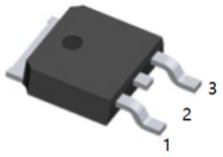
Description

This N-Channel MOSFET is produced using ductor's advanced process that has been tai-lored to minimize the on-state resistance and maintain superior switching performance.

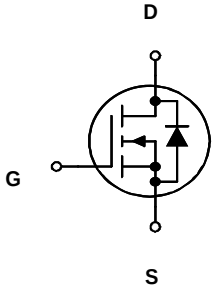


1.G 2.D 3.S

TO-252(DPAK) top view

Features

- V_{DS} =100V
- $R_{DS(ON)}$(at V_{GS}=10V) < 124mΩ
- $R_{DS(ON)}$ (at V_{GS} = 5V) < 175mΩ
- Low Gate Charge (Typ.2.78 nC)
- Fast Switching
- Improved dv/dt Capability
- RoHS Compliant



Application

- Consumer Appliances
- LED TV and Monitor
- Synchronous Rectification
- Uninterruptible Power Supply
- Micro Solar Inverter

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

Symbol	Parameter			FDD1600N10ALZ	Unit
V_{DSS}	Drain to Source Voltage			100	V
V_{GSS}	Gate to Source Voltage			±20	V
I_D	Drain Current	- Continuous (T_C = 25°C)		6.8	A
		- Continuous (T_C = 100°C)		4.3	
I_{DM}	Drain Current	- Pulsed	(Note 1)	13.6	A
E_{AS}	Single Pulsed Avalanche Energy		(Note 2)	5.08	mJ
dv/dt	Peak Diode Recovery dv/dt		(Note 3)	6.0	V/ns
P_D	Power Dissipation	(T_C = 25°C)		14.9	W
		- Derate Above 25°C		0.12	W/°C
T_J, T_{STG}	Operating and Storage Temperature Range			-55 to +150	°C
T_L	Maximum Lead Temperature for Soldering, 1/8" from Case for 5 Seconds			300	°C

Thermal Characteristics

Symbol	Parameter	FDD1600N10ALZ	Unit
$R_{\theta JC}$	Thermal Resistance, Junction to Case, Max.	8.4	°C/W
$R_{\theta JA}$	Thermal Resistance, Junction to Ambient, Max.	87	

Electrical Characteristics T_C = 25°C unless otherwise noted.

