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November 2013

FDPF8N60ZUT N-Channel UniFETTM II Ultra FRFETTM MOSFET 600 V, 6.5 A, 1.35 Ω

Features

- $R_{DS(on)}$ = 1.15 Ω (Typ.) @ V_{GS} = 10 V, I_D = 3.25 A
- Low Gate Charge (Typ. 20 nC)
- Low C_{rss} (Typ. 10 pF)
- 100% Avalanche Tested
- · Improved dv/dt Capability
- RoHS Compliant

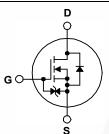
Applications

- LCD/LED TV
- Lighting
- Uninterruptible Power Supply
- AC-DC Power Supply

Description

UniFETTM II MOSFET is Fairchild Semiconductor's high voltage MOSFET family based on advanced planar stripe and DMOS technology. This advanced MOSFET family has the smallest on-state resistance among the planar MOSFET, and also provides superior switching performance and higher avalanche energy strength. In addition, internal gate-source ESD diode allows UniFET II MOSFET to withstand over 2kV HBM surge stress. UniFET II Ultra FRFET[™] MOSFET has much superior body diode reverse recovery performance. Its t_{rr} is less than 50nsec and the reverse dv/dt immunity is 20V/nsec while normal planar MOSFETs have over 200nsec and 4.5V/nsec respectively. Therefore UniFET II Ultra FRFET MOSFET can remove additional component and improve system reliability in certain applications that require performance improvement of the MOSFET's body diode. This device family is suitable for switching power converter applications such as power factor correction (PFC), flat panel display (FPD) TV power, ATX and electronic lamp ballasts.





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

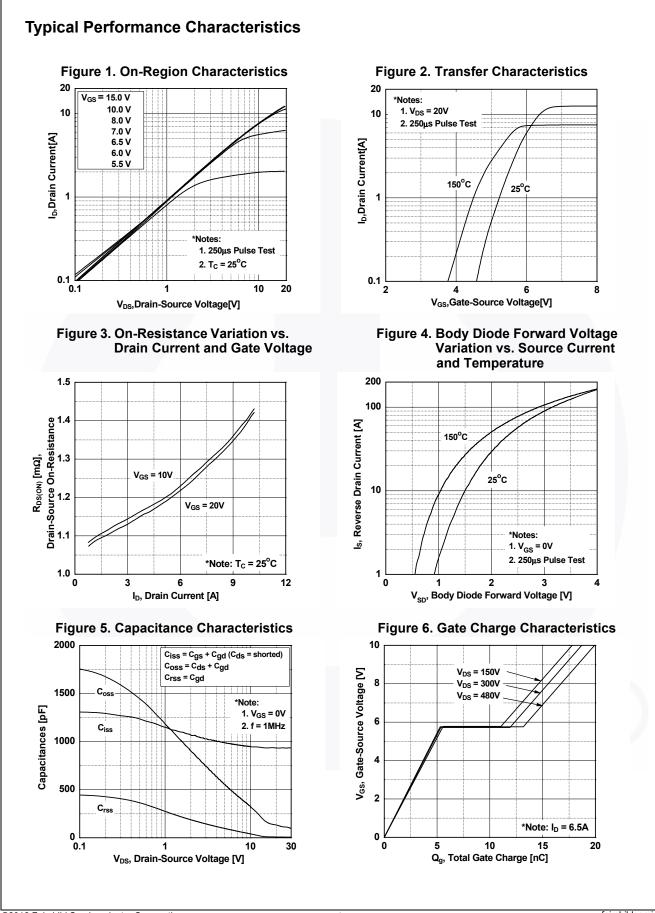
Symbol		Parameter	FDPF8N60ZUT	Unit		
V _{DSS}	Drain to Source Voltage		600	V		
V _{GSS}	Gate to Source Voltage		±30	V		
ID	Drain Current	- Continuous (T _C = 25°C)		6.5*	Α	
		- Continuous (T _C = 100 ^o C)		3.9*	A	
I _{DM}	Drain Current	- Pulsed	(Note 1)	26*	Α	
E _{AS}	Single Pulsed Avalanche Energy (Note 2)		420	mJ		
I _{AR}	Avalanche Current ((Note 1)	6.5	Α	
E _{AR}	Repetitive Avalanche Energy (Note 1)		(Note 1)	13.5	mJ	
dv/dt	Peak Diode Recovery dv/dt (Note 3)		20	V/ns		
P _D	Dower Dissinction	(T _C = 25 ^o C)		34.5	W	
	Power Dissipation	- Derate Above 25°C		0.28	W/ºC	
T _J , T _{STG}	Operating and Storage Temperature Range			-55 to +150	°C	
T	Maximum Lead Temperature for Soldering, 1/8" from Case for 5 Seconds			300	°C	

