

FDPF680N10T N-Channel PowerTrench[®] MOSFET 100 V, 12 A, 68 m Ω

Features

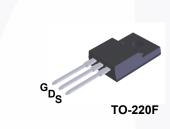
- R_{DS(on)} = 54 mΩ (Typ.) @ V_{GS} = 10 V, I_D = 6 A
- · Fast Switching Speed
- Low Gate Charge
- High Performance Trench Technology for Extremely Low $R_{\text{DS}(\text{on})}$
- High Power and Current Handling Capability
- RoHS Compliant

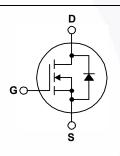
Description

This N-Channel MOSFET is produced using Fairchild Semiconductor's advance PowerTrench[®] process that has been tailored to minimize the on-state resistance while maintaining superior switching performance.

Applications

- Consumer Appliances
- LCD/LED/PDP TV
- Synchronous Rectification
- Uninterruptible Power Supply
- Micro Solar Inverter





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

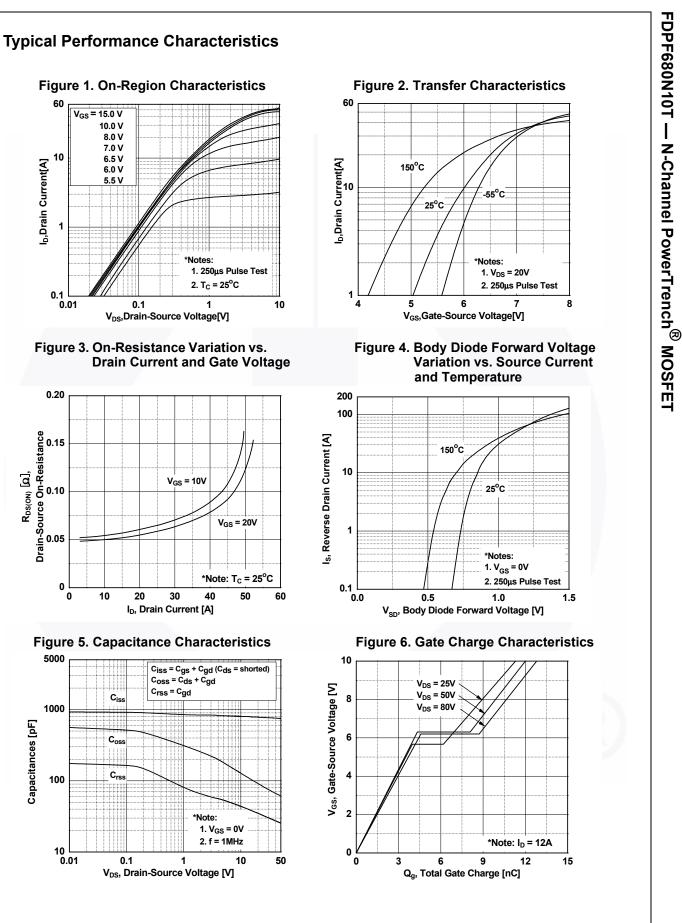
Symbol	Parameter			FDPF680N10T	Unit	
V _{DSS}	Drain to Source Voltage			100	V	
V _{GSS}	Gate to Source Voltage		±20	V		
ID	Drain Current	- Continuous (T _C = 25 ^o C)		12		
	Drain Current	- Continuous (T _C = 100 ^o C)		7.6	Α	
I _{DM}	Drain Current	- Pulsed	(Note 1)	48	А	
E _{AS}	Single Pulsed Avalanche Energy (Note 2)			50.4	mJ	
dv/dt	Peak Diode Recovery dv/dt (Note 3)		13.0	V/ns		
P _D	Devuer Dissinction	$(T_{\rm C} = 25^{\rm o}{\rm C})$		24	W	
	Power Dissipation	- Derate Above 25°C		0.19	W/ºC	
T _J , T _{STG}	Operating and Storage Temperature Range			-55 to +150	°C	
TL	Maximum Lead Temperature for Soldering, 1/8" from Case for 5 Seconds			300	°C	

Thermal Characteristics

Symbol	Parameter	FDPF680N10T	Unit
$R_{ extsf{ heta}JC}$	Thermal Resistance, Junction to Case, Max.	5.2	°C/W
$R_{ extsf{ heta}JA}$	Thermal Resistance, Junction to Ambient, Max.	62.5	0/10

