

FQP9N25C/FQPF9N25C

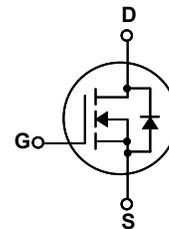
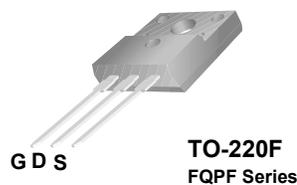
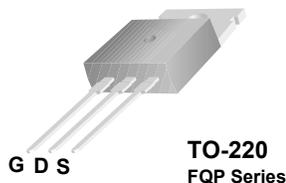
250V N-Channel MOSFET

General 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 efficiency switching DC/DC converters, switch mode power supplies, DC-AC converters for uninterrupted power supplies and motor controls.

Features

- 8.8A, 250V, $R_{DS(on)} = 0.43\Omega @ V_{GS} = 10V$
- Low gate charge (typical 26.5 nC)
- Low Crss (typical 45.5 pF)
- Fast switching
- 100% avalanche tested
- Improved dv/dt capability



Absolute Maximum Ratings T_C = 25°C unless otherwise noted

Symbol	Parameter	FQP9N25C	FQPF9N25C	Units
V _{DSS}	Drain-Source Voltage	250		V
I _D	Drain Current - Continuous (T _C = 25°C) - Continuous (T _C = 100°C)	8.8	8.8 *	A
		5.6	5.6 *	A
I _{DM}	Drain Current - Pulsed (Note 1)	35.2	35.2 *	A
V _{GSS}	Gate-Source Voltage	± 30		V
E _{AS}	Single Pulsed Avalanche Energy (Note 2)	285		mJ
I _{AR}	Avalanche Current (Note 1)	8.8		A
E _{AR}	Repetitive Avalanche Energy (Note 1)	7.4		mJ
dv/dt	Peak Diode Recovery dv/dt (Note 3)	5.5		V/ns
P _D	Power Dissipation (T _C = 25°C) - Derate above 25°C	74	38	W
		0.59	0.3	W/°C
T _J , T _{STG}	Operating and Storage Temperature Range	-55 to +150		°C
T _L	Maximum lead temperature for soldering purposes, 1/8" from case for 5 seconds	300		°C

* Drain current limited by maximum junction temperature.

Thermal Characteristics

Symbol	Parameter	FQP9N25C	FQPF9N25C	Units
R _{θJC}	Thermal Resistance, Junction-to-Case	1.69	3.29	°C/W
R _{θJS}	Thermal Resistance, Case-to-Sink Typ.	0.5	--	°C/W
R _{θJA}	Thermal Resistance, Junction-to-Ambient	62.5	62.5	°C/W

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	$V_{GS} = 0\text{ V}, I_D = 250\ \mu\text{A}$	250	--	--	V
$\Delta BV_{DSS} / \Delta T_J$	Breakdown Voltage Temperature Coefficient	$I_D = 250\ \mu\text{A}$, Referenced to 25°C	--	0.30	--	$\text{V}/^\circ\text{C}$
I_{DSS}	Zero Gate Voltage Drain Current	$V_{DS} = 250\text{ V}, V_{GS} = 0\text{ V}$	--	--	10	μA
		$V_{DS} = 200\text{ V}, T_C = 125^\circ\text{C}$	--	--	100	μA
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	$V_{GS} = -30\text{ V}, V_{DS} = 0\text{ V}$	--	--	-100	nA

On Characteristics

$V_{GS(th)}$	Gate Threshold Voltage	$V_{DS} = V_{GS}, I_D = 250\ \mu\text{A}$	2.0	--	4.0	V
$R_{DS(on)}$	Static Drain-Source On-Resistance	$V_{GS} = 10\text{ V}, I_D = 4.4\text{ A}$	--	0.35	0.43	Ω
g_{FS}	Forward Transconductance	$V_{DS} = 40\text{ V}, I_D = 4.4\text{ A}$ (Note 4)	--	7.0	--	S

Dynamic Characteristics

C_{iss}	Input Capacitance	$V_{DS} = 25\text{ V}, V_{GS} = 0\text{ V},$ $f = 1.0\text{ MHz}$	--	545	710	pF
C_{oss}	Output Capacitance		--	115	150	pF
C_{riss}	Reverse Transfer Capacitance		--	45.5	60	pF

Switching Characteristics

$t_{d(on)}$	Turn-On Delay Time	$V_{DD} = 125\text{ V}, I_D = 8.8\text{ A},$ $R_G = 25\ \Omega$	--	15	40	ns
t_r	Turn-On Rise Time		--	85	180	ns
$t_{d(off)}$	Turn-Off Delay Time		--	90	190	ns
t_f	Turn-Off Fall Time		(Note 4, 5)	--	65	140
Q_g	Total Gate Charge	$V_{DS} = 200\text{ V}, I_D = 8.8\text{ A},$ $V_{GS} = 10\text{ V}$	--	26.5	35	nC
Q_{gs}	Gate-Source Charge		--	3.5	--	nC
Q_{gd}	Gate-Drain Charge		(Note 4, 5)	--	13.5	--

Drain-Source Diode Characteristics and Maximum Ratings

I_S	Maximum Continuous Drain-Source Diode Forward Current	--	--	8.8	A	
I_{SM}	Maximum Pulsed Drain-Source Diode Forward Current	--	--	35.2	A	
V_{SD}	Drain-Source Diode Forward Voltage	$V_{GS} = 0\text{ V}, I_S = 8.8\text{ A}$	--	--	1.5	V
t_{rr}	Reverse Recovery Time	$V_{GS} = 0\text{ V}, I_S = 8.8\text{ A},$	--	218	--	ns
Q_{rr}	Reverse Recovery Charge	$di_F / dt = 100\text{ A}/\mu\text{s}$ (Note 4)	--	1.58	--	μC

Notes:

1. Repetitive Rating : Pulse width limited by maximum junction temperature
2. $L = 5.9\text{ mH}, I_{AS} = 8.8\text{ A}, V_{DD} = 50\text{ V}, R_G = 25\ \Omega$, Starting $T_J = 25^\circ\text{C}$
3. $I_{SD} \leq 8.8\text{ A}, di/dt \leq 300\text{ A}/\mu\text{s}, V_{DD} \leq BV_{DSS}$, Starting $T_J = 25^\circ\text{C}$
4. Pulse Test : Pulse width $\leq 300\ \mu\text{s}$, Duty cycle $\leq 2\%$
5. Essentially independent of operating temperature