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### November 2013

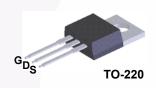
## FQP32N20C / FQPF32N20C N-Channel QFET<sup>®</sup> MOSFET 200 V, 28 A, 82 mΩ

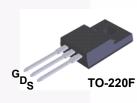
### Features

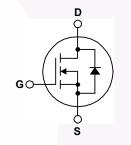
- + 28 A, 200 V,  $R_{DS(on)}$  = 82 m $\Omega$  (Max.) @  $V_{GS}$  = 10 V,  $I_{D}$  = 14 A
- Low Gate Charge (Typ. 82.5 nC)
- Low Crss (Typ. 185 pF)
- 100% Avalanche Tested

### 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.







### MOSFET Maximum Ratings T<sub>C</sub> = 25°C unless otherwise noted.

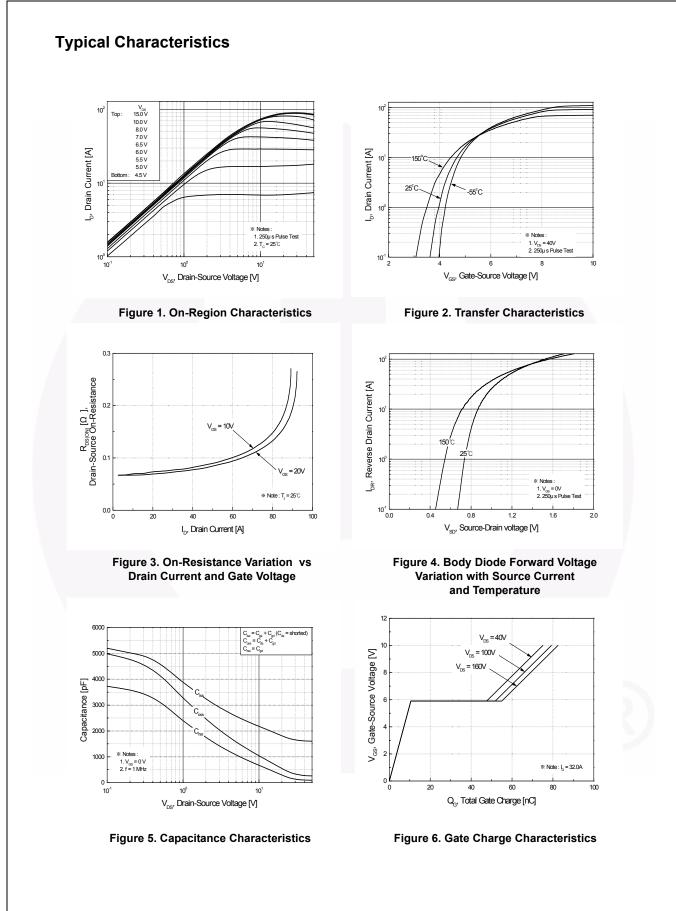
Symbol	Parameter			FQP32N20C	FQPF32N20C	Unit
V <sub>DSS</sub>	Drain to Source Voltage			200		V
ID	Ducia Current	-Continuous (T <sub>C</sub> = 25 <sup>o</sup> C)	-Continuous (T <sub>C</sub> = 25 <sup>o</sup> C) -Continuous (T <sub>C</sub> = 100 <sup>o</sup> C)		28.0 *	А
	Drain Current	-Continuous (T <sub>C</sub> = 100 <sup>o</sup> C)			17.8 *	А
ОМ	Drain Current	- Pulsed	(Note 1)	112	112 *	А
V <sub>GSS</sub>	Gate to Source Voltage		± 30		V	
E <sub>AS</sub>	Single Pulsed Avalanche Energy		(Note 2)	955		mJ
AR	Avalanche Current		(Note 1)	) 28.0		А
E <sub>AR</sub>	Repetitive Avalanche Energy		(Note 1)	15.6		mJ
dv/dt	Peak Diode Recovery dv/dt		(Note 3)	5	.5	V/ns
P <sub>D</sub>	Rower Dissinction	(T <sub>C</sub> = 25°C)		156	50	W
	Power Dissipation	- Derate above 25ºC	-	1.25	0.4	W/°C
T <sub>J</sub> , T <sub>STG</sub>	Operating and Storage Temperature Range		-55 to	+150	°C	
TL	Maximum Lead Temperature for Soldering Purpose, 1/8" from Case for 5 Seconds			300		°C

