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November 2013

FQD19N10L

N-Channel QFET® MOSFET

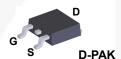
100 V, 15.6 A, 100 mΩ

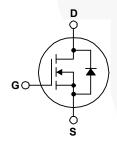
Description

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, audio amplifier, DC motor control, and variable switching power applications.

Features

- 15.6 A, 100 V, $R_{DS(on)}$ = 100 m Ω (Max.) @ V_{GS} = 10 V
- Low Gate Charge (Typ. 14 nC)
- · Low Crss (Typ. 35 pF)
- 100% Avalanche Tested





Absolute Maximum Ratings T_C = 25°C unless otherwise noted.

Symbol	Parameter		FQD19N10LTM	Unit	
V_{DSS}	Drain-Source Voltage		100	V	
I _D	Drain Current	- Continuous (T _C = 25°	C)	15.6	Α
		- Continuous (T _C = 100	ı°C)	9.8	Α
I _{DM}	Drain Current	- Pulsed	(Note 1)	62.4	Α
V _{GSS}	Gate-Source Vo	oltage		± 20	V
E _{AS}	Single Pulsed Avalanche Energy		(Note 2)	220	mJ
I _{AR}	Avalanche Current		(Note 1)	15.6	Α
E _{AR}	Repetitive Avalanche Energy		(Note 1)	5.0	mJ
dv/dt	Peak Diode Re	covery dv/dt	(Note 3)	6.0	V/ns
P _D	Power Dissipation (T _A = 25°C) *			2.5	W
	Power Dissipation (T _C = 25°C)			50	W
	- Derate Above 25°C			0.4	W/°C
T _J , T _{STG}	Operating and Storage Temperature Range			-55 to +150	°C
T _L	Maximum Lead Temperature for Soldering, 1/8" from Case for 5 Seconds			300	°C

Thermal Characteristics

Symbol	Parameter	FQD19N10LTM	Unit
$R_{\theta JC}$	Thermal Resistance, Junction to Case, Max.	2.5	
D	Thermal Resistance, Junction to Ambient (Minimum Pad of 2-oz Copper), Max.	110	°C/W
	Thermal Resistance, Junction to Ambient (*1 in ² Pad of 2-oz Copper), Max.	50	

Package Marking and Ordering Information

Part Number	Top Mark	Package	Packing Method	Reel Size	Tape Width	Quantity
FQD19N10LTM	FQD19N10L	D-PAK	Tape and Reel	330 mm	16 mm	2500 units

Electrical Characteristics T_c = 25°C unless otherwise noted.

Symbol	Parameter	Test Conditions		Тур.	Max.	Unit
Off Cha	racteristics					
BV _{DSS}	Drain-Source Breakdown Voltage	$V_{GS} = 0 \text{ V}, I_D = 250 \mu\text{A}$	100			V
ΔBV _{DSS} / ΔT _J	Breakdown Voltage Temperature Coefficient	I _D = 250 μA, Referenced to 25°C		0.09		V/°C
I _{DSS}	Zara Cata Valtana Dunin Courset	V _{DS} = 100 V, V _{GS} = 0 V			1	μΑ
	Zero Gate Voltage Drain Current	V _{DS} = 80 V, T _C = 125°C			10	μΑ
I _{GSSF}	Gate-Body Leakage Current, Forward	V _{GS} = 20 V, V _{DS} = 0 V			100	nA
I _{GSSR}	Gate-Body Leakage Current, Reverse	V _{GS} = -20 V, V _{DS} = 0 V			-100	nA
On Cha	racteristics					
V _{GS(th)}	Gate Threshold Voltage	$V_{DS} = V_{GS}, I_{D} = 250 \mu A$	1.0		2.0	V
R _{DS(on)}	Static Drain-Source On-Resistance	V _{GS} = 10 V, I _D = 7.8 A V _{GS} = 5 V, I _D = 7.8 A		0.074 0.082	0.10 0.11	Ω
9 _{FS}	Forward Transconductance	V _{DS} = 30 V, I _D = 7.8 A	\	14		S
-	ic Characteristics			ı		
C _{iss}	Input Capacitance	$V_{DS} = 25 \text{ V}, V_{GS} = 0 \text{ V},$		670	870	pF
C _{oss}	Output Capacitance	f = 1.0 MHz		160	210	pF
C _{rss}	Reverse Transfer Capacitance			35	45	pF
Switchi	ng Characteristics					
t _{d(on)}	Turn-On Delay Time	V _{DD} = 50 V, I _D = 19 A,		14	38	ns
t _r	Turn-On Rise Time	$R_{G} = 25 \Omega$		410	830	ns
t _{d(off)}	Turn-Off Delay Time			20	50	ns
t _f	Turn-Off Fall Time	(Note 4)		140	290	ns
Q_g	Total Gate Charge	V _{DS} = 80 V, I _D = 19 A,		14	18	nC
Q _{gs}	Gate-Source Charge	V _{GS} = 5 V	/	2.9		nC
Q _{gd}	Gate-Drain Charge	(Note 4)		9.2		nC
Drain-S	ource Diode Characteristics a	nd Maximum Ratings			/	
I _S	Maximum Continuous Drain-Source Did			15.6	Α	
I _{SM}	Maximum Pulsed Drain-Source Diode Forward Current				62.4	Α
V _{SD}	Drain-Source Diode Forward Voltage	V _{GS} = 0 V, I _S = 15.6 A			1.5	V
t _{rr}	Reverse Recovery Time	V _{GS} = 0 V, I _S = 19 A,		80	-	ns
Q _{rr}	Reverse Recovery Charge dl _F / dt = 100 A/μs			0.195	-	μС

