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June 2014

FQA11N90_F109

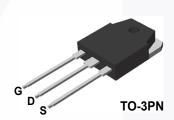
N-Channel QFET[®] MOSFET 900 V, 11.4 A, 960 m Ω

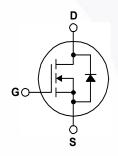
Features

- 11.4 A, 900 V, $R_{DS(on)}$ = 960 m Ω (Max.) @ V_{GS} = 10 V, I_D = 5.7 A
- · Low Gate Charge (Typ. 72 nC)
- Low Crss (Typ. 30 pF)
- · 100% Avalanche Tested
- RoHS compliant

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_C = 25°C unless otherwise noted.

Symbol	Parameter			FQA11N90_F109	Unit
V _{DSS}	Drain to Source Voltage			900	V
I _D	Drain Current	- Continuous (T _C = 25°C)		11.4	Α
	Drain Current	- Continuous (T _C = 100°C)		7.2	Α
I _{DM}	Drain Current	- Pulsed	(Note 1)	45.6	Α
V_{GSS}	Gate to Source Voltage			± 30	V
E _{AS}	Single Pulsed Avalanche Energy		(Note 2)	1000	mJ
I _{AR}	Avalanche Current		(Note 1)	11.4	Α
E _{AR}	Repetitive Avalanche Energy		(Note 1)	30	mJ
dv/dt	Peak Diode Recovery dv/dt		(Note 3)	4.0	V/ns
P_{D}	Dawer Dissipation	(T _C = 25°C)		300	W
	Power Dissipation	- Derate Above 25°C		2.38	W/°C
T _J , T _{STG}	Operating and Storage Temperature Range			-55 to +150	°C
T _L	Maximum Lead Temperature for Soldering Purpose, 1/8" from Case for 5 Seconds			300	°C

Thermal Characteristics

Symbol	Parameter	FQA11N90_F109	Unit
$R_{\theta JC}$	Thermal Resistance, Junction to Case, Max	0.42	°C/W
$R_{\theta JA}$	Thermal Resistance, Junction to Ambient, Max	40	°C/W

Package Marking and Ordering Information

Device Marking	Device	Package	Reel Size	Tape Width	Quantity
FQA11N90	FQA11N90_F109	TO-3PN	Tube	N/A	30 units

Electrical Characteristics $T_C = 25^{\circ}C$ unless otherwise noted.

Symbol	Parameter	Test Conditions	Min	Тур	Max	Unit
Off Cha	racteristics					
BV _{DSS}	Drain-Source Breakdown Voltage	$V_{GS} = 0 \text{ V}, I_D = 250 \mu\text{A}$	900			V
ΔBV_{DSS} / ΔT_{J}	Breakdown Voltage Temperature Coefficient	I _D = 250 μA, Referenced to 25°C		1.0		V/°C
1	Zara Cata Valta na Dunin Cumant	V _{DS} = 900 V, V _{GS} = 0 V			10	μΑ
I _{DSS}	Zero Gate Voltage Drain Current	V _{DS} = 720 V, T _C = 125°C			100	μΑ
I _{GSSF}	Gate-Body Leakage Current, Forward	V _{GS} = 30 V, V _{DS} = 0 V			100	nA
I _{GSSR}	Gate-Body Leakage Current, Reverse	V _{GS} = -30 V, V _{DS} = 0 V			-100	nA
On Cha	racteristics					
V _{GS(th)}	Gate Threshold Voltage	$V_{DS} = V_{GS}, I_{D} = 250 \mu\text{A}$	3.0		5.0	V
R _{DS(on)}	Static Drain-Source On-Resistance	V _{GS} = 10 V, I _D = 5.7 A		0.75	0.96	Ω
9 _{FS}	Forward Transconductance	V _{DS} = 50 V, I _D = 5.7 A		12		S
	ic Characteristics					
C _{iss}	Input Capacitance	V _{DS} = 25 V, V _{GS} = 0 V,		2700	3500	pF
C _{oss}	Output Capacitance	f = 1.0 MHz		260	340	pF
C _{rss}	Reverse Transfer Capacitance			30	40	pF
Switchi	ng Characteristics					
t _{d(on)}	Turn-On Delay Time	V _{DD} = 450 V, I _D = 11.4 A,		65	140	ns
t _r	Turn-On Rise Time	$R_G = 25 \Omega$		135	280	ns
t _{d(off)}	Turn-Off Delay Time	1.6 20		165	340	ns
t _f	Turn-Off Fall Time	(note 4)	/	90	190	ns
Qg	Total Gate Charge	V _{DS} = 720 V, I _D = 11.4 A,		72	94	nC
Q _{gs}	Gate-Source Charge	V _{GS} = 10 V		16		nC
Q _{gd}	Gate-Drain Charge	(note 4)		35		nC
Drain-S	ource Diode Characteristics ar	nd Maximum Ratings				
I _S	Maximum Continuous Drain-Source Diode Forward Current				11.4	Α
I _{SM}	Maximum Pulsed Drain-Source Diode Forward Current				45.6	Α
V _{SD}	Drain-Source Diode Forward Voltage	V _{GS} = 0 V, I _S = 11.4 A			1.4	V
	Daviers Dansvery Times	V _{GS} = 0 V, I _S = 11.4 A,		850		ns
t _{rr}	Reverse Recovery Time	VGS = U V, IS = 11.4 A,		030		113

