

FQP10N60C / FQPF10N60C N-Channel QFET[®] MOSFET

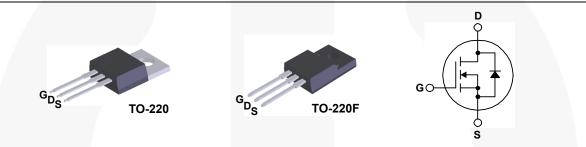
600 V, 9.5 A, 730 mΩ

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 effi-ciency 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		°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
$R_{ ext{ heta}JC}$	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

FQP10N60C FQP10N60C TC FQPF10N60C FQPF10N60C TO FQPF10N60CT FQPF10N60CT TO		Top Mark Pac		kage	Packing Method	Reel	Size	Tape Wi	dth	Quantity	
		-	TO-	220	Tube	N//	4	N/A		50 units	
		FQPF10N60C	TO-2	-220F Tube		N//	N/A			50 units	
		-	0-220F Tube N/A			N/A		50 units			
FQPF10N60		FQPF10N60C		220F	Tube	N//	4	N/A		50 units	
Symbol	Chara	Cteristics T _C = 25 ⁴ Parameter	°C unless o	otherwise	Test Condition	ns	Min	Тур	Мах	Unit	
• • • • • • • • • • • • • • • • • • • •			-						max		
Off Characte		urao Brookdown Voltag		\/ -	- 0) (1 - 250 4		600			V	
BV _{DSS}		urce Breakdown Voltag	_	$V_{GS} = 0 V, I_D = 250 \mu A$		000	-		V/°C		
ΔΒV _{DSS} /ΔTJ	Coefficie	wn Voltage Temperature nt	;	I_D = 250 µA, Referenced to 25°C		-	0.7				
I _{DSS}	Zero Gate Voltage Drain Current		t	V_{DS} = 600 V, V_{GS} = 0 V				1	μA		
				V _{DS} = 480 V, T _C = 125°C					10	μA	
I _{GSSF}	Gate-Boo	dy Leakage Current, Fo	rward	V_{GS} = 30 V, V_{DS} = 0 V				100	nA		
I _{GSSR}	Gate-Body Leakage Current, Reverse		verse	$V_{GS} = -30 \text{ V}, V_{DS} = 0 \text{ V}$				-100	nA		
On Character	istics										
V _{GS(th)}	Gate Thr	e Threshold Voltage		$V_{DS} = V_{GS}, I_D = 250 \ \mu A$		2.0		4.0	V		
R _{DS(on)}	Static Drain-Source On-Resistance			V _{GS} = 10 V, I _D = 4.75 A			0.6	0.73	Ω		
9 _{FS}	Forward	rward Transconductance		V _{DS} = 40 V, I _D = 4.75 A			8.0		S		
Dynamic Cha	racteristi	cs									
C _{iss}				V _{DS} =	= 25 V, V _{GS} = 0 V,			1570	2040	pF	
C _{oss}		apacitance	_	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} = 300 V, I _D = 9.5A,				23	55	ns		
t _r		Rise Time		$R_{G} = 25 \Omega$		-	69	150	ns		
t _{d(off)}	Turn-Off	Delay Time		1				144	300	ns	
t _f		Fall Time		(Note 4)		(Note 4)		77	165	ns	
Q _g	Total Gat	e Charge		V _{DS} =	= 480 V, I _D = 9.5A,			44	57	nC	
Q _{gs}	Gate-Sou	urce Charge		$V_{GS} = 10 V$ (Note 4)			6.7		nC		
Q _{gd}	Gate-Dra	in Charge					18.5		nC		
Drain-Source	Diode Ch	aracteristics and Max	imum F	Ratings				1		6	
I _S		n Continuous Drain-Sou		•					9.5	A	
I _{SM}	Maximun	n Pulsed Drain-Source	Diode F	orward Current		-		38	А		
V _{SD}	Drain-So	urce Diode Forward Vo	Itage	V _{GS} =	= 0 V, I _S = 9.5 A				1.4	V	
t _{rr}	Reverse	Recovery Time		V _{GS} =	= 0 V, I _S = 9.5 A,			420		ns	
Q _{rr}		Recovery Charge		$dI_{\rm F}$ / dt = 100 A/µs			4.2		μC		

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

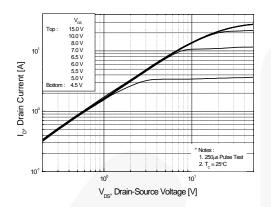
2. L = 14.2 mH, I_{AS} = 9.5 A, V_{DD} = 50 V, R_G = 25 Ω , starting T_J = 25°C.

