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March 2013

FQP8P10

P-Channel QFET® MOSFET

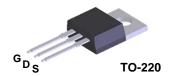
-100 V, -8 A, 530 mΩ

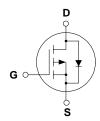
Description

This P-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, audio amplifier, DC motor control, and variable switching power applications.

Features

- -8 A, -100 V, $R_{DS(on)}$ =530 m $\Omega(Max.)$ @ V_{GS} =-10 V, I_D =-4 A
- Low Gate Charge (Typ. 12 nC)
- Low Crss (Typ. 30 pF)
- 100% Avalanche Tested
- 175°C Maximum Junction Temperature Rating





Absolute Maximum Ratings T_C = 25°C unless otherwise noted

Symbol	Parameter		FQP8P10	Unit
V _{DSS}	Drain-Source Voltage		-100	V
I _D	Drain Current - Continuous (T _C = 25	°C)	-8.0	А
	- Continuous (T _C = 100°C)		-5.7	А
I _{DM}	Drain Current - Pulsed	(Note 1)	-32	А
V _{GSS}	Gate-Source Voltage		± 30	V
E _{AS}	Single Pulsed Avalanche Energy	(Note 2)	150	mJ
I _{AR}	Avalanche Current	(Note 1)	-8.0	А
E _{AR}	Repetitive Avalanche Energy	(Note 1)	6.5	mJ
dv/dt	Peak Diode Recovery dv/dt	(Note 3)	-6.0	V/ns
P_D	Power Dissipation (T _C = 25°C)		65	W
	- Derate above 25°C		0.43	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	Тур	Max	Unit
$R_{\theta JC}$	Thermal Resistance, Junction-to-Case		2.31	°C/W
$R_{\theta CS}$	Thermal Resistance, Case-to-Sink	0.5		°C/W
$R_{\theta JA}$	Thermal Resistance, Junction-to-Ambient		62.5	°C/W

Symbol	Parameter	Test Conditions	1	Min	Тур	Max	Unit
Off Cha	racteristics						
BV _{DSS}	Drain-Source Breakdown Voltage	$V_{GS} = 0 \text{ V}, I_{D} = -250 \mu\text{A}$		-100			V
ΔBV _{DSS} / ΔT _J	Breakdown Voltage Temperature Coefficient	I _D = -250 μA, Referenced	I to 25°C		-0.1		V/°C
I _{DSS}	Zero Gate Voltage Drain Current	V _{DS} = -100 V, V _{GS} = 0 V				-1	μΑ
		V _{DS} = -80 V, T _C = 150°C				-10	μΑ
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 Cha	racteristics						
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 V, I _D = -4.0 A			0.41	0.53	Ω
9 _{FS}	Forward Transconductance	$V_{DS} = -40 \text{ V}, I_{D} = -4.0 \text{ A}$	(Note 4)		4.3		S
C _{iss} C _{oss} C _{rss}	Input Capacitance Output Capacitance Reverse Transfer Capacitance	$V_{DS} = -25 \text{ V}, V_{GS} = 0 \text{ V},$ f = 1.0 MHz			120 30	155 40	pF pF pF
	'				30	40	pF
	ng Characteristics					T	
t _{d(on)}	Turn-On Delay Time	$V_{DD} = -50 \text{ V}, I_{D} = -8.0 \text{ A},$ $R_{G} = 25 \Omega$ (Note 4, 5)			11	30	ns
t _r	Turn-On Rise Time				110	230	ns
t _{d(off)}	Turn-Off Delay Time				20	50	ns
t _f	Turn-Off Fall Time		(14016 4, 3)		35	80	ns
Q _g	Total Gate Charge	$V_{DS} = -80 \text{ V}, I_{D} = -8.0 \text{ A},$ $V_{GS} = -10 \text{ V}$			12	15	nC
Q _{gs}	Gate-Source Charge				3.0		nC
Q _{gd}	Gate-Drain Charge		(Note 4, 5)		6.4		nC
Drain-S	ource Diode Characteristics ar	nd Maximum Ratings	S				
I _S	Maximum Continuous Drain-Source Diode Forward Current				-8.0	Α	
I _{SM}	Maximum Pulsed Drain-Source Diode F	m Pulsed Drain-Source Diode Forward Current				-32	Α
V_{SD}	Drain-Source Diode Forward Voltage	$V_{GS} = 0 \text{ V}, I_{S} = -8.0 \text{ A}$				-4.0	V
t _{rr}	Reverse Recovery Time	$V_{GS} = 0 \text{ V}, I_{S} = -8.0 \text{ A},$			98		ns
Q _{rr}	Reverse Recovery Charge	$dI_{F} / dt = 100 A/\mu s$	(Note 4)		0.35		μС