Notes :

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

^{2.} L = 15 mH, I_{AS} = 11.4 A, V_{DD} = 50 V, R_G = 25 Ω , starting T_J = 25°C.

 $^{3.~}I_{SD} \leq 11.4~A,~di/dt \leq 200~A/\mu s,~V_{DD} \leq BV_{DSS,} starting~~T_J = 25^{\circ}C.$

^{4.} Essentially independent of operating temperature.

Typical Characteristics

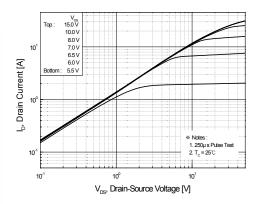


Figure 1. On-Region Characteristics

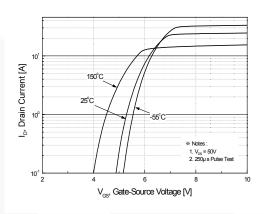


Figure 2. Transfer Characteristics

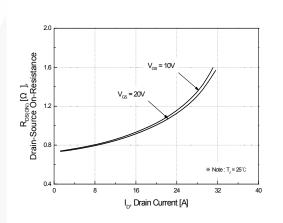


Figure 3. On-Resistance Variation vs. Drain Current and Gate Voltage

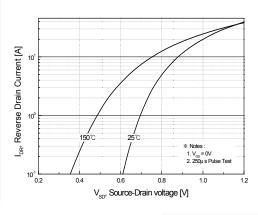


Figure 4. Body Diode Forward Voltage Variation vs. Source Current and Temperature

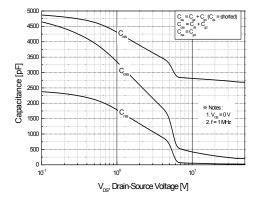


Figure 5. Capacitance Characteristics

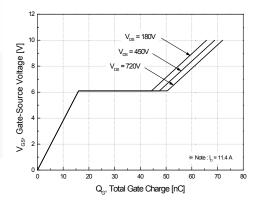


Figure 6. Gate Charge Characteristics

Typical Characteristics (Continued)

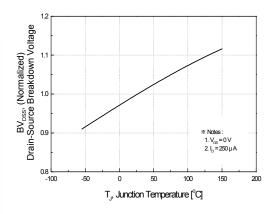
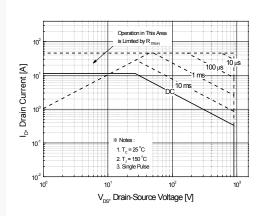


