

FDP33N25 N-Channel UniFETTM MOSFET 250 V, 33 A, 94 mΩ

Features

- $R_{DS(on)}$ = 94 m Ω (Max.) @ V_{GS} = 10 V, I_D = 16.5 A
- Low Gate Charge (Typ. 36.8 nC)
- Low C_{rss} (Typ. 39 pF)
- 100% Avalanche Tested

Applications

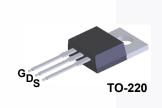
- PDP TV
- Lighting
- Uninterruptible Power Supply
- AC-DC Power Supply

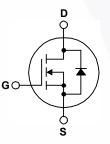
November 2013

FDP33N25 — N-Channel UniFETTM MOSFET

Description

UniFETTM MOSFET is Fairchild Semiconductor's high voltage MOSFET family based on planar stripe and DMOS technology. This MOSFET is tailored to reduce on-state resistance, and to provide better switching performance and higher avalanche energy strength. 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.





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

Symbol	Parameter		FDP33N25	Unit
V _{DSS}	Drain-Source Voltage	9	250	V
ID	Drain Current	- Continuous (T _C = 25°C) - Continuous (T _C = 100°C)	33 20.4	A A
I _{DM}	Drain Current	- Pulsed (Note	132	A
V _{GSS}	Gate-Source voltage	± 30	V	
E _{AS}	Single Pulsed Avalar	nche Energy (Note	2) 918	mJ
I _{AR}	Avalanche Current	(Note	33	А
E _{AR}	Repetitive Avalanche Energy (Note 1)		23.5	mJ
dv/dt	Peak Diode Recovery dv/dt (Note 3)		(3) 4.5	V/ns
P _D	Power Dissipation	(T _C = 25°C) - Derate Above 25°C	235 1.89	W W/°C
T _{J,} T _{STG}	Operating and Stora	ge 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	FDP33N25	Unit
$R_{ extsf{ heta}JC}$	Thermal Resistance, Junction-to-Case, Max.	0.53	°C/W
$R_{ extsf{ heta}JA}$	Thermal Resistance, Junction-to-Ambient, Max.	62.5	C/VV

