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November 2013

FDD3N40 / FDU3N40 N-Channel UniFETTM MOSFET **400 V, 2 A, 3.4** Ω

Features

- $R_{DS(on)} = 3.4 \Omega (Typ.) @ V_{GS} = 10 V, I_D = 1 A$
- Low Gate Charge (Typ. 4.5 nC)
- Low C_{rss} (Typ. 3.7 pF)
- 100% Avalanche Tested

Applications

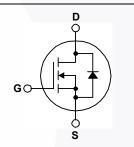
- LED TV
- Consumer Appliances
- Lighting
- Uninterruptible Power Supply

Description

I-PAK

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		FDD3N40TM / FDU3N40TU	Unit
V _{DSS}	Drain-Source Voltage		400	V
ID	Drain Current	- Continuous (T _C = 25°C) - Continuous (T _C = 100°C)	2.0 1.25	A A
I _{DM}	Drain Current	- Pulsed (Note 1)	8.0	А
V _{GSS}	Gate-Source voltage		±30	V
E _{AS}	Single Pulsed Avalanche Energy (Note 2)		46	mJ
I _{AR}	Avalanche Current (Note 1)		2	А
E _{AR}	Repetitive Avalanche Energy (Note 1)		3	mJ
dv/dt	Peak Diode Recovery dv/dt (Note 3)		4.5	V/ns
P _D	Power Dissipation	(T _C = 25°C) - Derate Above 25°C	30 0.24	W W/°C
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

FDD3N40 / FDU3N40 Rev. C3

Symbol	Parameter	FDD3N40TM / FDU3N40TU	Unit
$R_{ extsf{ heta}JC}$	Thermal Resistance, Junction-to-Case, Max.	4.2	°C/W
$R_{ hetaJA}$	Thermal Resistance, Junction to Ambient, Max. 110		°C/W

FDD3N40 /
FDU3N40 —
- N-Channel
MOSFET

Package Marking and Ordering Information

Part Number	Top Mark	Package	Packing Method	Reel Size	Tape Width	Quantity
FDD3N40TM	FDD3N40	DPAK	Tape and Reel	330 mm	16 mm	2500 units
FDU3N40TU	FDU3N40	IPAK	Tube	N/A	N/A	75 units

Electrical Characteristics T_C = 25°C unless otherwise noted.

Symbol	Parameter	Conditions	Min.	Тур.	Max	Unit
Off Charac	teristics					
BV _{DSS}	Drain-Source Breakdown Voltage	V _{GS} = 0 V, I _D = 250 μA				V
ΔBV_{DSS} / ΔT_{J}	Breakdown Voltage Temperature Coefficient	$I_D = 250 \ \mu$ A, Referenced to 25°C		0.4		V/°C
I _{DSS}	Zero Gate Voltage Drain Current	$V_{DS} = 400 \text{ V}, V_{GS} = 0 \text{ V}$ $V_{DS} = 320 \text{ V}, T_{C} = 125^{\circ}\text{C}$			1 10	μΑ μΑ
I _{GSSF}	Gate-Body Leakage Current, Forward	V _{GS} = 30 V, V _{DS} = 0 V			100	nA
I _{GSSR}	Gate-Body Leakage Current, Reverse	V _{GS} = -30 V, V _{DS} = 0 V			-100	nA
On Charac	teristics					
V _{GS(th)}	Gate Threshold Voltage	$V_{DS} = V_{GS}, I_{D} = 250 \ \mu A$	3.0		5.0	V
R _{DS(on)}	Static Drain-Source On-Resistance	V _{GS} = 10 V, I _D = 1 A		2.8	3.4	Ω
9 _{FS}	Forward Transconductance	V _{DS} = 40 V, I _D = 1 A		2		S
Dynamic C	Characteristics					
C _{iss}	Input Capacitance	V _{DS} = 25 V, V _{GS} = 0 V,		173	225	pF
C _{oss}	Output Capacitance	f = 1 MHz		30	40	pF
C _{rss}	Reverse Transfer Capacitance			3.7	6	pF
Switching	Characteristics	·			•	
t _{d(on)}	Turn-On Delay Time	V _{DD} = 200 V, I _D = 3 A,		10	30	ns
t _r	Turn-On Rise Time	V_{GS} = 10 V, R_G = 25 Ω		30	70	ns
t _{d(off)}	Turn-Off Delay Time			10	30	ns
t _f	Turn-Off Fall Time	(Note 4)		25	60	ns
Qg	Total Gate Charge	V _{DS} = 320 V, I _D = 3 A,		4.5	6	nC
Q _{gs}	Gate-Source Charge	$V_{GS} = 10 V$		1.2		nC
Q _{gd}	Gate-Drain Charge	(Note 4)		2		nC
Drain-Sou	rce Diode Characteristics and Maximur	n Ratings				
I _S	Maximum Continuous Drain-Source Diode Forward Current				2	Α
I _{SM}	Maximum Pulsed Drain-Source Diode Forward Current				8	Α
V _{SD}	Drain-Source Diode Forward Voltage	V _{GS} = 0 V, I _S = 2 A			1.4	V
t _{rr}	Reverse Recovery Time	V _{GS} = 0 V, I _S = 3 A,		210		ns
Q _{rr}	Reverse Recovery Charge	dI _F /dt =100 A/µs		0.75		μC

