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FQP10N60C / FQPF10N60C N-Channel QFET[®] MOSFET

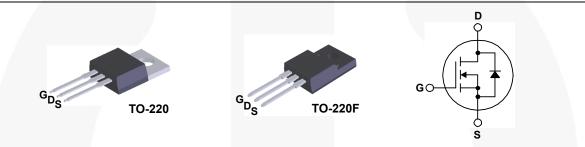
600 V, 9.5 A, 730 mΩ

Description

These N-Channel enhancement mode power field effect transistors are produced using Fairchild's proprietary, planar stripe, DMOS technology. This advanced technology has been especially tailored to mini-mize on-state resistance, provide superior switching perfor-mance, and withstand high energy pulse in the avalanche and commutation mode. These devices are well suited for high efficiency switched mode power supplies, active power factor correction, electronic lamp ballasts based on half bridge topology.

Features

- 9.5 A, 600 V, $R_{DS(on)}$ = 730 m Ω (Max.) @ V_{GS} = 10 V, I_{D} = 4.75 A
- Low Gate Charge (Typ. 44 nC)
- Low Crss (Typ. 18 pF)
- 100% Avalanche Tested



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

Symbol	Parameter		FQP10N60C	FQPF10N60C	Unit
V _{DSS}	Drain-Source Voltage		600		V
I _D	Drain Current - Continuous (T _C = 25°C)		9.5	9.5 *	А
	- Continuous (T _C =	= 100°C)	5.7	5.7 *	А
I _{DM}	Drain Current - Pulsed	(Note 1)	38	38 *	А
V _{GSS}	Gate-Source Voltage		± 30		V
E _{AS}	Single Pulsed Avalanche Energy	(Note 2)	700		mJ
I _{AR}	Avalanche Current	(Note 1)	9.5		А
E _{AR}	Repetitive Avalanche Energy	(Note 1)	15.6		mJ
dv/dt	Peak Diode Recovery dv/dt (Note 3		4.5		V/ns
P _D	Power Dissipation ($T_c = 25^{\circ}C$)		156	50	W
	- Derate above 25°C		1.25	0.4	W/°C
T _J , T _{STG}	Operating and Storage Temperature Range		-55 to +150		°C
Τ _L	Maximum lead temperature for soldering, 1/8" from case for 5 seconds		300		°C

* Drain current limited by maximum junction temperature.

Thermal Characteristics

Symbol	Parameter	FQP10N60C	FQPF10N60C	Unit
$R_{\theta JC}$	Thermal Resistance, Junction-to-Case, Max.	0.8	2.5	°C/W
$R_{\theta CS}$	Thermal Resistance, Case-to-Sink, Typ.	0.5		°C/W
R_{\thetaJA}	Thermal Resistance, Junction-to-Ambient, Max.	62.5	62.5	°C/W