*Drain current limited by maximum junction temperature

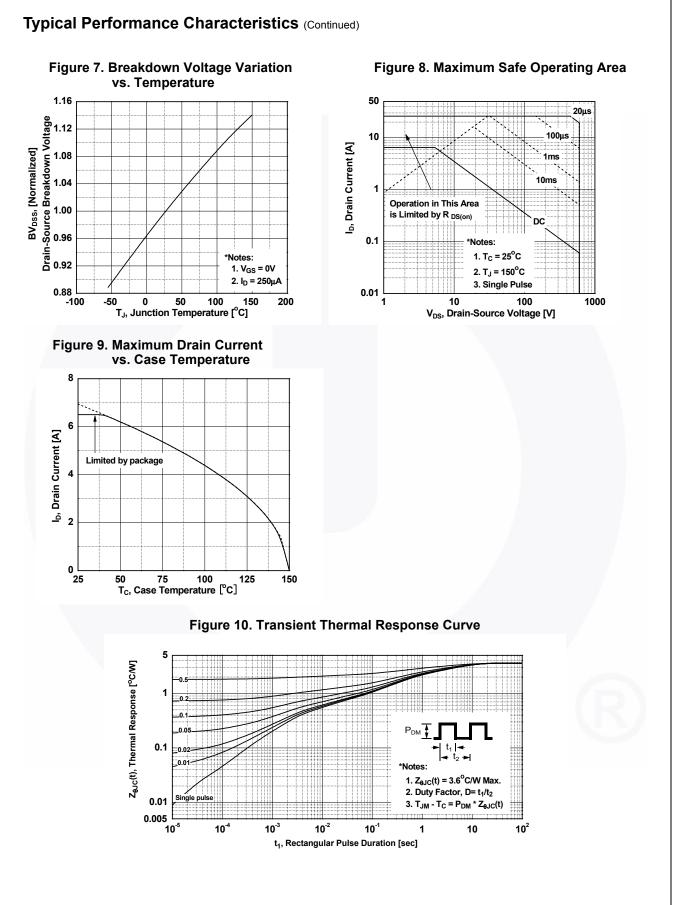
Thermal Characteristics

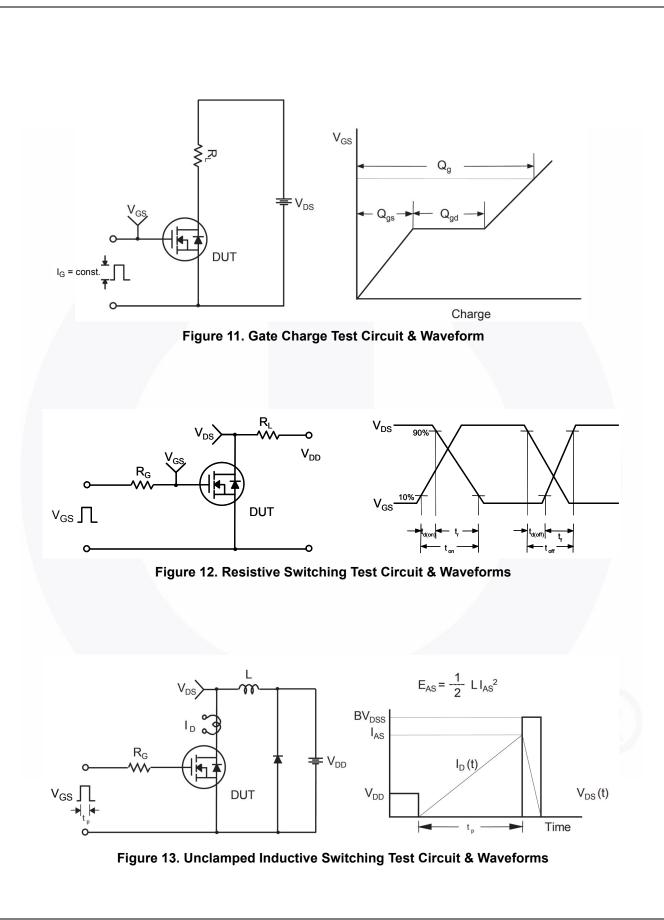
Symbol	Parameter	FDPF8N60ZUT	Unit	
$R_{ extsf{ heta}JC}$	Thermal Resistance, Junction to Case, Max.	3.6	°C/W	
R_{\thetaJA}	Thermal Resistance, Junction to Ambient, Max.	62.5	°C/W	