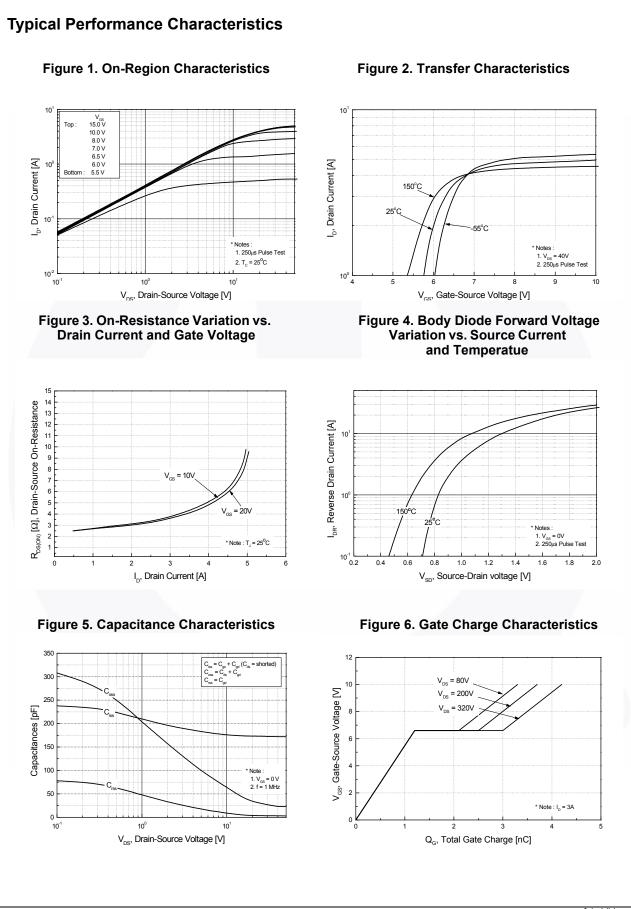
Notes:

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

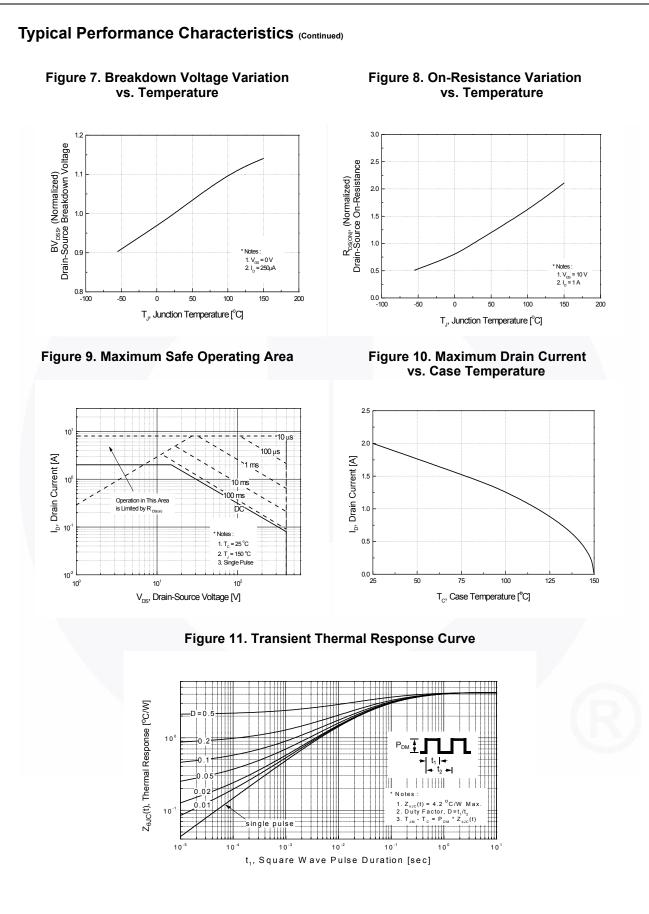
2. L = 20 mH, I_{AS} = 2 A, V_{DD} = 50 V, R_G = 25 Ω , starting T_J = 25°C.