November 2013

Part Num	ber	Top Mark	Package	Packing Method	Reel S	Size	Tape Wie	dth	Quantity	
FQP10N60C		FQP10N60C	TO-220	Tube	N/A	A	N/A		50 units	
FQPF10N	60C	FQPF10N60C	TO-220F	Tube	N/A	N/A			50 units	
FQPF10N6		FQPF10N60CT	TO-220F				N/A		50 units	
FQPF10N60		FQPF10N60C	TO-220F	Tube	N/A	4	N/A		50 units	
Symbol	Chara	Cteristics T _c = 25° Parameter	C unless otherwi	Test Conditions	s	Min	Тур	Мах	Uni	
-					_		71	_	_	
Off Character BV _{DSS}	1	urce Breakdown Voltage		_s = 0 V, I _D = 250 μA		600			V	
ΔBV _{DSS} /ΔTJ		vn Voltage Temperature		$V_{GS} = 0.0$ v, $r_D = 250 \ \mu\text{A}$ $I_D = 250 \ \mu\text{A}$, Referenced to 25°C			0.7		V/°C	
I _{DSS}	Zero Gat	e Voltage Drain Current	V _{DS}	V _{DS} = 600 V, V _{GS} = 0 V				1	μA	
			V _{DS}	V _{DS} = 480 V, T _C = 125°C				10	μA	
I _{GSSF}	Gate-Boo	ly Leakage Current, For	ward V _{GS}	V _{GS} = 30 V, V _{DS} = 0 V				100	nA	
I _{GSSR}	Gate-Boo	dy Leakage Current, Re	verse V _{GS}	V_{GS} = -30 V, V_{DS} = 0 V				-100	nA	
On Character	ristics									
V _{GS(th)}	Gate Threshold Voltage		V _{DS}	$V_{DS} = V_{GS}, I_{D} = 250 \ \mu A$		2.0		4.0	V	
R _{DS(on)}	Static Drain-Source On-Resistance		V _{GS}	V _{GS} = 10 V, I _D = 4.75 A			0.6	0.73	Ω	
9 _{FS}	Forward Transconductance		V _{DS}	V _{DS} = 40 V, I _D = 4.75 A			8.0		S	
Dynamic Cha	racteristio	cs								
C _{iss}	Input Capacitance			V _{DS} = 25 V, V _{GS} = 0 V,			1570	2040	pF	
C _{oss}	Output C	apacitance	f = 1	f = 1.0 MHz			166	215	pF	
C _{rss}	Reverse	Transfer Capacitance					18	24	pF	
Switching Ch	aracterist	ics								
t _{d(on)}	1	Delay Time	V _{DD}	$V_{DD} = 300 \text{ V}, \text{ I}_{D} = 9.5\text{A},$ $R_{G} = 25 \Omega$ (Note 4)			23	55	ns	
t _r	Turn-On	Rise Time	R _G				69	150	ns	
t _{d(off)}	Turn-Off	Delay Time					144	300	ns	
t _f	Turn-Off	Fall Time					77	165	ns	
Q _g	Total Gat	e Charge		$V_{DS} = 480 \text{ V}, \text{ I}_{D} = 9.5\text{A},$ V_{GS} = 10 V (Note 4)			44	57	nC	
Q _{gs}	Gate-Sou	Irce Charge	V _{GS}				6.7		nC	
Q _{gd}	Gate-Dra	in Charge					18.5		nC	
Drain-Source	Diode Ch	aracteristics and Max	imum Ratin	qs						
I _S		n Continuous Drain-Sou	,	<u> </u>			-	9.5	Α	
I _{SM}	Maximum Pulsed Drain-Source Diode Forward Cu		rd Current				38	Α		
V _{SD}	Drain-So	urce Diode Forward Vol	tage V _{GS}	_s = 0 V, I _S = 9.5 A				1.4	V	
t _{rr}	Reverse	Recovery Time	V _{GS}	_s = 0 V, I _S = 9.5 A,			420		ns	
Q _{rr}	Reverse	Recovery Charge		$dl_F / dt = 100 \text{ A/}\mu\text{s}$			4.2		μC	

1. Repetitive rating: pulse-width limited by maximum junction temperature.

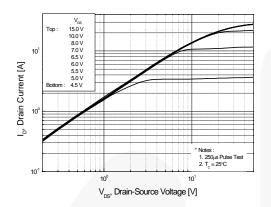
2. L = 14.2 mH, I_{AS} = 9.5 A, V_{DD} = 50 V, R_G = 25 Ω , starting T_J = 25°C.

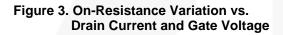
3. $I_{SD} \leq$ 9.5 A, di/dt \leq 200 A/µs, $V_{DD} \leq BV_{DSS},$ starting T_J = 25°C.

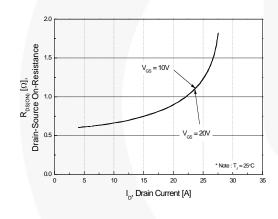
4. Essentially independent of operating temperature typical characteristics.