- Notes:
 1. Repetitive rating : pulse-width limited by maximum junction temperature.
 2. L = 1.35 mH, I_{AS} = 15.6 A, V_{DD} = 25 V, R_{G} = 25 Ω , starting T_{J} = 25°C.
 3. I_{SD} ≤ 19 A, di/dt ≤ 300 A/µs, V_{DD} ≤ BV_{DSS}, starting T_{J} = 25°C.
 4. Essentially independent of operating temperature.

Typical Characteristics

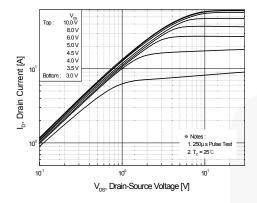


Figure 1. On-Region Characteristics

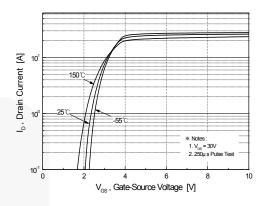


Figure 2. Transfer Characteristics

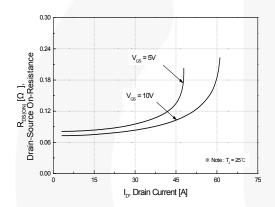


Figure 3. On-Resistance Variation vs. Drain Current and Gate Voltage

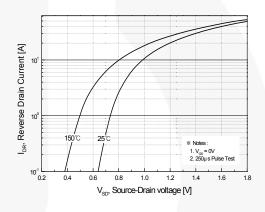


Figure 4. Body Diode Forward Voltage Variation vs. Source Current and Temperature

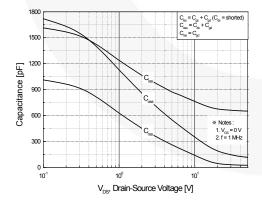


Figure 5. Capacitance Characteristics

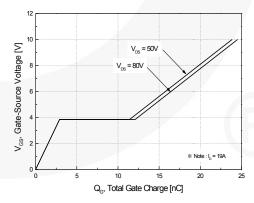


Figure 6. Gate Charge Characteristics

Typical Characteristics (Continued)

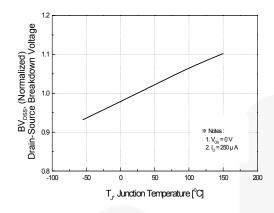
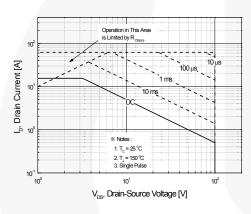