- **Notes:** 1. Repetitive Rating : Pulse width limited by maximum junction temperature 2. L = 3.5mH, I_{AS} = -8.0A, V_{DD} = -25V, R_G = 25 Ω . Starting T_J = 25°C 3. I_{SD} \leq -8.0A, didt \leq 300A/µs, V_{DD} \leq BV_{DSS}, Starting T_J = 25°C 4. Pulse Test : Pulse width \leq 300µs, Duty cycle \leq 2% 5. Essentially independent of operating temperature

Typical Characteristics

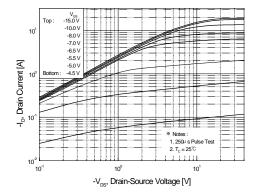


Figure 1. On-Region Characteristics

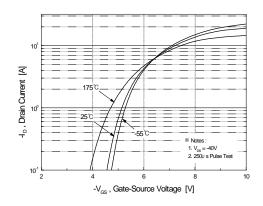


Figure 2. Transfer Characteristics

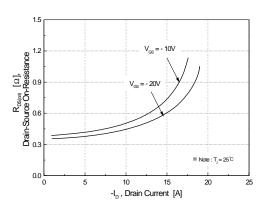


Figure 3. On-Resistance Variation vs. Drain Current and Gate Voltage

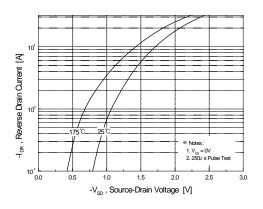


Figure 4. Body Diode Forward Voltage Variation vs. Source Current and Temperature

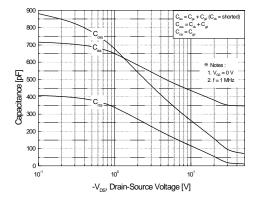


Figure 5. Capacitance Characteristics

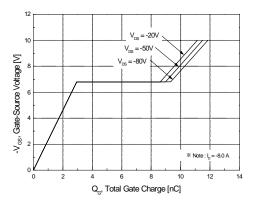
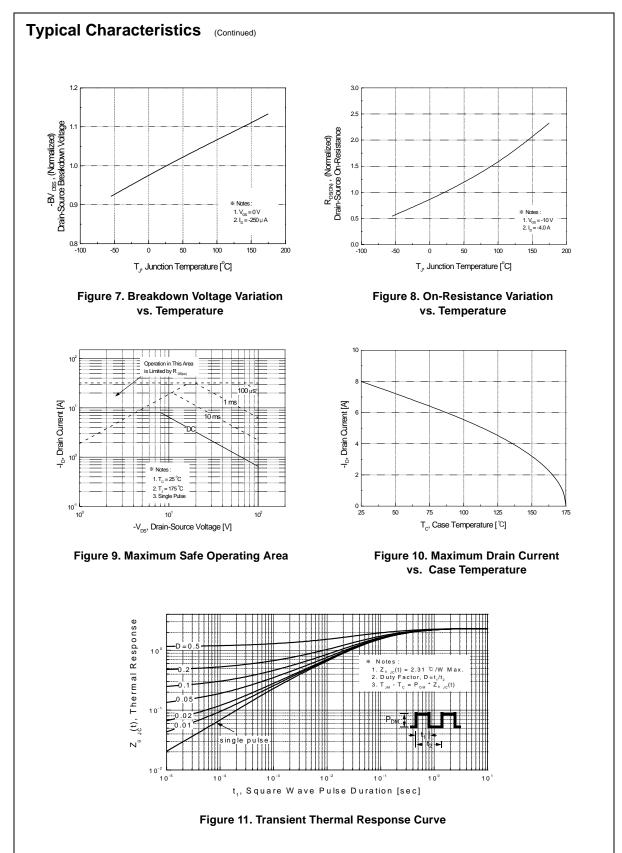
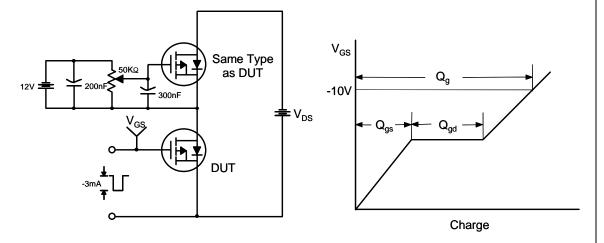