Typical Performance Characteristics

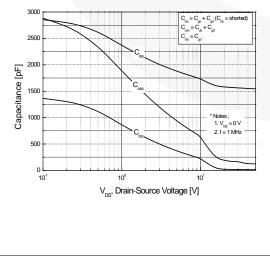


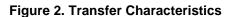


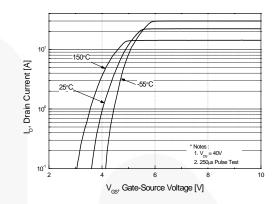




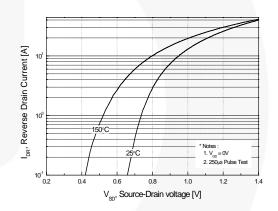




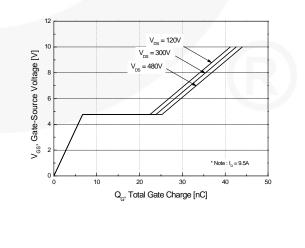


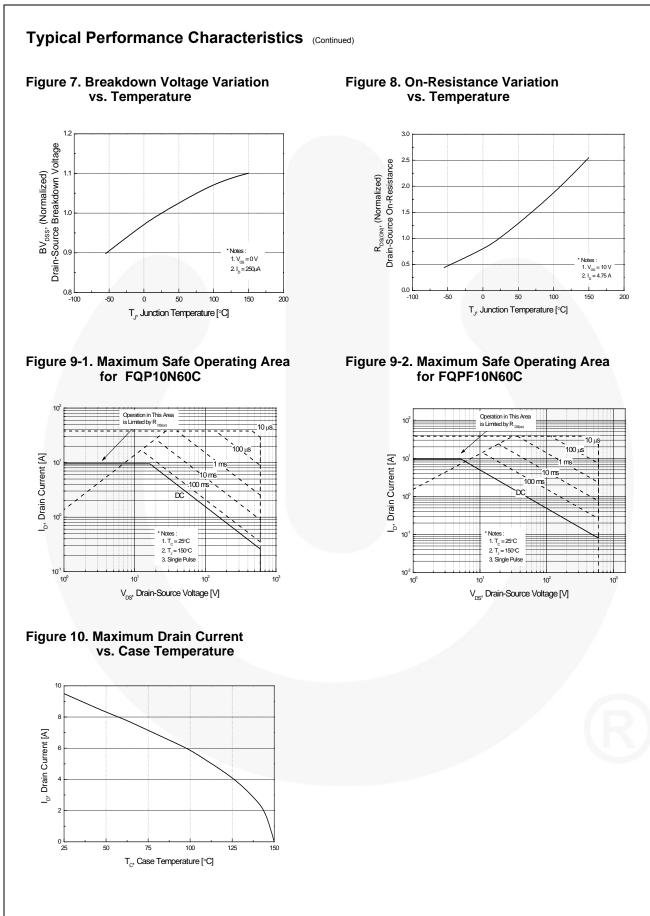








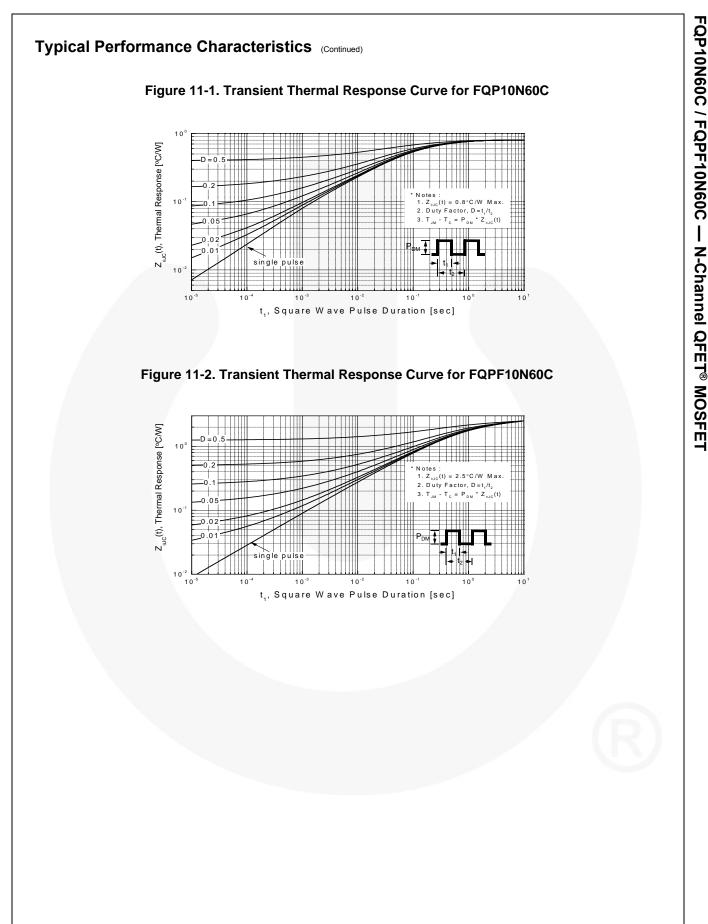


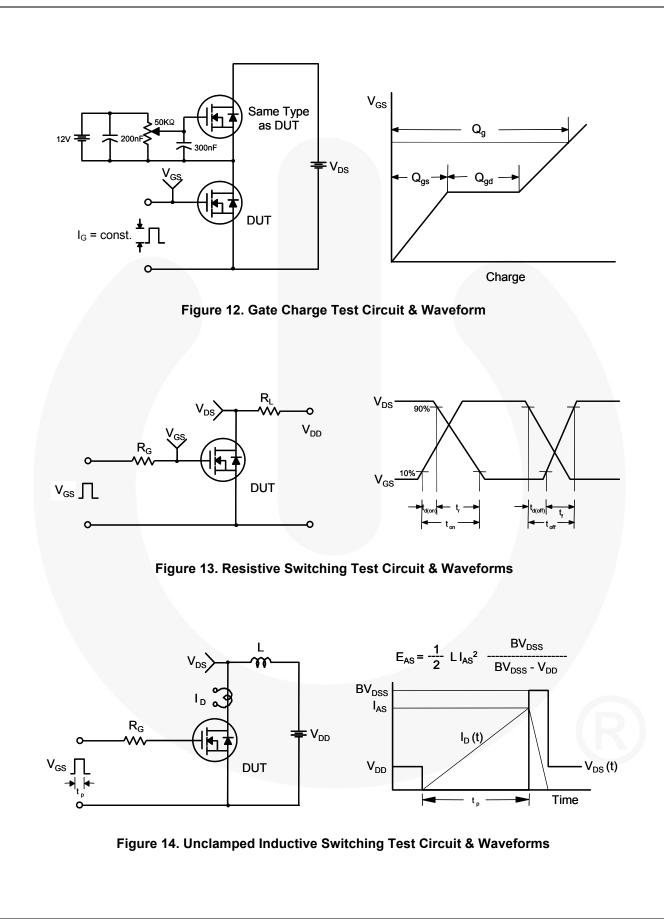


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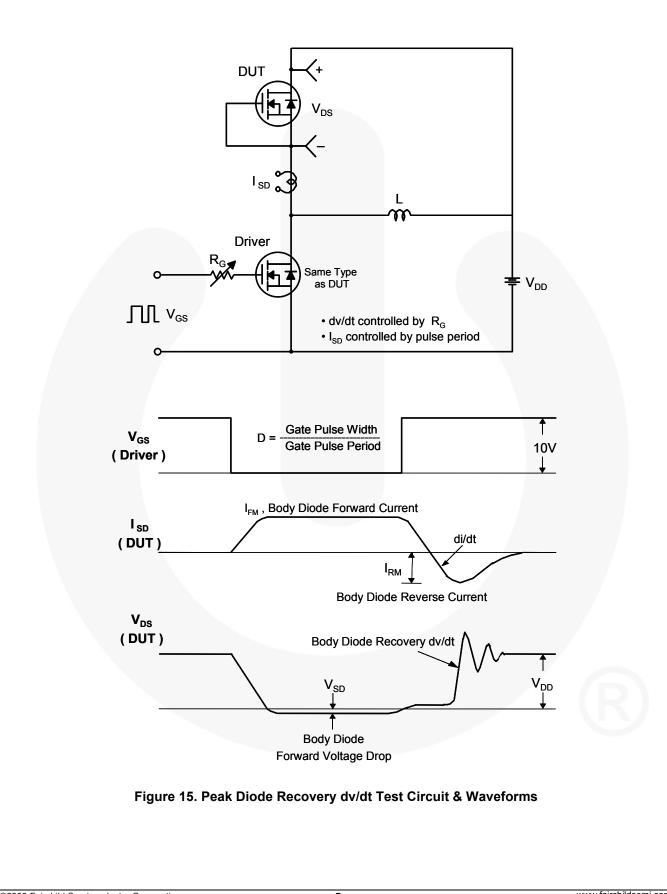
