

FQT3P20 P-Channel QFET<sup>®</sup> MOSFET -200 V, -0.67 A, 2.7 Ω

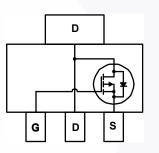
## Description

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

- 0.67 A, -200 V,  ${\sf R}_{\sf DS(on)}$  = 2.7  $\Omega$  (Max.) @V\_{\sf GS} = 10 V,  ${\sf I}_{\sf D}$  = 0.335 A
- Low Gate Charge ( Typ. 6.0 nC)
- Low Crss (Typ. 7.5 pF)





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

Symbol	Parameter		FQT3P20TF	Unit
V <sub>DSS</sub>	Drain-Source Voltage		-200	V
I <sub>D</sub>	Drain Current - Continuous ( $T_C = 25^\circ$	°C)	-0.67	A
	- Continuous (T <sub>C</sub> = 70°	°C)	-0.53	A
I <sub>DM</sub>	Drain Current - Pulsed	(Note 1)	-2.7	A
V <sub>GSS</sub>	Gate-Source Voltage		± 30	V
E <sub>AS</sub>	Single Pulsed Avalanche Energy	(Note 2) 150		mJ
I <sub>AR</sub>	Avalanche Current	(Note 1)	-0.67	А
E <sub>AR</sub>	Repetitive Avalanche Energy	(Note 1)	0.25	mJ
dv/dt	Peak Diode Recovery dv/dt	(Note 3)	-5.5	V/ns
PD	Power Dissipation ( $T_C = 25^{\circ}C$ )		2.5	W
	- Derate above 25°C		0.02	W/°C
T <sub>J</sub> , T <sub>STG</sub>	Operating and Storage Temperature Range		-55 to +150	°C
Τ <sub>L</sub>	Maximum lead temperature for soldering purposes, 1/8" from case for 5 seconds		300	°C

## **Thermal Characteristics**

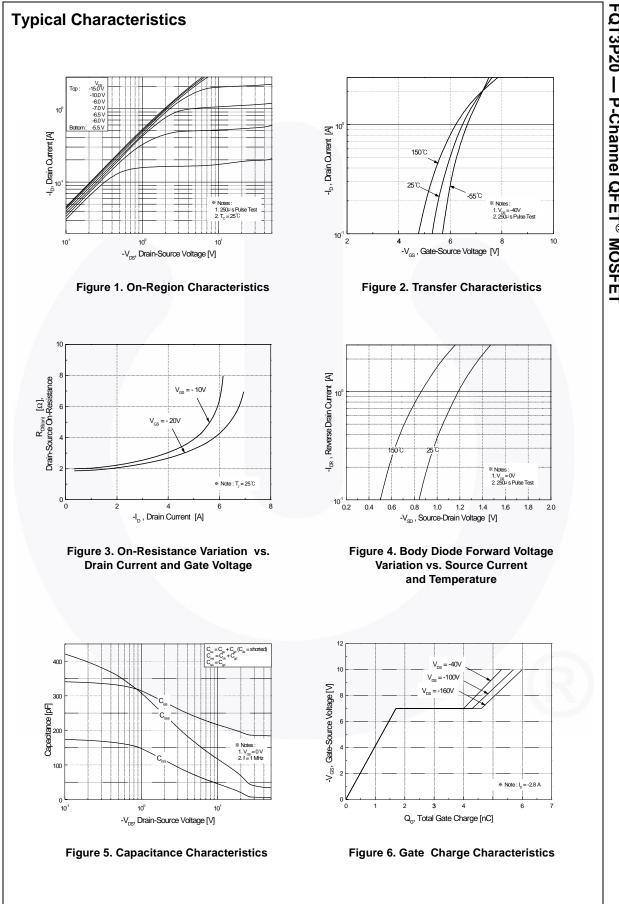
Symbol	Parameter	FQT3P20TF	Unit
$R_{\thetaJA}$	Thermal Resistance, Junction-to-Ambient	50	°C/W

