

FQN1N* 0C N-Channel QFET MOSFET *00 V, 0.3\$ A, 11.5 Ω

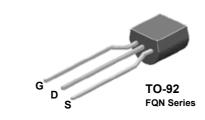
Description

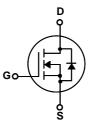
This N-Channel enhancement mode power MOSFET is produced using Fairchild Semiconductor®'s proprietary planar stripe and DMOS technology. This advanced MOSFET technology has been especially tailored to reduce on-state resistance, and to provide superior switching performance and high avalanche energy strength. These devices are suitable for switched mode power supplies, active power factor correction (PFC), and electronic lamp ballasts.

March 2013

Features

- + 0.30 A, 600 V, ${\sf R}_{\sf DS(on)}$ = 11.5 Ω (Max) @V_{\sf GS} = 10 V, ID = 0.14 A
- Low Gate Charge (Typ. 4.8 nC)
- Low Crss (Typ. 3.5 pF)
- 100% Avalanche Tested





Absolute Maximum Ratings

Symbol	Parameter			FQN1N60C	Unit
V _{DSS}	Drain-Source Ve	oltage		600	V
I _D	Drain Current	- Continuous (T _C =	25°C)	0.3	A
	- Continuous (T _C = 100°C)			0.18	A
I _{DM}	Drain Current	- Pulsed	(Note 1)	1.2	A
V _{GSS}	Gate-Source Vo	oltage		± 30	V
E _{AS}	Single Pulsed A	valanche Energy	(Note 2)	33	mJ
I _{AR}	Avalanche Curr	ent	(Note 1)	0.3	A
E _{AR}	Repetitive Avala	anche Energy	(Note 1)	0.3	mJ
dv/dt	Peak Diode Red	covery dv/dt	(Note 3)	4.5	V/ns
P _D	Power Dissipati	on (T _A = 25°C)		1	W
	Power Dissipati	on (T _L = 25°C)		3	W
		- Derate above 25°	С	0.02	W/°C
T _J , T _{STG}	Operating and Storage Temperature Range			-55 to +150	°C
Τ _L	Maximum lead temperature for soldering purposes, 1/8" from case for 5 seconds			300	°C

Thermal Characteristics

R _{θJL} Thermal Resistance, Junction-to-Lead (Note 6a) 50 °C/W R _{θ,IA} Thermal Resistance, Junction-to-Ambient (Note 6b) 140 °C/W	Symbol	Parameter		Тур	Max	Unit
Rela Thermal Resistance, Junction-to-Ambient (Note 6b) 140 °C/W	$R_{ extsf{ heta}JL}$	Thermal Resistance, Junction-to-Lead	(Note 6a)		50	°C/W
	R_{\thetaJA}	Thermal Resistance, Junction-to-Ambient	(Note 6b)		140	°C/W