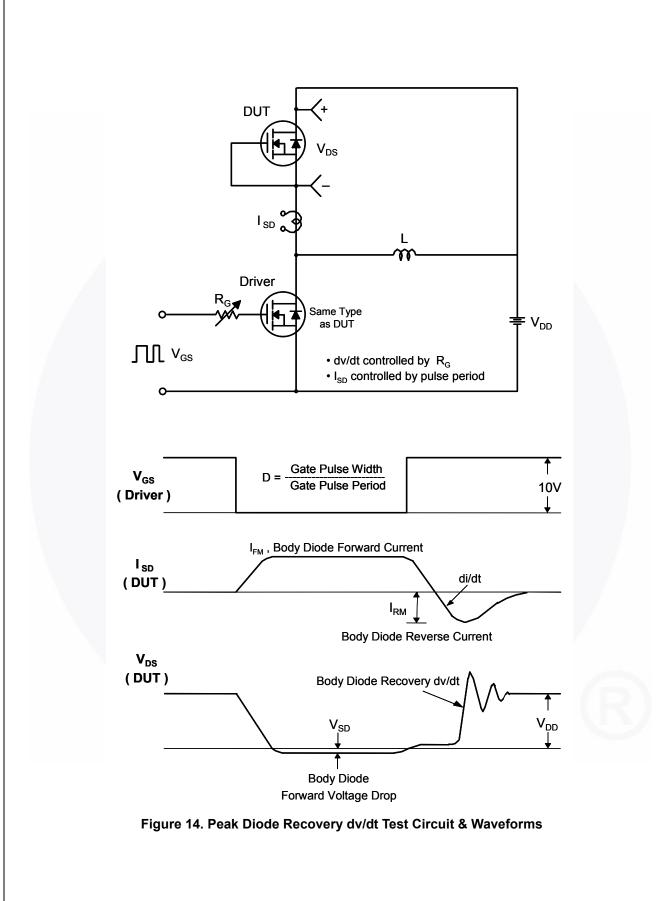
racteristics T _C = 25°C u Parameter CS o Source Breakdown Voltage down Voltage Temperature cient Sate Voltage Drain Current o Body Leakage Current CS Threshold Voltage	I _D = I _D = V _{DS} V _{DS}	Tube wise noted. Test Conditions $250 \mu A, V_{GS} = 0 V, T_J = 250 \mu A, Referenced to 3 = 600 V, V_{GS} = 0 V 3 = 480 V, T_C = 125^{\circ}C 3 = \pm 30 V, V_{DS} = 0 V $		Min. 600 - - - -	N/A Typ. - 0.7 - - - - - - - - -	50 Max. - 25 250	Units Unit V/°C μA
Parameter Parame	I _D = I _D = V _{DS} V _{DS}	Test Conditions 250 μA, V _{GS} = 0 V, T _J = 250 μA, Referenced to $_{S} = 600 V, V_{GS} = 0 V$ $_{S} = 480 V, T_{C} = 125^{\circ}C$		600 - - -	- 0.7 - -	- - 25	V V/°C
cs o Source Breakdown Voltage down Voltage Temperature cient sate Voltage Drain Current o Body Leakage Current cs Threshold Voltage	I _D =	250 μA, V _{GS} = 0 V, T _J 250 μA, Referenced to $_{5}$ = 600 V, V _{GS} = 0 V $_{5}$ = 480 V, T _C = 125 ^o C		600 - - -	- 0.7 - -	- - 25	V V/°C
o Source Breakdown Voltage down Voltage Temperature cient sate Voltage Drain Current o Body Leakage Current cs Threshold Voltage	I _D =	250μ A, Referenced to $h_{3} = 600 V$, V _{GS} = 0 V $h_{3} = 480 V$, T _C = 125 ^o C		-	0.7 - -	- 25	V/ºC
o Source Breakdown Voltage down Voltage Temperature cient sate Voltage Drain Current o Body Leakage Current cs Threshold Voltage	I _D =	250μ A, Referenced to $h_{3} = 600 V$, V _{GS} = 0 V $h_{3} = 480 V$, T _C = 125 ^o C		-	0.7 - -	- 25	V/ºC
Iown Voltage Temperature cient Gate Voltage Drain Current D Body Leakage Current CS Chreshold Voltage	I _D =	250μ A, Referenced to $h_{3} = 600 V$, V _{GS} = 0 V $h_{3} = 480 V$, T _C = 125 ^o C		-	-	25	
cient ciate Voltage Drain Current D Body Leakage Current CS Threshold Voltage	V _{DS} V _{DS}	s = 600 V, V _{GS} = 0 V s = 480 V, T _C = 125°C	25°C	-	-	25	
o Body Leakage Current	V _{DS}	_s = 480 V, T _C = 125 ^o C		-	-		μA
o Body Leakage Current	-					250	μι
cs Threshold Voltage	V _{Gt}	_S = ±30 V, V _{DS} = 0 V		-			
hreshold Voltage					-	±10	μA
	VG	_S = V _{DS} , I _D = 250 μA		3.0	-	5.0	V
Drain to Source On Resistance		V _{GS} = 10 V, I _D = 3.25 A		-	1.15	1.35	Ω
rd Transconductance		_S = 40 V, I _D = 3.25 A		-	7	-	S
eristics					1		
					950	1265	pF
	$V_{DS} = 25 \text{ V}, \text{ V}_{GS} = 0 \text{ V},$ f = 1 MHz		_				pF