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
Off Characteristics						
BV_{DSS}	Drain to Source Breakdown Voltage	I_D = 250 μA, V_{GS} = 0 V	100			V
ΔBV_{DSS} / ΔT_J	Breakdown Voltage Temperature Coefficient	I_D = 250 μA, Referenced to 25°C		0.1		V/°C
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS} = 80 V, V_{GS} = 0 V V_{DS} = 80 V, V_{GS} = 0 V, T_C = 125°C			1 500	μA
I_{GSS}	Gate to Source Leakage Current	V_{GS} = ±20 V, V_{DS} = 0 V			±10	μA
On Characteristics						
$V_{GS(th)}$	Gate Threshold Voltage	V_{GS} = V_{DS}, I_D = 250 μA	1.0	1.6	2.5	V
$R_{DS(on)}$	Static Drain to Source On Resistance	V_{GS} = 10 V, I_D = 3.4 A V_{GS} = 5 V, I_D = 2.1 A		124 175	160 375	mΩ
g_{FS}	Forward Transconductance	V_{DS} = 10 V, I_D = 6.8 A		19.6		S
Dynamic Characteristics						
C_{iss}	Input Capacitance	V_{DS} = 50 V, V_{GS} = 0 V, f = 1 MHz		169	225	pF
C_{oss}	Output Capacitance			43	55	pF
C_{rss}	Reverse Transfer Capacitance			2.04		pF
$C_{oss(er)}$	Energy Related Output Capacitance	V_{DS} = 50 V, V_{GS} = 0 V		85		pF
$Q_{g(tot)}$	Total Gate Charge at 10V	V_{GS} = 10 V; V_{DD} = 50 V, I_D = 6.8 A		2.78	3.61	nC
$Q_{g(tot)}$	Total Gate Charge at 5V	V_{GS} = 5 V; V_{DD} = 50 V, I_D = 6.8 A		1.5	1.95	nC
Q_{gs}	Gate to Source Gate Charge	(Note 4)		0.72		nC
Q_{gd}	Gate to Drain “Miller” Charge	(Note 4)		0.56		nC
$V_{plateau}$	Gate Plateau Volatge	(Note 4)		4.02		V
Q_{sync}	Total Gate Charge Sync.	V_{DS} = 0 V, I_D = 3.4 A		2.5		nC
Q_{oss}	Output Charge	V_{DS} = 50 V, V_{GS} = 0 V		5.2		nC
ESR	Equivalent Series Resistance (G-S)	f = 1 MHz		2.1		Ω
Switching Characteristics						
$t_{d(on)}$	Turn-On Delay Time	V_{DD} = 50 V, I_D = 6.8 A, V_{GS} = 10 V, R_G = 4.7 Ω (Note 4)		7	24	ns
t_r	Turn-On Rise Time			2	14	ns
$t_{d(off)}$	Turn-Off Delay Time			13	36	ns
t_f	Turn-Off Fall Time			2	14	ns
Drain-Source Diode Characteristics						
I_S	Maximum Continuous Drain to Source Diode Forward Current				6.8	A
I_{SM}	Maximum Pulsed Drain to Source Diode Forward Current				13.6	A
V_{SD}	Drain to Source Diode Forward Voltage	V_{GS} = 0 V, I_{SD} = 6.8 A			1.3	V
t_{rr}	Reverse Recovery Time	V_{GS} = 0 V, I_{SD} = 6.8 A, V_{DS} = 50 V, dI_F/dt = 100 A/μs		37		ns
Q_{rr}	Reverse Recovery Charge			42		nC

Notes:

1. Repetitive rating: pulse-width limited by maximum junction temperature.
2. L = 1 mH, I_{AS} =3.18 A, R_G = 25 Ω, starting T_J = 25°C.
3. I_{SD} ≤ 6.8 A, di/dt ≤ 200 A/μs, V_{DD} ≤ BV_{DSS}, starting T_J = 25°C.
4. Essentially independent of operating temperature typical characteristics.