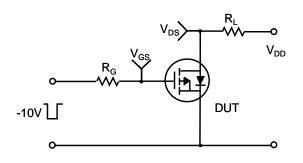
Figure 6. Gate Charge Characteristics

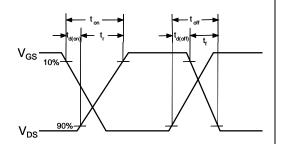


Gate Charge Test Circuit & Waveform

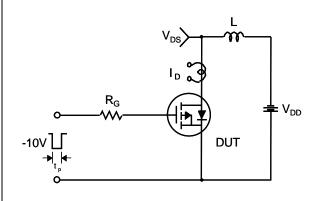


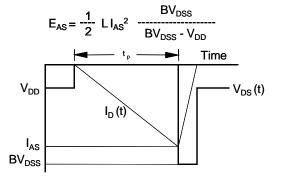
Resistive Switching Test Circuit & Waveforms

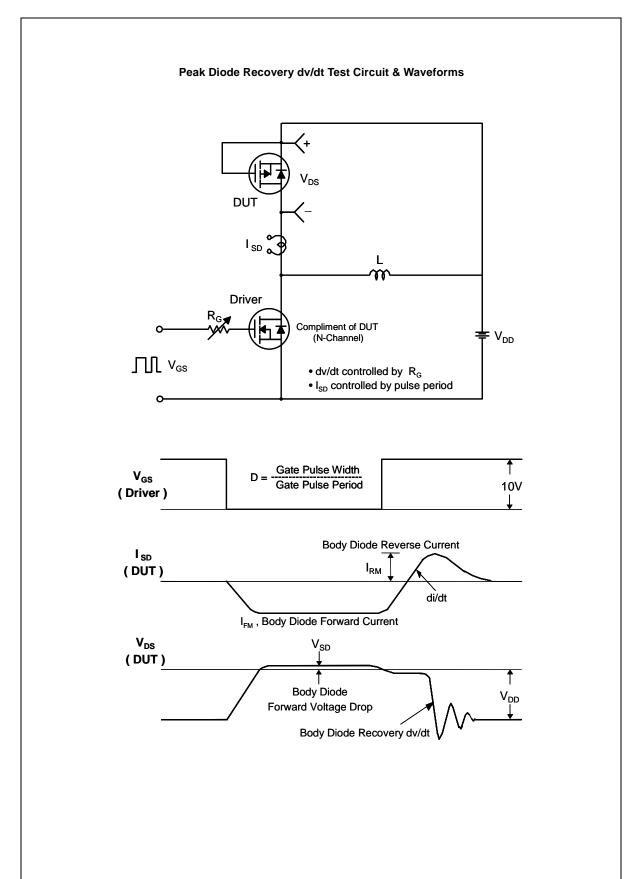


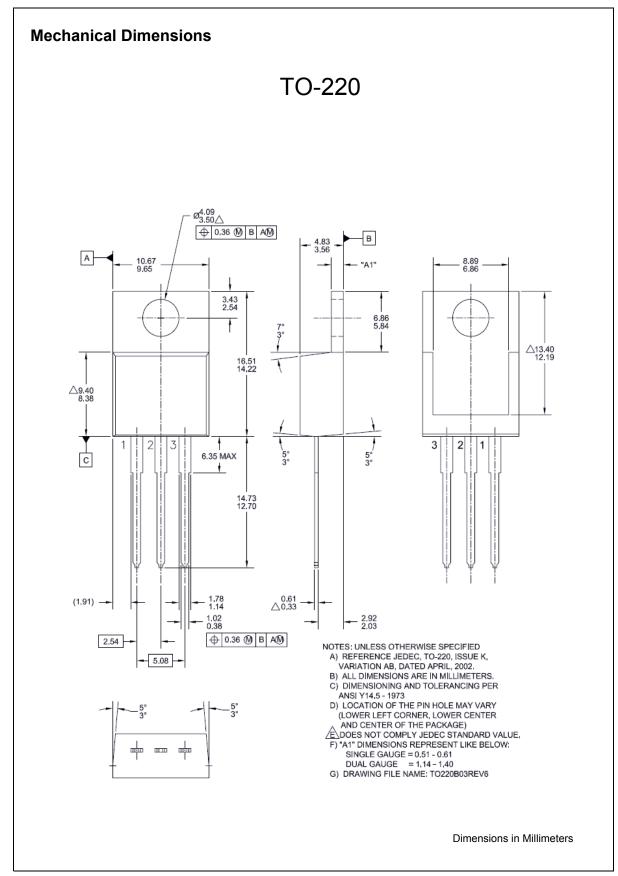


Unclamped Inductive Switching Test Circuit & Waveforms













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