

SEMICONDUCTOR®

### November 2013

# FQP16N25

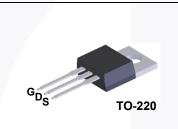
# N-Channel QFET<sup>®</sup> MOSFET 250 V, 16 A, 230 m $\Omega$

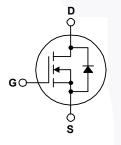
### Description

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.

### Features

- 16 A, 250 V,  $R_{DS(on)}$  = 230 m $\Omega$  (Max.) @ V<sub>GS</sub> = 10 V, I<sub>D</sub> = 8.0 A
- Low Gate Charge (Typ. 27 nC)
- Low Crss (Typ. 23 pF)
- 100% Avalanche Tested





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

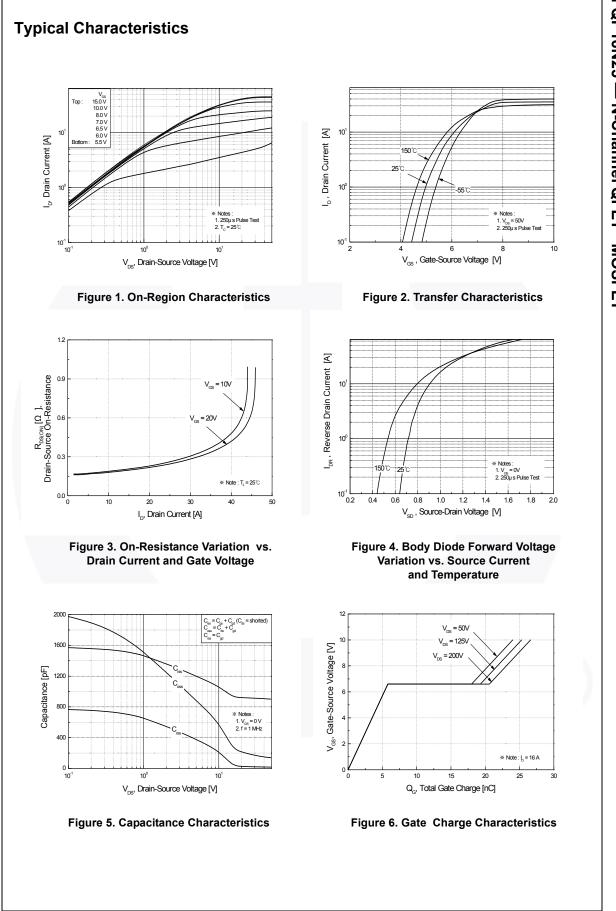
Symbol	Parameter		FQP16N25	Unit
V <sub>DSS</sub>	Drain-Source Voltage		250	V
I <sub>D</sub>	Drain Current - Continuous (T <sub>C</sub> = 25°C	C)	16	A
	- Continuous (T <sub>C</sub> = 100°	C)	10	A
I <sub>DM</sub>	Drain Current - Pulsed	(Note 1)	64	A
V <sub>GSS</sub>	Gate-Source Voltage		± 30	V
E <sub>AS</sub>	Single Pulsed Avalanche Energy	(Note 2)	560	mJ
I <sub>AR</sub>	Avalanche Current	(Note 1)	16	A
E <sub>AR</sub>	Repetitive Avalanche Energy	(Note 1)	14.2	mJ
dv/dt	Peak Diode Recovery dv/dt	(Note 3)	5.5	V/ns
PD	Power Dissipation ( $T_C = 25^{\circ}C$ )		142	W
	- Derate above 25°C		1.14	W/°C
T <sub>J</sub> , T <sub>STG</sub>	Operating and Storage Temperature Rang	je	-55 to +150	°C
TL	Maximum Lead Temperature for Soldering 1/8" from Case for 5 seconds	],	300	°C