Typical Performance Characteristics

Figure 1. On-Region Characteristics

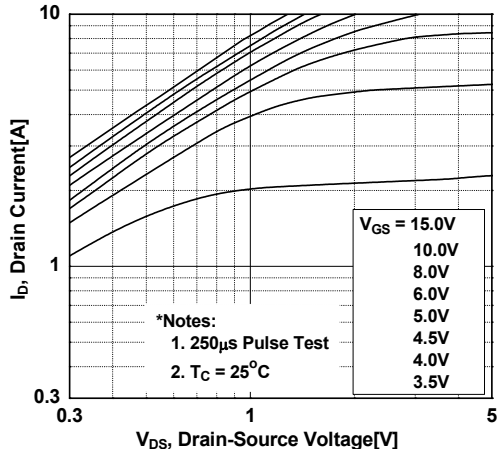


Figure 2. Transfer Characteristics

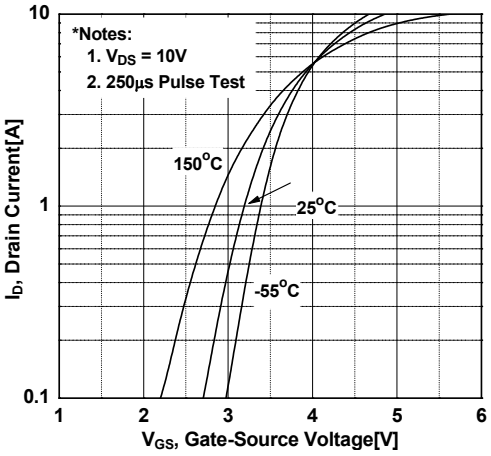


Figure 3. On-Resistance Variation vs. Drain Current and Gate Voltage

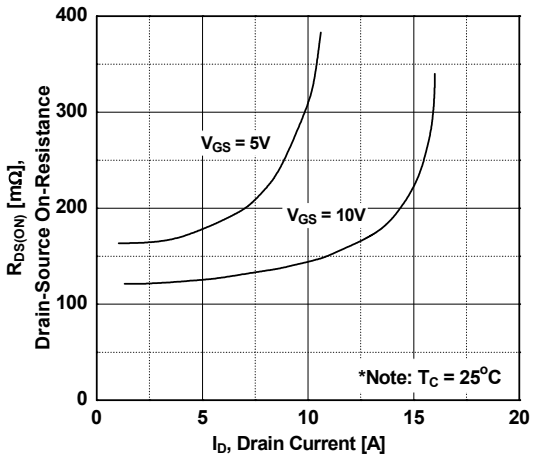


Figure 4. Body Diode Forward Voltage Variation vs. Source Current and Temperature

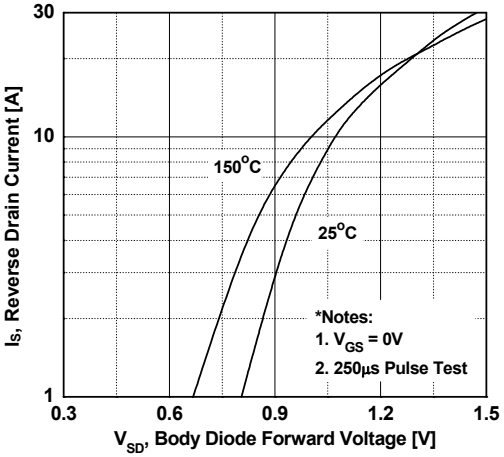


Figure 5. Capacitance Characteristics

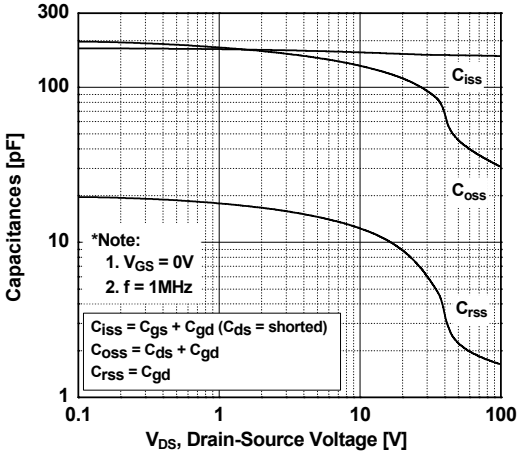
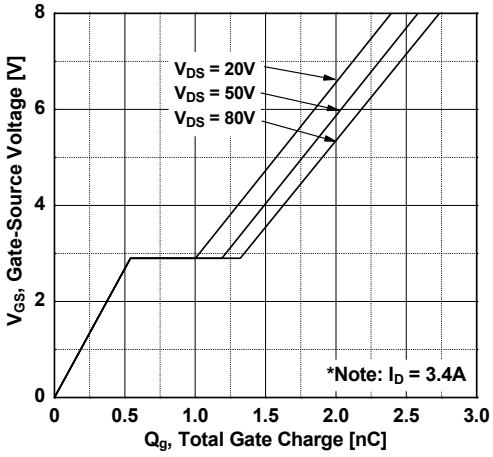


Figure 6. Gate Charge Characteristics



Typical Performance Characteristics (Continued)

