

FQP22P10

100V P-Channel MOSFET

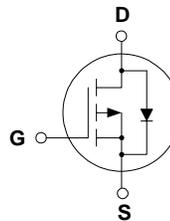
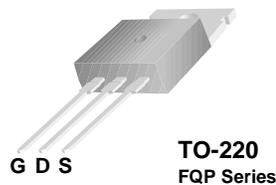
General Description

These P-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 low voltage applications such as audio amplifier, high efficiency switching DC/DC converters, and DC motor control.

Features

- -22A, -100V, $R_{DS(on)} = 0.125\Omega @ V_{GS} = -10V$
- Low gate charge (typical 40 nC)
- Low Crss (typical 160 pF)
- Fast switching
- 100% avalanche tested
- Improved dv/dt capability
- 175°C maximum junction temperature rating



Absolute Maximum Ratings T_C = 25°C unless otherwise noted

Symbol	Parameter	FQP22P10	Units
V _{DSS}	Drain-Source Voltage	-100	V
I _D	Drain Current - Continuous (T _C = 25°C) - Continuous (T _C = 100°C)	-22	A
		-15.6	A
I _{DM}	Drain Current - Pulsed (Note 1)	-88	A
V _{GSS}	Gate-Source Voltage	± 30	V
E _{AS}	Single Pulsed Avalanche Energy (Note 2)	710	mJ
I _{AR}	Avalanche Current (Note 1)	-22	A
E _{AR}	Repetitive Avalanche Energy (Note 1)	12.5	mJ
dv/dt	Peak Diode Recovery dv/dt (Note 3)	-6.0	V/ns
P _D	Power Dissipation (T _C = 25°C) - Derate above 25°C	125	W
		0.83	W/°C
T _J , T _{STG}	Operating and Storage Temperature Range	-55 to +175	°C
T _L	Maximum lead temperature for soldering purposes, 1/8" from case for 5 seconds	300	°C

Thermal Characteristics

Symbol	Parameter	Typ	Max	Units
R _{θJC}	Thermal Resistance, Junction-to-Case	--	1.2	°C/W
R _{θCS}	Thermal Resistance, Case-to-Sink	0.5	--	°C/W
R _{θJA}	Thermal Resistance, Junction-to-Ambient	--	62.5	°C/W

Electrical CharacteristicsT_C = 25°C unless otherwise noted

Symbol	Parameter	Test Conditions	Min	Typ	Max	Units
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Off Characteristics

BV _{DSS}	Drain-Source Breakdown Voltage	V _{GS} = 0 V, I _D = -250 μA	-100	--	--	V
ΔBV _{DSS} / ΔT _J	Breakdown Voltage Temperature Coefficient	I _D = -250 μA, Referenced to 25°C	--	-0.1	--	V/°C
I _{DSS}	Zero Gate Voltage Drain Current	V _{DS} = -100 V, V _{GS} = 0 V	--	--	-1	μA
		V _{DS} = -80 V, T _C = 125°C	--	--	-10	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 Characteristics

V _{GS(th)}	Gate Threshold Voltage	V _{DS} = V _{GS} , I _D = -250 μA	-2.0	--	-4.0	V
R _{DS(on)}	Static Drain-Source On-Resistance	V _{GS} = -10 V, I _D = -11 A	--	0.096	0.125	Ω
g _{FS}	Forward Transconductance	V _{DS} = -40 V, I _D = -11 A (Note 4)	--	13.5	--	S

Dynamic Characteristics

C _{iss}	Input Capacitance	V _{DS} = -25 V, V _{GS} = 0 V, f = 1.0 MHz	--	1170	1500	pF
C _{oss}	Output Capacitance		--	460	600	pF
C _{rss}	Reverse Transfer Capacitance		--	160	200	pF

Switching Characteristics

t _{d(on)}	Turn-On Delay Time	V _{DD} = -50 V, I _D = -22 A, R _G = 25 Ω (Note 4, 5)	--	17	45	ns
t _r	Turn-On Rise Time		--	170	350	ns
t _{d(off)}	Turn-Off Delay Time		--	60	130	ns
t _f	Turn-Off Fall Time		--	110	230	ns
Q _g	Total Gate Charge	V _{DS} = -80 V, I _D = -22 A, V _{GS} = -10 V (Note 4, 5)	--	40	50	nC
Q _{gs}	Gate-Source Charge		--	7.0	--	nC
Q _{gd}	Gate-Drain Charge		--	21	--	nC

Drain-Source Diode Characteristics and Maximum Ratings

I _S	Maximum Continuous Drain-Source Diode Forward Current	--	--	-22	A	
I _{SM}	Maximum Pulsed Drain-Source Diode Forward Current	--	--	-88	A	
V _{SD}	Drain-Source Diode Forward Voltage	V _{GS} = 0 V, I _S = -22 A	--	--	-4.0	V
t _{rr}	Reverse Recovery Time	V _{GS} = 0 V, I _S = -22 A, dI _F / dt = 100 A/μs (Note 4)	--	110	--	ns
Q _{rr}	Reverse Recovery Charge		--	0.6	--	μC