		Package	Packing Method	Reel Size	Тар	e Width	Qua	ntity	
		TO-220F	220F Tube N/A		N/A		50 units		
Electrica	l Char	acteristics T _c = 25°C	C unless ot	herwise noted.					
Symbol		Parameter		Test Condit	ions	Min.	Тур.	Max.	Unit
Off Chara	cteristic	S			4				1
BV _{DSS}	Drain to Source Breakdown Voltage		e I	I _D = 250 μA, V _{GS} = 0 V, T _C = 25 ^o C		100	-	-	V
ΔBV _{DSS} /ΔTJ		own Voltage Temperature		$I_D = 250 \ \mu\text{A}$, Referenced to 25°C		-	0.1	-	V/ºC
I _{DSS}		Coencient		V _{DS} = 100 V, V _{GS} = 0 V		-	-	1	
	Zero Gate Voltage Drain Current			$V_{\rm DS} = 100 \text{ V}, V_{\rm GS} = 0 \text{ V}, T_{\rm C} = 150^{\circ}\text{C}$			-	500	μA
I _{GSS}	Gate to Body Leakage Current			$V_{\rm GS} = \pm 20 \text{ V}, \text{ V}_{\rm DS} = 0$		-	-	±100	nA
On Charac	teristic	S							1
V _{GS(th)}	Gate Th	reshold Voltage	١	V _{GS} = V _{DS} , I _D = 250 μ	ιA	2.5	3.5	4.5	V
R _{DS(on)}	Static D	rain to Source On Resistan	ce '	V _{GS} = 10 V, I _D = 6 A		-	54	68	mΩ
9 _{FS}	Forward	d Transconductance	١	V _{DS} = 10 V, I _D = 12 A		-	26	-	S
Dynamic Characteristics C _{iss} Input Capacitance		,	V _{DS} = 50 V, V _{GS} = 0 V	/	-	750	1000	pF	
C _{oss}		Capacitance		$v_{DS} = 50 \text{ V}, v_{GS} = 0 \text{ V},$ f = 1 MHz		-	60	80	pF
C _{rss}		e Transfer Capacitance				-	25	40	pF
Q _{g(tot)}		ate Charge	,			-	13	17	nC
Q _{gs}	Gate to	Source Gate Charge		V _{DS} = 80 V, I _D = 12 A V _{GS} = 10 V	,		4	-	nC
Q _{gd}	Gate to	Drain "Miller" Charge			(Note 4)	-	4	-	nC
Switching	Charac	teristics							
	Turn-On	n Delay Time		V_{DD} = 50 V, I _D = 12 A, V _{GS} = 10 V, R _G = 10 Ω		-	13	36	ns
t _{d(on)}	Turn-On	Rise Time				-	19	48	ns
t _{d(on)} t _r		f Delay Time				-	18	46	ns
· · /	Turn-Off				(Note 4)		6	22	ns
t _r		f Fall Time			(Note 4)	-	U		
t _r t _{d(off)} t _f	Turn-Off	,			(Note 4)	-	0		
t _r t _{d(off)} t _f	Turn-Off	f Fall Time	rce Diode I	Forward Current	(Note 4)	-	-	12	A
t _r t _{d(off)} t _f Drain-Sou	Turn-Off rce Dioc Maximui	f Fall Time de Characteristics	Diode Forw	ard Current	(Note 4)	-	-	12 48	A A
t _r t _{d(off)} t _f Drain-Sou	Turn-Off rce Dioc Maximu Maximu Drain to	Fall Time de Characteristics m Continuous Drain to Sour m Pulsed Drain to Source D Source Diode Forward Volt	Diode Forw	vard Current V _{GS} = 0 V, I _{SD} = 12 A		-	-		
t _r t _{d(off)} t _f Drain-Sou I _S I _{SM}	Turn-Off rce Dioc Maximum Maximum Drain to Reverse	f Fall Time Je Characteristics m Continuous Drain to Sour m Pulsed Drain to Source D	Diode Forw tage	ard Current		-	-	48	Α

4. Essentially independent of operating temperature typical characteristics.



©2008 Fairchild Semiconductor Corporation FDPF680N10T Rev. C5

10 L 0.01

60

l_b,Drain Current[A] D

0.1

0.20

Drain-Source On-Resistance 01.0 01.0 01.0

0

5000

1000

100

Capacitances [pF]