Device Marking Device Pac		kage	kage Reel Size		Tape W	/idth	Qua	ntity	
-			-92				2000ea		
Electrical C	haracteristics T	_C = 25°C unles	s otherwise no	ted					
Symbol	Parameter			Test Conditions	6	Min.	Тур.	Max.	Unit
Off Characteristic	<u>.</u>								
	ain-Source Breakdown Vol	tane	$V_{aa} = 0$	/ I_ = 250 µA		600			V
	Breakdown Voltage Temperature		$V_{GS} = 0 \text{ V}, \text{ I}_{D} = 250 \mu\text{A}$				0.6		V/°C
	pefficient	uic	$I_D = 250 \ \mu A$, Referenced to $25^{\circ}C$				0.0		V/ 0
I _{DSS} Ze	Zero Gate Voltage Drain Current			V _{DS} = 600 V, V _{GS} = 0 V				50	μA
			$V_{\rm DS}$ = 480 V, T _C = 125°C					250	μΑ
I _{GSSF} Ga	ate-Body Leakage Current,	Forward	V _{GS} = 30			100	nA		
I _{GSSR} Ga	ate-Body Leakage Current,	Reverse	$V_{GS} = -30$	0 V, V _{DS} = 0 V				-100	nA
On Characteristic	s								
	Gate Threshold Voltage		V _{DS} = V _{GS} , I _D = 250 μA			2.0		4.0	V
R _{DS(on)} Sta	atic Drain-Source n-Resistance		V _{GS} = 10	V, I _D = 0.15 A			9.3	11.5	Ω
g _{FS} Fo	rward Transconductance		V _{DS} = 40	V, I _D = 0.3 A	(Note 4)		0.75		S
Dynamic Charact	eristics								
C _{iss} Inp	Input Capacitance		V_{DS} = 25 V, V_{GS} = 0 V,				130	170	pF
C _{oss} Ou	utput Capacitance		f = 1.0 M	Hz			19	25	pF
C _{rss} Re	everse Transfer Capacitance	e					3.5	6	pF
Switching Charac	teristics								
t _{d(on)} Tu	rn-On Delay Time		V_{DD} = 300 V, I _D = 1.1 A, R _G = 25 Ω				7	24	ns
	rn-On Rise Time						21	52	ns
	rn-Off Delay Time						13	36	ns
	rn-Off Fall Time				(Note 4, 5)		27	64	ns
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	tal Gate Charge		V _{DS} = 48	0 V, I _D = 1.1 A,			4.8	6.2	nC
Q _g To	tal Gate Charge ate-Source Charge		V _{DS} = 48 V _{GS} = 10	0 V, I _D = 1.1 A, V			4.8 0.7	6.2 	nC nC
Q _g To Q _{gs} Ga	-		V _{DS} = 48 V _{GS} = 10	0 V, I _D = 1.1 A, V	(Note 4, 5)				-
Q _g To Q _{gs} Ga Q _{gd} Ga	ate-Source Charge ate-Drain Charge	avimum Pa	V _{GS} = 10	0 V, I _D = 1.1 A, V	(Note 4, 5)		0.7		nC
Q _g To Q _{gs} Ga Q _{gd} Ga Drain-Source Dio	ate-Source Charge ate-Drain Charge de Characteristics and M		V _{GS} = 10	V	(Note 4, 5)		0.7		nC
Q _g To Q _{gs} Ga Q _{gd} Ga Drain-Source Dio I _S	ate-Source Charge ate-Drain Charge de Characteristics and M aximum Continuous Drain-	Source Dioc	V _{GS} = 10	V Current	(Note 4, 5)		0.7 2.7		nC nC A
Q _g To Q _{gs} Ga Q _{gd} Ga Drain-Source Dio Is I _S Ma	ate-Source Charge ate-Drain Charge de Characteristics and M aximum Continuous Drain- aximum Pulsed Drain-Sour	Source Dioc ce Diode Fo	V _{GS} = 10	V Current ent	(Note 4, 5)		0.7 2.7	 0.3 1.2	nC nC
Qg To Qgs Ga Qgd Ga Drain-Source Dio Is Is Ma V _{SD} Dr	ate-Source Charge ate-Drain Charge de Characteristics and M aximum Continuous Drain-	Source Dioc ce Diode Fo	$V_{GS} = 10$ atings le Forward orward Curre $V_{GS} = 0$	V Current	(Note 4, 5)		0.7 2.7		nC nC A A

FQN1N60C N-Channel MOSFET

Q_{rr} Notes:

1. Repetitive Rating : Pulse width limited by maximum junction temperature

2. L = 59mH, I_{AS} = 1.1A, V_{DD} = 50V, R_G = 25 $\Omega,$ Starting $\mbox{ T}_{J}$ = 25°C

3. I_{SD} \leq 0.3A, di/dt \leq 200A/µs, V_{DD} \leq BV_{DSS,} Starting $\ T_{J}$ = 25°C

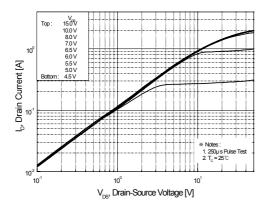
4. Pulse Test : Pulse width $\leq 300 \mu s,$ Duty cycle $\leq 2\%$

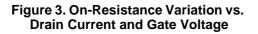
5. Essentially independent of operating temperature

6. a) Reference point of the R_{0,IL} is the drain lead
 b) When mounted on 3"x4.5" FR-4 PCB without any pad copper in a still air environment (R_{0,JA} is the sum of the junction-to-case and case-to-ambient thermal resistance. R_{0CA} is determined by the user's board design)