Notes:

1. Repetitive Rating : Pulse width limited by maximum junction temperature
2. L = 2.2mH, I_{AS} = -22A, V_{DD} = -25V, R_G = 25 Ω, Starting T_J = 25°C
3. I_{SD} ≤ -22A, di/dt ≤ 300A/μs, V_{DD} ≤ BV_{DSS}, Starting T_J = 25°C
4. Pulse Test : Pulse width ≤ 300μs, Duty cycle ≤ 2%
5. Essentially independent of operating temperature

Typical Characteristics

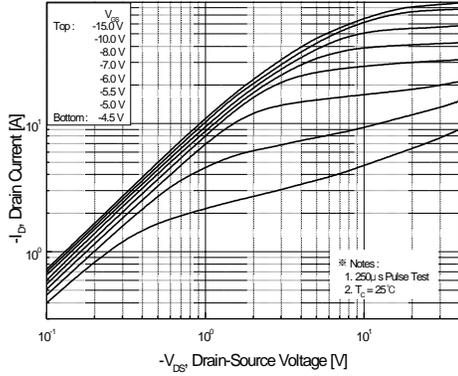


Figure 1. On-Region Characteristics

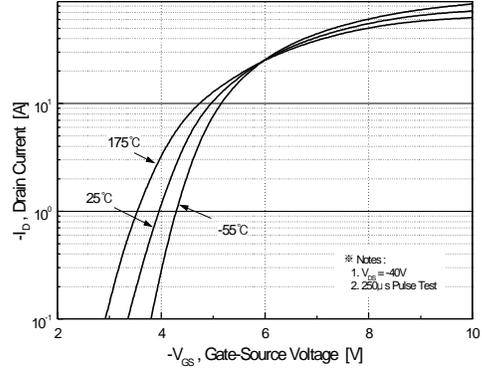


Figure 2. Transfer Characteristics

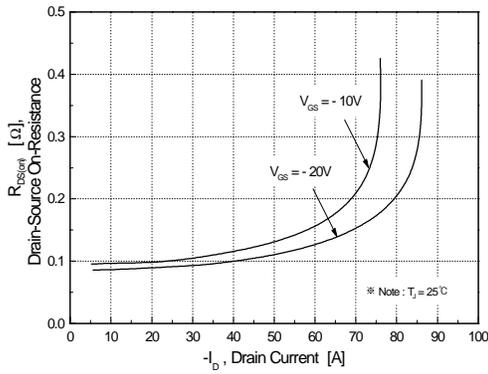


Figure 3. On-Resistance Variation vs. Drain Current and Gate Voltage

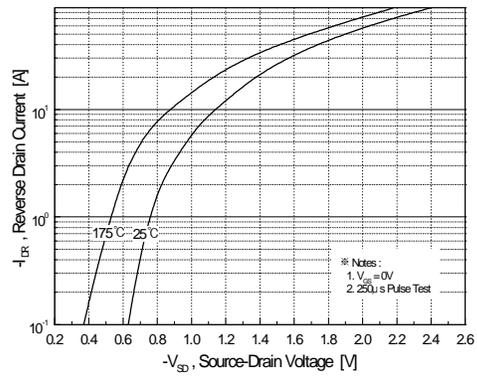


Figure 4. Body Diode Forward Voltage Variation vs. Source Current and Temperature

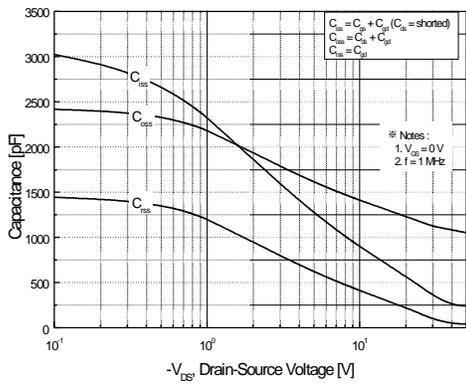


Figure 5. Capacitance Characteristics

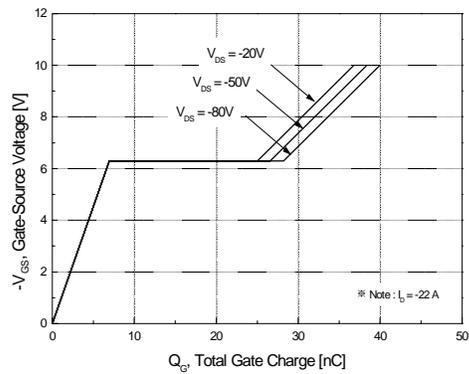


Figure 6. Gate Charge Characteristics