Figure 7. Breakdown Voltage Variation vs. Temperature

Figure 8. On-Resistance Variation vs. Temperature



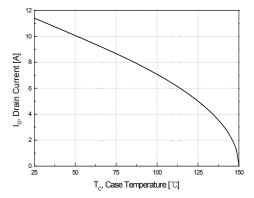


Figure 9. Maximum Safe Operating Area

Figure 10. Maximum Drain Current vs. Case Temperature

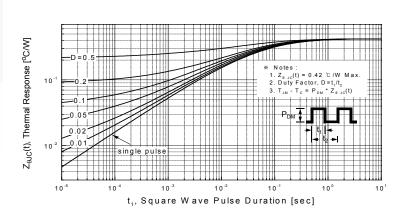


Figure 11. Transient Thermal Response Curve

Figure 12. Gate Charge Test Circuit & Waveform

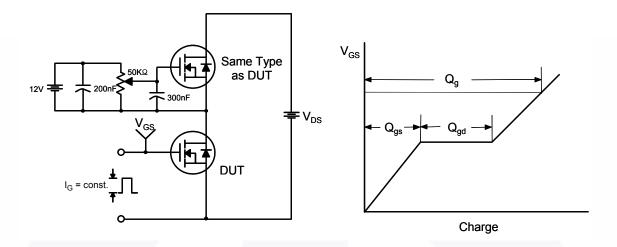


Figure 13. Resistive Switching Test Circuit & Waveforms

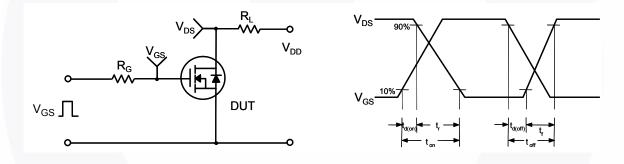
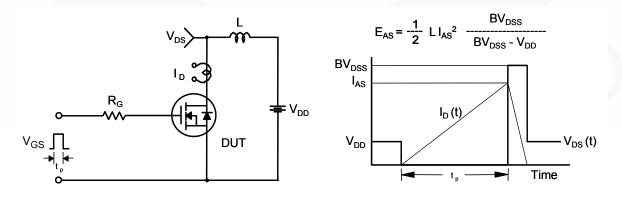


Figure 14. Unclamped Inductive Switching Test Circuit & Waveforms



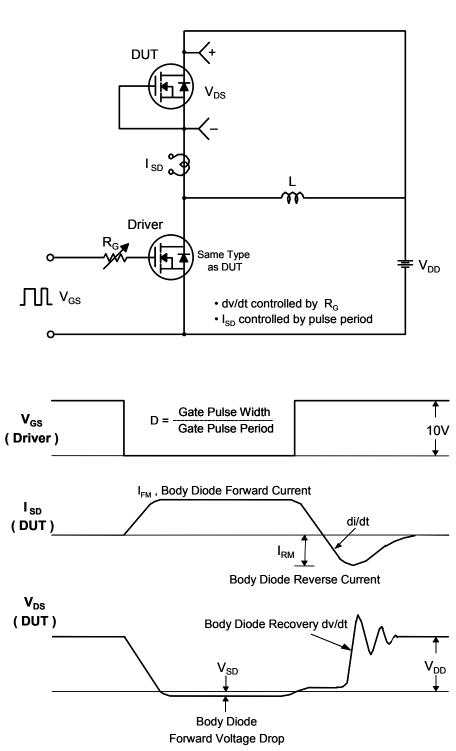
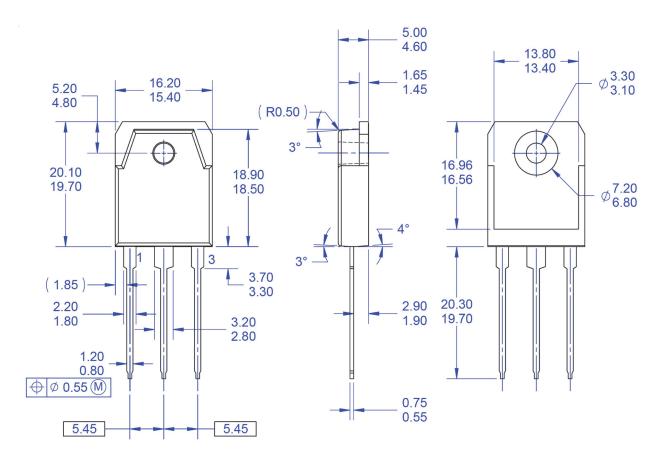


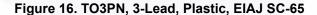
Figure 15. Peak Diode Recovery dv/dt Test Circuit & Waveforms

Mechanical Dimensions



NOTES: UNLESS OTHERWISE SPECIFIED

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- B) ALL DIMENSIONS ARE IN MILLIMETERS.
 C) DIMENSION AND TOLERANCING PER
 ASME14.5-2009.
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Dimension in Millimeters

(R0.50)





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