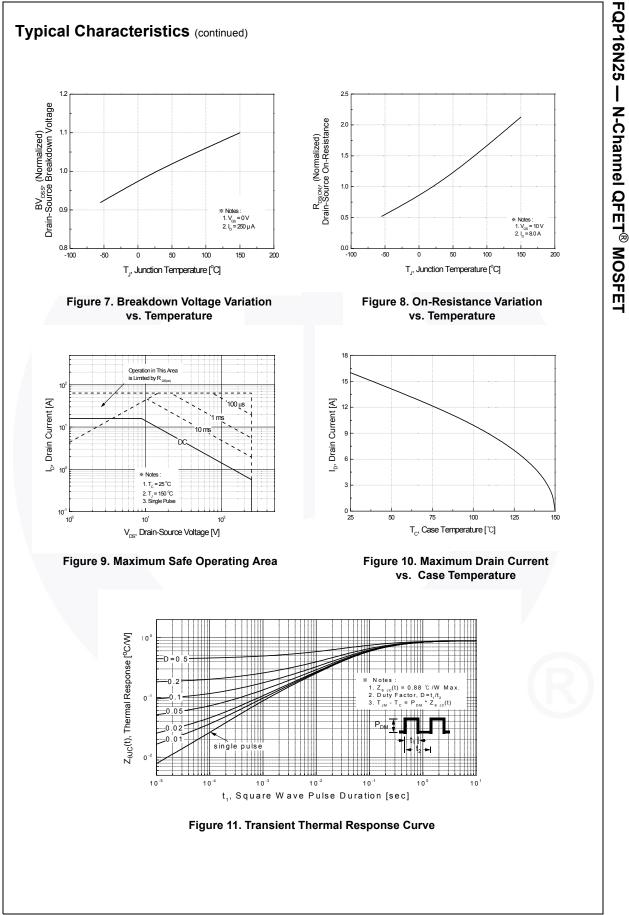
### **Thermal Characteristics**

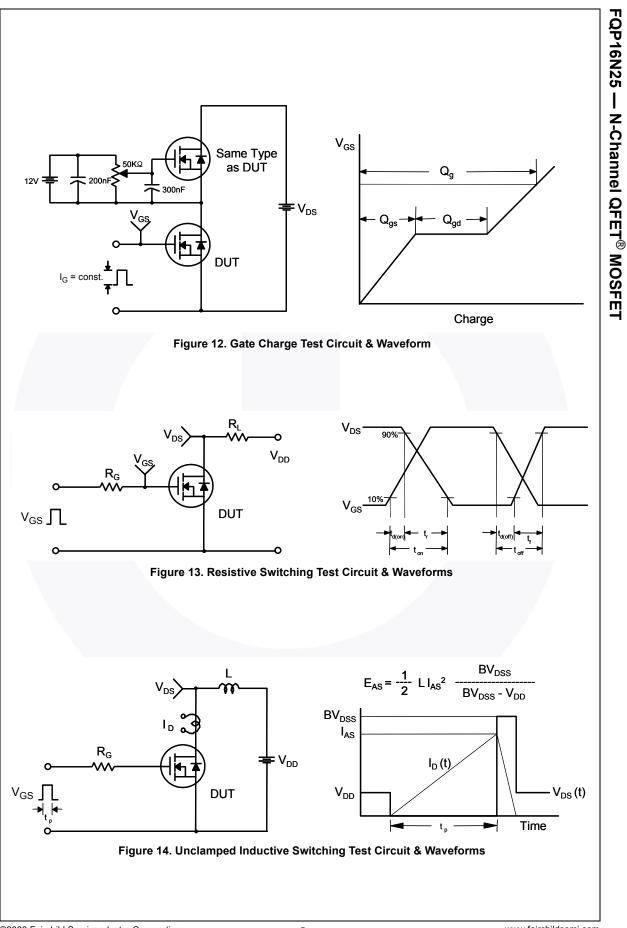
Symbol	Parameter	FQP16N25	Unit
$R_{ extsf{ heta}JC}$	Thermal Resistance, Junction-to-Case, Max.	0.88	°C/W
$R_{ extsf{ heta}JA}$	Thermal Resistance, Junction-to-Ambient, Max.	62.5	°C/W