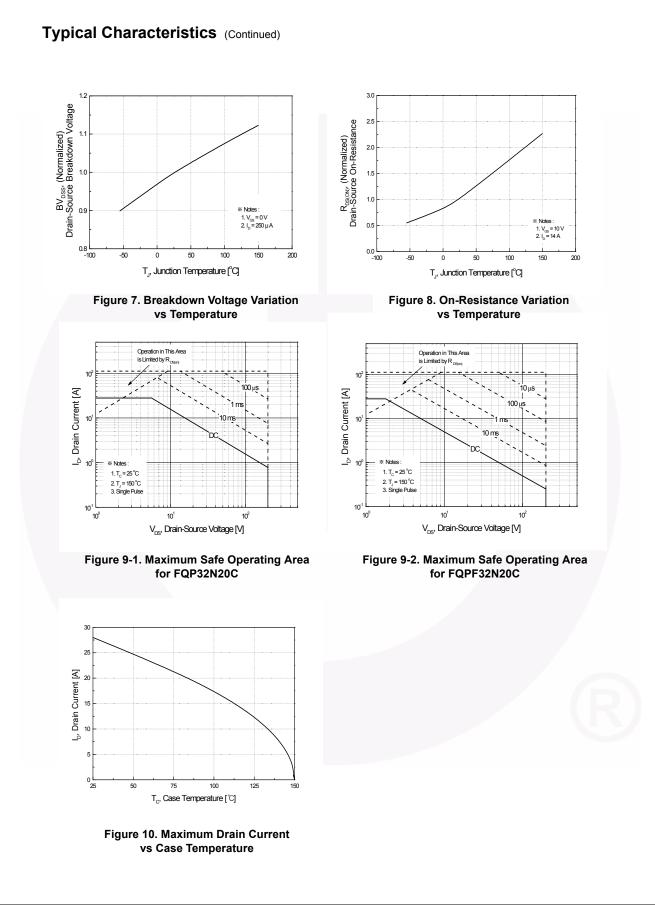
### **Thermal Characteristics**

Symbol	Parameter	FQP32N20C	FQPF32N20C	Unit
$R_{\theta JC}$	Thermal Resistance, Junction to Case, Max	0.8	2.51	°C/W
$R_{ extsf{ heta}JA}$	Thermal Resistance, Junction to Ambient, Max	62.5	62.5	°C/W

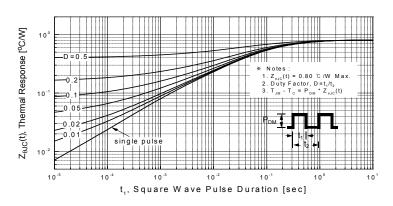
Device MarkingDeviceFQP32N20CFQP32N20CFQPF32N20CFQPF32N20C			Package	Reel S		Tape Width		antity	
			TO-220	Tube		N/A		50 units	
		TO-220F Tu			N/A	50	50 units		
	r	<b>EVALUATE:</b> T <sub>C</sub> = $25^{\circ}$ C ur			Min	Tree	Мах	l lmit	
Symbol	r	Parameter	Test Conditions		Min	Тур	Мах	Unit	
Off Cha	racteristics								
BV <sub>DSS</sub>	Drain-Source B	reakdown Voltage	$V_{GS}$ = 0 V, I <sub>D</sub> = 250 µA		200			V	
ΔBV <sub>DSS</sub> / ΔT <sub>J</sub>	Breakdown Voltage Temperature Coefficient		$I_D = 250 \ \mu A$ , Referenced to 2	25°C		0.24		V/°C	
I <sub>DSS</sub>	Zero Gate Volta	ge Drain Current	ge Drain Current $\frac{V_{DS} = 200 \text{ V}, \text{ V}_{GS} = 0 \text{ V}}{V_{DS} = 160 \text{ V}, \text{ T}_{C} = 125^{\circ}\text{C}}$				10	μA	
.022							100	μA	
I <sub>GSSF</sub>		kage Current, Forward	$V_{GS}$ = 30 V, $V_{DS}$ = 0 V				100	nA	
I <sub>GSSR</sub>	Gate-Body Leal	kage Current, Reverse	$V_{GS}$ = -30 V, $V_{DS}$ = 0 V				-100	nA	
On Cha	racteristics								
V <sub>GS(th)</sub>	Gate Threshold	Voltage	$V_{DS} = V_{GS}, I_D = 250 \mu A$		2.0		4.0	V	
R <sub>DS(on)</sub>	Static Drain-Sou On-Resistance	urce	V <sub>GS</sub> = 10 V, I <sub>D</sub> = 14 A			0.068	0.082	Ω	
9 <sub>FS</sub>	Forward Transc	onductance	V <sub>DS</sub> = 40 V, I <sub>D</sub> = 14 A			20		S	
Dynam	ic Charactori	stics							
C <sub>iss</sub>	ic Characteria Input Capacitan					1700	2220	pF	
C <sub>iss</sub> C <sub>oss</sub>	Output Capacitan		$V_{DS} = 25 V, V_{GS} = 0 V,$			400	520	pF	
C <sub>rss</sub>	Reverse Transf		f = 1.0 MHz			185	245	pF	
-155						100	240	P	
Switchi	ng Character	ristics							
t <sub>d(on)</sub>	Turn-On Delay	Time	V <sub>DD</sub> = 100 V, I <sub>D</sub> = 32 A,			25	60	ns	
t <sub>r</sub>	Turn-On Rise T	ime	$R_{\rm G} = 25 \Omega$			270	550	ns	
t <sub>d(off)</sub>	Turn-Off Delay	Time				245	500	ns	
t <sub>f</sub>	Turn-Off Fall Tir	ne		(Note 4)		210	430	ns	
Qg	Total Gate Char	ge	V <sub>DS</sub> = 160 V, I <sub>D</sub> = 32 A,			82.5	110	nC	
Q <sub>gs</sub>	Gate-Source Cl	narge	V <sub>GS</sub> = 10 V			10.5		nC	
Q <sub>gd</sub>			(Note 4)			44.5		nC	
Drain S	ouros Diodo	Characteristics and	Movimum Dotingo						
brain-5	1	nuous Drain-Source Diode	0				28	А	
I <sub>SM</sub>	Maximum Continuous Drain-Source Diode						112	A	
V <sub>SD</sub>		iode Forward Voltage	V <sub>GS</sub> = 0 V, I <sub>S</sub> = 28 A				1.5	V	
t <sub>rr</sub>	Reverse Recov	0	$V_{GS} = 0 V, I_S = 32 A,$			265		ns	
Q <sub>rr</sub>	Reverse Recov	·	dl <sub>F</sub> / dt = 100 A/μs	-		2.73		μC	
otes:		,			-				