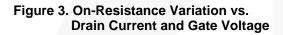
3. $I_{SD} \leq$ 9.5 A, di/dt \leq 200 A/µs, $V_{DD} \leq BV_{DSS},$ starting T_J = 25°C.

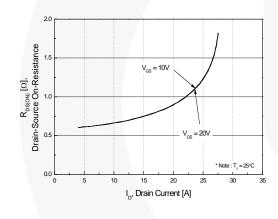
4. Essentially independent of operating temperature typical characteristics.

Typical Performance Characteristics

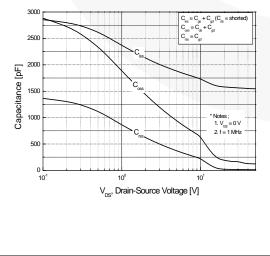




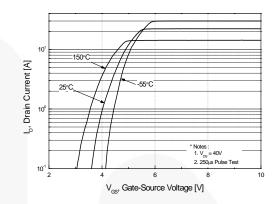


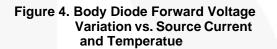


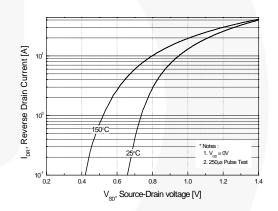




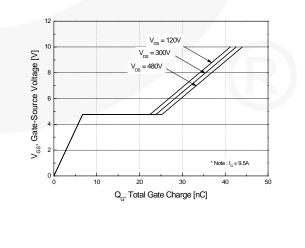


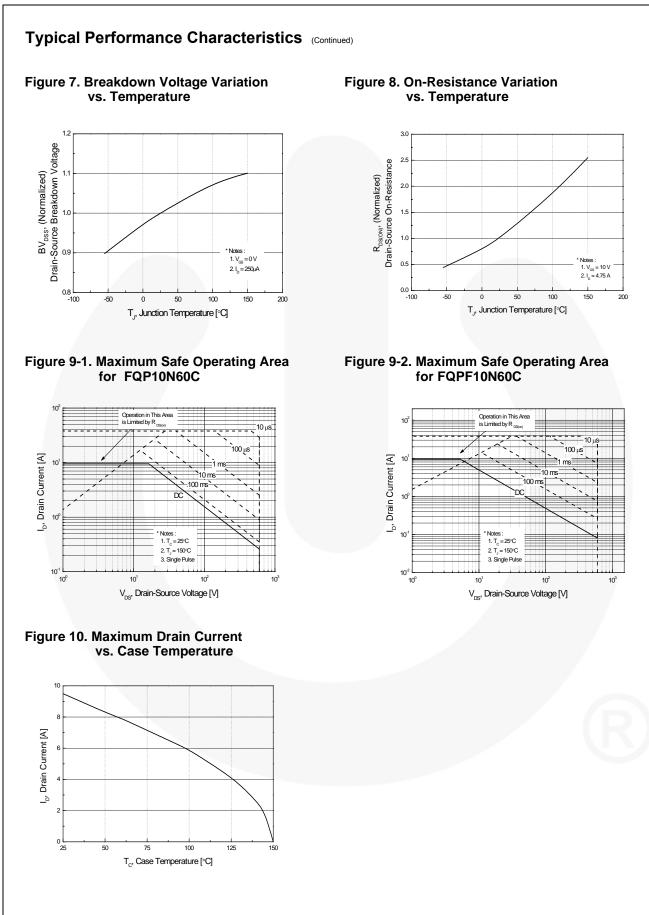








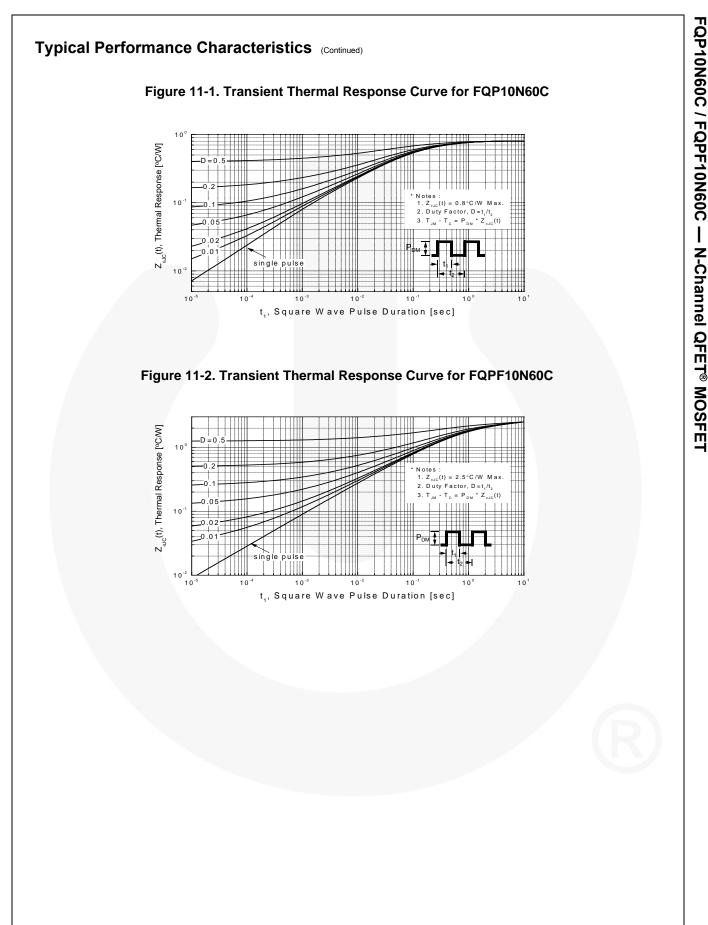


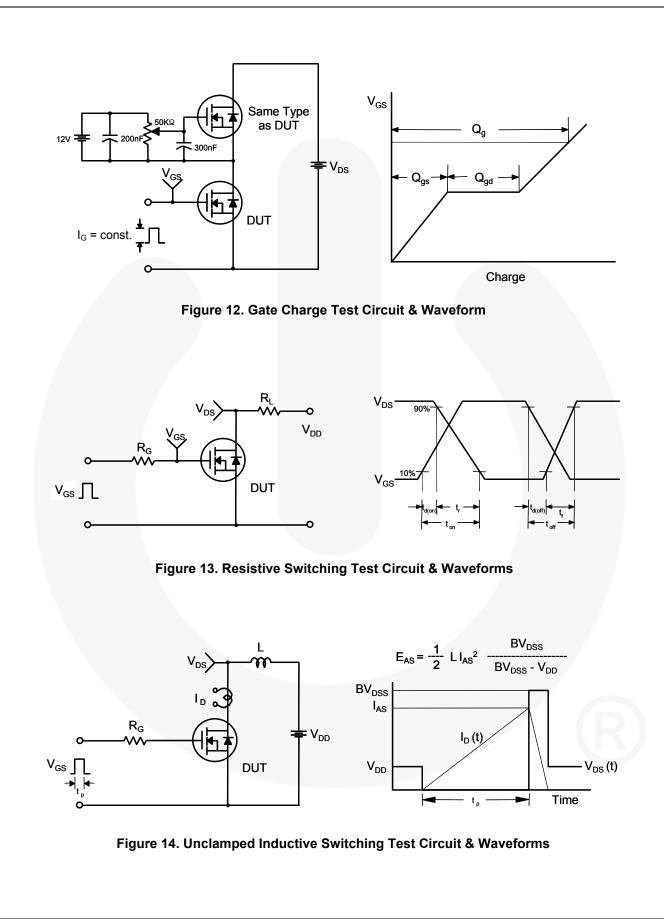


4