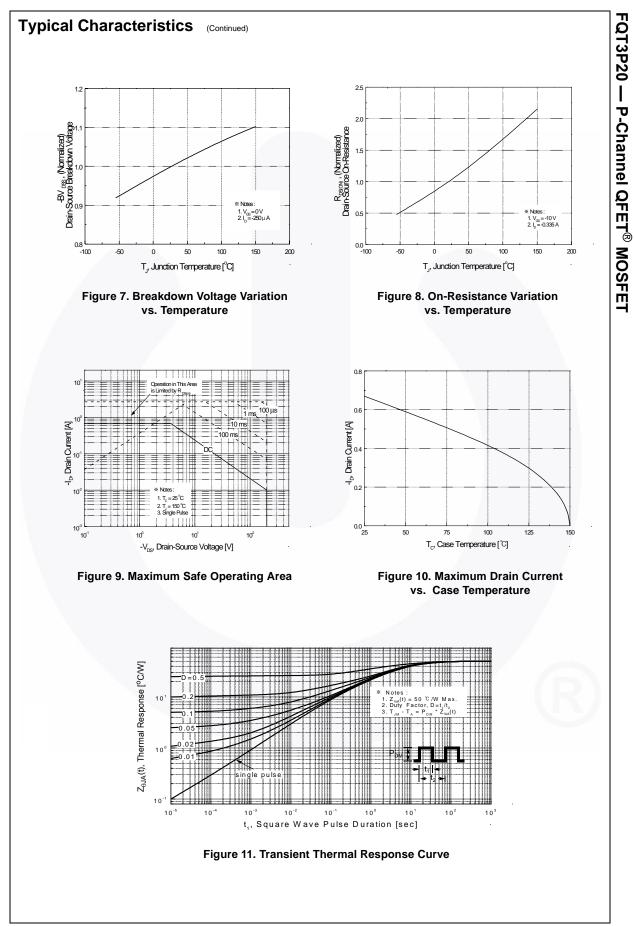
October 2013

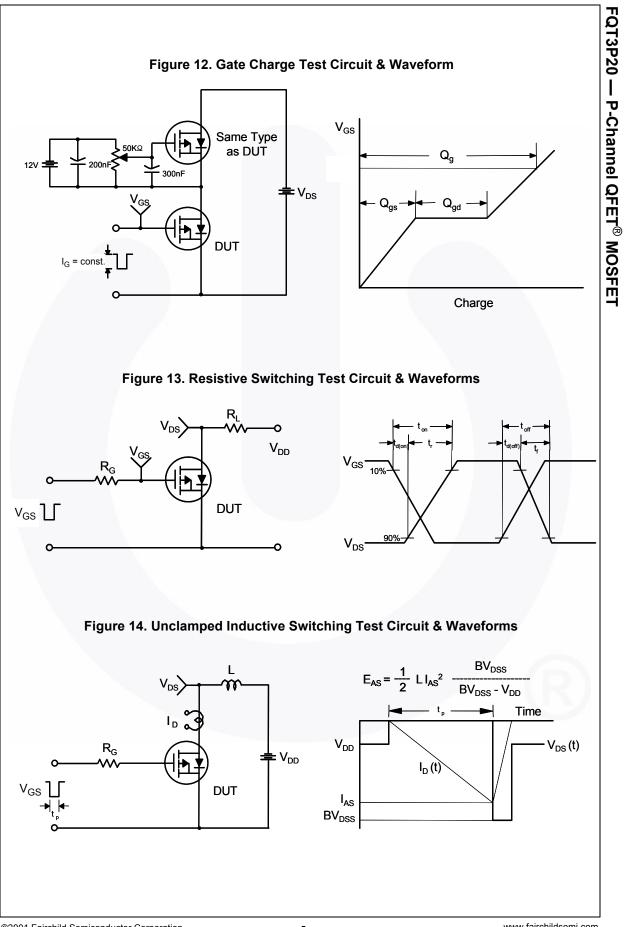
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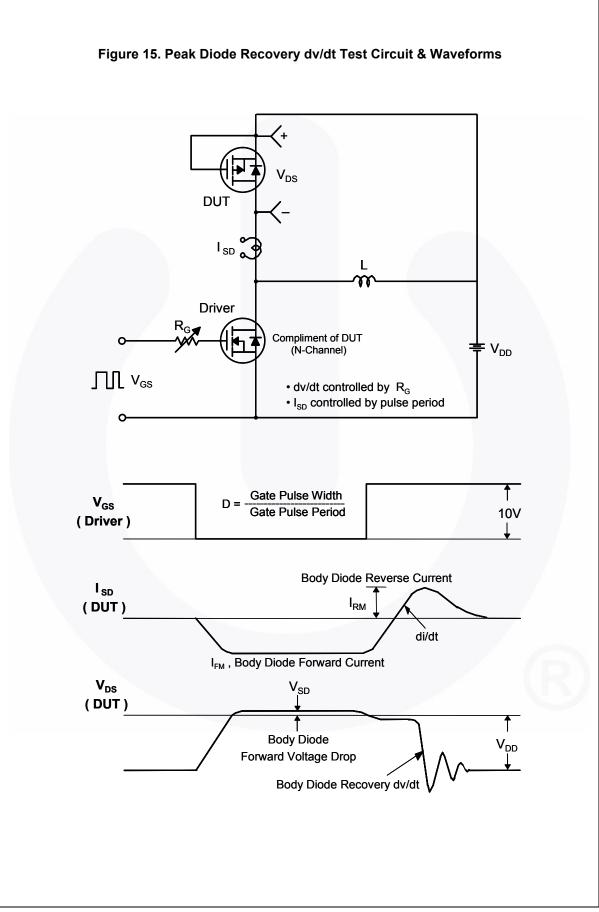
Device Marking		Device Package Reel Size			Tape Width		Quantity		
FQT3	3P20	FQT3P20TF	SOT-223	13"		12 m	ım	2500	) units
lectri	cal Cha	aracteristics T <sub>c = 25</sub>	°C unless otherw	vise noted.					
Symbol		Parameter	Т	est Conditions		Min	Тур	Max	Unit
Off Cha	aracteris	stics							
BV <sub>DSS</sub>	Drain-Sc	ource Breakdown Voltage	V <sub>GS</sub> = 0 V	/, I <sub>D</sub> = -250 μA		-200			V
ΔB <sub>VDSS</sub> / ΔT <sub>J</sub>	Breakdo Coefficie	wn Voltage Temperature nt	I <sub>D</sub> = -250	μA, Referenced t	o 25°C		-0.18		V/°C
I <sub>DSS</sub>			V <sub>DS</sub> = -20	0 V, V <sub>GS</sub> = 0 V				-1	μA
	∠ero Gat	te Voltage Drain Current	V <sub>DS</sub> = -16	$V_{DS} = -160 \text{ V}, \text{ T}_{C} = 125^{\circ}\text{C}$				-10	μA
I <sub>GSSF</sub>	Gate-Bo	dy Leakage Current, Forward	V <sub>GS</sub> = -30	$V, V_{DS} = 0 V$				-100	nA
I <sub>GSSR</sub>	Gate-Bo	dy Leakage Current, Reverse	$V_{GS} = 30$	V, $V_{DS} = 0 V$				100	nA
On Cha	racteris	tics							
V <sub>GS(th)</sub>	Gate Th	eshold Voltage	$V_{DS} = V_{GS}$	<sub>S</sub> , I <sub>D</sub> = -250 μA		-3.0		-5.0	V