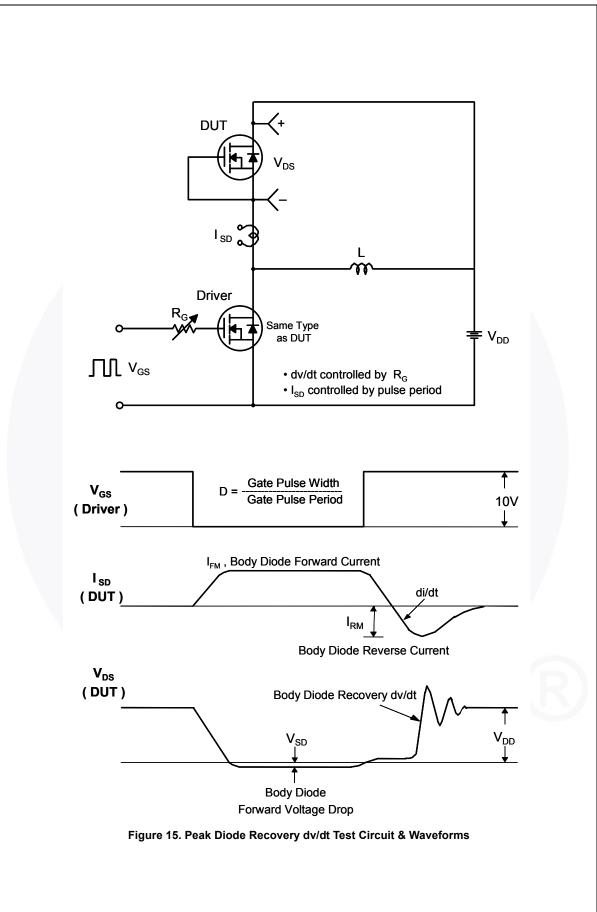
Part NumberTop MarkPackageFQP16N25FQP16N25TO-220		Packing Method	Reel Size	Tape Width		th Q	Quantity		
		Tube N/A		N/A		5	50 units		
lectri	cal C	haracteristics	T <sub>C</sub> = 25°C	unless otherwise noted.					
Symbol		Parameter		Test Condi	tions	Min	Тур	Max	Unit
Off Cha	aracte	ristics							
3V <sub>DSS</sub>	Drain-	Source Breakdown V	/oltage	$V_{GS}$ = 0 V, I <sub>D</sub> = 250	μA	250			V
ΔBV <sub>DSS</sub> ΔT <sub>J</sub>	Breakdown Voltage Temperature Coefficient		$I_D = 250 \ \mu A$ , Referenced to $25^{\circ}C$			0.22		V/°C	
DSS	Zero Gate Voltage Drain Current		$V_{DS}$ = 250 V, $V_{GS}$ =	0 V			1	μA	
	Zero C	Sale Vollage Drain Ci		$V_{DS}$ = 200 V, $T_{C}$ = 1	25°C			10	μA
GSSF	Gate-I	Body Leakage Currer	nt, Forward	$V_{GS}$ = 30 V, $V_{DS}$ = 0	V			100	nA
GSSR	Gate-E	Body Leakage Currer	nt, Reverse	$V_{GS}$ = -30 V, $V_{DS}$ =	0 V			-100	nA
On Cha	aracter	ristics							
GS(th)	Gate 1	Threshold Voltage		$V_{DS} = V_{GS}, I_{D} = 250$	) μΑ	3.0		5.0	V
R <sub>DS(on)</sub>		Drain-Source esistance		V <sub>GS</sub> = 10 V, I <sub>D</sub> = 8.0	A		0.18	0.23	Ω
FS	Forwa	rd Transconductance	•	V <sub>DS</sub> = 50 V, I <sub>D</sub> = 8.0	Α		18		S
Dynam	ic Cha	racteristics							
Siss	1	Capacitance		V <sub>DS</sub> = 25 V, V <sub>GS</sub> = 0	) V		920	1200	pF
Poss	Outpu	t Capacitance		f = 1.0 MHz	· •,		190	250	pF
rss	Reven	se Transfer Capacita	nce				23	30	pF
Switch	ina Ch	aracteristics							
d(on)		On Delay Time					17	45	ns
		On Rise Time		$V_{DD} = 125 \text{ V}, \text{ I}_{D} = 16$	δA,		140	290	ns
d(off)		Off Delay Time		R <sub>G</sub> = 25 Ω			45	100	ns
:		Off Fall Time			(Note 4)	/	75	160	ns
λ <sup>g</sup>		Gate Charge		V <sub>DS</sub> = 200 V, I <sub>D</sub> = 16	3 Δ		27	35	nC
λ <sub>gs</sub>		Source Charge		$V_{GS} = 10 V$	, , , , , , , , , , , , , , , , , , ,		5.8		nC
2 <sub>gd</sub>	Gate-I	Drain Charge			(Note 4)		15		nC
		Diada Charact	rictico on	d Maximum Pat	ingo				
S S S S		Diode Characte			ings			16	A
SM	-	num Pulsed Drain-So						64	A
SD		Source Diode Forwa		$V_{GS} = 0 V, I_S = 16 A$				1.5	V
т		se Recovery Time		$V_{GS} = 0 V, I_S = 16 A$			190		ns
יי ז <sub>יי</sub>		se Recovery Charge		$dI_{\rm F}$ / $dt$ = 100 A/µs			1.2		μC
		in the second seco		•					24