FDP33N25 —
N-Channel
UniFET TM
MOSFET

Part Number Top Ma		Top Mark	Package	Packing Method	Reel Size	T	ape Width	ı Qu	antity
FDP33N25 FDP33N25 1		TO-220	O-220 Tube N/A		N/A 5		50	units	
Electric	al Char	racteristics T _C = 25°	C unless oth	nerwise noted.					
Symbol		Parameter		Conditions		Min	Тур	Max	Unit
Off Charac	teristics						•		
BV _{DSS}	Drain-Sou	irce Breakdown Voltage	$V_{GS} = 0$	V _{GS} = 0 V, I _D = 250 μA, T _J = 25°C		250			V
ΔBV_{DSS} / ΔT_{J}	Breakdow Coefficien	n Voltage Temperature t	I _D = 250	$I_D = 250 \ \mu\text{A}$, Referenced to 25°C			0.25		V/°C
I _{DSS}	Zero Gate Voltage Drain Current			$V_{DS} = 250 \text{ V}, V_{GS} = 0 \text{ V}$ $V_{DS} = 200 \text{ V}, T_C = 125^{\circ}\text{C}$				1 10	μΑ μΑ
I _{GSSF}	Gate-Bod	y Leakage Current, Forward	V _{GS} = 3	30 V, V _{DS} = 0 V				100	nA
I _{GSSR}	Gate-Bod	y Leakage Current, Reverse	e V _{GS} = -	V _{GS} = -30 V, V _{DS} = 0 V				-100	nA
On Charac	teristics								
V _{GS(th)}	Gate Thre	eshold Voltage	$V_{DS} = V$	/ _{GS} , I _D = 250 μA		3.0		5.0	V
R _{DS(on)}	Static Drain-Source On-Resistance		V _{GS} = 1	V _{GS} = 10 V, I _D = 16.5 A			0.077	0.094	Ω
9 _{FS}	Forward 1	ransconductance	V _{DS} = 4	0 V, I _D = 16.5 A			26.6		S
Dynamic C	haracteris	tics							
C _{iss}	Input Cap	acitance		V _{DS} = 25 V, V _{GS} = 0 V, f = 1.0 MHz			1640	2135	pF
C _{oss}	Output Ca	apacitance	f = 1.0 l				330	430	pF
C _{rss}	Reverse 7	Fransfer Capacitance					39	59	pF
Switching	Characteri	stics						•	
t _{d(on)}	Turn-On Delay Time			V _{DD} = 125 V, I _D = 33 A,			35	80	ns
t _r	Turn-On F	Rise Time	V _{GS} = 1	V_{GS} = 10 V, R_{G} = 25 Ω			230	470	ns
t _{d(off)}	Turn-Off	Delay Time					75	160	ns
t _f	Turn-Off F	all Time			(Note 4)		120	250	ns
Qg	Total Gate	e Charge	V _{DS} = 2	$V_{DS} = 200 \text{ V}, \text{ I}_{D} = 33 \text{ A},$ $V_{GS} = 10 \text{ V}$ (Note 4)			36.8	48	nC
Q _{gs}	Gate-Sou	rce Charge	V _{GS} = 1				10		nC
Q _{gd}	Gate-Drai	n Charge					17		nC
Drain-Sou	rce Diode (Characteristics and Maxim	um Ratings	\$					
I _S Maximum Continuous Drain-Source Dio			Diode Forwa	rd Current				33	Α
I _{SM}	Maximum Pulsed Drain-Source Diode F		e Forward C	orward Current				132	Α
V _{SD}	Drain-Sou	rce Diode Forward Voltage	$V_{GS} = 0$) V, I _S = 33 A				1.4	V
t _{rr}	Reverse F	Recovery Time) V, I _S = 33 A,			220		ns
Q _{rr}	Reverse F	Recovery Charge	dl _F /dt =	100 Ā/μs			1.71		μC

Notes:

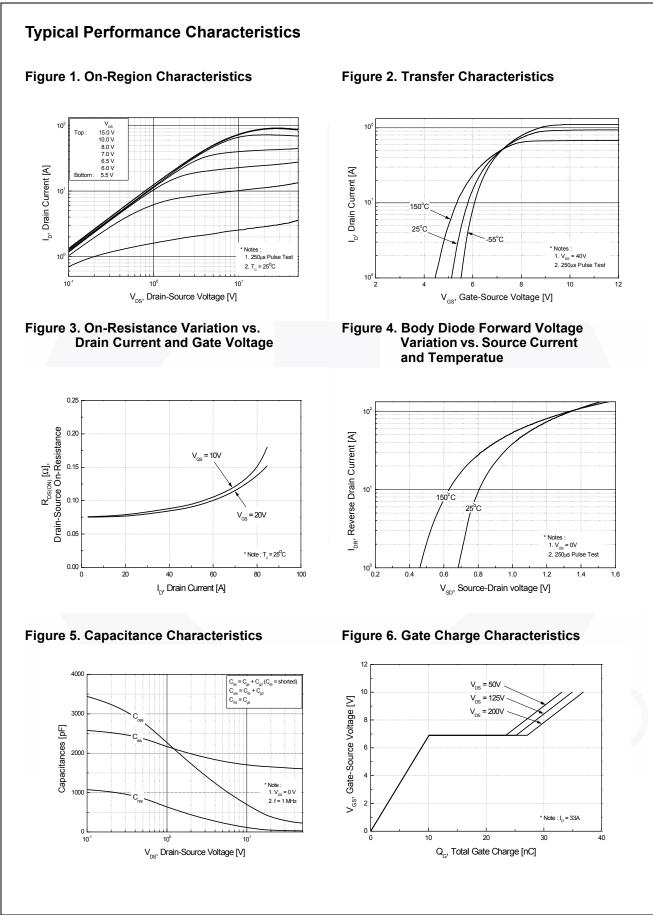
1. Repetitive rating: pulse-width limited by maximum junction temperature.