Typical Performance Characteristics

Figure 1. On-Region Characteristics





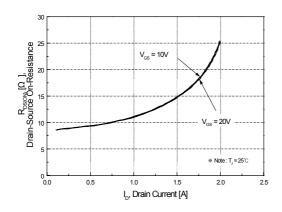


Figure 5. Capacitance Characteristics

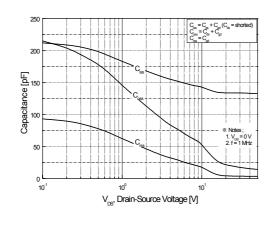
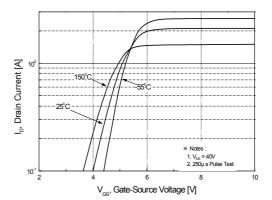


Figure 2. Transfer Characteristics





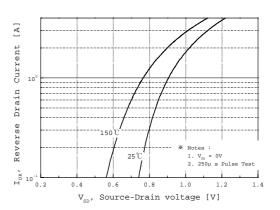
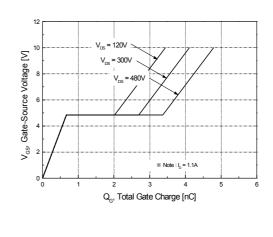
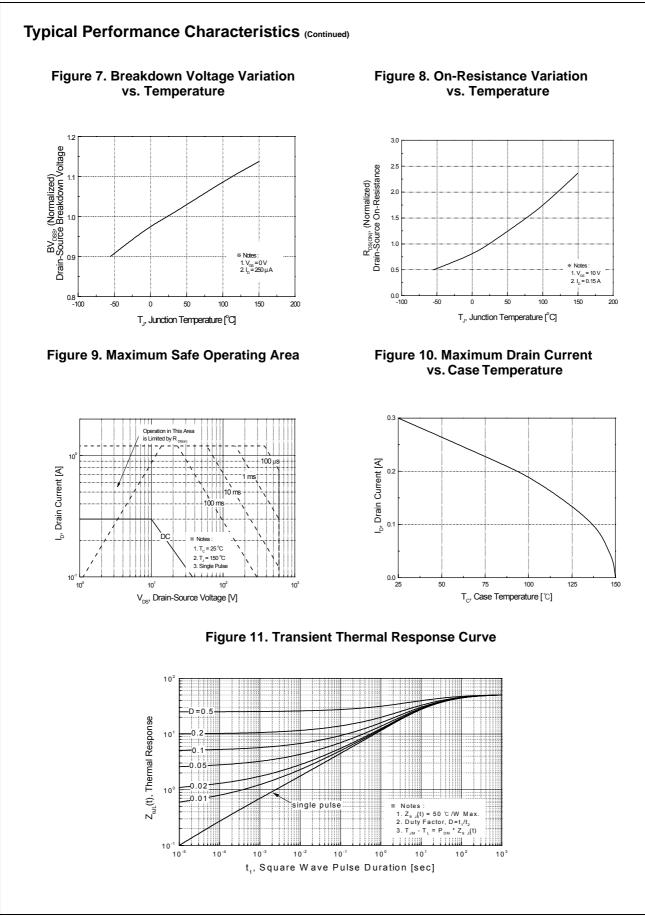


