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December 2013

FDPF17N60NT

N-Channel UniFETTM II MOSFET 600 V, 17 A, 340 m Ω

Features

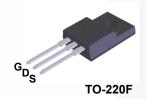
- $R_{DS(on)}$ = 290 m Ω (Typ.) @ V_{GS} = 10 V, I_D = 8.5 A
- Low Gate Charge (Typ. 48 nC)
- Low C_{rss} (Typ. 23 pF)
- · 100% Avalanche Tested
- · Improved dv/dt Capability
- RoHS Compliant

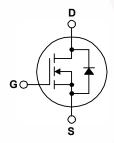
Applications

- LCD/LED/PDP 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 onstate 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. 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			FDPF17N60NT	Unit
V_{DSS}	Drain to Source Voltage			600	V
V_{GSS}	Gate to Source Voltage			±30	V
	Dunin Comment	- Continuous (T _C = 25°C)		17*	
ID	Drain Current	- Continuous (T _C = 100°C)		10.2*	_ A
I _{DM}	Drain Current	- Pulsed	(Note 1)	68*	Α
E _{AS}	Single Pulsed Avalanche Energ	gy	(Note 2)	838	mJ
I _{AR}	Avalanche Current		(Note 1)	17	Α
E _{AR}	Repetitive Avalanche Energy		(Note 1)	24.5	mJ
dv/dt	Peak Diode Recovery dv/dt		(Note 3)	10	V/ns
D	Davida Disabatian	(T _C = 25°C)		62.5	W
P_{D}	Power Dissipation	- Derate Above 25°C		0.5	W/°C
T _J , T _{STG}	Operating and Storage Temper	rature Range		-55 to +150	°C
TL	Maximum Lead Temperature for 1/8" from Case for 5 Seconds	or Soldering,		300	°C

Thermal Characteristics

Symbol	Parameter	FDPF17N60NT	Unit
$R_{\theta JC}$	Thermal Resistance, Junction to Case, Max.	2.0	°C/W
$R_{\theta JA}$	Thermal Resistance, Junction to Ambient, Max.	62.5	*C/VV

Package Marking and Ordering Information

Part Number	Top Mark	Package	Packing Method	Reel Size	Tape Width	Quantity
FDPF17N60NT	FDPF17N60NT	TO-220F	Tube	N/A	N/A	50 units

Electrical Characteristics T_C = 25°C unless otherwise noted

Symbol	Parameter	Test Conditions	Min.	Тур.	Max.	Unit
Off Charac	cteristics					
BV _{DSS}	Drain to Source Breakdown Voltage	$I_D = 250 \mu A, V_{GS} = 0 V, T_C = 25^{\circ} C$	600	-	-	V
ΔBV _{DSS} / ΔT _J	Breakdown Voltage Temperature Coefficient	I _D = 250 μA, Referenced to 25°C	-	0.8	-	V/°C
1	Zero Gate Voltage Drain Current	V _{DS} = 600 V, V _{GS} = 0 V	1	-	1	μА
IDSS	Zero Gate Voltage Drain Current	$V_{DS} = 480 \text{ V}, V_{GS} = 0 \text{ V}, T_{C} = 150^{\circ}\text{C}$	1	-	10	μΑ
I _{GSS}	Gate to Body Leakage Current	$V_{GS} = \pm 30 \text{ V}, V_{DS} = 0 \text{ V}$	-	-	±100	nA

On Characteristics

$V_{GS(th)}$	Gate Threshold Voltage	$V_{GS} = V_{DS}, I_{D} = 250 \mu\text{A}$	3.0	-	5.0	V
R _{DS(on)}	Static Drain to Source On Resistance	$V_{GS} = 10 \text{ V}, I_D = 8.5 \text{ A}$	-	0.29	0.34	Ω
9 _{FS}	Forward Transconductance	V _{DS} = 20 V, I _D = 8.5 A	-	21	-	S

Dynamic Characteristics

C _{iss}	Input Capacitance	V 05 V V 0 V		-	2285	3040	pF
Coss	Output Capacitance	$V_{DS} = 25 \text{ V}, V_{GS} = 0 \text{ V},$ f = 1 MHz		-	310	410	pF
C _{rss}	Reverse Transfer Capacitance	1 = 1 1/11/12		-\	23	35	pF
Q _{g(tot)}	Total Gate Charge at 10V	V _{DS} = 480 V I _D = 17 A,		- \	48	65	nC
Q _{gs}	Gate to Source Gate Charge	V _{GS} = 10 V		- \	13	-	nC
Q_{gd}	Gate to Drain "Miller" Charge	(N	ote 4)	-	20	-	nC