3.  $I_{SD} \le 28$  A, di/dt  $\le 300$  A/µs,  $V_{DD} \le BV_{DSS}$ , starting 4. Essentially independent of operating temperature.

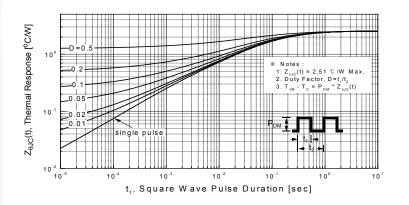




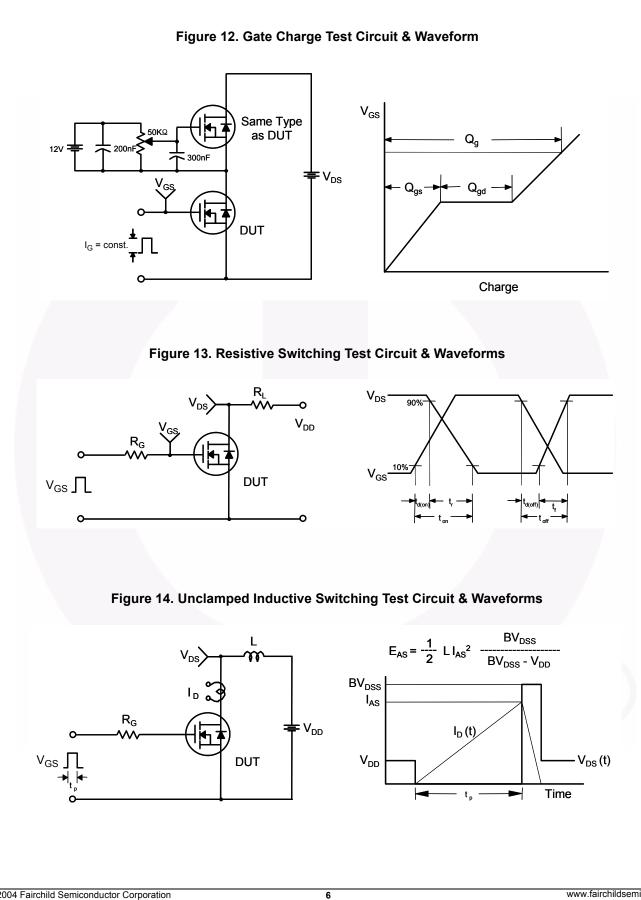
### Typical Characteristics (Continued)