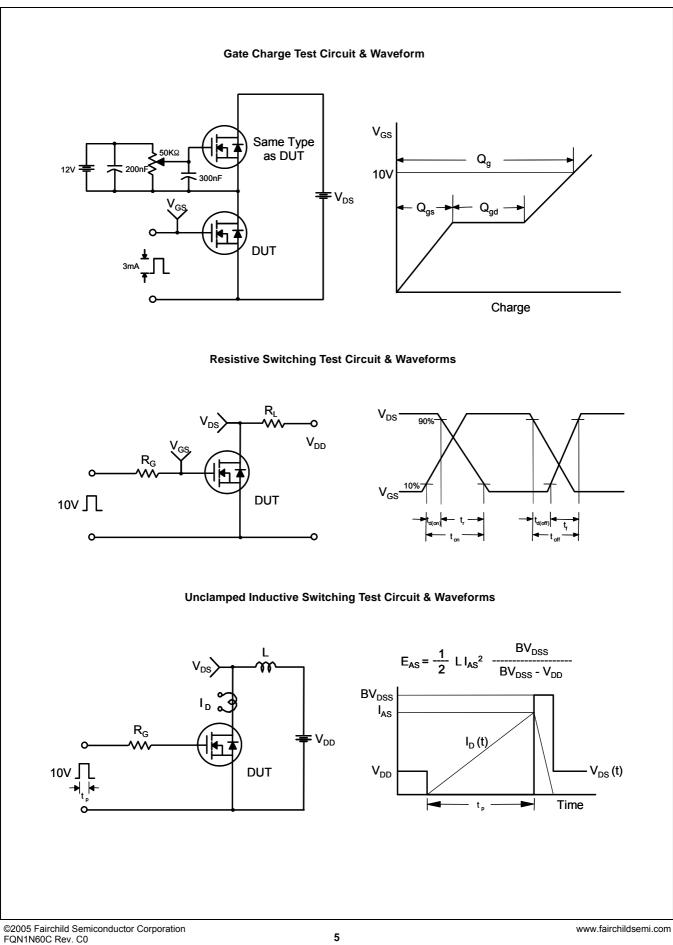
Figure 6. Gate Charge Characteristics



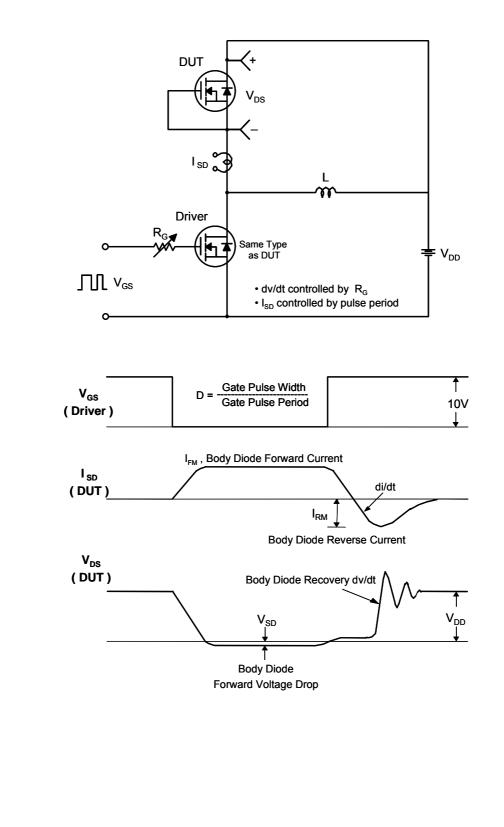
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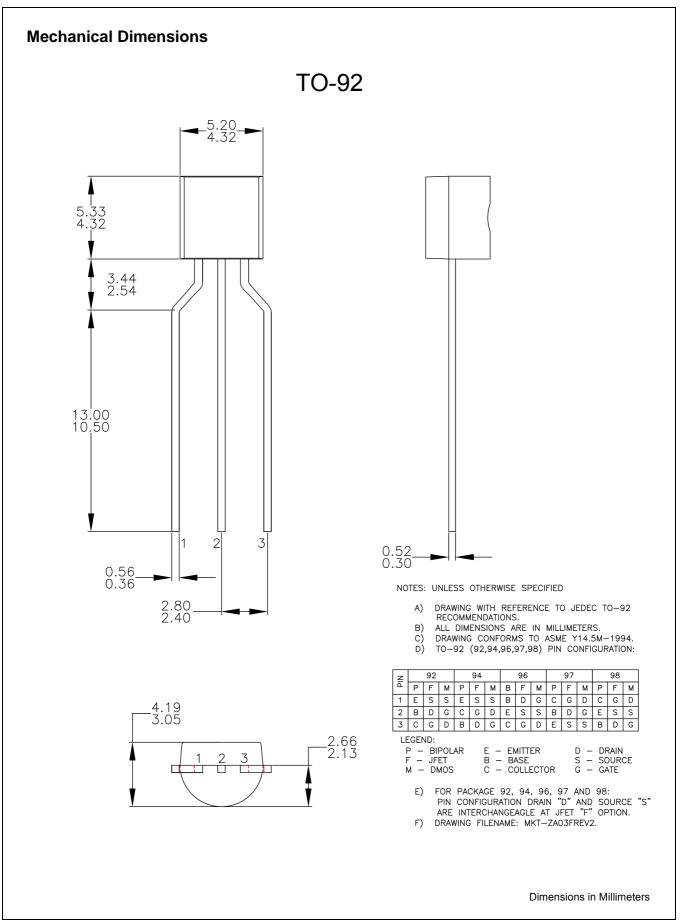


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