	100	μA
I_{GSSF}	Gate-Body Leakage Current, Forward	$V_{\text{GS}} = 30 \text{ V}, V_{\text{DS}} = 0 \text{ V}$	--	--	100	nA
I_{GSSR}	Gate-Body Leakage Current, Reverse	$V_{\text{GS}} = -30 \text{ V}, V_{\text{DS}} = 0 \text{ V}$	--	--	-100	nA
On Characteristics						
$V_{\text{GS(th)}}$	Gate Threshold Voltage	$V_{\text{DS}} = V_{\text{GS}}, I_D = 250 \mu\text{A}$	2.0	--	4.0	V
$R_{\text{DS(on)}}$	Static Drain-Source On-Resistance	$V_{\text{GS}} = 10 \text{ V}, I_D = 3.13 \text{ A}$	--	1.25	1.5	Ω
g_{FS}	Forward Transconductance	$V_{\text{DS}} = 40 \text{ V}, I_D = 3.13 \text{ A}$ (Note 4)	--	8.7	--	S
Dynamic Characteristics						
C_{iss}	Input Capacitance	$V_{\text{DS}} = 25 \text{ V}, V_{\text{GS}} = 0 \text{ V}, f = 1.0 \text{ MHz}$	--	965	1255	pF
C_{oss}	Output Capacitance		--	105	135	pF
C_{rss}	Reverse Transfer Capacitance		--	12	16	pF
Switching Characteristics						
$t_{\text{d(on)}}$	Turn-On Delay Time	$V_{\text{DD}} = 300 \text{ V}, I_D = 6.26 \text{ A}, R_G = 25 \Omega$	--	16.5	45	ns
t_r	Turn-On Rise Time		--	60.5	130	ns
$t_{\text{d(off)}}$	Turn-Off Delay Time		--	81	170	ns
t_f	Turn-Off Fall Time		--	64.5	140	ns
Q_g	Total Gate Charge	$V_{\text{DS}} = 480 \text{ V}, I_D = 6.26 \text{ A}, V_{\text{GS}} = 10 \text{ V}$	--	28	36	nC
Q_{gs}	Gate-Source Charge		--	4.5	--	nC
Q_{gd}	Gate-Drain Charge		--	12	--	nC
Drain-Source Diode Characteristics and Maximum Ratings						
I_S	Maximum Continuous Drain-Source Diode Forward Current	--	--	6.26	A	
I_{SM}	Maximum Pulsed Drain-Source Diode Forward Current	--	--	25	A	
V_{SD}	Drain-Source Diode Forward Voltage	$V_{\text{GS}} = 0 \text{ V}, I_S = 6.26 \text{ A}$	--	--	1.4	V
t_{rr}	Reverse Recovery Time	$V_{\text{GS}} = 0 \text{ V}, I_S = 6.26 \text{ A}, dI_F/dt = 100 \text{ A}/\mu\text{s}$	--	82	--	ns
Q_{rr}	Reverse Recovery Charge	(Note 4)	--	242	--	nC

NOTES:

- Repetitive Rating : Pulse width limited by maximum junction temperature
- $L = 7.3\text{mH}$, $I_{AS} = 6.26\text{A}$, $V_{DD} = 50\text{V}$, $R_G = 25 \Omega$, Starting $T_J = 25^\circ\text{C}$
- $I_{SD} \leq 6.26\text{A}$, $dI/dt \leq 200\text{A}/\mu\text{s}$, $V_{DD} \leq \text{BV}_{\text{DSS}}$, Starting $T_J = 25^\circ\text{C}$
- Pulse Test : Pulse width $\leq 300\mu\text{s}$, Duty cycle $\leq 2\%$
- Essentially independent of operating temperature

Typical Performance Characteristics

Figure 1. On-Region Characteristics

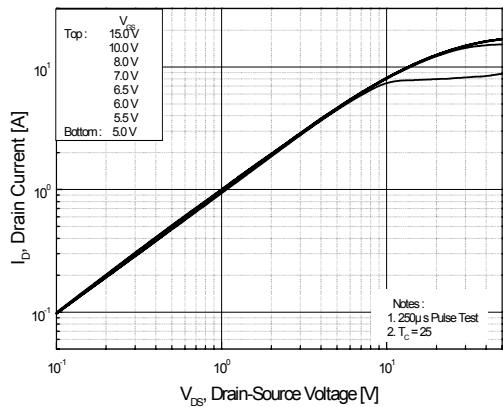


Figure 3. On-Resistance Variation vs. Drain Current and Gate Voltage

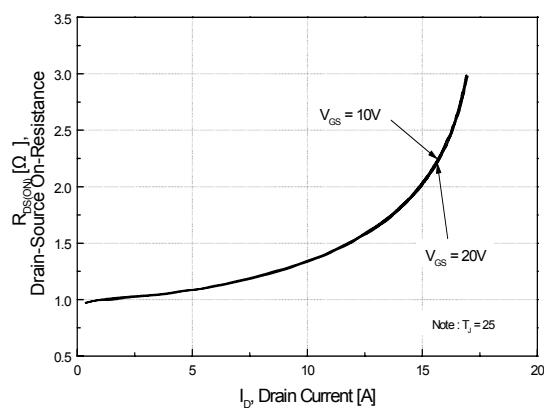


Figure 5. Capacitance Characteristics

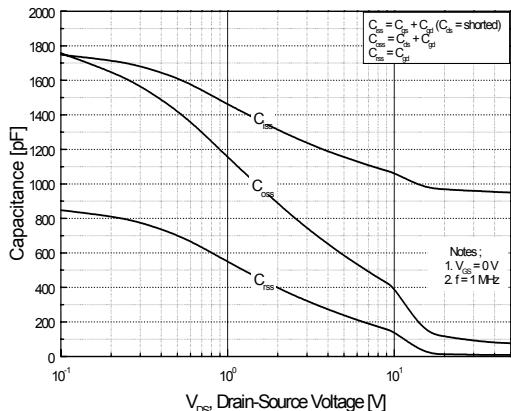


Figure 2. Transfer Characteristics

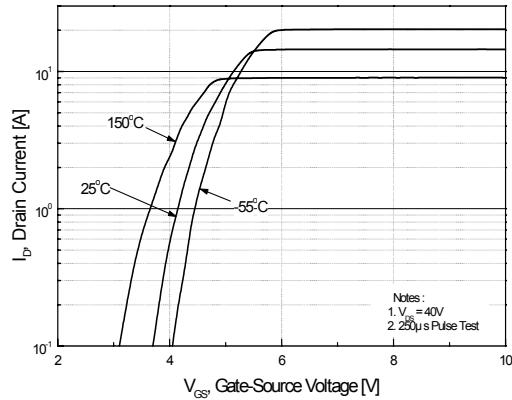


Figure 4. Body Diode Forward Voltage Variation vs. Source Current and Temperature

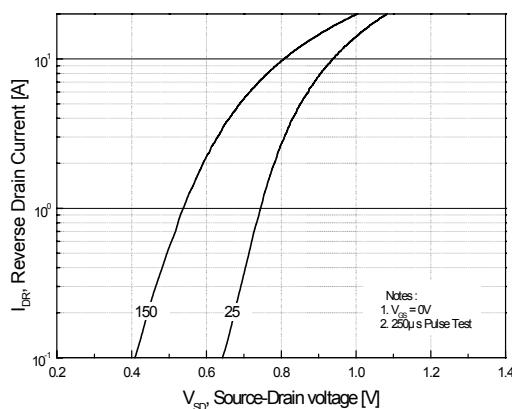


Figure 6. Gate Charge Characteristics