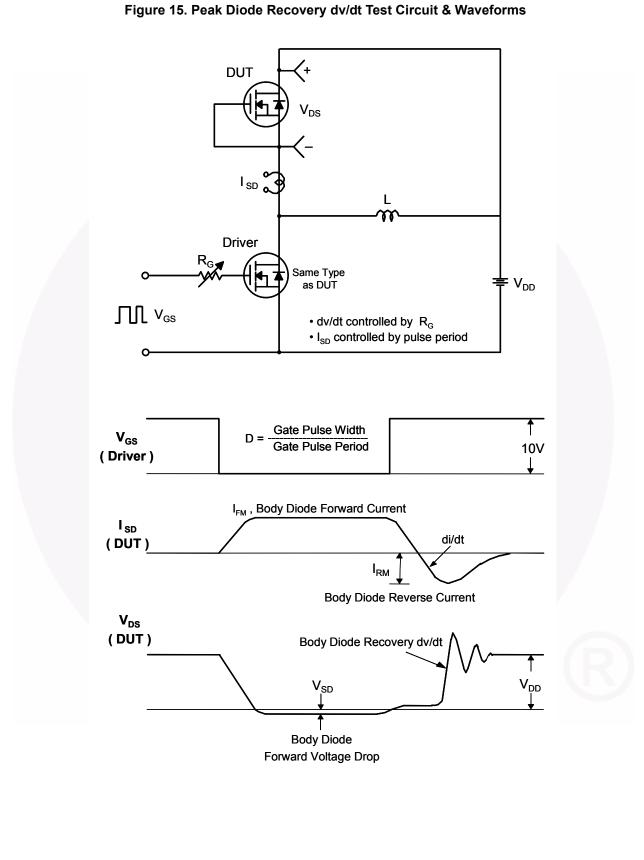




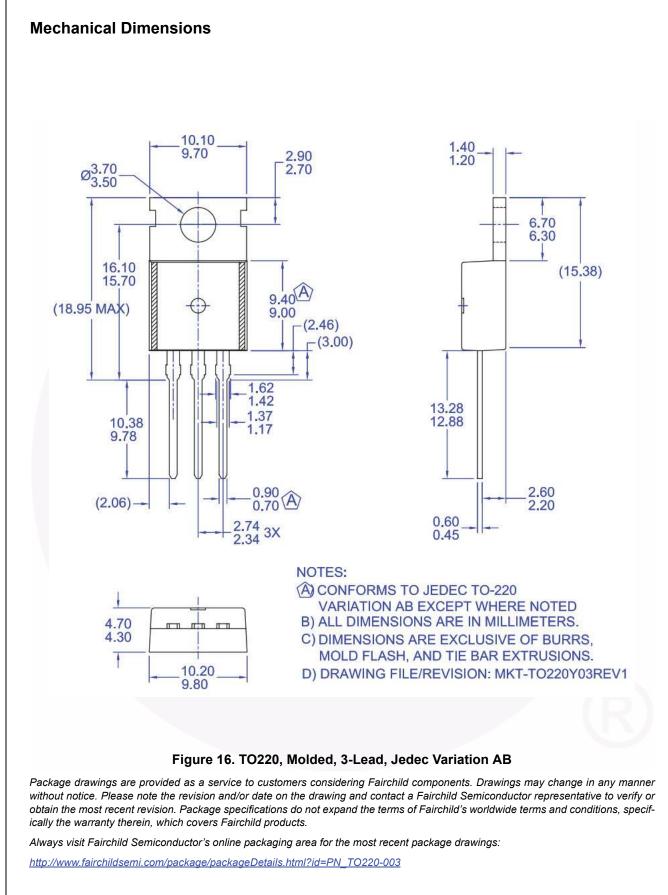


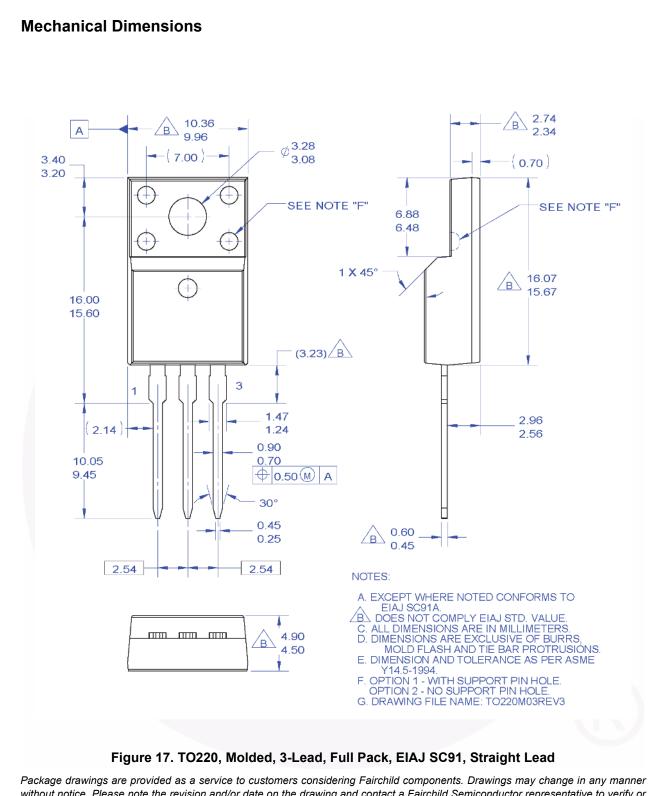
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FQP32N20C / FQPF32N20C — N-Channel QFET® MOSFET





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