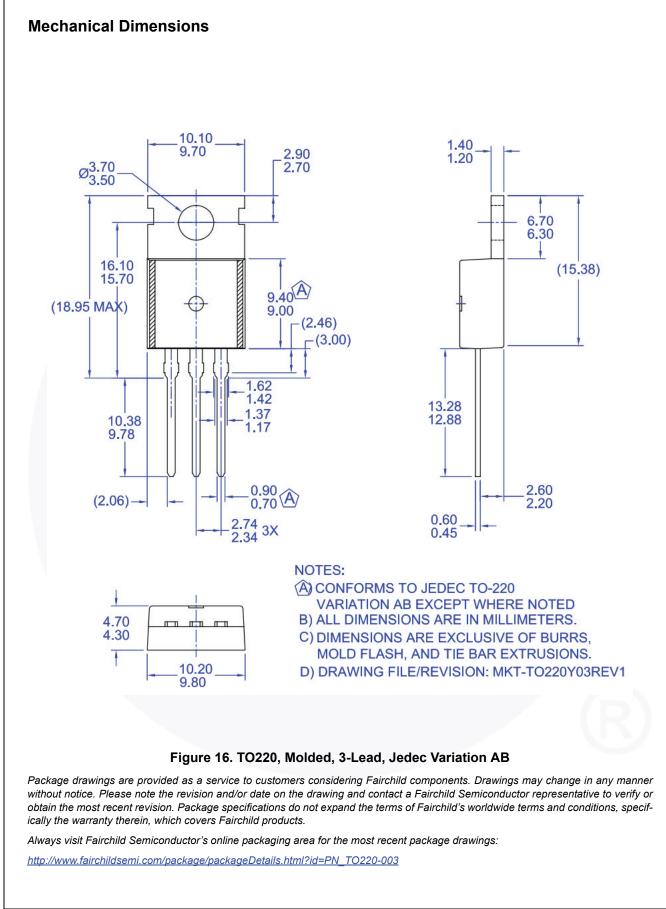
FQP16N25 — N-Channel QFET<sup>®</sup> MOSFET













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