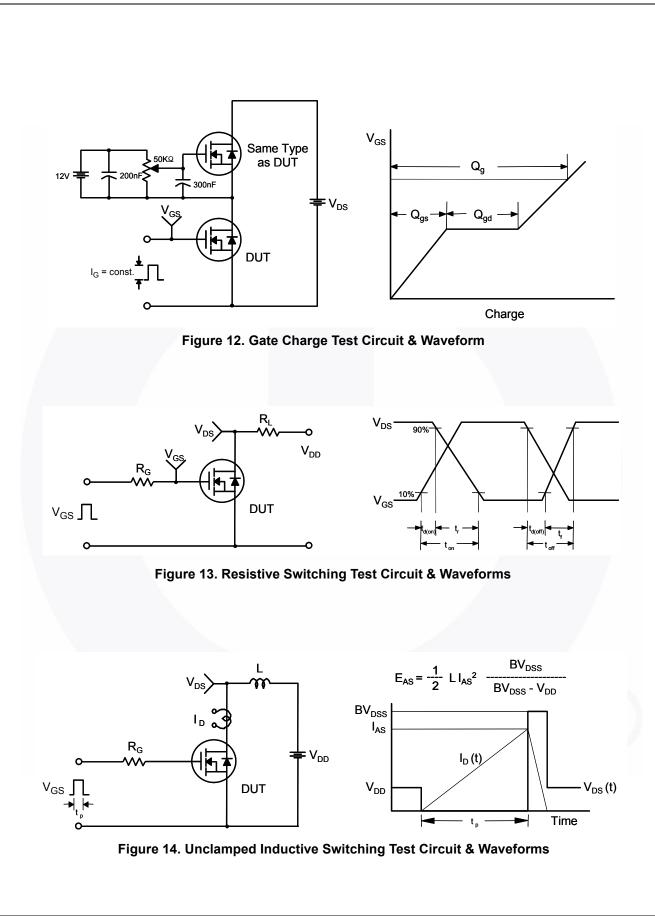
3. I_{SD} \leq 2 A, di/dt \leq 200 A/µs, V_{DD} \leq BV_{DSS}, starting T_J = 25°C.

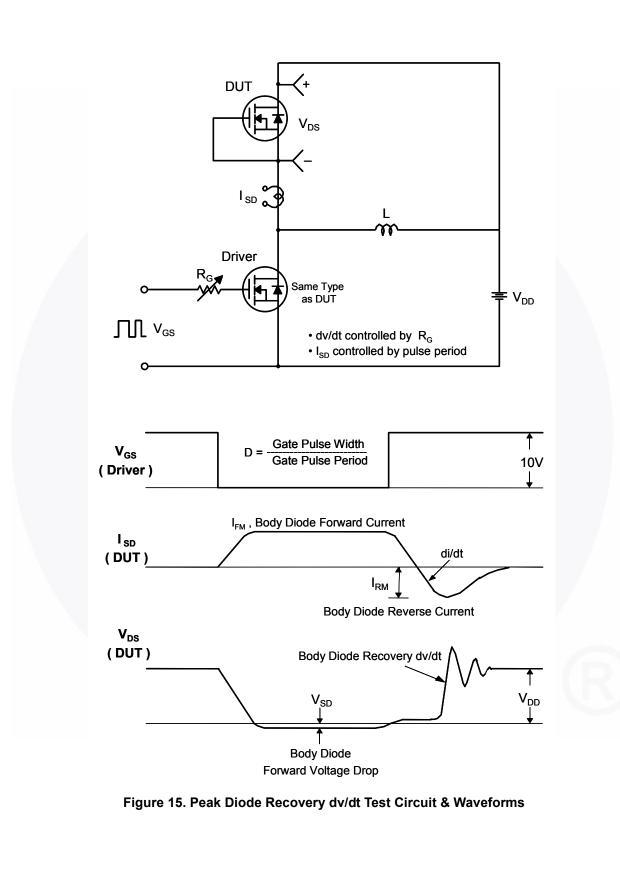
4. Essentially independent of operating temperature typical characteristics.