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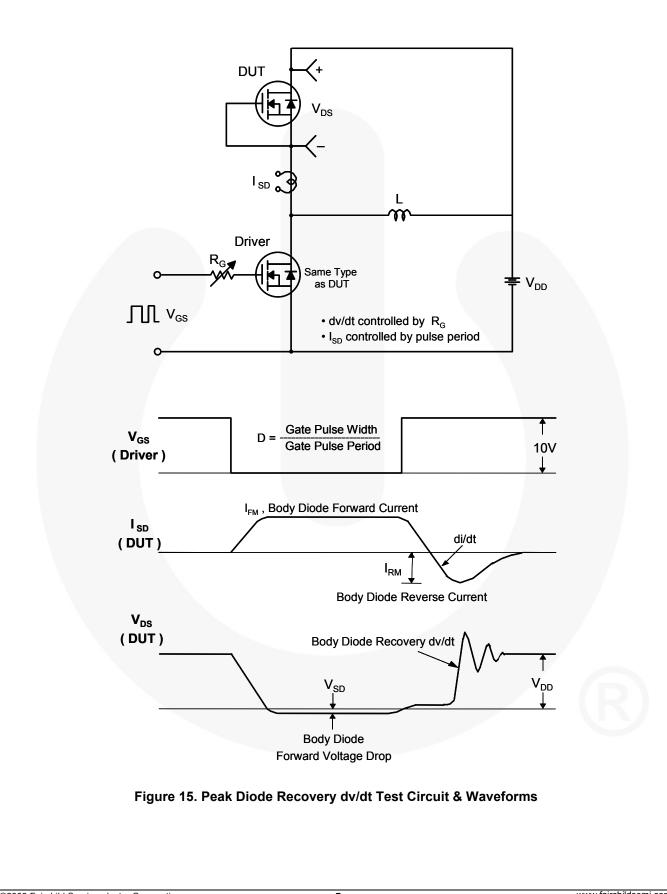
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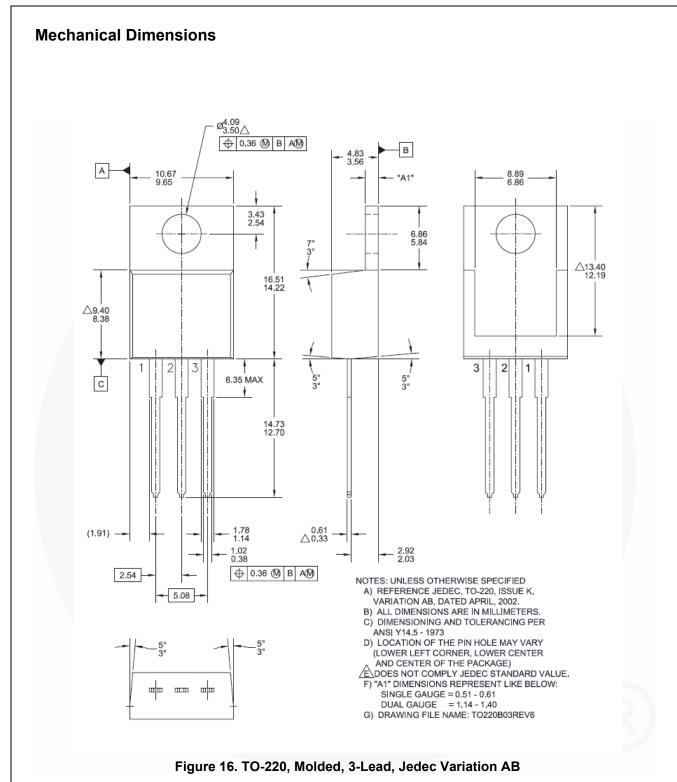




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6



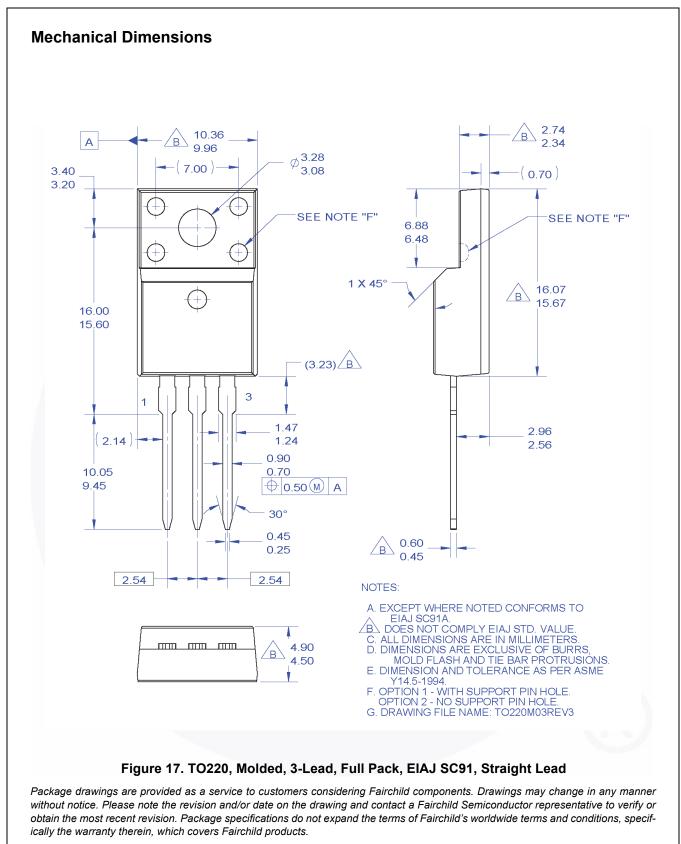


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