Figure 7. Breakdown Voltage Variation vs. Temperature

Figure 8. On-Resistance Variation vs. Temperature



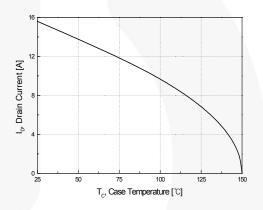


Figure 9. Maximum Safe Operating Area

Figure 10. Maximum Drain Current vs. Case Temperature

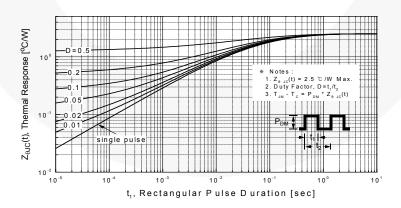


Figure 11. Transient Thermal Response Curve

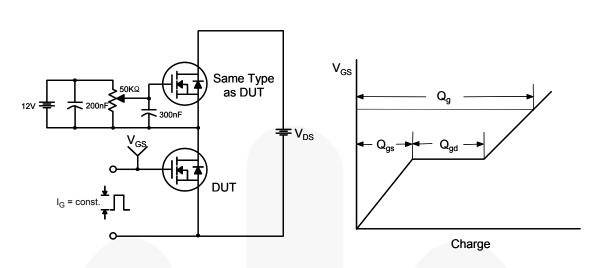


Figure 12. Gate Charge Test Circuit & Waveform

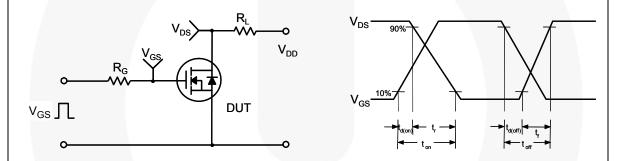


Figure 13. Resistive Switching Test Circuit & Waveforms

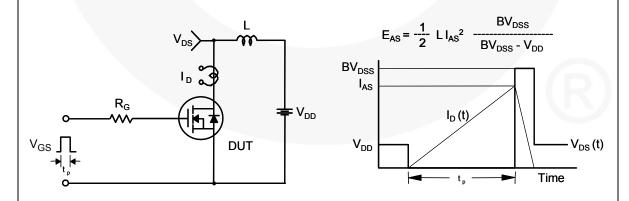
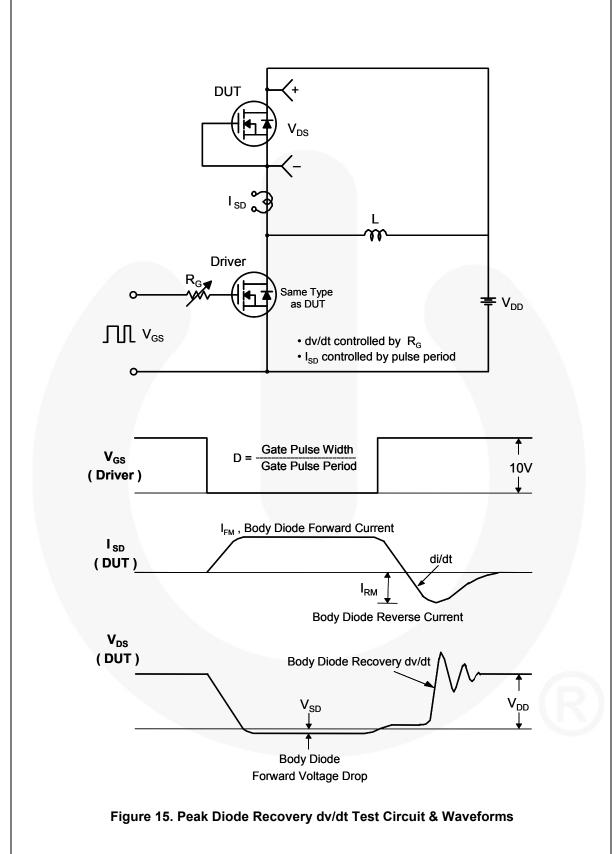


Figure 14. Unclamped Inductive Switching Test Circuit & Waveforms



Mechanical Dimensions

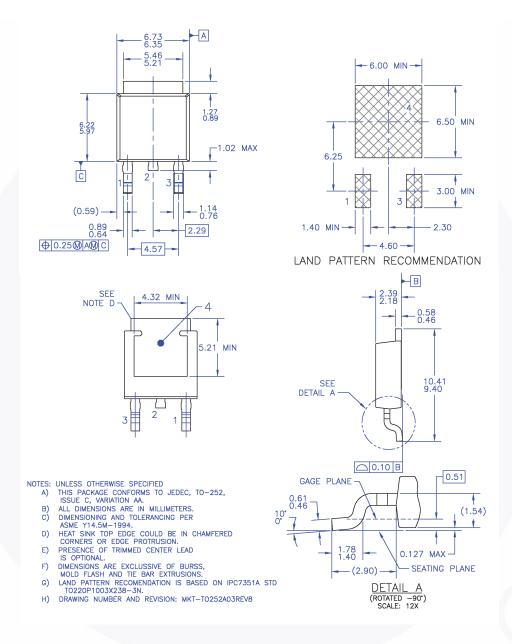


Figure 16. TO252 (D-PAK), Molded, 3-Lead, Option AA&AB

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