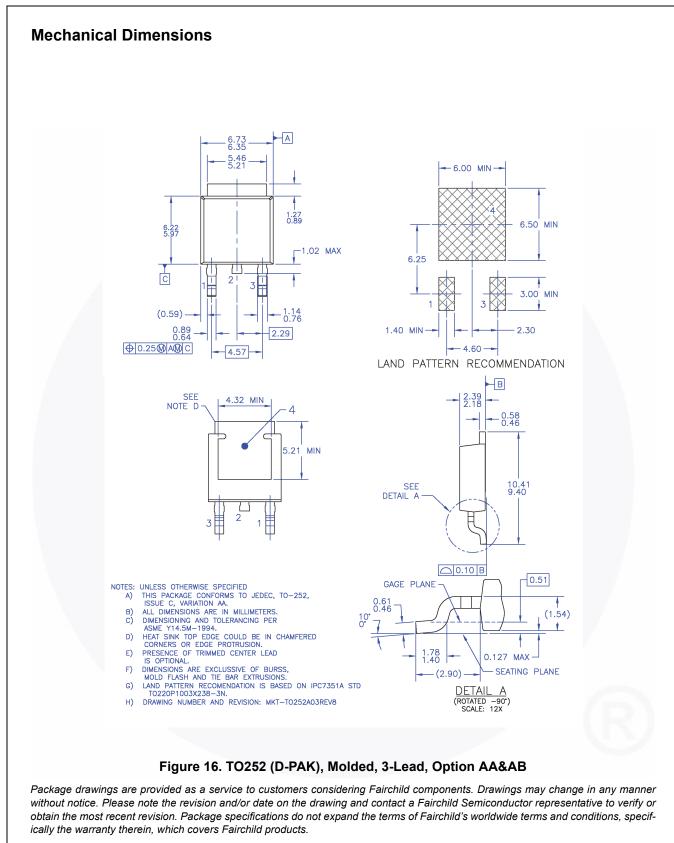


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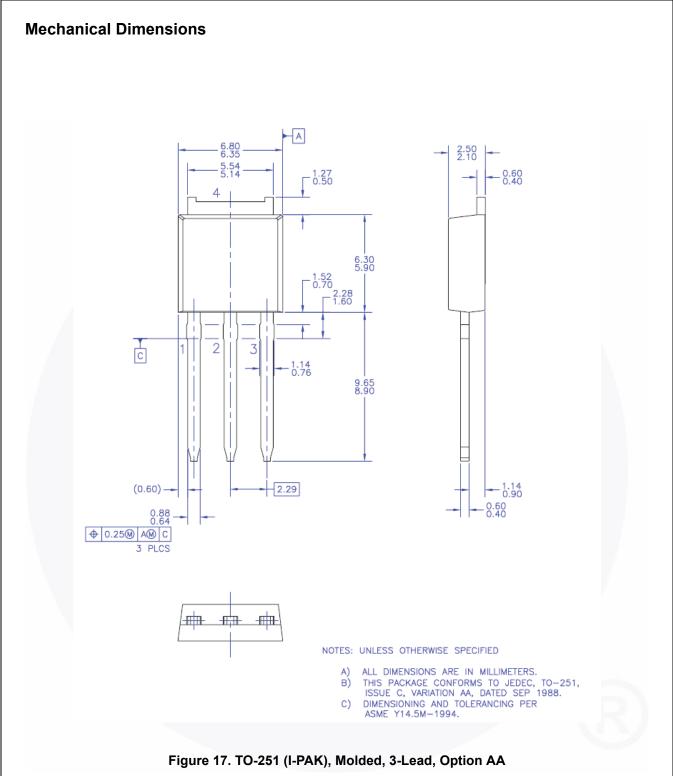






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