				_			pF
-	$V_{DS} = 480 \text{ V}, \text{ I}_{D} = 6.5 \text{ A},$ $V_{GS} = 10 \text{ V} $ (Note 4			-			nC
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			(Note 4)	-	8	-	nC
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	f -	· · · · · · · · · · · · · · · · · · ·					ns Ω
				0.5	5		32
de Characteristics							
Im Continuous Drain to Source	Diode For	ward Current		-	-	6.5*	Α
Im Pulsed Drain to Source Dio		Forward Current		-	-	26	A
				-	-	1.6	V
e Recovery Time		V _{GS} = 0 V, I _{SD} = 6.5 A,		-	40	-	ns
e Recovery Charge	dI _F /dt = 100 A/µs				42		nC
	um Continuous Drain to Source um Pulsed Drain to Source Dioo o Source Diode Forward Voltag	Capacitance VDC Capacitance f = Se Transfer Capacitance f = Sate Charge at 10V VDC So Source Gate Charge VGC D Drain "Miller" Charge VGC D Drain "Miller" Charge VGC Cteristics VDC In Delay Time RG If Delay Time RG If Fall Time Interference Ident Series Resistance f = Ce Characteristics Jum Continuous Drain to Source Diode Forward Im Pulsed Drain to Source Diode Forward VGC D Source Diode Forward Voltage VGC	Capacitance $V_{DS} = 25 \text{ V}, V_{GS} = 0 \text{ V},$ f = 1 MHzCapacitancef = 1 MHzSe Transfer Capacitance $V_{DS} = 480 \text{ V}, I_D = 6.5 \text{ A},$ $V_{GS} = 10 \text{ V}$ Source Gate Charge $V_{DS} = 480 \text{ V}, I_D = 6.5 \text{ A},$ $V_{GS} = 10 \text{ V}$ Drain "Miller" Charge $V_{DD} = 300 \text{ V}, I_D = 6.5 \text{ A},$ $R_G = 25 \Omega, V_{GS} = 10 \text{ V}$ In Delay Time $V_{DD} = 300 \text{ V}, I_D = 6.5 \text{ A},$ $R_G = 25 \Omega, V_{GS} = 10 \text{ V}$ If Fall TimeIntermediate for the formation of the f	Capacitance $V_{DS} = 25 \text{ V}, V_{GS} = 0 \text{ V},$ f = 1 MHzSee Transfer Capacitancef = 1 MHzSeate Charge at 10V $V_{DS} = 480 \text{ V}, I_D = 6.5 \text{ A},$ $V_{GS} = 10 \text{ V}$ Source Gate Charge $V_{GS} = 10 \text{ V}$ Source Gate Charge $V_{GS} = 10 \text{ V}$ Source Gate Charge $V_{DD} = 300 \text{ V}, I_D = 6.5 \text{ A},$ Source Time $V_{DD} = 300 \text{ V}, I_D = 6.5 \text{ A},$ In Delay Time $V_{DD} = 300 \text{ V}, I_D = 6.5 \text{ A},$ If Delay Time $R_G = 25 \Omega, V_{GS} = 10 \text{ V}$ If Fall Time(Note 4)Ient Series Resistancef = 1 MHzde Characteristicsum Continuous Drain to Source Diode Forward Currentum Pulsed