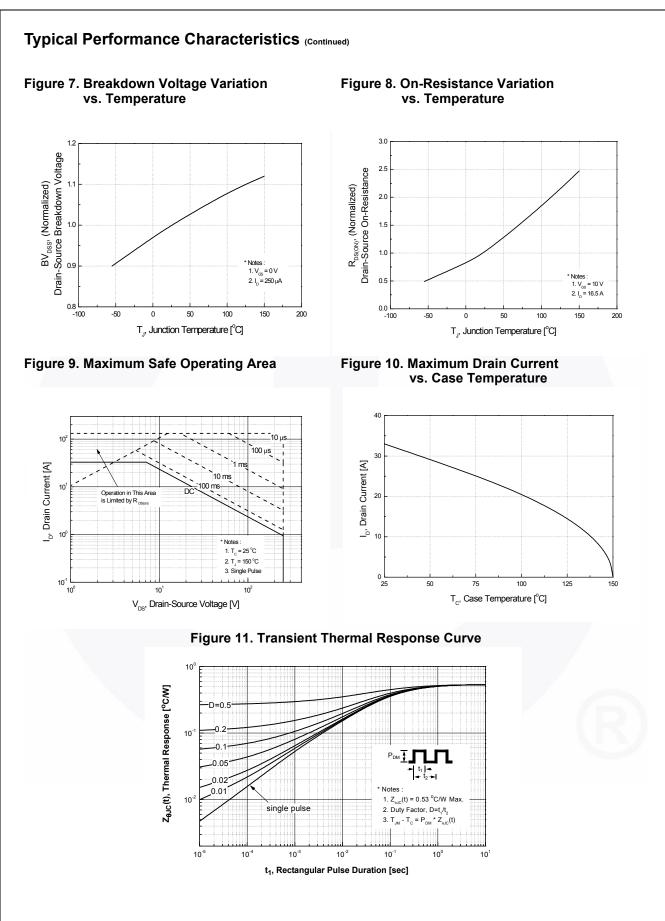
2. L = 1.35 mH, I_{AS} = 33 A, V_{DD} = 50 V, R_G = 25 Ω , starting T_J = 25°C.

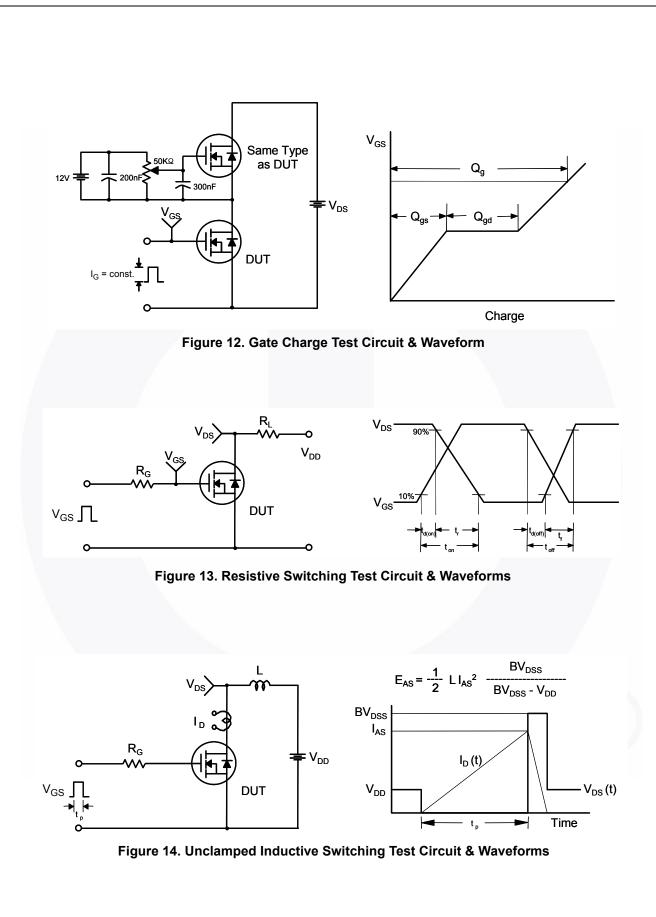
3. I_{SD} \leq 33 A, di/dt \leq 200 A/µs, V_{DD} \leq BV_{DSS}, starting T_J = 25°C.