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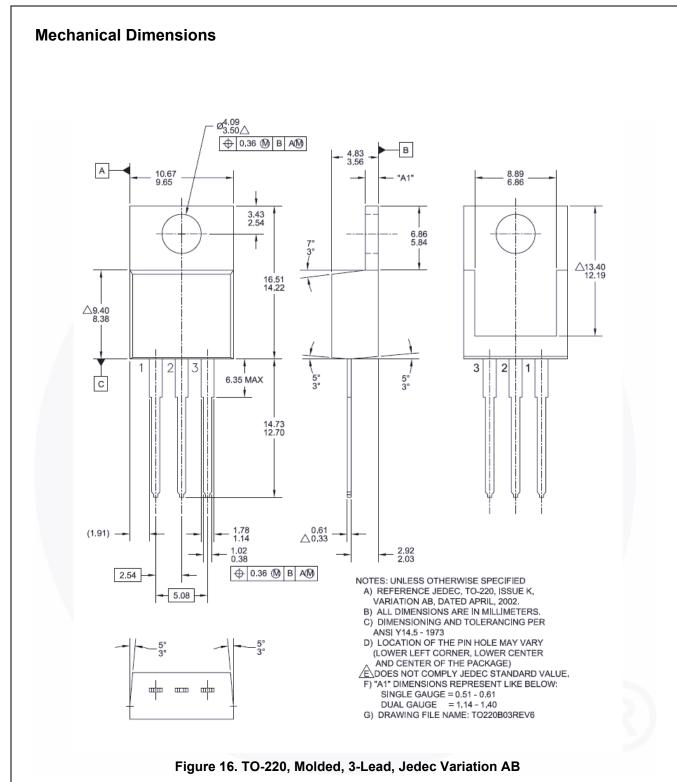




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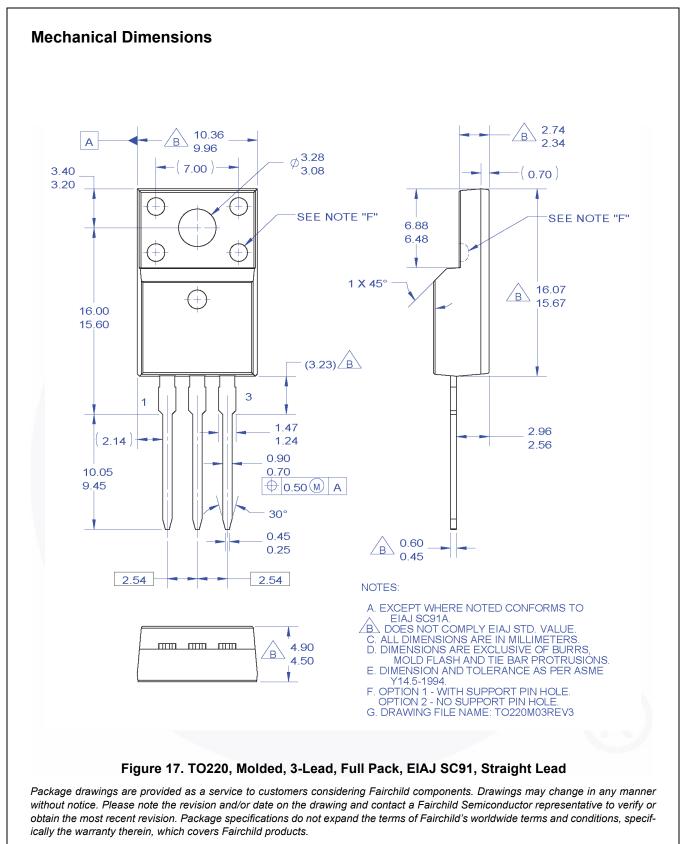


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