Figure 7. Breakdown Voltage Variation vs. Temperature

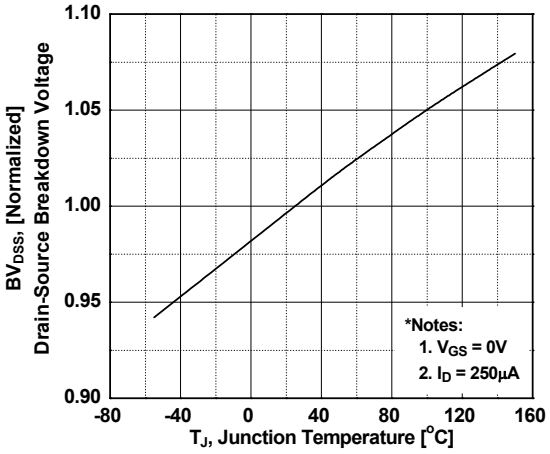


Figure 8. On-Resistance Variation vs. Temperature

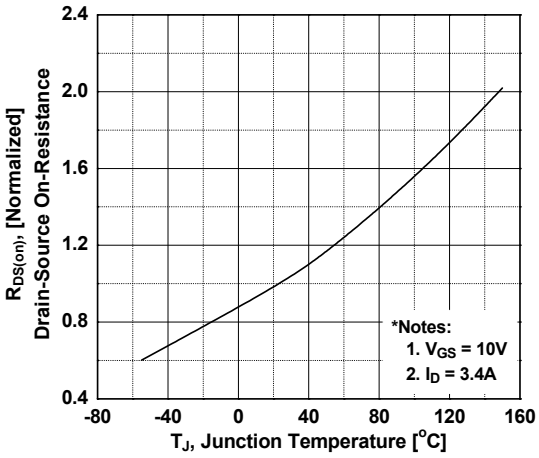


Figure 9. Maximum Safe Operating Area

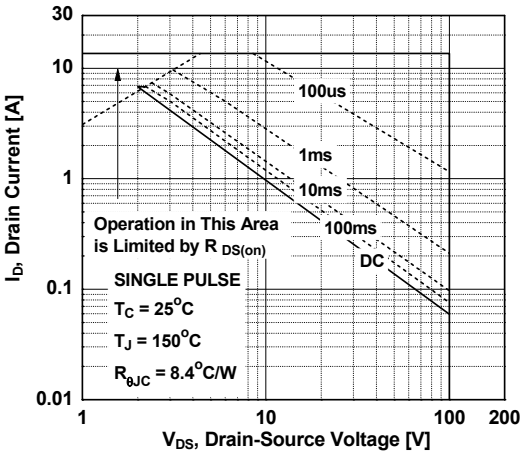


Figure 10. Maximum Drain Current vs. Case Temperature

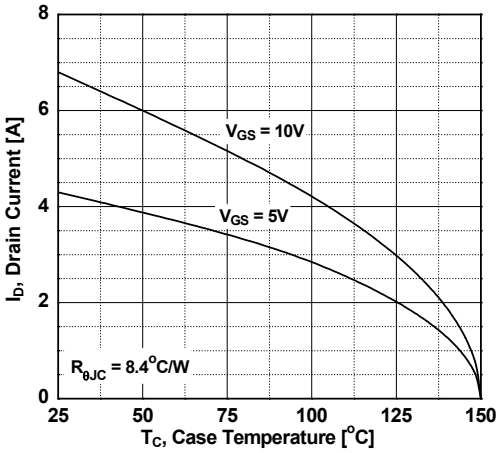


Figure 11. Eoss vs. Drain to Source Voltage

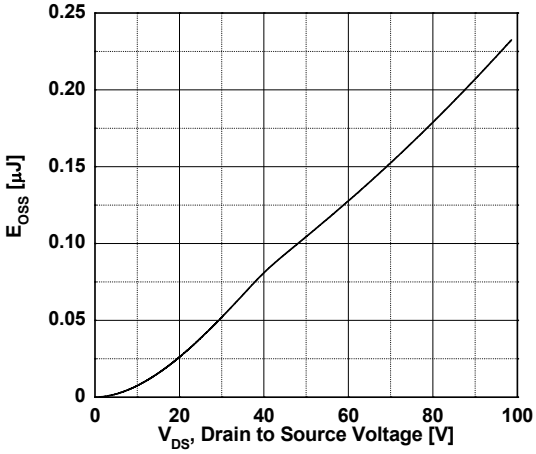
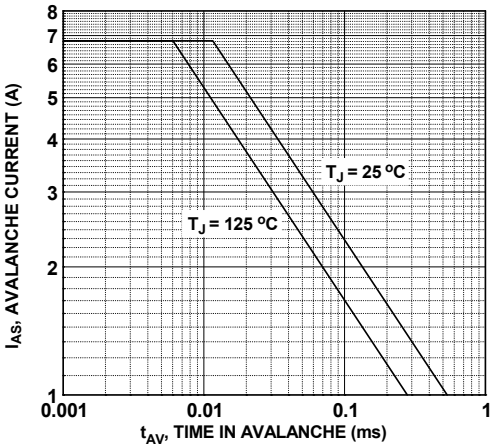
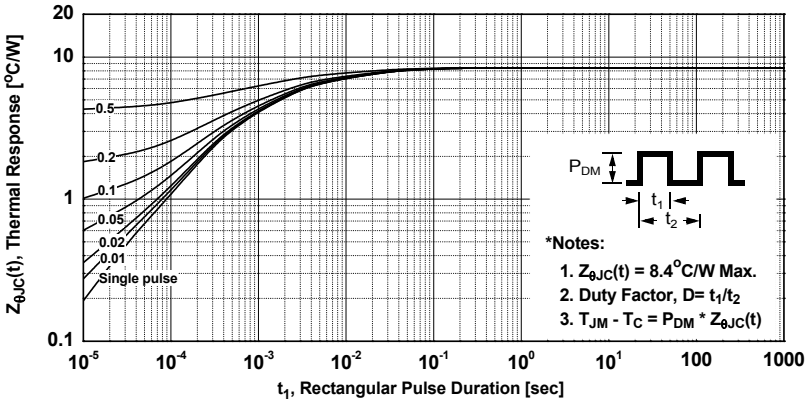


Figure 12. Unclamped Inductive Switching Capability

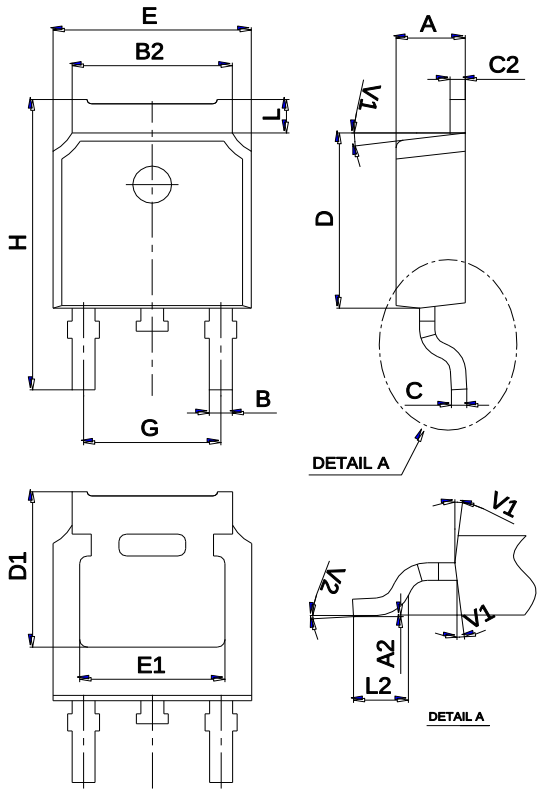


Typical Performance Characteristics

Figure 13. Transient Thermal Response Curve

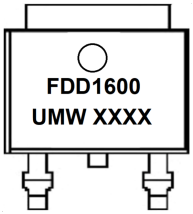


Package Mechanical Data TO-252



Ref.	Dimensions					
	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	2.10		2.50	0.083		0.098
A2	0		0.10	0		0.004
B	0.66		0.86	0.026		0.034
B2	5.18		5.48	0.202		0.216
C	0.40		0.60	0.016		0.024
C2	0.44		0.58	0.017		0.023
D	5.90		6.30	0.232		0.248
D1	5.30REF			0.209REF		
E	6.40		6.80	0.252		0.268
E1	4.63			0.182		
G	4.47		4.67	0.176		0.184
H	9.50		10.70	0.374		0.421
L	1.09		1.21	0.043		0.048
L2	1.35		1.65	0.053		0.065
V1		7°			7°	
V2	0°		6°	0°		6°

Marking



Ordering information

Order code	Package	Baseqty	Deliverymode
UMW FDD1600N10ALZ	TO-252	2500	Tape and reel

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