4. Essentially independent of operating temperature typical characteristics.

2

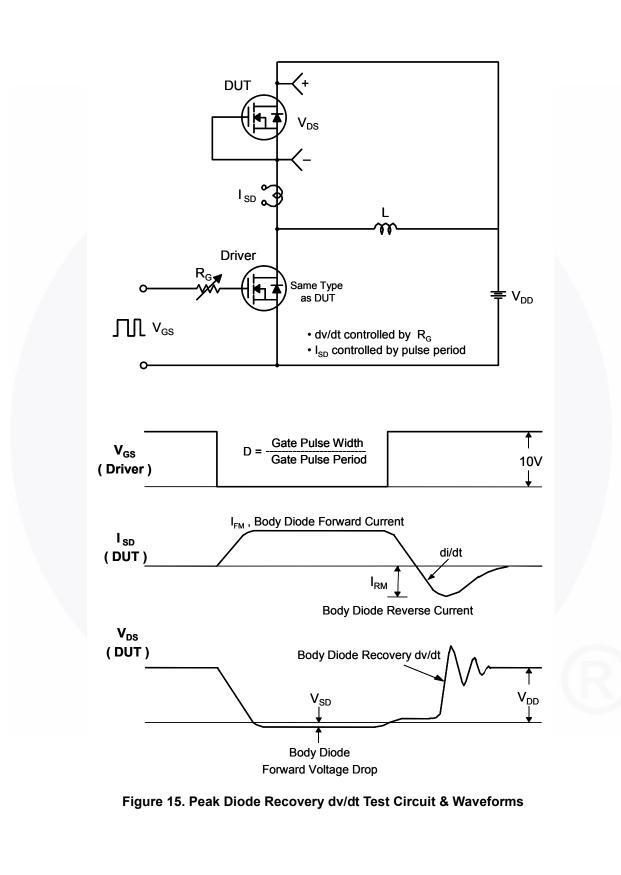






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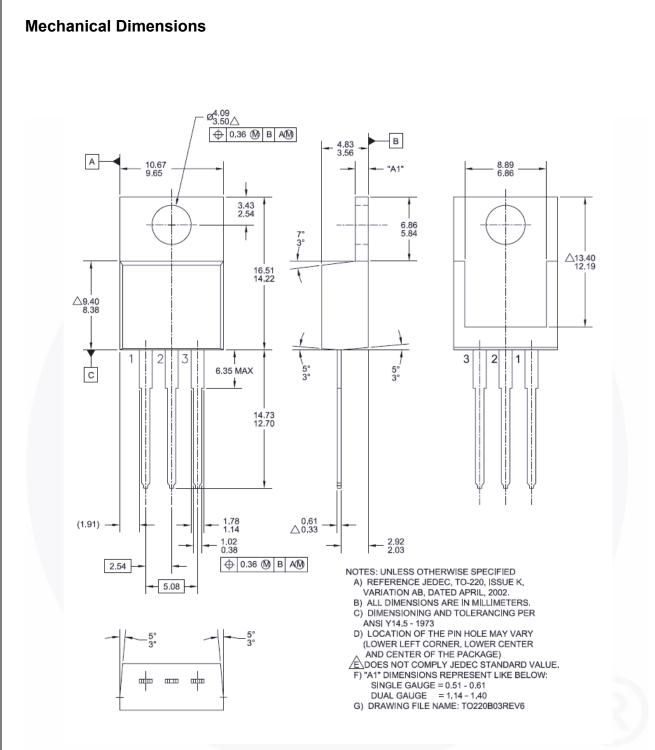


Figure 16. TO-220, Molded, 3-Lead, Jedec Variation AB

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