0

10

Ciss

Cos

Crs

0.1

20

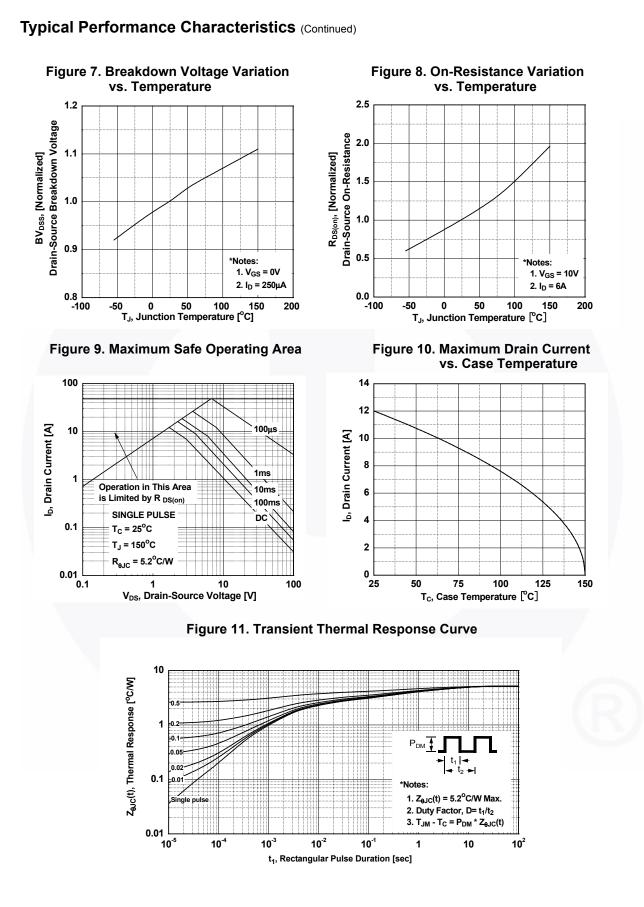
R_{DS(ON)} [Ω],

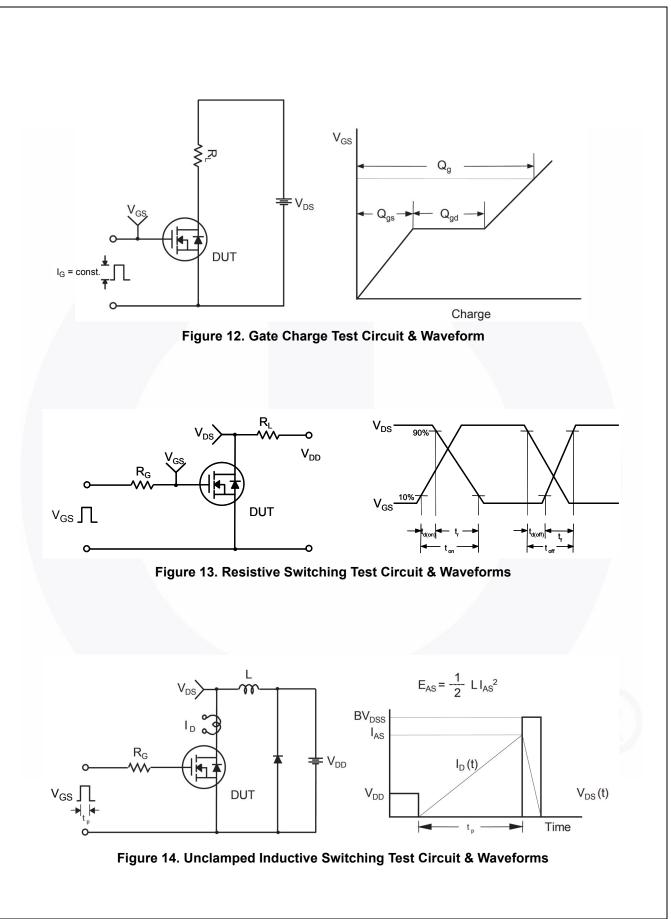
V_{GS} = 15.0 V 10.0 V 8.0 V

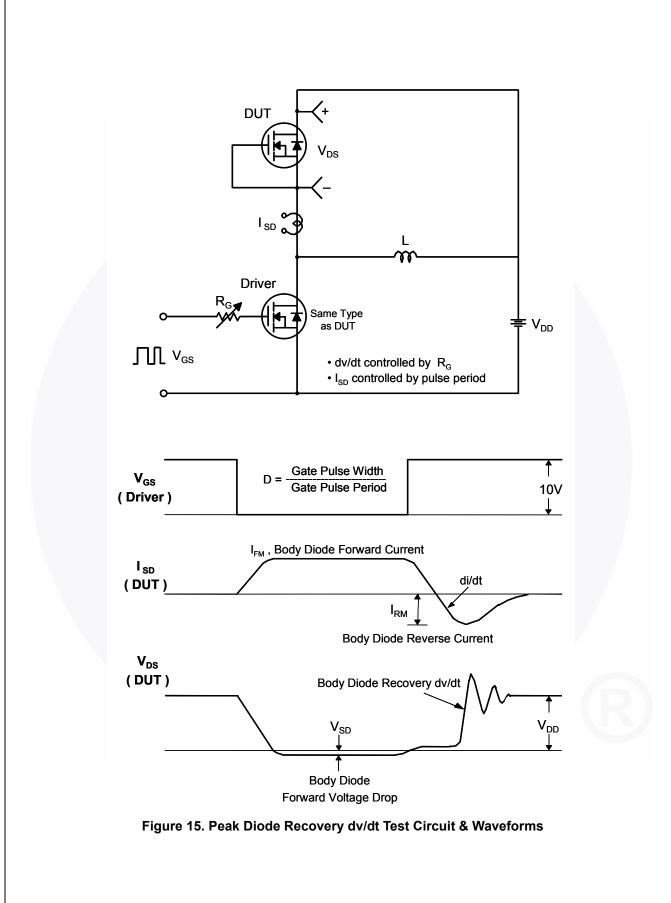
7.0 V 6.5 V

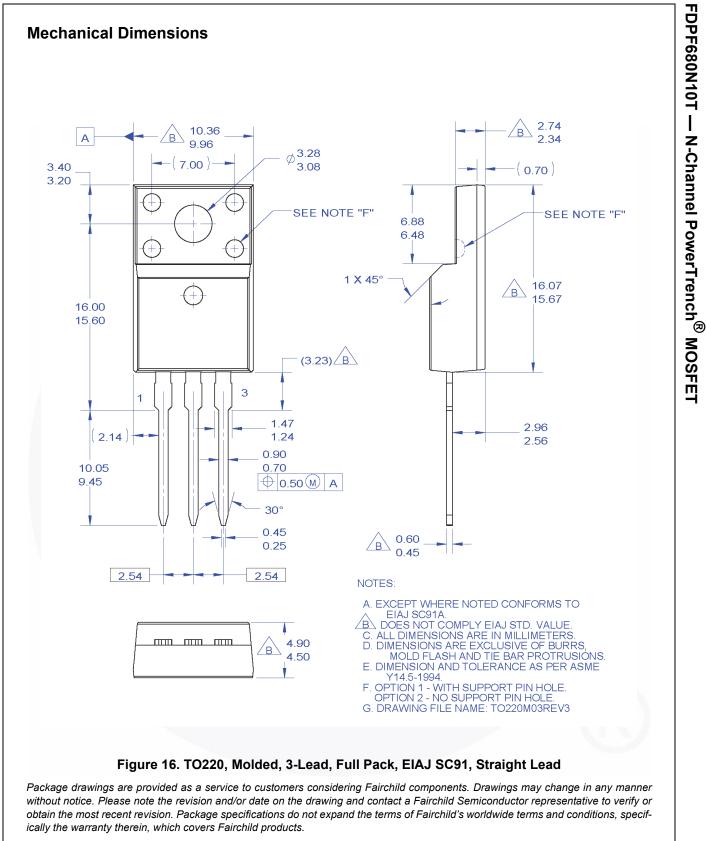
6.0 V 5.5 V

0.1









Always visit Fairchild Semiconductor's online packaging area for the most recent package drawings:

http://www.fairchildsemi.com/package/packageDetails.html?id=PN_TF220-003



SEMICONDUCTOR

TRADEMARKS

The following includes registered and unregistered trademarks and service marks, owned by Fairchild Semiconductor and/or its global subsidiaries, and is not intended to be an exhaustive list of all such trademarks.

AccuPower™	F-PFS™
AX-CAP [®] *	FRFET®
BitSiC™	Global Power Resource SM
Build it Now™	GreenBridge™
CorePLUS™	Green FPS™
CorePOWER™	Green FPS™ e-Series™
CROSSVOLT™	Gmax™
CTL™	GTO™
Current Transfer Logic™	IntelliMAX™
DEUXPEED®	ISOPLANAR™
Dual Cool™	Marking Small Speakers Sound L
EcoSPARK [®]	and Better™
EfficentMax™	MegaBuck™
ESBC™	MIČROCOUPLER™
R	MicroFET™
+	MicroPak™
Fairchild®	MicroPak2™
Fairchild Semiconductor [®]	MillerDrive™
FACT Quiet Series™	MotionMax™
FACT®	mWSaver [®]
FAST®	OptoHiT™

 $(b)_{\mathbb{B}}$ PowerTrench® PowerXS™ Programmable Active Droop™ QFET QS™ Quiet Series™ RapidConfigure™ Louder Saving our world, 1mW/W/kW at a time™ SignalWise™ SmartMax™ SMART START™ Solutions for Your Success™ SPM[®] STEALTH™ SuperFET[®] SuperSOT™-3 SuperSOT™-6 SuperSOT™-8 SupreMOS®