R <sub>DS(on)</sub>	Static Dr On-Resis	ain-Source stance	V <sub>GS</sub> = -10	) V, I <sub>D</sub> = -0.335 A			2.06	2.7	Ω
9 <sub>FS</sub>	Forward	Transconductance	V <sub>DS</sub> = -40	V, I <sub>D</sub> = -0.335 A			0.7		S
C <sub>iss</sub> C <sub>oss</sub> C <sub>rss</sub>	Input Ca Output C	acteristics pacitance Capacitance Transfer Capacitance	V <sub>DS</sub> = -25 f = 1.0 MH	5 V, V <sub>GS</sub> = 0 V, Hz			190 45 7.5	250 60 10	pF pF
		racteristics							
t <sub>d(on)</sub>	-	Delay Time					8.5	25	ns
r		Rise Time		$V_{DD} = -100 \text{ V}, \text{ I}_{D} = -2.8 \text{ A},$			35	80	ns
d(off)		Delay Time	R <sub>G</sub> = 25 S	2			12	35	ns
f		Fall Time			(Note 4)		25	60	ns
ָ ג <sup>מ</sup>		te Charge	$V_{D0} = -16$	60 V, I <sub>D</sub> = -2.8 A,			6.0	8.0	nC
Q <sub>gs</sub>		urce Charge	$V_{GS} = -10$	-			1.7		nC
Q <sub>gd</sub>		ain Charge			(Note 4)		2.9		nC
	Source D	Diode Characteristics a	nd Maxim	num Ratings		<u> </u>			<u> </u>
I <sub>S</sub>		n Continuous Drain-Source D		-				-0.67	Α
		n Pulsed Drain-Source Diode						-2.7	A
ISM		ource Diode Forward Voltage		/, I <sub>S</sub> = -0.67 A				-5.0	V
		°	$V_{GS} = 0 V, I_S = -2.8 A,$			100		ns	
I <sub>SM</sub> V <sub>SD</sub> trr	Reverse	Recovery Time	$V_{GS} = 0 V$	$r_{1S} = -2.0 \text{ A},$			100		110