Switching Characteristics

t _{d(on)}	Turn-On Delay Time			-	48	106	ns
t _r	Turn-On Rise Time	$V_{DD} = 300 \text{ V}, I_D = 17 \text{ A},$		-	79	168	ns
t _{d(off)}	Turn-Off Delay Time	V_{GS} = 10 V, R_{G} = 25 Ω		-	128	266	ns
t _f	Turn-Off Fall Time		(Note 4)	-	62	134	ns

Drain-Source Diode Characteristics

I _S	Maximum Continuous Drain to Source Diode Forward Current		_	-	74	Α
I _{SM}	Maximum Pulsed Drain to Source Diode Forward Current		-	-	68	Α
V_{SD}	Drain to Source Diode Forward Voltage	V _{GS} = 0 V, I _{SD} = 17 A	-	-	1.4	V
t _{rr}	Reverse Recovery Time	V _{GS} = 0 V, I _{SD} = 17 A,	-	575	-	ns
Q _{rr}	Reverse Recovery Charge	$dI_F/dt = 100 A/\mu s$	-	7.2	_	μC

- 1. Repetitive rating: pulse-width limited by maximum junction temperature.
- 2. L = 5.8 mH, I $_{AS}$ = 17 A, V $_{DD}$ = 50 V, R $_{G}$ = 25 $\Omega,$ starting T $_{J}$ = 25 $^{\circ}C.$
- 3. $I_{SD} \le 17$ A, di/dt ≤ 200 A/ μ s, $V_{DD} \le BV_{DSS}$, starting T_J = 25°C.
- 4. Essentially independent of operating temperature typical characteristics.

Typical Performance Characteristics

Figure 1. On-Region Characteristics

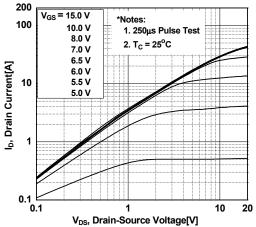


Figure 3. On-Resistance Variation vs.
Drain Current and Gate Voltage

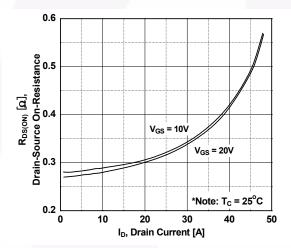


Figure 5. Capacitance Characteristics

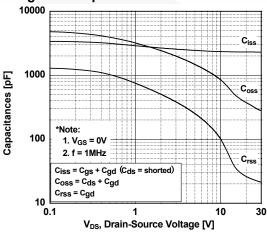


Figure 2. Transfer Characteristics

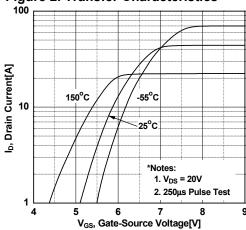


Figure 4. Body Diode Forward Voltage Variation vs. Source Current and Temperature

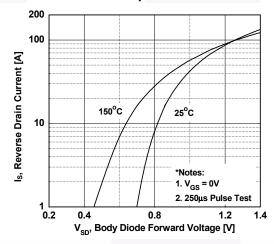
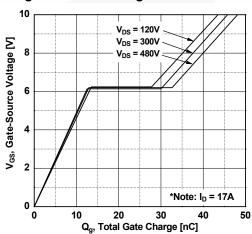


Figure 6. Gate Charge Characteristics



Typical Performance Characteristics (Continued)

Figure 7. Breakdown Voltage Variation vs. Temperature

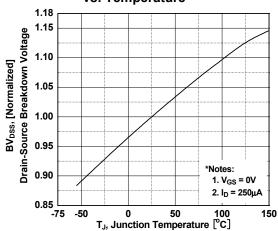


Figure 8. On-Resistance Variation vs. Temperature

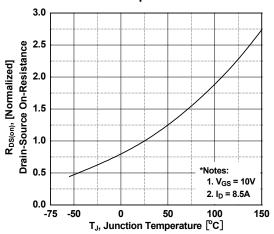


Figure 9. Maximum Safe Operating Area

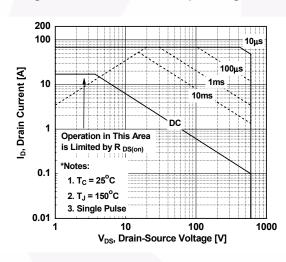


Figure 10. Maximum Drain Current vs. Case Temperature

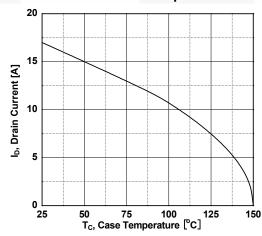
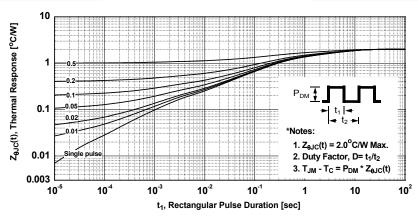