Drain to Source Diode Forward CurrentSource Diode Forward CurrentU Pulsed Drain to Source Diode Forward CurrentDiode Forward VoltageV_{GS} = 0 V, I_{SD} = 6.5 \text{ A}	Capacitance $V_{DS} = 25 \text{ V}, V_{GS} = 0 \text{ V},$ f = 1 MHz-Capacitancef = 1 MHz-Se Transfer Capacitance-State Charge at 10V $V_{DS} = 480 \text{ V}, I_D = 6.5 \text{ A},$ $V_{GS} = 10 \text{ V}$ -O Source Gate Charge $V_{GS} = 10 \text{ V}$ -O Drain "Miller" Charge(Note 4)-TetristicsIn Delay Time ff Delay Time ff Fall Time $V_{DD} = 300 \text{ V}, I_D = 6.5 \text{ A},$ $R_G = 25 \Omega, V_{GS} = 10 \text{ V}$ -In Series Resistancef = 1 MHz0.5Other Series Resistancef = 1 MHz0.5Other Continuous Drain to Source Diode Forward Current um Pulsed Drain to Source Diode Forward Current-O Source Diode Forward Voltage $V_{GS} = 0 \text{ V}, I_{SD} = 6.5 \text{ A}$ -	Capacitance $V_{DS} = 25 \text{ V}, V_{GS} = 0 \text{ V}, f = 1 \text{ MHz}$ -950Gapacitance-110se Transfer Capacitance-10sate Charge at 10V $V_{DS} = 480 \text{ V}, I_D = 6.5 \text{ A}, V_{GS} = 10 \text{ V}$ -20o Source Gate Charge $V_{GS} = 10 \text{ V}$ -5o Drain "Miller" Charge(Note 4)-8cteristics-20-5on Delay Time $V_{DD} = 300 \text{ V}, I_D = 6.5 \text{ A}, R_G = 25 \Omega, V_{GS} = 10 \text{ V}$ -20ff Delay TimeR_G = 25 \Omega, V_{GS} = 10 \text{ V}-30-ff Fall Time(Note 4)-35-55de Characteristicsf = 1 \text{ MHz}0.555um Continuous Drain to Source Diode Forward Currentum Pulsed Drain to Source Diode Forward Currento Source Diode Forward Voltage $V_{GS} = 0 \text{ V}, I_{SD} = 6.5 \text{ A}$	Capacitance $V_{DS} = 25 \text{ V}, V_{GS} = 0 \text{ V},$ - 950 1265 capacitance f = 1 MHz - 110 150 is ate Charge at 10V $V_{DS} = 480 \text{ V}, I_D = 6.5 \text{ A},$ - 20 26 is Source Gate Charge $V_{GS} = 10 \text{ V}$ - 5 - is Deain "Miller" Charge $V_{GS} = 10 \text{ V}$ - 8 - cteristics - 100 15 - in Delay Time $V_{DD} = 300 \text{ V}, I_D = 6.5 \text{ A},$ - 20 50 in Rise Time $V_{DD} = 300 \text{ V}, I_D = 6.5 \text{ A},$ - 30 70 if Delay Time $V_{CD} = 300 \text{ V}, I_D = 6.5 \text{ A},$ - 30 70 if F all Time $V_{DD} = 300 \text{ V}, I_D = 6.5 \text{ A},$ - 35 80 ilent Series Resistance f = 1 MHz 0.5 5 11 de Characteristics - - 6.5* 11 ium Continuous Drain to Source Diode Forward Current - - 26 ium Pulsed Drain to Source