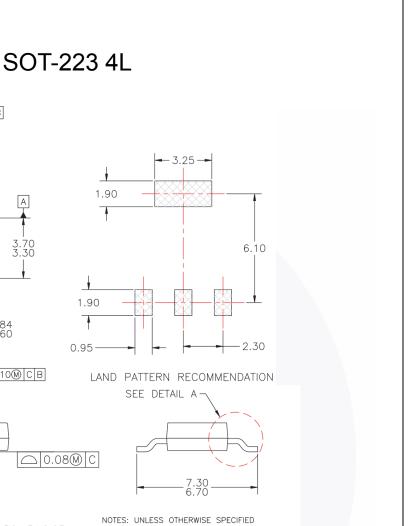
2. L = 500mH, I<sub>AS</sub> = -0.67A, V<sub>DD</sub> = -50V, R<sub>G</sub> = 25  $\Omega$ , Starting T<sub>J</sub> = 25°C 3. I<sub>SD</sub> = -2.8A, di/dt  $\leq$  3004/us, V<sub>DD</sub>  $\leq$  BV<sub>DSS</sub>, Starting T<sub>J</sub> = 25°C 4. Essentially independent of operating temperature



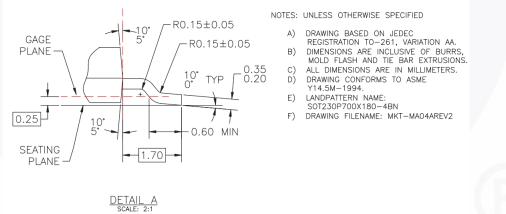








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1.90

4

0.95

 $\square$  0.08 $\square$  C

## Figure 16. Molded Package, SOT-223, 4 Lead

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**Dimension in Millimeters** 

**Mechanical Dimensions** 

6.70 6.20

⊕ 0.10@ C B - 3.10 -

3

4

.30 2

1.80 MAX

Ċ

0.10

4.60

► B

А

.70 3

0.84

⊕ 0.10 @ C B



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