Figure 11. Transient Thermal Response Curve



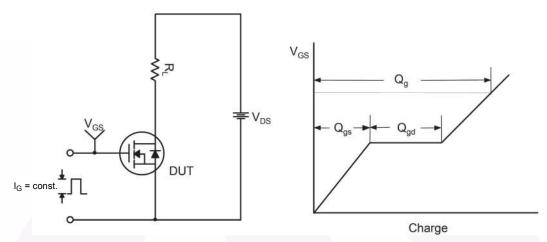


Figure 12. Gate Charge Test Circuit & Waveform

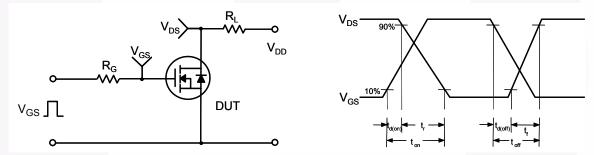


Figure 13. Resistive Switching Test Circuit & Waveforms

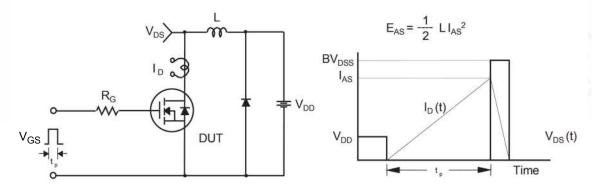


Figure 14. Unclamped Inductive Switching Test Circuit & Waveforms

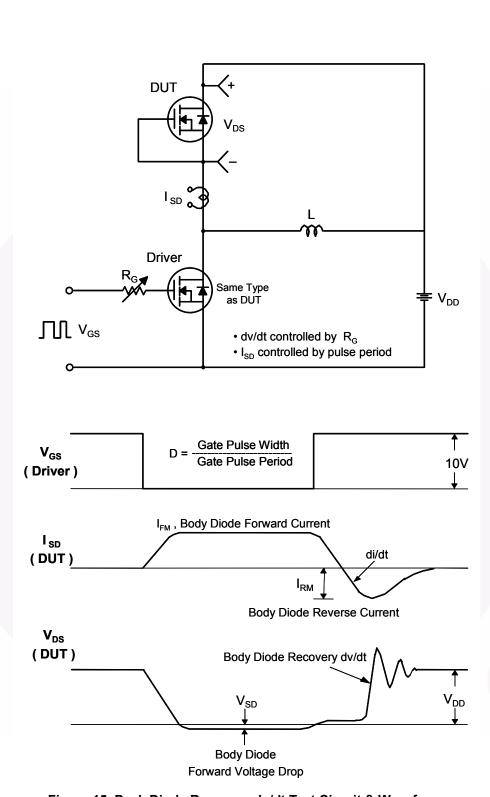


Figure 15. Peak Diode Recovery dv/dt Test Circuit & Waveforms

Mechanical Dimensions

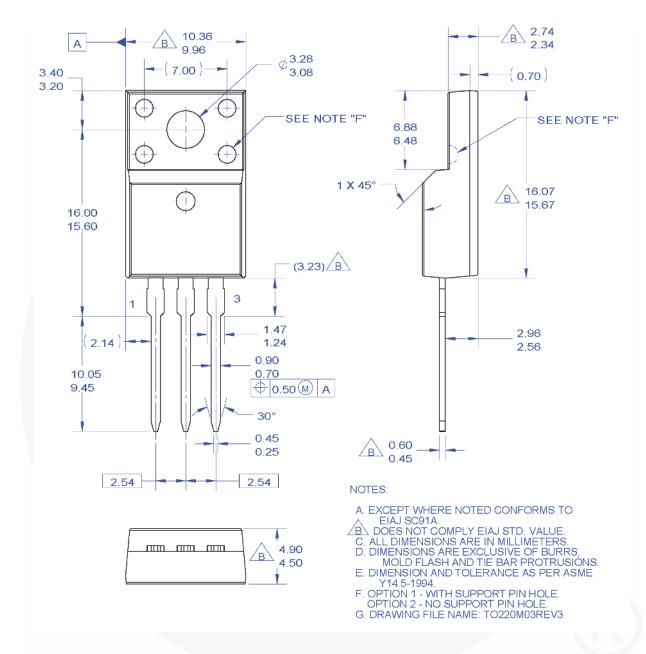


Figure 16. TO220, Molded, 3-Lead, Full Pack, EIAJ SC91, Straight Lead

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