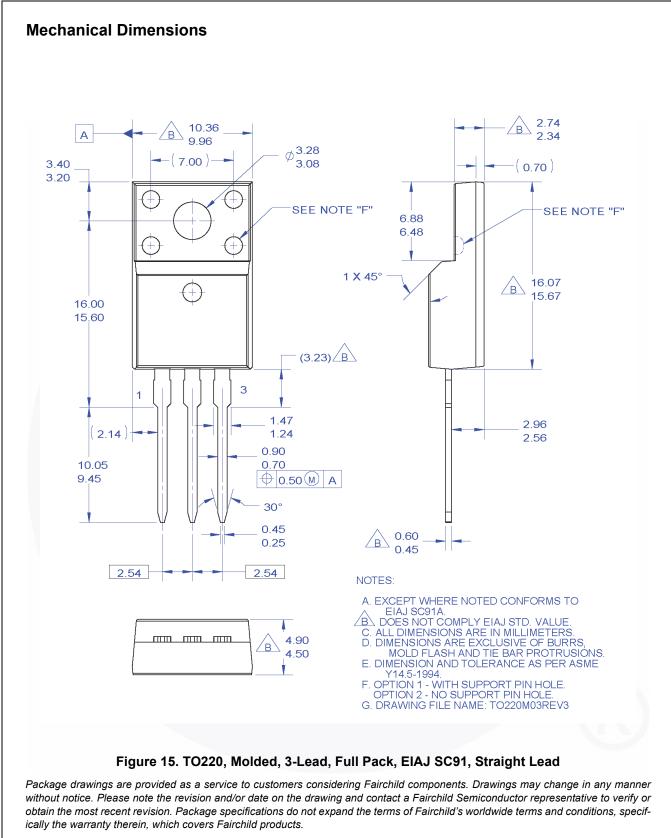


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