Sync-Lock™ **E**SYSTEM^{®*} GENERAL TinyBoost[®] TinyBuck® TinyCalc™ TinyLogic® TINYOPTO™ TinvPower™ TinyPWM™ TinyWire™ TranSiC™ TriFault Detect™ TRUECURRENT®* uSerDes™ UHC® Ultra FRFET™ UniFFT™ VCX™ VisualMax™ VoltagePlus™

XS™

FDPF680N10T — N-Channel PowerTrench[®] MOSFE

*Trademarks of System General Corporation, used under license by Fairchild Semiconductor.

OPTOLOGIC®

OPTOPLANAR[®]

DISCLAIMER

FastvCore™

FETBench™

FPS™

FAIRCHILD SEMICONDUCTOR RESERVES THE RIGHT TO MAKE CHANGES WITHOUT FURTHER NOTICE TO ANY PRODUCTS HEREIN TO IMPROVE RELIABILITY, FUNCTION, OR DESIGN. FAIRCHILD DOES NOT ASSUME ANY LIABILITY ARISING OUT OF THE APPLICATION OR USE OF ANY PRODUCT OR CIRCUIT DESCRIBED HEREIN; NEITHER DOES IT CONVEY ANY LICENSE UNDER ITS PATENT RIGHTS, NOR THE RIGHTS OF OTHERS. THESE SPECIFICATIONS DO NOT EXPAND THE TERMS OF FAIRCHILD'S WORLDWIDE TERMS AND CONDITIONS, SPECIFICALLY THE WARRANTY THEREIN, WHICH COVERS THESE PRODUCTS.

SvncFET™

LIFE SUPPORT POLICY FAIRCHILD'S PRODUCTS ARE NOT AUTHORIZED FOR USE AS CRITICAL COMPONENTS IN LIFE SUPPORT DEVICES OR SYSTEMS WITHOUT THE EXPRESS WRITTEN APPROVAL OF FAIRCHILD SEMICONDUCTOR CORPORATION.

As used here in:

- Life support devices or systems are devices or systems which, (a) are 1. intended for surgical implant into the body or (b) support or sustain life, and (c) whose failure to perform when properly used in accordance with instructions for use provided in the labeling, can be reasonably expected to result in a significant injury of the user.
- 2. A critical component in any component of a life support, device, or system whose failure to perform can be reasonably expected to cause the failure of the life support device or system, or to affect its safety or effectiveness.

ANTI-COUNTERFEITING POLICY

Fairchild Semiconductor Corporation's Anti-Counterfeiting Policy. Fairchild's Anti-Counterfeiting Policy is also stated on our external website, www.Fairchildsemi.com, under Sales Support.

Counterfeiting of semiconductor parts is a growing problem in the industry. All manufactures of semiconductor products are experiencing counterfeiting of their parts. Customers who inadvertently purchase counterfeit parts experience many problems such as loss of brand reputation, substandard performance, failed application, and increased cost of production and manufacturing delays. Fairchild is taking strong measures to protect ourselves and our customers from the proliferation of counterfeit parts. Fairchild strongly encourages customers to purchase Fairchild parts either directly from Fairchild or from Authorized Fairchild Distributors who are listed by country on our web page cited above. Products customers buy either from Fairchild directly or from Authorized Fairchild Distributors are genuine parts, have full traceability, meet Fairchild's quality standards for handing and storage and provide access to Fairchild's full range of up-to-date technical and product information. Fairchild and our Authorized Distributors will stand behind all warranties and will appropriately address and warranty issues that may arise. Fairchild will not provide any warranty coverage or other assistance for parts bought from Unauthorized Sources. Fairchild is committed to combat this global problem and encourage our customers to do their part in stopping this practice by buying direct or from authorized distributors.

PRODUCT STATUS DEFINITIONS Definition of Terms

Datasheet Identification	Product Status	Definition
Advance Information	Formative / In Design	Datasheet contains the design specifications for product development. Specifications may change in any manner without notice.
Preliminary	First Production	Datasheet contains preliminary data; supplementary data will be published at a later date. Fairchild Semiconductor reserves the right to make changes at any time without notice to improve design.
No Identification Needed	Full Production	Datasheet contains final specifications. Fairchild Semiconductor reserves the right to make changes at any time without notice to improve the design.
Obsolete	Not In Production	Datasheet contains specifications on a product that is discontinued by Fairchild Semiconductor. The datasheet is for reference information only.